Chapter

RAILROAD SAFETY INSPECTION PROGRAMS

Chapter VIII

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INTRODUCTION

Inspection has been conceived by the Federal Railroad Administration, the States, the railroads, and their employees as being one of the key components of railroad safety, The theory is that since both empirical and research information exists as to conditions that give rise to accidents, inspection by persons knowledgeable in a particular area will give sufficient warning when such conditions are developing so as to allow preventive actions to be taken or when such conditions have developed to allow corrective action to be taken. Although the theory is easily understood, the implementation of a comprehensive inspection program is impeded by several factors. They include:

- Difficulty of precisely identifying the causal agents in accidents and their correlation with accidents;
- Difficulty of establishing accurate measures of effectiveness for the inspection activity because it must depend to some extent on determining events or conditions that did not occur which otherwise might have; and
- Difficulty of maximizing the resources available from all parties concerned, given their differing mandates, areas of responsibility, and thus approaches to the problem.

Despite the impediments, however, an inspection program that depends upon the interlocking efforts of the FRA, the States, and the railroads is in place. The word "program" is used here in its broad sense, because the efforts of the FRA, the States, and the railroads are not singly conceived and because these efforts do not always coincide as to motivation or authority. These efforts are predicated upon the common assumption that inspections will prevent accidents—although the parties may disagree as to how much inspection (at which levels, by whom, and with what checks) constitutes an adequate effort. Important to the assessment of inspection's "effectiveness" in preventing accidents is that a framework of prescribed Federal regulatory powers and specifications in some way defines many of the inspection efforts. However, at the present time, no clear way of gauging the causal relationship of inspection to accident prevention appears to exist.

The Federal, State, and railroad approaches to safety inspection are focused on specific components of the train and its equipment (including track) and of the railroad's operating practices. Inspectors generally have to comply with a different set of requirements for each component that is the subject of an inspection program and therefore, inspectors tend to be highly specialized and perform only one type of inspection.

Brief overviews of the Federal, State, and railroad programs follow:

Federal Inspection[1]

Federal inspection activities focus primarily on five major aspects of the railroad. These are:

- Track,
- Operating practices,
- s Motive power and equipment,
- Signals and train control, and
- c Hazardous materials.

[1]Federal inspection programs include that administered by the National Transportation Safety Board (NTSB) however, this program is not discussed in detail in this chapter since i t is designed to investigate only serious accidents (including any that involve a fatality). Thus, its program is not one that directly bears on the relationship between a comprehensive inspection effort and the reduction of accidents.

The FRA has enforcement power in each of these areas, with the ability to assess civil penalties ranging from $250 to $2,500 per violation in the first four areas and up to $10,000 in the hazardous materials area, as well as criminal penalties for hazardous materials. Although the aim of the FRA program is accident prevention, it emphasizes the enforcement implications of the inspection system, since it believes that its mandate under the law is to monitor carrier compliance with Federal regulations. The railroad is itself responsible under the law for ensuring that it is in compliance with the regulations and thus also for directly preventing accidents. Therefore, one of the FRA inspector's main functions, when lack of compliance is determined, is to recommend assessment of penalties to the FRA Office of Chief Counsel. The inspection effort represents one of FRA's most significant safety programs in terms of dollars and numbers of personnel assigned to it directly or in support of it.

In FY 1976, for instance, $1,341,964 was expended in direct costs for conducting 1,587,349 individual inspections ranging from record checks to physical inspection of various aspects of the railroads' operations and equipment. During this same time, there were 386 FRA Office of Safety personnel authorized in the field and in headquarters for carrying out the inspection program. Three hundred and sixty of these positions were filled. (See appendix D.)

State Inspection[2]

The potential scope of State inspection activities was redefined by the Federal Railroad Safety Act of 1970 (P.L. 94-458). It contemplated a program in which States would work with the FRA to enforce Federal regulations, with the FRA financing a portion of these activities. The program that has been developed is known as the "State Participation Inspection Program." At present, the program permits the States to inspect in two areas. These are:

Track, and

Motive power and equipment.

