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Safety Effectiveness Evaluation of the Federal Railroad Administration's Hazardous Materials and Track Safety Programs

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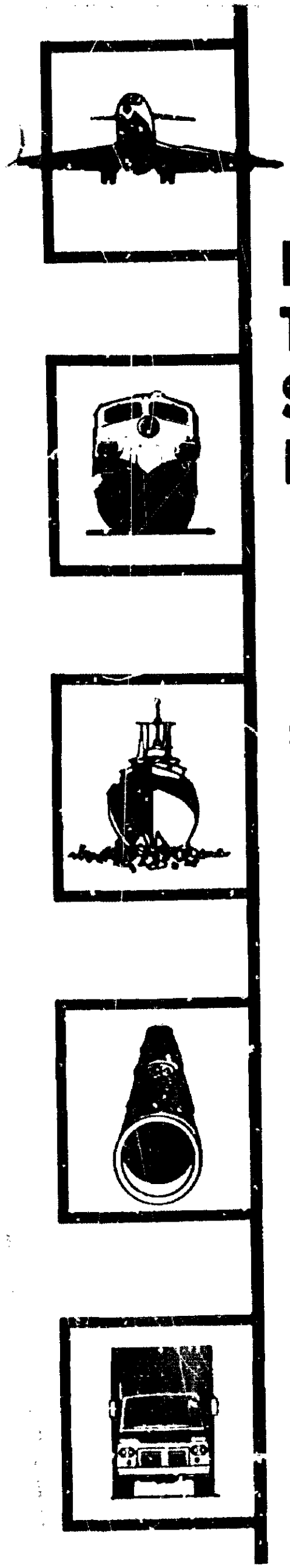

NATIONAL TRANSPORTATION SAFETY BOARD

WASHINGTON, D.C. 20594

SAFETY EFFECTIVENESS EVALUATION OF THE FEDERAL RAILROAD ADMINISTRATION'S HAZARDOUS MATERIALS AND TRACK SAFETY PROGRAMS

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16. Abstract

The Congress directed NTSB to "conduct a thorough review of hazardous materials rail shipments and the applicable Federal (track) standards as well as determine how the Federal Railroad Administration (FRA) can more effectively prevent the occurrence and reduce the severity of derailments of hazardous materials."

The report is based on information obtained through interviews and reviews of technical literature and Department of Transportation organizational documents. The review was limited to the derailment of hazardous materials and the applicable track standards.

The review found that FRA needs a full-time railroad safety expert at the head of the Office of Safety. The data base is inadequate to define and rate the problems. The program should be based on risks and the goals and objectives should be based on the level of risk that is acceptable. The Federal/State partnership required by the Federal Railroad Safety Act of 1970 should be improved for more effective use of State inspectors.

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FOREWORD

In June 1978, Conferees of the House and Senate directed the National Transportation Safety Board "...to conduct a thorough review of hazardous materials rail shipments and the applicable Federal rail standards as well as determine how the Federal Railroad Administration can more effectively prevent the occurrence and reduce the severity of derailments of hazardous materials." 1/ Additional advice indicated that the review should be restricted to track-caused derailments of hazardous materials and should not be extended into the postderailment phase of the accidents. Consequently, this report does not address activities such as the notification, emergency services activities, and the wreck-clearing operations.

In addition to its primary statutory responsibility to investigate accidents, the National Transportation Safety Board is authorized by the Independent Safety Board Act of 1974 to "...evaluate, assess the effectiveness, and publish the findings of the Board with respect to the transportation safety consciousness and efficacy in preventing accidents of other Government agencies," and "...to evaluate the adequacy of safeguards and procedures concerning the transportation of hazardous materials and the performance of other Government agencies charged with assuring the safe transportation of such materials." 2/

During the review, the Safety Board interviewed Government, State, and railroad management personnel, railroad labor officials, and other related industry officials. In addition, technical and safety literature and Department of Transportation organizational documents were reviewed.

Several other Government agencies, including the Department of Transportation, the Office of Technology Assessment, the General Accounting Office, and the Interstate Commerce Commission, recently have published reports addressing various aspects of railroad safety or hazardous materials transportation safety. This report is intended to put those efforts in perspective. The report of the Office of Technology Assessment (OTA) entitled "An Evaluation of Railroad Safety," submitted to the Congress on May 8, 1978, was used extensively as a source document. Of vital importance to the solution of the derailments problems are the findings in the DOT report, "A Prospectus for Change in the Freight Railroad Industry," issued in October 1978. In conducting this review the Safety Board did not analyze the individual regulations which cover the transportation of hazardous materials by rail or the individual track standards.

1/ U.S. House of Representatives, "Making Appropriations for the Department of Transportation and Related Agencies," Report No. 95-1329, June 29, 1978.

2/ Independent Safety Board Act of 1974, P.L. 93-633, (U.S.C. 1901 et. seq.), January 3, 1975.

There are three Safety Board Special Studies which are directly applicable and should also be used in conjunction with this report--

"Risk Concepts in Dangerous Goods Transportation Regulations," Report Number: NTSB-STS-71-1, January 27, 1971.

"Special Study of Proposed Track Safety Standards," Report Number: NTSB-RSS-71-2, August 26, 1971.

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

NATIONAL TRANSPORTATION SAFETY BOARD
WASHINGTON, D. C. 20594

SAFETY EFFECTIVENESS EVALUATION

Adopted: March 8, 1979

REVIEW OF THE FEDERAL RAILROAD ADMINISTRATION'S HAZARDOUS MATERIALS AND TRACK SAFETY PROGRAMS

INTRODUCTION

The hazardous materials [3] most often transported by railroads include those bulk commodities shipped in tank cars having capacities up to 42,000 gallons. Such commodities as liquefied petroleum gas (LPG), chlorine, anhydrous ammonia, and vinyl chloride cause most of the third-party property damage and injuries when they are involved in derailments. Derailments of these tank cars have received most of the Federal Railroad Administration's (FRA) attention during the past 10 years.

At the close of 1977, there were 170,000 tank cars in railroad service, representing slightly more than 10 percent of all freight cars. About 18,000 tank cars (10.6 percent of the tank car fleet) are DOT Specification 112A and 114A design.

From 1971 through 1975, the last year for which complete statistics are available, railroads reported 636 accidents involving the release of hazardous materials. These accidents resulted in 13 deaths and 1,300 injuries and forced evacuation of a total of 53,622 persons. (See Table 1.) [4]

Since 1975 FRA has compiled data which indicate the exposure of hazardous materials cars in accidents, regardless of release. Data for 1975 through 1977 indicate that during the 3-year period, 1,937 consists which included hazardous materials were involved in derailments. [5] (See Table 2.)

Of the 10,481 hazardous materials cars in these accidents, 2,576 (25 percent) were damaged and 431 (4 percent) released some or all of their contents. These accidents forced the evacuation of 27,720 persons and resulted in more than $70 million in reported damage to railroad equipment alone.

3/ The Hazardous Materials Transportation Act, P.L. 933-633 (45 U.S.C. 1802) January 3, 1975, defines a hazardous material as "a substance or material in a quantity and form which may pose an unreasonable risk to health and safety or to property when transported in commerce."

4/ Department of Transportation, 1975 and 1976 Annual Reports of the Secretary of Transportation on Hazardous Materials Control.

5/ FRA Accident/Incident Bulletins--No. 144 Calendar Year 1975; No. 145 Calendar Year 1976; No. 146 Calendar Year 1977.

TABLE 1

SUMMARY OF RAILROAD HAZARDOUS MATERIALS ACCIDENTS
SHOWING CASUALTIES AND EVACUATIONS
1971 - 1975

Year	No. of Accidents	Deaths	Injuries	Evacuations	No. of Persons Evacuated
1971	80	1	57	16	3,005
1972	99	0	226	18	5,274
1973	123	2	384	32	29,647
1974	148	10	613	28	10,941
1975	186	0	20	19	4,755
TOTAL	636	13	1,300	113	53,622

TABLE 2

DERAILMENTS INVOLVING CONSISTS TRANSPORTING
HAZARDOUS MATERIALS
1975 - 1977

	No. of Consists In Derailments	Total No. Of Cars In Consists	No. of Cars Containing Haz. Mat.	Haz. Mat. Cars Damaged	Haz. Mat. Cars Releasing	People Evacuated	Railroad Equipment Damage ($)
1975	637	48,669	4,711	891	126	3,345	18,128,364
1976	627	45,363	2,642	736	152	13,679	22,894,291
1977	673	50,007	3,118	949	153	10,696	29,670,284
TOTAL	1,937	144,039	10,481	2,576	431	27,720	70,692,939

Direct comparison of hazardous materials incident data in all modes of transportation is complicated by several factors--multiple systems for incident reporting, differences in reporting requirements and in compilation of data in the separate systems, and lack of distinction between minor incidents posing relatively little risk to public health and safety and more serious incidents posing much higher levels of risk.

DOT's Materials Transportation Bureau (MTB) maintains a centralized system for reporting hazardous materials incidents 6/ in transportation by air, highway, and railroad, and package freight by water. Although pipelines and bulk marine vessels transport large quantities of materials classified as hazardous, these modes are excluded from MTB's centralized reporting system. Pipeline operators are required to report leaks, including catastrophic accidents, to a separate office within MTB; incidents and accidents involving bulk marine vessels must be reported to the U.S. Coast Guard. Major differences between the MTB system and the Coast Guard system precluded consideration of bulk marine transportation in the review.

Nearly 72,000 incidents involving hazardous materials were reported in MTB's centralized and pipeline reporting systems from 1971 through 1977. (See Table 3.) These incidents resulted in 457 deaths, 6,729 injuries, and millions of dollars of property damage.

The percentage of total incidents which was reported by railroads during the 7-year period was relatively low--less than 7 percent--and railroad fatalities from hazarous materials incidents were even lower--3.5 percent. But railroad accounted for 21 percent of all reported hazarous materials injuries.

Highway transportation accounted for 75 percent of reported incidents, but only 32 percent of reported deaths and 39 percent of reported injuries. Pipeline incidents, which represented 17 percent of the total, were responsible for 64 percent of all deaths and 38 percent of all injuries in hazardous materials incidents.

While these figures reflect the total hazardous materials problem, they include numerous reports of minor incidents such as leaks and spills from batteries and cans of paint. There is no distinction made between these types of incidents and those incidents which pose a relatively higher risk to the public health and safety. Recognizing this limitation, MTB in 1977 excluded all incident reports involving splashes and spills of small quantities of hazardous materials such as incidents involving less than 5 gallons of flammable liquid and those

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6/ An incident is any event involving the unintentional release of a hazardous material.

TABLE 3
NUMBER OF REPORTED INCIDENTS INVOLVING RELEASE OF HAZARDOUS MATERIALS, BY MODE 1/
1971 - 1977

MODE	1971	1972	1973	1974	1975	1976	1977 2/	7-YEAR TOTAL Number	Percent
HIGHWAY	1,891	3,965	5,542	7,615	9,914	10,827	14,250	54,004	75.1
PIPELINE	1,593	1,602	1,637	1,733	1,628	1,788	2,234	12,215	17.0
RAILROAD	346	337	412	617	679	959	1,500	4,850	6.7
AVIATION	5	33	49	157	152	84	130	610	0.8
WATER	13	10	12	26	32	15	50	158	0.2
OTHER 3/	1	2	6	32	2	13	24	80	0.1
TOTAL	3,840	5,949	7,658	10,180	12,407	13,686	18,188	71,917	99.9

1/ Excludes bulk marine transportation.
2/ Includes reports submitted by stevedoring firms, freight forwarders and other interested parties.
3/ The 1977 figures, for all modes except pipeline, are estimates by MTB.

involving batteries. 7/ About 48 percent of all incidents reported to the Office of Hazardous Materials Operations (OHMO) in 1977 involved small splashes and spills. As a result, 7,616 incident reports were excluded, including 600 rail reports. With minor incidents excluded, the distribution of the total of 10,572 reports by mode in 1977 is highway 7,292 (69.0 percent); pipeline 2,234 (21.1 percent); and rail, 899 (8.5 percent). Air, water, and "other" accounted for a combined total of 147, less than 2 percent of the total incidents.

