

Virginia's Cooperative Accident Analysis System

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● THIS report will describe Virginia's cooperative accident analysis system. The need for more constructive use of the information contained in the accident records available in Virginia became apparent to the Highway Commissioner, General James A. Anderson, and other administrative personnel of the Highway Department. In 1952, this resulted in the establishment of the present accident analysis system which combines the use of mechanical punch cards and a special adaptation of the graphic log system. As the title of this report indicates, the outstanding feature of this accident analysis system is the fact that it is a joint safety program participated in by both the State Police and the Highway Department. To coordinate and supervise this program, the Accident Study Section was created within the Traffic and Planning Division of the Virginia Department of Highways. The personnel in this section consists of the section head, three investigators, one statistician, two traffic technicians, and one clerk stenographer.

Accident facts are one of the most convincing means of presenting to the public and state legislature the complex and varied problems facing present day road builders. These facts help justify the amount of funds needed to carry out an adequate highway program.

DEVELOPMENT OF TRAFFIC ACCIDENT PREVENTION PROGRAM IN VIRGINIA

One of the earliest and most important steps in the development of the traffic accident prevention program in Virginia was the enactment by the state legislature of the Motor Vehicle Safety Responsibility Act, which became effective on January 1, 1945. This act made it mandatory for the driver of any vehicle involved in an accident resulting in injuries or death to any person or property damage of \$50 or more, to file a report of the accident with the Division of Motor Vehicles. One section of this act required the Division of Motor Vehicles to furnish the Department of State Police with a photostatic copy of each original accident report filed at the Division. This act was responsible for the State Police revising the existing mechanical punch card system for handling traffic accident data, so that more detailed information could be secured from the photostatic copies of the original accident reports. The State Police use accident information gained through this procedure to aid them in the enforcement of the Motor Vehicle Code. Further, it is of immeasurable benefit in determining the assignment of manpower and equipment, as well as where the State Police should concentrate their efforts in driver education.

The first extensive use of accident records by the Highway Department was in 1945, when one man from the Traffic and Planning Division worked in the Accident Records Section of the State Police collecting manually accident data from the photostats of reported accidents to be used in connection with certain traffic studies and investigations. This was the earliest planned cooperative effort of the State Police and the Highway Department in the mutual use of accident records. It was necessary for the Highway Department to collect information manually because the State Police punch card system did not include detailed information concerning the influence of highway characteristics and conditions on the causation of traffic accidents. In order to obtain the desired highway data, it was agreed by the State Police and Highway Department that an additional system of mechanical punch cards was required to augment the existing State Police punch card system.

The author of this report, under the guidance and supervision of K. G. McWane, former Traffic and Planning Engineer and M. M. Todd, former Associate Traffic and Planning Engineer of the Virginia Department of Highways, planned this joint safety program in 1951. During the planning phase, the code manual for the highway accident analysis system was prepared using the Connecticut State Highway Department Accident Analysis Code Manual as a guide. The mechanical punch card system for accident analysis was placed in operation in the fall of 1952.

The following were the objectives to be obtained through the new system: (1) the determination of the accident frequency rates of road sections for the Rural Primary System, (2) the listing of the essential details of the individual accidents for use in formulating corrective measures and for the programming of new improvements for those sections having an abnormally high accident frequency, and (3) the pinpointing of specific locations where accident occurrence is abnormal.

At the end of the first year of operation, these three objectives had been accomplished.

In order to maintain adequately the additional punch card system for the Highway Department, it was necessary to add five persons to the existing State Police Accident Section. Two of these employees are used to locate each accident case file on the straight line graphic log sheet and record data for highway coding on the top of each case file. Two other employees are used to code the information from the photostatic copies of the accident case file onto highway code sheets. The other employee is used to punch and verify the highway mechanical punch cards from the code sheets, as well as to sort the punch cards for filing. The additional cost of personnel to supplement the State Police Headquarters Staff amounted to approximately \$12,500 per year, which is included within the budget of the Department of State Police.

