Urban and Suburban Arterial Safety Performance Functions: Final Report

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Urban and Suburban Arterial Safety Performance Functions

Final Report

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15. Supplementary Notes

16. Abstract

This report documents findings from a comprehensive set of safety performance functions developed for the entire urban-suburban arterial road segment system on the state highway system in Washington. Conventional urban suburban safety performance functions on the basis of cross sectional classifications were developed using random parameter negative binomial models. Total crashes, as well as crashes by severity type were modeled. It was found that out of 20 statistically significant variables, number of lanes, roadway width, shoulder width, point of vertical tangent grade (PVT), vertical curve point of vertical curve grade (PVC) horizontal curve maximum super elevation (e), curve central angle (delta), horizontal curve radius (R) were found to be random parameters. In addition, derived measures such as degree of curve, absolute vertical grade difference (A), and rate of vertical curvature (K) were also found to be random. The majority of the statistically significant effects were geometric. In addition, functional class indicators such as minor arterial indicator were also found to be random. Roadside information was not fully evaluated due to inconsistencies in matching roadside inventories for all homogeneous segments. An alternative classification of the safety performance functions on the basis of ADT-population thresholds was also considered. Similar patterns of parameter randomness were found. In the absence of roadside and land use information, it appears from the 173 advanced random parameter models that were developed, that the treatment of geometric parameters as random is justified, due to significant unobserved heterogeneity in the urban-suburban arterial crash context.

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1.0 Introduction

The scope of this study is to provide a detailed analysis of all Washington State highway crashes from 2010 to 2012 with specific attention focused on addressing the manner in which urban-suburban functional classes are assigned to highway segments or various stretches of roadway within the Washington State highway network. The conventional method of assigning highway functional class type in transportation applications is to base the functional classifications on surrounding land-use definitions that include such factors as census information, population density, and property boundaries. Efforts by the Washington State Department of Transportation (WSDOT) have aimed to establish a more detailed methodology for assigning highway functional classifications that are based on the afore mentioned metrics as illustrated by the Detailed Functional Classification Criteria document (prior to October 2013) and the more recent release of WSDOT's report on Guidelines for Amending Functional Classification in Washington State (October 2013).

These existing methods of highway functional classification incorporate additional metrics that are not necessarily conducive to highway safety analysis. Multiple factors that influence highway segment functional class or geographic class misrepresent how highway crashes should be evaluated because of the way in which the roadway is defined. In transportation safety analysis, Annual Average Daily Traffic (AADT) is a crucial component in safety modeling. By utilizing AADT as a means for determining highway functional class, it is hypothesized that such a classification system would result in more robust crash prediction with respect to functional class and geographic class type. This report will compare two core methodologies of highway geographic classification: 1) land-use population estimates and 2) AADT counts. The two methods of classification will be compared and the differences in approach will be explained. The intent of this report and the resulting SPF methodology is to offer clarity and assist WSDOT in their efforts for establishing a standard safety protocol for developing SPFs for various urban-suburban classifications.

1.1 Overview of Study Area

The study area for this research focuses on all highways in Washington State, which totals 187 routes. The following figure displays all state routes for Washington as shown in an available state highway map downloaded from the WSDOT Highway Map webpage.

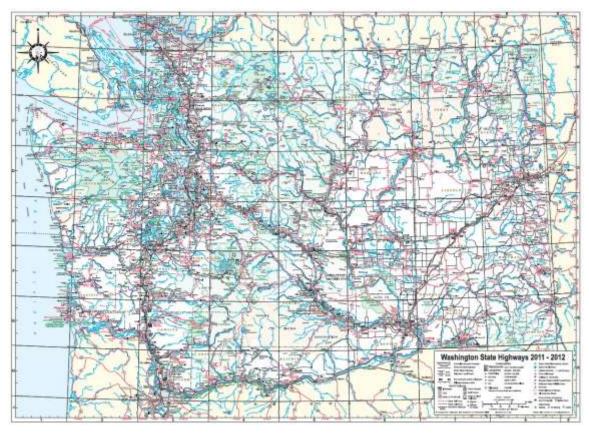


Figure 1.1: Washington State Highway Map 2011-2012.

The next three tables list all of the routes from Washington State that are included in the study from 2010, 2011, and 2012. The routes are listed by number with their associated route mileage shown in parentheses. The tables show consistent mileage for all state routes across the three-year time span and minimal changes in total mileage, with a total centerline mileage of 6,867.68 miles for 2010, 6,864.38 miles for 2011, and 6,864.30 miles for 2012.

From 2010 to 2011, there was a recorded reduction of 3.0 centerline miles across the state highway network, of which 2.63 miles were reduced for State Route 527. From 2011 to 2012, the reduction in centerline miles across the Washington State highway network totaled 0.08 miles, with State Route 7 reducing 0.07 miles between 2011 and 2012.

Table 1.1: 2010 Washington State Routes and Total Mileage.

	State Route # (Mileage)-2010			
2(322.72 miles)	106(20.07 miles)	174(40.52 miles)	291(23.35 miles)	523(1.61 miles)
3(59.82 miles)	107(7.83 miles)	181(5.96 miles)	292(5.89 miles)	524(14.61 miles)
4(62.24 miles)	108(11.92 miles)	182(15.04 miles)	300(3.31 miles)	525(30.47 miles)
5(276.58 miles)	109(40.18 miles)	193(2.11 miles)	302(16.75 miles)	526(4.47 miles)
6(51.36 miles)	110(3.3 miles)	194(13.98 miles)	303(9.19 miles)	527(9.21 miles)
7(58.25 miles)	112(61.24 miles)	195(93.26 miles)	304(3.02 miles)	528(3.25 miles)
8(20.66 miles)	113(9.58 miles)	197(2.48 miles)	305(13.31 miles)	529(7.7 miles)
9(91.58 miles)	115(2.24 miles)	202(30.47 miles)	307(5.19 miles)	530(50.32 miles)
10(16.09 miles)	116(5.91 miles)	203(24.24 miles)	308(3.38 miles)	531(9.84 miles)
11(21.23 miles)	117(1.36 miles)	204(2.34 miles)	310(1.85 miles)	532(10.02 miles)
12(324.4 miles)	119(9.28 miles)	205(10.55 miles)	395(186.42 miles)	534(4.92 miles)
14(179.97 miles)	121(7.62 miles)	206(15.28 miles)	397(22.15 miles)	536(5.22 miles)
16(27.06 miles)	122(7.71 miles)	207(4.32 miles)	401(12.1 miles)	538(3.48 miles)
17(135.02 miles)	123(16.33 miles)	211(15.13 miles)	405(30.18 miles)	539(14.91 miles)
18(28.29 miles)	124(44.61 miles)	213(.22 miles)	409(3.77 miles)	542(57.16 miles)
19(12.53 miles)	125(23.63 miles)	215(6.19 miles)	410(107.07 miles)	543(1.05 miles)
20(395.16 miles)	127(26.87 miles)	221(25.92 miles)	411(13.28 miles)	544(8.89 miles)
21(179.26 miles)	128(.51 miles)	223(3.69 miles)	432(10.23 miles)	546(7.78 miles)
22(35.76 miles)	129(42.48 miles)	224(9.98 miles)	433(.87 miles)	547(9.53 miles)
23(65.91 miles)	131(1.99 miles)	225(11.31 miles)	500(22.15 miles)	548(13.78 miles)
24(78.71 miles)	141(25.99 miles)	231(72.07 miles)	501(13.82 miles)	599(1.73 miles)
25(121.13 miles)	142(35.2 miles)	240(40.05 miles)	502(7.57 miles)	702(9.19 miles)
26(133.59 miles)	150(10.91 miles)	241(25.08 miles)	503(53.05 miles)	704(.61 miles)
27(89.85 miles)	153(30.76 miles)	243(28.21 miles)	504(51.7 miles)	705(1.48 miles)
28(135.23 miles)	155(78.31 miles)	260(37.97 miles)	505(19.28 miles)	706(13.63 miles)
31(26.74 miles)	160(7.45 miles)	261(56.12 miles)	506(11.49 miles)	730(5.99 miles)
41(.31 miles)	161(32.2 miles)	262(20.04 miles)	507(43.42 miles)	821(25.09 miles)
82(132.5 miles)	162(17.34 miles)	263(9.11 miles)	508(32.74 miles)	823(5.14 miles)
90(297.5 miles)	163(3.33 miles)	270(9.84 miles)	509(29.24 miles)	900(15.28 miles)
92(7.96 miles)	164(14.59 miles)	271(8.37 miles)	510(13.05 miles)	902(12.28 miles)
96(6.68 miles)	165(20.25 miles)	272(18.91 miles)	512(12.04 miles)	903(10.02 miles)
97(250.59 miles)	166(4.93 miles)	274(1.89 miles)	513(3.33 miles)	904(16.9 miles)
99(49.09 miles)	167(28.53 miles)	278(2.76 miles)	515(7.73 miles)	906(2.64 miles)
100(4.54 miles)	169(25.22 miles)	281(10.2 miles)	516(16.47 miles)	970(10.14 miles)
101(365.47 miles)	170(3.57 miles)	282(4.9 miles)	518(3.4 miles)	971(10.37 miles)
103(16.48 miles)	171(3.75 miles)	283(14.52 miles)	519(.79 miles)	Total Length
104(31.55 miles)	172(34.93 miles)	285(5.03 miles)	520(12.73 miles)	(Mainline Only)
105(48.54 miles)	173(11.51 miles)	290(17.7 miles)	522(24.31 miles)	6867.683 miles

Table 1.2: 2011 Washington State Routes and Total Mileage.

	State Route # (Mileage)-2011			
2(322.72 miles)	106(20.07 miles)	174(40.52 miles)	291(23.35 miles)	523(1.61 miles)
3(59.82 miles)	107(7.83 miles)	181(5.96 miles)	292(5.89 miles)	524(14.61 miles)
4(62.24 miles)	108(11.92 miles)	182(15.04 miles)	300(3.31 miles)	525(30.47 miles)
5(276.58 miles)	109(40.18 miles)	193(2.11 miles)	302(16.75 miles)	526(4.47 miles)
6(51.36 miles)	110(3.3 miles)	194(13.98 miles)	303(9.19 miles)	527(6.58 miles)
7(58.25 miles)	112(61.24 miles)	195(93.26 miles)	304(3.02 miles)	528(3.25 miles)
8(20.66 miles)	113(9.58 miles)	197(2.48 miles)	305(13.31 miles)	529(7.7 miles)
9(91.58 miles)	115(2.24 miles)	202(30.47 miles)	307(5.19 miles)	530(50.25 miles)
10(16.09 miles)	116(5.91 miles)	203(24.24 miles)	308(3.38 miles)	531(9.84 miles)
11(21.23 miles)	117(1.36 miles)	204(2.34 miles)	310(1.85 miles)	532(10.02 miles)
12(324.43 miles)	119(9.28 miles)	205(10.55 miles)	395(186.42 miles)	534(4.92 miles)
14(179.97 miles)	121(7.62 miles)	206(15.28 miles)	397(22.15 miles)	536(5.22 miles)
16(27.21 miles)	122(7.71 miles)	207(4.32 miles)	401(12.1 miles)	538(3.48 miles)
17(135.02 miles)	123(16.33 miles)	211(15.13 miles)	405(30.18 miles)	539(14.91 miles)
18(28.29 miles)	124(44.61 miles)	213(.22 miles)	409(3.77 miles)	542(57.16 miles)
19(12.53 miles)	125(23.63 miles)	215(6.19 miles)	410(107.07 miles)	543(1.05 miles)
20(395.16 miles)	127(26.87 miles)	221(25.92 miles)	411(13.28 miles)	544(8.89 miles)
21(179.26 miles)	128(.51 miles)	223(3.69 miles)	432(10.23 miles)	546(7.78 miles)
22(35.76 miles)	129(42.48 miles)	224(9.98 miles)	433(.87 miles)	547(9.53 miles)
23(65.91 miles)	131(1.99 miles)	225(11.31 miles)	500(22.15 miles)	548(13.78 miles)
24(78.71 miles)	141(25.99 miles)	231(72.07 miles)	501(13.82 miles)	599(1.73 miles)
25(121.13 miles)	142(35.2 miles)	240(40.05 miles)	502(7.57 miles)	702(9.19 miles)
26(133.59 miles)	150(10.91 miles)	241(25.08 miles)	503(53.05 miles)	704(.61 miles)
27(89.85 miles)	153(30.76 miles)	243(28.21 miles)	504(51.7 miles)	705(1.48 miles)
28(135.23 miles)	155(78.31 miles)	260(37.97 miles)	505(19.28 miles)	706(13.63 miles)
31(26.74 miles)	160(7.45 miles)	261(56.12 miles)	506(11.49 miles)	730(5.99 miles)
41(.31 miles)	161(32.2 miles)	262(20.04 miles)	507(43.42 miles)	821(25.09 miles)
82(132.5 miles)	162(17.34 miles)	263(9.11 miles)	508(32.74 miles)	823(5.08 miles)
90(297.48 miles)	163(3.33 miles)	270(9.84 miles)	509(29.24 miles)	900(15.28 miles)
92(7.96 miles)	164(14.59 miles)	271(8.37 miles)	510(13.05 miles)	902(12.28 miles)
96(6.68 miles)	165(20.25 miles)	272(18.91 miles)	512(12.04 miles)	903(10.02 miles)
97(250.59 miles)	166(4.93 miles)	274(1.89 miles)	513(3.33 miles)	904(16.9 miles)
99(48.39 miles)	167(28.53 miles)	278(2.76 miles)	515(7.73 miles)	906(2.64 miles)
100(4.54 miles)	169(25.22 miles)	281(10.2 miles)	516(16.47 miles)	970(10.14 miles)
101(365.47 miles)	170(3.57 miles)	282(4.9 miles)	518(3.4 miles)	971(10.37 miles)
103(16.48 miles)	171(3.75 miles)	283(14.52 miles)	519(.79 miles)	Total Length
104(31.55 miles)	172(34.93 miles)	285(5.03 miles)	520(12.73 miles)	(Mainline Only)
105(48.54 miles)	173(11.51 miles)	290(17.7 miles)	522(24.31 miles)	6864.38 miles

Table 1.3: 2012 Washington State Routes and Total Mileage.

	Sta	te Route # (Mileag	e)-2012	
2(322.72 miles)	106(20.07 miles)	174(40.52 miles)	291(23.35 miles)	523(1.61 miles)
3(59.82 miles)	107(7.83 miles)	181(5.96 miles)	292(5.89 miles)	524(14.61 miles)
4(62.24 miles)	108(11.92 miles)	182(15.04 miles)	300(3.31 miles)	525(30.47 miles)
5(276.58 miles)	109(40.18 miles)	193(2.11 miles)	302(16.75 miles)	526(4.47 miles)
6(51.36 miles)	110(3.3 miles)	194(13.98 miles)	303(9.19 miles)	527(6.58 miles)
7(58.25 miles)	112(61.24 miles)	195(93.26 miles)	304(3.02 miles)	528(3.25 miles)
8(20.66 miles)	113(9.58 miles)	197(2.48 miles)	305(13.31 miles)	529(7.7 miles)
9(91.58 miles)	115(2.24 miles)	202(30.47 miles)	307(5.19 miles)	530(50.25 miles)
10(16.09 miles)	116(5.91 miles)	203(24.24 miles)	308(3.38 miles)	531(9.84 miles)
11(21.23 miles)	117(1.36 miles)	204(2.34 miles)	310(1.85 miles)	532(10.02 miles)
12(324.43 miles)	119(9.28 miles)	205(10.55 miles)	395(186.39 miles)	534(4.92 miles)
14(179.95 miles)	121(7.62 miles)	206(15.28 miles)	397(22.15 miles)	536(5.22 miles)
16(27.21 miles)	122(7.71 miles)	207(4.32 miles)	401(12.1 miles)	538(3.48 miles)
17(135.02 miles)	123(16.33 miles)	211(15.13 miles)	405(30.18 miles)	539(14.91 miles)
18(28.29 miles)	124(44.65 miles)	213(.22 miles)	409(3.77 miles)	542(57.16 miles)
19(12.53 miles)	125(23.63 miles)	215(6.19 miles)	410(107.07 miles)	543(1.05 miles)
20(395.16 miles)	127(26.87 miles)	221(25.92 miles)	411(13.28 miles)	544(8.89 miles)
21(179.26 miles)	128(.51 miles)	223(3.69 miles)	432(10.23 miles)	546(7.78 miles)
22(35.76 miles)	129(42.48 miles)	224(9.98 miles)	433(.87 miles)	547(9.53 miles)
23(65.91 miles)	131(1.99 miles)	225(11.31 miles)	500(22.15 miles)	548(13.78 miles)
24(78.71 miles)	141(25.99 miles)	231(72.07 miles)	501(13.82 miles)	599(1.73 miles)
25(121.13 miles)	142(35.2 miles)	240(40.05 miles)	502(7.57 miles)	702(9.19 miles)
26(133.59 miles)	150(10.91 miles)	241(25.08 miles)	503(53.05 miles)	704(.61 miles)
27(89.85 miles)	153(30.76 miles)	243(28.21 miles)	504(51.7 miles)	705(1.48 miles)
28(135.16 miles)	155(78.31 miles)	260(37.97 miles)	505(19.28 miles)	706(13.63 miles)
31(26.74 miles)	160(7.45 miles)	261(56.12 miles)	506(11.49 miles)	730(5.99 miles)
41(.31 miles)	161(32.2 miles)	262(20.04 miles)	507(43.42 miles)	821(25.09 miles)
82(132.5 miles)	162(17.34 miles)	263(9.11 miles)	508(32.74 miles)	823(5.08 miles)
90(297.48 miles)	163(3.33 miles)	270(9.84 miles)	509(29.24 miles)	900(15.28 miles)
92(7.96 miles)	164(14.59 miles)	271(8.37 miles)	510(13.05 miles)	902(12.28 miles)
96(6.68 miles)	165(20.25 miles)	272(18.91 miles)	512(12.04 miles)	903(10.02 miles)
97(250.59 miles)	166(4.93 miles)	274(1.89 miles)	513(3.33 miles)	904(16.9 miles)
99(48.39 miles)	167(28.53 miles)	278(2.76 miles)	515(7.73 miles)	906(2.64 miles)
100(4.54 miles)	169(25.22 miles)	281(10.2 miles)	516(16.47 miles)	970(10.14 miles)
101(365.47 miles)	170(3.57 miles)	282(4.9 miles)	518(3.4 miles)	971(10.37 miles)
103(16.48 miles)	171(3.75 miles)	283(14.52 miles)	519(.79 miles)	Total Length
104(31.55 miles)	172(34.93 miles)	285(5.03 miles)	520(12.73 miles)	(Mainline Only)
105(48.54 miles)	173(11.51 miles)	290(17.7 miles)	522(24.31 miles)	(6864.30 miles)

1.2 WSDOT Functional Classification Methodology

The Federal Highway Administration (FHWA) Directive 23 CFR 470 dictates that state transportation agencies maintain the primary responsibility for determining statewide highway functional classifications in rural and urban areas. At the state level, the Washington State Legislature in RCW 47.05.021 dictates WSDOT to "analyze the entire state highway system to 'subdivide', classify, and sub-classify all designated state highways according to their function and importance. These two directives serve as the driver for WSDOT's functional classification initiative, as described on the WSDOT Functional Classification webpage. Within recent years, WSDOT has updated their methodology for determining highway functional class. Here, a brief history will be presented on how WSDOT developed their methodology for assigning functional class designations and what standards they currently follow.

Prior to October 2013, WSDOT outlined their protocol for assigning functional classifications through their *Detailed Functional Classification Criteria* document. This document lists the criteria for establishing functional classes that WSDOT adheres according to:

- Type and magnitude of travel generators.
- Route feasibility and directness of travel.
- Traffic characteristics and trip length.
- Spacing between types of functional classes.
- Continuity of various functional classes.
- Multiple service capability (accommodation of other modes of transportation).
- Relationships of functional classes to transportation plan(s).
- Miles and travel classification control values.
- Integration of classification of adjoining jurisdictions.

The criteria related to type and magnitude of travel generators are referenced to the generators that concern: travel, population, recreational/cultural, industrial, commercial, and governmental. Each type of travel generator describes the thresholds for classifying a particular functional class within the framework of principal arterial, minor arterial, major collector, or minor collector, respectively, in either the rural or urban type setting. Feasibility of route and directness of travel are considered where a choice of routes between areas has less than a 10% difference in distance. Traffic characteristics relate to trip purpose and type of travel service the route is intended to provide: interstate and statewide, interregional, interregional and intercounty, and intracounty. Spacing is another element that serves as a qualifier for accomplishment of service, where travel setting affects the manner in which traffic flow is accommodated to travel generators. System continuity impacts the functional classification for principal and minor arterials, with ending termini at a junction with an equal or higher functionally classified facility. Multiple service capability weighs the impact that other transportation modes have on normal traffic flow. Relationship of route to transportation plan is only considered in situations in the classification evaluation process where transportation plans have been developed. Classification controls deal with miles by functional class and travel by functional class within rural and urban systems; these controls are more directly tied to incorporated zonal limits and area boundaries. System integration represents the final step in the classification process which reviews the classifications of individual roadways, within the larger

context of areas and regions, involving interagency collaborations to present a statewide classification of roadways.

In 2013, WSDOT, in cooperation with the FHWA, implemented procedures for adjusting the Urban Area (UA) boundaries due in part to the 2010 Census. Thus, the 2010 Census Adjusted Urban Area (AUA) Boundaries program recognizes the impact that changes in boundary determination will have on defining breaks between rural and urban areas. In response to these changes, WSDOT provides various guides that define the requirements and procedures for local agencies and Metropolitan Planning Organizations (MPOs) for requesting changes to the UA boundaries on the 2010 Census Adjusted AUA Boundaries webpage. As a result of the 2010 Census, WSDOT released the 2010 Census Urbanized Areas and Urban Clusters Map that highlights urban areas according to information provided by the US Census Bureau.

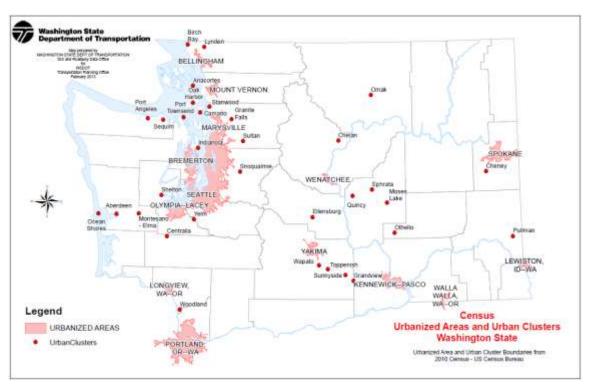


Figure 1.2: WSDOT Census Urbanized Areas and Urban Clusters Map.

As outlined by WSDOT's *Guidance for Urban Area Boundary Adjustment in Washington State*, UA boundary adjustments are negotiated among MPOs, local officials, and WSDOT before being submitted for approval by the FHWA. As defined by the US Census for population size, Urban Area Types are defined as 'Urban Clusters' for populations of 2,500 – 49,999 and 'Urban Areas' as 50,000+. The FHWA defines Urban Area Types as 'Small Urban Area' for populations of 5,000 – 49,999 and 'Urbanized Area (UZA)' for populations 50,000+. Most importantly, the UA boundary adjustment procedure must be completed before any functional classification adjustments can be made.

The Boundary Review Team is responsible for reviewing boundary adjustment proposals from MPOs and local regional planning agencies, and coordinating adjustment decisions to the various stakeholders involved in the boundary determination process before submitting AUA

recommendations for FHWA approval. In the summer of 2013, the FHWA approved the resulting Highway Urban Area (HUA) boundaries as a result of the AUA process. Subsequently, all counties and MPOs affected by the HUA boundary changes had been asked to review their roads on August 13, 2013 and October 16, 2013, respectively. Figure 1.3 illustrates the basic steps required in the functional classification change request process.

Begin Functional Classification Request Process Local agency submits request using standard form and gains necessary concurrence a) l Week Request reviewed by Region Local Programs Engineer b) c) Complete? On standard form Yes Region cc Planning Office Request processed by HQ Strategic Planning Division TDGO Functional Classification Inventory Specialist 2 to 4 weeks No Complete? Yes Request reviewed by FHWA 2 to 4 weeks Approved? Yes or No FHWA approval/denial/ conditional approval received by TDGO HQ H&LP FC Inventory Specialist who forwards it to: **HQ** Systems Analysis **HQ TDGO GIS Specialist** Region Local Programs Engineer cc's Region Planning Office MPO/RTPO Originating Local Agency Process completed in 3 months or less End of Process

Figure 1.3: WSDOT Functional Classification Request Flow Chart.

The functional classification process was scheduled to occur from July 3, 2013 to December 31, 2013 where arterial or collector changes in classification were to be submitted to WSDOT for approval and input into WSDOT systems.

WSDOT released the Guidelines for Amending Functional Classification in Washington State document in October 2013 to assist state authorities in the functional classification process. This document builds upon the Highway Functional Classification: Concepts, Criteria and Procedures, 2013 Edition by providing additional details and clarification to the methods and considerations involved in the process. This comprehensive guidance document explains the critical concepts and criteria while also providing some real-world examples of applying the functional classification methodology throughout the procedure. Some key changes covered in the Guidelines for Amending Functional Classification in Washington State document includes:

- Upgrading the functional classification of rural/urban should predominantly be driven by an actual change in function, as opposed to the location of an urban/rural boundary.
- All available classification categories now exist in both urban and rural areas, rather than
 different codes systems for rural and urban areas that existed in the previous Highway
 Performance Monitoring System (HPMA).
- For Washington State, the Functional Class (FC) numbering system is clarified by the FHWA by including additional subdivisions to ensure the symmetry in the categories for urban and rural classifications: Urban Collector subdivision included in Major and Minor Collector; Rural Other Principal Arterial subdivision into Other Freeway/Expressway and Other Principal Arterial.

The functional classification concepts are discussed to outline the role that the roadway segment plays in accommodating traffic flow in the network. Among the considerations that are referenced in the *Guidelines for Amending Functional Classification in Washington State*, roadway access and mobility, efficiency of travel, collectors, access points, speed limit, route spacing, usage in terms of AADT volumes and Vehicle Miles of Travel (VMT), number of travel lanes, regional and statewide significance, and system continuity. The criteria that govern functional classification are presented in the different types of roadway functional class:

- Interstates the highest classification of arterials offering high levels of mobility.
- Other Freeways and Expressways similar to interstates, but with separated directional travel lanes, limited on- and off-ramp locations, and very limited at-grade intersections.
- Other Principal Arterials provides high degree of mobility while also directly serving abutting land uses in major centers of metropolitan areas.
- Minor Arterials offers connectivity to higher arterial systems while also providing intracommunity continuity; typically provides high overall travel speeds in rural areas.
- Major and Minor Collectors in general, major collector routes are longer in length with lower connecting driveway densities, higher speed limits, greater space intervals, higher AADT, and more travel lanes than minor collectors.
- Local Roads accounts for the greatest mileage of all roadways; are not intended for long distance travel aside, from the origin/destination terminal of a trip, because of direct access to abutting land.

The decision process for assigning functional classifications stems from the characterization of the travel service provided by the roadway. The overall decision process in the functional classification system, as shown in the *Guidelines for Amending Functional Classification in Washington State*, is displayed in Figure 1.4.

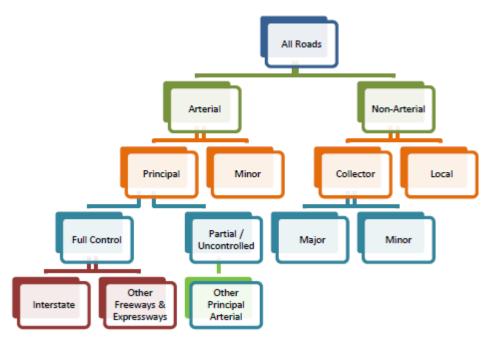


Figure 1.4: Federal Functional Classification Decision Tree (FHWA).

It is important to note the emphasis on roadway function and service over the urban/rural distinction. While land development patterns are considered in the peripheral of the functional classification process, the determination should be explicitly based on actual functional criteria rather than the location of the roadway within an urban or rural context. On December 31, 2013 WSDOT submitted the boundaries and functional classification changes to the FHWA for approval, with the resulting data to be reported by June 15, 2014.

The methodology employed by WSDOT and FHWA incorporates various elements in the determination of roadway functional class. The many concepts and considerations in the evaluation process make the task of assigning functional classifications complex. If the functional classifications were to be limited to key elements, the task of assigning functional classifications will become simplified. This report will present two methods of assigning functional class: by population and by AADT. The motivation of isolating functional classifications to a single qualifier is two-fold: 1) to demonstrate a simplistic, efficient and effective methodology for assigning functional class and 2) illustrate the impact that functional classifications may have on safety modeling with the two methods of functional class determination. The ramifications of such a method would have wide ranging policy implications concerning WSDOT and FHWA functional class determination. That is, if this demonstration of assigning functional class proves to be both efficient and effective, then the various planning organizations and governing bodies may be able to consolidate their efforts to focus on the single-determining factor of functional class assignment. This would essentially streamline the request and review process that local, MPO, regional, and

state agencies must undergo in order to classify/reclassify roadway functional class to satisfy the directives set forth by the FHWA.

1.3 Organization of Report

The report is organized in the following manner:

Data Description – the four data sources of accident, roadway geometrics, AADT, and functional class will be described in their source formats as they were obtained from WSDOT. The final database, expressed in the format of homogeneous roadway segments, will be explained and the parameters within the dataset will be presented.

Functional Classification (Centerline Miles) – geographical classifications of Rural, Small Urban, Small Urbanized, Large Urbanized, and Metropolitan will be described and the manner in which they are assigned according to population and AADT based metrics will be introduced. The method for validating the functional class centerline miles with the WS Highway Log centerline miles will be discussed. Comparison tables between the population and AADT based methods will be presented in several matrices in units of centerline miles.

Functional Classification (Segments) – the population and AADT comparison matrices will be expressed in counts of homogeneous roadway segments based on WSDOT's definition of function class: Interstate, Principal Arterial, Minor Arterial, and Collector roadways. The matrices will evaluate segments of all functional class types as well as each functional class individually. The chapter will conclude by examining the comparison matrices for all Non-Interstate related homogeneous roadway segments.

Crash Summary – the report will conclude with crash summaries being shown for the crash descriptors of total crash count, impact location, collision severity, number of vehicles involved, and collision type. The tables will be presented in the first section on the basis of roadway functional class, followed by roadway geographic class in the second section. The functional classification tables will show the four functional class types disaggregated by Urban and Rural area. The geographic classification crash tables will compare and contrast the differences in the crash counts between the AADT and population based methods of assignment.

2.0 Data Description

All data has been provided by or obtained from WSDOT sources. The crash data analysis centers on the accident records for three years of raw crash data, 2010 to 2012, for all highways in Washington State. Roadway geometric data includes information pertaining to horizontal and vertical alignment, as well as lane and roadway and shoulder configurations. AADT information was extracted from the ArcGIS metadata files downloaded from WSDOT's GeoData Distribution Catalog webpage; the final crash database utilizes the AADT obtained from Traffic Section counts. Similarly, State Route Functional Class data was also extracted from the ArcGIS metadata file from the same GeoData webpage. This data file provides both the federal functional class description and the state functional class description on a segmentation basis. Both the AADT counts and the State Route Functional Class data were cross-referenced with Washington State Highway Logs to account for and ensure consistency across all recorded highway segments. These four sources of data have been combined and integrated to create a homogeneous segments crash database segmented according to roadway geometric features. Of particular interest with the final crash database is the manner of assigning functional class designations by AADT and population counts. This chapter will describe the source data obtained from WSDOT, introduce the AADT and population based functional classification assignments, and will conclude with presentation of the complete three-year crash database.

2.1 Source Accident Data

The accident data, which is the most extensive of all WSDOT provided data, is presented in one single dataset that encompasses years 2010-2012. The accident data was requested from the WSDOT Transportation Data and GIS Office (TDGO), formally known as STCDO. This dataset includes 794,914 recorded observations for the 2010-2012 time frame with 210 columns. The extensive nature of the accident data encompasses information pertaining to collision identification, date and time, locational data, facility type, collision specific information, driver and passenger information, environmental conditions, and vehicle description. A portion of the crash descriptors refer to internal codes used by WSDOT and other agencies involved with crash investigation, however, most of the parameters thoroughly describe related factors that may have contributed or influenced the accident. This section will focus on the most pertinent crash related parameters while also briefly describe the general nature of the data recorded in the WSDOT source accident data. Table 2.1 on the subsequent pages lists all of the available parameters, in order of accident record, catalogued in the WSDOT source accident dataset.

Table 2.1: WSDOT Source Accident Dataset Parameters.

Para	ameter
Collision Report Number	City Secondary Trafficway 1
State Reportable Indicator	City Secondary Trafficway 2
Intentional	State Route ID
Legal Intervention	State Route Mile Post
Medically Caused	State Route Mile Post Ahead_Back Indicator
County Name	State Route Accumulated Route Milepost or ARM
City Name	State Route Number
Collision Report Type	State Route Related Roadway Type
Date	State Route Related Roadway Qualifier
Year	State Route History_Suspense Indicator
Yearmo	State Route Region Name
Month Name	State Route_State Functional Class Code
Month Number	State Route Urban Rural
Day Of Week	State Route Urban Rural Code
Quarter Number	State Route Federal Functional Class Name
Full Time	State Route Federal Functional Class Number
Full Time 24	State Route Vehicle 1 Compass Direction Description
Hour 24	State Route Vehicle 1 Compass Direction Code
Number Of Fatalities	State Route Vehicle 1 Movement Description
Number Of Injuries	State Route Vehicle 1 Movement Code
Number Of Pedal Cyclists Involved	State Route Vehicle 1 Milepost Direction Description
Number Of Pedestrians Involved	State Route Vehicle 1 Milepost Direction Code
Number Of Motor Vehicles Involved	State Route Diagram Collision Type Description
City Primary Trafficway	State Route Diagram Collision Type Code
City Block Number	State Route Vehicle 2 Compass Direction Description
City Intersecting Trafficway	State Route Vehicle 2 Compass Direction Code
City Distance From Reference Point	State Route Vehicle 2 Movement Description
City Reference Point Miles_Feet Indicator	State Route Vehicle 2 Movement Code
City Compass Direction From Reference Point	State Route Vehicle 2 Milepost Direction Description
City Reference Point Name	State Route Vehicle 2 Milepost Direction Code

Table 2.1 (continued): WSDOT Source Accident Dataset Parameters.

Parameter Parameter					
First Impact Location Effective Date Most Severe Schrietz Tyres Code					
1_1_10 for City_County and Misc Traf First Impact Location CodeEffective Date	First Collision Type				
1_1_10 for City_County and Misc Traf Second Impact Location Effective Date	31				
1_1_10 for City_County and Misc Traf	First Collision Type Code				
Second Impact Position CodeEffective Date 1_1/_10 for City_County and Misc Traf	First Object Struck				
County Road Number	First Object Struck Code				
County Road Milepost	Second Collision Type				
County Road Mile Post Ahead_Back Indicator	Second Collision Type Code				
County_Intersecting County Road Number	Second Object Struck				
County_Intersecting County Road Milepost	Second Object Struck Code				
County_Intersecting County Road Mile Post Ahead_Back Indicator	Junction Relationship				
County_Federal Functional Class Name	Junction Relationship Code				
Miscellaneous Trafficway Type	Weather				
Miscellaneous Trafficway Primary Trafficway	Weather Code				
Miscellaneous Trafficway Block Number	Roadway Surface Condition				
Miscellaneous Trafficway Intersecting Trafficway	Roadway Surface Condition Code				
Miscellaneous Trafficway Distance From Reference Point	Lighting Condition				
Miscellaneous Trafficway Reference Point Miles_Feet Indicator	Lighting Condition Code				
Miscellaneous Trafficway Compass Direction	Location Characteristics				
Miscellaneous Trafficway Reference Name	Location Characteristics Code				
Miscellaneous Trafficway Number	Roadway Characteristic				
Miscellaneous Trafficway Mile Post	Roadway Characteristic Code				
Miscellaneous Trafficway Secondary Trafficway 1	Workzone				
Miscellaneous Trafficway Secondary Trafficway 2	Workzone Code				
Most Severe Injury Type	Work Zone Construction Type Description				
Most Severe Injury Type Code	Working Vehicle Ownership Desc				
Collision Severity	Working Vehicle Ownership Code				
Collision Severity Code	Investigative Agency				
Most Severe Sobriety Type	Investigative Agency Code				

Table 2.1 (continued): WSDOT Source Accident Dataset Parameters.

Ori # Contributing Circumstance 3 Reporting Agency Long Name	Para Para	ameter
Reporting Agency Short Name MV Driver Miscellaneous Action 1 Hazardous Material MV Driver Miscellaneous Action Code 1 Hazardous Material Code MV Driver Miscellaneous Action 2 Fire MV Driver Miscellaneous Action Code 2 Stolen MV Driver Miscellaneous Action 3 Hit And Run MV Driver Miscellaneous Action Code 3 Unit Number Vehicle Type Unit Type Description Vehicle Type Code Damage Threshold Met Indicator Towel Indicator Involved Person Type Government Owned Indicator Involved Person Type Government Owned Indicator Age Vehicle Make Gender Vehicle Model Air Bag Type Vehicle Style Ejection Status Vehicle Year Restraining System Type Traffic Control Type Description Helmet Use Posted Speed Limit Injury Type Roadway Type Description Seat Position Roadway Type Code Sobriety Level Vehicle Classification Alcohol Test Result Vehicle Use Dre Assessment Description 1 Registered State Dre Assessment Code 1 Vehicle Condition 1 Dre Assessment Description 2 Vehicle Condition 2 Unlicensed Driver Vehicle Condition Ode 1 Liability Insurance Vehicle Condition 3 Pedestrian Pedalcyclist Clothing Visibility Type Pedestrian Pedacyclist Type Sequence Of Event 1 Pedestrian Pedacyclist Type Pedestrian Pedacyclist Type Pedestrian Pedacyclist Type Pedestrian Actions Sequence Of Event Code 2	Ori#	Contributing Circumstance 3
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Liability Insurance Unlicensed Driver Vehicle Condition 2 Vehicle Condition Code 2 On Duty Indicator Vehicle Condition 3 Pedestrian_Pedalcyclist Clothing Visibility Type Vehicle Condition Code 3 Pedestrian Pedacyclist Was Using Pedestrian Pedacyclist Type Sequence Of Event 1 Pedacyclist Actions Sequence Of Event 2 Pedestrian Actions Sequence Of Event Code 2	Dre Assessment Description 2	Vehicle Condition 1
Unlicensed Driver On Duty Indicator Pedestrian Pedalcyclist Clothing Visibility Type Pedestrian Pedacyclist Was Using Pedestrian Pedacyclist Type Sequence Of Event 1 Pedacyclist Actions Pedestrian Actions Vehicle Condition Code 3 Vehicle Condition Code 3 Sequence Of Event 1 Sequence Of Event 2 Sequence Of Event 2	Dre Assessment Code 2	Vehicle Condition Code 1
On Duty Indicator Pedestrian_Pedalcyclist Clothing Visibility Type Vehicle Condition Code 3 Pedestrian Pedacyclist Was Using Pedestrian Pedacyclist Type Sequence Of Event 1 Pedacyclist Actions Sequence Of Event 2 Pedestrian Actions Sequence Of Event Code 2	Liability Insurance	Vehicle Condition 2
Pedestrian_Pedalcyclist Clothing Visibility Type Pedestrian Pedacyclist Was Using Pedestrian Pedacyclist Type Sequence Of Event 1 Pedacyclist Actions Sequence Of Event Code 1 Pedestrian Actions Sequence Of Event 2 Pedestrian Actions	Unlicensed Driver	Vehicle Condition Code 2
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Pedacyclist Actions Sequence Of Event 2 Pedestrian Actions Sequence Of Event Code 2	Pedestrian Pedacyclist Type	
Pedestrian Actions Sequence Of Event Code 2	* **	-
•	•	Sequence Of Event Code 2
	Contributing Circumstance 1	
Contributing Circumstance Code 1 Sequence Of Event Code 3	<u> </u>	
Contributing Circumstance 2 Sequence Of Event 4	Š	*
Contributing Circumstance Code 2 Sequence Of Event Code 4	<u> </u>	

Table 2.1 (continued): WSDOT Source Accident Dataset Parameters.

Parameter	
Compass Direction From	Gvwr
Compass Direction To	Hazardous Material Name
Commercial Carrier Address	Interstate Intrastate
Commercial Carrier City Name	Number Of Axles
Commercial Carrier State Code	Placard Number
Commercial Carrier Zip Code	Placard Suffix Type Code
Commercial Vehicle Cargo Body Type	Usdot Number
Commercial Vehicle Class	State Plane X
Commercial Vehicle Name Source	State Plane Y

The WSDOT identification parameters are based on unique identifiers assigned to each crash observation, reflected by such descriptors as: Collision Report Number, State Reportable Indicator, and Collision Report Type. The Collision Report Number serves as the identification number to distinguish each observation. As such, repeated Collision Report Numbers corresponds to multiple persons or vehicles involved in a single crash. Additional information related to the type of Collision Report is described in location-related identifiers such as County and City name. All observations in the three-year crash dataset are listed as having Collision Report type of City Street, County Road, Miscellaneous Trafficway, or State Route.

Date and Time information listed for each observation is extensive in that the date and time descriptors are expressed in various ways. For example, the Date of the accident is also further described by separate columns such as Month, Day of Week, and Quarter Number, which is more indicative of the time of year to imply seasonal considerations.

Location related information is of particular importance for matters related to assigning crash counts to the correct corresponding roadway segment within the proper milepost limits. Each recorded crash is assigned milepost markers and route identifiers. The milepost parameters include State Route Mile Post, State Route Mile Post Ahead/Back Indicator, and State Route ARM. In relation to the final crash database, the State Route ARM is the basis that the segments are disaggregated. Additionally, XY coordinate information is also available for some crash observations that provide a point location for the accident.

Roadway facility type data is expressed in attributes that describe the roadway or refer to the classification of the roadway where the accident occurred. State Route Related Roadway Type (RRT) and State Route Related Roadway Qualifier (RRQ) classify the roadway facility based on the identifying acronyms established by WSDOT. Perhaps most relevant for the purposes of this study, the functional class codes that describe the roadway are listed in the columns for State Route State Functional Class Code, State Route Urban Rural, State Route Federal Functional Class Name, and State Route Federal Functional Class Number. The State Functional Class Code consists of a two-character identification code with the prefix of R or U signifying rural or urban arterial classification. The numerical value associated with the R/U prefix is predicated on the classification code consistent with WSDOT and FHWA guidelines. The Urban Rural column simply lists whether the facility is considered as an urban or rural arterial, while the Federal Functional Class Name uses the FHWA standards for naming the facility (see FHWA Directive 23 CFR 470).

The category that contains the most extensive amount of information is the data describing the collision. This information will serve as the basis for the inputting crash severity, number of vehicles involved, and collision type attributes in the final homogeneous segments crash database. The crash severity data is captured in the columns of Collision Severity (Fatal, injury, or Property Damage Only (PDO)) and Injury Type (Dead at Scene, Dead on Arrival, Died in Hospital, Evident Injury, No Injury, Possible Injury, Serious Injury, or Unknown). The number of vehicles involved in the accident is captured in the vehicle prefix descriptors; in some cases, like hit-fixed-object crashes, the Vehicle 2 prefix in not applicable. Collision type information is presented in the column for First Collision Type (Same Direction Rear End, One Park One Moving, Entering at Angle, Same Direction Sideswipe, etc.). The WSDOT source data also provides other columns to describe the accident in more detail with parameters such as: Contributing Circumstance 1, MV Driver Miscellaneous Action 1, and State Route Diagram Collision Type Description.

Data determined to be related to driver information includes role of the individual (passenger, driver, pedestrian) in the accident identified in the column Involved Person Type, as well as some basic demographic related data (Age, Gender). Some driver/vehicle related crash outcomes are also described in relation to deployment of airbag, ejection status of occupant, and most importantly, the resulting Injury Type to the individual involved in the crash. Crash contributing factors are described by Sobriety Level, Alcohol Test Result, Restraining System Type, and Seat Position. For pedestrians and bicyclists, the source data presents columns to describe those nonmotorized travelers with Pedestrian/Pedacyclist Clothing Visibility Type, Pedestrian Pedacyclist Type, Pedacyclist Actions, and Pedestrian Actions.

Environmental conditions data depict the physical environment at the time of the reported crash. These environmental descriptors detail the roadway environment, weather conditions, and special circumstances in columns such as Weather, Roadway Surface Condition, and Lighting Condition. Weather succinctly illustrates the climate conditions at the time of the reported crash; the Weather classifications are limited to visibility-related designations. Similarly, the Roadway Surface Condition category identifies the elements on the roadway at the time of the reported crash and are appropriately labeled as dry, ice, oil, other, sand/mud/dirt, snow/slush, standing water, unknown, or wet. Lighting Conditions identifies the source of illumination while loosely implying the time of day by indicating daylight or dark with or without street lights. Location Characteristics highlight unique features (bridge, parking lot, shopping mall, tunnel, etc.) of the arterial that may have some involvement with those particular crashes; for the majority of the observations, this column remains blank. Roadway Characteristic provides a concise description of the geometrics for the arterial; these descriptions simply identify if the roadway was straight or had some type of curve. The Work Zone descriptor is not applicable to all observations as it is contingent on the presence of a work zone at the location of the reported crash.

Vehicle descriptors in the WSDOT source accident data define both personal and commercial vehicles involved in the accident. Of note, commercial carrier and commercial vehicle information only applies if those type of vehicles were involved in the reported accident. The vehicle involved in the crash, regardless of personal or commercial transport classification, is described by Vehicle Type, Vehicle Make, Vehicle Model, Vehicle Style, Vehicle Year, and Registered State. Vehicle Action 1 describes what activity the vehicle was engaged in at the time of the crash, while Vehicle Condition 1 pertains to the operating condition of the vehicle prior to involvement in the crash. For

instance, if the vehicle's headlights were not in operating condition prior to the crash, it may be a contributing factor to causing the accident.

2.2 Source Roadway Geometrics Data

The WSDOT TDGO provided the roadway data for horizontal alignment, vertical alignment, number of lanes and roadway width, and shoulder width information. These files compile the geometric data for 2010 and 2011; the 2012 geometric data utilized the same information as 2011 since 2012 geometric data was unavailable at the time of request. The roadway geometric data will be included in the complete crash database that contains elements of horizontal and vertical alignment, number of lanes and roadway width, and shoulder width.

The WSDOT horizontal alignment data lists the main components of each horizontal curve captured in 19 columns. All of the horizontal curves listed progress in the increasing mile post direction expressed in segments by mile post and includes 17,769 observations for the 2010 dataset, and 17,870 observations for 2011, an increase of 101 additional curves in a two year time span. The horizontal curve elements included in this dataset are listed in Table 2.2.

Table 2.2: WSDOT Horizontal Alignment Data.

Horizontal Alignment Attribute	Definition
LRS_Date	Date input into Linear Referencing System
SRID	State Route ID
SR	State Route
RRT	Related Route Type
RRQ	Related Route Qualifier
BegARM	Beginning Accumulated Route Mileage
EndARM	Ending Accumulated Route Mileage
BegMP	Beginning Mile Post
BegAB	Beginning Mile Post Ahead/Back
EndMP	Ending Mile Post
EndAB	Ending Mile Post Ahead/Back
HorizontalCurvePointOfTangencyArm	Horizontal Curve PT Accumulated Route Mileage
HorizontalCurvePointOfCurvatureArm	Horizontal Curve PC Accumulated Route Mileage
HorizontalCurveType	Horizontal Curve or Angle
HorizontalCurveRadius	Radius of Curve (R)
HorizontalCurveMaximum(Super)Elevation	Max Super Elevation (e)
HorizontalCurveLength	Length of Curve (L) in feet
HorizontalCurveDirection	Curve Left or Curve Right
HorizontalCurveCentralAngle	Angle of Deflection (Δ) in degrees

The horizontal curve data is expressed on a segment basis according to accumulated route mileage (ARM) markers. The addition of 101 observations between 2010 and 2011 is reflected in the difference among average values for horizontal alignment characteristics between 2010 and 2011, as shown in Table 2.3 on the next page.

Table 2.3: Average WSDOT Horizontal Alignment Values for 2010 and 2011.

Year	2010	2011
HorizontalCurvePointOfTangencyArm	69.79	69.42
HorizontalCurvePointOfCurvatureArm	69.68	69.30
HorizontalCurveRadius	2265.28	2274.17
HorizontalCurveMaximum(Super)Elevation	0.01	0.01
HorizontalCurveLength	585.43	584.53
HorizontalCurveCentralAngle	2609.74	2607.78

Between the two databases, the maximum values are consistent from 2010 to 2011 and report the same locations. The maximum curve radius identified is designed at 70,000 feet between ARM 67.02 and 67.32 along SR 82. The maximum super elevation of 0.2 is located along SR 3 between ARM 53.19 and 53.48. The greatest curve length of 12,683 feet is located between ARM 104.63 and 107.03 on SR 82. The largest central angle is located on a horizontal curve that spans from ARM 0.08 to 0.22 on SR 167.

The vertical alignment data includes all pertinent vertical curvature information for all State Routes described in 23 columns. For 2010, there are 34,260 recorded vertical curves while 2011 maintains 34,426 observations, an increase of 226 additional vertical curves over the course of two years. This WSDOT provided vertical alignment data uses different nomenclature to reference all vertical curve attributes to mile post markers. For instance, instead of using the definition of Vertical Point of Curvature (VPC), the raw data references the Beginning Vertical Curve Accumulated Route Mileage. A description of the WSDOT vertical alignment data is displayed in Table 2.4 on the following page.

Table 2.4: WSDOT Vertical Alignment Data.

Vertical Alignment Attribute	Definition
LRS_Date	Date input into Linear Referencing System
SRID	State Route ID
State Route Number	State Route
Related Route Type	Related Route Type Code
Related Route Qualifier	Related Route Qualifier Code
Begin ARM	Beginning Accumulated Route Mileage
End ARM	Ending Accumulated Route Mileage
Begin SRMP	Beginning State Route Mile Post
Begin AB	Beginning Mile Post Ahead/Back
End SRMP	Ending State Route Mile Post
End AB	Ending Mile Post Ahead/Back
Begin SRMP2	Beginning State Route Mile Post (Ahead/Back)
End SRMP2	Ending State Route Mile Post (Ahead/Back)
Related Roadway Type Description	RRT Definition
State Route Description	State Route and Cross Street
RRT_RRQ	RRQ Definition
Vertical Curve Bvc Arm	Beginning Vertical Curve Accumulated Route Mileage
Vertical Curve Vpi Arm	Vertical Point of Intersection Accumulated Route Mileage
Vertical Curve Evc Arm	Ending Vertical Curve Accumulated Route Mileage
Vertical Curve Type	Crest or Sag Curve
Vertical Curve Length	Length of Curve (ft)
Vertical Curve Percent Grade Ahead	Grade (%) ahead of Curve
Vertical Curve Percent Grade Back	Grade (%) back of Curve

Although the recorded number of vertical curves increases by 226 from 2010 to 2011, there is no calculated difference among the average values of all observations for vertical curve length and vertical curve percent grade ahead or back between the two years (315 feet, 0, and 0 respectively). The maximum recorded value for vertical curve length is 6,700 feet located along SR 82 between ARM 106.24 and 107.51. The steepest vertical curve percent grade ahead is 16.13% along an Angle Point Curve at ARM 28.65 of SR 503; similarly, the steepest vertical curve percent grade back is located at ARM 28.66 of the same route. These maximum values are found at the same locations for the 2010 and 2011 datasets.

The WSDOT data for the number of lanes and roadway width information differentiates between the increasing and decreasing mile post directions for the State Routes. The 2010 dataset contains 8,519 observations while the 2011 dataset lists 8,549 rows, and increase of 30 observations over the period of two years. The WSDOT data captured in the 16 columns describing number of lanes and roadway information is listed in Table 2.5 on the next page.

Table 2.5: WSDOT Number of Lanes and Roadway Width Data.

Number of Lanes and Roadway Width Attribute	Definition
LRS_Date	Date input into Linear Referencing System
SRID	State Route ID
SR	State Route
RRT	Related Route Type
RRQ	Related Route Qualifier
BegARM	Beginning Accumulated Route Mileage
EndARM	Ending Accumulated Route Mileage
BegMP	Beginning Mile Post
BegAB	Beginning Mile Post Ahead/Back
EndMP	Ending Mile Post
EndAB	Ending Mile Post Ahead/Back
RoadwayDirection	Increasing or Decreasing or Both ways
NumberOfLanesIncreasing	Number of Lanes in Increasing Direction
NumberOfLanesDecreasing	Number of Lanes in Decreasing Direction
RoadwayWidthInc	Roadway Width (ft) in Increasing Direction
RoadwayWidthDec	Roadway Width (ft) in Decreasing Direction

When examining the average values among all observations within the 2010 and 2011 lane and roadway datasets, the average number of lanes in the increasing and decreasing direction do not change with both remaining at 2 lanes over the two-year period. Moreover, the calculated average roadway width in the increasing direction does not incur any difference at 23 feet for the 2010 and 2011 datasets. However, in regard to the decreasing direction, the average roadway width increases from 22 feet in 2010 to 23 feet for 2011. The maximum recorded values are the same for the two year datasets with six lanes in the increasing direction, five lanes in the decreasing direction, a maximum of 99 feet for roadway width in the increasing direction and 96 feet in the decreasing direction, respectively.

Similar to the lane configuration data, the WSDOT shoulder width data also accounts for increasing and decreasing mile post directions for the State Routes. The shoulder locations are referenced as Left, Left Center, Right Center, and Right. For 2010, there were 9,042 recorded shoulder width observations while 2011 recorded 9,056 observations; an increase of 14 observations over the two-year span. The shoulder width descriptors and their associated definitions are listed on the next page in Table 2.6.

Table 2.6: WSDOT Shoulder Width Data.

Shoulder Widths Attribute	Definition
LRS_Date	Date input into Linear Referencing System
SRID	State Route ID
SR	State Route
RRT	Related Route Type
RRQ	Related Route Qualifier
BegARM	Beginning Accumulated Route Mileage
EndARM	Ending Accumulated Route Mileage
BegMP	Beginning Mile Post
BegAB	Beginning Mile Post Ahead/Back
EndMP	Ending Mile Post
EndAB	Ending Mile Post Ahead/Back
RoadwayDirection	Increasing or Decreasing or Bothways
ShoulderWidthLeft	Shoulder Width (ft) of outer portion of Decreasing Direction
ShoulderWidthLeftCenter	Shoulder Width (ft) of median side of Decreasing Direction
ShoulderWidthRightCenter	Shoulder Width (ft) of median side of Increasing Direction
ShoulderWidthRight	Shoulder Width (ft) of outer portion of Increasing Direction

There exists no calculated difference between the average and maximum recorded shoulder widths values for the 2010 and 2011 datasets. The average shoulder width left and shoulder width right is calculated to be 5 feet, while the average shoulder width left center and right center remains at 1 foot. A maximum of 37 feet is the distance of the left shoulder width, while the right shoulder width maximum value is 40 feet. The greatest shoulder width for the left center and right center is 20 and 36 feet respectively.

2.3 Source AADT Data

The WSDOT GeoData Distribution Catalog webpage offers publically available data for download organized by transportation features, political and administrative features, geographic reference data, and environmental features. This downloadable data is provided in the form of ESRI shapefiles, which also includes the metadata files that accompany the shapefile information. Under the transportation features category, the Traffic Count Data file was downloaded from the GeoData Catalog webpage. Since this study examines highway crashes on a segmentation basis, the TPT Traffic Sections data was selected for download as opposed to the TPT Traffic Counts file which provides count information at specific point locations. The files selected for download include the TPT Traffic Sections data for years 2010, 2011, and 2012. The metadata files were extracted via ArcGIS and report the following information shown in Table 2.7.

Table 2.7: WSDOT TPT Traffic Sections Data.

AADT Attribute	Definition
FID	Internal Feature Number (sequential)
Shape *	Feature Geometry
OBJECTID	Internal Feature Number (sequential)
SRID	State Route Identifier
Begin_ARM	Beginning Accumulated Route Mileage
End_ARM	Ending Accumulated Route Mileage
Location	Milepost Count Locations and Ahead/Back indicator
Year_20**	WSDOT calculated AADT for specified year
LOC_ERROR	Error (if any) produced in LRS at time of input
RteType	Route Type: IS (Interstate), SR (State Route), US (United States)
Shape_Leng	Shape Length (coordinate defining measure)

The WSDOT TPT Traffic Sections data contains 5,388 counts for year 2010, 5,290 counts for year 2011, and 5,236 counts for year 2012. From this source data, the AADT counts will be input into the 2010-2012 crash database according to the segments defined by the mile post locations. The varying number of segments for each year does not impact the AADT inputs into the final crash database because the homogeneous segments are more finite in length. The homogeneous segments captured within the WSDOT TPT Traffic Sections data are input with the associated AADT values reported for those segment milepost limits.

2.4 Source Functional Classification Data

Also from the WSDOT GeoData Distribution Catalog webpage, the Functional Class, State Routes file under the transportation features category was downloaded for inclusion into the final crash database. The functional class observations were input by WSDOT based on the procedures previously explained in Section 1.2 WSDOT Functional Classification Methodology. Following the same process as the AADT data, the Functional Class, State Routes metadata file was extracted through ArcGIS to report the following information displayed on the following page in Table 2.8:

Table 2.8: WSDOT Functional Class State Routes Data.

Functional Class Attribute	Definition
OBJECTID *	Internal Feature Number (sequential)
Shape *	Feature Geometry
LRS_Date	Date input into Linear Referencing System
BegARM	Beginning Accumulated Route Mileage
EndARM	Ending Accumulated Route Mileage
BegMP	Beginning State Route Milepost
BegAB	Beginning State Route Milepost Ahead or Back
EndMP	Ending State Route Milepost
EndAB	Ending State Route Milepost Ahead or Back
Direction	Increasing or Decreasing Milepost direction
FederalFunctionalClassCode	Federal Highway Administration Numerical Code
FederalFunctionalClassDesc	Federal Highway Administration Code Definition
StateFunctionalClassCode	WSDOT Functional Class Code (Alphanumeric)
StateFunctionalClassDesc	WSDOT Functional Class Code Definition
LOC_ERROR	Error (if any) produced in LRS at time of input
RouteID	WSDOT Route Identifier
StateRouteNumber	Washington State Route Number
RelRouteType	State Route Related Roadway Type
RelRouteQual	State Route Related Roadway Qualifier
Shape.STLength()	Shape Length (coordinate defining measure)
Shape_Length	Shape Length (coordinate defining measure)

The available WSDOT Functional Class State Routes downloadable data only presented the functional class information for 2012; the 2010 and 2011 was unavailable for download on the GeoData Distribution Catalog website. The assigned functional class categories are shown on a segment basis according to accumulate route mileage and state route milepost markers. The 2012 dataset has 3,956 observations that show both the federal functional class designation as well as the state functional class designation for each stretch of roadway. Like the AADT data, the homogeneous segments captured within the WSDOT Functional Class State Route segments are input with the associated functional classes reported for those segment milepost limits.

The federal and state functional class designations from this dataset have been assigned according to standards and procedures established by the Federal Highway Administration and WSDOT. The homogenous segments crash database will show how the functional class designations will differ segment to segment if the designations were based on AADT and population thresholds. When assigning functional class designations by AADT and population counts, few changes in functional class labels were observed across the three year period of 2010 to 2012 for any individual segment. This would indicate that the federal and state functional class designations did not considerably change across the milepost segments within the WSDOT Functional Class State Routes downloadable data from 2010 to 2012.

2.5 Homogeneous Segments Crash Database 2010-2012

The development of the homogeneous segments crash database incorporates accident information, roadway geometrics, AADT counts, and functional class. The manner in which the final database was established began by first determining the segment lengths. The roadway segments were defined as segments that maintain consistency in roadway characteristics for the length of a particular stretch of roadway, with a new segment being defined when any of the roadway characteristics change. The roadway characteristics that determine the segmentation process are the roadway geometrics which include the WSDOT source roadway geometrics data described in Section 2.2: horizontal alignment, vertical alignment, number of lanes and roadway width, and shoulder width. The shortest segment length that maintains consistent roadway geometrics measures 0.009 miles in length. The total number of observations for the three year period of 2010 to 2012 is 323,085 segments of homogenous roadway, with 107,695 segments for each year.

A total of 97 parameters are captured in the database which covers roadway geometrics, crash type, accident severity, AADT counts, and functional class. The data and information was pulled from the sourced WSDOT data and integrated into the homogeneous roadway segment. The observations from the source data were input into the homogeneous roadway segment format based on milepost markers recorded in the source WSDOT data. The WSDOT source accident data was input as counts or number of occurrences that occurred on any specific homogeneous roadway segment for each of the 2010 to 2012 crash years. The manner of accident tabulation for any particular roadway segment was determined by the recorded milepost location from the crash observations. The reported crashes were assigned to its corresponding homogeneous segment if the milepost location fell within the homogeneous segment milepost limits. These counts were accumulated for total crash count, impact location, collision severity, number of vehicles involved, and collision type on a segment-by-segment basis.

As described earlier, the roadway geometric data served as the basis for segmentation when creating the homogeneous roadway segments crash database. Not all segments contain complete roadway geometric information; these cells with omitted geometric information within the dataset were populated with the value -99 to signify missing data. Additionally, roadway geometric information was unavailable for year 2012; therefore, the roadway geometric information from 2011 was used as the basis for 2012. The segmentation process for homogeneous segments was standardized across the three year period; that is to say, the limits and attributes for the homogeneous segments from 2010 are the same for 2011 and 2012.

Section AADT information was used from the Annual Average Daily Traffic volumes along the state highway system in the WSDOT geospatial database, and matched to each segment according to milepost. Each homogenous segment was then classified based on one of five geographic classes: Rural, Small Urban, Small Urbanized, Large Urbanized, and Metropolitan. It was observed that areas designated as Rural did not always have low AADT levels and not all Metropolitan segments displayed high levels of AADT. In order to obtain finer resolution on the five geographical classes and to compare the definitions at the segment level, two sets of classifications were made based on section AADT and census population data.

Table 2.9 on the following pages lists the parameters in the homogenous roadway segments database with a brief description for each one.

Table 2.9: Homogeneous Roadway Segments Database Parameters.

Parameter	Description
SR	State Route
BegARM	Beginning Accumulated Route Mileage
EndARM	Ending Accumulated Route Mileage
Year	Crash Year
NumberOfLanesIncreasing	Number of Lanes in Increasing Direction
NumberOfLanesDecreasing	Number of Lanes in Decreasing Direction
RoadwayWidthInc	Roadway Width (ft) in Increasing Direction
RoadwayWidthDec	Roadway Width (ft) in Decreasing Direction
ShoulderWidthLeft	Shoulder Width (ft) of outer portion of Decreasing Direction
ShoulderWidthLeftCenter	Shoulder Width (ft) of median side of Decreasing Direction
ShoulderWidthRightCenter	Shoulder Width (ft) of median side of Increasing Direction
ShoulderWidthRight	Shoulder Width (ft) of outer portion of Increasing Direction
HorizontalCurvePointOfTangencyArm	Horizontal Curve PT Accumulated Route Mileage
HorizontalCurvePointOfCurvatureArm	Horizontal Curve PC Accumulated Route Mileage
HorizontalCurveRadius	Radius of Curve (R)
Horizontal Curve Maximum (Super) Elevation	Max Super Elevation (e)
HorizontalCurveLength	Length of Curve (L) in feet
HorizontalCurveCentralAngle	Angle of Deflection (Δ) in degrees
Vertical Curve Bvc Arm	Beginning Vertical Curve Accumulated Route Mileage
Vertical Curve Vpi Arm	Vertical Point of Intersection Accumulated Route Mileage
Vertical Curve Evc Arm	Ending Vertical Curve Accumulated Route Mileage
Vertical Curve Length	Length of Curve (ft)
Vertical Curve Percent Grade Ahead	Grade (%) ahead of Curve
Vertical Curve Percent Grade Back	Grade (%) back of Curve
totalacc	total count of roadside, roadway, and other location crashes in segment
rdside	count of roadside crashes in segment
rdway	count of roadway crashes in segment
othloc	count of other location crashes in segment
pdo	count of reported Property Damage Only from crashes in segment

Table 2.9 (continued): Homogeneous Roadway Segments Database Parameters.

Parameter	Description						
pinj	count of reported Possible Injury from crashes in segment						
evi	count of reported Evident Injury from crashes in segment						
sinj	count of reported Serious Injury from crashes in segment						
fatal	count of reported Fatal from crashes in segment						
unknown	count of reported Unknown Injury from crashes in segment						
hiinj	count of crashes in segment reporting more than one injury						
justinj	count of crashes in segment reporting one injury						
loinj	count of crashes in segment reporting no injuries						
veh1	count of crashes in segment involving 1 vehicle						
veh2	count of crashes in segment involving 2 vehicles						
veh3	count of crashes in segment involving 3 vehicles						
veh4	count of crashes in segment involving 4 vehicles						
veh5	count of crashes in segment involving 5 vehicles						
othveh	count of crashes in segment involving more than 5 vehicles						
rend	count of Rear End type crashes in segment						
trend	count of Turning Rear End type crashes in segment						
sdirtsw	count of Same Direction Turning Sideswipe type crashes in segment						
sdirsw	count of Same Direction Sideswipe type crashes in segment						
sdirt	count of Same Direction Turning type crashes in segment						
sdiroth	count of Same Direction Others type crashes in segment						
headon	count of Head On type crashes in segment						
odirsw	count of Opposite Direction Sideswipe type crashes in segment						
odirt	count of Opposite Direction Turning type crashes in segment						
fobj	count of Fixed Object type crashes in segment						
eang	count of Entering At Angle type crashes in segment						
oturn	count of Overturned type crashes in segment						
animal	count of Animal type crashes in segment						
bicycle	count of Bicycle type crashes in segment						
ped	count of Pedestrian type crashes in segment						
oneparkonemoving	count of One Parked, One Moving type crashes in segment						
entlvdr	count of Entering/Leaving Driveway type crashes in segment						
other	count of crashes classified as Other in segment						
nostate	count of crashes classified as Not Stated in segment						
StateFunctionalClass	Rural or Urban class indicator						
FederalFunctionalClass	Federal Functional Class including 'Other Principal Arterial'						
Functional	Federal Functional Class 'Other Principal Arterial' captured in						
class(4level)	'Principal Arterial'						
Interstate	indicator for Interstate Functional Class type						
Other Freeway/Expressway	indicator for Other Freeway/Expressway Functional Class type						

Table 2.9 (continued): Homogeneous Roadway Segments Database Parameters.

Parameter	Description
Other Principal Arterial	indicator for Other Principal Arterial Functional Class type
Minor Arterial	indicator for Minor Arterial Functional Class type
Major Collector	indicator for Major Collector Functional Class type
AADT	WSDOT calculated AADT for specified year
Functional Class_AADT based	AADT based Geographic Classification
Functional Class_Population based	Population based Geographic Classification
Rural Rural	indicator for Rural AADT class and Rural population class
Small Urban Rural	indicator for Small Urban AADT class and Rural population class
Small Urbanized Rural	indicator for Small Urbanized AADT class and Rural population class
Large Urbanized Rural	indicator for Large Urbanized AADT class and Rural population class
Metropolitan Rural	indicator for Metropolitan AADT class and Rural population class
Rural Small Urban	indicator for Rural AADT class and Small Urban population class
Small Urban Small Urban	indicator for Small Urban AADT class and Small Urban population class
Small Urbanized Small Urban	indicator for Small Urbanized AADT class and Small Urban population class
Large Urbanized Small Urban	indicator for Large Urbanized AADT class and Small Urban population class
Metropolitan Small Urban	indicator for Metropolitan AADT class and Small Urban population class
Rural Small Urbanized	indicator for Rural AADT class and Small Urbanized population class
Small Urban Small Urbanized	indicator for Small Urban AADT class and Small Urbanized population class
Small Urbanized Small Urbanized	indicator for Small Urbanized AADT class and Small Urbanized population class
Large Urbanized Small Urbanized	indicator for Large Urbanized AADT class and Small Urbanized population class
Metropolitan Small Urbanized	indicator for Metropolitan AADT class and Small Urbanized population class
Rural Large Urbanized	indicator for Rural AADT class and Large Urbanized population class

Table 2.9 (continued): Homogeneous Roadway Segments Database Parameters.

Parameter	Description
Small Urban Large Urbanized	indicator for Small Urban AADT class and Large Urbanized population class
Small Urbanized Large Urbanized	indicator for Small Urbanized AADT class and Large Urbanized population class
Large Urbanized Large Urbanized	indicator for Large Urbanized AADT class and Large Urbanized population class
Metropolitan Large Urbanized	indicator for Metropolitan AADT class and Large Urbanized population class
Rural Metropolitan	indicator for Rural AADT class and Metropolitan population class
Small Urban Metropolitan	indicator for Small Urban AADT class and Metropolitan population class
Small Urbanized Metropolitan	indicator for Small Urbanized AADT class and Metropolitan population class
Large Urbanized Metropolitan	indicator for Large Urbanized AADT class and Metropolitan population class
Metropolitan Metropolitan	indicator for Metropolitan AADT class and Metropolitan population class

The functional class related parameters are the focal point of the homogeneous roadway segments crash database. While most of the data was obtained from WSDOT sources and formatted for input into the final crash database, the functional class parameters are the ones that address the nature of this study. The assigned WSDOT classifications are described in the parameters State Functional Class, Federal Functional Class, and Functional Class (4level), in addition to the indicators for each individual functional class type. The column for Functional Class AADT Based lists the geographic class that is assigned to the segment based on AADT alone. Alternatively, the Functional Class Population Based column labels the geographic class that is assigned to the segment based on population alone. The subsequent columns serve as indicators for the various combinations of functional classification based on AADT and functional classification based on population; the columns indicate whether the two geographic classifications match or not. As the homogeneous roadway segments crash database shows, there exist many observations in which the geographic class assigned on the basis of AADT for not match the geographic class assigned on the basis of population. The difference in the classifications illustrate the discrepancy that exists between using AADT and population for assigning geographic class, thus influencing the way in which functional class is assigned. The functional classification procedure for assignment based on population and AADT will be explained in the next chapter.

3.0 Functional Classification (Centerline Miles)

Section 1.2 discussed the procedure and protocol that WSDOT, in conjunction with the FHWA, follows in assigning functional classifications to roadway segments, and concludes by mentioning the process of assigning functional class by population and AADT. This chapter will introduce the process in which functional classifications were assigned by population and AADT counts. The two methods of assigning functional class are applied to the homogeneous segments crash database in which functional and geographic classifications are input into each observation. This chapter will begin by describing the procedures and conditions applying the geographical classifications of Rural, Small Urban, Small Urbanized, Large Urbanized, and Metropolitan, using the population and AADT criteria. The last section will discuss the validation process using the WSDOT Highway Logs, followed by comparisons between the population based and AADT based geographic and functional classifications in terms of centerline miles.

3.1 Population Based Geographic Type Classification

The source crash data provided by WSDOT was found to contain information on segment location by city and county. Census data was obtained for years 2010 to 2012 from the United States Census Bureau – U.S. Department of Commerce. The census data was found to contain population information at both county and city levels. This data was matched to the location information in the source data to obtain the area populations for each segment's location. Area names for several sections of roadway, predominantly in rural areas were absent in the source data. In order to assign them with a population estimate, WSDOT SRweb, and Geoportal were utilized to ascertain their area type or physical boundary. Segments for which area names were available were assigned a population count based on the census information available. This information was then used to categorize the segments into one of the five geographic classes, based on the following population criteria:

• Rural: < 5,000

• Small Urban: 5,000 – 49,999

Small Urbanized: 50,000 – 199,999
Large Urbanized: 200,000 – 499,999

• Metropolitan: > 500,000

3.2 AADT Based Geographic Type Classification

The source crash data obtained from WSDOT was found to classify the available routes within four functional classes: Principal Arterials, Minor Arterials, Collectors, and Interstates. The federal classifications for the same routes included an additional class with a distinction made between freeways/expressways and other principal arterials. To avoid repeated observations of freeway segments as Principal Arterials, the federal classifications were matched to the homogenous segments and all five federal classifications for functional class were included in this part of the study. Ranges were obtained from the FHWA guidelines to set the capacity levels for each

functional class within each of the five geographical classes. The upper limits for Small Urban levels of AADT were also obtained from the FHWA guidelines and were used as a baseline to compute ranges of AADT for the higher order geographical classes, using volume to capacity ratios and the average number of lanes for each functional class. Table 3.1 shows the resulting ranges of AADT for each of the classes.

Table 3.1: AADT Ranges for Functional and Geographic Class.

Functional Class/ Geographic Class	Factors	Interstate	Other Freeways/ Expressways	Other Principal Arterials	Minor Arterials	Major & Minor Collectors
	Capacity	2,400	2,300	1,900	1,700	1,400
Matropoliton	V/C ratio	0.8	0.8	0.83	0.8	0.7
Metropolitan	Lane	8	6	4	2	2
	Boundary	153,600	110,400	63,080	27,200	19,600
	Capacity	2,200	2,100	1,700	1,400	1,200
Large	V/C ratio	0.8	0.8	0.83	0.8	0.65
Urbanized	Lane	6	6	4	2	2
	Boundary	105,600	100,800	56,440	22,400	15,600
	Capacity	2,000	1,800	1,500	1,200	1,000
Small	V/C ratio	0.6	0.6	0.65	0.65	0.6
Urbanized	Lane	6	4	4	2	2
	Boundary	72,000	43,200	39,000	15,600	12,000
Small Urban	Boundary	12,000	4,000	2,000	1,500	1,100

The 'boundary' values form an upper limit for the AADT range for each functional class within each geographic class; the Rural classification (not listed in the table) would be considered as anything less than Small Urban. These ranges were then matched to the AADTs for each homogenous segment to obtain the AADT based geographic classifications.

3.3 Highway Log Centerline Miles Validation

In checking the length of each route using the ARMs for each homogenous segment in the dataset, it was found that the total ARM lengths resulted in a figure about 300 miles in excess of the WSDOT highway log lengths. It was observed that the highway log ARMs were consistent with the homogenous segment ARMs and further investigation showed that the differences in length were in specific segments of routes that overlapped each other. These differences between ARM lengths and highway log lengths were matched to the overlapping segments, as a means of avoiding double counting the lengths while testing data consistency. One example of such a location is State Route 12, where the ARM length totals at 430.779 miles, while the highway log length is 106.38 miles less at 324.51 miles. It was found that SR12 overlapped with I-5 and I-82. After accounting for these overlaps, the homogenous segment data resulted in a total system mileage of 6,867.683 miles, which was found to be within acceptable limits of the WSDOT highway log total system length of 6,951.34 miles. Thus, the homogenous segment data was

assembled based on specific criteria as a means of testing and ensuring its validity. A summary of the number of centerline mainline only miles based on 2010 ARM for principal arterial, minor arterial, and collector roadways is provided in Table 3.2, based on the homogeneous segments database.

Table 3.2: Functional Class Centerline Miles by Lane Configuration.

Number of Lanes	2-Lane	Multi-Lane	One-way
Principal Arterial	1,918.87	780.191	18.318
Minor Arterial	1,783.85	99.374	1.49
Collector	1,378.87	26.857	3.451
Total	5,081.59	906.422	23.259

Together, these three functional classes account for 6,011.267 miles of the 6,867.683 miles available. Principal arterials were found to comprise a total of 2,717.377 miles, of which 1,918.868 miles were 2-lane roadways, 780.191 were multi-lane roadways, and 18.318 miles being one-way. Of the 1,884.716 minor arterial miles, 1,783.852 miles were found to be 2-lane roadways, 99.374 miles were found to be multi-lane roadways with the remaining being one-ways. Similarly, collectors were found to be a total of 1,409.174 centerline miles, of which 1,378.866 miles were 2-lane roadways.

The functional classification of the homogenous segments using section AADT data and census population counts has been expressed in cumulative centerline miles. A segment wise comparison between the two classifications was made to show the similarities and differences in the resulting five geographical classifications from 2010 until 2012. Tables 3.3 and 3.4 show the summary of this comparison for 2010.

Table 3.3: Population Based Functional Class Centerline Miles by Geographic Classification.

Population Based	Rural	Small Urban	Small Urbanized	Large Urbanized	Metropolitan
Principal Arterial	1,935.036	521.684	190.364	36.095	34.198
Minor Arterial	1,701.500	131.176	49.616	2.424	0.000
Collector	1,344.655	49.208	11.672	3.639	0.000
Total	4,981.191	702.068	251.652	42.158	34.198

Table 3.4: AADT Based Functional Class Centerline Miles by Geographic Classification.

AADT Based	Rural	Small Urban	Small Urbanized	Large Urbanized	Metropolitan
Principal Arterial	453.379	2,112.08	138.105	7.543	6.270
Minor Arterial	716.077	1,052.298	65.598	13.994	36.749
Collector	652.946	685.351	7.989	26.742	36.146
Total	1,822.402	3,849.729	211.692	48.279	79.165

The largest differences were observed in the total centerline miles that fell under the Rural and Small Urban definitions. The population based classification resulted in 4,981.191 Rural centerline miles of roadway, while based on AADT, only 1,822.402 miles would fall under a Rural definition.

Similarly, Small Urban areas had a total of 702.068 centerline miles of roadway when classified by population, but 3,849.729 miles when described by AADT. Thus, segments that were being classified as falling within Rural areas were observing traffic volumes that would be expected in higher order geographic areas, something that was observed for Principal Arterials, Minor Arterials, and Collectors alike. These observations taken together suggest that a classification based solely on the population of the area that a segment falls within does not necessarily hold true based on the traffic volumes being observed along the segments.

Table 3.5 displays the centerline miles of roadway for each of the five geographic classifications based on section AADT data and census population information for Principal Arterials, Minor Arterials, and Collectors. The rows contain the centerline miles based on AADT while the columns show the centerline miles based on population and each cell shows the intersection of the respective geographic types. Thus, the diagonal entries show the number of miles where the classifications based on AADT and population matched, while the off-diagonal cells show the number of miles where the AADT classifications did not match with the population based classifications.

Table 3.5: Matrix of 2010 Population Based and AADT Based Functional Class Centerline Miles.

			Population Basis					
		Rural	Small Urban	Small Urbanized	Large Urbanized	Metropolitan		
	Rural	1,742.492	51.43	26.355	2.125	0.000		
AADT Basis	Small Urban	3,104.596	546.797	147.378	114.694	15.468		
	Small Urbanized	70.864	66.299	54.256	4.562	15.672		
	Large Urbanized	26.721	8.326	12.903	0.000	0.329		
	Metropolitan	1,742.492	51.43	26.355	2.125	0.000		

Of the 6,011.774 centerline miles of Principal Arterials, Minor Arterials and Collector roadways, the diagonal entries totaled to 2,343.545; only 38.983% of the geographic classifications by population corresponded to the classification based on observed AADT. The 3,108.709 miles that were classified as being within Rural areas based on population would fall under a Small Urban classification based on AADT. Similarly, 66.299 miles classified as being in Small Urban areas based on population would actually be considered as Small Urbanized based on AADT. These differences in geographical classification were less pronounced at the Large Urbanized and Metropolitan levels with the largest observed difference being 34.652 miles of roadway that were classified as being Large Urbanized based on population, but had small enough daily traffic volumes to be categorized as Small Urban by AADT.

Table 3.6 visualizes the percentage of the miles for each geographical definition type against the total system centerline miles of 6,011.267 for Principal Arterials, Minor Arterials and Collectors. The color scale employed in this table progresses in values from low to high with their corresponding color of green to red, with red signifying the highest percentage.

Table 3.6: Matrix of 2010 Population Based and AADT Based Functional Class Centerline Miles by Percent.

			Population Basis				
		Rural	Small Urban	Small Urbanized	Large Urbanized	Metropolitan	
	Rural	28.99%	0.86%	0.44%	0.04%	0.00%	
AADT Basis	Small Urban	51.65%	9.10%	2.45%	1.91%	0.26%	
	Small Urbanized	1.18%	1.10%	0.90%	0.08%	0.26%	
	Large Urbanized	0.44%	0.14%	0.21%	0.00%	0.01%	
	Metropolitan	28.99%	0.86%	0.44%	0.04%	0.00%	

As before, 90.65% of the total centerline miles fell within the Rural and Small Urban classifications. Approximately 80.69% of the total miles were classified as being Rural by population, only 28.98% of the centerline miles saw AADT classifications that correspond with a Rural area. The remaining 51.71% had annual daily traffic volumes that would be classified as being Small Urban. Another notable observation is that none of the Principal Arterial, Minor Arterial or Collector roadway miles that were classified as being Metropolitan or Large Urbanized by population actually fell within the corresponding categories based on AADT. This could be a result of either no corresponding segments, or perhaps an effect of low Metropolitan miles in comparison to Rural and Small Urban miles. This large difference in the total number of miles for each category could lead to a percentage of the total that is very close to zero. Additionally, 0.58% of Large Urbanized and 0.26% of Metropolitan areas by population were observed to have AADTs in the Small Urban ranges. Conversely, 0.61% of the Rural areas and 0.49% of the Small Urban areas by population were found to have Metropolitan levels of daily traffic volumes.

