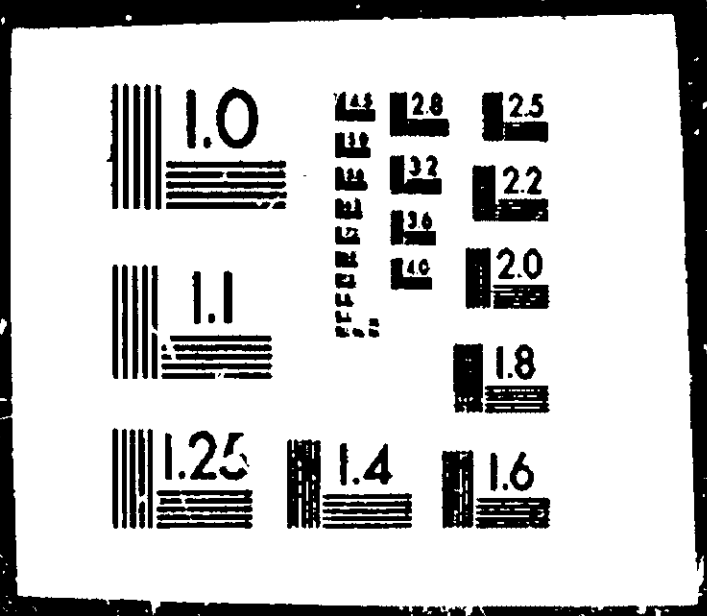

PB82-136268

Safety Report: Status of Department of Transportation's Hazardous Materials Regulatory Program

(U.S.) National Transportation Safety Board
Washington, DC

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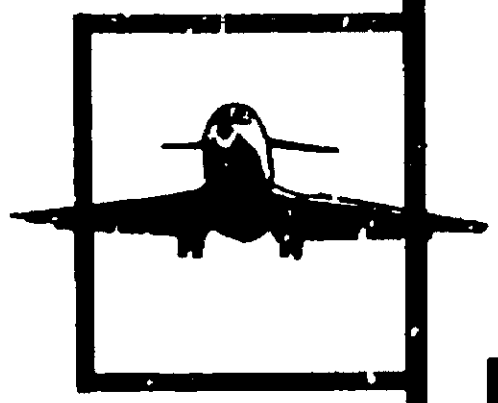
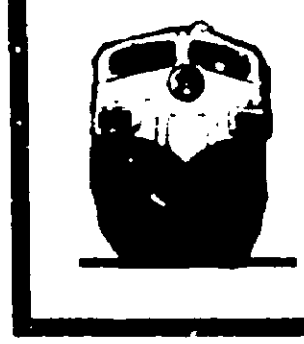
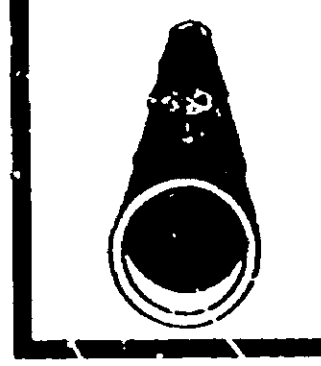
U.S. Department of Commerce
National Technical Information Service







NATIONAL TRANSPORTATION SAFETY BOARD

WASHINGTON, D.C. 20594

SAFETY REPORT

STATUS OF DEPARTMENT OF TRANSPORTATION'S HAZARDOUS MATERIALS REGULATORY PROGRAM

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16.Abstract

Over a 12-year period, the Safety Board has identified and recommended corrective measures for the many unsafe conditions it has identified in the shipment of hazardous materials, but too often, action necessary to remedy the identified problems has been delayed -- sometimes for years. Delayed correction of identified safety problems perpetuates substantial losses, both economic and personal, to shippers, carriers, employees of the transportation mode, emergency response personnel, and the public.

The Safety Board reviewed hazardous materials legislation and regulations promulgated by the Federal government, analyzed the DOT hazardous materials safety programs, and reviewed Safety Board reports on hazardous materials accidents and its recommendations for corrective actions. This report identifies reasons for past delays in implementing corrective safety improvements by DOT and identifies changes needed in DOT's management of the hazardous materials transportation program to bring about more timely correction of identified safety hazards which is essential for reducing losses in life, injury, and property damage.

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FOREWORD

The mission of the National Transportation Safety Board is to improve transportation safety. This is done by determining the probable causes of accidents through direct investigations and public hearings; through staff review and analysis of accident information; through evaluations of operations, effectiveness, and performance of other agencies; through special studies and safety investigations; and through published recommendations and reports.

Since its establishment, the Safety Board has been concerned that solutions to certain safety problems of national significance have not been implemented as rapidly as possible, even though the solutions were known, feasible, and timely. Therefore, the Safety Board has begun to identify such problems each year and aggressively pursue implementation of specific safety improvements. One of these safety objectives during fiscal year 1981 was to bring about regulatory changes in hazardous materials shipping responsibilities to provide incentives for the shipping industry to improve the level of safety in hazardous materials transportation operations.

This Safety Report analyzes previous activities in the development of the present Department of Transportation hazardous materials regulatory programs, and identifies changes which, if implemented, would significantly enhance hazardous materials transportation safety.

NATIONAL TRANSPORTATION SAFETY BOARD
WASHINGTON, D.C. 20594

SAFETY REPORT

Adopted: September 29, 1981

STATUS OF DEPARTMENT OF TRANSPORTATION'S HAZARDOUS MATERIALS REGULATORY PROGRAM

INTRODUCTION

The Department of Transportation (DOT) estimates that more than 250,000 shipments of hazardous materials move daily through the nation's transportation systems, and that an estimated 200 billion ton-miles of hazardous materials are shipped annually in the United States. These shipments originate from more than 100,000 locations within the 50 States, and more than 2 million persons are involved in the handling of these shipments.

Experience indicates that most hazardous material shipments are transported safely, and DOT's accident data indicate that the overall transportation safety record for hazardous materials is good. Fewer than 400 shipments annually are involved in accidents which result in injuries or loss of life. However, when involved in transportation accidents, some commodities and types of shipments have the potential for causing enormous losses of life and property, and investigations of these accidents have established that additional safety precautions must be implemented in order to minimize or avert these losses. From 1977 through 1979, nearly 80 percent of the fatalities involved only five specific commodities in three commodity groups - flammable liquids, pressurized liquefied gases, and corrosive liquids. During 1980, after enhanced thermal and tank-head protection was added to most railroad tank cars that transport liquefied petroleum gases, liquefied petroleum gases were no longer a major cause of fatalities. Almost 80 percent of the fatalities in 1980 were caused by flammable and combustible liquids. On the other hand, the nature of many hazardous material shipments is such that a single catastrophic event could reverse these statistics overnight.

Over a 12-year period, the Safety Board has identified and recommended corrective measures for the many unsafe conditions it has identified in the shipment of hazardous materials, but too often, action necessary to remedy the identified problems has been delayed -- sometimes for years. (See appendix.) Delayed correction of identified safety problems perpetuates substantial losses, both economic and personal, to shippers, carriers, employees of the transportation mode, emergency response personnel, and the public.

The Safety Board conducted this review to determine the reasons for past delays in implementing corrective safety improvements by DOT and to determine if DOT's management of the hazardous materials program can be improved to bring about more timely correction of identified safety hazards and thereby reduce losses of life, injury, and property damage. In performing this review, the Safety Board reviewed hazardous materials legislation and regulations promulgated by the Federal government, analyzed the DOT hazardous materials safety programs, and reviewed Safety Board reports on hazardous materials accidents and its recommendations for corrective actions.

EVOLUTION OF HAZARDOUS MATERIALS REGULATORY PROGRAMS

Since 1866, the Congress has enacted more than 50 laws directly or indirectly affecting hazardous materials shipments. (1) (Numbers in parentheses refer to Literature Cited, p. 25.) Early laws specified protective measures for hazardous material shipments. However, the first Federal law requiring the development of safety standards for the transportation of hazardous materials was enacted in 1871 (16 Stat.-441) and related to transportation by water. This law made it a criminal offense to transport certain explosives, flammables, and acids on passenger-carrying vessels in navigable waters unless such transportation complied with safety regulations issued by the Secretary of the Treasury (the predecessor agency of the United States Coast Guard (USCG) was a part of the Treasury Department at this time). Subsequent acts of Congress enlarged this authority. Other legislation required the USCG to adopt the Interstate Commerce Commission (ICC) regulations for classifications of hazardous materials and the packing, marking, and labeling requirements for shipments in portable containers 1/ (46 USC 170(7)(a)). (2)

The first Federal law authorizing safety standards for the transportation of hazardous materials by rail or truck (by land) was the Transportation of Explosives Act, enacted in 1908 (35 Stat. 554). The law prohibited the transportation of explosives and other dangerous articles except as provided by regulations promulgated by the ICC and made violations of the law a criminal offense. (2) (3) Later, this law was amended to include additional classes of hazardous materials such as flammable liquids and solids, corrosive liquids, compressed gases, poisons, and etiological agents. These amendments made shippers, contract carriers, and private carriers subject to the ICC regulations. Prior to this, the ICC regulations applied only to common carriers. 2/

The first Federal law specifically authorizing safety standards for the transportation of hazardous materials by air was enacted in 1958 (Public Law 85-726). Among other actions, this law transferred from the Civil Aeronautics Board, which had implicit authority to regulate air transportation of hazardous materials, to the Federal Aviation Agency (FAA) authority to regulate the transportation by air of explosives and other dangerous articles.

Thus, immediately before the formation of the DOT (Public Law 89-670), the FAA had authority regarding air shipments of hazardous materials, the USCG had authority regarding marine shipments, and the ICC had authority regarding surface shipments. However, because the USCG was required by law to adopt the ICC regulations for classifications of hazardous materials and the packing, marking, and labeling requirements for shipments in portable containers and because the FAA chose to base its regulations on the ICC requirements, the ICC became the lead agency for determining the thrust of hazardous materials transportation safety programs, except for bulk marine hazardous materials shipments. (2) In carrying out its lead-agency status in developing safety regulations for hazardous materials transportation, the ICC looked to industry-developed standards for surface transportation, which became the basis for regulations applicable also to marine and air transportation.

1/ Portable containers are packagings that are designed primarily to be loaded into, on, or temporarily attached to the transport vehicle or ship, and equipped with skids, mountings, or accessories to facilitate handling by mechanical means.

2/ A common carrier is a person who "holds himself out" to the public generally to transport goods or persons for compensation.

