

COMMONWEALTH OF VIRGINIA, DEPARTMENT OF TRANSPORTATION SAFETY

TRANSPORTATION SAFETY PLAN

for the Period July 1, 1981 — June 30, 1982

by

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ABSTRACT

Senate Bill 85, passed by the General Assembly in 1978, renamed the Highway Safety Division of Virginia the Department of Transportation Safety (VDTS) and authorized it to participate in the evaluation of current safety measures in all modes of transportation to recommend to the Governor and General Assembly possible corrective measures, policies and plans. This first Transportation Safety Plan provides an overview of the Commonwealth's programs and safety activities in water, air, rail and mass transit transportation. Furthermore, this document is designed to identify problems of non-highway transportation modes*, establish safety goals and objectives, and propose some possible solutions to the problems identified.

*It should be noted at the outset that it is recognized that most mass transit activity in Virginia utilizes rubber-tired vehicles travelling by highway. However, for purposes of simplicity, this report refers to all of the above cited transportation modes as "non-highway".

INTRODUCTION

The Virginia General Assembly passed Senate Bill 85 in its 1978 session (see Appendix A). The Bill directed that as of July 1, 1978, the Virginia Department of Transportation Safety (VDTS) was to become successor to the Highway Safety Division. This change in status broadened the Department's responsibilities to encompass safety in all modes of transportation, where before its purview had been restricted to highway safety.

As a result of this action, the Department became authorized to evaluate current safety measures and to recommend to the General Assembly and the Governor corrective measures, policies, procedures, plans, and programs needed to make the movement of passengers and property in and through the Commonwealth as safe as reasonably practicable (Va. Code §33.1-392-396). In compliance with the legislative mandate, the Director of the VDTS requested that the Virginia Highway and Transportation Research Council (VHTRC) prepare a Transportation Safety Plan (TSP) for fiscal year 1982.

The TSP, which encompasses the modes of air, rail, water, and mass transit transportation, provides an overview of Virginia's current safety programs, identifies safety problems, delineates those program goals and objectives which have been formulated by responsible agencies, specifies the time schedules for implementation of these safety programs, and presents a summary of program expenditures.

The VHTRC report entitled Development of a Methodology for Transportation Safety Planning in Virginia (February 1980) laid much of the foundation for this first TSP. In preparing the report, contacts were made with the non-highway transportation agencies to identify current safety programs and areas where the VDTS can assist in safety activities.

It became obvious at the outset that, while quite cooperative, the non-highway agencies were able to provide only a relatively small amount of the information which would be desirable for problem identification and planning purposes. Most significantly, very little data were available for isolating problem areas. Other deficiencies were a lack of program information necessary to assess overall program operations and a lack of program budget information. Because of these constraints, a reporting methodology was developed to alleviate the problems resulting from the lack of information to the extent possible and to aid the VDTS in compiling a multi-year TSP.

This first TSP is being compiled using many of the ideas developed in the previously mentioned report. The directors of the Virginia Alcohol Safety Action Program (VASAP), the Public Information Office of the VDOTS, and the Transportation Safety Training Center at Virginia Commonwealth University were asked to participate in the reporting process as described in the VHTRC report. The non-highway agencies were asked to complete a simplified reporting form that requested them to describe their current safety programs, use their expertise to identify problems, formulate goals and objectives for their safety programs, and list programs that they plan for fiscal year 1982.

While the reporting process filled many of the voids in the information needed, a lack of in-depth data made problem identification difficult. As a result, it was decided that a modified delphi technique (a process that enables a large group of people to contribute ideas without the pressures of a group situation), combined with interviews with local transportation safety commission members, would be used to supplement the analysis of available data. It is felt that the use of all three analysis techniques will facilitate the understanding of transportation safety problems in Virginia for this first TSP. Once problems have been identified, formulating program goals and objectives and the development of countermeasure programs will become rational and manageable.

VIRGINIA'S TRANSPORTATION NETWORK

Virginia has a well-developed transportation network which allows the rapid and economical movement of passengers and goods. This section will briefly describe the magnitude of this network to provide a perspective for the discussion of transportation safety problems, goals, and objectives and countermeasure programs.⁽¹⁾

Water

Virginia's port facilities include a natural harbor and three inland river ports. The Hampton Roads harbor and shipping center consists of marine terminals in Newport News, Norfolk, Portsmouth, and Chesapeake (Exhibit 1). The harbor is free of ice in the winter and its deep water is capable of handling nearly every category of cargo. The river ports are Alexandria, on the Potomac River, and Hopewell and Richmond on the James. Together, Virginia's harbor and ports account for approximately 5.5% of the nation's foreign trade tonnage.

Water for recreational boating is abundant in Virginia. The Chesapeake Bay, the Atlantic Coast, and the tidal estuaries give Virginia 1,500 miles of shoreline. Nine major lakes provide additional opportunity for recreational boating (Exhibit 1). In 1979, there were 141,275 registered boats taking advantage of these facilities.

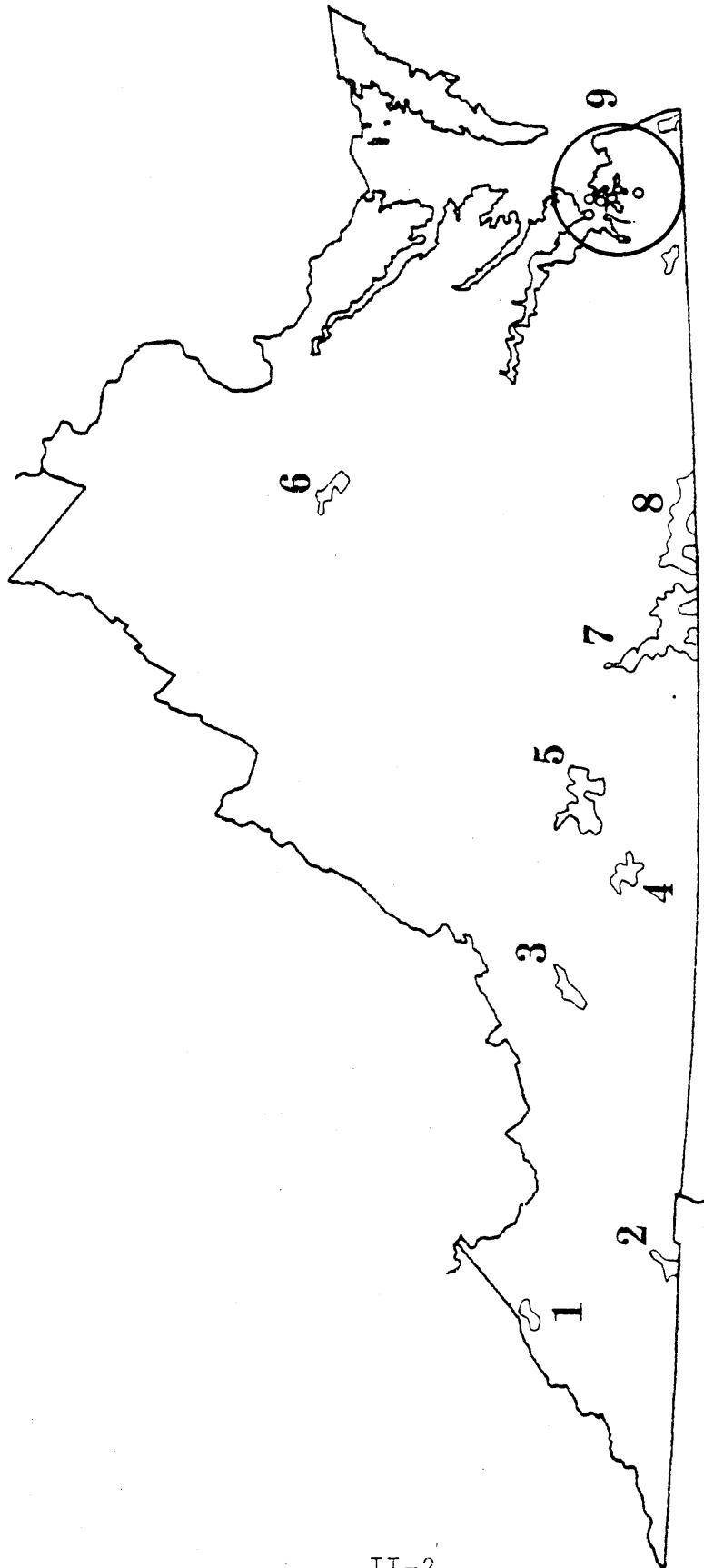
Air

There are 14 commercial airports and 66 general aviation airports located throughout Virginia (Exhibit 2). The commercial airports offer complete general aviation facilities, including service for corporate jets. Of the 80 airports, 43 offer instrument approach facilities that increase accessibility during marginal weather.

Northern Virginia's two airports — Washington National and Dulles — serve metropolitan Washington. National Airport, located in Arlington, is one of the world's busiest. Dulles International provides long-range continental and intercontinental flights.

EXHIBIT 1

VIRGINIA'S LAKES AND HARBORS

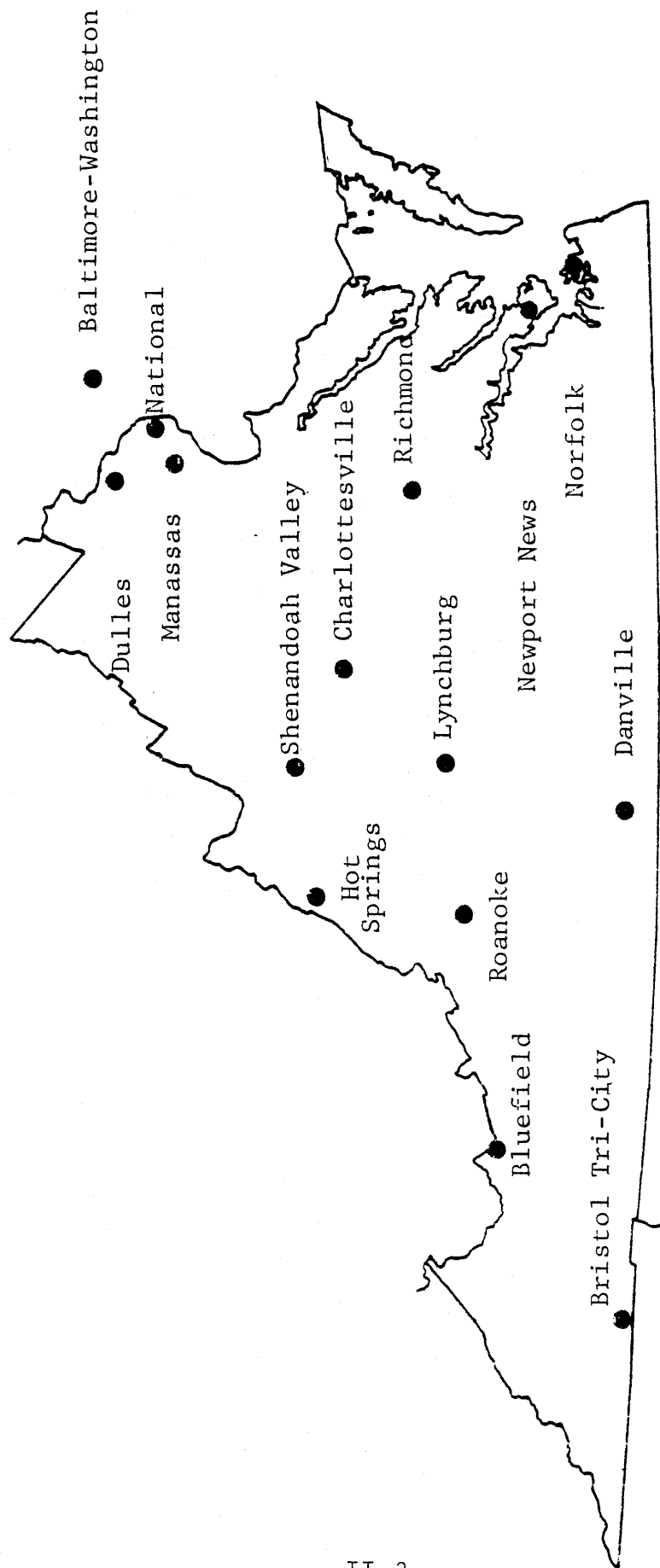


LEGEND:

- | | |
|---------------------------------|---------------------------|
| 1 - John W. Flannagan Reservoir | 5 - Smith Mountain Lake |
| 2 - South Holston Lake | 6 - Lake Anna |
| 3 - Claytor Lake | 7 - Buggs Island Lake |
| 4 - Philpott Reservoir | 8 - Lake Gaston |
| | 9 - Port of Hampton Roads |

Source: Virginia Facts and Figures 1981.

EXHIBIT 2
VIRGINIA'S AIRPORTS



Source: Virginia Department of Aviation.

Railroads

Virginia is the crossroads between major north-south and east-west rail lines (Exhibit 3). The major north-south lines are the Richmond, Fredericksburg and Potomac, the Seaboard Coast Line, and the Southern Railway System. Major east-west carriers are the Chesapeake and Ohio Railway and the Norfolk and Western Railway. In addition to the major lines, the Virginia-Maryland Railroad Company maintains a line running the length of the Eastern Shore, while the Baltimore and Ohio serves the Shenandoah Valley. Finally, the Louisville and Nashville Railroad, as well as the Clinchfield Railroad, serve the southwestern coal region.

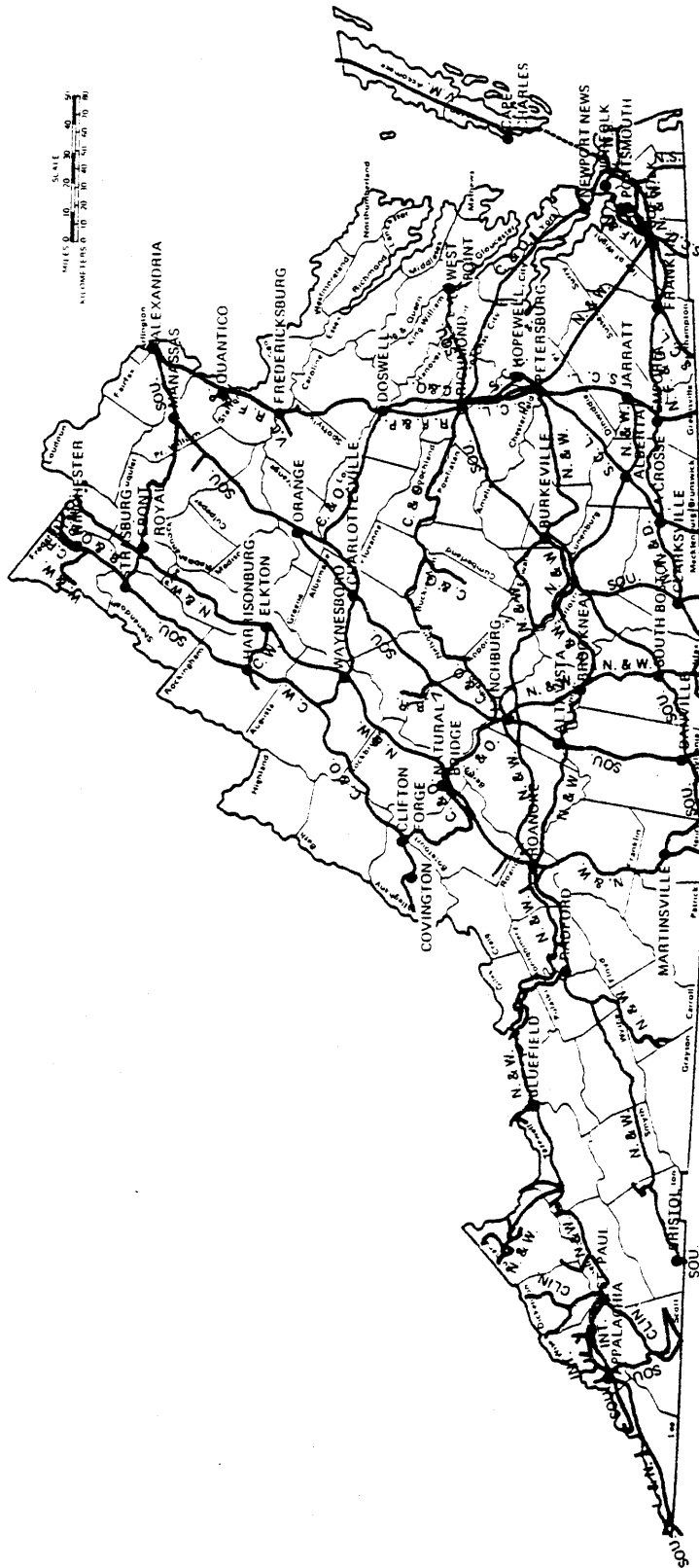
Amtrak provides both north-south and east-west passenger service.

Mass Transit

At this time mass transit facilities are a relatively small part of Virginia's transportation network. There are 15 intra-urban bus companies operating in Virginia. In July 1979, the first segment of the Metro rapid rail system began operating in Northern Virginia.

EXHIBIT 3

RAILROADS OPERATING IN VIRGINIA - 1981



Legend

B. & O. Baltimore and Ohio Railroad
 C. & O. Chesapeake and Ohio Railway
 C. W. Chesapeake Western Railway
 CLIN, Clinchfield Railroad
 C.R. Consolidated Rail Corporation
 INT. Interstate Railroad
 L. & N. Louisville and Nashville Railroad
 N. & W. Norfolk and Western Railway
 N.F. & D. Norfolk, Franklin, and Danville Railway

N.P.B.L. Norfolk and Portsmouth Belt Line Railroad Company
 N.S. Norfolk Southern Railway Company
 R.F. & P. Richmond, Fredericksburg and Potomac Railroad
 S.C.L. Seaboard Coast Line Railroad
 SOU. Southern Railway System
 V.B.R. Virginia Blue Ridge Railway
 V.C. Virginia Central Railway
 V.M. Virginia-Maryland Railroad Company
 W. & W. Winchester and Western Railroad

Source: Virginia Department of Highways and Transportation

PROGRAM OVERVIEW

The purpose of this section of the TSP is to provide background information on the agencies that administer non-highway transportation safety programs in Virginia. For each of the non-highway modes of transportation, legislative authority, program elements and activities, and staffing and resources are discussed. It should be noted that in certain instances the state's safety activities are preempted by the federal government. In these cases, only general program information is available.

Water

Legislative Authority

In 1972, the Virginia General Assembly amended the Motorboat and Water Safety Act (Va. Code §62.1-166 et seq.) to conform to the Federal Boating Act (PL 92-75). This change required that all motor-propelled boats be registered with the Commission of Game and Inland Fisheries, the agency having the authority to enforce and administer all of Virginia's boating safety regulations, to keep records, and to investigate accidents, deaths, and injuries. The U. S. Coast Guard is the primary agency for the administration of the Federal Boating Act and shares enforcement jurisdiction with the Commission of Game and Inland Fisheries on bodies of water which have been deemed "navigable waters of the U. S."

The U. S. Coast Guard's Marine Safety Division is responsible for enforcing federal safety regulations concerning commercial vessels. It should be noted that because of the interstate and international nature of commercial boating, the states are preempted from commercial safety activities.

In 1978, the Virginia General Assembly passed Senate Bill 382, which amended the Code of Virginia by establishing the Boating Advisory Committee in the Office of the Secretary of Commerce and Resources. The Committee serves strictly in an advisory capacity. The Committee makes recommendations — to the Secretary and interested state agencies for which the Secretary is responsible, including the Commission of Game and Inland Fisheries — concerning any proposed rule, regulation, or administrative policy which would directly affect the boating public.

Program Elements and Activities

The Commission of Game and Inland Fisheries collects Virginia boating accident reports, develops boating safety programs,

and implements these programs throughout the Commonwealth. From the accident reports which boaters are required to submit, the Commission manually records the numbers of total, fatal, personal injury, and property damage accidents. The U. S. Coast Guard collects a significant amount of data which is published in Boating Statistics. However, the only information compiled for individual states is the total number of accidents, the type of accident, and the number of accidents in each jurisdiction. The remaining information is reported for the United States in general.

Current annual water safety programs are largely education and training oriented. The Virginia Commission of Game and Inland Fisheries offers an optional home study course entitled "Virginia Better Boating, A Guide to Safety Afloat." Those who complete the course and pass an exam are given a certificate and ID card. The Commission publishes a boating safety newsletter, and each month contributes an article pertaining to boating to Virginia Wildlife. A primer of boating safety is made available for school groups and organizations. The Commission has designed safety equipment posters for distribution to marinas, boat dealers, and schools. A series of safe boating slides has just been developed by the Commission and will be made available to school groups and community organizations.

The Commission annually prepares promotional materials for the Power Squadron and Coast Guard Auxiliary boating courses. The boating courses, which stress safety and navigation, are taught primarily during the winter. The Coast Guard Auxiliary, a volunteer group of boat owners, teaches three types of boating courses — a one-lesson course, a multi-lesson course, and a youth attendance course. In 1980, approximately 85,000 Virginians took these courses. While participants pay for books and materials, the Coast Guard spent approximately \$40,000 on equipment, audiovisual films, and slides used in teaching the courses. In addition to their teaching activities, the Coast Guard Auxiliary will give a "Courtesy Marine Examination," in which the boat and safety equipment are inspected and deficiencies pointed out to the boat owner.

In past years, the Coast Guard extensively participated in the enforcement of federal laws on bodies of water where they have joint jurisdiction. However, a significant reduction in personnel has greatly curtailed enforcement activities. Boating Safety Teams, which had primarily focused on enforcement, have changed their emphasis to the education of boaters.