4.0 Functional Classification (Segments)

The centerline mileage matrices comparing population based and AADT based functional classes presented in Section 3.3, are presented in this chapter in counts of homogeneous segments. A total of 107,695 homogeneous roadway segments are account for each individual year of crash data. The functional classification matrices of AADT and population based measures will first be presented for all functional class segment types. The segment matrices will be further evaluated by presenting the comparison matrices for each specific WSDOT defined functional class: Interstate, Principal Arterial, Minor Arterial, Collector, and Non-Interstate segments.

All 107,695 homogeneous roadway segments for years 2010, 2011, and 2012 are shown in comparison matrices in Tables 4.1, 4.2, and 4.3. As with the centerline miles comparison tables, the rows represent the classifications based on AADT while the columns represent the classifications based on population, with each cell showing the intersection of the respective geographical classifications expressed in number of homogeneous segments. The cells along the diagonal of the tables depict segments where the two types of classifications remained consistent with each other. The off-diagonal cells show segments that were classified as being of a certain geographical type by population but differences in AADTs resulted in differences in classification.

Table 4.1: Matrix of 2010 Population Based and AADT Based Functional Class Homogeneous Roadway Segments.

			2010 Population Basis				
		Rural	Small Urban	Small Urbanized	Large Urbanized	Metropolitan	
×	Rural	27,379	1,067	436	65	4	
2010 AADT Basis	Small Urban	54,586	9,757	4,498	887	408	
	Small Urbanized	1,471	1,604	1,348	128	378	
	Large Urbanized	462	521	911	0	32	
7	Metropolitan	443	628	518	0	164	

Table 4.2: Matrix of 2011 Population Based and AADT Based Functional Class Homogeneous Roadway Segments.

			2011 Population Basis				
		Rural	Small Urban	Small Urbanized	Large Urbanized	Metropolitan	
Ø	Rural	28,718	1,381	794	94	18	
2011 AADT Basis	Small Urban	51,991	9,655	4,563	897	391	
	Small Urbanized	2,026	1,298	1,133	68	271	
	Large Urbanized	720	571	710	0	38	
7	Metropolitan	886	672	511	21	268	

Table 4.3: Matrix of 2012 Population Based and AADT Based Functional Class Homogeneous Roadway Segments.

		2012 Population Basis				
		Rural	Small Urban	Small Urbanized	Large Urbanized	Metropolitan
Ø	Rural	29,054	1,695	1,123	104	50
2012 AADT Basis	Small Urban	50,466	9,455	4,798	855	424
	Small Urbanized	2,615	1,228	747	43	174
	Large Urbanized	896	436	626	40	76
7	Metropolitan	1,310	763	417	38	262

It should be noted that while the total number of homogenous segments remain the same over the three-year period, the number of segments in each category change depending on the adjustments in area population and traffic section AADT levels.

As observed in the centerline miles evaluation, the number of segments classified as Rural and Small Urban by AADT and population account for 86.15% of the total number of segments. While the number of segments in each category remains relatively consistent over the three years, some

interesting observations could be made when aggregating some of the data. The number of segments classified as being Rural based on both population and AADT increased by 6% from 27,379 in 2010 to 29,054 in 2012. Conversely, the number of segments classified as being Rural based on population, but with Small Urban AADT levels, reduced by 7.55% from 54,586 in 2010 to 50,466 in 2012. The number of Rural segments by population that saw Metropolitan levels of traffic flow increased nearly threefold from 443 segments in 2010 to 1,310 segments in 2012. An increasing trend was also observed in the segments classified as Metropolitan by both measures wherein the number of homogenous segments increased from 164 in 2010 to 268 in 2011, and remained consistent through 2012. The largest changes were observed in the number of segments that fell within the Rural, Large Urbanized and Metropolitan classifications. The subsequent sections of this chapter will isolate the functional classifications of Interstates, Principal Arterials (Freeway/Expressway + Other Principal Arterial), Minor Arterials, and Collector roads to show the segment distribution among the geographic classifications.

4.1 Interstate Segments

The summary for all 7,459 homogenous Interstate segments is shown in Tables 4.4, 4.5, and 4.6. The greatest difference observed from 2010 to 2012 were in the number of segments classified as Small Urbanized by population and Rural by AADT levels, an increase from 51 homogenous segments in 2010 to 247 in 2012.

Table 4.4: Matrix of 2010 Population Based and AADT Based Functional Class Homogeneous Interstate Segments.

		2010 Population Basis								
		Rural Small Small Large Urbanized Urbanized Metropolit								
S	Rural	211	37	51	0	4				
Basis	Small Urban	3,500	803	307	187	66				
	Small Urbanized	255	211	194	0	0				
2010 AADT	Large Urbanized	143	337	604	0	11				
2	Metropolitan	2	235	208	0	93				

Table 4.5: Matrix of 2011 Population Based and AADT Based Functional Class Homogeneous Interstate Segments.

			2011 Population Basis				
		Rural	Small Urban	Small Urbanized	Large Urbanized	Metropolitan	
Ø	Rural	243	38	143	0	18	
Basis	Small Urban	3,322	901	363	187	52	
AADT E	Small Urbanized	317	139	110	0	0	
2011 A.	Large Urbanized	192	298	520	0	6	
7	Metropolitan	37	247	228	0	98	

Table 4.6: Matrix of 2012 Population Based and AADT Based Functional Class Homogeneous Interstate Segments.

			2012 Population Basis					
		Rural	Small Urban	Small Urbanized	Large Urbanized	Metropolitan		
S	Rural	274	40	247	10	35		
Basis	Small Urban	3,269	962	380	177	35		
	Small Urbanized	201	159	85	0	0		
2012 AADT	Large Urbanized	274	224	487	0	15		
7	Metropolitan	93	238	165	0	89		

The total number of segments within each geographical classification by population remained the same over the three year span. Therefore, the differences observed in the number of corresponding segments by AADT are a result of the variations in AADT over the three year period. The number of homogenous segments that were classified as having Metropolitan, Small Urban and Large Urbanized levels of AADT showed the least amount of variation going from 2010 to 2012, while the number of segments with Rural levels of daily vehicular flow increased by 100% from 303 segments in 2010 to 606 segments in 2012. On the other hand, the number of segments with Small Urbanized levels of AADT reduced from 660 segments in 2010 by 14.24% from 2010 to 2011 and further reduced by 21.38% from 2011 to 2012, an overall reduction of 215 homogenous segments. The number of Interstate segments falling within areas of Rural definitions by population was unsurprisingly a significant portion of the total segments at 4,111. But under the AADT definition, this number was found to drop significantly to 442 segments in 2011, while the number of Small Urban Interstate segments increased from 1623 based on population, to 4825 segments in 2011 based on AADT. Similar increases were observed in the number of Large Urbanized and Metropolitan segments with an increase from 187 population based segments to 1,016 AADT based segments, and 174 population based segments to 610 AADT based segments respectively in 2011.

4.2 Principal Arterial (Freeway/Expressway + Other Principal Arterial) Segments

By definition, WSDOT characterizes the functional classification of Principal Arterials as a combination of Freeway/Expressway and Other Principal Arterials type functional classes. Tables 4.7, 4.8, and 4.9 depict the matrix comparisons of the 42,046 homogenous segments that fall within this category between the population based and AADT based classifications.

Similar to the Interstate segments, the total number of homogenous Principal Arterial segments remained the same over the three-year period at 42,046 segments. The number of segments with Rural levels of AADT increased by 1,688 segments from 6,091 in 2010 to 7,779 in 2012. The total number of Rural segments by the population definition of geographical area was found to be 27,735 while under the AADT classification this number was found to be significantly smaller at 6,967 segments in 2011.

Table 4.7: Matrix of 2010 Population Based and AADT Based Functional Class Homogeneous Principal Arterial Segments.

			2010 Population Basis				
		Rural	Small Urban	Small Urbanized	Large Urbanized	Metropolitan	
Ø	Rural	5,485	341	200	65	0	
Basis	Small Urban	21,716	6,716	3,407	531	342	
	Small Urbanized	531	968	909	100	378	
2010 AADT	Large Urbanized	3	27	106	0	21	
7	Metropolitan	0	26	103	0	71	

Table 4.8: Matrix of 2011 Population Based and AADT Based Functional Class Homogeneous Principal Arterial Segments.

			2011 Population Basis					
		Rural	Small Urban	Small Urbanized	Large Urbanized	Metropolitan		
Ø	Rural	5,892	528	453	94	0		
Basis	Small Urban	21,145	6,686	3,388	543	339		
AADT E	Small Urbanized	692	786	773	59	271		
2011 A.	Large Urbanized	4	35	25	0	32		
7	Metropolitan	2	43	86	0	170		

Table 4.9: Matrix of 2012 Population Based and AADT Based Functional Class Homogeneous Principal Arterial Segments.

				2012 Popula	tion Basis	
		Rural	Small Urban	Small Urbanized	Large Urbanized	Metropolitan
Ø	Rural	6,183	826	661	94	15
Basis	Small Urban	20,557	6,422	3,554	586	389
	Small Urbanized	964	665	439	16	174
2012 AADT	Large Urbanized	13	61	13	0	61
7	Metropolitan	18	104	58	0	173

The difference between the two classifications was also observed in the other geographic classifications, but the most significant difference was observed for the Small Urban classification whereas the population based definition resulted in 8,078 segments while the daily traffic volumes based definition had 32,101 segments in 2011. Approximately 76% of the segments in the Principal

Arterial functional classification were observed to have Small Urban levels of AADT over the three-year study period.

4.3 Minor Arterial Segments

A total of 32,024 segments comprise the number of homogeneous segments identified with the Minor Arterial classification. Tables 4.10, 4.11, and 4.12 represent the population based and AADT based comparison matrices of the Minor Arterial segments for 2010, 2011, and 2012.

Table 4.10: Matrix of 2010 Population Based and AADT Based Functional Class Homogeneous Minor Arterial Segments.

			2010 Population Basis					
		Rural	Small Urban	Small Urbanized	Large Urbanized	Metropolitan		
Ø	Rural	9,556	149	148	0	0		
Basis	Small Urban	17,146	1,966	562	68	0		
	Small Urbanized	617	422	245	28	0		
2010 AADT	Large Urbanized	103	102	201	0	0		
2	Metropolitan	218	295	198	0	0		

Table 4.11: Matrix of 2011 Population Based and AADT Based Functional Class Homogeneous Minor Arterial Segments.

			2011 Population Basis					
		Rural	Small Urban	Small Urbanized	Large Urbanized	Metropolitan		
Ø	Rural	10,244	357	161	0	0		
Basis	Small Urban	15,863	1,757	616	66	0		
	Small Urbanized	758	333	249	9	0		
2011 AADT	Large Urbanized	262	130	140	0	0		
7	Metropolitan	513	357	188	21	0		

Consistent with the Interstate and Principal Arterials, the number of Rural segments based on population was found to reduce significantly from 27,640 compared to 10,762 segments based on AADT in 2011. The number of Small Urban segments by population showed an increase from 2,934 compared to the 18,302 AADT based segments in 2011. Another significant observation from the summary is that under the Minor Arterial functional class, there are zero segments that fall within a Metropolitan geographic definition based on population. On the contrary, the AADT based definition suggests that between 711 and 1,417 Minor Arterial segments demonstrated Metropolitan levels of daily traffic volumes over the three-year period.

Table 4.12: Matrix of 2012 Population Based and AADT Based Functional Class Homogeneous Minor Arterial Segments.

			2012 Population Basis					
		Rural	Small Urban	Small Urbanized	Large Urbanized	Metropolitan		
S	Rural	10,451	465	209	0	0		
Basis	Small Urban	14,923	1,651	637	27	0		
AADT E	Small Urbanized	1,116	361	197	0	0		
2012 A.	Large Urbanized	346	74	119	31	0		
7	Metropolitan	804	383	192	38	0		

4.4 Collector Segments

A total count of 26,166 homogeneous roadway segments has been identified as the Collector type functional class for years 2010, 2011, and 2012. Tables 4.13, 4.14, and 4.15 show the matrices for the population based and AADT based comparisons for the Collector functional class types from 2010 to 2012.

Table 4.13: Matrix of 2010 Population Based and AADT Based Functional Class Homogeneous Collector Segments.

				2010 Popula	tion Basis	
		Rural	Small Urban	Small Urbanized	Large Urbanized	Metropolitan
S	Rural	12,127	540	37	0	0
Basis	Small Urban	12,224	272	222	101	0
	Small Urbanized	68	3	0	0	0
2010 AADT	Large Urbanized	213	55	0	0	0
2	Metropolitan	223	72	9	0	0

Table 4.14: Matrix of 2011 Population Based and AADT Based Functional Class Homogeneous Collector Segments.

			2011 Population Basis					
		Rural	Small Urban	Small Urbanized	Large Urbanized	Metropolitan		
Ø	Rural	12339	458	37	0	0		
Basis	Small Urban	11661	311	196	101	0		
AADT B	Small Urbanized	259	40	1	0	0		
2011 A.	Large Urbanized	262	108	25	0	0		
7	Metropolitan	334	25	9	0	0		

Table 4.15: Matrix of 2012 Population Based and AADT Based Functional Class Homogeneous Collector Segments.

				2012 Popula	tion Basis	
		Rural	Small Urban	Small Urbanized	Large Urbanized	Metropolitan
S	Rural	12146	364	6	0	0
Basis	Small Urban	11717	420	227	65	0
AADT E	Small Urbanized	334	43	26	27	0
2012 A.	Large Urbanized	263	77	7	9	0
7	Metropolitan	395	38	2	0	0

Like the Minor Arterial segment analysis, 24,855 Collector segments classified by population were reduced to 12,834 segments when based on AADT criteria in 2011. Similarly, the number of Small Urban segments were found to increase from 942 population based segments to 12,269 AADT based segments in 2011. Based on population, the Collectors contain zero Metropolitan segments while the AADTs over the same three year span of this study indicate between 304 and 435 Metropolitan level segments.

4.5 Non-Interstate Segments (Collector + Minor Arterial + Principal Arterial)

When excluding Interstate segments, the total count of homogeneous roadway segments is 100,236 Non-Interstate segments for 2010, 2011, and 2012. The Non-Interstate segments classification includes Principal Arterial (Freeway/Expressway + Other Principal Arterial), Minor Arterial, and Collector segments. Tables 4.16, 4.17, and 4.18 represent the matrices for the population based and AADT based comparisons for the Non-Interstate functional classification for 2010, 2011, and 2012.

Table 4.16: Matrix of 2010 Population Based and AADT Based Functional Class Homogeneous Non-Interstate Segments.

		2010 Population Basis				
		Rural	Small Urban	Small Urbanized	Large Urbanized	Metropolitan
S	Rural	27,168	1,030	385	65	0
Basis	Small Urban	51,086	8,954	4,191	700	342
AADT B	Small Urbanized	1,216	1,393	1,154	128	378
2010 A.	Large Urbanized	319	184	307	0	21
7	Metropolitan	441	393	310	0	71

Table 4.17: Matrix of 2011 Population Based and AADT Based Functional Class Homogeneous Non-Interstate Segments.

		2011 Population Basis				
		Rural	Small Urban	Small Urbanized	Large Urbanized	Metropolitan
Ø	Rural	28,475	1,343	651	94	0
AADT Basis	Small Urban	48,669	8,754	4,200	710	339
	Small Urbanized	1,709	1,159	1,023	68	271
2011 A.	Large Urbanized	528	273	190	0	32
7	Metropolitan	849	425	283	21	170

Table 4.18: Matrix of 2012 Population Based and AADT Based Functional Class Homogeneous Non-Interstate Segments.

		2012 Population Basis				
		Rural	Small Urban	Small Urbanized	Large Urbanized	Metropolitan
AADT Basis	Rural	28,780	1,655	876	94	15
	Small Urban	47,197	8,493	4,418	678	389
	Small Urbanized	2,414	1,069	662	43	174
2012 A	Large Urbanized	622	212	139	40	61
7	Metropolitan	1,217	525	252	38	173

It was observed that while 80,230 segments fell under a Rural definition based on population, only between 28,648 and 31,420 segments demonstrated AADTs within an actual Rural range. Additionally, 11,954 segments were classified as being Small Urban based on population, but over the three-year period it was observed that between 61,175 and 65,273 segments showed Small Urban levels of daily traffic volumes. Rural areas based on population with Metropolitan levels of AADT increased from 441 segments in 2010 to 1,217 segments in 2012. This trend was observed for all the other population classes except for Small Urbanized areas, whereas the number of segments with Metropolitan levels of daily traffic volumes decreased from 310 in 2010 to 252 in 2012. Small Urbanized population based segments also saw an increase from 385 to 876 Rural level AADT segments, and 4,191 to 4,418 Small Urban level AADT segments from 2011 to 2012. Inversely, areas designated as Small Urbanized based on both the population and AADT criteria were found to reduce from 1,154 to 662 segments over the three years of 2010 to 2012.

5.0 Crash Summary

The crash counts in the homogeneous segments crash database were consolidated to ensure consistency with the WSDOT source crash data and Washington State collision data summary logs

for the years 2010 to 2012. It should be noted that while the crash counts in the Washington State collision data summary logs include crashes on ramps, alternatives, spurs and couplets, only crashes occurring along the mainline of the roadway segments are examined in this study. The crash counts from the homogeneous segments crash database have been disaggregated to examine various mainline crash characteristics in tabular summaries. The summaries were prepared according to the total number of crashes, number of crashes by impact location, number of crashes by collision severity, and collision type for the three year time frame of 2010 to 2012. This chapter will present the crash summary tables by roadway functional classification in the first section, and by geographic classification in the second section. The functional classification tables are based on the results the WSDOT determined from their functional classification procedures. The geographic classification tables will present comparisons between the crash counts with the AADT based classification measure and the population based classification measure.

5.1 Crash Summaries by Roadway Functional Class

Each of the roadway functional class summary tables includes Rural and Urban crashes within the major functional classes of: Interstate, Principal Arterials, Minor Arterials, and Major Collectors. The resulting segment functional classifications stem from WSDOT's functional class assignment process in which the functional class were determined on a roadway segment basis according to accumulate route mileage and state route milepost markers. Table 5.1 displays the total number of crashes along the 6,867.683 miles of mainline roadway represented in the homogeneous crash segments database, grouped by year and area type for the four major functional classifications used by WSDOT.

Table 5.1: Total Crash Count by Functional Class from 2010 to 2012.

Functional Class	Rural/Urban	Total Crashes			
Functional Class	Kurai/Orban	2010	2011	2012	
Interstate	Rural	2,188	2,180	2,346	
Interstate	Urban	9,419	9,169	9,604	
Duinainal Autorial	Rural	3,954	4,078	4,076	
Principal Arterial	Urban	15,214	15,267	15,445	
Minor Arterial	Rural	2,089	2,066	2,085	
Willor Arterial	Urban	2,286	2,209	2,314	
Major Collector	Rural	1,332	1,218	1,283	
iviajoi Collectoi	Urban	15	15	12	
Total		36,497	36,202	37,165	

The number of crashes in Urban areas were found to be consistently about 2.8 times higher than the number of Rural crashes during the three-year time frame. The total number of crashes along minor arterial roadways in Washington State was found to be around 4,300 per year with a 100 crash reduction between 2010 and 2011, but an increase from 4,275 crashes in 2011 to 4,399 in 2012. Similarly, Interstate crashes were found to reduce from 11,607 in 2010 to 11,349 crashes in 2011, but increase significantly to 11,950 in 2012. Total crashes along Principal Arterials were found to show an increasing trend over the three years with 19,168 crashes in 2010 up to 19,521

crashes in 2012. Overall, the total number of crashes decreased from 2010 to 2011, but increased significantly between 2011 and 2012. The total number of crashes from 2010 to 2012 is organized by major impact location as Roadside, Roadway, or Other location in Table 5.2 on the following page. The information is presented for each of the crash years and disaggregated according to functional class and Rural or Urban indicators.

Table 5.2: Functional Class Crash Count by Impact Location from 2010 to 2012.

Functional Class	Rural/Urban	2010	2011	2012
runctional Class	Kurai/Orbaii	Roadside		
Intonstata	Rural	800	772	891
Interstate	Urban	1,346	1,199	1,402
Duinging Autorial	Rural	1,335	1,458	1,457
Principal Arterial	Urban	1,612	1,611	1,707
Minor Arterial	Rural	924	875	885
Willor Arterial	Urban	357	336	317
Major Collector	Rural	636	621	676
Major Conector	Urban	5	5	2
Sub Total		7,015	6,877	7,337
Functional Class	Rural/Urban		Roadway	
Interstate	Rural	1,374	1,379	1,436
mersiale	Urban	8,066	7,959	8,195
Principal Arterial	Rural	2,609	2,606	2,612
rinicipal Arterial	Urban	13,565	13,613	13,697
Minor Arterial	Rural	1,163	1,187	1,194
Williof Afterial	Urban	1,918	1,867	1,991
Major Collector	Rural	695	593	606
Major Conector	Urban	10	10	10
Sub Total		29,400	29,214	29,741
Functional Class	Rural/Urban		Other	
Interstate	Rural	14	29	19
micistate	Urban	7	11	7
Principal Arterial	Rural	10	14	7
rinicipai Arteriai	Urban	37	43	41
Minor Arterial	Rural	2	4	6
Willor Arterial	Urban	11	6	6
Major Collector	Rural	1	4	1
Major Conector	Urban	0	0	0
Sub Total		82	111	87
Total		36,497	36,202	37,165

Crashes along the main Roadway section accounted for a significant portion of the total number of crashes. Crashes falling under the Other location category increased between 2010 and 2011 before reducing in 2012. The number of crashes on the Roadway or Roadside was found to show the opposite with 2012 having the highest number of total crashes for the three-year period. It was also

found that crashes along Rural Principal Arterial Roadsides, Rural Interstate Roadways, Urban Principal Arterial Roadways, and Rural Minor Arterial Roadways, demonstrated a steady increase in crashes while Roadside Minor Arterial crashes showed a steady decrease in crashes from 2010 to 2012. Functional class crash counts sorted by collision severities are displayed in Table 5.3 according to PDO, Possible Injury, Evident Injury, Serious Injury, Fatal, and Unknown Injury.

Table 5.3: Functional Class Crash Count by Collision Severity from 2010 to 2012.

F 4 101	D 1/II.1	2010	2011	2012	
Functional Class	Rural/Urban	PDO			
Tutamatata	Rural	1,505	1,504	1,662	
Interstate	Urban	6,474	6,250	6,607	
Duin ain al Antanial	Rural	2,537	2,652	2,724	
Principal Arterial	Urban	9,961	9,931	10,046	
Minor Arterial	Rural	1,235	1,205	1,253	
Willior Arterial	Urban	1,503	1,447	1,494	
Maior Callacter	Rural	797	690	790	
Major Collector	Urban	10	7	6	
Sub Total	·	24,022	23,686	24,582	
Functional Class	Rural/Urban		Possible Injury		
Interstate	Rural	353	319	347	
Interstate	Urban	2,239	2,231	2,328	
Duin ain al Antanial	Rural	647	631	650	
Principal Arterial	Urban	3,786	3,843	3,853	
Min an Antanial	Rural	390	397	382	
Minor Arterial	Urban	507	498	535	
Main Callartan	Rural	230	217	213	
Major Collector	Urban	1	5	4	
Sub Total	·	8,153	8,141	8,312	
Functional Class	Rural/Urban	Evident Injury			
T44	Rural	266	276	255	
Interstate	Urban	554	546	539	
Dain aireal Antanial	Rural	537	556	505	
Principal Arterial	Urban	1,052	1,161	1,160	
M' A 4 ' 1	Rural	301	318	301	
Minor Arterial	Urban	177	178	188	
Mailan Callanta	Rural	203	229	179	
Major Collector	Urban	3	2	2	
Sub Total		3,093	3,266	3,129	

Table 5.3 (continued): Functional Class Crash Count by Collision Severity from 2010 to 2012.

F 1.C1	D 1/II 1	2010	2011	2012	
Functional Class	Rural/Urban	Serious Injury			
•	Rural	38	39	40	
Interstate	Urban	87	79	73	
Daineinel Autorial	Rural	138	136	95	
Principal Arterial	Urban	254	179	184	
Minor Arterial	Rural	97	83	70	
Willor Afterial	Urban	40	50	53	
Maior Collector	Rural	54	47	54	
Major Collector	Urban	1	0	0	
Sub Total		709	613	569	
Functional Class	Rural/Urban		Fatal		
Interstate	Rural	14	24	17	
mierstate	Urban	19	25	18	
Dringing Astonial	Rural	52	48	44	
Principal Arterial	Urban	43	39	51	
Minor Arterial	Rural	39	30	31	
Willor Afterial	Urban	14	14	6	
Major Collector	Rural	13	9	13	
Major Corrector	Urban	0	1	0	
Sub Total		194	190	180	
Functional Class	Rural/Urban		Unknown		
Interstate	Rural	12	18	25	
mterstate	Urban	46	38	39	
Principal Arterial	Rural	43	55	58	
Timeipai Aiteriai	Urban	118	114	151	
Minor Arterial	Rural	27	33	48	
Willion Alterial	Urban	45	22	38	
Major Collector	Rural	35	26	34	
iviajoi Conectoi	Urban	0	0	0	
Sub Total		326	306	393	
Total		36,497	36,202	37,165	

PDO type crashes were found to be significantly higher in number than the other crash severity types with 2012 having the highest number of the three years. Fatalities were found to have the least number of overall crashes, displaying an apparent decreasing trend, with the exception of Urban Principal Arterial Fatalities which were found to be significantly higher in 2012 compared to 2010.

The functional class crash count by number of vehicles involved is presented on the next two pages in Table 5.4 ranging from one vehicle involved (Veh1) to more than six vehicles involved (≥Veh6).

Table 5.4: Functional Class Crash Count by Number of Vehicles Involved from 2010 to 2012.

		2010	2011	2012
Functional Class	Rural/Urban		ber of vehicles -	
T	Rural	1,404	1,385	1,527
Interstate	Urban	1,647	1,501	1,721
D: : 14 / :1	Rural	2,227	2,399	2,374
Principal Arterial	Urban	2,290	2,384	2,463
NC 44 11	Rural	1,187	1,142	1,181
Minor Arterial	Urban	442	415	416
Mailer Callerter	Rural	786	747	825
Major Collector	Urban	5	5	4
Sub Total		9,988	9,978	10,511
Functional Class	Rural/Urban	Num	ber of vehicles -	Veh2
Intonstata	Rural	692	682	690
Interstate	Urban	5,937	5,857	5,987
Dringing Autoria	Rural	1,541	1,481	1,525
Principal Arterial	Urban	11,045	11,025	11,055
Minon Antonial	Rural	798	832	793
Minor Arterial	Urban	1,637	1,559	1,651
Maior Collector	Rural	509	424	423
Major Collector	Urban	10	9	8
Sub Total		22,169	21,869	22,132
Functional Class	Rural/Urban	Num	ber of vehicles -	Veh3
Interstate	Rural	69	84	94
mterstate	Urban	1,396	1,400	1,450
Principal Arterial	Rural	164	172	152
Timeipai Aiteriai	Urban	1,533	1,518	1,572
Minor Arterial	Rural	95	83	98
IVIIIIOI ATTUITAI	Urban	182	208	204
Major Collector	Rural	30	39	31
iviajoi Concetoi	Urban	0	1	0
Sub Total		3,469	3,505	3,601
Functional Class	Rural/Urban	Num	ber of vehicles -	Veh4
Interstate	Rural	17	15	22
mersiae	Urban	348	312	362
Principal Arterial	Rural	17	20	20
i ilicipai Atteliai	Urban	285	283	298
Minor Arterial	Rural	7	7	12
Willion Atterial	Urban	23	21	39
Major Collector	Rural	6	7	2
1714/01 C01100101	Urban	0	0	0
Sub Total		703	665	755

Table 5.4 (continued): Functional Class Crash Count by Number of Vehicles Involved from 2010 to 2012.

Functional Class	Rural/Urban	2010	2011	2012	
runctional Class	Kurai/Orbaii	Number of vehicles - Veh5			
Intenstate	Rural	3	9	7	
Interstate	Urban	64	73	70	
Duin singl Autorial	Rural	5	5	3	
Principal Arterial	Urban	39	44	45	
Minor Arterial	Rural	1	1	1	
Willor Arterial	Urban	2	5	4	
Major Collector	Rural	0	0	0	
Wajor Corrector	Urban	0	0	0	
Sub Total	Sub Total		137	130	
Functional Class	Rural/Urban	Numb	per of vehicles -	≥Veh6	
Interstate	Rural	3	5	6	
interstate	Urban	27	26	14	
Principal Arterial	Rural	0	1	2	
Fillicipal Atterial	Urban	22	13	12	
Minor Arterial	Rural	1	1	0	
Willor Afterial	Urban	0	1	0	
Major Collector	Rural	1	1	2	
Major Corrector	Urban	0	0	0	
Sub Total	Sub Total		48	36	
Total		36,497	36,202	37,165	

The number of crashes involving one vehicle and two vehicles were found to be significantly higher than the other vehicle involvement types across all roadway functional classes. In crashes involving four vehicles or more, it was found that Urban Interstate and Urban Principal Arterial regions had significantly higher numbers of crashes than the other functional classes. Moreover, with the exception of crashes involving two vehicles, all the other categories show higher total accidents in 2012 than in 2010. One instance of a crash involving six vehicles or more on a Rural Major Collector was found for 2010 and 2011, and two such events were found to have occurred in 2012 despite the lower expected AADTs on such segments.

The crash counts for the 19 different collision types are arranged by functional class from 2010 to 2012 in Table 5.5. It was observed that the largest number of occurrences were Rear End, Fixed Object, Same Direction Sideswipe, Same Direction Others, and Entering at an Angle type crashes. As one would expect, Interstates were found to have had the least number of crashes related to Turning Traffic and Head-On collisions because of the divided directional lanes and reduced access points. It was observed that 43 crashes involving pedestrians occurred on the Interstate system over the three years. The total number of Rear End crashes for all functional types was found to remain fairly steady over the three year crash analysis period with more occurrences in Urban areas than in Rural areas, particularly in Urban Interstates and Principal Arterials.

Table 5.5: Functional Class Crash Count by Collision Type from 2010 to 2012.

Functional Class	Rural/Urban	2010	2011	2012	
1 unctional Class			Rear End		
Interstate	Rural	328	315	288	
merstate	Urban	5,537	5,501	5,563	
Principal Arterial	Rural	738	735	747	
1 Imerput 7 itterius	Urban	6,839	6,917	6,830	
Minor Arterial	Rural	380	367	399	
Williof Afterial	Urban	858	900	884	
Major Collector	Rural	203	165	167	
iviajoi Conccioi	Urban	3	1	1	
Sub Total		14,886	14,901	14,879	
Functional Class	Rural/Urban	•	Гurning Rear En	d	
Interstate	Rural	0	0	0	
micistate	Urban	0	0	1	
Dringing Autorial	Rural	7	9	7	
Principal Arterial	Urban	208	225	169	
Min and Automial	Rural	10	3	4	
Minor Arterial	Urban	20	9	21	
Mailer Callerton	Rural	2	0	1	
Major Collector	Urban	0	0	0	
Sub Total	Sub Total		246	203	
Functional Class	Rural/Urban	Same Dia	Same Direction Turning Sideswipe		
Totalinate	Rural	0	0	0	
Interstate	Urban	0	0	1	
Dain sin at Autoriat	Rural	7	6	5	
Principal Arterial	Urban	135	127	142	
Min and Automial	Rural	3	5	1	
Minor Arterial	Urban	24	17	22	
M : C 11 4	Rural	0	1	2	
Major Collector	Urban	0	0	1	
Sub Total	·	169	156	174	
Functional Class	Rural/Urban	Same	e Direction Sides	swipe	
T	Rural	205	202	243	
Interstate	Urban	1,581	1,592	1,686	
D: 11.	Rural	124	117	114	
Principal Arterial	Urban	1,482	1,510	1,598	
3.6	Rural	39	47	30	
Minor Arterial	Urban	132	110	135	
7.5 . ~	Rural	19	17	9	
Major Collector	Urban	1	1	0	
Sub Total	·	3,583	3,596	3,815	

Table 5.5 (continued): Functional Class Crash Count by Collision Type from 2010 to 2012.

- i i di	D 1/III	2010	2011	2012
Functional Class	Rural/Urban		ne Direction Turi	
T	Rural	2	1	2
Interstate	Urban	0	0	1
D: : 1 A . : 1	Rural	104	88	91
Principal Arterial	Urban	289	295	342
NC 44 11	Rural	59	59	66
Minor Arterial	Urban	72	80	67
M: CIII	Rural	35	30	41
Major Collector	Urban	1	1	1
Sub Total		562	554	611
Functional Class	Rural/Urban	Sar	me Direction Otl	ners
T	Rural	136	156	154
Interstate	Urban	398	349	416
D: : 1 A . : 1	Rural	80	71	86
Principal Arterial	Urban	372	360	374
NG 1 1 1	Rural	25	37	33
Minor Arterial	Urban	37	48	52
M: CIII	Rural	16	14	18
Major Collector	Urban	0	0	0
Sub Total	Sub Total		1,035	1,133
Functional Class	Rural/Urban		Head On	
Tukunskaka	Rural	3	2	5
Interstate	Urban	2	7	6
Duin singl Autorial	Rural	36	41	33
Principal Arterial	Urban	50	43	69
Minor Arterial	Rural	23	19	20
Willior Arterial	Urban	14	14	19
Maior Collector	Rural	10	13	18
Major Collector	Urban	1	2	0
Sub Total		139	141	170
Functional Class	Rural/Urban	Oppos	ite Direction Sid	leswipe
Interstate	Rural	1	3	3
Interstate	Urban	4	4	4
Dringing Autorial	Rural	51	58	42
Principal Arterial	Urban	71	56	63
Minor Arterial	Rural	34	48	25
Willion Afterial	Urban	26	22	23
Major Collector	Rural	28	25	27
iviajoi Conectoi	Urban	0	1	0
Sub Total		215	217	187

Table 5.5 (continued): Functional Class Crash Count by Collision Type from 2010 to 2012.

F 1 C1	D 1/III	2010	2011	2012
Functional Class	Rural/Urban	Оррс	site Direction To	urning
Tukunskaka	Rural	0	0	0
Interstate	Urban	1	0	0
Duin singl Autorial	Rural	78	84	106
Principal Arterial	Urban	1,047	1,047	1,008
NC 4	Rural	60	62	52
Minor Arterial	Urban	186	145	163
M: CIII	Rural	38	34	25
Major Collector	Urban	0	1	0
Sub Total		1,410	1,373	1,354
Functional Class	Rural/Urban		Fixed Object	
Tukunskaka	Rural	874	864	968
Interstate	Urban	1,433	1,240	1,467
Duin singl Autorial	Rural	1,179	1,334	1,316
Principal Arterial	Urban	1,652	1,656	1,732
NC 44 11	Rural	751	723	733
Minor Arterial	Urban	320	297	287
M: CII	Rural	546	529	560
Major Collector	Urban	5	4	2
Sub Total		6,760	6,647	7,065
Functional Class	Rural/Urban]	Entering At Angl	le
Tutanistata	Rural	0	0	1
Interstate	Urban	0	2	2
Duinainal Autarial	Rural	341	287	290
Principal Arterial	Urban	2,080	1,970	2,020
Minor Arterial	Rural	194	185	194
winor Arteriai	Urban	412	392	461
Major Collector	Rural	139	112	101
Major Collector	Urban	4	2	5
Sub Total		3,170	2,950	3,074
Functional Class	Rural/Urban		Overturned	
Interstate	Rural	275	233	259
Interstate	Urban	174	139	138
Dringing Autorial	Rural	257	269	262
Principal Arterial	Urban	180	192	176
Minor Arterial	Rural	190	173	164
Willor Arterial	Urban	34	34	31
Major Collector	Rural	102	98	121
iviajoi Collectoi	Urban	0	1	0
Sub Total		1,212	1,139	1,151

Table 5.5 (continued): Functional Class Crash Count by Collision Type from 2010 to 2012.

F (1.01	D 1/II.1	2010	2011	2012
Functional Class	Rural/Urban		Animal	
T	Rural	184	198	226
Interstate	Urban	67	86	77
D: : 14 : :1	Rural	655	703	708
Principal Arterial	Urban	110	136	145
N.C	Rural	186	200	228
Minor Arterial	Urban	37	22	26
M. C. II.	Rural	110	83	111
Major Collector	Urban	0	0	1
Sub Total	•	1,349	1,428	1,522
Functional Class	Rural/Urban		Bicycle	
T	Rural	20	2	0
Interstate	Urban	4	1	0
D: : 14 : :1	Rural	39	8	13
Principal Arterial	Urban	16	140	130
3.5	Rural	32	14	10
Minor Arterial	Urban	4	26	21
M ' C 11 4	Rural	19	6	5
Major Collector	Urban	0	0	0
Sub Total	1	134	197	179
Functional Class	Rural/Urban		Pedestrian	
T	Rural	2	2	2
Interstate	Urban	10	16	11
Dulmain al Antanial	Rural	25	21	14
Principal Arterial	Urban	237	247	271
Minera Associat	Rural	12	10	18
Minor Arterial	Urban	28	35	41
Maileo Callacter	Rural	3	11	10
Major Collector	Urban	0	0	0
Sub Total		317	342	367
Functional Class	Rural/Urban	One	Parked, One Mo	oving
T4	Rural	33	35	31
Interstate	Urban	33	39	33
Duin sin al A (1 1	Rural	34	31	28
Principal Arterial	Urban	87	80	96
M: A 1	Rural	19	19	21
Minor Arterial	Urban	25	20	21
M.: C 11 4	Rural	13	20	15
Major Collector	Urban	0	0	0
Sub Total		244	244	245

Table 5.5 (continued): Functional Class Crash Count by Collision Type from 2010 to 2012.

F 4' 1.01	D 1/III	2010	2011	2012	
Functional Class	Rural/Urban	Entering/Leaving Driveway			
Interestata	Rural	5	2	3	
Interstate	Urban	3	3	4	
Duinainal Autorial	Rural	10	8	10	
Principal Arterial	Urban	20	23	25	
Minor Arterial	Rural	6	5	2	
Minor Arterial	Urban	6	6	3	
Maior Collector	Rural	6	8	10	
Major Collector	Urban	0	0	0	
Sub Total		56	55	57	
Functional Class	Rural/Urban		Other		
Interstate	Rural	120	164	160	
micistate	Urban	171	188	193	
Principal Arterial	Rural	189	208	204	
Principal Arterial	Urban	338	243	253	
Minor Arterial	Rural	66	90	84	
Millor Afterial	Urban	51	32	37	
Major Collector	Rural	42	51	42	
Major Conector	Urban	0	1	1	
Sub Total		977	977	974	
Functional Class	Rural/Urban		Not Stated		
Interstate	Rural	0	1	1	
mterstate	Urban	1	2	1	
Principal Arterial	Rural	0	0	0	
Timeipai Aiteriai	Urban	1	0	2	
Minor Arterial	Rural	0	0	1	
Willor Arterial	Urban	0	0	0	
Major Collector	Rural	1	1	0	
iviajoi Conccioi	Urban	0	0	0	
Sub Total		3	4	5	
Total		36,497	36,202	37,165	

Reduced access to interstate facilities led to nearly zero Turning Rear End and Same Direction Turning Sideswipe type crashes, the only exceptions being one incident each on an Urban Interstate reported in 2012. Urban Principal Arterials accounted for a significant number of the Turning Rear End type collisions on the network with 208, 225, and 169 crashes in 2010, 2011, and 2012. Same Direction Sideswipe crashes were found to follow an increasing trend going from 3,583 crashes in 2010 to 3,596 crashes in 2011 to 219 crashes in 2012. This trend was consistent within the Urban Interstate and Principal Arterial functional classes, while Rural Principal Arterials demonstrated a reduction from 124 crashes in 2010 to 114 in 2012.

Same Direction Turning type crashes decreased from 562 in 2010 to 554 in 2011, but increased to 611 in 2012. While Rural Principal Arterials decreased over the three year span, Urban Principal Arterial Same Direction Turning type crashes increased from 289 in 2010 to 342 in 2012. The number of Head-On crashes was also found to increase from 139 in 2010 to 170 in 2012, while the number of Opposite Direction Sideswipes was found to be 215 in 2010 lowering to 187 in 2012. Opposite Direction Turning type collisions were observed to decrease with 1,410 crashes in 2010 to 1,354 crashes in 2012, with over a third of the incidents occurring on Urban Principal Arterials. Collisions involving Fixed Objects were found to decrease from 2010 to 2011, but increase to 7,065 incidents in 2012, with Principal Arterials accounting for nearly half of the yearly total.

Another consideration in this analysis was the impact pedestrians and bicyclists had on crashes within the major roadway functional classes. It was found that over the three year period, 27 collisions involving bicyclists occurred on the interstate system, 22 of which occurred on Rural Interstates. Of these bicyclist collisions, 24 occurred in 2010 with zero incidents in 2012. Principal Arterials were found to have the highest number of bicyclist related crashes, with Rural regions decreasing from 39 crashes in 2010 to 13 in 2012. Conversely, Urban Arterials increased from 16 bicycle related crashes in 2010 to 140 in 2011 and 130 in 2012. Rural Minor Arterials and Major Collectors showed a decrease over the three year period, while Urban Minor Arterials increased by nearly five times from 2010 to 2012. Overall, bicycle related crashes were found to increase from 134 in 2010, to 197 in 2011, before reducing by 18 crashes reported in 2012.

Collisions involving pedestrians was found to exhibit an increasing trend over the three years with 317, 342, and 367 crashes respectively from 2010 to 2012. A total of 43 crashes over the three year period involved pedestrians on Interstates, of which 37 were found to have occurred in Urban areas. Crashes involving pedestrians on Rural Principal Arterials were found to decrease from 25 in 2010 to 14 in 2012. Urban Principal Arterials in contrast, while not only accounting for about 70% of the total pedestrian related crashes, also increased from 237 in 2010 to 271 in 2012. To a lesser extent, a similar trend was also observed in Urban Minor Arterials with 28 crashes in 2010 increasing to 41 in 2012.

5.2 Crash Summaries by Geographic Class

The next series of tables arranges the crash counts according to geographic class beginning with the total counts for all 6,867.683 miles of mainline roadway in Washington State. The crash counts were arranged based on geographic regions classified by segment AADT and regional census population data. The crash count tables are presented by impact location, collision severities, number of vehicles involved, and collision types. The tables aggregated by geographic class compare the measures of both the section AADT based classification results and the population based results. A large number of segments on the system fall within Small Urbanized, Small Urban or Rural definition when based on population. These segments are not isolated on the network and areas with low population levels could contain segments with very high AADT levels. Incident geographical area type was found to vary depending on the population and AADT of the respective segments on the system.

Table 5.6 shows the comparison of the total crash counts for the AADT and population based geographic class according to: Metropolitan, Large Urbanized, Small Urbanized, Small Urban, and Rural. The population based geographic classification shows that the number of accidents in

Metropolitan areas increased from 3,121 in 2010 to 3,181 in 2012. The highest number of crashes according to this measure occur in Small Urbanized and Small Urban areas, with the former showing a decreasing trend going from 2010 to 2012 and the latter showing and increasing trend

Table 5.6: Total Crash Count by Geographic Class from 2010 to 2012.

	A	ADT Base	d	Pop	Opulation Based		
Geographic Class	Т	Total Crashes			otal Crashe	es	
	2010	2011	2012	2010	2011	2012	
Metropolitan	5,018	5,148	5,194	3,121	3,134	3,181	
Large Urbanized	3,619	3,321	3,689	922	941	794	
Small Urbanized	4,874	3,487	2,519	11,026	10,749	10,885	
Small Urban	21,008	21,626	21,893	10,460	10,422	11,019	
Rural	1,978	2,620	3,870	10,968	10,956	11,286	
Total	36,497	36,202	37,165	36,497	36,202	37,165	

Between 2010 and 2012, crashes in Large Urbanized areas decreased by 128 crashes. Compared to the AADT based measure, while the total number of accidents for the years remains the same, the number within each geographic class varies due to the disparity between the two methods of classification. Population based Rural crashes total at 109,864 for the three years, whereas only 8,468 crashes based on AADT occur in areas that can be classified as Rural. Small Urban areas inversely show nearly double the number of crashes using AADT as the basis for classification compared to using the population based assessment. Similarly, AADT based Small Urbanized areas have about a third of the number of crashes in contrast to using population as a basis; Large Urbanized areas also show a significantly higher number of crashes when using AADT as a basis.

Table 5.7 on the following page displays the total number of crashes sorted by impact location for the AADT based and population based geographic classes. The impact locations are identified as Roadside, Roadway, or Other location and presented for crash years 2010, 2011, and 2012 disaggregated to five geographic classes.

As with the total crash counts discussion, Small Urban areas were found to have had between 4,603 and 4,668 Roadside crashes when consolidated by AADT. In contrast, population based Rural Roadside crashes were depicted as being the highest at about 3,970 crashes per year. In spite of the reduced totals, AADT based rural Roadside crashes were found to have an increasing trend over the three years. AADT based Metropolitan, Small Urbanized and Small Urban Roadside crashes saw a reduction from 2010 to 2011, before increasing in 2012. The general distribution of Roadway type crashes follows similar pattern as the Roadside type crashes when AADT is used as to classify geographic area. In addition to being the highest in number of crashes, Small Urban Roadway type crashes were observed to increase from 16,352 in 2010 to 17,159 in 2012.

Table 5.7: Geographic Class Crash Count by Impact Location from 2010 to 2012.

	A	AADT Based Population			ulation Ba	Based	
Geographic Class	2010	2011	2012	2010	2011	2012	
			Road	lside			
Metropolitan	573	625	661	364	343	405	
Large Urbanized	444	394	517	124	128	110	
Small Urbanized	719	600	516	1,260	1,223	1,275	
Small Urban	4,603	4,469	4,668	1,354	1,308	1,427	
Rural	676	789	975	3,913	3,875	4,120	
Sub Total	7,015	6,877	7,337	7,015	6,877	7,337	
Geographic Class	Roadway						
Metropolitan	4,437	4,516	4,523	2,751	2,787	2,775	
Large Urbanized	3,169	2,922	3,168	792	805	680	
Small Urbanized	4,143	2,871	2,000	9,750	9,506	9,595	
Small Urban	16,352	17,086	17,159	9,080	9,093	9,565	
Rural	1,299	1,819	2,891	7,027	7,023	7,126	
Sub Total	29,400	29,214	29,741	29,400	29,214	29,741	
Geographic Class			Otl	ner			
Metropolitan	8	7	10	6	4	1	
Large Urbanized	6	5	4	6	8	4	
Small Urbanized	12	16	3	16	20	15	
Small Urban	53	71	66	26	21	27	
Rural	3	12	4	28	58	40	
Sub Total	82	111	87	82	111	87	
Total	36,497	36,202	37,165	36,497	36,202	37,165	

Crash counts by geographic class are grouped by collision severities in Table 5.8 presented in the next page. The collision severity categories are listed as: PDO, Possible Injury, Evident Injury, Serious Injury, Fatal, and Unknown Injury. In regard to crash severities, PDO crashes were found to vary between 2,051 and 2,064 crashes over the 3-year period when classified on the population base, a range that increases to 3,417 to 3,563 crashes based on AADT. Similarly, AADT based Large Urbanized and Small Urban PDO crashes were found to be significantly higher than the corresponding population based counts. PDO crash locations that were classified as Small Urbanized and Rural based on population reduced greatly when examined on the AADT basis. Possible Injury crashes followed a similar relationship as demonstrated by the PDOs, with AADT based Small Urban crashes increasing over the 3-year period. AADT based Evident Injury crashes in Metropolitan areas were found to increase from 241 in 2010 to 307 in 2012, while in Small Urbanized areas they were found to decrease over the same period. AADT based Serious Injury crashes in Small Urbanized and Small Urban areas were exhibited a decreasing trend and Rural areas, while being fewer in number compared to the population based classification, showed an increase in number of crashes in 2012 over 2010. Consolidating crashes based on population would suggest that crashes in Rural areas result in the most fatalities on the system, but when classified based on AADT this number was found to indicate Small Urban areas as being more susceptible.

Table 5.8: Geographic Class Crash Count by Collision Severity from 2010 to 2012.

Coographic Class	able 5.6. Geographic Ci		<u> </u>				1
PDO	0 1: 01						
Metropolitan	Geographic Class	2010	2011			2011	2012
Large Urbanized 2,440 2,230 2,412 550 565 470 Small Urbanized 3,208 2,265 1,646 7,366 7,091 7,210 Small Urban 13,657 14,102 14,398 7,064 7,013 7,443 Rural 1,300 1,657 2,563 6,991 6,948 7,395 Sub Total 24,022 23,686 24,582 24,022 23,686 24,582 Geographic Class Possible Injury Metropolitan 1,271 1,316 1,238 834 827 863 Large Urbanized 899 798 993 262 248 204 Small Urban 4,471 4,659 4,715 2,367 2,369 2,480 Rural 331 502 768 1,982 1,946 1,963 Sub Total 8,153 8,141 8,312 8,153 8,141 8,312 Geographic Class Metropolitan 241	3.6 . 11.	2 417	2 422			2.060	2.064
Small Urbanized 3,208 2,265 1,646 7,366 7,091 7,210 Small Urban 13,657 14,102 14,398 7,064 7,013 7,443 Rural 1,300 1,657 2,563 6,991 6,948 7,395 Sub Total 24,022 23,686 24,582 24,022 23,686 24,582 Geographic Class Possible Injury Metropolitan 1,271 1,316 1,238 834 827 863 Large Urbanized 899 798 993 262 248 204 Small Urban 4,471 4,659 4,715 2,369 2,480 Small Urban 4,471 4,659 4,715 2,369 2,480 Rural 331 502 768 1,982 1,946 1,963 Sub Total 8,153 8,141 8,312 8,153 8,141 8,312 Geographic Class Evident Injury Metropolitan 241 309							
Small Urban 13,657 14,102 14,398 7,064 7,013 7,443 Rural 1,300 1,657 2,563 6,991 6,948 7,395 Sub Total 24,022 23,686 24,582 24,022 23,686 24,582 Geographic Class Possible Injury Metropolitan 1,271 1,316 1,238 834 827 863 Large Urbanized 899 798 993 262 248 204 Small Urbanized 1,181 866 598 2,708 2,751 2,802 Small Urban 4,471 4,659 4,715 2,367 2,369 2,480 Rural 331 502 768 1,982 1,946 1,963 Sub Total 8,153 8,141 8,312 8,153 8,141 8,312 Geographic Class Evident Injury Metropolitan 241 309 307 167 196 205 Large Urbanized 360							
Rural							
Sub Total 24,022 23,686 24,582 24,022 23,686 24,582 Geographic Class Possible Injury							
Possible Injury Metropolitan 1,271 1,316 1,238 834 827 863					·		
Metropolitan		24,022	23,686			23,686	24,582
Large Urbanized	U 1						
Small Urbanized 1,181 866 598 2,708 2,751 2,802 Small Urban 4,471 4,659 4,715 2,367 2,369 2,480 Rural 331 502 768 1,982 1,946 1,963 Sub Total 8,153 8,141 8,312 8,153 8,141 8,312 Geographic Class Evident Injury Metropolitan 241 309 307 167 196 205 Large Urbanized 220 222 228 85 104 92 Small Urbanized 360 272 189 699 700 682 Small Urban 2,034 2,135 2,038 745 782 791 Rural 238 328 367 1,397 1,484 1,359 Sub Total 3,093 3,266 3,129 3,093 3,266 3,129 Metropolitan 58 47 52 52 22 <td< td=""><td></td><td></td><td></td><td></td><td></td><td></td><td></td></td<>							
Small Urban 4,471 4,659 4,715 2,367 2,369 2,480 Rural 331 502 768 1,982 1,946 1,963 Sub Total 8,153 8,141 8,312 8,153 8,141 8,312 Geographic Class Evident Injury Metropolitan 241 309 307 167 196 205 Large Urbanized 220 222 228 85 104 92 Small Urbanized 360 272 189 699 700 682 Small Urban 2,034 2,135 2,038 745 782 791 Rural 238 328 367 1,397 1,484 1,359 Sub Total 3,093 3,266 3,129 3,093 3,266 3,129 Metropolitan 58 47 52 52 22 34 Large Urbanized 39 34 13 10 12	Ü						
Rural 331 502 768 1,982 1,946 1,963 Sub Total 8,153 8,141 8,312 8,153 8,141 8,312 Geographic Class Evident Injury Metropolitan 241 309 307 167 196 205 Large Urbanized 220 222 228 85 104 92 Small Urbanized 360 272 189 699 700 682 Small Urban 2,034 2,135 2,038 745 782 791 Rural 238 328 367 1,397 1,484 1,359 Sub Total 3,093 3,266 3,129 3,093 3,266 3,129 Geographic Class Serious Injury Metropolitan 58 47 52 52 22 34 Large Urbanized 32 39 34 13 10 12 Small Urban 478 400							-
Sub Total 8,153 8,141 8,312 8,153 8,141 8,312 Geographic Class Evident Injury Metropolitan 241 309 307 167 196 205 Large Urbanized 220 222 228 85 104 92 Small Urbanized 360 272 189 699 700 682 Small Urban 2,034 2,135 2,038 745 782 791 Rural 238 328 367 1,397 1,484 1,359 Sub Total 3,093 3,266 3,129 3,093 3,266 3,129 Sub Total 3,093 3,266 3,129 3,093 3,266 3,129 Metropolitan 58 47 52 52 22 34 Large Urbanized 32 39 34 13 10 12 Small Urban 478 400 347 148 140 157<							
Geographic Class Evident Injury Metropolitan 241 309 307 167 196 205 Large Urbanized 220 222 228 85 104 92 Small Urbanized 360 272 189 699 700 682 Small Urban 2,034 2,135 2,038 745 782 791 Rural 238 328 367 1,397 1,484 1,359 Sub Total 3,093 3,266 3,129 3,093 3,266 3,129 Geographic Class Serious Injury Metropolitan 58 47 52 52 22 34 Large Urbanized 32 39 34 13 10 12 Small Urban 478 400 347 148 140 157 Rural 62 76 91 355 322 275 Sub Total 709 613 569 709<		331	502		1,982	1,946	1,963
Metropolitan 241 309 307 167 196 205 Large Urbanized 220 222 228 85 104 92 Small Urbanized 360 272 189 699 700 682 Small Urban 2,034 2,135 2,038 745 782 791 Rural 238 328 367 1,397 1,484 1,359 Sub Total 3,093 3,266 3,129 3,093 3,266 3,129 Geographic Class Serious Injury Metropolitan 58 47 52 52 22 34 Large Urbanized 32 39 34 13 10 12 Small Urban 478 400 347 148 140 157 Rural 62 76 91 355 322 275 Sub Total 709 613 569 709 613 569 Geograp	Sub Total	8,153	8,141	8,312	8,153	8,141	8,312
Large Urbanized 220 222 228 85 104 92	Geographic Class			Eviden	t Injury		
Small Urbanized 360 272 189 699 700 682 Small Urban 2,034 2,135 2,038 745 782 791 Rural 238 328 367 1,397 1,484 1,359 Sub Total 3,093 3,266 3,129 3,093 3,266 3,129 Geographic Class Serious Injury Metropolitan 58 47 52 52 22 34 Large Urbanized 32 39 34 13 10 12 Small Urbanized 79 51 45 141 119 91 Small Urban 478 400 347 148 140 157 Rural 62 76 91 355 322 275 Sub Total 709 613 569 709 613 569 Geographic Class Fatal Metropolitan 10 18 8 6							
Small Urban 2,034 2,135 2,038 745 782 791 Rural 238 328 367 1,397 1,484 1,359 Sub Total 3,093 3,266 3,129 3,093 3,266 3,129 Geographic Class Serious Injury Metropolitan 58 47 52 52 22 34 Large Urbanized 32 39 34 13 10 12 Small Urbanized 79 51 45 141 119 91 Small Urban 478 400 347 148 140 157 Rural 62 76 91 355 322 275 Sub Total 709 613 569 709 613 569 Geographic Class Fatal Metropolitan 10 18 8 6 7 5 Large Urbanized 18 11 12 29	Large Urbanized	220	222	228	85	104	92
Rural 238 328 367 1,397 1,484 1,359 Sub Total 3,093 3,266 3,129 3,093 3,266 3,129 Geographic Class Serious Injury Metropolitan 58 47 52 52 22 34 Large Urbanized 32 39 34 13 10 12 Small Urbanized 79 51 45 141 119 91 Small Urban 478 400 347 148 140 157 Rural 62 76 91 355 322 275 Sub Total 709 613 569 709 613 569 Geographic Class Fatal Metropolitan 10 18 8 6 7 5 Large Urbanized 10 12 7 3 3 3 Small Urban 137 130 129 40 26	Small Urbanized	360	272	189	699	700	682
Sub Total 3,093 3,266 3,129 3,093 3,266 3,129 Geographic Class Serious Injury Metropolitan 58 47 52 52 22 34 Large Urbanized 32 39 34 13 10 12 Small Urbanized 79 51 45 141 119 91 Small Urban 478 400 347 148 140 157 Rural 62 76 91 355 322 275 Sub Total 709 613 569 709 613 569 Geographic Class Fatal Metropolitan 10 18 8 6 7 5 Large Urbanized 10 12 7 3 3 3 3 Small Urban 137 130 129 40 26 36 Rural 19 19 24 116 1	Small Urban	2,034	2,135	2,038	745	782	791
Geographic Class Serious Injury Metropolitan 58 47 52 52 22 34 Large Urbanized 32 39 34 13 10 12 Small Urbanized 79 51 45 141 119 91 Small Urban 478 400 347 148 140 157 Rural 62 76 91 355 322 275 Sub Total 709 613 569 709 613 569 Geographic Class Fatal Metropolitan 10 18 8 6 7 5 Large Urbanized 10 12 7 3 3 3 3 Small Urban 137 130 129 40 26 36 Rural 19 19 24 116 125 111 Sub Total 194 190 180 194 190 180<	Rural	238	328	367	1,397	1,484	1,359
Metropolitan 58 47 52 52 22 34 Large Urbanized 32 39 34 13 10 12 Small Urbanized 79 51 45 141 119 91 Small Urban 478 400 347 148 140 157 Rural 62 76 91 355 322 275 Sub Total 709 613 569 709 613 569 Geographic Class Fatal Metropolitan 10 18 8 6 7 5 Large Urbanized 10 12 7 3 3 3 3 Small Urban 137 130 129 40 26 36 Rural 19 19 24 116 125 111 Sub Total 194 190 180 194 190 180 Geographic Class Unk		3,093	3,266	3,129	3,093	3,266	3,129
Large Urbanized 32 39 34 13 10 12 Small Urbanized 79 51 45 141 119 91 Small Urban 478 400 347 148 140 157 Rural 62 76 91 355 322 275 Sub Total 709 613 569 709 613 569 Geographic Class Fatal Metropolitan 10 18 8 6 7 5 Large Urbanized 10 12 7 3 3 3 Small Urban 137 130 129 40 26 36 Rural 19 19 24 116 125 111 Sub Total 194 190 180 194 190 180 Geographic Class Unknown Metropolitan 21 26 26 11 13 10	Geographic Class			Serious	s Injury		
Small Urbanized 79 51 45 141 119 91 Small Urban 478 400 347 148 140 157 Rural 62 76 91 355 322 275 Sub Total 709 613 569 709 613 569 Geographic Class Fatal Metropolitan 10 18 8 6 7 5 Large Urbanized 10 12 7 3 3 3 Small Urban 137 130 129 40 26 36 Rural 19 19 24 116 125 111 Sub Total 194 190 180 194 190 180 Geographic Class Unknown Metropolitan 21 26 26 11 13 10 Large Urbanized 18 20 15 9 11 13	Metropolitan	58	47	52	52	22	34
Small Urban 478 400 347 148 140 157 Rural 62 76 91 355 322 275 Sub Total 709 613 569 709 613 569 Geographic Class Fatal Metropolitan 10 18 8 6 7 5 Large Urbanized 10 12 7 3 3 3 Small Urbanized 18 11 12 29 29 25 Small Urban 137 130 129 40 26 36 Rural 19 19 24 116 125 111 Sub Total 194 190 180 194 190 180 Geographic Class Unknown Metropolitan 21 26 26 11 13 10 Large Urbanized 18 20 15 9 11 13	Large Urbanized	32	39	34	13	10	12
Rural 62 76 91 355 322 275 Sub Total 709 613 569 709 613 569 Geographic Class Fatal Metropolitan 10 18 8 6 7 5 Large Urbanized 10 12 7 3 3 3 Small Urbanized 18 11 12 29 29 25 Small Urban 137 130 129 40 26 36 Rural 19 19 24 116 125 111 Sub Total 194 190 180 194 190 180 Geographic Class Unknown Metropolitan 21 26 26 11 13 10 Large Urbanized 18 20 15 9 11 13 Small Urbanized 28 22 29 83 59 75	Small Urbanized	79	51	45	141	119	91
Sub Total 709 613 569 709 613 569 Geographic Class Fatal Metropolitan 10 18 8 6 7 5 Large Urbanized 10 12 7 3 3 3 Small Urbanized 18 11 12 29 29 25 Small Urban 137 130 129 40 26 36 Rural 19 19 24 116 125 111 Sub Total 194 190 180 194 190 180 Geographic Class Unknown Metropolitan 21 26 26 11 13 10 Large Urbanized 18 20 15 9 11 13 Small Urbanized 28 22 29 83 59 75 Small Urban 231 200 266 96 92 112 <td>Small Urban</td> <td>478</td> <td>400</td> <td>347</td> <td>148</td> <td>140</td> <td>157</td>	Small Urban	478	400	347	148	140	157
Geographic Class Metropolitan 10 18 8 6 7 5 Large Urbanized 10 12 7 3 3 3 Small Urbanized 18 11 12 29 29 25 Small Urban 137 130 129 40 26 36 Rural 19 19 24 116 125 111 Sub Total 194 190 180 194 190 180 Geographic Class Unknown Metropolitan 21 26 26 11 13 10 Large Urbanized 18 20 15 9 11 13 Small Urbanized 28 22 29 83 59 75 Small Urban 231 200 266 96 92 112 Rural 28 38 57 127 131 183 Sub To	Rural	62	76	91	355	322	275
Geographic Class Fatal Metropolitan 10 18 8 6 7 5 Large Urbanized 10 12 7 3 3 3 Small Urbanized 18 11 12 29 29 25 Small Urban 137 130 129 40 26 36 Rural 19 19 24 116 125 111 Sub Total 194 190 180 194 190 180 Geographic Class Unknown Metropolitan 21 26 26 11 13 10 Large Urbanized 18 20 15 9 11 13 Small Urbanized 28 22 29 83 59 75 Small Urban 231 200 266 96 92 112 Rural 28 38 57 127 131 183 Sub Tot	Sub Total	709	613	569	709	613	569
Large Urbanized 10 12 7 3 3 Small Urbanized 18 11 12 29 29 25 Small Urban 137 130 129 40 26 36 Rural 19 19 24 116 125 111 Sub Total 194 190 180 194 190 180 Geographic Class Unknown Metropolitan 21 26 26 11 13 10 Large Urbanized 18 20 15 9 11 13 Small Urbanized 28 22 29 83 59 75 Small Urban 231 200 266 96 92 112 Rural 28 38 57 127 131 183 Sub Total 326 306 393 326 306 393	Geographic Class	•	•	Fa	ıtal		
Small Urbanized 18 11 12 29 29 25 Small Urban 137 130 129 40 26 36 Rural 19 19 24 116 125 111 Sub Total 194 190 180 194 190 180 Geographic Class Unknown Metropolitan 21 26 26 11 13 10 Large Urbanized 18 20 15 9 11 13 Small Urbanized 28 22 29 83 59 75 Small Urban 231 200 266 96 92 112 Rural 28 38 57 127 131 183 Sub Total 326 306 393 326 306 393	Metropolitan	10	18	8	6	7	5
Small Urbanized 18 11 12 29 29 25 Small Urban 137 130 129 40 26 36 Rural 19 19 24 116 125 111 Sub Total 194 190 180 194 190 180 Geographic Class Unknown Metropolitan 21 26 26 11 13 10 Large Urbanized 18 20 15 9 11 13 Small Urbanized 28 22 29 83 59 75 Small Urban 231 200 266 96 92 112 Rural 28 38 57 127 131 183 Sub Total 326 306 393 326 306 393	Large Urbanized	10	12	7	3	3	3
Small Urban 137 130 129 40 26 36 Rural 19 19 24 116 125 111 Sub Total 194 190 180 194 190 180 Geographic Class Unknown Metropolitan 21 26 26 11 13 10 Large Urbanized 18 20 15 9 11 13 Small Urbanized 28 22 29 83 59 75 Small Urban 231 200 266 96 92 112 Rural 28 38 57 127 131 183 Sub Total 326 306 393 326 306 393		18	11	12	29	29	
Sub Total 194 190 180 194 190 180 Geographic Class Unknown Metropolitan 21 26 26 11 13 10 Large Urbanized 18 20 15 9 11 13 Small Urbanized 28 22 29 83 59 75 Small Urban 231 200 266 96 92 112 Rural 28 38 57 127 131 183 Sub Total 326 306 393 326 306 393				129			
Sub Total 194 190 180 194 190 180 Geographic Class Unknown Metropolitan 21 26 26 11 13 10 Large Urbanized 18 20 15 9 11 13 Small Urbanized 28 22 29 83 59 75 Small Urban 231 200 266 96 92 112 Rural 28 38 57 127 131 183 Sub Total 326 306 393 326 306 393		19		24	116	125	
Metropolitan 21 26 26 11 13 10 Large Urbanized 18 20 15 9 11 13 Small Urbanized 28 22 29 83 59 75 Small Urban 231 200 266 96 92 112 Rural 28 38 57 127 131 183 Sub Total 326 306 393 326 306 393	Sub Total	194	190	180			
Metropolitan 21 26 26 11 13 10 Large Urbanized 18 20 15 9 11 13 Small Urbanized 28 22 29 83 59 75 Small Urban 231 200 266 96 92 112 Rural 28 38 57 127 131 183 Sub Total 326 306 393 326 306 393	Geographic Class			Unkı	nown		
Large Urbanized 18 20 15 9 11 13 Small Urbanized 28 22 29 83 59 75 Small Urban 231 200 266 96 92 112 Rural 28 38 57 127 131 183 Sub Total 326 306 393 326 306 393	Metropolitan	21	26	26	11	13	10
Small Urbanized 28 22 29 83 59 75 Small Urban 231 200 266 96 92 112 Rural 28 38 57 127 131 183 Sub Total 326 306 393 326 306 393		18	20	15	9	11	13
Rural 28 38 57 127 131 183 Sub Total 326 306 393 326 306 393	Small Urbanized	28	22	29	83	59	75
Rural 28 38 57 127 131 183 Sub Total 326 306 393 326 306 393	Small Urban	231	200	266	96	92	112
Sub Total 326 306 393 326 306 393		28			127	131	
		326	306	393	326	306	393
	Total	36,497	36,202	37,165	36,497	36,202	37,165

Geographic class crash counts disaggregated by number of vehicles involved is shown on the following page in Table 5.9. The categories for number of vehicles ranges from one vehicle involved (Veh1) to more than six vehicles involved (\geq Veh6).

Table 5.9: Geographic Class Crash Count by Number of Vehicles Involved from 2010 to 2012.

	AADT Based			Population Based			
Geographic Class	2010	2011	2012	2010	2011	2012	
				hicles - Veh			
Metropolitan	633	744	823	401	400	451	
Large Urbanized	531	522	630	203	189	182	
Small Urbanized	1,003	817	700	1,592	1,563	1,616	
Small Urban	6,840	6,744	6,924	1,928	1,948	2,086	
Rural	981	1,151	1,434	5,864	5,878	6,176	
Sub Total	9,988	9,978	10,511	9,988	9,978	10,511	
Geographic Class		Nı	umber of ve	hicles - Veh	2		
Metropolitan	3,414	3,406	3,382	2,072	2,094	2,115	
Large Urbanized	2,361	2,174	2,319	596	617	509	
Small Urbanized	3,180	2,186	1,487	7,743	7,542	7,543	
Small Urban	12,324	12,839	12,878	7,285	7,197	7,540	
Rural	890	1,264	2,066	4,473	4,419	4,425	
Sub Total	22,169	21,869	22,132	22,169	21,869	22,132	
Geographic Class				hicles - Veh			
Metropolitan	751	763	744	502	484	470	
Large Urbanized	563	496	576	100	104	83	
Small Urbanized	526	387	256	1,311	1,315	1,375	
Small Urban	1,538	1,696	1,734	1,021	1,049	1,111	
Rural	91	163	291	535	553	562	
Sub Total	3,469	3,505	3,601	3,469	3,505	3,601	
Geographic Class				hicles - Veh	4		
Metropolitan	171	184	200	112	123	117	
Large Urbanized	139	93	132	21	26	19	
Small Urbanized	126	71	68	304	252	291	
Small Urban	253	280	289	192	189	233	
Rural	14	37	66	74	75	95	
Sub Total	703	665	755	703	665	755	
Geographic Class			umber of ve	hicles - Veh			
Metropolitan	34	39	41	25	27	23	
Large Urbanized	19	24	25	2	2	1	
Small Urbanized	22	21	4	50	58	48	
Small Urban	38	49	49	23	28	41	
Rural	1	4	11	14	22	17	
Sub Total	114	137	130	114	137	130	
Geographic Class	-			nicles - ≥Vel	16		
Metropolitan	15	12	4	9	6	5	
	6	12	7	0	3	0	
Large Urbanized			4	26	19	12	
Large Urbanized Small Urbanized	17	5	4	20	19	12	
	17 15	5 18	19	11	11	8	
Small Urbanized							
Small Urbanized Small Urban	15	18	19	11	11	8	

For crashes involving one or two vehicles, the population based definition suggests Rural areas having the most occurrences; when based on AADT, the counts shift towards Small Urban areas. The number of single vehicle crashes in Small Urban areas dips from 2010 to 2011, and increases in 2012, while the number of two vehicle crashes shows an increasing trend. The number of Rural two vehicle crashes increases when based on AADT, but the total crash counts are much lower when compared to the population based classification. Three vehicle crashes in areas with Small Urban levels of AADT were found to be much higher than those in areas of Rural AADT. Crashes involving four vehicles were observed to increase in areas with Metropolitan, Small Urban, and Rural levels of AADT, whereas Small Urbanized levels of AADT decreased over the three-year period. Population based measures would indicate that there were 28 crashes in Rural areas involving six vehicles or more, but when AADT is taken into account this number dropped to four crashes over the three-year span.

It was found that while many of the crashes were recorded as having occurred in Rural areas based on segment area population, these numbers changed because of the AADT based geographical classifications reported on the segments. Table 5.10 on the following pages will present the crash counts for the 19 different collision types arranged by geographic class from 2010 to 2012 for the AADT and population based measures.

Rear End crashes were counted at their highest numbers in segments with Small Urban levels of AADT, with an increase in counts from 2010 to 2012 for both AADT levels with Small Urban and Rural levels. The number of Rear End crashes in areas with Large Urbanized levels of AADT was found to be in the range of 2,108 to 2,229 crashes, substantially higher than the numbers within Large Urbanized populated areas. Similarly, Turning Rear End, Same Direction Turning Sideswipe, and Same Direction Sideswipe type crashes were found to occur more frequently in areas with Small Urban levels of AADT, the latter two demonstrating an increase over the three year period. Same Direction Sideswipe crashes were observed to decrease for segments with Small Urbanized levels of AADT.

Head-On collisions were at their highest counts in Small Urban levels of AADT while Rural and Small Urbanized levels of AADT showed an increase from 2010 to 2012. Opposite Direction Sideswipe crashes have the greatest counts at Small Urbanized AADT levels or lower with Small Urban and Small Urbanized levels of AADT indicating a decrease in crash counts over the three years. Opposite Direction Turning type crashes were significantly higher in areas with Small Urban levels of AADT, but Rural and Large Urbanized appeared to increase. As with the previous crash types, Small Urban levels of AADT accounted for more Fixed Object, Overturned, Entering/Leaving Driveway, and Entering at an Angle crashes than the other geographic class.

The population based classification would suggest that Rural areas experienced the highest number of bicycle related crashes. Based on AADT, Rural bicycle crashes reduced to 45 crashes over the three-year period. Alternatively, areas with Small Urban levels of AADT were found to have had 386 crashes with an increase in crash counts over the same period. A similar observation was made with respect to crashes involving pedestrians, with increasing crash counts for all geographic classes with the exception of areas with the Small Urbanized class.

Table 5.10: Geographic Class Crash Count by Collision Type from 2010 to 2012.

able 3.10. Geographic C		ADT Base		Population Based			
Geographic Class	2010	2011	2012	2010	2011	2012	
	•		Rear	End			
Metropolitan	2,982	2,974	2,951	1,774	1,815	1,771	
Large Urbanized	2,229	2,003	2,108	380	417	324	
Small Urbanized	2,343	1,636	1,013	5,710	5,588	5,602	
Small Urban	6,881	7,515	7,548	4,669	4,718	4,829	
Rural	451	773	1,259	2,353	2,363	2,353	
Sub Total	14,886	14,901	14,879	14,886	14,901	14,879	
Geographic Class			Turning	Rear End			
Metropolitan	9 9 2 10 2				4		
Large Urbanized	1	5	5	2	3	1	
Small Urbanized	60	16	21	95	106	74	
Small Urban	168	206	155	113	107	99	
Rural	9	10	20	27	28	25	
Sub Total	247	246	203	247	246	203	
Geographic Class		Same	Direction T	urning Sid	eswipe		
Metropolitan	9	7	9	13	11	10	
Large Urbanized	3	3	6	12	4	4	
Small Urbanized	22	7	10	49	53	58	
Small Urban	122	132	135	75	70	85	
Rural	13	7	14	20	18	17	
Sub Total	169	156	174	169	156	174	
Geographic Class		Sa	ame Directi	on Sideswi	pe		
Metropolitan	865	817	842	484	474	533	
Large Urbanized	507	492	563	75	99	75	
Small Urbanized	563	377	269	1,457	1,415	1,518	
Small Urban	1,506	1,733	1,762	1,031	1,076	1,152	
Rural	142	177	379	536	532	537	
Sub Total	3,583	3,596	3,815	3,583	3,596	3,815	
Geographic Class		S	Same Direct	tion Turnin	g		
Metropolitan	17	43	37	24	39	25	
Large Urbanized	20	9	16	21	18	15	
Small Urbanized	49	42	40	117	125	128	
Small Urban	436	419	444	207	189	226	
Rural	40	41	74	193	183	217	
Sub Total	562	554	611	562	554	611	

Table 5.10 (continued): Geographic Class Crash Count by Collision Type from 2010 to 2012.

	AADT Based			Population Based		
Geographic Class	2010	2011	2012	2010	2011	2012
			Same Direc	ction Others	5	
Metropolitan	204	204	179	89	99	89
Large Urbanized	118	92	152	29	20	17
Small Urbanized	141	111	79	356	309	345
Small Urban	569	561	622	292	288	345
Rural	32	67	101	298	319	337
Sub Total	1,064	1,035	1,133	1,064	1,035	1,133
Geographic Class			Hea	d On		
Metropolitan	3	6	13	2	1	9
Large Urbanized	2	5	4	1	3	5
Small Urbanized	11	12	18	22	20	25
Small Urban	114	101	117	40	37	44
Rural	9	17	18	74	80	87
Sub Total	139	141	170	139	141	170
Geographic Class		Орр	osite Direc	ction Sidesv	vipe	
Metropolitan	11	6	6	7	6	3
Large Urbanized	3	10	3	0	0	1
Small Urbanized	22	15	12	32	27	27
Small Urban	161	148	132	51	48	47
Rural	18	38	34	125	136	109
Sub Total	215	217	187	215	217	187
Geographic Class		Орр	osite Direc	ction Sidesv	vipe	
Metropolitan	68	75	61	118	119	103
Large Urbanized	37	41	48	52	46	52
Small Urbanized	180	106	87	442	435	386
Small Urban	1,071	1,094	1,056	556	538	579
Rural	54	57	102	242	235	234
Sub Total	1,410	1,373	1,354	1,410	1,373	1,354
Geographic Class			Fixed	Object		
Metropolitan	578	609	688	356	320	388
Large Urbanized	466	427	507	147	143	124
Small Urbanized	762	646	529	1,272	1,222	1,273
Small Urban	4,350	4,278	4,474	1,396	1,343	1,466
Rural	604	687	867	3,589	3,619	3,814
Sub Total	6,760	6,647	7,065	6,760	6,647	7,065

Table 5.10 (continued): Geographic Class Crash Count by Collision Type from 2010 to 2012.

Table 3.10 (Continued		ADT Base		Population Based		
Geographic Class	2010	2011	2012	2010	2011	2012
			Entering	At Angle		
Metropolitan	111	144	169	120	108	113
Large Urbanized	74	69	70	118	119	100
Small Urbanized	346	242	184	946	877	893
Small Urban	2,465	2,299	2,320	1,183	1,132	1,239
Rural	174	196	331	803	714	729
Sub Total	3,170	2,950	3,074	3,170	2,950	3,074
Geographic Class			Overt	turned		
Metropolitan	51	51 67 61 25 26				
Large Urbanized	51	47	60	11	9	7
Small Urbanized	89	62	51	141	138	132
Small Urban	858	795	783	182	169	151
Rural	163	168	196	853	797	840
Sub Total	1,212	1,139	1,151	1,212	1,139	1,151
Geographic Class			An	imal		
Metropolitan	8	16	33	2	2	0
Large Urbanized	25	34	28	14	13	5
Small Urbanized	52	57	74	33	53	48
Small Urban	1,093	1,095	1,097	161	194	220
Rural	171	226	290	1,139	1,166	1,249
Sub Total	1,349	1,428	1,522	1,349	1,428	1,522
Geographic Class			Bic	ycle		
Metropolitan	1	14	12	0	19	15
Large Urbanized	2	2	6	2	9	13
Small Urbanized	6	23	13	2	62	53
Small Urban	105	141	140	9	74	67
Rural	20	17	8	121	33	31
Sub Total	134	197	179	134	197	179
Geographic Class			Pede	strian		
Metropolitan	11	35	25	40	39	43
Large Urbanized	7	6	25	17	11	31
Small Urbanized	66	35	27	102	112	103
Small Urban	221	250	264	106	122	133
Rural	12	16	26	52	58	57
Sub Total	317	342	367	317	342	367

Table 5.10 (continued): Geographic Class Crash Count by Collision Type from 2010 to 2012.

	A	ADT Base	d	Pop	oulation Ba	sed
Geographic Class	2010	2011	2012	2010	2011	2012
		O	ne Parked,	One Movii	ng	
Metropolitan	20	31	23	15	20	24
Large Urbanized	13	8	23	4	2	3
Small Urbanized	31	32	29	37	35	40
Small Urban	168	144	144	88	78	83
Rural	12	29	26	100	109	95
Sub Total	244	244	245	244	244	245
Geographic Class	Entering/Leaving Driveway					
Metropolitan	2	3	8	6	2	4
Large Urbanized	1	1	2	1	1	0
Small Urbanized	5	4	1	4	8	5
Small Urban	40	42	42	22	24	24
Rural	8	5	4	23	20	24
Sub Total	56	55	57	56	55	57
Geographic Class			her			
Metropolitan	67	88	74	35	32	26
Large Urbanized	60	66	62	36	24	17
Small Urbanized	126	64	62	208	164	173
Small Urban	678	671	655	279	214	229
Rural	46	88	121	419	543	529
Sub Total	977	977	974	977	977	974
Geographic Class			Not S	Stated		
Metropolitan	1	0	1	1	0	0
Large Urbanized	0	1	1	0	0	0
Small Urbanized	0	0	0	1	0	2
Small Urban	2	2	3	0	1	1
Rural	0	1	0	1	3	2
Sub Total	3	4	5	3	4	5
Total	36,497	36,202	37,165	36,497	36,202	37,165

6.0 Model Findings

We begin with the discussion of results from the population-ADT classification models. This discussion provides a rational basis for evaluating the conventional urban-suburban modeling typology that typically includes three-lane, four-lane, five-lane and six-plus lane SPFs. The reasoning is that the population-ADT classifications are subsumed within the conventional urban-suburban architecture, but not in a neat nested manner. For example, a five-lane urban SPF can contain variables that belong in part to the urban-urban classification, and in part to an urban-rural

classification. Due to this potential crossover effect, the heterogeneities extracted from the population-ADT classification are more micro-level than those that will be uncovered in the traditional urban-suburban SPF architecture. The implications are that the random parameter mean and standard deviation in the traditional urban-suburban architecture may not reflect the mean shifts due to the population-ADT effects that drive the underlying sub categories of urban-suburban arterials. Hence, inferences can be too aggregate – and one can miss the opportunity to target locations of safety interest at a more micro level consistent with the population-ADT classifications.