The ICC's indiscriminate reliance on the regulated shippers and carriers to provide most of the expertise for developing regulations essentially resulted in nongovernment entities carrying out governmental functions. (14) A 1979 report of the Senate Committee on Commerce, Science, and Transportation stated, "The ICC regulations appear to be an accretion of specific requirements, based on special permits (now called exemptions) that the ICC issued to industry on a product-by-product, container-by-container, procedure-by-procedure basis." (2)

In 1921, the ICC was authorized by law (41 Stat. 144) to use the services of the Association of American Railroads' Bureau for the Safe Transportation of Explosives and Other Dangerous Articles (now named the Bureau of Explosives). The 1979 Senate Committee report characterized the ICC's use of this authority as, "The ICC took this congressional authorization literally; it practically turned the hazardous materials transportation safety program over to AAR's Bureau of Explosives." (2)

In 1960, the law was amended (Public Law 86-710) again so as to authorize the ICC to use the services of carrier and shipping associations in its hazardous materials safety program. Again, according to the Senate report, "the ICC took this authorization literally, turning to the trade associations for assistance, particularly for the development of the requirements for large containers, such as tank cars and tank trucks." The ICC did not have sufficient expertise to analyze the industry recommendations, and it did not establish objective criteria or procedures to guide the industry in its development of standards. Generally, the ICC accepted the industry-developed standards. (2)

In 1966, the ICC had only 11 professionals assigned to its hazardous materials regulatory program, and this small staff did not have the technical knowledge required to perform all its assigned functions. (2) In 1966, Congress created the DOT and transferred to it all safety regulatory authority for the transportation of hazardous materials formerly vested in the ICC, FAA, and the USCG. However, the existing diffuse industry-oriented framework in which most of the regulation of the transportation of hazardous materials had evolved, remained essentially unchanged. (3)

DOT HAZARDOUS MATERIALS SAFETY PROGRAMS

Since the DOT was formed, deficiencies in hazardous materials safety programs in each of the modal Administrations have been identified in both government and private reports and in testimony before congressional committees. Program elements which have been commonly criticized and which were the subjects of many past Safety Board recommendations are organization and management, data collection, regulations, and inspection and enforcement activities.

Organization and Management

Under the DOT, Federal authority for hazardous materials transportation safety was, for the first time, the responsibility of one Federal department. While all hazardous materials authority resided in the DOT, the Secretary of Transportation (Secretary) had direct authority only over marine transportation of hazardous materials. The Administrators of the Federal Railroad Administration (FRA), the FAA, and the Federal Highway Administration (FHWA) were directed by law (Public Law 89-670) to administer the hazardous materials safety regulations and programs applicable to the carriers under their respective jurisdictions. (5)

The Secretary recognized that in order to reach their destinations, hazardous material shipments often must be transported by two or more of the transportation modes. Believing it important that the regulations governing intermodal shipments be compatible to the fullest extent feasible and that requirements for safety be consistent, in 1967 the Secretary formed a Hazardous Materials Regulations Board (HMRB) to coordinate the DOT's hazardous materials safety programs. The HMRB, which included representatives of each modal Administration, was charged by the Secretary to develop regulations that:

1. Would be the same for all modes of transportation;

2. Would be adopted under the same procedures; and

3. Would be published in the same document or series of documents.

However, since the air, highway, and railroad modal Administrators had independent authority to establish regulations for carriers, actions recommended by the HMRB did not have to be carried out by these Administrators. (2) (5) Even so, a plan to completely revise the hazardous materials safety regulations was developed and published in 1968. The objectives of the proposed actions were to:

1. Eliminate the differences in the requirements among the modes, except where the inherent characteristics of an individual mode required a difference.

2. Make the regulations consistent with international requirements, except where national needs required a difference.

3. State the container requirements as performance standards rather than manufacturing specifications.

4. Require labels on packages that would give cargo handlers information as to the kind of hazard that the material posed during transportation.

5. Require placards on vehicles that would inform policemen and firemen about the hazards that would result from a spill of the products. (4)

In a 1970 internal DOT memorandum, the Director of the Office of Hazardous Materials (OHM), (an organization within DOT consisting primarily of staff transferred from the ICC and serving as staff support for the HMRB) advised the Secretary concerning the difficulties being experienced by the small hazardous materials staff in accomplishing its responsibilities:

> The present staff is able to do little more than process industry requests for regulatory action (exemptions). We have not been able to change the product-by-product, container-by-container, procedure-by-procedure system which the Department inherited from the Interstate Commerce Commission. This system is cumbersome and costly to the Department and also the shippers and carriers subject to our regulations. (2)

Because of continuing concern about hazardous materials transportation safety, the Congress passed the Hazardous Materials Transportation Control Act of 1970 (Public Law 91-458). Its purpose was "to reduce deaths and injuries to persons and reduce damage to property caused by accidents involving any carrier of hazardous material." This act imposed two major new duties on the Secretary:

1. Establish facilities and technical staff within the Federal government capable of evaluating the hazards involved in the transportation of hazardous materials, and

2. Establish control systems to provide technical advice to law enforcement and firefighting personnel and others involved in meeting emergencies arising out of the transportation of hazardous materials.

Also, the act made clear that the authority granted was additional to the authority provided under the 1871 and 1908 laws and their subsequent amendments.

In 1973, the Office of Hazardous Materials' budget request for fiscal year 1974 described the status of DOT's hazardous materials program as follows:

> Ever since the inception of hazardous materials control in transportation by passage of the Transportation of Explosives Act of 1908, there has been no real direction or coordination in this important safety function. The diffusion of authority among and between the four modal administrations for carriers, and the Office of Hazardous Materials for shippers, results in overlapping, gaps, and different treatment of the same materials in different transportation situations. (2)

In June 1973, a DOT proposal to amend portions of its authorizing statutes (Sections 831-835 of Title 18) was introduced in the Congress (S. 2064, 93d Congress, 1st Session). It proposed amendments that would vest all hazardous materials safety rulemaking authority in the Secretary, extend his rulemaking authority, and permit assessment of civil penalties for regulatory violations. Congress held extensive hearings on the proposed amendments, receiving testimony from the Safety Board, DOT, shippers, carriers, trade associations, and others about safety problems related to the shipment of hazardous materials, the hazardous materials regulations, the DOT exemption process, and the DOT proposal for changes in the existing laws governing the transportation of hazardous materials. (5)

Rather than make the limited changes in the existing law proposed by the DOT, Congress developed an entirely new law, the Hazardous Materials Transportation Safety Act of 1974 (HMTA). (6) The HMTA provided a new framework for hazardous materials transportation safety regulations and provided new, comprehensive authority to the Secretary for restructuring and redirecting DOT's hazardous materials programs. In addition to the changes proposed by DOT, the Congress provided:

- A hazardous materials transportation safety policy statement;
- A redefinition of hazardous materials; 3/
- A redefinition of the scope of transportation activities covered by legislation;
- A requirement to coordinate hazardous materials routing regulations;
- Authority to establish "criteria for handling hazardous materials;"

3/ The fundamental basis for hazardous materials regulations was changed from the inherent nature of the materials to the risks posed by the quantity and form in which the materials are shipped in transportation.

- o Authority to require registration of persons who transport or cause to be transported or shipped in commerce hazardous materials;
- o Limitations on exemptions or waivers from regulations;
- o A requirement for a safety analysis to determine the level of safety for proposed exemptions;
- o Restrictions against transporting radioactive materials in passenger aircraft unless use of these materials is for research or for medical diagnosis or treatment;
- o A restatement of the Secretary's duties for evaluating the risks of transporting hazardous materials and materials alleged to be hazardous;
- o Authority to order suspension or restriction on the transportation of materials found to pose an imminent hazard;
- o A 2-year limit on existing permits, contracts, certificates, licenses, or privileges granted before the Act.

The HMTA did not repeal earlier legislation (18 U.S.C. 831-835) under which hazardous materials regulations had been promulgated; however, this authority was repealed in November 1979 by Public Law 96-129. This action did not affect the authority provided to the Secretary for marine transportation by 46 U.S.C. 170.

Using this new authority, in July 1975 the Secretary dissolved the HMRB and created the Materials Transportation Bureau (MTB). The MTB was designated as the lead agency for the DOT's hazardous materials transportation safety program. The Secretary delegated to the MTB responsibilities for: 4/

- o Issuing hazardous materials regulations;
- o Designating the quantity and form of materials that are to be subject to the hazardous materials regulations;
- o Classifying hazardous materials as to the kind and degree of hazard that a material poses to public safety during transportation;
- o Prescribing safety standards for the containers (such as boxes, barrels, drums, cylinders, portable tanks, tank cars, and tank trucks) that are used to transport the various classes of hazardous materials;
- o Prescribing labels for containers and placards for vehicles used to transport the various classes of hazardous materials; and
- o Prescribing handling, stowing, and other in-transit requirements for the various classes of hazardous materials. (2)

The MTB was made responsible for issuing all hazardous materials regulations, but the initiative for developing regulations applicable to a single mode was left with the modal Administrations. Also, the responsibility for monitoring and enforcing the hazardous materials regulations for a particular mode of transportation was left with the

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4/ This delegation did not include regulation of marine transportation of bulk hazardous materials which was delegated to the USCG.

modal Administration. The MTB was given full regulatory authority only in respect to manufacturers of containers and in respect to shippers whose shipments were moved by two or more transportation modes. (24)

In early 1978, in response to mounting public concern about rail accidents involving hazardous material releases resulting in casualties, injuries, and large losses of property, the Secretary established a special hazardous materials task force to evaluate DOT's hazardous materials programs. In its report of September 1978, the task force made six recommendations for improving the DOT hazardous materials safety programs which the Secretary adopted. The recommendations were:

- o to establish a Standing Committee on Hazardous Materials,
- o to continue efforts to make Environmental Protection Agency and DOT regulations as compatible as practicable,
- o to analyze civil and criminal penalties for fairness,
- o to establish a centralized hazardous materials information system,
- o to develop an implementation plan for a National Hazardous Materials Response Center,
- o to design an emergency response training program and to publish a more comprehensive hazardous materials emergency guide.

With regard to DOT's management and organization of the hazardous materials safety program, the task force evaluation found that:

- o Until recently, true planning has been lacking in the development and modification of hazardous materials regulations; and 5/
- o The "joint development and prior coordination" requirements contained in RSPA's delegation of authority for rulemaking make it difficult for the Department to develop a cohesive, aggressive hazardous materials regulatory program.

An April 1979 report prepared by the Congressional Research Service of the Library of Congress at the request of the Committee on Commerce, Science, and Transportation, U.S. Senate, made the following observations about DOT's organization and management of the hazardous materials safety programs:

- o The five reorganizations within the last 4 years have adversely affected the MTB's communications with the industry and the MTB's ability to interpret and enforce the regulations. Additionally, there are insufficient resources within the MTB to effectively carry out its responsibilities.
- o DOT's organizational structure is ineffective for developing regulations for bulk transportation of hazardous materials by land. For example, the MTB issues the regulations for tank trucks and tank cars, but does not control the staff which develops the regulations. (2)

5/ The only recent regulatory planning improvement cited in the report was the development by the MTB of its "First Annual Regulatory Review and Development Plan and Schedule of Rulemaking Actions," March, 1978.