Since a high percentage of property damage reports includes no damage estimate, the Safety Board did not review property damage. Even when damage figures are reported, they generally do not include third-party property damage, which is often the major component of total damage in the most serious and costly incidents.

The number of train accidents reported by railroads has steadily increased in recent years, and the number of derailments and track-caused accidents in general has increased as a proportion of train accidents as well as in absolute numbers. 8/

From 1971 through 1974, the number of total train accidents increased 46 percent, derailments increased 66 percent and track-caused derailments increased 91 percent. 9/

In the same 4-year period, 450 train accidents involved the release of hazardous materials, resulting in 13 deaths and 1,280 injuries and forced 94 evacuations of a total of 48,867 persons. The number of train accidents involving release of hazardous materials rose from 80 in 1971 to 148 in 1974, an increase of 85 percent. 10/

7/ The exclusion was applied to reports received by the Office of Hazardous Materials Operations; minor pipeline incidents are excluded by the Office of Pipeline Safety Operations reporting requirements.

8/ A train accident is defined by FRA as an event with or without casualties, arising in connection with the operation of railroad equipment (standing or moving) which results in an amount of damage to railroads, track roadbed, and equipment greater than the minimum accident reporting threshold specified for the year of occurrence ($1,750 in 1975 and 1976; and $2,300 in 1977).

9/ Portions of these increases are due to the effects of inflation.

10/ Fifth Annual Report of the Secretary of Transportation on Hazardous Materials Control, Calendar Year 1974.

Between 1975 and 1977 11/ the number of train accidents increased 29 percent, from 8,041 to 10,362; derailments increased 28 percent, from 6,328 to 8,073; and track-caused derailments increased 37 percent, from 3,095 to 4,239. During the same period, the number of railroad cars releasing hazardous materials in train accidents increased 28 percent, from 135 cars in 1975 to 173 cars in 1977.

The increasing numbers of derailments and track-caused accidents between 1971 and 1977 resulted in significant changes in the composition of train accidents by type and by major cause. While derailments constituted 70 percent of all train accidents in 1971, by 1977 78 percent of all train accidents were derailments. During the same period the portion of derailments caused by defective track increased from 43 percent of all derailments to 53 percent. While track-caused derailments accounted for 30 percent of all train accidents in 1971, by 1977 41 percent of all train accidents were track-caused derailments.

Of those accidents caused by defective track in 1977, the leading subcause was track geometry defects. Defective track geometry was responsible for 46 percent of all track-caused derailments. The second leading track defect subcause was rail and joint bar defects, which accounted for nearly 29 percent of track-caused derailments in 1977.

In 1975 FRA began compiling data on the speeds at which train accidents occur. Data on accidents in which the train speed was reported indicate that most train accidents occur at low speeds, but the low speed accidents account for a disproportionately small share of railroad damages.

In 1977 train accidents at 0 to 10 mph comprised 67 percent of all train accidents and accounted for 28 percent of all reported railroad damage, while 33 percent of all accidents were at speeds greater than 10 mph and accounted for 72 percent of the total railroad damage.

In 1977, 77 percent of all track-caused accidents occurred at speeds of 0 to 10 mph, compared to 67 percent of all train accidents. The 3-year data for 1975 to 1977 also indicate that the percentage of train accidents at 0 to 10 mph, as well as the percentage of track-caused accidents at that speed, is increasing. Train accidents in that range rose from 62.4 percent of all accidents in 1975 to 67 percent in 1977; 69.6 percent of the track-caused accidents occurred at 0 to 10 mph in 1975, compared to 76.7 percent in 1977. About 4 percent of the track-caused accidents occurred at speeds greater than 30 mph.

11/ Direct comparison of accident and casualty data for 1975 and later years with previous data is not feasible because of revisions in reporting requirements effective January 1, 1975.

Data for 1975 through 1977 also indicate that an increasing percentage of accidents is occurring on track having the lowest FRA track classification. In 1977, about 52 percent of all train accidents for which the track class was reported occurred on Class I track (the lowest class) compared to 40 percent in 1975. Nearly 62 percent of track-caused accidents in 1977 occurred on Class I track.

Since FRA does not compile data on the mileage of track in each track class or on the train miles logged on each class of track, the relative levels of safety for different classes of track cannot be determined.

Of the 10,362 train accidents reported by railroads to FRA in 1977, 8,073 (77.9 percent) were derailments; 4,239 (40.9 percent) were track-caused derailments; 864 (8.3 percent) were accidents involving consists transporting hazardous materials, and 673 (6.5 percent) were derailments involving consists transporting hazardous materials.

MANDATE AND AUTHORITY

Hazardous Materials Program

According to the FRA Administrator and his staff, their mandate comes from several sources, however, not all staff members perceive the mandate identically. In addition to the statutory mandate, FRA believes that it has a mandate from the public, through the Congress, to insure the safe transportation by rail of hazardous materials. Combined with this mandate is the unwritten, inconstant pressure from the public to which FRA reacts in the aftermath of catastrophic accidents involving hazardous materials.

The FRA perceives its mandate as the development and administration of a regulatory and enforcement program to insure the safe transportation of hazardous materials by railroad. The ends to which the agency should go to accomplish this and the division of the responsibilities have not been established in FRA.

The Hazardous Materials Transportation Act makes clear Congress' intent regarding the transportation of hazardous materials. The Declaration of Policy, Section 102, states, "It is declared to be the policy of Congress in this title to improve the regulatory and enforcement authority of the Secretary of Transportation to protect the Nation adequately against the risks to life and property which are inherent in the transportation of hazardous materials in commerce."

The statutory authority which was delegated to FRA by the Secretary under the mandate of the Hazardous Materials Transportation Act (49 CFR 1.49) was intended to minimize duplication of staff functions, maximize parallel treatment of hazardous materials among all modes, and take advantage of railroad experience where it was most needed.

The early hazardous materials laws, supplemented by the broad Railroad Safety Act of 1970, and the ensuing Hazardous Materials Transportation Act of 1974, with its delegation of authority by the Secretary, provide the FRA with sufficient authority to develop and administer a program which can provide an acceptable level of safety in the transportation of hazardous materials by rail.

Track Safety Program

The legislative history of the Federal Railroad Safety Act of 1970 (FRSA) and the emphasis on deteriorating track conditions during the late 1960's left little doubt that FRA had a definite mandate from the Congress to develop track safety standards. The type of standards or the level of safety to be addressed was not stated or implied in the statutory mandate. FRA perceives its mandate in track safety as the development, promulgation, and enforcement of track safety standards to control the number of track-caused derailments.

The FRSA affords sufficient statutory authority to develop a track safety program--including regulations and enforcement. The statutory authority is supplemented by the Secretary's delegation to FRA, which requires certain analyses relating to economics and environmental effects of the regulations. There is no stated mandate that the regulations be analyzed to determine their ultimate effect on track safety.

ADMINISTRATION OF HAZARDOUS MATERIALS AND TRACK SAFETY PROGRAMS

In 1968, as a result of the derailment of a hazardous materials consist at Dunreith, Indiana, the Safety Board intensified its activities related to the derailment of hazardous materials. The Safety Board made a number of recommendations in connection with the worsening derailment situation and the need for action to lessen the severity of the derailment of hazardous materials. A rash of catastrophic hazardous materials accidents which began in early 1969 emphasized the need for concentrated attention to the hazardous materials safety problem.

Following a series of tank car accidents in 1969, the Railway Progress Institute (RPI) and the Association of American Railroads (AAR) established a cooperative industry project between the AAR and five major tank car builders through the RPI. The objective of the project, based on a comprehensive accident review, was to improve the safety of tank cars in accidents by making them more resistant to punctures and ruptures. Over $1,250,000 was budgeted by RPI/AAR for the project and, in addition, FRA allocated about $8.5 million for related research. In several important phases of the research, the RPI-AAR and FRA programs were conducted on a cooperative basis.

In 1972, the RPI-AAR Tank Car Research Committee indicated that an E-type coupler with a top and bottom shelf was significantly more cost effective than the head shield which FRA recommended in 1971. In May 1973, DOT issued Docket HM-109 which proposed a 1/2-inch-thick head shield on all new 112A and 114A tank cars for flammable compressed gas and anhydrous ammonia built after January 1, 1974, and on all such cars by December 31, 1977. In December 1974, after a challenge, the courts upheld HM-109. In 1975, as a compromise, DOT, RPI, and AAR jointly agreed that a combination of head shields and shelf couplers would provide the best protection. In November 1976, MTB issued an NPRM and on September 9, 1977, MTB issued a final rule to require shelf couplers, head shields, and thermal protection. At that time practically no tanks had been retrofitted with head shields because the Tank Car Committee had withheld approval of the head shield attachments. As a result of Congressional concern and Safety Board activity 12/, MTB issued an NPRM on May 11, 1978, and a final rule on July 15, 1978, to accelerate the schedule to require shelf couplers by December 31, 1978, head shields over a 2-year period by December 31, 1979, and jacketed insulation and integral tank head protection by December 31, 1980. (See 49 CFR 179.105.)

As of December 31, 1978, there were about 1,400 tank cars that did not have the required shelf couplers. The penalty for not complying with the regulation is holding out of service the unequipped tank cars. The percentage completion requirements in the regulation have no binding legal sanctions. The only provision to enforce the application of the head shields and thermal protection before the last day of 1980 is by use of Section 111(b) of the Hazardous Materials Transportation Act. If the Secretary can show that a failure to retrofit the required number of tank cars constitutes an "imminent hazard," he may petition an appropriate district court of the United States for an order to eliminate or ameliorate such imminent hazard.

From 1968 through 1977, the Safety Board made more than 15 recommendations to FRA which involved improvements in the crashworthiness of tank cars carrying hazardous materials. In addition, in order to impress on FRA, the railroads, and the tank car builders the urgency of the situation, the Safety Board called a meeting on September 20, 1976, to address the impasse on the use of shelf couplers and head shields. After that meeting, MTB issued the November 1977 NPRM which resulted in the final rule to require shelf couplers, head shields, and thermal protection on 112A and 114A tank cars.

In addition to the recommendations concerning crashworthiness of the tank cars, the Safety Board made at least two recommendations to reduce the speed of consists which included 112A and 114A tank cars

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12/ On April 4, 1976, the Safety Board convened an en banc public hearing on derailments and hazardous materials and issued Recommendations R-78-19, 20, 21, and 22. See Appendix B.

loaded with compressed liquefied gas. Although the validity of this principle has been confirmed by the recommendations of the Inter-Industry Task Force 13/, FRA has not required reduced speeds.

The first proposed Federal Track Safety Standards were published in the Federal Register June 23, 1971. FRA considered these standards to be of a minimum design nature and took into account existing industry standards as required by the Federal Railroad Safety Act of 1970.

The FRA intended to write the Federal track requirements in performance terms rather than detailed specifications whenever it was possible to do so without lowering the level of safety. However, the FRA recognized that in most cases it was not possible to substitute performance requirements without additional research. Violation of the standards would be subject to a penalty of a minimum of $250 and a maximum of $2,500 per day for each violation.

The FRA based the proposed track safety standards on existing safety data and standards made available to it by representatives of the AAR, the railroads, railroad labor organizations, and State regulatory agencies. Informal meetings were held with representatives of those groups to assist in the refinement of the information. Technical publications provided by foreign governments also were reviewed and considered.

Data presented by the AAR included its Engineering Division's recommended Standards for Track Maintenance, adopted September 25, 1970. The data contained in these standards were more comprehensive and more restrictive than the proposed Federal Track Safety Standards. The AAR commented that their standards, in addition to being safe, were also for passenger train comfort and, consequently, more restrictive than required for Federal minimum track safety standards.

The Safety Board published a special study in response to the proposed standards in 1971. 14/ Although the Safety Board made specific recommendations related to the basic issues of vagueness, subjectivity, incompatibility, and unenforceability, only minor corrections were made in the final rule. The study also stated, "The only method by which compatible regulations can be developed is by the use of a systems approach. This approach necessitates a thorough review of the track standards as they affect each other as well as a review of the inter-relation of the track with the entire pathway, the vehicles, the human operator characteristics and knowledge, the operating rules, and the

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13/ Interim Report of the Inter-Industry Task Force on Rail Transportation of Hazardous Materials, July 21, 1978.