Global findings from the population-ADT classification models are based on the following geometric characteristics:

Lanes (number of lanes increasing, number of lanes decreasing, roadway width increasing, roadway width decreasing);

Shoulders (shoulder width left, shoulder width left center, shoulder width right center, shoulder width right);

Vertical alignment (vertical curve BVC arm, vertical curve VPI arm, vertical curve EVC arm, vertical curve length, vertical curve percent grade ahead, vertical curve percent grade back); and Horizontal alignment (horizontal curve point of tangency arm, horizontal curve point of curvature arm, horizontal curve radius, horizontal curve maximum (super) elevation, horizontal curve length, horizontal curve central angle)

Out of the above mentioned 20 significant features, number of lanes, roadway width, shoulder width, point of vertical tangent grade (PVT), vertical curve point of vertical curve grade (PVC) horizontal curve maximum superelevation (e), curve central angle (delta), horizontal curve radius (R) were found to be random parameters. In addition, derived measures such as degree of curve, absolute vertical grade difference (A), and rate of vertical curvature (K) were also found to be random. The majority of the statistically significant effects were geometric. In addition, functional class indicators such as minor arterial indicator were also found to be random. Roadside information was not fully evaluated due to inconsistencies in matching roadside inventories for all homogeneous segments. Nevertheless, the finding of randomness in a substantial number of geometric features merits attention.

First, it demonstrates the significant amount of unobserved heterogeneity that is present in the urban-suburban context. There is no particular pattern in the nature of the randomness of parameters across the population-ADT spectrum. In other words, we do not observe a greater degree of randomness (as in numerous random parameters) in the urban-urban context, which one would typically expect due to traffic flow heterogeneities and functional class variations.

The heterogeneity of horizontal curvature variables such as degree of curve and radius reflects the fact that driver response to sharpness of curve effects is variable across segments, and that it is not reasonable to constrain the effect of curve degree or radius to a fixed parameter across segments. Likewise, the effect of superelevation is also not expected to be fixed across segments due to the inherent variations in superelevation design and driver reaction with respect to lane position on a superelevated curve. Randomness of superelevation effects in this study turns out to be motivated

by the maximum value in a segment. This effect appears to capture the sensitivity of superelevation variation within the curve and associated driver expectations.

The randomness of vertical curvature parameters such as rate of vertical curvature and absolute grade difference reflects the variations from segment to segment due to design speed effects. The rate of vertical curvature in particular is a direct measure of design speed application, and it is not reasonable to constrain this effect to be fixed across segments. The absolute grade difference is a parameter that is influenced by the design speed and the length of curve. For the same A value, one can expect a longer curve with a higher design speed, versus a shorter curve with a lower design speed. It is not reasonable to expect the same effect size across these two segment types.

The randomness of vertical curve grades (PVC and PVT) is an interesting finding. It appears that the effect of a 3% forward tangent in a segment A would have a different effect size compared to the same magnitude forward tangent in segment B. While this is expected, the context in which this occurs requires further attention. For example, it is not possible to discern with the given data organization whether this is due to within-segment design features alone, or also motivated by prior segment and following segment features. The same reasoning is applied to the interpretation of randomness of the backward tangent as well. The heterogeneity effect, i.e., the random parameter means are smaller compared to the effect of the absolute grade difference by an order of magnitude, but still statistically significant.

The discussion above summarizes the findings from the population-ADT classification models. Out of the 24 major categories that were developed, 16 categories yielded sufficient sample sizes so as to enable the estimation of random parameter models. The six categories that did not yield estimable models included with sample size in parentheses:

Rural-metropolitan (0); Large urban-large urbanized (0); Large urbanized-small urban (200); Metropolitan-large urbanized (0); Small urbanized-large urbanized (16); Large urbanized-metropolitan (8); Small urbanized-metropolitan (198); and

Rural-large urbanized (188)

As result, a total of 87 models were estimated for the population-ADT classification SPFs.

6.1 Conclusions and Recommendations

Several conclusions arise from the development of the 87 models developed in this study. First and foremost is the treatment of heterogeneity in the form of random parameters in SPF development in the urban-suburban context. Since the majority of parameters that are random are geometric in nature, context appears to play a role that in that the roadside environment is unaccounted for. The treatment of roadside data on a consistent basis and its inclusion in the model

database will potentially alleviate some of the ambiguities in the random parameter effects currently attributed to horizontal and vertical curvature.

Second, the presence of transition zones in the urban-suburban border areas can also play a role in the generation of unobserved heterogeneity. Land use information is usually a reasonable proxy for capturing this transition effect, in addition to design features such as speed limit change zones, cross sectional change areas and signage control. The addition of such data can provide added resolution to the nature of unobserved heterogeneity and the role it plays in the significance of geometric random parameters.

Third, the effect of roadside environment variables such as lighting, curb and sidewalk presence can also play a role in generating unobserved heterogeneities in the geometric parameter effect. Lighting is most likely a factor in segments containing horizontal curves, as well as vertical curves with climbing lanes, transition zones and segments where pedestrian and nonmotorized activity is significant. The addition of lighting data can provide for a richer set of random parameter identifications with more accurate effect sizes attributed to urban-suburban roadway geometry.

Roadside geometry is also potentially random if it were included. In the case of roadside geometry an added computational burden arises. Roadside geometry due to its correlation with roadway geometry will motivate the need for random parameter models where parameter correlation cannot be ignored. The correlated parameter models pose the burden of larger parameter dimensionalities and difficulties in interpretation. For example, if a roadside parameter represents a roadside variable that is an indicator, and its correlation with a roadway geometry parameter such as degree of curve is found to be significant, then, we have a potential mix of parameter distributions. This mix of parameter distributions makes the interpretations of parameter effects and their standard deviations difficult. In random parameter models, it is often useful to consider the simpler of mixing distributions, such as normal only distributions. However, given the complexity of the urban-suburban context, this aforementioned simplicity may not be suitable, motivating instead a much more complex modeling typology. The urban-suburban context is therefore a challenging area to gain insights from with respect to targeted geometric treatment; however, this challenge can be mitigated with the addition of consistent roadside geometry data, roadside environment data, and land use data.

With respect to modeling architectures, it is worthwhile to consider the mapping of the population-ADT classification SPFs with the conventional urban-suburban architecture in an embedded manner. For example, one can use population-ADT classification data indicators as additional variables in five-lane urban arterial SPF to see if the indicator is random or fixed across segments. Any randomness in the indicator will suggest that the heterogeneity due to multiple population-ADT class effects is significant. As a result, it may be worthwhile to consider further deepening of the five-lane SPF into stratifications along the population-ADT subsets provided that adequate sample sizes allow that differentiation.

Another aspect that has not been evaluated in this study is the effect of heterogeneity in means in random parameter models. Heterogeneity in the mean of a geometric parameter can result in mean

shifts within stratified subgroups. For example, if it is determined that roadside variables are significant sources of heterogeneity in means, then, one can examine the nature of random parameter means by roadside stratification. This type of analysis also has its computational limitations due to parameter dimensionality. However, careful choice of the roadside stratifications, as well as potential land use and roadside environment stratifications can provide additional insights that can enrich the process of safety location prioritization.

A.1 Appendix on Population-ADT Classification SPFs

Random Parameter Negative Binomial Model of Total Crashes on Rural-Rural SPF Class Roadway Segments

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TOTLAME	129890555	-03453	2.31	.000I	,06876	-20407
HEART.	48489	-14454	6-28	.0334	102265	-54250
	below diagonal e	Generate of	Chobesley:	matrix		
INCT DOEL	+.20852***	.04565	-9.59	.0000	~,29760	-,11165
EMAR LML!	18824	-23064	-11000	-0148	64068	-26120
DAME TOT!	21991	-16420	-1.00	-0340	68061	-14500
	Meparaton paran					
			2.92	.0005	25263	1,18180

Covaciaco	e matrix			
	191	ES TO	TLASE	HABL
LHLEH TOTLAHE HARL		01 103. 10 104. 10		.1624
beplies s	tendara o	evistions	of rendo	м разметесе
5.5 Sets		13		
2		49197		
Zepland :	preletio			parameters
Implied o	preletto			paramaters
Cor.Hac.	DIFALENIO INLEN	TOTIANS	HOJO. 46575 -09272	parameters
CHLENI TOTLARE	INLEN 1.00000 83688	0071AM 0071AM 53652 1,00009	10.10. 46572 .09272	parameters

Random Parameter Negative Binomial Model of Evident Injury crashes on rural-rural SPF class roadway segments

Dependent Log likel: Restricter Chi squar Significer Mofedden ! Estimation Inf.Ct.Al! Model est: Sample is	officients Hegi variable thood function I log likelihood at 1 3 d.f.) use lawel tendo Brequared 1 a 40d1.5 at mateur Sep Ol. 2 gds and 32 ulcommil regress	-2020, 618 -2228,748 406,240 ,000 ,0018* 52040, K = C/M = 2018, 19:22 20 individue	67 942 900 66 11 11 178			
871	Coefficient	Stendard Error	1	Prob.	SS# Co	ofidence erval
10	Conrandom parama	ters				
Constant?	-11,20000+++	.50100	-22.35	10000	-12,5842	-10.2166
(CYNOCIEC)	000000+++	:00183	-6,58	+0000	01106	+:00000
TOME OF YMAN	+,06042*	.02691	-1.99	10499	10726	-0060€
ACTIFICATE !	.40559***	.00045	0.55	.0000	+05633	.00687
DEST:	00808*** 06042* .00859*** 01974**	100991	-1.19	10464	03917	-,00031
	leans for eaching	DATEMETATA				
	.83966***	-07799	12.25	+0000	-78590	1,19137
THOUGH					51.445	+.01575
TOTAL	11418**	1,099,62	100000	+2224	7 - 400 - 410	
TOTLANE	Legonal element	s of Cholesi	or materia	N. L.		
TOTLANE	Legonal element	s of Cholesi	or materia	N. L.		1,81882
INDIANE:	10272*** 10272***	# of Choles .37003 .02916	2.41 3.52	,0158 ,0004	-16503 -04856	1,61882
INTLANT: INAUT: TOTLANT:	Regional element .59328** .10271*** Selow diagonal e	s of Choles) .07003 .02916 lements of 0	ry metria 2.41 3.52 Smolesky	,0158 ,0004	.10000 .04056	
INDICATE: INDICATE: TOTLERE: TOT LEA:	Regonal element .89328** .10371*** Selow diagonal e .17281	s of Choles) ,37003 ,02916 lements of 0 ,13046	ry metria 2.41 3.52 hplesky 1.54	,0158 ,0004 matrix	-16503 -04956 10080	
INAUT TOTLAND	Regional element .59328** .10271*** Selow diagonal e	s of Choless .07003 .02916 lements of C .13044 eser for Per	y metris 2.41 3.52 holesky 1.56 thin dist	.0158 .0004 matrix .0152 x18061cm	-16503 -04956 10080	

Implied poverience matrix of random parameters

COVARIANCE DIAGNE

LEADT -00000-04
TOTIANE -12442-02 -40412-01
Implied standard deviations of random parameters

8.8_Sets| 1 | 1 | .00702523 | 2 | .701012

Implied correlation matrix of random parameters

Cor.Hat.) LNADT TOTIANE

LNADT| 1.00000 /55541
TOTIANE(.88862 1.00000

Random Parameter Negative Binomial Model of Serious Injury Crashes on Rural-Rural SPF Class Roadway Segments

							Implies coverience natrix of rendom paremeter
	efficients Negl						
Dependent			082				Greeniscoe matrix
	thood function						SHADT VOFAMUL
	S log likelihood						LIMILY YORKSON.
ina mquair Significat	ed [d.f.]	-90					LHADT /1260E-02
	Pseudo R-squared						VCEARMA4688E-02 .4470E-03
	besed on N =						
	: - 1926.9 Al						Implies standard seviations of random payment
	2 pds and 200						5.0 Sets: 1
	binumial regress						3.0_34141
							11 ,0556289
		Scandard		Freb.	934 Co	nfidence	21 - 209750
SINT	Toefficient	force		12/32*		Israel	
-17	Singunden payane						Implied occumulation matrix of random paramete
Constanti	-11.6428***	1.19997	-11781	20000	-49,9016	-11.2038	mention continued the second behavior
MEGGA	.06631**	.04272		-0115	.13466	1.53910	
			2.15	0359			
HARL!	.6651744	31700			104386	1,25841	
NARL!	.00365***		3.10	.0015	.00138	1.25041	Cur.Mat. IMADO VCFARRA
VCVBVCA		-00119	9.10	.0015	.00138		
ACACATRI ACACATRI	.00365***	.00119 .3914D-04	9.10	.0015	.00138	.00803	Cur.Mat. IMADE VCFARMA
VCVBVCA/ RCVCRASI LIBET	.96019D-04** .96019D-04** Hears for rendom .97101***	.00119 .3914D-04 permeters .14173	3.15 2.45 6.66	.0015 .0141	.00136 .189180-04 .89422	.00609 .172740-08 1.26979	Cor.Mat. INADE VCFASSA
VCVBVCA) RCVCBASI (IRADT) VCFASSA)	.00365*** .96029D-04** Hears for rendom .97201*** 98224***	.00119 +3914D-04 :permaters .14175 .09804	8,10 2,46 6.86 -1,00	.0019 .0141 .0000 .0001	.00138 .189180-04	.00609 .17274D-08	CHE.Mat. LHADE VCPASHA LHADE 1.0000062062
HOVERAGE LHADT VUELBOCK	.00365*** .96019D-04** Hears for random .97201*** 98224*** Diagonal element	.00119 .3914D-04 : persmaters .14173 .09804 s of Cholesi	0.10 2.46 6.66 -4.00 Kg matria	.0019 .0141 .0000 .0001	.00138 .189100-09 .69422 -,58435	.172740-08 1.72740-08 1.26979 20010	CHE.Mat. LHADE VCPASHA LHADE 1.0000062062
VCVBVCA RCVCRASI LHADT VCFLBVA LHADT	.00365*** .86029D-04** Means for random .97201*** -39224*** Diagonal element .03563***	.00119 .00140-04 :permeters .14173 .09604 a of Cholesi	0.10 2.45 6.00 -1.00 kg matrix 3.02	.0019 .0141 .0000 .0001	.00138 .183180-04 .69422 58439	.00609 .172740-08 1.26979 20010	CHE.Mat. LHADE VCPASHA LHADE 1.0000062062
VOVEVOR ROVORANI LINADT VOTESMA LINADT VOTESMA	.96239D-04 Beans for rendom .97201 -39224 Diagonal element .03563 .18847	.00115 +891eD-04 - personners -14173 .09804 - 01180 -01180 -06787	0.10 2.46 6.66 -4.00 Kg matria 3.02 2.43	.0019 .0141 .0000 .0001 .0025 .0149	.00138 .189100-09 .69422 -,58435	.172740-08 1.72740-08 1.26979 20010	CHE.Mat. LHADE VCPASHA LHADE 1.0000062062
VOVENCE ROVORANI LINDT VOPENCE LINDT VOPENCE VOPENCE	.96239D-04 leans for rendom .9720198224 Dragonal element .0356318867 Below diegonal e	.00119 .3914D-04 : persenters .14173 .09804 s of Cholesi .01150 .00797 ::ememors of	0.10 2.45 6.66 -4.00 Fy matrix 3.02 2.43 Cholesky	.0019 .0141 .0000 .0001 .0025 .0189 Matthia	.00158 .189180-04 .69422 58495 .01251 .03209	.00609 .172740-08 1.26909 20010 .00815 .28690	CHE.Mat. LHADE VCPASHA LHADE 1.0000062062
VCVBVCA RCVCRASI LHADT VCFASOA VCFASOA VCFASOA VCFASOA	.00065*** .96239D-04** Means for rendom .97201*** .98224*** Dragonal element .03583*** .10847** Pelow diegonal e	.00119 .3914D-04 : permanters .14173 .09804 s of Cholesi .01150 .06787 Lemens of :	0.10 2.45 6.66 -1.00 Fy matria 3.02 2.43 Choleeky -1.06	.0019 .0141 .0000 .0001 .0025 .0149 FATUR .0479	.00136 .182180-04 .68422 68439 .01251 .03200 25817	.00609 .172740-08 1.26979 20010	CHE.Mat. LHADE VCPASHA LHADE 1.0000062062
VCVBVCA RCVCRASI LHADT VCFASOA VCFASOA VCFASOA VCFASOA	.96239D-04 leans for rendom .9720198224 Dragonal element .0356318867 Below diegonal e	.00119 .3914D-04 : permanters .14173 .09804 s of Cholesi .01150 .06787 Lemens of :	0.10 2.45 6.86 -1.00 Fy matria 3.02 2.43 Cholesky -1.05 phin dist	.0019 .0141 .0000 .0001 .0025 .0149 FATUR .0479	.00136 .182180-04 .68422 68439 .01251 .03200 25817	.00609 .172740-08 1.26909 20010 .00815 .28690	CHE.Mat. LHADE VCPASHA LHADE 1.0000062062

Random Parameter Negative Binomial model of High Injury Crashes on Rural-Rural SPF Class Roadway Segments

resisted for likelihood #1040.5760 agused [3 d.f.] 160.4608 millouine level .0009 millouine level .000 millouine .000 mi	IMIES .2020E-01 WOFING
Standard Frob. 25% Confidence HIDSY Coefficient Error o x >I* Interval	1) ,137019
(Nonzandon parameters	Implied correlation matrix of random parameters
setant: -2,73665+++ .35666 -11,56 .0000 -3,30052 -2,27254	
NASC:6883*** .11887 -8.68 .00008861768157	
MC018:e1745*** .11101 -5.56 .00008860289888 TVCRAM: .00145D-D4*** .1749D-04 4.58 .0000 .43835D-04 .11443D-	IN COLUMNS DRIEN NOTLENG
Weans for random parameters	IN CHERROL DILLE SOFTER
LHLEH! _95070*** .02705 34.27 .0000 _88918 1.00028	1HLEN 1.0000037447
Film: .00271*** .18366 0.02 .0000 .56275 1.26267	MOFELINC: +,31647 1,00000
(Discoult elements of Cholesky matrix	
INIER: .14278*** .01890 7.56 .0000 .10575 .17982	
## 1961 19704+++ 104096 3.15 10014 104794 1261198	
(Below diagonal elements of Cholerky matrix	
F_DRL: -105101 104092 -1197 1086 -11078 102812	
(Dispersion parameter for HegBin distribution	
AFREN: 1.84343** .49313 2.23 .0260 .18492 2.90191	

Random Parameter Negative Binomial Model of Just Injury Crashes on Rural-Rural SPF Class Roadway Segments

Dependent Log likel	efficients Sept variable thood function d Log likelihood	JUST1 -060.066	630				Coveriance			MCVCRAM				
Chi squar Significa Hofadden Essinatio	ed [] si.f.] noe level Facodo K-aquares n based on H =	19.457 .001 4 .00881 52080, K *	192 166 160				ENEXY REVERAS	.8512E-00 .6615E-08						
Nodel est Sample is	C = 1761.9 A rmsted: Sep S4, I pds and 26 binomini recres	2015, 14:25: 520 individua	12.7				S.D_Seta;	soderd bevi	ations of render per 1	meters				
JUSTINA	Confficient	Stendard Error		From.	98% Co Int	mfidence merval	11 21	.09220 .8291668-						
	Monrandos parane						tooliet or	rvelation m	stris of random paras	retord				
Constant	-4.26197*** 92951***	21749	-11.12		-5.01311	-3.51083	3.9.2.							
			-5.88			49053 39281								
	204597+		1.91		+,00340	.09333		LULES HO						
TOTLANE	48226**	-22272	1.17		04574			SHEER RE						
MCVLIMI (-1,11204*	-69155	-1.96						20786					
	Means for sandor							.00000 1.						
LHLEBI	.97961***	105356		.0000	187470	1.08465	356600							
REVERSE!	.82198D-04**	-39490-04	2.11	10152	-\$1213D-05	+15994D-04								
	Diagonal element	ts of Chilast	ky matrix											
	.05226***		3.13		-5364T	-15005								
LHEEN	+329770-54++				-38283D-05	-10213D-08								
ROVCRAIN		elements of C												
ROVCRAM					-1.01001	-12007								
ROVERNIE!	.03003+	-03522		0.734										
REVERSAL I		meter for Neg	Str dire	Elbinio		8.20741								

Random Parameter Negative Binomial Model of Low Injury Crashes on Rural-Rural SPF Class Roadway Segments

Dependent.	efficients Hegh variable thood function	101		00001880		onemone.	Coverience mai	nce matrix of random parameters
	d log limelihood							LHADT LHLES
Significa: Nofedden 1	ed [3 5.f.] nce level Freudo R-squeped	+000	19					2E-03 0E-02 .7544E-03
inf.Cr.Al	n hases on H = C = B248,J AI	C/H = -1	78				Deplied standar	d deviations of random parameters
Sample is	imated: Sep 04, 2 pds and 260	20 individua					B.D_Betal	4
Hegative I	strooter tetrese	ton model					11	,0850430
rotani	Coefficient	Standard Stree		Frob.	SSR Co	mfidance erval	#f) ()	,000000
-17	Hoodandon patama	ters					Implied orrests	tion matrix of mandom parameters
Constant	-7.02040***	-10000	-20.35	10000	-8.22907	-7.42873		
BOYCRAN		-11630-04		.0000	-T65T7D-04	,12136D-03		
	00023***		-5.56	10000	-,00031	0001H		
2017							Cor.Nat. 1364	DT CHIEF
- 11	Means for rendom							- 50
LHADT	Means for random .84732***	,02634	35.97		.89570	.22094	Analysis of the second	*******
LHADT	Meane for sendom .84732*** 1.00323***	.02634 .02130	55.87 66.65	.0000	.89570 .96205	1.04555	LHADT 1.000	0009659
LHADT: LHLEN:	Means for random .84732*** 1.00325*** Diagonal element	.02634 .02180 s of Daylesk	35.97 66.65 Willes V	.0000	.96105	1.04558		0009659
LHADT LHLDH LHLDH	Means for recdom .84732*** 1.00323*** Disposal element .00804***	.02634 .02180 b of Cholesk .00477	35.97 66.65 V MATEEM 5.25	.0000	.06108	1.04558	LHADT 1.000	0009659
LHADT: LHLEN:	Means for random .84732*** 1.00325*** Diagonal element	.02634 .02180 s of Daylesk	35.97 66.65 Willes V	.0000	.96105	1.04558	LHADT 1.000	0009659
LHEADT LHEADT LHEADT LHEADT	Heane for sendom .84732*** 1.00323*** Diagonal element .0264*** .02471** Below diagonal e	.01634 .01180 b of Cholesk .00477 .01133	SS.WT GG.65 V MATSIM E.25 2.55 holeawy :	.0000 .0000 .0291	.06105 .01849 .00250	1.04556 .03440 .04692	LHADT 1.000	0009659
LHADT LHADT	Heene for rendom .84732*** 1.00333*** Diagonal siemein .03471** Below diagonal = .08657***	.01634 .01180 e of Cholesk .00477 .01132 liments of C	35.97 66.65 y matsix 5.25 2.55 holesky: -5.45	.0000 .0000 .0291 Matrix	.06105 .01849 .00200	1.04558	LHADT 1.000	0009659
LHADT LHADT	Heane for sendom .84732*** 1.00323*** Diagonal element .0264*** .02471** Below diagonal e	.01634 .01180 e of Cholesk .00477 .01132 liments of C	35.97 66.65 y matsix 5.25 2.55 holesky: -5.45	.0000 .0000 .0292 hatri# .0000 ribution	.06105 .01849 .00200	1.04558 .03440 .04692	LHADT 1.000	0009659

Random Parameter Negative Binomial Model of Total Crashes on Small-Urban-Rural SPF Class Roadway Segments

Bendom Coefficients Hegin	Seg Nodel
Dependent variable	TOTALAGE
Log likelihood function	-31100.16961
Destricted log likelihood	-4109T-14719
Chi squared [- 6 d.f.]	10093,95514
Dignificance level	.00000
Hofadden Freudo R-squased	. 2452829
Estimation based on H = 1	4114. K = 15
Inf.Co.All + 62200.0 All	7H + .461
Nodel estimated: Sep 64, 1	015, 22:50:11.
Sample is 2 pds and 4705	
Negative himmetal regressi	

TOTALACC	Coefficient	Stendard Erzer		Prop.		osfidence verval		
- 12	Sunrandon parame	ters				~		
Constanti	-1.88568+++	111486	-65.45	10000	-9.08450	-7.65457		
LHADI	.99565***	,01350	72.38	.0000	97163	1.02574		
TOTLANK	09610***	01676	-5.73		12894	~,06325		
SEMPRIT	00009+++	,00223			03663	-,02544		
VEVLUEL	98120+++	1255000	-4.62	,0000	78440	31198		
	1805072-04***	-5021D-06	10.12		40966b-04	- 60648D-04		
	-110075-54***	24200-05	-4.05			+,725270-0		
SEMPLICE:	08532***	.00658	-17.97	.0000	09871	07243		
MCDLR:	.20954***	108723		.0500		.29290		
13	Steams for candin	Decemposes						
0.00013	.D0832***	.00120	2,77	1,0057	- 0000PT	100068		
THERM	.00676***	.00092	1111.60	.0000	.00925	192423		
HWYWD SHID:	.01188***	.00168	7.58	.0000	-00867	-01816		
11	Siegonal element	s of Choles	ey matrix					
DEGLA	.00230***	.00081	2.84	.0045	_00011	.00386		
LNURSE	.05877***	100727	8.23	.0000	.04993	107401		
INVENTED I	100099**	.00048	2.21	10272	.00011	100179		
1	Selev diagonal e	Lements of t	Cholesky :	matria				
LHC DEG	.06657***	.00070	7.43	1,0000	-04002	.08342		
BHY DED	-,00219	100126	-1.95	+2485	00267	100228		
THAT THE		190193	-4.75	.0000	-,00800	4.002257		
-575,101 (1)	Dispersion pares		Bin Hist	PARAMERA	m 20000			
Spalfarm:	.91169***	,02425	97.58	.0000	- 55414	194923		

DEST FREE SMANDING	Coveriance	MATERIAL			
DEGI LHLEH WHYNDING					
		DEGI	Laker	SHAMDING	
	DES1	-3841E+04			

2601	Later	SHAMDING	
.8841E-04 .3036X-04 1114E-04	.7977E-00 3047E-03	-24798-04	

Implied standard deviations of random parameters

.D. B	818	1											I
				-	+	-		-	-	-	+	-	
	1	D.	3	ă	7	7	2	0.0	9 0	5 0	į	0	2
	3	0				ò	å	ä	į	d	ŝ	Ė	4

Deplies occrelation matrix of random parameters

Coc.Mat.	DESS	THIER	RWYWICHE
	2,00000	,7651D	+,0087Z -,68521
POLICE COLLARS		69525	1.00000

Random Parameter Negative Binomial Model of Property Damage Only Crashes on Small-Urban-Rural SPF Class Roadway Segments

Random Coefficients Hegit	
Dependent variable	\$D0
Log likelihood function	-25122-64267
Restricted log likelihood	
Chi aguares [6 S.f.]	10056,90069
Significance level	
McFadden Feeddo B-equared	11789494
Escommitton based on M = 5	#118, H = 18
Tof.Co.ATC - 46081.9 ATC	
Hodel estimated: Sep 07, 2	015, 00:49:12
Sample is 2 pds and 4705	
Hegative Bicomial regress:	

FDO	Coefficient	Standard Error		Prob.		nfideoce erval
13	Tonyandow param	tere				
Constant	-0.36073***		-66,50	.0000	-6.60706	-8.11437
LNEDTS	1.00836***	.01640	64.63	,0000	,97778	1.03894
06011	.00992**		2,00	0367	,00090	.02607
SERVET	-,02335***		-9.53	.0000	04000	02670
WOVE THEFT	2,75525***	113549	-5.75	.0000	+1.04551	-,51768
MCVCRAM :	+454005-04***	401552-05	7.37	.0000	.33337D-04	.57478E-04
HCVR:	-974013-05***	-21980-06	-3.60	-000E	-,15065D-04	429560-05
SEMBLICE)	-,07034***	.00756	-10.29	.0000	09335	06374
13	many for remote	Limitatetera				
TOTIANE!	-,07145***	102122	-5.31	.0000	11506	-,02990
CHERN	.90668***	V01045	86.78	.0000	.88618	+92718
ENVINCING (100910***				+00438	01359
	hagonal element	ts of Chalus	ty matrix			
TOTIANE:	.00940***	, 01±79	4.74	0000	-115244	.12421
LHLEN)	.06003***	,00883	6.95	.0000	-04212	107695
DRICOWANG	100111	.00051	2,18	.0295	.00011	.00210
1	slow disconst .	Claments of (Tho Leaky	matrix		
LINE TOT!	.06185***	,01840	5,95	.0000	04147	.00223
TRMA, 2021	-,01219***	.00289	-4.60	.0000	+,01849	-,00718
LENY LIST !	+100472***	100154	-4.09	.0000	-,00000	-,00244
11	Lapersion parm	meter for New	PERM MINE	PARKET	rn.	
ScalFaim!	94742***	103367				1.00061

Junited o	SASTAULE NA	tris of ratio	un parametera	
Coveriend	m matrix			
	TOTIANE	130,511	ENTWOCHE	
TOTLAND LUCEN ENVNOING	.8006E-02 .5534E-02 1194E-02	.7429E-03	.1870E+03	

Implied standard deviations of random parameters

D	fie	ti	ĸ,	ĸ														1
	-	-	÷	+	-	-	-	٠	-	-	-	٠	-	-	-	-	+	-
			1	i							2	d	ċ	į	4	7	ű	ė
			1	į							ċ	a	c	ŧ	1	2	4	3
			3	a								ð	d	ð	d	Ť	ž	Ξ

Implied correlation matrix of rendom parameters

Cov.Hat.	TOTLANE	2312801	BMANDENC
TOTLAME	1,00000	71786	+,55196
LNLEH	.72786	1.40000	91196
pletout mum.	0.5455	41146	

Random Parameter Negative Binomial Model of Possible Injury Crashes on Small-Urban-Rural SPF Class Roadway Segments

Standard Srob, 95% Confidence							Implied movariance matrix of ransom parameters Coveriance motifs TOTIANE LARDT TOTIANE .86208-02 LIMADT .2530E-02 .1540E-02 Implied standarm seviations of random parameters 5.0.Secal 2 10 .0525M1
FINAL		Standard Error	30	\$200. (1)02*	95% Ct	nfidence erval	1) -0552541
	lincandom pacam		14.00	9.81823	19 18 48		Implied correlation matrix of random parameters
THIMPS		.01715	44.65	10000	.78966 05718	.83711 -,00066	***************************************
SHARETER:	3143T*** 00418***	_01992 _00091	-5.36	.0000	14365 .00017	.00820	TOTLAME: 1.0000096189
VCFARMA) MCCCAY	.02568*	.01399	3,00 1,89 2.63	.0557		.04828	18100:94369 1.00000
MCVLUMI:	-:82751+** Seame for random		98733	10000	-1,16726		
TOTTAME	1.18855***	-04528 -08257	35.40	-2010	3,09472	1.22237	
TOTLANE	.05536***	.01410	8,15	,0000		.08716	
	.01070***		tita		-50617	.01822	
	03805***				4.04777	02812	
Boal Farm	1982)***	.08880	13.75	.0000	.51991	41247	

Random Parameter Negative Binomial Model of Evident Injury Crashes on Small-Urban-Rural SPF class Roadway Segments

SPF cla	ass Roadwa	y Segme	nts				220		
Dependent	efficients Segi variable unced function			1113311			COVERZEDO	eriance matrix of random paramet matrix	
	i log likelihda							TOTIANE INLEN	
	ed (3 d.f.)								
	nce ferel Feeudo R-square o based on M =		610					.6898-08 .1314E-02 ,1886E-02	
Inf.Cr.AIC	= 15368.1 A lmsted: Sep 07.	10/11 = 11/21	163				Implied sta	ndard deviations of rendom param	maters
Immple is	S pile and 47:	067 individu					5.0_3ete)	1	
				Freb		inflishoon	2)	.0252953	
	Coefficient	REFOR		18152*	Int	Lavini			
	fonrandom pasum							relation matrix of random parame	
Constant	-7.52552***	-20400	-25,42	.0000	-0.00000	-6.06715	22		
LIMET	TROCEPAN	.03420	21129	10000	46315	19720			
SHIPPING (02097**	,00629	-2.55	.0109	-109110	00488		A CONTRACTOR OF THE PARTY OF THE PARTY.	
MCVR -	-15637D+04+**	-64192-05	-2.90	-000T	-,211970-04	+,605650-06	Cor Mat. T	OTLAME INLEM	
SHWCLTCR	04753644	.01634	-2.92	.0035	07990	01577		and an in the second contract of the second contract of	
SCYMKSEL	-,00185***	.00066	7.63	.0087	,00055	.00318	TOTLANE! 1	30000 -,86778	
MANADAGO	-21187##	+00655	2.00	-0481	100029	.02390	CHURCH -	86779 5.00010	
RDOCAL	.26172***	100219	3.15	+100.	.10069				
SCYCRASI	.37882D-06***	-1407D-04	7.00	.0077	.99075D-05				
	teens for rando								
TOTLAME	10370**	-04505	-7.1€	.0300	-,19789	00952			
Litt.Ritt		.01892	46.55	.0000	.84380	.91798			
	Diagonal element				141774	100.00			
TOTLANE	.02530***	-00920	1.75	.0000	.00726	.04332			
LELES!	.02916v+4	00000		+0014	01104	-04739			
	Melcu diagonal								
inst ror:	+.05197***	.01122		.0000	07191	02999			
	Dispersion pers								
SoalFarmi	78289***		5.05			93105			
	1,0402								

Random Parameter Negative Binomial Model of Serious Injury Crashes on Small-Urban-Rural SPF Class Roadway Segments

Dependent Log likel: Bestriote Chi square Chi square Significa Mofadden ! Betisector Inf.Cr.AT Model est: Fample le Depative !	officients Hed variable incode functions a log limethood sed [3 d.f.] and limethood sed [3 d.f.] are level for sed of # 2 e. accept to the s	### -2992.93 # -2992.93 # -2992.93 # 10069 # 10069 ####################################	1842 1842 1847 1940 1940 1941 1941 1941 1941			
8197	Coefficient	Precdard		Prob.		nfidence excel
13	Concendin param	cters				
Constanti	-9:01079+++	146624	-19.23	.0000	+0.92442	-B.09697
SUVUEAR)	.00221***	-2977D=04	2.22	40196	96179D-05	4110630-03
HOVPTOVAL	-202221***	400044	71.49	*400#	-00097	100346
	Sanna for capting	A THE PROPERTY AND A				
100	season tot satisfied	4. President and the				
LIGADT)	.41027***	.05135	7.59	.0000	.50957	151098
DE316	Heans for random .41027*** 02648***	100555	+3,05	.0021	*-01351	00566
DE316	~,02645***	100555	+3,05	.0021	*-01351	00566
DEGI:	Layonal element	ce of Choles)	O MATTLE 1.13	10000	04351	00966
DEGI:	~,02645***	ce of Choles)	O MATTLE 1.13	10000	04351	00966
DEGI: IMADT: DEGI:	GI645*** Diagonal element .12034*** .01662*** Selow Giagonal *	.00585 te of Choles) .00501 .00501 blements of S	-3.08 cy matria 5.18 5.52 Tholesky	.0001 .0000 .0003	04351 01824 00675	00966 .03813 .02646
DESI: IMADT: DESI: IMES INE:	GI645*** Diagonal element .12034*** .01662*** Selow diagonal (.01169**	.00888 te of Choles) .00801 .00801 clemento of 1	-3.08 cy matria 5.18 5.32 Cholesky 2.24	.0001 .0000 .0009 matrix	04351 .01824 .00675	-,00966 .09812 .02646 .02141
DESI: IMADT: DESI: IMES INE:	GI645*** Diagonal element .12034*** .01662*** Selow Giagonal *	.00888 te of Choles) .00801 .00801 clemento of 1	-3.08 cy matria 5.18 5.32 Cholesky 2.24	.0001 .0000 .0009 matrix	04351 .01824 .00675	-,00966 .09812 .02646 .02141

Implied covariance matrix of random parameters Covariance matrix LHADT DEGI IMADE .7978E-DS IMADE .7978E-DS IMPLIED .1002E-DS .4108E-DS Implied standard deviations of random parameters 8.0_Betel 1 I. .0282370 II. .0282370 II. .0282370 Cor.Mass. IMADE DEGI LMADE 1.00000 .87551 DEGI .47581 1.00000

Random Parameter Negative Binomial Model of Fatal Injury Crashes on Small-Urban-Rural SPF class Roadway Segments

Dependent Log likel Restricte	efficients Hegle variable shood function i log likelihood ed [3 G.f.]	-1171,40	103				Duglied novariance matrix af zandom payameters Cryariance matrix 1840T DSS
Signifina Hofadden Estimation Inf.Co.Al Hodel est Sample is	nce level Famudo A-squared o based on D = 1 C = 2940.8 AI Imated: Dep 00, 1 2 pds and 4700	.0015; 0015; E = 1/E = .0 1015; 18:08:	192 120 9 128 138				LHADT .1395E-D2 DEG1SR21E-D3 .8991E-D3 Implied standard deviations of random parameters S.D_Deta) 1
	pinomial regress	Standard		Fran.	914 Co	ofidence	1) .0379468 2) .0044770
TATAL	Coefficient	Excee		143524	2111	erval	
	Songandom pagame			114114	2115	erval	Implied conveletion matrix of sendom parameters
Donatans	Sonvandom paramet	.16548	-15.17	,0000	-11.8781	-8-5777	Implied outselstion matrix of sendom parameters
Donatens	Sonvendom pexemer -10.0759*** .50426***	.16548 .00073	-15.17 5.02	.0000	-11.6781	-8-8777 .00569	
Donataon SCVPTCVA SEMDRI	5003405000 paxamet -10.0775*** .00426*** .04203*	.76548 .00073 .02510	-15.17	,0000	-11.8781	-8-5777	
Donateos BCVPTCVA SEMDRT	Sonrandom paramet -10.0799*** .50426*** .04203* Seems for candom	.76548 .00078 .02510 parameters	-15.17 5.82 1.97	.0000 .0000 .0557	-11,8781 .00282 -,00117	-8_5777 .00569 .00725	Cor.Mat. IMLOT 1891
Donateni BCVPTCVR SEMDRI LHEST	Sonvendom pexeme -10.0750*** .00426*** .0476*** .04703*** Means for sandom .41509***	76548 -76548 -00078 -02510 parameters -08684	-15.17 5.02 1.97 4.61	.0000 .0000 .0357	-11.5781 .00282 00117	-6,5777 .00549 .09725 .58438	Cor.Nat., INLOT 2831
Donateni BCVPTCVR SMMDRT DEGL:	Figuration payanet -10.0719*** .00426*** .04203* deems for random .41508*** .03852**	.76548 .00078 .02310 paismeters .0888 .01408	-15.17 5.02 1.97 4.61 -2.52	.0000 .0000 .0357 .0000 .9147	-11,8781 .00282 -,00117	-8_5777 .00569 .00725	Cor.Mat. INLOT 2001 INDIT: 1.00000 - 41796
Donatani BCVPTCVR SEMDRI DEGG:	Sonvandom peremer- 10.0710*** .00426*** .04203* deens for sandom .41509*** 03252** Diagrani elements	.76848 .00073 .02510 parameters .01408 c of Cholesi	-19.17 5.02 1.07 4.61 -2.52 ky matria	.0000 .0000 .0357 .0000 .0117	-11,8781 .00282 -,00117 .24582 -,06213	-8,8777 .00569 .09725 .88438 00790	Cor.Nat., INLOT 2831
Donatani BoyPicVA SEMDRI INADI LHADI	Sonvendom perene -10.0750*** .00424*** .04503* Steins for sendom .41809*** 03532** Chapmal element; .03738***	Tests .Tests .DOOTS .DZSID persenters .O4838 .O1408 s of Cholest .DOTES	-19.17 5.02 1.97 4.61 -2.52 ky matrix 6.67	.0000 .0000 .0357 .0000 .0117	-11.5781 .00282 -,00117 .24582 -,04313	-8,5771 .00569 .00725 .88488 00790	Cor.Mat. INLOT 2001 INDIT: 1.00000 - 41796
Donateni BCVPTCVE SSMDETI LHEBTI DEGI LHEBTI DEGI	Sonvendom pereme -10.0799*** .00426*** .04203* deems for sandom .41803*** -02522** Disputal elements .03738*** .02224**	76868 .00078 .002510 pdismeters .01408 .01408 cd Cholest .00766 .00940	-15.17 5.02 1.97 4.61 -2.52 kg matrix 5.57 2.37	.0000 .0000 .0557 .0000 .014T	-11,8781 .00282 -,00117 .24582 -,06213	-6.5777 .00549 .00725 .88438 00791 .05236 .04066	Cor.Mat. INLOT 2001 INDIT: 1.00000 - 41796
CONSTRAIN BCVPTCVA SEMDRI IMADI DEGG LMADI DEGGI	Sonvendom perene -10.0750*** .00424*** .04503* Steins for sendom .41809*** 03532** Chapmal element; .03738***	76868 .00078 .002510 pdismeters .01408 .01408 cd Cholest .00766 .00940	-15.17 5.02 1.97 4.61 -2.52 ky metria 5.57 2.37 Chilanky	.0000 .0000 .0557 .0000 .014T	-11.5781 .00282 00117 .24582 06313 .02238 .00381	-8,5771 .00569 .00725 .88488 00790	Cor.Mat. INLOT 2001 INDIT: 1.00000 - 41796
Donateni SCYPTOVA SEMPRI LHADT DEGI LNAST DEGI	Sonyandom parameter 10.0719*** .00426*** .04503* Stein for random .41509*** .02520** Seprial elements .03738*** .02224** Seliv fiagonal elements .02738***	76548 .00073 .02310 patameters .01408 c of Cholesi .07764 .09440	-15.17 5.02 1.97 4.61 -2.52 ky matria 6.67 2.97 Cholasky -1.92	.0000 .0000 .0557 .0000 .0147 .0000 .0180 matrix .041E	-11.8781 .00282 -,00117 .24582 -,06113 .02283 .00381	-6.5777 .00649 .02725 .88438 00781 .05228	Cor.Net. INLOT 2001 EMBDT: 1.00000 - 41796

Random Parameter Negative Binomial Model of Unknown Injury Crashes on Small-Urban-Rural SPF Class Roadway Segments [PRINTED AND IN COMPANIES OF COLUMN PARAMETERS OF COLUMN PARA

	ass resultin						Check and the		trix of random	*Arabatara
Random Cor Dependent	efficients Regi veriable thood function	OnRey Hodel UNYN	1000				Covexiano	e metrix		
Restricted	d ing likelihon	4 -1247.092	48					EHLEH	LHADT	
Sognificat McEadden i	ed [3 d.f.] not level Freedo S-square n based on N =	.001 d .0127	000 013				THERM	-1124E-01 -3497E-52	.1204E-02	
Inf.Cr.AD	C = 2523.8 A	10/W =	027				Implied at	cenderd devi	anions of rand	on parameters
Sample is	imated: Sep UD. 2 pds and 47 binomial regres	007 100172004					B.D_Besa)		1	
инински:		Standard	1	#ron-		ofidence erral	1) 21	,1060 ,03471	45	
- 11	Nonrendum param	eters					Implied or	orrelation m	etris of rando	n parapaters
Constant: HCVCRAS HCVCRAS HCCLR;	-10.0530*** -,59742** -889010-04**	.75480 .81008 .8824D-04 .23772	2.61	.0124 8010.			Coc.Mat.		LHADT	
	Means for dendu	gustameters.							95067	
LHART	.92995***		7,41		162643	1.02467	DOUT	195007 11	00000	
0.000	Diegonal element	ts of Choles	by matrix							
		-05555	2.25		103665	,17586				
LHEAT!	.10600***	+90778			+00067	.00117				
LHLEN LHAOT: 110A LNL:		.00778 elements of 0 .00981	Stolesky 5,43	matrix .0006	,01915	,00117				

Random Parameter Negative Binomial Model of High Injury Crashes on Small-Urban-Rural SPF Class Roadway Segments

Dependent	efficients Heg Variable Thood function	81					Implied ocverience matrix of rendom parameters Coverience matrix
	d log likelthbo						STARL WARE
Significa Mofadden Estimatio Inf.Cr.Al Model est Yemple le	ed [3 d.f.] nom level Focudo B-equaro n based on N = C = 19502.5 A insted: Eep 09, 2 pde and 47 binomial regres	000: 8 .0000* 9*114; = - 10/8 = .; 2019; 15:31: 067 indivisue	000 131 13 207				DRIES -52445-00 IMADE .7415E-02 .2075E-03 Implied standard deviations of random parameters 8.T.Botes 1
1	Coefficient		ı	Frob. (2)5%*	35% Co	nfidence excel	1) (0451470 2) (D144134
-	Monrendim param	eters					Implied correlation matrix of random parameters
Constant!		.21515	-29.34	.0000	+6,77547	-5.00490	
DEGL	+:00637*	100001	-1.0E		+.01299	.00000	
MODERY	-19282**	.06812	2723	+0270	-01798	.28850	
NEVELNE:	T0610***		-5-49	+9000	+-91422	45215	Cor.Net, INLES LEADT
HEVERAN	-71336D-04***		5.73	10000	47191D+D4	,95%810-04	
SHINDRE	-,02021+++	.00646		.0024	+,03326	-,00717	LOLER: 1,00000 .78950
(J38500000)	-00213***	100004		10044	.00099	100326	CHADT1 .78986 1.00000
	Manchel Con married	m parahetere					
(1)							
	156075***	101515	50.50		-81108	287046	
(1)	156075***	101515			-67618	.66794	
SHEN)	156075***	02333	28.94	10000			
SHEN)	.56075*** .60101*** Disposal elemen	.01515 .02396 ts of Choles	28.94	10000		.66794	
INLEN LHADT)	.56075*** .60101*** Disposal elemen	.01515 .02396 ts of Choles	IS.St ey mattis e.le	10000	-676118	166734	
INLEN LHADT: LHADT:	.86075*** .60101*** Disponal elemen .06815***	.01518 .02398 ts of Cholesi .01088 .00232	28.94 My metria 4.14 2.82	0000. 0000. 1000.	-87838	.66794 .08868	
HEIRE TOARE (HEIRE TOARE	.56075*** .62101*** Disponal elemen .06815*** .00885*** Below disponal	.01518 .02398 ts of Cholesi .01088 .00232	Ji 94 Ny matria 4.16 3.62 Cholapky	0000. 0000. 1000.	-87838	.66794 .08868	
HEIRE HOARL HOARL TOARL	.56075*** .60101*** Disponal elemen .06815*** .00885*** Below disponal	.01515 .02994 tm of Choles .01065 .00332 elements of 0	IB:94 By matria 6:16 3:60 Cholepky 3:70	0000. 0000. 1000. xirdan	-67638 -04443 -00431 -00638	.88794 .08888 .01340	

Random Parameter Negative Binomial Model of Just Injury Crashes on Small-Urban-Rural SPF class Roadway Segments

Dependent		700				
	hood function	-1356.043				
Sestificate	1 log likelihood					
	d [6 d.f.]					
Significat		1000				
	resido N-equeres					
	Based on W =					
	= 9999.T A					
	instad: Sep 01,					
	2 pos son 471		11.0			
Setative 1	thomial regress	nico model				
		Standard		Prob.	209 00	nfldence
SUMBINE.	Coefficient	dreor.	=	(E() [*	Int	egval
		+				
	Activation packets					
	-12.2603***	,39917	+30,73			-11.0750
READTWE	-1.02001***	155462	-5175			-1.26887
	-86400D-04***	-21490-04		.0001	438990-04	
2800082			-4.45		06711	
SCHOOLSEL	-00361+++	,00082	3.91	.0001	00188	.00542
TOTLAME	50703***	.00082 .06154	71.22	.0000	.00185 42761	.00842 -,18690
TOTLAME!	-,50702*** -,00002***	.00082 .06154 .01178	7.91 -1.55 -1.50	.0001 .0000 .0000	.00188 42761 07498	.00542 -,16660 -,0301X
TOTLAME! SHWOOR! SHWOOR!	-00361*** 30701*** 08301*** -02540***	.00082 .06154 .01178 .00754	3.91 -9.59 -4.50 2.27	.0001 .0000 .0000	.00185 42761	.00842 -,18690
SCHOKSEL TOTLANE: BNWOOR: BNWNDDEC:	.00341*** 30701*** 08301*** .02540***	.00082 .06154 .01178 .00754	3.91 -9.59 -6.60 2.27	.0000 .0000 .0000 .0000	.00188 42162 07698 .01067	.00542 18660 0301X .04031
SCHOOLSEL TOTLAME: SWWDOR: SWWNDDEC: [3 LWLEN:	.00341*** 50701*** 08301*** .02540*** Heans for random .82675***	.00082 .06154 .01178 .00754 .00754 parameters .02641	2.81 -1.29 -1.50 2.27 91.81	.0001 .0000 .0000 .0000 .0007	.00188 42781 07698 .01067	.00542 16690 9301% .04031
SCHOOLSEL TOTLAME: SHWDOR: SHWNDDEC: LHLER! LHADT:	.00361*** 30103*** 00301*** .02540*** !mans for random .02678*** 1.26003***	.00082 .06154 .01178 .00754 .00754 .02611 .04699	9.81 +8.99 -6.60 1.27 91.91 26.90	.0001 .0000 .0000 .0000 .0007	.00188 42761 07698 .01067 .77868 1.17574	.00542 10690 93013 .04031 .87891 1.38593
SCHOOLSEL TOTLAME SWEDCE SWYNDEC SKYNDEC SHLEW LHADE DESI	.00361***50101***08301*** .02540*** Heans for rendom .22678*** 1.26301***00162*	.00082 .06154 .01178 .00754 .00754 .02641 .04699 .00441	9.81 +8.99 -6.60 3.27 91.91 26.90 -1.06	.0001 .0000 .0000 .0000 .0000 .0000 .0000	.00188 42781 07698 .01067	.00542 10690 93013 .04031 .87891 1.38593
SCHOOLSEL TOTLAME SHWOOR SHYNDEC LALEN LIADE DESL	.00362+++30702-+08362++02540 leans for random .82675 1.249082+00862+ Diagonal sizesett	.00032 .00154 .01178 .00754 parameters .02641 .04699 .00441	9.81 -9.99 -6.60 2.27 91.91 26.90 -1.96 by matrix	.0001 .0000 .0000 .0007 .0000 .0000 .0000	.001es 42761 07698 .01047 .77808 1.47574 01726	.00842 18660 93018 .04021 .87891 1.28592 .00001
SCHOKSEL TOTLAME SHWOCK SHWODEC SHWODEC SHUNDE	.0541+++50703-++02540-++ 02540-++ leans for random .2672-+- 1.24901-++00842+ Diagonal element .09451	.00032 .06154 .01178 .00756 parameters .02611 .04699 .00441 s of Chiles! .02988	9.81 +1.99 -4.60 2.27 91.81 26.90 -1.96 8y matrix 8.95	.0001 .0000 .0000 .0000 .0007 .0000 .0000 .0003	.001en 427e1 0749e .01047 .718de 1.17574 01726	.00542 10690 60018 .04031 .87901 1.25592 .00003
SCHOOSEL TOTLAME SWEDGE SWENDED SELVED LINARY DESI LINARY LINARY DESI	-00342++50702-+08302++- 02540-+- Heans for bandon -22678 124302-+00842+ Diagonal element -0848202650	.00032 .00154 .01178 .00754 parameters .02641 .04699 .00441	9.81 +1.99 -4.60 2.27 91.81 26.90 -1.96 8y matrix 8.95	.0001 .0000 .0000 .0007 .0000 .0000 .0000	.001en 427e1 0749e .01047 .778de 1.47574 01726	.00542 10690 03018 .04031 .87991 1.38593 .00001 .114148 .03518
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SCHOOLSEL TOTLANE: SWEDCE: SWEDCE: STATEM LMADT: DESI: LMADT: DESI: LMADT: DESI: LMADT: DESI: LMADT: DESI: LMADT: DESI: LMADT: DESI: LMADT: DESI: LMADT: DESI: LMADT: DESI: LMADT: DESI: LMADT: DESI: LMADT: DESI: LMADT: DESI: LMADT: DESI: LMADT: DESI: LMADT: DESI: LMADT: DESI: LMADT: DESI: LMADT: DESI: LMADT: DESI: LMADT: DESI: LMADT: DESI: LMADT: DESI: LMADT: DESI: LMADT: DESI: LMADT: DESI: LMADT: DESI: LMADT: DESI: LMADT: DESI: LMADT: DESI: LMADT: DESI: LMADT: DESI: LMADT: DESI: LMADT: DESI: LMADT: DESI: LMADT: DESI: LMADT: DESI: LMADT: DESI: LMADT: DESI: LMADT: DESI: LMADT: DESI: LMADT: DESI: LMADT: DESI: LMADT: DESI: LMADT: DESI: LMADT: DESI: DESI: D	.00361*** -,38701*** -,08251** -,02549*** 1,26203*** 1,26203** -,00861** -,06651** -,06651** -,06651** -,06651** -,06651**	.00032 .06154 .01178 .00754 .00754 .02611 .04699 .00441 s of Chiles .02988 .00443 .00444	3.91 -8.99 -6.69 2.27 91.91 26.90 -1.96 by matrix 8.95 5.98 8.07	.0001 .0000 .0000 .0000 .0007 .0000 .0000 .0000 .0000 .0000 .0000	.001en 427e1 0749e .01047 .778de 1.47574 01726	.00542 10690 93018 .04031 .87991 1.38593 .00001 .14148 .03518
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	THEFT		DIRECT	DER	14
LHLEN LHADT DEG1	.8991E-02 1669E-02 1007E-02		4E-01 2E-05	.12118-0	10
testion e	(anderd day)	AFTERN	AT HE	ofer saves	
S.D Seta				24140	
s-m seral		+			
11 21 31	.09450 .33184 .31786	29			
2) Implied o	,33184	ill ill matrix	of Tand		thir
2) 3) Implied o	.33124 .01735 SETPLATION S	ATTIX	DE	 	et e s
Implied o	.01186 .01786 errelation s	HADT	-,610:	54 58 88	taze

Random Parameter Negative Binomial Model of Low Injury Crashes on Small-Urban-Rural SPF Class Roadway Segments

Dependent Log likel Bestricte Chi squar Significa Mofadden Estimatio Inf.Cr.Al Model est Bample la	efficients Regi- variable incode faction of log lakelihood sad [& d.f.] and [& d.f.] and level factor for lakelihood factor factor for lakelihood thased on H = C = 2004,6 % inated: 3sp 20, 2 pds and 470 binomial regress	105 -28498.30 1 -82097.49 12206.57 .00 1 .2057. 94114. W = 107W = 2015. 16:21 87 1MULVIdos	EMF 660 490 801 000 228 18 842			
MICH	Coefficient	Standard Extor		Prop. (2)>2*		nfidence erval
	Socrender peren	there				
Congtant)	-0.21652***	152425	-86.11	_5000	-0.46016	-7.97294
ECVLISI (<.78788*A*	100035	19.25	-0000	+.00479	-:61029
BCVCRAM!	reseasp-payer	-72472-05	6.87	-0000	-502440-04	.T#T92D-04
SHIDET	01255	.00024	-9.04			02594
12/30/553		.00042	5.01	.0000	.00127	.00291
	04400***	.00373	-11.50	.0000	+,06131	
NAVANDOEC:	101676***	190250	6,75	10000	+01186	-02168
ACCUPATION A	00063+++	00004	4-3-410	0.0001	-:00109	00014
	Seans for randor	. parameters				
LISTER	.95457***	01004	90.09	-9000	1,00405	1,92,129
LNADTI	1.01191***	101912	47.50	-0000	199217	1.05144
TOTIANE)	Neans for rands .90e57*** 1.03191*** 12610***	02091	+6.03	.0000	+,16108	08512
200000	Disconsi element	s of Children	by battle			
1,197, 218	-12804***	100944	18,22	-0000	+10482	-14361
LHADT	-01699+++	.00450	2.74	0002	100807	.02979
TOTLAM:						.01865
	Selmy diagonal s					
ING BULL	02817***	100613	-4.60	.0000	04018	01817
LTCT LNL	02720+	102865	+2.91	0.0527	++00791	,00082
LTOS CHAI	03496*	201304	+1.96	.0626	-,05005	100120
	Dispersion pares	ster for Se	ghin mide	nibution	n:	
Scallain						192196

	1911	D)	TIMES	TOTLANT
LHIADT TOTLAME	-1869E- 0523E-	02 :+101		.19816-02
Implies s	tandard d	eviations	of rat	don parameters
S.D_Sets		1.		
	.03 .03 Oxselatio			ion permonere
Cor.Mat.	LULEU	LHADT	TOTLAS	II.
CHADT	46717	-,55717 1,00080 -20064	12899	4

Random Parameter Negative Binomial Model of Total Crashes on Small-Urban-Small-Urban SPF Class Roadway Segments

Dependent Log likeli Restricted Chi squara Significan MoFadden 3 Estimation Inf.Cr.AIC Model esti Sample 18	officients Wegf Veriable Licos function & log likelikood at [& d.f.] loce lema! Ferdoo N-squisced : hased on N = : 2 19737.5 Al Lesteds Dep Ob. . I pos end % commissioned ferman	TOTAL -19831-32 -96529-53 -96529-53 -00 -6188 17072, W = 1, 2015, 17-85 84 Individual	022 024 000 515 17. 742 105			
TOTALACC	Coefficient	Standard Error		Prob: (2)>2*		nfidence eyval
(i	Tommandoe parama	ters				
Constant)	-4.70471***	.20400	-17,78	.0000	-5.2232T	-4,15615
	421246444	001000	92,50	,0000	.79259	.55300
0000	168314***	.06617	5.56	0000	-42344	169288
MCVMMRII:	-4.95015***	3.24975				-2.40049
TOTLANE	.09795***	.01549	6.32	,0000	.06759	122531
SERDOR		100 669	-9,85	.0000	05556	03699
VCVPTORE:	.00149***	1000002	4,10	,0000	.00008	799812
1.0	leans for random	parameters				
LEADI	,70115***	+02941	23.04	00000	464351	175576
VCE.	+3.07862***	127576	-11:17	10000	+3-41911	-2,53823
SCHLIST!	,70115*** -5.07867*** -1.05926***	119735	-12.04	.0000	-2,20216	+1.55594
	Naposel element	a of Choles	NY MATERIA	10000		
	.04216***					.02644
ACR.	-61566***		5.76	.0002	.29450	
3072.181			2,29		.06670	155523
	Helov Glegoral e					
THUR THE	3.65204***	.29966	5.55	.0000	2.01551	2.19017
INCV LUB!	1,77309***	21616	8.20	.0000	1.34932	2,19650
TRUN ACK	-,69165***	128770	-3:63	10002	-1,06951	32580
	Lepersion payer					
ScalFarm	201212	.00052	42.24	20000	.35456	.34794

----- Implied operations matrix of random parameters

COVARIAN	e matrix			
	DIADE	ACK	MCV5.Did	
LHART VCK WCVLINT	.27218-03 .83618-01 .92498-01	2.948 2.416	1-127	

Deplied standard deviations of random parameters

D Beta	
11	1052140
21	1.7170
21	1.9304

Implied conveletion matrix of rundom payameters

Cor.Mat.	LHADT	. VCR	REALTRI
LEAST	1,00000	1,00000	.91850 .92896
MCVLIMI	,65000	-72095	1.00000

Random Parameter Negative Binomial Model of Property Damage Only Crashes on Small-Urban-

Small-Urban SPF class roadway segments

F001	Coefficient	Standard Error		Frob.		ntidence arral
1	Conrandum param	11517				
Conetanti	+5.98882***	152986	-18-19	10000	-6.65233	-6,18981
VCE)	-,47101***	.09294	-4.01	10000	F. 65300	-,25235
STVNOVELLS	-6.20626***	1.66767	-5.99	10001	-8.25929	-9.19991
TOTLAME !	-,08122***	.02758	-2.35	1,0032	13522	02722
BENDON:	-,00996***	100536	-1,46	10000	+.08049	-,02948
CVITORS:	100391***	.00064	6.09	.0000	.00268	.20517
DE31	55377**	100148	-2.14	+0110	+-00es7	+,10086
SHAMDING	.03146***	,00301	10.52	.0000	02576	103756
CVFTCVA	,00146***	100091	4.65	+0000	-00094	,00207
HCVCRAH-	522740-04***	, #830D+05	9,21	.0000	.047720-04	.397750-0
VCVVPLAT	20192***	.00091	-6.25	10000	00361	00100
1 3	mens for sendar	transmeters				
LIGHT)	,70091***	.03757	23126		+72566	187715
THERM	.02215***	.01836	50.23		.55620	195516
MCVLSHI)	-3.53350***	120148	-15,60	1,0000	-5.54030	-2,75561
	tegoral element					
LIGHT:	-01006444		0,00		.00e7e	.00103
THIEN		(00706)	26,47		-1020€	.12966
MCYLARI.	.44239***	.10611	2.40		-13642	·74836
	Milou diagonal	elements of 1				
	.12657***	,01796	7.52	.0000	-09097	114127
MCV LHA!	1万個をプロサナナ		2.72		-21655	1,32772
MEA THE		122101		+2000	-44253	0.53747
	Lepension panel					
calParm:	.39547***	.01105	35.37	.0000	37226	.41270

Implied coveriance matrix of random parameters

Coveriance				
,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,	SHADE	Locker	HCADTHE	
LHADT	.3825E-03 .246EE-02	10-20000		MISSE

Implies standard deviations of random parameters

e-11 400										-
		 		*	,	-	-	-	-	-
	311		'n	ΰ	1	9	Ė	ð	7	2
	0.4					7		×		1
				*	,				٠	7
	(2)			I	i	4	2	٥	2	2

Implied correlation matrix of random parameters

Cor.Mat.	INKST	DATES	80/2180
LHADT	1,00000	1,00000	.55706 .92764
HCVLIME!	.34706	.02764	

Random Parameter Negative Binomial Model of Possible Injury Crashes on Small-Urban-Small-Urban SPF Class Roadway Segments

Dependent Log likel: Mestriote Chi aquari Significa Mofedden: Estimation Inf.Cr.All Model est. Sample is	efficients Reg variable throof function S log likelihoo d [6.1.] Seedo F-square o based on W = c = 17651.4 R imated: Sep 30, 2 pgs and 6 binomial regres	P -6321-71 E -6908-82; 3176-22; .00 E .2904 17072, H = 17074 = 17075 17075 18015	291 408 100 786 19 143 165			
	States	Stendard		From:		nfidence
FDU)	Coefficient	RECOR		121754	Int	erval
	Monrandom param					
Constant	-1.65101***	.47323	-12.27	8866	-6,77987	
VOR:	-13677044	17360	12.35		-,70785	
MCTYNOSEL11		2,61758		.0507		.01433
SHREER			-6.92		07700	
	-00495***					
			4,70	.0000	.00295 -2.88736	
SHYNDENC	-2.59819*** .02746*** _75716D-04***	21000				
DOMESTICAL PROPERTY.	- manual 20 27444	,00900 ,14072-04	77.05	+0000	13KAR7	103290-03
VCVVEIA	00465***	100000	-5-51	10000		-,00294
				176560	-100537	-100134
SHAPE		a barancoers		22.55	. 53974	-78979
LHLES	.07743***	.02764	12.64	.5533	.12121	.93161
0001				,0007		
	Diegonal elesan					-100409
	.02552+++				.00963	.04301
1301200		.00994			.00364	112290
	.42468**				.00196	.01040
	Selow diagonal					
	.13924***					-15900
	-05122***	.01136		.0000		
ints int	00273		-1.06		00911	000145
	Dispension perm					

	THATT	THEFT	pegi
HADT HLEH ESL	.6667E-08 .1595E-02 .8717E-04	,3006E-01 ,8470E-04	.004GE-04
epties s	enderd Devi	etions of re	ndom paramet
D Bets:		1	

implied.	SULTRIALISM	metria	OF	eardin	DOMESTRE

Cor.Mat.	LISADT	THERE	0001
IMADT)	I,00000	.00007	181576
DEGL		1,00000	

Random Parameter Negative Binomial Model of Evident Injury Crashes on Small-Urban-Small-Urban SPF Class Roadway Segments

Log libel: Restrictor Chi square Bignifica Rofedden (Estimation Inf Cr.Al) Nodel est: Sample is	variable thood function d log likelihood d [8 9.f.] com lavel Resudo Resquare n bestd on H = 0 = 6151.4 Al tested: Sep 10, J pds and 50 thomist regress	-2063.746 5 -2646.293 761.098 .000 5 .11045 17012, M = 10/N = .0 2016, 19:06:	80 81 60 60 11 80 98			
1		Standard		Frob.	\$54. Co	mfidence
2711	Confficient	Extes	1	(4)359	Int	erval

	Contendon parame		19232	10000	100000	100000
BC/OBSEL!	-2-11169***	102756	2125	-0010	105353	.00Tpg
#SATTATE	-2-11184	145469	-8-23	-0000	-2,99599	-5135879
BOLAMBING	.01107***	.00383	8.32	-0009	+00236	-02071
SCYCRAM	.39928D-04*	-2075D-04	2.95	-0593	732640-06	-80588D-04
	06004***			+0000	-,07763	04285
A	Deans for random	n parameters				
LHADT	-33345***	.06085	0.51	-0000	141.027	66068
DISTRICT.	.84861***	.0320#	26-98	.0000	.78982	.91140
	Disgonal element					
	.01056**					
	.02268**					-04965
	Delow diagonal +	Lebents of C	holesky	MATTER		
LIST LIST	.05292**	.02307	2.29	-0215	.00772	.05513
- 11	Dispersion parm	tetel for Wes	Bun dies	sibision	n .	
	-T7342***	0.0000	0.00	0.000	143674	.7100W

Random Coefficients SegünReg Model

••••••	LHADT	TATAN
LHADT	.1922E-03 .7897E-03	.98168-112
Digital et	andard devi	ations of mandom parameters
		20
S.D Setal		1

DILE

Cor.MAt.; LHADT

LHADT 1.00000 .91914 LHEEN .91914 1.00000

Random Parameter Negative Binomial Model of Serious Injury Crashes on Small-Urban-Small-Urban SPF Class Roadway Segments

rependent log likel Heatriote Tri aquam ignification tofadden letimation lef.Cr.AJ fodel eatri lemple le legative	thread function 5 log limithood ad [6.f.] not level Frendo R-required 1 cased on H = 1 = 1610.5 AT Imated: Sep 10, 2 pds and 55 cincomial regress	#792 %15 -#34.747 #8.467 #8.467 .000 1 .05298 17072 K = .00 2015, 19:50: 96 Institute tion model	18 00 69 00 36 18 94 30 12				COVERTABLE MATER LIGADY LEMES SHARET LIGADY LIMITS SHARET LIGADY .1147E-01 LIGHT .2147E-02 .1142E-01 SHEDDEY -2370E-03 .1545E-02 .1545E-02 Lightes standard deviations of random parameter \$.D.Beta) 1
simil	Coefficient	Standard Ertor		Frob. 2 32+	95% Co Int	mfidence erval	1 ,De63336 2 -187824 3 .0000334
	Tonzandzat parane						
Constant.	-5.95440***	1.71119	+4.93	0000		-3.58065	
SCATISE!	-1.50751**	177185	+2.24	.0532	-5.51972	29531	Implied pozzelation matrix of random parameters
VCFARESA	.09082***	103927	2.85	10099	-02179	-16005	
	Heans for random						
LISADT)	-42303***		2.41	-0006	+16310	1.07030	***************************************
137,211	.87798***	,05014	15.10	-2000	176400	.99190	Cor.Nat. LHACT LHLEN SHWORT
AHRORT)	~,04008**	.021.94	-2.07		09490	001116	2
	Diagonal element				0.000		LUADI: 1.00000 .1799020090
LOADI	.04833***		2,71		,01297	.07979	LHLESK, ,17991 1,00000 .45115
LISTER	15687**	-04940		.0201	.01659	12956	EMWDRY - 20090 .48218 1.93000
SHADET	.03257444	:05187	2,77	-0056	+009eb	105424	
	selow disponal e						
- 1			3.05	-0047	103978	+16452	
INT DO	+09713***	,09497					
ING LWA:	-09713*** 02779**	192235	-2.26	-0239	05188	+_00568	
LINI_LNA: LINE_LNA:	.09715*** 02778** .01944	.01235	-2,26 1,98	.0259	05188 02088	00568	
LINI_LNA: LINE_LNA:	-09713*** 02779**	.01235	-2,26 1,95 Bin dist	.0259			

Random Parameter Negative Binomial Model of Fatal Injury Crashes on Small-Urban-Small-Urban SPF Class Roadway Segments

Dependent Log likeli Restricted Dri square Significat Mofadden I Estimation Inf.Co.All Model est: Hample is	officients Regil variable thood function i hog limetimose at [1 d.f.] see level resums 8 equared i hases on N = 1 = 447.5 Al insted; Sep 13, 1 pds and 55 simumiah regress	FAT -218.753 -218.481 1.397 .00318 17072, H = 0 17072, H = 0 17072, 101321 36 individua	72 20 10 87 5 26			
		Stendard		Prob.	255 D	
FATSL	Coefficient					
	Coefficient	Revor		(4)>2.	Int	terrel
[] Constant	Coefficient Increndom parama -3.51668***	Resor ters 2.24011	-4.28	.0000	-14.20723	-5.42611
Constant Litter	Coefficient Increndom permu -3.21663*** .50652***	Revor ters 2.24011 .09180	-4.36 10.73	.0000	-14.20723	-5.42611
Constant; LRLEN	Coefficient Cobrector person -3.21663+++ .50652+++ (sector random	Reyor ters 2.24011 .00180 personesers	4.56 10.73	.0000 .0000	-14,20723 -80620	-5.42611 1.18661
Constant LHLEN	Coefficient Document parame -3.21669++56652++- feant for landom .66762++-	Revor ters 2,34011 ,09180 permeters ,20810	-4.56 10.73 3.96	.0000 .0000 .0000	-14.20723 -80620	-5.42615 1.16665
Constant LHLEH	Coefficient Forwards parame -0.51668++0.50652-+- teams for immodus _62762++- Stale parameters	Resor ters 2.24011 .09150 permeters .23532 for dists.	4.36 10.73 2.96 of rends	.0000 .0000 .0000	-14.20723 -80620 -20601	-5.42615 1.16665 1.10923
Constant LHLEN LHLET LHLET	Coefficient Controlom parame -3.01668*** .90652*** teams for random .66762*** Scale parameters .7023**	Revor ters 2.24011 .00180 permeters .23532 for dists. .19811	-4.56 10.73 2.96 of rando	.0000 .0000 .0000 .0000 m pazama	-14.20723 .80620 .20601	-0.42611 1.16661 1.10923
Constant LHLEN LHLET LHLET	Coefficient Forwards parame -0.51668++0.50652-+- teams for immodus _62762++- Stale parameters	Revor ters 2.24011 .00180 permeters .23532 for dists. .19811	-4.56 10.73 2.06 of rando	.0000 .0000 .0000 .0000 m pazama	-14.20723 .80620 .20601	-5.42611 1.16661 1.10921

Random Parameter Negative Binomial Model of Unknown Injury Crashes Small-Urban-Small-Urban SPF Class Roadway Segments

Dependent Log likel: Restricte: Chi squam Significan Hofydden I Estimanion Inf.Cr.Al! Hodel est: Sample is	officients Hegs variable hood function into likelinood di I d.f.! ose layel beado R-pquares t based on N = : = 121,5 an mares Rep II, I pis and SI inomial regress	19888 -599.80 -411.40 84.06 .00 .0190 17072, 8 = .0015, 16410 36 individu	636 108 005 178 7			
		Standard		Prob.	078.00	nfidence
9.00						
Manageri .	Coefficient	Errar		12/325		sryal.
13	Monandon person	Errar		12/324	Int	sryal
13		Errar		12/324	Int	sryal
Canatanti	Whiteholds person -2.43375***	Errar Sers .26291	-10.02	12152*	-3.14808	-2.01041
Constant! Constant!	Monandon person	Errar Sess .26298 .04603	-10:02 17:72	.0000 .0000	-9,14908 -72544	-2.11041 .90554
Constant Constant Constant VCR	Normodom permae -2.43375*** .01865***	Errar 5818 .26293 .04803 2.87707	-10.02 17.72 -3.65	.0000 .0000 .0000	-0.14808 .72946 -15.57688	-2.11041 .90554
Constant! Constant! Lights: VCR! TOTLAME!	Onrendom persee -2.43375*** .01565***	Errar Sers .26298 .04602 2.87707 .07562	-10.02 17.72 -3.95 9.04	.0000 .0000 .0000	-0.14808 .72946 -15.57688	-2.11841 .90554 -4.2065
Constant! Constant! Constant! VCM! TOTLAME!	Workendow persee -2.41375*** .81865*** -3.83764*** .22953***	Errar -26298 -04602 2.81707 -07562 personters	-10.02 17.72 -3.99 9.04	*0054 *0000 *0000 *0000	-1.14808 .72544 -15.57688 .06182	-2.11841 .90554 -0.20659 .37778
Constant Constant Constant VCR VCR TOTLANE CONSTANT	Workendow persee -2.41255*** -2.82565*** -2.82565*** Weate for random	Errar .26398 .04603 2.87797 .07563 parameters .02487	-10.02 17.72 -3.65 9.04	.0000 .0000 .0004 .0024	-0.14808 .72544 -15.57638 .06182	-2.11841 .90554 -0.20659 .37778
Constant Constant Constant VCR VCR TOTLANE CONSTANT	Worseldon germae -2.43754** -0.1050** -3.2744** -3.2744** -1.10136** Coale parameters	Errar 5028 .00002 2.81707 .07562 parameters .02487 for distr.	-10.02 17.72 -3.95 9.04 -4.05 of rando	.0000 .0000 .0004 .0024	-3,14808 .72944 -15,57638 .06182 -,15013	-2.11841 .G0504 -4.29647 .97778
Constant Constant Constant VCR TOTLAME CONSTANT CONSTA	Worlendow germae -2.43375+** -01865*** -3.23764** -3.23765** Weans for random -10138** Coale parameters	Errar Sers .26298 .04602 2.87707 .07562 parameters .02487 for 81955 .01706	-10.02 17.72 -3.45 8.04 -4.05 0f rando	.0000 .0000 .0004 .0004 .0000 paranx .0005	-3,14808 .72544 -15,57658 .09182 15013	-2.11841 .G0504 -4.29647 .97778

Random Parameter Negative Binomial Model of High Injury Crashes on Small-Urban-Small-Urban SPF Class Roadway Segments

	fficients Hegi	inReg Model				
Dependent	veriable	#1	107			
lng likel:	hood function	+3311.42	170			
Restricted	log likelihood	-3864.08	121			
Chi equare	M [8 d-f-1	21++,73	596			
Significat	ce level	.00	000			
Scrudden	Seado Beguares	1 00 - 12673	625			
istimatio:	based on 5 m	27074; E =	11			
	* 6645.4 A					
Model met:	mated: Sep 11,	2015, 14:54	:52			
Semple 19	2 pds and 81	ubirthd: 50	81.e			
Regative A	unomial regrees	sion midel				
				1011075		
		Scandard		Frob.		ofidence.
HIIII	Coefficient	Error		(B)25a	285	erval
13	Concendon person	stere				
	-4-55144*** -02942***		-12:06	.0000	-7.34936	-6.12279
		- ATTACA	91 44	40.00	*****	.85051
LHLEST	422942***					
LHIEN	-029025**	00081	2.51	,0120		.00221
BCVL1	00030***	.69T9D-04	-5.27	-0000	-,00028 -,00088	100221
BCVL1	-9012544	.69T9D-04	-5.27	-0000	-,00028 -,00088	-,00016
BCVL: MARL:	00025** 00030*** 30014**	.00001 .4979D-04 .10441 parameters	-9.27 -2.22	.0120 .0000 .0215	-,00028 -,00098 -,06361	-,00016
BCVL: MARL:	00025** 00030*** 30014**	.00001 .4979D-04 .10441 parameters	-9.27 -2.22	.0120 .0000 .0215	-,00028 -,00098 -,06361	.00228 -,00016 03671
BCVL: BARL: SARL: SHADE: SHADE:	00025** 00030*** 30014** Gens for randor .67436*** 07947***	.00051 .8979D-04 .10441 parameters .05475 .00068	-9.27 -9.27 -2.23 12.32 -9.46	.0000 .0285	-,00028 -,00098 -,06361	.00228 -,00016 03671
BCVL: BARL: SARL: SHADE: SHADE:	00020*** 00030*** 00014** Gents for random .0743*** 07947*** Diagonal element	.00051 .8979D-04 .10441 s parameters .05475 .00665	-9.27 -9.27 -2.23 12.32 -9.46 ky matria	.0000 .0285 .0000 .0000	.00028 0008 06081 06081	.00228 -,00018 -,03671 ,78165
BOYL SURI SURI SHEET SHEET	00128**00030***30014** Gents for randor .57436**07947*** Occupant element	.0001 .4979D-04 .10441 s parameters .00445 .00665 te of Choles	2.51 -9.27 -2.23 12.35 -9.46 ky matrix 5.59	.0000 .0285 .0000 .0000	.00028 00098 04361 04703 04061	.00228 00018 03671 .79165 06644
BOYL SURI SURI SHEET SHEET	00020*** 00030*** 00014** Gents for random .0743*** 07947*** Diagonal element	.0001 .4979D-04 .10441 s parameters .00445 .00665 te of Choles	2.51 -9.27 -2.23 12.35 -9.46 ky matrix 5.59	.0000 .0285 .0000 .0000	.00028 00098 04361 04703 04061	.00228 -,00016 03671 .72165 -,06648
BCVL BCVL BARL SARDE BHIDET CHART CHART	00128**00030***30014** Gents for randor .57436**07947*** Occupant element	.00051 .8979D-04 .10441 s parameters .00645 .00645 cs of Choles .00591 .00061	2.51 -4.27 -2.23 12.35 -9.46 ky matris 5.59 2.55	.0000 .0255 .0000 .0000 .0000	.02028 02088 84301 54703 08061 .01421 .00029	.00228 00016 03671 .78185 06644 .02953 .00227
BOYL MARL IMADE IMADE SHMIRT SHMIRT	-00125** -00030** -00014** Gens for rendor -0136*** -0136*** 0215***	.00051 .4979D-04 .10441 s parameters .00475 .0068 ts of Choles .00091 .00061 slements of :	2.51 -4.27 -2.23 12.35 -8.45 ky matrix 3.59 2.63 Choleeky	.0000 .0255 .0000 .0000 .0000	.02028 02088 04081 04703 08061 .01421 .00029	.00228 00016 03671 .78185 06644 .02953 .00227
BCVLI MARL SMARL SMART SMART SMART SMART	-00128** -00030*** -00014** Gens for rendor -01381** -01381** -0128** -0128** -0128** -0128** -0128**	.00051 .8979D-04 .1044) S parameters .0048 .00591 .00591 .00591 slederts of: .00627	2.51 -9.27 -2.23 12.32 -9.46 ky matria 1.59 2.69 2.69 Dodeky 9.51	.0120 .0000 .0215 .0000 .0000 .0115 matrix	.02028 02088 84301 54703 08061 .01421 .00029	.00228 00016 03671 .78185 06644 .02953 .00227

	DID	DT	BERDST	
NAMES.	.4783E- -1305E-	08 02 .88	182R-02	
inglied a	tandari d	eriation	s of vendom y	parameters
Dista		1		
1 2	.02 .05	10711 99320		
implied o	urreletio	s matrix	of random po	szametezs
Cor.Nat.	LUADI	зинтег		
	1.00000			
LHADT	.99925	7:00000		

Random Parameter Negative Binomial Model of Just Injury Crashes on Small-Urban-Small-Urban SPF class roadway segments

Dependent Dog likel Restricte Chi squar Significe MrFedden Estimation Inf.Cr.all Model est Hample 18	efficients Hegi variable throof faction sing likelihoos en [6 d.f.] noc levi Fesuda R-equarm n besed on H = 2 = \$312.6 a Heated: Sep 11, I pds and S	JUSTI -4136,255 6 -4929,356 1596,202 200 8 16085 17072, K = 17072, K = 2016, 184275	91 92 90 95 90 87			
TURTINI	Coefficienz	Standard Error		Frob.		onfidence merval
1	Nonzandow param	stere				7337-050
Constant	-5.05105***	58375	-2.65	.0000:	-6.19521	-3.90494
VCEARSA.	08678***	.02129	7.55	10099	101514	
HCV30KSE3	-7.25125**					
	05035***	-01104	14.50	.0000	-,07200	02571
	-90317**	.00130	25.55	+0147	-70340.2	-00972
	-35524.0**	16235748	-2.27	1847.T	-70340.2	-6657.3
	18260***	-00999			102492	
SUVCRAM	.B4580D-04***	.1885D-04			-184555-04	
VCVVP1A	00084***					
36275	7.233112++	2:07547	2.37	10177	1,24600	10.02162
	Means for randor					
	-86122***			10000	,79935	
LEADT				.0000		
1631	00620**	.00004	-2.04		01218	00029
	Diagonal element					
DIFFERENCE IN	-16225***	.00000		.0000		
LISADT	.02558+++	.00427		.0000	,01721	

	THIEN	LHADT	0001
LHERT DESI	.34848-01 62036-02 74248-00	.2153E-04 -1814E-03	.990EE-04
mplies s	tendend Devi	etions of re	ndom parame
.D Bets:		1	

	3	.00768441		
(mpl:	ed 101	selation notzia	of sands	n parameters

Cor.Mat.	THERM	THADT	Dear
		-,85655 1,00000	
	55024	.50671	1.00000

Random Parameter Negative Binomial Model of Low Injury Crashes on Small-Urban-Small-Urban SPF Class Roadway Segments

