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Final Report

Run-Off-Road Collision Avoidance Countermeasures Using IVHS Countermeasures

TASK 2

Volume 2: Support Data

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Contracting Officer's Technical Representative's Precis

This report provides a basis for disseminating the preliminary contract results on a timely basis resulting in the information being available before the contract final reports are produced. Research performed during the remainder of the contract may support and/or modify the results, therefore, the material contained in this report should not be consider to be final. The current schedule calls for the completion of this research project by the third quarter of 1999.

 4 Tule and Subtule Run-Off-Road Collision Avoidance Counter- measures Using IVHS Countermeasures Task 2 Final Interim Report Volume 2: Support Data 7 Author(s) J.A. Pierowicz, D.A. Pomerleau, D.L. Hendricks, E.S. Bollman, N.J. Schmitt 9 Performing Organization Name and Address Robotics Institute Carnegie Mellon University 5000 Forbes Avenue Pittsburgh, PA 15213 12 Sponsoring Agency Name and Address 	5 Report Date June 7, 1995 6 Performing Organization Code 8 Performing Organization Report No 10 Work Umit No (TRAIS)n code 11 Contract of Grant No DTNH22-93-C-0702 13 Type of Report and Period Covered Final Report	3
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 ¹⁶ Abstract The Run-Off-Road Collision Avoidance Usi address the single vehicle crash problem throand/or reduce the severity of these crashes. This volume contains a summary of the data taxonomy and functional goals for run-off-rosheet is provided for each case, containing be on the time it took for the vehicle to depart the these departure times is also provided. An accident collision diagram is included for timeline depicts interpolated times for each k crash sequence. Also included in this volume are descriptions the causal factor groupings of these cases. 	ng IVHS Countermeasures p ough application of technolog used to develop the run-off-r oad collision countermeasures asic information about the cas he roadway. The methods use e each case with a superimpos nown vehicle position during of countermeasure functional	rogram is to y to prevent oad collision s. A summary se, as well as data ed to calculate ed timeline. The the run-off-road al goals applied to
17 Key Words Run-Off-Road Collision Avoidance Single Vehicle Roadway Departure Collision Taxonomy Functional Goals 19 Security Classif (of this report) 20 Security Classif (of this page)	18 Distribution Statement Document is available to the p National Technical Informatio	public through the on Service,

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INTRODUCTION

This volume contains a summary of the data utilized in Task 2 of the Run-Off-Road Collision Avoidance program. The data are presented in a case-by-case format. The cases are a subset of the clinical sample from Task 1. Of the original 207 cases, 102 were used in the analysis.

A *Summary Sheet* is provided for each case. The Summary Sheet contains basic information about the case (i.e., Driver/Occupant data, Vehicle data, and Roadway data). In addition, the summaries present data on each vehicle's departure time. Departure time is the amount of time from when the vehicle first deviated from its pre-crash travel path to when the vehicle departed the roadway edge or shoulder edge. The methods used and the assumptions made to determine the vehicle's departure time is provided.

An Accident Collision Diagram is included for each case with a superimposed timeline. The timeline depicts interpolated times for each known vehicle position (stations) during the run-off-road crash sequence. The timelines reflect each vehicle's roadway edge departure time.

Also included in this volume are *Descriptions of the Countermeasure Functional Goals* applied to the causal factor groupings of these cases.

CAUSAL FACTOR: Vehicle Speed - Speed and Alcohol

ROADSIDE DEPARTURE: Right

General Accident Information				
Date:	7-2-93	Weather:	Clear	
Time:	0130	Surface Conditio	n: Dry	
Accident Type:	Control/Traction Loss	Lighting:	No	
Accident Severity:	3 (A)	Land Use:	Rural	
Driver/Occupa	Driver/Occupant Information		ormation	
Driver Age:	17	Year:	1981	
Driver Sex:	Male	Vehicle Make:	Ford	
Impairment:	Intoxicated (alcohol/ other illicit drugs)	Vehicle Model:	Escort/EXP	
	Roadway Information			
Trafficway Type (Median):	Unknown	Alignment: Slope:	Curve Left Grade	
No. of Lanes:	2	Speed Limit:	56 km/h	
	Departure	e Times		
Roadway Edge:	0.93 sec	Method Stra	aight Line Projection	
Shoulder Edge:	1.06 sec			
 Assumptions: Departure time for Departure time for Initial velocity of Velocity of 80 km. Station 2 was add 	r the roadway edge was calcula r the shoulder edge was calcula the vehicle was 80 km/h. /h was assumed since excessive ed.	ted between Stations 3 and 4 ted between Stations 3 and 4 speed was indicated as a cau	(+3 m). (+6 m). sal factor.	



CAUSAL FACTOR:

Evasive Maneuver - Vehicle Encroaching into Lane -SameTravel Direction

ROADSIDE DEPARTURE: Left

	General Accident information				
Date:	7-6-93	Weather:	Clear		
Time:	1330	Surface Condition:	Dry		
Accident Type:	Avoid Collision	Lighting:	Daylight		
Accident Severity:	1 (C)	Land Use:	Rural		
Driver/Occupa	nt Information	Vehicle Information			
Driver Age:	33	Year:	1992		
Driver Sex:	Male	Vehicle Make:	Toyota		
Impairmen t:	None	Vehicle Model:	Camry		
	Roadway Information				
Trafficway Type (Median):	Physical barrier	Alignment: Slope:	Straight Grade		
No. of Lanes:	2	Speed Limit:	89 km/h		
	Departure	e Times			
Roadway Edge:	0.32 sec	Method: Straig	ht Line Projection		
Shoulder Edge:	1.04 sec				
 Assumptions: Departure time for Departure time for Initial velocity of the second sec	the roadway edge was calcula t the shoulder edge was calcula the vehicle was 89 km/h.	ted between Stations 1 and 2 (- 4 ated between Stations 1 and 3 (-3	m). m).		



CAUSAL FACTOR:Driver Relinquishes Steering Control - Fell AsleepROADSIDE DEPARTURE:Left

	General Accident Information			
Date:	7-2-93	Weather:	Clear	
Time:	0045	Surface Conditio	n: Dry	
Accident Type:	Drive Off Road	Lighting:	No	
Accident Severity:	2 (B)	Land Use:	Rural	
Driver/Occup	Driver/Occupant Information Vehicle Information			
Driver Age:	67	Year:	1986	
Driver Sex:	Male	Vehicle Make:	Oldsmobile	
Impairment:	Fell Asleep	Vehicle Model:	Cutlass	
	Roadway Information			
Trafficway Type (Median):	Flush or curb	Alignment: Slope	Curve Right	
No. of Lanes:	2	Speed Limit:	89 km/h	
	Departure	e Times		
Roadway Edge:	0.93 sec	Method: Str	aight Line Projection	
Shoulder Edge:	0.96 sec			
 Assumptions: Departure time fo Departure time fo Initial velocity of 	r the roadway edge was calcula r the shoulder edge was calcula the vehicle was 100 km/h.	ted between Stations 1 and 3 ted between Stations 1 and 3	(-3 m). (-2 m).	



CAUSAL FACTOR:Vehicle Speed - Attempted to Initiate a 90 Degree TurnROADSIDE DEPARTURE:Left

	General Accident information			
Date:	7-2-93	Weather:	Clear	
Time:	1240	Surface Condition	: Wet	
Accident Type:	Control/Traction Loss	Lighting:	Daylight	
Accident Severity:	2 (B)	Land Use:	Rural	
Driver/Occupant Information Vehicle Information				
Driver Age:	47	Year:	1983	
Driver Sex:	Male	Vehicle Make:	Cadillac	
Impairment:	None	Vehicle Model:	DeVille/ Fleetwood	
	Roadway Information			
Trafficway Type (Median):	Not divided	Alignment:	Curve Right	
No. of Lanes:	2	Speed Limit:	56 km/h	
	Departure	e Times		
Roadway Edge:	1.62 sec	Method: S	traight Line Projection	
Shoulder Edge:	1.62 sec (no shoulder)			
Assumptions:				
• Departure time fo	r the roadway edge was calcula	ted between Stations 2 and 4		
 Departure time for Initial velocity of 	r the shoulder edge was calculat the vehicle was 56 km/h	ted between Stations 2 and 4.		



CAUSAL FACTOR:Driver Relinquishes Steering Control - Fell AsleepROADSIDE DEPARTURE:Left

	General Accident Information			
Date:	8-1-93	Weather:	Fog	
Time:	0625	Surface Condition	on: Dry	
Accident Type:	Drive Off Road	Lighting:	Daylight	
Accident Severity:	1 (C)	Land Use:	Rural	
Driver/Occupa	Driver/Occupant Information Vehicle Information		ormation	
Driver Age:	27	Year:	1992	
Driver Sex:	Male	Vehicle Make:	Mazda	
Impairmen t:	Fell Asleep	Vehicle Model:	GLC/323/ Protege	
	Roadway Information			
Trafficway Type (Median):	Physical barrier	Alignment: Slope:	Curve Right	
No. of Lanes:	2	Speed Limit:	89 km/h	
	Departure	e Times		
Roadway Edge:	3.32 sec	Method: A	rc Formula Derived	
Shoulder Edge:	5.36 sec			
Assumptions: Departure time fo Departure time fo Initial velocity of Station 1 extends	r the roadway edge was calcula r the shoulder edge was calcula the vehicle was 105 km/h. beyond scope of page.	ted between Stations 2 (-88 n ted between Stations 2 (-133	n) and 2 (+10 m). m) and 2 (+24 m).	



CAUSAL FACTOR:Evasive Maneuver - Avoid Animal or PedestrianROADSIDE DEPARTURE:Right

	General Accident Information			
Date:	1-6-93	Weather:	Clear	
Time:	7003	Surface Condition:	Wet	
Accident Type:	Avoid Collision	Lighting:	Daylight	
Accident Severity:	2 (B)	Land Use:	Urban	
Driver/Occupa	ant Information	Vehicle information		
Driver Age:	56	Year:	1990	
Driver Sex:	Female	Vehicle Make:	Acura	
Impairment:	None	Vehicle Model:	Integra	
	Roadway Information			
Traficway Type (Median):	Flush or curb	Alignment: Slope:	Straight Level	
No. of Lanes:	3	Speed Limit:	80 km/h	
	Departur	e Times		
Roadway Edge:	0.45 sec	Method: St	raight Line Projection	
Shoulder Edge:	0.95 sec			
 Assumptions: Departure time for Departure time for Initial velocity of Station 2 was addet 	r the roadway edge was calcul r the shoulder edge was calcula the vehicle was 80 km/h. d.	ated between Stations 1 (+10 r ted between Stations 1 (+10 r	m) and 3 (+1 m). n) and 4.	



CAUSAL FACTOR:Driver InattentionROADSIDE DEPARTURE:Right

	General Accident Information			
Date:	1-1-93	Weather:	Clear	
Time:	1629	Surface Condition:	Dry	
Accident Type:	Control/Traction Loss	Lighting:	Daylight	
Accident Severity:	0 (0)	Land Use:	Urban	
Driver/Occupa	Driver/Occupant Information Vehicle Information			
Driver Age:	44	Year:	1991	
Driver Sex:	Female	Vehicle Make:	Chevrolet	
Impairment:	None	Vehicle Model:	Cavalier	
	Roadway Ir	formation		
Trafficway Type (Median):	Not divided	Alignment:	Straight Level	
No. of Lanes:	6	Speed Limit:	40 km/h	
	Departur	e Times		
Roadway Edge:	1.80 sec	Method Arc F	formula Derived	
Shoulder Edge:	1.80 sec (no shoulder)			
 Assumptions: Departure time for Departure time for Initial velocity of the Station 2 was added 	the roadway edge was calcula the shoulder edge was calcula the vehicle was 40 km/h. ed.	ted between Stations 3 (-6 m) and ted between Stations 3 (-6 m) and	1 4. 1 4.	



CAUSAL FACTOR:Vehicle Speed - ExcessiveROADSIDE DEPARTURE:Left

	General Accident Information			
Date:	1-5-93	Weather:	Clear	
Time:	unknown	Surface Condition:	Dry	
Accident Type:	Drive Off Road	Lighting:	No	
Accident Severity:	0 (0)	Land Use:	Urban	
Driver/Occupa	Driver/Occupant Information Vehicle Information			
Driver Age:	27	Year:	1989	
Driver Sex:	Female	Vehicle Make:	Mazda	
Impairment:	None	Vehicle Model:	626	
	Roadway Information			
Trafficway Type (Median):	Flush or curb	Alignment: Slope [.]	Curve Right	
No. of Lanes:	3	Speed Limit:	80 km/h	
	Departure	e Times		
Roadway Edge:	1.40 sec	Method: Straig	tht Line Projection	
Shoulder Edge:	1.40 sec (no shoulder)			
 Assumptions: Departure time for Departure time for Initial velocity of Station 4 was added 	r the roadway edge was calcula the shoulder edge was calcula the vehicle was 80 km/h. ed.	ated between Stations 1 and 3 (+: ted between Stations 1 and 3 (+:	3 m). 3 m).	



Scale: 1/250

CAUSAL FACTOR:

Driver Relinquishes Sfeering Control - Physical (seizure/passed out) Right

ROADSIDE DEPARTURE:

	General Accident Information			
Date:	7-2-93	Weather:	Clear	
Time:	1625	Surface Condition	: Dry	
Accicient Type:	Control/Traction Loss	Lighting:	No	
Accident Severity:	2 (B)	Land Use:	Rural	
Driver/Occupa	Driver/Occupant information		rmation	
Driver Age:	39	Year:	1980	
Driver Sex:	Male	Vehicle Make:	Pontiac	
Impairment:	Physical (seizure/passed out)	Vehicle Model:	Sunbird	
	Roadway In	formation		
Trafficway Type (Median):	Not divided	Alignment: Slope:	Straight Grade	
No. of Lanes:	2	Speed Limit:	56 km/h	
	Departure	e Times		
Roadway Edge:	0.71 sec	Method: Arc	Formula Derived	
Shoulder Edge:	1.01 sec			
 Assumptions: Departure tune for Departure tune for Initial velocity of Station 1 extends 	the roadway edge was calculat the shoulder edge was calculat the vehicle was 56 km/h. beyond scope of page.	ted between Stations 2 (- 1 m) a ted between Stations 2 (-1 m) a	and 4 (-4 m). and 4 (+1 m).	



CAUSAL FACTOR: Vehicle Failure

ROADSIDE DEPARTURE: Left

	General Accident Information			
Date:	8-6-93	Weather:	Rain	
Time:	1341	Surface Condition:	Dry	
Accident Type:	Control/Traction Loss	Lighting:	Daylight	
Accident Severity:	0 (0)	Land Use:	Urban	
Driver/Occupa	Driver/Occupant Information		mation	
Driver Age:	17	Year:	1987	
Driver Sex:	Female	Vehicle Make:	Ford	
Impairment:	None	Vehicle Model:	Escort/EXP	
	Roadway Information			
Trafficway Type (Median):	Flush or curb	Alignment: Slope:	Curve Right Grade	
No. of Lanes:	4	Speed Limit:	32km/h	
	Departure	e Times		
Roadway Edge:	1.02 sec	Method: Straig	ght Line Projection	
Shoulder Edge:	2.21 sec			
 Assumptions: Departure time for Departure time for Initial velocity of t Station 2 was addet 	the roadway edge was calcula the shoulder edge was calcula the vehicle was 45 km/h. d.	ated between Stations 3 and 4. ted between Stations 3 and 5.		



CAUSAL FACTOR: Evasive Maneuver - Avoid Animal or Pedestrian

ROADSIDE DEPARTURE: Right

General Accident Information				
Date:	8-2-93	Weather:	Clear	
Time:	2341	Surface Condition	: Dry	
Accident Type:	Avoid Collision	Lighting:	Yes	
Accident Severity:	2 (B)	Land Use:	Urban	
Driver/Occupant Information Vehicle Information				
Driver Age:	27	Year:	1988	
Driver Sex:	Male	Vehicle Make:	Pontiac	
Impairment:	None	Vehicle Model:	Firebird/ Trans Am	
	Roadway In	formation		
Trafficway Type (Median):	Not divided	Alignment:	Straight	
No. of Lanes:	2	Speed Limit:	64 km/h	
	Departur	e Times		
Roadway Edge:	0.65 sec	Method: Stu	raight Line Projection	
Shoulder Edge:	0.93 sec			
 Assumptions: Departure time for Departure time for Initial velocity of 	r the roadway edge was calcula r the shoulder edge was calcula the vehicle was 64 km/h.	ted between Stations 3 and 4 (- ted between Stations 3 and 4 (-	•8 m). •3 m).	



CAUSAL FACTOR: Vehicle Speed - Excessive ROADSIDE DEPARTURE: Left

General Accident Information				
Date:	3-5-93	Weather;	Clear	
Time:	2058	Surface Condit	ion: Dry	
Accident Type:	Control/Traction Loss	Lighting:	No	
Accidenf Severity:	1(C)	Land Use:	Rural	
Driver/Occupa	Driver/Occupant Information Vehicle Information		nformation	
Driver Age:	19	Year:	1990	
Driver Sex:	Male	Vehicle Make:	Ford	
Impairment:	None	Vehicle Model:	Taurus	
;	Roadway In	formation		
Trafficway Type (Median):	Not divided	Alignment: Slope:	Curve Right	
No. of Lanes:	2	Speed Limit:	64 km/h	
	Departure Times			
Roadway Edge:	0.84 sec	Method:	Straight Line Projection	
Shoulder Edge:	1.01 sec			
 Assumptions: Departure time for the roadway edge was calculated between Stations 1 (+6 m) and 3 (-5 m). Departure time for the shoulder edge was calculated between Stations 1 (+6 m) and 3 (-2 m). Initial velocity of the vehicle was 64 km/h. 				



CAUSAL FACTOR:Lost Directional ControlROADSIDE DEPARTURE:Right

	General Accident Information				
Date:	1-5-93	Wea ther:	Snow (sleet/hail)		
Time:	0937	Surface Condition:	Snow (slush/ice)		
Accident Type:	Control/Traction Loss	Lighting:	Daylight		
Accident Severity:	0 (0)	Land Use:	Rural		
Driver/Occupa	Driver/Occupant Information		Vehicle Information		
Driver Age:	22	Year:	1989		
Driver Sex:	Male	Vehicle Make:	Ford		
Impairment:	None	Vehicle Model:	Explorer		
	Roadway Information				
Trafficway Type (Median):	Not divided	Alignment: Slope:	Curve Right Grade		
No. of Lanes:	2	Speed Limit:	72 km/h		
	Departur	e Times			
Roadway Edge:	0.72 sec	<i>Method:</i> St	raight Line Projection		
Shoulder Edge:	0.99 sec				
 Assumptions: Departure time for the roadway edge was calculated between Stations 5 and 6. Departure time for the shoulder edge was calculated between Stations 5 and 6 (+3 m). Initial velocity of the vehicle was 40 km/h. Station 2 was added. 					



CAUSAL FACTOR:

Driver Relinquishes Steering Control - Physical (seizure/passed out)

ROADSIDE DEPARTURE: Right

	General Accident Information			
Date:	2-3-93	Weather:	Snow (sleet/hail)	
Time:	1322	Surface Condition:	Wet	
Accident Type:	Controlffraction Loss	Lighting:	Daylight	
Accident Severity:	3 (A)	Land Use:	Urban	
Driver/Occupa	Driver/Occupant Information		Vehicle Information	
Driver Age:	80	Year:	1989	
Driver Sex:	Male	Vehicle Make:	Oldsmobile	
Impairment:	Physical (seizure/ passed out)	Vehicle Model:	Ninety-Eight	
	Roadway Information			
Trafficway Type (Median):	Not divided	Alignment: Slope:	Curve Left Grade	
No. of Lanes:	4	Speed Limit:	56 km/h	
	Departure	e Times		
Roadway Edge:	1.51 sec	Method: Arc	Formula Derived	
Shoulder Edge:	1.51 sec (no shoulder)			
 Assumptions: Departure time for Departure tune for Initial velocity of Only the first five 	 Assumptions: Departure time for the roadway edge was calculated between Stations 1 and 3. Departure tune for the shoulder edge was calculated between Stations 1 and 3. Initial velocity of the vehicle was 56 km/h. Only the first five stations were used. The last three were ommitted. 			



CAUSAL FACTOR:Driver Relinquishes Steering Control - IntoxicatedROADSIDE DEPARTURE:Right

	General Accident Information				
Date:	7-7-93	Weather:	Clear		
Time:	0150	Surface Condition:	Dry		
Accident Type:	Control/Traction Loss	Lighting:	No		
Accident Severity:	0 (0)	Land Use:	Urban		
Driver/Occupa	Driver/Occupant Information		Vehicle Information		
Driver Age:	28	Year:	1984		
Driver Sex:	Male	Vehicle Make:	Audi		
Impairment:	Intoxicated (alcohol/ other illicit drugs)	Vehicle Model:	5000		
	Roadway In	formation			
Trafficway Type (Median):	Flush or curb	Alignment:	Curve Right		
No. of Lanes:	2	Speed Limit:	89 km/h		
	Departure	e Times			
Roadway Edge:	0.61 sec	Method: Arc Fo	ormula Derived		
Shoulder Edge:	1.23 sec				
 Assumptions: Departure time for Departure time for Initial velocity of t Station 1 extends b 	 Assumptions: Departure time for the roadway edge was calculated between Stations 2 (-16 m) and 2 (-1 m). Departure time for the shoulder edge was calculated between Stations 2 (-2 1 m) and 3. Initial velocity of the vehicle was 89 km/h. Station 1 extends beyond scope of page. 				



CAUSAL FACTOR:Driver Relinquishes Steering Control - IntoxicatedROADSIDE DEPARTURE:Right

General Accident Information					
Date:	7-3-93	Weather:	Clear		
Time:	2204	Surface Condition: Dry			
Accident Type:	Control/Traction Loss	Lighting:	Yes		
Accident Severity:	0 (0)	Land Use:	Urban		
Driver/Occupa	Driver/Occupant Information		Vehicle Information		
Driver Age:	37	Year:	1989		
Driver Sex:	Male	Vehicle Make:	Chevrolet		
Impairmen t:	Intoxicated (alcohol/ other illicit drugs)	Vehicle Model:	Cavalier		
	Roadway Information				
Trafficway Type (Median):	Not divided	Alignment: Slope:	Curve Left Grade		
No. of Lanes:	3	Speed Limit:	56 km/h		
	Departure	e Times			
Roadway <i>Edge:</i>	0.87 sec	Method: A	rc Formula Derived		
Shoulder Edge:	0.87 sec (no shoulder)				
 Assumptions: Departure time for the roadway edge was calculated between Stations 2 (-3 m) and 3 (-1 m). Departure time for the shoulder edge was calculated between Stations 2 (-3 m) and 3 (-1 m). Initial velocity of the vehicle was 56 km/h. Station 1 extends beyond scope of page. 					


CAUSAL FACTOR:Driver Relinquishes Steering Control - Fell AsleepROADSIDE DEPARTURE:Right

General Accident Information				
Date:	1-1-93	Weather:	Clear	
Time:	0220	Surface Condition	: Dry	
Accident Type:	Drive Off Road	Lighting:	No	
Accident Severity:	3 (A)	Land Use:	Rural	
Driver/Occupant Information Vehicle Information				
Driver Age:	19	Year:	1984	
Driver Sex:	Female	Vehicle Make:	Ford	
Impairment:	Fell Asleep	Vehicle Model:	Tempo	
	Roadway Ir	formation		
Trafficway Type (Median):	Not divided	Alignment:	Straight	
No. of Lanes:	2	Slope:	Grade	
		opeca Linik.	00 km/n	
	Departure	e Times		
Roadway Edge:	1.71 sec	Method: Arc	Formula Derived	
Shoulder Edge:	1.71 sec (no shoulder)			
 Assumptions: Departure time for the roadway edge was calculated between Stations 2 (-18 m) and 4 (-4 m). Departure time for the shoulder edge was calculated between Stations 2 (-18 m) and 4 (-4 m). Initial velocity of the vehicle was 80 km/h. 				