Accident statistics for the year 1950, were used as a basis for the planning phase of the new program. During that year, 46,371 accidents were reported on Virginia's highways and in these accidents, 915 persons were killed and 21,840 injured. For each of these accidents, reports were made by the drivers involved and the police officers making the investigation. Thus, the Department of State Police examined and analyzed some 100,000 individual reports, in order to provide summaries of the circumstances surrounding each of the 46,371 accidents, as required by the Virginia law. In Virginia approximately 80 percent of all rural accidents occur on the Primary System of 8,600 miles, which comprises only 18 percent of the State Highway System.

With the foregoing information and the desire to minimize the volume of the new analysis, it was decided to confine the continuing study to the rural portion of the Primary System, lying outside of municipalities having a population of more than 3,500. Therefore, studies of accidents occurring in the larger towns and cities, or on the Secondary System are not included in the highway accident analysis system.

OPERATION OF MECHANICAL PUNCH CARD SYSTEM FOR ACCIDENT ANALYSIS

To understand fully the operation of the new accident analysis system, it is best to start with the original accident report filled out by the individual driver or the police officer investigating the accident. These forms are sent to the Division of Motor Vehicles where they are processed solely from the point of view of enforcing the Motor Vehicle Safety Responsibility Act and disciplinary or preventive action against the licenses of accident prone drivers.

Photostatic copies of the original reports are made by the Division of Motor Vehicles and sent to the Accident Records Section of the State Police. The joint program goes into operation as soon as the photostats are received by the Accident Section. The first step in processing the photostats is to assemble all reports for one month by county and route order. After this operation, the investigating officers' and individual drivers' reports are matched and a case file is made of each accident. The State Police Highway Locator takes each case file and from the information available, determines the highway location information for each individual case. He then secures the essential highway characteristic information for each accident location from straight line graphic logs of the Rural Primary System.

One of the most important elements of the accident analysis system is the graphic log; therefore, it is important that these logs be accurate and up to date at all times. The Accident Study Section is notified by the Construction Division of all pertinent construction information, as well as the starting and completion dates of all construction projects. Upon notification of the construction project completion date, two men from the Accident Study Section relog the route so that any changes due to reconstruction will be included on the new graphic log. This particular phase of the operation is not entirely satisfactory, as sufficient personnel is not available in the Accident Study Section to handle this portion of the program.