The U. S. Coast Guard Marine Safety Division boards vessels coming into Virginia harbors and checks to see what type of cargo they are carrying. When accidents occur, the Coast Guard utilizes a sophisticated system that identifies the nature of the cargo and, if hazardous materials are involved, determines the precautions to be taken.

Exhibit 4 is a summary of the water safety activities conducted by the Commission of Game and Inland Fisheries. Because they are not funded with state money, federal programs conducted by the Coast Guard have not been included.

Staffing and Resources

Boating safety activities are conducted through the Education Division — one of five divisions under the Director of the Commission of Game and Inland Fisheries. The Safety Officer in the Division is responsible for identifying problems and initiating all boating safety and hunting safety programs. The Commission of Game and Inland Fisheries has a field office and a local game warden in each county to set up displays, talk at schools, distribute materials, etc.

The 1980-82 Commonwealth of Virginia Budget appropriated \$18,805,340 to the Commission of Game and Inland Fisheries. Of this amount, \$941,170 was appropriated for Boating Safety and Regulation. Besides being used to publish safety materials and encourage boating safety programs, money allocated for Boating Safety and Regulation is used for administering the boat registration programs, acquiring lands and constructing new boat ramps, and enforcing boating laws and regulations.

The Commission of Game and Inland Fisheries received funds under the U. S. Coast Guard's Boating Safety-Financial Assistance Program from 1976 to 1980. The program, which was designed to encourage state participation and consistency in boating safety efforts, provided up to one-third the cost of an approved state boating program. Examples of projects which were partially financed through the Boating Safety-Financial Assistance Program include purchasing patrol equipment, signing of waterways, advertising safety courses, and installing launching ramps. Coast Guard officials estimate that \$514,000 of federal money was spent in Virginia between fiscal years 1974 and 1979.

EXHIBIT 4

WATER SAFETY PROGRAMS

PROGRAM NAME	PURPOSE	TARGET POPULATION	LOCALITIES COVERED	COST BREAKDOWN	
				STATE	FEDERAL
Boating Safety Home Study Course	To encourage safe boating practices	All boaters	Statewide	Game Commission \$35,000.00 -8,000.00 (Charge 1.00 for each) 27,000.00	
Safe Boating Slide Series (80 Slides)	To teach safe boating practices	School and Community Groups	Statewide		
Uniform Waterway Marker System Program	Authorize signs for control areas	All boaters	Statewide	\$15,000.00	
Advertise Power Squadron and Coast Guard Auxiliary Boating Courses	To inform the boating public of safe boating courses	All boaters	Statewide	\$10,000.00	
Publications - Boating Safety Boat Owners Guide	To encourage safe boating practices	All boaters	Statewide	\$6,000.00	
Public Information "Now Hear This" Program	To encourage safe boating practices	All boaters	Statewide Total	\$3,000.00 \$61,000.00	

Federal funding of the Boating Safety-Financial Assistance Program ended in 1980. The Commission of Game and Inland Fisheries expected that the funds lost due to the ending of the program would be replaced by funds appropriated through a bill sponsored by Congressman Biaggi which would allow fuel tax money paid by boatmen to be used for safety improvements. The Biaggi Bill, which was passed in December 1980, set up a Coast Guard administered program which would provide one-half of the cost of an approved boating program (PL 96-451). Unfortunately, however, no funds have been appropriated for the program to date.

Air

Legislative Authority

In its 1979 session, the Virginia General Assembly passed Senate Bill 76, which created the Department of Aviation under the Secretary of Transportation. This new organization replaced the State Corporation Commission's Division of Aeronautics. The Department of Aviation is responsible for the development of a statewide aviation system; promoting aviation within the Commonwealth; licensing aircraft, airmen, and airports; administering state aviation laws; and conducting aviation safety and educational programs. The Director of the Department of Aviation is appointed by the Governor. A seven-member Aviation Commission, appointed by the Governor, promulgates aviation rules and regulations, approves airport improvements, and generally oversees aviation activities.

The Bureau of Aviation of the National Transportation Safety Board (NTSB) is responsible for aviation safety activities, including those for civil aircraft, within the United States. Certain aircraft accident investigations, usually those not involving fatalities, may be delegated to the Federal Aviation Administration (FAA). In addition to investigations by the FAA and NTSB, the Virginia State Police are required to investigate any aircraft accident which occurs in the Commonwealth (Va. Code Ann. §52.8).

Program Elements and Activities

The Department of Aviation conducts administrative activities necessary to manage the air safety program. The Department devotes a significant amount of time and resources to the licensing of aircraft and airmen. Licensing enables the Department to effectively plan for safe and efficient use of the airports and airways and protects the public by requiring aircraft owners to have liability insurance.

In addition, the Department extracts certain accident data from the NTSB accident reports. The accident information collected — which includes the total number of aircraft accidents, property damage accidents, aircraft destroyed, fatalities, serious injuries, minor injuries, the pilot rating, and a monthly distribution of accidents — is used to support requests for funding. At the federal level, the NTSB publishes an Annual Review of Aircraft Accident Data. This publication contains a great array of useful statistics. Unfortunately, because very little of the data are state-specific, the document is of limited use in identifying Virginia's air safety needs.

The Department of Aviation conducts a variety of safety meetings and pilot education programs. In cooperation with the FAA, the Department sponsors two Flight Instructors' Courses annually and a Mechanics' Seminar semiannually. The Flight Instructors' Course lasts three days, with each participant receiving 24 hours of intensive ground school training. The one-day Mechanics' Seminar instructs mechanics and airmen on new developments in aircraft products, aircraft equipment, and maintenance techniques.

The Department holds an annual Aviation Weather Seminar for pilots. These seminars are held at different locations from year to year so that all Virginia pilots have an opportunity to attend. The Department also publishes and distributes the following: a quarterly newspaper containing notice of aviation activities and articles pertaining to aviation safety, a cloud chart for identifying unfavorable weather, and a Virginia Airport Directory. Public information and education projects conducted currently in cooperation with the Department of Aviation include seminar flight clinics for pilots and instructors stressing the effects of alcohol in the flight environment.

Exhibit 5 is a summary of the air safety activities conducted by the Department of Aviation. Unfortunately, a breakdown of costs was not available for individual programs.

Staffing and Resources

Air safety activities are conducted through the Safety and Licensing Division of the Department of Aviation. The Safety and Licensing Division, one of five divisions that fall under the Director, consists of three sections — safety, licensing, and enforcement. The three sections are allocated a total of six positions.

EXHIBIT 5

AIR SAFETY PROGRAMS

PROGRAM NAME	PURPOSE	TARGET POPULATION	LOCALITIES COVERED	COST BREAKDOWN		
				STATE	FEDERAL	TOTAL
Safety and Educational Seminars	Promote Safe Flying for Pilots	Pilots and Aircraft Owners		Cost breakdown is not available for individual programs.		
Recommend Improvements in Airport Engineering Aids and Marking at Airports		"				
Mail Aviation Safety Letters and Brochures to Pilots and Aircraft Owners	Aviation Safety	"				
Licensing Programs	Increase Aircraft and Airman Licensing	"				
Flight Instructors Courses		"				
Mechanics Seminar		"				
Quarterly Newspaper	Aviation Safety					
Cloud Chart and Virginia Airport Directory						
			Total	\$153,000.00		

380

The 1980-1982 Commonwealth of Virginia Budget appropriated \$347,840 to the Department of Aviation for Air Transportation Regulation and Safety. Approximately \$153,000 were allocated to the Safety and Licensing Division for fiscal year 1979-1980. No breakdown of costs between safety and licensing activities was available. However, because licensing is the third ranked priority and safety is the twelvethranked (out of 14) listed in the Executive Budget, it is likely that the bulk of the money went to programs to encourage the licensing of aircraft and airmen.

Rail

Legislative Authority

The State Corporation Commission (SCC) is the state agency primarily responsible for railroad safety in Virginia. The SCC has statutory authority to promulgate and enforce regulations governing the operation of railroads within the Commonwealth (Va. Code Ann. §56-338.82). In addition to its general grant of authority, the Commission has specific statutory powers relevant to railroad safety. The Commission may promulgate regulations to enforce and effectuate the railroad safety provisions contained in the Code of Virginia (§56.413 et seq.). Secondly, the Commission has authority to compel repairs to railroad equipment and facilities. (Va. Code Ann. §56-129). Finally, the Commission has authority to require railroads doing business within the Commonwealth to file accident reports with the SCC. (Va. Code Ann. §56-448).

In actuality, the SCC has very limited authority in the area of railroad safety regulation. The bulk of the responsibility was designated to the Federal Railroad Administration (FRA) as a result of the 1970 Federal Railroad Safety Act. The Act, enacted into law as a response to a sharp increase in railroad accidents, granted the Secretary of Transportation the authority to prescribe rules, regulations, orders, and standards for all areas of railroad safety. However, Congress did provide the states with the opportunity to participate along with the federal government in carrying out investigative and surveillance activities related to the federally prescribed railroad safety regulations. It should be noted that until a state chooses to participate, its authority to conduct safety inspections is preempted by the FRA.

The 1981 session of the Virginia General Assembly passed Senate Bill 771, which authorized Virginia to participate in the federal program. Virginia's participation authorizes the SCC to

hire state inspectors to carry out investigative and surveillance activities in connection with any rule, regulation, order, or standard prescribed by the Secretary of Transportation under the authority of the Federal Railroad Safety Act. The bill provides that the Commonwealth's participation in the program will be supplemental and does not replace the federal government's responsibility in the inspection of railroad facilities.

The Virginia Department of Highways and Transportation (VDH&T) also has certain responsibilities for rail safety. Although primarily planning and operation oriented, the Department's Rail Transportation Division is concerned with rail safety and briefly deals with rail safety in the State Rail Plan. The Traffic and Safety Division of the VDH&T is responsible for grade crossing improvements and has administered the Grade Crossing Improvement Program contained within the Highway Safety Act.

Program Elements and Activities

Until the Virginia General Assembly passed Senate Bill 771 authorizing the Commonwealth to participate in the federal rail safety program, Virginia was preempted from most safety activities. The SCC, however, has conducted limited safety activities. These activities include maintaining records of railroad accidents and grade crossing accidents; receiving complaints that involve railroad safety and handling the complaints with the railroad or referring them to the FRA; and investigating major railroad accidents.

State participation in the federal program will begin July 1, 1981. The SCC expects to enter the Track Inspection Program in the fall of 1981. As part of the Track Inspection Program, the Division of Railroad Regulation will hire two track inspectors. It is reasoned that state inspectors are more familiar with Virginia's railroads than the federal inspectors and thus have a greater opportunity to note safety deficiencies.

The Traffic and Safety Division of the VDH&T administers the Railroad Grade Crossing Improvement Program. The Division studies grade crossings on VDH&T maintained roads, rank orders the hazard level using various numerical formulas, and applies engineering solutions. Although the Division will advise cities whose roads are not maintained by the VDH&T concerning grade crossings which need improvements, the cities are not obligated to make the suggested improvements.

To reduce the number of grade-crossing accidents, the National Safety Council designed a joint state and federal program called Operation Lifesaver. Operation Lifesaver operates on the premise that for grade-crossing safety programs to be successful

a combination of engineering, education, and enforcement counter-measures is necessary. The federal responsibility lies largely in engineering, operations, and maintenance. At the state level, the program strives to fund and implement projects to improve, accelerate, and continue effective grade-crossing programs.

See Exhibits 6 and 7 for a summary of rail safety programs being conducted by the SCC Division of Railroad Regulation and the Traffic and Safety Division of the VDH&T. A more detailed description of Operation Lifesaver activities is found in the Public Information Program Area.

Staffing and Resources

The Division of Railroad Regulation is one of seven divisions of the SCC. Presently, the Division of Railroad Regulation is very small — it consists of two people and clerical support.

The Division is prepared to employ a full complement of inspectors so that Virginia can begin participation in the Federal Railroad Safety Program. Under the program, two track inspectors, two equipment inspectors, a chief rail safety engineer, and a clerk will be hired.

The 1980-82 Executive Budget lists Railroad Regulation as a subprogram of Ground Transportation Regulation. Of the five subprograms, the Rail Regulation Subprogram is rank ordered last. It is then not unreasonable to assume that the Rail Regulation Division receives a fairly small portion of the \$7,034,845 recommended for Ground Transportation Regulation. The final 1980-82 Budget appropriated \$269,535 to the SCC for Railroad Regulation.

State participation in the federal program will cost less than \$100,000. Under federal law, one-half of the cost related to state participation in the program is paid for by the Department of Transportation. Thus, the Commonwealth will have to provide less than \$50,000 during the first year of the program.

The Rail Division of the VDH&T does not have staff positions devoted to rail safety activities. The Rail Division is divided into two rail planning sections and a rail operations section. The Traffic and Safety Division of the VDH&T, which is responsible for grade-crossing improvements, falls under the Director of Engineering. Within the Traffic and Safety Division three people work part-time on grade-crossing safety while two others spend part of their time on grade-crossing projects.

EXHIBIT 6
RAIL SAFETY PROGRAMS
STATE CORPORATION COMMISSION

PROGRAM NAME	PURPOSE	TARGET POPULATION	LOCALITIES COVERED	COST BREAKDOWN		
				STATE	FEDERAL	TOTAL
State Participation in Federal Rail Safety Program to Begin July 1, 1981	Track Inspection			\$ 50,000.00	\$ 50,000.00	\$100,000.00

285

EXHIBIT 7

RAIL SAFETY PROGRAMS
VDH&T, TRAFFIC SAFETY DIVISION

PROGRAM NAME	PURPOSE	TARGET POPULATION	LOCALITIES COVERED	COST BREAKDOWN		
				STATE	FEDERAL	TOTAL
Railroad Grade Crossing Safety Improvement Program	Improve Grade Crossing		Statewide Public Cross- ings	\$300,000.00	\$3,100,000.00	\$3,400,000.00

Under the Grade Crossing Improvement Program, which is administered by the Traffic and Safety Division of the VDH&T, federal money is available for 90% of the cost of grade-crossing improvements. The state is required to pay the remaining 10%. Since 1973, the Division has been authorized to improve 375 crossings at a total cost of \$17 million. Another 75 improvements, which will cost \$8 million, have been proposed.

Mass Transit

Legislative Status

In 1978, the Virginia General Assembly established, within the VDH&T, the Division of Public Transportation. The primary responsibilities of the Division are to coordinate public transportation planning within the Commonwealth and to administer state and federal grants for public transportation (Va. Code Ann. §33.1-390). The statutory responsibilities of the Division do not make specific reference to safety-related activities such as safety investigation or accident reporting. Nevertheless, such activities are probably germane to the Division's specific responsibilities to investigate matters affecting the operation of public transportation and to develop data pertaining to the operation of public transportation. (Va. Code Ann. §33.1-391).

The State Corporation Commission also has certain responsibilities in the area of mass transportation. The Commission issues certificates of convenience and necessity to motor carrier operators such as bus companies (Va. Code Ann. §56-278). In addition, the Commission requires motor carrier operators to file with the Commission reports of any accidents involving motor carriers (Va. Code Ann. §56-332).

Each transit company is responsible for keeping its own accident and operation records. At present, there are no uniform guidelines for reporting accidents and, consequently, there are only limited data bases at both the state and federal levels. Metro Rail data are reported to the FRA for compilation and analysis.

Most transit companies are concerned with safety and have established driver training programs incorporating aspects of operations safety and preventive maintenance. It is also common for bus companies to sponsor driver incentive programs designed to promote the safe operation of transit vehicles.

During FY 79 and FY 80 the Public Transportation Division of the VDH&T granted federal funds acquired under the State Aid for Experimental Public Transportation and Ride-sharing Projects

Program, to the Transportation Safety Training Center at Virginia Commonwealth University. These funds were used to (1) conduct a one-day Virginia Transit Training Needs Assessment Workshop, and (2) develop curriculum and training materials responsive to the training needs identified by the "needs assessment workshop." The Transportation Safety Training Center is also being funded through the Public Transportation Division to give on-site technical assistance to transit and paratransit properties (see Exhibit 8). Furthermore, the Public Transportation Division, which administers paratransit programs for the handicapped, is studying the state-of-the-art research in wheelchair securement.

Staffing and Resources

Although the Public Transportation Division of the VDH&T has concerns in the area of mass transit safety, the Division does not employ a safety staff and does not receive state funds for safety programs. The safety programs conducted by the Transportation Safety Training Center for the Division are funded through a federal grant.

EXHIBIT 8

MASS TRANSIT SAFETY PROGRAMS

PROGRAM NAME	PURPOSE	TARGET POPULATION	LOCALITIES COVERED	COST BREAKDOWN		
				STATE	FEDERAL	TOTAL
Transit Curriculum Development	Develop Training Curriculum for Paratransit Operators	Smaller Bus Companies	Statewide		\$35,487.00	

PROBLEM ANALYSIS

This section of Virginia's 1982 Transportation Safety Plan is devoted to identifying statewide transportation safety problems. Administrative, legislative, and organizational problems, as well as accident problems, are discussed for air, rail, water, and mass transit modes of transportation. Administrative, legislative, and organizational problems are deficiencies in the transportation safety program. Insufficient legislation, low manpower, lack of training, and inadequate data are examples of this type of problem. Accident problems relate directly to accidents, fatalities, or injuries and may be corrected through the application of countermeasure programs. Examples of accident problems are accidents involving alcohol, speed-related accidents, and defective vehicles.

A complete set of program information would allow administrative, legislative, and organizational problems to be identified. Presently, however, there is a significant lack of program information that makes an assessment of program management very difficult. The non-highway agencies did not provide an "annual report" or a similar document that would allow access to materials concerned with overall program operations (i.e., manpower, equipment, training, communications, etc.).

Accident problems are identified primarily through statistical analyses of available crash data. Various data for the period 1971-1979 are plotted in Exhibits 7 through 15 and projected to 1985 using a statistical technique known as regression, or time series, analysis. (See Appendix B for a more detailed discussion of the technique employed and the criteria for interpreting "goodness of fit.") It should be noted, however, that accident data collected by the state agencies are nonspecific; they record little more than the number of accidents, injuries, and fatalities. While information retrieved from the federal transportation agencies is more detailed, very little data are reported specifically for Virginia. Additionally, because of the overlapping jurisdiction of state and federal agencies, it is likely that accident data in the non-highway modes are not uniformly reported.

Because of the information constraints, it was clear that to identify transportation safety problems it would be necessary to supplement data analyses with an inventive problem identification methodology. It was felt that a modified delphi study combined with interviews with local transportation safety commission members would facilitate an understanding of safety problems.

EXHIBIT 9

DELPHI TECHNIQUE

Mode of Transportation	Group Receiving Questionnaire	Number of Questionnaires Sent	Number Returned	Percent Returned
Water	Boating Advisory Committee	14	8	57.1
Air	Airport Managers	16	1	6.3
Rail	Operation Life- saver Members	16	4	25.0
Mass Transit	Transit Companies	13	7	53.8
	Total	59	20	33.9

The modified delphi study involved sending a list of problems — developed from the safety literature and by brainstorming — to people knowledgeable in the non-highway modes. The "experts" receiving the questionnaire were asked to rank order the list of problems. See Appendix C for a copy of each questionnaire. Exhibit 9 briefly summarizes information concerning the questionnaires and the responses.

It was planned that the results of the problem rankings would be combined into a composite ranking by assigning a point value to the first, second, and third ranked problems. However, because the participants rank ordered different numbers of problems, it was difficult to numerically weight the ranked problems without the results appearing misleading. Thus, all problems rank ordered by the participant (regardless of where the problem was rank ordered) were totaled.

The analysis of data in non-highway transportation modes presents some difficult problems which should be mentioned prior to proceeding with the problem analysis. Before such an analysis can be useful for comparative problem identification, terms must be standardized. The problem begins at definition; it is difficult for experts to agree on a definition of an "accident." Some definitions include a minimum dollar amount of vehicle property damage. A single property damage figure probably could not be applied to all modes. For example, the NTSB and the Virginia State Police use different definitions for an air accident. A standard definition of "accident" on the intramodal level is needed.

A second problem involves choosing the appropriate measure of modal exposure. Exhibit 10 illustrates that fatalities occurring in non-highway modes of transportation constitute a small proportion of the total fatalities in Virginia transportation. But the small proportion doesn't necessarily lead to the conclusion that there are no significant safety problems associated with non-highway modes. The number of accidents is meaningless without an accompanying measure of modal exposure (i.e., number of passenger miles, vehicle miles, number of trips, time, etc.). Modal exposure is necessary for problem identification on both intra- and inter-modal levels. On the intra-modal level, the terms of modal exposure chosen to express the accident experience make a significant difference. For example, it has been observed that air accidents occur most frequently during takeoff and landing. Thus one would expect a higher accident rate per number of trips than per mile. This leads to increasingly difficult problems on the inter-modal level. Because the most valid exposure terms for the various modes are probably not consistent, it is very difficult to compare safety performance.

Water

Administrative, Legislative, and Organizational Problems

The administrative, legislative, and organizational problems that affect boating were identified through questionnaires sent to the Virginia Boating Advisory Commission (a group comprised of 16 representatives from the boating public, state government, the U. S. Coast Guard Auxiliary, the U. S. Power Squadron, and yacht clubs) and interviews with the Commission of Game and Inland Fisheries Safety Officer, Coast Guard personnel, and local transportation safety commission members.

