SELECTION OF A LOCATION METHOD FOR HIGHWAY DATA SYSTEMS

by

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(A Cooperative Organization Sponsored Jointly by the Virginia Department of Highways and the University of Virginia)

Charlottesville, Virginia

April 1973
VHRC 72-R35

SUMMARY

The Virginia Department of Highways has many data systems, and among them highway locations are referenced in various ways. While each of the several present systems is useful for its primary intended purpose, the ability to automatically relate the systems through the use of a common locator method would yield much greater benefits. In fact, the full utilization of some systems now being developed will be dependent upon the ready retrieval of data from the present data files.

The purpose of this report is to outline a proposed locator system to be used in the development of new data systems, and which can also be applied to present data systems in order to make them compatible.

After considering various alternatives, a paper milepost method was selected as being the most appropriate locator method to use, except for recording accident locations in cities, where a locator system utilizing intersection identification numbers is felt to be the most feasible.

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INTRODUCTION

The Virginia Department of Highways has many data systems, in and among them highway locations are referenced in various ways. For example, in the accident data system given locations are referenced by county, route and milepost; in the road inventory data system, they are referenced by county, route, section, and subsection; and in the traffic volume data system they also are referenced by county, route, and section, but the sections used do not correspond to those used in the road inventory system. Assignment of mileposts to the traffic volume sections has been accomplished to the extent that it is possible to determine volume at a given milepost location.

While each of the several present systems is useful for its primary intended purpose, the ability to automatically relate the systems would yield much greater benefits. In fact, the full utilization of some systems now being developed is dependent upon the ready retrieval of data from the present data files. For instance, one of the systems being developed is the pavement data file, which will contain descriptive, construction, and materials information for the primary and interstate systems. Some intended uses of this file are research on the skid resistance of various aggregate types, research on the performance of different materials, and planning for maintenance resurfacing. These uses dictate that data from the accident data system, traffic volume data system, and skid data system (being developed) be correlated with data from the pavement data system, which of course means that these four systems must be compatible. The only way to make the various systems compatible is to adopt a common locator method, such as milepost, for identifying the particular portion of the highway that a given set of data pertains to.

The need for selecting a common locator method is well recognized by several people in the Virginia Department of Highways, particularly those responsible for the automated data processing function. This need has been intensified somewhat by the fact that the "Report of the Virginia Traffic Records Feasibility Study Team to the State Traffic Records Committee", recommended that the Highway Department be

responsible for selecting the locator method to be used for identifying accident locations.* Within the past year work has been done in selecting the most appropriate locator method, but, at present no formal agreement has been reached by all Divisions in the Department regarding what the method should be.

PURPOSE

The purpose of this report is to outline a proposed locator system to be used in the development of new data systems, and which can also be applied to present data systems in order to make them compatible.

SUGGESTED LOCATOR METHOD

After considering various alternatives, a paper milepost method as described below was selected as being the most appropriate locator method to use, except for recording accident locations in cities. The use of mileposts as the common locator offers several advantages.

1. The source documents for a paper milepost system on the primary and interstate systems already exist in the form of the graphic logs maintained by the Traffic and Safety Division.

2. The use of a paper milepost system does not require the erection of physical markers on the highway.

3. Several data systems already use a paper milepost as the locator method. These include the accident data system, the pavement data system, and the skid data system. Also, as mentioned above, provisions have been made by the Data Processing Division to identify traffic volume sections by mileposts.

4. Paper milepost locations could be assigned to present systems not using this method without great difficulty and without altering the present system. For instance, the sections used in the traffic volume

* H. F. Taylor, "Report of the Virginia Traffic Records Feasibility Study Team to the State Traffic Records Committee," Virginia Highway Research Council, VHRC 72-R20, January 1973.

data system could be assigned beginning and ending milepost locations based on the graphic log within the computer, and data could still be submitted based on the sections customarily used.

5. The use of mileposts makes it easy to report data in order by ascending or descending milepost along a highway, which is desirable in many cases.

The major disadvantage in using a paper milepost system is that the mileposts may change as new portions of a highway are built, or when portions are relocated. Use of the system requires that the utmost care be taken in updating the data files with the correct mileposts, and that everyone use identical materials in selecting paper mileposts as location identifiers.

In detail, the locator method proposed would be as given in the following subsections.

Interstate and Primary Systems

As mentioned above, the graphic logs maintained by the Traffic and Safety Division would be used as the source document for paper milepost locations on the interstate and primary systems. A consistent update procedure would have to be adopted so that everyone used identical graphic logs in assigning milepost locations. The Data Processing Division would be responsible for assigning corrected milepost locations to old data when milepost locations change.