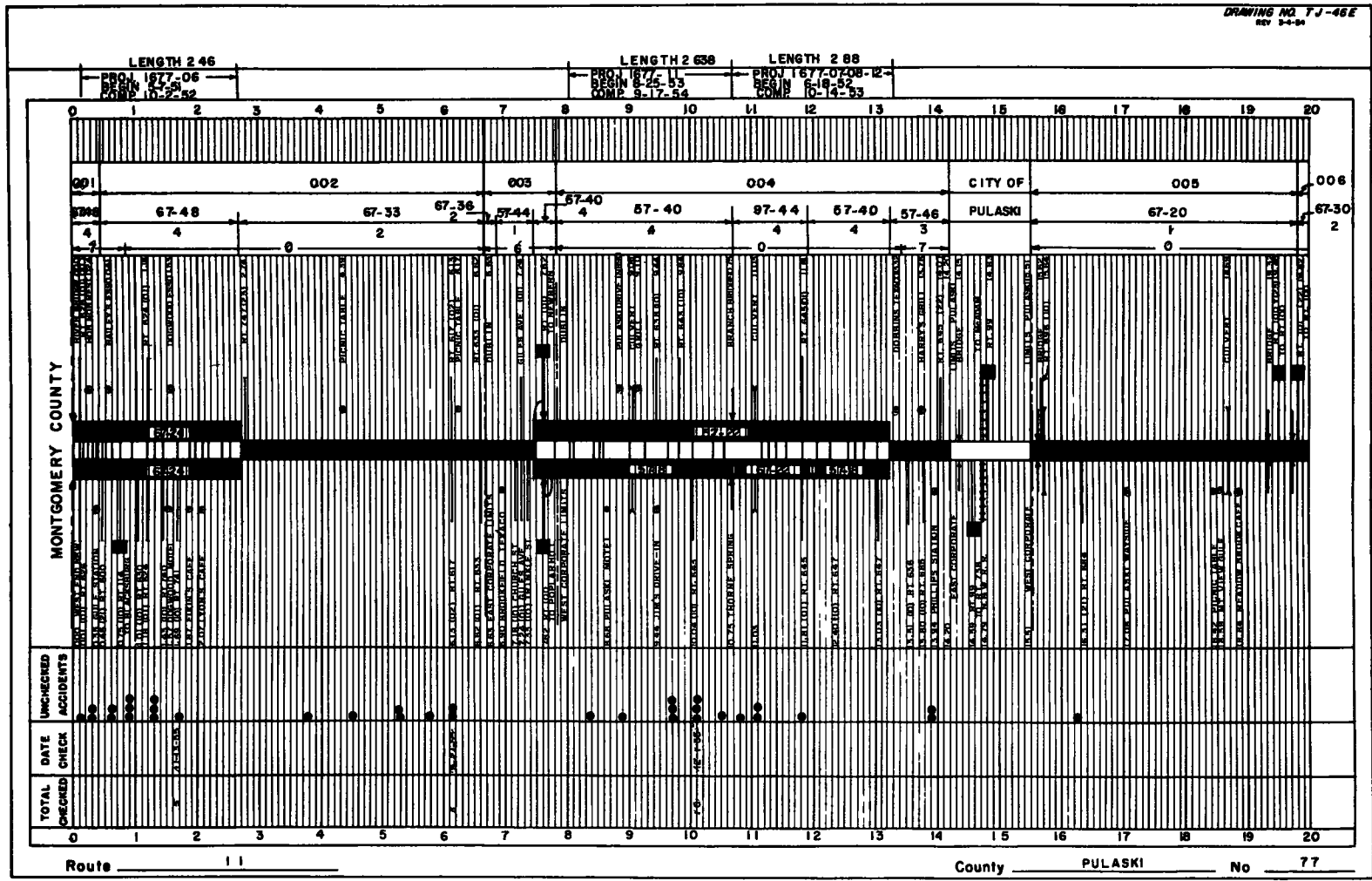


Figure 1. Straight line accident graphic log.

A straight line graphic log is prepared for each route of the Rural Primary System. Figure 1 is an example of the accident graphic log sheet used in the accident analysis system. This figure shows a 20 mile section of Route 11 in Pulaski County, which can be considered as a typical straight line graphic log used in the location of each individual accident, as well as indicating accident prone locations. Along the top edge of the graphic log is shown the construction project number, the starting and completion dates of construction, and the total length of the road project. At the bottom of the graphic log sheet is indicated the route number, county, and county code number. The scale of the graphic log representing the milepost line is found at two places on this figure: one just beneath the line indicating the project information, and the other above the line giving the route number and county name. This scale is determined by the density of roadside development along a particular route; thus, the usual scale of one inch equals one mile does not always apply. The maintenance section number is shown on the first line below the upper milepost line. In sequence on separate lines beneath the maintenance section number line is given the information: surface type in code and actual surface width, type of highway facility (kind of highway) in code, and roadside development in code. The wide black band shown in the center of the graphic log sheet is the straight line representation of the route with descriptive material on either side indicating county lines, corporate limits of cities and towns, primary and secondary roads, bridges, culverts, and roadside establishments, such as service stations, restaurants, and motels. The two black parallel bands represent divided highways. The spotting of commercial establishments has been very beneficial in the plotting of individual drivers' accident reports.

Location-Five or More Accidents	
County	Fairfax
Route No	7
Section No	005 M P 03 3
From Date	1-1-55 To Date 7-14-55
Date Posted	8-16-55

Figure 2. Request for check investigation form.

The three wide spaces at the bottom of the graphic log are used in the prompt identification of accident prone locations. The first of these spaces marked "Unchecked Accidents" is used by the highway locator for the placing of a pencil dot at the exact milepost where the accident occurred. When five accidents have been recorded at any milepost, the highway locator then erases the pencil dots and records the date of this action in the second space marked "Date Checked." In the third space marked "Total Accidents," an accumulative total is kept of each five accidents occurring at the particular milepost. Each time five accidents are recorded in the third space, the locator fills out a Request for Check Investigation Form which is sent to the Accident Study Section for field investigation purposes. This form is a 3- x 5-in. card showing the county, route number, the maintenance section, and the exact milepost where five accidents have occurred. On this form is also indicated the period within which the five accidents occurred, as well as the date of the posting. Figure 2 is an example of the Request for Check Investigation Form. In Virginia a policy has been established in which five accidents at a particular milepost justify a complete investigation of the accident records and field conditions at this location.