Their inspection authority in the motive, power, and equipment areas is limited to freight car safety standards and does not include safety appliance standards. State inspectors are responsible to the States for which they work. Federal authority over them is limited to the State's eligibility (including prescriptions for inspector qualifications) for the State Participation Inspection Program and to the monitoring of the inspection records of performance. The State inspector, like the Federal inspector, recommends enforcement action to the FRA in Washington. Only if the FRA fails to act on the inspector's recommendation within 180 days from the date of the violation does the State have the right to enforce directly under this program.

In FY 1976, the State program is estimated to have cost approximately $341,925 in Federal money, matched by approximately the same amount in State money. These dollars supported the activity of 29 State inspectors and trainees. (See appendix D.)

Railroad Inspection

Railroad inspection activities cover all of the aspects of Federal and State inspections programs. In addition to ensuring compliance with Federal requirements, railroads use the inspection process to serve as an "early warning system." Inspection provides many railroads with information as to where preventive maintenance or modification/redirection of other operating practices may be necessary. The railroad inspection system as it pertains to safety is monitored internally by management, with its effectiveness being gauged by the twin results of preventing accidents and of preventing the necessity for FRA enforcement action. The FRA and State inspectors check on the adequacy of railroad inspection by conducting inspections of their own to ensure compliance with Federal

[2]Since this report is concerned with the implementation of Federal laws, it will not cover any aspects of State inspection effort that are not related to Federal requirements.

standards; however, railroad inspections—both by railroad policy and by Federal regulation—must take place with far greater frequency than FRA or State inspections. Figures are not available on the total costs of railroad safety inspections.

FEDERAL INSPECTION PROGRAMS

The Federal approach to railroad safety has included an inspection component, since the Locomotive Inspection Act was enacted in February 1911 to check boilers for the safety of employees and others. Since that time, the Safety Appliances Act[3] *(45* U.S. C. 1 et seq.), the Power Brake and the Signal Drawbar Act *(45* U.S.C. *9),* the Inspection Act (U. S.C. *26),* the Transportation of Explosives and Other Dangerous Articles Act of 1960 (18 U.S. C. 831-835), the Hours of Service Act (45 U.S. C. 46), and the Railroad Safety Act of 1970 (45 U.S. C. *431)* have been amended or enacted to empower the executive branch to enforce safety regulations promulgated under its authority. Each of the five principal inspection programs carried out by the FRA implements portions of these laws. All of the inspection programs are posited on the ability of inspectors to measure the existing conditions against a standard for which they are inspecting.

Many of the inspection programs were originally administered by the Interstate Commerce Commission but were transferred to the FRA in *1967,* with the establishment of the Department of Transportation. There have been numerous reorganizations and significant personnel increases since 1967. At the present time, FRA inspection programs are located in its eight regions. The headquarters Office of Safety, headed by an Associate Administrator for Safety, has no line authority over the field; each region reports directly to the Deputy Administrator of FRA. The Office of Safety is responsible for planning, developing, and administering 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. [4]In this light, the Office of Safety provides support to the field activities through its Office of Safety Programs, which houses divisions responsible for compliance and enforcement and program guidance, and its Office of Standards and Procedures, which houses divisions covering each of the inspection program disciplines as well as a division which analyzes accident and inspection reports (see appendix D for a schematic representation of the Office of Safety Organization).

At the present time, there are a total of *221* FRA inspectors at outstations. [5](See appendix D for summary by program.) These inspectors are stationed in 31 of the *50* States. The safety inspectors are assigned to one of the five specific inspection programs and work under the supervision of a Supervising Railroad Safety Inspector. While the FRA has placed importance on inspectors having in-depth knowledge/experience in the substance of a particular program, the Supervising Inspector is not required to have similar knowledge in all five programs. However, a Regional Railroad Safety Specialist position has been created in each discipline in each region to provide technical support and guidance.

[3]Originally enacted in 1893, the first Safety Appliances Act, however, did not provide for inspections.

[4]Taken from *FRA Organization Manual,* FRA *1100,23,* p. II-149.

[5]Figures, which include supervisors and specialists, are taken from "Railroad Safety Assessment, Task *III:* Analysis of Federal, State, and Railroad Inspection Programs, " Peat, Marwick, Mitchell & Co., Nov. 30, 1977. (Hereafter referred to as PMM &Co, "Task III"). The four Materials Transportation Bureau inspectors are not included in this figure.