Training

It was readily apparent that the most serious administrative, legislative, and organizational problem is the inadequate training of boaters. Of the 57% of the members of the Boating Advisory Committee who responded to the questionnaire, 75% identified inadequate training as a problem. In addition, 50% of those people who identified inadequate training as a problem, acknowledged it as the most important problem. It should be made clear, however, that the problem is not that the training courses conducted by the U. S. Coast Guard Auxiliary or the Power Squadron are inadequate, but that not enough boaters take the available courses.

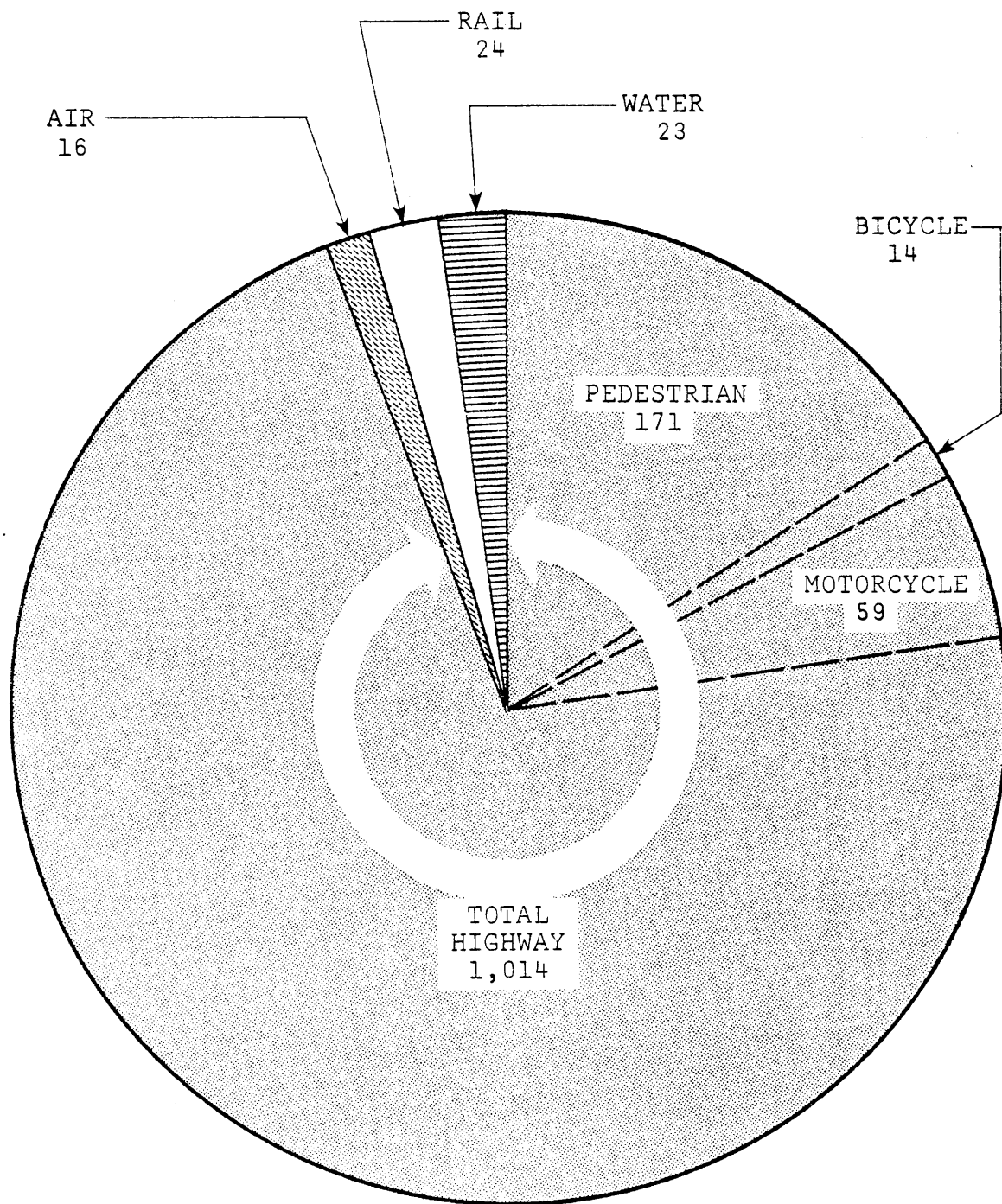


EXHIBIT 10

TRANSPORTATION DEATHS IN VIRGINIA, 1,077 IN 1979.

The local commission members interviewed also expressed a need for more training. Additional emphasis on training appears to be especially important in areas which have just recently acquired man-made boating facilities. In these areas many first-time boaters are taking to the water with little knowledge of how to operate their boats, boats in general, or regulations pertaining to boaters.

Underreporting of Boating Accidents

It is generally recognized that reported boating accidents represent only a small percentage of the total boating accidents that occur. While the number of fatal accidents is probably accurate, the number of injury and property damage accidents is felt to be grossly underreported. A study in California revealed that in an eight-month period there was an accident rate of slightly more than 0.001% of all registered boats.⁽²⁾ During that same period, a California insurance company, which insured approximately 5,000 recreational boats, reported a 4% claim rate.

Additionally, the accidents that are reported may not be reported accurately. Coast Guard personnel pointed out that since boaters fill out their own report, the reports tend to underestimate the boater's role in causing the accident. In fact, it was recounted that a large proportion of the accidents listed "fault of other boat" as the cause of the accident.

Accident Problems

In 1979 92 boating accidents were reported in Virginia, which represented a 24% decrease from the 121 accidents reported in 1978 (Exhibit 11). Exhibit 12 indicates that a reduction in accidents of that magnitude is not particularly unusual; over the past 10 years the numbers of boating accidents reported annually have ranged between 83 and 135. Boating fatalities, however, have exhibited a decreasing trend (Exhibit 13).

Significantly, while reported boating accidents have remained fairly constant and fatalities have decreased, the number of boats registered in Virginia almost doubled between 1970 and 1979. In 1970, boat registrations in Virginia totalled 77,000; by 1979 there were 141,275 (Exhibit 11). Interestingly, boat registrations have been affected very little by either economic trends or gasoline prices. It appears that more people are becoming involved in boating as owners and passengers and thus public information, education, and training must reach a greater number of Virginians.

EXHIBIT 11

ANNUAL SUMMARY OF BOATING ACCIDENTS

Year	Registered Boats	Reported Accidents	Fatalities	Injuries
1971	77,000	92	30	36
1972	85,609	91	33	31
1973	110,000	121	43	33
1974	126,000	83	43	23
1975	131,832	125	43	62
1976	138,726	116	20	59
1977	137,674	135	36	37
1978	141,775	121	26	46
1979	141,275	92	23	34

Source: Commission of Game and Inland Fisheries

EXHIBIT 12

REPORTED BOATING ACCIDENTS

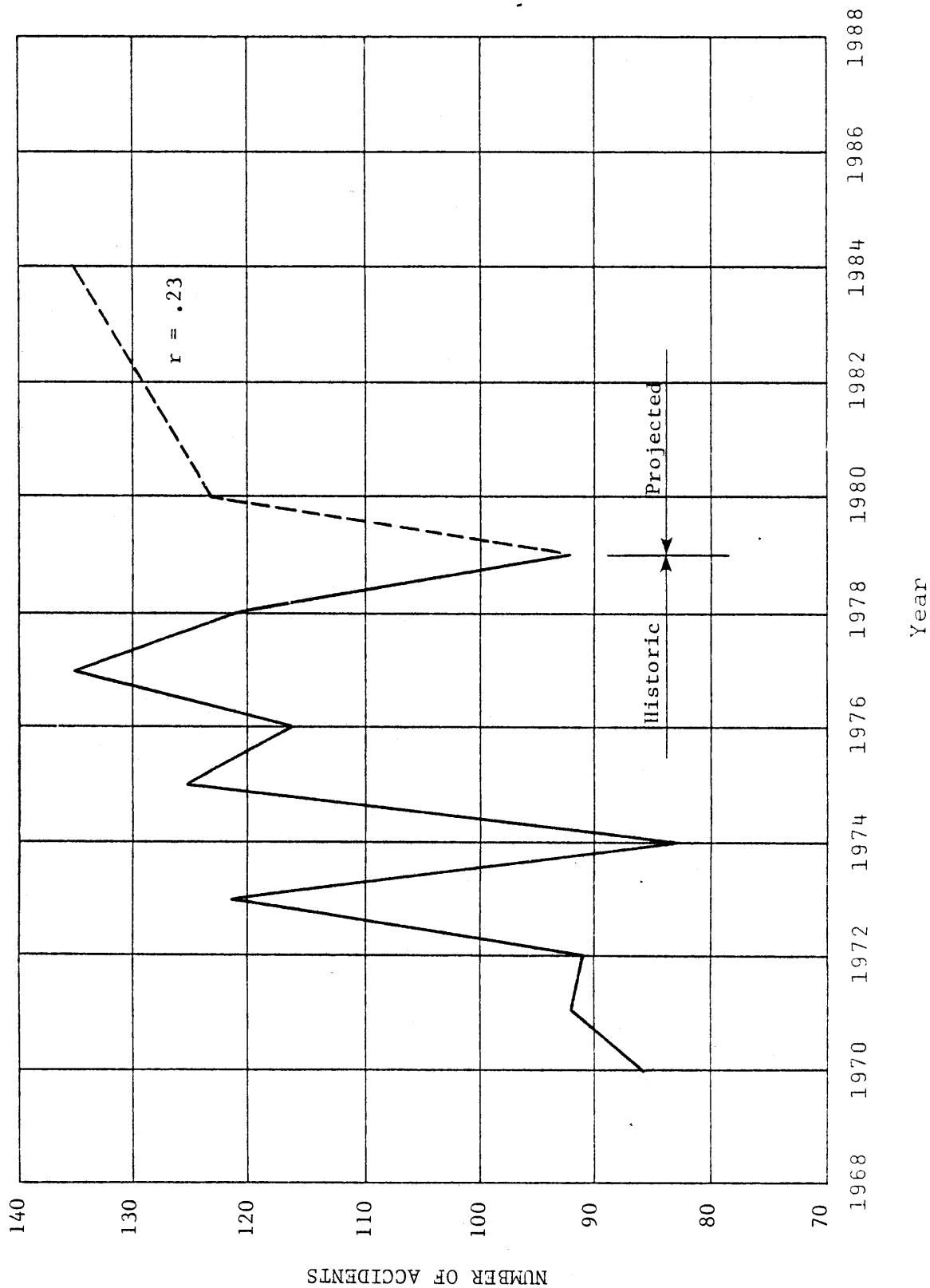
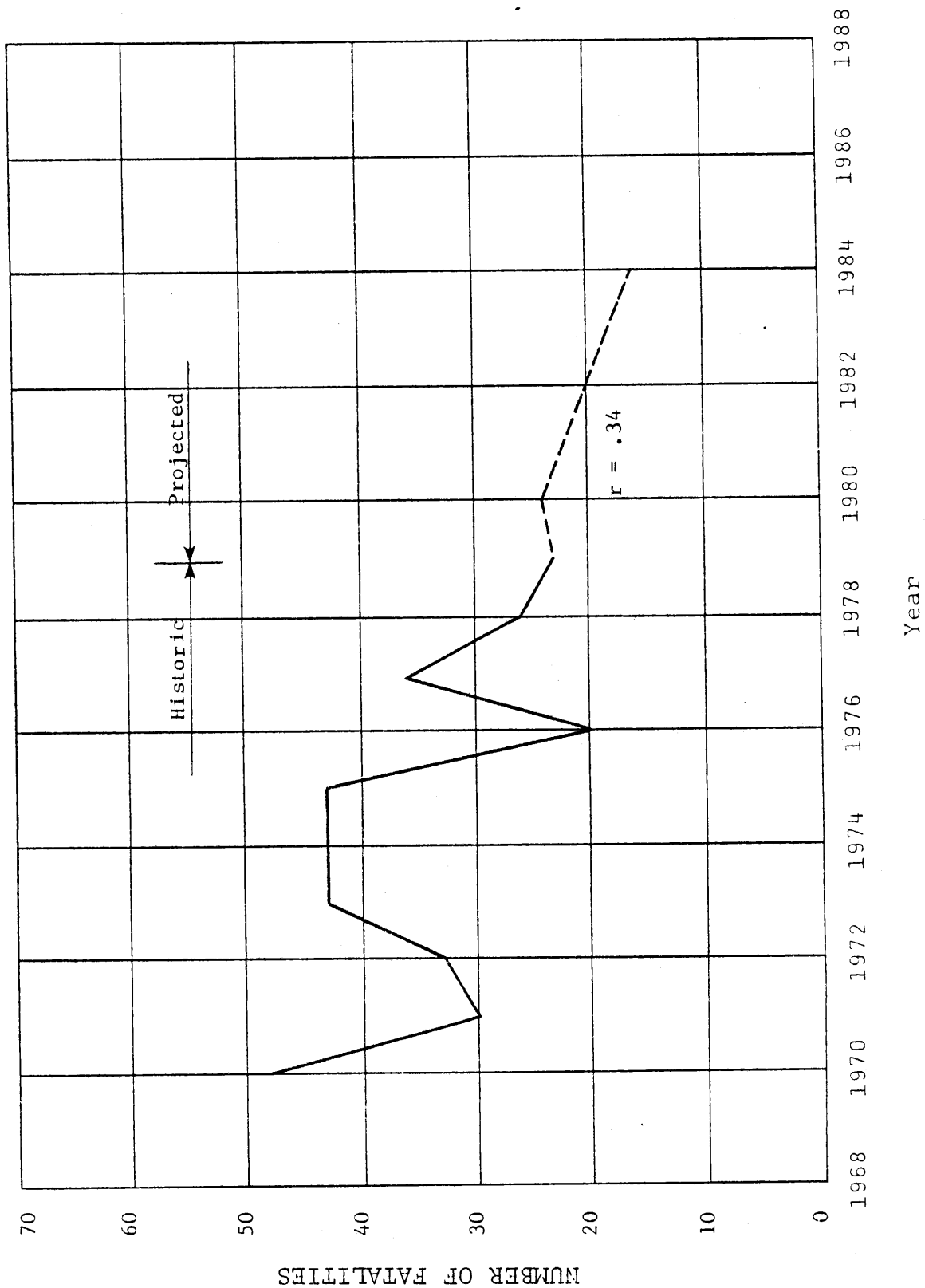


EXHIBIT 13

BOATING FATALITIES



Type of Accident

A data analysis has revealed that fatalities are more likely to occur when boaters are involved in certain types of accidents. In 1979, falling overboard and capsizing were the most common types of fatal boating accidents, comprising 33% and 48%, respectively (Exhibit 14).

Injury accidents and property damage accidents, however, are most likely to be a result of a collision. Collisions with vessels, fixed objects, and floating objects comprised 48% of injury accidents and 57% of property damage accidents (Exhibit 14).

EXHIBIT 14

BOATING ACCIDENTS — TYPE OF ACCIDENT

<u>Type of Accident*</u>	<u>Fatal</u>	<u>Injury</u>	<u>Property Damage</u>
Grounding	0	2	3
Capsizing	10	0	4
Flooding	2	0	3
Sinking	1	0	6
Fuel Fire/Explosion	0	0	1
Other Fire/Explosion	0	0	1
Collision With Vessel	0	4	15
Collision With Fixed Object	2	6	7
Collision With Floating Object	0	2	4
Falls Overboard	7	5	1
Falls in Boat	1	2	0
Burns	0	0	0
Hit by Boat or Propeller	0	8	4
Other	3	6	3
Unknown	0	0	0
Total Accidents	21	25	46

Source: Multi-Modal Crash Facts.

*Please note that the categories in this table are not mutually exclusive thus total accidents cannot be calculated by simply adding down a column.

Cause of Accident

Although at this time Virginia has not established a maximum blood-alcohol level for boaters, and does not test boaters for

alcohol level, Coast Guard personnel estimate that 60% of all boating fatalities are alcohol-related. An analysis of reports on boating accidents has revealed that carelessness was a causative factor in 52% of the fatal accidents, while boating in hazardous waters was determined to be a contributing factor in 57% (Exhibit 15). In another 19% of fatal boating accidents, the boats had been overloaded. The large percentage of fatal accidents attributed to causes such as carelessness, boating in hazardous waters, and overloading — accidents which probably can be avoided — indicates a great need for education and training.

As in the case of fatal boating accidents, a large percentage of accidents which resulted in injury could probably have been prevented with proper training. Carelessness and boating in hazardous waters were each found to be a factor in 36% of injury accidents. Excessive speed was reported in 24% and not having a proper lookout a factor in 20% of the boating accidents that resulted in injury (Exhibit 15).

Also in support of the need to reach more people with safe boating instruction are the many accident reports revealing that the boaters involved had not been instructed in boating safety. For boating accidents where the level of boating instruction was known from the accident report, in 75% of the fatal accidents and 54% of the injury accidents the boat operators had no safe-boating instruction (Exhibit 16).

EXHIBIT 15

BOATING ACCIDENTS — CAUSE OF ACCIDENT

<u>Cause of Accident*</u>	<u>Fatal</u>	<u>Injury</u>	<u>Property Damage</u>
Weather Conditions	5	2	6
Excessive Speed	0	6	2
No Proper Lookout	0	5	9
Overloading	4	0	2
Improper Loading	0	1	0
Hazardous Waters	12	9	10
Fault of Other Person	0	4	11
Fault of Hull	0	0	1
Fault of Machinery	0	1	3
Fault of Equipment	0	0	4
Carelessness	11	9	19
Total Accidents	21	25	46

Source: Multi-Modal Crash Facts.

*Please note that the categories in this table are not mutually exclusive, thus total accidents cannot be calculated by simply adding down a column.

EXHIBIT 16

BOATING ACCIDENTS — INSTRUCTION IN BOAT SAFETY

<u>Instruction in Boat Safety*</u>	<u>Fatal</u>	<u>Injury</u>	<u>Property Damage</u>
None	9	13	28
USCG Auxiliary	1	6	9
U. S. Power Squadron	0	1	6
American Red Cross	0	2	1
State	1	1	5
Other	1	1	3
Unknown	9	8	15
Total Accidents	21	25	46

Source: Multi-Modal Crash Facts.

*Please note that the categories in this table are not mutually exclusive, thus total accidents cannot be calculated by simply adding down a column.

Air

Administrative, Legislative, and Organizational Problems

Few problems were identified for general aviation. There was a very poor response to questionnaires sent to airport managers — only one airport manager (out of 16) returned the questionnaire. There are several explanations for the poor response, including: (1) the airport managers didn't perceive any air safety problems, (2) the airport managers didn't feel that they should (or were required to) report their safety problems to the VDTs, and (3) the airport managers were too busy to respond to the questionnaire. It is likely that a combination of the above is necessary to explain the nonparticipation of the airport managers.

Interviews with the local Transportation Safety Commission members revealed very few administrative, legislative, or organizational problems. It is apparent the majority of the commissions have very little expertise in or contact with general aviation. Thus, local commissions don't perceive many problems with general aviation.

Training

Local Transportation Commission members felt that more training courses are needed. The private pilot information/safety seminars are sometimes inconvenient to attend. It is felt that these courses should be given in more localities.

Licensing

The Code of Virginia requires the licensing of airmen, aircraft, and airports in Virginia for safe and efficient use of airports and airways. Through licensing, the Department of Aviation can ensure that federal/state safety and air transportation system requirements are met. In 1979-80, 4,840 Virginia aircraft and 20,182 Virginia airmen were registered with the federal government. However, in 1980 the Virginia Department of Aviation licensed just 2,571 aircraft and 10,800 airmen — just slightly more than half the members licensed by the federal government.

Accident Problems

In 1970, 1,635 airplanes were registered in Virginia. By 1979, the number of registered airplanes had risen to 2,601, representing a 59% increase (Exhibit 17). However, the number of accidents or fatalities did not change significantly during this period (Exhibits 17, 18, and 19). The air accident rate has decreased significantly since the early 1970's (Exhibit 20). Interestingly, the fatality rate had not decreased as consistently as the accident rate (Exhibit 21). This is probably due to the random nature of air fatalities.

EXHIBIT 17

SUMMARY OF VIRGINIA AIR ACCIDENTS

<u>Year</u>	<u>Registered Aircraft</u>	<u>Accidents</u>	<u>Fatalities</u>
1970	1,635	67	27
1971	1,964	56	27
1972	2,018	59	17
1973	1,762	55	9
1974	1,751	52	22
1975	1,974	46	23
1976	2,216	58	20
1977	2,465	57	15
1978	2,477	63	26
1979	2,601	61	16

Source: Federal Aviation Administration.