When the Accident Study Section receives the Request for Check Investigation Form from the State Police, it is assigned to one of the field accident investigators. Prior to making a field investigation, certain information pertaining to previous and existing road conditions is obtained from the appropriate divisions within the Highway Department, which is helpful in determining the causes of accidents at the location under investigation. The investigator also checks the accident records and tabulates all accidents at the given location to discover, if possible, whether a consistent pattern of circumstances exists. He also secures the traffic volume, road capacity, and accident rate on the particular section of road, as well as whether a previous study has been made of that road section. All office information is taken into the field when the investigator checks the existing road conditions at the location. The resident engineer and

017-69-30-2-0-15.7 (01)

MAIL TO DIVISION OF MOTOR VEHICLES, BOX 1296, RICHMOND (10), VIRGINIA

T I M E	Date of Accident January 2, 1956	Day of Week Monday	Hour 8:30	A.M. P.M.	DO NOT WRITE IN THIS SPACE
L O C A T I O N	PLACE WHERE ACCIDENT HAPPENED County Fairfax City or town				NO GA LET LET
	If accidents occurred in rural areas indicate distance from nearest town. Use two distances and two directions if necessary. miles north } limits of Falls Church miles south } of City or town miles east } miles west } 2				TYPE NO CODED BY TYPE RT PL PG.25 PDU TT RBS RSP OFF
R O A D	ACCIDENT HAPPENED ON US Routes 29/211 Lee Highway Give name of street or highway number (U.S. or State) If no highway number, identify by name Route 650 Name of intersecting street or highway number AT ITS INTERSECTION WITH - OR IF NOT AT INTERSECTION - feet north of feet south feet east feet west				Show nearest intersecting street or highway, house number, curve, bridge, railroad crossing, alley, driveway, culvert, sidewalk, underground, numbered telephone pole, or other identifying landmark. Show exact distance, using two directions and feet distances if necessary.
	C H A R A C T E R	S U R F A C E	T R A F F I C	K I N D	L I G H T
<input checked="" type="checkbox"/> Straight road <input type="checkbox"/> Curve <input type="checkbox"/> Level <input type="checkbox"/> On grade <input type="checkbox"/> Hillcrest SURFACE <input type="checkbox"/> Concrete <input checked="" type="checkbox"/> Blacktop <input type="checkbox"/> Brick <input type="checkbox"/> Gravel <input type="checkbox"/> Dirt <input type="checkbox"/> Specify other	SURFACE CONDITION (Check one) <input checked="" type="checkbox"/> Dry <input type="checkbox"/> Wet <input type="checkbox"/> Muddy <input type="checkbox"/> Snowy <input type="checkbox"/> Icy DEFECTS (Check one or more) <input type="checkbox"/> Defective shoulders <input type="checkbox"/> Holes, deep ruts, bumps <input type="checkbox"/> Loose material on surface <input type="checkbox"/> Road under construction <input type="checkbox"/> Specify other	TRAFFIC CONTROL (Check one or more) <input type="checkbox"/> Officer or watchman <input type="checkbox"/> Stop-and-go or flashing light <input type="checkbox"/> Stop sign <input checked="" type="checkbox"/> Warning sign <input type="checkbox"/> Railroad crossing gates <input type="checkbox"/> Railroad automatic signal <input type="checkbox"/> One way street <input checked="" type="checkbox"/> Traffic lanes painted or marked <input type="checkbox"/> Opposing traffic lanes separated by what <input type="checkbox"/> Specify other <input type="checkbox"/> No traffic control present	KIND OF LOCALITY (Check one to show that the area adjacent to the street or highway within 300 feet was primarily) <input type="checkbox"/> Manufacturing or industrial <input type="checkbox"/> Shopping or business <input type="checkbox"/> Residential district <input type="checkbox"/> School or playground <input checked="" type="checkbox"/> Open country <input type="checkbox"/> Specify other	LIGHT (Check one) <input type="checkbox"/> Daylight <input type="checkbox"/> Dusk <input type="checkbox"/> Dawn <input type="checkbox"/> Darkness - street lighted <input checked="" type="checkbox"/> Darkness - street not lighted WEATHER (Check one) <input type="checkbox"/> Clear <input checked="" type="checkbox"/> Cloudy <input type="checkbox"/> Raining <input type="checkbox"/> Snowing <input type="checkbox"/> Fog <input type="checkbox"/> Specify other	
V E H I C L E S	YOUR VEHICLE - No 1 55 Ford Sedan Year Make Type (Sedan, truck, Van, bus, etc.) Vehicle License Plate 55 Va. 000-000 ICC Plate No. Was Vehicle Insured? Yes				
	DRIVER John J. Doe 00 E. Main St. Richmond, Va. 35 M White Name Street or R.F.D. City and State Age Sex Race White, negro, etc. Driver's Occupation Salesman Driving Experience 14 Driver's License Va. 000-0000 () Chauffeur () Operator () Begunner Speed before accident 30 Speed limit 55 Maximum safe speed 55 Carpenter, sales clerk, etc. Years State Number City and State Miles per hour Miles per hour Miles per hour OWNER John J. Doe 00 E. Main St. Richmond, Va. Name Street or R.F.D. City and State PARTS OF VEHICLE DAMAGED Front right fender, headlight and grill Approximate cost to repair vehicle \$ 225.00				
T O T A L	OTHER VEHICLE - No 2 51 Chev. Truck Year Make Type (Sedan, truck, Van, bus, etc.) Vehicle License Plate 55 Va. T-000 ICC Plate No. Was Vehicle Insured? Yes				
	DRIVER Richard R. Smith 10 Glebe Rd. Arlington, Va. 22 M White Name Street or R.F.D. City and State Age Sex Race White, negro, etc. Driver's Occupation Contractor Driving Experience 5 Driver's License Va. 0003 () Chauffeur () Operator () Begunner Speed before accident 5 Speed limit 55 Maximum safe speed 55 Carpenter, sales clerk, etc. Years State Number City and State Miles per hour Miles per hour Miles per hour OWNER Smith Construction Corporation, Glebe Rd., Arlington, Va. Name Street or R.F.D. City and State PARTS OF VEHICLE DAMAGED Grill Approximate cost to repair vehicle \$ 30.				
DAMAGE TO PROPERTY OTHER THAN VEHICLES None Name object, show quantity, and state nature of damage Approximate cost to repair vehicle \$					
I N J U R E D	Name John J. Doe Address 00 E. Main St. Richmond, Va.				
	Age 35 Sex M Race White Nature and extent of injuries Broken left arm Was person killed? No				
Name Address Nature and extent of injuries Was person killed? Age Sex Race					