CAUSAL FACTOR: Driver Inattention ROADSIDE DEPARTURE: Left

Date:	2-1-93		
Timo	2175	Weather:	Clear
nine.	0720	Surface Conditi	i on: Dry
Accident Type:	Drive Off Road	Lighting:	Daylight
Accident Severity:	3 (A)	Land Use:	Rural
Driver/Occupa	nt Information	Vehicle II	nformation
Driver Age:	31	Year:	1982
Driver Sex:	Male	Vehicle Make:	Plymouth
Impairment:	None	Vehicle Model:	Gran Fury
	Roadway Ir	nformation	
Trafficway Type		Alignment:	Curve Left
(Median):	Physical barrier	Slope:	Grade
No. of Lanes:	4	Speed Limit:	64 km/h
	Departure	e Times	
Roadway Edge:	1.47 sec	Method:	Arc Formula Derived
Shoulder Edge:	1.47 sec (no shoulder)		
Assumptions:			
Departure time for	the roadway edge was calcula	ted between Stations 2 (-4 m	n) and 4 (-2 m).
- Lienarittre fitte Lor	the shoulder edge was calcula	ted between Stations 2 (-4 n	n) and 4 (-2 m).



CAUSAL FACTOR:Driver InattentionROADSIDE DEPARTURE:Left

	General Accident Information			
Date:	2-6-93	Weather:	Clear	
Time:	1446	Surface Condition:	Dry	
Accident Type:	Drive Off Road	Lighting:	Daylight	
Accident Severity:	3 (A)	Land Use:	Rural	
Driver/Occupa	ant Information	Vehicle Infor	mation	
Driver Age:	17	Year:	1975	
Driver Sex:	Female	Vehicle Make:	Nissan/Datsun	
Impairment:	None	Vehicle Model:	Z-car, ZX	
	Roadway Ir	formation		
Traflicway Type (Median):	Physical barrier	Alignment: Slope:	Straight Level	
No. of Lanes:	4	Speed Limit:	89 km/h	
	Departur	e Times		
Roadway Edge:	0.70 sec	Method: Arc Fo	ormula Derived	
Shoulder Edge:	1.08 sec			
 Assumptions: Departure time for Departure time for Initial velocity of Station extends I Station 9 was added 	the roadway edge was calcula the shoulder edge was calculat the vehicle was 89 km/h. beyond scope of page. ed.	ted between Stations 2 (-3 m) an ed between Stations 2 (- 11 m) a	d 4 (-2 m). nd 4.	



CAUSAL FACTOR: Vehicle Speed - Speed and Alcohol

ROADSIDE DEPARTURE: Right

	General Accident Information				
Date:	1-7-93	Weather:	Clear		
Time:	1845	Surface Conditio	n: Dry		
Accident Type:	Drive Off Road	Lighting:	No		
Accident Severity:	3 (A)	Land Use:	Rural		
Driver/Occupa	Driver/Occupant Information Vehicle Information				
Driver Age:	47	Year:	1978		
Driver Sex:	MaIe	Vehicle Make:	Buick		
Impairment:	Intoxicated (alcohol/ other illicit drugs)	Vehicle Model:	LeSabre		
	Roadway In	formation			
Trafficway Type (Median):	Physical barrier	Alignment:	Curve Left		
No. of Lanes:	4	Speed Limit:	89 km/h		
	Departure	e Times			
Roadway Edge:	0.97 sec	Method Str	aight Line Projection		
Shoulder Edge:	1.75 sec				
 Assumptions: Departure time for Departure time for Initial velocity of 	r the roadway edge was calculat r the shoulder edge was calculat the vehicle was 89 km/h.	ted between Stations 1 and 3 ted between Stations 1 and 4.	(-4 m).		



8

CAUSAL FACTOR:Vehicle Speed - ExcessiveROADSIDE DEPARTURE:Left

	General Accident Information				
Date:	2-7-93	Weather:	Clear		
Time:	0313	Surface Condition:	Snow (slush/ice)		
Accident Type:	Drive Off Road	Lighting:	No		
Accident Severity:	3(A)	Land Use:	Rural		
Driver/Occupa	nt Information	Vehicle Info	ormation		
Driver Age:	20	Year:	1986		
Driver Sex:	Male	Vehicle Make:	Ford		
Impairment:	Intoxicated (alcohol/ other illicit drugs)	Vehicle Model:	Escort/EXP		
	Roadway Ir	formation			
Trafficway Type (Median):	Not divided	Alignment: Slope:	Curve Right Grade		
No. of Lanes:	2	Speed Limit:	40 km/h		
	Departur	e Times			
Roadway Edge:	1.87 sec	Method: Str	aight Line Projection		
Shoulder Edge:	2.50 sec				
 Assumptions: Departure time for Departure time for Initial velocity of 	 Assumptions: Departure time for the roadway edge was calculated between Stations 2 (-5 m) and 4 (-5 m). Departure time for the shoulder edge was calculated between Stations 2 (-5 m) and 4 (+2 m). Initial velocity of the vehicle was 40 km/h. 				



Scale: 1/250

CAUSAL FACTOR:Vehicle Speed - Speed and AlcoholROADSIDE DEPARTURE:Right

	General Accident Information			
Date:	7-6-93	Weather:	Clear	
Time:	1650	Surface Condition	n: Dry	
Accident Type:	Drive Off Road	Lighting:	Daylight	
Accident Severity:	4 (K)	Land Use:	Rural	
Driver/Occupa	ant Information	Vehicle In	formation	
Driver Age:	47	Year:	1984	
Driver Sex:	Female	Vehicle Make:	Lincoln	
Impairment:	Intoxicated (alcohol/ other illicit drugs)	Vehicle Mode/:	Continental/ Town Car	
	Roadway Inf	ormation		
Trafficway Type (Median):	Not divided	Alignment: Slope	Straight Level	
No. of Lanes:	2	Speed Limit:	80 km/h	
	Departure	Times		
Roadway Edge:	0.60 sec	Method S	traight Line Projection	
Shoulder Edge:	0.74 sec			
 Assumptions: Departure time for Departure time for Initial velocity of Station is 10 m b 	r the roadway edge was calculate r the shoulder edge was calculate the vehicle was 80 km/h. pehind Station 2.	ed between Stations 2 (-10 red between Stations 2 (-10 red between Stations 2 (-10 red	m) and 3 (-7 m). m) and 3 (-4 m).	



CAUSAL FACTOR:Driver Relinquishes Steering Control - IntoxicatedROADSIDE DEPARTURE:Left

General Accident Information					
Date:	7-5-93	Weather:	Rain		
Time:	1550	Surface Condition:	Wet		
Accident Type:	Drive Off Road	Lighting:	Daylight		
Accident Severity:	3 (A)	Land Use:	Rural		
Driver/Occupa	Driver/Occupant Information Vehicle Information				
Driver Age:	62	Year:	1989		
Driver Sex:	Male	Vehicle Make:	Chevrolet		
Impairment:	Intoxicated (alcohol/ other illicit drugs)	Vehicle Model:	Baretta/Corsica		
	Roadway Ir	formation			
Trafficway Type (Median):	Not divided	Alignment: Slope:	Straight Level		
No. of Lanes:	2	Speed Limit:	89 km/h		
	Departure	e Times			
Roadway Edge:	1.18 sec	Method Ar	c Formula Derived		
Shoulder Edge:	1.27 sec				
 Assumptions: Departure time fo Departure time fo Initial velocity of Station 1 extends Stations 8 and 9 years 	r the roadway edge was calcula or the shoulder edge was calcula the vehicle was 89 km/h. beyond scope of page. were added.	ted between Stations 2 (-18 m) ted between Stations 2 (-15 m)	and 3 (+2 m).) and 3 (+5 m).		



CAUSAL FACTOR:Vehicle Speed - Speed and AlcoholROADSIDE DEPARTURE:Right

	General Accident information				
Date:	7-7-93	Weather:	Clear		
Time:	0017	Surface Condition:	Dry		
Accident Type:	Drive Off Road	Lighting:	No		
Accident Severity:	3 (A)	Land Use:	Rural		
Driver/Occupa	nt Information	Vehicle Infor	mation		
Driver Age:	20	Year:	1988		
Driver Sex:	Male	Vehicle Make:	Toyota		
Impairment:	Unknown	Vehicle Model:	Pickup		
	Roadway Ir	formation			
Trafficway Type (Median):	Not divided	Alignment: Slope	Curve Left Grade		
No. of Lanes:	2	Speed Limit:	89 km/h		
	Departure	e Times			
Roadway Edge:	0.29 sec	Method: Straig	ght Line Projection		
Shoulder Edge:	0.29 sec (no shoulder)				
Assumptions:					
Departure time forDeparture time for	 Departure time for the roadway edge was calculated between Stations 2 (-2 m) and 3 (-2 m). Departure time for the shoulder edge was calculated between Stations 2 (-2 m) and 3 (-2 m). 				
• Initial velocity of t	he vehicle was 113 km/h.				
 Station 1 is 2 m be Stations 7 and 8 w 	erind Station 2. ere added.				



CAUSAL FACTOR:Driver InattentionROADSIDE DEPARTURE:Right

	General Accident Information			
Date:	7-2-93	Weather:	Clear	
Time:	0920	Surface Condition:	Dry	
Accident Type:	Drive Off Road	Lighting:	Daylight	
Accident Severity:	3 (A)	Land Use:	Rural	
Driver/Occupa	nt Information	Vehicle Infor	mation	
Driver Age:	33	Year:	1988	
Driver Sex:	Female	Vehicle Make:	Mazda	
Impairment:	None	Vehicle Model:	MX-6	
	Roadway Ir	formation		
Trafficway Type (Median):	Not divided	Alignment: Slope:	Straight Grade	
No. of Lanes:	2	Speed Limit:	89 km/h	
	Departure	e Times		
Roadway Edge:	1.23 sec	Method Arc I	Formula Derived	
Shoulder Edge:	2.13 sec			
 Assumptions: Departure time for Departure time for Initial velocity of 	the roadway edge was calcula the shoulder edge was calcula the vehicle was 89 km/h.	ted between Stations 2 (-10 m) a ted between Stations 2 (-27 m) a	nd 3 (+5 m). and 3 (+lO m).	



CAUSAL FACTOR:Evasive Maneuver - Avoid Animal or PedestrianROADSIDE DEPARTURE:Left

General Accident Information				
Date:	7-4-93	Wea ther:	Clear	
Time:	0252	Surface Conditi	ion: Dry	
Accident Type:	Drive Off Road	Lighting:	No	
Accident Severity:	2 (B)	Land Use:	Urban	
Driver/Occupant Information Vehicle Information				
Driver Age:	38	Year:	1992	
Driver Sex:	Male	Vehicle Make:	Chevrolet	
Impairment:	Intoxicated (alcohol/ other illicit drugs)	Vehicle Model:	C, K, R, V-series	
	Roadway In	formation		
Trafficway Type (Median):	Not divided	Alignment: Slope:	Straight Level	
No. of Lanes:	2	Speed Limit:	72 km/h	
	Departure	e Times		
Roadway Edge:	1.28 sec	Method:	Straight Line Projection	
Shoulder Edge:	1.33 sec			
 Assumptions: Departure time for Departure time for Initial velocity of Station 1 is 4 m be 	the roadway edge was calculat the shoulder edge was calculat the vehicle was 72 km/h. ehind Station 2.	ed between Stations 2 (-4 m ed between Stations 2 (-4 m	n) and 4 (-4 m). n) and 4 (-3 m).	



CAUSAL FACTOR: Vehicle Speed - Unsafe Driving Act

ROADSIDE DEPARTURE: Right

	General Accident Information				
Date:	7-2-93	Weather:	Clear		
Time:	0415	Surface Condition	n: Dry		
Accident Type:	Drive Off Road	Lighting:	No		
Accident Severity:	4 (K)	Land Use:	Rural		
Driver/Occupa	Driver/Occupant Information Vehicle Information				
Driver Age:	21	Year:	1993		
Driver Sex:	Male	Vehicle Make:	Ford		
Impairmen t:	Intoxicated (alcohol/ other illicit drugs)	Vehicle Model:	Mustang/ Mustang II		
	Roadway In	formation			
Trafficway Type (Median):	Not divided	Alignment: Slope:	Curve Left Grade		
No. of Lanes:	2	Speed Limit:	89 km/h		
	Departure	e Times			
Roadway Edge:	0.38 sec	Method Stra	aight Line Projection		
Shoulder Edge:	1.02 sec				
 Assumptions: Departure time fo Departure time fo Initial velocity of Station 1 is 8 m b Stations 7, and 10 	r the roadway edge was calcula r the shoulder edge was calcula f the vehicle was 161 km/h. whind Station 2. through 15 were added.	ted between Stations 2 (-8 m) ted between Stations 2 (-8 m)	and 3. and 6.		



CAUSAL FACTOR:Driver InattentionROADSIDE DEPARTURE:Right

	General Accident Information				
Date:	7-3-93	Weather:	Clear		
Time:	1510	Surface Coudition: Dry			
Accident Type:	Drive Off Road	Lighting:	Daylight		
Accident Severity:	0 (0)	Land Use:	Urban		
Driver/Occupa	ant Information	Vehicle Int	formation		
Driver Age:	38	Year:	1988		
Driver Sex:	Female	Vehicle Make:	Dodge		
Impairment:	None	Vehicle Model:	Caravan		
	Roadway ir	formation			
<i>Trafficway Type</i> (Median):	Not divided	Alignment:	Straight		
No. of Lanes:	2	Stope. Speed Limit:	64 km/h		
	Departure	e Times			
Roadway Edge:	1.75 sec	Method: A	rc Formula Derived		
Shoulder Edge:	2.71 sec				
 Assumptions: Departure time for Departure time for Initial velocity of Station 1 extends 	t the roadway edge was calcula t the shoulder edge was calcula the vehicle was 64 km/h. beyond scope of page.	ted between Stations 2 (-25 n ted between Stations 2 (-38 n	n) and 3 (-4 m). n) and 3.		



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CAUSAL FACTOR:Evasive Maneuver - Vehicle Encroaching into Lane - OtherROADSIDE DEPARTURE:Left

	General Accident Information				
Date:	7-3-93	Weather:	Clear		
Time:	0740	Surface Condition	: Dry		
Accident Type:	Drive Off Road	Lighting:	Daylight		
Accident Severity:	3 (A)	Land Use:	Rural		
Driver/Occupa	Driver/Occupant Information		Vehicle Information		
Driver Age:	25	Year:	1993		
Driver Sex:	Female	Vehicle Make:	Ford		
Impairment:	None	Vehicle Model:	Escort/EXP		
	Roadway In	formation			
Trafficway Type (Median):	Not divided	Alignment: Slope:	Curve Right Grade		
No. of Lanes:	2	Speed Limit:	89 km/h		
	Departure	e Times			
Roadway Edge:	0.29 sec	Method: Str	aight Line Projection		
Shoulder Edge:	1.01 sec				
 Assumptions: Departure time for the roadway edge was calculated between Stations 2 (-4 m) and 3 (-4 m). Departure time for the shoulder edge was calculated between Stations 2 (-4 m) and 5. Initial velocity of the vehicle was 113 km/h. Station 1 is 4 m behind Station 2. 					



CAUSAL FACTOR:Driver Relinquishes Steering Control - IntoxicatedROADSIDE DEPARTURE:Left

General Accident Information				
Date:	8-3-93	Weather:	Clear	
Time:	0200	Surface Condition: Dry		
Accident Type:	Control/Traction Loss	Lighting:	No	
Accident Severity:	2 (B)	Land Use:	Urban	
Driver/Occupa	Driver/Occupant Information		Vehicle Information	
Driver Age:	22	Year:	1988	
Driver Sex:	Male	Vehicle Make:	Saab	
Impairment:	Intoxicated (alcohol/ other illicit drugs)	Vehicle Model:	99/99E/900	
	Roadway Ir	nformation		
Trafficway Type (Median):	Physical barrier	Alignment: Slope:	Curve Left Level	
No. of Lanes:	3	Speed Limit:	89 km/h	
	Departur	e Times		
Roadway Edge:	1.01 sec	Method:	Arc Formula Derived	
Shoulder Edge:	1.30 sec			
 Assumptions: Departure time for Departure time for Initial velocity of Station 1 extends 	the roadway edge was calcula the shoulder edge was calcula the vehicle was 89 km/h. beyond scope of page.	ted between Stations 2 (-17 ted between Stations 2 (-16	m) and 3 (-8 m). m) and 3.	



CAUSAL FACTOR;Driver Relinquishes Steering Control - OtherROADSIDE DEPARTURE:Left

	General Accident Information				
Date:	7-2-93	Weather:	Clear		
Time:	0125	Surface Condition	on: Dry		
Accident Type:	End Departure	Lighting:	No		
Accident Severity:	2 (B)	Land Use:	Urban		
Driver/Occupa	Driver/Occupant Information		Vehicle Information		
Driver Age:	30	Year:	1989		
Driver Sex:	Female	Vehicle Make:	GMC		
Impairment:	Unknown	Vehicle Model:	Jimmy		
	Roadway Information				
Trafficway Type (Median):	Not divided	Alignment:	Curve Right		
No. of Lanes:	2	Speed Limit:	40 km/h		
	Departure Times				
Roadway Edge:	8.98 sec	Method: A	rc Formula Derived		
Shoulder Edge:	8.98 sec (no shoulder)				
 Assumptions: Departure time for the roadway edge was calculated between Stations 2 (-83 m) and 7 (-6 m). Departure time for the shoulder edge was calculated between Stations 2 (-83 m) and 7 (-6 m). Initial velocity of the vehicle was 40 km/h. Station 1 extends beyond scope of page. Stations 3, 5, 6 and 8 were added. 					



CAUSAL FACTOR:Driver Relinquishes Steering Control - Fell AsleepROADSIDE DEPARTURE:Right

	General Accident Information				
Date:	1-4-93	Weather:	Clear		
Time:	0753	Surface Condition: Dry			
Accident Type:	Drive Off Road	Lighting:	Daylight		
Accident Severity:	3 (A)	Land Use:	Rural		
Driver/Occupa	Driver/Occupant Information		Vehicle Information		
Driver Age:	21	Year:	1991		
Driver Sex:	Female	Vehicle Make:	Chevrolet		
Impairment:	Fell Asleep	Vehicle Model:	S-10, T-10		
	Roadway Ir	nformation			
Trafficway Type (Median):	Physical barrier	Alignment: Slope	Curve Left		
No. of Lanes:	4	Speed Limit:	105 km/h		
	Departure	e Times			
Roadway Edge:	1.40 sec	Method: Ar	c Formula Derived		
Shoulder Edge:	2.56 sec				
 Assumptions: Departure time for the roadway edge was calculated between Stations 2 (-34 m) and 2 (+7 m). Departure time for the shoulder edge was calculated between Stations 2 (-5 1 m) and 3. Initial velocity of the vehicle was 105 km/h. Station 1 extends beyond scope of page. 					



CAUSAL FACTOR:Driver InattentionROADSIDE DEPARTURE:Left

	General Accide	nt Information		
Date:	7-1-93	Weather:	Clear	
Time:	1057	Surface Condition: Dry		
Accident Type:	Control/Traction Loss	Lighting:	Daylight	
Accident Severity:	3 (A)	Land Use:	Rural	
Driver/Occupa	Driver/Occupant Information		Vehicle Information	
Driver Age:	40	Year:	1993	
Driver Sex:	Female	Vehicle Make:	Chevrolet	
Impairment:	None	Vehicle Model:	Astro Van	
	Roadway Ir	formation		
Trafficway Type (Median):	Flush or curb	Alignment: Slope:	Straight Grade	
No. of Lanes:	2	Speed Limit:	105 km/h	
	Departur	e Times		
Roadway Edge:	0.73 sec	Method: Ar	c Formula Derived	
Shoulder Edge:	1.29 sec			
 Assumptions: Departure time for the roadway edge was calculated between Stations 2 (-19 m) and 2 (+2 m). Departure time for the shoulder edge was calculated between Stations 2 (-30 m) and 3. Initial velocity of the vehicle was 105 km/h. Station 1 extends beyond scope of page. 				



CAUSAL FACTOR: Lost Directional Control

ROADSIDE DEPARTURE: Left

	General Accident Information				
Date:	7-5-93	Weather:	Rain		
Time:	2135	Surface Condition:	Wet		
Accident Type:	Control/Traction Loss	Lighting:	Daylight		
Accident Severity:	0 (0)	Land Use:	Urban		
Driver/Occupa	Driver/Occupant Information		Vehicle Information		
Driver Age:	27	Year:	1989		
Driver Sex:	Female	Vehicle Make:	Chevrolet		
Impairmen t:	None	Vehicle Model:	Cavalier		
	Roadway Information				
Trafficway Type (Median):	Not divided	Alignment: Slope:	Curve Right Grade		
No. of Lanes:	1	Speed Limit:	89 km/h		
	Departur	e Times			
Roadway Edge:	2.09 sec	Method: Stra	ight Line Projection		
Shoulder Edger	2.31 sec				
 Assumptions: Departure time for the roadway edge was calculated between Stations 1 (+17 m) and 6 (-2 m). Departure time for the shoulder edge was calculated between Stations 1 (+17 m) and 6. Initial velocity of the vehicle was 32 km/h. Stations 2,3,4 and 5 were added. 					