Secondary System

Graphic logs are available for a small portion of the secondary system and should be used as the source document where available. Also, as the graphic logs become available on additional portions of the secondary system, they should replace the less detailed source information described below.

For the remainder of the secondary system it is recommended that a scheme employing the present county maps and a supplemental document as illustrated in Table 1 be used as the source information for milepost location. As indicated in Table 1, it will be necessary to assign a zero milepost location at one end of each route in each county and to classify the route as a north-south or east-west route. It is recommended that the zero milepost locations chosen coincide with those used in the road inventory system to the extent possible.

TABLE 1

Supplemental Data for Assigning Milepost Locations Using County Maps

Route	Direction	Zero Milepost Location	Distance From Zero M. P. to	
609	E - W	Intersection Route 33	Rt. 619 = 2.35	Rt. 29 = 4.00
610	N - S	Intersection Route 33		
618	E - W	Intersection Route 610		
645	N - S	Intersection Route 29		
657	E - W	Intersection Route 610		

The system using the above described source information for assigning milepost locations would work as follows. Figure 1 shows a small portion of the Green County map. Assume the point to be assigned a milepost location is on Route 609 at its intersection with Route 672. Using the map as shown in Figure 1, and the supplemental information as shown in Table 1, the milepost location selected would be 0.53. If the point occurred on Route 609 one-half mile east of Route 29, the milepost location would be 4.50.

Direction is specified so that the appropriate lane or direction of travel can be used as input data if desired.

It is estimated that it would take approximately 16 man-months to develop the supplemental data required to use this system, with the total cost for development being about $15,000. As for the graphic logs, a procedure for updating the source documents must be specified so that everyone uses the same data to provide milepost locations, and corrected mileposts are used in updating the data files. It is envisioned that updating of the supplemental data used with the county maps would require about 4 man-months per year.

Of course, the development of the system would be contingent on the need for users to report data on a milepost basis. It is not the intent of this report to suggest that this need does or does not exist, but rather to gain acceptance of the method outlined in the event the reporting of data by milepost, and thus the ability to make separate data files compatible, should be required on the secondary system.