SR 300-Revised 5-1-50 **IMPORTANT!** If you had an automobile liability policy at the time of the accident, secure from your agent or insurance company a notice of insurance (Form SR-21) and send it with this report to the Division of Motor Vehicles or have your agent send it at once

Figure 3. Typical accident case file showing placement of highway #, coded information from accident graphic log.

ROUTE	COUNTY	SECTION	ACCIDENT	INJURY	DEATH
NUMBER	CODE NO	NUMBER	RATE	RATE	RATE
1	89	001	517	337	26
1	89	002	518	328	15
2	16	003	204	87	102
2	88	004	408	136	
3	23	001	128	256	
3	23	002	236	101	
3	48	001	93	93	
3	48	002	480	87	
3	48	003	242	132	
3	51	002	534	178	
3	51	005	353	126	
3	51	006	317	264	
3	68	001	184	553	
3	79	001	303	34	
3	79	002	146	73	
3	79	004	410	246	
3	88	005	416	222	
3	88	006	603	464	
3	89	003	345	158	43
3	96	001	143	95	
3	96	002	767	639	
3	96	004	270	337	
3	96	005	217	299	
5	18	001	175	88	
5	18	002	164	164	
5	43	003	654	1308	
5	43	004	338	271	

Figure 7. Frequency rates by route, county and section.