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CAUSAL FACTOR:Vehicle Speed - Speed and AlcoholROADSIDE DEPARTURE:Right

Date:7.7.93Weather:ClearTime:0224Surface Condition:DryAccident Type:Drive Off RoadLighting:YesAccident Severity:4 (K)Land Use:UrbanDriver/Occupation:InformationVehicle InformationDriver Age:36Year:1978Driver Sex:MaleVehicle Make:ChevroletImpairment:Intoxicated (alcohol/ other illicit drugs)Yehicle Mode/:Fullsize BlazerTrafficway Type (Median):Not dividedAlignment:GradeSlope:2Speed Limit:40 km/hCurve Left Slope:99 se: (modian):Straight Line ProjectionShoulder Edge:0.99 se: (modiar):Not dividedStraight Line ProjectionShoulder Edge:0.99 se: (modiar):No sclause of the vehicle was calculated between Stations 1 and 3 (-14 m).Departure time for the roadway edge was calculated between Stations 1 and 3 (-14 m).Initial velocity of the vehicle was 60 km/h.•Station 2 was added.Station 2 was added.	General Accident Information					
Time:0224Surface Condition:DryAccident Type:Drive Off RoadLighting:YesAccident Severity:4 (K)Land Use:UrbanDriver/OccupationNethicle InformationVehicle InformationDriver Age:36Year:1978Driver Sex:MaleVehicle Make:ChevroletImpairment:Intoxicated (alcohol/ other illicit drugs)Vehicle Mode/:Fullsize BlazerTrafficway Type (Median):Not dividedAlignment:Curve LeftSlope:0Straiget:GradeNo. of Lanes:2Speed Limit:40 km/hShoulder Edge:0.99 sc (no shoulder)MethodStraiget:Assumptions:0.99 sc (no shoulder)MethodStraiget:• Departure time for the roadway edge was calculated between Stations 1 and 3 (-14 m).Departure time for the shoulder edge was calculated between Stations 1 and 3 (-14 m).• Distain 2 was added.Station 2 was added.Station 2 was added.	Date:	7-7-93	Weather:	Clear		
Accident Type: Drive Off Road Lighting: Yes Accident Severity: 4 (K) Land Use: Urban Driver/Occupation Vehicle Information Vehicle Make: Driver Age: Driver Age: 36 Year: 1978 Driver Sex: Male Vehicle Make: Chevrolet Impairment: Intoxicated (alcohol/ other illicit drugs) Vehicle Mode/: Fullsize Blazer Trafficway Type (Median): Not divided Alignment: Curve Left Slope: 0 Grade Stope: Grade No. of Lanes: 2 Method Straight Line Projection Shoulder Edge: 0.99 sc (no shoulder) Method Straight Line Projection Assumptions: 0.99 sc Kethod Straight Line Projection • Departure time for the roadway edge was calculated between Stations 1 and 3 (-14 m). Departure time for the shoulder edge was calculated between Stations 1 and 3 (-14 m). • Departure time for the vehicle was 60 km/h. Station 2 was added.	Time:	0224	Surface Conditio	n: Dry		
Accident Severity: 4 (K) Land Use: Urban Driver Age: 36 Year: 1978 Driver Age: Male Vehicle Make: Chevrolet Impairment: Intoxicated (alcohol/ other illicit drugs) Vehicle Mode/: Fullsize Blazer Trafficway Type (Median): Roadway Iofore: Curve Left No. of Lanes: 2 Slope: Grade No. of Lanes: 0.99 sc: (no shoulder) Method Straight Line Projection Shoulder Edge: 0.99 sc: (no shoulder) Method Straight Line Projection Assumptions: 0.99 sc: (no shoulder) Intervent stations1 and 3 (-14 m). Intervent stations1 and 3 (-14 m). • Departure time for the roadway edge was calculated between Stations1 and 3 (-14 m). Intial velocity of the vehicle was 60 km/h. Station 2 was adduct	Accident Type:	Drive Off Road	Lighting:	Yes		
Driver/Occupant Information Vehicle Information Driver Age: 36 Year: 1978 Driver Sex: Male Vehicle Make: Chevrolet Impairment: Intoxicated (alcohol/ other illicit drugs) Vehicle Mode/: Fullsize Blazer Trafficway Type (Median): Not divided Alignment: Curve Left Slope: 0 Grade Grade No. of Lanes: 2 Method Straight Line Projection Shoulder Edge: 0.99 sc: (no shoulder) Method Straight Line Projection Assumptions: Departure time for the roadway edge was calculated between Stations I and 3 (-14 m). Departure time for the shoulder edge was calculated between Stations I and 3 (-14 m). Initial velocity of the vehicle was 60 km/h. Station 2 was added. 	Accident Severity:	4 (K)	Land Use:	Urban		
Driver Age:36Year:1978Driver Sex:MaleVehicle Make:ChevroletImpairment:Intxicated (alcohol/ other illicit drugs)Vehicle Mode/:Fullsize BlazerFoadway InformationTrafficway Type (Median):Alignment:Curve LeftTrafficway Type (Median):Alignment:GradeTrafficway Type (Median):Not dividedSlope:GradeTrafficway Type (Median):Not dividedSlope:GradeTrafficway Type (Median):Not dividedSlope:Curve LeftTrafficway Type (Median):Not dividedSlope:Curve LeftTrafficway Type (Median):Not dividedMethodStraigetTrafficway Type (Median):0.99 sec (no shoulder):MethodStraiget Line ProjectionFoodway Edge:0.99 sec (no shoulder):MethodStraiget Line ProjectionAssumptions:0.99 sec (no shoulder):Image Was calculated between Stations 1 and 3 (-14 m).• Departure time for the roadway edge was calculated between Stations 1 and 3 (-14 m).Image Was calculated between Stations 1 and 3 (-14 m).• Initial velocity of the vehicle was 60 km/h.Station 2 was addetted between Stations 1 and 3 (-14 m).	Driver/Occup	ant Information	Vehicle Inf	ormation		
Driver Sex:MaleVehicle Make:ChevroletImpairment:Intoxicated (alcohol/ other illicit drugs)Vehicle Mode/:Fullsize BlazerRoadway InterstationTrafficway Type (Median):Not dividedAlignment:Curve Left Slope:Not dividedSpeed Limit:GradeNo. of Lanes:2Departure TimesMethodStraight Line ProjectionSpeed Limit:Roadway Edge:0.99 sc (no shoulder)MethodStraight Line ProjectionAssumptions: •0.99 sc (no shoulder edge was calculated between Stations 1 and 3 (-14 m).Station 2 was add.	Driver Age:	36	Year:	1978		
Impairment:Intoxicated (alcohol/ other illicit drugs)Vehicle Mode/:Fullsize BlazerRoadway IntersectionTrafficway Type (Median):Not dividedAlignment:Curve LeftNot dividedSlope:GradeNo. of Lanes:2Speed Limit:40 km/hDeparture TimesRoadway Edge:0.99 sec (no shoulder)MethodStraight Line ProjectionShoulder Edge:0.99 sec (no shoulder)Departure time for the roadway edge was calculated between Stations 1 and 3 (-14 m).Departure time for the shoulder edge was calculated between Stations 1 and 3 (-14 m).Initial velocity of the vehicle was 60 km/h.Station 2 was add-	Driver Sex:	Male	Vehicle Make:	Chevrolet		
Roadway Information Trafficway Type (Median): Not divided Alignment: Curve Left Slope: Grade No. of Lanes: 2 Speed Limit: 40 km/h Departure Times Roadway Edge: 0.99 sec Method Straight Line Projection Shoulder Edge: 0.99 sec (no shoulder) Method Straight Line Projection Assumptions: 0.99 sec (no shoulder) Method Straight Line Projection Initial velocity of the vehicle was calculated between Stations I and 3 (-14 m). Initial velocity of the vehicle was 60 km/h. Station 2 was added.	Impairment:	Intoxicated (alcohol/ other illicit drugs)	Vehicle Mode/:	Fullsize Blazer		
Trafficway Type (Median):Alignment:Curve LeftNot dividedSlope:GradeNo. of Lanes:2Speed Limit:40 km/hDeparture TimesBoadway Edge:0.99 secMethodStraiger Line ProjectionShoulder Edge:0.99 secMethodStraiger Line ProjectionShoulder Edge:0.99 secIntial velocityIntial velocity edge was calculated between Stations and 3(-14 m).Departure time for the roadway edge was calculated between Stations and 3(-14 m).Intial velocity of the vehicle was 60 km/h.Initial velocity of the vehicle was 60 km/h.Station 2 was additioned was calculated between Stations and 3(-14 m).		Roadway In	formation			
(Median):Not dividedSlope:GradeNo. of Lanes:2Speed Limit:40 km/hDeparture TimesDeparture TimesRoadway Edge:0.99 secMethodStraight Line ProjectionShoulder Edge:0.99 secMethodStraight Line ProjectionAssumptions:0.99 secIn straight lineStraight lineOpeparture time for the roadway edge was calculated between Stations 1 and 3 (-14 m).Initial velocity of the vehicle was 60 km/h.Initial velocity of the vehicle was 60 km/h.Station 2 was added.Station 2 was added.Station 2 was addedStation 2 was addedStation 2 was added	Trafficway Type		Alignment:	Curve Left		
No. of Lanes: 2 Speed Limit: 40 km/h Departure Times Departure Times Roadway Edge: 0.99 sc Method Straight Line Projection Shoulder Edge: 0.99 sc Method Straight Line Projection Assumptions: 0.99 sc Image: Comparison of the shoulder of the shoulder edge was calculated between Stations 1 and 3 (-14 m). Departure time for the shoulder edge was calculated between Stations 1 and 3 (-14 m). Imitial velocity of the vehicle was 60 km/h. Station 2 was adddddddddddddddddddddddddddddddddd	(Median):	Not divided	Slope:	Grade		
Departure Times Roadway Edge: 0.99 sc Method Straight Line Projection Shoulder Edge: 0.99 scc Nethod Straight Line Projection Assumptions: Projection Projection Projection Operature time for the roadway edge was calculated between Stations and 3 (-14 m). Projection Departure time for the shoulder edge was calculated between Stations and 3 (-14 m). Projection Initial velocity of the vehicle was 60 km/h. Station 2 was added. Projection	No. of Lanes:	2	Speed Limit:	40 km/h		
Roadway Edge:0.99 secMethodStraight Line ProjectionShoulder Edge:0.99 sec (no shoulder)		Departure	e Times			
 Shoulder Edge: 0.99 sec (no shoulder) Assumptions: Departure time for the roadway edge was calculated between Stations 1 and 3 (-14 m). Departure time for the shoulder edge was calculated between Stations 1 and 3 (-14 m). Initial velocity of the vehicle was 60 km/h. Station 2 was added. 	Roadway Edge:	0.99 sec	Method Str	aight Line Projection		
 Assumptions: Departure time for the roadway edge was calculated between Stations1 and 3 (-14 m). Departure time for the shoulder edge was calculated between Stations 1 and 3 (-14 m). Initial velocity of the vehicle was 60 km/h. Station 2 was added. 	Shoulder Edge:	0.99 sec (no shoulder)				
 Departure time for the roadway edge was calculated between Stations1 and 3 (-14 m). Departure time for the shoulder edge was calculated between Stations 1 and 3 (-14 m). Initial velocity of the vehicle was 60 km/h. Station 2 was added. 	Assumptions:					
 Departure time for the shoulder edge was calculated between Stations 1 and 3 (-14 m). Initial velocity of the vehicle was 60 km/h. Station 2 was added. 	• Departure time f	for the roadway edge was calcul	ated between Stations1 and 3	8 (-14 m).		
 Initial velocity of the vehicle was 60 km/n. Station 2 was added. 	• Departure time for the shoulder edge was calculated between Stations 1 and 3 (-14 m).					
- Station 2 was added.	Initial velocity of the vehicle was 60 km/h. Station 2 was added					
	• Station 2 was added.					



CAUSAL FACTOR:Driver Relinquishes Steering Control - IntoxicatedROADSIDE DEPARTURE:Right

	General Accident Information				
Date:	7-7-93	Weather:	Clear		
Time:	0113	Surface Condition:	Dry		
Accident Type:	Drive Off Road	Lighting:	No		
Accident Severity:	0 (0)	Land Use:	Rural		
Driver/Occupa	ant Information	Vehicle Inf	ormation		
Driver Age:	31	Year:	1979		
Driver Sex:	Male	Vehicle Make:	Ford		
Impairment:	Intoxicated (alcohol other illicit drugs)	Vehicle Model:	F-series pickup		
	Roadway In	formation			
Trafficway Type (Median):	Not divided	Alignment: Slope:	Straight Level		
No. of Lanes:	2	Speed Limits	89 km/h		
	Departure	e Times			
Roadway Edge:	0.88 sec	Method: Ar	rc Formula Derived		
Shoulder Edge:	0.88 sec (no shoulder)				
 Assumptions: Departure time for Departure time for Initial velocity of Station 1 extends 	 Assumptions: Departure time for the roadway edge was calculated between Stations 2 (-5 m) and 3 (-5 m). Departure time for the shoulder edge was calculated between Stations 2 (-5 m) and 3 (-5 m). Initial velocity of the vehicle was 89 km/h. Station 1 extends beyond scope of page. 				



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CAUSAL FACTOR: Vehicle Speed - Excessive

ROADSIDE DEPARTURE: Right

	General Accident Information			
Date:	7-1-93	Weather:	Clear	
Time:	1738	Surface Condition:	Dry	
Accident Type:	Control/Traction Loss	Lighting:	Daylight	
Accident Severity:	0 (0)	Land Use:	Urban	
Driver/Occupa	ant Information	Vehicle Info	rmation	
Driver Age:	Unknown	Year:	1984	
Driver Sex:	Unknown	Vehicle Make:	Chevrolet	
Impairment:	Unknown	Vehicle Model:	Celebrity	
	Roadway Ir	formation		
Trafficway Type (Median):	Not divided	Alignment: Slope:	Straight Grade	
No. of Lanes:	2	Speed Limit:	40 km/h	
	Departure	e Times		
Roadway Edge:	2.59 sec	Method Strai	ght Line Projection	
Shoulder Edge:	2.59 sec (no shoulder)			
 Assumptions: Departure time for the roadway edge was calculated between Stations 1 (+9 m) and 4. Departure time for the shoulder edge was calculated between Stations 1 (+9 m) and 4. Initial velocity of the vehicle was 40 kmih. Station 2 was added. 				



CAUSAL FACTOR:Driver Relinquishes Steering Control - Fell AsleepROADSIDE DEPARTURE:Right

	General Accident Information				
Date:	7-6-93	Weather:	Clear		
Time:	0545	Surface Condition	on: Dry		
Accident Type:	Drive Off Road	Lighting:	No		
Accident Severity:	0 (0)	Land Use:	Rural		
Driver/Occupa	ant Information	Vehicle Inf	formation		
Driver Age:	17	Year:	1978		
Driver Sex:	Female	Vehicle Make:	Chevrolet		
Impairmen t:	Fell Asleep	Vehicle Model:	G-series van		
	Roadway In	formation			
Trafficway Type (Median):	Not divided	Alignment: Slope:	Curve Left Grade		
No. of Lanes:	2	Speed Limit:	89 km/h		
	Departure	e Times			
Roadway Edge:	1.74 sec	Method: A	rc Formula Derived		
Shoulder Edge:	1.74 sec (no shoulder)				
 Assumptions: Departure time for Departure time for Initial velocity of Stations 4 and 7 velocity 	 Assumptions: Departure time for the roadway edge was calculated between Stations 1 (-2 m) and 3 (-4 m). Departure time for the shoulder edge was calculated between Stations 1 (-2 m) and 3 (-4 m). Initial velocity of the vehicle was 89 km/h. Stations 4 and 7 were added. 				



CAUSAL FACTOR:Driver Relinquishes Steering Control - Fell AsleepROADSIDE DEPARTURE:Left

	General Accident Information				
Date:	8-3-93	Weather:	Clear		
Time:	1234	Surface Condition	: Dry		
Accident Type:	Control/Traction Loss	Lighting:	Daylight		
Accident Severity:	3(A)	Land Use:	Rural		
Driver/Occupa	nt Information	Vehicle Info	rmation		
Driver Age:	24	Year:	1989		
Driver Sex:	Female	Vehicle Make:	Chevrolet		
Impairment:	Fell Asleep	Vehicle Model:	S-10, T-10		
	Roadway In	formation			
Trafficway Type (Median):	Physical barrier	Alignment:	Straight		
No. of Lanes:	2	Speed Limit:	105 km/h		
	Departure	e Times			
Roadway Edge:	1.69 sec	Method: Arc	Formula Derived		
Shoulder Edge:	2.34 sec				
 Assumptions: Departure time for Departure time for Initial velocity of Station 1 extends 	 Assumptions: Departure time for the roadway edge was calculated between Stations 2 (-39 m) and 3 (-17 m). Departure time for the shoulder edge was calculated between Stations 2 (-53 m) and 3 (-10 m). Initial velocity of the vehicle was 113 km/h. Station 1 extends beyond scope of page. 				



CAUSAL FACTOR:Vehicle Speed - Speed and Driver inexperienceROADSIDE DEPARTURE:Right

	General Accident Information				
Date:	8-1-93	Weather:	Rain		
Time:	1259	Surface Condition:	Wet		
Accident Type:	Control/Traction Loss	Lighting:	Daylight		
Accident Severity;	1 (C)	Land Use:	Rural		
Driver/Occupa	ant Information	Vehicle Info	rmation		
Driver Age:	16	Year:	1987		
Driver Sex:	Female	Vehicle Make:	Nissan/Datsun		
Impairment:	None	Vehicle Model:	Pathfinder		
	Roadway Ir	nformation			
Trafficway Type (Median): No. of Lanes:	Not divided	Alignment: Slope: Speed Limit:	Curve Right Level 40 km/h		
	Departure	e Times			
Roadway Edge:	0.91 sec	Method: Straig	tht Line Projection		
Shoulder Edge:	1.90 sec				
 Assumptions: Departure time for Departure time for Initial velocity of Stations 2 and 3 velocity 	 Assumptions: Departure time for the roadway edge was calculated between Stations 1 (+3 m) and 4. Departure time for the shoulder edge was calculated between Stations 1 (+3 m) and 6. Initial velocity of the vehicle was 64 km/h. Stations 2 and 3 were added. 				



CAUSAL FACTOR: Lost Directional Control

Right

ROADSIDE DEPARTURE:

	General Accident Information				
Date:	9-2-93	Weather:	Rain		
Time:	1910	Surface Conditior	: Wet		
Accident Type:	Control/Traction Loss	Lighting:	Daylight		
Accident Severity:	3(A)	Land Use:	Rural		
Driver/Occupa	ant Information	Vehicle In	formation		
Driver Age:	25	Year:	1986		
Driver Sex:	Female	Vehicle Make:	Mercury		
Impairment:	None	Vehicle Model:	Topaz		
	Roadway Ir	nformation			
Trafficway Type (Median):	Not divided	Alignment: Slope:	Straight Grade		
No. of Lanes:	2	Speed Limit:	89 km/h		
	Departure	e Times			
Roadway <i>Edge:</i>	1.29 sec	Method:	straight Line Projection		
Shoulder Edge:	2.35 sec				
 Assumptions: Departure time for Departure time for Initial velocity of Station 1 is 6 m be 	 Assumptions: Departure time for the roadway edge was calculated between Stations 2 (-6 m) and 4. Departure time for the shoulder edge was calculated between Stations 1 (-6 m) and 5 (+10 m). Initial velocity of the vehicle was 89 km/h. Station 1 is 6 m behind Station 2. 				



CAUSAL FACTOR: Evasive Maneuver - Avoid Animal or Pedestrian Right

ROADSIDE DEPARTURE:

	General Accident Information				
Date:	1-3-93	Weather:	Other (clouds)		
Time:	0645	Surface Condition	on: Dry		
Accident Type:	Avoid Collision	Lighting:	Daylight		
Accident Severity:	0 (0)	Land Use:	Rural		
Driver/Occupa	ant Information	Vehicle In	formation		
Driver Age:	36	Year:	1993		
Driver Sex:	Male	Vehicle Make:	Ford		
Impairment:	None	Vehicle Model:	Escort/EXP		
	Roadway Ir	nformation			
Trafficway Type (Median):	Not divided	Alignment: Slone:	Curve Left		
No. of Lanes:	2	Speed Limit:	89 km/h		
	Departur	e Times			
Roadway Edge:	0.45 sec	Method: S	traight Line Projection		
Shoulder Edge:	0.61 sec				
 Assumptions: Departure time fo Departure time fo Initial velocity of 	 Assumptions: Departure time for the roadway edge was calculated between Stations 1 (+24 m) and 2. Departure time for the shoulder edge was calculated between Stations 1 (+24 m) and 2 (+4 m). Initial velocity of the vehicle was 89 km/h. 				



CAUSAL FACTOR:Vehicle FailureROADSIDE DEPARTURE:Left

	General Accident Information						
Date:	Date: 1-7-93 Weather: Clear						
Time:	1840	Surface Conditi	ion: Dry				
Accident Type:	Control/Traction Loss	Lighting:	Daylight				
Accidenf Severify:	3 (A)	Land Use:	Urban				
Driver/Occupa	nt Information	Vehicle Ir	nformation				
Driver Age:	18	Year:	1980				
Driver Sex:	Male	Vehicle Make:	Nissan/Datsun				
Impairment:	None	Vehicle Model:	Z-car, ZX				
	Roadway In	formation					
Trafficway Type (Median): No. of Lanes:	Flush or curb 4	Alignment: Slope: Speed Limit:	Straight Level 72 km/h				
	Departure	- Times					
	Departary						
Roadway Edge:	0.50 sec	Method: St	traight Line Projection				
Shoulder Edge:	0.92 sec						
 Assumptions: Departure time for the roadway edge was calculated between Stations 2 (-18 m) and 2 (-8 m). Departure time for the shoulder edge was calculated between Stations 2 (-18 m) and 2 (-2 m). Initial velocity of the vehicle was 72 km/h. Station 1 is 18 m behind Station 2. 							



CAUSAL FACTOR:Diver Relinquishes Steering Control - Fell AsleepROADSIDE DEPARTURE:Left

	General Accident information			
Date:	7-4-93	Weather:	Clear	
Time:	0522	Surface Condition	on: Dry	
Accident Type:	Drive Off Road	Lighting:	No	
Accident Severity:	0 (0)	Land Use:	Rural	
Driver/Occupa	ant Information	Vehicle Inf	ormation	
Driver Age:	26	Year:	1984	
Driver Sex:	Male	Vehicle Make:	Pontiac	
Impairment:	Other (driver fatigued)	Vehicle Model:	J-2000/2000/ Sunbird	
	Roadway In	formation		
Trafficway Type (Median):	Not divided	Alignment: Slope:	Curve Right Level	
No. of Lanes:	1	Speed Limit:	89 km/h	
	Departure	e Times		
Roadway Edge:	0.64 sec	Method: Arc	Formula Derived	
Shoulder Edge:	1.25 sec			
 Assumptions: Departure time for Departure time for Initial velocity of Stations 3,7, 8 an Station 1 extends 	r the roadway edge was calculat r the shoulder edge was calculat the vehicle was 89 km/h. d 9 were added. beyond scope of page.	ted between Stations 2 (-4 m) red between Stations 2 (-4 m)	and 4 (-12 m). and 5 (+4 m).	



CAUSAL FACTOR:Vehicle Speed - Speed and AlcoholROADSIDE DEPARTURE:Right

	General Accident Information				
Date:	7-7-93	Weather:	Clear		
Time:	0012	Surface Condition:	Dry		
Accident Type:	Drive Off Road	Lighting:	No		
Accident Severity:	4 (K)	Land Use:	Rural		
Driver/Occupa	ant Information	Vehicle Infor	mation		
Driver Age:	27	Year:	1992		
Driver Sex:	Male	Vehicle Make:	Isuzu		
Impairment:	Intoxicated (alcohol/ other illicit drugs)	Vehicle Model:	Amigo		
· · · · · · · · · · · · · · · · · · ·	Roadway In	formation			
Trafficway Type (Median):	Not divided	Alignment: Slope:	Curve Left		
No. of Lanes:	2	Speed Limit:	72 km/h		
· · · · · · · · · · · · · · · · · · ·	Departure	e Times			
Roadway Edge:	0.83 sec	Method: Straig	ht Line Projection		
Shoulder Edge:	1.33 sec				
 Assumptions: Departure time for Departure time for Initial velocity of t Station 2 was added 	 Assumptions: Departure time for the roadway edge was calculated between Stations 3 (+8 m) and 4 (-5 m). Departure time for the shoulder edge was calculated between Stations 3 (+8 m) and 4 (+5 m). Initial velocity of the vehicle was 72 km/h. Station 2 was added. 				

ACCIDENT COLLISION DIAGRAM



CAUSAL FACTOR:Driver InattentionROADSIDE DEPARTURE:Left

	General Accident Information				
Date:	1-4-93	Weather:	Clear		
Time:	2140	Surface Condition:	Dry		
Accident Type:	Drive Off Road	Lighting:	No		
Accident Severity:	4 (K)	Land Use:	Urban		
Driver/Occupa	nt Information	Vehicle Infor	mation		
Driver Age:	15	Year:	1987		
Driver Sex:	Male	Vehicle Make:	Plymouth		
Impairment:	None	Vehicle Model:	Horizon		
	Roadway In	formation			
Trafficway Type (Median):	Not divided	Alignment: Slope:	Straight Level		
No. of Lanes:	2	Speed Limit:	48 km/h		
	Departure	e Times			
Roadway Edge:	2.07 sec	Method: Straig	ht Line Projection		
Shoulder Edge:	2.09 sec				
 Assumptions: Departure time for Departure time for Initial velocity of t Station 1 is 8 m bo Station 3 was added 	 Assumptions: Departure time for the roadway edge was calculated between Stations 2 (-8 m) and 5. Departure time for the shoulder edge was calculated between Stations 2 (-8 m) and 5 (+0.2 m). Initial velocity of the vehicle was 48 km/h. Station 1 is 8 m behind Station 2. Station 3 was added. 				