EXHIBIT 18
TOTAL AIRCRAFT ACCIDENTS

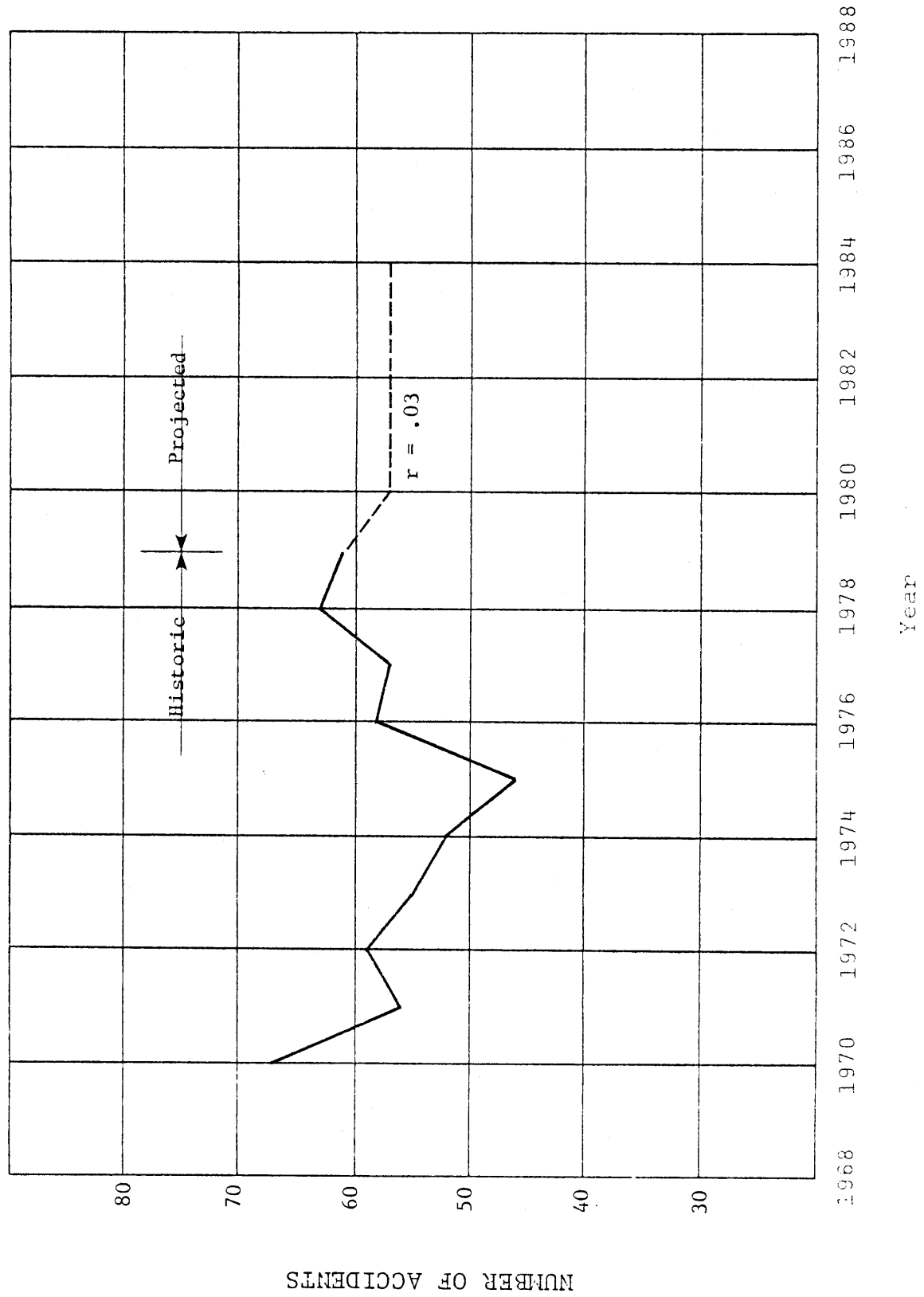


EXHIBIT 19

AIR FATALITIES

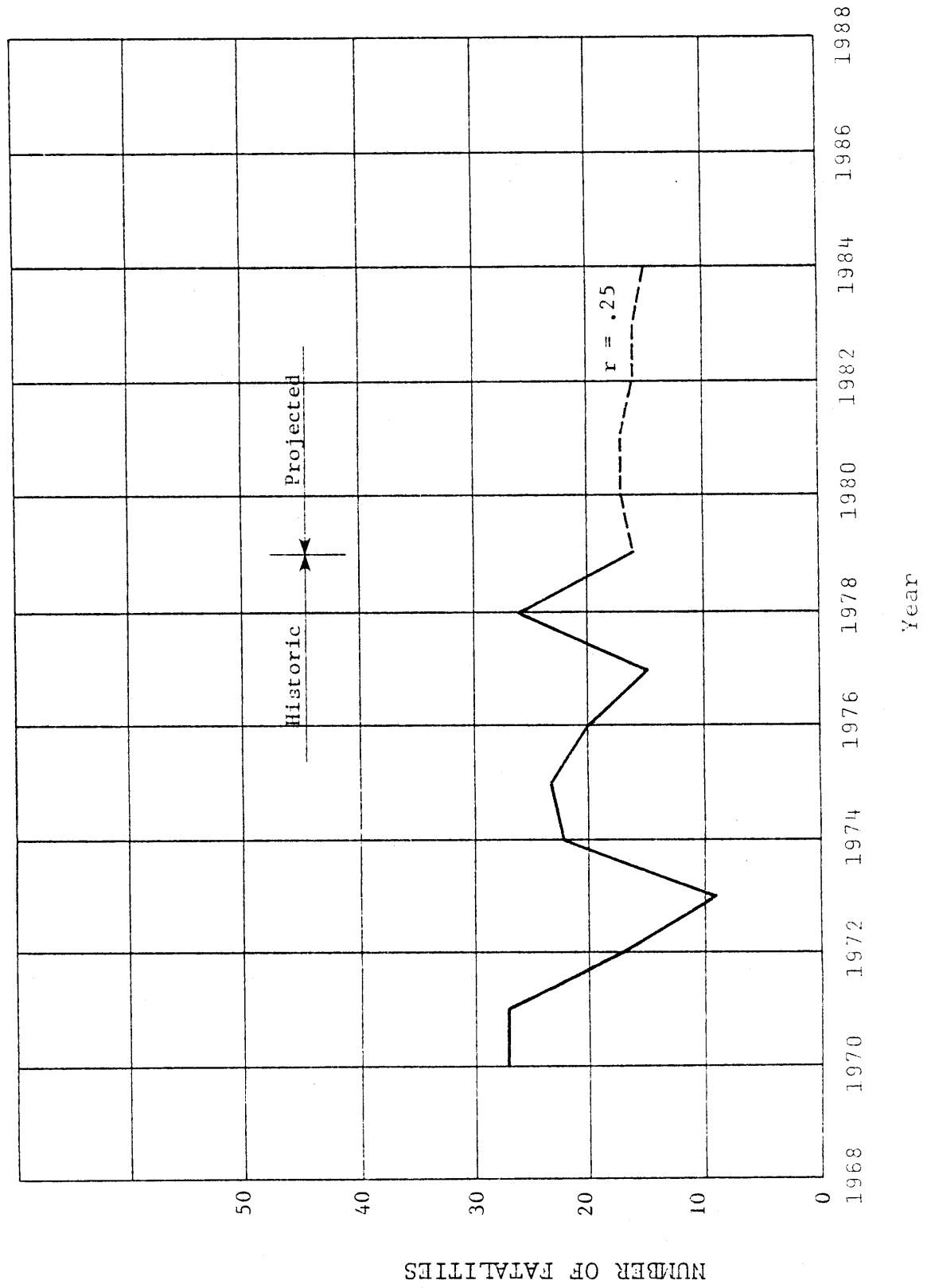


EXHIBIT 20

AIR ACCIDENT RATE

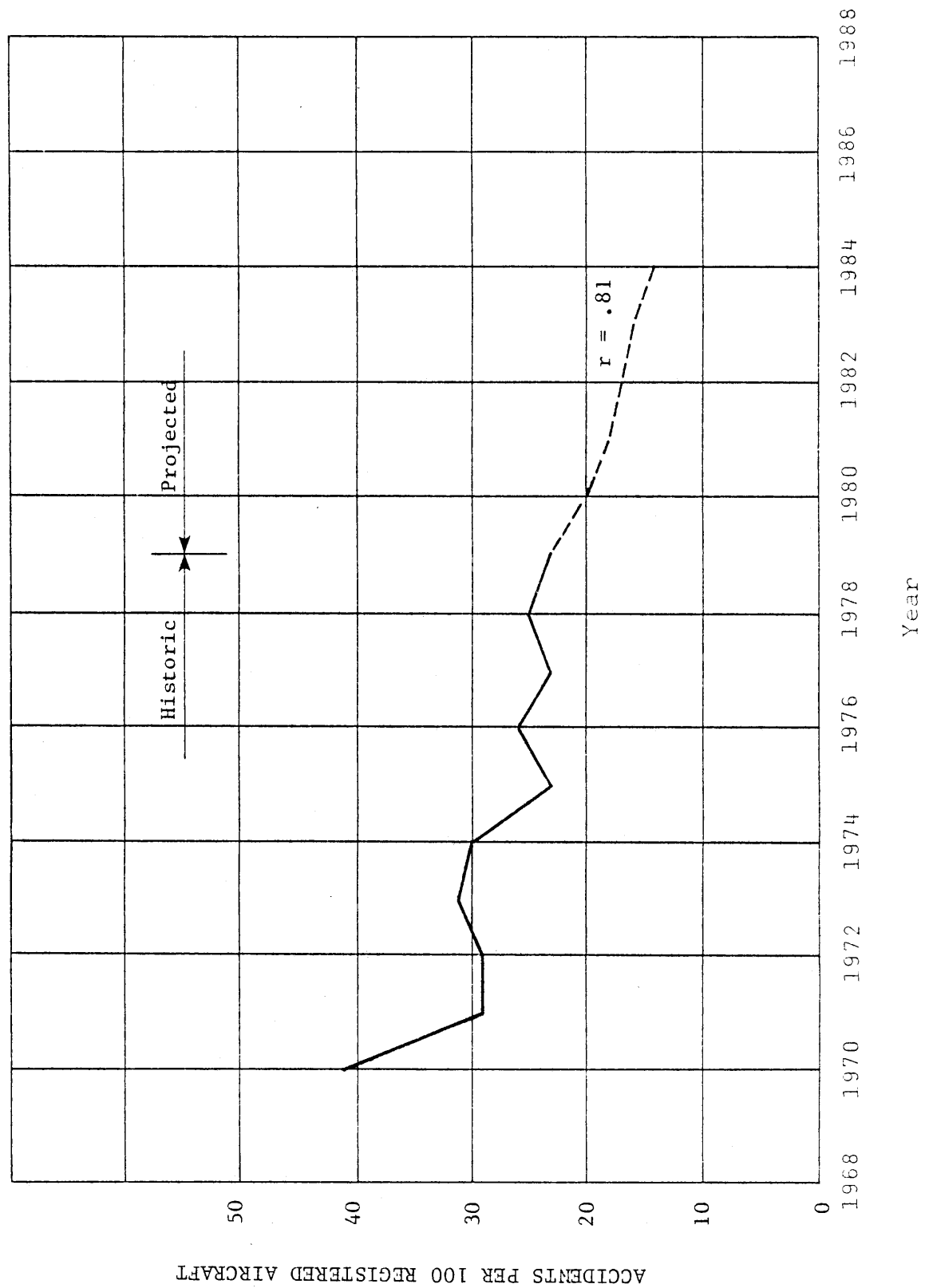
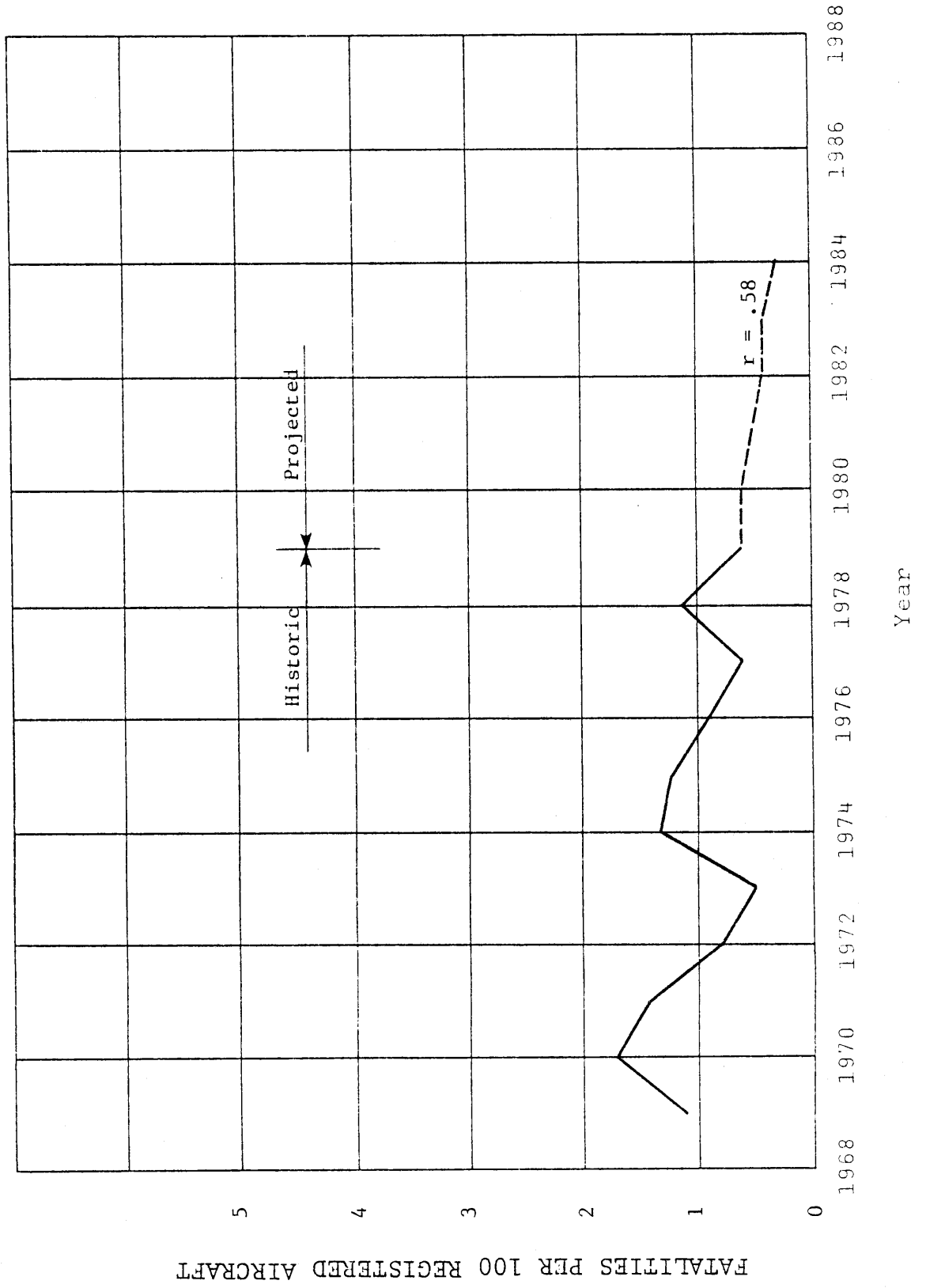


EXHIBIT 21
AIR FATALITY RATE



The Virginia Highway and Transportation Research Council has coded information from the State Police air accident reports and has compiled the information to publish Air Accident Crash Facts, which was used for the following analysis. It is important to note that the State Police definition of an air accident is more inclusive than the definition used by the NTSB. Thus, State Police will report more air accidents than the Department of Aviation, which relies on the NTSB reports. The State Police reports are used here because they are more up to date than the NTSB reports, which have a lag time of from one to two years.

Nearly all fatal, injury, and property damage accidents involve only a single aircraft. Not surprisingly, air accidents occur during the spring, summer, and fall — the time of the year when the weather is nicest and people are more inclined to fly (Exhibit 22). Slightly more than 35% of the accidents occurred during pleasure/vacation trips, while slightly more than 28% occurred during business trips and other transportation-related trips combined (see Exhibit 23). Interestingly, environmental factors play a rather small role in air accidents — less than 3% of air accidents occurred with severe or extreme air turbulence, 69% occurred during daylight hours, and 58% occurred on clear days (Exhibit 24).

EXHIBIT 22

MONTHLY DISTRIBUTION OF AIR ACCIDENTS — 1979

<u>Month</u>	<u>Fatal</u>	<u>Injury</u>	<u>Property Damage</u>
January	1	1	2
February	1	3	2
March	2	0	3
April	1	0	4
May	0	0	4
June	1	0	4
July	0	1	6
August	0	5	6
September	3	3	8
October	2	0	3
November	1	1	3
December	0	1	5
Unknown	0	0	1
Total Accidents	12	15	51

Source: Federal Aviation Administration.

EXHIBIT 23

AIR ACCIDENTS — PURPOSE OF FLIGHT

<u>Purpose of Flight*</u>	<u>Fatal</u>	<u>Injury</u>	<u>Property Damage</u>
Pleasure/Vacation	6	7	15
Business	2	3	7
Training	2	1	12
Other Transportation	1	0	9
Other	0	4	5
Unknown	3	0	4
Total Accidents	12	15	51

Source: Multi-Modal Crash Facts.

*Please note that the categories in this table are not mutually exclusive, thus total accidents cannot be calculated by simply adding down a column.

EXHIBIT 24

AIR ACCIDENTS — ENVIRONMENTAL FACTORS

<u>Environmental Factors</u>	<u>Fatal</u>	<u>Injury</u>	<u>Property Damage</u>
Turbulence			
None	6	13	36
Light	1	1	3
Moderate	1	0	5
Severe	0	0	0
Extreme	1	0	1
Other	0	0	0
Unknown	3	1	6
Total Accidents	12	15	51
Light Conditions			
Dusk/Dawn	1	1	9
Daylight	9	13	32
Bright Night	0	0	1
Dark Night	2	1	8
Other	0	0	0
Unknown	0	0	1
Total Accidents	12	15	51
Weather*			
Fog	4	2	6
Haze	2	2	4
Smoke	0	0	1
Rain	2	2	1
Thunderstorm	2	0	2
Hail	0	0	0
Snow	0	0	0

EXHIBIT 24 (continued)

<u>Environmental Factors</u>	<u>Fatal</u>	<u>Injury</u>	<u>Property Damage</u>
Sleet	0	0	0
Freezing Rain	0	0	0
Icing	0	0	0
Clear	1	10	34
Other	1	0	4
Unknown	2	0	0
Total Accidents	12	15	51

Source: Multi-Modal Crash Facts.

*Please note that the categories in this table are not mutually exclusive, thus total accidents cannot be calculated by simply adding down a column.

Location of Accident

Accidents occurring during takeoffs and landings accounted for 53% of the total number of air accidents, and resulted in 33% of fatal and injury accidents and 63% of the property damage accidents in 1979 (Exhibit 25). In-flight accidents, although less common, appear to be far more serious, representing 58% of the fatal accidents, but accounting for just 22% of all accidents (Exhibit 25). Emergency landings which accounted for 22% of total air accidents, resulted in 8% of fatal accidents, 33% of the injury accidents and 22% of the property damage accidents (Exhibit 25).

Cause of Air Accidents

Pilot error, which often results from a lack of training, causes a significant number of air accidents. Pilot error alone accounted for 40% of the air accidents, while pilot error combined with either equipment failure and environmental problems, accounted for another 14% (Exhibit 26).

EXHIBIT 25

AIR ACCIDENTS — LOCATION OF ACCIDENT

<u>Location*</u>	<u>Fatal</u>	<u>Injury</u>	<u>Property Damage</u>
On Takeoff	1	2	7
On Landing	3	3	25
In-Flight	7	5	5
In Motion on Runway or Taxiway	0	0	1
Aircraft Not in Motion	0	0	1
Emergency Landing	1	5	11
Parked	1	0	1
Pulling Glider	1	0	0
Other	0	0	0
Unknown	0	0	1
Total Accidents	12	15	51

Source: Multi-Modal Crash Facts.

*Please note that the categories in this table are not mutually exclusive, thus total accidents cannot be calculated by simply adding down a column.

EXHIBIT 26

AIR ACCIDENTS — CAUSE OF ACCIDENT

<u>Cause of Accident*</u>	<u>Fatal</u>	<u>Injury</u>	<u>Property Damage</u>
Equipment Failure Only	3	8	15
Environmental Problem Only	1	0	3
Pilot Error Only	3	4	24
Equipment and Pilot Error	1	2	2
Environment and Pilot Error	1	0	5
Equipment and Environment	0	0	0
Equipment, Environment & Pilot	0	0	0
Unknown	3	1	2
Total Accidents	12	15	51

Source: Multi-Modal Crash Facts.

*Please note that the categories in this table are not mutually exclusive, thus total accidents cannot be calculated by simply adding down a column.

Rail

Administrative, Legislative, and Organizational Problems

Problems facing the railroads were isolated through questionnaires and interviews. Questionnaires were sent to 16 members of the Operation Lifesaver Program — a group which includes representatives from the railroads and from government. Only 25% of the questionnaires were returned and only one of the returned questionnaires rank ordered administrative, legislative, and organizational problems. More useful information was obtained through interviews with representatives from the Division of Railroad Regulation of the State Corporation Commission and the Traffic and Safety Division of the Virginia Department of Highways and Transportation.

Most significantly, until the Virginia General Assembly approved Senate Bill 771 in its 1981 session — authorizing Virginia to participate in the Federal Rail Safety Program — Virginia was preempted in the regulation of railroads in all major areas of rail safety. In other words, since Virginia has not been authorized to participate in the investigative and surveillance activities, there has been no rail safety activity on the state level.

Additionally, management/union conflicts appear to prevent the initiation of many safety programs. It is important to note that the railroads are operated by private industry. Rail regulations, enforced by the FRA, must be approved by Congress. The FRA rules are largely operational, and few rules pertain to areas such as training. Thus, the railroads apparently can set many standards themselves. The railroad industry, however, has strong unions which have a significant influence on management policy. A case in point is the strong negative reaction by the railroad unions to management testing of rail employees for BAC level before each run.