-.01556 .00208 .00565

Bandom Scefficients Hegholes Hossil Dependent Weishite DOING Tog likelihood function -1268,004 tog likelihood function -1268,004 teerstoom 1268,004 teerstoom 1268,004 teerstoom 1268,104 teerstoom 1268,004 teerstoom 1268,00	

10193	Coefficient	Standard Error				Confidence Coerval	
	Sourandon parame	rters					
Congnant	-5.53639+++	30775	-17.99	10000	HE-23056	-6,23323	
VCK	-,43660***	.10581	-6.53	.0000	64229	-,32921	
CVMX36L	-5.41774***	1,44548	9.76	10004	+8.28078	-2.66427	
SHINDCR!	00041**	100001	-2.42	-0204	04027	00969	
CYPTOBA	.00310***	-00068	4,73	.0000	.00181		
NAMETON	.01428***	.00193	7.40	10000	00000	.01808	
HCVCRAN	.66365D-04***	.6199D-05		10000	.50236D-04	182454D-04	
VEVVELA							
	+.00240***	.00045	-1,57	10000	00334		
60375	9,42099***	1,445-44	3,79	,0002	2.68197		
DEGI	00608***	400044	-4.22	,0000	00090	00226	
SHADOL	+,00790***	*00ers	-6.19	.0000	04990	00590	
SEMPHIT	一,在在这个方面中	-00645	+8,55	10000	-105424		
MARGO	-,20639***	-05697	-5-62	-0008	31774	-, 99443	
	leans fur candon	appearanters.					
LHLEW	.90987***	.01761	51.66	.0000	27346		
THATT	192951***	-53374	21.35	,0000	176900	.49922	
BCVL1KI	+30625.5***	7631,856	-3.75	00000	-43004.I	-13667.6	
100000	Magonal element	s of Cholesi	NV MASSEA				
LHLES	,22711+x+	.01700	10.85	.0000	.20379	.37048	
LHADT	.04023***	,00297		.0000	-05918	,04527	
HEVELINE!	.31142**	14632	2.12	.0340	.02345	122225	
	Salmy diagonal (
INA INI	06252***	00642		.0000	07549	-,04955	
HCY LHL	.90875	.45750		.0061		.61039	
NEW LIEE	2.21216***	.22200	1.47	.0000	.78133		
	teperator para						
oalParmi	41141***	.01161	35,45	.0002	22222		
ORLUBIE!	Cattering	102184	50140	140,04	,,,,,,,,,,	143476	

Implied covariance matrix of random parameter						
	Implied	covariance	matrix	of.	nanden	Distablished

COVECLE	ne matrix			
	19189	LIBER	HUVLINI	
DILEN	.9422E-01 1422E-01	,5527E+02	35555	

Implied standard deviations of random parameter	Implied	standard	deviations	of rendum	parameter.
-------------------------------------------------	---------	----------	------------	-----------	------------

D.D. Det	#1								1
	-+		-	-	-	-	-	-	-
	11			2	3	7	1	3	0
	21	114	ø	'n	ė	8	4	6	Q
	3.1		1		á	ò	ð	3	è

Implied occupiation matrix of vandom parameters

Cor.Mat.	THEFT	IHADI	BOVELEG
	1,00000	-,00000	.23821
LHADTI	54096	1.00000	.85075
ROYLING.	.22626	.04071	2,00000

Random Parameter Negative Binomial Model of Total Crashes on Small-Urban-Small-Urbanized SPF Class Roadway Segments

Dependent Log likel Bastricts Chi squax Significa Hoffadden Estimatio Inf.Cr.Al Hodel est Sample in	refficients Hegt verieble inhood function ed [e 0.f.] unce level Paeudo R-square m fased on N = 1 = 17105.8 A intered: Sep 11. 2 pds and 6 5 incombal regrees	TOTAL -8731.35 5 -24417.20 31878.59 1 .00 1 .6423 8330, # = 10/# = 2. 2015.18:08	ACC 525 927 928 938 952 91 104 101			
TOTALAGE	Doefficient	Standard fired		Fron-		nfisence erval
	Hiorandon param					
Constant	minrecaso param	47474	-10.00	Ann.	-6 55545	
WTVT.	-6.00396*** 00035*** .32207D-04***	edeth-na	44.47	-0000	- D0064	- 40015
Memorrophic	922020-04***	111000-04	2.72	0000	403085-08	053030-04
POST TARREST	:00265+++	-00000	4.03	0.001	.00486	36540
MANUEL .	.16955D-04**	TORED-OF	2.40	21.68	51.0970-TR	. SD601D-04
THEFT	+:09043***	00000	18:07	0000	10095	- 2000
1100000	.02222+**	-00694	5 10	-0000	10031 .03174 -2.98171	04445
	-2.38455***		-6.76	0.550	-9:021.00	-1.81796
Tro-T-G-STOR	Z9057**	14700	27.72	70000	57102	4 51 51 S
MODES	-1,20074***	-25124	58:10	0000	-1.79017	10132
	=:001284=	-00063	-7 36	2000	-,00249	20222
THYDYLAN	Means for random	10000	74.14		-100845	100000
THE WILL	WOLATARE	00474	24 47		92719	95415
LMADT	.9056T***	-05549	14.42	.0000	.65781	.95415
TOTLANE	.12454***	-02917	4.47	0000	-06747	
	Disgonal element	a of Chales	er marris			
1101.010	09400000	02458	4.74	- 0050	-19171	-28857
LUADT	.28869***	01383	9.86	.0000	,03833	
TOTLAND	:01965***	-00406	4.05	.0001	02023	.02955
	.01965+ Below diagonal e	lensons of	Cholessy	PATRIC		
1105 (200)	07701***	01797	44.48	ADDAY.	11092	04308
ATOT LML	.09407	-03996	1.47	0025	04278	
STOT LEA	05137	03452	-2.47	.0708		-91281
	Dispersion parer					
70.000						

	DILE	LINADT	TOTLAND
TATELLA	ST\$88-04		
TOTLAKE	-01847E-01	-,5599E-02	Advanced to
implied at	CANDRED GAVE	attinta of re-	titin paran
S.D Betal		1	
-	0100	30	
11	.2398	90	

Cos.Mat.	DUE	THEOR	TOTAL
TAPER:	1.00000	<.75045	152000
LMADT:	78069	1,20000	90 40 4
TABLE LAW.	83055	20404	2 00000

Random Parameter Negative Binomial Model of Property Damage Only Crashes on Small-Urban-Small-Urbanized SPF Class Roadway Segments

Bandom Coefficients Septiment Model

Dependent wavable Log likelihood Emerion Bestrinted log likelihood Chi squared [6 d.f.] Significance latel Mortadom Facush Ar-quared Satination based on H = Int.Cr.AIC = 14060.7 At Model estimated dep IJ. Sample is 2 pds and 41 Hopative binomial square	-15606.2601 16990.3534 .0000 .047200 8330, H = 2 C/N = 1.69 2015, 18:04:6 60 individual		
177	Standard	 Fron.	864 Confidence

900)	Confficient	Standard Excus	(4)	Fron.		ofidence ermi
1	Monrandom param	state				243.5
Constanti	-5.05663***	.94300	-10.67	.0000	-6,53271	+8.TE065
WWW.	-,00080***	-4781D-04	+4-40	-0000	-,00048	00017
HCYCSQUI.	.40834D-04***	-3.82 SD-04	0.08	.0000	-14887D-04	.66761D-04
VEYFTGER.	.00237***	.00056	4.10	-0000	,00124	.00350
3073	.22560D-04***	_8023D-08	2.91	.0049	-68346D-05	-98283D-04
SHEDET	+105901***	100554	+15.25	.0000	-,10045	01757
SEWOCK!	.03265***	00787	4-15	.0000	101728	.04512
HCVL LHT !	·· · · · · · · · · · · · · · · · · · ·	38788	-7.18	-0000	-8,08794	-1.74901
8420283	+1,36550***	191371	+4.31	-0000	-1,90043	-275056
VCE)	+.27457*	14362	-2.97	-045T	-155660	00475
10000000	means for render	n parameters				
LOLEN	.85125***	.02836	33,05	.,0000		193453
ESADT	.63017***	06189	13.42	-0000	,70838	.95159
TOTLANE	19256***	109276	3-12	.0018	,09808	-16628
0.0	Diagonal slamen	ts of Chales	by mainings			
200201	.22761***	02828	8.05	00000	1177217	25556
CHADTI	.06094***	.01478	4-14	0000	09208	.02980
THILADS	.01095***	.02578		.0002	100363	03026
	Selow diaponal :					
LINE THE	A \$60.06***	-01945	-9.55	-0004	-+10690	02082
THE TOTAL	02417	.04561	3.75	.0735	+.06193	10364
LICT SHALL	-,05862	10367#	-1.99	+007€	+,12665	02744
52.5	Dispersion pays	menes for We	gean saws	PARSTAG	W. Control	
ScalParm!	36396***	.01343	26.95	-0000	33750	.33055

COVALLAD	ne massim		
211111111	LHLEH	INAUT	TOTLANE
LHIEH INAST TOTIANE	.8161E-01 1367E-01 .8501E-02	.5456E-00 4993E-00	.09618-02

Implied standard deviations of random parameters

3	Z		1			4	1									ļ
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						ī			ľ		b	ī	ė	Ē	ī	á
						3	1				e					

Implied vorvelation matrix of random parameters

Cor.Mat.	CHEER	seminar s	TOTLAME
	1,00000	7,74859	.38377

Random Parameter Negative Binomial Model of Possible Injury Crashes on Small-Urban-Small-Urbanized SPF Class Roadway Segments

Dependent Log likeli Restricted Chi aguar Mignificat Nofalden I Estimatio Inf.Co.Al Model esti Sample 18	officients Hegi- variable three function d log likelikoo ad [5 d.f.] oce level peeds 8-equares 1 based on 8 = 5 = 2475.1 Al unuscat: Sep 12, 2 pds and 1: rinsmial repres	P +8228.08 4 +6878.32 4000.51 2 +0078 5320, K = 1078 = 1. 1018, 13:08 40 individu	605 000 481 18 019			
		Standard		Frob.	954 0	inflidence
FinJ	Coefficient	Error		E >2*		Terre
	Tongangon param	stars				
	-5.76936***					
	.69128***					.00169
WENT.	-,000339***	-94510-04	-41.17	10000	-,00057	00028
SENDAL	09718*** .08878*** -2.74865*** -1.77518*** .01646***	100011	-15,58	10000	11081	08066
BRNDCK	.05378+++	101082	3.21	.0018	101117	.05408
MCVL1RI	-2,74365+++	134955	+7.50	.0000	-3.44922	-2.07798
MODER	-2,775550***	.49894	-2,54	+0004	-2.71009	+.79749
ENTENDENC!	.01646***	.00563	2.92	.0035	00542	.02750
HCVR.	.010010-044	.10860-04	2,97	.0523	21233D-06	422742-04
	deans for render					
	2.00000000000	.03230	25.29	,0000	-75363	.88008
VCVFT08A		.00081	2.71			
TOTTARE:	V07746		2,55		⇒,02275	-11766
	hiaponal element	s of Chales	MY MATELA			
	.04036++	.02540	2,27	.0174	-01051	.11038
VCVPTGRA:	.04030++ .00407+++	.00078	2.12	.0000	.00252	.00561
TOTLANE	.20021***	+02548	2.11	.0001	.05270	.14033
	balow diagonal a					
TACA THE	.00819***	*00054	5.52	.0000	+90335	
TRUE THE	207710	+02651	-2.23	.0098	-,05826	
TIOI ACA!	.00519*** 00770 03265***	01269	12,59	10097	-,05784	0079Z
	TERDEX STOR DAYAR	DECEMP FOR NE	dern arad	ELBUSIO	8	
Scalfers:	.24664***	1000172	18.51		230884	.20224

Covaziano	MATELE .				
	LISTE	i vev	PIGRA.	TOTLAME	
ucn	.3646E-0	2			
VCVPTERA.	-3131E-0	3 .434	35-04		
POTLANE	+-44400-0	6 172	EE-00	152565-02	
S.D Bete			1834	don perenetera	
D.D. Betel					
21	1060	8691			
21					
3)	.034	0044			
implied of	orrelation	matrie	of rate	ion parameters	
for Hat.	LINEAU VI	ARDIEVE	TOTLM	it.	
				44	
LULEN		.76695	-, 2264		
		1.00000			

Random parameter Negative Binomial Model of Evident Injury Crashes on Small-Urban-Small-Urbanized SPF Class Roadway Segments

Dependent Log likel Sestilote Chi squar Significa hofeden Estimatio Inf.Cr.AI Hodel usu Sample is	efficients Hegi variable unod function d log likelihood at [3 d.f.] pec Laval Feeudo fr-squared o based on N = C = 3549.7 Al imated: Sep 14. I put and 41 binocial regress	# -1963.868 3 -2191.409 302.083 .000 1 .08295 8929, # = .4 2018, 14:12: 40 instvides	80 14 00 61 11 75			
8V1	Coefficient	Stengerd Error		Freb.		nfisence erval
	Honrandom parama	THE P. LEWIS CO., LANSING				
Constant	-4.32397***	-67129	-4.27	.0000	+4.03748	-2.62227
TOTLAME	,15120++	09969	1.21	10275	.01429	26512
ECYTOKSEL	,15120**	- 00105	3.20	0014	100230	005H2
THIER	.78095***	-04240	17,96	-0000	+69574	-16616
	-2.52162***					
100000000000000000000000000000000000000	Heans for random	parameters:				
LHADTI	Neens for random	109452	4.45	1,0000	- 624183	+42114
1000282	06347+++	-01092	-5.87	10000	00447	04326
33	Diagonal element	s of Cholenk	y matrix			
LIGITI	.09476***	00461	7,84	,0000	492572	04378
SHATE	.03478***	.06146	1.17	.0298	101911	-25997
100000	Below diagonal e	dements of C	holesky	matrix		
135N DG	Below diagonal e 01202	.00760	-1.00	.0137	02693	.00257
- ii	Dispension param	eter for Neg	Bin diet	SIBWILES		
	.50165***					

	110,00	SENDAL
LHADY SHEET	112078-02	.246)5-03
Implied a	tandard days	etions of render parameters
A.D_Bets		1
1	,03474 ,03869	
Implied o	orrelation m	stric of reddin persenters
Cor Mat.	LHADT 5	
	1,00000 -, -,16608 1,	
NAMES		

Random Parameter Negative Binomial Model of Serious Injury crashes on Small-Urban-Small-Urbanized SPF Class Roadway Segments

Log livel; Restricted Chi agrare Significan Mifedden P Estination Inf.Cr.AJC Bodel esti Dample is	section N-aquased based on N =	+89,492 +481.895 8.207 .0427 8020, K = E/N = 1 2018, 14194; 40 instrudue	04 01 26 69 8 20 82			
ADSJ	Coefficient	Standard Error		Prob;		nfidence erval
12	longandon parame	ters				
Sonwtwot)	-3.88517***	1,42226		.0063	-6.67078	+1,09559
	*+D87369	,02682	-2,95		-,09903	,00430
SENDAT				.0888	.00036	01066
HIVMONDES.	.00681**	,00269				
LNEED	.09681** .74618***	.09951	7.98	.0000	.64292	.02947
TMTEN:	.09681** .74618*** -2.78513**	1,5001	7.98		.64292	.02947
ECVLINI ECVLINI	teams for random	.09351 1,36611 parameters	7.98	.0000 .0400	.84392 -3.47266	.02947 11760
CVMXSEL LHLEH: MCVLINI:	teams for random	.09351 1,36611 parameters .14610	7.98	.0000 .0400 .0722w	.84392 -3.47266 89425	.02947
LHADT:	teans for random .28218* Coale parameters	.09251 1,36611 primeters .14610 for dista.	7.90 -2.05 1.85 of rando	.0000 .0400 .0722w m parame	.84392 -3.67266 03421	.02947 11760
CVMXSEL: LNLEH: ECVLINI: CHADT: LNADT:	teams for remote .25215* Coale parameters .03300***	.09251 1,20611 parameters .14610 for dista. .01012	7.90 -2.05 1.85 of rando 5.26	.0000 .0400 .0722w m parame .0011	.84292 -3.47264 03421 saas	.02947 11760
CVMXSEL INLEN: ECVLINI: CHADY: LHADY:	teans for random .28215* [cale parameters .03300*** Numpersion param	.09251 1.38611 primeters .14610 for dista. .01012 mier for Neg	7.90 -2.05 1.05 of rando 5.26 (Bin disc	.0000 .0400 .0720w m parene .0011 ribotion	.84392 +3.47264 03421 tara ,E1317	.82947 -,11760 ,88855

Random Parameter Negative Binomial Model of Unknown Injury Crashes on Small-Urban-Small-Urbanized SPF Class Roadway Segments

Restricted Chi aquare Significan MiFadden F Estimation Inf.Ch.AIC Model esti Semple 1s	hoos function log limelihood i	-876.700 10.848 .001 .0180 8320, H = .5 2015, 16:047 40 individua	75 92 96 16 05 8 91 13			
CHOLONN	Coefficiens	Standard Keror		Prob.		nfidence exval
(3	onrandon parame	ters				
TRACT!	-1,00567** ,00006*** -1,01482** -,11973*** ,00046***	2.01912 2.01912 .09022	2,24 -1,22 -2,88	.0013 .0461 .0029	10064	,14102 -,04868 -,03883
INCH!	mens for randos	122207	6.21	.0000	.79468	.59710
1.5	cale parameters	for dista.	of wange	IN PATREE	STREE	
	+10124***					117811
	Laperaton passa .30079*					1

Random Parameter Negative Binomial Model of High Injury Crashes on Small-Urban-Small-Urbanized SPF Class Roadway Segments

Log limils Sestricted Chi aquari Significat Mofedom: F Satimation Inf.Cr.AIC Model esti Sample is	Variable hood function log likelihoo d [6 d.f.] cm level seado fraguare based on N =	-2175.425 -2495.046 -277.247 .001 -10505 -10505 -10505 -2015, 15:501 -2015, 15:501 -2015, 15:501	99 27 00 96 16 16 17 88			
HIDE	Coefficient	Stendard Egypt		frob. irisl*	359 C	nEld
(2)	onrendom peram	sters				
BUVLING	+2.15575+++	.32435	-8.26	10000	~5.2226I	= I.

HIDD	Coefficient	Stendard Egypy		from. isipl*			
- 11	Concendon person	STRIP					
Constant)	-1,77501+++	77200	-4.22	.0000	-5.29000	-2.26573	
BEVLINE	+2.15575***	.32495	-6.26	10000	·2.22242	-1,15603	
TOTLARE	-16705***	.05446	8.07	.0022	.06031	-27971	
MOAT	000001***	.9563D-04	-9.20	.0014	000049	+100012	
SHKELTI	08511***	.01119	-6.09	.0000	09003	-,04615	
SHIPDON	.03237***	02100	2.86	.0045	.01003	05471	
18	means for cando	payaneters					
CHIEN		004002	32.16	.0000	100014	296100	
LHADE	-408134++	488847	4.42	.0000	+23472	.38183	
ECVISION SELL	+90255**	.00108	2.46	11188	.00053	-20168	
11	Nagonal element	s of Cholesk	y metris	100000			
1303100	-14168***	-98717	5.82	-0005	06897	-21469	
130401	.01913***	.50696	2.75	.0060	100550	008377	
SCYNOCIEL!	15919*	0.08171	1.00	.0514	0009€	.31834	
13	Selow diagonal o	demants of C	BELLERY.	matria			
LINE INC.		-03409	-3.68	.0000	07895	-,52302	
THE VOHE	00446***	.00433	+9.35	10000	00797	+,20185	
THEY THE	,00175	30100	1.12	.7235	-,00037	.00387	
- 11	Dispersion pare	seter for Seg	die dist	ribution			
Scal Party	.591914**	.07699	7.49	-0000	-640BG	.76271	

Deplied covariance matrix of random parameters

	DILET	LHAUT	SCYSOCSEL	
LHLEH LHADT HCYNOCSEL	.2011E-01 7283E-02 6027E-08	.3003E-02	.21146-04	

Implied standard deviations of random parameters

1		9	_	3	*	±	4	ļ											Į	
-	-	-	-	-	-	+	-	+	-	 -	-	-	-	-	+			-		
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							ä	i				,	Q	Ġ	d	ė	ψ	ò	ģ	
							3	į			d	ġ	D	4	d	'n	ż			

Implied conveletion matrix of random parameters.

Cor.Mat.	THEER	LHADT	BUNDLET
LHART	1,00000	1,00000	91858 .98397
HOYOGREE.	91559	.00227	1.00000

Random Parameter Negative Binomial Model of Just Injury Crashes on Small-Urban-Small-Urbanized SPF Class Roadway Segments

Fanding Coefficients Dephapes Hodel Dependent variable /005THF Log Likelihood function +2783.2036 Resultioned log likelihood +3402.0138	
Chi equared [3 d.f.] 1479.21193 Significance level .00000 McFedden Frendr R-squares .2003858	
Estimation based on H = 8320, H = 14 Inf.Cr.AIC = 8614.4 AIC/H = .475 Nodel estimated: Sep 14, 2015, 16:45:35	
Semple is 2 pms and 4:60 individuals Negative binomial regression model	

JOHT DIE	Coefficient	Standard Error	1.0	Frob.	55% Co	nfidence erval
13	Conrandom payane					
Constant!	-5.50239***		-5.62	.0000	-7.35157	-5.45327
LHLES	.75935***		18,75	.0000	.67997	.55574
SHMDCT	~,02655*	v01950	-1,90	.0655	-,09706	
TOTLAHE	-18422***	7.08873	9.95		.07498	129895
	06429++				-1.71997	
:MC05M1	+1.70262***	,60015	+2.00	.0001	-2.59450	+,51067
BCVL	00064***	-87640-04	-1,27	.0000	00581	-400063
SCURNALL.	-00494***	00100	4.88	.0000	.00288	.00690
13	leans for randor	parameters				
LEADE	-55500***	-10001	5,70	+0000	133065	130051
SHEEDEL	+,07696111	101333	-5.00	.0000	00TLZ	04600
11	Degenal clesent	e of Cholesk	y metric			
TROUBE	'09130	100997	7.88	+0505	.12991	123909
SHEEPS	.13264***	104432	7.90	.0029	.04119	121,990
	Selow diagonal o					
	.02412***					105507
11	Lepaision para	eter for Deg	Din Hist	ribution		
ScalParm	-53592+++	102724	12:35	.0000	.25249	132324

Deplied covariance matrix of random parameters

COVERNO	pe settia	
*******	LUADI	SHIVERT
LEADT	,9794E-03	

Implied standard deviations of random parameters

3	. 5	2	3	e	t	a	1													I
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						8	14							ż		4	Ť	5	ú	×

Implied coxteletion metric of random parameters

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		+		-	-		-			-	+	-	-
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	REMITET	91	т.	4	×	64	٠			d	á	5d	śά

Random Parameter Negative Binomial Model of Low Injury Crashes on Small-Urban-Small-

Urbanized SPF Class Roadway Segments	
Random Coefficients HegBnReg Rodel	
Dependent warieble 101NJ	
log ligalihood function +1602.16214	
Restricted log likelibood -19513.09685 Chi squared (b d.f.) 22249.02690 Significance level .00000 NoFadden Feeudo 8-strared .591108	
Estimation bases on S = 8337, K = 16 inf_Cr_AIC = 18817.1 AIC/H = 1.888 Nodel estimated: Sep 24, 2013, 17:06:43	

TOTAL	Coefficient	Standard Error		Frob.		ofidance erval
	Convendos peres					*********
Constant	-6.81691***	.51761	-11.24	-0006	-6.93040	-4.80131
DIRECT	.85768***		24.78		.74296	.97141
TENDET	-,02478***		-5.07		+,04056	-,00000
VCPARMA/	.04701**	.01882		.0120	.01013	20333
ROOM	-1.35+18***	.27234	-6.87	-0500	-1.88788	-,92034
HCVL	00046***	-5609D-04	-0.20	_0000	00057	-,00038
HISTORYCH !	V00042***	.00000	5.75	-0000	.00226	,00655
SWEDST	-,57831***	-00788	-9.98	-0000	-,09369	-,06298
VDVL	-,00000+++	.B816D-04	-6.16	-0000	00041	00018
SENDER	.04254***	.00641	6.43	.0000	.02994	205652
- 13	leans for rendu	m parameters				
DREED	.53580+++	.01767	22,47	.0000	.24434	.95200
TOTLARE	-09929***	-03001	5.31	0009	104046	135810
	Happrel elemen	te of Choles	by matrix			
LITTER	.21130***	.01388	13.33	-0000	.18026	.24251
TOTLAME	*01727***	.00408	2,75	-0060	190521	.01920
-11	leiny miagonal	elements of	Chalesky.	waters.		
THE TOTAL	.06365***	.01000	6.60	_0000	.03653	109071
	Tababator bass	meter for Per	chin mich	ribution		
Scalfage	.59329***	.01999	29.74	.0000	.38717	140942

	e metrie	
	23028	SI YOYLAHE
ITLES TOTALISE		1 41185-02
Aplices et	candard de	viations of random parameter
.D Setal		1
11	.21	
aplied or	premiarion	matrix of candon parameters
	orselation	

Random Parameter Negative Binomial Model of Total Crashes on Rural-Small-Urban SPF Class Roadway Segments

Dependent Log likeli Restricted Chi square Significan Nofadden B Estimation Inf.Cr.All Wodel esti Dempie 1s	efficients Wegt varieble incod function i log limblinos d [6.6.] res level feeddo % squarer) based on H = [= 2134.2 Al imated: Sep 15, i pds and] incomial regress	TOTAL -1132.00: -1698.23: -1698.23: -1698.23: -1698.23: -1698.23: -1698.23: -1698.23: -1698.23: -1698.23: -1698.23: -1698.23: -1698.23: -1698.23: -1698.23: -1698.23: -1698.23: -1698.23: -1698.23: -1698.23: -1698.23: -1698.23: -1698.23: -1698.23: -1698.23: -1698.23: -1698.23: -1698.23: -1698.23: -1698.23: -1698.23: -1698.23: -1698.23: -1698.23: -1698.23: -1698.23: -1698.23: -1698.23: -1698.23: -1698.23: -1698.23: -1698.23: -1698.23: -1698.23: -1698.23: -1698.23: -1698.23: -1698.23: -1698.23: -1698.23: -1698.23: -1698.23: -1698.23: -1698.23: -1698.23: -1698.23: -1698.23: -1698.23: -1698.23: -1698.23: -1698.23: -1698.23: -1698.23: -1698.23: -1698.23: -1698.23: -1698.23: -1698.23: -1698.23: -1698.23: -1698.23: -1698.23: -1698.23: -1698.23: -1698.23: -1698.23: -1698.23: -1698.23: -1698.23: -1698.23: -1698.23: -1698.23: -1698.23: -1698.23: -1698.23: -1698.23: -1698.23: -1698.23: -1698.23: -1698.23: -1698.23: -1698.23: -1698.23: -1698.23: -1698.23: -1698.23: -1698.23: -1698.23: -1698.23: -1698.23: -1698.23: -1698.23: -1698.23: -1698.23: -1698.23: -1698.23: -1698.23: -1698.23: -1698.23: -1698.23: -1698.23: -1698.23: -1698.23: -1698.23: -1698.23: -1698.23: -1698.23: -1698.23: -1698.23: -1698.23: -1698.23: -1698.23: -1698.23: -1698.23: -1698.23: -1698.23: -1698.23: -1698.23: -1698.23: -1698.23: -1698.23: -1698.23: -1698.23: -1698.23: -1698.23: -1698.23: -1698.23: -1698.23: -1698.23: -1698.23: -1698.23: -1698.23: -1698.23: -1698.23: -1698.23: -1698.23: -1698.23: -1698.23: -1698.23: -1698.23: -1698.23: -1698.23: -1698.23: -1698.23: -1698.23: -1698.23: -1698.23: -1698.23: -1698.23: -1698.23: -1698.23: -1698.23: -1698.23: -1698.23: -1698.23: -1698.23: -1698.23: -1698.23: -1698.23: -1698.23: -1698.23: -1698.23: -1698.23: -1698.23: -1698.23: -1698.23: -1698.23: -1698.23: -1698.23: -1698.23: -1698.23: -1698.23: -1698.23: -1698.23: -1698.23: -1698.23: -1698.23: -1698.23: -1698.23: -1698.23: -1698.23: -1698.23: -1698.23: -1698.23: -1698.23: -1698.23: -1698.23: -1698.23: -1698.23: -1698.23: -1698.23: -1698.23: -1698.23: -1698.23:	110 100 186 18 180			
TOTALECC.	Coefficient	Standard Error		Prob.		nfidense erval
- 65	ionrandom param	etava			72,000	
Constant	-0.17016*** 1.32059***	.80230	-12.44	.0000	-10,75133	-7.60439
LNADI	2,32453***	120567	11.54	0000	1,11178	1,53100
CVERREL	100269*	100288	1.97	0166	-,00007	.00633
BUNDLY	11040++*	105020	-6.48	00000	55451	-,00266
ALAE	.00269* 11048*** 00000***	*0001E	-2.20	20055	-,00004	00015
TMCSM:	.91320***	104094	14.98	10000	179379	1,08287
25 to 20 to 10 to	-+ D0 D0 B 4 4 4 4	* E + 1 4 E - 7 F	-25.6	. 0000		-+00/0144
TOTTANE	+,15509**	.07006	-2.22	10563	29141	+-01777
100	hagonal element	se or copies	ey mattim			
THERM	.00048***	,04,082	5.16	.0016	106579	+20763
HOURI	+00048***	178822-04	5,96		.00000	100060
	+04046***			.0002	.02901	+09191
	Selov diagonal e					
ACA THE	,00016	,93030-04	2.00	10426	000003	,00055
FOI THE	.10726**	1,052,50	2.08	10126	+00887	1,02096
THE BCA!	.12717***	102413	5,27	,0000	207908	.57,443
	taperaton paras					
Colfern	.66672***	1.07/68年	正し作作	12200	:51359	+22550

	2303		RCVR	TOTIANE	
LULEU HOVE TOTLANE		04 .224		.4199E-01	341111331
Implied a	tendard d	eristicos	If 190	don paramete	1.0
S.D_Sets		1			
2 2 2	-#7660 -12	77010			
Implied o	orrelation	HE-DR 77010 D Mattie		on parameter	
(#)		HE-DS 77010 D Mattle BIND	of rand		

Random Parameter Negative Binomial Model of Property Damage Only Crashes on Rural-Small-Urban SPF Class Roadway Segments

Santon Coefficients Dependent variable Leg likelihood fund Dep likelihood fund Bastricted Ing likel Chi appared 1 c d Significance level NoTadden Dawodo B-su Estimation based on Inf.Co.AUC = 1300 Model estimated 5c Jample 1s 3 pds and Megative binomial 2 Megative binomial 2	10000			
and Coatton	Itandard	100	Frob.	95% Confidence

800	Coefficient	Standard Error		Frob.		nfidence ervel
	Ronrandom parak	eters				*********
Constant	-9.09455+++	.97109	+9.36	:0000	+10.99968	-7,10090
LHADE	1.24294***	-14967	9.55	.0000	155556	1-45690
SHOOLT	11072***	.01088	-5.30	10000	15164	96974
11	Seans for cando	m parameter				
1381.836	. 22366***	07122	19,00	.0000	,7860E	1.06526
90778	000224+44	.9685D-04	-2.92	+0086	-,90041	00009
TOTEAUE	000224+4	167440-04	-2.55	10207	-,00064	A.00000
11	Disgramal slemen	ts of Choles	sky materia			
LHLERI	-17460***	04313	3,55	.0006	17509	>27090
SCV8.	-00047+**	.8114D-04	3,79	.0000	00031	.00063
TOTLAME	.05166***	-01796	2.95	-0040	.01646	-09667
	Selow diagonal	elements of	Chalmaky	BATTLE		
THIS THE	10012	.04010	1.97	.1004	-,00000	.00033
STOT EMP	-14191+4	.06975	2.24	10210	01787	-26755
LTGT HCV)	-11445***	02462	6.27	.0000	196187	-14702
	Dispersion para					
ScalParm	.37367***	.07610	7,54	.0000	. 92952	.72255

Coveriano	e metrix	110811	Hissin	Sec. 118811 (1991)
	185	EUE.	MINE	TOTLAGE
LULEN HOVE TOTLANE	.3046E- .2124E- .2494E-	01 04 -985 01 -711	6E-04 7E-04	-5619E-F1
Diplies #	candars o	eviations	of sec	don permeter
5.D_Setal		1		
11	.40335	74494		
Implies o	nneletin	netris.	of rend	on parameters
Coc.Mat.			TOTLAN	
80781	1.00000 -26069 -75122		17512 17707 1.0000	2

Random Parameter Negative Binomial Model of Possible Injury Crashes on Rural-Small-Urban SPF Class Roadway Segments

Dependent Log likeli Restricted Chi sgiari Significat Mofadden I Estimation Inf.Cr.All Model arti Bample is	officients Degit variable	+173,840 -448,460 307,639 .000 .27528 .2202, H = 1078 = _4 .2018, 14:21 .01 institutes	49 97 00 13 16 41 28			
9292	Coefficient	Standard Error		Prob.		ofidence erral
	Concension patern					
Commission	-12 4430+++	5 44555	-7:45	.0000	-15,3270	-9.5711
THEFT	.mmpmmede	.00270	70.53	.0000	-70544	
OWNERT	.87083*** 13916***	.02854	-4.61	10000	15411	40000
NOVAMENT :	.00296*	.00200	3.97	0523	90004	.00794
VINCIBIT!	-3.82600**	1,54535	-2.07	10361	-7.44229	-,20911
the same to reliable to	to the second	1.00 (4.20)	401,544	10000	1-17107	1,98774
82578.5	00032**	.00016	+5.58	.0471	00004	.00000
TOTLAGE:	00032** 10365**	.00175	-2.00	10454	36304	00376
110000000000000000000000000000000000000	Coessonal element	5-0D Chuleson	N MARKEL			
IMADT	,95006+	.02522	2.97	.0560	00323	.10538
HCVH /	.05008* .00032***	.00011	2.99	.0028	.00011	.00084
TOTLAND	.05432+++	.02068	2.61	10006	101378	.59465
- 91	below diagonal a	Lamanna of C	beliefly	materia.		
INCY LHAS	100020	.000013	1.50	10478	0.00004	1,00048
DENNE THE L	122444	100553	3,94	10456	0+017	.29229
TEGE BEA	,18221***					
TIOE BIN	Lapersion pares 1,02058***	seter for Heg	Sin dist	ribution		

41100116	5104	DT .	BCVF	TOTLAHE		
UMOT SOVA SOTLANIE		04 1196		.90958-01		
begines o	tenderd d	evietims	of rac	dom pasemen	***	
.D Beta		1				
3	-94297	97356				
	.1	97356 n matrix		on parapete	t#	

Random Parameter Negative Binomial Model of Evident Injury Crashes on Rural-Small-Urban SPF class Roadway Segments

	effluients Neph	Cabok walks					implied covariance matrix of random parameters
	variable.		/1				Covariance matrix
	thood function	-211,996	11				
Restrictes	d log likelihood	+227,067	4.7-				LHADT TOTLAME
	ed (3 d.f.)	22.222					
	noe level	.000					LHADT ,5536E+02
	Paeumi R-aquarem						TOTICAME .2292E-01 .1012
	n based on H =						Implied etandard deviations of random parameters
	SMATERI Sep 15.						referred branders secretified or handour batassocial
	2 pds and 11						5.D Setal 1
	binomial regress						*****
		****		++++++		*******	10 ,0730169
		STANDAME .		Prop.		mfloence	21 1318104
EVI	Coefficient	Estate	2	183554		erval	
			,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,				
The state of the s	Sonrandon parase	CRIR					Implied correlation matrix of random payaneters
Imatanti	Monrandon parame		-4.28	-0000	-71,99687	-4.36108	Implied correlation matrix of raccom payameters
		1,90849 1,00849	-6.28 6.86	.0000	-21-89697 .80699	-4.36108 .96881	Implied correlation matrix of racdom parameters
Constant!	+8-12775***	1,90849	6.16				Inglied ourrelation matrix of random payameters
Constant) CORING TJOHNE	-8-11775*** -75062***	2.90848 .10944 .03008	6.16	.0000	.64633	-96931	
COMPTANT) COMPT SHUGET	+8-11773*** -75062*** 07595 Heans Suc candim -86618***	1,90848 .10944 .03009 papamatars .24107	6.16	.0000	.88693 17814 -49569	.96931 .02018 1.49868	Cox.Het.; DRAFT TOTLARE
LHAUT TOTLANG	+8-11773*** -75062*** 07595 Heans Suc candim -86818*** 58814***	2.90848 .10944 .03009 perameters .24107 .20748	6.86 -1.98 4.81 -2.88	.0000 .0185 .0001 .0046	.88693 17814	.96931 .02018	Dow Mat. (LHADT TOTTLINE LHADT/ 1.00000 .86091
CONSTRUCT SHEET LHAUT TOTLANG	+8.11779*** .75082***07508 Heans Soc candim .96818***58814*** Disgoral element	1.90849 .10944 .03009 perameters .24107 .00748 s of Cholesk	6.06 -1.06 4.01 -2.00 7 matria	.0000 .0103 .0001 .0046	.83633 17814 .49569 98474	-96531 -02018 1-49968 18154	Coy.Mat.; LHAST TOTLEHE LHAST; LODODO .86051 TOTLEHE .96051 1.00000
LIMATE LIMATE LIMATE	-8.11773*** .75062***07595 Hears Sor candis .96818***58814*** Disporal element.	1.90849 .10944 .03009 perameters .24107 .00748 s of Cholesk .03793	6.96 -1.96 4.81 -2.84 7 matria 1.95	.0000 .0185 .0001 .0046	.83633 17814 .43569 99474 00150	.96831 .02018 1.49968 19154	Dow Mar. (LIRADY TOTLAND LIRADY 1.00000 .86091
CHICATA CHICATA CHICATA CHICATA COTLAND CHICATA TOTLAND	-8,11779** .75082*** -07508 Beans Soc candum .86818*** -18814*** Diagonal element .06861*	1.90849 .10944 .03009 perameters .24107 .00748 s of Cholesk .03752 .08448	6.96 -1.96 4.81 -2.84 7 matrix 1.95 1.97	.0000 .0185 .0001 .0046 .0841 .0477	.83633 17814 .49569 98474	-96531 -02018 1-49968 18154	Coy.Mat.; LHAST TOTLEHE LHAST; LODODO .86051 TOTLEHE .96051 1.00000
LHADT TOTLANE	-8.11773*** .75082*** -07508 Means Soc candim .56813*** -18814*** Diagonal element07305* .06861* Below diagonal e	1.90448 .10944 .03009 permaters .24107 .00748 s of Chilesk .03793 .03448 laments of Chi	6.86 -1.96 4.81 -2.84 7 matrix 1.95 1.97	.0000 .0183 .0001 .0046 .0541 .0477	.83638 17814 -49969 -,98474 00130 00644	.96531 .02018 1.93568 18154 .14739 .18347	Coy.Mat.; LHAST TOTLEHE LHAST; LODODO .86051 TOTLEHE .96051 1.00000
CONTRACT CONTRACT CONTRACT CONTRACT CONTRACT CONTRACT TOTLANG TOTLANG TOTLANG	-8.1272** .75083** .07285 Beans For candum .86812** .28814*** Diagonal element .07305* .06851* Below diagonal element .2024**	1.90849 .10944 .01009 : permattra .24107 .00741 a of Chilask .02791 .03448 laments of Ci	6.06 -1.06 4.01 -2.00 7 matrix 1.05 1.07 Tolesky 2.46	.0000 .0185 .0001 .0046 .0541 .0477 matrix .0198	.83633 17814 -49369 99474 00190 00694	.96831 .02018 1.49968 19154	Coy.Mat.; LHAOT TOTLEHE LHADT; LODDOD .36051 TOTLEHE .96051 1.00000
CONSTRUCT CHART CHART TOTIANG CHART TOTIANG	-8.11773*** .75082*** -07508 Means Soc candim .56813*** -18814*** Diagonal element07305* .06861* Below diagonal e	1.90849 .10944 .01009 : permattra .24107 .00741 a of Chilask .02791 .03448 laments of Ci	6.86 -1.96 4.81 -2.84 7 matrix 1.97 1.97 101esby 2.46 Sin Slot	.0000 .0185 .0001 .0046 .0541 .0477 matrix .0198	.83633 17814 -49369 99474 00190 00694	.96531 .02018 1.93568 18154 .14739 .18347	CON.Het.; LHADT TOTLEHE LHADTY 1.00000 .80001 TOTLEHE: .90011 1.00000

Random Parameter Negative Binomial Model of Serious Injury Crashes on Rural-Small-Urban SPF Class Roadway Segments

Dependent Log likeli Restricted Dis aguara Significan Mofadden I Estimation Inf.Cr.Alc Nodel esti Sample is	officients Hegs: variable hood function tog limelihood d[1 d.f.] com lavel beard to H = - 174.7 AU metal: Sep [6, 1 2 pds and 111 inottal recrease	2102. K = 10015. 16081. 16081. 16081. 16081. 16081. 16081. 16081. 16081. 16081. 16081. 16081. 16081. 16081. 16081. 16081. 16081. 16081. 16081. 16081. 16081. 16081. 16081. 16081. 16081. 16081. 16081. 16081. 16081. 16081. 16081. 16081. 16081. 16081. 16081. 16081. 16081. 16081. 16081. 16081. 16081. 16081. 16081. 16081. 16081. 16081. 16081. 16081. 16081. 16081. 16081. 16081. 16081. 16081. 16081. 16081. 16081. 16081. 16081. 16081. 16081. 16081. 16081. 16081. 16081. 16081. 16081. 16081. 16081. 16081. 16081. 16081. 16081. 16081. 16081. 16081. 16081. 16081. 16081. 16081. 16081. 16081. 16081. 16081. 16081. 16081. 16081. 16081. 16081. 16081. 16081. 16081. 16081. 16081. 16081. 16081. 16081. 16081. 16081. 16081. 16081. 16081. 16081. 16081. 16081. 16081. 16081. 16081. 16081. 16081. 16081. 16081. 16081. 16081. 16081. 16081. 16081. 16081. 16081. 16081. 16081. 16081. 16081. 16081. 16081. 16081. 16081. 16081. 16081. 16081. 16081. 16081. 16081. 16081. 16081. 16081. 16081. 16081. 16081. 16081. 16081. 16081. 16081. 16081. 16081. 16081. 16081. 16081. 16081. 16081. 16081. 16081. 16081. 16081. 16081. 16081. 16081. 16081. 16081. 16081. 16081. 16081. 16081. 16081. 16081. 16081. 16081. 16081. 16081. 16081. 16081. 16081. 16081. 16081. 16081. 16081. 16081. 16081. 16081. 16081. 16081. 16081. 16081. 16081. 16081. 16081. 16081. 16081. 16081. 16081. 16081. 16081. 16081. 16081. 16081. 16081. 16081. 16081. 16081. 16081. 16081. 16081. 16081. 16081. 16081. 16081. 16081. 16081. 16081. 16081. 16081. 16081. 16081. 16081. 16081. 16081. 16081. 16081. 16081. 16081. 16081. 16081. 16081. 16081. 16081. 16081. 16081. 16081. 16081. 16081. 16081. 16081. 16081. 16081. 16081. 16081. 16081. 16081. 16081. 16081. 16081. 16081. 16081. 16081. 16081. 16081. 16081. 16081. 16081. 16081. 16081. 16081. 16081. 16081. 16081. 16081. 16081. 16081. 16081. 16081. 16081. 16081. 16081. 16081. 16081. 16081. 16081. 16081. 16081. 16081. 16081. 16081. 16081. 16081. 16081. 16081. 16081. 16081. 16081. 16081. 16081. 16081. 16081. 16081. 16081. 16081. 16081. 16081. 16081. 16081. 16081.	19 13 98 94 95 6 75 18			
regerate t		Standard	+++**	Denk.	954 Ca	of Change
SING	Coefficient	Error		12/32*		erval
	onrandom paramet	ese.				
	+20.7749***					
LUADT	1,15950**	149503	4.57	+0204	42784T	
DIDEN	100029***	28789	2.65	.0002	46318	1,61330
- 33	leans for random	parameters				
	56162*			.0101	-1.2240T	100053
	cale parameters					173
						22245
TOTLASE	17669*	.09120	1.94	+0527	00206	.33343
TOTLASE	.17669* Esperaton param	.09120	1.94	+0527	00206	.33342

Random Parameter Negative Binomial Model of High Injury Crashes on Rural-Small-Urban SPF Class Roadway Segments

Mandim Coe Department		Beg Model HII	162				Coveriance		trie of rendim peremet	
Bestrioted	hood facution log likelihood		65				10003300	LMADT	TOTLAME	
Significer McFaddet F	wedds R-squared	41.955 .000 .pe727 2502, K =	99				LHADT TOTLAHE	.0690E-02 .1429E-01	.e722E-01	
inf.Gr.AIC	- 555,7 AD	M = 12					Implied at	enderd dens	ations of rendom pages	minimum.
Sample is	sated: Sep 16. 2 pds and 11: incoist regress	1 Individua					S.D_Setal		1	
1		Standard		Profe-	9.64 00	nfidense	21	.28074		
HITTHY	Coefficient	Error		12/024		erval				
	onrandon parane						implied to	crelation w	winter of render parame	ters
Constant VCVFTGRB SCVMESTI	-12.5915*** 00854** -12.1978*	1,43335	-8.79 -2.81 -1.99	.0000 .0209 .0844	-15,4002 01099 -25,9471	-9.7525 00090 1.6514				
	mans for random						COF-ENG.	INAUT TO	71456	
TOTLAME	1.00795*** +.89707*** Hagonal element	,17464 ,14169	-2.10		- 47466	1.44024		1,00000 .	50769	
LOGDTI	.06015**		2.05		.00269	.11880				
TOTLANS	-10882**	-09356	2.52	10117	02424	-19941				
TIOT LEA	elow diaponal e	Lementa of U		.0078	106190	-40174				
	Apperaich param					175 3 10				
Fostfarm;	7086644	34809	2.57	.0389	.03818	1.38103				

Random Parameter Negative Binomial Model of Just Injury Crashes on Rural-Small-Urban SPF class Roadway Segments

Bandon Coe Depandant	efficients Regi tariable	knikeg Model JUNIE	uJ				Covaziano	matria		of sendom parameters
Restricted	i log likelihoop	-255.406	93					THE	12	TOTLAME
Significan NoFadden A	ed [3 d.f.] not level Pasudo R-squares n based on S =	.000	91				INADT TOTLAME	,1767E-	01	_1567
Inf.Cr.AT	+ 615.9 A1	C/N + .2	52				implied a	endard o	evieti	one of candom parameters
Dample is	immted: Seg 16, J pds and 11	Of individua					S.D_Bets)		1	
	ninumial regress					tracia id tratacian destruteración.			92900	
JUSTINJ		Standard Error		FE00.	Int		21	- 9	95163	
	Foorangem parame				******		Institut o	rrelatio	. natri	a of random parameters
Constant	-10,7550+++	5.73992			-14,2658					
THERE	.00540**				-20299	06398				
HARL	82990**		2,30		09229	5.14751	Cog.May.			
	teans for rangos				000000	60.000				
LHADT:		,20882	4.97	10000	-63611	1.44414	DUDT	1-00000	-9893	r ^y
TOTLAGE		,00242		.0171	01000	+,00068	TOTLANE	.01917	1.0000	0.0
	Diagonal sissent									
THEOT	13255***			10000	-97519	+13987				
TOTLAME		.01244			00et2	.12119				
	Below diagonal 4									
ARL TOTE		100404		10000	-22655	.55638				
	Haperalon parak					20.000				
Bralfarm:	.92346**	41110	0.00	+9275	-10227	2,74454				

Random Parameter Negative Binomial Model of Low Injury Crashes on Rural-Small-Urban SPF Class Roadway Segments

Dependent Log 118el:	efficients Negh variable thood function d log likelihood	inkeg Model 101 -1049.445	062 618				Coveriano	nettie	nris of candon par	
Chi squari Significan MoFwiden (Estimation Inf.Cr.AI) Model exti Sample is	ed [] d.f.]	2277.621 .000 1 .52104 2202, E = 1078 = .1 2018, 141481 01 individua	100 100 100 12 12 120				INACT SHRELT Implied at p.D_beta)	:2612E-03 -:6513E-03	.1017E-01 ations of random p	
	Coefficient		4	Frob.	95% Co	nfidence ervel	21	.05303 .1347	05 95	
	Sonrandom parabe						Implied or	orrelation m	atrix of random pa	armeters.
Constant	-9.94524+**	.97016	-10.29	10000	-11,54072					
TOTLAME!	16403**	.07671	13.60	10447	79610	00168 L.06620				
HEVERSES!	-11.0187***	3,53346	-5.11	02000	-17,9520	-4.0015	Cor.Man.		MATT	
	.00011+**	-8177D-D6	2.35	20001	,00000	.00025				
SCVR	65023++	121964	-2.00	-0976		0.05392	LHADT			
SCAR!		-21994			-1.14651			1.00000	91115	
SCAR!	65023+4	-21994							91115	
SCVR VCK LHADD SHMDLT	65021+* Neams for rendom 1.56692+++ 10712+++	.20964 parameters .12662 .02108	-2.00 10.00 -5.00	.0976 .0000 .0000	-1.14681	05393		1.00000	91115	
SCAN (2 PRINCE)	69021** Neans for random 1.96693***10712*** Disputel element	.20964 parameters .12663 .02105 ss of Choless	-2.00 10.00 -5.00 ty matrix	.0976 .0000 .0000	-1.14688 1.11894 14843	08893 8.46490 06581		1.00000	91115	
SCVR VCK 12 LHADT 12 LHADT	69021+* Neams for retion 1.96693++10712+++ Disputs! element .08808+++	.20964 parabeters .12662 .02108 ss of Cholest .00739	-2.00 10.00 -5.00 ty matrix 7.18	.0976 .0000 .0000	-1.1668 1.11894 14863	05393 1.61490 06591 .06781		1.00000	91115	
SCVR VCR (3 LHADD) SHREET (1 LHADT) SHREET	55023** Deams for random 1.56693***10712*** Diagrams; element .05805*** .05516***	.28984 parameters .12653 .02108 m of Choless .00788 .01889	+2-00 10.00 +5:00 ty matrix 7-18 3.50	.0976 .0000 .0000	-1.14688 1.11894 14843	08893 8.46490 06581		1.00000	91115	
SCVR VCR (3 LHADD) SHREET (3 LHADT) SHREET	55023** Deams for ration 1.56693***10712*** Diagros2 element .05355*** .05556*** Below diagros1 4	-28984 parameters -12682 -02108 s of Cholest -00738 -01889 Elements of C	+2.00 10.00 +5.00 by matrix 7.18 3.50 holesky	.0976 .0000 .0000 .0000	-1.14688 1.11894 14863 .03688 .02442	03393 8.61490 06591 .06781 .00470		1.00000	91115	
SCVR VCW LHADT SINGLT LHADT LHADT SINGLT SINGLT SINGLT	55023** Deams for random 1.56693***10712*** Diagrams; element .05805*** .05516***	.28964 parameters .1268 .02108 is of Cholest .00785 .01808 Lements of C	-2.00 10.00 -5.00 by matrix 7.18 3.50 holesky:	.0976 .0000 .0000 .0000 .0000 metrix	-1.14681 1.11896 14963 .03688 .03642 15634	05393 1.61490 06591 .06781		1.00000	91115	

Random Parameter Negative Binomial Model of Total Crashes on Small-Urbanized-Rural SPF Class Roadway Segments

Dependent	efficiente Seg variable incos function	TOTAL	000				Corectano				m personerers
Restricted	d log likelihoo	-1106.085	162				-00000000000000000000000000000000000000	13/40		AUG.	
Significe: McFadden Estimation Inf.Cr.AX Hodel est: Sample is Negative b	ed (6 m.f.] nom level Pseudo R-aguarea D based on N = D = IITO, S A Lwated: Hep 14. D pds and 3 binomial pagras	.000 1 .29436 2020, K = 50/8 = 1.1 2019, 18:400 510 individua sion model	100 118 14 124 42			0101100001122	IMADT TOTLAND SONDLT	.887ZE-D 2164E-O .1059E-O tendezd de	t 1 ,30421 2 .65811 VLATIONA 1	1-02 1-03	,6620E-01 Mom parameters
TOTALACCI	Confficient	Standard Error	18.7	Prob.	BEA Co	mfloence ervel	1) 2)	,078 ,061	2947 2005		
	Tonrandom param						71	1.004	10.40		
DOUB)	-,75276D-04***	,08099	16.55	10000	.74401	~6,02868 .94887 21764D-04	Implies o	orcelation	MATULE OF	Cane	NIR Derenetera
DESTI			6,04		.01593	,04384					
MONTHE.	-1.04138***		-2,69	10088	+2.74927	-101336	Cor. Nac. 1	110.00		48800	
	Seans for randh		200	10400		10000		Times.			
	1.00716***	.10622	-2.80	,0000	.79597 +.27209 -1.98204	1,21535	TOTLARE	1,00000 +-06208 -99210	1,00000	1,663	
13	Diegonal elemen										
LEADT			11:46	10000	-03173	235496					
TOTLASE	.06190*			10626	00016	13192					
SHWOLT	.02372***			1,0002	100344	.03359					
	Selov diagonal -				2000	0.0000					
158W LBA			-1,90		00049	.00000					
	01749		1.99		03396	04894					
	Dispersion para	menes for Nec	Gin dias	FIRMERA							

Random Parameter Negative Binomial Model of Property Damage Only Crashes on Small-Urbanized-Rural SPF Class Roadway Segments

Dependent Log likely Restricted Chi square Righizion P MuFauten P Estimation Information Hodel esti Sample is	finitents Heg8 variable hood function log likelihood d [3 d.f.] or level sends R-squared fased on S = = 1704.8 AI members Pep 16. I pde and 10 inomial regress	9 -848.803 -1048.800 405.173 .000 .18174 2020, K = 2020, K = 2015. 16:281 10 individua	11 59 00 60 8 44	Name and the		
PDG	Coefficient	Standard Error	*	Prob.		ofidence ermi
138	energy modnecos	ters				
Tonetent:	-7.82550***	1,01491	-7,71	,0000	49.81668	05.83632
1111/2/11	.83566***	.09100	16.29	.0000	,73072	.93061
TOTILHE	+,04006**	.01980	-3.17	0297	00104	02422
	eans for random					
DUADT	,90373***	111140	0.15	.0000	+65732	1112406
HENDOR:	04020***	.01949	-2.75	10169	~-07399	-,01240
12	tagonal element	s of Cholask	y matrix			
DUADT	.DIBBO*** .DESS*** .DESS*** .DESS***	.00000	11,87	.0000	-01729	.Depei
SHMDON	109219***	100966	1.10	.0000	100051	. DE097
1.3	elow miagonal w	lements of C	balesky	MATX18		
LOSS LNA	.03266***	.00996	2.20	.0030	.03355	,03217
(2	impersion pares	aver for Dec	San High	ribution		
BoalFamil	1.12909***	.22562	4.55	.0000	-97766	2.97852

	1102	T :	SHOOK			
DIBADT SHIPDCE	.8383E-0	5 3 ,284	6E-01			
Implied at	enderd de	visticas	of sec	oce par	meters	
S.D_Bata)		1				
3	025					
Implied of	rreletzon	NUTTER	of rend	on paire	meters	
Com.Mat-1	LHADT	SHVDCR				
	1,00000					

Random Parameter Negative Binomial Model of Possible Injury Crashes on Small-Urbanized-Rural SPF Class Roadway Segments

Dependent Log likeli Sestriote Chi aquari Significar Nofeoden I Fatimation Inf.Cr.All Model easi Fample is	officients Beging wariable wariable had incoming to a single section of the secti	#152.657 #452.657 #4.043 #4.043 .000 .09891 .09891 .09891 .09891 .09891 .09891 .09891 .09891	90 101 100 30 14 14 142 07			
F1312	Coefficient	Stendard Reson		Frob.		nfidence reival
(3	Conrendom person	terr				
Cometanti	+8.55522***	1.99999	-0.65	+0000	-12,00631	-5.31015
THIEF	.76858***	.08180	9.42	0000	.60622	-92493
TOTLAME	26000**	114718	-2.50	+0217	+.49171	+,03942
SCHOOLS .	.00477*	100249	2106	.0882	00011	100065
18	teans for recomm	parameters				
DAMET	1,047864**	17682	2-21	.0000	·70188	1,33303
HCVLINI:	+8,72735444	1.97094	-2,65	+0109	B-40955	-2-44965
SHEEDER!	-,152034++	,02974	-2.14	.0000	+.21327	09440
1.0	Disgral alement	s of Chales	cy metris			
LHADT	3.23370***	103359	2,75	+0040	102655	115577
HCATTH21	9-29270	1,12979	2.88	.0340	5.00119	5.49622
AND PARKET	-06109-77	.04000	1995年中華	- PORT 1	-02002	.50723
	selow diagonal e	Dements of C	holesky	matta		
SHCV_SHAI	-00456*	202230	2.52	+0897	00032	-0094E
THE THE	109166***	,00058	21.74	.0097	-52694	.15630
THEN HELY!	.00488* .09366***	,02552	-2.35	+0197	+.20948	+.00847
100000000000000000000000000000000000000	Timberaton navm	wher for New	Sten dage	edded from		
Stal Faits:	1.92676**	66122	2.81	.0209	23019	2-82274
		THE PARTY OF				

Implied covariance matrix of random parameters

Covariance Receix

IMADT SCULINT SCHOOL

DRAFT .1168-08
SCULINT .11602-02 10.47
SCULINT .11602-02 10.47
SCULINT .1602-02 10.47
SCULINT .1602-02 10.47
SCULINT .1602-02 10.47
SCULINT .1602-01

Implied scandard deviations of random parameters

5. D. Betal 1

1: .0115626
3: 2.29566
3: 1.20027

Implied correlation matrix of random parameters

Cor.Nat. | UMADT SCULINT BUNDOR

LIMADT 1.50000 .03393 .71633
SCULINT .03384 1.00000 -4.65526
SEMEDOR .71433 -.43523 1.00020

Random Parameter Negative Binomial Model of Evident Injury Crashes on Small-Urbanized-Rural SPF Class Roadway Segments

Dependent Log likeli Bestrioted Chi square Significan Bifadden B Estimation Inf.Cr.AIC Wodel esti	hood function log likelihood d [1 d.f.] ca level sends B-squares hased on S = 283.5 al mated: Dep 17,	2015, 19140:	49 12 13 9 80 47				Taplies covariance matrix of random parameters COVEXIANCE MADDI SONDER LHADT SHEECE .66726-02 LHADT25672-02 .20072-02
Separity b	Coefficient			grob.	355.00	ofidence erval	Implied standard deviations of random garaneters 5.D_Deta 10759496
	chrandum parana						2) _0459503
Constant: LRIEN: 90VVFIA:	-6.49115*** 1.09305*** .00717** eans for random	2.35442 .11214 .00318		.0068 .0000 .0220	-11.04513 .80737 .00188	-1.81657 1.25873 .01831	Deplied correlation matrix of inciden parameters
SENDIR)	00385* .60285** laponal element	.04521 .23552	-1.95 2.56	.0536 .0105	17245 :24122	,00416 1,06665	Cor.Man.(SHEDCE THADT
DONDCE:	.07834*** .03024*	.02478 .01590	2.45 1.82	.0049 .5571	.02284	.12784 208343	SEMDON: 0,0000074828 18820:74824 1.00000
STARL BHR	elow Siagonal e 00980** ispersion param	.03418	-2.48	+9171	04140	00401	
ScalFarm(.01818+	.01553	2.61	.0095	00225	19861.	

Random Parameter Negative Binomial Model of Serious Injury Crashes on Small-Urbanized-Rural SPF Class Roadway Segments

Dependent Log liveli Restricted Chi square Significan McFadden, P Estimation Inf.Cr.Alc Model esti Sumple is	finients beging relation of the control of the control of the control of [] and [] are the control of [] are th	91 -81.762 -101.000 12.613 .000 1 .09209 2020, X = C/N = .1 2018, 18:381 10 individua	82 47 42 91 93 99 9	1		
2211	Coefficient	Standard Error		9800- 2 52*	954 Co Inc	nflaense erval
15	cornodon parane	ters				
Congress)	+3.033354+	W.20220	+2.17	40000	-17,00618	86391
1304001	· 7-6885*	-44240	1:34	- 2722	09011	
DEGIL	.06823***	.02229	2.92	.0035	.02228	+52406
18	eans for random 46965** 1-16875***	pereneters				
SHIPSON!	-,469654+	-15555	42.00	.0104	52551	-,10336
230300	2-14675+++	-15448	4-54	.0000	+80758	1,49029
1.0	iagonal simment	m of Cholese	O. mercans			
SHREEK	-30165***	+11041	2.72	10063	.02220	35500
INLES	.301ED***	10785	1.129	-0112	+.03381	18812
2000年1月1日	elow diagonal e	lements of C	malesky	部等でする場		
11.0% 38W)	-22706***	.06503	3.34	.0000	.03373	.36040
	.96534*				02571	

	EMMOC	N ENTEN	
THEREIS SIGNOCH	,0097E-0 ,6068E-0		00000
Implied s	tandard de	vistims of vandom param	minis
S.D_Setal		1	
11 21	,30 ,28	1604 6719	
	orrelation	matica of candom parame	Seif
implied o			CRIF

Random Parameter Negative Binomial Model of High Injury Crashes on Small-Urbanized-Rural SPF Class Roadway Segments

Dependent Log likel: Restricted Chi Bousse Significan Nofadden I Stimanhor Lof.Cr.Att Model wats Seeple is	efficients Heg variable bood function log librition log li	#11 -345.439 8 -165.939 90.009 .004 2015, 8 - 10/W0 2015, 17:00:	60 60 00 41 11 56 57			
#31H7	Coefficient	Standard Error		Frob. 10/52*		nfidence er/sl
(1	Conrendom payane	eters				
Constanti	-7.40150***	1.00020	+4.90	.0000	-10.96960	-4.44531
LIGHT	.79510***	.10608	4,78	-,0000	-46769	1.11569
MIVE	*,00002***	100026	-3,12			
HOVEBARI	.00029***	*1780-04	8.14	-0017	-00011	100047
KNEWN DIDECT	03429**	.01690	-2.03	.0425	+.06742	
1.2	Marrie Print manifest	a service and bearing				
2,812,530	.50255***	109607	2.59	10000	-71284	1,00011
ESTRUCK!	CHARLES CO.	104545	-6.127	19574	11990	01372
	imponal element					
THIEN	117952444	103435	5.23	.0000	-11245	-24122
SHRECKI	.06100***	-61781	5.85	10000	-01705	-11495
17	lelow diagonal :	elements of c	holesky	MATERN		
					00915	204700
THE WILL	002895	101996	4 4 70 70	149299		4 14 50 1 50 10
11	.02095 Expersion para .00363	seter for Neg				-00792

	natria.		00165
	LULE	I DANDER	
HINDON	.3234E+0 .1467E-0		
agiled at	cambard de	ristions of random payer	MINIB
D Deta		1	
1) 2)	.008	9024 0210	
mplied o	orelation	matrix of random parame	tara
	LHLEN		
		DENDON	
or.Hat.		M. Annalising Reference.	

Random Parameter Negative Binomial Model of Just Injury Crashes on Small-Urbanized-Rural SPF Class Roadway Segments

Dependent Log likel: Sertricter Chi Square Significan NoFadden I Estimation Inf.Cr.At Nodel war: Semple La	efficients Hagh variable bood function I log likelihood St 8 d.f. ica lawal femulo Hguaped i Maard on H = ; = 454.2 Al 2 pds and 10 localal regress	######################################	11 21 00 06 10 28 15			
JUSTIMA	Coefficient	Standard Error		Frob. (1)524	95% Confident Interval	
	Conrendom payane	THE				
	-10.2488***		+4.24	.0000	-24,5517	-6.0151
LHADE	1.05584***	.22275	6.67	_0000	-62968	
	-,22990***	.00293	-6,70	.0000	32579	13400
SHINDCAL						
MCVL.	00098**			10266		
MCVL.						
MCVL.						
HCATT.	leads for random 1,11266*** 200740	.15007 .00503	0.50	.0000		
THIEN)	Means for random 1,11266*** Joored Nagonal element	parameters .15097 .00905 s of Cholesk	0.50 1.57 Y matrix	.0000 .0010	-8559E +,0029E	1.36997
THIEN THIEN THIEN THIEN THIEN	Seate for random 1.11266*** .00740 Nagonal element .20255***	parameters .15007 .00503 a of Cholesk .06250	0.50 1.97 Y matris	.0000 .0010	_8559E +,0029E _07700	1.36937
THIEN THIEN THIEN THIEN THIEN	Means for random 1,11266*** Joored Nagonal element	parameters .15007 .00503 a of Cholesk .06250	0.50 1.97 Y matris	.0000 .0010	-8559E +,0029E	1.36937
HCVL 1HLEH SCHKSEL 1HLEH SCHKSEL	Semis for random 1,11266*** 200740 Nisponal element 20255*** Selow disponal e	parameters .15007 .00903 a of Cholesk .06260 .00135	0.50 1.57 V matri: 3.17 2.19	.0000 .0010 .0015 .0285	_8559E +,0029E _07700	1.36937
HCVL 1HLEH SCHKSEL 1HLEH SCHKSEL	Semis for random 1,11266*** 200740 Nisponal element 20255*** Selow disponal e	parameters .15007 .00903 a of Cholesk .06260 .00135	0.50 1.57 V matri: 3.17 2.19	.0000 .0010 .0015 .0285	_8559E +,0029E _07700	1.36937
MCVL: SCHESEL SCHESEL LHCV_LHC	Seate for random 1,11260*** 20074D Nagonal element 20255***	parameters .13097 .00903 s of Cholesk .06130 .00135 lements of C .00403 ster for Bey	E.SC 1.87 y matris 3.27 2.19 Edicasy 1.87 Sic Hist	.0000 .0010 .0018 .0285 #8521# .0480 ribution	_85598 +,00298 _87700 _90051 00286	1.36997 ,01791 .82701 .00531

	DIEDI	HOWKEET.
NLEN CVBCHEL	.4283E-01 .9168E-09	-11148-04
mplied at	candard david	tions of random parameters
D_Setal		1
21	,90204 .0038878	
mplied o	irrelation ma	strim of random parameters
or Mar.	LISLEN SCHO	
	1,00000 1	

Random Parameter Negative Binomial Model of Low Injury Crashes on Small-Urbanized-Rural SPF Class Roadway Segments

Dependent Log likel: Restricter Chi agust Bighificat McFaiden I Estimation Inf.Cs.AI Nodel est: Semple La	efficients Hegs variable thoos function displikelinood sig 3.5.] pos leyel Freudo Ssquared h bases on S = 0 = 1877. NI imated: Sep 17, J pds and 10 Nincolal regress	2029.250 -127.0655 &15.404 .000 .21704 2020, K = .4 2011, 14:8:	947 54 78 48 90 93 90 98	110011100		MISS 1198
LOINJ	Coefficient	Standard Error		Prob.		nfidence erval
	Innrandom parama	+414				
	-7,18481,***		-8.04	.0000	48,74812	-5.64370
	.05113***					1,00039
	-2.41442*					
	mene for receive			STREET.		
DIEDL	.69677***	,00100	17.55	.0000	.79601	. 61613
SSNDCR	04277***	.01430			07061	~.01474
	Diagonal element					
THERM	14886***				11011	1256780
SINDCR	.01010***				.02151	0.05419
	delow disponal a					
	-DZe06**				:00621	.04294
	Dispersion payer	eter for Neg	Win dies	PERUVEROR		

OASTTSCO.	natrix	000000000000000000000000000000000000000
	THEFT	AIMDCR
HINDON HINDON	.22198-01 .9589E-02	.20908-02
milian et	andard devi	ations of random parameter
D Betel		1
21 21	.1489 .04571	63 21
glied o	crowletion m	atria of random parameters
	1HLEH 3	

Random parameter Negative Binomial Model of Total Crashes on Small-Urban-Large-Urbanized SPF Class Roadway Segments Implied coverience matrix of rendom paremeters

Dependent Log likel Beatriste Chi squar Significa McFadden Estinatio Inf.Cr.AI Model est Dample 1s	efficients Dept Wariable inhos Emotion ding likelikon and [6 3:5], nos laws focused on H = 2 = 2529.2 A leasted: Sep 27. I pos and binomial regress	TOTALA *1275.578 d -0040.918 d -0050 d .88013 1608, H = 107H = 1.6 TOTE, 16:550 604 Institution	66 31 00 32 16 10			
TOTALACC	Coefficient	Stenderd Error		From:		nfidende erval
	Hoorandon garane	stars				
Constant	Honrandom parame -5.72401***	3.04743	-2.46	.0000	-7,17492	-5.67500
DEGI	.00557+++	.00815	1.7¢	10068	.00246	.01000 07879 12884D-04
RHADEL	10227***	.01658	-7.04	.0000	-,13074	07879
MOVERANT	+.9245SD-04+*	-40E0D-04	-2.28	0228	172035-03	12884D-04
900	1,54500**	.4060D-04 .65168 .54218	2.21	.0234	.20898	2.88103
91001.01	-1.16873**	. 54219	-2.16	.0314	-2.22990	+-1060E
	Heans for randor	CHARACTER .				
LHADI	.76311***	111145	6.85	10000	24407	.00140
LIELEN					.04466	
DESCRIPTION OF THE PERSON NAMED IN COLUMN TWO IS NOT THE PERSON NAMED IN COLUMN TO THE PERSON NA		-00668		.0000		
	Disconal element	rs of Cholesk	v matria			
DEADT	.06872**	.02878	2.39	-3149	.01281	-12512
100,000	.04074**	+01641	2.48	.6181	,00037	-07298
DRIGHTING	.01002*	- 84700	1.96	.0531	-,00044	02850
	Seles disponal :	elements of C	Scienty	mattte		
TEME EMAI	-55467+	.07869	1.98	.0670		-21955
IRWY LUG	02353**	-01049	-2.27	.0228	04427	00330
IRRY LSE		.00640				
	Dispersion paras					

	LUA	DI	CHUEN	BMANDERC	
THADT	47928-	50			
LISTER	22242-	52 .58	10-279		
BRANDING	14032-	DD31	08E-05	.5946E-03	
implied a	tendező ó	evieninn	e at est	nion paramete	*13
S.D_Sets)		1			
4.	74	87152			
2.0		17741			
(3)	.02	41794			
3)	.02				
3)					
Implied o			of can	ion paramete	
Implied o			në can	SOD paramete	**
	orselatio	- matrix			**
		- matrix	of cano		**
Cor.Hat.	orrelatio LHADT	LHLEN	Person		
Cor.Hat.	CERPT 1.00000	LHLEH	200001 555	100 100 100	
Cor.Hat.	orrelatio LHADT	LHLEH	-,9884 -,9884	100 100 100 101	**

Random Parameter Negative Binomial Model of Property Damage Only Crashes on Small-Urban-Large-Urbanized SPF Class Roadway Segments

Dependent Log likeli Heattloted Chi aquare Significan Hofadden I	efficients Sept variable shood function a log likelihood of [1 d.f.] com level reduct R-squared shaed on N =	-966,186 -1792,776 -1792,776 1819,178 -000	71 68 00 65				COVEZIBBOE	INTER INTER	ENYMPTAL .1012E-03
Inf.Cr.AIC Model set: Sample in Regative b	= 1055.4 Al mated: Sep 22. 2 pdo end : incensi regress	D/H = 1.3 2015, 17:42: 04 individua ion model	10 65 10	Frob.		onfidence	8:0_Beta:		1
8001	Coefficient	Error	=	121520		erval		1010041	-
			*******	******					
- 41	fonyandon payans						Implied som	reletion wa	toux of random parameters
Constant	-5.03718***		+4.29	-0000	-6,50576	-3.16861			
LHADT	.657854**		9.95		135714	92555			
16071	1.02978**	. 65042	2.05	-0399	109957	9.07959			
SHWDLT			-2-64	-0089	-,09596	01406	Tor.Met.		
MOVEBAIL	-1000016***	-3431D-08	-2.52	-0026	+200007	-,0000E	*********		
Von.	1,010257		3.27	00000	+,03206	3.57061	1301011 1	00000 1	2912
HCVNOLHEL I	.00048**	-00177	1-96	-9497	100001	.00494	SWYNDING: -	72912 1.0	0000
11	leans for randor	PATABATATA .							
1.91.83	.93340***	107240	12.59	_0000	,79155	1.07539			
BWYWDISC!	.05750***	.00007	7.17	-0000	109208	-07372			
112	Diagonal element	s of Chileek	y metris						
TAKE BIT I	-18394***	,0381#	4.82	-0000	,10818	.28872			
	.00688***	.00213	9.93	-0012	,00276	.01106			
REVINDENCY.	the Country of the property of	dements of C	holasky	MACRIK					
	service dyadoust a				W-01483	81200			
13	00734*	.00862	-1.97	20001	7 1 2 4 4 4 4 4 4				
THAT THE									

Random Parameter Negative Binomial Model of Possible Injury Crashes on Small-Urban-Large-Urbanized SPF Class Roadway Segments

Bandom Coe Dependent Log Irkell Heattloted Chi aquara Significan Hofadden F Estimation Inf.Cr.ATC	hood function log likelihood d [l d.f.]	5:Reg (5:05:1 -366.663 6 -819.886 492.886 .000 1 .30350 L600, K =	843 49 94 95 85 81				Implied covariance matrix of random parameters Covariance matrix SEMBLE LUMIN SHREET -1374E-04 LUMIN .394EE-05 .819EE-02 Duplied clandard deviations of random parameters
Megatire b	2 pgs end 1 inceial regress Coefficient	Stendard Stendard Sayor		Freb.	99% Cb	nfldence erval	S.D. Seran: 1 10 ,00440022 27 .0960262
18	Contendon perem	tery					Implied correlation matrix of random parameters
CONSTANT! LHADT! DEST! REFENDING! MCVCRAH!	-9.41081*** 1.03686*** .03666*** 00018**		-5.47 5.60 1.98 2.55 -2.53	,0000 ,0626	-15,06905 .87629 00095 .01642 00007	-6.17168 1.39967 .02278 .05690	Dec.Man.) SHMOLT INLEM
Th	mens for render	contaminate:					HUNDLT: 1-00000 .64048
SHWOLT:	16878*** .W7917***	.02676 .09711		10000	23122 -78884	1.1495	IMPEN .6406E 1.00000
	Magonel element						
SHADITA I	.01862** .0188***	.00889 .02948	2.98	,0000	.00179	12988	
	mins diagonal e						
	Logeraton paras		Bin diet			10994	
SpalParm	-87557***	.14479	4.67	,0000	-39179	.01930	

Random Parameter Negative Binomial Model of Evident Injury Crashes on Small-Urban-Large-Urbanized SPF Class Roadway Segments

Dependent Log libel: Markiloted Chi squaye Significan McTadden I Estimation Inf.Cr.Alc Model est: Sangle is	thood function I log Lizelihood of [270.496 -427.462 118.881 .000 .13326 1695. H = .4 2015, 17:42:	86 00 45 10 73 13				VCPAREA SHYMOIHC Implied at 5.D_beta)	VCERRUR ,3475E-01 ,106E-03 anderd devi	.0541E-08 ations of random parameters 1
	Coefficient			Prob. 1 >2*		nfidence ermal	31 21	.1972 .01241	46
18	Sonrandon paraba	CATE					leblief or	erelation e	strix of rendom cargneters
COMMITMENT LUMBET	-4.80464** -43094**	1.90027	-2-68 2.07	+0304	.,02318	-1.00218 .04870			The second second
LICEN	.83758***	.08230	10.05		166633				
SHRELT	+,07768***	.02979	-5-97	+0085	-,13228	02341		ACEMENT BALL	
100	deans for rection	, peper	-1.99	-0470	-, 20424	00240			
						THE RESERVE AND THE PERSON NAMED IN COLUMN TWO IS NOT THE PERSON NAMED IN COLUMN TWO IS NAMED IN COLUMN T		1,000000	54030
VCPARMA:	17647**			5.555	0.000	mart na.		****	
VCPARSA) SWINDERC	.03232**	-014b#	2.73		,00399	06108	BESADING	04000 L	
VCDADBA) BWTHDEHC		-014b#	Z-ZS V Hetrix		,00399	.01625	BRAMDING!	##010 I	
VCPARMA) SWINDENC (VCPARMA)	.05252** Diagonal element	e of Cholesk Johnson	I-I3 V Hatirix 1-94				BRANDING	,84030 I.	
VCDADNA) BWTHDENC(VCDARNA) VCDARNA(.05252** Diagonal element .15735*	.01454 # 05 Choleek .05112 .00352	Z-Z3 y matrix 1-94 2.74	.052 <i>E</i>	00175	.01625	#MZMDZWC)	,84030 I.	
VCBABBA) BWENDENCI VCBABBA; RWENDENCI (3	,03282** Diagonal element ,18735* ,01046***	.01454 # 05 Choleek .05112 .00352	Z-ZS y matkix 1-94 Z-74 holesky	.052 <i>E</i>	00175	.91625 .01793	BRINDING	,84030 L	
VCDABBA) BWENDENC(VCDABBA) RWENDENC((2 LRRY_VCF)	.05252** Diagonal element, .15725* .01044*** Selow diagonal e	.01456 e of Choleek .06112 .00562 lements of C .00290	Z-Z3 y matrix 1.94 2.74 holeswy 2.91	.0126 .0062 matcis .0209	00175 ,00296	.91625 .01793	Bestablisci	,00000 L	

Random Parameter Negative Binomial Model of Serious Injury Crashes on Small-Urban-Large-Urbanized SPF Class Roadway Segments

Dependent Log likel: Restricté: Chi square	officients Hegh Veriable Thood function I log likelihood Mt (ld.f.)	81 -78,807 -81,208 1,204	79 15 79			
Estimation Inf.Cr.AII Nodel est: Asspie is	Paeudo N-squared o based on H = C = 160,0 AD Imated: Dep IS, I pde and S binomial regress	1600. H = C/N = .1 2015, 15:00: 00 lndividua	6 05 21			
		Standard		Freb.		mflidence
SINI	Coefficient	Standard Error		Frob. 2 >Z*		mfldence etval
		Errer		(2)>2*	Int	ecval
	the state of a school of the state	Errer		(2)>2*	Int	ecval
Constanti	Annecdon parame	Errer tere 1.11270	-6.00	.0000	-6.00001	-5,45000
Constant (SHYNDENC)		Errer 1.11278 .02767	-6.00 3.21	.GD00 .GD00	-6.00001	-5.49880 ,14807
Commant (SMYMDING) VQVL(Annyandon parame -7.46061***	Error 1.11278 .02767 .00980	-6.00 3.21	.GD00 .GD00	-9.00001 .03000	-5.49880 ,14807
Commtant (SHYNDING) VCVL)	Annendon pereme -7.46501*** .00083*** 00630*	Error 1.11278 .02767 .00990 parameters	-6.00 9.25 -1.91	.0000 .0010 .0561	-9.00001 .03600 -,01276	-5.49880 ,14807 ,00010
Constant (SHYNDING) VCVL(SCVE	Anneadon parame -7.46501** .00083**00690* Heads for random00715**	Error 1-11278 .02767 .00980 panameters .00363	-6.00 3.21 -1.91 -1.97	.0000 .0010 .0561	-9.85581 .05680 -,01276 -,00476	-8.49880 .14807 .00916
Constant SHENDING VCVL	Annyendon perese -7.46061*** .00083*** 00690*	Error 1.11278 .02767 .00980 parameters .00362 for dists,	-6.00 3.25 -1.95 -1.97 vf rando	.0000 .0010 .0061 .0081	-6.65091 .05660 01276 01476	-8.49880 .14807 .00916 00003
Constant SHENDING WOVL SCVE	Horaddon parame -7.46561** .00003*** 00630* Heans for tandum 00715**	Error ters 1.11278 .02767 .00980 parameters .00081 for dists.	-6.00 3.25 -1.95 -1.97 uf rando 2.64	.0000 .0010 .0561 .0491 m perame	-9.85081 .03680 01276 02426 term	-8.49880 .14807 .00916 00003

Random Parameter Negative Binomial Model of Unknown Injury Crashes on Small-Urban-Large-Urbanized SPF Class Roadway Segments

landom Col	dficients Sept	nReb Model				
			101			
Low likely	veriable hood function	-92,600	42			
Bestricted	log liwelihood	-96.665	65			
Chi equale	S log likelihood ed (2,719	56			
Significat	ce level	.001	18			
McFeddem &	Secuto S-equated	-04001	0.6			
ESTIMBLION	Besed on H =	1400, 2 -	9			
	- 200,1 47					
	mated: Sep 25,					
Sample is	2 pds and 5	D4 rudsArque	7.0			
	unumial regress					
1				Frob.	153 0	ofidence
TRESCHOIL)	Coefficient	Error	12	121524	Int	erval
					THE STATE	STEEL STREET
100	innrendon parese	CRIN				
	-0.25575**	4.14244	-2,23	-0255	-17,37276	-1.13472
CHISTAGE						
CHIEFE!	.52050****	-14749	3.40	.0003	.24190	-0200E
LULEN	-9.2637E** .52099*** .01932*	.00763	1.95	.0003	-,00162	.02026
15	Seens for sendon	palameters				
15	Seens for sendon	palameters				
LHADT (01454* .00312*	.0007# .00177	1.06	.0633 .0563	-,00000 -,00003	.09999
LHADT (PRINDING)	01454* .00312*	.0007# .00177	1.06	.0633 .0563	-,00000 -,00003	.02553
LHADT (PETNOTIC)	Seens for Heades .01454* .00012* Disgonal element .18878***	.00078 .00177 .00177 s of Cholesk .07049	1.86 1.97 y metris 2.68	.0633 .0563	-,00090 -,00093	82820. 69900.
LHADT (RWYNDING) LHADT (ENADT (RWYNDING)	%eas for leader .01454* .00312* Diagonal element .18878*** .01480**	.00078 .00078 .00177 s of Cholesk .07049 .00021	1.06 3.97 y metria 2.68 2.00	.0633 .0565 .007+	-,00090 -,00093	.02553
LMADT (RWYNDING) LMADT (LMADT (RWYNDING)	Seens for sendom .01654* .00012* Diagonal element .16878*** .01600** Selow diagonal e	parameters .00079 .00177 s of Cholesk .07049 .00021 lements of C	1.86 3.97 y metris 2.68 2.03 holksky	.0633 .0565 .007+ .0407 matrix	-,00080 -,00083 .08068 .00071	.02998 .00663 .02694 .02289
LHADT (PETNOTH) LHADT (LHADT (REFENOTH) 12 LHANY_LHA	Seens for incident .01654* .00512* .00512* .016878*** .01680** .01680** .01680** .016536**	patameters .00078 .00177 s of Cholesk .07049 .00021 Ismatts of C	1.86 1.97 y metria 2.68 2.03 holksky -2.96	.0633 .0565 .0565 .0074 .0407 matrix .0151	-,00080 -,00083 .04048 .00071	.02998 .00663 .02694 .02289
LHADT REFERDING LHADT LHADT REFERDING 12 LEMY_SHA	Seens for sendom .01654* .00012* Diagonal element .16878*** .01600** Selow diagonal e	perameters .00078 .00177 s of Cholesk .07048 .00021 lements of C .01918 wies for Meg	1.86 1.97 y metris 2.68 2.08 hrisaky -2.96 Bin diet	.0633 .0565 .0074 .0407 matrix .0151 Vibution	-,00080 -,00033 ,04048 ,00071 -,05291	.02858 .00663 .82696 .03289

	730	477	NAMADERC		
LHADT BHYNDING	1,5569E-		19408-02		
Implied a	tendays:	levsacu.	me of eac	ion payanetes	*
S.D Beta					
1	100	88194 83720			
Implied o	orrelatio		is of range	n parameters	
Implied o	orrelati	n matri	ix of randa	on parameters	9
Implied o	LHADT	MATE	ix of rand:	on parameters	6

Random Parameter Negative Binomial Model of High Injury Crashes on Small-Urban-Large-Urbanized SPF class roadway segments

KoFadden F Estimetion Inf.Cr.AIC Nodel esti Sample is	se level sendo R-aguara based on N = - 117.4 R mates: Rep 26. 2 pds and innestal regress	1606, H = 100/H = .4 10/H = .4 2018, 14:16: 104 individua scon model	00 81 10 66 87 1#			
HIINI	Coefficient	Standard Error		Prop.		nflaense erval
15	Cornolton param	etere				
Commtent)	-,00036444	+59110-04	12,00	+0037	-,00063	00009
LHCER	.96669***	,09168	10.94	+0200	178679	
	.00903***	.00277	2.56	+0008	-90389	
SHADER	-,05533*	.04529	-7.95	+0595	-,17408	.00343
	eans for random	s betweeners.				
	.04007***				7.00107	006427
	ingunal slemen					
	-09124**					
	.00745##					101342
13	wlow diagonal o	elements of C	holesky	MATERIA		
TRAL ROAL	100577++	.00271	2.13	.0334	.00045	.81109
	tepetaton garas					
ScalParm!	-78309***	124546	21.74	.0041	.22316	1.3+301

	ROYCEAR	
		BHANDTHC
HEVERASI BHYKDISE	.2991E-07 .9955E-06	.1526E-04
implies #t	undered devi-	solons of random parameters
S.D_Bets:		I.
11	-172955E- -009394	10
implied oc	crelabion m	etita of rendim parameters
	HOVORAIR RRIY	
SCYCADI:	1.00000 .61452 1.	