In carrying out the various inspection programs, the FRA emphasizes its monitoring and enforcement role. It does not view its inspection activities as a primary means of ensuring that adequate preventive measures take place, believing, instead, that such a role is more properly the responsibility of the railroads. The FRA carries out inspections that flow from six different purposes. They are:

- Accident investigation (initiated by FRA),
- Emergency situation investigation (initiated by FRA),
- Complaint investigation (initiated by members of the public, including railroad employees),
- Routine planned investigation (initiated by FRA),
- Petition and application investigation (initiated by railroads), and
- Follow-up investigation (initiated by FRA).

The inspections in all of these categories are intended to determine if the railroad has complied with Federal safety standards (and, if not, to make a judgment about appropriate remedial action and/or penalty assessment). However, in the case of "petition and application" investigations, the FRA also is seeking to determine whether an exception to complying with an FRA regulation should be granted to a railroad requesting an exception. Depending on the situation, the FRA investigations may require several hours or several weeks to carry out.' The FRA stresses the importance of cooperating with the railroads in carrying out these inspections. In the case of routine planned inspections, inspectors are instructed to notify the railroads in advance of the inspections. Federal inspectors may inspect for many aspects of the railroad safety regulations on their own; however, they generally are accompanied on their inspections by an employee of the railroad.

[6]The term "an inspection" or "an inspection unit" maybe misleading when used as an output measurement or a way of assessing effectiveness because of the discrepancies that exist between the effort required to examine, for example, a railroad's time log versus that required to inspect freight car equipment.

The FRA accords accident investigations the highest priority. Emergency situation and complaint investigations also are given priority and are generally handled through headquarters in Washington. A control number is assigned and field personnel carrying out the inspections are monitored. The FRA estimates that about 10 percent of its inspections are complaint investigations, which are handled according to the inspector's schedule. However, no matter what the purpose of the investigation, all inspectors are expected to identify those elements present that are likely to cause failures and/or accidents. In addition, general courses, such as "Railroad Inspector Orientation and Accident Prevention" offered by the FRA are designed to provide the inspector with a broader, cross-cutting understanding of the variables in accidents than that offered by his specialized experience. This includes ways to recognize defects and failure modes that could cause accidents, legal implications, human factors considerations, and hazardous materials concerns in any given situation.

The various inspection programs report to the Director of Railroad Safety in the field (see appendix D), but aside from the reporting commonality the programs appear to be carried out in the region independently from one another. There does not appear to be an overall inspection/enforcement strategy that governs the day-to-day activities of the inspectors.[7]

There has been a shift in the inspection activity from FY *1974* to FY *1976.* The reasons for the shifts within some of the individual programs are not immediately clear because of a lack of data to relate these shifts to the accident pattern. For instance, freight car inspection increased by

'Th; approach to each inspection program is discussed under the section dealing with each program that follows. However, it is important to note here that in an April 1975 letter to the Secretary of Transportation the GAO recommended that the development of an inspection /enforcement strategy would strengthen the FRA's inspection program. (See 4/11/75 Eschwege letter to Secretary of Transportation (B-1 S4497(5)). PMM & Co., "Task III" also notes lack of accident prevention strategy in the inspection programs, based on the interviews conducted during the course of the study. pp. 1.5-1.6.

approximately 80,000 units, while motive power inspection decreased by approximately 40,000 (about 50 percent) during the period FY 1974-76. Similarly, inspection of hazardous materials records decreased dramatically from 75,094 in FY 1974 to *4,968* in FY 1976—and less dramatically in all other of its activities. The Signal and Train Control Inspection Program showed decreases in almost all of its activities, while the Operating Practices Inspection Program and the Track Inspection Program showed increases, with the relationship of the individual activities to the total program remaining more or less constant.

Total inspection activity declined slightly during FY 1974-76, indicating that the decrease in motive power and equipment, hazardous materials, and signal and train control inspections had not been offset by the increases in track and operating practices inspections. Because of the difficulty of relating the specific components of the individual inspection programs to the accident data, it is not possible to understand the reasons underlying the timing and the nature of the shifts. However, the increase in track inspections in all likelihood indicates a response to the high number of track-related accidents; similarly, the increase in operating practices inspections may indicate a response to the employee fatality problem. Nonetheless, these two inspection efforts have been allocated one-half as many dollar and personnel resources and one-tenth as many dollar and one-half as many personnel resources, respectively, as those allocated to the motive power and equipment inspection efforts. (See appendix D.)