A November 4, 1980, General Accounting Office (GAO) report on DOT's hazardous materials programs found that the Department had not developed a comprehensive program or assigned specific responsibilities within the Department for evaluating all risks associated with transporting hazardous materials. (8)

In a February 19, 1981, Safety Board report on the effectiveness of Federal and State hazardous materials enforcement programs for highway transportation of bulk hazardous materials by commercial motor vehicles, the Safety Board concluded that DOT's delegation to the MTB of the coordination of all DOT hazardous materials activities had not succeeded in shaping the hazardous materials enforcement activities of all transportation modes into a well coordinated enforcement program. (9)

Hazardous Materials Data

With regard to DOT's gathering and use of hazardous materials data, as early as 1969, the Safety Board determined that:

- The accident and incident data gathered through the different modal systems are not comparable nor are they compatible for assessing the potential for an identified problem in one mode to exist in another transportation mode, and

- A common, properly defined hazardous materials accident and incident data-gathering system is a logical and necessary prerequisite for solving many of the problems now confronting all Administrations. (10)

The Safety Board recognized that many factors besides the physical characteristics of the commodity influenced--perhaps even controlled--a shipper's decision to use a particular transportation mode for shipment, e.g., such factors as the freight rate or cost structure of a mode, the reliability, and the level of service. (10)

A 1971 Safety Board report expressed concern about the degree to which safety was being considered during the development of government policies and programs affecting transportation safety and demonstrated the need for the DOT to collect, analyze, and publish comparable transportation safety statistics for each transportation mode. This report included an illustration of the use of the differences in modal statistics for program development. Data were gathered by the Safety Board for a limited time span from various sources and accident rates for each transportation mode were developed and compared as ratios. The ratio between the then "safest" transportation mode (pipeline) and the then "least safe" transportation mode (highway) was about 1,000 to 1. The Safety Board concluded that the gathering and use of safety statistics which would permit such comparisons (and others) on a long-term basis would assist the DOT in developing more effective government policies and programs regarding freight transportation. (11)

In a 1973 Report to the Congress, the GAO found that the DOT hazardous materials program was handicapped by a lack of basic data on hazardous materials. Based upon its evaluation, GAO recommended that the Secretary establish a management information system for developing and maintaining data about hazardous materials movement. (12)

The DOT's September 1978 report also recognized there were many deficiencies in the types of data being collected. The task force reported:

- Despite isolated efforts by DOT elements, there is no centralized, cohesive information system for identifying such matters as where hazardous materials are produced and stored, the mode by which they are transported, and the geographic and physical nature and population density of the routes over which they move. (7)

Just days after the release of DOT's report, a U.S. House of Representatives Committee on Government Operations study which reviewed five previous hearings (1969, 1971, 1972, 1973, and 1976), in reporting on its April 25, 1978, hearing, analyzed DOT's role in providing information to emergency response personnel about the handling of hazardous materials transportation accidents and found that:

- The Department has a clear responsibility for maintaining a reporting system to provide information and advice to local communities for meeting hazardous materials transportation emergencies.

- DOT's responsibility for maintaining a reporting system is unrestricted by limitations regarding the procedures the Department may use.

- The present hazardous materials incident data reporting system is inadequate. In using its reporting system, the Department has largely disregarded its mandate to provide information and advice to local communities for meeting hazardous materials transportation emergencies. (13)

In 1979, DOT began the development of a new hazardous materials reporting system. This included a contract arrangement for the gathering of information about the adequacy of emergency response actions. 6/ However, recent evaluations of DOT hazardous materials programs have reported on data collection deficiencies. A 1979 Safety Board report concerning survival in hazardous materials transportation accidents concluded that:

- The MTB's current reporting system requires the occurrence of numerous accidents in order to identify data trends that demonstrate a need for improved safeguards.

- The MTB cannot evaluate its safeguards affecting hazardous materials transportation releases adequately or promptly because it does not have a procedure by which survival action data are collected and used.

- The DOT hazardous materials incident reporting system requires carriers to help prepare data to support trend analysis that is directed toward packaging rather than improved survivability; both factors need to be considered.

- The MTB needs to change its policy of relying solely on carriers to support its accident/incident reporting system; it should marshal all the available resources for collecting accident information to support its regulatory program. (25)

6/ Redevelopment of the hazardous materials reporting system is still in progress and an evaluation of the results will not be possible for some time.

The 1980 GAO report found that:

- o The Department (DOT) does not have complete or accurate information on the volumes and/or types of hazardous materials shipped or the identity and locations of all firms involved in the hazardous materials industry. Without this information, the Department cannot effectively plan its inspection and emergency response activities, and

- o The Department (DOT) has not developed an information system that is complete or accurate, or which allows for comprehensive planning and analysis of the hazardous materials safety program. As a result, the Department can neither determine the extent of problems involved in transporting hazardous materials nor assure the Congress--and the American public--that it is using its limited staffing and funding resources efficiently and effectively. (8)

In its 1981 report, the Safety Board concluded that the DOT has no accurate, comprehensive information about the characteristics of hazardous materials transportation on highways. (9)

Hazardous Materials Regulations

General.--In its 1973 budget request, the DOT's Office of Hazardous Materials provided its assessment of previous hazardous materials regulatory efforts and of the existing regulations:

> Parts and pieces have been added when the needs were demonstrated by severe accidents and catastrophes, or to accommodate the needs of individual manufacturers and shippers. The body of laws and regulations has grown like "Topsy," piece by piece, package by package, rule by rule. As a result, the structure today is an ill-fitting, ramshackle, largely out-dated set of confusing and conflicting requirements. In the past, decisions were made by "knowledgeable persons" who performed more as practitioners than technical experts. The Bureau of Explosives of the Association of American Railroads furnished all technical input and proposed most new regulations. This accounts for the inclusion in the regulations of over 200 specific delegations of authority to the Bureau of Explosives to act for the U.S. Government. (2)

In its 1974 testimony before the Senate Committee on Commerce, the Safety Board identified the following general areas where improvements were needed in the hazardous materials regulations:

- o Improving technical safety analysis to be able to anticipate accidents. From such analysis, appropriate safety requirements can be developed.

- o Greater attention during regulatory development to the crash behavior of hazardous materials packagings and containers. (5)

Additionally, the Safety Board cited accidents it had investigated to support its recommended changes and to demonstrate the long delays by DOT in implementing corrective actions for identified safety problems.

On April 15, 1976 (41 FR 15972), the MTB consolidated, into 49 CFR Parts 171-179, the hazardous materials regulations for transportation by water (except transportation in

bulk), air, rail, and highway. These regulations had previously been published in separate modal regulations. (Regulations regarding transportation by pipeline remain separate.) The stated objectives of this consolidation were to standardize requirements and to organize the regulations so that they would be more easily understood. However, the "product-by-product, container-by-container, procedure-by-procedure" basis for the regulations was unchanged and the dependence on the industry-developed standards continued. Additionally, the delegations of authority to industry organizations were left largely intact.

Since consolidating the hazardous materials regulations in 1976, DOT efforts primarily have been devoted to issuing exemptions, incorporating exemption requirements into the regulations, and striving for greater harmony between the DOT regulations and international standards. However, some notable exceptions were:

- Adoption of requirements for additional crashworthiness safeguards for certain railroad tank cars (Dockets HM-144, -145, and -174). Additional crashworthiness safeguards for existing DOT 105 tank cars still are under consideration (Docket HM-175).

- Initiation of rulemaking which proposed registration of shippers and carriers but without the averment required by Section 106(b) (HMTA). 7/ The advance notice of rulemaking was published on March 1, 1974, (39 FR 7950), and the notice of proposed rulemaking was issued on March 8, 1979 (44 FR 12326); however, no final rule has yet been adopted (Docket HM-115).

- Adoption of the United Nations numerical identification system for hazardous materials to improve the ability of emergency response personnel to quickly identify hazardous materials and to assure accurate notice of the identity of a hazardous material (Docket HM-126).

- Identification of and listing as "forbidden" certain hazardous materials found too hazardous to be transported in commerce (Docket HM-159).

- Implementation of routing requirements for radioactive materials transported on highways. It should be noted, however, that this action was thrust upon DOT by State and local governments which implemented prohibitions against such transportation because of the perceived public risks (Docket HM-164).

- Initiation of action to redefine the "flammable solid" and "oxidizer" hazardous materials classifications (Docket HM-178).

Bases for Developing Safety Regulations.--In a 1971 special study regarding the development of DOT regulations, the Safety Board found that:

- The framework on which the existing regulations are based is inadequate since it does not provide a logical framework for developing objectives, approaches, and analytical methods necessary for overcoming the difficulties of the existing regulations or for improving hazardous materials safety regulations.

7/ The averment (a formal assertion as a fact) prescribed by the Act is that the registrant is in compliance with all applicable criteria established under section 106(a).

- o A risk-based framework for developing an effective hazardous materials transportation safety program is needed, is feasible, and should be implemented without delay. Among other advantages, a risk-based framework provides a systematic, uniform basis for identifying and evaluating the risks posed by the transportation of hazardous materials, provides a means for equitable comparisons of risk levels among transportation modes, aids in identifying potentially catastrophic system failures, serves as a rational basis for developing public policy about the acceptance or rejection of hazardous materials transportation risks, and is responsive to future needs for developing efficient, equitable regulations for all transportation systems and all hazardous materials. (14)

Because the Safety Board believed that marine transportation of bulk hazardous materials presented the potential for the largest scale catastrophic transportation loss, a separate review of this DOT regulatory program was conducted. The findings of this review reinforced previous Safety Board concerns about the lack of responsiveness of the present regulatory framework for identifying safety problems, deficiencies in existing regulations, and the lack of a process for identifying safety problems. (15)

In 1978, after the Secretary had sufficient opportunity to modify the hazardous materials programs to reflect the new authority and the Congressional direction provided in the HMTA, the Safety Board evaluated DOT's efforts to assess the threat posed to public safety as a result of derailments of trains carrying hazardous materials and DOT's implementation of measures to mitigate the threats. The evaluation showed:

- o DOT 112A/114A tank cars which transport flammable gases and anhydrous ammonia were designed by the tank car and railroad industries in order to maximize economies on the railroad transportation system. No specific safety methodology to determine unreasonable risk to the public was employed.

- o No adequate safety methodology has been developed by Federal regulatory agencies in order to determine risks for the transportation of hazardous materials by rail as a basis for regulation.

- o When the DOT 112A/114A tank cars were accepted on special permit, the safety features of thermal insulation and a center sill were eliminated and the capacity of DOT 112A/114A tank cars was increased from 11,000 gallons to 33,000 gallons. There was no analysis or full-scale testing of the consequences of crashes before these designs and equipment were placed into service.

- o The accident history of the DOT 112A/114A tank cars has demonstrated safety shortcomings in their design, and increased losses to the public. The Safety Board has recommended safety changes to DOT 112A/114A tank cars since the accident in Laurel, Mississippi, in 1969. The Board concludes that the acceptance of the 112A/114A cars on special permits introduced an unreasonable risk to the public because safety assessments made at that time were inadequate.

Safety Board testimony before the Congress in 1978 about DOT's regulatory program supported the development and use of safety analysis guidelines to identify accident risks and to implement corrective action before catastrophes occurred. The substance of MTB's response to this criticism was:

> One of the objectives of the DOT's hazardous materials classification system is to signify accident risks before accidents occur. The packaging and handling requirements are based on the safety risks presented for each class of material. The communications regulations are designed to provide an alert to the risk. While an adequate data base for performing safety analysis does not exist, they can be a useful tool. Services for development of a comparative modal risk assessment were contracted in February 1978, and results of this assessment will be used for evaluating existing regulations and exemption applications for transporting explosives and flammable cryogenic liquids. (17)

In its report on the 1978 authorization hearing, the Senate Committee on Commerce, Science, and Transportation instructed that serious consideration be given to the publication of guidelines describing methods available for conducting safety analyses that would uncover accident risks before major accidents occurred. (18)

With regard to DOT's hazardous materials regulatory development program, the DOT task force stated in its September 1978 report:

- The hazardous materials rulemaking programs may be one of reaction rather than initiative.
- Historically, hazardous materials regulations have not been based on a systematic commitment to a single long-term objective, such as "maintaining the current level of public safety" or "improving the current level of public safety."
- Until recently, little effort was made to predict the frequency of occurrences, their expected severity, or the magnitude of risk as a basis for regulatory decision-making in hazardous materials transportation activities.
- The most recent major improvement in hazardous materials regulations was the consolidation of requirements for all transportation modes. (7)

Exemption Process.--In May 1970, a tank truck partially loaded with liquefied oxygen exploded killing 2 persons, injuring 30 others, and resulting in substantial property losses. The Safety Board's investigation of the accident revealed that the transportation was being performed under a special permit (now called exemption). Justification for the requested exemption conditions was based on three previously exempted tank designs which varied greatly from the instant liquefied oxygen tank truck design. The DOT exempted the transportation of this commodity without any safety analysis of the potential effects of the deviations of the design from the regulations. (20) (This exemption was withdrawn in January 1972.)