Random Parameter Negative Binomial Model of Just Injury Crashes on Small-Urban-Large-Urbanized SPF Class Roadway Segments

Dependent Log 118el Restricte Chi squar Significa McFadden Estimatica Inf.Cr.Al Model est Sample is	efficients Regi variable throof function \$ log likelihoo ed [2 d.f.] not layel Freudo R-rquare c based on [= 2 = 631.6 K Limated: Sep 25. I pde end incomial regress	20811 -325,250 8 -488,476 178,862 1000 8 18821 1608, K = 1578 = 15 2015, 16:56:	00 86 10 11 82			
DIST DAY	Coefficient	Standard Error	1	Frob.	754 Co Too	ofidence erval
17	Monrandom param	CALL				
Constant	-2.99091+	2.14591	-2.93	.0646	-8.24403	.24616
WOVE	00122**	400094	-7.25	022E	#1002ZT	00027
DRIGHTING	-06887+++	101017	4.88	.0000	.08883	.08922
ROVORAGE	00018+*	*#502D-04	-2.14	.0322	90000	000002
SHVDCR	15165***	.05246	+3,46	20005	26429	07567
LOGIDT	00018** 18166***	.8879D-04	2.06	10390	Z6429 .00001	.00035
11	Heans for syndom	DAYMONTON'S				
THEFT	Heans for rando	.00000	9.32	.0000	.40463	1,04852
	.00927***				.00326	+92397
41	Diagonal element	te mf Cholese	y satria			
200,831	-08268***	109190	2.99	.0096	-02018	-14515
HCVROUSEL!	_00E12+++			.0099	100147	-01078
	Selow disponsi :	clements of C	beleaky.			
180V_18L	-09302**	04088				-17315
- 11	Dispension pain					
ScalFarm!	.71307+++		2.22	.0013	27925	1,14509

POARTYWEEK	metrix	
James	INTER	HCVNOXSEL
DITER	13468E-03 ,3225E-04	.2793E-04
implied st	andard devia	cline of random parameters
S.D_Bessi		1
2) 2)	.0061888	
Implied o	erelation ma	ntrix of rendom paremeters
Cur, Nat.	THIEN HOVE	DISEL
2302500	1.00000 .1	

Random Parameter Negative Binomial Model of Low Injury Crashes on Small-Urban-Large-Urbanized SPF Class Roadway Segments

Restricte Di Agian Significa Hifedden Kethesio Inf.Cr.Al Nodel est Sample is	officients Hegi veriable throad function 3 log limelihood so [6 0.5] Foetido N-squeres 5 hose down 1 2 = 224.3 Al imated: Sep 13, 2 pd and 1 incomal regress	101 -1104.126 1 -2297.116 2005.960 2005.960 1 -51062 1406.8 - 15015.1657:	81 17 00 40 19 69			
		Standard		Froh.	SEA Co.	fidence
Loted	Coefficient	Error		12 32*	Int	Lawren
and the same		CONTRACTOR STREET	****	0.000		
	Followandom parmie					
	-2.03810***	1.00609	-2,44	20080		
SWYWDISC:			20.59	.0000	.02422	
	00021***			10000	-100032	00022
	teans for rendes	. parameters				
LUCEU	.86737***	.06349	13.66	.5550	.74293	.99180
		.00100	4.67	.0000		
	,32175***				.09828	-54631
LHADY						
	Diagonal element					
					102779	+20163
LNLEN	.15471++	-06476 -00209			.02779	
LNLES	.15471++	-06476 -00209	2.29	.0169		
LNLEN: SCVSSSSEL: LNADT		.00209 .00209	2.09 2.20 2.05	.0169 .0250 .0379	.00050	.00570
LNLEN SCVMMSEL LNAIT	.15471++ .00480++ .01067++ Selow diagonal e	.00476 .00209 .00514 :iemenda of C	2.39 2.30 2.08 hilasky ~2.10	.0169 .0260 .0079 metria	.00050	.00570
LNLEH SCYMMSEL LNAIT LNAIT	.15471++ .00460++ .01067++ Selow diagonal e 00486**	.00476 .00209 .00514 :iemenda of C	2.39 2.30 2.08 hilasky ~2.10	.0169 .0260 .0079 metria	.00050	.00670 .02074
LNLEN SCUMMEELS LNAIT LNGV_LNL	.15471++ .00480++ .01067++ Selow diagonal e	-06476 -00209 -00514 -00514 -00282 -00177	2.09 2.20 2.05 hulesky -2.10 1.95	.0169 .0250 .0079 Matrix .0861 .0646	.00050 .00060 00041	.00670 .02074 00032
LHLEN SCUSSEL LHAIT HICY_LHL LHA LHL	.15471++ .00460++ .01067++ Selow diagonal * 00486** .00278	.00476 .00209 .00514 dements of C .00232 .00177 .01027	2.29 2.20 2.05 huledky ~2.10 1.95 -1.87	.0168 .0250 .0279 .0279 .0261 .0246 .0215	.00050 .00060 00041 00060 00033	.00610 .02074 00032 .00427

	LELES	HOVESEL	LNADT	
Cottate	29999-01			
REVOKSEL	7522E-03	44715-04		
LUADI	-1660E+01	-,21025-03	-1112E-02	
Implied at	tanders devi	ations of re	nince paramet	ATE
1,5 Setal	neenconno	1		
1	-1547	0.0		
	1000631			
21	.03334	0.9		
4114655		12.50 802 1000	dim paramete	9597
tubrase b	DEFENDANCE OF THE	MATERIAL CO. 1100	man between	18
	LITTERS BCV	MOUSEL LID	CIT.	
Cor.Mat.)	A distribution of the first of the first	****	CAPAC.	
a management			26	
DAPER	1,00000 -,			
		12685 - 782	20	

Random Parameter Negative Binomial Model of Total Crashes on Metropolitan Rural SPF Class Roadway Segments

Dependent Log likels Heatricted Thi square Highlight LoFanden I Catimetin Latimetin Latimetin (odel eati Hample is	efficience Degle variable incod function i log likelihood of [6 d.f.] not level Feeudo R-squared i based of H =	TOTALA -430.435 -672.253 877.657 .050 .5656 1236, K = .78 = .7. [016, 16:20]	56 74 71 50 54 14 21 66				SMATTERS A	19738- 92 2948E- tandard d	ES 01 45 01 01 01 01 01 01 01 01 01 01 01 01 01	VOK 53.49 1.923	MOSTING _7424E-01 dom parmmetexs
	sinceial regress:	Prenderd			95% Co		1				
	Coefficient	Error			Int		21	7.	31364		
							21	13	72665		
	Contendon peremet -2.66655***	.90247	-9.32		-4.23370	HI:09329					
LHADT		10001			.12296						on parameters
DEGI	01000**	.05209			04907						
BCOOKSEL!	,05230			10475	-,00000						
	Seens for isodom						*********				63
LUCES!	.77506***		120,480	100.00	144211	190601	Cor.Mac.)	THERM	1/080	HOFLIN	
VOR.	3.00862***	1.04717	2,52	,0049	-91403	5,09724					
30527301	.39672**				03164	.78801			-,59578		
	Magnial elements								1,00000		
1,01,830	111014***				,05312	.21116	NOTE: NO	81218	.06436	1.00000	100
VOR.	3.89142***				1,96981	8.81214					
10027-11001	-14200**	.07146	1,98		.00198	.28202					
	Selmy diagonal el										
	+6-15502×**					-2.68820					
THOS_THE	.14353**				.00365	.28341					
TROS ACK	107143	.06124	2.97	.0434	04039	.19148					
	nepersion payme	may For Yan	ore was	*190***							
1.7		CARL COS SERVICE	NAME OF TAXABLE	24000000	110021	-9-70481-					
ScalParm)											

Random Parameter Negative Binomial Model of Property Damage Only Crashes on Metropolitan Rural SPF Class Roadway Segments

epetdent og 11mel esttlote	efficients Segfic veriable thood function d log likelihood ed [] d.f.]	P212,778	41					DIDDE	LHADT
lignifice Ofedden Stination	toe level Facudo X-aquared 5 Dased un H =	.000 .03177	00 91 P				LHAUT	.2330E-01 .1613E-03	,999E-04
Inf.Cr.Al	- 643.6 All						Implied a	manderd devi	ations of random parameters
Sample in		8-1801V100A					N.D_Beta:		1
								.1516	
apol	Coefficient	Exect	x	Frob.		nfidence erval	21	1091630	36
	Sorrandon paraset		*******	********			The State of the S	and the same	atria of render parameters
merant	-4.57022***	.84460	-8.17	0000	-6.02599	-2.72445		CLUBARIAGE F	write or recomm betweeners
DEXL	02699**		-2.08		+,03244	00153			
90%	1.28656**	.60421	2.12	-0338	109963	2.47472			++++
	Neens for sandom	DAKAMECELK					Cor.Mar.	THERM	LHADE
THILES	24036***	0.6869	15,70	.0000	,80613	1.07560			++
LHADI	.95125***	.05338		00000	156735	72465			15739
	Diagonal element						LHADE		
	.15264***	.04069		_0002	.07269	.22239			
Loten		.03521		.0099	.02177	.15372			
LUGART	209077***								
LNADT	Below diagonal e								
LOLEN; LOADT; (SALUEL)	Below diagonal e.	.03514	2.45	-0163	191722	15495			
LOUEN) LOGADT! (1 LUNA_LOGA!	Below diagonal e	.03514	2.45 818 8185	-0163	06876	2.50496			

Random Parameter Negative Binomial Model of Possible Injury Crashes on Metropolitan Rural SPF Class Roadway Segments

Chi squar- Significer McFedden Estimation Inf Cr.All Model swt: Sample in	veriable thood function \$ log likelihoot ed [E.S.] the lawal Facuto B-square: h Barel on N = 2 = 244.1 & tmated: Oct Og tanontal regress	17.406 ,000 1 ,07149 1284, K = 10/8 = .1 2015, 15:58: 618 individua	87 56 39 9 97 37			
FIRS	Coefficient	Standard Scrot	e	Frob.	99% Co Shit	nfidence erval
	Contantos param					
Constant	-7,00186***	1,70641	+1.13	10000	+11.12239	-4.00057
THINDS	,63006*** 3,34078**	1,2897.9	2:83	.2004	45093	5,01920
ACK!	3,34079**	6,70300	2.96	.0498	100280	6.67876
	leans for random ,70564*** ,00021**	n perameters				
THIER	470000-44	*21249	6123	.0000	. 48228	192400
SCYCRAN	.00021**	185350-04	2.43	.0150	.00004	.00037
	liagunal -timen:	ps HE Cholesa	y manifix	1		
THIER	104052**	102054	2.01	10442	100104	
RCVCRAH	+00029++	.91230-04	2.05	.0408	100001	.00037
1	Selow diagonal (-,22287**	elements of C	holasky.	metris		
LECY LEL	-,22287**	109118	-2.44	19145	40138	7,24419
	hisparaton paras	mater for Help	Bin dist	PINGERN	10.000	
100000		102024				

	THERM	BICVCRAH
CER VCRAM	,76985-08 -,17975-06	.98788-07
uplied s	tenderd Devi	ations of random parameters
D_Bess!		1
21 21	.04174 .196841E-	73

INLEN; 1.00000 -.51000 SCVCKAH) -.31804 1.00000

Random Parameter Negative Binomial Model of Evident Injury Crashes on Metropolitan Rural SPF Class Roadway Segments

Dependent Log libeli Restricted Chi squere Significan McTadden I Estimation Inf.Cx.AIG Hodel satt Sample 1s	fficters Degle variable hood function log likelihood d [1 fif] selvel peudo R-squared bored on N = 2 Skil AD mated: Oct 12, 1 2 pps and 6 invental perced	2011.534 -116.130 \$.187 .002 .03957 1236, 8 = 1015, 16.00; 8 individua	00 70 41 92 6 90 51			
EVI	Coefficient	Standard Erros	r	Prob. (x)>Z*		infldence incvel
EVE	Coefficient	Error	ř			
Constant) LUCES; VGE2;	01/20/01/20/01/20/01/20/01/20/01/20/01/20/01/20/01/20/01/20/01/20/01/20/01/20/01/20/01/20/01/20/01/20/01/20/01/20/01/20/01/20/01/20/01/20/01/20/01/20/01/20/01/20/01/20/01/20/01/20/01/20/01/20/01/20/01/20/01/20/01/20/01/20/01/20/01/20/01/20/01/20/01/20/01/20/01/20/01/20/01/20/01/20/01/20/01/20/01/20/01/20/01/20/01/20/01/20/01/20/01/20/01/20/01/20/01/20/01/20/01/20/01/20/01/20/01/20/01/20/01/20/01/20/01/20/01/20/01/20/01/20/01/20/01/20/01/20/01/20/01/20/01/20/01/20/01/20/01/20/01/20/01/20/01/20/01/20/01/20/01/20/01/20/01/20/01/20/01/20/01/20/01/20/01/20/01/20/01/20/01/20/01/20/01/20/01/20/01/20/01/20/01/20/01/20/01/20/01/20/01/20/01/20/01/20/01/20/01/20/01/20/01/20/01/20/01/20/01/20/01/20/01/20/01/20/01/20/01/20/01/20/01/20/01/20/01/20/01/20/01/20/01/20/01/20/01/20/01/20/01/20/01/20/01/20/01/20/01/20/01/20/01/20/01/20/01/20/01/20/01/20/01/20/01/20/01/20/01/20/01/20/01/20/01/20/01/20/01/20/01/20/01/20/01/20/01/20/01/20/01/20/01/20/01/20/01/20/01/20/01/01/20/01/01/20/01/20/01/01/01/20/01/01/01/20/01/01/01/01/01/01/01/01/01/01/01/01/01	### 1.9170# 1.2440 .00322	5.60	**************************************	-9.10292 -48401	ervel
Constant) LUCEN; VGE2;	001random paramet -5.34463*** .60025*** -18785***	Erras 1.9170J .12440 .05312 Desentes	5.60 -3.53	,0058 ,0000 ,0004	-9-10292 -40407 -29214	-1,68896 .94248 08252
Constant) LUCEU VCE2) LUADI	00:random paramet -5.34465*** .60025*** .18783*** Mane for random .41089**	#19 1.9172# .12440 .06322 personeters .19391	5.60 -3.53 2,14	.0058 .0000 .0000 .0004	-9,10292 _48407 +129214	-1.68496 .94240
Constant) LUCES; VCE2; LUADT; LUADT;	001random paramet -5.34463*** .60025*** -18785***	Erros 1.91728 .12440 .06322 Dereneters .19391 for dete. .02298	5.60 -3.53 2.18 of rendo 2.49	(0) NI* ,0050 ,0000 ,0004 ,0017 th parameter ,0106	-9.10202 .40407 +20214 .03491	-1.68696 .94240 08352

Random Parameter Negative Binomial Model of High Injury Crashes on Metropolitan Rural SPF Class Roadway Segments

	Efficients Hegh					
Dependent	Feriable	WIII	16.7			
Log likel:	Feriable hood function	-147-524	23			
Restricted	log likelihoom	-150,577	2.5			
Chi equare	d [1 8.f.]	14.484	65			
	de level	.000	14			
tofadden I	reado Borquaced	004808	71			
	based on H =					
	- 296.7 331					
	mated: Oct 11, 1					
			1.00			
	2 pps and 6					
	Tuckiel setteses					
		ion model		Drob.	508.00	ofidense
Segetive 1	LEGELAL Vegreen					ofidence erval
Segative)	Coefficient	Standard Error				
Segative)	LEGELAL Vegreen	On sodel Standard Error		E >0*	Int	etast
HIINJ) Constant:	Coefficient Coefficient	Standard Error	-3.36	,5000 ,5000	-4.28319	etast
HIDE	Coefficient Intrandom paramet -3.1596540059 Hemma for random	On model Stendard Error MESS .13170 parabolars	-3.36 2.22	.0000 .0010	-4.28319 -4.26337	-1.39630 -2.39630 .65592
HIDE	Coefficient Confident Confident Confident Confident -3.13961*** 40009***	On model Stendard Error MESS .13170 parabolars	-3.36 2.22	.0000 .0010	-4.28319 -4.26337	-1.39630 -2.39630 .65592
HITH/) HITH/) Constant TOTLANT EMIANN	Coefficient Intrandom paramet -3.13965*** -40205*** Heans for random -66525*** Cale parameters	Standard Error ters .58345 .13170 parameters .18224 for dists.	-3.36 3.29 9.62 of rando	.0000 .0010 .0004	-4.28319 -4.2837 -20408	-1.99650 .83592 .72486
HITH/) HITH/) Constant TOTLANE (3	Coefficient Intrandom paramet -3.13965++- temms for random .46823*** Icale parameters .13004+*	Stendard Error iars .58345 .13170 parameters .18398 for dists. .05983	# -5.36 3.29 9.62 of sando 2.30	.0000 .0010 .0014 .0217	-4.28319 .56257 .20405 term	-1.99650 .83592 .72486
SEGRETIVE S STEADS STORESSES STORESS	Coefficient Intrandom paramet -3.13965*** -40205*** Heans for random -66525*** Cale parameters	Standard Error sers .58345 .13170 parameters .13234 for dists. .05963 rier for Meg	8 -5.36 3.29 9.55 of rando 2.30 bin diet	.0000 .0010 .0004 m parame .0217	-4.28319 .56257 .20408 term	-1.99650 .83592 .72486

Random Parameter Negative Binomial Model of Just Injury Crashes on Metropolitan Rural SPF Class Roadway Segments

Dependent Ing likel: Restricte: Chi square Significat	hood function log likelihood d 1 d-f+	20571 -63.960 -1256.000 2344.038	65 00 69 00			
Inf.Cr.AIC Model est: Sample is	based on N = 140.0 Al mated; Oct 11, 2 pds and 6 inversal regrees	0/8 = .1 2015, 14:12: 18 individua	19			
2022282	Coefficient	Joannard Error	100	3100. 2100*		nfidense mrvsl
13	Conrendon parase	Error		12130*	2010	ervs3
Constant:	Conrendon parese	Esses term 1.02900		121>0*	-19.8829	-0.7542
Constant:	 	Erocs Term 1.02906 .24175	4,11	.0098 .0090	-19.8829 -19432	-0.7542 1.47994
Constant: Linux; Extropec;	Conrendom parame -11.6545*** 1.00215*** 09171**	E2000 Tesa 4.02906 .24175 .05864	4,11	.0098 .0090	2nts -19.8829	-0.7542 1.47994
Constant: Linux; SHYNDDEC:	 	# 01996 - 24175 - 03564 - parameters	4,11 -2,29	.0098 .0000 .0213	-19.8829 -192422 -,19156	-9.7842 1.47994 01186
Constant: LiftEd; SKYNDDEC; [2 LIGHT:	Conrendon parame -11.6545*** 1.60215***09175** Heans for candon 1.31206***	######################################	4,11 -2,29 2,78	.0098 .0000 .0219	-19.8829 -19.412 19156 .96961	-9.7842 1.47994 01186
Constant Lifes SHYMODEC ISADT	Concendon parage -11.6545** 1.00215** .00115** Cemma For rendon 1.31205***	ters 1.02906 .24176 .03564 perimeters .98090 for dists.	4,11 -2,29 2,78 of rapdo	.0098 .0000 .0213 .0064 m parame	-19.8829 .12422 -12156 .86961	-9.7942 1.47994 01186 2.35498
Constant Lifes SKYMDDEC ISOLOT	Conrection parent -11.6545** 1.65215** 28171** Hemma For rendom 1.31205** krale parameters .84651*	Eroon tera 4.02906 .24170 .03564 perametera .98090 dor diata44932	4,11 -2,29 2,78 of rando 1,98	.0098 .0000 .0213 .0064 m parame	-19.8829 .12422 -12156 .86961	-9.7942 1.47994 01186 2.35498
Constant: Lines; SKINDDEC; LNADT: LNADT: Dispersion	Concendon parage -11.6545** 1.00215** .00115** Cemma For rendon 1.31205***	### ##################################	4.11 -2.29 2.78 of rendo 1.98 1845100	.0098 .0000 .0213 .0064 m parame	-19.8829 .12422 -12156 .86961	-9.7942 1.47994 01186 2.35498

Random Parameter Negative Binomial Model of Low Injury Crashes on Metropolitan Rural SPF Class Roadway Segments

Rendum Coefficient					
Dependent veriable		TODAL			
Log likelihood fur	odelen -	941,77506			
Restricted ing 113	elihood -	522-56807			
Chi-equared [1					
Significance level					
Mofadden Freudo B-					
Estimation bases o					
Inf.Cr.B20 - 1	04.5 ATC/8 -	.572			
Nodel extimated: (See 15, 1015.	16:50:20			
Sample is 7 pds a					
Segetive binomial					
	94.4	40.00	Marin.	AND CONTRACTOR	

10107	Coefficient	Standard Error	31	From.		efidence (ecom)
12	fonzandom patame	SALE		19,000	12.157.13	
Constant)	-4.24241***	.29435	-4174	.0000	-5.39490	-2.41910
LHADT	.59455***	,08862	6.15	00000	.37118	,71858
00011	-,03795**	.01499	-2,64	0122	06722	+,00066
VEFARMA:	.18776*	,04503	3.96	0549	02948	-34404
VEVE:	+,00003+	.00004	-1107	0.0004	00130	.00003
SCYCKARI	.00031**	. 62760-04	2.29	023.5	.00002	.00021
3100000	teams for capaci	parameters				
INLEN	.97191+++	.07987	12.81	-0000	. 32321	3,13062
VCK	1.69556++	5.29752	2.05	2075	.15774	5.23546
- 12	Componed element	s of Chalese	y mentice			
THERM	.11010***	.02782	4.95	20000	10002	117904
VCR1	2.08276**				-27301	2,79247
	Helow diagonal +	Camenta of C	holesky.	matrix		
INCH INC.	-1.70867***	,63776	-2.65	.0074	-7.35545	45249
- Table 1	Experator paras	mater for Neg	bin diet	ribution		
Scalfarm:	3,92666**	199249	2.02	-0125	.06191	2,15521

Note: annun,D-xe or D-xe => multiply by 10 or -xx or -xx.
Note: ***, **, * **> Significant at 1%, 5%, 10% level.

Implied ocvariance matrix of random parameters

Covesian	oe Matrix		
-70.000	DIEDI	VOIE	00000
LULEU	,18618-01 -,2128	7,287	

Implied standard deviations of random parameters

3	,1	ď,	۳	Ċ	t	8															2	
-	-		-	٠	-	-	٠	-	-	٠	-	-	-	-		-		÷	-			
						÷															p	
						•									۰	-	•	•	-	•	-	
						٠,									٠		×	м	M	-		

Implied occrelation matrix of random parameters

Cor.Hat.				
		000		42423
14040	-	43	422	110000

Random Parameter Negative Binomial Model of Total Crashes on Rural Small Urbanized SPF

Class Roadway Segments

DOTALLOC Coefficient President Presi	
LMADET 1.02007*** .00172 11.64 .0010 9.8488	onfidence cerel
LMADET 1.02007*** .00172 11.64 .0010 9.8488	
INCOME for Jandon parameters LMIENI . #8442*** 05656 14.91 .0000 .66945	*5.74391 1.15272 83682 04107 .1158
INIEM: ,89443*** ,08866 3*.81 .0000 .66965	
DESI:00669*** .00202 -3.29 .001001689 RMYMDING: .02781*** .00787 8.78 .0002 .02307	1.09922 01317 00247 .04194
Disponal elements of Cholesky matrix	
INLEN 3857*** 58608 5.21 0000 22190 TOTLANE: 18576*** .88732 2.62 0088 0.922 BEG: 0.122 0.0088 1.96 .9419 -0.022 FMWSDIN: 0.0632*** .0018 3.68 .001 .00018 BELW 0.13000000 1000000 10000000000000000000	.48978 .26951 .02467 .00984
	12477
1085 ML -01025 00906 -1.91 1072 -02271 1085 DUT -02204*** 00161 3.43 00001 00946 1097 MV UT 00126 1.44 1259 -00916 1897 UT -14149* 00915 -1.64 00915 -35285 1097 0097 0097 0097 0097 0097 0097 0097 0097 0097 0097 0097 0097 0097 0097 0097 0097 0097 0097 0097 0097 0097 0097 0097 0097 0097 0097 0097 0097 0097 0097 0097 0097 0097 0097 0097 0097 0097 0097 0097 0097 0097 0097 0097 0097 0097 0097 0097 0097 0097 0097 0097 0097 0097 0097 0097 0097 0097 0097 0097 0097 0097 0097 0097 0097 0097 0097 0097 0097 0097 0097 0097 0097 0097 0097 0097 0097 0097 0097 0097 0097 0097 0097 0097 0097 0097 0097 0097 0097 0097 0097 0097 0097 0097 0097 0097 0097 0097 0097 0097 0097 0097 0097 0097 0097 0097 0097 0097 0097 0097 0097 0097 0097 0097 0097 0097 0097 0097 0097 0097 0097 0097 0097 0097 0097 0097 0097 0097 0097 0097 0097 0097 0097 0097 0097 0097 0097 0097 0097 0097 0097 0097 0097 0097 0097 0097 0097 0097 0097 0097 0097 0097 0097 0097 0097 0097 0097 0097 0097 0097 0097 0097 0097 0097 0097 0097 0097 0097 0097 0097 0097 0097 0097 0097 0097 0097 0097 0097 0097 0097 0097 0097 0097 0097 0097 0097 0097 0097 0097 0097 0097 0097 0097 0097 0097 0097 0097 0097 0097 0097 0097 0097 0097 0097 0097 0097 0097 0097 0097 0097 0097 0097 0097 0097 0097 0097 0097 0097 0097 0097 0097 0097 0097 0097 0097 0097 0097 0097 0097 0097 0097 0097 0097 0097 0097 0097 0097 0097 0097 0097 0097 0097 0097 0097 0097 0097 0097 0097 0097 0097 0097 0097 0097 0097 0097 0097 0097 0097 0097 0097 0097 0097 0097 00	.00222 .00137 .02842
Dispersion parameter for DegRin distribution ScalParm: 19741*** .06623 11.64 .0000 .62151	.87930

Note: nnnnn.D-mm ss 3+ms \rightarrow sultiply by 10 to -ms or +ms. Some: +ms, +ms, +ms, +ms Significance at 14, 54, 104 level.

Implied orvariance matrix of random paramete

COMMETHUS	e MATESIA				
5	CHEER	TOTIANE	2691	BALADESC	
LMLESF TOTLAND DEG1 DMYNDIMI	.1061 8276E-01 3838E-02 .896EE-02	.8727E-01 .8675E-02 1127E-01	.6454E-09 9339E-08	.16462-02	

Duplied standard deviations of random parameters

-D_Seta)	
- 11	.515744
21	-29141
31	.0254050
4)	.0254057

Implied correlation matrix of random parameters

Con.Mat.	DILLER	TOTTANE	DEGL	RWWINTER
	1-00000		60828	
		1-00000		
	40323	,75575	1,00000	90634
BRAMDING!	.67016		-,00604	1,00000

Random Parameter Negative Binomial Model of Property Damage Only Crashes on Rural Small Urbanized SPF Class Roadway Segments

Dependent Log likel: Bascriste: Chi squerr Significan McFable: I Estimation Inf.Cr.All Model est: Sample is	officients Hegi variable incod famotion s log livelihood s log livelihood s (6 if.) noc level feedo h equirm c hased on H = C = 2400.7 A liveled lep 28, 2 pds and sincesial regres	-1187.087 0 -2398.410 2428.644 .001 1 .0028 1 1452.18 2018.14486 726 indiridua	774 116 167 167 168 17 188 188				IMADT LHLEN SCVENSKI	1HADT .9789E-02 .1234E-01 -,8196E-04	1HLEN .4294E-01 -,4778E-02	,33968-04
	Coeffisient	Standard		Prob.	91% Co	nfidence	Implied at	anderd dev	terrine of m	andom paramet
PDC	Coefficient	ESSOS	1	181354	11/2	erval	5.D_Betsk		1	
Constant) BCVE; TCTLARE BCVGRAN; BCVGRAN; BWYMDINC; SHWDRTCR;	#Unimediat perset -7.02392-** -27400-04* -25002-** -26.5606*** -00015** -00011** Heans for matchin 1.07468**	.77790 .1511D-04 .59512 0.41818 .4488D-04 .00499 .05231	2.91 2.27 -2.57	-0107 -0201 -0101	.00004 .00218 -,14644	.00028 .02850 01877	1/ 2/ 2/ Deplied or	rrelation :	129 121 124 18trim of Tec	odom paremete
SCHOOLSEL	1.07448*** .07138*** .00409**	00783	2.12	0337	100032	-00757	Cor.Nat.;	LHADT	DRIES SCHOOL	130
LITLES	Disgonal elemen .06285*** .08285* .00227***	.03255 .02975	1.06	-0072 -0583	-,00093	,10641 ,11662 ,00380	THIER	.96787 I 17379 -	96787 -:17: 00000 -:39: 29871 1:000	100
LENE_LINA LHCV_LNA: LHCV_LNL	-300604** 00101 00527***	.07d91 .00177 .00147	2-89 -2.57 -3.58	.0047 .0072 .0003	-,04185 -,00445 -,00616	.33545 .00241 00239				
Description - 0 17	Dispersion pares .45355***	natur for Sac	filte Stat	#ibution						

Random Parameter Negative Binomial Model of Possible Injury Crashes on Rural Small Urbanized SPF Class Roadway Segments

Dependent Log likel Restricte Thi squar Significa Sofedden Latimatic Inf.Cr.Al Sodel est Pample is Regative	ibood function d log likeliboo ed [3 d.f.] nom lavel frequio Braquare n massed on S = C = 1501.6 A instead Sep 19, 2 pis sud binomial regress	P1 -639.379 d -898.880 897.801 0 .3192 1452.8 = 12/M = _8 2018, 20124 726 Individue kint model	87 88 62 00 98 11 87 21 0.8				Implied coverience metris of random parameters Coverience metris SHHDCR LHEM ANDRER .3962E-02 LHEM2998E-02 .1207E-01 Implied standard deviations of random parameters
9337	Coefficient	Stendard Error		from:	Int	ervel	5.D_Beta I 11 .0442821 21 .114327
Constant: LHADT: HCVMX551; HCVCRAH	1,00185***	1,43181 .16383 7,18829 .6391D-04	-6,10 6,50 -4,90 3,61 1,99	10000	-11.85423 .72034 -88.8010 .00010 00785	1,26538 -21,1577 ,00036	Implied correlation matrix of random parameters
BHRDOR	Neens for cendo -,07655*** _00224*** Steponal elemen	m parameters .02440 .00340 ts of Cholesk	-0.10 10.50 y matrix	10017 10000	-,13443 ,71980	-,92879 1,04608	COT.MAN. SHRDCH LBUEN SHRDCH 1.6000051200 LBUEN51290 1,00000
	Below diagonal	elements of S	4,18 bulesky	netria.	.00888 .08226 10007	.07573 .126608 01712	
STATE SHEET	05859*** Dispersion pare					. 45828	

Random Parameter Negative Binomial Model of Evident Injury Crashes on Rural Small Urbanized SPF Class Roadway Segments

Restricted Chi equero Significati NoFaziden I Estimation Inf.Cr.All Model esti Sample is	variable inoud function i log limelihood id [3 dif.] ide lavel Pseudo R. squared i based on N = 1 = 495.5 AI mated: Sep No. 2 pde end 7 innomial regress	-240,418 -280,493 -000 -1420 -1460, N = - C(N = .3 2018, Trist 26 Instvious	46 7e 00 2e 9 46 51			
EAT!	Coefficient	Stendard Regor		Frob. 4 >2*		nfidence erval
- 11	Conrection person	ters				
Comptent!	+5-14217***	1,30821	-3.52	10001	+7.70688	-2.97040
LHADT	.49414***	.53762	5.54	10000	.22445	
MUNICIPAL	2,04404**	L.ODEEL	1,90	.0000	-01645	6.07164
	bane for render					
	-28.1681*					
2 5m mm;	.98825***				-46354	1,29479
	risgonal element	s of Cholese	V METELS			
		24.64	2.34	1910.	.04343	221068
HE/DOLDLE	27004**					
HC/DOLDLI) LHLEH)	_27006** _15081***	295175	2.95	19036	.04933	25223
HE/SOLULI) LINERY)	elmu diaconal e	Jenesta of C	2.91 holesky	10036	,04938	
HEYDOLDEL) ENGEN	elmu diaconal e	Jenesta of C	2.91 holesky	10036	,04938	
THE HEY	-150081***	.05175 Lementa of C .04698 eter for Neg	0.91 Noleaky -2.96 Sin dist	netria netria .0091 ribution	-,29045	04465

Covariance	MATELE		
-12111	HCV100521	230250	un ilography our good and the
BCVMXXL1 LHLEN	.0728	.41898-01	
Implied sta	nasta derile	nions of random par	rametera
N-D_Betal		1	
1)	,0220 ,2027	1	
Implied cor	relation ma	trox of rendom peri	mater
		MUNDE	
Cor.Mat. 180		1965	

Random Parameter Negative Binomial Model of Serious Injury Crashes on Rural Small Urbanized SPF Class Roadway Segments

Dependent Log likel: Restricte Chi bquare Rightfine Rofadden I Estimation Inf.Cr.All Nodel est: Sample is	efficients Begin mariable hand function (log likelihood d [1 d.f.] de level Sendo R-squared (based on N = 0 = 282.7 Alo mated: Oct 01, 1 2 pds and 72 incessed regress	SI -111.53D -111.679 2.697 100 01197 1652. W = /H = 0.1 018. 16:042 6 indumidua	73 61 76 49 00 2 40 04			
pegacara s						
SENE	Coefficient	Standard Ecock		Frob. z >Z*		nfidence erval
szuci		Standard Error				
SZNE)	Coefficient Couracton paramet	Standard Error ers .66233	-1.34	121>2*	-9.8287E	82999
SZMI) Constanti DESI	Coefficient Conrection paramet -2,22764*** ,02475	Standard Ecock esp .66233 .01557	-8.34 1.99	121>2*	211	82999
SCHOOL Constant DESI	Coefficient Compandom paramet -2.22784*** .02475 Gens for pandom	Standard Ecock eco .66233 .01557 parameters	-9.34 1.99	.0000 .0138	-9.62878 00976	82949 82949 65526
SCHOOL Comments DESI	Coefficient Consendon person -2.22764*** .02475 Name for pandon .60005***	Standard Ecood esp .66283 .01557 parameters .25221	-9.86 1.99 2.77	.0008 .0138	-9.62676 00676 .19093	82999
SCHO) Constant DESI	Coefficient Distriction paramet -2:2:56+** -0:2475 Namis for pardice -60:05*** Namis parameters	Standard Ecoco eco .66283 .01857 parameters .75171 for dists.	-9.56 1.99 2.77	.0000 .0118 .0084 parame	-9.62676 00576 ,19693	92999 .05526
SCHOOL Constant DESI INLES	Coefficient Confactent Confactent -2.27164*** -0.2475 Name for pandom -60009*** Name parameters -6217***	Standard Ecoco eco .66233 .01357 parameters .7527 for diate. .20016	-9.86 1.99 2.77 0f yendo 2.64	.0000 .0118 .0084 # Decame	-9.82676 00976 .19693	92999 .05526
SCHIT	Coefficient Coefficient Consendom paramet -2.2796*** -0.2475 Deans for pandom -0.000*** Whale parameters -(2017*** Lightson parameters	Standard Ecoco eco .66233 .01357 parameters .7527 for diate. .20016	-9.84 1.99 2.77 0f xendo 2.44	.0000 .0118 .0084 # perame .0083 ribution	-9.82676 00576 .19693 5629 .16242	9299 .05520

Random Parameter Negative Binomial Model of High Injury Crashes on Rural Small Urbanized SPF Class Roadway Segments

		y organic.					Implied covariance matrix of random parameters			
Dependent	efficients Sept variable incod function	RII					Coverience matrix			
Restricted	t log ligelihood ed (0 d.f.)	-450.056	96 54				LISACT SHWIRT			
HoFazidan i Estimation Inf.Cr.AIC Hodel esti Sample la Hagative b	Precisio R-rquared n based on H = 1 = 76s.0 AD imated: Sot 02, 2 pde end 7 ninceial regress	.15463 1482, N = C/S = .5 2018, 18:51: 26 insividua ion model	88 10 41 18 18				LWADT -1095E-02 SEMBOT -2015E-02 STIPSE-02 Implied standard deviations of random parameters			
1		Diendard		Frob.		nfidence	S.D.Beta) 1			
RIIMI	Coefficient	REFOR		181>5+		erval	4: .0030922			
	Sonrandon parame						2) .0620079			
Comptent: LISTER: AMMOLT: HEMMOREL:	+9.10082*** .81224*** .08281** -13.4365*	1.01809 .11048 .04102 #.09100	78.01 7.80 2.26 -1.97	10000	+7,09993 .99168 .01241 +27,1386	-9:10911 1:03680 :17320 :2656	implied contelection matrix of random parameters			
LOADT	Means for random		4 44	,0000	.b3676	.72979	The state of the s			
BHADKE				,0038		04676	Ecc.Met. LMADT SHMIMI			
	Disgonal element						LHADT: 1.0000074242			
			2,68	0105	.007T6	.05843	SEMINI) -,74262 1,00000			
	Pelow diaponal e	.02043		.0029	+.10095	01058				
		ener for Neg								
TRUM THY!				+0001	.29293	12748				

Random Parameter Negative Binomial Model of Just Injury Crashes on Rural Small Urbanized SPF Class Roadway Segments

Dependent	fficients Negh		82			Implied covariance matrix of rangem parameters Droamiante matrix	
	log likelihnod						THERE REPORT
Significer McPadden S Estimation Inf.Cr.Alt Model est) Sample is Megative b	Sendr R-squared t based on S = t = 769.0 Al mated: Dot 02, 3 pds and 3 tinomial repress	1482, X = 1/H = .8 1016, Leill: 16 individua ton model	00 08 11 30 39 1e				INITH .5566E-02 SHEET . 5516E-02 SHEET . 5517E-02 SHEET . 5517E-02 SHEET
2012/12/02	Coefficient	Standard Ergor	¥	Prob.	BSA Co	nfidence marwal	2) 0679287
	Consendon parame						Implied occrelation matrix of random parameters
THATT:	-0.56659***	2.09979			-12.96286 -50241	4.06006	
HCVMX311	-33,6450+++	12.10423	-2.80	.0052	-57.5690	-10.1209	Cox.Met. LHCHH SHRERT
ROYCEAN	+.12042	.00011		.0116	×.26198	.02702 .00038	Cog.Met. LULEH SHEDET
	leans for random		4104	144.0	-10000	100031	INIER) 1.0000059996
THERM	.59202***	.10291	6.72	10000	-63153	1.18251	SHEEDET: 88596 1.00000
SHMIRT	-,06561	102987	-1.97	10187	P-19716	.00995	
	Magninal element						
THEFT	,07874**	.02234		+0376	.00430	114318	
SHMIRT	07065***	101142		.0001	.03408	,10914	
	Malmo diagonal e						
THE THE		.01826		10042	05810	01661	
11	Laperator param	ries for Meg		10001	.23129	.71550	
ScalFarm;							

Random Parameter Negative Binomial Model of Low Injury Crashes on Rural Small Urbanized SPF Class Roadway Segments

Log likel: Restricte: Chi squar: Significe: Mofedden ! Estimation Inf.Cr.Al! Model est: Sample is	Veriable thood function of log likelihoo of [6 d.f.] are level frequence. Cased on E = 2001.7 & instead Oct 02, 2 pds and binomial regres	-1254.657 d -2862.870 2136.025 .000 d .54962 1452. W = IC/M = 1.7 2019, 16:251 726 individue	31 24 50 00 64 14 92 84			
10102	Coefficient	Stendard Error	1	from:		nfidence ex7el
10	Forrandum param -7.98795*** 1.97611***	61418				
Constant	-7.98790+++	.00340	-9.04	10000	-9.55239	-6.41191
DUADTE	1,27611***	:0993E	11.40	10000	09112	1/14109
VCEARSA.	.00277***	.02915	2.34	+0045	.02564	.53969
MCVCRAN	957730-0444	43E20-04	2,19	10258	.98927D-05	.151650-03
WCE!	-3,81821**	1,70754	-2.06	10354	6.86871	-,27578
	Means for canco	s parameters				
	.66303***					
	-,04666***					
MOSTABEL	+,438724	12257	-1,94	10025	67355	2025B
	hagonal elemen	ts of Cholesk	ty matrica			
THIRD	.15181***	.55147	4.44	.,0000		.23545
SCHOOL	.22221***	703376	7,70	10000	.0903€	
HUS HORY I	0.4000000000000000000000000000000000000	170436	21,20	1.000.000		+39500
+1	percondiscons;	elements of C				
1,0167 (1015)	-,08527***	101598			11640	
INCL. THIS	.40033***	110041	4.70	+6000	.25354	.47713
LHOF SHW	+,37127***	06533	-5.19	10000	66212	25243
100-030-01	Dispension para	meder for Neg	Bin dist	TIBUDED.		
	,41110ees					

Implied covariance matrix of random parameters

Covaviance macris

	THIEN	SENDET	BORTOEC
NOWING SHADES THURN	.5420E-01 1905E-01 .1118	.2196E-01 8196E-01	20667

Implied standard deviations of random parameters

D.D_Bets	
13	,212516
21	140190
70.0	607748

Implied correlation matrix of random parameters

Cor Mai . I	LNCEN	SHRIRT	MOSTDEC
LHUERY	1.00000	57507	.79100
SEMPORT	-,57837	1,00000	-,95518
MOFILDEC	.79100	65518	1,00000

Random Parameter Negative Binomial Model of Total Crashes on Small Urbanized Small Urban

Sote: nnnn,D-me or D-me => multiply by 10 to -sm or -sm. Note: ***, **, * -=> Significance at 14, 84, 104 level.

Rendom Coefficients NegBolleg Nodel

SPF Class Roadway Segments Sandom Coefficients Heginies Hodel
Dependent varieble TOTALACO
Log likklihood firstism - TOTALACO
Log likklihood firstism 95% Confidence Interval Coefficient -8.51114 .63961 .86913D-08 -.80799 -.12792

-6.03668 --04071 -79219 .01841 -.00716 1.02666 ScalFarmi 6,28 .0000 .92374 2.45502

Note: nonex.D-ws or D-ws -> multiply by 10 to -ws nr -ws. Note: ---, --, --, Significance at 1%, 5%, 10% level.

Deplied opvariance matrix of random parameters

Coverie	ce matrix			
	928	DEGL	EHERN	
VCR DESI INLES	15.87 7710E-01 7446	.8209E-02 .8781E-02	,8860E-01	

Implied standard deviations of random parameters

B.D_Beck	1
1	3,92043
2	10472040
- 01	1,205505

Implies opyrelation matrix of random parameters

Cor.Mat-	VCK	1691	DATE
VCE)	1,00000	-141037	00615
0501	-141887	1,00000	178868
13(1,8%)	-,80615	178848	1100000

Random Parameter Negative Binomial Model of Property Damage Only Crashes on Small Urbanized Small Urban SPF Class Roadway Segments

Restricted Thi square Significar NoFAdden E Estimation Inf.Cr.AIG Bodel esti Besgle le	veriable mood function 1 log Libeliano d 3 d.f. po leval iseldo R-squere Based on W = 1 = 1108.8 a, mated: Oct 14, 8 pos ens innomial regree	8 -871,666 256,523 .000 8 .19083 1183, E - 10/89 2018, 16:371	68 01 00 89 11 50			
FD0:	Coefficient	Stendard Error		Frob.		esfidence estal
	Conceptum person					
Constant?	-4.73073*** .70187***	196791	+4.00	1,0000	-6.63760	+2.53367
LHART	4701874**	129649	7,27	+0000	+83275	189100
HONEYMI!	-4.19455***	,98306	-4.27	.0000	-6.12532	-2,26178
SCYMOLET!	.00743***	.00220	2.47	.6006	.00332	.01195
MCYCRAIL	2000025449	+36560-04	5,36	10001	-00007	.00022
13	deans for sando	n parameters				
THIRD	1.02996***	,07003	14.40	10000	.09216	110000788
DEGL	+,05393***	.01655	-3.26	.0011	98636	+102149
11	isegonal element	te of Cholesk	y matrix	0.000		
INLEH	127606***	-01986	8.87	10000	+13714	· Z1499
0501+	129211444	.00583	5.22	10000	.02254	.04187
1.5	elow Giagonal :	elementa of C	bolesky.	METALE		
	02793***	.90737	-5.54	10000	05210	+,02248
JUEO INT:	hapersion para	seter for Neg	Sin dist	ribution		
12				10202		8.99197

	LHLES	DEG:
LHLEN DESI	.3100E-02 6678E-03	.82128-02
Implied s	tenderd devi	Lations of random parameters
8.D_Beth)		(F)
1.1 2.1	.1760 .08667	
Implied o	orgalation m	MATTIN OF SANDON DATAMETERS
	HAZRE	2601
Cur.Mat.		

Random Parameter Negative Binomial Model of Possible Injury Crashes on Small Urbanized Small Urban SPF Class Roadway Segments

Bestricter Chi equare Significar NcFadden W Estimation Inf.Cr.All Nodel est: Sample is	veriable hood function flog litelihood dd [3 d.f.] ice level seado R.egueres based on S = [= 867.8 A] 2 pde and [] inness] regress	-290.021 44.191 .000 .07618 1130, W = 1130, H = .0208 .0208 .0208 .0208 .0208 .0208 .0208 .0208 .0208 .0208 .0208 .0208 .0208 .0208 .0208 .0208 .0208 .0208 .0208 .0208 .0208 .0208 .0208 .0208 .0208 .0208 .0208 .0208 .0208 .0208 .0208 .0208 .0208 .0208 .0208 .0208 .0208 .0208 .0208 .0208 .0208 .0208 .0208 .0208 .0208 .0208 .0208 .0208 .0208 .0208 .0208 .0208 .0208 .0208 .0208 .0208 .0208 .0208 .0208 .0208 .0208 .0208 .0208 .0208 .0208 .0208 .0208 .0208 .0208 .0208 .0208 .0208 .0208 .0208 .0208 .0208 .0208 .0208 .0208 .0208 .0208 .0208 .0208 .0208 .0208 .0208 .0208 .0208 .0208 .0208 .0208 .0208 .0208 .0208 .0208 .0208 .0208 .0208 .0208 .0208 .0208 .0208 .0208 .0208 .0208 .0208 .0208 .0208 .0208 .0208 .0208 .0208 .0208 .0208 .0208 .0208 .0208 .0208 .0208 .0208 .0208 .0208 .0208 .0208 .0208 .0208 .0208 .0208 .0208 .0208 .0208 .0208 .0208 .0208 .0208 .0208 .0208 .0208 .0208 .0208 .0208 .0208 .0208 .0208 .0208 .0208 .0208 .0208 .0208 .0208 .0208 .0208 .0208 .0208 .0208 .0208 .0208 .0208 .0208 .0208 .0208 .0208 .0208 .0208 .0208 .0208 .0208 .0208 .0208 .0208 .0208 .0208 .0208 .0208 .0208 .0208 .0208 .0208 .0208 .0208 .0208 .0208 .0208 .0208 .0208 .0208 .0208 .0208 .0208 .0208 .0208 .0208 .0208 .0208 .0208 .0208 .0208 .0208 .0208 .0208 .0208 .0208 .0208 .0208 .0208 .0208 .0208 .0208 .0208 .0208 .0208 .0208 .0208 .0208 .0208 .0208 .0208 .0208 .0208 .0208 .0208 .0208 .0208 .0208 .0208 .0208 .0208 .0208 .0208 .0208 .0208 .0208 .0208 .0208 .0208 .0208 .0208 .0208 .0208 .0208 .0208 .0208 .0208 .0208 .0208 .0208 .0208 .0208 .0208 .0208 .0208 .0208 .0208 .0208 .0208 .0208 .0208 .0208 .0208 .0208 .0208 .0208 .0208 .0208 .0208 .0208 .0208 .0208 .0208 .0208 .0208 .0208 .0208 .0208 .0208 .0208 .0208 .0208 .0208 .0208 .0208 .0208 .0208 .0208 .020	67 79 00 72 11 68			
FERE	Coefficient	Standard Error		Prop. (#(52*		nfidence erval
12	Correction parame	ters				
Constanti	-4.60400*** _60060*** -117778**	1,68977	-2.99	10000	+7-42211	-1,56600
THAPT	-60060***	,15984	2.76	+0002	-28728	.91192
VCFARRA.	-127778**	.05725	-2.04	10616	n.36559	00873
HCVL1H1:	-4.95195**	3.08223	-2.42	.0167	-9.02328	-,99991
SCVPTCVA)	01095**	,00485	2.54	10112	.00348	221940
	mans for randor					
THIES	.55857***	133330	7457	.0000	463453	2,67525
	05692*					-20408
	Magninal element					
LHLESS	.04601	.03499	1,99	.0455	02236	.11423
	.03321*					
00091	below distrocal e					
					1.0000000000000000000000000000000000000	
13		109919	-1.35	+0468	36558	GDZ86:
iDEG INL		,09319 exer for Neg	Bin diet	-0468	36576	00186

Implied covariance matrix of random parameters

LNLEN DEGL

LNLEN .01176-02
DEGL -.550325-03 .11767-02
Deplied standard Seviations of random parameters

5.D. Beta 1
11 .0440181
2) .0342942

Implied correlation matrix of random parameters

Coc.Mat. LSUES 0501

LNLEN 1.00000 -.24921

CHURI ..24921 1.00000

Random Parameter Negative Binomial Model of Evident Injury Crashes on Small Urbanized Small Urban SPF Class Roadway Segments

Restricte Thi Squar- Highifica Reflection Tetimetion Inf.Cr.&D Sodel est Respie La	Variable Ihood function a log librithood od [3 d.f.] noe level Pawids R-squared n hased on S = 1 = 312.3 AZ imstel Oct 16, 2 pos and 6 binimial regress	-354.198 14.198 .003 .04375 1181, X = .7 2018, Doill: 86 Lodividua	176 171 176 177 8 162 183			
avi	Coefficient	Standard Error		frob. (2):52*	55% Confident	
	Monrandum perame -7,19910***		-1.55	-,0009	-11,83748	-2.44576
Water Agricial	.80812***	.22126	3.65	0000	57447	1,24177
THATE						
SHADE		105535	+3.68	-0021	+ 26839	
SHIRT	18414***			.0021	-14031	-105972
SHARRE	16414*** Name For random	parameters				
THERE	16414*** Ness# For random 1-03568***	parameters .16679	4.11	.0000	-71925	1,82186
SHHERT (16414*** Neune for rendom 1.01668*** 00033*	15679 .00017	4.91	.0000	-71925	1,82186
SHHERT (16416*** Names for random 1.02566*** 00093* Diagonal element	parameters .16679 .00017 a of Cholesk	4.91 -2.04 Ty matria	.0000 .0121	.71926 *.00067	1,82196
SHEEDE 1 LHLICH HOVE LHLICH	16416*** Names for random 1.01088*** 00093* Diagonal element	parameters .16679 .00017 a of Cholesk .04835	4.91 -2.04 Ty matria 3.12	.0000 .0141	-71926 00067 -01432	1,82186
SHICKET LICENT BOVE LICENT BOVE	1641s*** Nemme For rendom 1.01065***00033* Diagonal element .15105*** .00617** Below diagonal e	parameters .19679 .00017 a of Cholesk .04835 .60305	4.81 -2.04 ty matria 3.12 2.00 molesky	.0000 .0121 .0016 .0016 .0452	-71326 *-00047 -01432 -01033	1,82186
SHADAT LHEAN HOVE DATAN HOVE LHEV_THE	-1841*** Nemma For random 1.01058***00033* Diagonal element .15108*** .00817** Below diagonal e0002**	parameters .16679 .00017 s of Cholesk .04835 .00305 lemente of C	4.81 -2.04 ty matria 3.12 2.00 holesky -1.86	.0000 .0121 .0016 .0432 Matrix	-71326 *-00047 -01432 -00033	1,82196 ,00000 ,24584 ,01221
SHADAT LHEAN HOVE DATAN HOVE LHEV_THE	1641s*** Nemme For rendom 1.01065***00033* Diagonal element .15105*** .00617** Below diagonal e	parameters .16679 .00017 s of Cholesk .04835 .00305 lemente of C	4.81 -2.04 ty matria 3.12 2.00 holesky -1.86	.0000 .0121 .0016 .0432 Matrix	-71326 *-00047 -01432 -00033	1,82196 ,00000 ,24584 ,01221

COMMITMES	e success		
	1311	EII	MCV/E
THIEN HOVE	.3283E- 2931E-		01E-07
Implied #	tendard d	eristion	s of random parameters
8.D_Setal		1	
ž.	-20741		
Implied o	orrelatio	netria	of rendom parameters
Cor. Hat.	INTER	BUVE	
	L.00000 -,93225		

Random Parameter Negative Binomial Model of High Injury Crashes on Small Urbanized Small Urban SPF Class Roadway Segments

estribte hi squar ipnifica rFadden stirenco nf.Gr.AI odel est	veriable phood function d log likelihoo ed [3 d.f.] noe ievel Pasedo R-square n based on W = E = 376.7 a limateS oct 21, 2 pds and binomial regree	8 -106.163 15.655 .001 4 .04175 1182, W = 10/8 = .3 5018, 16.831	21 21 40 54 10 16 28			
	Coefficient	Standard Error		Prob.		nfilmence Acrel
	**********			1-1		
- 1	Honrandon param	11818				
Snedent	-,88281* -,00082***	152126	-2199	+9708	-1.90456	123876
HCVL	00092***	.00001	-8,60	.0089	-100148	-,00021
TOTLAME	22000+++	101003	2.79	.0052	-09259	.62752
	4000026**			+0432	-00000	.00001
	Means for rando	s paxameters				
	1.13993***	.13741	8,30	10000	.07050	1,40927
LHAUT			-31.05	.0421	01110	+.00020
VCVBVCA:	+,00574**	199493				
ACABACY:						
LHADT: VCVBVCA: LHADT:	Diagonal elemen: .12906**	e of Cholesk	y matrix 2.45	+0144	-02879	,25299
LHAUT VCVBVCA VCVBVCA	Diagonal elemen .12906** .00534***	08 Of Choleak .06272 .00109	2.45 2.45 2.82	+0144		,25299
LHAST VCVBVCA LHAST VCVBVCA	Diagonal elemen ,12906** ;00514*** Below diagonal	is of Cholesk .06272 .00109 elements of C	y matrix 2.45 2.82 belesky	+0144 -0048 Matxix	-02879	,25299
LHAST VCVBVCA LHAST VCVBVCA	Diagonal elemen ,12906** ;00514*** Below diagonal	is of Cholesk .06272 .00109 elements of C	y matrix 2.45 2.82 belesky	+0144 -0048 Matxix	-02879	.00005
LHAST VCVBVCA VCVBVCA VCVBVCA VCVCV_LHA	Diagonal elemen .12906** .00534***	is of Cholesk .06272 .00109 elements of C .00159 meder for Neg	y matris 2,45 2,82 bolesky 2.80 Bin dist	+0144 -0048 MBTX18 +0309 F150tion	.02879 .00143 .00083	.00005

HE IS	Letter	VOVEVCA
	.1666E-01 .5217E-03	-4482E-04
Implied at	underd devi	elions of random parameter
8.D_Besai		1
11	.5290 .004699	
laplied o		etrix of random parameters
Cor.Mat.	INDEX VC	VBVCA
TOTAL SOLL	1.00000 .	

Random Parameter Negative Binomial Model of Just Injury Crashes on Small Urbanized Small Urban SPF Class Roadway Segments

Dependent Log likeli Restricte Chi squari Significa Mofadden Setimation Inf.Cr.Al Model set Bample is	Veriable inced function i log limelicand id [I d.f.] ice level recuso 8-squares i based on W = 1 = 140.5 Act instes; Oct (I)	9.204 .002 .02666 1192, H = C/H = 12 2018, 16157: 86 individua	08 13 17 41 86 6 92 17			
HWENTTHE !	Commence of the contract of					
SISTINI HERETIA	Coefficient	Standard Exect	ī	frob.		nfidence exval
SISTILL		Standard Exect		frob. (NIPI*		
JUSTINI)	Coefficient	Standard Exect	-2.72	Niple.		erval
STOTINI Constant	Coefficient Formandom person +5.65655*** +1.00012*	Standard Execut 1.04107 .00021	12.95	.0084 .0721	-3,68908 -,00062	erval
JUSTINI Constant MCVS. LNLESS	Coefficient Formandom person -5.65650** -30013* -70858***	Standard Execut ters 1.04107 .00011 .16048	12.95	.0034	-0,6890S	-1.65469
JUSTINI Constant MCVS LNLES	Coefficient Conrection person -5.656501.0012* -7188* Beans for random	Standard Error Ders 1.04107 .00011 .16048 parameters	1.95	.0054 .0721 .0000	-9.68908 09062 .40489	-1.68463 .00003 1.03888
Constant Schelant MCVA LNCAN	Coefficient Correction person -5.65650**50012*7385*** Bens for radim -8135**	Standard Execution 1.04107 .00011 .16045 parameters .18942	72.98 1.18 2.43	.0084 .0721 .0000 .0157	-2,68905 -,09062 -,09086 ,09086	-1.68463 .00003 1.03888
Constant ECVS LUCEN	Coefficient Formsbdox person -5.6565+** -10012* -7398*** Beans for random -81155** Toele personeters	Stendard Error ters 1.04107 .00021 .16048 parameters .15042 for filets.	-1.95 4.48 2.43 of ranso	.0054 .0721 .0000 .0157	-8,68905 -,00162 ,40439 ,03086	-1.68463 .00003 1.03888
Constant Sonstant SCAN LNCAN	Coefficient Correction person -5.65650**50012*7385*** Bens for radim -8135**	Standard Execution 1.04107 .00011 .16045 parameters .18942	-1.95 4.48 2.43 of ranso	.0084 .0721 .0000 .0157	-2,68905 -,09062 -,09086 ,09086	-1.68463 .00003 1.03888
Constant MCVR LHADT	Coefficient Formsbdox person -5.6565+** -10012* -7398*** Beans for random -81155** Toele personeters	Standard Error 1.04197 .00011 .16048 parameters .18948 for Hacts. .01468	-1.95 1-88 2.41 0f renst 8.56	.0054 .0721 .0000 .0157 m parame .0004	-0,68905 -,00062 ,40489 ,02086	-1.68463 .00003 1.03888

Random Parameter Negative Binomial Model of Low Injury Crashes on Small Urbanized Small Urban SPF Class Roadway Segments

Dependent Log likel:	efficience Pegs Variable Those function	-604.267	367 28				Coversano	matrix		1 240000	perameter
Seattlite Chi equeze Significat	s log likelihood ed (6 s.f.) oce level	769.169 297.752	64 100					tet		1001	YOR
Estimatim Inf.Cr.AI Model est Sample is	Paeudo R-squared b based on N = 2 = 1341.6 Al Imsted: Oct 19, 2 pts and 1 binomial regress	1192, K = 178 = 1.0 2019, 17:17: 00 individue	17 42 87 18					.5061E- .2191E- 3345E-	02 -185 01 -598		22.05
SOEM?	Coefficient	Francisco :	*	freb.	99% CU	mfidence erval	Implied a	renderd d	eviations 1	of rands	m paramet
	Monrandon parase		000.000	100	1800000						
	-6.52806***		-5.48	.0000	-0.01753	+4.19310	(2)	-07			
CARDEL	1.00078***	115465	7148	.0000	73690	1.26464	21				
MOYCEAR	.00960***	37710-06	2.24	0111		17001D-03	31		69615		
MCVOOLSEL!	.00060***	.00247	2.29	.0005	-02476						
SMADKET	-781038Exex	100000	- B - BB	20004	10969	-,09114					
BUVL	+.000T9*** +.33290**	00019	-4.15	.0000	00118	00042	Implied :	corelatio	metrics.	of random	parameter
MOSIDECT	+,33250×+	12246	-2.46	10140	59533	06741					
	Geans for render	parameters									
EMERN I	.69655***	+04004	24,34	10000	-78079	1.01422	********	***			
00011		.01668	-2.10	10001	99748	03209	Cor.Mar.	DATES	08.93	VOR	
VCW	-6.67683**	2,28586	+2782	.0117	-10.08753	-1,26028	maryland warming	******		*******	
11	Diagonal wiement	m of Cholese	y mangan				185881	1,00000	75570	-,05026	
T-MC-818 (-07655***	.02525	3.03		-02710		04091.1	195570	1,00000	29993	
16911					-01210	.04429		09026			
VOE	3.88023***				1.28108	6-45940	333500		377577	FT 5555-55.	
	Selow diagonal e										
IDES INT.	.01211++	121342			00624	.02663					
1969 6964	02588**	127.75				-,00000					
	-020464	- V13518									
TACK DEST		Action of a William William	Die diat	WINGELO							
TACK DEG	Z.48900***	建设金金、工业企、19条金				4,15554					

Random Parameter Negative Binomial Model of Total Crashes on Metropolitan Small Urban SPF Class Roadway Segments [PRINT CRASHED CONTINUES MALTIN OF FRANCE PRINTED PRINTED CONTINUES MALTIN OF FRANCE PRINTED PRINTED

Dependent Log likeli Restricted Chi aquare Significan Nofedden M Estimation Inf.Cr.AI Nodel esti Semple le	officients Hegt variable threaten incomments of a fig. livelihood fineticts at [6 d.f.] are livel freedo H-squares on N = 2 = 2318.6 Al instead for 02, 2 pds and 4 ps. controllar regress	TOTALS -1143.376 1 -9092.307 1897.307 1897.307 2000 .77849 278 = 2.6 2019, 18:137	06 43 00 16 56 41 26			
TOTALAGE	Coefficient	Panggard Error		Frob. (2)5%*		nfidenve erval
13						
Congranti	fonrendim parens	16471	-4.60	0000	-4,22679	-1.69994
THANT	.55561***	106935	8.01	-0000	-62963	
SIRCOCK:	-09749***	101047	3.53	10004	-01656	-05640
VIIVETGRA!	00659***	00147	-6.49	.0000	00947	00371
	04810***					
HEVE SMILE	-1,28086**	.80725	+2.04	-0410	-7.63055	08068
13	seans for random	DATABATAGA				
VERRANGO	.00202**	104129	1.99	20470	_00106	.14195
- DEG15	.00202**	:01103	+3,52	+0004	06336	01179
THIRD	***30538***	.05501	14,03	40000		.98890
	liatonal element	s of Chalesk	of material			
VCERRIGA	.04912	.63173	1.94	.0616	01331	.11131
DEG1:	.04910***	.00794	6,13	.0000	.03334	.06465
INLER	-09286**	101545	2.04	1488.	-D018#	
1.7	Selby diagonal e	lements of C	bolesky:	BATRIX		
1DES VCF1	-01746	101892	5.99	.0964	00903	G04896
SSEE WCP!	.02987	-01892 -02739	5.97	.0403	02432	
	.14708***	02124	6.12	10000	.20393	18569
11	Dispersion perso	eter for Neg	Bin diet	ribution		
	44447***	,09249				

	VCFARNA.	1080	ENTER	
VCEARBA DENI LKLEN	.3412E-02 .8978E-03 .1448E-03	18726E-93 1793E-93	.23818-01	

Implied	standerd	deviations	20	281/208	pareneter
J.D_Deta	1				
		0491170 0621110 053314			

Deplied correlation matrix of random parameters

Cop.Mat.	VCEANG.	0001	10150
(VCEARIOL)	1,00000	1,00000	.19197
	129157		1,20000

Random Parameter Negative Binomial Model of Property Damage Only Crashes on Metropolitan Small Urban SPF Class Roadway Segments

Rendom Coefficients HegSoSeg 1	
Dependent variable	900
Log inwellhood function of	965,85693
Restricted log likelihood -32	
Dis squared [6 d.f.] 60	629.00094
Significance level	100000
Mofedden Feeudo R-squezed	.T001968
Estimation based on H = \$79.	R = 16
Inf.Cr.AIC = 1929.7 AIC/H =	
Model estimated: Nov 05, 2015,	
Sample is I pay and 199 in:	
Hegative binomial regression m	

9001	Coefficient	Remoterd Remot		Fcob- (#1>2*		erval
	Nonrandos parama	THEF				
Constant	-2.10182++	.94331	-2.22	.0258	-3.93033	25265
0800	*1,68702**	165744	+2.52	0122	-2,03556	F. 35540
LHAST	1407174**	+11040	1:69	.0002	119578	162986
CVPTGRA:	w.00663***	,00129	~5.52	. 2000	00918	-,00400
HOW THE	-1,75553***	465235	-2.13	10063	-3.06558	-750400
TOTLAME	.08261	,08799	2.97	2507	03007	129530
- 64	Heans for sanson	pacameters				
SHOCK	.00402***	.01010	2136	.0008	.01520	.05784
SHMULT	++04887***	102884	+2.55	,0095	05579	01104
THISH	,87856***	704171	24.24	10000	,75762	189992
11	liapinal alement					
SHRDCR	,0181644	,00948	1,30	.0480	100017	.03811
SEMBLI	.00222**	102562		12294	00392	106043
LHLEN	+04006**	0.0000	2.13	.0286	:00418	157593
17	Below diagonal a	General of C	balesky.	matria		
1994 994	-,00683	101912	-2.38	10213	04278	1709216
HIRL SHEET	-,08958++	.00595	-2.20	.0215	16192	01333
ILHL SHW:	120002***	152550		.0000	135396	,26568
1	dispersion paras		bin dist	ributhon		
SCRLFACK!	.82502***	-09482	4.76	.0000	.42910	1,01096

Covarian	OR MATER			
			LHERN	
SHWICK SHWILT LNIAN	.3664E-03 1016E-03 1716E-02	.30665-02 .72345-92	-5MME-01	

B.D. Bettel	5
1	.0191404
21	-0326160
	The second of the second of

Implied correlation matrix of rendom paremeters

Cor, Mat.	SENDCE	SHWCCT	
BENDON	1,00000	16265	-,10611
	-,18260	1,00000	1.00000

Random Parameter Negative Binomial Model of Possible Injury Crashes on Metropolitan Small Urban SPF Class Roadway Segments Implied coveriance matrix of random parameters

Dependent Log likeli Restricte Chi squari Significa Mofadden Estipation Inf.Cr.All Model esti Sample Le	efficients Hegs wariable thood function \$ log likelihood at [6 c.] the lavel freedo W. squard [1 a c.] the lavel 2 = 1145.4 Al thousand Wev Ob. 2 pps And 5 thousand regress	#37.722 -989.526 843.627 .000 .13687 #79. E = C/H = 1.3 2015, 19:217 39 LOGUVINA	90 72 00 68 14 52 29			
F2H21	Coefficient	Standard Error		From.		nfidence arral
	Conrandos parama	THEF				
Constant	-4.74000+++	468337	-6.63	.0000	-6,10079	-5.26586
INADT	960704**		0.772	10000		.66218
VCVFTSRA:	-,00888+++	100204	~2.75	.0068	00962	-,00186
VCFARMA!	.10245**	.05150	11.00	.0466	.00153	,20000
- 1	leans for randos	parameters				
SEMPORE	.01896*	00575	2.00	.0490	-,00115	,53311
0800		100497	-2.05	0440	-,05962	-,00082
THURSE	.04049+++	.00000	16.16	.0000	175041	.04414
	Disponal element					
SERDOR	+02057**	100566	2.00	10225	100501	303773
0501	.03793**	91765				.07182
THIRN	.06948***	102149	3,24	.0012	02748	122299
- 17	below disposal w	lengues of C	ticlesky.	matrix		
1066 StW	0052348	.00240	-2,14	10322	-100963	00043
	7.0058T	104282	+2.13	:0365		.07555
	+53840***	199211	4 - 84	.0000	1079-96	.20124
LINE_DEST.				- 276.11 - 2		
TIME_DESCRIPT	lispersión param Y.31719***			,0018		

Coverience maters SHNDCK DESI LUCEU

.4140E-03 -.1906E-08 -.1184E-08

1.D_Deta ,0205656 .0381836 .154946

Implied correlation matrix of candim parameters

Cor.Mac.) SEMPCH HMDCR: 1.00000 -.24486 -.02284 DES1: -.24496 1.00000 .87484 LMIES: -.08584 .87484 1.00000

Random Parameter Negative Binomial Model of Evident Injury Crashes on Metropolitan Small Urban SPF Class Roadway Segments

Dependent Log likelt Restricted Dis Square Rightficen HrFattgen i Estimation Inf.Cr. All Model est: Seeple 10	efficients Beginning Warristle Warristle Warristle Warristle Flood function of log likelihood of log l	E -755.319 -309.139 105.839 105.839 105.839 105.839 2000 105.839 105.839 105.839 105.839 105.839 105.839	67 74 90 60 11 86			
E77.	Coefficient	Standard Espec	1	\$20b. (1)38*		ofidence erval
11	fenrandom parame	ters			100000000000000000000000000000000000000	
Congrade	44.50041***	92769	+6.66	.0000:	+6.81900	PZ.88178
LHADT	152059***	.06295	6.10	.0000	,35055	. 88524
SHMDLI	-,28241***	.0688T	+4.22	-0000	+,61182	+,15330
SHMIRT	.20401***					.33540
VEVLIS	-6.82551++	5.12512	-2.18	.0290	-12,91063	70040
0	leans for randos	peremeters				
LHEEN	1,57605×+4	106494	18.02	1,0000	+95555	1,10332
0891	.97605*** 08973**	.02541	-2.85	10114	10601	+.01345
	Magorial element	s of Cholest	P. MARKEL			
THESE	.08184**					
	.024154+				1,00058	.04997
	elow miegonal s					
	04660***	91709				.07930
IDES DAT						
IDES DAT	Laperaton paras	star for Neg	Sin dist	110117500		

Implied coverience matrix of rendom parameters

Coverinnoe Metrim DEG1 DATES DEST DEST .6698E-02 .2247E-02

Implied standard deviations of random parameters

Implied correlation matrix of random parameters

Cor.Hat. | DIGEN 9891 181250 1.00000 .94542 16011 .94542 1.00000

Random Parameter Negative Binomial Model of Severe Injury Crashes on Metropolitan Small Urban SPF Class Roadway Segments

thi squar Significa ScFadden : Setimation of Cr.AI Sodel est Sample is	d log libelihood ed [1 d.f.] hose level Passido R-aquares n based on H = 7 = 195.1 Al insted; Den II; . I pds end ninnmal regree	I.450 ,228 1 ,00765 872, K = 10/8 = .2 2015, 204541 109 individua	21 49 21 1 16 0+			
82117)	Coefficient	Standard Ecotx			Str Con Inte	ndidence esval
		stars				100
	Nonrandom parame					
Constant	+4.00480**	1.88882	12.15			
Instant LHADT	-9.00480** .25555	,58490	1.06	.1046		
Interact Interact	-9.00980** .25383 Beens for rendom	Coppe,	1.06	.1046	-,17886	.59592
INADY)	*4.00480** .25365 Seens for rendom .78888***	.18490 perameters .13224	8.88	.1046	-,17886	.59592
Entant LHEADT LHEADT	-9.00450** .35355 Heens for rendon .75550*** Scale parameter	.18490 peremeters .13224 r for dists.	1.06 8.88 of mando	.1046 .000E m perane	-,17886 ,47480	.55592
LHLEN	*9.00480** .25355 Deens for rendor .73383*** Scale parameter: .11246	.1890 perameters .18224 s for dists. .07250	1.06 8.88 of mends 1.93	.0008 m perane .0820	-,17856 ,47480 :ers -,04140	.55592
LHLEN	-9.00450** .35355 Heens for rendon .75550*** Scale parameter	.1890 s peremeters .18224 r for dists. .07850	1.06 8.88 of mendo 1.93	.000E m perade .0520	-,17856 ,47480 :818 -,04140	.55592

Random Parameter Negative Binomial Model of High Injury Crashes on Metropolitan Small Urban SPF Class Roadway Segments

	efficients Hegh	offer Nodel				
Dependent	wariable.	811	167			
	Lbood fubction	+434.617	23			
Restatote	S log likelihood	+650,970	선호			
Chi equer	60 [1 d.f.]	472-704	42			
Significat	ed [1 d.f.] now level Freudo X-rquered	1000	00			
NoFedoen 1	Preudo Araquased	,36307	23			
	tased in it -					
	# 883 2 AI					
	Lmated: Dec 24;					
	2 pds and 4		LB			
Nedertae :	dinomial regress	top model				
-				Details	254 34	of Change
	Coefficient	Standard		Prob.	964 Cc	nfidence
				Prob. [s]:I*	#64 do	
81192	Coefficient	Standard Error		[#]>2*	Int	erval
HIINZ)	Coefficient Intranton payane	Standard Error Teps 1.5eps	-3.70	.0003	-10.55403	erval
HIINZ)	Coefficient Intranton payane	Standard Error Teps 1.5eps	-3.70	.0003	-10.55403	-2,36733 2,84856
BIINZ	Coefficient **Incoming payant -6,97555*** 1.73983*** .05674***	Standard Error Tebe 1.5ebss .5e5es .01202	-2,70 3,06 4,54	.0002 .0021 .0000	-10.55603 .63112 .03541	-2.36733 2.89855 .08407
BIINZ	Coefficient	Standard Error Tebe 1.5ebss .5e5es .01202	-2,70 3,06 4,54	.0002 .0021 .0000	-10.55603 .63112 .03541	-2,36733 2,84856
BIINZ Constant LHLEN HOFLING VCVL11	Coefficient **Companies parame -6,97555***	Standard Error Lebe 1.5ebs .666s .01282 6.07694 parameters	-3,70 3.08 4.54 -2,77	.0002 .0021 .0020 .0086	-10.55603 .69112 .03341 -23.0350	-5.36733 2.84855 .08407 +5.4850
BIINZ	Coefficient Honrandum payame -6, 97535*** 1,3988*** -19,3605*** teans for rangem 43225**	Stendard Error Tebe 1.56085 .01282 6.07894 parmeters .21904	-3,78 3.08 4.54 -2,77	.0003 .0021 .0000 .0055	-10.59403 .89112 .03241 -23.0220	-5.36733 2.84855 .08407 +5.4850
BIINZ Constant LMLEN MOFING VCVL11	Coefficient **Control payant -6,2155*** -7,2363*** -7,2567*** -7,2567*** **Control payant	Standard Error Lebe 1.56055 .6566 .0120 6.07604 parameters .21504 for dists.	-3,79 3.08 4.54 -2,77 1.87 of rands	.0002 .0021 .0021 .0000 .0055	-10.55403 .89112 .03241 -23.0250 .00134	-2,36733 2,84855 .08407 -3,68320
BIOMZ Constant LMCSN BOFING VCVLII LMADT	Coefficient Manzandam peramo -6,37536*** 2,3893*** .05514*** teans for random .43216** Scale perameters .04013***	Standard Error Lebe 1.54068 .01292 6.07694 parameters .21904 for dists.	-3.79 3.08 4.54 -2.77 1.97 of rando	.0002 .0001 .0000 .000b .0489 m parame	-10.59403 -89112 -03241 -33.0250 .00134	-2,36733 2,84855 .08407 -3,68320
BIOMZ Constant LMCSN BOFING VCVLII	Coefficient **Control payant -6,2155*** -7,2363*** -7,2567*** -7,2567*** **Control payant	Standard Error Lebe 1.54068 .01292 6.07694 parameters .21904 for dists.	-3.79 3.08 4.54 -2.77 1.97 of rando	.0002 .0001 .0000 .000b .0489 m parame	-10.59403 -89112 -03241 -33.0250 .00134	-2,36733 2,84855 .08407 -3,68320

Random Parameter Negative Binomial Model of Just Injury Crashes on Metropolitan Small Urban SPF Class Roadway Segments

(og likelihood 1 8 d.f.) (level rudo B-squaren sased on H = 2014.4 Al sted: Der I4, (pdr and)	1 -3885,189 1814,291 .000 1 ,1978 878, 8 - 10/8 - 3.1 2013, 18:58:	62 36 00 63 11 95			
	Standard				nfidence
			12/25-	Int	erval
		-6.73	.0000	-3,11245	-2.80724
					-,00258
		-9.91	.0009 -		
.28266***	31489	8-12	.0018	00987	.08814
		7.7.77	11122	100000	11700 (7)
E.04930+++	104061	12,90	.0000	.95951	1.11000
.65545***	, Dedg:	10.09	40000	-55795	.77242
	ie of Cholesk	Y BALLER			
.46910***	-04096	11,31	,0000		.54322
.00999**	.00506	1.97	.0425	_00007	,01990
ow diagonal e	lements of D	nolesky :	matrix		
- Hadridgee	-01298				-,02174
		market and the second	Secretaria principality		
speraton peras		7,62			2.14024
	log likelihood 1 8 d.f. 1 8 d.f. 2 2 6	1	mado B-oguared (19799) aseed on P 878, 8 = 11 2014.4 AID/W = 1.304 2014.5 AID/W = 1.305 pde and 000 Lodividuals monial repression model Confinient Error s Wandows Decembers: -0.58003** 101405 - 0.54 -0.58003** 101405 - 0.54 -0.58003** 101405 - 0.54 -0.58003** 101405 - 0.54 -0.58003** 101405 - 0.54 -0.58003** 101405 - 0.54 -0.58003** 101405 - 0.54 -0.58003** 101405 - 0.54 -0.58003** 101405 - 0.54 -0.58003** 101405 - 0.54 -0.58003** 101405 - 0.54 -0.58003** 101405 - 0.54 -0.58003** 101405 - 0.54 -0.58003** 101405 - 0.54 -0.58003** 101405 - 0.54 -0.58003** 101405 - 0.54 -0.58003** 101405 - 0.54 -0.58003** 101405 - 0.54 -0.58003** 101405 - 0.54 -0.58003** 101405 - 0.54 -0.58003** 101405 - 0.56 -0.58003** 101405 - 0.56 -0.58003** 101405 - 0.56 -0.58003** 101405 - 0.56 -0.58003** 101405 - 0.56 -0.58003** 101405 - 0.56 -0.58003** 101405 - 0.56 -0.58003** 101405 - 0.56 -0.58003** 101405 - 0.56 -0.58003** 101405 - 0.56 -0.58003** 101405 - 0.56 -0.58003** 101405 - 0.56 -0.58003** 101405 - 0.56 -0.58003** 101405 - 0.56 -0.58003** 101405 - 0.56 -0.58003** 101405 - 0.56 -0.58003** 101405 - 0.56 -0.58003** 101405 - 0.56 -0.58003** 101405 - 0.56 -0.58003** 101405 - 0.56 -0.58003** 101405 - 0.56 -0.58003** 101405 - 0.56 -0.58003** 101405 - 0.56 -0.58003** 101405 - 0.56 -0.58003** 101405 - 0.56 -0.58003** 101405 - 0.56 -0.58003** 101405 - 0.56 -0.58003** 101405 - 0.56 -0.58003** 101405 - 0.56 -0.58003** 101405 - 0.56 -0.58003** 101405 - 0.56 -0.58003** 101405 - 0.56 -0.58003** 101405 - 0.56 -0.58003** 101405 - 0.56 -0.58003** 101405 - 0.56 -0.58003** 101405 - 0.56 -0.58003** 101405 - 0.56 -0.58003** 101405 - 0.56 -0.58003** 101405 - 0.56 -0.58003** 101405 - 0.56 -0.58003** 101405 - 0.56 -0.58003** 101405 - 0.56 -0.58003** 101405 - 0.56 -0.58003** 101405 - 0.56 -0.58003** 101405 - 0.56 -0.58003** 101405 - 0.56 -0.58003** 101405 - 0.56 -0.58003** 101405 - 0.56 -0.58003** 101405 - 0.56 -0.58003** 101405 - 0.56 -0.58003** 101405 - 0.56 -0.58003** 101405 - 0.56 -0.58003** 101405 - 0.56 -0.58003** 101405 - 0.56 -0.58003** 10140	10 11 11 12 12 13 14 15 14 15 14 15 14 15 14 15 15	10 11 11 12 12 13 13 13 13

	LELE	LMADT	
LHLEN LHADT	.114 21115	_8219E-08	
Implied o	tanderd de	iations of sendom pe	CARRETAIN
F.D_Seta		1	
2)	,46 ,547	01#	
Implied o	orrelation	matrix of random par	ametera
	Litteri	19907	

Random Parameter Negative Binomial Model of Low Injury Crashes on Metropolitan Small Urban SPF Class Roadway Segments

Dependent Log livel: Mestricte Thi squer Highlfrom McFadden : Estimation Lof.Cr.Al: Model est: Memple is	offinians Regil Variable hood function \$ log likelihood for 3 m.L./ job layel pactor, and to based on N = 1 = 294.8 AL paradi Dec 14. 2 pds and 4 innomial regress	JUSTI -987.419 -982.626 210.626 210.600 .000 .21360 275, 5 = 0/N = .9 2015, 10/04/138 2015, 10/04/138	28 68 00 07 10 08 27			
Justes!	Coefficient	Stendard Exect		finite.		nfidense exval
11	Conrandom parame	cere				
	-4.333ee***		-6.17	0000	44,80094	-1.56837
INNURT!	.18166***	1.08840	39,40	.000€	107941	29902
	12923+*				23472	02373
	15,7475+4			10002	,0005	22:0015
		returned the decade at the period of				
11	Heane for Eardon	BRIDGE CALL				
11	mens for Essain	-05744	14.04	.0000	.49254	-91071
LUCEU	.00014*** .47376***	-05744 -07600	8.26	.0000	49356	-01071
LUCAUT	.00614*** _47176*** Diagonal elemant	.05744 .07600 a of Coulesk	14.04 6.26 y matrix			
LUCAUT	.00014*** .47376***	.05744 .07600 a of Coulesk	14.04 6.26 y matrix			-42472
LUCEU LUADT LUCEU	.00614*** _47176*** Diagonal elemant	.05744 .01600 a of Chulesk .08082	14.04 6.26 y matrix 5.14	20000	(1618)	.82472
LUCEU LUADT LUCEU LUCEU	.80614*** .47276*** Diagonal element .06120***	.05744 .07600 # of Cholesk .08082 .02682	14.04 6.26 y matrix 8.19 2.62	.0000	(1618)	.85000 .35000 .12001
LICER DRADT LICER DRADT	.00414*** _47176*** Diagonal element _26122*** _06883***	.05744 .07620 a of Cholesk .08082 .02632 lements of 0	14.04 6.26 y mahris 3.14 2.62 holesky	.0000 .0000 .0000	(1618)	.85000 .35000
LUCADT LU	.80814*** .47276*** Diagonal element .26120*** .06885*** Welcu diagonal e	.05744 .07600 a of Cholesk .08083 .02632 lements of 0 .01244	14.04 6.26 y mahris 3.14 2.62 holesky -1.05	.0000 .0009 matrim .0481	.16181 .01728	.82472 .86080 .12041 00020

Implies covariance matrix of random parameters

LMIEN LHADT

INLES -6218-0; INLES -6218-05

Deplies standard deviations of random parameters

S.D.Beck) 1

1 .161205
21 .059119

Teplies correlation matrix of random parameters

Cor.Mat.| LHESS LEGAT

LMLES 1.00000 -.56700
LMLDT; -.86706 3.00000

Random Parameter Negative Binomial Model of Total Crashes on Large Urbanized Small Urbanized SPF Class Roadway Segments

Dependent Log likel: Restricts Chi square Significal HoFadden : Estimation Inf.Cr.AI Model est: Semple is	ibood function d log libelihood and [6 d.f.] boe level Feendo R-aquired o based on H = C = 200c.T Al imated: Dec 25. 2 pds enc :	TOTAL -1478.869003.75 - 15045.83 - 000 - 0007 - 0007 - 0007 - 0007 - 0007 - 0007 - 0007 - 0007 - 0007 - 0007 - 0007 - 0007 - 0007 - 0007 - 0007 - 0007 - 0007 - 0007 - 0007 - 0007 - 0007 - 0007 - 0007 - 0007 - 0007 - 0007 - 0007 - 0007 - 0007 - 0007 - 0007 - 0007 - 0007 - 0007 - 0007 - 0007 - 0007 - 0007 - 0007 - 0007 - 0007 - 0007 - 0007 - 0007 - 0007 - 0007 - 0007 - 0007 - 0007 - 0007 - 0007 - 0007 - 0007 - 0007 - 0007 - 0007 - 0007 - 0007 - 0007 - 0007 - 0007 - 0007 - 0007 - 0007 - 0007 - 0007 - 0007 - 0007 - 0007 - 0007 - 0007 - 0007 - 0007 - 0007 - 0007 - 0007 - 0007 - 0007 - 0007 - 0007 - 0007 - 0007 - 0007 - 0007 - 0007 - 0007 - 0007 - 0007 - 0007 - 0007 - 0007 - 0007 - 0007 - 0007 - 0007 - 0007 - 0007 - 0007 - 0007 - 0007 - 0007 - 0007 - 0007 - 0007 - 0007 - 0007 - 0007 - 0007 - 0007 - 0007 - 0007 - 0007 - 0007 - 0007 - 0007 - 0007 - 0007 - 0007 - 0007 - 0007 - 0007 - 0007 - 0007 - 0007 - 0007 - 0007 - 0007 - 0007 - 0007 - 0007 - 0007 - 0007 - 0007 - 0007 - 0007 - 0007 - 0007 - 0007 - 0007 - 0007 - 0007 - 0007 - 0007 - 0007 - 0007 - 0007 - 0007 - 0007 - 0007 - 0007 - 0007 - 0007 - 0007 - 0007 - 0007 - 0007 - 0007 - 0007 - 0007 - 0007 - 0007 - 0007 - 0007 - 0007 - 0007 - 0007 - 0007 - 0007 - 0007 - 0007 - 0007 - 0007 - 0007 - 0007 - 0007 - 0007 - 0007 - 0007 - 0007 - 0007 - 0007 - 0007 - 0007 - 0007 - 0007 - 0007 - 0007 - 0007 - 0007 - 0007 - 0007 - 0007 - 0007 - 0007 - 0007 - 0007 - 0007 - 0007 - 0007 - 0007 - 0007 - 0007 - 0007 - 0007 - 0007 - 0007 - 0007 - 0007 - 0007 - 0007 - 0007 - 0007 - 0007 - 0007 - 0007 - 0007 - 0007 - 0007 - 0007 - 0007 - 0007 - 0007 - 0007 - 0007 - 0007 - 0007 - 0007 - 0007 - 0007 - 0007 - 0007 - 0007 - 0007 - 0007 - 0007 - 0007 - 0007 - 0007 - 0007 - 0007 - 0007 - 0007 - 0007 - 0007 - 0007 - 0007 - 0007 - 0007 - 0007 - 0007 - 0007 - 0007 - 0007 - 0007 - 0007 - 0007 - 0007 - 0007 - 0007 - 0007 - 0007 - 0007 - 0007 - 0007 - 0007 - 0007 - 0007 - 0007 - 0007 - 0007 - 0007 - 0007 - 0007 - 0007 - 0007 - 0007 - 0007 - 0007 - 0007 - 0007 - 0007 - 0007 - 0007 - 0007 - 0007 - 0007 -	649 452 605 000 878 15 489 197				COVARIABLE MEDIA SINDER INTER LHART .5008E-05 SINDER INTER LHART .5008E-02 .5761E-05 LHIER278E-02 .2615E-02 .6656E-01 IMPLIED STANDARD MEDIATIONS OF VANCOUS PAYMETERS 8.D_Beta: 1
TOTALACCI	Doefficient	Stendard Error	1	frob.	95% Co	nfidence erval	1 -0161800
	Sunrandon parame		01,000	23322			THE CONTROL OF THE CO
	~6.54020***		+8.74	.0000	+6.18455	+6.49582	
MCVCRAIT	.33696D-04***	18400-04	4.79	,0000	_948X5D-04	.12497D-63	Implied correlation matrix of random parameters
11,170,00	1.31726***	97268	2.95	0000	- 95055	1.30365	
BHYNDING)	.01423***				-0060%	.02238	
H27500311	-5.71007***			.0091			
	Seans for render						COT.NOT.) LIBET SUBSCR LIGHT
LOSADTI	.81481***	-06126	10.08	10000		-97408	***************************************
SHIVE CR.	01646***			.0012	4.02639	-:00459	13027: 1.000005090946965
CHICKS	.01595***	.03366	27,30	.0000	.05300	.95495	SEMPCR:50989 1.0000050101
10	Diegonal element		my matrix				121201 - 44965 - 20101 1.00000
LHADEL	-01818++	-00911	3.00		.00088	.03408	
SEMPLE	01868***	-00419		.0001	.00566	-02450	
	-04996***		4.66		.02994	-97096	
	Balow diagonal e						
					4.01929	00049	
AME JOIL	00959**	-01609	-4.74	.0000	17468	06457	
11UL 2881	21825***	.01273	-17.22	.0000	24420	19430	
	Dispension paras						
Sugificant!		30758			1191152	2-11705	
Note: non	n.D-sm or D-sm , **, * wwo Fig	*> mainiply	by 10 %	-88.00	MEX.		