During this same period, inspection personnel increased from an on-board figure of 185 in FY 1974 to 220 in FY 1976.

Description of Federal Inspection Programs[a]

A brief history and description of each of the five Federal safety inspection programs follows:

[a]Appendix D summarizes the inspection efforts and direct costs for FY 1974-7b.

Track Safety Inspection Program

This program was implemented to enforce standards (49 CFR 213) established under the Railroad Safety Act of 1970 (P.L. 91-458), beginning in 1972 when the first Federal track inspector was hired. The track safety standards prescribe minimum structural requirements and maximum speed limits for track used in interstate freight and passenger service. They were proposed on June *23,* 1971, and became effective for different types of track (depending upon when constructed) in October 1971, October 1972, or October 1973. Thus, for at least part of the time that the track standards were first in effect, FRA had no inspection force to monitor compliance.

The track safety standards were based in large part on industry standards already in use at the time of their promulgation, as well as on state-of-the-art information that FRA had already developed. So compliance with the standards did not pose a difficult technological problem for the railroads. However, FRA was not able to staff fully for several years following promulgation of the regulations. A summary of the numbers of track inspectors follows:

Number of Track Safety Inspectors*

1972	1973	1974	1975	*1976*	1977
	12	38	39	47	45
					3 vacancies

Thus, inasmuch as an inspection program serves as a deterrent, for at least 2 years following the promulgation of the regulations their deterrent aspect had minimal impact.

Since its inception, the track safety inspection program has become increasingly sophisticated, including the use of automated geometry inspection cars and rail flaw detection cars, both of which assist the inspectors and industry in analyzing track geometry for compliance with

‘1’MM & Co., “Tash III, ‘ p. 1, 3.

Track geometry car

Photos. Courtesy of National Transportation Safety Board

Rail flaw car

Federal standards. In addition, the FRA Automated Track Inspection Program (ATIP) provides computerized analytical support to the inspectors to detect and pinpoint the location of any deviation from the track geometry standards that had not previously been detected. Partly as a result of such inspection aids, the number of cited track defects, violations, and penalties assessed and collected appears to be increasing.

Track safety inspectors routinely conduct spot compliance inspections (both with and without the aid of automated track geometry cars) based on such criteria as the deficiencies in carrier records, population density along tracks, and number, frequency, and severity of accidents.

The routine inspection is usually carried out in cooperation with the railroads. The inspector gives advance notice of the inspection—which includes the territory to be inspected, a proposed date for starting the inspection, and an invitation for a railroad representative to accompany him on the inspection. For its part, the railroad usually provides a hi-rail car or motor car to facilitate the inspection process. Even though the advance notice of inspection is given to the railroad, the FRA may consider such an inspection to be a "spot compliance" inspection. If the inspection takes place because of a complaint that has been lodged, the inspector informs the railroad of this fact, but he does not divulge the name of the complainant.

Depending upon the result of the investigation, the inspector may:

- Urge voluntary correction of the defect (usually in the case of defects deemed "not serious"),
- Cite the railroad for violation of the safety standards,
- Furnish the railroad with a Special Notice for Repairs (when the track is found not to comply with speed requirements for the class at which the track is being used), which specifies the train speed that which may be used until repairs are made, or
- Issue a notice of track condition which is precedent to an Emergency Order (when track contains serious defects) removing the track from service until repairs are made.

The effectiveness of the track safety inspection program is particularly important because of the relatively high frequency (compared to other accident categories) with which track-related accidents occur. For instance, FRA's testimony during hearings on the Railroad Safety Authorization Act of 1976 (P. L. 94-348) before the House Subcommittee on Transportation and Commerce indicated that track-related accidents accounted for the largest number of accidents per million train-miles, despite the increasing number of violations cited. FRA indicated, too, that while the total number of train-miles decreased between 1974 and 1975 *(833.3* million in 1974 to 726.1 million in 1975), track-related accidents per million train-miles increased.