A 1972 Safety Board special study questioned some aspects of the DOT's regulatory programs governing the transportation of hazardous materials by air. The study revealed also that through use of the special permit process, the safeguards contemplated by the Administrative Procedures Act were being circumvented in what amounted to "private rulemaking" for new shipping techniques or processes. (19)

On August 1, 1975 (40 FR 32758), the MTB issued an NPRM, "Hazardous Materials Regulations; Proposed Exemption Procedures," Docket No. HM-127, Notice No. 75-7, to prescribe procedures for applying for and processing of exemption requests. The NPRM cited the requirement of Section 107 of the HMTA for a safety analysis and listed

11 proposed actions which the applicant would have to take in requesting an exemption. Several of these proposed actions were intended to meet the congressionally-mandated requirement for a safety analysis. Based upon its review of the proposed exemption procedures, the Safety Board concluded that they did not fulfill the intent of Section 107 of the HMTA of 1974 regarding a safety analysis and that the information which would be required to be filed would not produce a clear presentation of the relevant safety concerns. Therefore, the Safety Board recommended that the Secretary:

- Prescribe the content and form for a safety analysis statement to accompany applications for exemptions to the Materials Transportation Bureau's regulations. (HM-75-1)

- Revise Proposed 49 CFR 107.5(b)(9) to require submission of a safety analysis statement, in the form prescribed by the Secretary of Transportation, to support the applicant's belief that his proposed exemption will achieve the level of safety specified in 49 CFR 107.5(b)(9)(i) and (ii). (HM-75-2)

The exemption procedure requirements made final on October 10, 1975, did not incorporate the changes sought by either of these Safety Board recommendations.

In testimony before the Congress in 1979, the Safety Board stated that the DOT should require a safety analysis as a part of any application for an exemption -- an analysis which would explore the potential effect of the exemption upon transportation safety and evaluate the effectiveness of proposed control measures. In response to the Safety Board's statement, DOT told the Congress that:

> Present exemption requirements (49 CFR 107) prescribe the information to be submitted with each application. This includes an assessment of any increased risks posed by the shipment and specification of safety control measures to compensate for any increased risks. An exemption is issued only when analysis of technical information presented indicates that the level of safety for the proposed shipment is equivalent to the level of safety achieved by following existing requirements or is consistent with public interest and the policy of the HMTA. Contrary to the Safety Board's characterization, the exemption process actually is an acknowledgment of industrial innovations which have surpassed the state-of-the-art on which the regulations were based. (17)

The Senate Committee on Commerce, Science, and Transportation instructed that the DOT evaluate current exemption procedures to determine if further improvements, particularly in the area of safety analysis, were warranted.

A 1979 Senate Committee on Commerce, Science, and Transportation report concluded that too much of MTB's time was devoted to processing exemptions from the hazardous materials regulations. (2) During May 1981, Safety Board staff selected at random 50 DOT exemption approvals for review to determine the current basis for granting exemptions. Only 2 of the 50 applications included an analysis of the potential effects of the proposed changes upon transportation safety; both applications were from Federal agencies. The other requests provided little more than a guess, based on experience, that the proposed shipment would result in safety equal to that currently achieved by similar transportation performed in accordance with the regulations or in accordance with other approved exemptions. Restrictions imposed upon exempted

shipments generally were no more than a listing of requirements from the regulations for similar shipments and were developed by DOT staff rather than by the applicant as required by the regulations. These limited reviews not only are not sufficient to identify safety hazards posed by the requested transportation conditions, but also appear to be an inefficient use of the DOT's small hazardous materials staff.

Shipper-Carrier Registration.--The Safety Board testimony before the Congress in 1978 supported the registration of carriers of hazardous materials in bulk as a means of motivating safer operations as envisioned by the HMTA. The DOT responded to the Senate Committee on Commerce, Science, and Transportation that the FHWA required carriers to register flammable gas cargo tank trucks and that this registration identified the carriers. In the FHWA's views, a requirement for additional registration would not provide safety benefits commensurate to the costs. (17) In its report on the 1978 authorization hearing, the Senate Committee instructed the DOT that Safety Board recommendations for registration of all bulk carriers be seriously considered. It was noted that carriers of liquefied petroleum gases in bulk, the transportation of which poses tremendous potential for harm, were not currently required to register. (18)

The September 1978 report by the DOT task force found that carrier and shipper registration could assist the DOT to better manage its limited inspection resources. Also, the task force reported that registering carriers of "high risk" materials could facilitate enforcement of various safety regulations. (7)

In 1980 during testimony before the Senate Committee on Commerce, Science, and Transportation, the Chairman of the Hazardous Materials Advisory Council (HMAC) 8/ called for new national policies for improving hazardous materials transportation safety. One of the new policies advocated was to change the permissive provision of the HMTA for registration of carriers and shippers to mandate their registration. He asserted that registration was essential if effective control over the hazardous materials community was to be implemented and for disseminating current regulatory and compliance information to the hazardous materials community. (21)

Inspection and Enforcement Activities

There are about 21,000 suppliers of hazardous material containers, more than 100,000 locations from which shipments originate, and more than 1,300,000 vehicles regularly used for transporting hazardous materials. Each shipper and carrier location and each vehicle is subject to DOT inspection. Information about the number of DOT inspections and its inspection manpower for 1977 and 1978 are presented in Tables 1 and 2 on page 16. (1978 is the latest year for which this information was available.)

A 1972 Safety Board special study of the DOT's regulatory programs for air transportation of hazardous materials reported that most hazardous materials enforcement actions taken during the preceding year were initiated as followup actions on the investigation of accidents or incidents rather than as a result of inspection and monitoring. (19)

In its 1973 Report to the Congress, the GAO found that the DOT hazardous materials program was handicapped by a lack of basic data on hazardous materials, a small and unsystematic inspection effort, and inadequate enforcement actions. Based upon its evaluation, among other things, it was recommended that the Secretary:

8/ HMAC is an organization composed of specialists representing shippers, air carriers, motor carriers, railroads, water carriers, freight forwarders, pipelines, insurers, container manufacturers, and others involved with shipments of hazardous materials.

Table 1.--Hazardous Materials Inspections and Investigations

	USCG		FAA		FHWA		FRA		MTB		Total	
	77	78	77	78	77	78	77	78	77	78	77	78
Operations/Facilities												
Carriers			11,892	8,508	1,865	1,521	2,208	2,014	20	15	15,782	10,058
Shippers					1,261	1,203	618	672	35	72	1,915	1,947
Container Manufacturers					194	93	41	109	26	82	261	236
Freight Forwarders							93	114	2	6	95	120
Waterfront	7,290	16,865							3		7,293	16,865
Other										44		44
Vehicles/Vessels												
Railroad Tank Cars							9,700	16,206			9,700	16,206
Railroad Freight Cars							5,040	7,783			5,040	7,783
Vessels	40,842	40,886									40,842	40,886
Motor Vehicles					8,447	3,790					8,447	8,790
Accidents/Incidents		4,185	180	150	259	398	814	405		2	718	5,090
Totals	48,132	61,936	12,072	8,658	6,639	7,007	18,009	27,305	86	111	85,088	103,025

Prior to 1978, the USCG did not maintain records on Accidents/Incidents.

SOURCE: DOT, Ninth Annual Report, Hazardous Materials Transportation

Table 2.--Hazardous Materials Inspectors

Operating Administration	Full-Time Inspectors		Part-Time						Total Work Years	
			Inspectors		Percent of Time		Work Years			
	1977	1978	1977	1978	1977	1978	1977	1978	1977	1978
USCG	0	0	717	733	15	15	107.6	110.0	107.6	110.0
FAA	18	13.5	109	691	35	4	38.2	28.0	56.2	41.5
FHWA	9	9	221	133	21	25	46.4	33.3	55.4	42.3
FRA	16	18	42	54	15	15	6.3	8.1	22.3	26.1
MTB	5	8	3	1	6	6	0.2	0.1	5.2	8.1
TOTALS	48	48.5	1,092	1,612			198.7	179.5	246.7	228.0

SOURCE: DOT, Eighth and Ninth Annual Reports, Hazardous Materials Transportation

- o Reassess the adequacy of the DOT's hazardous materials efforts compared with the volume and danger of the materials.

- o Develop a plan for a more effective hazardous materials inspection and enforcement program. (12)

In its 1974 testimony before the Senate Committee on Commerce, the Safety Board stated that "there is a vital need to improve the level of compliance with existing safety regulations and procedures." The Safety Board recognized that monetary penalties could motivate compliance, but expressed the belief that additional approaches for motivating compliance by shippers and carriers should be explored to promote a high degree of compliance. (5)

After receiving testimony on the DOT's hazardous materials safety programs in 1978, the Senate Committee on Commerce, Science, and Transportation instructed that the DOT determine whether the Department's authority to assess penalties for violations of hazardous materials transportation regulations was being adequately utilized. Also, the DOT was encouraged to conduct a vigorous inspection program to assure compliance with the HMTA. (18)

With respect to the Department's inspection and enforcement activities, the DOT's September 1978 task force report found that:

> The degree of compliance with the regulations at the initial shipping point affects adherence to the regulations throughout the transportation chain. Because of the limited size of the Department's inspection force and the importance of compliance by container manufacturers and shippers who offer hazardous materials to carriers, it is necessary to assure proper allocation of resources to the various segments of the regulated industry. Registration programs could aid in scheduling and allocating resources for inspections. Registering carriers of "high risk" materials could facilitate enforcement of various safety regulations. (7)

The 1979 Senate Committee on Commerce, Science, and Transportation report on DOT hazardous materials programs concluded that the Department's inspection and enforcement programs were not adequate. It reported that:

> Penalty figures indicate that DOT agencies do not take vigorous enforcement actions, thus indicating a lack of credibility and effectiveness in DOT inspection programs.
>
> DOT inspection forces are inadequate to properly inspect industry activities, thus there is no assurance that the hazardous materials industry is complying with the regulations, and with only six full-time inspectors, MTB will be unable to properly inspect even a representative percentage of the 20,000 container manufacturers/suppliers and 100,000 shippers of hazardous materials.
>
> DOT does not seem to be properly allocating its inspection resources among all segments of the industry. There is a strong emphasis on inspection of carrier operations. (2)

A 1979 letter to the Senate Committee on Commerce, Science, and Transportation by a major shipper offered the following assessment of the DOT's inspection and enforcement programs:

In general, compliance efforts should place more emphasis on violations of packaging and similar regulations intended to prevent accidents, rather than the apparent current emphasis on "paper work" regulations, which while important, cannot be considered preventive in nature. Frequently, compliance results are brought to the attention of a shipper after an inordinate interval of time. Alleged violations ought to be immediately brought to a shipper's attention so that, if necessary, adequate education and correction may be accomplished while the problem is current.