14/ National Transportation Safety Board, "Special Study of Track Safety Standards," Report Number NTSB-RSS-71-2, August 26, 1971.

full range of environmental conditions." In that same comment, the Safety Board expressed the view that "The necessary research and follow-up work to insure complete objectivity should be undertaken immediately so that the correction of the initial regulations is a continual self-sustaining process, and not dependent solely upon exceptions found through experience."

After considering the comments submitted in writing and made at the August 2, 1971, hearing, the FRA decided that a number of changes should be made in the proposed initial track safety standards. FRA concluded that some of the proposed initial track safety standards, particularly those for the lower classes of track, were, in fact, preferred or recommended practices from an economic and engineering standpoint, rather than minimum requirements for safety. In addition, several editorial changes and minor clarifying modifications of language were made.

On October 20, 1971, FRA published the final rule now found in 49 CFR 213. The FRA recognized that the railroad industry would need a reasonable period of time in which to comply with some of the proposed regulations. Therefore, it proposed that the regulations become effective October 15, 1971, for newly constructed track and rebuilt track, and effective October 15, 1972, for existing track.

On November 15, 1978, the FRA began conducting its first public hearing into the possible revision of the Federal Track Safety Standards. At this hearing representatives from the AAR, several railroad companies, labor unions, and various public agencies presented 2 days of testimony. The FRA anticipates publishing the first revision of the initial track safety standards in about a year.

Since 1968, when the Safety Board made recommendations which, in part, led to the passage of the FRSA, the Safety Board has continued to make recommendations directed toward reversing the track-caused derailment trend. In a number of its accident reports, the Safety Board has pointed out track conditions which complied with the standards but which caused or contributed to derailments. Many of these derailments involved track-train dynamics or combinations of conditions, issues which the initial standards do not address specifically.

Currently, the FRA's Office of Research and Development is working with the AAR to develop performance track standards. Existing standards do not address such items as longitudinal loads, lengths of trains, axle loads, and rail rollover. Attempts will be made to define and quantify the track/train system and its functions with regard to allowable loads and the predictability of the performance of the track structure.

FRA Organization and Staff

The Associate Administrator for Safety, who reports directly to the Administrator, is authorized to set policy and develop safety programs. Figure 1 shows the organization structure of the Office of Safety. According to the FRA Organization Manual, the mission of the Associate Administrator for Safety is as follows: "...to plan, develop and administer an effective and comprehensive program to achieve safe operating and mechanical practices in the railroad industry, including the enforcement of all the Federal laws and related regulations designed to promote safety of railroads, as they relate to employees, travelers, and the general public." The Deputy Associate Administrator and Special Assistant make up the Associate Administrator's staff.

The Office of Safety Programs has a mission to plan, develop, and coordinate FRA railroad safety programs; to direct a National rail safety compliance and enforcement program covering safety in operation of railroads; to assist and monitor State rail safety programs; and to foster an environment conducive to maximum safety in railroad operations. Within the Office of Safety Programs there are two divisions--the Program Guidance Division and the Compliance and Enforcement Division.

The Office of Standards and Procedures has a mission to promote railroad safety by the establishment of policies, rules, and standards and by the evaluation of the effectiveness thereof. Within the Office of Standards and Procedures there are five divisions--Hazardous Materials, Maintenance of Way, Motive Power and Equipment, Operating Practices, and Reports and Analysis.

The entire field inspection force, which is responsible for the everyday compliance activities, reports through Regional Directors of Railroad Safety to Regional Administrators, who report directly to the Administrator. In some instances Regional Directors act as Regional Administrators. The current FRA Organization Manual does not contain a mission and functional statement for the position of Regional Administrator. The functional statements for the Office of Safety and its offices conflict with the current organizational structure.

Although not perceived as a problem by the Administrator and the Chief Counsel, who was currently Acting Associate Administrator for Safety during the review, all other management and technical personnel interviewed, including railroad management and labor personnel, perceived the absence of an effective full-time head of the Office of Safety as a major negative factor in FRA's effectiveness in safety. There has never been a competent safety professional in that position who has the full respect and support of DOT management, the railroads, and labor. Although the Deputy Associate Administrator has acted for short times as the Associate Administrator, he has been used seldom as a real deputy.

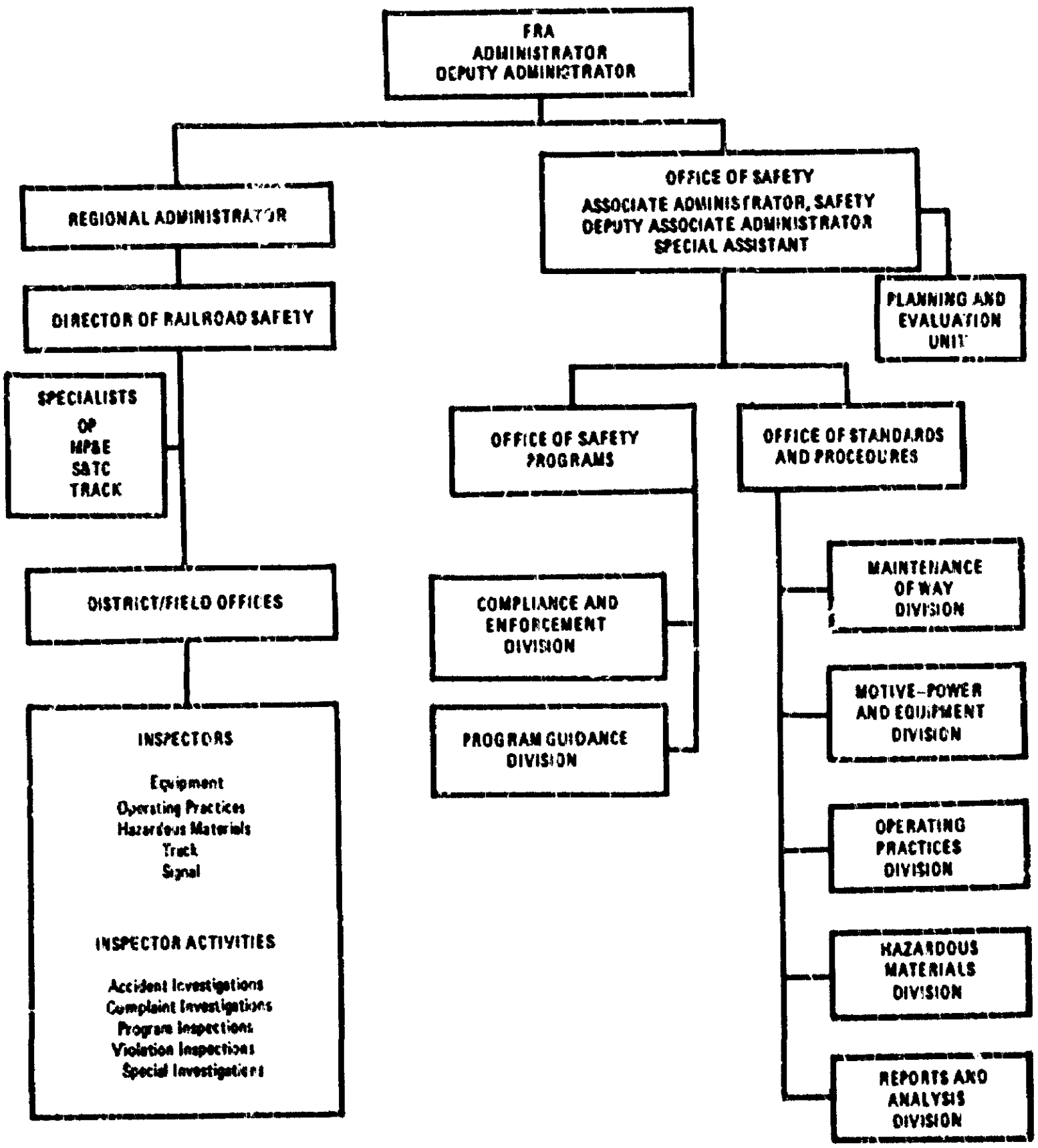

Figure 1.
Organization Chart
Office of Safety and Regional Administrators

The organization structure, as perceived by firstline management, is a major deterrent to successful track safety and hazardous materials programs. Office of Safety managers considered the lack of a direct line of authority in the organizational structure and the indirect lines of communications as major deterrents to success. Under the current organization, participating States report to the Office of Safety for training and monitoring, to the Office of Federal Assistance for funding and approval of organization, and to the Regional Directors for additional guidance and monitoring.

The Maintenance of Way Division's Office of Standards and Procedures is responsible for formulating track safety standards. However, the office has to look to the Office of Research and Development for technical research and testing to back up its regulations. The Office of Research and Development, under the Associate Administrator for Research and Development, obtains many requests for research from a number of other areas, all vying for priority. The Safety Board could find no program to identify and rate problems so that safety projects are assigned priorities.

The Office of Research and Development handles many of its track research contracts with the Transportation Test Center (TTC) at Pueblo, Colorado. The test center functions under a Director, who reports directly to the Administrator. The test center does not have a system of assigning priorities to projects on the basis of predetermined criteria. There also appears to be an absence of clearcut management decisions regarding the publication of test data relating to manufacturers' products tested at the test center. As a result, tests of equipment and track components have produced much data which have not been fully analyzed and published.

Programs and Procedures

Inspection is considered by railroad management and labor, the States, and FRA as one of the basic requirements for a successful railroad safety program. There is no single, integrated program of inspection which includes the coordinated efforts of the railroads, the States, and FRA. The FRA inspection programs are based on the assumption that finding those conditions which do not comply with the regulations will prevent accidents.

Although inspection is perceived as the basis for the entire regulatory and enforcement program, inspectors spend, on the average, less than 50 percent of their productive time on inspections. Firstline managers in the Office of Safety perceive this as a deterrent to success of their mission and attribute it to the lack of direct control of the field inspectors. The amount of time spent on complaints and violations indicates that the time spent on regular programmed inspections is less than one-third of an inspector's time. Since a goal-oriented program has not been documented, this phase of activity is difficult to analyze.

The FRA's track safety and hazardous materials programs are documented in several uncoordinated documents--the authorizing statutes, the Code of Federal Regulations, the FRA Organization Manual, and annual budget documents. In general, the programs do not state goals and objectives, acceptable levels of success, and criteria by which success can be measured.

The functional statements in the FRA Organization Manual assign to the Special Assistant to the Associate Administrator responsibility for developing and identifying goals and objectives and assigning priorities; also he has the responsibility for reviewing and appraising the safety programs to assess results and effectiveness of stated objectives. Although the Hazardous Materials Division has set certain priorities on the staff's analyses of available data, the Safety Board was not able to find documented reports of any coordinated development of objectives and assessments thereof. When the Acting Associate Administrator was questioned about the measurement of the success of the program, he said that he did not know of any good measures of effectiveness; however, he was certain that the level of safety in track and hazardous materials was not acceptable.

The responsibility for the safe transportation of hazardous materials by rail is delegated by the Secretary of Transportation to the MTB and to the FRA (49 CFR 1.49 (f)(s)(t) and 1.53 (5). Under the Administrator, Research and Special Programs Administration (RSPA), MTB has primary responsibility for carrying out the provisions of Title I--Hazardous Materials Transportation Act of 1974 (Public Law 93-633). The Act provides the authority for the Secretary to draw together previously fragmented regulatory and enforcement powers over the movement of hazardous materials in commerce into one consolidated and coordinated effort under the direction of MTB.

After a review by a DOT Hazardous Materials Transportation Task Force, a Standing Committee on Hazardous Materials was established. 15/ This committee is chaired by the Administrator, RSPA and is composed of the Administrators of FRA, Federal Highway Administration (FHWA), Federal Aviation Administration (FAA), the Commandant of the U.S. Coast Guard, the General Counsel, and the Assistant Secretary for Policy and International Affairs. The first task of the Standing Committee is to oversee the implementation of the recommendations in the report. (See Appendix C.) The Standing Committee provides a focal point at the senior management level for continuing oversight for all hazardous materials programs, and it will work closely with the Departmental Regulations Council. It is not clear whether the Administrator, RSPA, as Chairman, will be held accountable for the success or failure of the DOT hazardous materials program.

15/ United States Department of Transportation, "Report of the Hazardous Transportation Task Force, September 1978.