For track-related accidents, the increase was not as great as it was for the other categories; however, track-related accidents remained the category of accidents with the highest rate per million train-miles. In 1974, there were 3.5 track-related accidents per million train-miles; in 1975, there were 3.7.10 However, the inconsistency of reported data between 1974 and 1975 must be kept in mind. Similarly, FRA's testimony before the Senate Appropriations Committee for FY 1977, indicated that track-related accidents increased 10 percent in FY 1976 over FY 1075 and would increase an additional 9 percent in 1977 over 1976.1]

During comparable time periods, however, the numbers of FRA inspectors also increased, as did the number of violations reports filed and the number of claims made against railroads for noncompliance with track safety standards.

[10] See Federal Railroad Safety Authorization Act Hearings before House Subcommittee on Transportation and Commerce of the Committee of Interstate and Foreign Commerce.

[1] 'See Department of Transportation and Related Agencies Appropriations Hearings for FY 1 977 before the Senate Commit tee on Appropriate ions.

During FY 1975-76, a total of 549,819 unit inspections were performed covering all aspects of track safety. During this same time period, there were 4,940 track violations reports filed with the FRA. 1˜The number of violations reports filed in FY 1975 outnumbered those made in FY 1976 by 10:1. The reason for this disproportion is not clear since track accidents increased, the track inspection force remained constant, and total number of unit inspections increased slightly during this time period. A possible explanation may be that while inspection units increased, inspections on mainlines, where many of the track-related accidents occur, decreased by 11,429. (See appendix D.)

A summary of the pertinent track safety inspection benchmarks for FY 1975 and FY 1976 follows:

Table 31.—Track Safety Inspection Benchmarks

	FY 1975	FY 1976
Track-related accidents . .	2,719	3,810
(per 1,000,000 train-miles)a	3.7	––
Violations reports filedb. .	4,489	451
Number of inspections conducted	264,655	285,164
Number of inspectors on boardd.	47	45

aHeari rigs, supra. bpfvlfvl & co., "Task V" supra.
cAppendlx D. dAppendix D,

In light of the accident data, it is ironic that during the past several years, FRA has increased the staff of the track safety inspection program, although it still remains about half the size of the motive power and equipment inspection staff. Nonetheless, the increase in track-related accidents does not necessarily mean that the inspection program itself has been ineffective. As with most problems associated with railroad safety, an argument may be made that track conditions are, in part, a function of the financial health of the railroad industry as a whole over the past several years. For instance, each year the cumulative effect of inadequate or deferred maintenance, dating from several years ago, may contribute to the increase in track-related accidents, particularly in the lower speed limit track groups. (Track that is placed in this group may already be in a relatively deteriorated state.) However, the validity of drawing relationships between deferred maintenance and track-related accidents is a controversial issue, and the controversy points, in part, to the difficulty of assessing the effectiveness of the track safety inspection program.

It is possible to understand something of the dimensions of the track safety problem in relation to the inspection program from numbers such as those in table 31, but it is not possible to draw certain conclusions about the relationship of inspection to prevention of accidents—because it is not possible to say with certainty how many of the 4,940 violations reports filed with the FRA during FY 1975-76 in fact prevented accidents. Furthermore, as to those accidents that occurred, it is not possible with the data available to determine how many of those occurred because of a lack of compliance with the track safety standards. Neither is it possible to say which of those would not *have* occurred if the inspection program had been more vigilant. The data available do not allow determination of how many of the accidents occurred because of intervening variables, which the track safety standards were not able to anticipate, such as peculiar track/train interaction due to unusual hazards, for example, climatic conditions. [14]

Operating Practices Safety Inspection Program

The Operating Practices Safety Inspection Program revolves around inspection and enforcement of the Railroad Operating Rules (49

"Unit i> uwd here to dcscritw one type of lnspcctic>n — e.g. , t rach rt'c<~rds, track main 1 ine, track cr(~ssin~s, etc. Thus, It i~ possible Ior one railroadto have been subjected tomore than oneinspectionuni t. Figure is takenfrom appendix D.

"I'hlhl & CO., Task V,pp.VI. 4-5.

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' 'That such conditions could leadto accidents is implicitly acknowledged in the standard's instructionto inspect "as soonas possible" afterflood,storm,or other occurrence.