In general, existing procedures for the imposition of civil penalties do not appear to give adequate recognition to the number of exposures to which a given shipper may be subject. In view of the extremely detailed and highly complex nature of hazardous materials regulations, it is unreal to expect that each and every shipment of hazardous materials will be complete and in absolute compliance in each and every detail. Observed violations, therefore, should be considered in the context of a given shipper's total performance under the regulations relative to the aggregate number of its shipments, the seriousness of such violations, the existence or absence of a genuine concern for, and implementation of, policies and procedures for compliance, and similar factors. Although experience to date is somewhat limited, the current dispersion among at least five separate agencies of enforcement responsibilities relative to shipper activities would appear to mitigate against such "coordinated" consideration of shipper's violations. (22)

In October 1979, the Air Transport Association (ATA) petitioned the DOT to require that commercial shippers and freight forwarders of hazardous materials provide initial and recurrent training for personnel through DOT-approved commercial programs and that DOT establish the curriculum and designate acceptable programs. It was envisioned that the DOT would make no attempt to verify that each shipper meets the requirements until a violation is detected. At this time, the shipper would be required to prove compliance with the training requirements or lose the right to ship hazardous materials until the requirement was fulfilled. The ATA believed that such actions by the DOT would markedly improve compliance with hazardous materials regulations. (23)

In the November 4, 1980, GAO report of DOT's hazardous materials programs, the following deficiencies were noted:

- Risk profiles of carriers and shippers and selected route studies would be useful in planning inspection coverage, providing for better information to response personnel, and evaluating the potential of accidents occurring during the transportation process. Given its limited staff and data base, such a program may not be feasible at this time. However, these limitations should not preclude the Department from giving greater attention to certain aspects of risk evaluations.

- The Department inspects only a minimal number of carriers and shippers each year primarily because of the small number of inspectors available compared to the large number of companies involved in manufacturing and transporting hazardous materials.

- The Department does not have a program to identify those companies presenting the greatest risk to the public. Generally, selecting the companies for inspections is the responsibility of field investigators. As

a result, high-risk companies may not be selected for inspection to ensure compliance with the hazardous materials regulations. (8)

The 1981 Safety Board report on the effectiveness of hazardous materials enforcement programs for bulk hazardous materials highway transportation revealed the following inspection and enforcement problems:

- Hazardous materials truck inspections focus primarily on such violations as incorrect shipping papers, placarding, and sometimes such obvious violations as leaking cargo.

- No agency of the DOT inspects tank truck manufacturers, reconditioners, or retesters to ensure that the DOT specification tank trucks in use are, in fact, safe for bulk hazardous materials transportation.

- Reliable information on industry compliance with the Federal Motor Carrier Safety Regulations and the Federal Hazardous Materials Regulations has not been developed.

- Explicit criteria for deciding which highway carriers and shippers of bulk hazardous materials to audit has not been developed. Thus, there is no means to ensure that inspection resources are focused on the companies most in need of attention.

- There is no uniform national truck safety or hazardous materials enforcement program, although some aspects of the field activities have been standardized, the differences in policies and operating procedures from region to region are substantial.

- Because the DOT does not exercise its authority to enforce the Federal Hazardous Materials Regulations in intrastate commerce, and because there is little State enforcement of the hazardous materials regulations, the percentage of intrastate hazardous materials truck carriage inspected is very small. (9)

ANALYSIS

The Safety Board has prepared this overview of prior studies of DOT's hazardous materials regulatory programs to show how the regulatory programs evolved and the reasons for its great reliance on industry, not only in the development of regulations but also for self-policing. Further, it shows that in spite of years of changes in organizational placement of the regulatory function and consolidation of the regulations themselves, little improvement has been made in the effectiveness of DOT regulatory programs. Rather, voluminous "red tape" has resulted, the need for or the safety results of which cannot be assessed.

Further, congressional, GAO, and Safety Board reviews of DOT's implementation of its hazardous materials safety responsibilities since 1969 have consistently identified the same deficiencies and needed improvements. (The appendix contains a listing of Safety Board recommendations in the area of hazardous materials since 1969.)

The Safety Board believes that DOT's long delays in completing implementation of the Safety Board's recommendations are not necessarily the result of reluctance or disagreement on the part of DOT, but rather organizational inability to bring about needed changes in a timely fashion because administration and management of the hazardous materials regulatory program is fragmented and the scheme of regulations is unmanageable.

Management of Safety Programs

The carryover of the pre-DOT dispersal of hazardous materials transportation jurisdiction into the DOT modal administrations' autonomous control over hazardous materials programs prevented the early development of a cohesive and effective departmental program. In spite of a clear legislative mandate for a coherent departmental hazardous materials program in the HMTA, the fragmented administration of hazardous materials safety programs continues today. Modal Administrators independently determine their hazardous materials program objectives, priorities for inspection and enforcement, basis for development of regulations, and standards for granting exemptions.

The Safety Board recognizes that hazardous materials safety improvement needs are only a few of the many demands placed upon the modal administrations' finite resources and that the Administrators often must shift resources to improve what each believes to be the most acute safety problem facing an agency. However, it is not reasonable to expect that the DOT will develop an effective departmental hazardous materials safety program for administering the requirements of the HMTA unless overall program objectives, priorities, and performance standards are developed to guide the Administrators in their implementation of modal hazardous materials safety activities.

A central organization, RSPA, charged with the coordination of the DOT's hazardous materials programs exists; however, it lacks authority for establishing a departmental program and for establishing standards to ensure that departmental objectives and priorities are effectively implemented by each DOT Administration. Without an overall mandate by the Secretary for a single, departmental hazardous materials program to be implemented by the Administrations, the Safety Board believes that long-range planning, establishment of department-wide hazardous materials safety objectives, and effective use of limited DOT resources for administering the responsibilities assigned by the HMTA will not be accomplished.

The Secretary needs to be able to realign authority and, if necessary, personnel for the development of a hazardous materials safety program that will result in: (1) effective use of existing resources, (2) development of integrated inspection and enforcement programs which concentrate DOT efforts upon high-priority safety problems, (3) application of safety analysis techniques in all modes, (4) adoption of the congressionally-mandated "quantity and form" basis for development of hazardous materials regulations, (5) evaluating the effectiveness of the safety enhancement programs for which the Congress made provisions in the HMTA, and (6) coordinating industry efforts to reduce the potential for harm when hazardous materials are released during transportation accidents.

The DOT Administrations, in particular the RSPA, have in recent years begun to acknowledge the ineffectiveness of existing DOT safety programs and existing regulations to provide an adequate level of safety. However, unless the DOT places within one agency the responsibility for developing and assuring the implementation of a cohesive and effective hazardous materials transportation safety program, the DOT hazardous materials safety regulatory activities will continue to be fragmented and unmanageable.

Legislative initiatives of the late 19th and early 20th centuries established a regulatory framework that has dominated transportation activities for almost 70 years in which regulations were developed product-by-product, container-by-container, and procedure-by-procedure. Based in part on the findings of Safety Board accident investigations, in 1974, the Congress changed the fundamental framework for hazardous materials regulations from one based on the inherent nature of the materials to one based on the risks posed to the public by the quantity and form in which materials are shipped.

The HMTA authorized the regulation of materials only in quantities and forms that pose unreasonable risks as shipped in transportation. The DOT's September 1978 task force report pointed out that the most recent major improvement in the hazardous materials regulations was the consolidation of the requirements for all transportation modes. Even though legislation directed the DOT to change the framework for hazardous materials regulations, DOT has not analyzed, on the basis of the risks posed by the quantities and forms shipped, the existing hazardous materials regulations to determine their combined effects upon safety or the continuing necessity to regulate materials. Also the DOT has not restructured substantially its basis for developing regulations or for identifying the materials authorized to be regulated. Few of the regulations developed since the DOT was assigned responsibility for administering transportation safety programs have been developed using the regulatory framework mandated by the Congress in the HMTA--assessing risks based upon the form and quantity of materials being shipped. This has resulted in the continued promulgation of requirements which are difficult for shippers, carriers, and the regulatory agencies themselves to administer efficiently and effectively. The complexity of the regulations also can add substantial costs to the transportation of hazardous materials and frequently results in noncomplying shipments being offered for transportation.

The Safety Board believes that a review of the existing regulations, using the HMTA criteria of quantities and forms that pose unreasonable risks, would identify many currently regulated materials which in specific quantities and forms do not pose unreasonable risks and, thus, should not be regulated. Through the use of appropriate safety analysis techniques and available data for reviewing the existing regulations, the Safety Board believes the DOT will find that many existing requirements do not contribute to the safe shipment of hazardous materials and can be eliminated. Further, a comprehensive analysis of the regulations would undoubtedly identify safety problems with specific quantities and forms of shipments for which existing requirements do not provide adequate protection and pose unreasonable risks to the public, employees of shippers and carriers, and emergency response personnel. After identifying the quantity and forms of materials which should be regulated and the safety requirements which should be imposed, most requirements could be stated as performance criteria and reduce the necessity for product-specific regulations and ultimately eliminate the necessity for many exemption requests. The above actions would allow shipper, carrier, and DOT inspection resources to be more effectively applied to shipments that pose unreasonable risks during transportation.

The DOT's exemption process, as administered, does not require applicants to perform any safety analysis for evaluating the effects of requested changes; however, the regulations require applicants to provide assessments which realistically can be accomplished only through use of safety analysis techniques. Use of safety-analysis to identify and evaluate the hazards posed by shipments to be exempted would contribute to the formulation of useful regulations while helping to identify deficiencies in existing safety requirements. The DOT should develop guidelines and establish standards to assist applicants for exemptions in using appropriate safety analysis and, after a reasonable lead time, require appropriate safety analyses to be filed as a part of any application. Through this process, an accurate determination that the proposed exemption requirements provide an acceptable level of safety could, for the first time, be made by the DOT.

In developing the HMTA, Congress recognized that the product-specific regulations and use of conventional inspection and enforcement programs would not bring about desired safety improvements. For this reason, the Congress authorized specific actions in the HMTA to guide the improvement of the current regulatory programs in addition to expanding the basic authority of the DOT.

Congressionally-identified initiatives included in the HMTA for improving DOT safety programs have not been undertaken by the DOT to determine their effectiveness as a tool for motivating improved safety in hazardous materials transportation. The Safety Board believes that these authorized actions, if focused upon specific safety problem areas, could motivate safer operations by shippers and carriers as well as make more efficient use of the DOT's inspection and enforcement resources. For example, the procedure proposed in the October 1979 petition of the Air Transport Association should be studied further as an avenue for increasing safety through better compliance with the hazardous materials regulations. Also, the DOT could require registration of individual shippers or carriers, of shippers and carriers of high-risk products, or of specific segments of a transportation mode as a means to enhance accountability for improving safety.

CONCLUSIONS

1. Safety Board, congressional, and GAO reviews of the DOT's implementation of its hazardous materials safety responsibilities, since 1969, have consistently identified the same needed improvement in DOT programs. An internal DOT study conducted in 1978 reached essentially the same conclusion.

2. The HMTA provides the Secretary of Transportation sufficient flexibility to efficiently and effectively organize the DOT's effort and provides adequate regulatory and other authority for achieving needed hazardous materials safety improvements.

3. The congressionally-mandated framework in the HMTA for the development of hazardous materials regulations has not been implemented by the DOT.

4. The present hazardous materials regulations have never been analyzed to determine their combined effect upon transportation safety and their contribution to today's level of safety is unknown.

5. All materials now classified as hazardous may not pose unreasonable risks and would not meet the criteria for being regulated under the HMTA.