PSU-Case No. 45-039

CAUSAL FACTOR:Driver InattentionROADSIDE DEPARTURE:Right

General Accident Information						
Date:	2-5-93	Weather:	Other (clouds)			
Time:	0020	Surface Conditio	n: Dry			
Accident Type:	Drive Off Road	Lighting:	No			
Accident Severity:	0 (0)	Land Use:	Rural			
Driver/Occupa	Driver/Occupant Information		Vehicle Information			
Driver Age:	17	Year:	1989			
Driver Sex:	Male	Vehicle Make:	Toyota			
Impairment:	None	Vehicle Model:	4-Runner			
	Roadway Information					
Trafficway Type (Median):	Not divided	Alignment: Slope:	Straight			
No. of Lanes:	2	Speed Limit:	48 km/h			
	Departur	re Times				
Roadway Edge:	0.81 sec	Method: An	rc Formula Derived			
Shoulder Edge:	1.07 sec					
Assumptions:Departure time foDeparture time foInitial velocity of	r the roadway edge was calcula r the shoulder edge was calcula the vehicle was 48 km/h.	nted between Stations 1 (+9 m ated between Stations 1 (+8 m	a) and 2 (-2 m). and 2.			



CAUSAL FACTOR:Vehicle Speed - Speed and Driver InexperienceROADSIDE DEPARTURE:Right

	General Accident Information				
Date:	7-1-93	Weather:	Clear		
Time:	2156	Surface Conditior	: Dry		
Accident Type:	Control/Traction Loss	Lighting:	No		
Accident Severity:	3 (A)	Land Use:	Urban		
Driver/Occupant Information		Vehicle Information			
Driver Age:	16	Year:	1991		
Driver Sex:	Female	Vehicle Make:	Honda		
Impairment:	None	Vehicle <i>Model:</i>	Civic/CRX		
	Roadway Ir	formation			
Trafficway Type (Median):	Not divided	Alignment:	Curve Left		
(mechan).	Not divided	Slope:	Grade		
No. of Lanes:	2	Speed Limit:	40 km/h		
	Departur	e Times			
Roadway Edge:	1.21 sec	Method: Str	aight Line Projection		
Shoulder Edge:	1.21 sec (no shoulder)				
 Assumptions: Departure time for Departure time for Initial velocity of f Velocity of 60 km 	r the roadway edge was calcula the shoulder edge was calcula the vehicle was 60 km/h. /h was assumed since excessive	ated between Stations 1 (+5 m) ted between Stations 1 (+5 m) e speed was indicated as a caus	and 2 (-2 m). and 2 (-2 m). sal factor.		



CAUSAL FACTOR: Vehicle Speed - Speed and Alcohol Left

ROADSIDE DEPARTURE:

General Accident Information					
Date:	7-1-93	Weather:	Clear		
Time:	1613	Surface Condition	: Dry		
Accident Type:	Drive Off Road	Lighting:	Daylight		
Accident Severity:	3(A)	Land Use:	Rural		
Driver/Occupa	Driver/Occupant Information		Vehicle Information		
Driver Age:	29	Year:	1987		
Driver Sex:	Female	Vehicle Make:	Dodge		
Impairment:	Intoxicated (alcohol/ other illicit drugs)	Vehicle Model:	Dakota		
	Roadway In	oformation			
Trafficway Type (Median):	Not divided	Alignment: Slope:	Straight		
No. of Lanes:	2	Speed Limit:	64 km/h		
	Departur	e Times			
Roadway Edge:	2.81 sec	Method: Strai	ght Line Projection		
Shoulder Edge:	2.99 sec				
 Assumptions: Departure time for Departure time for Initial velocity of the Station 1 is 50 m be 	the roadway edge was calculat the shoulder edge was calculat he vehicle was 64 km/h. behind Station 2.	ted between Stations 2 (-50 m) a ted between Stations 2 (-50 m) a	and 2. and 2 (+3 m).		



Scale: 1/500

CAUSAL FACTOR:Driver Relinquishes Steering Control - IntoxicatedROADSIDE DEPARTURE:Right

	General Accident Information				
Date:	7-6-93	Weather:	Clear		
Time:	2358	Surface Condition	Dry		
Accident Type:	Drive Off Road	Lighting:	Yes		
Accident Severity:	3 (A)	Land Use:	Urban		
Driver/Occupa	Driver/Occupant Information		Vehicle Information		
Driver Age:	17	Year:	1984		
Driver Sex:	Male	Vehicle Make:	Ford		
Impairmenf:	Intoxicated (alcohol/ other illicit drugs)	Vehicle Model:	Tempo		
	Roadway In	formation			
Trafficway Type (Median):	Not divided	Alignment: Slope:	Straight		
No. of Lanes:	2	Speed Limit:	56 km/h		
	Departur	e Times			
Roadway Edge:	1.78 sec	Method: Arc	Formula Derived		
Shoulder Edge:	1.78 sec (no shoulder)				
 Assumptions: Departure time for Departure time for Initial velocity of Stations 3,5 and 6 Last station was e Station 1 extends 	the roadway edge was calculat the shoulder edge was calcula the vehicle was 56 km/h. were added. liminated. beyond scope of page.	ed between Stations 2 (- 12 m) ted between Stations 2 (-12 m)	and 4. and 4.		



CAUSAL FACTOR:Driver Relinquishes Steering Control - IntoxicatedROADSIDE DEPARTURE:Right

	General Accident Information				
Date:	7-5-93	Weather:	Clear		
Time:	2220	Surface Condition:	Dry		
Accident Type:	Drive Off Road	Lighting:	No		
Accident Severity:	3 (A)	Land Use:	Rural		
Driver/Occupa	ant Information	Vehicle Infor	mation		
Driver Age:	24	Year:	1988		
Driver Sex:	Male	Vehicle Make:	Mazda		
Impairment:	Intoxicated (alcohol/ other illicit drugs)	Vehicle Model:	Pickup		
	Roadway Inf	ormation			
Trafficway Type		Alignment:	Straight		
(Wedian):	Physical barrier	Slope:	Level		
No. of Lanes:	3	Speed Limit:	89 km/h		
	Departure	Times			
Roadway Edge:	0.79 sec	Method: Arc F	ormula Derived		
Shoulder Edge:	1.63 sec				
Assumptions:					
• Departure time for	r the roadway edge was calculate	d between Stations 2 (-4 m) ar	nd 4.		
-		d between Stations 2 (-11 m) a	and 6 (-8 m).		
• Departure time for	r the shoulder edge was calculate	,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,			
 Departure time fo Initial velocity of Station 2 was addressed 	r the shoulder edge was calculate the vehicle was 89 km/h.				



CAUSAL FACTOR:Vehicle Speed - Speed and AlcoholROADSIDE DEPARTURE:Left

General Accident Information				
Date:	7-1-93	Weather:	Clear	
Time:	2336	Surface Condition	: Dry	
Accident Type:	Drive Off Road	Lighting:	Yes	
Accident Severity:	3(A)	Land Use:	Urban	
Driver/Occupant Information		Vehicle Information		
Driver Age:	23	Year:	1986	
Driver Sex:	Male	Vehicle Make:	Ford	
Impairment :	Intoxicated (alcohol/ other illicit drugs)	Vehicle Model:	Escort/EXP	
	Roadway In	formation		
Trafficway Type (Median):	Not divided	Alignment:	Straight	
No. of Lanes:	3	Siope: Speed Limit:	Grade 72 km/h	
	Departure	Times		
Roadway Edge:	2.22 sec	Method:	Straight Line Projection	
Shoulder Edge:	2.22 sec (no shoulder)			
Assumptions:				
• Departure time fo	r the roadway edge was calculate	ed between Stations 2 (-8 i	m) and 6 (-2 m).	
• Departure time to	i the foudway edge was earedian			
Departure time toDeparture time fo	r the shoulder edge was calculate	ed between Stations 2 (-8	m) and 6 (-2 m).	
 Departure time to Departure time fo Initial velocity of 	r the shoulder edge was calculate the vehicle was 72 km/h.	ed between Stations 2 (-8 h	m) and 6 (-2 m).	
 Departure time to Departure time to Initial velocity of Station 1 is 8 m b 	r the shoulder edge was calculate the vehicle was 72 km/h. pehind Station 2.	ed between Stations 2 (-8 p	m) and 6 (-2 m).	


CAUSAL FACTOR:Vehicle Speed - Speed and AlcoholROADSIDE DEPARTURE:Right

General Accident Information					
Date:	7-7-93	Weather:	Clear		
Time:	0428	Surface Condition:	Dry		
Accident Type:	Drive Off Road	Lighting:	Yes		
Accident Severity:	4 (K)	Land Use:	Rural		
Driver/Occupant Information Vehicle Information					
Driver Age:	20	Year:	1982		
Driver Sex:	Female	Vehicle Make:	Ford		
Impairment:	Intoxicated (alcohol/ other illicit drugs)	Vehicle Model:	Mustang/ Mustang II		
	Roadway Information				
Trafficway Type (Median):	Not divided	Alignment: Slope:	Curve Left		
No. of Lanes:	4	Speed Limit:	80 km/h		
	Departure	e Times			
Roadway Edge:	0.58 sec	Method	Straight Line Projection		
Shoulder Edge:	0.71 sec				
 Assumptions: Departure time for Departure time for Initial velocity of Stations 4 and 5 yes 	r the roadway edge was calcula r the shoulder edge was calcula the vehicle was 80 km/h. were added.	ted between Stations 1 and 2 ted between Stations 1 and 2	(-2 m). (+l).		



CAUSAL FACTOR:Vehicle Speed - Unsafe Driving ActROADSIDE DEPARTURE:Right

General Accident Information				
Date:	8-2-93	Weather:	Clear	
Time:	1926	Surface Condi	tion: Dry	
Accident Type:	Control/Traction Loss	Lighting:	Daylight	
Accident Severity:	3 (A)	Land Use:	Urban	
Driver/Occupant Information Vehicle Information				
Driver Age:	30	Year:	1985	
Driver Sex:	Male	Vehicle Make:	Chevrolet	
Impairment:	None	Vehicle Model:	Camaro	
Roadway Information				
Trafficway Type (Median):	Not divided	Alignment: Slope:	Straight	
No. of Lanes:	2	Speed Limit:	48 km/h	
	Departur	e Times		
Roadway Edge:	0.80 sec	Method:	Straight Line Projection	
Shoulder Edge:	0.80 sec (no shoulder)			
Assumptions:				
• Departure time for	r the roadway edge was calcula	ted between Stations 2 (-10) m) and 2 (+6 m).	
Departure time fo	r the shoulder edge was calcula	tted between Stations 2 (- 1	0 m) and 2 (+6 m).	
 Initial velocity of Velocity of 70 km 	the vehicle was 70 km/n.	e speed was indicated as a	causal factor	
		F		



CAUSAL FACTOR:Vehicle Speed - Speed and AlcoholROADSIDE DEPARTURE:Right

General Accident Information					
Date:	8-7-93	Weather:	Clear		
Time:	0134	Surface Condi	tion: Dry		
Accident Type:	Control/Traction Loss	Lighting:	No		
Accident Severity:	3 (A)	Land Use:	Rural		
Driver/Occupant Information Vehicle Information					
Driver Age:	21	Year:	1981		
Driver Sex:	Male	Vehicle Make:	Toyota		
Impairment:	Intoxicated (alcohol/ other illicit drugs)	Vehicle Model:	Celica		
	Roadway In	formation			
Trafficway Type (Median):	Not divided	Alignment:	Curve Left		
No. of Lanes:	2	Speed Limit:	64 km/h		
	Departur	e Times			
Roadway Edge:	0.72 sec	Method:	Straight Line Projection		
Shoulder Edge:	0.72 sec (no shoulder)				
 Assumptions: Departure time for Departure time for Initial velocity of Velocity of 80 km Second to last state 	r the roadway edge was calcular r the shoulder edge was calculat the vehicle was 80 km/h. n/h was assumed since excessive tion was ommitted.	ted between Stations 1 (+1 ted between Stations 1 (+ 1 e speed was indicated as a	1 m) and 2 (+4 m). 1 m) and 2 (+4 m). causal factor.		



CAUSAL FACTOR: Evasive Maneuver- Vehicle Encroaching into Lane - Other ROADSIDE DEPARTURE: Right

	General Accident Information				
Date:	1-1-93	Wea ther:	Rain		
Time:	2350	Surface Condition:	Wet		
Accident Type:	Control/Traction Loss	Lighting:	No		
Accident Severity:	3 (A)	Land Use:	Urban		
Driver/Occupa	Driver/Occupant Information Vehicle Information				
Driver Age:	30	Year:	1991		
Driver Sex:	Male	Vehicle Make:	Ford		
Impairment:	None	Vehicle Model:	Taurus		
	Roadway Information				
Trafficway Type (Median):	Not divided	Alignment:	Straight		
No. of Lanes:	2	Speed Limit:	72 km/h		
	Departure	e Times			
Roadway Edge:	0.25 sec	Method Str	aight Line Projection		
Shoulder Edge:	0.60 sec				
 Assumptions: Departure time for Departure time for Initial velocity of Station 2 was added 	the roadway edge was calculat the shoulder edge was calculat the vehicle was 72 km/h. ded.	ted between Stations 3 and 3 ted between Stations 3 and 3	(+5 m). (+lO m).		



CAUSAL FACTOR:Driver inattentionROADSIDE DEPARTURE:Right

	General Accid	ent Information		
Date:	1-7-93	Weather:	Clear	
Time:	0740	Surface Cond	ition: Dry	
Accident Type:	Drive Off Road	Lighting:	Daylight	
Accident Severity:	3 (A)	Land Use:	Rural	
Driver/Occupant Information Vehicle Information				
Driver Age:	41	Year:	1985	
Driver Sex:	Female	Vehicle Make:	Dodge	
Impairment:	None	Vehicle Model:	Caravan	
	Roadway	Information		
Trafficway Type	NY . 19 11 1	Alignment:	Straight	
(Median):	Not divided	Slope:	Level	
No. of Lanes:	2	Speed Limit:	40 km/h	
	Departu	ure Times		
Roadway Edge:	10.26 sec	Method:	Arc Formula Derived	
Shoulder Edge:	10.26 sec (no shoulder)			
Assumptions:				
• Departure time for	r the roadway edge was calcu	lated between Stations 2 (-9	1 m) and 4.	
• Departure tune for	r the shoulder edge was calcu	lated between Stations 2 (-9	1 m) and 4.	
• Initial velocity of	the vehicle was 40 km/h.			
Stations 2 and 5 r	vere added.			
• Stations 5 and 5 v	1 1 2			



Scale: 1/250

CAUSAL FACTOR:Lost Directional ControlROADSIDE DEPARTURE:Left

	General Accident information				
Date: Time:	2-2-93 2235	Weather: Surface Condition:	Rain Wet		
Accident Type:	Control/Traction Loss	Lighting:	No		
Accident Severity:	3 (A)	Land Use:	Urban		
Driver/Occupa	Driver/Occupant Information Vehicle Information				
Driver Age:	23	Year:	1992		
Driver Sex:	Female	Vehicle Make:	Toyota		
Impairment:	None	Vehicle Model:	MR-2		
	Roadway Information				
<i>Trafficway Type</i> (Median):	Not divided	Alignment: Slope:	Straight Level		
No. of Lanes:	2	Speed Limit:	89 km/b		
	Departur	e Times			
Roadway Edge:	1.59 sec	Method: S	traight Line Projection		
Shoulder Edge:	1.63 sec				
 Assumptions: Departure time for Departure time for Initial velocity of Station 1 is 4 m b Stations 3,9, 10 a 	r the roadway edge was calcular r the shoulder edge was calcula the vehicle was 89 km/h. ehind Station 2. and 11 were added.	ted between Stations 2 (-4 m) ted between Stations 2 (-4 m) and 5.) and 5 (+1 m).		



CAUSAL FACTOR;Vehicle Speed - Speed and AlcoholROADSIDE DEPARTURE:Right

General Accident Information					
Date:	2-6-93	Weather:	Clear		
Time:	0450	Surface Condition	Dry		
Accident Type:	Control/Traction Loss	Lighting:	No		
Accident Severity:	3 (A)	Land User	Rural		
Driver/Occupant Information Vehicle Information					
Driver Age:	36	Year:	1986		
Driver Sex:	Male	Vehicle Make:	Chevrolet		
Impairment:	Other (alcoh. consumption - BAC unknown)	Vehicle Model:	S-10, T-10		
	Roadway Information				
Trafficway Type (Median):	Not divided	Alignment:	Curve Left		
No. of Lanes:	2	Speed Limit:	64 km/h		
	Departure	e Times			
Roadway Edge:	0.57 sec	<i>Method:</i> Straig	ht Line Projection		
Shoulder Edge:	1.35 sec				
 Assumptions: Departure time for Departure time for Initial velocity of Velocity of 80 km Station 1 is 10 m 1 	the roadway edge was calculat the shoulder edge was calculate the vehicle was 64 km/h. /h was assumed since excessive behind Station 2.	ed between Stations 2 (-10 m) a ed between Stations 2 (- 10 m) a e speed was indicated as a causa	and 2. and 4. 1 factor.		



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CAUSAL FACTOR:Vehicle Speed - Speed and AlcoholROADSIDE DEPARTURE:Left

	General Accident Information				
Date:	4-6-93	Weather:	Rain		
Time:	0120	Surface Condition:	Wet		
Accident Type:	Drive Off Road	Lighting:	No		
Accident Severity:	4 (K)	Land Use:	Rural		
Driver/Occupa	Driver/Occupant Information Vehicle Information				
Driver Age:	34	Year:	1983		
Driver Sex:	Male	Vehicle Make:	Buick		
Impairment:	Intoxicated (alcohol/ other illicit drugs)	Vehicle Model:	Skylark		
	Roadway Information				
Trafficway Type (Median):	Not divided	Alignment: Slope:	Curve Right		
No. of Lanes:	2	Speed Limit:	40 km/h		
	Departure	e Times			
Roadway Edge:	1.76 sec	Method: Stra	aight Line Projection		
Shoulder Edge:	1.76 sec (no shoulder)				
 Assumptions: Departure time for Departure time for Initial velocity of Station 1 is 10 m 	the roadway edge was calculat the shoulder edge was calculat the vehicle was 40 km/h. behind Station 2.	ted between Stations 2 (-10 m) ted between Stations 2 (-10 m)	and 3 (-10 m). and 3 (-10 m).		



CAUSAL FACTOR: Lost Directional Confrol

ROADSIDE DEPARTURE: Left

	General Accident Information					
Date:	4-3-93	Weather:	Rain			
Time:	1555	Surface Condition:	Wet			
Accident Type:	Control/Traction Loss	Lighting:	Daylight			
Accident Severity:	3 (A)	Land Use:	Rural			
Driver/Occupa	Driver/Occupant Information Vehicle Information					
Driver Age:	30	Year:	1991			
Driver Sex:	Female	Vehicle Make:	Nissan/Datsun			
Impairment:	Unknown	Vehicle Model:	8 10/Maxima			
	Roadway information					
Trafficway Type (Median):	Not divided	Alignment: Slope:	Straight Grade			
No. of Lanes:	2	Speed Limit:	89 km/h			
	Departur	e Times				
Roadway Edge:	1.15 sec	Method: Str	aight Line Projection			
Shoulder Edge:	2.00 sec					
 Assumptions: Departure time for Departure time for Initial velocity of Station 1 is 20 m 	r the roadway edge was calcula r the shoulder edge was calcula the vehicle was 89 km/h. behind Station 2.	ted between Stations 2 (-20 m) ted between Stations 2 (-20 m)) and 3.) and 4 (-1 m).			



CAUSAL FACTOR:Driver InaffentionROADSIDE DEPARTURE:Left

	General Accident Information				
Date:	4-3-93	Weather:	Rain		
Time:	0500	Surface Conditio	n: Dry		
Accident Type:	Drive Off Road	Lighting:	Daylight		
Accident Severity:	3 (A)	Land Use:	Urban		
Driver/Occup	Driver/Occupant Information Vehicle Information				
Driver Age:	20	Year:	1981		
Driver Sex:	Male	Vehicle Make:	Chevrolet		
Impairment:	None	Vehicle Model:	Caprice/Impala		
Trafficway Type (Median):	Roadway Ir	nformation Alignment: Slope:	Curve Right Grade		
No. or Lanes:	2	Speed Limit:	40 km/h		
	Departur	e Times			
Roadway Edge:	2.91 sec	Method A	rc Formula Derived		
Shoulder Edge:	2.91 sec (no shoulder)				
 Assumptions: Departure tune for Departure time f Initial velocity of Station 1 extends 	or the roadway edge was calcula for the shoulder edge was calcula the vehicle was 40 km/h. beyond scope of page.	ted between Stations 2 (-18 n ated between Stations 2 (-18 n	n) and 3 (-9 m). n) and 3 (-9 m).		



CAUSAL FACTOR:Vehicle Speed - Speed and AlcoholROADSIDE DEPARTURE:Right

I/Traction Loss ormation ated (alcohol/ llicit drugs) Roadway I	Weather: Surface Conditi Lighting: Land Use: Vehicle In Year: Vehicle Make: Vehicle Model:	Clear Dry Yes Urban nformation 1992 Chevrolet Lumina
I/Traction Loss ormation ated (alcohol/ llicit drugs) Roadway I	Surface Conditi Lighting: Land Use: Vehicle In Year: Vehicle Make: Vehicle Model:	fon: Dry Yes Urban nformation 1992 Chevrolet Lumina
I/Traction Loss ormation ated (alcohol/ llicit drugs) Roadway I	Lighting: Land Use: Vehicle In Year: Vehicle Make: Vehicle Model: nformation	Yes Urban nformation 1992 Chevrolet Lumina
ated (alcohol/ llicit drugs) Roadway I	Land Use: Vehicle In Year: Vehicle Make: Vehicle Model: nformation	Urban nformation 1992 Chevrolet Lumina
ated (alcohol/ llicit drugs) Roadway I	Vehicle In Year: Vehicle Make: Vehicle Model: nformation	nformation 1992 Chevrolet Lumina
ated (alcohol/ llicit drugs) Roadway I	Year: Vehicle Make: Vehicle Model: nformation	1992 Chevrolet Lumina
ated (alcohol/ llicit drugs) Roadway I	Vehicle Make: Vehicle Model: nformation	Chevrolet Lumina
ated (alcohol/ llicit drugs) Roadway I	Vehicle Model: nformation	Lumina
Roadway I	nformation	
or curb	Alignment:	Straight
	Siope: Speed Limit:	Grade 80 km/h
Departu	re Times	
ec	Method:	Straight Line Projection
ec oulder)		
dway edge was calcul	ated between Stations 1 and	4.
ulder edge was calculated	ated between Stations 1 and	4
	Departu ec ec ioulder) dway edge was calcul ulder edge was calcul	Speed Limit: Departure Times ec Method: ec ioulder) dway edge was calculated between Stations 1 and ulder edge was calculated between Stations 1 and



Scale: 1/250

CAUSAL FACTOR:Evasive Maneuver - Avoid Animal or PedestrianROADSIDE DEPARTURE:Right

	General Accident Information				
Date:	5-1-93	Weather:	Clear		
Time:	1655	Surface Condition:	Dry		
Accident Type:	Avoid Collision	Lighting:	Daylight		
Accident Severity:	3 (A)	Land Use:	Rural		
Driver/Occupant Information Vehicle Information					
Driver Age:	29	Year:	1976		
Driver Sex:	Female	Vehicle Make:	Oldsmobile		
Impairment:	None	Vehicle Model:	Cutlass		
	Roadway Information				
Trafficway Type		Alignment:	Straight		
(Median):	Not divided	Slope:	Grade		
No. of Lanes:	2	Speed Limit:	72 km/h		
	Departur	e Times			
Roadway Edge:	0.80 sec	Method: Strai	ght Line Projection		
Shoulder Edge:	0.80 sec (no shoulder)				
Assumptions:					
• Departure time for	or the roadway edge was calculated	ated between Stations 4 and 5.			
• Departure time fo	r the shoulder edge was calcula	ated between Stations 4 and 5.			
Initial velocity of Station 2 was all	the vehicle was 72 km/h.				
• Station 3 was add	ieu.				