Accident Problems

This section focuses on both rail accident problems and highway/rail grade-crossing problems to provide an overview of rail accident problems. It begins with an analysis of accident trends based on information compiled from FRA Bulletins.

In 1979 the FRA reported 123 rail accidents in Virginia (Exhibit 27). Although rail fatalities decreased 26% between 1978 and 1979, a regression analysis has indicated an increasing trend

in rail fatalities (Exhibits 28 and 29). Highway/rail grade-crossing accidents remain a significant problem in Virginia. In 1979, grade-crossing accidents accounted for almost 40% of Virginia's railroad fatalities (Exhibits 29 and 30). The FRA reports that although highway/rail grade-crossing accidents increased 12% between 1977 and 1979, the number of grade crossing accidents was still 6% lower than the number reported in 1976 (Exhibits 30 and 31).

Rail Accident Crash Facts, which provides a large amount of detailed information, was used for the following data analysis. It should be noted that although the Rail Accident Crash Facts are extracted from the FRA tape, there is some inconsistency between the Rail Accident Crash Facts and the FRA Accident Bulletins. This inconsistency is due largely to the manipulation of the accident file by the FRA.

EXHIBIT 27

SUMMARY OF VIRGINIA TRAIN ACCIDENTS

<u>Year</u>	<u>Collisions</u>	<u>Derailments</u>	<u>Other</u>	<u>Total</u>
1975	32	132	9	173
1976	26	128	17	171
1977	23	110	10	143
1978	12	143	12	167
1979	20	86	17	123

Source: FRA Bulletin.

EXHIBIT 28

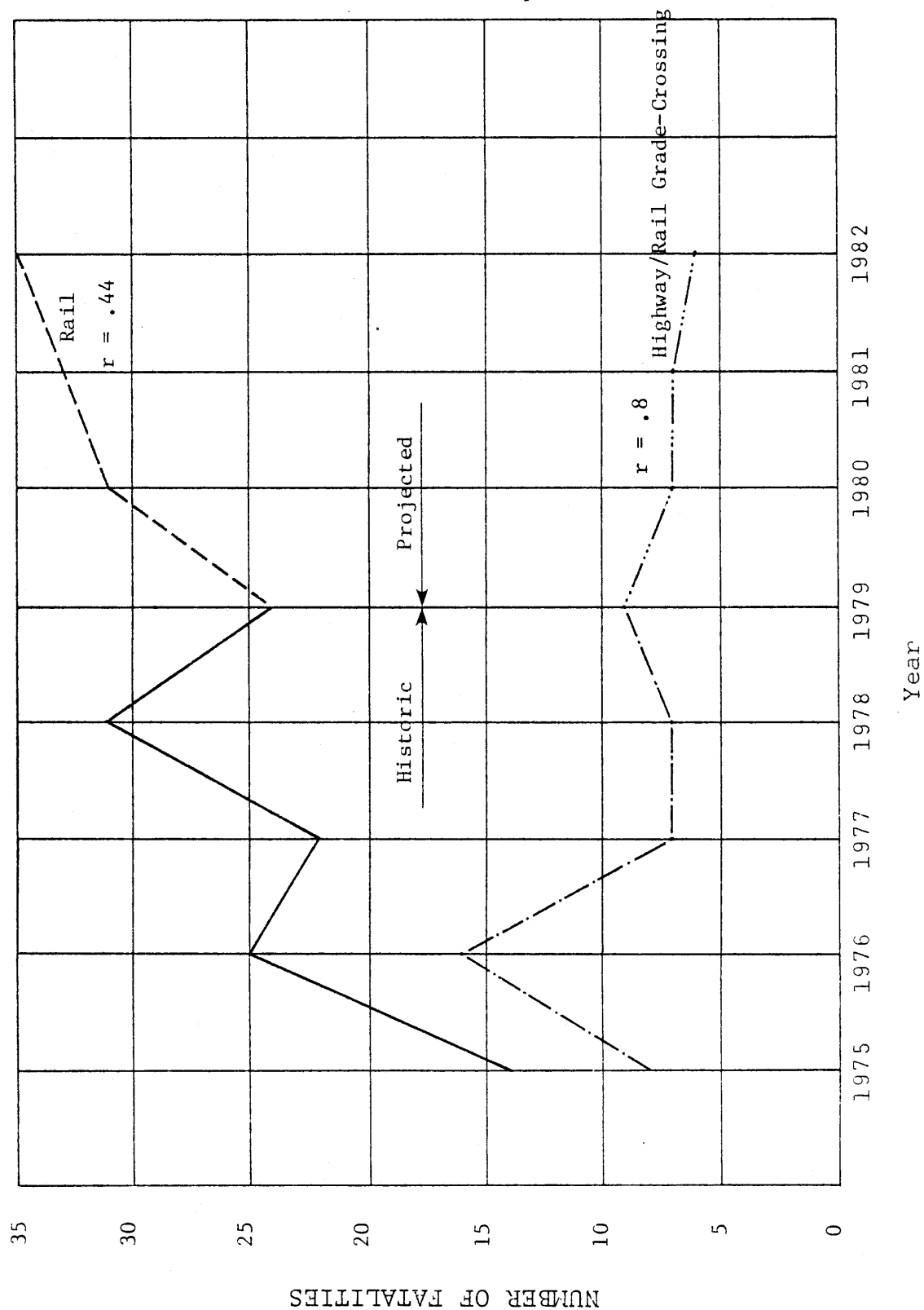
RAIL CASUALTIES

<u>Year</u>	<u>Fatalities</u>	<u>Injuries</u>
1975	14	336
1976	25	394
1977	22	317
1978	31	368
1979	24	391

Source: FRA Bulletin.

EXHIBIT 29

RAIL AND HIGHWAY/RAIL GRADE-CROSSING ACCIDENTS



Rail Accident Characteristics

Almost 70% of rail accidents in 1979 involved freight trains (Exhibit 32). Passenger trains were involved in only one accident. Similarly, it is interesting to note that 46% of rail accidents occurred in the rail yard; only 39% occurred on main track (Exhibit 32). Apparently, rail accident problems plague the railroads most seriously while transporting goods and while on their own property.

Nearly 76% of Virginia's rail accidents involved a train derailling, while 16% were described as collisions (Exhibit 32). Many of the derailments were caused by faulty track. Structural defects in the track and roadbed were factors in 35% of the rail accidents (Exhibit 32). Although the Rail Accident Crash Fact publication did not list human factors as a separate category, the FRA Bulletin reports that in 1979 28% of rail accidents involved an error by a railroad employee.

Hazardous Materials

Although very few passengers were injured or killed in railroad accidents, rail accidents involving hazardous materials created potentially dangerous conditions for Virginians. In 1979, there were 16 train accidents involving hazardous materials which resulted in 2 fatalities and 9 injuries (Exhibit 33). While 16 accidents may not seem significant, cars releasing hazardous materials resulted in 1,470 people being evacuated. Furthermore, local Transportation Safety Commission members are concerned that local fire departments are not capable of handling a rail accident involving hazardous materials.

EXHIBIT 30

ACCIDENTS/INCIDENTS AND CASUALTIES AT HIGHWAY/RAIL CROSSINGS

<u>Year</u>	<u>Total Accidents/Incidents</u>	<u>Killed</u>	<u>Injured</u>	<u>Total</u>
1975	128	8	66	74
1976	158	16	106	122
1977	133	7	55	62
1978	138	7	46	53
1979	149	9	47	56

Source: FRA Bulletin.

EXHIBIT 31

ACCIDENTS/INCIDENTS AT HIGHWAY/RAIL CROSSINGS

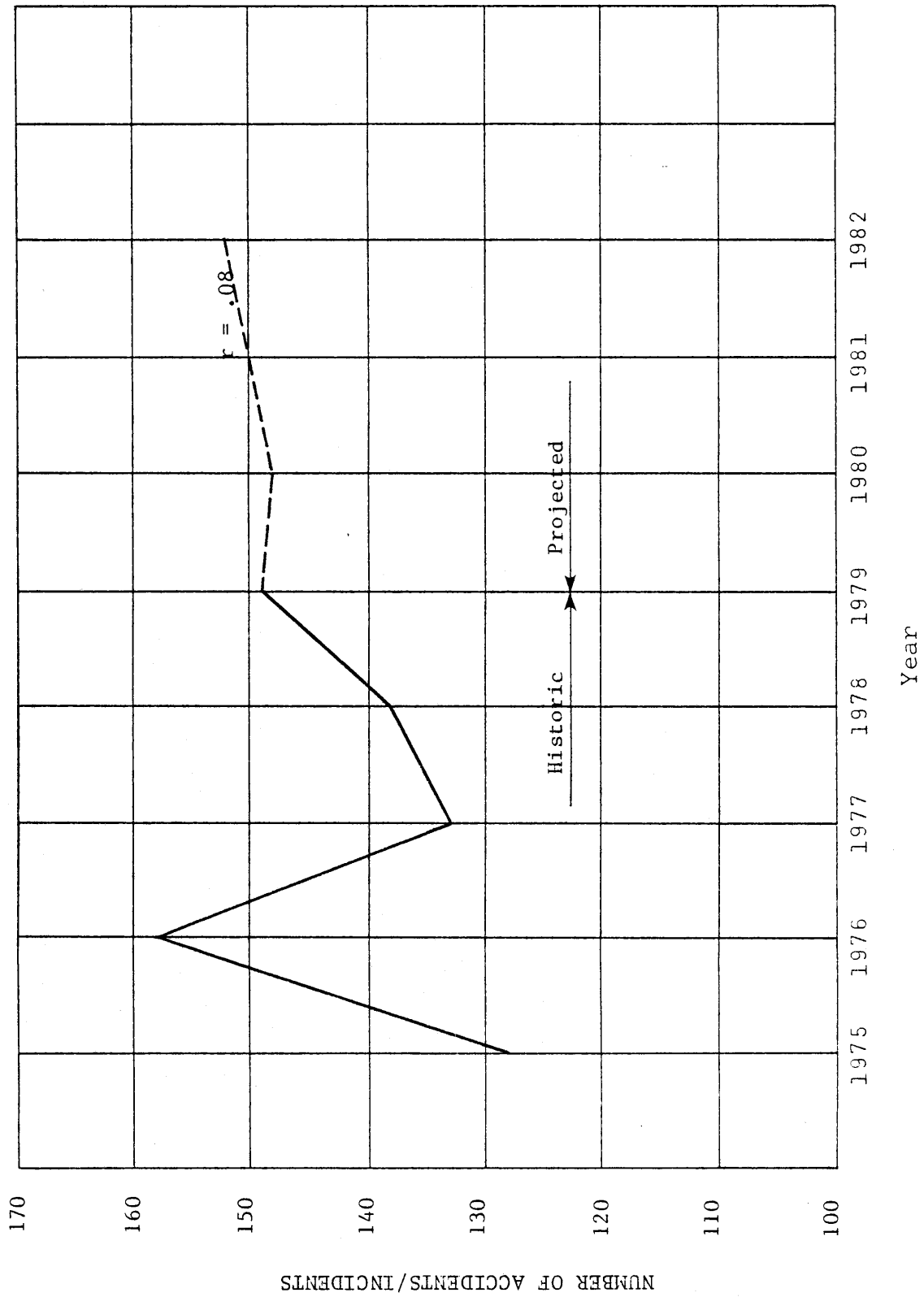


EXHIBIT 32

RAIL ACCIDENT CHARACTERISTICS

<u>Accident Characteristic</u>	<u>Fatal</u>	<u>Injury</u>	<u>Property Damage</u>
Equipment Involved*			
Freight Train	0	1	67
Passenger Train	0	0	1
Mixed Train	0	0	0
Work Train	0	0	0
Single Car	0	0	6
Out of Cars	0	1	18
Yard/Switching	0	2	20
Light Locomotive	0	0	3
Unknown	0	0	5
Total Accidents	0	4	96
Type of Track			
Main	0	0	38
Yard	0	2	43
Siding	0	0	8
Industry	0	0	6
Unknown	0	0	1
Total Accidents	0	2	96
Type of Accident			
Derailment	0	0	74
Head-On Collision	0	0	2
Rear-End Collision	0	1	4
Side Collision	0	1	8
Raking Collision	0	0	0
Broken Train Collision	0	0	2
Obstruction	0	0	0
Explosion/Detonation	0	0	0
Fire or Violent Rupture	0	0	2
Other	0	0	4
Unknown	0	0	0
Total Accidents	0	2	96
Cause of Accident			
Track/Roadbed/Structural Defect	0	0	34
Mechanical/Electrical Failure	0	0	26
Physical Conditions	0	0	0
Speed	0	0	3
Other	0	1	24
Miscellaneous	0	1	9
Not Stated	0	0	0
Total Accidents	0	2	96
Source: <u>Multi-Modal Crash Facts.</u>			

*Please note that the categories in this table are not mutually exclusive, thus total accidents cannot be calculated by simply adding down a column.

EXHIBIT 33

TRAIN ACCIDENTS INVOLVING HAZARDOUS MATERIALS

Year	Hazardous Materials Accidents	Total Cars Damaged With Hazardous Materials	People Evacuated
1976	22	33	0
1977	20	15	0
1978	18	11	0
1979	16	10	1,470

Source: FRA Bulletin

Highway/Rail Grade Crossing Accidents

In 1979, 88% of Virginia's grade-crossing accidents occurred on clear or cloudy days (Exhibit 34). Nearly 1/3 of grade crossing accidents took place during rush hours — between 7 and 9 a.m. and 4-6 p.m. (Exhibit 34).

Trucks were overrepresented in grade-crossing accidents. Although truck registrations account for only 6% of vehicles registered in Virginia, trucks were involved in 26% and truck-trailers in 9% of the grade-crossing accidents (Exhibit 34). It is not clear why such a large proportion of grade-crossing accidents involve trucks. This would be an appropriate topic for study.

Instances of grade-crossing accidents in which the driver had been drinking were somewhat fewer than the number of all crashes in which alcohol was involved. The VDH&T reports that in 1979, 9% of the drivers involved in grade-crossing accidents had been drinking. The Virginia State Police reports that in 1979 11% of the drivers involved in all crashes were known to have been drinking.

Mass Transit

Administrative, Legislative, and Organizational Problems

A questionnaire sent to all of the 13 transit companies in Virginia, an interview with personnel of the Public Transportation Division of the VDH&T, and discussions with local Transportation Safety Commission members helped to identify administrative, legislative, and organizational problems. While 53% of the questionnaires were returned, most of them did not explain or elaborate on the problems they rank ordered. An interview with representatives from the Public Transportation Division revealed that while the Division does administer transit and paratransit programs and is concerned about transit safety, it does not conduct safety activities.

EXHIBIT 34

GRADE-CROSSING ACCIDENT CHARACTERISTICS

<u>Accident Characteristic</u>	<u>Fatal</u>	<u>Injury</u>	<u>Property Damage</u>
Weather			
Clear	6	32	83
Cloudy	6	16	38
Rain	0	3	15
Fog	0	0	1
Sleet	0	0	3
Snow	0	1	1
Unknown	<u>0</u>	<u>0</u>	<u>0</u>
Total Accidents	12	52	141
Hour of Accident			
0 - 1	0	0	0
1 - 2	0	2	3
2 - 3	0	0	4
3 - 4	0	0	0
4 - 5	0	1	1
5 - 6	0	1	2
6 - 7	0	1	5
7 - 8	2	1	8
8 - 9	1	4	11
9 - 10	0	2	8
10 - 11	0	3	3
11 - 12	0	3	10
12 - 13	0	2	6
13 - 14	0	2	9
14 - 15	1	2	6
15 - 16	1	1	8
16 - 17	1	5	12
17 - 18	5	5	8
18 - 19	0	4	5
19 - 20	1	1	7
20 - 21	0	1	8
21 - 22	0	2	4
22 - 23	0	1	3
23 - 24	0	1	5
Unknown	<u>0</u>	<u>7</u>	<u>5</u>
Total Accidents	12	52	141
Type of Highway User			
Auto	7	33	83
Truck	2	12	39
Truck-Trailer	0	2	16
Bus	0	0	0
School Bus	0	0	0
Motorcycle	0	1	1
Pedestrian	2	2	0
Other	1	2	2
Unknown	<u>0</u>	<u>0</u>	<u>0</u>
Total Accidents	12	52	141

Source: Multi-Modal Crash Facts.

Training

Inadequate training of bus drivers was identified as a problem by 63% of the bus company officials and by the Public Transportation Division of the VDH&T. The training problems and concerns identified include inadequate training equipment and materials, a lack of properly trained instructors, a lack of time and funds for training, a lack of adequate facilities/classrooms, and difficulties in conducting regular in-service training. The problems of inadequate training are compounded as bus ridership increases due to rising energy costs. Increased ridership requires additional vehicles and new operators to be screened, selected, and trained.

In addition, social service agencies are increasingly providing transportation services to the elderly and handicapped. This has enlarged the paratransit system and accordingly the number of operators to be trained. Furthermore, these paratransit operators need to be trained to meet the special needs of their clients (i.e., securing wheelchairs, emergency care, etc.)

Transit Accident Records

Virginia lacks a transit accident record system — which is necessary for effective program management as well as problem identification. At present, transit records are limited to those kept by the Virginia State Police and the data reported to the Public Transportation Division of the VDH&T by the transit systems. Bowman, in his VHTRC report, A Uniform Transit Safety Records System for the Commonwealth of Virginia, explained that while the accident file maintained by the Virginia State Police does identify traffic accidents involving urban buses, the file is limited to those accidents involving death, injury, or property damage in excess of \$350. The State Police accident file is primarily designed to cover traffic accidents involving any motor vehicle operating on the highways, and thus does not include all of the data necessary for an analysis of bus transit safety.

The Code of Virginia requires transit systems to report certain statistical data to the Public Transportation Division of the VDH&T. These data, however, are summary in nature and not useful for in-depth problem identification. When comparing the number of bus accidents contained on the Virginia State Police accident file to the number reported to the Public Transportation Division, Bowman found that many bus accidents reported to the Public Transportation Division are not recorded on the State Police file.

While the discrepancy between the number of property damage accidents was attributed to the \$350 threshold for State Police investigation, the discrepancy in injury accidents is harder to explain.

Vehicle Design and Safety Equipment

Vehicle design was identified as a problem by 50% of the bus company officials responding to the questionnaire. The bus company officials, using their experience to identify problems, noted concern over inadequate seat padding in passenger areas, unreliable buses, and maintenance problems. In addition, some bus company officials feel that rubberized shock-absorbing bumpers are needed to minimize damage to the bus as well as prevent injury.

The Public Transportation Division identified the lack of safety and performance standards for specialized equipment used in the transportation of handicapped passengers as a serious problem. There are on the market many techniques and devices for restraining handicapped passengers. Studies examining the crash-worthiness of these wheelchair and occupant-restraint systems have shown that some devices are far safer than others. Thus, it is extremely important that standards be developed so that the safest equipment is purchased.

Accident Problems

Accident problems were analyzed using data collected from the Virginia State Police accident file. As discussed earlier, the State Police data do not include all of the information necessary for in-depth analysis. This information is, however, the most detailed available at this time.

In 1979 there were 642 bus accidents, 199 accidents resulting in injury, and 2 fatal accidents (Exhibits 35 and 36). Virginia experienced no rail rapid transit accidents in 1979. Exhibit 36 shows a decreasing trend in the number of bus accidents. Accidents appear to have peaked in 1974 due to increased transit use forced by the oil embargo, but have declined significantly since. However, it is possible that increased ridership and bus system expansion due to further gas price increases may lead to unforeseen safety problems.