Random Parameter Negative Binomial Model of Property Damage Only Crashes on Large Urbanized Small Urbanized SPF Class Roadway Segments

Dependent Log likel Restricte Chi squar Rightfice HrFallen	efficients Degi variable thood function d log likelihood ed [3 d.f.] noc level Feemin F-squares o based on S =	mReg Model p -1996.003 : -5340.221 : 5567,436 .000 : .77316	50 17 19 13 13 90 20				### ##################################
Model est Sample 10 Regative	C - 2539.8 Al imated: Dec 26, 2 pds and 4 binomial regress	2015, 14:06: 28 individue con model	29 1#				Implied Flandard Seviations of random parameters 3.5 Sera) 1 1/ .01878 2/ .220678
		Standard Error		\$20b.	Ins	42761	250 D-70700B
	Menrandon parame						Implied strowlation matrix of rendom paremeters
SCYCKAH SENDOR LHKYT VICYS ENCONDING	.84439D-06*** 01777*** .84173*** 00047** .01622***	1,05286 ,19205-04 ,50566 ,08028 ,00025 ,00425 ,08426	4.40 -3.26 8.32 -2.36 3.78	.0000 .0000 .0000 .0000 .0000	*9.78188 .48834D-04 *.02882 .66411 +.00084 .00782 .18684	-5.15945 .12236D-03 00109 1.01048 00008 .02463 .89091	Coc.Mat./HCCGCCL1 LMIEH HCCGCCL1 1.00000 .21140 LMIEH, .23240 1,00000
BCVB0CSEL)	Heans for vandos		547.00		22.22		
	-9.56400***	2.51533	24.63		-14.49984	-1.62212	
		s of Cholesk					
DECEM					7,00414	-02996	
ENERS!	,01049***	.00492 .01296		.0000	-18009	.23089	
THE HEV	101379***	.01396 Slements of D .01623	16.47 holasky 3.27	,0000 matrix ,0011	.18809	.23089	

Random Parameter Negative Binomial Model of Possible Injury Crashes on Large Urbanized Small Urbanized SPF Class Roadway Segments

Deptsdens Log likel Restricts Chi squar Significa HcFadgen / Estimatio Inf.Dr.AT Bodel wat:	efficients Regs	######################################	0942 148 148 159 100 129 11 100 120 120				Toplied overlance metris of random parameters COPETIANCE METRIC MADE HOWERS METRIC M
F1350	Coefficient	Frendard Error	E	Frub.	99% Co 200	ofidence ervel	1) 1813715E-05 2) 0640948
	Noorandon parane						Implied correlation matrix of rendem pareneters
Congress)	-6.84214***		-5.35	10000	-9,34853	4.33718	
13(15)			25.00	.0000	.76650	.90569	
539(D9T)	-,05591***	01261	-3:11	.0019	-,06626	-,01488	3
BOFLING:		.09070	2.35	-0137	.03788	. 29294	Cox.blat.) HCVCRAH IHADT
1007/00/2012	-E. T0055++	2.29396	-2.21	.0244	-12,60660	27050	3
- 1	Means for random	paramaters					MCVCRAH 1.00000 +.02000
HOYCEAN:	+50016***	-20440-04	7-15	-0000		00019	LHADT:92289 1.00000
THEFT	.79790***	251868	6.22	.0000	,50529	97080	
	Diagonal element	a of Chilesi	ty matrix				
ROYCESUI)	.00031***	-22100-04	10.00		+00023	.00087	
	.02425***	00427	5.56	0000	.01662	73235	
LIGATE		A AMERICA AND A	CHALLESTON.	MATCH N			
1	Selov diagonal e						
1	Selow diagonal e			.0000	04819	24929	
ilin scvi		-0049E	-11,69			-,54929	

Random Parameter Negative Binomial Model of Evident Injury Crashes on Large Urbanized Small Urbanized SPF Class Roadway Segments

Kandon Loe Dependent	Efficients Hegs	nReg Mindel ET -38T.863	71				Coverience	matrix		of random parameters
Restricted	log likelihood		97					LHA	es re	MOLICE
Significan McFapden B Estimation Inf.Cr.Alc Mccal wsti Sample is Papative b	Seado 5-equated	.000: .26232; 856, R = . C/S = .8; 2015, 19:54:: IN Individual ind model	00 12 10 16 11				IMADI SEMPLICE Implied at 5.D_Seta)	.2041E. .001E. candard d	02 -12 02 -13 Meviation	105-01 a of random parameters
		Brannand		Prob-	95% Co	nfinence	31		29969	
	Coefficient			x 22+		styel				
	laterature and the second									of making companies
Constant	** Onrevent parese	2.21111	240,640	10000	-12,40101	W 45140	marries of	STEELERS CT. 0	or macrin	of rendum payameters
	.02015D-06**	13612D-04			119160-04					
INTER	26123444	_000E		+0000	,77678	.55169				
	.00011***	4199D-04		.0351	400003	-00019	Cox.Mat.		SHUDLTON	
	teans for random		72.5		130004	100018				
THANK			4.24	.0000	142999	1.15426	THEFT	1,00000	.01241	
SMAGETCR)	+,04540++	_02149		.0346	+.05753	00328	SOUNDELICK:			
	liagonal miesent									
EMADE	.05140***	-99894		10000	1-0380±	106778				
SHOOLTCR	.05175***		3.02		101811	.00539				
	Selow diagonal e									
LESS THAT	.69705***	.02068	4.62	.0000	.05611	-13760				
	ispersion paren	sher for Regi	in dist	eabutton						
		1.12984		15600	-,04041	4.42114				

Random Parameter Negative Binomial Model of Serious Injury Crashes on Large Urbanized Small Urbanized SPF Class Roadway Segments

	fficients Heim		W.T.			
Log likelt	yeriable hood function	-79,448	9.6			
Restricted	lng likelihood	-76,263	96			
Chi aguare	d [1 d.f.]	5,756	23			
Significan	d [1 d.f.] ot level seudo A-equazed	.016	12.6			
MoFadden F	seudo E-aquazed	109798	69			
Estimation	based on II +	254, H =	(6)			
Inf.Cr.AND	 355.9.33 	C/R = 13	16			
	Materi Dec 27,					
	2 pds and 4					
	inomial represe					
		Standard		Trob.	258 Co	enfidence
ままがな)	Coefficient	fires		11120	Int	erval.
120	onrandom parame	tens				
Constant	onrandom parame	1,35053	-2.57	,0102	-1,72923	-,21212
Constant	9785344	1,35053	-2.57	.0102	-1.72923	+,28242 10,08567
VCVLL: LULEN:	0.87987*** 0.87985***	1,78886 1,78886 ,17988	3.66	.0002 .0000	-1,72923 9,07847 ,63904	-,28242 10,08867 1,92064
VCVLL: LHLEN:	0.87987*** 0.87987*** .97985*** Wans for rendom	1.78886 1.78886 .17909 perameters	3.66 9.64	.0002	9.07847	10,08567
VCVLL: LHLEN:	0.87987*** 0.87985***	1.78886 1.78886 .17909 perameters	3.66 9.64	.0002	9.07847	10,08567
VCVLL: LHLEN: LHLEN: SHHDCR:	0.87987*** 0.87987*** .97985*** Wans for rendom	1,78886 1,78886 ,17888 perameters ,18076	3.66 9.66 -2.20	.0002 .0000	9.07347 .63906 04322	10,08567
Donateon WCVLL: DHEN: (N DHEDCR: (S SENDOR)	-,21033** 0.07967*** .07985*** Mens for rendom 20094** Cale parameters .30050**	.35083 1.78886 .17309 perameters .13076 for dists.	-2,57 3,66 9,64 -2,21 of rendo 2,56	.0002 .0000 .0271 m parama .0109	9,07847 ,61904 -,94222 term ,04403	10,08867 5,02064 -,03266 -93297
Donateon WCVLL: DHEN: (N DHEDCR: (S SENDOR)	-,21033** 0.07967*** .07985*** Mens for rendom 20094** Cale parameters .30050**	.35083 1.78886 .17309 perameters .13076 for dists.	-2,57 3,66 9,64 -2,21 of rendo 2,56	.0002 .0000 .0271 m parama .0109	9,07847 ,61904 -,94222 term ,04403	10,08867 5,02064 -,03264 -93297
Donateon WCVLL: DHEN: (N DHEDCR: (S SENDOR)	0.07003** 0.07003*** .07003*** eans for rendom 20004** cale paramaters	.35083 1.78886 .17309 perameters .13076 for dists.	-2,57 3,66 9,64 -2,21 of rendo 2,56	.0002 .0000 .0271 m parama .0109	9,07847 ,61904 -,94222 term ,04403	10,08867 5,02064 -,03266 -93297
MOVILL LHIZM SHEDCE: SHEDCE: SCHIFFER	-,97053-+ 6.87985-+- ABRE FOR IMODIO -,22694-+ Cale parameters ,35080 Leptreion param 5.37149-	.35083 1.78086 .27509 permeters .15076 for dists. .07371 etes for Neg 3.79111	-2.57 3.68 0.64 -2.31 of rendo 2.56 (\$in user 1.90	.0002 .0000 .0271 # parama .0109 YIBUTION .0543	9.07847 .63006 54322 term .04403 09898	10,08867 5,02064 -,03266 -93297
MOVILL LHIZM SHEDCE: SHEDCE: SCHIFFER	-,21033** 0.07967*** .07985*** Mens for rendom 20094** Cale parameters .30050**	.35083 1.78086 .27509 permeters .15076 for dists. .07371 etes for Neg 3.79111	-2.57 3.68 0.64 -2.31 of rendo 2.56 (\$in user 1.90	.0002 .0000 .0271 # parama .0109 YIBUTION .0543	9.07847 .63006 54322 term .04403 09898	10,08867 5,02064 -,03266 -93297

Random Parameter Negative Binomial Model of High Injury Crashes on Large Urbanized Small Urbanized SPF Class Roadway Segments

Dependent		MILL					Covaziance matrix
	hood function ing limelihood						SCYCRAN LWADT
Ont equare	4 [3 4.4.]	416.344	90				
Significac	ce lavel Wands R-squared	.0000					NCVCRAM .1512E-07
	based on N =	956. H =					THERE
	- 984.9.47						Implied standard deviations of random parameters
	mated: Jan 12,						
	I pds and 4 increal regress		1.8				S.D Setal 1

		Branderd:		Frob.		nEidende.	2) .0418198
	Coefficient	Estat		11352+		ALVAL	
	borsodon pasame						Implied correlation matrix of random parameters
	-7,48927***			.0001	-11,34808		
LOCES!	.07863***	-04494	19.55		.19041	.04679	
ACATTRE !	1-24903*	.00000		-0077	-,56161 -,12942	2,62745	Cog. Het. BOVORAN IMADT
	leans for sandon		2100.	1000	1100716	8194-12	CONTRACT DATABLE SIMUL
BOYCKUIT:	-00011***	-2487D-04	4.25	-0000	+00004	.00016	MCVCRAN(1.0000086024
LIGADT (114417			142394	1106749	LHADT) - 85324 I.00000
	Legonal element				77272		
DOVCHAR!	101747***	-2713D=04 -00567		-0.03T	100008	,00015 ,02888	
	wlow disponal a				133494	170013	
	-,05929***			.0000	N.07302	- F-95557	
	ispersion param						
11	6.49165	6.67155		.0731	-4.55421	44 54751	

Random Parameter Negative Binomial Model of Just Injury Crashes on Large Urbanized Small Urbanized SPF Class Roadway Segments

Random Co- Dependent Log likeli Rastrotte Chi agiari Righifion NoFedden : Estimation Inf.Cr.Adi Nodel est Sample is Begatire :	thood function of ing libelihood for [3 d.f.] to level for [3 d.f.] to level from 3 = 1 hased on 3 = 1023.2 at imated 3an 20, 2 pds and to innomial regress	######################################	### 91 72 57 66 14 10 81 17				Coverience metrix LHADT SENDOR LHADT .75168-03 SENDOR .2016E-03 ,1468E-02 Emploed standard deviations of random parameters S.D_Setel 1
JUSTING		Freedard Error	1	Frob-	pay Co	ofidence	21 .027201 21 .022201
Constant) SCYCRAII SCFLISC LICEN	-89026D-04*** -26810**	1.51941 .21910-04 .11762 .24463	-2.90 3.25 2.26 18.71	7500. 1000. 9550. 0000.	-1,38807 ,420785-04 ,08617 ,74788	-1.43200 .12737D-03 .49622 .92246	Implied correlation matrix of random parameters Gor.Nat. 1HADT SHEDOR
EMMOT:	.43632*** -,62642*** Diagrnal element .02705***	.23565 .00968	-2.65 y matria 6.17	.0012 .0049 .0000	,17197 04912 .01452 .02335	.01067 00779 .02077	EMADT; 1.00000 .21263 SHWDCR: .27269 1.00000
15HF_LSR(Selow diagonal a .01042 Diagnosion param .20167***	,00825	1.67 Bin dist	2048	-,00667 1 .18504	.02681	
ScalParm/ Note: non Note: ***	dispension param	ecer for Neg .04929 *> sultiply nificance at	8in dist 6:36 by 10 to 18, 18,	-9W 07	1,18504 +88. +81.	.36867	

Random Parameter Negative Binomial Model of Low Injury Crashes on Large Urbanized Small Urbanized SPF Class Roadway Segments

							- Implied coverience matrix of random parameters
Rendom Coe	Efficients Negf	nReg Model					
Dependent		1011					Coverience metrie
	thred function	-1372,6506					
	log likelinood						INDICT TODAYS
	d (3 d.f.)	11061,7574					
Significan		0000					INACT .3533E-01 FOTIZOE .6126E-01 .7682E-01
	raeudo K-aquares Dased on N =						TOTIADE , 8129E-01 , 7982E-01
	= 2772.7 A2						Section section design and the section of the secti
	mared: Dec 17,						lupiled standard deviations of random parameters
	2 pds and 4						3.0 Sets) 1
	inumial regress						
							11 ,187909
		Standard		Prob.	358 Co	nfidence	31 ,376256
LOIMFI	Doefficient	fores	2	74132*		Isvas	

	lineunden parame						Implied convelation matrix of random parameters
Constant	-4.59533+++	1.02557		+0000		+2.57575	
ACAL'T	-2.02394*	1.10942		-0181	-4.19817	-72000	
SHADOR	+.01471+**	100535		10065	-,02526	00418	
1391,639	381555***	0.5476	24,15	.0000	77998	90949	Cor.Man. LHADT TOTIAMS
	.83097D-04***	+17610-04	6.75		-48792R-04	-11743D-08	
709883081	.22345***	,05454	3:43		.11140	,22111	IMADT 1.00000 _90730
BC/0003751	-5.56520***	7,55857	+5,37	10001	-13.91395	~3,57633	TOTLAME: ,98728 1,00000
	Stene for sendom		1		2223		
THEORY	-57620+++			.0000	-1870€	7.6935	
TOTLANE	.18360+**	04535		10001	.09492	.27268	
	lagonal element						
LHADE	.18795***	-02121		+0000	114639	.22952	
TOTLANG	406393***	100477		10000	100045	-01/20	
	Wilder Mannach W	lements of Ci			128300	77,232	
19				.0000	.19320	-3522E	
LTOT_LHA	27274***	.04050					
LTOT_INAT	.27274*** Dispersion param	ates for Negl	fish dies	ribunio			
ITOT_INA; ITOT_INA; ID Scalfern;	27274***	ster for Negl	Sin dies 8.29	,0000	1-60254	2.55144	

Random Parameter Negative Binomial Model of Total Crashes on Small Urban Metropolitan SPF Class Roadway Segments

Dependent Log likeli Restricted Chi sgiare Significan Nofedoon P Estimation Inf.Cr.AJC Model esti Mample 1s	hood function log likelihood d [1 d.f.] om level beudn R-squared	TOTALA -852.639 -2528.829 3695.968 .000 .75008 850. H = 2.5 2018. 25:41: 78 individue	55 56 60 00 42 12 27				DHADT 199 TOTIANE 186	DMADT TOTIAMS PEG-03 TOTICAL STORES I deviation of function parameters 1
TOTALACC	Coeffician	Standard Error		Fxcb. s >1*	91% Co	ofidecoe erval	1) 2)	.0623341 .0618670
	DENABLICATION PAYAGE	5698						ation matrix of random parameters
Constant	5.25411+**	1,20775		10000	2,91697	7.61116		
THEST	2424244	07603		00000	170247	1,00150		
BRNDCHI	-,55617	.02539		-1442	~,08002	(01168		
VCVPTORA)	-+503559++	100199	-2.45	-0987	+100778	00031	Soc.Nat.; EX	ADE IDITANE
HC1/00/382	00401**			.0157	+,00726	00074		
SEMBLI	- 07104+44	,00006	-3.15	0000	11156	-,03073	IMBDI 1.00	
(10	want for random	parameters					TOTIANE: . 90	1,90000
THATT	-,34343***	.11809	-2.16	-0031	55055	+,1278*		
TOTIANE)	.85559***	.04888	8-90	10001	-16ST6	.63048		
12	dagonal element	s of Cholesk	g matrix					
IMADT	.06233**	102467	2.55	.0100	-91427	.11030		
TOTLARE	.03953**	,01662		.0401	-00158	.08760		
	alow diagonal a							
ITOT LEAS		.05962		.2146	04BDL	.10147		
	ispersion param							
				-2000	52488	286679		
	.65681***	1.08 72 5						

Random Parameter Negative Binomial Model of Property Damage Only Crashes on Small Urban Metropolitan SPF Class Roadway Segments

Dependent Log likel Restricts Chi equar	efficients Neps variable thood function d log likelihood ed [3 d.f.] noe level	nRes Model # -560.495 -1480,220 1855.565	90 09 36				COVARIANCE MATER COVARIANCE MATER LHADT SHNDCE LHADT (64)52-50
MoFedden	Pesudo R-squared o based on R =	.62341					MDMDCR1016E-02 .2440E-02
Inf. Cr. Al	C = 1146.8 AI	C/H = 2.0	0.0				Implied standard deviations of random parameters
Sample is Negative	immted: Jun 25, 2 pds and 2 pinomial regress	75 individua	l#				5,0_5ete) 1
PDC	Coefficient	Standard Srigs	10	Prob.	35% Co 325	nfidence Erval	2 0496902
-11111111111111	Norrandon parane			CONTRACT.	1. P. S. S. S. V		Implied correlation matrix of random parameters
Constanti	5,41397***	1.63619	3.81	10001	7,65549	8.25254	용하게 경기로 보다 이 가능한 것이 있는 경기로 있는 것이 되었습니다. 그런 사용하게 되었습니다. 하는 것이 되었습니다.
LELEN	.94559***	.05401			.76073	1.11005	
TOTLANE	-27122***	-09318	2.25	,003e	408870	45375	
LIESBRYDH	00874++	-05146	+3107	.0384	00728	00020	Cox.Wat.: LNADY BHWDCR
310/007	05095***	02247	-3.63	.0003	12100	01691	
VOVEVEA	-015594	-00752	1.24	10023	00174	-02895	LHADT: 1.00000 +:79535
CVFTURA			-2.25	10345	03185		SHMDCR: 79993 1.30200
	Means for random						
LHADT	35723+++		-2.66	.0077	+.67217	10226	
SHIPDOR	06161++	-03944	+2.17	.0202	11737	00109	
- 0	Disgral element	e of Cholesk	y matrix				
LISADT	-02661***	-00626	0.75	10002	002221	35991	
SHIPD CR.	-03024*	91688	1.98	-0976	00219	-04267	
10.00	Below diaponal e	lapance of C	holesky	DATELE			
SCHOOL LODAY	03365**	.01659	-2.15	10325	01611	00325	
	Dispersion param	eter for Neg	Bin dies	ribution.			
				10000	48379	.81992	

Random Parameter Negative Binomial Model of Possible Injury Crashes on Small Urban Metropolitan SPF Class Roadway Segments

Rantom Coefficients Neighbles Note: Dependent variable FIH7 Dog Likelihood functum - 141.97371 Fortrioted log likelihood +07.2008 Chi squared N.f.) \$70.7404 Significants lawel						Covariance matrix LINIAN VOVETORA LINIAN SESSE-02 VOVETORA -1797E-04 .1504E-04 Implied standard deviations of random parameters 2.D_Bets: 1	
92001	Coefficient	Standard Error		FE00- (#)52*	964 Co Int	nfidence erral	2: .0098125
	Toniandom parame		*******				Implied ourselation matrix of random parameters
COMPTANT: LIGARY: BURGOT: VCVL; VCVSVCA: VCVSVCA: BCVGXSEL:	3,87941-4 -,07480 -,05055- ,16915 -994,881 -,09790- -,00747	1,39167 .02154 .03018 .07795 412.3656 .01843 .00144	-8.41 -1.46 2.45 -2.11 -1.92	.0104 .0005 .0470 .0352 .0160 .0548 .0024	.64000 11702 10914 .03627 -1204.053 07686 01229	6,31880 -,03188 .00805 .58192 -185,679 .00076 -,00168	CON. Hes.: LINES VOYPINGA INLEN] 1.0000030107 VOYPINGA;30107 1.00000
13	Seans for pandop	parameters					
THEED!	.bagaa*** ineze** Diagnosi element	,1156Z ,0710S a of Choleak	+2.17		,72258 -,29363	1,17830	
THERM		.04379		.0214	00920	115537	
VCVFTGRA:	.00370++ Selow Sladonal e	,00147		.0118	.,00062	,00636	
		.00165		-5277	+100480	1002461	
SMCW-THE.E.		ener for Ner					
MGA_FRE	Dispersion Garas						

Random Parameter Negative Binomial Model of Evident Injury Crashes on Small Urban Metropolitan SPF Class Roadway Segments

og likel Restricte Di dyser Rightfiss Erfelden Retimetion Inf. Gr.AI Rodel est Regative	officients Hegh ratiable shood function d log likelihood 60 [1 d.f.] noe level Freedo R.squared n bases on N = C = 200.3 az smeted Sun 21. 2 pde and 2 binimial regress	-130.150 -167.537 -64.574 .000 .10334 580, H = C/H = .5 2014, 19:591 76 individual	88 87 00 00 00 00 00 00 00			
		Standard.		Fron.	959.00	ofigence
EVIL	Coefficient	Error -	1	(4)34+	Int	HETTE
	Monrandon parame	tars				
	Monrandom parame		1.04	.0415	.20588	10.21454
dinsbant)	5.21021**	2,55325			,20588 ,73949	10.21454
linstant)	5.21021** 1,17942***	2.55325	5.25	.0000	73919	1,61996
LHLEN: TOTLAME:	5.21021** 1,17942*** .81322*	2,55325 .02466 .17118	1.93	.0000	.73949 02916	1,61996
INCENT INCENT INTLANT: INNOBI	5.21021** 1,17942*** .81323* 18060***	2.55325	8.25 1.93 -2.93	.0000	.72949 02919 23411	1,61996 .64763 04708
DUNATURE LICENT TOTLANE: SHEDET: COVETORA:	5.21021** 1.17942*** .81322* 18060*** 03231***	2.55328 .02448 .17118 .35261 .01118	6.25 1.93 -2.95 -2.99	.0000 .0691 .0046 .0029	.72949 02918 23411 05422	1,61996 .64763 64708 01040
INLEH INLEH INTAHE INMONT CVFIGAA VCVVFIA	5.21021** 1.17942*** .81322* 18060*** 03231***	2,55328 ,22498 ,17118 ,35261 ,01118 ,00929	6.25 1.93 -2.95 -2.99	.0000 .0491 .004#	.72949 02919 23411	1,61996 .64763 04708
DURSTANT INCENT TOTAME: SHMDRT: FOVETORAL MONVEIA	5.21021** 1.17942** .81322* 18060*** 03231*** .02442***	2,55325 .02448 .17118 .35261 .01118 .00929 parameters	5.25 1.93 -2.95 -2.99 2.49	.0000 .0691 .0046 .0029	.72949 02918 23411 05422	1.61996 .66763 04708 01040 .04262
CONSTSTANT LINEST TOTLAME: SOMEONI COVETONA: VCVVFIA: LINADO:	5.21021** 1,17942** .81322*18060***03231*** .02442*** Reans for bandom17243***	2,55328 .02448 .17118 .55261 .01118 .00929 parameters .00302	1.93 -2.95 -2.95 -2.95 2.49	.0000 .0691 .0044 .0029 .0029	.72949 02918 25411 05422 .00622	1.61996 .64768 04708 01040 .04262
DIRECTOR OF THE PROPERTY OF T	5.21021** 1.17942*** .11302* -12040*** -03231*** .02442*** Reans for imnos -17243*** Scale parameters	2,55328 .22448 .17118 .05261 .01118 .00529 parameters .05300 for dists.	5.25 1.93 -2.95 -2.95 2.49 -3.26 of rance	.0000 .0681 .0044 .0029 .0029 .0029	.73949 03368 23461 05422 .00622 27654	1,61995 .64763 04705 01040 .04263 06872
INLER INCER FOTLAME SUMPET CVFTGRA VCVVFTR LHADT	5.21021** 1,17942** .81322*18060***03231*** .02442*** Reans for bandom17243***	2,55328 .2248 .17118 .05261 .01118 .00929 parameters .03302 for Hists .01563	5.25 1.93 -2.95 -2.95 2.49 -3.26 of rance 3.07	.0000 .0681 .0048 .0029 .0029 .0029 .0011 m paramet	.72949 02918 25411 05422 .00622	1.61996 .66763 04708 01040 .04262

Random Parameter Negative Binomial Model of High Injury Crashes on Small Urban Metropolitan SPF Class Roadway Segments

ependent og likeli estglosed hi egiare lgmifican ofadden 7 etimetion mf.Cr.alt odel eatl ample is legative h	Efficients Beginnership April Service April	#EII -222,907 1 -243,849 103,008 103,008 103,008 103,008 103,008 103,008 103,008 103,008 103,008 103,008 103,008 103,008 103,008 103,008 103,008 103,008 103,008 103,008 103,008 103,008 103,008 103,008 103,008 103,008 103,008 103,008 103,008 103,008 103,008 103,008 103,008 103,008 103,008 103,008 103,008 103,008 103,008 103,008 103,008 103,008 103,008 103,008 103,008 103,008 103,008 103,008 103,008 103,008 103,008 103,008 103,008 103,008 103,008 103,008 103,008 103,008 103,008 103,008 103,008 103,008 103,008 103,008 103,008 103,008 103,008 103,008 103,008 103,008 103,008 103,008 103,008 103,008 103,008 103,008 103,008 103,008 103,008 103,008 103,008 103,008 103,008 103,008 103,008 103,008 103,008 103,008 103,008 103,008 103,008 103,008 103,008 103,008 103,008 103,008 103,008 103,008 103,008 103,008 103,008 103,008 103,008 103,008 103,008 103,008 103,008 103,008 103,008 103,008 103,008 103,008 103,008 103,008 103,008 103,008 103,008 103,008 103,008 103,008 103,008 103,008 103,008 103,008 103,008 103,008 103,008 103,008 103,008 103,008 103,008 103,008 103,008 103,008 103,008 103,008 103,008 103,008 103,008 103,008 103,008 103,008 103,008 103,008 103,008 103,008 103,008 103,008 103,008 103,008 103,008 103,008 103,008 103,008 103,008 103,008 103,008 103,008 103,008 103,008 103,008 103,008 103,008 103,008 103,008 103,008 103,008 103,008 103,008 103,008 103,008 103,008 103,008 103,008 103,008 103,008 103,008 103,008 103,008 103,008 103,008 103,008 103,008 103,008 103,008 103,008 103,008 103,008 103,008 103,008 103,008 103,008 103,008 103,008 103,008 103,008 103,008 103,008 103,008 103,008 103,008 103,008 103,008 103,008 103,008 103,008 103,008 103,008 103,008 103,008 103,008 103,008 103,008 103,008 103,008 103,008 103,008 103,008 103,008 103,008 103,008 103,008 103,008 103,008 103,008 103,008 103,008 103,008 103,008 103,008 103,008 103,008 103,008 103,008 103,008 103,008 103,008 103,008 103,008 103,008 103,008 103,008 103,008 103,008 103,008 103,008 103,008 103,008 103,008 103,008 103,008 103,008 103,008 103,008 103,0	100 102 100 100 10 10 10 10 10			
1(11)(2)	Coefficient	Standard Error		Prick. (2)52+		nfidence erval
	Convendos person	sters.				
	4.41585*	2.58904	2.46	.0016	18479	9.11661
LHADT	-, 46460*	.24814	-1.91	.5540	94118	.05199
TOTLANE)	.25055**	.01000	2.51	.0118	.04500	. 53134
VCVPTURA:		.00938	-2.13	.0282	02000	00220
VCVVEIA:	102849*	100007	1.92	-0554	~, D0088	+03124
NCVMOCREC	-,00899	,00269	-1.86	-0496	-,00921	.00134
SHIDLY	+.51402**			0487	-3.03500	00001
	many for sandor	. parameters				
11.00			W 1000	canas	180818	1,00222
LIFLED!	1.07018***	.18370				
DREED	1.07018*** cale payameters					
DREED	1.0T0le*** Cale payameters		of seads	m parame	bexe	.20703
THERM	1.0T0le*** Cale payameters	for Hists. .04571 merer for Dep	of reads 3.18 Sta Stat	m perene .cost	.02564	,20783

Random Parameter Negative Binomial Model of Just Injury Crashes on Small Urban Metropolitan SPF Class Roadway Segments

Dependent Log livein Restricted Thi square Significan Rofraden & Estimation Inf.Cr.AIC Bodel esti Sample 18	officients Begin variable hood function s log likelihood and [1 s.f.] precide fivedwisted based on H = z = ele.2 al lmaned: Jun 25, 2 pds And 2 simmutal regress	JUST: -208.12: -835.82: 250.00: .8782: 880.8 = E/H = 2016, 20:58	050 612 639 000 977 6 179			
JUSTINA	Coefficient	Standard Store		Fools.		mfidence erval
		200000000000000000000000000000000000000	.,,,,,,,,,,			
	innounder parame					
Constant)	6.05963*	3.22494				12.41039
LHADT!	6.05963+	3,22494	-2.30	10172	+.75762	07696
LHADT!	6.05963* -,63538** -60632*	3,22494 -18176 -82000	1,88	.0172 .0986	75942 02186	1,28241
LHADT (MOFIDED (SUMDLY	6.01963* -,61535** -61532* -,01076**	3,22494 -15176 -32000 -03408	-2.55 1.89 -2.29	.0172 .0988 .0920	75962 02196 16616	07696 1.28241 01127
Constant) LHADT(MOFIDED(SINDLT)	6.05963* -,63538** -60632*	3,22494 -15176 -32000 -03408	-2.55 1.89 -2.29	.0172 .0988 .0920	75942 02186	07696 1.28241 01127
CONSTANT: LHADT: HGFLDED: SINDLT: HCVNHAEL:	6.05962* 6552* -6052* 07676** 07486**	3.22494 -18176 -82000 -03498 -08792	-2.50 1.88 -2.29 -1.96	.0172 .0884 .0020 .0489	75962 02186 16616 1606	07694 1.28941 01127 0008
CONSTANT LHADT: MOFIDED: SHNDLT: MCVNKSEL: [3	6.05963+ 65532+ 65522+ 07676++ 07456++ Heans for random 1.20908+++	3.22494 -15178 -32000 -03408 -03192 -parameters -19497	-2.50 1.89 -2.29 -1.94 6.22	.0172 .0584 .0020 .0489	78942 02194 14614 14060	07694 1.28941 01127 0008
Constant LHADT HOFLDED SHNDLT HOWOCAEL (3 LHADES)	6.05962* 6552* -6052* 07676** 07486**	3.22494 -15178 -32000 -03408 -03192 -parameters -19497	-2.50 1.89 -2.29 -1.94 6.22	.0172 .0584 .0020 .0489	78942 02194 14614 14060	07694 1.28941 01127 0008
Constant LHADT HOFIDED SHNDLT HOWNDEL LHLEN	6.05063* 05032* -00632* 07636* 07486** Heans for random 1.20204** York parameters .20204**	3.23494 .18178 .82000 .03438 .08792 parameters for disto- .04932	-2.38 1.89 -2.29 -1.96 8.22 of rendo	.0172 .0888 .0020 .0489 .0000 m geramet .0000	78942 02194 14614 14060 .82788	01696 1.28241 01121 00008
Constant LHADT HOFIDED SHNDLT HOWNDEL LHLEN	6.05963* 65525** -65525* 07625* 07456** Heans for random 1.20904**-	2.22494 .18176 .32080 .03438 .03792 parameters .19447 for siste- .04802 eter for Se:	-2.30 1.89 -2.29 -1.96 6.22 of rendo 3.64 gBun dist	.0172 .0888 .0020 .0489 .0000 m geramet .0000 ributiom	-,78941 -,02184 -,14614 -,14066 -,82766 (829	01696 1.28241 01121 00008

Random Parameter Negative Binomial Model of Low Injury Crashes on Small Urban Metropolitan SPF Class Roadway Segments

Log livel: Bestricted Chi equare Significer No.Faiden E Estimation Inf. Cr. All No.del esti Sample is	Wariable incod function incod function incode function incode inc	-608,408 -1818,678 2426,339 .000 .66104 850, K = 2/8 = 2.2 2018, 31:06:	17 04 74 00 60 12 48 48			
		Standard Excor	1	181527	200	12181
10	funrantion parame 5.00343***	tare .		71 1882 1		
Constant	3,00343***	1,32512	9./27	10000	3.06636	0.27233
THANT	36T86T4F	V\$39427	一直 7.7%	19061	63102 .13009 14728	-,10470
MORTDEC	.55996*** 10854***	122962	3.02	0026	13029	164512
SHADLT	10854***	0.01000	-5.48	.6000	14724	07088
VCVFTSAB	-+00393+	>100188	-2.35	10646	00882	100032
0501	13026444	106500	21,03	10000	.10250	.35773
- 1	teans for sansom	parameters				
LHLEN	teans for sandom	.07702	12,17	.0000	.78660	1.08633
HCVHX3EL	00649***	100239	+2.72	10033	-101108	~.00180
21	Maponal element	e of Cholesk	y matrix			
HEIRI	,000454**	.02647	2.42	10000	V2355E	114233
MCVMXSEL.	100078447	100108	-2.41	19000	100376	100550
- 1	elov diagonal e	Lesente bf C	linkesky.	matrix.		
DREV DRE	~.02345	101608	-1,47	.1417	05518	,00789
- 1000000000000000000000000000000000000	Cispersion perse .Telebers	ster for Dep	Sin diet	gabutaon		
DOMIFACE:	.79296***	120762	7.01	-0000	154300	.56688

Signaficance at 14, 44, 104 levels

Aandom Coefficiente PegBsBeg Hodel

Implied ovverishre matrix of random parameters

LMLES MCCMOSEL

LMLES MCCMOSEL

LMLES MCCMOSEL

LMCS MCCMOSEL

Implied standard deviations of random parameters

5.0_State) 1

1. .0000440
21 .00054005

Implied correlation matrix of random parameters

Cor.Mat.; LMLES MCCMOSEL

LMLESH 1.00000 *.20006

MCCMOSSEL; -.20086 1.00000

Random Parameter Negative Binomial Model of Total Crashes on Metropolitan Small Urbanized SPF Class Roadway Segments

LEADT SCYL
EMADE -1479E-02 HCVL -0022E-02 -4964E-07
Implied statified deviations of random parameters
3,D_2eta) 1
1: .2400010 2: .2220005-00
Implied correlation matrix of pandum parameters
Cox.Hat.) INDE HOYL
2007/10/7/1 WOMEN TO THE REAL PROPERTY OF THE PROPERTY OF THE PROPERTY O
LHEADT: 1.00000 .00005
MCVC1 ,99666 1,00000

Random Parameter Negative Binomial Model of Property Damage Only Crashes on Metropolitan Small Urbanized SPF Class Roadway Segments

Dependent Log likel: Pastricte: Chi equari Highifica Highifica Highifica Highifica Inf. Gr. All Hoppin is Depairs is Depairs is	variable thood function to log likelihood to [3 d.f.] the lavel French R-squared these on N = 0 = 1533.8 Al thates Jun 25, 2 pde and 2 thomis! regress	-3961.201 6888.100 .000 .01068 476, E = C/W = 3/Z 2016, Z1168: 96 individua ion model	96 85 00 16 13 22 35				DMADIT DENGLT Implied at: 6.D_Bets:	IHADT SWELT .T713E-01 .T713E-02 .SSICE-02 .415EE-03 sociati deviations of random parameters
¥50	Coefficient	Stendard Error		From-	354 Do	nfidence merval	2)	.0646575
	Concending person							rrelation metria of random parameters
	-5.56663***		-3.21	+0000	+6,28068	-1:01101		
181581	05559***	.08211	16.00	.0000	.72240	.35741		
VICK1	-,0000144	V00048	-2.13	.0301	-,00196	-,00008		
SOFLERC:	.20539***	111545	2-24	-0908	.16912	+61167	Cor.Nat.1	LHADT SHRELT
COOCHERS	02950***	.01022	-2.67	.0041	04952	00927	*******	
VCVSTORS:	00336**	.00131	-2.65	-0107	00590	+:00071	THEOTY	1,0000098897
HCVCSAM:		-9950D-04	-2.55	+0095	+:0001#	+,00002	SHREET!	.98897 1.00000
13	Mans for randor	parameters						
INADT	67549***	.13327	5.07	.0000	41428	35665		
TUDINSE	06803***	-01770	-5.87	.0002	09871	00032		
70000	Cimponal alemant	s of Cholers	v matrix					
		,00871			199099	-16827		
				0.000	.00877	.20643		
		104574	2040					
LHACT	.15763** Melow diagonal *							
ERRECT	.15763**	Leman/ts of C	holasky	matria	-,00116	04303		
LHACT SHREET 1299 1304	.15763** * Lancgeit woled	Lemants of C	holasky -6.00	00000		04203		

Random Parameter Negative Binomial Model of Possible Injury Crashes on Metropolitan Small Urbanized SPF Class Roadway Segments

Dependent Log likeli Mestristes	hood function log likelihood	-476,278 -1246,420	71 09				Implied cov	DATES SENDET
Significat NoTedden I	ed [3 5.f.] toe level Treudo X-rqueced L bared on S =	1070.294 .000 .02362 474. K =	00 03					.5461E-02 .5071E-02 .5103E-02
Inf.Cr.Ald							Implied sta	ndard deviations of random parameters
Sample is	mated) Jun 25, I pds and 2 commist regress	36 individua					S.D_Seta)	
							31	.0309996
-0.1.4		Standard		Frenk.		nfidence	21	.0554952
	Enefficient	Error		12/25-		srval		
	Innyandos parane							relation matrix of random imposetors
Constant		3,43048	+4.07	10000	-10.32761	-1.91464	200,000,000	Telegram interes at Tallote Ballonius
CHERRY	.95855***	107461	12.55	10000	81176	1.10424		
BCVFTTYA	00089	+00209		.6722	-,00499	_00022		
BOSTDEC	. 42223***	+2.4249	2.55	10044	,13180	171386	COX-Mat.	INADT SHEEPT
BRYMDDEC	04114***	100328	+3.10	.0019	+-06711	+.01517		******
VCVFTSAB:	00593***	.00191	-2.06	10012	-,00969	00210	IMADI 1	.00000 -493666
2593	201135	+0153%	.74	-4220	01871	-04I4E	SENDAT -	-99498 1.00000
BCV0003E2.1	00361	+00982	177	-3933	+100328	-01110		
BOYL!	-,01046**	+00023	-2-98	12478	-,00098	00001		
	mens for raction							
LHADT	.93906***	17616		10008	+59579	1.25454		
SHOUDEL	-,09490+++	.02403	-3.12		14355	04624		
	dagonal element							
LHART	.08900***	+00869		.0000	.01156	_prebe		
SHIPPLE	102983	101224		17029	-,00454	-04888		
	lelov disponal s							
LEMM LIMAT	-,05204***	,01355	+3.84		-,07561	D7256E		
	Maperaton param	27000 Jep		.0050	.06312	1.92114		
	1.38227***							

Random Parameter Negative Binomial Model of Evident Injury Crashes on Metropolitan Small Urbanized SPF Class Roadway Segments

Log likeli Restricted Chi square Significan NoFadden P Estipation Inf.Cr.AIC Nodal esti Sample is Regative b	reudo B-equared based on B =	-178.882 -221.761 35.527 .000 .21609 476, K = .7 30187 3018 , 15:41; 35 individual ion wodel	48 37 43 00 09 13 91 45				THIEN BOXDES LHEEK (19925-01 BHODES LHEEK (19925-01 11948-02 Explica standard deviations of random parameters 5.2_Bets) 1
tvz	Coefficient	Stendard Error		Frob.	954 Zo Zot	ofidence erval	1: .114084 21 .0506899
	Contandos parane						Implied correlation matrix of random parameters
Constant	-5.46043**	2,72050	-2.41	0487	-10,75266	12520	
IMADT	.62522++	.20027	2.18	-0234	.06422	1.19422	
	20741***	20672	-2.55	-0040	+,51636	09527	
	37435***		2,88	-0047	,11804	,89366	COS.MAD. (INCEN AMMENT
	05594***			-0032	09017	D187I	
HCAT.	00032**	100016	-2.00	-Q457	00063	00001	INIES 1,00000 -33630
	sans for randos						SHMIDE: +5365E I-D0000
THERM	(967)9***	122,029	8,46		+7.85.94	3127804	
		.02454		.0072	16029	-,02490	
	Laponal element						
LHLEH	.11605***			.0095	.02631	20384	
SMIDEL	V03171++	751483		.0325	100265	26076	
	elow Hisponsi e						
	.01138	.01023		-2612	00672	100137	
		eter for Sec			13129		
Doniform	1,36966***	117166	3.04			,60506	

Random Parameter Negative Binomial Model of High Injury Crashes on Metropolitan Small Urbanized SPF Class Roadway Segments

Dependent Log likel: Smatricom Chi square Significer (nYadden)	i Ing Itkelihood ed [5 d.f.] not level Feendo R-Aquayed	#11 -1+0,939 -150,109 234,360 .000 .82721	97 93 70 00 98				LHLEH	.142	CIR CHILEN SE-01	ENOUT .1187E-02	
Inf.Cr.Ald Model est: Sample is	t based on H = : = \$57.9 MJ imaged: Jim 26, I pds end I	D/N = 1.0 2016, 15:55: 35 individua	47 20				S.D Betal			tions of random parameters	
82183	Coefficient	Standard Error		Frob.	95% Co Int	nfidence erral	1		.11942	6	
	FORESE MODERATED						Implied on	irela	tion ma	tris of random parameters	
	+五·\$\$何75***			0000E							
LHADT		.00425		.0021							
	15520**	97633		9137	F:33780		20000000000				
TOTLANE			2.80	-0128	+05824	×17958	CON-HELLI				
RWYWEDEC	05004***			.0018	+,05498		********				
	+,000054+	100024		-0155		00011	23(1.5)(
SCACETAL!	100019		1.30	-0048	<. D0000B	+0003€	DEMOCI	-,425	00 I.O	0000	
	leans for random										
THESH		197729		-9999	172000						
SEMPLY	-,20499**	,09927		0280	98780	02227					
	Stagonal element										
		103197		-0000	.05677	.15205					
SHADEL		.01188		-0024	100782	-05820					
	elow Hisponel e										
	01435*			10962	+.03124	.00256					
	Dispersion paras										
	1 .57851***	1,19672		0033	.18288	. 26416					

	on-D-MK of D-MK										
	th, thems Sig										

Random Parameter Negative Binomial Model of Just Injury Crashes on Metropolitan Small Urbanized SPF Class Roadway Segments

Pependent Log likel Restricte Chi squar Significa NiFadden Estimatio Inf.Cr.A. Bookel est Sample is Sepation	efficients Hegs workship to shood function d log libelibood ed [3 d.f.] noe level Feedo A-aquared n based on B = E = 629.9 aT imated: Jun 26, 2 pds and 2 Dinomial regrees	30971 -801.74) -502.818 808.328 .000 .40387 476, K = C/M = 1.3 2014, 14:06: 35 individua lon model	88 773 70 60 76 13 22 04 12				COVARIANCE METRIA LINER VERRORA LINER 25545-01 VERRORA -,52115-07 ,24985-01 Explica standard deviations of random parameters 5.0_Bets) 1
JUNTING		Standard Error	100	Frob.	55% Con Inte	ofidance cyval	1(.155196 21 .155086
	Monrandom parame						Implied correlation matrix of random parameters
		2,16689			-9,28870	0.17882	
INGET	.62666***	125199	3.70	-0049	+57295	1,05134	
	.22255**		2.97		.00119		***************************************
SHMDLT:	-,56877*	.0351#	-1.97	-0516	-+18432	200819	Cox.Nat.: INLEH VCPARSA
RHYNDDEC:	03226+	,01661	-2.97	+0330	-106820	.50066	
HUVL	-,00055+++	100023	-3.01	-0026	-,00006	00020	LHLEN: 1,00000 +,36579
08011			2.92	-0080	108881	146546	MCRASNA/ -,86875 1.00000
2000	Means for randos	parameters					
THEFT.	.32422***	.10058	9.67	-0000	172,675	1.12171	
VCERROR!	+,16571+	09305	-1.95	-0650	34515	101672	
	Diagonal element	w of Choleen	N HWEST				
	129920***	,03666	9.51	.0000	198738	23100	
SHEER		200104	2.08	.0421	100527	,20162	
INTEN	1,14695**						
VCFARKA:	.146%5** Below diagonal e		malesky	macris.			
UCFARKA:		lements of C			-,16127	-044ET	
UCFARMA:	Selow diagonal e	lements of C	-1.11	.2671		.04467	

Random Parameter Negative Binomial Model of Low Injury Crashes on Metropolitan Small

Dependent ing libel: Destricte	efficients Dept variable thood function f log limitingood ed [] G.f.]	101 -804.818 -4962.482	91 28				Implied poverience matrix of rendom persenters Coverience matrix LECES MOVERNE
Significat NoTadden 1		.000	50				LELEN .1289E-01 HCVCRQN .423TE-00 .23TSE-00
int Cr.AI	: sares in s : = 1011.0 %; :Mated: Jut 24,	20/18 # 2.4	65				Diplied granderd deviations of random parameters
Sample is	2 pds and 3 singmial regress	Di individua					S.D_Beta I
100	Cuefficient	Standard Error		Prob. (2)>2*	994 Co	nEldence	11 .112613 21 .9882338-54
	Fongandia, payers		+ 4.4 (and a part of the			implied sorrelation matrix of random parameters
	+4.57172***		12.33	-0000	-7.23597	-I.04197	manager morroration marries or topolic Second Actions
LHADT	.71155***		6.36			1.06136	
VCX2	02687**		-2.25			00501:	
TOTLANE	.23250***		3,20			37513	Con. Han. INTEN HOYCEAN
SHMULT	~. D6558***	.02009	+3:16			02418	*******************
RWYNDOEG	02955	.01065	-2.00	.0050	05027	-,00991	INTEN 1.00000 .87193
8072	.00004***		20.22	-0013	.00231	100007	BC/CRAH 1 157162 1.00000
VCVFTGES	-,0000644	100167	-2.40	-0162	#.00esZ	-,00065	
BOVLUME 1	+24.8364***	10.43621	-9.95	-0000	-55.3910	-14.6610	
05011	.02653++	101204	2.04	-0416	100099	194813	
- 20	mana for rendor						
THERM!	-91147***		15.05		.79292	1.00053	
SCYCRAII)	0.00018+	-71623-04	+2.97		-,00021	.60001	
	Diagonal element						
LNLEW	111244-14						
	,79431D-04+				-381110-05	-162610-08	
	Selow diagonal a						
	.553660-04**					1105900-05	
	prahecarny bases						
	2,12654***	114384	7.04	_D000	199692	1741504	

Random Parameter Negative Binomial Model of Total Crashes on Small Urbanized Small Urbanized SPF Class Roadway Segments

Dependent Log likelt Bestricted Chi square Significer McFedden I Estimation Inf.C. Alt Model esti Sample is	officients Hegi veriable hood function I leg likelihoo dd (3 d.f.) de level seudo K-equare > based on H = = 1801.4 K Hanned Jun 17, 2 pdz and invesial regres	TOTALAC: -801.803411700.3012: -1703.37327 -00001507401507401507401507401507401507401507401507401507401507401507401507401507401507401507401507401507401507401507401507401507401507401507401507401507401507401507401507401507401507401507401507401507401507401507401507401507401507401507401507401507401507401507401507401507401507401507401507401507401507401507401507401507401507401507401507401507401507401507401507401507401507401507401507401507401507401507401507401507401507401507401507401507401507401507401507401507401507401507401507401507401507401507401507401507401507401507401507401507401507401507401507401507401507401507401507401507401507401507401507401507401507401507401507401507401507401507401507401507401507401507401507401507401507401507401507401507401507401507401507401507401507401507401507401507401507401507401507401507401507401507401507401507401507401507401507401507401507401507401507401507401507401507401507401507401507401507401507401507401507401507401507401507401507401507401507401507401507401507401507401507401507401507401507401507401507401507401507401507401507401507401507401507401507401507401507401507401507401507401507401507401507401507401507401507401507401507401507401507401507401507401507401507401507401507401507401507401507401507401507401507401507401507401507401507401507401507401507401507401507401507401507401507401507401507401507401507401507401507401507401507401507			
	Coefficient	Standard	-	Frab.	36% Confidence Interval

TOTALACC	Coefficient	Standard Extor	10	Frab.	35% Confidence Interval		
13	Concendon parame	cers	924,397	121183711			
Constant	-9.000000444	2.65267	#8.0Z	.0001	46.68017	-2,95661	
LEADT	.05390***	.14549	5.67	19000	154575	1,13904	
VCEAROSA	*:13704**	-06461	-1.99	0465	24221	+,00167	
VEVESURAL	111667++	108220	-2.46	0287	-,22039	-,02636	
757745	5-67036*	3,10474	1.43	-0676	91076	32,76747	
SHYDET	+.05555+**	-01787	+3-12	.0019	-,09041	+,02035	
ANYMDIMC)	01887	-00970	-1.58	11188	-,03538	100368	
CYPTORE	-12595**	:05266	2.39	-0167	.02272	.32797	
13	deans for rendom	parameters.					
100250			13.26	.0000	.73506	1,07466	
SCVL	05588***	.00010	-9-37	0.000	-190074	-,00099	
11	Magonal element						
LNEED	-16762***	-01908	8.79	-0000	129029	.20501	
BUYL	-00019**	.8193D-04	2.25	.0226	,00008	,00035	
	Selow diagonal a						
THON THE		-7048D-04			,00000	100028	
13	Dispersion param	eter for Neg	Bin dist	PARKETAGE			
ScalParm	.72243***	.00165	7.32	.0000	.34523	190503	

Mote: mnnn.D-am oy D-am -> multiply by 10 to -am or -am.
Note: "", "", " -am. flynnficence at 14, 54, 10% level.

Implied poverience matrix of rendom parameters

COVERZED	DE RETER		
\$1,000.00	DIEDE	BOYL	distance.
LHLEN	10-50195-	*****	

Implied standard deviations of random parameters

3	- 5	Z.	Þ	e	t	d	4														Į
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							٠					*	-	79		٠	-				4

Implied coordination matrix of random parameters

Cir	r.lost.	7	ï	i	ij	ž	ï	1	7	-		H		Š	1
							_		-	_		+	-		
	SCAT I	15	g	D	d	0	0				ā	0	2	á	
	80%		á	9	ú	1	ð.		1	á	b	ò	b	ó	Ì

Random Parameter Negative Binomial Model of Property Damage Only Crashes on Small Urbanized Small Urbanized SPF Class Roadway Segments

PD0:	Coefficient	Standard Error s		Frob.	99% Confidence Incerval		
	Conrandom parame	tare	21000			010000	
Constant;	-5.00078***	\$.80535	-3.34	+0.000	-7.98121	-2.01034	
LHADE	.72067***	.14427	3.00	.0000	-43790	1.00344	
VCEARIGA:	-,19907**	-0887T	-2,00	.0431	21355	+,00421	
MOVETOVA/	.00033**	.00018	2.54	.0113	.00007	100088	
DEG1	09416***	.00497	-2.60	10011	16269	02360	
SENDRI	-,04607***	(01121	-2.67	.0077	07392	01221	
VCVFT08A	-,19802**	-09977	-2.47	-0198	23812	02763	
WCVFTGRB:	.13226**	105359	2.48	.0143	-02423	.23623	
13	leans for randos	parameters					
THEFT	.07629***	107159	11.14	10000	_72597	1.01661	
HCVL)	000E1444	:00017	-2.20	.0004	00095	-,00027	
11	Legonal element	e of Chalesa	y matrix				
Lift.Ett.	.15835***	.02115	7.74	0000	111999	119481	
BCVL)	.00021**	.88240-04	2.38	10179	_000004	.00038	
11	slow diagonal a	Lements of C	holesky	natrial			
INCV INL	*****	17121D-04	2.61	0121	.00004	.00082	
- 11	Lapersion paras	eter for Deg	Bin dist	sibution			
SUBLEBRUIT	178863***	.18286	8.94	10000	.82829	1.04901	

Note: mmnn.D-xm or D+xx => multiply by 10 to -ax or +ax. Note: ***, **, * =>> Significance as 1%, 5%, 10% level. Implied ocvariance matrix of random parameters

Coverses	106 881718		
-771.00	DICES	BCVL	
SNLEW MCOT	-24138-01 27767-04	261/08-02	

Implied prenders deviations of random parameters

S.D Set	43.						ļ
		 		-		-	-
			٠,		í.	ú	è
					2.2	*	
		 		i		-	÷

Implied correlation matrix of random parameters

Com.Mat.	DUE	MUVI
TAPER:	1,00000	.64172
HOTE !	1.00000	1,00000

Random Parameter Negative Binomial Model of Possible Injury Crashes on Small Urbanized Small Urbanized SPF Class Roadway Segments

Dependent Log likel: Destricted Di Square Significed McTadden (Estimation Inf Cr.A) Nodel est: Sample is Degative (efficients Registration of the control of the contr	-373.403 -499.020 -293.251 -000 -21874 	51 60 00 46 15 68 38 1#			
FD17	Coefficient	Standard Error	100		200 Cc 200	
	funranding parane		12.102	71,002	M	102 15 218
Constant	*6,08788***	2,28296	02.81	10017	+15.86212	-5.61807
DUADT	,77386***	.21666	9.67	:0004	91989	1,18780
UCPARKA!	,17386*** -,11415***	120485	+2.74	.0062	+2143287	20713
Very Labor	9,0655944	6.23210	20.22	:0269	1,07000	17,68035
MEVE	-+00078+++	,00015	+6.06	10000	00108	00040
SENDRY	W.D037544	102679	-2.01	0449	-,10622	-,00123
VCVPTORB:	*,00373** :71086***	127399	2.59	10096	127369	1,24767
- 17	Geans for sandos	parameters				
INTEN	Geans for Jandos .940394++	.09809	3.33	10000	.74516	11,13266
VCVFTURA-	++708594**	.27316	-2.55	10000	-1.24133	-,17126
17	Naponal element	e mt Choleek	V BALKSH			
THIAN	+10042+++	.00300	5.00	.0016	223015	116069
VCVFTIGRA!	,00296* Malow diagonal #	100156	1.30	.0550	00010	,00602
0.0000000000000000000000000000000000000	lelow diagonal e	Lements of C	holseky:	Serres		
blanks + jes -	.00241+	100129	1,73	.0535	-,00032	,00514
	hapersion paras	ever for Sec	din dirt	ELWELLOO		
11	.00920***					1,50762

	CHEEK	VETTERA		
LULEN VCVPTORA	,1008E-01 .2421E-03	.1450E-04		
Implied of	enderd days	enions of sec	dom personeters	
3.5 Setal		1		
21	.1004 .000519	24		
Implied or	orelation m	atrix of rand	in parameters	
22300117	D841000014			
Cor.Mat.	DILEN VOV	Assta		
LUCEU:	1.00000	83134 60000		

Random Parameter Negative Binomial Model of Evident Injury Crashes on Small Urbanized Small Urbanized SPF Class Roadway Segments

Dependent Sog likel: Bestricte: Chi square Signifina: Sofadden : Estimation Inf.Cr.AIC Nodel est: Sample is Magative:	efficients Head maxiable shood function fing likelihood ed; I 0.5.] use level securo 8-equand based on 12: 2 marced: Jun 25; Junamial regress	-149.416 -150.508 -150.508 2.772 .000 .00010 532, K = 178 = .3 2016, 10189 11 Individua ion model	160 180 138 15 15 161 162			
	Coefficient			Prob- (x)>3*	989 CO	mfidence erval
	innrandon parane					
			-1.57	.0203	-10.41977	57972
			-2.52 6.50	.0203	-10.41917 .66130	87972 1-22282
Constant) LPLEN SHNDRY	-5.64975++ .94196**+ 00036**	2.43373 .19320 .00017	-2.52 6.58 -2.04	.0203	-10.41917 .66130 00048	97972 1.22262 00000
Constant) LPLEN SHNDRY	-5.64975++ .94196**+ 00036**	2.43373 .19320 .00017	-1.52 6.58 -1.04 -1.97	.0203 .0000 .8891 .0482	-10,41917 .66130 00048 00076	87972 1.22262 00002 .50000
Constant) LUCEN SENDEY SCYL:	-5.64975++ .94198*** -:00036** -:00030**	2.45373 .14320 .00017 .00018	-1,97	-0492	+-00070	,50000
Constant) LUCEN SENDEY SCYL:	-5.64975++ .94198*** -:00036** -:00030**	2.45373 .14320 .00017 .00018	-1,97	-0492	+-00070	,50000
Constant) LIFLEN SENDEY NEVL) LNADT:	-5.64975++ .94198*** -:00036**	2.45373 .15320 .00017 .00018 parameters .25231	2.50	.0480	+-00070	,50000
Constant LIFLEN SHRIEY NCVL:	-5.64973++ .94190*** 00038+* 00038+* 00038+* 00038+*	2.45373 .15320 .00017 .00018 parameters .25231 for dists.	2.50 of swide	.0490 .0169 m. pacame	-10171 -10171	1,01298
Constant LIFLEN SHRIDEY REVIL LIFADT	-5.64973++ .94198*** -:00035+* -:00035-* Omans for random .65703** Scale parameters	2.43373 .19320 .00017 .00018 parameters .25231 for filets .21574	-1.97 2.50 of rendo 2.66	.0168 # pacate .0098	0007G -10171 cers -13621	1,01298
Constant LIPLEN SHRIDEY BENT INAUT	-5.64075++ .94190*** 00030** 00030** Owkno for random .65703** Scale parameters .66706***	2.43373 .19320 .00017 .00018 parameters .28231 for dists. .21574 etar for Heg	-1.97 2.50 of rendo 2.60 din dist	.0168 P. Dacame .0096 ribution	0007G -10171 cers -13421	1,01298 -97969

Random Parameter Negative Binomial Model of High Injury Crashes on Small Urbanized Small Urbanized SPF Class Roadway Segments

Restricted Chi aguare Significan Mofadgen S Estimation Inf.Ch.Ali Model esti Semple 18	variable hood function I log likelihood of [3 d.f.] ine lawel beudo 3-squared i hased on H = 2 = 457.0 Af inated: Jin 25, 2 pds and 4 innimial regress	-249,116 50,235 ,000 ,11355 822, H = 5/H = .5 2016, 19:02:	22 46 00 89 19 56 18			
	Coefficient	Standard Error		Frob. (x)>2*		nfidence erval
Constant)	-6.14507**	2,71330	-2.27	.0235	-11.46111	92880
LHART	.76076*** -,28698	125515	2.35	10032	125416	1,26678
PORARMA:	+,28698	· 5,4424	-1.56	0555	56089	0.62.92
SHMDRI			-4.87	.0584	11841	102549
HCVT.	50097***	+90924	-4+09	.0000	00143	00080
VCVFT98B	.23971*					
MCVND(SEL)	.01164+++	.00549	2.33	.0009	.00479	.01249
(2	leads for random	parameters				
THERE!	-84558444	124547	4+79	10000	61258	3.22292
VCVPISSA:	-,23068*	125.659	-1.92	.0672	47018	+07484
1	diagonal element	s or choless	A marrie	50.41	Section .	
LBLEN	.18086**	195503	2.25	-0260	.01199	
VCVPINEA	,00484*	159293	3+90	10607	53018	
Name 12	elow diagonal a	Lemants of C	suressy.	matrix		Carres
TAKEN TREE						.01312
	depending pacem					4,43169

Covariance	and the second second	
5000001	COLEH	VCVFTORA
UNILEN VOVETORA	1007E-01 29869E-09	-10792-03
Implied at	anders devi	ations of random parameters
f.D_Seta)		1
1) 2)	.1003 .01238	
Implies or	gratianion m	strik of vandom parameters

Random Parameter Negative Binomial Model of Just Injury Crashes on Small Urbanized Small Urbanized SPF Class Roadway Segments

Rendon Cod	dfiniants Repl	nReg Model				
Dependent	variable	21211	st.			
Log 11kel	variable thood function	-216,358	56			
Restricted	S log limetingos ed [D m.f.]	-280.209	69			
Chi equare	ed [- 2 m.f.]	27,702	\$0.			
Significa	nce level Pseudo R-squared	1000	0.0			
MoFedden 1	Pacudo Traquared	.06016	80			
	c based on H =					
	# 454.7 AI					
	insted: Jun 25,					
Sample is	I pds and 4	Il individua	2.8			
Hegative I	minosial regress	lon model				

		Standard		Feeb.		nfidence
SABITED!	Coefficient	Trips		(=)>5-	Int	erval
45	Congandon parame	PAVE				
Congrue	-7.25504+++	7. 65430	47.70	2000	-12 52124	01051
7.07 915	-52305+++	21597	7.70	2000	55576	1 00000
SOUTH DECK	.61242+*	22014	0.11	5545	04977	0.14110
Special management	06107++	. 22026	-2.00	0421	11222	w-00214
	8-92127					
		11-01-010	0.00	10000	8.102.200	82-99-66
909513	laung from render					
909513	deans for random	parameters 27477	2.19	0919	(有用之内容)	
POVILLE	Means for random	27627 .27627	2.15	,0315	-05259-	1-12592
VOVL13 DRADT HCVORSEL	Spare** 02472***	+00839	+5.65	10002	-102159-	00603
POTES 13 LUADT 1 HC/MMSEL	Weens for random .39426** 02472*** District element	-00000 e of Cholesis	+5.65 V MATELY	10002	-102255	00605
POTES 13 LUADT 1 HC/MMSEL	Weens for random .39426** 02472*** District element	-00000 e of Cholesis	+5.65 V MATELY	10002	-102255	00609
POPLIS LHADT HCMMSEL LHADT HCMMSEL	Deans for random .39426** 02472*** Disponal element .04440** .00253*	.00899 s of Cholesk .02938 .00145	+3.63 V MATELY 1.00 1.04	.0002 .0472 .05611	-,02255 -,00031	-,00689 -,09223 1,00587
POPLIS LHADT HCMMSEL LHADT HCMMSEL	Deans for random .39426** 02472*** Disponal element .04440** .00253*	.00899 s of Cholesk .02938 .00145	+3.63 V MATELY 1.00 1.04	.0002 .0472 .05611	-,02255 -,00031	-,00689 -,09223 1,00587
POPELS LHADT HCHMHEL LHADT HCHMHEL (1 LHADT HCHMHEL (1)	Weens for random .39426** 02472*** District element	.00899 s of Cholesk .02398 .00145 Lements of E	+5.69 y matrix 1.00 2.99 holasky +1.07	.0002 .0012 .00611 matrix .2020	-,0008 -,00031 -,00031	-,00689 -,09223 1,00587

*******	LHADT	SUVERSEL
HUVMXSEL -		(1571E-04
Implied Star	naked david	stions of rendom parameters
f.D_Bets:		1
1) 2)	104640	12
Deplications	elasion m	strim of random parameters
Cor.Mat.:	THOUSE HEW	CONTE
	.000001	

Random Parameter Negative Binomial Model of Low Injury Crashes on Small Urbanized Small Urbanized SPF Class Roadway Segments

Dependent Log likel: Sestriote Thi square Signifocan Moreaden ! Moreaden ! Moreaden ! Moreaden ! Moreaden ! Moreaden !	officients DepT variable thood function \$ log likelihood function \$ log likelihood ad [2 m.f.] not lavel for lavel for a lavel for a lavel for a lavel for a lavel function Jun 28, 2 ppd and 4 minomial representations.		48 97 79 00 68 13 74 30				Covariance matrix 194DT VORANGA 196DT :1067E-01 VORANGA :1155-01 :1698E-01 Implies standard deviktions of random parameters 3.D_Seta
10187	Coefficient	Standard Error		Feeb.	SEA Co	nfidenze erval	11 (1995822 2) (121861
	Conreccion parame						Implied correlation matrix of vandom parameters
Constant	-1.14916***	3.47633	-5.16	.0002	-0.44221	+2.45404	The state of the s
LACER	.03752+++	1.07041	11,00	.0000	. 49993		
SHWERT	05199***	+02750	+0.07	.0030	00620		
DEGL	05310444	-01004	+2.27	v0015	-,09503	01256	Cor.Mat. LIGHT VCFARMA
VCVPTORA	- 14194**	-05629	-2.39	-0169	-+29184	02949	***************************************
VCVPTGRB	-13975++	+05957	2.26	.0192	.02276	.25569	LHADT 1.00000 .43640
SCVL	+.00035+++	.00011	+5,02	.0000	0007€	000033	VCRADNA .43540 1.00000
jt	deans for random	personners					
LUMBE	-75454***	-14035	3.38	.0000	49107	1-09121	
VCESIONA	15697**	-07668	127,111	10352	30264	02050	
	diagonal element	s of Chalesk	y matrix				
LEWDT	_03955***	100646	6.42	.0000	.02691	.05223	
VCEARBA	,10353***	.00159	2.63	10085	:02800	.19205	
	felow mlagonal e						
	.00342	1.04206	2.27	.2040	02000	-12583	
INCE INT.			the months and	will be the bear.			
INCE INT.	Dispersion param _62803***	ener for Neg		,0000		+80761	

Random Parameter Negative Binomial Model of Total Crashes on Metropolitan Metropolitan SPF Class Roadway Segments

Rendon Co Dependent	efficients Negli Variable	indes Model TOTALA	00				Coveriende			La DE random parameters
Bestricte	ihood function d log likelihood	-10724-547	52				CELLONION.	110		THERE
Bignifice McFadden	ed [3 d.f.] noe level Pseudo R-squares	.000	90 98				LHADT	,1018E	-68	2711E-01
inf.Cr.Al Model est	n based on H = C = 1801,0 A1 imered: Jun 27, I pds and I	2016, 00:07:	2.9 4.5				S.D Beta)		1	Long of random perameters
	bindmini regress							1.00	114800	
TOTALACC		TITO:		11112+	Ins	erval.				
200000000000000000000000000000000000000	Winrandon parame			150,182	10,55,55			crelatio	n meta	rix of random parameters
Constant!	47.600094***	-T9549	12:02	.0000	-9.25595	-6.12592				
80178	.694725-04**	.33400-04	2,06	10375	.40187D-05	_13493D-03				
ATTTOVO	+.00239***	.0010.6	-2.87	,0077	00902	000T7				
	00948	-00677	-1194	-041T	-103079	-00189	Cor.Mat.	LHART	1,000	TEN TO THE TEN TEN TEN TEN TEN TEN TEN TEN TEN TE
INDLTCR!	-19706**	20004	1.98	.0478	100279	-22222	********			end .
HMDRICK!	+-09310*	125023	-1,00	10637	19594	.D0831	THART	1,00000	-922	102
	Steams for render	garanecers.					5,85,850	+90202	2,000	000
LOGADT	1.09384***	,07629	12.85	.0000	.88424	1.18334				
LOCEN	.02532***	.04396	\$1.22	.0000	.64216	1.01649				
1	Diagonal element	s of Chalesk	y matcle							
LHADI	.01149	-,00705	1.52	70751	+,00240	.02556				
LUCEN	-55066***	-01715	2,55	10032	101752	0.0512.6				
	Below Glagonal *									
THE TAKE O	.12061***				.07199	-18924				
	Dispersion paras									
	2.98024***	-12:106			F-14910	B-81159				

Random Parameter Negative Binomial Model of Property Damage Only Crashes on Metropolitan Metropolitan SPF Class Roadway Segments

	efficients Negli						Implies cov	ariance matrix of reodom parameters
Dependent							Covariable	
Restricted	ihood function 1 log likelihood	-0015-812	11					IMADE LHGEN
Significar NoTadden i Estimetion Inf. Or. Alt Nodel enti Saspie is	Paeudo X-aguazed	.000 .80590 428, K = 5/H = 1.9 1014, 001111	00 E9 12 80 86				LHADT LHADE Deplies sta S.D_Seta)	-6612E-04 .TT27E-02 .TT27E-02
PEC	Coefficient	Standard Error	1	From-	96% Co Inc	nfidence erval	21	.0027656 .0078045
	tourandos parane							relation matrix of random parameters
Constant	-7-10034***	1157960	+6.11	.0000	-9.43471	-4,09488		
ENCYMPORCE	-,00878	100706	-1.54	0648	-,02267	,00907		
BHONDGTCR	+22559**	+09814	2.30	.0216	.03394	+44779		
SHMIRTCR	-+10037**	105014	-2.00	10953	-,19569	-100209	Cop. Mat. 1	LHADT LHIEN
VUVEVCA	.00216+++	:00061	2,70	0069	,00060	,00376		
VCVS	00070**	100033	-2.14	10322	-,005.84	-,01004	LUMBET	.00000 .88286
j)	(Anna Str random	perameters					DEEDL	.00104 1.00000
TRADE	199635***	+30964	3.00	10000	277956	1,20685		
LHLEN	97224***	100052	21.36	10000	88303	1:04145		
100	Diagonal element	s of Cholesk	y materia					
LHEDT	23532**	.08918	2.38	+03.79	04188	.48081		
LHLEH	104135++	100979	2.00	10342	.00266	100001		
(2	Below diagonal a	Lements of C	bolesky	metrix				
LIST_LIST	+01756***	102504		10020	02678	122552		
1	hispersion payers	eter for Neg	945 SLET	sthutten				
	2.50190***	\$7947	4 14	10000	3.44616	4,71765		

Random Parameter Negative Binomial Model of Possible Injury Crashes on Metropolitan Metropolitan SPF Class Roadway Segments

Depandent	efficients Negli variable thood function	nReg Model 91 -410.742					COMMITTED MATTER
Restricted	1 log 118m115000	-2069.366	44				LINATE DILLEN
Significat Mofadden 1 Estimation Inf.Cr.AIC Model esti Sample 1s	Fraudo N-squared E based on H =	*24, 8 = 2/8 = 1,5 2016, 00:18: 13 individua	00 01 11 00 28				LHROT .1037E-03 TMLMM .202E-01 .7930E-01 Implied Shanders Nevictions of rendom parameters S.D_Bets: 1
FIRE	Coefficient	Standard Error		Fron- E >2*	964 Ot	nfilmence ervel	10 -0201827 21 -030069
	Sonrandon payane			-			implies convelation matrix of random parameters
Constant	-0.23416***	1,21421	-6.78	-0000	-10,61397	-5.85435	
SENTILYCS:	*08386*	.04846	1.94	.0655	00324	127294	
VCVEVCA!	+00100+	1,00070	2.92	-0545	-,000000	100273	*****************************
(日本) (日本)	.0021744	.00103	2:15	-0355	100015	,00429	Cor.Net. LHADT LHIEN
PERSONAL PROPERTY.	~. D9898**	104262	-2-05	-0345	4,17247	-100948	
	Seals for random						INDT: 1.0000 .96987
LISADT	-94022***	110594	0.05		,73259	1,14786	INTEN: .00000 1.00000
19050	3.02771***		18,32		192128	1,13415	
	Diagonal element						
LHADI	.01018		1.95		-100144	102200	
132,818	100598**	200078		-0104	100047	100882	
13	Below diagonal a						
		+03456		-0000	109674	+23337	
		eter for Beg 1.81829		.0024	1.82145	100000	
						9.04901	

Random Parameter Negative Binomial Model of Total Crashes on Two lane SPF Class Roadway Segments

Dependent Log likel Bestriche Chi Squso Significa Miffedden Estimatio Inf.Cr.AJ Nodel est Bample Ls	efficients Regional Vertical Control of the State of the	TOTAL, -38083.17- 5 -48528.48: 39040.63: -000 1 -3961. 104130.8 - 1078 - 2014, 17103 000 1811V103	731 768 700 155 19 887			
TOTALACC	Coefficient	Stendard Exect	1	fixet: (2)>2*		nfidence erval
1	Toorandom saran	stars				
Constant	-2.55940***	-09019	-55.15	,0000	-2-16636	-E-61269
2601	-00268***	-D0086	3.40	+0007	-00122	-00455
VCVL1MI	-1-17876***	10004	44.40	4444	U.S. SERVICE	
AIN/DCS	19020***	-02540	-6.00	.0050	-117253	0.8787
VCEAROIA.	.03270*** -1.56957*** 02668*** .86982D-54***	.00724	4.45	10000	.01801	.04640
BCVL1881	-1.56957***	-09004	-15.21	10000	-1.56555	-1.15303
30HPDR2	02668***	-03947	+7,40	10000	+,08248	01007
BICVCRAW!	.04002D-04***	47440-05	12126	.0000	+7764HD-04	-06110D-04
VCVPTGER.	<00056**	.00025	75.75	10066	100006	.00203
	deans for render	п ризамереза				
LUADT	1.05099*** .08970*** .94097***	_01104	86.82	+5000	1-03474	
MALINETINE I	-08970***	.00287	18,18	10000	-02861	
CHEEN	.94097+**	100056	109.60	.0000	192414	-95779
13	Diagonal elemen	to of Cholesi	ky matrix			
LUGADI	02457+++	00675	2517	-001E	-00970	
MANAMETERS!	.00036	-00146	3,47	10464	.00902	
THEFT	.05400***		1.34	.0000	-01001	-02198
	Selov diaponel (
TRMA TANK	00067	100292	723	15155	-,00956	
THE THE	.10100***	.00952	10.41	10000	201294	
ILHL RWY	.06675***	*00375	8.35	10000	.05289	.00075
-17	Dieperaton para .76032+++					.79126

Implied ocyanismos matrix of random parameters

COVERLARO	e matrix		
=100107	LUADT	RMAMBENC	LICER
LHADT RWYWDING LHLEN	.2242E-09 .9959E-05 .3522E-03	.1104E-04 .2044E-05	,1492E-01

Implies standard deviations of vandom paymeters

8.D	Setal								į
					_	_			_
	1.1	- 8	ġ	1	d	I	Ì	2	2
	21	3.0	ÌÒ	b	3	2	ż	1	Ó
	2.1		π	ž	э	Ħ	ą	я	٦

Deplied vorrelation matrix of random parameters

nr.Net.	LIDATE	RECEIPTE	DEED

CHADT	1.00000	.3001H	-02492
MAMBERS.	.20018	1.00000	.70133
COLETE)	.52652	.70130	1,00000

Random Parameter Negative Binomial Model of Property Damage Only Crashes on Two lane SPF Class Roadway Segments

Dependent Log likel Restricte Thi squar Significa MoFadden Estimatio Inf.Cr.Al Nodel est Sample is	efficience Rept variable incod finition d log limbilbook ed [3 m.f.] not level feeddo R-squared n based on H = 1 C = 50057.2 Ai Imated: May 26, 1 pds end 720 binnmini regress	-28467.59 -80280.60 10541.86 .00 1 .2887 64130, R = D/W = 2006, 18:17 63 andividu	179 193 100 144 16 354			
900	Confficient	Standard Exror		Prob.		nfidence erval
	Honzandom parame	CROS				
Constant)	-9.22762***	111126	-02.00	,0000	-9.92065	-0.99857
DATES	-90126***	.00069	101.60	.0000	.05432	-91546
2521	.00287*** +.77840*** 13093***	00098	3,07	10022	100103	-02470
VCVLI	+.77840+**	-19705	-5.95	10001	+1.16868	39214
SHUDGE	13093+++	-02987	+5.46	10000	+-17711	09354
MCVLIMI!	-1.26283+++	-11065	-00.90	.0000	-1.32233	-1.06015
SHWDET	02859***				-002555	v-01261
BANKARITRE	-04191***	00256	15.55	,0000	.03697	04495
UCUPTORA	.00158+++	.00028	4.10	10000	.00062	-00179
ECVCRAS	.77526D-D4+**	.97305-05	13.53	.0000	.68295D-04	.88755D-04
	Heany for rander	DEFENSE				
LEADT	2.06373***	00352	75,66	.0000	1.05711	1.01023
Vost	74552***	-21219	-3,55	10008	-1,16820	33265
5-4050	Diagonal element	s of Choles	CY MARKET	To the state of		
DIADT	.02411+++	.00111	21.03	.0000	.02196	-02652
VOS	36673**	,15070	2.02	10435	-01087	.71890
	Below diagonal e					
there water	95505+**	12295	-2.45	.0044	49510	11000
LYUR WINE						
- 4	Dispersion pares		ghin diet	ribution		

Implied coverience matrix of random parameters

Chin	SCHARLES	matria			
		DOUT	ACN		
INN	ıτ	.5831E-01	1441	0110000000011250	1000000000

Implied standard deviations of random parameters

B.D_Betal	- 1
3.1	.0241482
21	.507614

Deplied correlation natura of random parameters

Cur.Mat.	LHADT	YUE
DIADE	3.00000	00130
98990	- BREEK	a monos

Random Parameter Negative Binomial Model of Possible Injury Crashes on Two lane SPF Class Roadway Segments

Dependent Log 1:kel Nedskilden Chi aguar Significa Hofadden / Estimatio Ind Co Al Hodel est Sample is Hegative /	afficients Hegi variable ibose finction d log ilections ed [S d.f.] noce leval Petido S-square n based on N *. I = 3118.8 & imated: Nay 20, I gds and T2 imanual regres	FI -10577.40 d -11978.94 2608.00 6 +11608 fi+138. F = 1078 = 1018.16:25 009 Instruction	149 407 100 171 16 147			
#1MJ	Coefficient			Frob		nfidence erval
				4.00		
	Nonzendom parem					
Constant	-12:4604***	.30940	~FF.5#	+0000	-12,0709	-12.0100
WOVE DRIES	+,08188***	01988	-2.82	10043	-,07099	91275
VICEARIUS:	-,08189*** .D4D80*** -12.322*** -,08089*** .03938***	.01421	2,56	10043	.01276	105544
MCVLINI:	-22.3223***	2,97706	-4.14	.0000	-16,1878	+6.6880
SHADET	-,03039***	.00718	-4.27	.0000	H-54445	01424
REFYNDING	.03938***	100952	9,47	.0000	102904	.04881
HISTORIAN I	.56554D-06***	-1207E-06	4:52	10000	-30936D-06	.79232D-04
HCVL:	,00203***	.00056	3,63	10008	-20291	.00818
HEYR (213140-04**	-10050-04	-1.06	+0495	415850-04	~,435200-01
	Meens for random					
101120	.90304***	01819	20.04	10000	087307	483300
SSMDCE	+,24778+44	.04955	-4.95	.0000	40465	-,21008
31	Diagonal element	is of tholes	NATES Y			
THERE	120228	.00870	18.07	1,0000	-009192	-1141TO

Note: nmnnn,D-xx or D-xx => mulniply by 10 to -xx or -xx. Note: ***, **, * =*> Bignificance at 1%, 5%, 10% level.