CAUSAL FACTOR:Vehicle Speed - Speed and AlcoholROADSIDE DEPARTURE:Right

General Accident Information				
Date:	5-7-93	Weather:	Clear	
Time:	1858	Surface Condifion:	Dry	
Accidenf Type:	Control/Traction Loss	Lighting:	Daylight	
Accidenf Severity:	4 (K)	Land Use:	Rural	
Driver/Occupa	Driver/Occupant Information		Vehicle Information	
Driver Age:	22	Year:	1976	
Driver Sex:	Male	Vehicle Make:	Buick	
Impairment :	Intoxicated (alcohol/ other illicit drugs)	Vehicle Model:	LeSabre	
	Roadwav In	formation		
Trafficway Type (Median):	Not divided	Aligment: Slope:	Curve Left	
No. of Lanes:	2	Speed Limit:	72 km/h	
	Departur	e Times		
Roadway Edge:	0.64 sec	Method: Straigh	nt Line Projection	
Shoulder Edge:	0.64 sec (no shoulder)			
 Assumptions: Departure time for the roadway edge was calculated between Stations 1 and 2. Departure time for the shoulder edge was calculated between Stations 1 and 2. Initial velocity of the vehicle was 72 km/h. 				



CAUSAL FACTOR: Lost Directional Control

ROADSIDE DEPARTURE: Right

	General Accide	nt Information		
Date:	6-1-93	Weather:	Clear	
Time:	1140	Surface Condition:	Dry	
Accident Type:	Control/Traction Loss	Lighting:	Daylight	
Accident Severity:	0 (0)	Land Use:	Rural	
Driver/Occupa	Driver/Occupant Information		Vehicle Information	
Driver Age:	50	Year:	1992	
Driver Sex:	Female	Vehicle Make:	Dodge	
Impairment:	None	Vehicle Model:	Dakota	
	Roadway Ir	nformation		
Trafficway Type (Median): .	Flush or curb	Alignment:	Straight	
No. of Lanes:	4	Slope: Speed Limit:	Grade 105 km/h	
	Departur	e Times		
Roadway Edge:	0.73 sec	Method: Straig	nt Line Projection	
Shoulder Edge:	0.96 sec			
 Assumptions: Departure time for the roadway edge was calculated between Stations 1 and 4. Departure time for the shoulder edge was calculated between Stations 1 and 5. Initial velocity of the vehicle was 105 km/h. Stations 2,8 and 9 were added. 				



CAUSAL FACTOR:Driver Relinquishes Steering Control - Fell AsleepROADSIDE DEPARTURE:Right

	General Accident Information				
Date:	6-3-93	Weather:	Clear		
Time:	0330	Surface Condition:	Dry		
Accident Type:	Control/Traction Loss	Lighting:	No		
Accident Severity:	3 (A)	Land Use:	Rural		
Driver/Occupa	Driver/Occupant Information		Vehicle information		
Driver Age:	18	Year:	1987		
Driver Sex:	Female	Vehicle Make:	Ford		
Impairment:	Fell Asleep	Vehicle Model:	Ranger		
	Roadway In	formation			
<i>Trafficway Type</i> (Median):	Physical barrier	Alignment: Slope:	Straight Level		
No. of Lanes:	4	Speed Limit:	105 km/h		
	Departure	e Times			
Roadway Edge:	0.87 sec	Method: Arc F	Formula Derived		
Shoulder Edge:	1.72 sec				
 Assumptions: Departure time for the roadway edge was calculated between Stations 2 (-8 m) and 3 (-5 m). Departure tune for the shoulder edge was calculated between Stations 2 (+I0 m) and 6. Initial velocity of the vehicle was 105 km/h. Station 1 extends beyond scope of page. 					



CAUSAL FACTOR: Lost Directional Control

ROADSIDE DEPARTURE: Right

	General Accident Information				
Date:	1-7-93	Weather:	Rain		
Time:	0025	Surface Condition:	Wet		
Accident Type:	Control/Traction Loss	Lighting:	Yes		
Accident Severity:	4 (K)	Land Use:	Urban		
Driver/Occupa	Driver/Occupant information		Vehicle Information		
Driver Age:	18	Year:	1979		
Driver Sex:	Male	Vehicle Make:	Oldsmobile		
Impairment:	Intoxicated (alcohol/ other illicit drugs)	Vehicle Model:	Cutlass		
	Roadway Information				
<i>Trafficway Type</i> (Median):	Flush or curb	Alignment: Slope:	Straight Grade		
No. of Lanes:	3	Speed Limit:	48 km/h		
	Deoartur	e Times			
Roadway Edge:	0.54 sec	Method: Stra	ight Line Projection		
Shoulder Edge:	1.07 sec				
 Assumptions: Departure time for the roadway edge was calculated between Stations 4 and 7 (-10 m). Departure time for the shoulder edge was calculated between Stations 4 and 7 (-3 m). Initial velocity of the vehicle was 48 km/h. Stations 2,3,5 and 6 were added. 					



CAUSAL FACTOR:Lost Directional ControlROADSIDEDEPARTURE:Right

	General Accident Information				
Date:	1-1-93	Weather:	Rain		
Time:	2326	Surface Condition	: Snow (slush/ice)		
Accident Type:	Control/Traction Loss	Lighting:	Yes		
Accident Severity:	0 (0)	Land Use:	Urban		
Driver/Occupa	Driver/Occupant information		Vehicle Information		
Driver Age:	47	Year:	1968		
Driver Sex:	Male	Vehicle Make:	Ford		
Impairment:	None	Vehicle Mode/:	Mustang/ Mustang II		
	Roadway Ir	nformation			
Trafficway Type (Median):	Not divided	Alignment: Slope:	Straight Grade		
No. of Lanes:	3	Speed Limit:	48 km/h		
	Departur	e Times			
Roadway Edge:	0.83 sec	Method: S	traight Line Projection		
Shoulder Edge:	0.83 sec (no shoulder)				
 Assumptions: Departure time for the roadway edge was calculated between Stations 3 (+3 m) and 5. Departure time for the shoulder edge was calculated between Stations 3 (+3 m) and 5. Initial velocity of the vehicle was 48 km/h. Stations 2,4, 8 and 9 were added. 					



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CAUSAL FACTOR.'

Evasive Maneuver - Vehicle Encroaching into Lane -Same Travel Direction

ROADSIDE DEPARTURE: Left

	General Accident Information			
Date:	1-4-93	Weather:	Clear	
Time:	2020	Surface Condition: Dry		
Accident Type:	Avoid Collision	Lighting:	Yes	
Accident Severity:	2 (B)	Land Use:	Rural	
Driver/Occupa	Driver/Occupant Information		Vehicle Information	
Driver Age:	20	Year:	1992	
Driver Sex:	Female	Vehicle Make:	Saturn	
Impairment:	None	Vehicle Model:	SL	
	Roadway Ir	nformation		
Trafficway Type (Median):	Physical barrier	Alignment: Slope:	Straight Grade	
No. of Lanes:	2	Speed Limit:	89 km/h	
	Departur	e Times		
Roadway Edge:	0.65 sec	Method:	Straight Line Projection	
Shoulder Edge:	2.03 sec			
 Assumptions: Departure time for Departure time for Initial velocity of Station 1 is 24 m 	r the roadway edge was calcula r the shoulder edge was calcula the vehicle was 89 km/h. behind Station 2.	ted between Stations 2 (-2- ted between Stations 2 (-2	4 m) and 2 (-8 m). 4 m) and 2.	


Scale: 1/500

CAUSAL FACTOR: Lost Directional Control

ROADSIDE DEPARTURE: Left

	General Accident Information				
Date:	4-4-93	Weather:	Rain		
Time:	0550	Surface Condition:	Wet		
Accident Type:	Control/Traction Loss	Lighting:	Daylight		
Accident Severity:	1 (C)	Land Use:	Urban		
Driver/Occupa	ant Information	Vehicle Inf	formation		
Driver Age:	25	Year:	1984		
Driver Sex:	Male	Vehicle Make:	Nissan/Datsun		
Impairment:	None	Vehicle Model:	Pickup		
	Roadway Ir	nformation			
Trafficway Type (Median):	Flush or curb	Alignment: Slope:	Straight Grade		
No. of Lanes:	4	Speed Limit:	56 km/h		
	Departur	e Times			
Roadway Edge:	1.58 sec	Method: Str	aight Line Projection		
Shoulder Edge:	1.58 sec (no shoulder)				
 Assumptions: Departure time for Departure time for Initial velocity of Station 2 was add 	 Assumptions: Departure time for the roadway edge was calculated between Stations 3 (-17 m) and 5. Departure time for the shoulder edge was calculated between Stations 3 (- 17 m) and 5. Initial velocity of the vehicle was 80 km/h. Station 2 was added. 				



CAUSAL FACTOR:Driver Relinquishes Steering Control - IntoxicatedROADSIDE DEPARTURE:Left

Date: 1-6-93 Weather: Clear Time: 1830 Surface Condition: Dry Accident Type: Avoid Collision Lighting: Yes Accident Severity: 3 (A) Land Use: Urban Driver/Occupant Information Vehicle Information Vehicle Information Driver Age: 51 Year: 1991 Driver Sex: Male Vehicle Make: Chevrolet Impairment: Intoxicated (alcohol/ other illicit drugs) Vehicle Model: S-10, T-10 Trafficway Type (Median): Physical barrier Alignment: Curve Right Slope: Grade No. of Lanes: 1 Departure Times 89 km/h Straight Line Projection Shoulder Edge: 0.66 sec Method: Straight Line Projection Shoulder Edge: 0.91 sec Straight Line Projection 3. • Departure time for the roadway edge was calculated between Stations 2 (-8 m) and 3. • • Departure time for the vehicle was 89 km/h. • • • Station 1 is 8 m behind Station 2. • •		General Acciden	t Information			
Time:1830Surface Condition: DryAccident Type:Avoid CollisionLighting:YesAccident Severity:3 (A)Land Use:UrbanDriver/OccupationInformationVehicle InformationDriver Age:51Year:1991Driver Sex:MaleVehicle Make:ChevroletImpairment:Intoxicated (alcohol/ other illicit drugs)Vehicle Model:S-10, T-10Physical barrierAlignment:Sope:GradeNo. of Lanes:1Departure TimesSopeit Limit:89 km/hShoulder Edge:0.66 secMethod:Straight Line ProjectionShoulder Edge:0.91 secStraight Line Projection3.Assumptions:Straight Line Projection• Departure time for the roadway edge was calculated between Stations 2 (-8 m) and 3• Initial velocity of the vehicle was 89 km/h• Station 1 is 8 methid Station 2	Date:	1-6-93	Weather:	Clear		
Accident Type:Avoid CollisionLighting:YesAccident Severity:3 (A)Land Use:UrbanDriver Age:51Year:1991Driver Age:51Year:ChevroletImpairment:Intoxicated (alcohol/ other illicit drugs)Vehicle Make:ChevroletTrafficway Type (Median):Intoxicated (alcohol/ other illicit drugs)Vehicle Model:S-10, T-10Trafficway Type (Median):Physical barrierAlignment:Curve Right Slope:GradeNo. of Lanes:1Departure TimesStraight:By km/hFoadway Edge:0.66 secMethod:Straight:Straight:Assumptions:0.91 secStraight:Straight:Straight:• Departure time for the roadway edge was calculated between Stations 2 (-8 m) and 3.Openature time for the shoulder edge was calculated between Stations 2 (-8 m) and 4.• Initial velocity of the vehicle was 89 km/h.Station 1 is 8 m between Station 2.Station 1 is 8 m between Station 2.	Time:	1830	Surface Condition	on: Dry		
Accident Severity: 3 (A) Land Use: Urban Driver/Occuper Information Vehicle Information 1991 Driver Age: 51 Year: 1991 Driver Sex: Male Vehicle Make: Chevrolet Impairment: Intoxicated (alcohol/ other illicit drugs) Vehicle Model: S-10, T-10 Trafficway Type (Median): Roadway Interting Alignment: Curve Right No. of Lanes: 1 Slope: Grade No. of Lanes: 1 Departure Times Straight intertion Roadway Edge: 0.66 sec Method: Straight intertion Shoulder Edge: 0.91 sec Straight intertions 2 (-8 m) and 3. Speparture time for the roadway edge was calculated between Stations 2 (-8 m) and 3. • Departure time for the shoulder edge was calculated between Stations 2 (-8 m) and 3. Station 1 is 8 michtight intertion 2.	Accident Type:	Avoid Collision	Lighting:	Yes		
Driver/Occupant Information Vehicle Information Driver Age: 51 Year: 1991 Driver Sex: Male Vehicle Make: Chevrolet Impairment: Intoxicated (alcohol/ other illicit drugs) Vehicle Model: S-10, T-10 Roadway Information Trafficway Type (Median): Physical barrier Alignment: Curve Right No. of Lanes: 1 Slope: Grade Speed Limit: 89 km/h Assumptions: • 0.66 sec Method: Straight Line Projection Shoulder Edge: 0.91 sec Straight Line Projection Straight Line Projection • Departure time for the roadway edge was calculated between Stations 2 (-8 m) and 3. - - • Departure time for the shoulder edge was calculated between Stations 2 (-8 m) and 4. - - • Initial velocity of the vehicle was 89 km/h. - - - • Station 1 is 8 m behird Station 2. - - -	Accident Severity:	3 (A)	Land Use:	Urban		
Driver Age:51Year:1991Driver Sex:MaleVehicle Make:ChevroletImpairment:Intoxicated (alcohol/ other illicit drugs)Vehicle Model:S-10, T-10Foadway InformationTrafficway Type (Median):Mage and the second se	Driver/Occupant Information Vehicle Information					
Driver Sex:MaleVehicle Make:ChevroletImpairment:Intoxicated (alcohol/ other illicit drugs)Vehicle Model:S-10, T-10Roadway Ising InterstoreTrafficway Type (Median):Physical barrierAlignment:Curve RightNo. of Lanes:1Slope:GradeImpairment:1Departure Timest89 km/hImpairment:0.66 secMethod:Straight Line ProjectionShoulder Edge:0.91 secNo. 91 secStraight Line ProjectionImpairment:Impairment:Straight Line ProjectionStraight Line ProjectionShoulder Edge:0.91 secStraight Line ProjectionStraight Line ProjectionImpairment:Impairment:Straight Line ProjectionStraight Line ProjectionShoulder Is the roadway edge was calculated between Stations 2 (-8 m) and 3.Station 1 is 8 m bet det edge was sected between Stations 2 (-8 m) and 4.Impairment:Impairment:Station 2.	Driver Age:	51	Year:	1991		
Impairment: Intoxicated (alcohol/ other illicit drugs) Vehicle Model: S-10, T-10 Roadway Information Trafficway Type (Median): Physical barrier Alignment: Curve Right No. of Lanes: 1 Slope: Grade Departure Times 89 km/h Speed Limit: No. Roadway Edge: 0.66 sec Method: Straight Line Projection Shoulder Edge: 0.91 sec Straight Line Projection Straight Line Projection Assumptions: - Departure time for the roadway edge was calculated between Stations 2 (-8 m) and 3. Station 1 is 8 m between Station 2.	Driver Sex:	Male	Vehicle Make:	Chevrolet		
Roadway Information Trafficway Type (Median): Physical barrier Alignment: Curve Right Slope: Grade No. of Lanes: 1 Speed Limit: 89 km/h Departure Times Method: Straight Line Projection Shoulder Edge: 0.66 sec Method: Straight Line Projection Shoulder Edge: 0.91 sec Straight Line Projection Assumptions: Operature time for the roadway edge was calculated between Stations 2 (-8 m) and 3. Departure time for the shoulder edge was calculated between Stations 2 (-8 m) and 4. Initial velocity of the vehicle was 89 km/h. Station 1 is 8 m behind Station 2. Station 2.	Impairment:	Intoxicated (alcohol/ other illicit drugs)	Vehicle Model:	S-10, T-10		
Trafficway Type (Median):Physical barrierAlignment:Curve RightNo. of Lanes:1Slope:Grade1Departure Limit:89 km/hDeparture TimesMethod:Straiy Line ProjectionAssumptions:•0.66 secMethod:Straiy Line ProjectionShoulder Edge:0.91 secStraiy Line ProjectionAssumptions:•Departure time for the roadway edge was calculated between Stations 2 (-8 m) and 3.•Departure time for the shoulder edge was calculated between Stations 2 (-8 m) and 3.•Initial velocity of the vehicle was 89 km/h.•Station 1 is 8 m between 2.		Roadway In	formation			
No. of Lanes: 1 Stope: Grade No. of Lanes: 1 Speed Limit: 89 km/h Departure Times Departure Times Straight Line Projection Roadway Edge: 0.66 sec Method: Straight Line Projection Shoulder Edge: 0.91 sec Method: Straight Line Projection Assumptions: Operature time for the roadway edge was calculated between Stations 2 (-8 m) and 3. Departure time for the shoulder edge was calculated between Stations 2 (-8 m) and 4. Initial velocity of the vehicle was 89 km/h. Station 1 is 8 m behind Station 2. Station 2 method is 2 method.	<i>Trafficway Type</i> (Median):	Physical barrier	Alignment:	Curve Right		
Departure Times Roadway Edge: 0.66 sec Method: Straight Line Projection Shoulder Edge: 0.91 sec Method: Straight Line Projection Assumptions: . Departure time for the roadway edge was calculated between Stations 2 (-8 m) and 3. m) and 3. Departure time for the shoulder edge was calculated between Stations 2 (-8 m) and 4. m) and 4. Initial velocity of the vehicle was 89 km/h. Station 1 is 8 m beind Station 2.	No. of Lanes:	1	Siope: Speed Limit:	89 km/h		
Roadway Edge:0.66 scMethod:Straight Line ProjectionShoulder Edge:0.91 sccAssumptions:• Departure time for the roadway edge was calculated between Stations 2 (-8 m) and 3.• Departure time for the shoulder edge was calculated between Stations 2 (-8 m) and 4.• Initial velocity of the vehicle was 89 km/h.• Station 1 is 8 m between 2.		Departure	Times			
 Shoulder Edge: 0.91 sec Assumptions: Departure time for the roadway edge was calculated between Stations 2 (-8 m) and 3. Departure time for the shoulder edge was calculated between Stations 2 (-8 m) and 4. Initial velocity of the vehicle was 89 km/h. Station 1 is 8 m behind Station 2. 	Roadway Edge:	0.66 sec	<i>Method:</i> Str	aight Line Projection		
 Assumptions: Departure time for the roadway edge was calculated between Stations 2 (-8 m) and 3. Departure time for the shoulder edge was calculated between Stations 2 (-8 m) and 4. Initial velocity of the vehicle was 89 km/h. Station 1 is 8 m behind Station 2. 	Shoulder Edge:	0.91 sec				
 Departure time for the roadway edge was calculated between Stations 2 (-8 m) and 3. Departure time for the shoulder edge was calculated between Stations 2 (-8 m) and 4. Initial velocity of the vehicle was 89 km/h. Station 1 is 8 m behind Station 2. 	Assumptions:					
 Departure time for the shoulder edge was calculated between Stations 2 (-8 m) and 4. Initial velocity of the vehicle was 89 km/h. Station 1 is 8 m behind Station 2. 	• Departure time for the roadway edge was calculated between Stations 2 (-8 m) and 3.					
 Initial velocity of the vehicle was 89 km/n. Station 1 is 8 m behind Station 2. 	• Departure time for	• Departure time for the shoulder edge was calculated between Stations 2 (-8 m) and 4.				
	Initial velocity of Station 1 is 8 m k	the venicle was 89 km/h.				
		Juniu Station 2.				



CAUSAL FACTOR:Vehicle Speed - Attempted to Initiate a 90 Degree TurnROADSIDE DEPARTURE:Right

	General Accide	nt Information			
Date:	3-4-93	Weather:	Snow (sleet/hail)		
Time:	0047	Surface Condition:	Wet		
Accident Type:	End Departure	Lighting:	Yes		
Accident Severity:	3 (A)	Land Use:	Urban		
Driver/Occupa	nt Information	Vehicle Info	rmation		
Driver Age:	31	Year:	1979		
Driver Sex:	Male	Vehicle Make:	Pontiac		
impairment:	None	Vehicle Model:	Bonneville/ Catalina		
	Roadway Ir	nformation			
<i>Trafficway Type</i> (Median):	Not divided	Alignmen t: Slone:	Straight		
No. of Lanes:	2	Speed Limit:	48 km/h		
	Departur	e Times			
Roadway Edge:	1.08 sec	Method Stra	ight Line Projection		
Shoulder Edge:	1.08 sec (no shoulder)				
Assumptions:Departure time forDeparture time forInitial velocity of	 Assumptions: Departure time for the roadway edge was calculated between Stations 2 (+3 m) and 3 (-3 m). Departure time for the shoulder edge was calculated between Stations 2 (+3 m) and 3 (-3 m). Initial velocity of the vehicle was 48 km/h. 				



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PSU-Case No. 72-084

CAUSAL FACTOR:Driver InattentionROADSIDE DEPARTURE:Right

	General Accide	nt Information		
Date:	4-4-93	Weather:	Clear	
Time:	0055	Surface Conditio	n: Dry	
Accident Type:	Control/Traction Loss	Lighting:	Yes	
Accident Severity:	3 (A)	Land Use:	Urban	
Driver/Occupa	nt Information	Vehicle Inf	ormation	
Driver Age:	47	Year:	1983	
Driver Sex:	Male	Vehicle Make:	Plymouth	
Impairment:	Intoxicated (alcohol/ other illicit drugs)	Vehicle Model:	Reliant(K)	
	Roadway li	nformation		
Trafficway Type (Median):	Not divided	Alignment: Slope:	Straight Grade	
NO. OF Lanes.	2	Speed Limit:	56 km/h	
	Departur	e Times		
Roadway Edge:	1.38 sec	Method A:	rc Formula Derived	
Shoulder Edge:	1.38 sec (no shoulder)			
 Assumptions: Departure time for the roadway edge was calculated between Stations 1 (+2 m) and 3. Departure time for the shoulder edge was calculated between Stations 1 (+2 m) and 3. Initial velocity of the vehicle was 56 km/h. Last station was ommitted. 				



Scale: 1/250

CAUSAL FACTOR:Vehicle Speed - Speed and AlcoholROADSIDE DEPARTURE:Left

	General Accident Information			
Date:	1-1-93	Weather:	Snow (sleet/hail)	
Time:	1909	Surface Condition	on: Dry	
Accident Type:	Control/Traction Loss	Lighting:	No	
Accident Severity:	3 (A)	Land Use:	Urban	
Driver/Occupa	nt Information	Vehicle In	formation	
Driver Age:	48	Year:	1987	
Driver Sex:	Male	Vehicle Make:	Pontiac	
Impairmen t:	Intoxicated (alcohol/ other illicit drugs)	Vehicle Model:	Grand Prix (RWD)	
	Roadway Ir	nformation		
Trafficway Type <i>(Median):</i>	Not divided	Alignment:	Curve Right	
No. of Lanes:	2	Speed Limit:	48 km/h	
	Departure	e Times		
Roadway Edge:	1.20 sec	Method S	Straight Line Projection	
Shoulder Edge:	1.20 sec (no shoulder)			
 Assumptions: Departure time for the roadway edge was calculated between Stations 2 (-10 m) and 4 (-4 m). Departure time for the shoulder edge was calculated between Stations 2 (-10 m) and 4 (-4 m). Initial velocity of the vehicle was 96 km/h. Station 1 is 10 m behind Station 2. 				
• Station 1 15 10 III	John Gration 2.			

.