FRA has two primary authorities delegated under 49 CFR 1.49. Paragraphs (f) and (t) authorize FRA to carry out the functions relating to investigations, records, inspections, penalties, and specific relief as they apply to the transportation or shipment of hazardous materials by railroads. That authority includes the manufacture, fabrication, marking, maintenance, reconditioning, repair, or testing of containers represented, marked, certified, or sold for use in the bulk transportation of hazardous materials by railroad. Paragraph (s) authorizes the Administrator to carry out the functions of the Secretary by consulting and cooperating with the Interstate Commerce Commission (ICC) on regulations governing the routing of hazardous materials by railroad. FRA has not set routes for hazardous materials, but it has prohibited the movement of hazardous materials over certain routes pending improvement of track. The law gives DOT the discretionary authority to set routes and requires the ICC to cooperate.

In contrast to the delegation of authority statement, MTB issues regulations and exemptions formerly handled by FRA. The Hazardous Materials Division of FRA develops the regulations and submits them to MTB for concurrence and promulgation. This Division is also the source of the primary technical railroad hazardous materials expertise. The program does not provide a means of insuring that MTB does not overrule good judgment when there is a disagreement between the experts in the two elements.

Hazardous materials compliance inspections are made by 18 hazardous materials inspectors who are assigned to the Regional Directors. The motive power and equipment and operating practices inspectors are not primarily involved in hazardous materials inspections but are used irregularly to assist in the hazardous materials program. Most of the inspections are to detect failures to comply with container and loading requirements. Inspectors work constructively with shippers and carriers to correct noncompliance, and they report serious violations for enforcement action directly to the Office of the Chief Counsel. The relationship between the inspector, the Regional Director, the Office of Safety, the Regional Administrator, and MTB from a quality control standpoint is not clear. The program is not designed with clear goals and objectives, and measures of effectiveness are not delineated.

The Association of American Railroads (AAR) plays an active role in hazardous materials safety. For many years, its Bureau of Explosives performed functions delegated to it by Federal regulations. Although that delegation is being withdrawn as resources permit, the Bureau of Explosives continues to perform an important laboratory role in the classification of hazardous materials and in the education of railroad and shipper personnel. The AAR Mechanical Division publishes "Specifications for Tank Cars," a manual of AAR tank car specifications, including all DOT tank car specifications. The AAR Tank Car Committee is composed

of representatives from the railroads, tank car companies, and shipper associations. The Mechanical Division requires that applications for construction of new tank cars and any changes or additions, such as head shields, be approved by the Tank Car Committee. In 49 CFR 179, Federal regulations require that the Tank Car Committee approve all applications for new tank car construction and changes to existing tank cars. The Tank Car Committee is recognized by the Government, the railroads, and the tank car companies as the primary authority on tank cars.

The responsibility for the development of the track safety program is delegated to the Associate Administrator for Safety; however, the implementation and administration of the program is divided between the Associate Administrator for Safety and the Regional Administrators. The Maintenance of Way Division is the primary element in the development of the track safety standards and the inspection program to implement and enforce them. However, the Office of Safety Programs, under the Associate Administrator for Safety, is assigned responsibility to develop the policies and procedures for implementation of the rail safety program in general. The office provides interpretation and assistance to the regional field offices for implementing safety policies and procedures. The office also develops and monitors the State participation inspection programs, establishes the inspection manpower reporting and control system, and coordinates the training of rail safety personnel. In practice, it directs activities of the field inspectors through the Regional Directors of Safety, but the Maintenance of Way Division directs the Automated Track Inspection Program (ATIP).

Track safety inspectors normally make spot inspections based on deficiencies in railroad records, complaints, findings of the FRA track geometry cars, and other criteria which might indicate a higher level of risk or probability of a track-caused derailment. On a routine inspection, the railroad is given advance notice of the inspection and usually provides a track car to facilitate the process. As a result of the inspection, the inspector may take one of four actions: (1) In the case of the defects that are not deemed serious, urge voluntary correction of the defect; (2) issue a citation for violation of the track safety standards; (3) issue a Special Notice for Repairs which specifies the maximum train speed until repairs are made; or (4) when the defects are serious, issue a notice which is preliminary to an Emergency Order to remove the track from service until repairs are made.

The Safety Board has found that some railroads are using the track standards as a basis for instituting slow orders. If an inspector finds track defects, instead of correcting the defect the railroad operating department reduces the operating speed over a short section of track to comply with the appropriate class of track. One class I railroad in Kentucky in October 1978 issued a general order for a district with 37 slow orders on the main track.

Since the track safety regulations became effective, the number of track inspectors has increased from 12 in 1973 to 48 in 1978 and an additional increase of 27 is contemplated. The number of track-caused train accidents in 1977 compared to all train accidents was a 1 to 2.4 ratio, while the ratio of track inspectors to all inspectors was 1 to 5.2. In addition, during that period State inspectors were used. The number of inspections, the number of violations filed, and the number of claims made for noncompliance with track safety standards increased from 1975 to 1978. During this period the number of track-caused derailments also increased.

The FRSA contemplated a Federally funded program in which States would work with FRA to enforce Federal regulations. The FRSA did not authorize State participation in the hazardous materials program; however, it did permit the States to inspect in two areas--track and freight cars. State inspectors are responsible to the States for which they work, and the State inspector, like his Federal counterpart, recommends enforcement action to the FRA in Washington, D.C. If the FRA fails to act within 180 days from the date of the violation, the State has the legal authority to enforce directly.

In a letter of September 15, 1978, from the Administrator to the Honorable Preston Shannon, Commissioner, Virginia State Corporation Commission, the Administrator reversed his previous position and took a stand against expanding of the program to permit State participation in investigative and surveillance activities under the older safety statutes. That letter describes the State Participation Program and FRA's position on some of the issues and points of contention between FRA and the States. (See Appendix A.)

The FRA has developed its own high-speed track geometry cars. The FRA stated in its budget request for FY 1979 funds:

> "The Automated Track Inspection Program (ATIP) is a continuing program for supplying automated track and rail surveys to the FRA track inspectors. These automated surveys are essential to the monitoring and enforcement of FRA track safety standards. In addition to being used for safety purposes, the information is used by the Office of Federal Assistance, the Northeast Corridor Project and maintenance-of-way departments of the railroads inspected. We will have two hi-railers and three large track survey vehicles operational for a full year and a fourth large track survey vehicle, the prototype production vehicle, operational for approximately six months in FY 1979. In addition to the operation of these vehicles, another large track survey vehicle will be procured.

"Specific accomplishments planned in FY 1979 are as follows:

- Operate and maintain a fleet of four large track survey vehicles, and two highway-rail vehicles to cover 100,000 to 150,000 miles of track.

- Process the data from all surveys and provide track inspectors with information and service for monitoring track geometry and rail flaw defects.

- Install newly developed systems for measuring other track parameters as they become available.

- Evaluate the new vehicles for operational service.

- Continue the ATIP training program for FRA inspectors.

- Provide equipment maintenance for a survey fleet to work toward reducing track caused accidents."

"The ATIP interacts with the Inspection and Test Support Services subprogram under the Railroad Research and Development appropriation which provides the necessary research and development support needed to: inspect an increased number of track parameters measured; improve the quality of existing inspection systems; and reduce the cost per mile of track inspected." 16/

The large cars have computer equipment and sensors installed in passenger-type equipment and are capable of taking measurements at 70 mph. The FY 1979 budget request for ATIP was $5,100,000, about 20 percent of FRA's total safety budget.

FRA expects to be able to inspect all main tracks annually to determine if the tracks meet the geometry requirements for the corresponding operating speeds. However, before FRA can file a violation, an inspector must confirm the geometry car's measurements by actual visual and physical measurements. Some railroads are concerned that the FRA cars are too sophisticated and may be used to detect noncomplying track conditions that the track inspectors cannot detect.

16/ Federal Railroad Administration Railroad Budget Submittal for Fiscal Year 1979.

The FRA also has been attempting to install high-speed internal flaw-detection equipment on its track geometry cars for the past several years. To date, this effort has not been successful and the FRA continues to rely upon the railroads' own flaw-detection programs for compliance with the regulations. The railroads generally individually contract for rail inspection with the Sperry Division of Automation Industries, Inc. Several railroads have their own rail inspection cars, but occasionally augment their own inspection effort by contracting for additional inspections with Sperry.

There is no specific program to insure that the movement of hazardous materials is considered in the track safety program. The FRA's attitude is similar to that of the railroads--track that is safe for the movement of other freight cars is safe for the movement of hazardous materials.

ANALYSIS AND CONCLUSIONS

Hazardous Materials Program

In the past, FRA has not attempted to develop a program based on a systematic assessment of risks involved in the transportation of hazardous materials. Of all the documents alleged to be plans, FRA was not able to produce a documented safety program plan which identified the problems, rated them as to priorities, or determined what level of loss would be acceptable. The hazardous materials program is a fragmented one which reacts in an unstructured manner to concerns expressed by the various "safety shareholders"--the public, the Congress, the industry, labor, and the Safety Board. As a result, a task-oriented, ad hoc program has been set up without priorities and goals and objectives have not been established. The Safety Board found no evidence that FRA has ever attempted to identify and rank the relative risks posed by specific quantities and forms of hazardous materials moving by railroad.

The "safety shareholders" expect FRA to address all their concerns in its program. FRA's unstructured response to demands results in uncertain program direction. A hastily, poorly conceived, and poorly analyzed safety measure may prove to be ineffective and sometimes worse than the risk. However, a well structured, goal-oriented program could provide a basis for responding to the safety interest groups in an orderly and credible way.

> CONCLUSION: FRA's hazardous materials safety program is fragmented and reactive without established goals, objectives, or criteria by which success can be determined. The absence of established, documented goals and objectives results in failure to maintain program direction during reactions to catastrophes.

When 112A/114A tank cars were introduced in the late 1950's and early 1960's, economies of scale were the predominant value being satisfied by designers, technical committees, and regulatory agencies. Until the Safety Board was formed in 1967, there was no single, Federal voice to question, on the basis of accident experience, the safety level or risk level posed by this type of equipment when it was transporting LPG or other flammable liquefied, pressurized, compressed gases or toxic substances. Beginning with the Laurel, Mississippi, accident in 1969, the Safety Board called attention to the catastrophic consequences of accidents involving this type of equipment. At the time, the risk level was considered acceptable by all societal elements, except for the victims of the tragedies. With its recommendations at the end of 1969, the Safety Board was the first Federal agency to declare that the risk level associated with this equipment was not acceptable.

The October 29, 1970, Hazardous Materials Regulations Board Docket HM-63 proposed rescission of special permits under which such cars were allowed to operate, stating, "a continuing series of major accidents resulting in deaths, personal injuri s, and massive property damage, have involved cars of the above description."

The publication of this notice can be interpreted as a conclusion by the Hazardous Materials Regulations Board members that the risk level associated with the equipment was not acceptable and required correction. Later actions by FRA and MTB offer additional confirmation of this decision.

In the private sector in April 1970, the RPI-AAR Tank Car Safety Project began. This can also be interpreted as signaling a decision by these organizations that the risk level associated with these cars was not acceptable. Following the Crescent City, Illinois (1970), Houston, Texas (1971), and Kingman, Arizona (1973) accidents, the fire protection community, spearheaded by the National Fire Protection Association, came to a similar conclusion and publicly warned firefighters of the dangers of this type of equipment. Following the rash of hazardous materials accidents in late 1977 and early 1978, it became evident that the public was arriving at a similar conclusion that the risk level was unacceptably high.

However, even once the decision was reached that the risk levels were unacceptably high, action to reduce the risk levels has been spotty. Since 1969, FRA appears to have been most aggressive in its hazardous materials activity after major accidents. Now, 10 years after the problem was identified, the probability of another major hazardous materials accident is only beginning to decline with the retrofit of head shields and top and bottom shelf couplers. A well planned program with risk-based goals and objectives would have done much to maintain the direction and continuity of the program. Since identification of

possible fixes, major accidents which the Safety Board investigated and upon which the presence of shelf couplers and head shields may have had a preventive effect have resulted in at least 39 fatalities, 1,197 injuries, and $55.5 million in property damage.