Committance	BRITIS	
	DILES	SHRDCA
RENDCE: TRITER	1061E-01 1848E-02	.2076E-01
Implied at	sendand device	ctions of random parameters
3.D_Setal		I
11	-10295	11

Implied correlation matrix of random parameters

PART SHOWS IN	*	-				 	,	m	A	-	p
Cos.Hat.	1	1	at:	×	×	ł	Ų	94	p	G	K
DISTRI		.0	ö	50	ě	7	ž	3	š	à	ě
SENDO	1	. 2	'n	23	ò	ú	i	0	Ö	ō	ò

Random Parameter Negative Binomial Model of Evident Injury Crashes on Two lane SPF Class Roadway Segments

Departent log likel: Sections Chi square Significa MoFedden : Tetimacio Inf.Cr.Al! Model est: Sample is	officients Hegi variable inced Emotion 5 log Livelinos dd [3 d.5] com inval breads B-square i mased on N w c = 16562.5 A imetod Heg 27, 2 pde and 120 unnessal regrees	-5915.45. -8979.07. 809.34. -000 -000 -000 -000 -000 -000 -000 -000 -000 -000 -000 -000 -000 -000 -000 -000 -000 -000 -000 -000 -000 -000 -000 -000 -000 -000 -000 -000 -000 -000 -000 -000 -000 -000 -000 -000 -000 -000 -000 -000 -000 -000 -000 -000 -000 -000 -000 -000 -000 -000 -000 -000 -000 -000 -000 -000 -000 -000 -000 -000 -000 -000 -000 -000 -000 -000 -000 -000 -000 -000 -000 -000 -000 -000 -000 -000 -000 -000 -000 -000 -000 -000 -000 -000 -000 -000 -000 -000 -000 -000 -000 -000 -000 -000 -000 -000 -000 -000 -000 -000 -000 -000 -000 -000 -000 -000 -000 -000 -000 -000 -000 -000 -000 -000 -000 -000 -000 -000 -000 -000 -000 -000 -000 -000 -000 -000 -000 -000 -000 -000 -000 -000 -000 -000 -000 -000 -000 -000 -000 -000 -000 -000 -000 -000 -000 -000 -000 -000 -000 -000 -000 -000 -000 -000 -000 -000 -000 -000 -000 -000 -000 -000 -000 -000 -000 -000 -000 -000 -000 -000 -000 -000 -000 -000 -000 -000 -000 -000 -000 -000 -000 -000 -000 -000 -000 -000 -000 -000 -000 -000 -000 -000 -000 -000 -000 -000 -000 -000 -000 -000 -000 -000 -000 -000 -000 -000 -000 -000 -000 -000 -000 -000 -000 -000 -000 -000 -000 -000 -000 -000 -000 -000 -000 -000 -000 -000 -000 -000 -000 -000 -000 -000 -000 -000 -000 -000 -000 -000 -000 -000 -000 -000 -000 -000 -000 -000 -000 -000 -000 -000 -000 -000 -000 -000 -000 -000 -000 -000 -000 -000 -000 -000 -000 -000 -000 -000 -000 -000 -000 -000 -000 -000 -000 -000 -000 -000 -000 -000 -000 -000 -000 -000 -000 -000 -000 -000 -000 -000 -000 -000 -000 -000 -000 -000 -000 -000 -000 -000 -000 -000 -000 -000 -000 -000 -000 -000 -000 -000 -000 -000 -000 -000 -000 -000 -000 -000 -000 -000 -000 -000 -000 -000 -000 -000 -000 -000 -000 -000 -000 -000 -000 -000 -000 -000 -000 -000	270 328 300 416 18 117			
gyzi		Scandard Error		Prob.		nfidence erval
		+				
	longandom paress					
	+8.01749***	+19401		+0000		
1302830	.00015***	.01618		* 5000	+27642	132300
08911	-00544***	.00188		+0098	.00176	.00912
SHIPPORT	4,6987644	04176	-2.57		10002	-,01693
MUNICIPAL!	-1-366504+1	126617	-0.24		-1-69010	-1,04299
3333362	03027+++	000000	-4,72		++00300	02219
BCYCEAR!	:22762D-04+++	:5100D+04	7,05	10000	47836D-04	-1111290-01
	Means for random					
SHADE	.40442***	.02362	34.05	.0000	.75812	-85272
	69086**	1,33204	-2.05	.6375	-1.34145	+.03961
YOU			and the second large			
	Dispunsi clesent	is of Choles	sy matrix			
	Dispunsi element		8.78		-90809	-01637
- 11		-60211	8.78			1:1637
EMADE!	-01023***	-8621E	8.78	+5000 +5000		
EMADE!	.01228*** .87289*** Below diagonal e	-10211 -29827 Hementa of	5.78 I.93 Cholesky	.0000 .0001 matrix	,28525	
LHADE 1	.01228*** 87289*** Managamah e	-80211 -29827 Slements of (8.78 I.99 Choleeky -I.35	.0000 .0001 matrix .0108	18033	1(49700

Implied covaziance matrix of racion parameters 17657 Implies standard deviations of random parameters Deplied correlation matrix of random parameters DEC.Hat.; LHADT VCK LHADT; 1.00000 -.04743 VCE: -.04745 1.00000

Random Parameter Negative Binomial Model of Serious Injury Crashes on Two lane SPF Class Roadway Segments

Seatricter Chi square Significer Significer SoFedden Estimation Inf.Co.Alc Sodel esti Sample is	versable https://www.initiality.com/ ed [] d.f.] soc level Facuso R-squared based on H = 1 C = 0006.T AI wates: Hat IS. I pde and 700 sincetal regress	1 -9501.435 136.167 .000 .02410 64135, W = .0 2016, 201491 69 indivinua	164 157 150 152 157 157 151			
2737	Coefficient	Standard Exter	1	Dese. (81>0*		nfidence tival
	Roorandon parene					11223
Constant	-5.69507***	.55613	-21,41	.0000	-9.2106E	17,71849
LEADIN	-66583***	v.04709	24,28	10000	.87365	+18800
	.01435***	102691	30,24	-,0000	.76344	100013
DEGL	100037	1,00428	17.90	.0001	00232	:01425
SCVLUST:	-2.04531+++	.52892	-5,47	10001	-3.08200	-1,00863
BCYCRAIT	.00014***	-2025D-04	6.70	,0000	-00016	100018
	Seame for random	parameters				
	05112***					01489
	Scale parameters					
12						
SHREET!	.01964**	.00095	2,19	10250	-00209	03715
SHRULT		eter for Her	BIR GLAT	FIRSTIAN		103718

Random Parameter Negative Binomial Model of Fatal Injury Crashes on Two lane SPF Class Roadway Segments

Dependent Log likel Restricte Chi aquar Significa Nofadden Estimatio Inf.Cr.Al Nodel est Sample is	efficience Dephi variable ihood function d log likelihood es (FAT -1015.961 -1022.985 12.987 .000 .00634 84135, # = 0/8 = 0 2016, 15:41: 69 individua	94 48 52 16 8 16 26			
FATAL	Coefficient	Standard Exect		Peotra #152*		efidence serval
3,550						
	Monrandov parase					
			-3.48	,0000	-10-14099	-0.05016
Constant	-5.55534***	.01007	-9.48 12.90	0000	-10-14090	-6.65816 1.02018
Constant	-5.55534***	.01007	-9.48 17.90 1.90	,0000 ,0000 ,0323	-10-14088 -81810 08344	-0.05016 1.02018 .37043
Constant	-5.55534***	.01007	-9.48 17.93 1.90 -2.22	,0000 ,0000 ,0323 ,0261	-10-14088 -81815 08344 21488	-6.65816 1.02018 .37643 01370
Constant LNCEN SSMULICA BWYWDING	-8.99984*** .91964*** _15751 11908**	-88897 -05130 -11276 -05171	1,00	.0323	00344	01510
Constant INCES SENDIFOR REVERSE BOVORAS	-5.55534***	.89897 .05180 .11276 .05171 .3385D-06	1,00 -2,22 2,20	.0323	00344	01310
Constant INCENS SEMBLICA EMYMDIMO ECVCRAN	-6.99994*** .91964*** .15752 11906** .87014D-36***	.05130 .11274 .05171 .05171 .3350D-04 parmetters	1,00 22,2 2,10	,0323 ,0261 ,0095	-,06344 -,21485 ,21248D-04	.37843 01370 .18278B-0
Constant INCENS SEMELICA EMYMDING ECVCRASS	-6.99994*** .01064*** .1575211906** .87016D-06*** .87016D-06***	.88697 .05130 .11274 .05171 .3385D-04 parmetters .00890	1,00 -2,22 2,50 7,51	.0323 .0261 .0005	-,00344 -,21638 .21248D-04	.37843 01370 .18278B-0
COMMETANT LUCEUS SENDITOR MYMPLINO BOVORANI LUGADTI	-8.99994*** .91964*** .15753 11958** .87016D-06*** Means for readom .66786***	.88697 .01130 .11274 .05171 .3355D-04 gersectors .00890 for nists.	1,00 *2,22 3,10 7,51 of rends	.0323 .0261 .0091 .0000 m pereb	-,06344 -,21638 .21248D-04 .49346	.37843 01370 .18278B-0
Constant LACEU SEMBLICO MMEMBLINO BOVCRANI LAGADT	-8.9994*** .01964*** .157521190*** .87016D-06*** Means for rendom .66766*** Scale paremeters	.88697 .05130 .11274 .05171 .3385D-04 parameters .00890 for nists	1,00 -2,22 3,50 7,51 of rends	.0323 .0261 .0002 .0000 .0000 m parato	-,06344 -,21485 .21248D-04 .49346 etaru .09119	.37645 +.01370 .16276D-0:

Random Parameter Negative Binomial Model of Unknown Injury Crashes on Two lane SPF Class Roadway Segments

Neatrioted Chi aquare Significan NoFedden V Betleetion Inf.Cr.AIC Hodel esti Sample is	variable hood function log likelihood 3 d.f.] seleral prints R-square Base8 on 2 * 1 2008.5 31 anted. Hay 38, 3 pds and 72 innextal regress	1 -1849.421 60.391 .001 1 .0182 144138, W = 1 10.8 = 1 2014, 18:11	000 625 626 621 10 001 156 41a			
100						
THOROGET	Coefficient	Error		12/52*	986 00	arral:
18	iongandon parame	Stepp.				
Constanti	-9,71618***	154722	-27.76	-0000	-99-78075	-8.64568
SENDLY	~,08622***	02411	-9.95	-0001	14247	-,04797
BUYLINE)	-,08622*** -1,67534**	.75402	-2.21	.0224	-3.11615	23573
SEVERSIT	*00021***	-29200-04	5,78	-0002	+00005	00017
(2)	cons for rendis	parameters.				
LHADT	179653***	104679	12.11	-0000	1.66267	.92547
LHTFILL	,79682***	.04105	25.19	.0000	457143	1.05235
1201114	nagenal element	s of Chales	by materia			
DIABIT	,01546** ,07460***	.00974	2.00	.0488	+00099	00.660
THESEN	.07460***	22496	2.99	10026	102547	12255
	elow Hiagonal +					
COST THE	J04808+				-,00099	100006
		200	With Section	See Dead		
	ispersion paras	DECRIPTION OF	COAT GIPT			

Covariands	metris			
	THANT	1	REST	
LHADT LHLEH	.5050E-03 .5356E-02	17876	E-02	
Implied at	anderd devi	which	of candim po	stametera
S.D_Setal		2		
1)	.01744 .08874	180		
Implies of	exeletion e	MIXIN S	f renoun per	rametete
OSY (Mar.)		LHERM		
	1,00000 . .54176 1	54176		

Random Parameter Negative Binomial Model of High Injury Crashes on Two lane SPF Class Roadway Segments

Restricte Chi squer Significe HoFadden Estimatio Inf.Co.Al Hodel est Sample is	variable inhood function d ing likelihood ed [3 d.f.] hoo level Feath R-aquaged c based on H = 1 G = 2:550.1 Az immated: Ney 30, . 2 pds and 720 binomial regrees	-11489.72 1889.37 .00 .0428 44135, H = .004 = 2016, 17:25 68 indivisu	121 350 000 034 14 150 :35			
BIINI	Coefficient	Standard Error		Froh.		nfidance erval
			Heim			
Constant	Woodandon parama -6.70781+++		14 00	2550	2 (11)	4 44444
	.88311+++				.05826	
-2501					=.00045	
HCVHOURES.					00294	
HCAMERY!	100318***	+00004	0.40	10000	100004	.00422
THIRDER	09514** 03604*** 01649*** 18136D-06***	+63866	26199	10534		+-05032
SHAPAT	-1036b8+++	+00127		10000	-,05088	02120
tim Language 1		21122 05	26120	10050	C105307	7,00300
MCAN			-3+66	10048	-,436850-04	-175,1850-04
	Means for random .72057++>	parameters	31901		Carrier.	22.00
DIME	.720577**	+02172	20.55	,0000	.46401	
	-,02055++>				-1.01000	-26071
	Diagonal element				01.000	Atomi
THANK		+00200	30.27	+4000	.01646	
	.39925**					_70469
	Selow disposal e	Tements of	minagy.	DATTER		
1300 A THE	+,56557***	141891	374650	10000	170004	T-33218
	Dispersion paras 1,00572***	ming for No	Spru grac	cuputii		
			8.142	10000	.7821#	1.22926

Implied newarianne matrix of random parameters

LHADT MCVLIMI

LHADT 41802-05
RCVLIMI -11802-05

Random Parameter Negative Binomial Model of Just Injury Crashes on Two lane SPF Class Roadway Segments

Bestricte Chi squari Significa McFadden i Estimation Inf.Cr.All Nodel est: Sample is	veriable hood finution d log likelihood ed (3 d.f.) noe level Feeuno K-eguare o based on H = 1 = 11006,6 A, imated: May 20, 2 pds end 72 ninomial regree	= -6322.30 534.133 .000 = .06590 164138, H = 10/W = .0 2016, 16133 168 individual	194 155 100 671 13 181 161			
		Standard		Frab.	35% To	
SOUTH)	Coefficient	22101		18125	int	
1	######################################	cess				
Constanti	-13,6105494	,5066T	+44.35	.0000	+14,2115	-53.0094
LHELETT	.56336+++	.02073	61.65	10000	-,62275	,90396
CHWOLT	*:05006***	.00905	-9.32	00000	-,06788	-,03227
MCVLIMI:	-2.18802***	199470	-7.21	.0000	-3.19837	-1.60069
SHUDATER	31842+++	-10096	-3:16	00016	51738	-112141
ENTRODEC	-02445***	.00422	5.54	.0000	.02225	26665
DEST	-01e91+4A	.00198	9.41	0003	00918	101076
	deans for randor	n parameters.				
LEADT	1.34324***	.03441	39103	10000	1,07579	1.41089
BCVCRAM	_00011+++	-1269D-04	0.49	.0000	.00000	.00034
13	Diagonal slament	to the Challent	by matrix			
LSADT	.02384***	.00279	5.44	10000	700807	.02901
RCVCRAW!	.02384*** .18364D-04*	-1004D-04	1.97	-9449	155140-06	+290470-04
A 200 1 12 12	Selow diagonal a	elements of 0	Chalasky	matrix		
INCV LMAIN	-,15872D-04	. 6T728-05	-1.85	11158	310852-04	-532220-55
- 13	Olspersion paras	seter for Rec	strin diver	STRUCTURE	0	
ScalFarm	-41307+++	.04448	9.29	.0000	, 22520	,50024

CTANT32655-DE .56705-DB plied standard deviations of sandom paramete D_Stim) 1 11 .0196599 21 .238114E-D4 plied occretation matrix of random parameter	owartano	e matrix			
CTANT32655-DE .56705-DB plied standard deviations of sandom paramete D_Stim) 1 11 .0196599 21 .238114E-D4 plied occretation matrix of random parameter		1104	DT 3	CACETT	
plied standard deviations of sandom paramete 0_9ets) : 1 .0788389 2 .338116E-04 plied occretation matrix of random parameter	CAD'T	.55415-	52		
D_Bets) 1 1) .0278599 2) .336116E-04 plied occrelation matrix of random garageter	VCRAIT.	32685-	16 -56	70E-29	
1) .078535 2) .238116E-04 Diled cocrelation matrix of rendom parameter	qlied s	candard d	eviation	a of rand	in parameters
lied occrelation matrix of rendom parameter	Seta		1		
	2 2				
	whied o	ocrelatio	o matria	of rendo	n paremeters
A STATE OF THE PARTY OF THE PAR					
(.Mat.) ENADT MOVORAN	MAT.			333	
	THANK	2.00000	+.38256		

Random Parameter Negative Binomial Model of Low Injury Crashes on Two lane SPF Class Roadway Segments

Bandon Coefficients BeginDeg Model
Dependent variable 100H7
Log likelihood dimerion - Jelgo 10085
Returiored log likelihood -88697.83642
Cha squared [6 d.f.] 2008.0838
Signification ivel - 00000
Mofadden Pescus Required . JEDESO
Estimation bared on P. 144108, P. 20
Tof.Co. AlG = 56407.6 MIGU# . 393
Model refunction July 1 2006. 1450151
Secula is 1 pos and 72009 Individuals
Megative binomial regression model

Standard Prob. 25% Confidence

torer	Coefficient	Standard Exemp		\$20b.		nfidence erral
	Syntandon parass	cess				
CONSTANT	-11.5061***	113399	-69.40	10000	+11.4204	-10.7932
SHIPDLY	02662***	-00979	+7.08	-0000	09409	-,01920
HOVE THE	-1.31128***	.11261	-11.84	0000	+5,53200	-1,09056
HOVOMAS	.TT054D-04***	.8578D-05	18.88	-8000	481885-04	.680112-1
SHIPCE	13014+++	101363	+5.21	.0000	17645	e. 00383
NUMBER	04302***	.00307	14.66	.0000	.00029	105102
CYPTORA	.00069**	1,00028	2.45	10149	.00013	
WCVLURE	-1.37755+**	120472	46,75	.0000	+1,17578	+197636
ICPARION.	.03677+++	.00647	4.34	.0000	2201€	.00330
MOFLING	1.64973***	11581	14.35	-0000	1,42961	1,47545
	blesne for randor	paremeters	10.00			
LMADE	1-11238***	-01271	87.82	10000	11/06747	1+13729
1600	.05223**	100100	2.26	10254	100028	100419
1,501,816	95010***	-00961	95.27	.0000	293118	196905
	Diagonal element					
LONADT	00305***	.00010	2.93	.0034	00301	v01817
26.00	1 400197	100121	2.97	0741	-,00040	.00484
1301.53	-01526***	.00355	4,33	.0000	(00535)	100017
	Below disponal e	Caments of t	holasky.	MATTER		
DEG_LHA	00090	.00135	86	.5064	-,00355	.66175
ANL INA	-08681+**	100932	9.21	.0000	200334	.20100
LNL DEG	_07701***	.00470	16.41	10000	206786	100627
	Dispersion paras	setso for Ne	Sin diam	sabuttor	3000	
callars.	.75414***	.01254	32.37	.0000	.61997	,77831

Implies covariance matrix of random parameters

Covariance matrix

LHADT DEGI LHIES

LHADT JEGSE-0+

DEGI -5069E-0+

DEGI -510E-01 .44THE-01

LHEM -789H-03 .737T-04 .127HE-01

Implies atandard deviations of random parameters

I. _ 00000028

J. _ 00000028

J. _ 00000000

Deplies convelation matrix of random parameters

Cor.Mat. | LHADT DEGI LHIES

LHADT 1.00000 -4.0003 .74100

DEMI: -41625 1.00000 .25988

LHIES; .74104 .25088 1.00000

Random Parameter Negative Binomial Model of Total Crashes on Three lane SPF Class Roadway Segments

Random Coefficients HeginReg Nodel

100000		Standard		Frab.	994 Co	nfidence
COLLEGE	Coefficient	Error	T	12/525	Int	arval
	and the second second	-				
	Nonrandon pazas					
Cunstant!	-20.9822***	141000	-17.10	0000	-12.2347	-9.7297
THIEN	104042***	104038	17.03	0000	179387	193736
0881	7.01611	-00520	-1.95	-1099	7:01681	40940B
HEYELKI!	-2.03014***	.59186	-9.49	-0006	-9.19017	67010
DIGGIFFIN	.02344***	.00533	4.43	.0000	.01319	.03410
WOVE	~.00417***	.00114	-0.72	10002	00636	00197
HCVCRAII	-90116D-04***	.18180-04	5.42	.0000	.42553D-04	1155700-01
ENSADDEC!	201091**	100600	2.41	-0234	+00303	,0287£
VCV211	16.6005***	4.00700			6.0796	81.2214
12500000	-16,7642×**	9,00019	-2.01	-0046	-29.1993	-5.3372
1	Means for cando					
INADT	1,297954**		15,03			1.19909
VCPARHA:	400562***	103590	2.66	+9977	192826	-16599
SHROGT	+.04310***	101140	-5.76	-0002	00300	02047
	Disposal alegan	ts of Choles	ky matrix	1		
LIGIDT	-20232***	+90816	1.05	-0003	101544	
WCERROO.	.06563***	,02397	2,50	-0052	01366	111163
29045CT	.01100****	.00501	2.63	.0088	.00345	.02330
	Beling diagonal.	elaments of a	inclesing	MATERIA		
LVCF 180A	H: 02596	103556	- T-	-4691	03623	.04432
AND THE	00422		F=91		4,02482	
MAN ACE!	01145	-00787	-1.58	-1100	02609	100279
10	Dispersion pers	mener for Ne	fin dist	eshunse	n.	
ScalParm	.31131***	,01887	16.07	5500	27226	284927

Implied onverseore matrix of random parameters Coveriance matrix IMADT .0878E-00 .4001E-02 .7028AGL -.0186E-03 .4001E-02 .3318E-03 .3318E-03

Implied econdary deviations of random parameters

8.D_Betai .0316260 .0708792 .0182551

Implied correlation matrix of random parameters

Coc.Mat. | LHADT VCRARMA SENICT LHADT 1.00000 -.96776 -.50182 VERASUA) -.56775 1.00000 -.50042 ESMDLT -.22182 -.50043 1.00000

Random Parameter Negative Binomial Model of Property Damage Only Crashes on Three lane SPF Class Roadway Segments

Random Coefficients | NegSnReg Nodel Random Coefficients Register Model
Dependent variable PO
Log Limithod function - 1848,48920
Chi laminhod function - 1848,48920
Chi Squared [8 8,2.] 2734,1787
Significance level . .00000
Asfedden Pesudo P. aquared . .012574
Estimation besed on H = 8306, H = 15
Estimation besed on H = 8306, H = 15
Rodel satisfactor May 31, 2016, 1876404
Regetive binomial regression model

900	Coefficient	Error Error		fram: (2)>2*		nfidence erval
	Toorwoodom parame	PORTE				
Constant	-10.5568***	-72677	-25.00	,0000	-12,0610	-9.6121
CHILERY	.62125***	.01483	14.43	+0000	-70947	-83254
SCVLIST	-2.72450+++	61614	-3.95	.0001	-4.08820	-1.36039
DRIGHTME	.01666***	.00561	3,05	10071	-00605	-02727
VICTA	000071***	.00020	-3.62	10005	00100	-,00032
VCVL191	2.55261*	2.67026	2.57	TYEST	0.52011	0.22605
HCVHKSLI	-14-9798ee	6173498	-2.12	10000	-27,7849	+1.4120
110/DC9	.02768++	01111	2.07	.0386	100144	-09391
11	Seans for render	pereneters				
LUADIT	1.31954***	08111	26.26	.0000	1.16006	1.47602
RCVCRAM!	182979D-04***	-251SD-04	9.79	10001	+83321D-04	-192630-03
SHUDLT	+.04425***	.01244	-3.50	.0005	06901	01948
1	Disgonal Wiement	e of Codles	ky matria			
LITADI	-03740+**	-00880	1.28	10000	.0201€	-05565
ECYCHAS	.55556D-D4++	-2344D-04	2.15	10144	.1100000-De	-99760D-04
SHVDLT	.02042***	-00721	2.93	10048	.00429	-03465
	Delow diagonal e	depends of	Cholesky	matrix		
LECV LUAL	.98D66D-04***	31552-04	5,31	-0019	.562320-04	.15990D-UI
1.689 LSQ. (01622	.01192	12,36	12736	+.03355	-00716
LEMM HOY!	00010	-00642	-4,00	.2794	02254	.00759
- 4	Dispersion para	miter for He	gBin diet	ributio		
Scellern	-27917+++	-02065	10.45	,0000	22072	-31863

Implied ocvariance matrix of random parameters

COVETIANCE MATELIA LOWIT SOVERSE SENDLY .1599E-02 .3669E-05 .1268E-07 -.8088E-05 -.2589E-05 .7630E-08

Implied standard deviations of random parameters

.0374010 .0374020 .027425

Implied correlation matrix of dandem parameters

COS.NOSC. | LIADT HOYCKAN SHRULT LMADTI 1.00000 .57074 -.55737 NOVCKANI .57074 1.70000 -.67344 SHRULTI -.56787 -.67344 1.00000

Random Parameter Negative Binomial Model of Possible Injury Crashes on Three lane SPF Class Roadway Segments

Dependent Log luwel Restricted Chi square Significa- NoFaddan I Estimation Inf. Gr. AD Noral spri Semple in	variable bdod function log likelihod d [d d.f.]	-904,87; d -1157.60; 506.50; d .9187; d .9187; e306, E = 10/3 = 2016, 16:31;	441 496 100 124 14 427	*******		
F292	Coefficient	Standard Error		Brob.		nfidence coval
(1)	Corandon param	stars				
Constant	+15.8913***	1,26220	=10.77	.0000	-16,0652	+11,1179
RHYNDING	.01469*	100750	1.95	10597	000000	102997
ACAMATA	00589***	-00102	-3.52	19003	-,00589	-,00189
EWHDCT	-,05415***	.62010	-2.69	.0011	-,08959	01416
13	leans for cando	n parameters				
13921	1.41921+**	114256	2.26	10000	1,15950	1.69562
HCYURAR	**01000.**	149870-09	-2.02	-0442	+,00020	+00000
THURST	.71.620***	109048	7,90	-0000	553847	188382
11	caponal element	ts of Chales	ky matria			
IMADT	.08025*	.02722	1.95	.0659	00319	122360

| 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | Note: nnnnn,D-xz or D-xx == multiply by 10 to -xx or -xx. Note: ***, **, * ==> Significance at 14, 34, 10% lavel.

Implied covariance matrix of random parameters

Savazian	CO TRACTLE			
	LHADT	BOYCRAM		
LHADT MCVCRAM	.2126K-00 3366K-00	.2974E-07		
1357.635	1. 化各省分类公司力	+-245KE+04	2. 有我为为第一的主	

Implied standard deviations of random parameters

5.D Sets	
A STATE OF LABOR	
2.0	VIET2544
21	-172453E-03
	187931

Implied correlation matrix of random parameters

CHE-MAX-1	Lower	HOVORAVE	THESE
TUANT	1.00000	-,35537	,63430
BCYCKAB!	-1,58837	1-00000	-,75523
LHLEN	.63430	78828	1,00000

Random Parameter Negative Binomial Model of Evident Injury Crashes on Three lane SPF Class Roadway Segments

Dependent Log likel: Bestricte: Chi squar Significa: Bestricte: Bestricte: Infaction: Infaction: Infaction: Bestricte: Be	officiants Hegi variable blood function 3 log likelihosi ec 3 s.f. locate 3 s.f. 1002.0 Al mated Jun 03. 2 pds apri 2 locate 1002.0 Al mated Jun 03. 2 pds apri 2 locate 1002.0 Al mated Jun 03. 2 pds apri 2 locate 1002.0 Al mated 1002.0 Al m	-535.275 -595.371 45.796 .000 .04102 4304, ff = .078 = .2 .016, 18126; .30 individua	33 35 36 33 33 11 84 84			
		Standard		Frob.	95% Co	nfidence
\$7.1	Coefficient	Error	2	11/25	3	arval
	Surrandom parame	Company of the last to				
	-0.32102***		20.00	10000	-10.00620	-5-64545
	.83527***	.07418			45394	
	+17.7510	12.04914				
CONTROL T	94672**	.02006	27.74	0374	+,98385	
	-,00845***					
	leans for vandor	Baranetere		11111		
IMAGE	leans for yandom	.54255	8.06	.0000	44004	_99553
BRANDINE	.03559***	-00949	11.78	-0000	,02729	-05445
	isounal element					
		-02073			.07629-	-19750
		.00910				
IMADZ	.00771**					
IMADT	.00771** Helow diagonal #		beleasy.	DECISE		
IMADT HMYRDINC	lelow diagonal a	dements of t		,0000		03899
LMADT CHICARYMA LBET LMA		lements of C	-1.50	.0000	04233	01695

implied occapiance matrix of record parameters

COVEKSANO	e matrix	
	LHAIT	PATABOLISC
DOMET RETURNED	.1966E-01 3964E-02	93005-03

Implied stendard deviations of random parameters

5.D Bets:		÷
1.0	155 687	
21	-050 KZ7	d.

	-	+	-	+	-	-	-		-		-	٠	-	-
Cor Man			t	ķ	À	I	Ť	.00	n	71	D	I	2	d
	-	-	÷	-	-	-	-	-	-	-			-	-
Light	1		ġ	ά	þ	ò	á	2.	å	ģ	6	7	1	2
SHIDDING	_	è	9	E	Ť		2	1		Ò	b	ģ	O	d

Random Parameter Negative Binomial Model of Serious Injury Crashes on Three lane SPF Class Roadway Segments

							Implied on	variance matrix of random parameters
	efficients Negt							
	variable						Coverience	metrix
	imped function							
	d log likelihood							THEST THERE
	es () difil							
argurerne:	nce level Pseudo B-squered		24					,12945-21 _91946-01 _#9946-01
	n based on N =						P1477E34	-8794E-07 -8894E-32
	0 = 156-1 AI						Section sta	enderd deviations of random parameters
Hodel est:	imared: Din 01,	2014, 20:12:	13				60	
	2 pms and 21		2.0				S.D. Betal	1
	binomial regress							
	*****							,123739
0.000	Coefficient	CONTRACT.		12/32*	994 Co		2)	.205553
	COSTLINISCE					41141		
	Nonrandom parame						Implied our	rrelation matrix of random parameters
	-5.55500***	2:22249	+4709	-0000	-24,18788	+4,97440		
VCPARKA:	.10656**	-09198	2.93	-0422	,00616	.26716		
ACAT	-,00109	300071	-1.97	+8777	-100249	.00031		
12	Means for random	parameters					Cor.Mat.	INADT LHIER
	.63266***		2.70	-0049	118973	1,15556	and all the first tenth of the second	***********
	188888***		4.02		+30177	197833		1,00000 .90656
	Diagonal element		y materia				THERM	.00418 1.00000
	,51374***				,03200	129544		
	122009**				101174	.21611		
	Balow Stagooal a							
	.27731**			.0124	104055	.49436		
		ster for Dec	Ban Giat					
- 1	.28228***			-0034	104525	149552		

Random Parameter Negative Binomial Model of Fatal Injury Crashes on Three lane SPF Class Roadway Segments

ependent og likel søttitte ti squer ognifike	efficients Heght veriable shood function d log likelihood ed [3 d.f.] not level Facuto R-squared	FATA -170.0000 -4305.0000 6271.3000	14 15 10				Implied covariance matrix of random parameters Covariance matrix LHART DESI-DI LHART 11955-DI	
inf.Cr.AI fodel est temple is tegative	n based on M = C = 550.6 All Lmated: Jun Ob. 1 I pus and 31 Lincolal regress	C/S = .US 2016, 18:20:0 55 individual 100 model	13 12 14				India -esse-os _restr-12 Implies standard deviations of random parameters 5.0_Sets 1	
FATAL.		Standard Exem		Frob.	145	nfidence erval	1) 10969347 2) 10515445	
	Sonrendon perene							
	-9:38832***	2.66775	3,18		-14.18302 -53606	-t.90961 .96011	Implied correlation matrix of random parameters	
				,2250	00231	.00861		
CHECKEN !		.00309						
MINTENA		goodo.	****		122000		***************************************	
MINTENA	,00075 Heans for random			.0121	.16154	1,31224	Cor.Mat. LMADT DEUL	
MCVPTTVA) LNADT DEGI	.00075 Heans for rendom .73679** 07032	20060 .20060 .06719	2.81	,0121 ,0635			Coc.Mas. LUADT DEUL	
HUVETTYA - LHADT DESI	.00071 Means for rendom .73679** 07632 Diegonal elements	.20060 .20060 .06719 m of Cholesky	2.51 -1.67 matrie	,0121 ,0635	.16134 -,21002	1,31224	COR.NES. LHADT DEGL LHADT 1.00000 ,24658	
HEVETYA ISADT DESI IMADT	.00075 Means for rendom .73679** 07632 Diegonal element: .00482*	parameters .29360 .06719 s of Cholesky .01933	2.51 -1.67 Matrie 1.91	.0121 .0638	-16156 -,21002 00086	1,31224 .05335 .07481	Coc.Mas. LUADT DEUL	
HIVETTYA 1 LHADT DESI CHADT DESI	.00075 Means for rendom .72679** 07692 Diegonal element: .00402* .04995	20060 .20060 .06710 m of Cholesky .01935 .02793	2.51 -1.67 Batrie 1.91 1.36	.0121 .0638 .0861 .1878	.16134 -,21002	1,31224	COR.NES. LHADT DEGL LHADT 1.00000 ,24658	
HUVETYA LHADT DESI LHADT DESI	.00075 Means for rendom .72679-* .07032 Diegonal element: .02602- .04935 Selow diegonal el	parameters .20060 .06719 m of Cholesky .01931 .03793 lemente of Ch	2.81 -1.87 / matrix 1.91 1.30 plesky	.0121 .0635 .0161 .1075 metri#	-16154 -,21002 00006 02455	1,31224 .05335 .07481 .12429	COR.NES. LHADT DEGL LHADT 1.00000 ,24658	
LUADTI DESI LUADTI DESI LUADTI DESI	.00075 Whans for random .73679** 07632 Diagonal element: .04602* .04895 Selow diagonal e: .01871	20340 .20340 .06719 s of Cholesky .01931 .03793 lements of Ch	2.51 -1.67 / metrie 1.91 1.35 plenky /	.0121 .0635 .0161 .1072 metrim .6974	-16134 -,21302 00086 02433	1,31224 .05338 .07481 .12429	COR.NES. LHADT DEGL LHADT 1.00000 ,24658	
LUADTI DESI LUADTI DESI LUADTI DESI	.00075 Means for rendom .72679-* .07032 Diegonal element: .02602- .04935 Selow diegonal el	parameters .20040 .06719 s of Cholesky .01931 .03793 lements of Ch .03159 ster for NegD	2.51 -1.67 / metrie 1.91 1.35 plenky /	.0121 .0638 .0861 .1878 metris .6974 ributios	-16134 -,21302 00086 02433	1,31224 .05335 .07481 .12429	COR.NES. LHADT DEGL LHADT 1.00000 ,24658	

Random Parameter Negative Binomial Model of Unknown Injury Crashes on Three lane SPF Class Roadway Segments

Dependent Log likeli Restricted Chi sgiere Significan NoTadden S Ketimation Inf.Cr.AlC Nodel esti Sample 18	hood function log likelihood i [1 d.f.] po level peudo S-squared bases on S =	tmetmo -130.159 -5008.0399 8347.650 .000 .06930 4806. K = 17H = .0 2016.30:24:	67 55 66 00 60 6 64 03			
Negative b	rounter rabieses	ton moder				
concocnol		Standard Error		Frok.		nfidence
cattototot	Coefficient	Standard Error				
cattorotes i	Coefficient	Standard Error		= >2*		erval
CHOCKOT	Coefficient	Standard Error Cess 3.28986		,0000	Int	erval
CHICKNESS	Coefficient Onzandom paramet	Standard Entor Sexw 3.28986 .33530	-4.46	,0000	-21.1161	-8.2201
CHICKONI)	Coefficiens commandos paramet -14.6681*** 1.10867*** cons for randos	Standard Entor Sexw 3.28986 .33530	-4.46 3,30	,0000 ,0000	-21.1161	-8.2201
CHICKONI) CHICKONI) CHICKONI) CHICKONI)	Coefficiens commandos paramet -14.6681*** 1.10867*** cons for randos	Standard Error Sex# 1.20086 .33530 permeters .22650	-4.46 3.30 1.89	,0000 ,0000 ,0010	-21.1161 .48569 -,14955	-8.2201
COMODOMS!	Coefficient OSFANOS DEFANO: -14.4621 1.10567 cons for range3000 Osit parametere	Standard Error Sex# 1.20086 .33530 permeters .22650	-4.46 3.30 1.89 of ranco	,0000 ,0000 ,0010 ,1887 w payane	-21.1161 .48549 14955	-8.2201
CHICKORDI (III CHICKORDI (III) C	Coefficient OSFANOS DEFANO: -14.4621 1.10567 cons for range3000 Osit parametere	Standard Error 5438 3.28986 (33830 permenters 12450 for Mara. (07612	-4.46 3.30 1.59 of ranco 2.54	,0000 ,0000 ,0000 ,1857 m parame	-21.1161 .48509 .18305 Term .04302	-8.2201

Random Parameter Negative Binomial Model of High Injury Crashes on Three lane SPF Class Roadway Segments

Dependent Log likel: Bastricta Chi Square Significa NoTadden T Estimation Tof.Co.Al(Model est; Sample La Hegativa I	efficients DegB variable thoos finorion d log likelihood en [6 d.f.] hoe level Feedin R-squared o based in H = C = 1243.4 kD imated; Jim 63, 2 pds and 21 binomial regrees	#E1 -609.719 -661.671 108.903 .000 .00081 4304, H = 0/H = .2 IO16, I2:18: 93 LINGLY,MIS 100 model	94 67 63 90 50 12 99				LINERS MESTER LINERS LOADT VCSFTGER LINERS +665°E-D1 .2001E-D1 VCSFTGER .1665°E-D2 -1257E-D3 .9164E-D4 Laplied standard deviations of sandom parameter 8-0_Seta) i
RIINJ	Coefficient	Standard .	100	Froh.	950 Co	nfidance erval	1 .225551 2 .141463 3 .00057309
- 17	Foorandom parama	ters					
SHMIRT	05423	.02233		+0152			Implied operwistion matrix of rendom parameters
	Means dur random		20.00	0.000	20104	1.02716	
TARREST !	.86411***	11000			-70104	1.29914	***************************************
	-,00715444			.0004	01111	00310	ContAMet: LHLES INADT VCVPTSRS
	Diagonal element					100000000000000000000000000000000000000	COLUMN C. CALLET AND TOTAL CO.
	.21333++				.03542	.37924	DRIEN 1.0000087714 .72083
LEGADT	.08794***	.02149	3.14	.0014		.11006	LHADY:57714 1.0000096463
CVPTQES /	.00123	100116	2.19	.0274	00209	.00284	VCVSTGRS) _72555 - 56462 I.00000
12	Selow diaponal a						
THE THE	12008***	100354	-1.12	10002	-,15962	+-85874	
TENNEY TO LOST 1	.00690**	+00295	2.34	-0198	.00122	-01268	
Part A Mindell		100236	-2.81	10035	01136	-,00201	
NGA TRE			Birm Mines	rabotton			
INGA, TREE	Dispersion param ,37019***	.10462			17853		

Random Parameter Negative Binomial Model of Just Injury Crashes on Three lane SPF Class Roadway Segments

Dependent Log item: Bestricter Chi equar Significer McFadden I Estimation Inf Gr. All Nodel est Sample is	efficients RegB wariable incod fucction d log likelihood ed [6 2.5] see level passed on H = 1 = 220,2 MI imsteed for 92, 2 pds and 21 innomial regress	######################################	79 22 56 30 97 16 81 28			
JUSTINA	Coefficient	Standard Erxon	300	Frab. (8155*		ofidence erval
			00000			100,000
Constant	finisandon parame =13.4502*** 00485**	2.38899	49.97	0000	18.1912	-10.8088
OCUPTORA-		100210	-5.17	0909	-,00067	00043
MESTE	-,00061**	.00025	+2.47	0136	-,00109	00013
ENYSDINC	.00141***	.00166				204678
61	trees for stades	to a suppose to be body				
2.000	,66425***	a popular	100,000	v0000	148762	1786088
	1-29657***	-19082	8.35	.0000	. 95235	
- 1MAD5						
2/3M0/2 1	26335**	154093	+2.01	-0442	55974	00796
MENTORICE :	28385** Diaponal element	s of Cholesis	y matrix		55974	-,00798
MENTORICE :	28385** Diaponal element	s of Cholesis	y matrix		55974	57275.0
LHLEN LHADE	28385** Diaponal element .01136 .00313*	# of Cholese .10256 .21212	7 matris 2.23 1.91	.0260	500000	,42550
LHLEN LHLEN LHLOT:	28386** Diaponal element .01136 .00313* .22157**	# of Cholese ,10236 ,01212 ,00562	7 matria 2.23 1.91 2.12	.0260 .0886 .0205	.02732	,42555 ,59689
LHLEN LHADT LHADT HWOMICS	28386** Diagonal element .01136 .00313* .22157** Selow diagonal e	# of Cholesk .10256 .01212 .00563 lements of D	7 matris 2.23 1.91 2.32 holesky	.0260 .0584 .0205	.02730 00068 .03416	,42555 ,59689 ,40097
LHLEN LHADT LHADT HWOMICS	-,28365** Diagonal element ,01136 ,00368* ,22157** Selow diagonal e ,06121*	s of Cholesk .10256 .0256 .0252 .0852 lements of D	y matris 2.23 1.91 2.32 holesky	.0760 .0844 .0205	.02792 00068 .03416	,42555 ,59689 ,40697
LHLEN LHADT LHADT HWOMICE	-,28385** Disprnal element	s of Cholesk .10256 .0256 .0252 .0852 lements of D	y matris 2.23 1.91 2.32 holesky	.0760 .0844 .0205	.02792 00068 .03416	,42555 ,59689 ,40597
LHLEN LHLEN LHLEN LHLEN LHLEN LHLEN LHKELNE	-,28385** Disprnal element	# of Cholesk .10256 .01212 .00563 lements of D	y matris 2.23 1.91 2.32 holesky	.0760 .0844 .0205	.02792 00068 .03416	,42655 ,59689 ,40697 ,00651 ,25356
LHLEN LHADT LHADT LHADT LHADT LHA LHL LSHW LHL LSHW LHL	-,28385** Diagrael element ,01136 ,00988* ,22157** Selow diagonal e ,06121* -,08990	s of Cholesk 10706 10706 101212 10862 Lements of C 10065 10065 10821 ecer for Reg	7 matris 2.23 1.91 2.32 holesky -1.72 55 -2.01	.0260 .0888 .0205 matrix .0863 .5799 .0446 xibution	.02792 00068 .03416	,42555 ,59689 ,40697 ,20581 ,25356 -,20625

	DATES	LUADE	SHIDRICA	
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STREET, CO.	1134E-07		.1326	
3.0 Retai		1.		
	,01135			
2	104843			
3)	.3642	100		
Implied o		matrix of fem		
Implied o	ditalector a	MALLIN OF THE	ion, parameters	
Implied t	orrelector a	MACLIN OF DAM	ion parameters	
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Coc Met:	CHTEN	LHADT SENDET	TE CONTRACTOR	
Coc.Met.	INLES 1.00000	LHADT SEMBET		

Random Parameter Negative Binomial Model of Low Injury Crashes on Three lane SPF Class Roadway Segments

Pandom Coefficients Hespholes Model
Dependent variable 101MT
Log likelihood function -2147.08605
Restricted ing likelihood -501,12607
Chi mgubred | 4.6.f.| 9500.42607
Chi mgubred | 4.6.f.| 9500.42607
Chi mgubred | 4.6.f.| 9500.42607
Tolinations level | 0.0000
NoFadden French R-agnared | 4500817
Folimation based on N = 4308, f = 16
Inf.Cr.AIC = 4208.8 AIC/N = 1,000
Nocal settimated 3.000, 3018, 22:13:234
Seeple 18 2 pds and 2185 individuals
Regular binnels Degression model

Comparison Com	SHE	Coefficient	Brandage Error		First.		nfidense arral
Constant -1.6447*** 67272 17.91 0000 -12.862 -10	(86	ocanbin narang			******		
NUMBER -00380*** .0098				-17.0E	-0000	-12,9602	-1010263
NYMBURE	ASST	-,00389***	.00099	-3.96	.0001	-,00582	00195
#EVVEAU .0014** JOSED-04 0.21 .0030 .0010 #EVVEAU .2.11** 8.2242 -2.11 .0500 -29.3044 #Event for manuse persenters Hiller	SCVD)	-,00086***	/00012	-5.16	.0000	-,000088	-,00039
### 1-3.11*4** #.2040 - 2.11 .0350 -29.3050 - ####################################	DINC)	.01686***	.00469	2.44	.0006	.00723	.02643
### 1-3.114** #.2042 -2.11 .0850 -29.8308 - ####################################	TRAIT	-00014***	120680-04	6.61	.0000	.00010	20015
IMLEN 15000++ 09476 13.52 0000 75273 IMADO 137555+ 77605 18.39 0000 75275 IMMOLI -09000++ 1228 -9.20 0000 -06466 IMMOLI -09000++ 1228 -9.20 0000 00006 IMLEN 10020++ 10000 0.000 0.000 IMADO 09712++ 00001 0.20 0000 0.767 IMLEN 00796 00586 1.98 0000 -0020 IMMOLI 00796 00586 1.98 0000 -17012 IMMOLI -12211++ 12207 0.445 0.000 -17012 IMMOLI -01001 01005 1.45 0.000 -17012 IMMOLIN 0.0191 01005 1.45 0.000 -17012 IMMOLIN 0.0191 01005 0.000 0.0000 IMMOLIN 0.0191 01005 0.000 0.0000 IMMOLIN 0.0191 01005 0.0000 0.0000 IMMOLIN 0.0191 01005 0.0000 0.0000 IMMOLIN 0.0191 0.0100 0.0000 IMMOLIN 0.0191 0.0100 0.0000 IMMOLIN 0.0191 0.01000 0.0000 IMMOLIN 0.0191 0.01000 0.0000 IMMOLIN 0.0191 0.01000 IMMOLIN 0.0191 0.01000 0.0000 IMMOLIN 0.0191 0.01000 0.0000 IMMOLIN 0.0191 0.01000 0.0000 IMMOLIN 0.0191 0.01000 0.0000 IMMOLIN 0.0191 0.0000 0.0000 IMMOLIN 0.0191 0.0000 0.0000 IMMOLIN 0.0191 0.0000 IMMOLIN 0.00000 0.0000 IMMOLIN 0.00000 0.0000 IMMOLIN 0.00000 0.00000 IMMOLIN 0.00000 0.00000 IMMOLIN 0.00000 0.00000 IMMOLIN 0.00000 0.00000 IMMOLIN 0.000000 IMMOLIN 0.000000 IMMOLIN 0.000000 IMMOLIN 0.0000000 IMMOLIN 0.000000 IMMOLIN 0.0000000 IMMOLIN 0.0000000 IMMOLIN 0.000000000 IMMOLIN 0.0000000000000000000000000000000000	11063	-13.1274**	6.22624	-4.53	-0350	-29,3334	~.3242
DIRECT 1,37555*** 77608 B.34 .0000 1,2288 1.							
DIRECT 1,37555*** 77608 B.34 .0000 1,2288 1.	CEIL	. 650000+++	.054TE	15:52	-0000	.74275	1,05740
INSERT -0-000*** -0228 -0.20 -0.000 -0.6466 -0.0000 -0.6466 -0.0000 -0.6466 -0.0000 -0.6466 -0.0000 -0.0000 -0.6466 -0.0000 -0.0000 -0.0000 -0.0000 -0.0000 -0.0000 -0.0000 -0.0000 -0.0000 -0.0000 -0.0000 -0.0000 -0.0000 -0.0000 -0.0000 -0.0000 -0.0000 -0.0000 -0.00000 -0.00000 -0.00000 -0.00000 -0.00000 -0.000000 -0.0000000000	CLOT	1,37855***	,07808	18.34	-0000	1,22555	1,92300
THIRTH	17.103	04080***	.01228				-,01641
IHLER \$1020 25688 6.08 30500 21040 110301 10211 20601 5.25 30500 371040 110301 10211 20601 5.25 30500 3710 32501 1.25 30500 3710 32501 32501 3710 3710 3710 3710 3710 3710 3710 3710 3710 3710 3710 3710 3710 3710 3710 3710 3710 3710 3710 3710 3710 3710 3710 3710 3710 3710 3710 3710 3710 3710 3710 3710 3710 3710 3710 3710 3710 3710 3710 3710 3710 3710 3710 3710 3710 3710 3710 3710 3710 3710 3710 3710 3710 3710 3710 3710 3710 3710 3710 3710 3710 3710 3710 3710 3710 3710 3710 3710 3710 3710 3710 3710 3710 3710 3710 3710 3710 3710 3710 3710 3710 3710 3710 3710 3710 3710 3710 3710 3710 3710 3710 3710 3710 3710 3710 3710 3710 3710 3710 3710 3710 3710 3710 3710 3710 3710 3710 3710 3710 3710 3710 3710 3710 3710 3710 3710 3710 3710 3710 3710 3710 3710 3710 3710 3710 3710 3710 3710 3710 3710 3710 3710 3710 3710 3710 3710 3710 3710 3710 3710 3710 3710 3710 3710 3710 3710 3710 3710 3710 3710 3710 3710 3710 3710 3710 3710 3710 3710 3710 3710 3710 3710 3710 3710 3710 3710 3710 3710 3710 3710 3710 3710 3710 3710 3710 3710 3710 3710 3710 3710 3710 3710 3710 3710 3710 3710 3710 3710 3710 3710 3710 3710 3710 3710 3710 3710 3710 3710 3710 3710 3710 3710 3710 3710 3710 3710 3710 3710 3710 3710 3710 3710 3710 3710 3710 3710 3710 3710 3710 3710 3710 3710 3710 3710 3710 3710 3710 3710 3710 3710 3710 3710 3710 3710 3710 3710 3710 3710 3710 3710 3710 3710 3710 3710 3710 3710 3710 3710 3710 3710 3710 3710 3710 3710 3710 3710 3710 3710 3710 3710 3710 3710 3710 3710	104	appral element	of Chales	by matrice	.0000000		
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Selow Siegonel elemente of Cholesky Marrix	DAZZ	,08712***					.07638
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. e1210 6126. ee. 18210. 19210. AMI_WHEL Occupancy parameter for New Migraeles on temperature.	LHL	42511***	152397	-5.45	_0000	17012	-100000
Dispension parameter for DegBin distribution	LNL	01991	101405	-1.42	1565	-,04746	.00763
Dispension parameter for RegBin distribution	1000	.01291	.01252	.99	(3216)	-,01210	,23656
		spension parks	seces for De-	MAIN HAPP	ribution		
ScalFarm: .31044*** .02258 15.76 .0000 .26623 .	FACE!	431046***	.02251	15.74	.0000	.26622	.2546

Note: mnnnn.D-xe or D-xe => pultiply by 10 to -xx or +xx. Note: ***, **, * =>> Significance at 18, 5%, 10% level. Implied covariance matrix of cardon parameters

Committee matrix						
	DILIDI	110.07	ANWELT			
INTEN INTEN INDET	.86265-01 88816-01 61785-02	,18918-01 ,3200E-02	.6450E-03			

Teplies	ecandana	destairous	of render	n parameter
5.0_Beca	ii U			
	+			

log.Nat.	THIER	INADT	SHREET
single below the		med memorial	and the last of the
LHLERI	1,00000	+,90966	78382
20482	+.80966	1,00000	-91174
SEMBLE	+.75362	-325T4	1.00000

Random Parameter Negative Binomial Model of Total Crashes on Four lane SPF Class Roadway Segments

Beander Coefficients HeghnRey Hodel
Dependent variable 10711100
Log limilated function -25046.24157
Restricted log limilated -5004.24157
Chi spaned | 6 d.f.| 10000.1253
Significance level 00000
Mcfadden Pesude P-squared | 5579000
Mcfadden Pesude R-squared | 5579000
Mcfadden Restricted Jun 64, 2016, 174718
Semple 15 2 dd and 14216 individuals
Megative Nimonals regression model

TOTALACC	Coefficient	Standard Error		Frob.		mfidence erval		
(Nonzandom garameters								
Sonweatte	-6,72573+++	125609	-51:12:	.0000	+7:14926	-6.20222		
ENERS!	61272+++	.01159	10.15	.0000	. T9001	45542		
200311	.00092**	.00096	2.46	.0141	155927	.00418		
BCVL19(1)	-1.24201***	.07995	-15.10	.0000	-1:20071	+1.08830		
VCVPTSR5	.037734**	100756	4.59	,0000	-02291	.05256		
V257.1	03557+++	.00764	-4.46	.0000	05084	92065		
SCYCBAST!	-98585D-D4***	- 6502D+05	14.34	.0000	750530-04	-10274D-01		
NWYWDDDC:	.01065***	100198	9.47	10000	.00674	.01484		
VCVLL	184-302444	40.00723	8/57	+0000	105.304	265.306		
MCVMMXXXX	-6.00774***	+54006	-7-18	-0000	-T.68425	-4.38124		
WCVEVCA!	-,00080+++	100029	-2.73	.0064	+.00137	-,00022		
SEMPLICE	- D2764+++	.00eg7	-2.01	10042	4.02904	00934		
VCVL161	1.82432***	34121	5.33	.0000	1,15360	3.49504		
1100000	feany for rendor	parameters						
LHADY	.91110***	.02117	43.03	.0000	_66960	.91259		
VCEARSA:	105415+++	100985	0.54	.0000	.08457	,10380		
BUNDLY	++002207***	,00300	-27,46	-0000	+.01023	-,07649		
0.0000000000000000000000000000000000000	Magniel element	s of Chales	ky matria	S 1115				
LIGHT (.06574***	,00219	30.02	.0000	-06146	97008		
VCFARMA:	.03154***	.00040	3,72	.0002	.01492	.04017		
SHOULT	.00097***	V 00047	2,70	.0070	-D0108	.00488		
	e Lenopain unie		Chalesky.	BATHER				
INCE DIS	08760***	,01029	-8.63	.0000	T-0176E			
TRUE THEY	104124+++	.00811	13,126	-0000	+03551	-04780		
LEMEN_VCE	++01038+++	100019	+2,36	.0000	+-01463	-:01610		
	Lapersion payer	eter for Se	gRin Hist	CODUCTION				
SoalFarm!	45373***	,00764	54.54	.0000	30034	142552		

Implied noverience matrix of random parameters

Coveriance matrix

	LUADI	VETARIO	AMMELT
	.9329E-02 9787E-02	48188-02	
SENDLY	.2710E-03	+.301#E+0I	.21295-00

Implied standard deviations of random parameters

1.6	.0457588
21	.2454693
311	2461232

Implied correlation matrix of random parameters

Chr.Mas.	THEFT	VCPAING.	SHATET
*******			******
LHADT	1.00000	87708	.00019
VCELERAL!	-187708	1,00000	99542
SHOUGHT)	.19310	-,09542	1.00000

Random Parameter Negative Binomial Model of Property Damage Only Crashes on Four lane SPF Class Roadway Segments

Bessian Coefficients Deginise Model
Dependent variable
Log likelihood function - 2051.4506
Restricted Log likelihood -4165.3945
Chi aguared [6 m.r.] 6192.08954
Rignifilesed devel - 50920
Muffadden Facuda B-squared - 509206
Estimation based on W = 2543.3 = 12
Lof.0p.AlC = 1006.9 ACC/N = 1.445
Model estumates due 204.206.21818-03
Henglis 19 2 pds end 14716 individuals
Depositive biocomial repression model

		Standard		Frab.		nfidence		
800)	Coefficient	Extox		18154*	Int	serval.		
15	fonrandon parame	CATE						
(trattant)	-7.53677***	.24750	-30.48	.0000	48.02147	-1,05204		
DOCEST)	-00461***	-01396	62.26	.0000	.76131	. 83300		
08311	-00601*	+00928	1.95	.0646	00056	-71288		
VCV1.1	-5.39225***	456678	-5.66	0000	-4,09837			
BCVLUID:	-1.23455+**	10001	+10.91	.0000	-1.32330	92421		
NEWDDEC	-01056***	100221	4.56	.0000	00000			
CYPTORS	.00214***	.00048	6.746	.0000	.00120	.00209		
REVERSE!	.wf979D-04***	#140D-05	8-35	-0000	.814250-04	4.95440-0		
VCVEVCA)	+.0008544	000033	-2.57	0102	00180	-,00020		
VCPARSIA!	.08532+++	101177	7.553	.0000	20124	122239		
CN/SOCKLE.	-6.34521***	- 98452	-4.37	.0000	+8.29755	-4.59286		
VCV116	2.49733+++	.37742	3.97	.0001	.75762	2,23704		
11	mane for execute	parameters.						
COMMITTE	. 5525544+	-02463	30.60	.0000	30465	1,00126		
VCK	13623++	:06003	-2.00	10452	26956	00289		
SHEEDET!	00929+++	.00296	-30.13	10000	-,19379	00947		
in the second	Nagonal element	os of Choles	ay metraw					
LHADE	_05555+x+	.00221	25.11	.0000	104337	+89972		
- VCR	-29517+4	-11990	2.49	0127	10637€	183379		
STREET	.00383+++	.00182	5.22	.0014	100226	100939		
	below diagramal e	Canants of	Disleaky	matrix				
ACR THY!	16567	.18808	-1-44	:1812	-,43868	.00089		
339M_138A	.03335***	100049	2,33	.0000	/0224E	.03633		
SEM_VCK!	01911+++	100054	~5.16	.0000	-,02970	01482		
N.	dispersion peres							
calfarm)	.29461***	100061	66,07	.0000	27,913	411140		

implied covariance matrix of random parameters

0.0			1.0	
COVERLAG	oe matrix			
310010	ISADT	YCK	SMWDRT	
LHADT VOX SHWDRT	10-36906. -10-39701 10-30181.	.1240 1136E-01	_1255E-02	

Daplied standard deviations of random parameters

.D_Sets	
11	-0102943
21	1386162
8.1	.0354224

Cor.Net.	LIDATT	VCII.	THREE
CHADT	1.00000	34933	
VCK	+.34432	1.00000	+.90003
THE PARTY		- 90554	1.00000

Random Parameter Negative Binomial Model of Possible Injury Crashes on Four lane SPF Class Roadway Segments

Random Coefficients Region	beg floom)
Dependent veriable	PIM2
Log likelihood function	-10043,21665
Restricted log livelihood	
Chi squared [6 d.f.]	
Significance level	100000
McTanier Pasudo B-aguared	-9104994
Estimation Hased on H = 21	1432. K + 21
inf.Cr.AIC - Ji728.4 AIC.	3 + .764
Model estimated: Jun 06, 21	016, 18:42:37
Sample is 2 pds and 14210	* individuals
Segetive binomial regressi:	on model

	#CC##05000	Standard		Frob		nflownom	
P29(2)	Coefficient	Error		10/32		erval	
(1)	Monrandom parees	tiers					
Constant	-8.23887***	.37760	-21.82	.5500	-0.97115	+7,49579	
E-812-E-91	.76201+++	000000	82.83	.0000	172748	-79547	
HCVL1NZ	+2,40866***	117457	-18.64	.0000	+2.78442	-2.06248	
2030	29108***	.UTT54	-2.25	.0012	-,40300	-109996	
WCVL1	一、可是我还是有一个	-01072	-2.75	.0068	09000	7.008ZT	
HCVCRASH	-57623D-D44++	.1201D-04	4148	.0000	32322D-04	-619236+04	
SHREET	09972+++	100453	-20.75	.0000	10914	09000	
CONCRET.)	-00343***	-00061	6.64	-0000	.00241	.00442	
VCVEVCA!	- C0265***	.00082	-5.51	.0000	7,00382	+,00186	
SCVX I-	20101B-04***	.600LD-05	-5.35	.0005	318830-04	+.83593D-0	
VEYTANT	113.704***	166,61034	4.74	10066	42,762	264,116	
18	deans for tensor	parameters					
LHADE	-97224***	-03701	26.27	+0000	-29270	1:04479	
CYPTOBA	.03449***	101063	2.26	.0012	-01385	.05552	
AHRECK	+-022384+*	100001	-9.88	.0001	00076	+201100	
	Diagonal wlamant	s of Choles					
ENGLOS	.03243***	.00299	11.06	.0000	.00669	.0981#	
CYPTORA	.00291***	,00038	7.66		.00217	.00365	
SHMOCK	.61126***	.00636	1.00	.0095	.00272	.01961	
(1)	Below diagonal e	Lesents of S	Cholesky	MATELA			
VCV_110a	-00560	120053	- 24	+8455	+,000044	-00188	
SEM THAT	.06377***	-00774	2.24	.0000	.04860	-07594	
SEE VICTO	.00170***	100,600	5.22	.0000	.04978	104561	
11	Manag note: ede:	eter for Ne	read dags	PADUTA	10		
Scalfarm!	32565***	481180	27.55	.0000	100000	-35163	

Implied covariance matrix of random parameters

1100000	LHADT	VCVPTGRA	SENDOR
LUADT	.1062E-02	********	
UCUPTORA SHREDCR	:1616E+04	.8714E-06 .1229E-01	.5156E-02

Implied standard deviations of random parameters

S_D_Betai	tel							į
		-	+			-	+	-
2.0		ð	Ġ	á	ŧ	2	i	2
7.1	1.6	á	g	ā	é			
50	1.0	ï		ď,	Ô	2	ï	ä

Implied correlation matrix of random parameters

Dor Hat.	LIMADT	VEVFIGRA	SENDER

LHADT	1.00000	.14819	. 15449
VCVFTSEA:	.10018	1,00000	.66213
SENDOR	200000	8871%	1.00000

Random Parameter Negative Binomial Model of Evident Injury Crashes on Four lane SPF Class Roadway Segments

Random Speffigients HedBoked Hodel
Dependent warrante EVI
Log likelihood function -8864.66794
Restricted ing likelihood -6362.73454
Chi squared [3 d.f.] 1038.17442
Significance level .00000
McFedden Pseudo R-squared .0011701
Estimation based on H = 19431, K = 14
Inf. Cr. AIR = 11787.3 AIC/8 = .414
Nodel estimated: Jun 06, 2016, 17:15:50
Sample is 2 pds and 14216 individuals
Segative binomial regression model

žVI	Coefficient	Standard Error		8130°		nfidence erwal	
- 17	Fonrandom payane	seca				2238010	
Constant	-5-47814***	.47200	-11.41	-0000	-6.40524	-4.55304	
THIER	.78013***	100245	34.75	.0000	,73613	,82413	
05010	-0107e**	-00801	0.14	-0322	,00093	V02081	
VCV233	-1-17-37-4	14743	+2.38	-0007	-1,88680	-,49344	
REVELWE	-18267.0**	0000.004	+7-01	-0279	-55145.3	-1125.6	
MCVL	0.46532++	1.86795	2.05	-0379	,10414	0.73250	
TUVETURA:	-00215***	-90061	3.46	-0005	100092	.00933	
SCHREELI	-3,45935**	1,66755	+2.07	-9380	-6.772559	-,19107	
13	leans for random	parameters					
1300001	.57929***	.04669	12.41	-0000	140776	.67000	
21500001	e.00303***	,00000	-10,00	-0000	-107540	-,09187	
1	Legonal element	e of Cholest	ty metric				
THEORY.	.00950***	+00300	9.69	-0200	152324	.09901	
SHWIRT	,00903**	100173	2.42		100572	103404	
1000	Selow diagonal a	Lements of C	Tholesky	metrix			
LENG LIGHT	104072***	.004ZZ	2.61	.0000	109244	/011199	
- 1	Caperaton pares	ebar for Fer	din mist	eshotsen			
SoulPaym:	.83568***	- 0+89Y	12.79	-0.000	144969	162970	

Coverien	Coverance matrix					
	DIADT	SHAME				
LHADT	.0403E-05		2 000000000000000000000000000000000000			

Implied standard deviations of random parameters

S.D.Be	tel	3.
	11	.0291261
	21	18417643

Cor.Nat.		
LHADT	1.00000	-97627
SEMBET	.07627	1,00000

Random Parameter Negative Binomial Model of Serious Injury Crashes on Four lane SPF Class Roadway Segments

Dependent Log likel: Bestrinted Significan Krfanden I Sptimation Inf.Cr.AIC Model est: Sengile 1s Segutive b	officience Ment variable incode function of long likelihood function of left likelihood for left likelihood	### - 1411.853 - 1412.872 - 1438.724 88.660 01378 20482.8 ** 07W ** -1 3016, 30143; 100 model	66 28 02 53 11 01 54			
	*****	Standard		Prob.	954 00	nfidence
3187	Coefficient	Execu		101024	Int	erval
	Contantie Sarane					
	-5.34367***		25.00	COMMON CO.	-7.93445	-9.95209
	.50728***	-05285	19.28	,0000	-70072	
	-1.91403***	gong k	+3.18	0016	-3,10661	-,72550
RHANDORC !	02020*	01222			04715	
HEVEROREL!	.00499***	00166		.0012		.00501
	seems for random	payaneters				
LHADTI	41060***	120000	4.31	10000	-29295	41444
SMMDCA	07535***				-,11173	
	Asgonal element					
	.02459***	.00940				
SHUDCE	302137#	.03265		.0469	00398	.04432
1.15	Selow diagonal o	Lamanta of C				
		02120				AD8428
LESW_DALL			Marie Walnut	Act Section in pro-		
LESW_DALL	Assess.		2-27			

	110,07	SINDER
LHAST SHRECK	.8254E-03 .1789E-02	.41828-02
Implied un	endand devi	ations of random parameters
B.D_Betel		1
21 21	.02678 .06467	
Implied or	crelation m	optics of random parameters
		noje ferioripriori
Tot Han . 1	LHADT 5	HVOCR
	1.00000	94490
	124430 21	

Random Parameter Negative Binomial Model of Fatal Injury Crashes on Four lane SPF Class Roadway Segments

Ametricte Thi squar Highlfion Highlfion Highline	shood function of ing limitations of ing limitations of i I off.) not invel provide Braudo B-agrared to beset on B = 1 one.0 Al imates: Jun Of, 2 pos and 161 papers.	-30431,898 85833,090 .000 .98149 20432, E = .0 2016, 13:21: 16 individua	06 176 100 41 6 137 23			
Hadder FAE	OLINEAR SERVICE	Itandard Froor		Frob,		onfidence eroal
FATAL	Courtingage					
	Contandom parabe					
	Pontwidom parabe		-6.29	,0000	-10.56798	-9.95121
Constant		ters 1.60300 _11712	6.67	0000	.34559	
Constant	-7.26909+K* -77512***	ters 1.60300 _11712	6.67	0000	.34559	1.00466
Constant LHLEW SHADATCA	-7.26909+K* -77512***	1.60300 -11712 -08876	6.67	0000	.54550 02250	1.00466
Constant LICEN SEWDATCA HCVHKALL	-7.26999+** -77812*** -06719	ters 1.60300 .11722 .01874 7.42963	8,62	.0000 .0621 .0538	.54550 02250 -28.3390	1.00465 .15682 .7994
Constant LULEN SEVERTOR ROYMERLS VCVL18	-7.26999*** .77812*** .06715 -19.772** 5.26175***	1.60000 -11722 -01874 7.42968 1.96770	6,62 1,67 -1,95 2,67	.0000 .0621 .0538 .0078	.54559 02250 -28,9390 1.40513	1.00465 .15682 .7994
Constant LULEN SEVERTOR ROYMERLS VCVL18	-7.26999+** .77813+** .06715 -18.7728* 5.26175***	1.60000 -11722 -01874 7.42968 1.96770	6,62 1,67 -1,95 2,67	.0000 .0621 .0538 .0078	.54559 02250 -28,9390 1.40513	1.00465 .15682 .7994
Constant LISTERN SEMPORTOR ROWNERLI VOVELS	-7.26999*** .77812*** .06715 -19.772** 5.26175***	1100000 -11712 -01874 7-42968 1.06770 permeters -17821	6,62 1,67 -1,95 2,67	.0000 .0621 .0536 .0075	.54559 02250 -29.3350 1.40513	1.00466 .15680 .7696 9.11837
Constant LISTERN SEMPORTOR ROWNERLI VOVELS	-7.26999+** .77512+** .06715 -19.7728+ 9.26175+** Deans for random	1.60000 -11722 -05276 7.62968 1.96770 parameters -17901 for discs.	6,62 1,67 -1,95 2,67	.0000 .0621 .0536 .6075 .0388	.54559 02250 -28,9390 1.40513 .01841	1.00468 .15680 .7894 9.11837
Constant LULES SMCDTCA: MCYMCALS: VCVL15: LMADT:	-7.26999*** .77512*** .06715 -19.7728* 5.26175*** Deans for rendom .35752** Scale parameters	1.60000 -1.722 -0.524 7.52963 1.96770 perameter 1.7901 for dista- .01210	6,62 1,67 -1,95 2,67 2,07 of seconds,20	.0000 .0621 .0538 .0075 .0388 .0014	.54559 02250 -28,9390 1.40313 .01841 FERRE .01327	1.00468 .15680 .7894 9.11837

Random Parameter Negative Binomial Model of Unknown Injury Crashes on Four lane SPF Class Roadway Segments

Mestriote Dhi sgier Significa McTeddan Estimatio Inf-Cr.Al Hodel est Semple is Regetive	variable thoof function of log likelihood function of log likelihood for level Facedon B. squares in mased on B. C. = 2078.5 Atlimated Jun 06. 2 pds and 144 binomial regress	1 -1000.868 46.237 .000 1 .02200 .26482, 8 - 1078 - 18759; 1018.19759; 110 individua sino model	99 20 00 92 13 73 04			
	Coefficient	Standard		Prob.	95% Co	nfidence
		Charles and other body				
	Honrandom parama					
	-5,15546***					
	-TRESS.	+99744	13174	10000		-90442
SCYNOCSEL!		,00148 ,7525D-04	3.50	.0000	.00260	
BCAT	00048***	75250-04	-8.40	10000	-,00063	
ERMINI					18218	
EMAMDIRO	-104807444	193,896	-2.64	.0085	08538	01264
	Means for rangos					
LIGUE	,18004***	.13137			120004	
SHMORTCR				.0131	25746	03022
	Disponal element	s of Cholese	y matters			
139,07	.01281**	-50698	2.95		-00081	
	.02855			.0042	01570	-09245
	Below diagonal a					
ARL WEEL						-29792
	Dispersion pares	seter for Day	Din dist	ribution		
		109576	27.66	20040	109768	-46309

	THAT	SHMENTON
LIBET	.16412-03	
SHADELOR	,2788E-02	-4749E-01
Deplied st	andard devi	ellone of rendom parameters
1.D_Deta)		1
21 21	002505	
21	121791	14
Deplies on	xrelation sw	atria of random parameters
	IMADT SENS	

Random Parameter Negative Binomial Model of High Injury Crashes on Four lane SPF Class Roadway Segments

Dependent Log likel Bestricts Chi squat Significa No Fadden Estimation Inf.Cr.A Nodel mat Sample Li	refficients Hegi refrance inhood function of log likelihoo red [3 d.f.] inhoe level Freedo R-selare in based of S Ilmatod: Jur 01, s z pus and 14 binomial zegres	H1 -6754.19 1-7467.45 1428.45 10055 10431, E - 1016, 13:55 16 Lndavidu	023 025 000 131 11 474 :25			
H21347	Coefficient	Standard Erate	30	910b.		nfidence erwal
55/2013/9	Honrandom parame	etara	1122	2.55.17		
Constant	-4.85066*** -50083*** -50083*** -42471** -18114*** -20086** -10868***	.82726	-9.38	-2000	-5.9840T	-8.91725
2301.63	.80083***	101083	40.35	.0000	.76167	,53939
HOVE	-,00013***	126550-01	-4.91	.0000	=,000LE	-,00000
HOTLERC	42471++	18761	-2.26	-0236	79343	05700
ANNURSER	.15114***	.05790	5.90	-0001	107670	.22558
DEGL	21036**	200498	2.06	-0372	.00061	202012
PHRIST		.00991	-10.08	-0000	07122	-,04804
SCYMKSEL	.00319***	-00059	5.32	.0000	.00148	.00432
HOVE	.00315*** 19411D-04***	. 6415D-05	-2.03	.0025	519990-04	+1652340+05
	Neans for randm	n parameters				
LHADT	481548***	102120	16.07	0000	156061	160001
505H2CK	.81548*** 07176***	102002	+3.83	-000¢	11159	03133
	Diagonal element					
LIGHT	.02878***	.00215	13.37	-2000	- 02456	.03300
SHINDER	101520+++	100655	2.14	.0027	+90571	102479
	Below diagonal e					
COURSE TAPE	.09663***	100423	11.06	.0000	4,03837	-05400
SSEEK THE						
111	Diepersion perm .72632***	menen for He	gein mies	PERMIT	Th.	