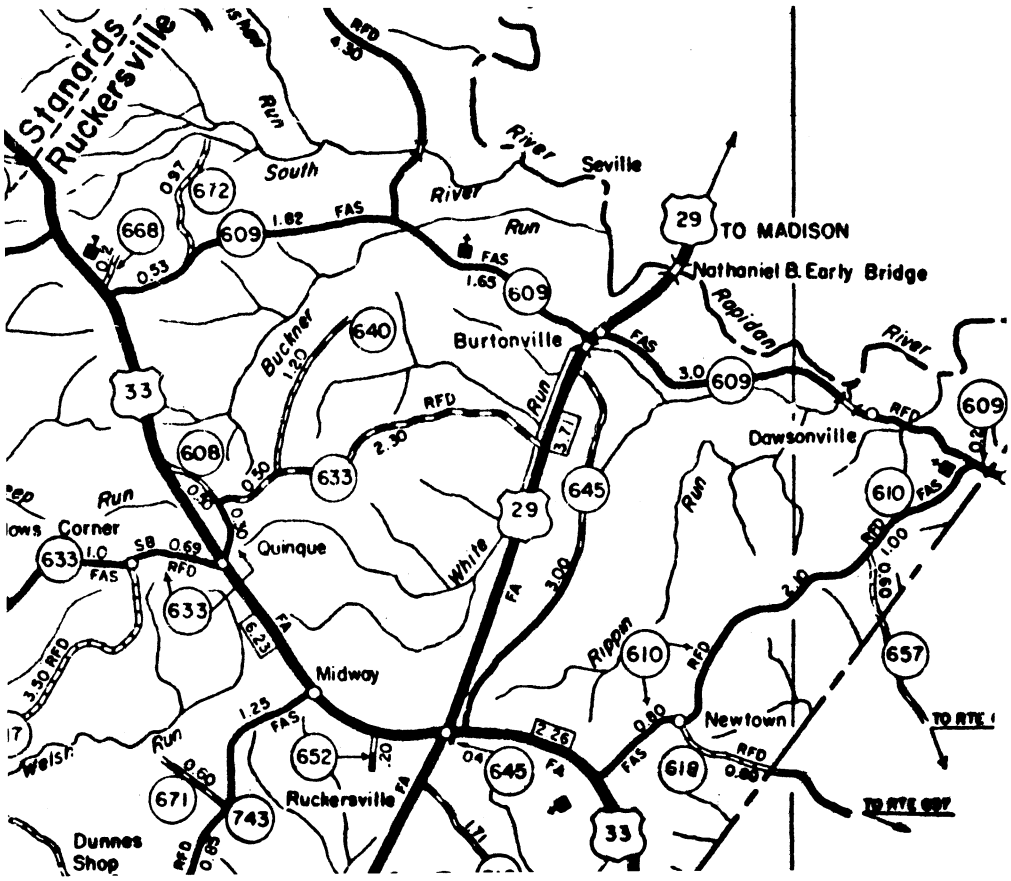

Figure 1. Portion of Green County map.

Cities, Towns, and Counties Not in the State Highway System

As indicated earlier, it has been recommended that the Highway Department be responsible for selecting the locator method to be used in identifying accident locations should a new, statewide traffic records system be implemented. The milepost system outlined thus far can, of course, be used for identifying accident locations on the state maintained interstate, primary, and secondary systems.

However, the proposed accident data system will involve the reporting of accidents not only on state maintained highways, but also in cities, towns and counties maintaining their own highways. It is important to keep several things in mind when selecting a locator system for areas having their own highway and street systems. First, the Department will be concerned only with processing accident data for these areas, and will not be relating accident data to other data located by milepost.

Second, in most cases the cities, towns, and counties outside the state highway system have no route numbers or maps equivalent to the Department's county maps. Finally, since 80-85 percent of the accidents in urban areas occur at intersections, they can be readily located without using the milepost system by identifying all intersections.

For the above reasons, a locater system utilizing intersections identification numbers is felt to be the most feasible one for locating accidents in areas not in the state highway system. An example of how this system would work follows. Table 2 illustrates the information which would have to be developed for each area not in the state system. The information shown is for the blocked off section of the Richmond city map as shown in Figure 2. Each intersection would have only one identification number.

TABLE 2

Intersection Identification Numbers

Intersection	Identification Number
Commonwealth Ave. & Cary St. Rd.	1001
Commonwealth Ave. & S. Ashlawn Drive	1002
Commonwealth Ave. & N. Ashlawn Drive	1003
Commonwealth Ave. & Willetta Drive	1004
Commonwealth Ave. & Grove Ave.	1005
Commonwealth Ave. & Hanover Ave.	1006
Commonwealth Ave. & Stuart Ave.	1007
Commonwealth Ave. & Kensington Ave.	1008
Commonwealth Ave. & Leonard Ave.	1009

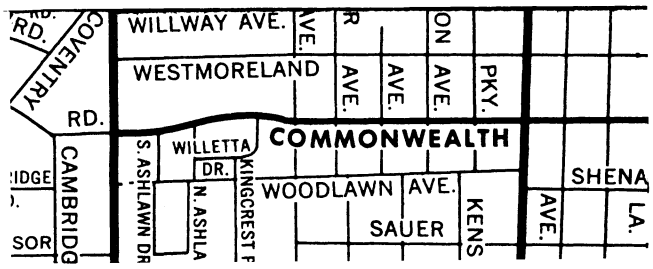

Figure 2. Portion of Richmond, Virginia.

Thus, if an accident occurred at the intersection of Commonwealth and Grove Avenues, the location would be coded as 1005. This method would also allow locating accidents occurring between intersections by coding both intersection identification numbers, with the lowest number being entered first. In fact, the exact locations between intersections could be recorded by entering the distance from the lowest numbered intersection. Table 3 illustrates how the coded input data may appear for the three examples above. It would probably be desirable to record distance only in less congested areas than shown in Figure 2.

The responsibility for developing and updating the intersection identification numbers would be that of the areas the information pertains to. An updated version of the master list of intersection numbers would have to be supplied periodically to the Highway Department's Data Processing Division.

It is felt that the areas not in the state highway system should also have the option of using a milepost system for reporting accidents if they so desire and will develop the milepost information, but the intersection identification number system appears to be far easier to develop and implement.

TABLE 3

Input Data Using Intersection Identification Numbers

Intersection Number	Intersection Number	Distance[1] (Miles)	Descriptive Location
01005			Intersection of Commonwealth and Grove Avenues
01005	01006		On Commonwealth Ave. between Grove Ave. and Hanover Ave.
01005	01006	.01	On Commonwealth Ave., 50 feet from Grove Ave. toward Hanover Ave.

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