In 1971 the RPI-AAR Tank Car Safety Research Program identified solutions to the head-puncture problem--top and bottom shelf couplers and head shields. The regulation requiring head shields by December 31, 1977, (HM-109) had no enforcement provision until the end of the installation period. When MTB issued the final rule on September 19, 1977, which required a combination of head shields and shelf couplers, the industry was relieved of the December 31, 1977, deadline. At that time, practically no tanks had been retrofitted with head shields, because the AAR Tank Car Committee had withheld approval of the design of the attachment. Unless FRA is willing to enforce its tank car regulations without AAR Tank Car Committee approval, the Tank Car Committee has virtual veto power over regulations covering specifications for tank cars. We do not know what the true effect of not having that protection has been. No one person below the Secretary can be singled out as being accountable for this delay. Although it is not clear that the Administrator, RSPA, will be held accountable, the Standing Committee on Hazardous Materials should give the Administrator, FRA, a better opportunity to initiate and expedite railroad hazardous materials safety matters.

> CONCLUSION: FRA and MTB must formalize the process of finding unacceptable risks in hazardous materials railroad transportation and must act promptly once such a finding has been made.

Under FRA's Hazard Analysis and Priority Determination contract, the Transportation System Center (TSC) is analyzing underlying accident causal factors to forecast the number and severity of accident exposures and is characterizing the flow of hazardous materials over the railroad network. This information will be used to assess current and future exposure and risks. Previously there have been virtually no specific formal attempts by FRA to compile available data in a coherent fashion.

The Safety Board could not determine how FRA intends to use the results of the TSC work. However, the data should be expanded into a risk-based framework for evaluation and planning of a hazardous materials transportation safety program. More immediately, the results should help toward determining the feasibility of designating particular routes or other control measures for hazardous materials. At this time, FRA does not know what the density and/or the severity patterns are in relation to the population centers or in relation to poorly maintained track. The terrible potential consequences of some tank car derailments require that the risks be defined and considered in track safety problems. A well planned track safety program will consider all risks and provide for those which are the result of hazardous materials in trains. The

principle of routing hazardous materials around vulnerable population concentrations has been established in the highway mode. In railroad, however, it is a more complex and political issue. Since there is a potential for disaster each time a tank car of compressed flammable gas or chlorine is involved in a derailment in populated areas, the feasibility and benefits of establishing rail routes should be explored completely. In spite of the fact that the percentage of tank cars that release any of their contents when involved in accidents is low, every reasonable effort should be made to prevent derailments which involve tank cars and to reduce the severity of those derailments which do occur. It is not known how much more can be done to the tank cars to reduce the severity of derailments before the point of diminishing return is reached.

This TSC work is FRA's first formal attempt to define problems and rank them. FRA, and thus TSC, are handicapped in their hazardous material mission by deficiencies in FRA's and MTB's accident/incident data systems. Since the data system was designed primarily for trend analysis of package performance, the prospects of success using DOT data appear dim.

When using the results to set priorities, FRA should realize the shortcomings of the data and judge the results accordingly. For example, although reported property damage figures can be used for some comparative analyses, they represent only about 30 percent of the total accident costs. 17/ Therefore, in determining the level of loss to the public, the reported damage figures are not adequate. Furthermore, since little data have been gathered by DOT about the accident processes which produce the harm, identifying and evaluating new safeguards will also suffer from data problems.

> CONCLUSION: The value of the results of the TSC work on hazard analysis and priority determination is jeopardized by the inadequacy of the FRA and MTB data which are being used.

Track Safety Program

The success of the track safety program is based upon finding, through inspection, those track conditions which do not comply with the Federal track safety standards, and initiating an enforcement action which results in fines for the violations.

T is no documented program which identifies the problems and rates them as to priorities. The absence of established goals, objectives, and criteri by which effectiveness can be measure ecludes any constructive program analysis and control by FRA. FRA use number of inspections, the number of enforcement actions, and the amount o nes collected as measures of effectiveness. One of FRA's goals for FY 1978 was to double

17/ U.S. Department of Transportation, "A Recommended Rail Safety Research Plan for Fiscal Years 1971-1975," FRA-RP-70-1, October 1969.

the fines collected. On October 9, 1978, Railway Age reported that the Administrator had said, in a speech, "Last year, we collected almost $3.5 million in fines for safety violations, more than double the 1976 total. This year the figure could double again to $7 million .... These actions are not just a warning to the railroads to get their act together. It is a policy that will continue until the regulations are met. In the past railroads found it cheaper to defer maintenance and take a chance on a fine. Now it will be more cost effective to do the necessary work in advance." In fact, FRA collected more than $7.5 million in FY 1978, using civil rather than criminal penalties for the first time.

The Office of Technology Assessment pointed out accurately in its report that there is no demonstrated negative correlation between the level of inspections and fines and the incidence of track-caused accidents. One cannot infer from this that regulations with a system of enforcement which imposes fines are completely ineffective. However, the railroad track problem is related to available cash. The FRA should determine whether the fine does more good than leaving the money in the corporation for use in correcting track defects. Proponents of the enforcement system of fines fail to consider that most serious track defects result from insufficient cash. Those carriers whose cash for operating expenses is seriously low rely on the standards as minimums; however, the well managed railroads maintain their track at considerably higher standards. The results of the better track is reflected in the derailment records.

An enforcement system which does not insure correction of the defect fails to accomplish a primary goal of regulation--adequate protection against risk. Detection of the defects must be combined with some method of requiring the offender to correct the defects. Currently manpower is not available to accomplish the upgrading.

> CONCLUSION: There is currently no indication that the FRA track safety program is reducing the number of track-caused derailments.

Enforcement of track safety standards has not always prevented track-caused derailments.

One effect of the track standards apparently has been to increase the number of miles of and the number of derailments on lower classes of track. This increase in miles of lower class track may be a result of railroads' using the track standards as a basis for instituting slow orders. The Safety Board has found that slow orders are being issued excessively as an alternative to restoring the track to its original class. Although the slow order is a respected, effective operating tool, when used to excess it can create operating risks. For example, an engineer may become preoccupied with the large number of slow orders and

allow unsafe operation. Statistics are not available to determine the effect of more trackage in the lower classes of track. From 1975 to 1977, the percentage of train accidents on each class of track above class 1 track has generally decreased, while the percentage on class 1 track has increased--from 40 percent of all train accidents in 1975, to 48 percent in 1976, to 52 percent in 1977. This shift is more pronounced in the case of track-caused accidents, with 46 percent occurring on class 1 track in 1975, 57 percent in 1976, and 62 percent in 1977. We have neither casualty figures nor exposure rates (such as gross ton-miles) related to the various classes of track; therefore, the significance of the distribution of the accidents cannot be determined.

> CONCLUSION: One effect of enforcing the track standards has been to increase the miles of track in the lower track classifications. The final safety effect of this increase has not been determined.

FRA has known since the conception phase of the track safety standards that imperfect standards would have to be published initially because of the lack of confirmed technical engineering data needed to define track performance. Seven years have passed since the initial standards were promulgated, the data are still not available, and no FRA program has been developed specifically to generate the data. The data being developed from tests on the Facility for Accelerated Service Testing (FAST) track at TTC are not being compiled and analyzed in a structured manner. Although the data may have potential value for defining track and train performance, the testing is not being done under "real world" conditions. The FAST track is inspected and monitored closely and its condition upgraded as soon as it deteriorates to a class 4 condition. In addition, the original track was constructed of a good 136-pound rail section on oversize crossties with a full ballast section. Track and train performance data from such a test cannot be extrapolated to determine dependably the required performance of track in classes 1, 2, 3, and 4. For these reasons the probability of success of the effort to develop performance standards is low.

The goal of track safety standards should be to insure safety of the entire pathway, the vehicles, the human operators, and the environment. The only known method by which compatible track standards can be developed is the systems approach. This requires a thorough analysis of the standards as they affect each other as well as an analysis of the interrelationship of the track with the entire pathway, the vehicles, the cargoes, the operating practices, and the full range of environmental conditions. This approach implies a positive search to find the full range of conditions possible in each category to insure that they are controlled. There is no indication that the increased risk of transporting tank cars of hazardous materials has been considered in the establishment of the track safety standards. The Inter-Industry Task Force on Rail Transportation of

Hazardous Materials recognized the increased risk when they recommended that "all trains with placarded loaded tank cars of 112A and 114A types operate at a speed ten miles per hour less than the maximum speeds authorized for freight trains operating on classes 3, 4, 5, or 6 tracks." 18/ To be effective, the standards must be compatible within their own framework as well as with other aspects of the railroad environment. The existing standards do not meet these requirements.

Rail failure is one of the largest single causes of derailments, yet efforts are concentrated toward detecting rail failures and controlling operations after the rail has failed. The regulations do not devote direct attention to controlling the number of rail failures.

Since the rail acts as a continuous beam, rail failures result from weight, speed, frequency, and nature of loads to which the rail is subjected. Even though this may be an oversimplification of a sensitive, complex phenomenon, it does indicate that regulations to minimize rail failure could be realistically established and enforced using progressive failure rates and other reliability criteria. It also indicates that compatibility with rolling stock was not considered adequately when the standards were developed. Most track engineers would readily agree that some of the older, smaller rail sections are overloaded by some of the new cars. Excessive axle load becomes more critical when track with smaller than 100-pound rail is allowed to deteriorate to class 3, 2, or 1. The additional dynamic loads induced by heavy trains on poorly maintained track with defective crossties and inadequate ballast surely overstress the smaller rail sections.

In addition the standards do not address adequately combinations of conditions that can cause derailments. For example, a wide gage condition may exist at a joint in the outer rail of a curve which is out of proper cross-level. This condition, in combination with a similar condition at the next joint in the inner rail, indicates "warp," which can cause derailments. This condition is not addressed explicitly in the initial standards. There are numerous combinations of conditions which increase the probability of derailment, but are not violations of the regulations. Some railroads recognize the dangers of combinations of conditions and therefore use track geometry cars.

> CONCLUSION: The track standards do not address their interrelationship with each other as well as with the pathway, the vehicles, the operating practices, and the full range of environmental conditions.

18/ Interim Report of the Inter-Industry Task Force on Rail Transportation on Hazardous Materials, July 21, 1978.

The nature of the initial standards and the need to recognize the dangers of combinations of conditions make it imperative that track inspectors have a basic knowledge of track-train dynamics and experience in recognizing the causes of derailments. Most inspectors--Federal, State, and railroad--do not have this knowledge and experience and have not been trained adequately to detect combinations of derailment-causing conditions. Since some conditions individually do not violate a standard, the conditions are not cited and often go unremedied until they cause a derailment.

CONCLUSION: There is a direct relationship between the subjectivity of the track standards and the need for highly qualified track inspectors.

When FRA issued the track safety standards, it faced a number of difficult problems. Most track design and maintenance technology is still in the empirical stage and has not been subjected to engineering analysis. In addition, the interrelated performances of various parts of the track subsystem and other parts of the railroad operating system have not been determined. Although the use of performance standards may be the ultimate best practice, few engineering descriptions of track performance exist. Standards defined by design specifications may tend to encourage incompatibility within the system and may restrict alternative means of meeting the performance requirements. Since the state of the art of track design is based largely on empirical data, it is not possible to be certain of the adequacy of some track standards, even when they are stated in terms of design. Even now, after more than 6 years of experience with the track safety standards, it is not possible to relate safety benefits to the track safety regulations.

Some regulations are unenforceable, because the requirements are indefinite or are open to varying interpretations by persons of different interests. Such regulations have no greater benefit than recommended practices and, actually, may hinder the funding of research to produce workable and enforceable regulations.

Although FRA has asked an AAR committee to help develop performance standards, the prospects for success are not good. Most knowledgeable track engineers agree that performance standards are desirable; however, none of the engineers interviewed by the Safety Board know how to develop performance standards, and some of them are not sure that they can be developed. Part of the problem is the failure to agree on what level of safety is acceptable. If the FRA cannot set an acceptable level of safety, performance standards cannot be set. Although the use of performance criteria is required to insure standards that compatibly define system operation, there is a lack of verified data and a failure to agree upon criteria for determining acceptable performance of track for given combinations of train characteristics, speed, and track geometry.

CONCLUSION: Performance-based track safety standards are preferable to design-based track safety standards; however, the state of the art and available data preclude development of performance standards.