	LNADO		2
CHAPT	-82815-00		
Implied st	andard de-	to manifest	random paremeters
S.D_Beta		1	
2)	.0287	1740	
2.1	.0420		
Implied co	rrelenim	matrix of a	andom parameters
	001001100		
Cor.Hat.,	LHADT		
198771	2.00000		

Random Parameter Negative Binomial Model of Just Injury Crashes on Four lane SPF Class Roadway Segments

Depandent Log likels Bestricter Cti Sgiars Significar Hofadoen B Estimation Inf-Ct.810 Nodel werd	officients Hegi variable variable variable hand function of log limbellhood of 3 d.f.] too lettel feedo 8-squares is based on 8 = 1 = 13557.3 AU mated Jun 11. Jpds and 14. Innomial regress	7051 -6021.61 8 -2432.93 3010.73 .00 9 .1764 20422.8 = 10/8 = 2016, 15:05	000 000 000 160 164			
		STREAMENTS		Poots		efidence
0097.2860	Coefficient	Error		11132	111	ervel
Constant LMLER SEMPCE BREEFICE DEVIL VCVL1 VCVL1 VCVL SEMPSI SEMPSI SCVL VCVL SEMPSI SCVE SEMPSI SCVE SEMPSI	Compandom paramit -0.01141*** -1.01141*** -1.01145*** -1.01145*** -1.01145*** -1.01145*** -1.01145*** -1.0145*** -1.0145*** -1.0145*** -1.0145*** -1.0145*** -1.0145*** -1.0145*** -1.0145*** -1.0145*** -1.0145*** -1.0145*** -1.0145*** -1.0145*** -1.0145*** -1.0145*** -1.0145*** -1.0145*** -1.0145*** -1.0145*** -1.0145*** -1.0145** -1.0145** -1.0145** -1.0145** -1.0145** -1.0145** -1.0145** -1.0145** -1.0145** -1.0145** -1.0145** -1.0145** -1.0145** -1.0145** -1.0145** -1.0145** -1.0145** -1.0145** -1.0145** -1.0145** -1.0145** -1.0145** -1.0145** -1.0145** -1.0145** -1.0145** -1.0145** -1.0145** -1.0145** -1.0145** -1.0145** -1.0145** -1.0145** -1.0145** -1.0145** -1.0145** -1.0145** -1.0145** -1.0145** -1.0145** -1.0145** -1.0145** -1.0145** -1.0145** -1.0145** -1.0145** -1.0145** -1.0145** -1.0145** -1.0145** -1.0145** -1.0145** -1.0145** -1.0145** -1.0145** -1.0145** -1.0145** -1.0145** -1.0145** -1.0145** -1.0145** -1.0145** -1.0145** -1.0145** -1.0145** -1.0145** -1.0145** -1.0145** -1.0145** -1.0145** -1.0145** -1.0145** -1.0145** -1.0145** -1.0145** -1.0145** -1.0145** -1.0145** -1.0145** -1.0145** -1.0145** -1.0145** -1.0145** -1.0145** -1.0145** -1.0145** -1.0145** -1.0145** -1.0145** -1.0145** -1.0145** -1.0145** -1.0145** -1.0145** -1.0145** -1.0145** -1.0145** -1.0145** -1.0145** -1.0145** -1.0145** -1.0145** -1.0145** -1.0145** -1.0145** -1.0145** -1.0145** -1.0145** -1.0145** -1.0145** -1.0145** -1.0145** -1.0145** -1.0145** -1.0145** -1.0145** -1.0145** -1.0145** -1.0145** -1.0145** -1.0145** -1.0145** -1.0145** -1.0145** -1.0145** -1.0145** -1.0145** -1.0145** -1.0145** -1.0145** -1.0145** -1.0145** -1.0145** -1.0145** -1.0145** -1.0145** -1.0145** -1.0145** -1.0145**	81253 04000 04000 85100 150400 150400 170500 170500 170500 170500 170500 170500 170500 170500 170500 170500 170500 170500 170500 170500 170500 170500 170500 170500 170500 170500 170500 170500 170500 170500 170500 170500 170500 170500 170500 170500 170500 170500 170500 170500 170500 170500 170500 170500 170500 170500 170500 170500 170500 170500 170500 170500 170500 170500 170500 170500 170500 170500 170500 170500 170500 170500 170500 170500 170500 170500 170500 170500 170500 170500 170500 170500 170500 170500 170500 170500 170500 170500 170500 170500 170500 170500 170500 170500 170500 170500 170500 170500 170500 170500 170500 170500 170500 170500 170500 170500 170500 170500 170500 170500 170500 170500 170500 170500 170500 170500 170500 170500 170500 170500 170500 170500 170500 170500 170500 170500 170500 170500 170500 170500 170500 170500 170500 170500 170500 170500 170500 170500 170500 170500 170500 170500 170500 170500 170500 170500 170500 170500 170500 170500 170500 170500 170500 170500 170500 170500 170500 170500 170500 170500 170500 170500 170500 170500 170500 170500 170500 170500 170500 170500 170500 170500 170500 170500 170500 170500 170500 170500 170500 170500 170500 170500 170500 170500 170500 170500 170500 170500 170500 170500 170500 170500 170500 170500 170500 170500 170500 170500 170500 170500 170500 170500 170500 170500 170500 170500 170500 170500 170500 170500 170500 170500 170500 170500 170500 170500 170500 170500 170500 170500 170500 170500 170500 170500 170500 170500 170500 170500 170500 170500 170500 170500 170500 170500 170500 170500 170500 170500 170500 170500 170500 170500 170500 170500 170500 170500 170500 170500 170500 170500 170500 170500 170500 170500 170500 170500 170500 170500 170500 170500 170500 170500 170500 170500 170500 170500 17	50,10 -0,57 5,09 5,70 -6,13 5,27 -2,51 -2,69 -7,15 4,61 -7,52 -2,50	,0000 ,0001 ,0000 ,0000 ,0000 ,0122 ,0002 ,0002 ,0000	-,17485 .08475 .00409 -24,3402 .25496 -2,12395 -1,46291 -100044 .00164 -409976	-74798 -05137 -05137 -02568 -10.0551 2.77354 -2.12970 -44953 -01204 -00025
	Seane for random	Darmieters				
HCVIQUEE:	.02575*** .00419***	100047	8.29	+0000	.00268	
LHADT	naponal element 	,00210	8.55 7.02	10000	-01252	
DREA THE	lelow diagonal : 00200*** hapersion pares	.00038	-8.26	.0006	00312	00168
	'2008I ***					33215

Deplied covaciance matrix of xandom parameters

Covariance matrix

IMADT SCHWOODE

IMADT .0002F-03

INCOMENT .0158F-04 .0169F-04

Deplied standard deviations of random parameters

5,D_beta) 1

11 .0176102
21 .00341989

Deplied ourselation matrix of random parameters

Cor.Mat. 10407 MCMSSEE

LMADT: 1.00000 -.69472 HCVHKSEL: -.89472 I.00000

Random Parameter Negative Binomial Model of Low Injury Crashes on Four lane SPF Class Roadway Segments

Rependent og likel: Restricte hi square lignifikan loFadden Satimation inf.Cr.AT lodel est: Sample is	efficients Neginarialle interest of the function of log likelihood function of log log and likelihood function of log likelihood function of log log likelihood function of log log likelihood function of log likelihood function of log likelihood function of likelihood function o	100 -32351.67 d -49297.22 33803.131 33803.131 34632, K = 2016, 20133 2016, 20133 216 individue	589 500 126 24 174 100 819			
100 CO		Standard		Fron.	919 01	nfidence
TOTAL	Coefficient	Error		121529		erral
	Sociandos param					
engrant :	-7.20889***	23995	-30.06	.0000	-7.67607	-E.73540
TRUENT	-1,20569*** .81501*** -5.66016*** 2.56473***	.01.281	63.35	.0000	79290	94512
CURNINGT	.51501*** +5.6070*** 2.56471***05410***00967***00056***522070-04***00115*** .00261***	-90290	+6.49	.0000	-1,63049	-1.00106
MITST.	4.55577+++	200206	8.85	2000	4100000	7.83454
SENTER	- 58457944	.00280	-75.00	a ban	- 198 SAY	07859
programa co	00000000	100018	4.30	0000	200000	01760
United	000047++4	67975-04	-9.45	5000		-: 00054
urnimore s.	- 200000000	.00052	-2.71	obet	- 107148	+:00024
SCHOOL SELECTION	939075-04444	18845-08	7.00	dean	101025-04	877520-04
CONTRACTOR OF	4.00716444	477733	18.82	0000	A 2072 TH	0.70083
NOTES A SECTION	109261***	,00033 ,01096	0.55	2004	107232	100002
MUTATION STATE	-20047.1*** 1.45973*** 00269**	4767,192	40.00	2020	-40210-6	
harmen has	20001224	97417774	4.09	20000	78578	2,21951
0891	- 5114667	200.14	-2.25	.0228	00500	
apoli i	Seens for rando	199425	4140	CARRO	100000	150500
AMERICA.	196425***	23547	47.00	innan.	191555	1,02040
Water for the	02848444	00707	-3.63	0000	-,03983	
CURTOR	-,02560***	200048	7.10	0000	100245	
	.00343*** Sagonal elemen	ne of Photes	NO HARRIST		100545	10040
1411.77	CONTRACTOR	00100	22.22	noon	,03730	(04488)
Water Street	.04107*** .04422*** .00036*	00767	8.87	0.000	02947	05838
Charles and the first	A40544	200708	7 30	5499	02001	00073
SAN TARREST	Selmy diagonal	AND SAFE	4-25	10400	101041	CASS A. St.
sand rare.	CTACCALL.	CONTRACTOR OF CO.	runvessi.	2256	200000	04107
OPE TME	1000000000	20000	34 42	2000	+00708	00815
TOT_UNK!	-,02608*** -,06918*** -,00370***	190004	26.0	-5000	2100340	
ACA DOM!	-100310	100024	*25.37	10000	-100410	00323
	dispersion park	,00827	48.82	.0000	. 38778	42022
celFarm:						

Implies covariance matrix of random parameters

Covariance Matrix

LUGADT SEMBLICA VIVETGRA

LUGADT 1.6562-02

REMOLICA 98828-03

20148-03

VIVETGRA -27328-03 -32882-03

REPLIES STANDARD GEVENIONS OF SANDOM parameters

8.2.8618 1

1 .0010066

2 .00501847

3 .00773044

Implied correlation matrix of random parameters

Coc.Mat. LUGAT SEMBLICE VIVETGRA

LUGADT 1.00000 .47782 -.87830

SEMBLICA .57083 1.00000 .59318

VIVETGRA -37800 .39376 1.00000

Random Parameter Negative Binomial Model of Total Crashes on Five lane SPF Class Roadway

Segments

Bandom Coefficiencs Megdning Nodel
Dependent variable FORALDO
September variable FORALDO
September variable FORALDO
September variable FORALDO
September September Sep

1		Stendard		Frab.	95% Co	mfidence
COTALACCI	Coefficient	Extor		12127	Int	devis.

	Municandon param					
	-0.02265***		+0.36	.0000		-4,67990
13/12/21	.55001+**		22.07	.0000	78182	
SCVLISE.	-1.95920+++		+4.52	.0000	-2,75024	-1,14016
IMMOST	06140+**	-01891	+3.25	0012	-,09547	7.02433
VCVLL	00038+++	100014	+2.70	.0089	-,00067	+.00011
VCTARSA!	.00891***	-03118	3.00	.0022	23635	,28647
SHADETER	-04079***	101890	2,55	.0099	15000;	.07176
LTD0071	-5,35364**	2.43512	+2.22	10277	-10,11260	58799
11	deans for randor	parameters.				
LEGADT	-90781+++	.06911	13.11	10000	.77214	1.04348
STRUCKT!	01235+++	201953	-5.71	10003	-,11065	03411
HCVCRAH!	.00012+++	-3107D-04	3.00	.0001	00004	.,00018
1	Diagonal element	te of Chalesk	y matria			
LEGIT	-07915***	100507	15.61	10000	104921	,00909
SHUDLT	.03272***	.00769	4.76	.0000	.01766	:04779
HCVCRAW!	.42799D-04**		2.06	0594	.397400-05	
10	Selow disconsi 4	Language of C	bolasko	metrix		
SON LYD.	-06067***	.01077	4.70	.0000	.02947	0.07547
MCV LER	.#1279D-04++	.2993D-04	2.04	0410	U802350-05	-109530-03
SHOW WARK!	83950D-04**	26750-04	-21.99	0169	114995-09	115960-0
	Dispersion parss					
	.65541+++				.57928	179172
					1.007,000	

Deplies coverience matrix of vandom parameters

Coreciance matrix

LHADT SHMILT MCVCRAH

LHADT .62651-03
SHMILT .4007E-03 .5827E-02
HCVCRAH .6958-08 .2027E-05 .22825-07

Implied standard deviations of random parameter

1 (091987.0.) 12 009109.0.0 12 2001009.0.0 12

Implied correlation matrix of random parameters

Cer.Met.1 IMADE SENDII NEVERAM LMADE: 1.0000 .8988 -72690 SINGEE: 1.0000 .29927 NEVERAM: 72630 .29927 1.00000

Random Parameter Negative Binomial Model of Property Damage Only Crashes on Five Iane SPF Class Roadway Segments

200	Coefficient	Standard Error		Frob.		nfidence erral
	Sonrandon parane	Dete		100000		
Constant	-4.76475444		-9.71	.0000	-6:44520	-5,18536
LNCKY	-99394*** -01698***	104372	20.45	.0000	, 90929	197943
7651	-01699+++	120564	8.01	,9224	.00592	102959
VEVIA	-3.06848***	179450	-3795	0001	-4.62859	-1,50717
HCVL:HE	-1.39507***	-43990	-0.04	.0024	-2.14681	+,47484
ACABAGES.	_00208++	100090	2,30	0219	.00031	100285
2007	25303D-04**	-1248D-04	+2.02	.0436	496550-04	71648D-08
VCPARHO.		03645	3.17	0015	.04425	.18714
AVDDEVD:	_00223***		5,33	.0009	200002	
SHIPCO	-11035**	+D4076	2.82	0117		(19618
ENTINDENC		00403	-0.21	0269		A-101112
	Steams for random					
TOWN	_57315+++	,01940	11.14	.0000	.74930	1.02655
DEGONESKE	01540**	.00525	+2,55	0107	-,02584	+,00354
SHOUSE	17196***	-01012	-12.55	10000	-,15768	-,10623
	Disgonal element	s of Cholesk	y metris			
LEADT	-04959+++	*02484	2.32	.0000	01634	106264
MERIDOEC	00376***	-00170	5.38	.0007	200242	.00900
SHOUNT		-00481	1.98	-9724	-,00189	02491
	Selmy Missional e	elements of C	halesky	BATILE		
ASST TALK	.00434	100490	-0.0		-,00026	
LSHX LHA	_05827***	01226	4.75	10000	.00424	.09230
SHK RHY	02575***	100964		10075	,00629	124467
	Dispersion parks	ster for Ner	Sta Stat	#15071:	in	
Soalfarm:	-72346***	109407	18,98	10000	- 83.T4E	162946

Note: manna.D-sx of D-sx => multiply by 10 to -sx pr +sx. Note: ***, **, * ==> Significance at 1%, 5%, 10% level. Implied covariance matrix of random parameters

Covariance Metrie

LHADT REWNDECC SENIET

LHADT .2459E-02
REWNDEC .2148E-03
.5184E-04
.5580EZ .2500E-02 .4015E-05
.4187E-05

Implies standard deviations of rendom paymeters

1 .0405911 2 .00721071

Implied posselation matrix of random parameters

Cor.bac.: LMADT RWYWDDEC SHWURZ LMADT: 1.00000 .60935 .00000 SHWURZ: 40235 1.00000 .60032 SHWURZ: 80006 .60032 1.00000

Random Parameter Negative Binomial Model of Possible Injury Crashes on Five lane SPF Class Roadway Segments

Dependent Log livel: Restricted Chi square Significar HoTadden S Estimation Inf.Cr.AIC Nodel esti Sample is	efficients Regs variable blood function 4 log likelihood ms [6 d.1] see in 8 - squared t based to 8 - 1 = 2703.1 M meted for 15, 2 pds md 11 tinomial regress	-1305.568 -2151.170 1501.206 .000 .02883 2246, K = 2.2 2016.10179	66 71 90 73 16 06			
FIRS!	Coefficient	Stendard Error	1	Frub: (E)>0*		ofidence errel
	Concandos parane			1000	September 1	1,30,00
	-6,17708***	1,05537	-518T		-6.25143	
	.52754***	05315			,72338	
	.02235**			.0296	.00221	
ROVETOVAL	*40185+	.00109	1.97	-0613	-:00033	00897
HEYE	00040***	200002	-3.20	-0014	00064	00013
PREVIOUS CO.	00040*** *.01709**	,00817	+2.29	.0366	+,00000	-,00108
12	teans for randow	parameters				
130000	390776***	,10846	0.37	.0000	.69617	1,12034
RECYNOPEC	01863** 56956***	00792	-2.36	.0185	03413	00515
SENDATI	-,54955***	00004	~5:25	-0000	-,10013	=,11603
1.0	Caponal element	# Of Cholesk	V BATKER			
130,07	.00566** .01039***	22359	2.37	-0176	+00066	20073
PHYMODEC	,01019***	.00290	4.50	,0000	,00583	.01483
SHIDET	.02635***	79800.	2.33	_0000	+00075	.04390
	delow disgonal a					
1995 LHA:	100879	700771	1.15	12978		
LIMB LUA:	.04078	21860	-51	+5023	+100764	:04921
LINE RWY	.05028***	105442	3,40	.0005	102202	.07935
	Laberation bacas	ster for Jec				
	.54677444			-0000	43335	

Implied noverience natrix of random parameters

Coastraum	e metria			
records.	LEADT	SNAMBORC	INDET	100000000000000000000000000000000000000
LMADT BEVENDED SENDAI	.1197E-08 .1789E-04 .2209E-04	.1830E-01 .6137E-03		

Implies standard deviations of random parameters

.D Secal	
17	.00367890
27	.0198297
31	.0077747

Deplied correlation matrix of random parameters

or,Met-	LHADT	RHYNDOEC	SHORT
LHADT	1.00000	.64146	.14663
WYWDOEC!	164346	1.00000	178523
SHADET	15863	.78523	1.00000

Random Parameter Negative Binomial Model of Evident Injury Crashes on Five lane SPF Class

Roadway Segments

Fandom Coefficients NegBoleg Model Dependent variable EVI Log likelihood function -1257.41402 Restricted Log likelihood -1290.43897

Chi squar Significa NoFedden Estimation Inf.Cr.Al Nodel est Semple is	es 6 d.f. nos level Pesodo R-square: n bases on N = C = 2950.8 A; imated: Jun 30, 2 pds and 21 binomial regress	246,55 .00 1 .0956 .0246, 5 = .078 = .2016, 20149 709 individo	000 716 15 471 185			
171	Coefficient	Standard Error		First. (#)>0*	98% Co Zeri	nfidense arral
	Noncanibis pacans	tere				
Constant	47986	1.47451	2-30	0.0107	-2760812	8184749
HCVL LHZ (-3.70270***	.04139	-4.40	-0000	-5.35180	-2.05360
HCVNKSEL!	-3.70270***	00163	2:39	-0168	100071	(00711
ENTRUCHC)	03929***	.00995	-5.95	10001	05660	01976
-VIVLLE:	-4.94121***	1,31474	+5.7E	.0002	=7,81808	+2138437
BUFLDED	-1,48813***	.29546	-9.74	-0002	-2.26888	-,71314
DE92	03862**	.01013	-2.33	-9196	04044	00379
300000	Means for randor	paramaters				
LHADT	.64586***	.09162	6.99	-0000	.96106	.82022
ENGINEE:	55422***	.01921	-11.92	.0000	-1,18212	-,10033
THEATH	.65086*** 15622*** .56143***	.0433.9	19:06	.0000	127236	.95001
	Disponsi element	s of Choles	ky metria	i i		
DIDLET	,02563**	71367	2.12	0222	200224	.05502
SSMIRT	.02812**	.01112	2.05	0376	100132	.00651
THERM	/05081***	.01898	2,76	10057	+01478	
	Below diagonal e					
SARE THE	.03151+	.01894	1.92	.0553	00071	36373

ne diagonal .03151* -.02675* .01880 158W 1884 1181 1884 1181 1884 -,00071 -,20088 -,04886 06379 01198 07494 | Dispersion pers | Scalfers| 1.35507*** eter for Neghin distribution .56481 3.73 .0002 5,07412 ,64335 Note: chance.D-mx or D-mx == multiply by 10 to -mx or -mx. Note: ***, **, * ==> Significance at 14, 54, 104 level.

Taplies coverience matrix of recoon parameters

COVERTAR	DE BRITIS			
	*			******
	LHADT	SHADEL	LHERY	
	*			
ENADT	.0100E-01			

SENDET LOCEN .9023E-03 .1527E-02 .117EE-01 .-2713E-02 -.2690E-02 .117EE-01

S.D Seta								1
		-						
11	٠,	ģ	ģ	ż	ė	3	à	1
21		¢	à	b	d	4	2	2
3		i	ī	D	ŧ	2	d	3

Cox.Mat.	LHADT	DRIVERS	DHURN
LHADT	1,00000	,80631	57500
THOMES	-60681	1,00000	

Random Parameter Negative Binomial Model of Serious Injury Crashes on Five Iane SPF Class Roadway Segments

Dependent Log likeli Beetzjotes Thi square Significan Mofadden I Estimation Lof Cr. Ali Bodel esti Bample 18	Efficience FegB variable hood Embrion # log Limelibood id 1 d.f. cm level bespB X-squaptd : based of H = : = 205.4 AZ mated: Jun IZ, 2 pds and if classical regress	129, TOT -148, 989 12, 548 .000 .04227 .246, E = 2/N = 11 .2016, 16:12; 25 instrument	92 90 76 40 97 8 32 22			
		Standard		Prob.	SSN Co	ofidence
5100)	Coefficient			12/32*	Int	erval
		Lorus		12/32*	Int	erval
11	foliowodom parene	Error				
Congtant	Tobrandom pareme	Estat ters .24246	#.19	.0000	.54160	1,49203
Constant LNRDT	lobrandom parame 1.01662***	Estat ters .24246	#.19	.0000	.54160	1,49203
CONSTANT LHRDT SHHOLT	 	Estat ters .24246	#.19 2.12 -2.48	.0000 .0333 .0144	.54160 .00051 26116	1,49203
CONSTANT LHRDT SHHOLT	 1.01852+++ 1.01852+++ 1.01852+++ 1.4901++ 1.28528	Estes tex# .24246 .00305 .04626	#.19 2.12 -2.48 -1.65	.0000 .0332 .0145 .0028	.54160 .00051 26116	1,49203 .01246 02866 .08712
Constant LHRDT SHNOLT SHOUTER SHOLTCR	 1.01852+++ 1.01852+++ 1.01852+++ 1.4901++ 1.28528	Estos -24246 -00305 -04926 -17348 -13481	#.19 2.12 -2.48 -1.65	.0000 .0332 .0145 .0028	.54160 .00051 -;26116 -,62369	1,49203 .01246 02866 .08712
Constant LHRDT SHNOLT SHOUTER SHOLTCR	 1.0162*** .0263** .0263** .14501** .26360** .26360**	Estes -24246 -00308 -04526 -17368 -11981 -parameters	#.19 2.12 -2.45 -1.83 2.02	.0000 .0000 .0000 .0144 .0028 .0484	.54160 .00031 -;26136 -,62369 .00173	1,49203 .01246 02866 .08712 .93147
CONSTANT LUMENT SHWOLT SHWIDSTON SHWILLTON	 	Estos 12286 10305 108926 11385 12881 parametes 12033	#.19 2.13 -2.48 -1.63 2.72	.0000 .0000 .0000 .0144 .0028 .0484	.54160 .00051 -;26126 62369 .00073	1,49203 .01246 02866 .08712 .93147
CONSTANT LIMATI SHNOLT SHNORTCH SHNILTCH	1.01624** 1.01624** 1.01624** 1.01624** 1.01601** 1.01601** 1.01601** 1.01601**	Ester 128286 10308 10808 11388 11388 11388 11388 11388 11388 11388 11388 11388 11388 11388 11388 11388 11388 11388 11388 11388 11388 11388 11388 11388 11388 11388 11388 11388 11388 11388 11388 11388 11388 11388 11388 11388 11388 11388 11388 11388 11388 11388 11388 11388 11388 11388 11388 11388 11388 11388 11388 11388 11388 11388 11388 11388 11388 11388 11388 11388 11388 11388 11388 11388 11388 11388 11388 11388 11388 11388 11388 11388 11388 11388 11388 11388 11388 11388 11388 11388 11388 11388 11388 11388 11388 11388 11388 11388 11388 11388 11388 11388 11388 11388 11388 11388 11388 11388 11388 11388 11388 11388 11388 11388 11388 11388 11388 11388 11388 11388 11388 11388 11388 11388 11388 11388 11388 11388 11388 11388 11388 11388 11388 11388 11388 11388 11388 11388 11388 11388 11388 11388 11388 11388 11388 11388 11388 11388 11388 11388 11388 11388 11388 11388 11388 11388 11388 11388 11388 11388 11388 11388 11388 11388 11388 11388 11388 11388 11388 11388 11388 11388 11388 11388 11388 11388 11388 11388 11388 11388 11388 11388 11388 11388 11388 11388 11388 11388 11388 11388 11388 11388 11388 11388 11388 11388 11388 11388 11388 11388 11388 11388 11388 11388 11388 11388 11388 11388 11388 11388 11388 11388 11388 11388 11388 11388 11388 11388 11388 11388 11388 11388 11388 11388 11388 11388 11388 11388 11388 11388 11388 11388 11388 11388 11388 11388 11388 11388 11388 11388 11388 11388 11388 11388 11388 11388 11388 11388 11388 11388 11388 11388 11388 11388 11388 11388 11388 11388 11388 11388 11388 11388 11388 11388 11388 11388 11388 11388 11388 11388 11388 11388 11388 11388 11388 11388 11388 11388 11388 11388 11388 11388 11388 11388 11388 11388 11388 11388 11388 11388 11388 11388 11388 11388 11388 11388 11388 11388 11388 11388 11388 1	#.19 2.12 -2.48 -1.83 8.72 3.96	.0000 .0338 .0149 .0038 .8489	.54160 .00051 26116 62369 .00072	1,49203 .01246 02866 .08712 .93147
CONSTANT LINEDT SHADLT SHADLT SHADLTCH SHADLTCH LINESH	Document Document	Estron 124246 10308 10508 10508 11348 11081 PAREMETER 124033 FOR SLOTE 106821	#.19 2.13 -2.45 -1.83 2.72 3.96 of rendo	.0000 .0335 .0144 .0028 .0484 .0001 m pacamet	.54160 .00091 26136 62369 .00073 .52483	1,49203 -01246 -02866 -08712 -93147

Random Parameter Negative Binomial Model of Unknown Injury Crashes on Five Iane SPF Class Roadway Segments

Dependent Log likel Bestricte Chi Aquat Sugnifica NcFedden Estimatio Inf.Cr.Al	efficients Fors Variable Lhood function d log limelihood ed [100000 -13.560 -2246.000 +324.278 .000 .36266 2248. R * C/W * .0 2016, 32:28:	93 50 14 50 21 4 18 31			
	I pds and 11		1.0			
eofasom :	I pds and li egression model Coefficient			Prof. :		nfidence erval
CHICSONII	Epergion model Comfficient Formandom parame	Standard Estor		12 02+	Inc	erval
COSMITANT	Equipment Confictions Confictions Confictions Confictions Confictions	Standard Earns term	-2.41	+1x x2+ -0182	-3.84968	4100J
COSSTANT SHEDET	Equation model Confiscient Wonisadon parame -2.12864**14997**	Standard Earor Cers .ST747 .06028	-2.43 -2.45	+1x x2+ -0182	-3.84968	4100J
CONSTRUCT SHEET	Coefficient Coefficient Monrandom parame -2.13864**1492** Mosne for random	Standard Estor ters .ST747 .06028 pecesters	-2.43 -2.43	.0182 .0132	-5.54963 26753	41002 03122
CONSTRUCT CONSTRUCT SHEDET	Coefficient Coefficient Forrandom paramet -2.12884**1492** Deany for random	Standard Error term .ST747 .00028 pecameters .28976	2 -2,43 -2,45 2,65	.0182 .0182 .0182	-3.84968 -3.6753	41002 03122
CONSTRUCT CONSTRUCT SHEET	Coefficient Coefficient Monrandom parame -2.13864**1492** Mosne for random	Standard Siror Ceis .ST747 .06028 pecemeters .28976 for diate.	2 -3.43 -2.45 2.69 of rends	.0182 .0182 .0132 .0078 m parene	-3.84968 -3.6753 -36753	41003 03123 I:10648

Random Parameter Negative Binomial Model of High Injury Crashes on Five lane SPF Class Roadway Segments

Fandam Coefficients BeginNey Node: Degendent variable Ing IRBS Linked Function -700.75%1 Bestudent Day IRBS Linked Function -700.75%1 Bestudent Day IRBS Linked Function -700.75%1 Bestudent Day IRBS Linked Function -700.75%1 Bestudent Function -700.75%1 Bestudent Day IRBS Linked Function -700.75%1 Bestudent Day IRBS Linked Function -700.75%1 Bestudent Day IRBS Linked Function -700.75%1 Bestudent Function -700.75%1 Bestu								
		Standard		Frob.	RSN Co	tifidence		
H1282	Coefficient	Error		± 52+		erval		
	funrandom param	10000						
Constant	-7.83720***	1-97126	一年,李文	0200	-10.52557	-5-14555	50000	
SHADKE	07946-**	-01782	-4.41	.0000	11458	04472	Implies	
	00515***							
12	teans for randor	paramaters.	200		244.000	20000		
23/25/11	+88930***	26303	25.55	0000	111239	120000	400	
THADE		-12490	6.01	.0000	.61500	1-11296	Con.Mat	
	+00427**				.00002	-00219	tists	
2 100 400	Lagunal elemen	or of Cholese	y matrice	0.00				
THERM	109728	108680	3 - 335	10394		129187	LHE	
LNADI	.02624** .02624**	02,198	2.35	0208	.00399	106599	BCVBBIST	
SCSMOOTE.	*00578**	-00084	21,00	.0200	100009	-20424		
HE-MANUEL	Melow diagonal a	erements of P	cotess.	marria				
13				12666	07343	-02930		
ILUM IND	-,02657	104392	4 5 6					
ILMA INT	.00635***	00208	3106	.0022	.99228	-03042		
ILMA INL) IMCV_IML)	00129	.00208 .00189	3,06	.9076	-,00553	.01042 .00174		
LESS LECT LECT LESS	.00635***	.00208 .00185 meter for Neg	3.06 -1.02 Sto dist	.9076 ribution	-,00553	-00174		

********	DIG		LIMIT	HCVXX3EL	
LULES LUADT HOVENBEL	.3275E-0 -1620E-0 .9650E-0		94E-02 14E-03	-11768-01	11001
Implied o	sandard de	Mietion:	of sen	don parameters	
S.D.Setal	.coes	9401 0287 Satria	of mano	om patezeter#	
Con.Mat. (

Random Parameter Negative Binomial Model of Just Injury Crashes on Five lane SPF Class

Roadway Segments

Restricted Chi square Significan Rofedden Retination Inf.Cr.All Rodel est: Sample is	efficients Hegi variable shood function 8 log investment ed [6 d.f.] complete level freido 8-equares 0 heed of 8 = 0 = 1684.5 % unaces; Joh 12, 2 pds and 11 binomial regress	33511 -526,239 5 -1074,346 406,218 1000 2 ,23089 3246, 8 = 1078 = 17 2016, 381881 2016, 381881 2016, 381881	90 14 00 91 16 60 08			
		Standard		Frab.		nfidence
SOUTH !	Coefficient	Error	- 2	12/25.	Int	arvel
	SUCCESSION PAYANT					
constant)	-9.00651***	1,43886	-2.51	.0005	-1.66663	-2.22600
I COMMISSION	-11.4440**	4-78427	-2.38	25.68	-20.6348	-4.0633
MCVL	00035++	.00018	-2.26	.0240	00045	00005
DRIGHENN	022229**	.00018	-2.33	2197	04102	×.00356
VCK1					-1.92216	
HCVCRAW!	-00018+++	15697D-04	1.22	.0002	.00007	.00030
10	beans for render					
1,91,500		07710	11.00	(0000)	170274	
LHADT	-49575*X*	-19431	4,10	.0000	+42042	-96294
SHEWOLT	~.16205***	-01562	-5.56	10000	+,20068	12362
	Diagonal element					
LHLES	.24374***	.07120	3.42	.0006	.10420	
LHADT		-01277	2.15	10325	-00128	V05225
SHWOCK	-02797**	-01204	36167	1,000,000	.00174	-09100
	Below diagonal 4					
LINA LUL					11601	
LESK LHL	-,01015	.03057	7:32	7932		
	.04722**	92360	3,88	10478	+00097	-09987
SSM_TION	OT MARKET OF STREET	sever for Neg	thin dies	ribution		
11				.0000	:40121	-64300

	unantenus		12 28000	u becausiata
Coverienc	e mairie	Émana		
	Ditt		LHADT	SHIPLT
LOTLECK LOSSADT	-5512E-	01 .88	95E-03	.30028-02
implied s	tendero o	eviation	e of rec	dom parameters
2) 2) 2) glies o	,2 ,de .09	NE MACULE		
	ENLEN	110,00	339900	1
COY.MRE.	7.00000	4,00000		2

Random Parameter Negative Binomial Model of Low Injury Crashes on Five lane SPF Class

Roadway Segments

Amoin Coefficients Deghnag Nodel
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FOIRT	Coefficient	Standard Eyesy		Fron-		964 Confidence Interval	
13	Singardin param			0.055.00	-372-3374		
trestent	*4.47855***	.02004	-5.41	.0000	-6,10143	-2,99555	
CV500SE3	-4.81188A	2.54727	-1.99	-0419	-9.00442	.15067	
MCVI.	00046***	_0200D-04		.0000	00063	-,00030	
WYNDODCY.	01114**	.00454	-2-45	_0141	-,02003	+.00224	
9081	一直,企业各层设计中	-51778	-2.41	.0161	-2.26077	23111	
EMPROVE	06747***	-01998	+3-45	000d	-,10879	-,02938	
CVPTTYAL	.90572**	-0007#	2.27	0729	100024	100328	
SHWDLT)	- 07852***	02026	-3.35	0001	F-11543	-,00561	
BCVCSAN I	.00011***	-1114D-04	3.57	.0004	.00005	.00017	
CYPTGREE	300224***	.00076	2.05	.0001	.00075	200372	
- 11	leans for rando						
L30, D81	+91675***	-94424		-0000	1.03094	1,00545	
LIGADE	-42019***	.07926	10.35	.0000	66460	,97550	
SHPDCRI	-01827*	-00548	1.95	-0540	00031	23684	
	diagonal element						
28228	.28505***	-04438	6.45	*0000	120112	27607	
TRANS	.02163***	.00472	4.63	+0000	,01259	.03105	
SHEDGE	02296***	100545	7.72	.0068	100632	.03960	
				BATTLE			
THE THE	05016***	-01758	-9.92	-0009	09252	-,00380	
SHM_THT.	00eod	-91877	7-99	-4590	-,03007	.02091	
SHM THP!	-02625**	.01088	2,64	-010E	,00604	104482	
	repetaton betw						
cal Parm!	17014E***	-04734	04182	.0000	4.60887	179423	

THIEM

.8908-01 -16782-03 .9859E-03 -10781E-03 .9878E-03 ,1259E-03 LIFLEN LIFALIT STROCK

SHINDER

Implied standard Nevistions of random payameters

5.D Betal

Implied oncrelation matrix of resson paremeters

Coy-Mat.	THEFT	INDT	SHOOLE
DATES	1,00000	92613	+127157
	-,95619	1.00000	1,12215
SWMDCR	-,17157	292241	1,00000

Random Parameter Negative Binomial Model of Total Crashes on Six lane SPF Class Roadway

Segments

Random Coefficients Heghnieg Hodel
Impendent variable ICCALACC
Log likelihood function =0032,47534
Pentricted log likelihood -10514,13103
Chi equated [6 d.f.] 36861.66568

Markedien Fernander Inf.Cr.Ali Model est Sample is Departive i	nce level Psendo B-aguare: Daded on D' = C = 12087.0 Ai Insted: Jun 18. 2 pds and 2' Dinomial regree	8 .6919 5418, E = IC/S = 3.1 2014, ZZ:011 709 instrudua 9100 model	111 21 291 22 118			
TUTALACC	Coefficient	Standers		Prob.	994 DO	UETacube
				12700	200	
13	Monrandom parem	eterm				
Constant:	-5.01821*** -91888***	42347	-11.00	_0000	-5.03815	+4.19916
LHLEST	.91588***	102003	45.65	-0000	-87460	-48907
MCVL LMI	-2.82927+++	-20492	-55.22	*D000	-3.48771	-2.17000
	-85598D-04***		6.26	10000	-819980-64	-114650-00
MOVES!	-2.50170+++	47900	-0.28		-3,47238	
VCEARNAL	.09202*** .00334*** 02918***	101988	4.40	-0000	105304	12097
SCHOOLSEL!	20334***	400079			+00130	
PHYNODEC:	02916***	100988	-6.03	.0000		
ACATTOL	1,26527***	10020	2.75		.55557	2,17816
VCVL121	3.39912**		2.37	-0176	1,000,770	
DEGL	#.01007***		+2.65	-0027	≠4017±E	00255
13	Means for random	nistanatan n				
2.16AUT	.94183*** 12645***	.04003	23.47	-0000	+66327	2102059
SHEEDEL	12665***	.00402	-31.00	0000	13826	
MANUFACKE	一、一位是是多万万大大学	100704	-9.95	- DP04	04004	01199
LHADT	.04593*** .01215**	-40420	10,93	-0000	1,02769	
SHWIRT	.01215**	-00487	2.29	-0320	+00163	
SHEELTCK!	101305***	199470	2 F 7 F	*D098	+00384	.02226
	Selow Giagonal s					
THE THE	-02542***	100704	-9.65	-0103	09821	
235W_33B)	-02411**	00963	2.49	-0544	100484	
LERN SHILL	-,04910***	490545	+5.79	,0000	06573	03347
100000000000000000000000000000000000000	Dispersion pares	seber for Bey	göin dies	ribution	1 00000	
ScalParm!					464333	.78337

Covetiens	e matrix		
	CHAPT	SHASEL	SHMDLICE
INADT SHADET	_2100E-02	.7704E-03	. 9.64.64.43

Implied standard deviations of random parameters

A.D_Setal .0489238 .0277399 .0192247

Con Mat.	18307	SEMPET	SHADINGS

LMADT	1-00000		-48877
SHRUKT	91871	1-00000	+164813
SHIPLICK	-45577	69875	3.00000

Random Parameter Negative Binomial Model of Property Damage Only Crashes on Six lane SPF Class Roadway Segments

Dependent Dog 11 well Restricted Thi Poper Significan Sofedden ! Estimation Inf. Cr.Ali Nodel esti Segative !	officients Hegi veriable heed finishles i leg libeliheed et (4.f.) com lawel seeds finishles i hased on H = 1 = 2505.1 A metes Jun E, 2 pps end 2 bloomiel regree	-4827,61 6 -12418.02 11988.82 .000 8 4415, E = 10/W = 1.4 2016, 13437 100 intividue %ion model	428 718 300 330 30 426 418 418			
FDOS		Scandard Error		Frob.		nfidence erral
- 11	innuandom param	PERES				
	+5.87502***		-12.66	-0000	-8.91514	-9.03230
LHLEH			40.97		.95230	
HCVL4HI!	-2,26446***	180129	-7.55		-2.84499	-1,66101
	-61206D-06***	12400-04		-D008	-260515-04	
SHOUDCE!	01085+++		-2.70		01072	
900011	-5.14685***	+87591	-9.04	-0504	-1.87646	-:40524
VCEARIGA	.58121***	.02004	4.01	-0500	.04223	
DREGICE	+,00856***	.00498	-7.18	-0000	04552	02979
0001	000864*	100035	-2.29	+0146	+,001#1	-:00011
	-,0001144	00038	-2.03	-0129	00182	00002
	Wens for render					
	196979***	-04462			.,90229	
SENDAL	12181***	100448			18449	
SCYNOCIEL!	.00269***		5.41		100114	.00423
	Magonal element					
	.05225***	.00352			V09297	
SHORT	1044084++	100470			103487	
	100055+				,00000	:00110
	lelow diagonal s					
SHE THE		.00729		-5596	一,今先年等于	
INCV LHA!	00535***	.00071	-7.54		-,00874	
HCV SHW	1000055444	.00065	11.28		120412	-00672
ScalParm	Lepension parm	sever for Se			C.	
	151415040	104155	19.45	- DOOD	.73215	189620

	CURETWOOD BAL		A Particular and a second	
Cotations	m matrix			
	LIMOT	SHADAL	HC/ROKBEL	
LIGADT SHNORT HC/HESEL	.2733E-02 22245-03 2756E-03		41492-09	

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				3	ŧ					Ó	ż	7	Ċ	9	1	2	٩

Implied	correlation	matrix of	random	DATEMPTRIS

Cor.Met.	TULET	SHIDET	HEYNOUSEL
LHADTI	1.20500	-,09604	~.61156
SHEEDET	09606	1.00000	-74050
HEYNOXSEL	65156	+79050	3.00000

Random Parameter Negative Binomial Model of Possible Injury Crashes on Six lane SPF Class

Roadway Segments

9102	Coefficient	Standard Error		F000- 	HAN Confiden Interval	
3	Timrangom param	esace				
Constanti	-8,49880***	100941	-22.94	10000	+9.44004	-7,88587
LHLEN	75809444	.01946	41,07	.0000	.72191	178426
REVEALED.	-2.80102***	146997	-16.77	.0000	-9.16234	-2.50094
VCVL	00087***	.84412-04	-2.30	.0000	-,00064	00031
MCVMXXXI.	.00297###	.000049	4,00	10000	.00202	,00393
BENDOR:	01685***	00688	-3.25	.0050	-,02458	00683
13	Seens for random	parameters.				
LHADT	1,00817444	100793	26,00	10000	193466	1700160
VCVFT098	100262***	00006	4.45	.0000	,00151	.00372
SENDLY	w.120657***	100823	-20.05	40000	+,11513	-,00482
No.	Sagonal element	e of Choles	cy Hatris			
TATABLE	.00966***	.00354	11.00	.0000	20248	-04678
VCVPTGRE	.00114***	,00041	2,79	10002	,00078	.00234
SHADIL	101000444	100308	3.25	10012	,00336	101608
	Helov Giagonal +	elements of t	Dunkeeky	BATELS		
AND THE	-+00009	.00058	-1.61	.1046	-:00197	+00058
LINE LINE	.01117+	.00584	1.31	.0560	00029	1,02262
1.888 VCV	+:01418***	-00123	-2.33	10000	-,02249	-,00882
- 23	Saparatm para	mater for Ser	Sin Sist	erbunion		
SoulFacul	+50507***	101007	28.45	18000	28111	1,33034

Since: nnnnn, D-xe or D-xe => multiply by 10 to -xe or -xe.
Sone: ***, **, * ==> Significance at 18, 5%, 10% level:

Implied communicate matrix of random parameters

Covariance matrix

	LUMDI	ACABLONS	SHIDLE	
IMADT VIVETURS SEMBLI	.1579E-02 5522E-04 -4428E-03		.t281E-09	033-0-2000 0-003

Deplies standard deviations of random parameters

.O Sets		1
		٠
	.039460	į
2	.0017811	ż
2	.0206161	2

Ingited operatation matrix of random parameters

Coy.Met.)		VCVFTS88	SHWOLT
LMADT	1.00000	-,43561	.54150
VCVRTSRS:	-,49861	1,00000	1,00000

Random Parameter Negative Binomial Model of Evident Injury Crashes on Six lane SPF Class Roadway Segments

Dependent Log likel Bestrice Chi squar Significe NoFadden Estimatio Inf.Cr.Al Model ast	efficients Med variable inhood function of lng libelihood ed (6.8.7.) don level Feeudo K-aquares o based on N = 0 = 1850.8 Al immied; due 10, 2 pds and 2 binomial regress	1257.41/ -1257.41/ 5 -2004.40/ 246.09/ .00/ .00/ .00/ .00/ .00/ .00/ .00/ .00/ .00/ .00/ .00/ .00/ .00/ .00/ .00/ .00/ .00/ .00/ .00/ .00/ .00/ .00/ .00/ .00/ .00/ .00/ .00/ .00/ .00/ .00/ .00/ .00/ .00/ .00/ .00/ .00/ .00/ .00/ .00/ .00/ .00/ .00/ .00/ .00/ .00/ .00/ .00/ .00/ .00/ .00/ .00/ .00/ .00/ .00/ .00/ .00/ .00/ .00/ .00/ .00/ .00/ .00/ .00/ .00/ .00/ .00/ .00/ .00/ .00/ .00/ .00/ .00/ .00/ .00/ .00/ .00/ .00/ .00/ .00/ .00/ .00/ .00/ .00/ .00/ .00/ .00/ .00/ .00/ .00/ .00/ .00/ .00/ .00/ .00/ .00/ .00/ .00/ .00/ .00/ .00/ .00/ .00/ .00/ .00/ .00/ .00/ .00/ .00/ .00/ .00/ .00/ .00/ .00/ .00/ .00/ .00/ .00/ .00/ .00/ .00/ .00/ .00/ .00/ .00/ .00/ .00/ .00/ .00/ .00/ .00/ .00/ .00/ .00/ .00/ .00/ .00/ .00/ .00/ .00/ .00/ .00/ .00/ .00/ .00/ .00/ .00/ .00/ .00/ .00/ .00/ .00/ .00/ .00/ .00/ .00/ .00/ .00/ .00/ .00/ .00/ .00/ .00/ .00/ .00/ .00/ .00/ .00/ .00/ .00/ .00/ .00/ .00/ .00/ .00/ .00/ .00/ .00/ .00/ .00/ .00/ .00/ .00/ .00/ .00/ .00/ .00/ .00/ .00/ .00/ .00/ .00/ .00/ .00/ .00/ .00/ .00/ .00/ .00/ .00/ .00/ .00/ .00/ .00/ .00/ .00/ .00/ .00/ .00/ .00/ .00/ .00/ .00/ .00/ .00/ .00/ .00/ .00/ .00/ .00/ .00/ .00/ .00/ .00/ .00/ .00/ .00/ .00/ .00/ .00/ .00/ .00/ .00/ .00/ .00/ .00/ .00/ .00/ .00/ .00/ .00/ .00/ .00/ .00/ .00/ .00/ .00/ .00/ .00/ .00/ .00/ .00/ .00/ .00/ .00/ .00/ .00/ .00/ .00/ .00/ .00/ .00/ .00/ .00/ .00/ .00/ .00/ .00/ .00/ .00/ .00/ .00/ .00/ .00/ .00/ .00/ .00/ .00/ .00/ .00/ .00/ .00/ .00/ .00/ .00/ .00/ .00/ .00/ .00/ .00/ .00/ .00/ .00/ .00/ .00/ .00/ .00/ .00/ .00/ .00/ .00/ .00/ .00/ .00/ .00/ .00/ .00/ .00/ .00/ .00/ .00/ .00/ .00/ .00/ .00/ .00/ .00/ .00/ .00/ .00/ .00/ .00/ .00/ .00/ .00/ .00/ .00/ .00/ .00/ .00/ .00/ .00/ .00/ .00/ .00/	190 190 100 116 12 171			
EVI	Coefficient	Standard Extor		Frab.	95% Cc Int	nfidence erval
	Street and on the case			******	*********	**********
Constant	Ponrendom parame -2.84288*** -3.70270*** .00391** 03328***	74759	-T.91	0000	-7.30571 -5.33160	-6.37700 -2.00360
HCVHKKEL	-00391++	,00165	2,33	00166	,00071 -,05880	.00711
BOYCHAR	.997Z10-04+	-5977D-06	1,97	.0652	-7.81808 -,174190-08	T# 10 4 4 4 4 1 1 1
MUFLDED:	-1.48823***	.01012	-9.76 -7.33	0196	-2.24313	
225/334	Means for randor	personners.				
DISTRICT	Neans for random .84064*** 15622*** .86143***	104519	19.06	-0000	56252	13033
	Character S. of severe	and the state of the second	and the second second			
SHVDST		.01347 .01112	2.15	.0326	.0022+	,05500 ,09491
CHILES	.08001+++	.01836	4.79	10057	200675	100634
omercened	Selow diagonal e	Claments of t	mureson.	BELLINE.		706375
TENT THA	-03101+ 09675+ -01280	-05415	-1.75	.0801	20088	.01136
trur ask	Dispersion paras	93150	- 41	.0045	-,04585	107436
	1.38907+**	mter for Her				3.07416

		SHWGRT	LISLES	
CHILDY SHIGHT	.81988-08 .9023E-03 2713E-02	-1927E-02 2690E-02	.1172E-01	
	tattiers dett	ations of yar	don payameters	
tubirses a				
p.D_bets	2713E-02 tenderd devi	1		

Cog.Net.) LEADT BENDET LECEN LEADT: 1.00000 .50631 *.5753 869DRT: .80482 1.00000 -.68560 LECLEN: -.87508 -.6354E 1.00000

Random Parameter Negative Binomial Model of Serious Injury Crashes on Six Iane SPF Class Roadway Segments

rependent og likel: metricter hi square ignificer infadden l stimanion mf.Cr.All bdel mrt:	efficients Heggs variable incod function 5 log libelihood at [] d.f.] not level Deadon N-equared n based on N = C = 781.1 Al insted: Jun 16, L pds and LT pinoniel regress	01 -042.541 -042.374 1.667 .00224 5415, W = .0 2/5 + .1 2014, 19495 09 individed	495 165 660 844 8 237			2000
8187	Coefficient	Standard firec		Prich.		nfidence exval
	Moncandon parame					
	Nonrendom pereme -2.03525***		-2.61	.0083	-,06865	-,01010
Congrant	-2.03925***	-01488	- m 1 mm	10000	-,96888 .87981	-,01010 .97341
INLEST SHKDET:	-2.03525*** .77646*** +.16474***	.01985 .10049 .05952	7.75	.0000	.57951 21122	
Constant) 1MLES: SHWDET: SHWDET:	-2.03525*** .77646*** +.16474*** 10065***	.01485 .10049 .05382 .09278	7.75 ~1.27 -5.01	.0000 .0000	.57951 21122 16485	.97341 -,07827 -,09648
Comstant) 101ES(SHKDBT) RKYNOINC)	-2.03525*** .77646*** +.16474***	.01485 .10049 .05382 .09278	7.75 ~1.27 -5.01	.0000	.57951 21122	.97341 07827
CUMPTANT SHKDAT SHKDAT SKYNOINC DEG1	-2.00928*** .77646*** +.16474***10065*** .02746* Beans for pendom	.01485 .10049 .05381 .00078 .01836 parameters	7.75 ~1.27 ~9.01 1.88	.0000 .0000 .0001	.57951 +.21122 14481 00248	.97341 -,07827 -,09648
Comptant: 19169: 50000000: BNYNOINC: DEG1: [3	-2.03928*** .77646***104574***10065*** .02746* Deans for bendum	.01985 .10049 .05352 .05276 .01836 parameters .28869	7.75 -1.27 -5.01 1.88	.0000 .0000 .0001 .0343	.57951 +.21122 +.16481 00268	.97341 -,07827 -,09648
Constant: 131ES SHRENT; SHRWOINC; DEG1: 18ADT;	-3.03928*** .77666*** .10474*** -10065*** .02746* Deans for rendom .47600** Scale parameters	.01985 .10049 .05852 .05078 .01836 parameters .28580 for dista-	7.75 -1.27 -5.01 1.88 2.02 of rando	.0488 .0000 .0001 .0001	.57901 +.21122 +.16401 00368 .01407	.97341 07827 09648 .00162
COMPTAINT: 131LEST SHRINT: SHRINT: DEG1: LHADT:	-2.03928*** .77660** .10174** -10065*** .02746* Deans for rendom .47600** Scale parameters .02625**	.01485 .10049 .05392 .09078 .01896 parameters .28580 for dists01047	7.75 -1.27 -8.01 1.88 2.02 of rando 2.51	.0000 .0001 .0001 .0001 .0001	.57901 +.21122 +.16401 00368 01407 ters	.97341 -,07827 -,09648
CONSTANT: 131ES; 5HKDST; 5HKNOINC; DEG1; 14ADT;	-3.03928*** .77666*** .10474*** -10065*** .02746* Deans for rendom .47600** Scale parameters	.01485 .10049 .05392 .09078 .01896 parameters .28580 for dists01047	7.75 -1.27 -8.01 1.88 2.02 of rando 2.51	.0000 .0001 .0001 .0001 .0001	.57901 +.21122 +.16401 00368 01407 ters	.97341 07827 09648 .00162

Random Parameter Negative Binomial Model of Unknown Injury Crashes on Six lane SPF Class Roadway Segments

Dependent Log liwelt Restricted Chi agnera Significan McFedden F Settoation Inf.Cr.AIC Mcdel esti Sample is	fficients PegS variable hood function log limilated of 1 d.f.; celevil celevil celevil based on H = 832.3 M mated: 2m 17, 2 pds and 17, 1 pds and 17, 1 pds and 17,	728950 -288.124 -261.494 -025 -00980 5418, K = 0004, 35111 00 individua	66 30 66 7 98 21			
			-	Total Control	446.75	nfidence
UNITROVER	Coefficient	Standard Excur		Prob.	Int	
	Coefficient	Exece	*			
	octanitim parane	Error lers		12/32*	Int	erval
Dinetant	Onietitim perene -4.21247 .51027**	Exter 1.76711 .84033	-1.60 2.12	#780, #780,	-9.65591 -03923	1.21097 .88151
Dinetant	Onietitim perene -4.21247 .51027**	Exter 1.76711 .84033	-1.60 2.12	#780, #780,	-9.65591 -03923	1.21097 .88151
Omerant LUADT	Onietitim perene -4.21247 .51027**	Exter 1.76711 .84033	-1.60 2.12	#780, #780,	-9.65591 -03923	1.21097 .88151
DESCRIPTION OF THE PROPERTY OF	Octanitim parame	Error 1.76711 .24033 .11503 .09181	-1.60 2.12	#780, #780,	-9.65591 -03923	1.21097 .88151
INSTANT LIGADT LIGADT SHWIRT	Octanine person -4.21247 .510275** 1.01072*** -11045*** beans for random	Error 1.76711 .24033 .11503 .09181	-1,62 2,12 8,73 -3,67	.0878 .0387 .0300 .0002	-0.68591 -03023 -78925 17724	1,21007 ,38151 1,23615 -,08874
CONSTRUCTOR LUNGSTON LUNGSTON LUNGSTON SHINDRY (N	Octanine person -4.21247 .510275** 1.01072*** -11045*** beans for random	Error 2.76711 .24035 .11553 .03181 garanetes .03531	-1,60 2,12 8,73 -3,67	.0879 .0387 .0387 .0000 .0002	-0.68591 -03023 -78925 -117724 11171	1,21007 ,38151 1,23615 -,08874
DESCRIPTION OF THE PROPERTY OF	Contention persons -4.71247 .51027 1.010721.1045 Means for readom -08210 Cale parameters	Error 2.76711 .24035 .11553 .03181 garanetes .03531	-1,82 2,52 8,73 -3,87 -2,45 of rendo	.0878 .0387 .0387 .0000 .0002 .0142 m person	-0.68591 -03923 -78925 -13724 -11171	1,21007 ,38151 1,23615 -,08874
CONSTANT LIGADT LIGADT LIGADT SHEERT SHEERT SHEERT SHEERT	Contention persons -4.71247 .51027 1.010721.1045 Means for readom -08210 Cale parameters	Error 1019 3,76711 .24030 .11503 .03161 parameters .03531 for dists.	-1,60 2,12 8,73 -3,67 -2,45 of rendo 2,52	.0879 .0879 .0387 .0000 .0002 .0142 th person	-9.63591 .03923 .78925 +.17724 11171	1.21097 .86181 1.22618 08879

Random Parameter Negative Binomial Model of High Injury Crashes on Six lane SPF Class Roadway Segments

Random Cor Dependent Log 1:8el	efficients Sego variable thood function	nRep Nodel 811 -1895.051	157 54					e matrix	materia o	E-cana	m parameters
Restricted	d log livelihood ed [& S.f.]	+1919:803	43				2011	1,111.1		DRICK	LWADT
Significa: Nofedden Estimation Inf.Cr.A2 Nodel est: Basgle is	ros level Poeudo 8-squayed n based no 3 - C = 5120.2 A2 imsted: Jun 15, 2 pde and 27 binimial represe	,000 ,14288 E410, H = 17/H = ,6 2016, 21:01: 00 lostvious	00 36 17 13 36				INDIANA SMOORTER SMOORTER SMOORTER	.4001E-0 .3383E-0 1554E-0	12 13 -1008 14 -1004 17 -1008	2E-01 4E-03	.2931E-03 GIM pacameter
pegastre i	erumekt fehrese						A.D_Beta)	A DESIGNATION OF THE PARTY OF T			
82197	Coefficiens	Standard Error		(a)>f.	Test	ofidensk ezval	2)	1,070	5349		
							(4)	1011	8094		
Constant	Finnandom parene -6.75413***	.77944	-8-70	0000	-0.31160	-5.23643					
MCVLIBI (-1:03331-44	.00001	-2-45	CODEL	-1,79990	-,10001	*********				on parameters
SEMINET:	-,08727***	121216	-7.18	-2010	111110	06544					or betweeters
WCVLL	-2.81788***	177524	-9-92	-0000	+4.54527	~2,2905Z					
VCVII4	2.05857***	.87095	3.55	10004	1.85240	4,76499	100000000000				0
RWYNDING		.00748	-0.07	10001	04365			INLES :		LSSAD	
WCVL12	3,53928***	2,42220	2,70	2070	1,00079	6,62172					
	deane for random						1.01100	1,00000	74422	+.0101	1
	:81445***	.00392	32.47	.0000			SHWDRICK				
SOME TOWN		.01525	-2.30	-0037	+.07412	01414		+.35211			
	31773***				,66638	.97108					
	Diagonal element										
	.06355				01357						
BORDSTON.											
LHADT					.00110	.01774					
	Selve diagonal e	Sementa of C	coressà	PATELS							
	10020011										
	-,00609	194449	1.45	- 5 T T T	03233	.00100					
Trong and	T-924188*	- SOFT	Mary of the	and books and	-,02455	100789					
TINE SHE											
TINK_SHM	1.08613***	14628	4.35	0.655	.75528	1.88150					

Random Parameter Negative Binomial Model of Just Injury Crashes on Six lane SPF Class Roadway Segments

Random Coefficients Regina	eg Model
Dependent variable	2021092
Log likelthood function	-1708,8149E
Seattricted log likelihood	-2104.14106
Chi squared [# d.f.]	
Story: Firening Level	.00000
NoFedden Freudo R-squared	.2220431
Estimation based on H = 5	
Inf.Cr.AlC - 3457.6 ACC/	
Model estimated: Jun 20, 20	
Sample is 2 phs and 2709	
Segetive bindmini regressio	
makesara mempenya andanasan	to the season

Just 1941	Coefficient	Standard Extor		970b.		nfidence erral	
(Sonzendom peremeteys							
Constant!	-5.05561***	1,01753	+7.56	10000	+10,00254	-6,1046T	
Link Fig.	.54541***	104101	20.69	.0000	.74502	.92879	
SCVLINE!	-3.35442***	74975	+5.27	.0000	-2,42290	-2,48493	
ZHWDRT	21150***	101769	-11.47	.0000	24645	-,17712	
	09052+++		-7.88	.0000	-,07418	04289	
	02001+*	.00999	-2.08		-,00881		
VCVVETA:	0014849	.00088	~2.81	-0121	-,00287	-,00032	
VCV113	-2.144904	1.25212	-1-91	3764	-4,00101	20721	
HCVCRAW!	-00012++	2112D-04	2.41	10258	.00002	.00022	
SHUDLT	-05675***	.01495	3.45	.0006	12435	04904	
11	Means for randor	n parameters.					
LIBEROPOSE.	-00463***	-00149	9-56	-8023	100142	+00744	
attrock (03755+++	.00866	-4.34	10000	-,05482	02058	
LEADT	1.12930***	-10002	11.29	.0000	193326	1:32555	
100	diagonal aleman	as of Choles	by matrice				
(CARRIED)	-00456***	.00106	4.29	10000	200347	.00662	
SHVDOS	.05068***	200005	5.76	.0000	22342	109784	
LUGADIT	00363++	.00401	2.41	.0166	.00152	100786	
	Selow diagonal		Cholmswy	mayrin.			
SER HCYL		.01117		7340	-101509		
COR ARLE	+-05201+++			.0000			
LEAVE BARE	-03584***		4.78	.0000	205740	104206	
	Dispersion para						
RoalFarm!	+85798***	10002	7.48	.0000	.99624	2,01949	
and the second	US A ROOM OF BOOK IN PROCESS.	and the first few streets during	A STATE OF THE REAL PROPERTY.	A STATE OF THE REAL PROPERTY.	SERRENCE PROPERTY.	A REAL PROPERTY.	

Implied obvariance matrix of random parameters

-		-		

=100107	RC/DOSEL	SHNDCR	LHADT	01810101000
	According to the State Street,			
ANNOCA	.2068E-04	.20528-01		
THEFT	- TARRES - 02	19675-07	STATES OF	

Deplies standard deviations of random parameters

1.D_Bets) 1 11 .00024252 21 .0005176 31 .0454986

Deplied vorrelation matrix of random parameters

Cor.Net. ()	13500778	SHIPDOR	LHADT
SCHOOLET!	1.00000	.07468	72433
201002	10746E	1.00000	.59930
THEATT.	17422	. 53999	1.00000

Random Parameter Negative Binomial Model of Low Injury Crashes on Six lane SPF Class Roadway Segments

Random Coefficients 5	Megimikes Model
Dependent variable	10197
Log likelihood function	Mt5014,22174
Restricted log likelik	
Chi squared [6 d.f.	
	.00000
Mufadden Pasudo Rosque	
Estimation based on N	
Inf.Cr.AIC = 10868.9	
Model estimated: Jun J	
Sample to 1 pos and	
Hegative Binomial regi	DANASTI NOOMA

Nodel est: Sample Le	c = 10665.4 AD Imated: Jun 30, J pow and 37 Hindutal regress	2016, 20:45: 09 individua	33			
LOIMI	Coefficient	Standard Error		Prob.		nfidence erval
	Prorendon parawe	ters		10320		
	-2.53524** -2.4550*** -2.0912** -0.4411** -2.2034*** -1.00367*** -7.6682*** -0.4123***	.04366	-2.99 22.35 -8.41 -2.24 -8.95 -3.52 -3.50 -2.95 -2.75	.0026 .0000 .0020 .0000 .0004 .0003 .0004 .0003	-2,03626 -,01628 -,05403 -3,43177 ,818490-04 -1,68148	1.06134 -1.86895 00180 03459 97504 -102630-08

	.01825+**			.0052	.00739	1029
20120	-01710+++	200648	2.44	.0000	.00440	,029
184	fammigato woll-	elements of	Cholesky	matrix		
1539t SCVI	00722***	.00666	-2.55	0007	-,00020	P. 004
1151 SCF1	-06656***	-01721	3.87	.0001	19254	1200
TINE SHWI	.14275***	.01565	10.44	.0000	11557	1169
1.00	isperation pari		eghin die	estbesion		
ScalFarm	-77418***	103962	23.73	.0000	70438	.244
	LT-EX OF Dest					
Motes ***,	**, * man 2	ignificance :	NT 18, 5%	1. 50% Seve	66.00	

implied coveriance matrix of random parameters

Savi	WILL	ADO	* 8	NT.	23	×

	HOVENDEL	SENDAT	THIEN
SC/MOUSEL	.42306-06		
SHIPPET	2542E-04	162962-02	
THURS	,1369E-03	134558-02	29118-01

Implied standard Deviations of random parameters

D.D. Ber	tw:		1
	10	-0020	087£
	21	-025	5910
	3 (. 53	0461

Cor.Mas. 1	SCYSOLSEL	SHWORT	LULEU
NO/NOCHEL!	1,00000	01437	.42003
DROBET	68617	1.00000	.36600
THIER	.42005	.06698	1.00000

Random Parameter Negative Binomial Model of Total Crashes on Seven lane SPF Class Roadway

Dependent Log likel: Bestriote: Chi square Highiface: McFedden I Estimation Inf.Cr.All Hodel est: Sample is	efficients Neg variable into de function i log livelihoo function i log livelihoo di log livelihoo di log logo livelihoo di logo logo livelihoo di logo logo livelihoo di logo liveliho di logo livelihoo di logo livelihoo di logo livelihoo di logo	TOTALA -1335.686 6 -5685.699 5584.034 .000 6 .TW246 1160. W = 1206.1146. 560 individua	00 00 30 22 86 08			
TOTALAGE	Coefficient	Standard Error		Prob.		nfloance erval
13	funcandon passes	eters				
Congrant (45.15	.0000	-7,61722	-4.65554
LHLES	. 91344***	-04152	22,00			.99402
MCVLCHE!	-1.01417++	-42291		.0341	-1.16262	06b72
VICTURE 1		143,1990	+3.67	.0100	-649.308	+81,050
VCRANNAT		.03492	8.57		-05200	.15474
SHWULTUR		.01525	+5.50	.0000	-111401	
DEST		-01042			04494	00409
ENSWEDDED.	:00800	.00423		10524	00333	.02220
BHRDCT:		-01615	2.85	.0050	401400	-67990
807/81		-3351D-04			-+00022	05509
VCVL/		.02711		10101	.01607	
VENDERBY	06923+*	-02704			-,12227	G1610
19						
CHART	.86127***	.05014	17.10	.0000	.76299	95961
SHOUSET	04567**	.05014 .01827	-2.80	10124	06148	00986
	.00142***	.00033	4.76	20000	100260	,00824
i.i.	.00442*** Magonal elemen	ts of Cholese	V BETTIN			
LHADT	41591+	-00890	1.95	206843	+100197	-05839
SHEET	.05274***	-00584	5.6.	.0000	.02530	.04419
BCVFTCVA	.00128**	.00081		.0386	-00028	-00222
	Selew dispressi					1111111
15EM INA					04706	000001
IRCV LEA	+.00021	-00071		.7740	00159	.00118
LHCV SHE		.00051	+1.97		00184	21000.
		meter for Ned				
11						

	e mattia				
	188	it i		HOVETOW	
TOAN	-2500E-	13			
	31978-0				
CARICAN	57655-	15 -1225	35-04	-2265E-05	
mplied #	CADDADO D	eviétions	of ren	SOM DEPONSEDED	
.D Bezel					
11	.021	99066			
2.5	7.046	10206			
21	1001	20202			
	orreletio	natria	of rand	IN PAISSALEIS	
	orrelatio	matris	of rand	um parameters	
implied o	orreletion		of rand	m parameters	
implied o	LWADT	SHWERE	HOVETON		
Emplied o	LHADT	SHMINI	HOVETON	- -	
Coplied o	LMADT	SHMIRI SSSO+	HOVETON 1560	h	
Constant Constant States	LHADT	SHMERT \$6904 1.00000	HOVETON 1563 3743	A	

Random Parameter Negative Binomial Model of Property Damage Only Crashes on Seven lane SPF Class Roadway Segments

Randon Cod Dependent	efficienta Negli variable chood function	nReg Model	00				- Deglied covariance matrix of rendom persenters Covariance: matrix
Restricted	log likelihood	-3425,417	95				LHLEH IMAGE
Bignificar HoFadden F Estimation	d [3 d.f.] He level Secudo R-squared S based on H =	.000 .48773 1160, E =	100				LPLEN , \$300E-02 INLAT ,777E-00 ,272E-08
Model esti	= 2193.9 A1 nated: Jun 19.	2014, 12(0)	0.6				Deplied standard deviations of random parameters
Secarine :	2 pdr and 3 inceial regress	en individua ion model	T.				S.D.Decal 2
1001	Coefficient	Standard Error	X	Drop:	354 Cc	nfidence erval	2) 0193272
	Innrandom parame		101.00		0.00		Implied correlation matrix of random parameters
HIVLINI SHWIRI SHWIRI	-8.19067***	,52678 -77258	11.98 ·	.0000 .0000 .0176 .0000	4,03513	-8.15817 -1.77518 .00610 00684	Cor. Nac.: LHLEH LHAIT
DEUL) HOVOBARI	0386T*** 0386T***	.01000 .01000 .92430-04	3.10	8100. 8000. 1000.	-,00096 -,00096	_00408 01795 -00024	INLEM: 1.00000 .41714 INADT: .41714 1.00000
VCVL	-1.67828***	.00013		.0079	-2.91302	43553	
(2	beand For render	parameters					
2.03.000	4.整丁普尔克斯中央		22.56	.0000	+19846	+94423	
LHADE	.tessor Trement lescoper	offers a of Cholesk	19.22 V MATRIA		177561	.85200	
LHLES	.09639***	_02969			,03839	.13475	
SMADE	.01755+++	.00406	4.37		+0095T	.02545	
THE WHILE		18800-	1.94	10147		-02473	
	Lapersion pares						
Step 1 Step en 1		-24453				2.29192	

Random Parameter Negative Binomial Model of Possible Injury Crashes on Seven lane SPF Class Roadway Segments

Dependent Log 158el Restricte Chi squar Significa NicFadden Estimatio Inf.Cr.Al Nodel est Sample is Negativa	noe level Passido R-aguaren t bassi ob W = 0 = 1278.3 AI insted: fun 28. 2 pds end 5 binomial regress	91 -624:145 1 -1124.525 1000.765 1000.765 1100, K = (C/W = 1:1 2014, 12:12; 40 individuation model	133 154 100 112 15 102 180 418				COVERTISON RESULE LIMINE VETTERORS LIMINE .1874E-01 VETTEROR .8776E-01 .2019E-04 Implian standard deviations of random parameters S.D.Beta(1
P2H7)	Coefficient	Standard Errox		Froh.	Str. Co	ndidence esval	2) ,05000000
2	Honcandon parame	tars					Implied correlation matrix of random parameters
	-11.9189***		-11.39		415.9699		
18005		.08781		.0000	1,11522	1,45995	2-2011 102-201000 11-201000 11-20
HCVLIRE	-E.19825*** 04816***	1,07722	12,75		-2.307e0		Cox.Nat. LHLEN VCVFTSRB
VCERRIA!		100107	-4.23	.0000	0460E	-,02436	CONTRACT LAUREN ACARTEME
SCYCRASI		15402D-04	0.97		/50017	.00039	LMLEN 1.00000 .90928
ACAT I		-00055	-2.05		-,00090	-100002	VCVPTURB: .81998 1,00000
TCVFTGRA	+.08059**	.03718		.0306	-,19326	00752	APARAGET PETERS TANAMA
SCHWEET.	.00581***	.00122		2100.	.00334	.00948	
	Means for sensor		2.22		100034	1000000	
THERM		-04199	19776	10000	.93246	1.04446	
VCVF72R5	.00136**	-03716		0288	100857	13416	
	Diagonal element				11000	SACRE.	
LHLES		-02345		.0000	.11763	20939	
VCVPTGRB	.00177*	.00091		10526	00002	190385	
	Below diagonal e				1,0000	14444	
					.00242	-dokat	
		-50389				9.33005	
SoulParm	:00414*** Dispersion peres	.00088 mter for Seq .00009	#.75 Sin dist	,000s erbecton	1,18571		

Random Parameter Negative Binomial Model of Evident Injury Crashes on Seven lane SPF Class Roadway Segments

Dependent Log likeli Restricted Chi square Significes NcFadden F Estimation Inf.Cr.Ald Nodel esti Sample 1s	efficients Regional states of the states of	-820.087 -371.710 103.246 .000 .11887 1160, ff = .078 = .5 2016, 13:12:	57 51 00 44 12 73				COVARIANCE MATRIX LMLEN SINDCE LMCEN .7787r-02 SMMCCR +.4404r-02 .38338r-01 Implied standard deviations of random parameters 5.D_Sets) 1
	Coefficient	Standard Error			Ins	nfidence Esval	11 ,0889442 21 40839119
	Conrandon parana				013935		
Constant	-6.49524***	2.67978	-3.87	10000	+9.75013	-3-20e00	Deplied conteletion matrix of random parameters
LEGADT	.56756***			.0000	.32706	.61707	
MCVLIMI!	-3-92003**	1.62620	+2.09	10412	-e.80732	-,13274	
ROVORANT.	.00021**	-9124D-04	2,26	103.87	-05003	.0003#	
SALINDDEC!	.02208	101110	1,50	+1455	00724	.03740	Cor.Mat. LMLEN SHMOCR
VEVFTGER!	<.00075	.03236	-2.60	,0099	00863	.00088	100000000000000000000000000000000000000
18	Seans for render	parameters					LMLES: 1.0000004298
LULEN	.89750ere	09999	6.14	.0000	-71329	1.08132	##WDCRI84298 1.00000
\$1990CB (08440***	.02212	+5.90	.0036	10775	02101	
12	Diagonal element	s of Chalesk	y manning				
DRIVERS	05524***	02110		.004E	.01725	114004	
SHADOR)	.03355**	01553		10304	.00018	.06566	
	Weinw diagonal a				1555	1112312	
LESS DELL	05218***	.01321	-3.95		07888	02830	
	Dispersion paras					1000	
		1,11410			26165	4,11066	
Spalfurm)							

Random Parameter Negative Binomial Model of High Injury Crashes on Seven lane SPF Class Roadway Segments

Hestricte Chi square Significat SoFadden (Estimation LNY.Cr.Al) Socal estimation Semple is	Weriable Chood function S log limitation of [1 d.f.] Now Level Pseudo F. squared o Based on N = D = 871.5 Al Imated Jun 23, I pun and 8 pinomial regress	= -507.887 165.764 .000 = .16284 1160, #7 10787 2016, 13:317	155 155 166 160 11 151 151			
		Standard		Prob.		nfldence
MIINS	Coefficient	Ecton		18150+	In/t	erval
	Roncandon parame	care		40000		
	-7,13200***		-5.05	0000	-9-20123	T0.36397
	.76059***	-10531	7,37	00000	.85841	96337
	-5.53265***		-4.56	0000	-8,59853	-3.26648
SHRDCR	02271+	-01144	-1,96	.0853	04552	-90011
HCVCRAS)	.00028+**	17254D-04	3.11	20003	1,00001	
CORRECT!	-0079664	.00361	2.12	0266		-21474
TERM	02927**	-02170	-1.98	2168	04420	00038
NAMBERG	.05542** Deans for random	.02297	2.45	.0198	.01541	.10143
13	beans for random	parameters:				
130,000	.85390***	.07695	13,10	10000	.70008	1.00472
13	Scale parameters					
		,0027e				.01231
1301.880	Dispension parag	peres for Neg				
STEEL N						
calParm					+,23637	

Random Parameter Negative Binomial Model of Just Injury Crashes on Seven lane SPF Class Roadway Segments

Thi square Rightflown to Fadden in Estimation to f. Cr. Alt Rodel eat: Sample is	f log likelihood od [5 d.C.] ne level peudo 5-squared besed on N = 1 = 744.8 Al mated: Jin JS. J pos and [1 minumial regress	191,618 ,000 1 ,21137 1160, K = 1078 = .6 2016, 141021 180 EnsivLoue	92 00 91 15 42 04			
mornet.	Coefficient	Standard		Free:		ofidence exval
AART TROIT	COST CENTRAL	RECOE		14154	440	erour
	Foncendon parent					
Constant!	-11.1783***	3,44044	-7.72	40000	-14.1412	-0.4166
	173234***		11.00		-66086	
assincs:	06118***	101486	-4-12	10000		-,00208
BCVCRAM	.00023***	-61975-04	3.19		-00030	
	+100056**		-2.25		-,00103	
MATABLE !	-,03153***	01000	-3.15	.0017	+,05036	= 01120
YCPARMA:	.82972***	08434	5,70		-13969	+48878
VCVL11	-10.4014**	4,11111			-18,1070	
			-7.55	*0107	+.07252	+,00954
	teans for random					
	3.21004***				-94252	
MIVLIME:	-8.60965***	1,32416	-2.65	.0082	-6,10138	91636
- 62000	diagonal element	s of Chilesis	y materia			
LEADT	.03610					.04547
	-95240**				-11000	1,24850
	elow Glagonal e					
	07756**					-13994
	Expersion paces					
	6.39975***	1.92829	3.51	.0009	~7.00303	I.Tsete

Random Coefficients NeghnReg Model

COVERAGE	e metrix						
	1104		BEVLUIT			 	
LHADT SCYLIST	.18086- -,10886-	92	3,352			 	
Implied #	tenders o	evietis	ns of sa	name pe	renetar		
S.D_Becs)		1					
2) 2)		60295 93467					
Implied o	orrelatio	s matti	s of rec	dom gas	westers		
Cor. Mat.	DIADIT	MOVILIS					
LHADT	1,00000	-, 5635					

Random Parameter Negative Binomial Model of Low Injury Crashes on Seven lane SPF Class Roadway Segments

Random Coefficients NegRnReg Model	
Dependent variable 103N7	
Log likelihood function -1211.44659	
Restricted log likelihood -4457,76745	
Chi squased [1 d.f.] (001.29(1)	
#ignificance level .00000	
MuTadden Pasudo R-aquared .7101916	
Estimation based on $N = -1160$, $Z = -16$	
Inf.C:,AIC = 2465.5 AIC/S = 2,117	
Model estimates: Jun 26, 2014, 14:18:40	
dample is I pos and 860 individuals	
Hegetive hinostel segressiss nodel	

LOUIS	Coefficient	Standard Extor		1815%.		ofidence erval
ja	Ponrandom parame	oters				
Constabil	-5-65555***	-94719	-10.39	.0000	-6,15702	-6.61207
LSSADT.)	. #7553+++	-04797	18.48	.0000	.70268	194536
BUVLUME!	-3.85105***	.75395	-4-72	.0000	+6,02888	-2,07326
SHVDCK	一二百年安全代十七十	.00725	-6.82	.0000	06930	-,09504
SCVCRAS!	.00013***	-4381D-04	3.05	.0023	.00000	.00022
VCVL	00074***	.00058	-5-92	10000	-:00109	-,00055
VCFARMA!	-10555++	104114	2.52	.0116	102329	158941
907511	-12.0347**	9.98027	-2.45	.0316	-24.5758	-1.11036
DEG1	04325***	-01075	-4.03	.0001	-,06625	02221
WOMPS TAIL	0923844	100068	2.16	10010	.00013	100263
12	deane for rendom	parameters.				
LPC891	91965***	01201	21.76	.0000	53220	,99706
RESPONSE !	.00757+++	.00156	6.16	10000	100450	.01043
13	Diagonal element	to of Chalse	by matrix			
135231	-05090	,01654	3.26	10011 -	02146	100632
HIP/ROUSEL!	.00297***	-00087	3.44	.0000	.00296	100318
41	Below diagonal o	Camenta of 0	Dinlesky.	BALLIA		
180V LBL:	05126+	100070	-1.80	.0717	-,00266	.00011
- 11	Dispersion paint	mater for Wes	din dist	sibesion		
Spalfarmi	1.54385***	128874	2,77	.0000	1.15438	1.98881

Note: none.D-as or D-ax => multiply by 10 to -as or -as. Note: ---, -- ==> Significance at 14, 24, 10% level. Implied ocvariance matrix of candom parameters

Coveriance	matrix		
	THEFT	MCVMXSEL	

LHLEN .2905E-02 BCTGCREL -.600E-04 .886ZE-05

Deplied standard deviations of random parameters

8,D_Bets) 1 1/ .0188992 2/ .00242118

		-
Cor.Mat.	LHLEST	HEROGRAD
THIER	1,00000	+.52165
econocett.	-182148	1,00000

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