6. The DOT's use of the exemption process to add product-specific requirements to the general body of hazardous materials regulations remains the primary means of regulating the transportation of hazardous materials.

7. The congressionally-mandated requirement for the use of safety analysis to identify hazards and evaluate the effectiveness of applied safeguards for exemptions has not been implemented by the DOT.

8. DOT Administrations do not focus their limited hazardous materials inspection and enforcement capabilities upon either the industry segment in which most effective improvements could be accomplished or upon the specific products that pose the greatest potential for harm.

9. Congressionally-identified initiatives included in the HMTA for improving DOT safety programs have not been undertaken by the DOT to determine their effectiveness as tools for motivating improved safety in hazardous materials transportation.

10. DOT has not established a cohesive, effective management system for efficiently administering all of its hazardous materials responsibilities.

11. Present DOT operations have resulted in long delays in correcting identified safety problems, and many of these identified but uncorrected problems have resulted in continued, needless losses of lives, injuries, and large property losses.

12. During recent years, DOT management has begun to recognize the need for and act upon some hazardous materials program improvements, but the dispersal of responsibility within the DOT structure prevents development of an effective effort.

RECOMMENDATIONS

As a result of this review, the National Transportation Safety Board made the following recommendations to the Secretary, Department of Transportation:

Charge a single DOT agency with the responsibility for planning and administering an integrated, effective department-wide hazardous materials transportation safety program and provide it with sufficient authority to assure that the program objectives are achieved by each DOT Administration. (Class II, Priority Action) (I-81-11)

Require the development of safety analysis guidelines and standards appropriate for identifying unreasonable transportation safety risks and require their use by all DOT Administrations when analyzing potential safety problems and evaluating the effectiveness of hazardous materials regulations. (Class II, Priority Action) (I-81-12)

Require applicants for exemptions to submit, as part of their justification for the exemption, applicable safety analyses performed in accordance with DOT guidelines and standards. (Class II, Priority Action) (I-81-13)

Require that all new proposals for hazardous materials regulations be based upon the congressionally-mandated "quantity and form" framework to ensure that the protective measures required for each quantity and form of a material reduce the hazards to a level such that the public is exposed to no unreasonable risks. (Class II, Priority Action) (I-81-14)

Analyze existing hazardous materials regulations for each mode of transportation and eliminate requirements for material shipments in quantities and forms which do not pose unreasonable risks. (Class II, Priority Action) (I-81-15)

Implement and complete within 5 years a program to perform safety analysis evaluations of the existing requirements for shipments in quantities and forms which are determined to pose unreasonable risks and correct the safety deficiencies identified by the evaluations. (Class III, Longer Term Action) (I-81-16)

BY THE NATIONAL TRANSPORTATION SAFETY BOARD

/s/ JAMES B. KING
Chairman

/s/ ELWOOD T. DRIVER
Vice Chairman

/s/ G. H. PATRICK BURSLEY
Member

McADAMS and GOLDMAN, Members, did not participate.

September 29, 1981

LITERATURE CITED

1. "Federal Legislation Affecting the Transportation of Hazardous Materials with Selected Bibliographies and Data," Prepared for Transportation Research Board's National Strategies Conference, Williamsburg, Virginia, February 17-20, 1981.

2. Congressional Research Service, Library of Congress, "Hazardous Materials Transportation: A Review and Analysis of the Department of Transportation's Regulatory Program," April 1979.

3. Knorst, W. J., "Interstate Commerce Law and Practice," College of Advanced Traffic, Chicago, Illinois, 1953.

4. Department of Transportation Departmental Order 1100.11, July 27, 1967.

5. Senate Report No. 93-108, Transportation of Hazardous Materials; To Amend the Laws Governing the Transportation of Hazardous Materials, June 12, 13, and 14, 1974, Committee on Commerce, p. 38.

6. Title I—Hazardous Materials of the Transportation Safety Act of 1974, (Public Law 93-633).

7. Department of Transportation, "Report of the Hazardous Materials Task Force," September 1978.

8. Report by the Comptroller General of the United States, "Programs for Ensuring the Safe Transportation of Hazardous Materials Need Improvement," (Report No. CED-81-5) November 4, 1980.

9. "Safety Effectiveness Evaluation: Federal and State Enforcement Efforts in Hazardous Materials Transportation by Truck," (NTSB-SEE-81-2) February 19, 1981.

10. National Transportation Safety Board, "A Study of Uniform Reporting for all Modes of Transportation in Reporting Incidents and Accidents Involving the Shipment of Hazardous Materials," March 21, 1969.

11. "Special Study: Fatality Rates for Surface Freight Transportation 1963 to 1968," (NTSB-STS-71-4) August 18, 1971.

12. Comptroller General of the United States Report to the Congress, "Need for Improvement in Regulating Transportation of Hazardous Materials," (Report No. B-164497) May 1, 1973.

13. House Report No. 95-1644, "Emergency Response to Hazardous Materials Transportation Accidents," Committee on Government Operations, September 29, 1978.

14. "Special Study: Risk Concepts in Dangerous Goods Transportation Regulations," (NTSB-STS-71-1) January 27, 1971.

15. "Analysis of the Safety of Transportation of Hazardous Materials on Navigable Waters of the United States," (NTSB-MSS-72-2) March 15, 1972.

16. "Safety Effectiveness Evaluation: Analysis of Proceedings of the National Transportation Safety Board into Derailments and Hazardous Materials, April 4-6, 1978," (NTSB-SEE-78-2) June 23, 1978.

17. Senate Report No. 95-7[illegible], "Authorization Appropriations for the Hazardous Materials Transportation Act," Committee on Commerce, Science, and Transportation, April 18, 1978.

18. Senate Report No. 95-814, "Hazardous Materials Transportation Act Authorization for Fiscal Year 1979," Committee on Commerce, Science, and Transportation, May 12, 1978.

19. "Special Study of the Carriage of Radioactive Materials by Air," (NTSB-AAS-72-4) April 25, 1972.

20. "Highway Accident Report, Liquefied Oxygen Tank Explosion Followed by Fires in Brooklyn, New York, May 30, 1970," (NTSB-HAR-71-6), May 12, 1971.

21. Senate Report No. 96-94: Reauthorization Under the Hazardous Materials Transportation Act, Committee on Commerce, Science, and Transportation, April 1980.

22. L. L. Dintiman, Director, Corporate Distribution, Union Carbide Corporation, April 1979 letter to Senate Committee on Commerce, Science, and Transportation.

23. Air Transportation Association of America, "Petition for Rulemaking Re: DOT-MTB Commercially Approved and Mandatory Application of National Training Programs for Shippers and Freight Forwarders of Hazardous Materials by Air," October 29, 1979.

24. Senate Report, "Rail Transportation of Hazardous Materials," Subcommittees on Federal Spending Practices and Open Government, and Civil Service and General Services of the Committee on Governmental Affairs, March 20, 1978, pp. 125-126.

25. "Special Investigation Report: Survival in Hazardous Materials Transportation Accidents," (NTSB-HZM-79-4) December 6, 1979.

APPENDIX

SAFETY BOARD RECOMMENDATIONS FOR IMPROVEMENT OF DOT HAZARDOUS MATERIALS SAFETY REGULATORY PROGRAMS

Since 1968, the Safety Board has made numerous recommendations to DOT Administrations for improving their administration of the HMTA. Those recommendations issued by the Safety Board which are applicable to DOT hazardous material regulatory programs are listed below by program function. Following this listing is the text and status of each recommendation.

Safety Analysis

HM-75-1*	I-76-1*	H-71-27*	H-71-28*	H-71-32
HM-75-2*	I-76-2*	I-78-9	H-71-29	M-72-12
M-72-13	R-79-17			

* Recommendation consolidated into I-78-9 on August 13, 1979.

Exemptions

HM-75-1	HM-75-2	H-71-44	H-71-45	A-72-96

Regulations

I-71-5	I-80-1	H-72-28	A-74-26	R-80-12
I-76-4	I-80-2	H-72-31	A-79-90	R-80-14
I-76-6	I-81-3	H-69-4	H-72-37	R-78-22
I-78-1	I-81-4	H-71-28	A-72-96	A-72-91
I-78-12	I-81-5	M-68-12	M-72-12	R-79-17
I-79-1	I-81-6	H-71-29	R-69-11	R-68-15
I-79-2	H-69-1	M-72-13	R-72-44	R-79-24
I-79-15	H-71-30	A-72-87	R-75-16	R-80-15
I-79-16	H-71-65	A-72-88	R-75-22	R-79-28
R-78-32	R-79-22			

Inspection and Enforcement

I-76-10	I-79-4	H-81-2	H-81-4	H-81-7
I-79-3	I-81-3	H-81-3	H-81-6	H-81-8
H-81-9	R-79-17			

Data and Reporting Requirements

I-71-4	I-79-14	H-69-2	H-71-69	R-69-14
I-76-9	I-79-15	H-69-3	H-81-3	R-75-22
I-76-10	I-79-16	H-69-4	H-81-5	R-79-16
R-80-15				

Recommendation: HM-75-1
Issued: To DOT on September 25, 1975
Status: Closed, no longer applicable on August 13, 1979

Prescribe the content and form for a safety analysis statement to accompany applications for exemptions to the Materials Transportation Bureau's regulations.

Recommendation: HM-75-2
Issued: To DOT on September 25, 1975
Status: Closed, no longer applicable on August 13, 1979

Revise Proposed 49 CFR 107.5(b)(9) to require submission of a safety analysis statement, in the form prescribed by the Secretary of Transportation, to support the applicant's belief that his proposed exemption will achieve the level of safety specified in 49 CFR 107.5(b)(9)(i) and (ii).

Recommendation: I-71-4
Issued: To DOT on August 18, 1971
Status: Closed, no longer applicable on June 9, 1976

. . . develop and publish, on a regular basis, comparable data on the losses and loss rates associated with all modes of freight transportation. This data should include losses in all forms: death, injury, property damage, and delays due to accidents.

Recommendation: I-71-5
Issued: To DOT on August 18, 1971
Status: Closed, no longer applicable on June 9, 1976

. . . for both the employees in a segment of the transportation industry and for the general public, [give safety] active consideration during the formulation and implementation of all aspects of national transportation policy.

Recommendation: I-76-1
Issued: To DOT on March 3, 1976
Status: Closed, no longer applicable on August 13, 1979

Require applicants submitting proposals for transportation of detonable materials to make an examination of the transportation conditions for detonation risks and describe what they found.

Recommendation: I-76-2
Issued: To DOT on March 3, 1976
Status: Closed, no longer applicable on August 13, 1979

Publish guidelines describing methods available for conducting safety analyses that would facilitate the discovery of detonation risks and standards to be met in preparing the proposal.

Recommendation: I-76-4.
Issued: To DOT on October 2, 1979
Status: Open--Unacceptable Action

Establish regulations for quality specifications and quality control procedures in the manufacture, packaging, and loading of detonable hazardous materials.

Recommendation: I-76-6
Issued: To DOT on June 2, 1976
Status: Closed---Unacceptable Action on November 23, 1977

Establish a regulation to require the safety registration statements authorized by Section 106(b) of the Hazardous Materials Transportation Act of persons transporting bulk shipments of pressurized, liquefied petroleum gases in a form and quantity capable of causing widespread injury and property damage in transportation accidents.

Recommendation: I-76-9
Issued: To DOT on October 20, 1976
Status: Open—Unacceptable Action

Redesign its hazardous materials incident data reporting system so it will generate information about what emergency actions were taken, why they were taken, and what influence they had on the outcome of the emergency, for use in training firefighters and law-enforcement personnel to handle hazardous materials transportation emergencies.