Track safety standards based on design specifications are more practical because compliance can be determined more easily.

FRA's reliance upon the railroads to detect track conditions and correct them before they cause an accident would be more effective from a regulatory standpoint if the track safety standards were based on performance standards. If the railroads were economically healthy the normal inspection and maintenance policies of the railroads would insure a track condition which exceeded minimum safety standards.

Both the OTA report and the Secretary's "A Prospectus for Change in the Freight Railroad Industry," October 1978, make it clear that until there are some fundamental changes to improve the financial health of the railroad industry, derailment of hazardous materials will continue to pose a threat to the communities through which they are transported. It is not effective to treat track safety in isolation. Government economic policy should be coordinated with the safety policy to be sure that underlying operating and economic factors which affect safety are considered. Until something is done to make cash available to maintain track at an acceptable level, it is not likely that FRA can implement a track safety plan that will show a high degree of success. Recently, the ICC has been attempting to address this question in its railroad ratemaking by recognizing the deferred track maintenance issue.

The description of Federal Inspection Programs, Railroad Inspection Programs, and Analysis of Railroad Inspection found in Chapter VIII of the OTA Report provides additional detailed information.

The field inspection program is not well coordinated and managed with respect to authority, response, and accountability. The existing organizational structure makes the Regional Administrators responsible for the safety program as well as other railroad programs. There is no documented or even informal program which delineates the program and management responsibilities so that safety will be assured optimum consideration.

Since lines of authority for inspection and compliance activities between headquarters and the field are split, implementation of programs and effective quality controls is difficult. If the Regional Directors of Railroad Safety reported directly to the Associate Administrator for Safety or his designee, the operational and technical lines of communication and authority would be more compatible with the functional

activities of the various organizational elements of the Office of Safety. The limited success of the FRA inspection program is due primarily to the dedication of the middle managers of the Office of Safety. These managers, in contrast to the prescribed lines of authority, have continued to maintain a reasonably active inspection operation and deserve our commendation for an important and often thankless task.

The normal field inspection program is the responsibility of the Regional Directors, but the ATIP is directed by the Chief of the Maintenance of Way Division of the Office of Standards and Procedures. The ATIP appears to be more of a research and development program than a supplement to the track inspection program. To be most effective, track geometry cars must be used in a well planned track survey program to supplement the activities of the track inspectors. The Safety Board supports the use of automated track inspection vehicles as adjuncts to FRA's track inspection program. FRA, Transportation Test Center, and industry should continue the development and use of Federal track survey cars. Data produced by the Federal cars should be compatible with those produced by the various cars of those railroads that use them. Also, FRA should investigate the potential for use of track survey cars by some of the certified States. If the ATIP is going to be cost-effective, it must be oriented to practical goals and objectives and its effectiveness measured by criteria other than miles of track measured.

> CONCLUSION: The ATIP program is not coordinated effectively with the field inspection program and from an inspection standpoint may not be cost-effective.
>
> FRA's organizational structure is not conducive to the effective management of the field inspection operation.

Although FRA has never had great expectations for the State Participation Program, the Office of Safety expresses the attitude that since the law provided for it, they will make it work and get the most out of it. Unfortunately, the lack of management enthusiasm for the program has resulted in an apparent failure to develop and document a coordinated program and strategy to improve the safety inspection program. This lack of enthusiasm is exemplified by the change of opinion by FRA management regarding the wisdom of expanding the program to include those safety areas covered by the older statutes. The Safety Board agrees with the Administrator's testimony in the Spring of 1978, on H.R. 8361 as reflected in his letter of September 15, 1978, to the Honorable Preston Shannon, Commissioner, Virginia State Corporation Commission, "...it is the position of the Department that expansion of the program would be premature and inadvisable." However, that is not to say that at some future time, the program should not be expanded when the track and freight car safety programs are perfected.

The Office of Safety's insistence that the States must inspect at the direction of the Regional Directors and the Office of Safety Programs rather than allow the States the freedom of inspecting where they believe the need is greatest causes inefficiencies. The monitoring which takes the form of duplicate inspections by FRA tends to degrade the State inspectors in the sight of the railroads. In addition, the railroads do not understand the necessity of dealing with two sets of inspectors in a given State.

Improved communications between the States, and FRA's Office of Safety, Office of Federal Assistance, Regional Administrators, and the FRA inspectors in the regions would assist in clarifying the problems and delineating the options available to expand the program and make it more effective. The States represent a resource of inspectors which can supplement the FRA force of inspectors and, at the same time, allow the States to participate in a phase of transportation safety in which most States and the public are interested. The program appears to be a potentially cost-effective activity if properly developed and implemented. The Safety Board has already said, "Indeed, the Safety Board believes that the serious nature of the derailment and release of hazardous materials is of itself adequate rationale for the FRA to review its current State Participation Program in an effort to allow greater State participation in all areas of rail safety laws and regulations.... In the long term, increased State participation will augment the Federal monitoring effort, reverse the derailment trend, and minimize the effects of catastrophic hazardous materials releases." 19/

CONCLUSION: The FRA has not implemented an effective State Participation Program.

Summary of Conclusions

A difficulty associated with this review is that the Congressional directive contemplates looking at the weaknesses which may result in some persons' forgetting the many strengths of the organizations which are responsible for the relatively good railroad safety record. This review probed problems and the report is directed at delineating them and recommending solutions. The Safety Board was impressed with the talent and professionalism of FRA's staff and these strengths must be the foundation for improvements. To improve their effort will require a strong, knowledgeable railroad safety professional at the head of the Office of Safety who has the authority, as well as the responsibility, to issue clear-cut management directives, to develop, implement, and administer a safety program in a disciplined manner.

The absence of a full-time, railroad safety expert at the controls of the Office of Safety has had a remarkable effect upon the success of the FRA safety program. In spite of the dedication of the staff, the absence of a knowledgeable leader who is respected by the staff, the

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19/ Analysis of Proceedings of the National Transportation Safety Board into Derailments and Hazardous Materials, April 4-6, 1978. Report Number NTSB-SEE-78-2, June 23, 1978.

Secretary, the Administrator, the railroads, and labor has resulted in a loss of confidence in the ability of FRA to develop, implement, and administer an effective safety program. Labor no longer goes to FRA for action in railroad safety but instead, lobbies for legislation to accomplish their specific safety objectives. Although railroad interviewees were reluctant to indict FRA's safety activities, there is a widespread disenchantment with the FRA safety performance. Interviewees from both groups had no doubt that the continuing absence of a full-time Associate Administrator for Safety had affected the safety program adversely, and were convinced that a head of the Office of Safety which has the respect of all "safety shareholders" is needed if the improvements are going to be accomplished.

The Safety Board believes that the absence of a strong safety management leader is reflected in the unstructured, reactive program. A safety program which sets as a goal the doubling of last year's fines without knowing the effect of fines on the reduction of accidents reflects a lack of understanding of what controls risks. Goals and objectives must be the result of scientific safety analyses and they must be measurable, attainable, and worthy of support. These goals and objectives must guide program direction during times that the agency must react to crises. The agency must determine the acceptable level of safety (risk) and criteria by which the effectiveness of the program can be measured.

Conclusions

1. FRA's hazardous materials safety program is fragmented and reactive without established goals, objectives, or criteria by which success can be determined. The absence of established, documented goals and objectives results in failure to maintain program direction during reactions to catastrophes.

2. FRA and MTB must formalize the process of finding unacceptable risks in hazardous materials railroad transportation and must act promptly once such a finding has been made.

3. The value of the results of the TSC work on hazard analysis and priority determination is jeopardized by the inadequacy of the FRA and MTB data which are being used.

4. There is currently no indication that the FRA track safety program is reducing the number of track-caused derailments.

5. Enforcement of track safety standards has not always prevented track-caused derailments.

6. One effect of enforcing the track standards has been to increase the miles of track in the lower track classifications. The final safety effect of this increase has not been determined.

7. The track standards do not address their interrelationship with each other as well as with the pathway, the vehicles, the operating practices, and the full range of environmental conditions.

8. There is a direct relationship between the subjectivity of the track standards and the need for highly qualified track inspectors.

9. Performance-based track safety standards are preferable to design-based track safety standards; however, the state of the art and available data preclude development of performance standards.

10. Track safety standards based on design specifications are more practical because compliance can be determined more easily.

11. The ATIP is not coordinated effectively with the field inspection program and from an inspection standpoint may not be cost-effective.

12. FRA's organizational structure is not conducive to the effective management of the field inspection operation.

13. The FRA has not implemented an effective State Participation Program.

RECOMMENDATIONS

In addition to the recommendations which logically flow from this review, there are significant current recommendations in the Safety Board's report of the en banc hearing on derailments and hazardous materials which are still relevant to this issue. It is not the intent of this report to supersede those recommendations but to supplement them; particularly, recommendations I-78-9, and R-78-32, 33, and 36. (See Appendix B.)

The DOT Report of the Hazardous Materials Task Force also includes two recommendations, No.'s 1 and 3, which are relevant and which have been approved by the Secretary. Although this review was not directed at the entire hazardous materials problem across the transportation modes, the Safety Board endorses the concept of a Standing Committee on Hazardous Materials on a departmental basis as indicated in DOT recommendation No. 1. Even though accountability is not delineated, the Committee affords FRA an opportunity to advocate more effectively its railroad hazardous materials safety programs. The centralized hazardous materials information system, recommended in No. 3, is a necessity if the hazardous materials problem is going to be delineated and rated as to priority for correction. (See Appendix C.)

As a result of this review the Safety Board recommends--

--to the Federal Railroad Administration

"Select and install a railroad safety expert as Associate Administrator for Safety. Assure that he has the authority commensurate with his responsibility for the railroad safety program. (Class I, Urgent Action)(R-79-14)

"Change the organization so that the lines of authority are compatible with the functional requirements of the various organizational elements of the Office of Safety. (Class II, Priority Action)(R-79-15)

"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. (Class II, Priority Action)(R-79-16)

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. (Class II, Priority Action)(R-79-17)

"Insure the selective upgrading of those sections of track with the worst derailment records to a condition which will not cause derailments. (Class II, Priority Action)(R-79-18)

"Immediately revise the track safety standards to eliminate the subjectivity, incompatibility, vagueness, and unenforceability. The requirements should be made more explicit so as to insure the detection and correction of all combinations of track conditions which cause derailments. (Class I, Urgent Action)(R-79-19)

"Insure that the Automated Track Inspection Program includes goals and objectives and measurable criteria for program evaluation. (Class II, Priority Action) (R-79-20)

"Determine through an independent study why some states have been unable or unwilling to join in the existing State Participation Program and implement a productive program as contemplated by the FRSA of 1970 in which the States are true partners. (Class II, Priority Action)(R-79-21)

"Determine in cooperation with the ICC, the feasibility of establishing hazardous materials routes to bypass populous areas. If hazardous materials routing is operationally feasibile, require that the track on those routes be maintained at a minimum of Class 4 condition. (Class II, Priority Action)(R-79-22)

"Maintain the schedule for owners to complete the head shield and insulation program. (Class I, Urgent Action)(R-79-23)

"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. (Class II, Priority Action)(R-79-24)

"Determine the ultimate safety effect of allowing the indescriminate lowering of main track classifications instead of maintaining the track at original intended class. (Class II, Priority Action)(R-79-25)

"In cooperation with ICC develop railroad economic and safety policies which are compatible. (Class II, Priority Action)(R-79-26)

"Revise the policies at the Transportation Test Center, Pueblo, Colorado, to insure that the data which is developed is analyzed systematically and published. (Class II, Priority Action)(R-79-27)

"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 tracks. (Class I, Urgent Action)(R-79-28)"

BY THE NATIONAL TRANSPORTATION SAFETY BOARD

/s/ JAMES B. KING
Chairman

/s/ ELWOOD T. DRIVER
Vice Chairman

/s/ FRANCIS H. McADAMS
Member

/s/ PHILIP A. HOGUE
Member

March 8, 1979

APPENDIX A

SEP 15 1978

Honorable Preston Shannon
Commissioner
Virginia State Corporation Commission
P. O. Box 1197
Richmond, Virginia 23209

Dear Mr. Shannon:

Thank you for taking time to meet with me last spring to discuss state participation in investigative and surveillance activities under Section 206 of the Federal Railroad Safety Act of 1970 (Safety Act). Since that time the Federal Railroad Administration (FRA) has examined the State Participation Program with a view to establishing long range objectives and improving the quality of our common efforts to enhance railroad safety. Both the states and FRA have needed, for some time, a statement of principles for governance of the program. Similarly, we have needed to discuss short-term objectives. I am delighted to have the occasion of your annual report to address these concerns from the prespective of the FRA.