EXHIBIT 35

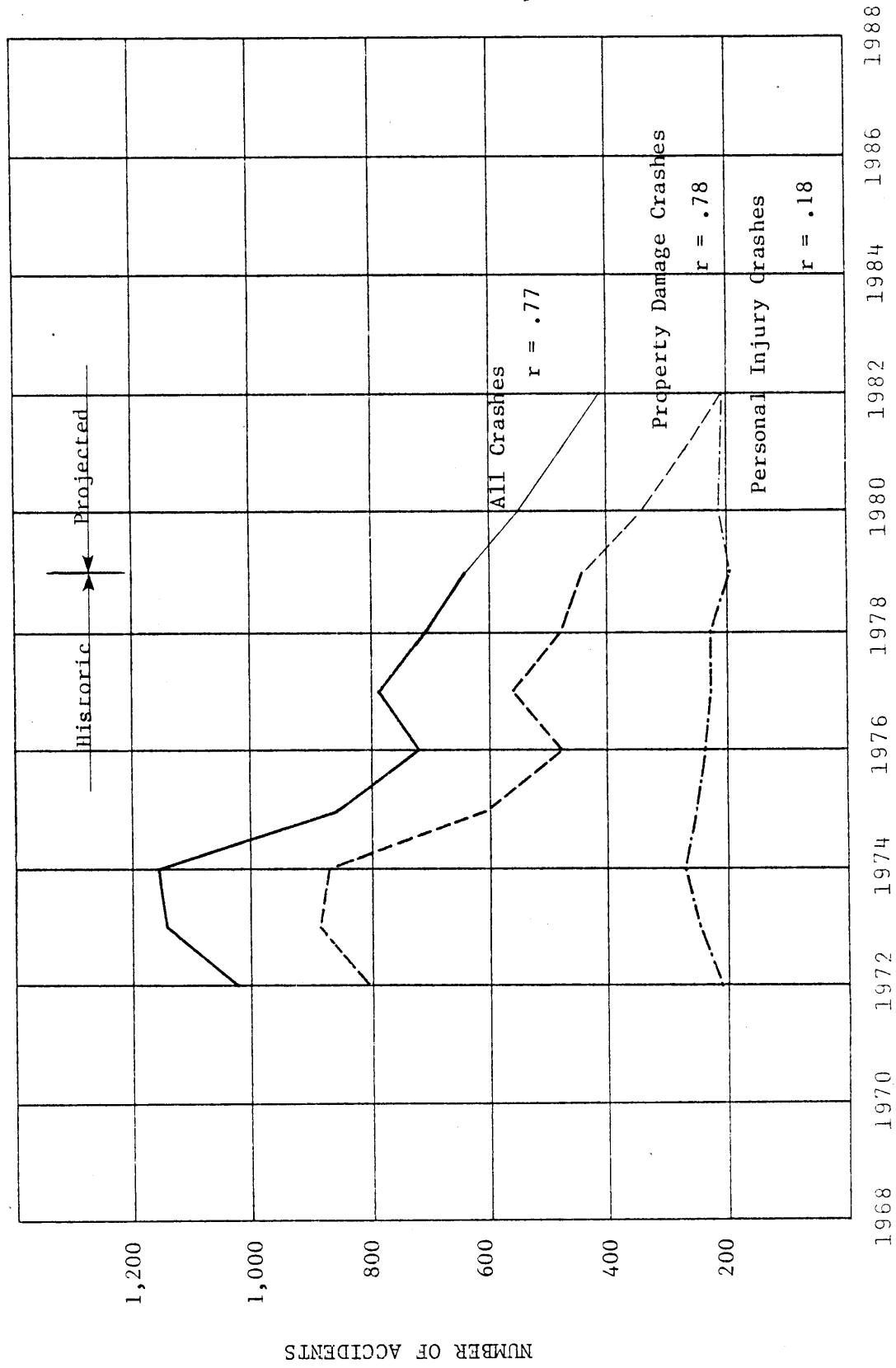
SUMMARY OF VIRGINIA BUS ACCIDENTS

<u>Year</u>	<u>Property Damage</u>	<u>Personal Injury</u>	<u>Fatal Crashes</u>	<u>All Crashes</u>
1979	441	199	2	642
1978	482	223	6	711
1977	558	225	3	786
1976	479	236	3	718
1975	602	249	6	857
1974	872	272	7	1,151
1973	886	245	6	1,137
1972	804	210	10	1,024

Source: State Police Crash Facts.

EXHIBIT 36

BUS ACCIDENTS



TRANSPORTATION SAFETY GOALS

Setting goals is an integral component of the transportation safety planning process. By establishing goals an agency can design countermeasure programs to achieve the desired level of improvement. Furthermore, goals can be used as a standard by which improvement can be evaluated — thus establishing an indication of how well the countermeasure program is working.

Ideally, the non-highway agencies would formulate goals as a part of their regular planning process (i.e., when determining safety programs for the next year). However, in the preparation of this TSP it quickly became apparent that very few of the non-highway agencies included formulating goals as a major activity. While in some cases the goals were formulated by the agency, most of the goals were established through discussions with agency representatives and by combining trend analysis with estimates of countermeasure effectiveness.

It should be noted that administrative, legislative, and organizational goals are very difficult to quantify because of a lack of an acceptable measure of the performance of these activities. For example, knowing the number of people trained gives very little information as to the effectiveness of a training program. Thus administrative, legislative, and organizational goals will be expressed so that a generalized but realistic picture is presented.

Water

The overall goals, goals for administrative, legislative, and organizational problems, and goals for accident problems were developed through a combination of trend analysis and consultation with agency personnel. The Commission of Game and Inland Fisheries submitted boating safety and regulation priorities to be included in the 1980-82 executive budget.

Overall Safety Goal:

To reduce the number of boating accidents to 104
(a 10% reduction from the 1977-1979 average).

Goals for Administrative, Legislative, and Organizational Problems:

To increase education and training activities by implementing a short boating safety course in schools and by preparing a videotape program for closed circuit television.

To decrease the number of unreported accidents.

Goals for Accident Problems:

To decrease the number of accidents attributed to carelessness to 47 (a 5% decrease from the 1979 figure).

Boating Safety and Regulation Priorities:

To provide registration, renewal, and transfer of boat registrations (Priority 1).

To obtain compliance with the laws and regulations relating to boating safety in Virginia (Priority 2).

To publish safety materials and encourage boating safety programs (Priority 3).

To acquire lands and construct new boat ramps in areas of need (Priority 4).

Air

The Department of Aviation established a nonquantitative overall program goal and delineated objectives by which to achieve the goal. The Department submitted air transportation regulation and safety priorities to be included in the 1980-82 executive budget.

Overall Safety Goal:

To reduce aircraft accidents thereby minimizing deaths, injuries, and the economic loss associated with aircraft accidents.

Goals for Administrative, Legislative, and Organizational Problems:

To increase aircraft licenses from 2,571 to 2,622 and airman licenses to 10,302 by contacting each unlicensed aircraft owner and airman in 1981-82 (a 2% annual increase).

Goals for Accident Problems:

To reduce the number of aircraft accidents in Virginia from a projected 81 accidents in 1981-82 to 77 accidents in 1982-83 (a 5% annual reduction).

Air Transportation Regulation and Safety Priorities:

To increase compliance of licensing registration through an automated data system (Priority 3 of 14 priorities).

To conduct aviation and educational programs throughout the state (Priority 12 of 14 priorities).

Rail

The Rail Division of the State Corporation Commission was reluctant to set goals for rail safety because until the Commission begins participation in the federal safety program, the SCC is preempted from rail safety activities.

Overall Safety Goal:

To initiate a coordinated rail safety program involving the railroads, the VDH&T, and the VDOTS.

Goals for Administrative, Legislative, and Organizational Problems:

To begin active participation in the federal rail program.

To concentrate public information programs on safety at protected highway/rail grade crossings.

Goals for Accident Problems:

Reduce the number of rail fatalities to 25 (a 5% reduction from the 1977-79 average).

Reduce the number of grade-crossing accidents to 137 (a 2% reduction from the 1977-79 average).

Mass Transit

Because there is no state agency particularly responsible for mass transit safety, establishing transit goals is especially difficult. The goals presented below represent an attempt to reflect the level of safety improvement desired by the bus companies, the Public Transportation Division of the VDH&T, and the VDOTS.

Overall Safety Goal:

To initiate a coordinated transit safety program involving the transit companies, the VDH&T, and the VDOTS.

Goals for Administrative, Legislative, and Organizational Problems:

To implement training courses for transit operators (see training module).

To work towards implementing a transit accident record system.

Goals for Accident Problems:

To decrease the number of transit accidents to 610 (a 5% decrease from the 1979 total).

Evaluation

The evaluation component of program planning is necessary to measure how well countermeasure programs are working. Evaluation determines if a program is helping to achieve the desired goals or if, in fact, it has resulted in unpredicted consequences. The importance of evaluation is highlighted when funding is limited; an evaluation provides the administration with the information to choose among programs when funding is cut. Furthermore, sound program evaluation which indicates certain programs to be efficient and effective can be used to convince the Governor and the General Assembly to increase funding.

There are essentially two types of evaluations — administrative, or performance evaluations, and effectiveness evaluations. A performance evaluation seeks to determine whether programs have been accomplished in accordance with their operational goals. This involves comparing the level of activity prior to initiating a program to the level following implementation of the program and to the program goals. An effectiveness evaluation attempts to determine the extent to which a program has reduced the number or severity of accidents. While the effectiveness evaluation provides the best indication of how well a program is working, developing a methodology for an effectiveness evaluation is often very difficult. For example to perform an effectiveness evaluation on a training program it would be necessary to determine if the training program actually reduced the number or severity of a particular type of accident. Establishing the linkage between a training program and a reduction in accidents in a statistically valid way is virtually impossible due to the complex nature of the linkage.

Similar difficulties arise when trying to perform effectiveness evaluations of many safety program types. Thus, in most cases, performance evaluations are the only means for determining the usefulness of a particular program. A performance evaluation questionnaire has been designed for each of the non-highway modes (Exhibits 37 through 40). The questions, which are specific to each of the defined goals, should provide a basis for program performance evaluation. In order to ensure that evaluation becomes an integral part of the planning process it is important that the evaluation questionnaire be prepared by someone familiar with the planning process as well as the program goals and objectives. The questionnaire should be completed as soon as the necessary data are available. Since a performance evaluation enables the administrator to determine the extent to which goals and objectives have been achieved it is a useful tool in establishing and refining goals and objectives for future years.

EXHIBIT 37

WATER SAFETY EVALUATION QUESTIONNAIRE

This questionnaire is designed to monitor the progress and assess the operational efficiency of water safety programs. Please complete the questionnaire in the spaces provided as completely as possible.

Overall Safety Goal

1. To reduce boating accidents to 104 (a 10% reduction from the 1977-1979 average).
 - a. Number of boating accidents (1977-79 average). 116
 - b. Number of boating accidents in 1980.
 - c. Difference between the number of accidents in 1980 and the overall safety goal (104 accidents).
 - d. Was the safety goal achieved? Yes or No

Goals for Administrative, Legislative and Organizational Problems

1. To increase education and training activities by implementing a short boating safety course in schools and by preparing a video tape for closed circuit television.
 - a. Number of school training courses planned for fiscal year 1982.
 - b. Number of training courses given.
 - c. Number of training courses given last year.
 - d. Were more training courses given this year than last year? Yes or No
 - e. Number of pupils attending training courses.

EXHIBIT 37 (cont.)

- f. Number of pupils trained that are currently involved in water activities. _____
- g. Number of times the video tape was shown. _____
- h. Cost of tape per time shown. _____
- 2. To decrease unreported accidents.
 - a. Number of posters distributed reminding boaters to report accidents. _____
 - b. Number of reported accidents in 1980. _____
 - c. Number of boating accident claims to State insurance companies for 1980. _____
 - d. Ratio of reported accidents to boating insurance accident claims. _____

Goals for Accident Problems

- 1. To decrease the number of accidents attributed to carelessness to 47 (a 5% decrease from the 1979 figure).
 - a. Number of boating accidents attributed to carelessness in 1979. _____ 49
 - b. Number of boating accidents attributed to carelessness in 1980. _____
 - c. Difference between the number of accidents attributed to carelessness in 1980 and the goal for accident problems (47 accidents). _____
 - d. Was the safety goal achieved? Yes or No

EXHIBIT 38

AIR SAFETY EVALUATION QUESTIONNAIRE

This questionnaire is designed to monitor the progress and assess the operational efficiency of air safety programs. Please complete the questionnaire in the spaces provided as completely as possible.

Overall Safety Goal

1. To reduce aircraft accidents thereby minimizing deaths, injuries, and the economic loss associated with aircraft accidents.
 - a. Number of air fatalities in 1979. 16
 - b. Number of air fatalities in 1980.
 - c. Have air fatalities been reduced? Yes or No

Goals for Administrative, Legislative and Organizational Problems

1. To increase aircraft licenses from 2,571 to 2,622 and airman licenses to 10,302 by contacting each unlicensed aircraft owner and airman in 1981-82 (a 2% annual increase).
 - a. Number of aircraft licenses in 1981.
 - b. Difference between the number of aircraft licenses in 1981 and the 1981 goal (2,622 licenses).
 - c. Number of airman licenses in 1981.
 - d. Difference between the number of airman licenses in 1981 and the 1981 goal (10,302 licenses).
 - e. Number of unlicensed pilots receiving direct mailings.

EXHIBIT 38 (cont.)

- f. Number of pilots and aircraft registered per
dollar of program cost. _____

Goals for Accident Problems

1. To reduce the number of aircraft accidents in Virginia from a
projected 81 accidents in 1981-82 to 77 accidents in 1982-83
(a 5% reduction).

- a. Number of air accidents in 1982-83. _____

- b. Difference between the number of accidents in
1982-83 and the goal of 77 accidents. _____

- c. Was the goal achieved?

Yes or No

EXHIBIT 39

RAIL SAFETY EVALUATION QUESTIONNAIRE

This questionnaire is designed to monitor the progress and assess the operational efficiency of rail safety programs. Please complete the questionnaire in the spaces provided as completely as possible.

Overall Safety Goal

1. To initiate a coordinated rail safety program involving the railroads, the VDH&T and the VDOTS.

a. Has an advisory group been established? Yes or No

b. Please list specific goals and objectives formulated by the advisory group. Goals should reflect the progress that the group would like to make in 3 or 4 years. Objectives can be thought of as steps which can be taken during the current fiscal year (FY 1982) to achieve a particular goal. It is desirable that goals and objectives be expressed in quantifiable terms.

Goals: _____

Objectives: _____

Goals for Administrative, Legislative, and Organizational Problems

1. To begin active participation in the federal rail program.
 - a. Number of miles of track in Virginia inspected by Federal inspectors. _____
 - b. Number of miles of track in Virginia inspected by State inspectors. _____
 - c. Deficiencies noted by State inspectors in Va. _____
 - d. Deficiencies noted by Federal inspectors in Va. _____
2. To concentrate public information programs on safety at protected highway/rail grade crossings and to reduce accidents at protected crossings.
 - a. Number of radio campaigns used during program. _____
 - b. Number of television campaigns. _____
 - c. List population groups reached by the programs.

 - d. Number of accidents which occurred at protected grade crossings in 1979. _____
 - e. Percentage of grade crossing accidents which occurred at protected crossings in 1979. _____
 - f. Number of accidents which occurred at protected grade crossings in 1980. _____
 - g. Percentage of grade crossing accidents which occurred at protected crossings in 1980. _____

Goals for Accident Problems

1. To reduce the number of rail fatalities to 25 (a 5% reduction from the 1977-79 average).
 - a. Number of rail fatalities (1977-79 average) 26
 - b. Number of rail fatalities in 1980.
 - c. Difference between the number of accidents in 1980 and the goal (24 accidents).
 - d. Was the goal achieved? Yes or No

2. To reduce the number of grade crossing accidents to 137 (a 2% reduction from the 1977-79 average).
 - a. Number of grade crossing accidents (1977-79 average) 140
 - b. Number of grade crossing accidents in 1980.
 - c. Difference between the number of accidents in 1980 and the goal (137 accidents).
 - d. Was the goal achieved? Yes or No

EXHIBIT 40

MASS TRANSIT SAFETY EVALUATION QUESTIONNAIRE

This questionnaire is designed to monitor the progress and assess the operational efficiency of mass transit safety programs. Please complete the questionnaire in the spaces provided as completely as possible.

Overall Safety Goal

1. To initiate a coordinated transit safety program involving the transit companies, the VDH&T, and the VDOTS.

- a. Has any advisory group been established? Yes or No
- b. Please list specific goals and objectives formulated by the advisory group. Goals should reflect the progress that the group would like to make in 3 or 4 years. Objectives can be thought of as steps which can be taken during the current fiscal year (FY1982) to achieve a particular goal. It is desirable that goals and objectives be expressed in quantifiable terms.

Goals:

Objectives:

EXHIBIT 40 (cont.)

Goals for Administrative, Legislative, and Organizational Problems

1. To implement training courses for transit operators.
 - a. Number of training programs scheduled. _____
 - b. Number of training programs held. _____
 - c. Number of operators trained. _____
 - d. Average class size. _____
 - e. Average program length. _____
 - f. Average cost per program. _____
 - g. Average cost per operator trained. _____
2. To work towards implementing a transit accident record system.
 - a. Has an advisory committee met to review and amend the procedures for developing the system? Yes or No
 - b. Number of studies directed toward developing a transit record system completed in fiscal year 1982. _____
 - c. Number of bus companies willing to participate in an automated transit accident record system. _____

Goals for Accident Problems

1. To decrease the number of transit accidents to 610 (a 5% decrease from the 1979 total).
 - a. Number of transit accidents in 1979. _____ 642
 - b. Number of transit accidents in 1980. _____
 - c. Difference between the number of accidents in 1980 and the safety goal (376 accidents) _____
 - d. Was the safety goal achieved? Yes or No

PROGRAM AREA 1

ADMINISTRATION OF THE TRANSPORTATION SAFETY PROGRAM

Program Status

Senate Bill 85, passed by the General Assembly in 1978, established the Department of Transportation Safety — formerly the Highway Safety Division of Virginia. The legislation states that the Director of the VDOT is responsible for carrying out Virginia's safety program in all modes of transportation (see Appendix A).

Although the Director of the VDOT has chosen to move quite carefully in assuming transportation safety activities, the Department has begun to conduct certain activities which can be carried out utilizing the current administrative infrastructure. The 142 local transportation safety commissions — established in each locality to conduct a variety of highway safety programs — are adding individuals with expertise in the non-highway modes of transportation and establishing committees to study water, air, rail, and mass transit safety. This will enable the commissions to better identify non-highway mode problems. The Department expanded its Regional Safety Conferences to include water safety as well as participated in meetings and workshops sponsored by the non-highway agencies. The VDOT Crash Investigation Team recently investigated its first air accident.

Finally, the Department determined that additional safety research was needed in many areas. The Department sponsored research at the Virginia Polytechnic Institute and State University on the shipment of hazardous materials by rail and air. Since the VDOT was given multi-modal safety responsibility, the VDOT's Safety Section has conducted the following research activities.

Revenue Sources for Financing Transportation Safety Activities in Virginia — Federal Sources. This project used the catalogue of Federal Domestic Assistance to survey and review all possible federally supported programs that might provide monies to the state for the implementation of potential safety programs.

Development of a Methodology for Transportation Safety Planning in Virginia. This project was the first attempt at providing an overview of transportation safety activities, identifying safety problems, and delineating possible safety programs. The report laid the foundation for the first TSP.

Revenue Sources for Financing Transportation Safety Activities in Virginia, Phase II -- State Sources. This study was conducted to examine potential state revenues.

Multi-modal Crash Facts. To provide a data base of essential crash data for the air, rail, water, and transit modes, data were collected and assimilated to produce a Crash Facts-like publication for problem identification and problem analysis purposes.

Development of a Transit Safety Records System. This project was undertaken to develop, test, and implement an accident data system for intercity bus companies.

Problem Statement

Although the VDOT is constantly working to improve the quality of non-highway mode accident data, the information currently available is insufficient for use in statewide transportation safety planning. The annual accident data collected by the non-highway agencies -- which consist largely of the total number of accidents, injuries, and fatalities -- are not detailed enough for in-depth problem identification. More specific accident information, including accident characteristics and probable causes, is compiled in the Multi-Modal Crash Facts publication. This information, however, is available only for the period since 1979 and is of little use in establishing trends.

Additionally, the non-highway agencies have been slow in accepting the new role of the VDOT. The agencies still feel that much VDOT activity in the non-highway modes is a possible duplication of work already being done. Without the cooperation of the non-highway agencies the VDOT is very limited in its ability to implement programs. Thus, while the VDOT has the administrative structure for conducting public information, training, and alcohol programs, it has been greatly constrained in program development by the lack of enthusiasm shown by the non-highway agencies.

Problem Solution Narrative

The only historical information available for analysis is that gleaned from a review of the agencies' budgets and this source is limited. Therefore, the following program will be adopted.

1. Seek a detailed program module from each of the modes of transportation outlining what they are doing now and the specific problems of each with regard to safety.

2. Solicit from each of the Transportation Safety Commissions, through the Coordinators, specific safety problems relating to railway, waterway, airway and mass transit.
3. From the information derived from the above, evaluate the safety problems of each mode, provide whatever assistance is possible within the limited budget of the Department of Transportation Safety, as well as support each agency in seeking to implement countermeasures affecting specific safety problems.

PROBLEM SOLUTION PLAN (PSP)		1. PSP TITLE Transportation Safety Plan - Administration		2. PACE NO.				
To secure a quality response from each of the State agencies and local Transportation Safety Commissions involved. 3. OBJECTIVE(S)		6. MILESTONES						
		CURRENT FISCAL YEAR 1982		PLANNING YEARS				
4. TASK TITLES	5. PLANNED QUANTITY	1ST Q	2ND Q	3RD Q	4TH Q	FY 83	FY 84	FY 85
1. Prepare a Transportation Safety Plan.	1							
7. CURRENT YEAR COST BY TASK (000's)		TOTAL	STATE	LOCAL	FEDERAL			
1. Prepare a Transportation Safety Plan								
GRAND TOTAL								

TRANSPORTATION SAFETY PLAN — ADMINISTRATION

Task Narratives

Task 1 — The VDTS will prepare a TSP for FY 1982. Problems will be identified through data analysis. Safety problems will be solicited from the non-highway agencies and local commissions. The VDTS will make every effort to coordinate these programs. The FY 1982 TSP will be completed by June 1, 1981.

PROGRAM AREA 2

PUBLIC INFORMATION

Program Status

Under the provisions of Senate Bill 85, the VDTS is given the responsibility to "engage in training and educational activities aimed at enhancing the safe transport of passengers and property in and through the Commonwealth." The public information and educational programs conducted to address this directive have concentrated largely on highway safety. However, the Department has conducted several public information activities in the non-highway modes, including publishing brochures and expanding the VDTS film catalog to include water safety films. In addition, the Department puts out yearly publications of selected transportation acts and transportation laws.

Problem Statement

Problems which might be remedied through public information and education programs exist in all of the non-highway modes of transportation.

Water

Analysis of Multi-Modal Crash Facts data reveals that in 1979 carelessness was a contributing factor in 52% of fatal accidents. Boating in hazardous waters and overloading the boat also contributed to a large number of boating accidents.