Recommendation: I-76-10
Issued: To DOT on October 20, 1976
Status: Open--Unacceptable Action

Develop a procedure to report such information regularly to Federal and State agencies with responsibilities for developing emergency training programs for law-enforcement and firefighting personnel.

Recommendation: I-78-1
Issued: To DOT on January 17, 1978
Status: Open--Unacceptable Action

Develop, publish, and maintain an official list of regulated hazardous materials that cross-references all U.S., U.N., IMCO, and IATA commodity description and reference numbers. The list should be arranged for convenient use by all persons engaged in the export or import of hazardous materials.

Recommendation: I-78-9
Issued: To DOT on June 20, 1978
Status: Open--Acceptable Action

Develop and implement a safety plan for utilizing the best available safety analysis technology to determine regulatory actions needed to adequately control hazardous materials transportation risks.

Recommendation: I-78-12
Issued: To DOT on June 29, 1978
Status: Open--Acceptable Action

Incorporate requirements imposed on shippers and carriers by Environmental Protection Agency Hazardous Materials regulations in 49 CFR 100-179, to assure that these regulations are complete and do not contain contradictions or gaps.

Recommendation: I-79-1
Issued: To DOT on August 14, 1979
Status: Closed--Acceptable Action on July 28, 1980

Expedite the ongoing DOT program of evaluating every hazardous materials safety regulation with the objective of revising each regulation so that the persons who need to use them can understand them.

Recommendation: I-79-2
Issued: To DOT on August 11, 1979
Status: Closed--Acceptable Action on July 28, 1980

Publish all nonemergency amendments to the regulations and simultaneously and at regular intervals such as semiannually with a cross-reference index, that also includes all previously released emergency amendments.

Recommendation: I-79-3
Issued: To DOT on August 14, 1979
Status: Open--Acceptable Alternate Action

Expand the MTB compliance program to work through the executives of shipping companies as a means of improving compliance with regulations through increased industry awareness and as a means of eliciting from these executives information on the effectiveness of the regulations.

Recommendation: I-79-4
Issued: To DOT on August 14, 1979
Status: Open--Acceptable Action

Expand the hazardous materials regulations compliance assurance program by formalizing compliance policies and management systems that will serve as a model for other departments with regulatory responsibility, and that ultimately will lead to the ability to measure the effectiveness of the program.

Recommendation: I-79-14
Issued: To RSPA on December 11, 1979
Status: Open—Await Reply

Incorporate hazardous materials incident survival action data in the new centralized hazardous materials information system which the Department of Transportation is establishing under recommendation No. 3 of the September 1978 report of the hazardous materials task force.

Recommendation: I-79-15
Issued: To RSPA on December 11, 1979
Status: Open—Await Reply

Establish procedures to promptly utilize survival action data and to analyze the harm from an accident in evaluating the influence of regulatory safeguards upon the outcome of serious hazardous materials incidents.

Recommendation: I-79-16
Issued: To RSPA on December 11, 1979
Status: Open—Await Reply

Use survival action data collected to revise emergency guidelines, incorporating recommended actions, their purpose, and the effect they should have in reducing losses following the release of hazardous materials.

Recommendation: I-80-1
Issued: To RSPA on October 21, 1980
Status: Open—Await Reply

Amend 49 CFR 174.25 to include a requirement that the volume, in gallons, and the temperature at which the pressurized liquefied gases were loaded in tank cars be entered on bills of lading, waybills, and shipping orders.

Recommendation: I-80-2
Issued: To FRA on October 21, 1980
Status: Open—Acceptable Action

Develop guidelines for handling tank cars containing pressurized liquefied gases at accident sites based on research and tests of a representative sample of damaged tank cars.

Recommendation: I-81-3
Issued: To RSPA on March 17, 1981
Status: Open - Await Reply

Develop and use a common shipper identifier in all DOT Hazardous Materials Compliance Records.

Recommendation: I-81-4
Issued: To RSPA on September 30, 1981
Status: Open - Await Reply

Amend 49 CFR 173.31(a)(7) to require that all tank cars authorized for ethylene oxide service be equipped with a coupler vertical restraint system in accordance with 49 CFR 179.105-6 by February 28, 1982.

Recommendation: I-81-5
Issued: To RSPA on September 30, 1981
Status: Open - Await Reply

Amend 49 CFR 173.31(a)(6) to establish priorities for installation of coupler vertical restraint systems on DOT specification tank cars required to be retrofitted by February 28, 1985, based on the relative dangers posed in accidents by the commodity being transported.

Recommendation: I-81-6
Issued: To RSPA on September 30, 1981
Status: Open - Await Reply

> Complete rulemaking on Docket HM-175 to require the extension of specified puncture and thermal protection levels to DOT specification tank cars and established priorities for installation based on the relative dangers posed in accidents by the commodity being transported.

Recommendation: H-69-4
Issued: To DOT (HMRB) on March 21, 1969
Status: Closed--Acceptable Action on June 27, 1975

> . . . expedite its action to amend or to revise existing Federal Regulations. It should develop uniform regulations for all modes of transport relating to the shipment and carriage of hazardous materials, as may be necessary to assure substantial uniformity among all modes as to reporting requirements and processing of incident and accident reports involving hazardous materials so that a centralized and unified hazardous materials and reporting system and clearinghouse might function effectively. If this cannot be done within the existing statutory framework, consideration should be given to seeking legislation which would authorize the issuance of one regulation applicable to all modes by the Secretary, following appropriate consultation with the Administrations and the Coast Guard.

Recommendation: H-71-37
Issued: To DOT on January 27, 1971
Status: Closed, no longer applicable on August 13, 1979

> . . . initiate the development and adoption of a risk-based framework for evaluation and planning of dangerous goods transportation safety regulations or programs in the Department, by a project leading to development of the analytical methods for risk identification and evaluation required for its implementation through a designated organization within the Department.

Recommendation: H-71-28
Issued: To FAA, FHWA, FRA, and USCG on January 27, 1971
Status: Closed, no longer applicable on August 13, 1979

> . . . require application of such a framework as it develops and use of risk-based analytical methods in the formulation of the dangerous goods regulatory programs, including special permits, in each mode, for both intra- and intermodal shipments at the earliest possible date. It appears that risk-based methods should be used first on bulk shipments.

Recommendation: H-71-29
Issued: To DOT on January 27, 1971
Status: Open--Acceptable Action

> . . . consider the formation of an advisory group or groups bringing together, under the auspices of an organization such as the

National Academy of Sciences, representatives of the point of view of all parties-at-risk, including the population along pathways of movement, to assist the Department of Transportation in the development of the risk identification and risk evaluations aspects of the risk-based framework and analytical methods. The use of existing advisory groups should be considered, where they include the point of view of all major segments of the population-at-risk.

Recommendation: H-71-30
Issued: To DOT on January 27, 1971
Status: Open--Unacceptable Action

[Require] technical advisors representing the point of view of a party-at-risk, or other parties (including academic institutions and non-Federal public agencies) having a clear and continuing interest in dangerous goods transportation safety, ...to have experience or capabilities in systems safety analysis techniques or be in training in such techniques in order to serve on such advisory groups.

Recommendation: H-71-32
Issued: To DOT on January 27, 1971
Status: Closed, no longer applicable on December 22, 1978

The Department of Transportation organization managing this project [should] publish, at not over semiannual intervals, reports of the progress in the development of risk-based methods of evaluating regulations and programs, and their application to specific dangerous goods systems.

Recommendation: H-71-44
Issued: To DOT on May 20, 1971
Status: Closed--Acceptable Action on October 29, 1975

. . . with the participation of the vehicle manufacturers and operators, conduct a complete restudy of existing cargo tanks used for transportation of oxygen, under suspended or outstanding Special Permits, to assure that the hazards identified in this accident are not present, are removed, or are adequately controlled and monitored prior to authorizing continued use of such vehicles in (or conversion to) oxygen transportation.

Recommendation: H-71-45
Issued: To DOT (HMRB) on May 20, 1971
Status: Closed--Acceptable Action on October 29, 1975

The Hazardous Materials Regulations Board of the Department of Transportation, and the Administrations represented thereon, [should] establish more rigorous requirements to be met by petitioners for or recipients of future Special Permits for new hazardous materials containers, such requirements to include a systematic analysis for and consideration of the risks and the hazards introduced during the manufacture and operation of the equipment over its life cycle, a plan for the monitoring or control of the hazards detected, and a periodic reporting plan which will permit an assessment of the success of these efforts.

Recommendation: H-71-65
Issued: To DOT, DOL, and ICC on October 19, 1971
Status: Closed--Unacceptable Action

> The Department of Transportation, with the participation of the Department of Labor and, if required, the Interstate Commerce Commission, [should] conduct a comprehensive investigation into the risks associated with the delivery of bulk cargoes from motor carrier vehicles, and initiate the implementation of risk-reduction measures.

Recommendation: H-71-69
Issued: To DOT on October 19, 1971
Status: Closed--Acceptable Action on October 29, 1975

> . . . initiate rulemaking action to amend 49 CFR 394 to require all carriers to report accidents occurring in connection with the delivery of bulk liquid materials from motor carrier vehicles, whether or not the carrier's employees, vehicle, or cargo suffered damages in the accident.

Recommendation: H-72-28
Issued: To DOT (HMRB) on September 11, 1971
Status: Closed--Acceptable Action

> . . . initiate rulemaking which would:
>
> (a) require manufacturers to submit to HMRB the hazard control measures utilized in the manufacture of hazardous materials;
> (b) compare the hazard control measures utilized in manufacture with those required for transportation of hazardous materials; and
> (c) take into consideration applicable hazard control measures resulting from these comparisons in the formulation of regulations for the transportation of hazardous materials.
>
> The comparison should be placed in the public docket of rulemaking proceedings.

Recommendation: H-72-31
Issued: To BMCS and OHM on December 7, 1971
Status: Closed--Reconsidered

> Initiate appropriate action to develop standards for mandatory installation of fire barriers in trucks or trailers used to transport Class "A" explosives or other hazardous, heat-sensitive materials. Such standards should apply to future vehicles and, by retrofit, to present vehicles.

Recommendation: H-73-37
Issued: To BMCS on November 15, 1971
Status: Open--Acceptable Action

> . . . study the existing regulations and requirements in 49 CFR 178.337, regarding LPG cargo tanks, for the purpose of instituting more explicit rulemaking toward reducing the likelihood of leakage and subsequent catastrophic failure of such cargo tanks in a variety of foreseeable types of accident crashes.

Recommendation: H-81-2
Issued: To FHWA on March 17, 1981
Status: Open—Await Reply

Develop and implement a data collection and analysis plan for use in determining the relationship between compliance with the Federal Motor Carrier Safety Regulations and the motor vehicle-related Federal Hazardous Materials Regulations and motor carrier accident/incident reduction.

Recommendation: H-81-3
Issued: To FHWA on March 17, 1981
Status: Open—Await Reply

Develop a plan for performing periodic vehicle inspections, based on random selection methods, of sufficient magnitude and appropriate frequency to provide statistically valid data on carrier compliance with the Federal Motor Carrier Safety Regulations and the motor vehicle-related Federal Hazardous Materials Regulations. Such a plan should consider the potential for assistance by the States in performing these inspections. The data should be published in a form usable by States with Motor Carrier Safety or Hazardous Materials enforcement programs.