ROUTE	COUNTY	SECTION	MILEPOST	REPORT NUMBER	DISTRICT	DIVISION	YEAR	MONTH	DAY	HOUR	ACCIDENT LOCATION	TYPE OF TRAFFIC CONTROL	WEATHER	ROAD SURFACE	DRIVEWAY	ROADSIDE LEVEL	INTERSECTION NUMBER	INTERSECTION TYPE	SEVERITY TYPE	NO. FATAL	NO. INJURED	NO. VEHICLES INVOLVED	AMOUNT OF PROPERTY DAMAGE	PLACEMENT	ZONE OF IMPACT	ACCIDENT TYPE	COLLISION OBJECT	VEHICLE MAKE/TYPE	CONFIRMING FACTOR	
1 00	001	002	34703	7	3	2	11	11	1	68	44	37	104						104		2	100	4	3010301	69020					
1 00	001	002	34704	7	3	2	8	13	18	2	1	11	11	68	44	37			104		2	185	3	1010301	74022					
1 00	001	002	46141	7	3	2	10	2	6	0	18	11	11	68	44	37			4		2	300	3	0010301	09312					
1 00	001	002	46147	7	3	2	10	24	17	2	1	11	11	68	44	37			104		1	700	1	36200701	00001					
1 00	001	003	33066	7	3	2	11	25	18	0	18	11	11	68	44	37			3		1	150	3	0020401	04015					
1 00	001	003	38930	7	3	2	12	24	2	2	1	11	11	68	44	37			104		2	300	4	1250501	54016					
1 00	001	003	29858	7	3	2	7	22	13	2	18	11	11	68	44	37			103		1	1	250	3	14080300	00003				
1 00	001	003	20459	7	3	2	3	31	15	0	18	11	11	68	44	37			3		7	2	1450	3	0010401	02017				
1 00	001	004	15279	7	3	2	4	20	10	0	18	11	11	68	44	37			4		2	123	4	0010401	02017					
1 00	001	004	40640	7	3	2	9	20	21	5	18	11	11	68	44	37			4		2	400	3	0010501	29015					
1 00	001	005	3072	7	3	2	6	12	6	2	18	11	11	68	44	37			104		2	143	3	2010501	53022					
1 00	001	005	25414	7	3	2	6	19	2	2	18	11	11	68	44	37			104		2	152	3	2010301	69020					
1 00	001	005	15281	7	3	2	4	28	13	2	18	11	11	68	44	37			4		1	4	400	3	0501	34022				
1 00	001	005	20473	7	3	2	3	31	20	2	11	11	11	68	44	37			104		2	313	4	1010301	69019					
1 00	001	005	46143	7	3	2	10	4	21	1	11	11	11	68	44	37			103		3	2	2000	3	010301	69016				
1 00	001	005	46144	7	3	2	10	11	13	2	11	11	11	68	44	37			104		2	575	4	2030501	74015					
1 00	001	006	53056	7	3	2	11	3	7	0	2	14	11	68	44	37			4		2	56	3	0010301	09020					
1 00	001	006	53062	7	3	2	11	15	16	2	2	11	11	68	44	37			104		2	105	4	2010501	74022					
1 00	001	006	3066	7	3	2	1	1	2	2	11	11	11	68	44	37			103		3	2	1200	4	020401	72060				
1 00	001	006	38931	7	3	2	12	24	16	0	18	11	11	68	44	37			3		1	2	350	3	0020301	03020				
1 00	001	006	29852	7	3	2	7	7	20	2	11	11	11	68	44	37			104		2	275	3	0010301	69020					
1 00	001	006	29854	7	3	2	7	8	22	0	18	11	11	68	44	37			3		2	2	425	9	0010301	09020				
1 00	001	006	29857	7	3	2	7	18	13	2	11	11	11	68	44	37			104		2	300	4	1010501	54022					
1 00	001	006	11238	7	3	2	3	12	17	5	18	11	11	68	44	37			4		2	275	4	0010501	31022					
1 00	001	006	40642	7	3	2	9	27	19	0	18	11	11	68	44	37			4		2	160	4	0230401	05101					
1 00	001	006	46145	7	3	2	10	11	8	0	18	11	11	68	44	37			102		1	1	25	3	0060901	01046				
1 00	001	006	46148	7	3	2	10	24	15	2	11	11	11	68	44	37			104		2	275	4	05010301	69000					

Figure 8. Listing of highway accident IBM cards by route, section and milepost.