Air

Pilot error, which often results from a lack of knowledge and training, causes a significant number of air accidents. Pilot error alone accounted for 40% of air accidents in 1979.

Rail

The Federal Rail Administration Bulletin reveals that in 1979 28% of railroad accidents involved an error by a railroad employee. Additionally, highway/rail grade-crossing accidents remain a significant problem in Virginia. The VDH&T reports that 38% of Virginia's 1979 grade-crossing accidents occurred at protected grade crossings. Thus, it is clear that public information programs are needed in addition to engineering improvements.

Mass Transit

At this time there is no conclusive evidence of mass transit safety problems. The low operating speeds and large size of intra-city buses seem to make bus safety problems minor in comparison to problems associated with other modes of transportation. However, an expectation of increased ridership and expanded service to be provided by public transportation may lead to unforeseen safety problems.

Problem Solution Narrative

The dissemination of information to the public is a means by which the VDTs can readily promote safety in all non-highway modes of transportation. Literature, films, and exhibits stressing safety can be made available to interested persons.

However, at this time limited information is available in the areas of air, water, and mass transit public information/educational problems and needs. It is important that this information be solicited. An evaluation should then be made of these problems and assistance with public information programs provided within the budget limitations of the VDTs.

Due to limited funding, no plans have been made for additional public information programs. However, the Department has developed several public information programs for each mode that can be initiated should funding become available. All of the suggested programs would be developed and conducted in concert with the responsible agency.

Water

1. More extensive utilization of Game and Inland Fisheries and Coast Guard material for distribution at other transportation seminars, programs, and mailings.
2. Distribution of boating safety information at highway safety programs where boaters and boating passengers are likely to be present.
3. Closer coordination of Public Information with Coast Guard Auxiliary, Power Squadrons, and other boating safety oriented groups not in conflict with regular agency efforts.
4. Special programs directed towards the boaters for mailings, training, and educational seminars.

Air

1. Special mailings and programs extended to pilots, passengers, and ground service personnel.

Rail

1. Continuation of Grade Crossings, Operation Life-saver and similar programs.
2. Special programs targeting private crossings and Railroad Right-of-Way mishaps. Youth and elderly groups would be given special attention.

Mass Transit

1. Programs to avoid incidents which occur when boarding, using, and exiting transit vehicles.
2. Utilization of mass transit vehicle public information services to expand on pedestrian safety.
3. Conduction of special crash prevention programs for mass transit operators.

Hazardous Materials

Make available to local Transportation Safety Commissions, police, fire, and rescue squads the results of studies on the transport of hazardous materials. This information will be used to determine local handling capabilities during emergencies.

PROBLEM SOLUTION PLAN (PSP)		1. PSP TITLE		Public Information		2. PACE NO.	
3. OBJECTIVE(S)		1. To secure information on public information needs. 2. To coordinate programs. 3. To increase public knowledge of safety techniques.		6. MILESTONES			
				CURRENT FISCAL YEAR 1982		PLANNING YEARS	
4. TASK TITLES		5. PLANNED QUANTITY	1ST Q	2ND Q	3RD Q	4TH Q	FY 83
1. Solicit information on public information/education programs in modes of air, rail, water and mass transit.		1					FY 84
2. Encourage coordination of public information/education programs within all modes of transportation.		1					FY 85
7. CURRENT YEAR COST BY TASK (000's)		TOTAL	STATE	LOCAL	FEDERAL		
GRAND TOTAL.							

PUBLIC INFORMATION

Task Narratives

- Task 1 — Information is needed on the various public information/education programs, problems, and needs in the modes of air, rail, water, and mass transit in Virginia. It is recommended that a survey be conducted to solicit this information and an evaluation be made of how these problems can be addressed.
- Task 2 — Methods will be sought to encourage coordination of public education/information programs between all modes of transportation and to encourage use of existing communication resources.

PROGRAM AREA 3

ALCOHOL-RELATED ACCIDENTS

Problem Statement

In 1979, 33% of all highway deaths in Virginia were alcohol-related. Through the experience of the Virginia Alcohol Safety Action Program (VASAP) and from national studies it is estimated that about one-half of all highway fatalities are alcohol-related. Similar findings are becoming evident in other transportation modes.

Water

The VASAP office reports that 56% of boating fatalities in 1980 were alcohol-related. By disregarding the group of accidents described as "cause unknown", the VASAP found that 75% of the fatalities were alcohol-related.

A report published by the Coast Guard and entitled "Alcohol and Pleasure Boat Operators" summarizes the effects of alcohol use with respect to boating.⁽¹⁾ This report indicates that alcohol can contribute to boating accidents because (1) peripheral vision decreases, (2) risk taking is likely to increase, (3) balancing abilities decrease, (4) information processing capabilities decrease, and (5) performance on divided attention tasks is lowered.

At present, boaters are not tested for alcohol level. Without testing, the extent to which alcohol contributes to boating accidents cannot be determined. Safe blood-alcohol levels have not been established for boating. In Virginia an automobile operator with a 0.10% blood-alcohol content is considered to be driving while intoxicated. The Coast Guard report points out that because water is an added hostile environment, the safe BAC is even lower than that for automobile operators. Balancing, exposure, and inexperience (relative to the number of hours one spends in a car) are added problems in the water environment.

Air

The Virginia State Police reported 75 air accidents in 1978 in which 26 persons were killed and 29 injured. Of these accidents, only one included alcohol as a "cause" or "factor" according to National Transportation Safety Board (NTSB) reports. In 1979, there were 78 total accidents, and 19 fatalities — two of which were alcohol-related.

A General Accounting Office (GAO) report to Congress said alcohol is a contributing factor in about 6% of the fatal, general aviation crashes and that the actual figure may be about 20%.⁽³⁾ In addition, the GAO found that 98% of the pilots with alcohol-related traffic offenses failed to report this on their medical histories to the FAA.

In commercial carrier operations there is no evidence to suggest a general problem with alcohol-related crashes in Virginia. Therefore, general aviation will be the only segment of Virginia aviation considered in this plan.

Information is available to the state's Department of Aviation that would confirm a pilot's history of alcohol-involved convictions or other drug-related offenses. An alcoholic pilot who is drinking can also be detected in the FAA's required medical examination. Such a hazardous pilot can also be detected and prevented from flying by others at the airport or friends prior to departure.

Although driving records of alcohol-related arrests/convictions, VASAP participation and classification, and alcohol-related physiological dysfunctions are good indicators of alcohol problems or alcoholism, these are not now being accessed by either the FAA, according to the GAO report, nor by the state's Department of Aviation. Readily available information is not now being used to identify potentially drunken pilots in order to prevent alcohol-related crashes.

The FAA's Office of the Chief Counsel, the Aeromedical Psychiatrist, and several studies confirm that the presumptive BAC established for intoxication while driving (0.10% blood-alcohol) is demonstrably higher than the level at which serious impairment occurs in the flight environment. This is due to the increased complexity of tasks in flying, the increased number of simultaneous tasks, and the increased number of forces acting on the pilot in the flight environment.

There is no BAC limit presumed for "intoxication" while flying, but the FAA does have an "eight hour" rule for time without drinking prior to flying; this is fairly comprehensive except for pilots whose BAC after eight hours would still be above 0.04% or at an unsafe level.

There is no implied consent statute for flying, so a pilot can be considered immune from blood-alcohol testing. Both implied consent legislation and a presumptive level of intoxication are being studied for implementation by the FAA with the support of the GAO.

In addition to the above statutory weaknesses, the probability of a pilot being arrested prior to departure is small due to the low level of surveillance activities. An increase in these activities, especially at uncontrolled airports, is probably not cost-effective. More effective utilization of existing resources, like the FAA controllers, and the mobilization of an educated flying public would prove more workable as an initial approach to preventing alcohol-related air crashes.

Rail

Of 202 rail accidents in 1978, there is no clear evidence to suggest that alcohol was either a cause or factor in either injuries or fatalities. There is, however, national evidence to support the idea that employees of rail companies are benefited by alcoholism services and that rail companies are seeking to incorporate employee assistance programs into their personnel services. For example, the Norfolk and Western has already followed the example of several large Virginia firms by instituting their own employee assistance program to reduce the costs of alcohol-related accidents.

It is likely that many alcohol-related rail accidents are not reported except within the company, so there are no data to confirm or deny the true cost to rail safety caused by drinking on or before going on the job.

Mass Transit

There are no data to support the notion that alcohol-related accidents are problematic to the mass transit systems in Virginia. This may be a deficiency in data collection or, like in airline work, company policy and company training may prevent alcohol involvement among the employees while performing the work of transporting people in the state.

At this time, no problem is identifiable in mass transit.

Problem Solution Narrative

Several countermeasure approaches are identified to reduce the incidences of alcohol involvement in crashes and the resulting injuries and fatalities. The plan of action, which includes public information and education, data collection and problem analysis, enforcement training, and new legislation, is designed to use existing resources at little additional cost.

Public Information and Education

Public information and education programs have been developed to make boaters and pilots more aware of the hazards of operating a boat or plane while under the influence of alcohol. It is hoped that alcohol education will result in pilot and boaters taking complete responsibility for their own safety and the safety of their passengers.

Data Collection and Analysis

The development of appropriate legislation and pilot training material is dependent, in part, upon a good information base. Research activities are planned which will enable the VASAP to understand the air/alcohol problems thoroughly and to identify groups of people to which programs should be targeted. The research will also allow Virginia to evaluate the effectiveness of alcohol/flight safety laws of other states in reducing air accidents.

Enforcement Training

Enforcement training will be given to local officials so that they can better recognize and apprehend boaters who are operating their boats while intoxicated. This program aims to fully educate the official in current laws and regulations as well as to increase awareness of the role of alcohol and other drugs in water accidents.

Legislative

The VDOTS should support the FAA's efforts to adopt a presumptive BAC level for intoxication and an implied consent statute requiring a pilot to submit to a blood or breath test. Further, state laws should be adopted as specified in the task narratives.

Next, legislation is necessary to allow the FAA and the Virginia Department of Aviation to access an applicant's driving record before issuing a pilot's license. A pilot/applicant who has been previously convicted of DUI or classified by the VASAP as a Level III drinker should be noticed by the Department of Aviation prior to issuance of a state license. This person could then be required to be reexamined by an FAA aeromedical examiner and be certified for a state license only after satisfactorily

completing whatever tests may be deemed necessary and appropriate to assure that alcohol would not be a problem in operating and controlling an aircraft.

Further, a legislative change should be adopted to allow court referral of pilots into ASAPs under the same conditions provided for drivers. It is reasonable to assume that the same educational or treatment experiences following classification would have equal benefits to pilots.

PROBLEM SOLUTION PLAN (PSP)		1. PSP TITLE		Information & Education					2. PAGE NO.	
				6. MILESTONES						
				CURRENT FISCAL YEAR 1982					PLANNING YEARS	
4. TASK TITLES		5. PLANNED QUANTITY	1ST Q	2ND Q	3RD Q	4TH Q	FY 83	FY 84	FY 85	
To increase awareness among associated agency officials, operator users of air, water and rail transportation systems about alcohol's effects on transportation safety.										
1. Conduct alcohol/water safety training program at Regional Transportation Safety Conferences.		5								
2. "Virginia Better Boating, a Guide to Safety Afloat."		8								
3. Conduct local alcohol/water safety seminars with Coast Guard, Commission for Game and Inland Fisheries and local ASAPs.		1								
4. Produce film/videotape on alcohol.										
5. Conduct alcohol/flight impairment demonstration at FAA Flight Safety Seminars.		3								
7. CURRENT YEAR COST BY TASK (000's)			TOTAL	STATE		LOCAL		FEDERAL		
1. Alcohol/Water Safety Training			2.5							
2. Alcohol/Water Safety Curriculum			7.0							
3. Local Alcohol/Water Safety Seminars										
4. Alcohol/Flight Safety Film			25.0							
5. Alcohol/Flight Impairment Demonstration			8.0							
Total			42.5							

INFORMATION AND EDUCATION

Task Narratives

- Task 1 - Conduct alcohol education training for boaters at the VDOTS Regional Safety Conferences held in each locality every other year. Invitations will be sent to personnel from the Coast Guard, Game and Inland Fisheries, and Marine Resources Commission in each area. This educational effort will be designed primarily to increase awareness among water safety personnel of the impact of alcohol consumption on boating skills and performance. Attendance in each area will be evaluated to determine initial acceptance of alcohol education and evaluation. Forms completed by participants at each conference will be reviewed by the VDOTS to determine areas identified for further training efforts and to develop more appropriate programs both in future regional conferences and in public education programs for boat owners/operators.
- Task 2 - Review "Virginia Better Boating, A Guide to Safety Afloat" (the home study course offered by the Commission of Game and Inland Fisheries) for accuracy and completeness of alcohol/boating information by September 30, 1982. Update and provide an alcohol/drug section to the Commission for consideration for inclusion in the package when it is reprinted for public distribution. Invite the Commission to train local ASAP personnel on this package so they can promote its availability and encourage its use by boaters and water safety personnel in their service areas.
- An administrative evaluation will be conducted by January 31, 1983, to determine that an alcohol section was developed for the home study course, that this section was accepted by the Commission, and that a training session for local ASAPs was conducted in alcohol/water safety.
- Task 3 - Encourage and support local ASAPs to conduct special seminars on alcohol/water safety in cooperation with the Coast Guard and Commission of Game and Inland Fisheries. This will affect only those ASAPs whose service area includes recreational and/or navigable waterways where there are full-service marinas.

The purpose of these seminars, to be conducted between April and August 1983, will be to educate boaters on alcohol's effect on driving and boating skills and to provide an opportunity for the Coast Guard and Commission of Game and Inland Fisheries to communicate other information to the public about water safety.

An administrative and impact evaluation will be conducted by September 30, 1982, to determine the number of seminars conducted, the attendance at each, and the level of knowledge attained by the participants, as measured by pre- and posttests. An effectiveness evaluation will be conducted by March 30, 1982, to compare injury and fatality data, by area if possible, to determine the effect of these seminars.

- Task 4 — Develop a film or videotape program to demonstrate alcohol's effects on the skills required for flying. The format of this educational film will be similar to that of the alcohol highway film "Under the Influence." Airline pilots will be used to fly simulated approaches and take a series of balance, coordination, reaction time, and visual perception tests sober, at a 0.02% BAC, 0.05% BAC, and a 0.10% BAC.

The film's purpose is to depict alcohol's effects on skills used in the flight environment.

This task will be completed and incorporated into pilot education through the department of Aviation and the FAA's General Aviation District Office (GADO) and the VDTS by September 30, 1982.

Pre- and posttests will be designed and administered during pilot programs or the first session using each method of instruction (audiovisual or demonstration). The test will be developed to determine changes in knowledge and attitudes about the use of alcohol prior to flying. A significant increase in knowledge will be required prior to statewide implementation of either program. This evaluation will be developed concurrently with the two tasks.

- Task 5 — The VDTS will offer a flight simulator demonstration of alcohol's effects on pilot skills (similar to the existing DUI demonstration programs which have been

conducted statewide with various highway safety groups) at each of the FAA's Flight Safety Seminars. The design will be to test one to three pilots on a table-top type of flight simulator after allowing practice time to reach maximum proficiency on a given approach to landing. Each pilot will also attain maximum proficiency on reaction time, visual perception, and field sobriety tests. Scores on each test will be recorded prior to the seminar.

During the seminar, each of the participants will attain a BAC of no less than 0.05% and no more than 0.10%. During the seminar, each of the participant's scores will be recorded, displayed, and discussed with all attendees near the close of the session.

This type of demonstration program will be replaced with the film or videotape presentation (task 3 above) on completion, and this program will be made available statewide as part of an ongoing educational program offered jointly by the FAA, Department of Aviation, and VDOTS.

The purpose of these demonstrations will be to give several pilots a direct experience of alcohol impairment and to show all attendees the measurable effects of impairment on flight skills.

Pre- and posttests will be designed and administered during pilot programs or the first session using each method of instruction (audiovisual or demonstration). A significant increase in knowledge will be required prior to statewide implementation of either program. This evaluation will be developed concurrently with the two tasks.

PROBLEM SOLUTION PLAN (PSP)		Data Collection & Analysis						2. PAGE NO.	
1. PSP TITLE		6. MILESTONES							
		CURRENT FISCAL YEAR 1982					PLANNING YEARS		
4. TASK TITLES		5. PLANNED QUANTITY	1ST Q	2ND Q	3RD Q	4TH Q	FY 83	FY 84	FY 85
1. Review alcohol/flight safety laws of other states and determine their effectiveness in reducing crashes.		1							
7. CURRENT YEAR COST BY TASK (000's)		TOTAL	STATE		LOCAL		FEDERAL		
1. Review of laws and effectiveness		3.0							
Total		3.0							

DATA COLLECTION AND ANALYSIS

Task Narratives

- Task 1 — Review other state's aviation laws to locate existing implied consent and/or presumptive BAC levels of intoxication. Conduct a review of at least five years of data from each of those states looking at alcohol-related crashes, enforcement activities, and sanctions imposed to see if enforcement levels and punitive sanctions tend to affect numbers of crashes, injuries, or fatalities. This will also serve to determine the relationship, if any, between such legislation, numbers of arrests/enforcement actions, and trends in alcohol-related crashes.

PROBLEM SOLUTION PLAN (PSP)		1. PSP TITLE		Enforcement Training		2. PAGE NO.	
3. OBJECTIVE(S) To develop and field test a training program for enforcement officials to facilitate the detection and apprehension of intoxicated boat operators.		6. MILESTONES					
		CURRENT FISCAL YEAR 1982		PLANNING YEARS			
4. TASK TITLES	5. PLANNED QUANTITY	1ST Q	2ND Q	3RD Q	4TH Q	FY 83	FY 84
1. Review laws and research to develop an enforcement training program on detection and apprehension of intoxicated boat operators. Conduct one training program on a statewide basis.							
7. CURRENT YEAR COST BY TASK (000's)		TOTAL		STATE		LOCAL	
1. Develop enforcement training program		12.0					
Total		12.0					
						FEDERAL	

INFORMATION TRAINING

Task Narratives

Task 1 — Produce pilot training program in alcohol/detection skills through the Transportation Safety Training Center for enforcement personnel with responsibilities for water safety. The elements of this tasks are:

- (a) Review application laws and regulations affecting alcohol consumption and/or intoxication while operating a boat in the state.

Evaluate existing regulations with current research data on impairment levels and accident probabilities to determine if needs exist for legislative changes. This review is to be complete with a final report to the VDOTS by December 30, 1981.

- (b) Study current enforcement level of alcohol offenses to determine strengths, weaknesses, and areas of potential improvement in water safety enforcement. Transportation Safety Training Center review will be completed by December 30, 1981.
- (c) Based on findings from the above studies, design a training program in alcohol/water safety enforcement for Coast Guard, Commission for Game and Inland Fisheries, and Marine Resources Commission officers by March 1, 1982. The purpose of this training package will be to increase awareness of the role of alcohol and other drugs in water accidents, injuries, and fatalities, discover clues for detecting intoxicated operators, and establish effective enforcement procedures to prevent alcohol/drug-related accidents.
- (d) Conduct one pilot training program on a state-wide basis for representatives of the three agencies involved in water safety enforcement.

Pre- and posttests of alcohol knowledge will be incorporated into the training program to determine whether this fills a need and where officers lack knowledge about alcohol's effects. Anonymous recommendations on additional topics and the training format will be solicited from the workshop participants. This evaluation will be completed by August 1, 1982.

Legislative

To develop and introduce legislation in the 1982 General Assembly to establish an implied consent statute and presumptive level of intoxication in the Virginia Aviation Code.

6. MILESTONES

CURRENT FISCAL YEAR 1982

PLANNING YEARS

4. TASK TITLES	5. PLANNED QUANTITY	1ST Q	2ND Q	3RD Q	4TH Q	FY 83	FY 84	FY 85
1. Draft and prepare legislation to establish an implied consent statute and presumptive level of intoxication for pilots.	1							

7. CURRENT YEAR COST BY TASK (000's)	TOTAL	STATE	LOCAL	FEDERAL
1. Draft legislation for implied consent and presumptive level of intoxication.	0			
Total	0			

LEGISLATIVE

Task Narratives

- Task 1 - Based on the results of the above study (task 1), draft and introduce, in the 1983 General Assembly, legislation to establish a state implied consent statute and a maximum BAC for the presumption of intoxication.

PROGRAM AREA 4

TRANSPORTATION SAFETY TRAINING

Problem Statement

Because of limited fiscal and personnel resources and small agency size, the several modes of non-highway transportation in Virginia are often unable to provide the level of training and staff development necessary for meeting their safety goals. As a result, these organizations are often poorly equipped to plan or implement basic or specialized safety countermeasures.

Also, because safety efforts in several of the transportation modes are carried out by unrelated agencies, organizations, and individuals throughout the Commonwealth, it is very difficult and often not cost-effective for individual organizations to design and implement their own training activities.

Specific problems identified within the modal areas of air, water, rail, and mass transit which are especially significant include (1) data collection and analysis (accident investigation), (2) instructor/training manager development, (3) curriculum development and a variety of on-site technical assistance services, and (4) shipment of hazardous materials.

Problem Solution Narrative

Several major training activities are planned for FY 82 in response to the problems identified above.

Data Collection and Analysis

To help improve this critical prerequisite to sound problem identification and countermeasure development in the water mode, the TSTC will plan, develop, and implement one 5-day specialized Boat Accident Investigation Course for local law enforcement agencies who have responsibility for and/or serious boat safety problems within their jurisdictions. This course will be provided on a tuition-free basis by the TSTC in the Tidewater Virginia area.