Purpose of the State Participation Program. The purpose of the state program as conceived in 1970 was to augment the Federal inspection capability with resources thought to be available in existing state safety programs. Nothing in the Safety Act suggested that the states were to supplant Federal inspection activities. Rather, participating states were to become an integral part of a national railroad safety program designed to assure the vigorous and uniform application of Federal safety standards.

We believe this original purpose must continue to be the lodestar of the program. If state agencies are amenable to constructive leadership from the Department of Transportation and act in concert with the national compliance program, they can play a valuable role in identifying and addressing safety problems which otherwise might not receive adequate attention.

Historical observations. Eight years after the passage of the Safety Act considerable progress has been made in bringing state agencies into the program. Twenty-four states have joined the program as of today, and there are three other state applications now being processed. It is expected that by the end of Fiscal Year 1979 some 35 to 40 states, employing at least 100 inspectors, will be on board.

When seen against the background of problems which have hindered implementation of the program, this pattern of growth is a tribute to the common efforts of the states and the FRA. Contrary to the expectations of authors of the Safety Act, the states, with notable exceptions, had only limited available human resources which could be made available for the track and equipment subprograms, the initial areas of regulation.

The low salary schedules of many states made recruitment of individuals meeting FRA-established qualifications difficult. In response, FRA made provision for an inspector trainee program and paid 100 percent of out-of-state training costs at the Department's Transportation Safety Institute.

Funding was a problem for some states. From the inception of the program, FRA has provided 50 percent funding of total state program costs--the maximum permitted by law. Funding was often made available long before actual inspection activities could be commenced.

State agencies experienced difficulties with Federal paperwork requirements. In 1977, FRA provided each state with a more simplified but comprehensive program management manual setting forth step-by-step instructions for fulfilling grant-in-aid and certification requirements. Additional help in this area has been provided by the Regional Directors of Federal Assistance and/or Safety on request.

While much remains to be done, we believe this record of initiative and accommodation on the part of FRA bears out the good faith of the administering agency and provides a foundation for future progress.

Federal-State communication. As might be expected, disagreements have arisen between the states and the FRA over the years. The number of separate governmental entities involved in the program makes communication an institutional problem of some magnitude. We are aware of the need to improve communication on both the planning and operational levels. We appreciate your personal efforts in this regard and look forward to a more active and extensive dialogue with the states in the coming months.

In the balance of this letter, I would like to respond to some specific concerns you have raised as Chairman of the National Committee on Railroads, National Association of Regulatory Utility Commissioners (NARUC).

Inspector qualification requirements and training. The matter of inspector qualifications is fundamental to the quality and cohesiveness of the State Participation Program. FRA must insist that state and Federal personnel are technically expert and capable of applying Federal standards in a uniform manner. It is our impression that many state agencies share this view.

However, this does not mean that doors will be closed to individuals who possess the requisite ability, but who lack the precise levels of experience or training set forth by regulation. The inspector trainee program was created to assure that formal requirements would not bar the recruitment of able, trainable personnel. FRA is working to assure that the inspector trainee program will be an increasingly effective mechanism for program growth.

As you know, the current inspector trainee program consists of a training guideline which extends to twenty-seven months leading to the administration of the inspector qualification examination. That period is by no means a minimum period of training, and FRA has shown its willingness to adapt the training cycle to the experience and ability of the individual trainee. In two recent instances, candidates with good academic backgrounds achieved inspector status after only seven months in the training program. In another case, a trainee successfully completed the inspector examination after fourteen months in the training program. Like the states, FRA wishes to see human resources used wisely and will not impose unreasonable training requirements.

In order to facilitate field instruction of inspector trainees and to encourage rapid completion of the overall training program, FRA contracted for the development of new, more structured training curricula for use in the track and equipment subprograms. We are now in the process of adapting the contractor's recommendations to accommodate actual field training conditions. We have targeted implementation to begin early next year. I am both pleased and confident that this new tool will provide new opportunities for us to compress further the training period where education, experience or unusual ability enhances the candidate trainee's potential to advance more rapidly to the productive inspector level.

The result of present and planned training initiatives will be to assure that no inspector candidate capable of serving in the program will either be denied the opportunity to serve or delayed in achieving full qualification as an inspector. Of course, field instruction will necessarily be accomplished utilizing an FRA inspector whose duties may take him outside of the trainee's home state. The trainee must be made

available for the program of instruction; and each state must assure that restrictions on travel are not permitted to frustrate early completion of the training program.

Enforcement policy. It is the policy of the FRA to utilize legal sanctions available under the Safety Act to the maximum extent necessary to effect compliance with regulations issued under the Act. In many cases, substantial compliance, both present and future, can be achieved without the use of penalty sanctions or other remedies. However, participating states are expected to recommend the assessment of penalties or other appropriate action where future compliance by the railroad is in doubt.

Obviously, state inspectors will need to exercise judgment in this area, as do FRA inspectors. However, some participating states have failed to make use of available compliance tools. FRA expects that state and Federal compliance policy will be identical to the extent possible. To that end FRA regional safety directors and the Headquarters Office of Safety will be emphasizing a closer liaison with the states to promote a more uniform application of safety policy.

Legislative proposals related to state participation. For some time it has been the position of DOT that the legislative mandate embodied in the Safety Act should be expanded to permit state participation in investigative and surveillance activities under the older railroad safety statutes (i.e., Locomotive Inspection Act, Safety Appliance Acts, Signal Inspection Act, Hours of Service Act). As reflected in my testimony last spring on H.R. 8361, it is the position of the Department that expansion of the program would be premature and inadvisable.

Two basic reasons underlie our position on this proposal. First, even with significant FRA assistance and active promotion of state participation, the entry of states into the track and equipment subprograms has been rather gradual. Much work remains to be done to assure that these subprograms function as an integral part of the national compliance effort. Second, existing Federal efforts to regulate interstate commerce under the older statutes have been effective in keeping accident and injury rates low with respect to the specific hazards addressed by those laws. Additional field resources should be focused on those newer areas of regulation which hold promise for affecting an improvement in the train accident picture and should not serve to duplicate the existing Federal capability.

The Department will continue to oppose any legislation calling for direct state enforcement of legal sanctions absent prior consultation with the Department. National uniformity can be achieved only if appropriate controls remain in place. The FRA has never failed to take action on request of a state where the action sought was within the law.

Operating practices. FRA has now issued initial railroad operating rules (49 CFR Part 216), requirements for the filing of carrier rules together with requirements for training and testing of carrier personnel (Part 217), radio rules (Part 220), and rear end marking device regulations (Part 221). These groups of regulations are relatively new. In some cases they are materially different from earlier railroad safety regulations. A number of problems of interpretation and enforceability have been encountered in relation to some of the requirements. Within the next year, FRA will review this body of regulations as a part of our regulatory improvement program. A significant redirection of the operating practices program is possible following that review. Pending that review of regulations, FRA will not expand the State Participation Program to encompass this area. To do so would necessitate extensive training efforts which might prove wasteful both from the point of view of the states and the FRA.

Accident/incident data. FRA has begun to provide to its own regional offices and to each participating state a monthly summary of all train accidents which occurred within the region or state. We are changing the entire operation for the processing of accident/incident data received from the railroads, which will significantly reduce the time taken to get the data onto the data base. It must be noted however, that the railroads are permitted thirty to sixty days to report an accident.

It should also be noted that the states may elect to have copies of all FRA accident/incident reports submitted directly to the state agency by the individual railroads. Furthermore, all of the accident/incident data on the data base is available to the states on magnetic tape for their own specialized processing. FRA is also developing new data analysis techniques, which should further improve the quality of information available to FRA and the states.

Sharing of information concerning field activities. Concern has been expressed by some participating states that adequate information related to direct FRA activities in the states has not been made available. I have directed that, upon request by a participating state, FRA inspection and violation reports concerning regulations with respect to which the state is participating shall be provided as a matter of routine.

The only qualification on this policy is that state agencies must agree to retain violation reports on a confidential basis until the alleged violations have been resolved through the claim collection process. FRA will endeavor to respond to other specific requests for information, assuring that participating states have the data necessary to plan programs of inspection.

Bridge standards. FRA has monitored the condition of railroad bridges through its field inspectors for a number of years. We hope to propose bridge safety standards within the next year. In the meantime, FRA will continue to investigate alleged bridge safety problems and seek remedial action where necessary.

FRA General Inquiries. FRA is conducting a series of general inquiries as a part of our regulatory improvement program. It has been a disappointment to us that the states have not been represented at these important safety proceedings. I hope NARUC and individual states will make a special effort to participate in our public hearing on the Track Safety Standards, which is scheduled for October 18 and 19, 1978. Among the matters which we will need to address is the safety of industrial spurs and sidings. Written comments submitted in connection with this general inquiry will also be appreciated.

The creation of any partnership is a two-way street. FRA is endeavoring to fulfill its responsibilities as a partner by assisting the states to play a constructive role in the national railroad safety effort. We are also attempting to open better lines of communication so that our respective concerns can be more fully understood. I am pleased to have met with you on these important matters. Thank you for expressing your point of view so effectively and bringing to our common venture a spirit of cooperation. I look to a continued strengthening of the national rail safety program.

Sincerely,

/s/ John M. Sullivan
JOHN M. SULLIVAN
Administrator

APPENDIX B

NATIONAL TRANSPORTATION SAFETY BOARD
WASHINGTON, D.C.

ISSUED: June 29, 1978

Forwarded to:
Honorable Brock Adams
Secretary
Department of Transportation
400 Seventh Street, S.W.
Washington, D.C. 20590

SAFETY RECOMMENDATION(S)

I-78-9 through -12 and R-78-32 and -33

On April 6, 1978, the National Transportation Safety Board concluded a 3-day en banc hearing on railroad derailments and the carriage of hazardous materials. 1/ The hearing was prompted by the increasing number of derailments nationwide, especially those involving the release of hazardous materials from DOT 112A/114A "jumbo" tank cars. Forty-nine witnesses from the railroad industry, tank car builders and operators, shippers, State and local officials, firefighters, labor representatives, and the public testified at the hearing.

The evidence indicated that DOT 112A/114A tank cars can and should be made safer, and that headshields, shelf couplers, and thermal protection are needed. On April 24, 1978, the Safety Board issued safety recommendations R-78-19 through -22 on these matters.

After fully analyzing the testimony, the Safety Board concludes that the Federal leadership, direction, and funding support are needed to pull together many varied existing emergency response activities into a nationwide emergency response network for handling hazardous materials emergencies. Most State and local government agencies are not prepared to handle massive hazardous materials releases without on-line technical advice in the first few critical minutes after an accident. The current Federal regulatory system of tank car placards, waybills, a booklet, and reliance on industries' notification systems and technical support have not been successful. If a fully operational hazardous materials emergency response system is not developed and implemented, then future railroad catastrophes will continue to result in the same deficiencies that have placed emergency response personnel and the public at risk. The Safety Board believes that the

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1/ For more information read, "Analysis of Proceedings of the National Transportation Safety Board into Derailments and Hazardous Materials, April 6-8, 1978," (NTSB-SEE-78-2).

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Department of Transportation (DOT) must assume a leadership role in setting up an effective response system. Efforts by States in developing their own hazardous materials emergency handling capabilities should be explored by the DOT and assistance provided to insure an adequate level of safety.

Several witnesses at the hearing testified to the ferocity of hazardous materials releases in train derailments and indicated that a majority of firefighting companies are not prepared to handle such releases. The Safety Board believes that the DOT should set minimum standards or guidelines for hazardous materials response teams at the National, regional, or State level.

Additional evidence from the hearing indicated concern over the number of hazardous materials substances not yet regulated by DOT. Also, it was indicated that the DOT and the Environmental Protection Agency should work closely in developing their regulations to insure that environmentally hazardous materials are adequately incorporated into DOT hazardous materials regulations.