CAUSAL FACTOR:Driver InattentionROADSIDE DEPARTURE:Left

General Accident Information				
Date:	2-6-93	Weather:	Clear	
Time:	2000	Surface Conditio	n: Dry	
Accident Type:	Drive Off Road	Lighting:	No	
Accident Severity:	4 (K)	Land Use:	Rural	
Driver/Occupa	ant Information	Vehicle Inf	ormation	
Driver Age:	16	Year:	1980	
Driver Sex:	Male	Vehicle Make:	Chevrolet	
Impairmen t:	None	Vehicle Model:	Fullsize Blazer	
	Roadway li	nformation		
Trafficway Type		Alignment:	Straight	
(Median):	Not divided	Slope:	Level	
No. of Lanes:	2	Speed Limit:	64 km/h	
	Departur	e Times		
Roadway Edges	0.84 sec	Method: St	raight Line Projection	
Shoulder Edger	0.84 sec (no shoulder)			
Assumptions:				
• Departure time for the roadway edge was calculated between Stations 1 and 2.				
 Departure time to Initial velocity of 	the vehicle was 80 km/h.	tied between Stations 1 and 2.		



CAUSAL FACTOR:Driver Relinquishes Steering Control - IntoxicatedROADSIDE DEPARTURE:Right

Date:	2-2-93	Weather:	Clear	
Time:	1848	Surface Condition	on: Dry	
Accident Type:	Drive Off Road	Lighting:	Daylight	
Accident Severity:	3 (A)	Land Use:	Urban	
Driver/Occupa	nt Information	Vehicle In	formation	
Driver Age:	68	Year:	1980	
Driver Sex:	Male	Vehicle Make:	Chevrolet	
Impairment:	Intoxicated (alcohol/ other illicit drugs)	Vehicle Model:	Caprice/Impala	
	Roadway Ir	formation		
Trafficway Type (Median):	Not divided	Alignment:	Straight	
(mechan).	Not divided	Slope:	Level	
No. of Lanes:	2	Speed Limit:	48 km/h	
	Departur	e Times		
Roadway Edge:	2.83 sec	Method: A	rc Formula Derived	
Shoulder Edge:	2.83 sec (no shoulder)			
Assumptions:				
• Departure time for	r the roadway edge was calcula	ted between Stations 2 (-11 r	m) and 3 (+3 m).	
• Departure time for the shoulder edge was calculated between Stations 2 (-11 m) and 3 (+3 m).				
 Initial velocity of the vehicle was 48 km/h. Reference point and reference line were assumed to be the utility pole and south road edge, respectively. 				
Station 1 extends 1	beyond scope of page.			



CAUSAL FACTOR:Evasive Maneuver - Avoid Animal or PedestrianROADSIDE DEPARTURE:Right

General Accident Information			
Date:	3-7-93	Weather;	Clear
Time:	1820	Surface Condition.	Dry
Accident Type:	Avoid Collision	Lighting:	Unknown
Accident Severity:	3 (A)	Land Use:	Rural
Driver/Occupa	nt Information	Vehicle Infor	mation
Driver Age:	16	Year:	1991
Driver Sex:	Male	Vehicle Make:	Hyundai
Impairment:	None	Vehicle Model:	Excel
	Roadway Ir	nformation	
Trafficwa y Type (Median):	Not divided	Alignment: Slope:	Straight
No. of Lanes:	2	Speed Limit:	64 km/h
	Departure	e Times	
Roadway Edge:	0.66 sec	Method: Straig	ght Line Projection
Shoulder Edge:	1.10 sec		
 Assumptions: Departure time for Departure time for Initial velocity of the second sec	the roadway edge was calcula the shoulder edge was calcula the vehicle was 64 km/h.	ted between Stations 1 (+3 m) a ted between Stations 1 (+3 m) a	nd 2 (+4 m). nd 3 (-1 m).



CAUSAL FACTOR; Lost Directional Control

Right

ROADSIDE DEPARTURE:

	General Accident Information			
Date:	3-7-93	Weather:	Snow (sleet/hail)	
Time:	0815	Surface Conditions	Snow (slush/ice)	
Accident Type:	Control/Traction Loss	Lighting:	Daylight	
Accident Severity:	3 (A)	Land Use:	Rural	
Driver/Occupa	nt Information	Vehicle Info	ormation	
Driver Age:	43	Year:	1991	
Driver Sex:	Male	Vehicle Make:	Oldsmobile	
Impairment:	None	Vehicle Model:	Cutlass (FWD)	
	Roadway Ir	oformation		
<i>Trafficway Type</i> (Median):	Not divided	A lignmen t: Slope:	Straight Grade	
No. of Lanes:	2	Speed Limit:	64 km/h	
	Departure	e Times		
Roadway Edge:	1.54 sec	Method: Stra	aight Line Projection	
Shoulder Edge:	1.54 sec (no shoulder)			
Assumptions:				
 Departure time for the roadway edge was calculated between Stations 1 and 7 (-3 m). Departure time for the shoulder edge was calculated between Stations 1 and 7 (-3 m). Initial velocity of the vehicle was 64 km/h. Last three stations were omitted. 				



Scole: 1/250

CAUSAL FACTOR:Driver Relinquishes Steering Control - IntoxicatedROADSIDE DEPARTURE:Right

	General Accident Information				
Date:	1-193	Weather:	Clear		
Time:	0155	Surface Conditi	on: Dry		
Accident Type:	Drive Off Road	Lighting:	No		
Accident Severity:	1 (C)	Land Use:	Rural		
Driver/Occupa	nt Information	Vehicle Ir	formation		
Driver Age:	46	Year:	1977		
Driver Sex:	Male	Vehicle Make:	Oldsmobile		
Impairment:	Intoxicated (alcohol/ other illicit drugs)	Vehicle Model:	Cutlass		
	Roadway Ir	nformation			
Trafficway Type (Median):	Not divided	Alignment: Slope:	Curve Left Level		
No. of Lanes:	2	Speed Limit:	48 km/h		
	Departur	e Times			
Roadway Edge:	0.81 sec	Method:	Arc Formula Derived		
Shoulder Edge:	1.14 sec				
Assumptions:					
• Departure time for	the roadway edge was calcula	ted between Stations 2 (-2 m	n) and 3.		
• Departure time for the shoulder edge was calculated between Stations 2 (-4 m) and 4 (-6 m).					
Initial velocity of Station 1 extends	Initial velocity of the vehicle was 48 km/h. Station 1 extends havend score of none				
	- Station I entends begoind beope of page.				



CAUSAL FACTOR: Lost Directional Control

ROADSIDE DEPARTURE: Left

	General Accident Information			
Date:	1-2-93	Weather:	Clear	
Time:	1750	Surface Condition:	Snow (slush/ice)	
Accident Type:	Control/Traction Loss	Lighting:	No	
Accident Severity:	1 (C)	Land Use:	Rural	
Driver/Occupa	nt Information	Vehicle Info	rmation	
Driver Age:	16	Year:	1988	
Driver Sex:	Female	Vehicle Make:	Buick	
Impairment:	None	Vehicle Model:	Regal	
	Roadway Ir	nformation		
<i>Trafficway Type</i> (Median) :	Not divided	Alignment: Slope:	Curve Right Grade	
No. of Lanes:	2	Speed Limit:	56 km/h	
	Departur	e Times		
Roadway <i>Edge:</i>	1.50 sec	Method: Stra	ight Line Projection	
Shoulder Edge:	1.65 sec			
 Assumptions: Departure time for the roadway edge was calculated between Stations 1 and 3. Departure time for the shoulder edge was calculated between Stations 1 and 3 (+2 m). Initial velocity of the vehicle was 48 kmih. 				



CAUSAL FACTOR: Vehicle Speed - Speed and Alcohol

ROADSIDE DEPARTURE: Right

	General Accident Information				
Date:	3-1-93	Weather:	Clear		
Time:	2145	Surface Condition	: Dry		
Accident Type:	Control/Traction Loss	Lighting:	No		
Accident Severity:	2 (B)	Land Use:	Rural		
Driver/Occupa	nt Information	Vehicle Infor	mation		
Driver Age:	19	Year:	1974		
Driver Sex:	Male	Vehicle Make:	Ford		
Impairment:	unknown	Vehicle Model:	Mustang/ Mustang II		
	Roadway Ir	nformation			
Trafficway Type (Median):	Not divided	Alignment; Slope:	Curve Left Grade		
No. of Lanes:	2	Speed Limit:	40 km/h		
	Departure	e Times			
Roadway Edge:	0.77 sec	<i>Method:</i> Straig	tht Line Projection		
Shoulder Edge:	1.54 sec				
 Assumptions: Departure time for Departure time for Initial velocity of Velocity of 60 km Station 1 is 4 m be 	 Assumptions: Departure time for the roadway edge was calculated between Stations 2 (-7 m) and 3 (-6 m). Departure time for the shoulder edge was calculated between Stations 2 (-2 m) and 4 (+4 m). Initial velocity of the vehicle was 60 km/h. Velocity of 60 km/h was assumed since excessive speed was indicated as a causal factor. Station 1 is 4 m behind Station 2. 				



PSU-Case No. 75-043

CAUSAL FACTOR;Vehicle FailureROADSIDE DEPARTURE:End Departure

	General Accide	nt Information		
Date:	3-4-93	Weather:	Clear	
Time:	1525	Surface Condition	on: Dry	
Accident Type:	End Departure	Lighting:	Daylight	
Accident Severity:	3 (A)	Land Use:	Urban	
Driver/Occupa	nt Information	Vehicle Information		
Driver Age:	64	Year:	1993	
Driver Sex:	Female	Vehicle Make:	Jeep	
Impairment:	None	Vehicle Model:	Cherokee (1984-on)	
	Roadway Ir	nformation		
Trafficway Type (Median):	Not divided	Alignment: Slone:	Straight	
No. of Lanes:	2	Speed Limit:	48 km/h	
	Departur	e Times		
Roadway <i>Edge:</i>	0.72 sec	Method: S	traight Line Projection	
Shoulder Edge:	0.72 sec (no shoulder)			
Assumptions:				
• Departure time for the roadway edge was calculated between Stations 3 (-3 m) and 4 (-3 m).				
 Departure time for the shoulder edge was calculated between Stations 3 (-3 m) and 4 (-3 m). Initial velocity of the vehicle was 48 km/h 				



CAUSAL FACTOR:Driver Relinquishes Steering Control - IntoxicatedROADSIDE DEPARTURE:Left

	General Accider	nt Information	
Date:	4-3-93	Weather:	Clear
Time:	0200	Surface Condition:	Wet
Accident Type:	Control/Traction Loss	Lighting:	No
Accident Severity:	3 (A)	Land Use:	Rural
Driver/Occupant Information Vehicle Information			
Driver Age:	21	Year:	1990
Driver Sex:	Female	Vehicle Make:	Chevrolet
Impairment:	Intoxicated (alcohol/ other illicit drugs)	Vehicle Model:	Nova/Geo Prizm
	Roadway Ir	formation	
<i>Trafficway Type</i> (Median):	Not divided	Alignment:	Straight
No. of Lanes:	2	Speed Limit:	80 km/h
	Departure	e Times	
Roadway Edge:	2.02 sec	Method: Arc	Formula Derived
Shoulder Edge:	2.47 sec		
 Assumptions: Departure time for the second seco	or the roadway edge was calcula or the shoulder edge was calcula f the vehicle was 80 km/h.	ated between Stations 1 (+7 m) ated between Stations 2 (-9 m)	and 4 (+4 m). and 5.



PSU-Case No. 75-057

CAUSAL FACTOR:Driver InattentionROADSIDE DEPARTURE:Right

	General Accident Information			
Date:	1-4-93	Weather:	Clear	
Time:	2030	Surface Conditi	i on: Dry	
Accident Type:	Drive Off Road	Lighting:	No	
Accident Severity:	1 (C)	Land Use:	Rural	
Driver/Occupa	Driver/Occupant Information		Vehicle Information	
Driver Age:	22	Year:	1992	
Driver Sex:	Female	Vehicle Make:	Volkswagon	
Impairment:	None	Vehicle Model:	Jetta	
	Roadway ir	nformation		
Trafficway Type (Median):	Not divided	Alignment: Slope:	Curve Right Level	
No. of Lanes:	2	Speed Limit:	72 km/h	
	Departur	e Times		
Roadway Edge:	0.71 sec	Method	Arc Formula Derived	
Shoulder Edge:	1.00 sec			
 Assumptions: Departure time for the roadway edge was calculated between Stations 2 (-3 m) and 3. Departure time for the shoulder edge was calculated between Stations 2 and 4. Initial velocity of the vehicle was 72 km/h. Station 1 extends beyond scope of page. 				



CAUSAL FACTOR:Vehicle Speed - Speed and AlcoholROADSIDE DEPARTURE:Left

	General Accident Information			
Date:	2-1-93	Weather:	Rain	
Time:	0213	Surface Condition:	Wet	
Accident Type:	Drive Off Road	Lighting:	No	
Accident Severity:	2 (B)	Land Use:	Rural	
Driver/Occupa	Driver/Occupant Information Vehicle Information			
Driver Age:	23	Year:	1976	
Driver Sex:	Male	Vehicle Make:	Chevrolet	
Impairment:	Intoxicated (alcohol/ other illicit drugs)	Vehicle Model:	Camaro	
	Roadway Ir	nformation		
<i>Trafficway Type</i> (Median):	Not divided	Alignment: Slope:	Straight Level	
No. of Lanes:	2	Speed Limit:	64 km/h	
	Departur	e Times		
Roadway Edge:	1.10 sec	Method: St	raight Line Projection	
Shoulder Edge:	1.10 sec (no shoulder)			
 Assumptions: Departure time for the roadway edge was calculated between Stations 2 (-6 m) and 4 (+2 m). Departure time for the shoulder edge was calculated between Stations 2 (-6 m) and 4 (+2 m). Initial velocity of the vehicle was 80 km/h. Station 1 is 6 m behind Station 2. 				



CAUSAL FACTOR:	Driver Inatten tion
ROADSIDE DEPARTURE:	Right

	General Accide	nt Information			
Date:	9-7-93	Weather:	Clear		
Time:	2058	Surface Condition	on: Dry		
Accident Type:	Drive Off Road	Lighting:	Yes		
Accident Severity:	1 (C)	Land Use:	Urban		
Driver/Occupa	Driver/Occupant Information		Vehicle Information		
Driver Age:	46	Year:	1985		
Driver Sex:	Female	Vehicle Make:	Chevrolet		
Impairmen t:	Other (driver fatigued)	Vehicle Model:	G-series van		
	Roadway li	nformation			
Trafficway Type <i>(Median)</i> :	Not divided	Alignment: <i>Slope:</i>	Curve Right Level		
No. of Lanes:	2	Speed Limit:	40 km/h		
	Departur	e Times			
Roadway Edge:	2.09 sec	Method: Are	e Formula Derived		
Shoulder Edge:	3.13 sec				
Assumptions:					
Departure time for	• Departure time for the roadway edge was calculated between Stations 2 (-7 m) and 4 (+4 m).				
 Initial velocity of 	 Departure time for the shoulder edge was calculated between Stations 2 (-5 m) and 7. Initial velocity of the vehicle was 40 km/h. 				
• Stations 3 and 8 v	• Stations 3 and 8 were added.				
• Station 1 extends beyond scope of page.					



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CAUSAL FACTOR:

Vehicle Speed - Speed and Alcohol

ROADSIDE DEPARTURE: Left

	General Accident Information			
Date:	4-6-93	Weather:	Clear	
Time:	2230	Surface Condition:	Dry	
Accident Type:	Drive Off Road	Lighting:	No	
Accident Severity:	3 (A)	Land Use:	Rural	
Driver/Occupa	Driver/Occupant Information Vehicle Information			
Driver Age:	26	Year:	1983	
Driver Sex:	Male	Vehicle Make:	Toyota	
Impairment:	Intoxicated (alcohol/ other illicit drugs)	Vehicle Model:	Pickup	
	Roadway In	formation		
Trafficway Type (Median):	Not divided	Alignment: Slope:	Straight Level	
No. of Lanes:	2	Speed Limit:	80 km/h	
	Departure	e Times		
Roadway Edge:	1.58 sec	Method: Straig	ght Line Projection	
Shoulder Edge:	1.58 sec (no shoulder)			
 Assumptions: Departure time for the roadway edge was calculated between Stations 2 (-10 m) and 4. Departure time for the shoulder edge was calculated between Stations 2 (-10 m) and 4. Initial velocity of the vehicle was 80 km/h Station 1 is 10 m behind Station 2. 				


CAUSAL FACTOR:Vehicle FailureROADSIDE DEPARTURE:Left

	General Accident Information				
Date:	4-2-93	Weather:	Clear		
Time:	1520	Surface Condifion	s Dry		
Accident Type:	Control/Traction Loss	Lighting:	Daylight		
Accident Severity:	3 (A)	Land Use:	Rural		
Driver/Occupa	int Information	Vehicle Info	rmation		
Driver Age:	28	Year:	1981		
Driver Sex:	Male	Vehicle Make:	Chevrolet		
Impairmen t:	None	Vehicle Model:	C, K, R, V-series		
Trafficway Typo	Roadway Ir	nformation	Straight		
Trafficway Type (Median):	Not divided	Alignment:	Straight		
No. of Lanes:	2	Siope: Speed Limit;	80 km/h		
	Departur	e Times			
Roadway Edge:	1.84 sec	Method: Stra	aight Line Projection		
Shoulder Edge:	1.84 sec (no shoulder)				
Assumptions:					
• Departure time for	• Departure time for the roadway edge was calculated between Stations 3 (-4 m) and 5 (-4 m).				
• Departure time for	• Departure time for the shoulder edge was calculated between Stations 3 (-4 m) and 5 (-4 m).				
Initial velocity of Station 2 was add	• Initial velocity of the vehicle was 80 km/h.				
• Station 2 was add	• Station 2 was added.				



PSU-Case No. 78-049

CAUSAL FACTOR: Vehicle Failure ROADSIDE DEPARTURE: Right

Date:4Time:1Accident Type:0Accident Severity:1	-1-93 1545 Control/Traction Loss	Weather: Surface Conditio Lighting:	Clear <i>n:</i> Dry Ves		
Time:1Accident Type:0Accident Severity:1	545 Control/Traction Loss	Surface Conditio Lighting:	n : Dry		
Accident Type: 0 Accident Severity: 1	Control/Traction Loss	Lighting:	Ves		
Accident Severity: 1	(C)		105		
		Land Use:	Rural		
Driver/Occupant	Driver/Occupant Information Vehicle Information				
Driver Age: 3	8	Year:	1988		
Driver Sex:	Male	Vehicle Make:	Ford		
Impairment: N	None	Vehicle Model:	Ranger		
	Roadway In	formation			
Trafficway Type		Alignment:	Straight		
(Median): N	Not divided	Slope:	Level		
No. of Lanes: 2	2	Speed Limit:	80 km/h		
	Departure	Times			
Roadway Edge: 0	0.50 sec	<i>Method:</i> Stra	aight Line Projection		
Shoulder Edge:	0.82 sec				
Assumptions:					
• Departure time for th	ne roadway edge was calculat	ed between Stations 4 and 5.			
• Departure time for the shoulder edge was calculated between Stations 4 and 7 (- 1 m).					
• Initial velocity of the	veniere was 60 km/n.				



CAUSAL FACTOR:Driver Relinquishes Steering Control - Fell AsleepROADSIDE DEPARTURE:Right

	General Accident Information				
Date:	5-7-93	Weather:	Clear		
Time:	0203	Surface Condition	ion: Dry		
Accident Type:	Drive Off Road	Lighting:	Daylight		
Accident Severity:	3 (A)	Land Use:	Rural		
Driver/Occupa	int information	Vehicle Ir	nformation		
Driver Age:	23	Year:	1993		
Driver Sex:	Male	Vehicle Make:	Toyota		
Impairment:	Fell Asleep	Vehicle Model:	Pickup		
	Roadway In	formation			
Trafficway Type (Median): No. of Lanes:	Not divided 2	Alignment: Slope: Speed Limit:	Straight Level 80 km/h		
	Departur	e Times			
Roadway Edge:	2.16 sec	Method:	Arc Formula Derived		
Shoulder Edge:	2.50 sec				
 Assumptions: Departure time for Departure time for Initial velocity of Station 1 extends 	 Assumptions: Departure time for the roadway edge was calculated between Stations 2 (-38 m) and 3. Departure time for the shoulder edge was calculated between Stations 2 (-37 m) and 4. Initial velocity of the vehicle was 80 km/h. Station 1 extends beyond scope of page. 				



CAUSAL FACTOR:Driver InattentionROADSIDE DEPARTURE:Left

	General Accident Information				
Date:	3-4-93	Weather	Clear		
Time:	0315	Surface Condition	: Dry		
Accident Type:	Control/Traction Loss	Lighting:	Daylight		
Accident Severity:	3(A)	Land Use:	Rural		
Driver/Occupa	nt Information	Vehicle Infor	mation		
Driver Age:	19	Year:	1993		
Driver Sex:	Male	Vehicle Make:	Mazda		
Impairment:	None	Vehicle Model:	Pickup		
	Roadway Ir	formation			
Trafficway Type (Median):	Physical barrier	Alignment: Slope:	Straight Level		
No. of Lanes:	2	Speed Limit:	105 km/h		
	Departure	e Times			
Roadway Edge:	1.42 sec	Method: Arc	Formula Derived		
Shoulder Edge:	2.11 sec				
 Assumptions: Departure time for Departure time for Initial velocity of t Station 1 extends 1 	 Assumptions: Departure time for the roadway edge was calculated between Stations 2 (-3 1 m) and 3. Departure time for the shoulder edge was calculated between Stations 2 (-35 m) and 4 (+1 m). Initial velocity of the vehicle was 105 km/h. Station 1 extends beyond scope of page. 				



Scale: 1/750

CAUSAL FACTOR:Driver InattentionROADSIDE DEPARTURE:Right

	General Accident Information			
Date:	4-3-93	Weather:	Clear	
Time:	1330	Surface Condition	on: Dry	
Accident Type:	Drive Off Road	Lighting:	Daylight	
Accident Severify:	3 (A)	Land Use:	Rural	
Driver/Occupa	ant Information	Vehicle Inf	formation	
Driver Age:	25	Year:	1981	
Driver Sex:	Female	Vehicle Make:	Chevrolet	
Impairmen f:	None	Vehicle Model:	Citation	
	Roadway Ir	nformation		
Trafficway Type (Median):	Not divided	Alignment:	Curve Left	
No. of Lanes:	2	Slope: Speed Limit:	Level 72 km/h	
	Departur	e Times		
Roadway Edge:	3.87 sec	Method: Arc	e Formula Derived	
Shoulder Edge:	5.91 sec			
 Assumptions: Departure time for Departure time for Initial velocity of Station 1 extends 	r the roadway edge was calcula r the shoulder edge was calcula the vehicle was 72 km/h. beyond scope of page.	nted between Stations 2 (-72 m ted between Stations 2 (-68 m	n) and 3 (-10 m). n) and 6.	



CAUSAL FACTOR:Vehicle Speed - Speed and AlcoholROADS/DE DEPARTURE:End Departure

	General Accident information				
Date:	6-7-93	Weather:	Clear		
Time:	1643	Surface Condition	: Dry		
Accident Type:	End Departure	Lighting:	Daylight		
Accident Severity:	2 (B)	Land Use:	Urban		
Driver/Occupa	nt Information	Vehicle Info	rmation		
Driver Age:	22	Year:	1987		
Driver Sex:	Male	Vehicle Make:	Oldsmobile		
Impairment:	Unknown	Vehicle Model:	Delta 88		
	Roadway In	formation			
Trafficway Type (Median):	Not divided	Alignment: Slope:	Straight Level		
No. of Lanes:	2	Speed Limit:	40 km/h		
	Departure	e Times			
Roadway Edge:	0.51 sec	Method: Strai	ght Line Projection		
Shoulder Edge:	0.51 sec (no shoulder)				
 Assumptions: Departure time for Departure time for Initial velocity of the 	 Assumptions: Departure time for the roadway edge was calculated between Stations 2 (-2 m) and 3 (-2 m). Departure time for the shoulder edge was calculated between Stations 2 (-2 m) and 3 (-2 m). Initial velocity of the vehicle was 114 km/h. 				