TABLE 1
SUMMARY OF ACCIDENTS BY HIGHWAY DISTRICTS
RURAL PRIMARY SYSTEM
YEAR - 1954

DISTRICT	LENGTH (MILES)	1954 VEHICLE MILES OF TRAVEL	FATAL ACCIDENTS	PERSONS KILLED	INJURY ACCIDENTS	PERSONS INJURED	PROPERTY DAMAGE ACCIDENTS	TOTAL ACCIDENTS	AMOUNT OF PROPERTY DAMAGE	ACCIDENT RATE	INJURY RATE	DEATH RATE
BRISTOL	1,162.57	665,665,465	47	56	624	1,123	1,479	2,150	\$ 1,061,201	222	169	8.4
SALEM	997.65	721,095,460	45	55	809	1,450	1,617	2,471	1,322,621	342	201	7.6
LYNCHBURG	969.05	576,149,215	39	47	548	1,015	1,180	1,767	920,026	307	176	8.2
RICHMOND	1,075.85	1,071,523,930	59	71	805	1,434	1,866	2,730	1,333,135	255	134	6.6
SUFFOLK	827.41	1,006,000,955	76	95	1,133	2,013	2,857	4,066	1,822,104	404	200	9.4
FREDERICKSBURG	762.00	553,610,100	53	60	584	1,139	1,095	1,732	1,031,771	313	206	10.8
CULPEPER	1,110.35	1,263,548,605	77	85	1,368	2,361	3,048	4,493	1,945,983	356	187	6.7
STAUNTON	1,037.53	719,096,720	44	56	649	1,100	1,436	2,129	1,056,188	296	153	7.8
TOTAL	7,942.41	6,576,690,450	440	525	6,520	11,635	14,578	21,538	\$10,493,029	327	178	9.0

TABLE 2
SUMMARY OF ACCIDENTS BY LOCATION
RURAL PRIMARY SYSTEM
YEAR 1954

Accident Location		Fatal Accidents	Persons Killed	Injury Accidents	Persons Injured	Property Damage Accidents	Total Accidents	Amount Of Property Damage
Between Intersections		379	456	4,247	7,471	8,224	12,850	\$ 7,057,557
At Opening in Median Divider		2	2	46	69	173	221	82,952
Intersection Rural Primary Route And:	Rural Primary Routes	16	20	360	678	1,049	1,425	561,474
	Other Public Road or Street	33	37	976	1,833	2,589	3,598	1,393,109
	Alley	0	0	3	5	18	21	4,573
	Private Drive	5	5	412	670	1,248	1,665	621,781
	Commercial Entrance	5	5	452	875	1,181	1,638	705,527
	Interchange Ramp	0	0	6	10	32	38	8,244
	Interchange Ramp And Other Road	0	0	1	1	8	9	3,277
	Railroad Track	0	0	17	23	56	73	54,520
TOTAL		440	525	6,520	11,635	14,578	21,538	\$10,493,029

TABLE 3
SUMMARY OF ACCIDENTS BY TYPE OF ROADWAY
RURAL PRIMARY SYSTEM
YEAR - 1954

ROADWAY TYPE	LENGTH (MILES)	1954 VEHICLE MILES OF TRAVEL	FATAL ACCIDENTS	PERSONS KILLED	INJURY ACCIDENTS	PERSONS INJURED	PROPERTY DAMAGE ACCIDENTS	TOTAL ACCIDENTS	AMOUNT OF PROPERTY DAMAGE	ACCIDENT RATE	INJURY RATE	DEATH RATE
2 - LANE	7,000.88	4,277,546,325	270	309	4,279	7,693	9,075	13,624	\$ 6,828,960	318	180	7.2
3 - LANE	449.83	881,943,660	53	75	734	1,284	1,697	2,484	1,099,488	282	146	8.5
4 - LANE UNDIVIDED	235.87	641,057,530	72	90	701	1,292	1,654	2,427	1,356,776	379	202	14.0
4 - LANE DIVIDED	227.31	649,559,110	35	41	591	1,027	1,487	2,113	881,790	325	158	6.3
LIMITED ACCESS PARTIAL CONTROL	16.75	74,394,300	7	7	91	146	225	313	142,091	420	196	9.4
LIMITED ACCESS FULL CONTROL	11.77	52,189,525	3	3	23	43	41	77	34,925	148	82	5.7
MISCELLANEOUS	--	--	0	0	101	150	399	500	149,999	-	-	-
TOTAL	7,942.41	6,576,690,450	440	525	6,520	11,635	14,578	21,538	\$10,493,029	327	178	8.0