Recommendation: H-81-4
Issued: To FHWA on March 17, 1981
Status: Open—Await Reply

Develop a written plan for using the management information system of the Bureau of Motor Carrier Safety to (1) improve the effectiveness of the Bureau's Motor Carrier Safety and Hazardous Materials enforcement activities; (2) evaluate the effectiveness of these activities on carrier compliance with the Federal Regulations and on reducing the risks of Motor Carrier Transportation and Hazardous Materials carriage by truck; (3) assist States in developing and conducting motor carrier safety and hazardous materials enforcement programs.

Recommendation: H-81-5
Issued: To FHWA on March 17, 1981
Status: Open—Await Reply

Allocate more resources to the development of the management information system and provide the Bureau of Motor Carrier Safety with adequate and timely programming support to facilitate the system's development.

Recommendation: H-81-6
Issued: To FHWA on March 17, 1981
Status: Open—Await Reply

Develop explicit criteria for deciding which carriers and hazardous materials shippers to audit to ensure that the small resources of the Bureau of Motor Carrier Safety are focused on the companies most in need of attention. The criteria should take into account such factors as

accident experience, type of cargo, compliance history, measures of exposure, and other factors related to the degree of hazard presented by the candidate companies.

Recommendation: H-81-7
Issued: To FHWA on March 17, 1981
Status: Open—Await Reply

Develop explicit criteria to guide the field staff of the Bureau of Motor Carrier Safety in the development of enforcement case reports, including criteria for initially determining that a case should be developed and the number and types of violations to document.

Recommendation: H-81-8
Issued: To FHWA on March 17, 1981
Status: Open—Await Reply

Develop and publish FHWA policy and procedures for determining initial and final assessments against motor carriers and hazardous materials shippers for violations of the Federal Motor Carrier Safety Regulations or the Federal Hazardous Materials Regulations, for use by FHWA attorneys and others.

Recommendation: H-81-9
Issued: To FHWA on March 17, 1981
Status: Open—Await Reply

Direct FHWA Regional and Headquarters attorneys to systematically document the reason(s) for the amount of an initial assessment, the arguments advanced by respondents for withdrawing or mitigating the initial assessment, the disposition of those arguments, and the reason(s) for the amount of the final assessment. Determine whether such documentation could be included in the carrier and hazardous materials shipper computer files of the management information system of the Bureau of Motor Carrier Safety.

Recommendation: M-68-12
Issued: To DOT on July 25, 1968
Status: Closed--Acceptable Action

. . . reexamine the existing practice of delegating authority to nongovernmental organizations to perform regulatory functions such as the granting of authorizations and special permissions to deviate in some manner from the existing Hazardous Materials Regulations.

Recommendation: M-72-12
Issued: To DOT on March 15, 1972
Status: Closed--Acceptable Action

. . . accord high priority to the Coast Guard research and development program to develop methodologies for determining quantitative risk rankings for those hazardous materials which are transported in large quantities on the navigable waters of the United States.

Recommendation: M-72-13
Issued: To DOT and USCG on March 15, 1972
Status: Closed--Acceptable Action

In development of hazardous materials regulations, utilize the "Risk Concept" technique.

Recommendation: A-72-87
Issued: To DOT on June 21, 1972
Status: Closed--Unacceptable Action

Establish an Advisory Working Group, composed of representatives of shippers, carrier management and labor, governmental modal and safety organizations, and the public, to inquire into the need for additional private or regulatory safety controls in the air transportation of hazardous materials, and to advise [DOT] of any changes found to be necessary.

Recommendation: A-72-88
Issued: To DOT on June 21, 1972
Status: Closed--Acceptable Action

Continue to pursue vigorously the stated objectives of the Hazardous Materials Regulations Board to develop a revised and standardized format for all hazardous materials regulations of the Department, and a regulatory system based on technically standardized criteria encompassing all modes.

Recommendation: A-72-90
Issued: To DOT on June 21, 1972
Status: Closed--Acceptable Action

Initiate action to amend appropriate regulations to provide guidance in regard to the separation, in storage, of aggregates of packages of radioactive materials, when the total transport index of more than one group of packages exceeds 50. The new regulations should be developed along the lines provided by the regulations of the International Atomic Energy Agency.

Recommendation: A-72-91
Issued: To DOT on June 21, 1972
Status: Closed--Acceptable Action

Consider a revision to the regulations which permit either a drop test or inclusion of an absorbent material requirement for Type B or larger shipments, to include both requirements in the case of liquid radioactive materials, or to include a requirement for redundancy of containment such as the enclosure of the inner container in a sealed plastic bag. Standards for containment of liquid and powder from radioactive materials should be reviewed with consideration given problems associated with manufacturing imperfections, maintenance problems, and human error aspects, for both new and reused Type B and larger shipping containers.

Recommendation: A-72-96
Issued: To DOT on June 21, 1972
Status: Closed--Unacceptable Action

. . . amend 49 CFR 170.15(b) to establish appropriate limitations on the time duration, number of shipments, or amount of equipment which will henceforth be authorized under the terms of each Special Permit.

Recommendation: R-68-15
Issued: To FHWA on March 7, 1968
Status: Closed--Acceptable Action

. . . study the feasibility of fire resistance regulations for tank trucks carrying flammable fluids to prevent low-order explosions and rapid propagation of flame from such tanks when they are ruptured. Such techniques as lining tanks with soft material or filling tanks with special reticulated foam are known to be technically effective in preventing such rapid flame spread. These methods would also be important in preventing fires following highway accidents and their feasibility as to future cost and weight should be evaluated.

Recommendation: R-69-11
Issued: To FRA on January 16, 1969
Status: Closed--Acceptable Action

. . . review 49 CFR 174.506, which intended to protect the public against fire or explosion resulting from railroad accidents by the assignment of the handling of the emergency to the Bureau of Explosives of the Association of American Railroads. This regulation appears to place responsibility for public safety in the hands of a private organization representing only one of the interests involved, and which may not be able to handle expeditiously emergencies which may develop. The Board is aware that the practice of delegating responsibility for hazardous materials regulations to private agencies is under study by the Department of Transportation.

Recommendation: R-69-14
Issued: To DOT on January 16, 1973
Status: Closed--Acceptable Action

. . . study the feasibility of establishing a National Hazardous Materials Advisory Data Center.

Recommendation: R-72-44
Issued: To DOT on December 13, 1972
Status: Open--Unacceptable Action

. . . initiate the development of a logical hazardous materials classification theory which will establish a rational basis for classifying hazardous materials, handled under normal transportation conditions and in transportation emergencies as well.

Recommendation: R-75-16
Issued: To FRA on April 24, 1975
Status: Open--Acceptable Action

Identify all liquids now transported in tank cars which are capable of detonation; determine whether detonation or other dangerous chemical reactions can be initiated by conditions and circumstances encountered by those liquids in railroad transportation and issue regulations to control the risks identified.

Recommendation: R-75-22
Issued: To FRA on April 10, 1975
Status: Open--Unacceptable Action

Revise Form F-59800.1 to obtain information required to support the rulemaking approach so that the degree of protection reflects the degree of severity of specific commodities in accidents. Such changes should address at least the delineation of the danger zone, and types and degree of injury of damages experienced by the various kinds of parties at risk.

Recommendation: R-78-22
Issued: To DOT on April 24, 1978
Status: Open--Acceptable Action

Assist the responsible Federal regulatory agencies to develop economic regulations that provide a strong economic incentive to install tank car safeguards quickly and a strong economic disincentive for delay.

Recommendation: R-78-32
Issued: To DOT on June 29, 1978
Status: Open--Acceptable Action

Review and develop necessary regulations or funding mechanisms for a hazardous materials track improvement priority system to insure adequate protection of the public in urban corridors against accident risks.

Recommendation: R-79-16
Issued: To FRA on March 20, 1979
Status: Open—Acceptable Action

Develop a data base that will allow the definition and rating of railroad safety problems, particularly those problems related to the derailment of hazardous materials.

Recommendation: R-79-17
Issued: To FRA on March 20, 1979
Status: Open—Unacceptable Action

Develop and document a track safety program based on risk as indicated by a comprehensive safety analysis which will include: desired level of safety (risk) to be achieved; program goals and objectives based on that level; and criteria by which the success of the program will be measured.

Recommendation: R-79-22
Issued: To FRA on March 20, 1979
Status: Open—Acceptable Action

Determine in cooperation with the ICC the feasibility of establishing hazardous materials routes to bypass populous areas. If hazardous materials routing is operationally feasible, require that the track on those routes be maintained at a minimum of class 4 condition.

Recommendation: R-79-24
Issued: To FRA on March 20, 1979
Status: Open--Unacceptable Action

In cooperation with the Inter-Industry Task Force, determine what additional cost-effective steps, based on risk-ranking results, can be taken to make tank cars more resistant to hazardous materials releases in derailments.

Recommendation: R-79-28
Issued: To FRA on March 20, 1979
Status: Open—Acceptable Action

Require that all trains with placarded loaded tank cars of the 112A and 114A types not equipped with the required shelf couplers and tank head protection, which are loaded with liquefied flammable gases and other liquids or toxic compressed gases, operate at a speed 10 mph less than the maximum speeds authorized for those trains on classes 3, 4, 5, and 6 track.

Recommendation: R-80-12
Issued: To DOT on March 12, 1980
Status: Open--Acceptable Action

Examine specialty products and Class A poisons which are shipped in Type 111 tank cars to determine if the toxicity hazard is sufficient to justify the protection afforded by 49 CFR 179.105.

Recommendation: R-80-14
Issued: To DOT on March 12, 1980
Status: Open--Unacceptable Action

Cause data to be collected on tank car derailment behavior to identify breach mechanisms, analyze these mechanisms, identify control methods, and incorporate findings in new car construction.

Recommendation: R-80-15
Issued: To DOT on March 12, 1980
Status: Open--Acceptable Action

Conduct tests of tank cars in freight train derailments to determine if the severity of collision damage can be reduced by tank car placement in trains. Identify and test countermeasures.

Recommendation: R-81-74
Issued: To RSPA on June 19, 1981
Status: Open—Unacceptable Action

Immediately ascertain, in conjunction with the Federal Railroad Administration, the adequacy of industry-adopted interim safety precautions for transportation of anhydrous methylamines in Specification 112A tank cars and institute any additional interim safety precautions which may be necessary to adequately control the risks to the public pending installation of tank head puncture resistance and thermal protection systems. In the identification of possible interim safety precautions consideration should be given to measures such as application of distinctive markings to the unretrofitted tank cars to make their status conspicuous to railroad employees and emergency response personnel, restrictions on the speeds of trains containing unretrofitted tank cars to minimize crash forces in the event of a derailment, and other precautions which may be appropriate.

Recommendation: R-81-75
Issued: To FRA on June 19, 1981
Status: Open—Unacceptable Action

Immediately ascertain, in conjunction with the Research and Special Programs Administration, the adequacy of industry-adopted interim safety precautions for transportation of anhydrous methylamines in Specification 112A tank cars and institute any additional interim safety precautions which may be necessary to adequately control the risks to the public pending installation of tank head puncture resistance and thermal protection systems. In the identification of possible interim safety precautions consideration should be given to measures such as application of distinctive markings to the unretrofitted tank cars to make their status conspicuous to railroad employees and emergency response personnel, restrictions on the speeds of trains containing unretrofitted tank cars to minimize crash forces in the event of a derailment, and other precautions which may be appropriate.

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