Further evidence at the hearing indicated that the best available safety analysis method technology is not being adequately utilized. Such technology must be used before Federal regulatory action for hazardous materials is taken. By not using technologies when approving DOT 112A/114A tank cars, high safety risks were imposed on the public. The Safety Board believes that the DOT should establish a safety analysis plan to assure that the best available technology is utilized in its regulatory procedures.

Members of the public testified that they were concerned that hazardous materials are being routed along poorly maintained track. Since the number of derailments has increased and the number of hazardous materials accidents and incidents has increased, mechanisms for priority funding of track improvements with either Federal or private monies in densely populated urban corridors through which substantial amounts of hazardous materials are transported appears necessary.

Additionally, research should be undertaken to determine the safest positioning of tank cars in a train and the effects of heavier trains on the track networks.

Therefore, the National Transportation Safety Board recommends that the Department of Transportation:

> 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. (Class II, Priority Action (I-78-9)

Supply the leadership required to establish an adequate nationwide hazardous materials emergency response network able to meet all facets of hazardous materials emergency response needs, using existing State and private resources whenever possible. (Class II, Priority Action) (I-78-10)

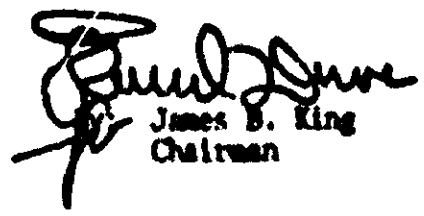
Encourage States to upgrade hazardous materials emergency handling capabilities, including State or regional one-call notification systems that will serve the needs of local public safety officials in significant hazardous materials transportation emergencies; and support development of guidelines by which States can evaluate their programs. (Class II, Priority Action) (I-78-11)

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. (Class II, Priority Action) (I-78-12)

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. (Class III, Longer Term Action) (R-78-32)

Provide sufficient funding for research that will assess the safety effects of heavier cars and trains on present track facilities, and safest positioning of hazardous materials tank cars and others in train consists, and issue regulations resulting from the findings of this research. (Class III, Longer Term Action) (R-78-33)

KING, Chairman, McADAMS, HOGUE, and DRIVER, Members, concurred in the above recommendations.



James B. King
Chairman

APPENDIX B

NATIONAL TRANSPORTATION SAFETY BOARD
WASHINGTON, D.C.

ISSUED: June 29, 1978

Forwarded to:

Honorable John M. Sullivan
Administrator
Federal Railroad Administration
400 Seventh Street, S.W.
Washington, D.C. 20590

SAFETY RECOMMENDATION(S)

R-78-34 through -36

On April 6, 1978, The National Transportation Safety Board concluded a 3-day public hearing on railroad derailments and the carriage of hazardous materials. 1/ The hearing was prompted by the increasing number of derailments nationwide, especially those involving the release of hazardous materials from DOT 112A/114A "jumbo" tank cars. Forty-nine witnesses from the railroad industry, tank car builders and operators, shippers, State and local officials, firefighters, labor representatives, and the public testified.

The evidence indicated that DOT 112A/114A tank cars need to be made safer, and the Safety Board has addressed Safety Recommendations R-78-19 through -22, dated April 24, 1978, to the Secretary of Transportation to accelerate the installation date of safety corrections for DOT 112A/114A tanks. After fully analyzing the proceedings, the Safety Board identified additional safety areas which warrant corrective action.

Testimony indicated that annual railroad accident statistics published by the FRA need to be interpreted by degree of danger to the public. Many accidents occur at low speeds in yard operations, and the loss is primarily monetary and is borne by the railroads. The annual statistics do not categorize accidents under the varying operating track classes (lower vs. higher speeds). Additionally, the statistical bulletin does not include FRA's plans and programs to eliminate accident causal trends and the effect these programs have had in reducing the number of accidents and incidents.

1/ For more information read, "Analysis of Proceedings of the National Transportation Safety Board into Derailments and Hazardous Materials, April 4-6, 1978," (NTSB-SEE-78-2).

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Further, testimony indicated that individual carriers and the Association of American Railroads (AAR) are addressing the safety of critical car components. However, the method for converting identified component failure rates into regulatory action has not been determined by the FRA. For example, the FRA does not have an adequate data collection program to determine the safe life of critical components. The Safety Board believes communications between the FRA and AAR need to be strengthened to insure that critical car component failure rates are identified and addressed by FRA regulatory actions as required.

Evidence indicated that derailments and release of hazardous materials is a major concern of State and local governments. The FRA State Participation Program is a major safety program (track and equipment standards only) that could increase the visibility of rail safety if the program was better utilized by the FRA. Currently, there are 57 State inspectors and inspector trainees. The Safety Board believes that the FRA should review and revise the program to encompass all rail safety regulations. Additionally, the Board believes that the FRA could measure the effectiveness of State programs and allow the States more flexibility in determining its requirements for inspectors without hampering uniform safety regulation application.

Therefore, the National Transportation Safety Board recommends that the Federal Railroad Administration:

> Publish an annual program management report that provides FRA's plans and programs to eliminate major accident causal factors. (Class II, Priority Action) (R-78-34)
>
> Identify critical car component failure rates and assure that they are properly addressed either by regulation or emergency order as required and expand communication channels with the Association of American Railroads to facilitate this program. (Class II, Priority Action) (R-78-35)
>
> Evaluate and revise the State Participation Program to allow greater State flexibility; base evaluation of the program on the States' ability to adequately monitor railroad and hazardous materials safety. (Class II, Priority Action) (R-78-36)

KING, Chairman, McADAMS, HOGUE, and DRIVER, Members, concurred in the above recommendations.

By: James B. King
Chairman

APPENDIX C

UNITED STATES DEPARTMENT OF TRANSPORTATION
REPORT OF THE
HAZARDOUS MATERIALS TRANSPORTATION TASK FORCE
SEPTEMBER 1978

RECOMMENDATION 1:

For the Assistant Secretary for Policy and International Affairs; the General Counsel; the Commandant of the U.S. Coast Guard the Administrators, Federal Railroad Administration, Federal Highway Administration, Federal Aviation Administration, and the Research and Special Programs Administration:

That a Standing Committee on Hazardous Materials be established by Secretarial directive to provide a Departmental focal point for execution of all hazardous materials programs. The Chairman of the Committee would be the Administrator of Research and Special Programs Administration. This Committee, composed of Secretarial Officers and heads of operating administrations, would serve as the Secretary's principal source of advice on all aspects of hazardous materials including policies, legislation, problems, and resource allocation. Through the Chairman of the Committee, liaison would be established with other Federal agencies and industry officials at the senior management level. This Standing Committed would be assigned the responsibilities delineated in this report. Included would be a requirement to submit quarterly reports to the Secretary which assess the impact of the Committee's various initiatives.

RECOMMENDATION 3:

For the Administrator, Research and Special Programs Administration:

That a centralized hazardous materials information system be established within the Department to collect and analyze hazardous materials program information. This information system should be carefully designed to record the significant characteristics of our program in order to assist in the Department's planning, regulatory, and compliance efforts.

APPENDIX D

PERSONS INTERVIEWED

The Federal Railroad Administration

1. John M. Sullivan
   Administrator

2. Raymond K. James
   Chief Counsel

3. Steven Ditmeyer
   Associate Administrator for
   Policy and Program Development

4. Robert E. Parsons
   Associate Administrator for
   Research & Development

5. Charles Swinburn
   Associate Administrator
   for Federal Assistance

6. Gene O. Cox
   State Safety Program Specialist

7. Robert M. Wright
   Deputy Associate Administrator for Safety

8. Jean U. Chrisman, Director
   Office of Safety Programs

9. Rolf-Mowatt-Larssen, Director
   Office of Standards & Procedures

10. William F. Black, Chief
    Hazardous Materials Division

11. William R. Paxton, Chief
    Maintenance of Way Division

12. Wallace F. Holl, Acting Regional
    Administrator
    Regional Director of Railroad Safety
    Region I

13. Edward R. Mathers, Director
    Transportation Test Center

Research & Special Programs Administration

1. Alan I. Roberts, Director
   Office of Hazardous Materials Regulations
   Materials Transportation Bureau

The American Short Line Railroad Association

1. P. H. Croft
   President and Treasurer

Association of American Railroads

1. J. E. Martin, Vice President
   Operations & Maintenance Department

2. F. A. Danahy, Executive Director
   Mechanical Division

3. C. E. Taylor, Director
   Special Studies Division

4. G. Way, Jr., Assistant Vice President
   Research & Test Department

5. J. A. Risendal, Executive Director
   Safety & Special Services

6. R. M. Graziana, Director& Chief Inspector
   Bureau for the Safe Transportation of
   Explosives & Other Dangerous Articles

7. G. J. Moyar, Director
   Tracl/Train Dynamics Program (Phase III)

8. M. Rougas, Chairman
   AAR Committee on Track Safety Standards
   Chief Engineer, Bessemer & Lake Erie
   Railroad Company

Railroads

1. W. S. Autrey, Chief Engineer
   The Atchison, Topeka, &
   Santa Fe Railway Company
   President
   American Railway Engineering Assn.

2. W. W. Simpson, Vice President
   Engineering
   Southern Railway Company

3. H. L. Rose, Assistant Vice President
   Maintenance of Way & Structures
   Southern Railway Company

4. R. A. Kelso, Chief Engineer
   Design & Construction
   Southern Pacific Railway Company

5. R. M. Brown, Chief Engineer
   Union Pacific Railroad

6. H. B. Berkshire, Assistant Vice President
   Maintenance of Way & Engineering
   Southern Pacific Transportation Company

7. J. M. Stricklin, Manager
   Damage Prevention & Loading Services
   Southern Pacific Transportation Company

8. R. E. Hart, Superintendent
   Hazardous Materials Control &
   Damage Prevention
   Southern Pacific Transportation Company

9. F. M. Kaylor, Assistant Vice President
   Safety & Freight Claim Services

10. R. K. Davidson, Senior Vice President
    Operations
    Missouri Pacific Railroad Company.

11. M. L. Smith, Director
    Marketing
    Petrochemicals & Hazardous Materials
    Missouri Pacific Railroad Company

Labor

1. Maxton Allcox
   National Legislative Representative
   Brotherhood of Maintenance of Way Employees

2. J. P. Snyder
   National Legislative Director
   United Transportation Union

3. Marshall Sage
   Research Director
   United Transportation Union

4. Lawrence Mann
   General Counsel
   United Transportation Union

5. Mr. E. L. McCulloch
   National Legislative Representative
   Brotherhood of Locomotive Engineers

State

1. Paul Rodgers, General Counsel &
   Administrative Director
   National Association of Regulatory
   Utility Commissioners

2. Frank Bowman, Director
   Motor Transportation Division
   Arizona Corporation Commission

3. William Crutchley, Jr.
   Railway Safety Supervisor
   Arizona Corporation Commission

4. Donald Ward, Director
   Advance Planning
   Iowa Department of Transportation

5. John Nimmo
   Transportation Needs Planner
   Iowa Department of Transportation

6. Dan Franklin, Administrative Assistant
   Railroad Division
   Iowa Department of Transportation

7. David J. Astle, Assistant Commissioner
   Rail-Air Program
   Public Utility Commission of Oregon

8. George E. Hardy, Jr., Administrator
   Railroad Safety Division
   Public Utility Commission of Oregon

9. R. A. Peteritas, Director
   Bureau of Transportation Rail
   Pennsylvania Public Utility Commission

10. Glenn Lehman, Chief
    Railroad Division
    Bureau of Transportation Rail
    Pennsylvania Public Utility Commission

Industry

1. J. H. Norton, Director
   Transportation & Distribution Department
   E.I. Dupont De Nemours & Company, Inc.

2. D. B. Bolgier, Division Manager
   Transportation
   E.I. Dupont De Nemours & Company, Inc.

3. C. R. Bigelow, Division Manager
   Transportation Safety & Equipment
   E.I. Dupont De Nemours & Company, Inc.

4. F. J. Heller, Consultant
   Phillips Petroleum Company

5. E. A. Phillips, Vice President
   Engineering & Development
   Union Tank Car Company

6. J. W. Thomas, Manager
   Quality Control Department
   Automation Industries, Inc.

END

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