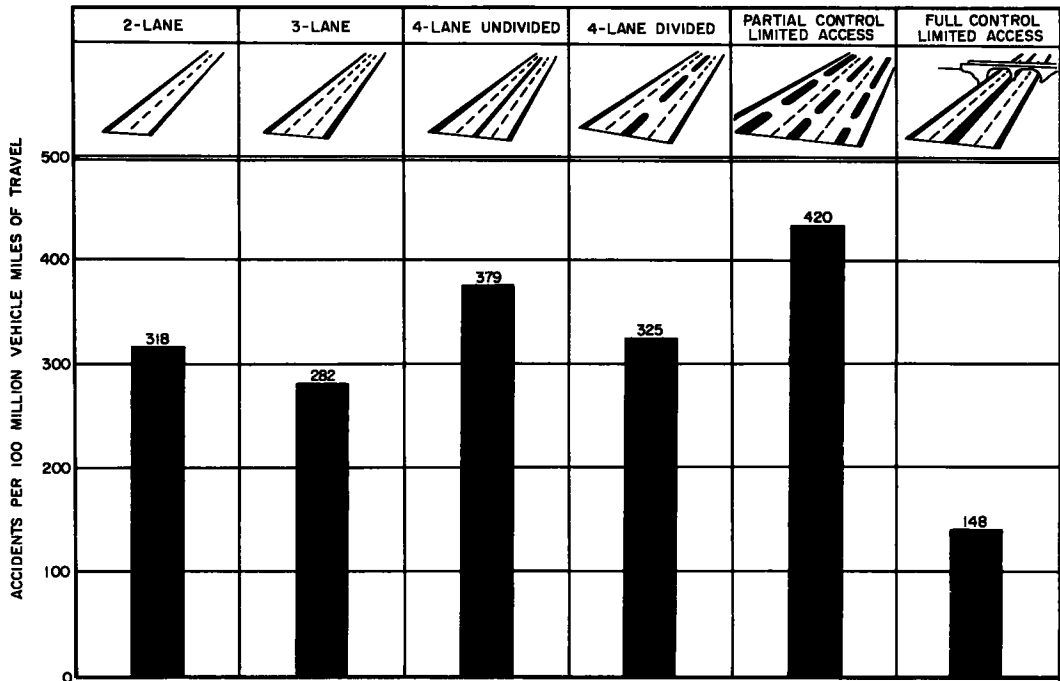


Figure 9. Comparison of accident rates by roadway type rural primary system, 1954.

Monthly individual accident cards are sorted and listed by milepost, section, county, and route. Current monthly cards are merged with previous month cards and at the end of the year, cards are listed for the yearly report. This tabulation is most useful since detailed information is available on all accidents occurring at a particular point (Figure 8).

Tables 1, 2, and 3 are illustrations of the various types of yearly summaries that can be produced by the use of the mechanical punch card system. These summaries cover such topics as (1) accidents by highway districts, (2) accidents by location, and (3) accidents by type of roadway.

From certain types of summaries based on information from the IBM punch cards, bar graphs can be compiled such as in Figure 9. This graph gives a comparison of accident rates on various types of highway facilities.

CONCLUSIONS

To date, the accident analysis system has been used only to a limited degree, in comparison to its numerous potential uses. However, the studies which have been completed as a result of this system have clearly shown its value in developing corrective treatment for existing highways and of even greater importance in establishing future highway needs. It is believed that the studies resulting from this system can also have a beneficial influence on future highway design in Virginia.

More effective use could be made of this system if it were not necessary to divert the limited personnel within the Accident Study Section from its primary function of accident analysis to the maintenance of the accident graphic logs of the Rural Primary System. Should any other state highway department consider setting up a similar accident analysis system, it is recommended that the responsibility for maintaining the graphic log be placed elsewhere.

The accomplishments of the joint accident analysis program were possible only through the cooperative and unselfish participation of the Department of State Police and the Division of Motor Vehicles.

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REFERENCES

1. Connecticut State Highway Department Motor Vehicle Accident Analysis Code Manual, dated January, 1949.