CAUSAL FACTOR;Driver Relinquishes Steering Control - Fell AsleepROADSIDE DEPARTURE:Right

	General Accident Information				
Date:	5-7-93	Weather:	Clear		
Time:	2055	Surface Condi	<i>tion:</i> Dry		
Accident Type:	Control/Traction Loss	Lighting:	No		
Accident Severity:	3 (A)	Land Use:	Rural		
Driver/Occupa	ant Information	Vehicle	Information		
Driver Age:	28	Year:	1969		
Driver Sex:	Male	Vehicle Make:	Mercury		
Impairment:	Fell Asleep	Vehicle Model:	Montego		
	Roadway Ir	formation			
Trafficway Type (Median): No. of Lanes:	Not divided	Alignment: Slope: Speed Limit:	Straight Grade 105 km/h		
	Departur	e nimes			
Roadway Edge:	1.62 sec	Method:	Straight Line Projection		
Shoulder Edge:	1.85 sec				
 Assumptions: Departure time for Departure time for Initial velocity of Station 1 is 10 m 	 Assumptions: Departure time for the roadway edge was calculated between Stations 2 (- 10 m) and 4 (+ 10 m). Departure time for the shoulder edge was calculated between Stations 2 (-10 m) and 5. Initial velocity of the vehicle was 105 km/h. Station 1 is 10 m behind Station 2. 				



CAUSAL FACTOR:Driver InattentionROADSIDE DEPARTURE:Left

Date: 7-2-93 Weather: Clear Time: 1235 Surface Condition: Dry Accident Type: Control/Traction Loss Lighting: Daylight Accident Severity: 0 (0) Land Use: Rural Driver/Occupant Information Vehicle Information Driver/Sex: Male Year: 1991 Driver Sex: Male Vehicle Model: 200 SX/240 SX Driver Sex: None Slope: Grade Driver Median): Physical barrier Slope: Grade No. of Lanes: 2 Departure Times Departure time for the roadway edge was calculated between Stations 2 (-34 m) and 2. No parture time for the roadway edge was calculated between Stations 2 (-42 m) and 3 (-6 m). Initial velocity of the vehicle was 105 km/h. Station 1 extends beyond scope of page. Station 1 extends beyond scope of page. Station 1 extends beyond scope of page.	te: 7-2-93 Weather: Clear me: 1235 Surface Condition: Dry cident Type: Control/Traction Loss Lighting: Daylight cident Severity: 0 (0) Land Use: Rural Driver/Occupant Information Vehicle Information iver Age: 34 Year: 1991 iver Sex: Male Vehicle Make: Nissan/Datsun pairmen t: None Vehicle Model: 200 SX/240 SX Roadway Information afficway Type (Median): Physical barrier Alignment: Straight Slope: Grade o. of Lanes: 2 Speed Limit: 105 km/h padway Edge: 1.17 sec Method Arc Formula Derived woulder Edge: 1.67 sec sumptions: Departure time for the roadway edge was calculated between Stations 2 (-34 m) and 2. Departure time for the shoulder edge was calculated between Stations 2 (-42 m) and 3 (-6 m). Initial velocity of the vehicle was 105 km/h. Station 1 extends beyond scope of page.		General Accide	nt Information		
Time:1235Surface Condition:DryAccident Type:Control/Traction LossLighting:DaylightAccident Severity:0 (0)Land Use:RuralDriver/Occupant InformationVehicle InformationNehicle InformationDriver Age:34Year:1991Driver Sex:MaleVehicle Make:Nissan/DatsunImpairmen t:NoneVehicle Model:200 SX/240 SXFoadway InformationVehicle Model:200 SX/240 SXDriver Sex:MaleNoneVehicle Model:200 SX/240 SXSuppe:GradeSuppe:GradeNo. of Lanes:2Speed Limit:105 km/hDeparture TimesAssumptions:•Departure time for the roadway edge was calculated between Stations 2 (-34 m) and 2.•Departure time for the shoulder edge was calculated between Stations 2 (-42 m) and 3 (-6 m).1 Initial velocity of the vehicle was 105 km/h.•Station 1 extends beyond scope of page.Station 1 extends beyond scope of page.Station 1 extends beyond scope of page.	me: 1235 Surface Condition: Dry cident Type: Control/Traction Loss Lighting: Daylight cident Severity: 0 (0) Land Use: Rural Driver/Occupant Information Vehicle Information iver Age: 34 Year: 1991 iver Sex: Male Vehicle Make: Nissan/Datsun pairmen t: None Vehicle Model: 200 SX/240 SX Roadway Information afficway Type (Median): Physical barrier Slope: Grade o. of Lanes: 2 Speed Limit: 105 km/h Support Times Padway Edge: 1.17 sec Method Arc Formula Derived pairment: 1.67 sec sumptions: Departure time for the roadway edge was calculated between Stations 2 (-34 m) and 2. Departure time for the roadway edge was calculated between Stations 2 (-42 m) and 3 (-6 m). Initial velocity of the vehicle was 105 km/h. Station 1 extends beyond scope of page.	Date:	7-2-93	Weather:	Clear	
Accident Type: Control/Traction Loss Lighting: Daylight Accident Severity: 0 (0) Land Use: Rural Driver/Occupant Information Vehicle Information Driver Age: 34 Year: 1991 Driver Sex: Male Vehicle Make: Nissan/Datsun Impairmen t: None Vehicle Model: 200 SX/240 SX Trafficway Type (Median): Physical barrier Alignment: Straight No. of Lanes: 2 Departure Times Grade Roadway Edge: 1.17 sec Method Ar: Formula Derived Assumptions: 1.67 sec Method Ar: Grade 2. Opparture time for the roadway edge was calculated between Stations 2 (-34 m) and 2. Departure time for the shoulder edge was calculated between Stations 2 (-44 m) and 3 (-6 m). Initial velocity of the vehicle was 105 km/h. Initial velocity of the vehicle was 105 km/h. Station 1 extends beyond scope of page. Initial velocity of the vehicle was 105 km/h.	cident Type: Control/Traction Loss Lighting: Daylight cident Severity: 0 (0) Land Use: Rural Driver/Occupant Information Vehicle Information iver Age: 34 Year: 1991 iver Sex: Male Vehicle Make: Nissan/Datsun pairmen t: None Vehicle Model: 200 SX/240 SX Roadway Information afficway Type (Median): Physical barrier Alignment: Straight slope: Grade Grade Speed Limit: 105 km/h co. of Lanes: 2 Departure Times Departure Times Straight wadway Edge: 1.17 sec Method Are Formula Derived Noulder Edge: 1.67 sec sumptions: Departure time for the roadway edge was calculated between Stations 2 (-34 m) and 2. Departure time for the shoulder edge was calculated between Stations 2 (-42 m) and 3 (-6 m). Initial velocity of the vehicle was 105 km/h. Station 1 extends beyond scope of page. Station 1 extends beyond scope of page. Station 1 extends beyond scope of page.	Time:	1235	Surface Condition	: Dry	
Accident Severity: 0 (0) Land Use: Rural Driver/Occupart Information Vehicle Information Driver Age: 34 Year: 1991 Driver Age: Male Vehicle Make: Nissan/Datsun Impairmen t: None Vehicle Model: 200 SX/240 SX Trafficway Type (Median): Physical barrier Alignment: Straight Slope: Grade Grade No. of Lanes: 2 Speed Limit: 105 km/h Examptions: • 1.17 sec Method Are Formula Derived Shoulder Edge: 1.67 sec Intital velocity of the vehicle was 105 km/h. 3 (-6 m). • Departure time for the roadway edge was calculated between Stations 2 (-34 m) and 2. . • • Departure time for the shoulder edge was calculated between Stations 2 (-34 m) and 3 (-6 m). • • • Initial velocity of the vehicle was 105 km/h. • • • • Station 1 extends beyond scope of page. • • •	cident Severity: 0 (0) Land Use: Rural Driver/Occupant Information Vehicle Information iver Age: 34 Year: 1991 iver Sex: Male Vehicle Make: Nissan/Datsun pairment: None Vehicle Model: 200 SX/240 SX Roadway Information Tradition afficway Type (Median): Physical barrier Alignment: Straight o. of Lanes: 2 Sope: Grade Grade o. of Lanes: 2 Beparture Times Method Arc Formula Derived madway Edge: 1.17 sec Method Arc Formula Derived patrure time for the roadway edge was calculated between Stations 2 (-34 m) and 2. Departure time for the shoulder edge was calculated between Stations 2 (-42 m) and 3 (-6 m). Initial velocity of the vehicle was 105 km/h. Station 1 extends beyond scope of page. Station 1 extends beyond scope of page.	Accident Type:	Control/Traction Loss	Lighting:	Daylight	
Driver/Occupant Information Vehicle Information Driver Age: 34 Year: 1991 Driver Age: Male Vehicle Make: Nissan/Datsun Impairmen t: None Vehicle Model: 200 SX/240 SX Roadway Information Trafficway Type (Median): Physical barrier Physical barrier Slope: Grade No. of Lanes: 2 Speed Limit: 105 km/h Departure Times Roadway Edge: 1.17 sec Method Arc Formula Derived Shoulder Edge: 1.67 sec Assumptions: . . • Departure time for the roadway edge was calculated between Stations 2 (-34 m) and 2. . . • Departure time for the shoulder edge was calculated between Stations 2 (-42 m) and 3 (-6 m). . . • Initial velocity of the vehicle was 105 km/h. . . . • Station 1 extends beyond scope of page. . . .	Driver/Occupant Information Vehicle Information iver Age: 34 Year: 1991 iver Sex: Male Vehicle Make: Nissan/Datsun pairment: None Vehicle Model: 200 SX/240 SX Roadway Information afficway Type (Median): Alignment: Straight of Lanes: 2 Speed Limit: 105 km/h Departure Times Departure Times Departure Times Departure time for the roadway edge was calculated between Stations 2 (-34 m) and 2. Departure time for the roadway edge was calculated between Stations 2 (-42 m) and 3 (-6 m). Initial velocity of the vehicle was 105 km/h. Station 1 extends beyond scope of page.	Accident Severity:	0 (0)	Land Use:	Rural	
Driver Age: 34 Year: 1991 Driver Sex: Male Vehicle Make: Nissan/Datsun Impairmen t: None Vehicle Model: 200 SX/240 SX Roadway Information Trafficway Type (Median): Physical barrier Alignment: Straight No. of Lanes: 2 Speed Limit: Grade Departure Times Roadway Edge: 1.17 sec Method Arc Formula Derived Shoulder Edge: 1.67 sec Method Arc Journal Derived • Departure time for the roadway edge was calculated between Stations 2 (-34 m) and 2. Departure time for the shoulder edge was calculated between Stations 2 (-42 m) and 3 (-6 m). • Initial velocity of the vehicle was 105 km/h. Station 1 extends beyond scope of page.	iver Age: 34 Year: 1991 iver Sex: Male Vehicle Make: Nissan/Datsun pairment: None Vehicle Model: 200 SX/240 SX Roadway Information Alignment: Straight Grade o. of Lanes: 2 Speed Limit: 105 km/h Departure Times Method Arc Formula Derived oulder Edge: 1.67 sec Sumptions: Departure time for the roadway edge was calculated between Stations 2 (-34 m) and 2. Departure time for the roadway edge was calculated between Stations 2 (-42 m) and 3 (-6 m). Initial velocity of the vehicle was 105 km/h. Station 1 extends beyond scope of page.	Driver/Occupa	nt Information	Vehicle Info	rmation	
Driver Sex: Male Vehicle Make: Nissan/Datsun Impairmen t: None Vehicle Model: 200 SX/240 SX Roadway Information Trafficway Type (Median): Physical barrier Alignment: Straight No. of Lanes: 2 Speed Limit: 105 km/h Departure Times Roadway Edge: 1.17 sec Method Arc Formula Derived Shoulder Edge: 1.67 sec Station 2 (-34 m) and 2. Departure time for the roadway edge was calculated between Stations 2 (-34 m) and 2. Departure time for the shoulder edge was calculated between Stations 2 (-42 m) and 3 (-6 m). Initial velocity of the vehicle was 105 km/h. Station 1 extends beyond scope of page. Station 1 extends beyond scope of page.	iver Sex: Male Vehicle Make: Nissan/Datsun pairment: None Vehicle Make: Dissan/Datsun Vehicle Model: 200 SX/240 SX afficway Type (Median): Roadway Information afficway Type (Median): Alignment: Straight o. of Lanes: 2 Slope: Grade Departure Times Departure Times Departure Times wadway Edge: 1.17 sec Method Arc Formula Derived noulder Edge: 1.67 sec Method Arc Formula Derived sumptions: Departure time for the roadway edge was calculated between Stations 2 (-34 m) and 2. Departure time for the shoulder edge was calculated between Stations 2 (-42 m) and 3 (-6 m). Initial velocity of the vehicle was 105 km/h. Station 1 extends beyond scope of page. Station 1 extends beyond scope of page.	Driver Age:	34	Year:	1991	
Impairmen t: None Vehicle Model: 200 SX/240 SX Roadway Information Trafficway Type (Median): Physical barrier Alignment: Straight No. of Lanes: 2 Speed Limit: 105 km/h Departure Times Roadway Edge: 1.17 sec Method Arc Formula Derived Shoulder Edge: 1.67 sec Alignment set ion 2 (-34 m) and 2. Departure time for the roadway edge was calculated between Stations 2 (-42 m) and 3 (-6 m). Initial velocity of the vehicle was 105 km/h. Station 1 extends beyond scope of page. Station 1 extends beyond scope of page.	pairmen t: None Vehicle Model: 200 SX/240 SX Roadway Information Roadway Information afficway Type (Median): Physical barrier Alignment: Straight o. of Lanes: 2 Slope: Grade o. of Lanes: 2 Speed Limit: 105 km/h Departure Times Method Arc Formula Derived moulder Edge: 1.67 sec Method Arc Formula Derived sumptions: Departure time for the roadway edge was calculated between Stations 2 (-34 m) and 2. Departure time for the shoulder edge was calculated between Stations 2 (-42 m) and 3 (-6 m). Initial velocity of the vehicle was 105 km/h. Station 1 extends beyond scope of page. Station 1 extends beyond scope of page.	Driver Sex:	Male	Vehicle Make:	Nissan/Datsun	
Roadway Information Trafficway Type (Median): Physical barrier Alignment: Straight No. of Lanes: 2 Slope: Grade No. of Lanes: 2 Speed Limit: 105 km/h Exampline: 1.17 sec Method Arc Formula Derived Shoulder Edge: 1.67 sec And the shoulder edge was calculated between Stations 2 (-34 m) and 2. Departure time for the roadway edge was calculated between Stations 2 (-42 m) and 3 (-6 m). Initial velocity of the vehicle was 105 km/h. Station 1 extends beyond scope of page. Station 1 extends beyond scope of page.	Roadway Information afficway Type (Median): Physical barrier Alignment: Straight Slope: Grade Grade o. of Lanes: 2 Speed Limit: 105 km/h Departure Times Method Arc Formula Derived moulder Edge: 1.67 sec Method Arc Formula Derived sumptions: Departure time for the roadway edge was calculated between Stations 2 (-34 m) and 2. Departure time for the shoulder edge was calculated between Stations 2 (-42 m) and 3 (-6 m). Initial velocity of the vehicle was 105 km/h. Station 1 extends beyond scope of page.	Impairmen t:	None	Vehicle Model:	200 SX/240 SX	
Trafficway Type (Median): Physical barrier Alignment: Straight No. of Lanes: 2 Speed Limit: Grade Speed Limit: 105 km/h Element: Roadway Edge: 1.17 sec Method Arc Formula Derived Shoulder Edge: 1.67 sec Arc Formula Derived Assumptions: . . . • Departure time for the roadway edge was calculated between Stations 2 (-34 m) and 2. . • Departure time for the shoulder edge was calculated between Stations 2 (-42 m) and 3 (-6 m). . • Initial velocity of the vehicle was 105 km/h. . . • Station 1 extends beyond scope of page. . .	afficway Type (Median):Physical barrierAlignment:Straighto. of Lanes:2Speed Limit:Grade2Departure Times105 km/hDeparture TimesMethodArc Formula Derivednoulder Edge:1.17 secMethodArc Formula DerivedSumptions:Departure time for the roadway edge was calculated between Stations 2 (-34 m) and 2.Departure time for the shoulder edge was calculated between Stations 2 (-42 m) and 3 (-6 m).Initial velocity of the vehicle was 105 km/h.Station 1 extends beyond scope of page.		Roadway Ir	formation		
Investigation First car barrier Slope: Grade No. of Lanes: 2 Speed Limit: 105 km/h Departure Times Departure Times Roadway Edge: 1.17 sec Method Arc Formula Derived Shoulder Edge: 1.67 sec Method Arc Formula Derived Assumptions: 0.00000000000000000000000000000000000	Slope: Grade o. of Lanes: 2 Speed Limit: 105 km/h Departure Times Method Arc Formula Derived wadway Edge: 1.17 sec Method Arc Formula Derived woulder Edge: 1.67 sec Sec Second Seco	Trafficway Type	Dhysical harrier	Alignment:	Straight	
No. of Lanes: 2 Speed Limit: 105 km/h Departure Times Roadway Edge: 1.17 sec Method Arc Formula Derived Shoulder Edge: 1.67 sec Method Arc Formula Derived Assumptions: 0 0 0 0 0 Operature time for the roadway edge was calculated between Stations 2 (-34 m) and 2. 0 <	o. of Lanes: 2 Speed Limit: 105 km/h Departure Times wadway Edge: 1.17 sec Method Arc Formula Derived wadway Edge: 1.67 sec ssumptions: Departure time for the roadway edge was calculated between Stations 2 (-34 m) and 2. Departure time for the shoulder edge was calculated between Stations 2 (-42 m) and 3 (-6 m). Initial velocity of the vehicle was 105 km/h. Station 1 extends beyond scope of page.	(median).	Physical barrier	Slope:	Grade	
Departure Times Roadway Edge: 1.17 sec Method Arc Formula Derived Shoulder Edge: 1.67 sec Arc Formula Derived Assumptions: Departure time for the roadway edge was calculated between Stations 2 (-34 m) and 2. Departure time for the shoulder edge was calculated between Stations 2 (-42 m) and 3 (-6 m). Initial velocity of the vehicle was 105 km/h. Station 1 extends beyond scope of page.	Departure Times Dadway Edge: 1.17 sec Method Arc Formula Derived Doulder Edge: 1.67 sec Sumptions: Departure time for the roadway edge was calculated between Stations 2 (-34 m) and 2. Departure time for the shoulder edge was calculated between Stations 2 (-42 m) and 3 (-6 m). Initial velocity of the vehicle was 105 km/h. Station 1 extends beyond scope of page.	No. of Lanes:	2	Speed Limit:	105 km/h	
Roadway Edge:1.17 secMethodArc Formula DerivedShoulder Edge:1.67 secAssumptions:• Departure time for the roadway edge was calculated between Stations 2 (-34 m) and 2.• Departure time for the shoulder edge was calculated between Stations 2 (-42 m) and 3 (-6 m).• Initial velocity of the vehicle was 105 km/h.• Station 1 extends beyond scope of page.	Are Formula Derived		Departur	e Times		
 Shoulder Edge: 1.67 sec Assumptions: Departure time for the roadway edge was calculated between Stations 2 (-34 m) and 2. Departure time for the shoulder edge was calculated between Stations 2 (-42 m) and 3 (-6 m). Initial velocity of the vehicle was 105 km/h. Station 1 extends beyond scope of page. 	 houlder Edge: 1.67 sec sumptions: Departure time for the roadway edge was calculated between Stations 2 (-34 m) and 2. Departure time for the shoulder edge was calculated between Stations 2 (-42 m) and 3 (-6 m). Initial velocity of the vehicle was 105 km/h. Station 1 extends beyond scope of page. 	Roadway Edge:	1.17 sec	Method Arc	Formula Derived	
 Assumptions: Departure time for the roadway edge was calculated between Stations 2 (-34 m) and 2. Departure time for the shoulder edge was calculated between Stations 2 (-42 m) and 3 (-6 m). Initial velocity of the vehicle was 105 km/h. Station 1 extends beyond scope of page. 	Departure time for the roadway edge was calculated between Stations 2 (-34 m) and 2. Departure time for the shoulder edge was calculated between Stations 2 (-42 m) and 3 (-6 m). Initial velocity of the vehicle was 105 km/h. Station 1 extends beyond scope of page.	Shoulder Edge:	1.67 sec			
 Departure time for the shoulder edge was calculated between Stations 2 (-42 m) and 3 (-6 m). Initial velocity of the vehicle was 105 km/h. Station 1 extends beyond scope of page. 	Departure time for the shoulder edge was calculated between Stations 2 (-42 m) and 3 (-6 m). Initial velocity of the vehicle was 105 km/h. Station 1 extends beyond scope of page.	Assumptions:Departure time for	the roadway edge was calcula	ted between Stations 2 (-34 m)	and 2.	
Initial velocity of the vehicle was 105 km/h.Station 1 extends beyond scope of page.	Initial velocity of the vehicle was 105 km/h. Station 1 extends beyond scope of page.	• Departure time for the shoulder edge was calculated between Stations 2 (-42 m) and 3 (-6 m).				
• Station 1 extends beyond scope of page.	Station 1 extends beyond scope of page.	Initial velocity of the vehicle was 105 km/h. Station 1 extends beyond score of page				
		• Station 1 extends	beyond scope of page.			



1.