Instructor/Training Manager Development

To help local, regional, and state agencies identify problems, assess training needs in relation to solution of those

problems, and plan, design, implement, and evaluate training efforts, the TSTC will deliver a 5-day course on Instruction and Program Design. This course will be offered on a tuition-free basis, and representatives from all modes will be encouraged to attend.

Curriculum Development and Technical Assistance

Because of the public's increasing use of public transportation, and the proliferation of social and other agencies which provide transportation in addition to their primary service, the training of transit and paratransit operators has become a major safety concern in Virginia. In order to meet this need, the TSTC, in cooperation with the Office of Public Transportation in the Virginia Department of Highways and Transportation, will provide a variety of transit operator curriculum dissemination and instructor development courses throughout the Commonwealth. On-site technical assistance will also be provided to any local transit or paratransit operation which wishes to implement an improved records system, training program, driver screening, or test/evaluation program.

Shipment of Hazardous Materials

The packaging, labeling, and shipment of hazardous materials are potentially significant problems in all modes of transportation. In order to help reduce the probabilities of mishap in air transportation, the TSTC, in conjunction with the Virginia Department of Aviation, will sponsor two 2-day regional workshops on the packaging and labeling of hazardous materials for air transport.

Evaluation

An administrative evaluation of training curriculum development and technical assistance services encompassed within this plan will be conducted. This will include performance, scheduling, and program costs. In the performance component, criteria such as the number of persons trained and class size will be used. Completion of programs scheduled and length of individual courses will be observed as evaluation criteria for the scheduling component. Program costs will be reviewed within the cost component.

PLAN (PSP)		1. PSP TITLE Data Collection and Analysis					2. PAGE NO.	
To design, develop, and implement one 5-day course for local law enforcement agencies in Virginia on the investigation of boat accidents and the analysis and interpretation of accident data.		6. MILESTONES					PLANNING YEARS	
		CURRENT FISCAL YEAR 1982						
4. TASK TITLES	5. PLANNED QUANTITY	1ST Q	2ND Q	3RD Q	4TH Q	FY 83	FY 84	FY 85
1. Boat Accident Investigation	1							
7. CURRENT YEAR COST BY TASK (000's)		TOTAL		STATE		LOCAL		FEDERAL
1. Boat Accident Investigation	7.3	7.3		0		0		0
Total	7.3	7.3		0		0		0
GRAND TOTAL								

DATA COLLECTION AND ANALYSIS

Task Narrative

Task 1 - This plan provides for the design, development, and delivery of one 5-day course on Boat Accident Investigation. This course will enhance the capabilities of local law enforcement organizations to collect quality investigations of boat accidents for determination of cause and development of effective countermeasure activities. This course will involve 15-25 participants and will be completed by June 30, 1982.

PLAN (PSP)		1. PSP TITLE				Instructor/Training Manager Development				2. PAGE NO.			
<p>The objective of this plan is to design, develop, and implement one 5-day course or Instruction and Program Objective(S) Design for trainers and training managers/planners in the several modes of transportation in Northern Virginia. This course develops expertise in assessing training needs, designing training strategies, and in the use of various instructional techniques and methods.</p> <p>4. TASK TITLES odologies.</p>		6. MILLIONNES											
		CURRENT FISCAL YEAR 1982								PLANNING YEARS			
		1ST Q	2ND Q	3RD Q	4TH Q	FY 83	FY 84	FY 85					
1. Instruction and Program Design		PLANNED QUANTITY	1										
7. CURRENT YEAR COST BY TASK (000's)		TOTAL	STATE	LOCAL	FEDERAL								
1. Instruction and Program Design		6.6	6.6	0	0								
Total		6.6	6.6	0	0								
GRAND TOTAL													

INSTRUCTOR/TRAINING MANAGER DEVELOPMENT

Task Narrative

- Task 1 - This plan provides for the design, development, and delivery of one 5-day course on Instruction and Program Design. This course will develop participant's skills in assessing training needs, designing instructional strategies and activities, developing instructional materials, and making classroom presentations. This course will involve 20-25 participants and will be completed June 30, 1982.

PLAN (PSP)		1. PSP TITLE		Curriculum Development and On-Site Technical Assistance					2. PAGE NO.	
The objective of this plan is to provide regional training for local transit and paratransit operators in the areas of operator screening, operator training, and instructor development. In addition, on-site technical assistance will be provided on request to transit/paratransit operations desiring to upgrade their accident records, or variety of other system support activities. 4. TASK TITLES operations or activities.		5. PLANNED QUANTITY Continuous		6. MILESTONES					PLANNING YEARS	
				CURRENT FISCAL YEAR 1982						
				1ST Q	2ND Q	3RD Q	4TH Q	FY 83	FY 84	FY 85
1. Phase II Transit Operator Training in Virginia										
7. CURRENT YEAR COST BY TASK (000's)		TOTAL		STATE		LOCAL		FEDERAL		
1. Phase II Transit Operator Training in Virginia		35.4		35.4		0		0		
Total		35.4		35.4		0		0		
GRAND TOTAL										

VI-35

423

VH-35

22

* Please note that the implementation of all tasks is dependent upon the availability of funds.

CURRICULUM DEVELOPMENT AND TECHNICAL ASSISTANCE

Task Narrative

- Task 1 — This plan provides for all instructional expenses necessary to design and deliver three regional transit instructor training workshops and provide on-site technical assistance to local transit/paratransit operations upon request. This technical assistance will be directed to the improvement of local accident records systems, driver selection and screening procedures, and other transit safety-related activities. This is a continuous 12-month project effort.

PLAN (PSP)		1. PSP TITLE		of Hazardous Materials					2. PAGE NO.	
				6. MILESTONES						
				CURRENT FISCAL YEAR 1982					PLANNING YEARS	
				1ST Q	2RD Q	3RD Q	4TH Q	FY 83	FY 84	FY 85
4. TASK TITLES		5. PLANNED QUANTITY								
1. Transportation of Hazardous Materials by Air		2								
7. CURRENT YEAR COST BY TASK (000's)		TOTAL		STATE		LOCAL		FEDERAL		
1. Transportation of Hazardous Materials by Air		3.6		3.6		0		0		
Total		3.6		3.6		0		0		
GRAND TOTAL										

TRANSPORTATION OF HAZARDOUS MATERIALS

Task Narrative

Task 1 - This task provides expenses necessary for the coordination of two regional 2-day seminars on the Transportation of Hazardous Materials by Air. Major emphasis will be placed on packaging, labeling, and shipping. The courses will be designed for a maximum of 25 participants each. The Seminars will be held during the third quarter of FY 82.

REFERENCES CITED

1. Virginia Facts and Figures — 1981.
2. Vilardo, F. J., Ripberger, R. J., "A Review of Selected State Recreational Boating Accident Reporting Systems," Journal of Safety Research, Volume 9, Number 2, June 1977.
3. "Stronger Federal Aviation Requirements Needed to Identify and Reduce Alcohol Use Among Civilian Pilots," General Accounting Office, March 20, 1978.

APPENDIX A
SENATE BILL 85

An Act to amend and reenact §§ 2.1-51.18 and 2.1-51.24 and to amend the Code of Virginia by adding in Title 33.1 a chapter numbered 10, consisting of sections numbered 33.1-390 through 33.1-396 and to repeal in Title 2.1 a chapter numbered 7.2, consisting of sections numbered 2.1-64.15 through 2.1-64.22, the amended, added and repealed sections relating to transportation and highway safety.

[S 85]

Approved April 10, 1978

Be it enacted by the General Assembly of Virginia:

1. That §§ 2.1-51.18 and 2.1-51.24 of the Code of Virginia are amended and reenacted and that the Code of Virginia is amended by adding in Title 33.1 a chapter numbered 10, consisting of sections numbered 33.1-390 through 33.1-396, as follows:

§ 2.1-51.18. Agencies for which responsible.—The Secretary of Public Safety shall be responsible to the Governor for the following agencies: Alcoholic Beverage Control Board ~~Commission~~, Department of Corrections, Rehabilitative School Authority, Criminal Justice Officers Training Standards Commission, Division of Justice and Crime Prevention, Department of State Police, Division of Motor Vehicles, ~~Highway Safety Division~~, Office of Emergency Services and the Department of Military Affairs. The Governor may, by executive order, assign any other State executive agency to the Secretary of Public Safety, or reassign any agency listed above to another secretary.

§ 2.1-51.24. Agencies for which responsible.—The Secretary of Transportation shall be responsible to the Governor for the following agencies: Department of Highways and Transportation, Virginia Airports Authority, Division of Motor Vehicles and ~~Highway Safety~~

~~Division~~ Department of Transportation Safety . The Governor may, by executive order, assign any other State executive agency to the Secretary of Transportation, or reassign any agency listed above to another secretary.

CHAPTER 10.

Department of Transportation Safety.

§ 33.1-390. *Declaration of policy.*—The General Assembly recognizes that the availability of safe and adequate transportation service in all modes contributes both to the economic well-being and to the convenience of the citizens of the Commonwealth. Further, the General Assembly recognizes a legitimate public interest in the safe operation of transportation throughout the State. Accordingly, it shall be the policy of the Commonwealth of Virginia to investigate, evaluate and promote the safe movement of people and property by all modes—highway, railway, waterway, airway, and mass transit.

§ 33.1-391. *Creation of Department; appointment of Director.*—There is hereby created in the executive branch, responsible to the Secretary of Transportation, the Department of Transportation Safety. The Department shall be headed by a Director who shall be appointed by the Governor, subject to confirmation by the General Assembly, to serve at the pleasure of the Governor for a term coincident with his own. Nothing herein shall affect the powers and duties of the State Corporation Commission with respect to the regulation of aviation, railroads and motor carriers.

§ 33.1-392. *Director to supervise Department.*—The Director of the Department shall, under the direction and control of the Governor and the Secretary of Transportation, be responsible for the supervision of the Department and shall exercise such other powers and perform such other duties as may be required of him by the Governor and the Secretary of Transportation.

§ 33.1-393. *General powers of Director.*—The Director shall have the following general powers:

A. To employ such personnel as may be required to carry out the purposes of this chapter.

B. To make and enter into all contracts and agreements necessary or incidental to the performance of the Department's duties and the execution of its powers under this chapter, including, but not limited to, contracts with the United States, other states, agencies and governmental subdivisions of this Commonwealth.

C. To accept grants from the United States government and agencies and instrumentalities thereof and any other source. To these ends, the Department shall have the power to comply with such conditions and execute such agreements as may be necessary, convenient or desirable.

D. To do all acts necessary or convenient to carry out the purposes of this chapter.

§ 33.1-394. *Additional powers and duties of Director.*—A. The Director shall have the following additional powers and duties related to transportation safety in general:

1. To evaluate the safety measures currently in use by all transport operators in all modes which operate in or through the

Commonwealth, with particular attention to the safety of equipment and appliances and to the safety of methods and procedures of operation.

2. To recommend to the Governor and to the General Assembly any and all corrective measures, policies, procedures, plans, and programs which are needed to make the movement of passengers and property in and through the Commonwealth as safe as reasonably practicable.

3. To engage in training and educational activities aimed at enhancing the safe transport of passengers and property in and through the Commonwealth.

4. To cooperate with all relevant entities of the federal government, including, but not limited to, the Department of Transportation, the Federal Railway Administration, the Federal Aviation Administration, the Coast Guard, and the Independent Transportation Safety Board in matters concerning transportation safety.

5. To initiate and conduct special studies on matters pertaining to transportation safety and to issue periodically reports concerned with transportation safety.

6. To evaluate the transportation safety efforts, practices, and procedures of the departments, divisions, boards, agencies, or other entities of the government of the Commonwealth, and to make recommendations to the Governor and to the General Assembly on ways to increase transportation safety consciousness or improve safety practices.

7. To offer such assistance to entities of State government and to towns, counties or other political subdivisions of the State as may enhance their efforts to ensure safe transportation, including the dissemination of relevant materials and the rendering of technical or other advice.

8. To collect, tabulate, correlate, analyze, evaluate, and review the data gathered by various entities of the State government in regard to transportation operations, management, and accidents, especially the information gathered by the Division of Motor Vehicles, the Department of State Police, and the State Corporation Commission.

B. In recognition of the special role played by highway transportation in the Commonwealth, the Director, shall also have the powers and duties:

1. To develop, implement and review, in conjunction with relevant State and federal entities, a comprehensive highway safety program for the Commonwealth, and to inform the public thereon.

2. To assist towns, counties and other political subdivisions of the State in the development, implementation, and review of such local highway safety programs which shall be approved as part of the State program.

3. To review the activities, role and contribution of various State entities to the State's highway safety program and to report annually and in writing to the Governor and General Assembly on the status, progress and prospects of highway safety in the Commonwealth.

4. To recommend through the Director to the Governor and to

the General Assembly any and all corrective measures, policies, procedures, plans and programs which are needed to make the movement of passengers and property on the highways of the Commonwealth as safe as practicable.

5. To design, implement, administer and review such special programs or projects as are needed to promote highway safety in the Commonwealth.

6. To integrate highway safety activities into the framework of transportation safety in general.

§ 33.1-395. Board of Transportation Safety established.—There is hereby established a Board of Transportation Safety, hereafter the "Board", to advise the Director, the Secretary of Transportation and the Governor on transportation safety matters. The Board shall elect its chairman and shall meet at his call. The Board shall seek to identify the elements of a comprehensive safety program for all transport modes operating in Virginia. In addition, the Board may consider, study, and report on the following issues: (i) the identification of the unique safety needs of each particular mode; (ii) the identification of the common elements of safe transportation operation, regardless of mode; (iii) the adaptation of proven safety practices and technology in use in one mode to other modes; (iv) the identification of the common elements of accident situation; and (v) consider and approve the allocation of grant funds made available to the Department.

§ 33.1-396. Appointment, term, compensation of Board members.—The Governor shall appoint, for four-year terms, and in a number not to exceed fifteen, such employees and officials of the State government, such representatives of the transport carrier industry, and such members of the public at large as he shall deem advisable to achieve a membership which is both competent and representative of all transportation modes. All such appointments shall be subject to confirmation by the General Assembly. The members of the Board shall be reimbursed for their necessary and actual expenses incurred in the performance of their duties.

2. That §§ 2.1-64.15 through 2.1-64.22 in Chapter 7.2 of Title 2.1 of the Code of Virginia are hereby repealed.

3. That the Governor may transfer an appropriation or any portion thereof within a State agency established, abolished or otherwise affected by the provisions of this act, or from one such agency to another, to support the changes in organization or responsibility resulting from or required by the provisions of this act.

4. That as of the effective date of this act, the Department of Transportation Safety shall be deemed successor in interest to the Division of Highway Safety. All right, title and interest in and to any real or tangible personal property vested in the Division of Highway Safety as of the effective date of this act shall be transferred to and taken as standing in the name of the Department of Transportation Safety.

5. That the provisions of this act shall be effective on and after the first day of July, nineteen hundred seventy-eight.

APPENDIX B

LINEAR REGRESSION ANALYSIS

For selected sets of data shown in Exhibits 12 through 36 a linear regression equation using the least squares formula was generated to project trends. The linear regression analysis, also known in this case as a time series analysis, correlates an independent variable (time) to a dependent variable and generates a line which is the best fit to the "known" data. Extrapolating from this line, trend projections can be made.

To evaluate the projections, a correlation coefficient (r) for each equation was obtained. An r of $+1.0$ represents a perfect fit of the data points to the regression line. Hence, as r approaches $+1.0$, the data fit to the line improves. An r value approaching zero indicates no relationship between two points and the trend described.

In viewing the data plotted in Exhibits 12 through 36, one should pay particular attention to the magnitudinal increments on the ordinate scale. The correlation coefficient (r) assesses the data fit and the validity of the projections. The amplitudinal changes graphically exhibited by the plotted data may be visually deceptive if close attention is not given to the increments on the ordinate scale. In areas related to highway safety accident research, the following relationships have been observed for r :

0 to ± 0.20	Zero to slight relationship
± 0.21 to ± 0.45	Low but typical of accident research levels
± 0.46 to ± 0.85	Moderate to high; correlations over 0.60 are rare in highway safety field
± 0.86 to ± 1.00	Extremely high

(See "The Evaluation of Highway Traffic Safety Programs" prepared for the U. S. Department of Transportation, March 1976.)

APPENDIX C

BOATING QUESTIONNAIRE

Below is a list of potentially significant safety problems. The problems have been divided into administrative, legislative and organizational problems and accident problems. Please identify and rank order* the 3 most significant problems in each of the two categories. Feel free to add problems to the list. Finally, please explain or elaborate on each of the problems that you have rank ordered so that we can better pinpoint problem areas.

Administrative, Legislative and Organizational Problems

Rank

_____	Legislative Deficiencies _____
_____	_____
_____	Inadequate or Inappropriate Regulations _____
_____	_____
_____	Inadequate Enforcement of Regulations _____
_____	_____
_____	Overlapping or Conflicting Jurisdiction with the U. S. Coast Guard _____
_____	_____
_____	Vessel Design _____
_____	_____
_____	Lifesaving Gear _____
_____	_____
_____	Inadequate Training _____
_____	_____
_____	Economic Problems/Inadequate funds for Safety Improvements _____
_____	_____
_____	Inadequate Data Base for Program Management _____
_____	_____
_____	Inadequate Provision of Weather Information _____
_____	_____

* Rank Order Key: Problem ranked 1 is most important, problem ranked 2 is second in importance, problem ranked 3 is third in importance.

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Accident Problems

Rank

_____ Alcohol Caused Accidents _____

_____ Inattention of Operator _____

_____ Operator Fatigue _____

_____ Speed _____

_____ Vessel Defects _____

_____ Environmental Factors _____

_____ Waterways - Inadequate Channelization, Poor Placement of Signing and
Bouys, etc. _____

_____ Hazardous Materials _____

Comments

MASS TRANSIT QUESTIONNAIRE

Below is a list of potentially significant safety problems. The problems have been divided into administrative, legislative and organizational problems and accident problems. Please identify and rank order*the 3 most significant problems in each of the two categories. Feel free to add problems to the list. Finally, please explain or elaborate on each of the problems that you have rank ordered so that we can better pinpoint problem areas.

Administrative, Legislative and Organizational Problems

Rank

_____	Legislative Deficiencies _____
_____	_____
_____	Inadequate or Inappropriate Regulations _____
_____	_____
_____	Inadequate Enforcement of Regulations _____
_____	_____
_____	Vehicle Design _____
_____	_____
_____	Safety Equipment _____
_____	_____
_____	Inadequate Training _____
_____	_____
_____	Economic Problems/Inadequate Funds for Safety Improvements _____
_____	_____
_____	Inadequate Data Base for Problem Identification and Program Management _____
_____	_____

Accident Problems

Rank

_____	Alcohol Caused Accidents _____
_____	_____

* Rank Order Key: Problem ranked 1 is most important, problem ranked 2 is second importance, problem ranked 3 is third in importance. 435

Rank

 Inattention of Operator

Operator Fatigue

Pedestrian Accidents

Vehicle Defects _____

Environmental Factors

Speed _____

Improper Design and Location of Transit Stops

Comments

GENERAL AVIATION QUESTIONNAIRE

Below is a list of potentially significant safety problems. The problems have been divided into administrative, legislative and organizational problems and accident problems. Please identify and rank order*the 3 most significant problems in each of the two categories. Feel free to add problems to the list. Finally, please explain or elaborate on each of the problems that you have rank ordered so that we can better pinpoint problem areas.

Administrative, Legislative and Organizational Problems

Rank

_____	Legislative Deficiencies	_____
_____	Inadequate or Inappropriate Regulations	_____
_____	Inadequate Enforcement of Regulations	_____
_____	Inadequate Data to Support Changes in Rules or Regulations Which Might Help Achieve and Maintain a Higher Level of Pilot Proficiency	_____
_____	Crew and Passenger Protection Procedure	_____
_____	Airport Operating Procedure	_____
_____	Inadequate Training	_____
_____	Inadequate Provision of Weather Information	_____
_____	Air Traffic Control Problems	_____

* Rank Order Key: Problem ranked 1 is most important, problem ranked 2 is second in importance, problem ranked 3 is third in importance.

Accident Problems

Rank

Alcohol Caused Accidents

Inattention of Pilot

Pilot Fatigue

Mechanical Defects

Environmental Factors

Hazardous Materials

Comments

RAIL QUESTIONNAIRE

Below is a list of potentially significant safety problems. The problems have been divided into administrative, legislative and organizational problems and accident problems. Please identify and rank order*the 3 most significant problems in each of the two categories. Feel free to add problems to the list. Finally, please explain or elaborate on each of the problems that you have rank ordered so that we can better pinpoint problem areas.

Administrative, Legislative and Organizational Problems

Rank

_____ Inadequate Jurisdiction Over State Rail Safety _____

_____ Inadequate Enforcement of Regulations _____

_____ Equipment Deficiencies _____

_____ Inadequate Training _____

_____ Economic Problems/Inadequate Funds for Safety Improvements _____

_____ Inadequate Data Base for Program Management _____

_____ Lack of Personnel _____

Accident

Rank

_____ Alcohol Caused Accidents _____

_____ Inattention of Operator _____

* Rank Order Key: Problem ranked 1 is most important, problem ranked 2 is second in importance, problem ranked 3 is third in importance.

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Rank

_____ Operator Fatigue _____

_____ Speed _____

_____ Track Defects _____

_____ Environmental Factors _____

_____ Hazardous Materials _____

Comments