CAUSAL FACTOR:Driver Relinquishes Steering Control - Fell AsleepROADSIDE DEPARTURE:Right

Date:2-7-93Weather:Other (clouds)Time:0120Surface Condition:WetAccident Type:Drive Off RoadLighting:YesAccident Severity:0 (0)Land Use:UrbanDriver/Occupation:Driver/Occupation:Nehicle InformationDriver Age:30Year:1964Driver Sex:MaleVehicle Make:ChevroletImpairment:Fell AsleepYear:C, K, R, V-seriesCondway InformationTrafficway Type (Median):Alignment:Straight Slope:LevelNo. of Lanes:7Departure TimesMethod:Arc Formula DerivedStraight Slope:Alignment:Straight Slope:LevelNo. of Lanes:7Departure TimesMethod:Arc Formula DerivedStraight Slope:Alignment:Staight Slope:LevelNo. of Lanes:7Staight Slope:Departure TimesAlign colspan="3">Method:Align colspan="3">Align colspan="3">Align colspan="3">Align colspan="3">Other HomesMethod:Arc Formula DerivedDeparture time for the roadway edge was calculated between Stations 2 (-10 m) and 3 (-5 m).Departure time for the shoulder edge was calculated between Stations 2 (-13 m) and 4 (+6 m).Method		General Accident Information					
Time:0120Surface Condition:WetAccident Type:Drive Off RoadLighting:YesAccident Severity:0 (0)Land Use:UrbanDriver/OccupantInformationVehicle InformationDriver Age:30Year:1964Driver Sex:MaleVehicle Make:ChevroletImpairment:Fell AsleepVehicle Mode/:C, K, R, V-seriesRoadway InformationTrafficway Type (Median):Straight Flush or curbNo. of Lanes:7Speed Limit:Straight Slope:LevelShoulder Edge:1.53 secMethod:Arc Formula DerivedStraight Slope:Astemptions:Opparture TimesAstemptions:0Departure time for the roadway edge was calculated between Stations 2 (-10 m) and 3 (-5 m).0Departure time for the shoulder edge was calculated between Stations 2 (-13 m) and 4 (+6 m).0Initial velocity of the vehicle was 56 km/h.0Station 1 extends beyond scope of page.	Date:	2-7-93	Weather:	Other (clouds)			
Accident Type:Drive Off RoadLighting:YesAccident Severity:0 (0)Land Use:UrbanDriver/Occupant InformationVehicle InformationDriver Åge:30Year:1964Driver Åge:MaleVehicle Make:ChevroletImpairment:Fell AsleepVehicle Make:ChevroletTrafficway Type (Median):Flush or curbAlignment:Straight Slope:Trafficway Type (Median):Flush or curbSlope:LevelNo. of Lanes:7Departure TimesRoadway Edge:1.53 secMethod:Arc Formula DerivedShoulder Edge:3.41 seStasumptions•Departure time for the roadway edge was calculated between Stations 2 (-10 m) and 3 (-5 m).•Departure time for the shoulder edge was calculated between Stations 2 (-13 m) and 4 (+6 m).•Initial velocity of the vehicle was 56 km/h.•Station 1 extends beyond scope of page.	Time:	0120	Surface Condition:	Wet			
Accident Severity: 0 (0) Land Use: Urban Driver/Occupant Information Vehicle Information Driver Age: 30 Year: 1964 Driver Sex: Male Vehicle Make: Chevrolet Impairment: Fell Asleep Vehicle Mode/: C, K, R, V-series Trafficway Type (Median): Flush or curb Alignment: Straight Slope: Level No. of Lanes: 7 Speed Limit: 56km/h Ensume the series Method: Arc Formula Derived Shoulder Edge: 3.41 se Straight 9 Departure time for the roadway edge was calculated between Stations 2 (-10 m) and 3 (-5 m). Departure time for the shoulder edge was calculated between Stations 2 (-13 m) and 4 (-16 m). 9 Departure time for the shoulder edge was calculated between Stations 2 (-13 m) and 4 (-16 m). Initial velocity of the vehicle was 56 km/h. 9 Station 1 extends beyond scope of page. Station 1 extends beyond scope of page.	Accident Type:	Drive Off Road	Lighting:	Yes			
Driver/Occupant Information Vehicle Information Driver Age: 30 Year: 1964 Driver Sex: Male Vehicle Make: Chevrolet Impairment: Fell Asleep Vehicle Mode/: C, K, R, V-series Roadway Information Trafficway Type (Median): Flush or curb Alignment: Straight Slope: Level No. of Lanes: 7 Speed Limit: 56km/h Departure Times Roadway Edge: 1.53 sec Method: Arc Formula Derived Shoulder Edge: 3.41 se Assumptions: . . • Departure time for the roadway edge was calculated between Stations 2 (-10 m) and 3 (-5 m). . Departure time for the shoulder edge was calculated between Stations 2 (-13 m) and 4 (+6 m). • Initial velocity of the vehicle was 56 km/h. . . . • Station 1 extends beyond scope of page. . . .	Accident Severity:	0 (0)	Land Use:	Urban			
Driver Age:30Year:1964Driver Sex:MaleYehicle Make:ChevroletImpairment:Fell AsleepYehicle Mode/:C, K, R, V-seriesRoadway InformationTrafficway Type (Median):Alignment:Straight Slope:Trafficway Type (Median):Alignment:Straight Slope:Trafficway Type (Median):Plush or curbSlope:LevelNo. of Lanes:7Speed Limit:56km/hDeparture TimesRoadway Edge:1.53 secMethod:Arc Formula DerivedShoulder Edge:3.41 secMethod:Arc Formula DerivedOpparture time for the roadway edge was calculated between Stations 2 (-10 m) and 3 (-5 m).Departure time for the shoulder edge was calculated between Stations 2 (-13 m) and 4 (+6 m).Initial velocity of the vehicle was 56 km/h.Station 1 extends beyond scope of page.Station 1 extends beyond scope of page.	Driver/Occupa	ant Information	Vehicle Info	rmation			
Driver Sex:MaleVehicle Make:ChevroletImpairment:Fell AsleepVehicle Mode/:C, K, R, V-seriesFoundationTrafficway Type (Median):Stoadway InformationTrafficway Type (Median):Alignment:StraightFlush or curbSlope:LevelNo. of Lanes:7Speed Limit:56km/hDeparture TimesAssumptions:• Departure time for the roadway edge was calculated between Stations 2 (-10 m) and 3 (-5 m).• Departure time for the shoulder edge was calculated between Stations 2 (-10 m) and 3 (-5 m).• Departure time for the vehicle was 56 km/h.• Station 1 extends beyond scope of page.	Driver Age:	30	Year:	1964			
Impairment:Fell AsleepVehicle Mode/:C, K, R, V-seriesRoadway InformationTrafficway Type (Median):Alignment:StraightFlush or curbSlope:LevelNo. of Lanes:7Speed Limit:56km/hDeparture TimesAlignment:Roadway Edge:1.53 secMethod:Arc Formula DerivedShoulder Edge:3.41 secAssumptions:.• Departure time for the roadway edge was calculated between Stations 2 (-10 m) and 3 (-5 m).• Departure time for the shoulder edge was calculated between Stations 2 (-13 m) and 4 (+6 m).• Initial velocity of the vehicle was 56 km/h.• Station 1 extends beyond scope of page.	Driver Sex:	Male	Vehicle Make:	Chevrolet			
Roadway Information Trafficway Type (Median): Flush or curb Alignment: Straight Slope: Level No. of Lanes: 7 Speed Limit: 56km/h Departure Times Method: Arc Formula Derived Shoulder Edge: 3.41 sec Method: Arc Formula Derived Assumptions: • Departure time for the roadway edge was calculated between Stations 2 (-10 m) and 3 (-5 m). • Departure time for the shoulder edge was calculated between Stations 2 (-13 m) and 4 (+6 m). • Initial velocity of the vehicle was 56 km/h. • Station 1 extends beyond scope of page.	Impairment:	Fell Asleep	Vehicle Mode/:	C, K, R, V-series			
Trafficway Type (Median):Flush or curbAlignment:Straight LevelNo. of Lanes:1Speed Limit:56km/hDeparture TimesMethod:Arc Formula DerivedShoulder Edge:3.41 secMethod:Arc Formula DerivedOperature time for the roadway edge was calculated between Stations 2 (-10 m) and 3 (-5 m).Departure time for the shoulder edge was calculated between Stations 2 (-10 m) and 4 (+6 m).Initial velocity of the vehicle was 56 km/h.Station 1 extends beyond scope of page.		Roadway Ir	formation				
Initial of curb Slope: Level No. of Lanes: 7 Speed Limit: 56km/h Departure Times Departure Times Roadway Edge: 1.53 sec Method: Arc Formula Derived Shoulder Edge: 3.41 sec Arc Formula Derived Assumptions: . Departure time for the roadway edge was calculated between Stations 2 (-10 m) and 3 (-5 m). Departure time for the shoulder edge was calculated between Stations 2 (-13 m) and 4 (+6 m). Initial velocity of the vehicle was 56 km/h. . Station 1 extends beyond scope of page.	Trafficway Type (Median):	Fluch or curb	Alignment:	Straight			
No. of Lanes: 7 Speed Limit: 56km/h Departure Times Roadway Edge: 1.53 sec Method: Arc Formula Derived Shoulder Edge: 3.41 sec Assumptions: . Operature time for the roadway edge was calculated between Stations 2 (-10 m) and 3 (-5 m). . Departure time for the shoulder edge was calculated between Stations 2 (-13 m) and 4 (+6 m). . Initial velocity of the vehicle was 56 km/h. . Station 1 extends beyond scope of page.	(meanan).	Fiush of Curb	Slope:	Level			
Departure Times Roadway Edge: 1.53 sec Method: Arc Formula Derived Shoulder Edge: 3.41 sec Assumptions: . Departure time for the roadway edge was calculated between Stations 2 (-10 m) and 3 (-5 m). Departure time for the shoulder edge was calculated between Stations 2 (-13 m) and 4 (+6 m). Initial velocity of the vehicle was 56 km/h. Station 1 extends beyond scope of page.	No. of Lanes:	7	Speed Limit:	56km/h			
Roadway Edge:1.53 secMethod:Arc Formula DerivedShoulder Edge:3.41 secAssumptions:• Departure time for the roadway edge was calculated between Stations 2 (-10 m) and 3 (-5 m).• Departure time for the shoulder edge was calculated between Stations 2 (-13 m) and 4 (+6 m).• Initial velocity of the vehicle was 56 km/h.• Station 1 extends beyond scope of page.		Departur	e Times				
 Shoulder Edge: 3.41 sec Assumptions: Departure time for the roadway edge was calculated between Stations 2 (-10 m) and 3 (-5 m). Departure time for the shoulder edge was calculated between Stations 2 (-13 m) and 4 (+6 m). Initial velocity of the vehicle was 56 km/h. Station 1 extends beyond scope of page. 	Roadway Edge:	1.53 sec	Method: Arc	Formula Derived			
 Assumptions: Departure time for the roadway edge was calculated between Stations 2 (-10 m) and 3 (-5 m). Departure time for the shoulder edge was calculated between Stations 2 (-13 m) and 4 (+6 m). Initial velocity of the vehicle was 56 km/h. Station 1 extends beyond scope of page. 	Shoulder Edge:	3.41 sec					
 Departure time for the roadway edge was calculated between Stations 2 (-10 m) and 3 (-5 m). Departure time for the shoulder edge was calculated between Stations 2 (-13 m) and 4 (+6 m). Initial velocity of the vehicle was 56 km/h. Station 1 extends beyond scope of page. 	Assumptions:						
 Departure time for the shoulder edge was calculated between stations 2 (-15 m) and 4 (+6 m). Initial velocity of the vehicle was 56 km/h. Station 1 extends beyond scope of page. 	Departure time for	• Departure time for the roadway edge was calculated between Stations 2 (-10 m) and 3 (-5 m).					
• Station 1 extends beyond scope of page.	 Departure time for the shoulder edge was calculated between Stations 2 (-13 m) and 4 (+6 m). Initial velocity of the vehicle was 56 km/h. 						
	• Station 1 extends	 Station 1 extends beyond scope of page. 					



CAUSAL FACTOR:Vehicle Speed - Speed and AlcoholROADS/DE DEPARTURE:Left

	General Accide	nt Information			
Date:	2-2-93	Weather:	Clear		
Time:	2210	Surface Condition	on: Dry		
Accident Type:	Drive Off Road	Lighting:	No		
Accident Severity:	2 (B)	Land Use:	Rural		
Driver/Occupa	ant Information	Vehicle In	formation		
Driver Age:	26	Year:	1979		
Driver Sex:	Male	Vehicle Make:	Mercury		
impairment:	Intoxicated (alcohol/ other illicit drugs)	Vehicle Model:	Cougar/XR7		
	Roadway Ir	formation			
Trafficway Type (Median):	Not divided	Alignment: Slope:	Curve Right		
No. of Lanes:	2	Speed Limit:	40 km/h		
	Departur	e Times			
Roadway Edge:	2.20 sec	Method: S	traight Line Projection		
Shoulder Edge:	2.65 sec				
 Assumptions: Departure time fo Departure time fo Initial velocity of 	 Assumptions: Departure time for the roadway edge was calculated between Stations 1 and 3 (-4 m). Departure time for the shoulder edge was calculated between Stations 1 and 3 (+1 m). Initial velocity of the vehicle was 40 km/h. 				
• Initial velocity of	the vehicle was 40 km/h.				



CAUSAL FACTOR: Lost Directional Control

ROADSIDE DEPARTURE: Left

	General Accident information				
Date:	1-6-93	Weather:	Clear		
Time:	1000	Surface Condition:	Snow (slush/ice)		
Accident Type:	Control/Traction Loss	Lighting:	Yes		
Accident Severity:	0 (0)	Land Use:	Rural		
Driver/Occupa	ant information	Vehicle Info	rmation		
Driver Age:	27	Year:	1992		
Driver Sex:	Male	Vehicle Make:	Pontiac		
Impairment:	None	Vehicle Model:	Grand Prix (FWD)		
	Roadway Ir	formation			
Trafficway Type (Median):	Not divided	Alignment: Slope:	Curve Right		
No. of Lanes:	2	Speed Limit:	24 km/h		
	Departure	e Times			
Roadway Edge:	2.76 sec	Method: Strai	ght Line Projection		
Shoulder Edge:	3.51 sec				
 Assumptions: Departure time for Departure time for Initial velocity of 	 Assumptions: Departure time for the roadway edge was calculated between Stations 2 (-4 m) and 3 (-4 m). Departure time for the shoulder edge was calculated between Stations 2 (-4 m) and 3 (+I m). Initial velocity of the vehicle was 24 km/h. 				



CAUSAL FACTOR:

Driver Relinquishes Steering Controi - Physical (seizure/passed out)

ROADSIDE DEPARTURE: Right

	General Accident Information				
Date:	2-5-93	Weather:	Clear		
Time:	1320	Surface Conditio	n: Dry		
Accident Type:	Drive Off Road	Lighting:	Daylight		
Accident Severity:	3 (A)	Land Use:	Rural		
Driver/Occupa	ant Information	Vehicle Inf	ormation		
Driver Age:	67	Year:	1971		
Driver Sex:	Male	Vehicle Make:	Nissan/Datsun		
Impairment:	Physical (seizure/ passed out)	Vehicle Model:	Pickup		
	Roadway Information				
Trafficway Type (Median): No. of Lanes:	Not divided	Alignment: Slope: Speed Limit:	Curve Left Grade 40 km/h		
	Departur	e Times			
	0.51	Mathada			
Roadway Edge: Shoulder Edge:	0.71 sec (no shoulder)	wethod: Arc	Formula Derived		
 Assumptions: Departure time fo Departure time fo Initial velocity of Last station was of 	 Assumptions: Departure time for the roadway edge was calculated between Stations 3 (-8 m) and 3. Departure time for the shoulder edge was calculated between Stations 3 (-8 m) and 3. Initial velocity of the vehicle was 40 km/h. Last station was omitted. 				



CAUSAL FACTOR:Driver Relinquishes Steering Control - IntoxicatedROADSIDE DEPARTURE:Right

General Accident Information					
Date:	4-1-93	Weather:	Rain		
Time:	1809	Surface Condition:	Wet		
Accident Type:	Control/Traction Loss	Lighting:	Daylight		
Accident Severity:	3 (A)	Land Use:	Urban		
Driver/Occupa	Driver/Occupant Information		Vehicle Information		
Driver Age:	59	Year:	1986		
Driver Sex:	Male	Vehicle Make:	Chrysler		
Impairment:	Intoxicated (alcohol/ other illicit drugs)	Vehicle Model:	LeBaron		
	Roadway Information				
Trafficway Type (Median):	Flush or curb	Alignment: Slope:	Curve Left Grade		
No. of Lanes:	3	Speed Limit:	48 km/h		
	Departure Times				
Roadway Edge:	2.93 sec	Method: Arc	Formula Derived		
Shoulder Edge:	2.93 sec (no shoulder)				
 Assumptions: Departure time for the roadway edge was calculated between Stations 2 (- 11 m) and 4. Departure time for the shoulder edge was calculated between Stations 2 (-11 m) and 4. Initial velocity of the vehicle was 48 km/h. Station 1 extends beyond scope of page. 					
Departure time forInitial velocity ofStation 1 extends	r the shoulder edge was calcula the vehicle was 48 km/h. beyond scope of page.	ted between Stations 2 (-11 m)	and 4.		



CAUSAL FACTOR:Vehicle Speed - Speed and AlcoholROADSIDE DEPARTURE:Right

	General Accident Information				
Date:	6-4-93	Weather:	Clear		
Time:	0530	Surface Condition:	Dry		
Accident Type:	Drive Off Road	Lighting:	Daylight		
Accident Severity:	3(A)	Land Use:	Urban		
Driver/Occupa	Driver/Occupant Information		Vehicle Information		
Driver Age:	19	Year:	1985		
Driver Sex:	Male	Vehicle Make:	Honda		
Impairment:	Other (alcoh. consumption - BAC unknown)	Vehicle Model:	Civic/CRX		
	Roadway Information				
Trafficway Type (Median):	Not divided	Alignment:	Straight		
No. of Lanes:	3	Speed Limit:	48 km/h		
	Departure	e Times			
Roadway Edge:	1.53 sec	Method Strai	ght Line Projection		
Shoulder Edge:	1.53 sec (no shoulder)				
 Assumptions: Departure time for the roadway edge was calculated between Stations 1 and 3 (-10 m). Departure time for the shoulder edge was calculated between Stations 1 and 3 (-10 m). Initial velocity of the vehicle was 48 km/h. Last station was omitted. 					



Description of Functional Goals

SUMMARY TABLE

Preliminary Functional Goals for a Run-Off-Road Collision Avoidance Countermeasure

Goal Number	Functional Goal Description
(1)	Monitor vehicle dynamic status
(2)	Determine geometric characteristics of upcoming roadway segment
(3)	Determine vehicle position/orientation relative to roadway
(4)	Determine driver intention
(5)	Detect degraded roadway condition
(6)	Process data to determine acceptable speed for approaching roadway segment
(7)	Detect potential for roadway departure
(8)	Present phased alarm to driver
(9)	Determine driver state
(10)	Modulate driver control input
(11)	Maintain/regain safe vehicle attitude

(1) Monitor Vehicle Dynamic Status

The countermeasure would have the ability to monitor the dynamic status of the vehicle. The dynamic status is defined as the motion and directional vector that the vehicle is experiencing at any given time. Equipment on-board the vehicle will determine vehicle speed, and accelerations along vehicle lateral and longitudinal axes. Additional equipment will monitor vehicle heading (direction that the vehicle is traveling) and the radius of curvature of the vehicle path. These functions will monitor vehicle dynamic status data during vehicle operation. This feature has potential for use in countermeasures applicable to crash types other than roadway departure crashes.

(2) Determine Geometric Characteristics of Upcoming Roadway Segment

Equipment on-board the vehicle or in the infrastructure would determine the following characteristics of the approaching roadway segment:

- Number of roadway lanes
- Lane width
- Roadway alignment (straight versus right/left curve)
- Curvature of roadway segment
- Roadway superelevation
- Presence of exits or cross streets

This information can be used by computers on-board the vehicle to assemble a situation map of the roadway segment that the vehicle is about to traverse. This function is identified as "roadway preview" and this function establishes the conditions through which the vehicle must travel. In conjunction with the first function, monitor vehicle dynamic status, computers on-board the vehicle would determine if the vehicle is traveling at a speed appropriate for the approaching roadway segment. The function of determining the presence of exits or cross streets would allow the countermeasure to infer if a potential roadway departure by the driver is a change of trafficway to an exit or cross street rather than an actual departure, Many of the informational items listed above may be included as part of an on-board map database.

(3) Determine Vehicle Position/Orientation Relative to Roadway

The countermeasure would determine the position of the vehicle within the context of the roadway on which it is traveling. The position of the vehicle would be determined with respect to the distance to the roadway segment where roadway departure may occur, such as an approaching curve. Another feature is the determination of the alignment of the vehicle's travel path in relation to the current roadway segment. This may be used by the countermeasure to monitor driver control behavior and to determine when a lane deviation is indicative of an imminent departure rather than a normal vehicle drift within the lane.

Other features that the countermeasure would have are the ability to determine the travel lane that the vehicle is occupying and the vehicle's lateral position within the lane. This information is vital to accurately determining imminent roadway/lane departure.

(4) Determine Driver Intention

The countermeasure would differentiate between a driver intention to perform a roadway departure and the following maneuvers:

- Evasive maneuver to avoid a vehicle, object, or animal in the roadway
- Turning at a cross street
- Pulling off to side of roadway (non-evasive maneuver)

The countermeasure would monitor vehicle dynamic state and driver control actions to determine intention. For example, the countermeasure may detect the vehicle proceeding to the right edge of the roadway accompanied by a deceleration. On reviewing the digital map data on-board, the countermeasure determines that a cross street is ahead at a distance of 100 feet. The countermeasure monitors the vehicle's deceleration and distance to the cross street and recognizes

that the driver is slowing to perform a right turn at the cross street. Upon determining that the driver is exercising control of the vehicle, and that the vehicle is operating within a nominal range, no warning is issued.

(5) Detect Degraded Roadway Condition

The countermeasure would determine if the roadway surface is degraded by environmental factors such as water, snow, or ice. This function may be accomplished by equipment on-board the vehicle or sensors in the roadway.

(6) Process Data to Determine Acceptable Speed for Approaching Roadway Segment

The countermeasure would acquire details of the configuration of the approaching roadway segment, the condition of the roadway, and the dynamic state of the vehicle and determine an acceptable travel velocity for this segment. As the vehicle approaches the segment, the countermeasure would monitor any change in dynamic state to determine if the vehicle is responding to the roadway configuration and conditions. If the driver does not respond to the configuration and conditions, an alert would be issued.

(7) Detect Potential for Roadway Departure

The countermeasure would process the following data to determine the potential for the vehicle to depart the roadway and to determine the immediacy of the impending departure.

- Roadway configuration
- Vehicle position on roadway
- Vehicle path
- Vehicle dynamic state
- Driver intention

(8) Present Phased Alarm to Driver

The countermeasure would determine the immediacy of the impending roadway departure and present a phased alarm to the driver. The intensity level of individual steps in the alarm sequence would be based upon the system's estimate of the remaining time to departure. These intensity levels may be summarized as follows:

• Passive Alert

Audio or visual message to the driver providing an alert of potential roadway departure. The message could be provided through either medium or through a combination of both mediums where the second medium is used to reinforce the alert provided by the first medium. For example, an audio alert could be reinforced by a redundant message conveyed as a visual cue projected to a heads-up display. Both message forms would be accompanied by indication of appropriate driver response (e.g., steer in a particular direction).

• Haptic Warning

In this modality, the warning is conveyed through excitation of the driver's seat, excitation of vehicle controls, and/or by increasing the force levels required to operate vehicle controls. Potential examples include shaking of the driver's seat, shaking of the steering wheel, vibration of the brake/accelerator pedals, and/or increasing the force levels required to turn the steering wheel/depress the accelerator pedal. Haptic warnings are likely to be very effective in cases associated with the Driver Inattention causal factor.

• Active Warning

In this warning modality, the countermeasure provides momentary intervention control inputs to primary vehicle controls (e.g., steering, brakes, and throttle). This warning intensity level would be utilized in circumstances where no response is received from the driver with respect to initial alerts/warnings and the threat of roadway departure is imminent. The inputs provided by the countermeasure are limited in time duration and are intended merely guide the driver in maintaining/regaining vehicle control.

(9) Determine Driver State

The countermeasure would monitor the behavior that the driver exhibits in controlling the vehicle. These behaviors are manifested in the way in which the driver normally initiates steering, braking, and throttle inputs, or in the resulting vehicle behavior. For example, the system may monitor the driver's behavior by determining the current position of the vehicle in the travel lane and comparing this position to the driver's normal or preferred position. Deviations from the normal pattern of behavior exhibited by the driver can indicate an altered driver state.

(10) Modulate Driver Control Input

The countermeasure would determine appropriate ranges of driver control inputs for functions such as steering, braking, and throttle. This function, when applied to the steering, can assist the driver by modulating the steering that may be initiated to regain control after an evasive maneuver. In the aerospace industry, this is termed "pilot induced oscillation", where a pilot's input to the control stick leads to a series of increasing magnitude oscillations. In this application, the countermeasure would utilize other available data such as the position of the vehicle on the roadway, configuration of the approaching roadway segment, and driver intention to determine if the control input is appropriate. This input may be to the steering wheel, brake pedal, or accelerator pedal. The countermeasure would determine if the input is within a range of acceptable inputs and either modulate the input to damp unwanted actions or amplify the input to prevent the crash. An example of this modulation is the driver initiating a large steering input while the vehicle is traveling at 65 mph. The countermeasure, sensing the input, would determine the consequences of this input at the given travel velocity. If the countermeasure determines that the input is produced.

(11) Maintain/Regain Safe Vehicle Attitude

The countermeasure would recover a "safe" vehicle attitude by active control of vehicle control functions If no response is received with respect to initial warning forms, the countermeasure would assume steering, braking, and throttle control. The countermeasure would control vehicle dynamic state and attitude until the driver exercises control over vehicle functions, or if the driver does not exercise control, the countermeasure maintains vehicle control to regain a "safe" attitude. Once a safe attitude is attained, the countermeasure would slow the vehicle and guide it to the side of the road. Again, this function would only be exercised if there is no driver response to warnings.