CFR 217). It requires the filing of current operating rules by railroads with FRA and the filing of the program of instruction for employees in the operating rules, as well as certain tests, inspections, and recordkeeping and the filing of an Annual Report. The Railroad Accident Incident Reporting Requirements *(49* CFR *225)* require railroads to report in a uniform manner those accidents incidents arising out of their operations and Hours of Service Rules (49 CFR 228), which implement the Hours of Service Act (P. L. 91-1 69). It requires that employees work no more than *12* hours in a **24-**hour period (except in the case of emergency accidents, when 16 hours are allowed) and has reporting and record keeping requirements. There has been an enlargement of the Operating Practices Safety Program. The Blue Flag Protection of Railroad Employees, Operation Rules *99, 93,* and Radio Standards and Procedures, all of which set down safety-related practices to be observed by employees, have taken effect in **1976 and 1977 Thus, although they have th**e potential to affect the human factors accident rate, they may not have been in effect long enough. Currenty, there are **42** Operating Practices inspectors onboard making this program about the same size in personnel as the Track Safety Inspection program. (See appendix D.)

All of the regulations that come under the Operating Practices Safety Inspection Program prescribe the general parameters on safety within which railroads must operate. Each railroad is required to do the following in order to remain in compliance with these regulations:

- Maintain a current file at the FRA, which must include a copy of its code of operating rules, its timetables, and its timetable special instructions; and
- File a program of tests and inspections with the FRA and conduct tests and inspections on certain operating employees to determine compliance with its own code of rules, timetables, and timetable special instructions.

The FRA's Office of Safety periodically reviews the operating rules, and its inspectors review the efficiency tests. In addition, FRA conducts periodic inspections of the degree to which the Hours of Service Act and rules are complied with (including employee interviews when there has been an apparent violation) and the degree to which the railroad accident/ incident records are kept as required, including records as to highway grade-crossing accidents/ incidents, rail equipment accidents, incidents, and death, injury, and occupational illness incidents.

With the exception of the records inspection, which has been the basic tool of this inspection program, this set of regulations provides a problematical enforcement issue for the FRA: how to determine whether these basically preventive human-related regulations are consistently observed. Unlike the track-safety regulations, for instance, violations of the regulations take place periodically over time and can or cannot occur, depending on the situation; whereas, once a track-safety violation occurs, it continues to exist until corrective action is taken. Spot-checking is one mechanism that can be used, of course; however, a violation may not be detected if it is not the subject of a spot-check (which must inevitably be a very small sample of all of the work situations in which the operating practices regulations apply) unless an accident occurs or unless a complaint is lodged by an employee.

In the event that a complaint triggers the investigation, the inspector is told the identify of the complainant but is prohibited from revealing this identity to the railroad, unless authorized in writing by the complainant to do so. The investigation that is conducted must rely to a great extent upon the relationship of the complainant's observations (as well as those of other witnesses) to the railroad's records. The inspector must make a determination as to wether the one bears the other out, and, in many cases, the judgment is finally a subjective one. The large majority of complaints filed under the program concern an alleged lack of compliance with Hours of Service requirements.

It is not possible with the data available to make a judgment as to which of the so-called "human factors accidents, which caused the

greatest number of employee fatalities, occurred because of a violation of one of the Operating practices Regulations. However, since there were 462[15] complaints of violations of operating practices regulations in FY 1975, it is apparent that there are some violations. However, as stated earlier, it is too early yet to say whether the Operating Practices Safety Inspection Program, with its newly promulgated regulations as well as additional areas under consideration for regulation, 16 will have a significant impact on this category of accidents and how or whether these new regulations should affect the Operating Practices Safety Inspection Program. What remains clear, however, is that prior to the promulgation of these new regulations, train accidents in the "human factors" category were increasing, despite the inspection activities. 1[7] In FY *1975,* they increased from 1.8 per million train-miles to 2.8 per million train-miles, a larger increase than for any other accident category, However, while the increase in FY 1976 continued, the rate of increase was lower than that for the other categories. Nonetheless, the absolute number of train accidents in this category was second only to track.18

The Operating Practices Safety Inspection Program, as it is now constituted, began with **30** inspectors in FY 1974 and in FY *1976* reached the authorized ceiling of 40. However, the relationship between the increase in human factors accident rate (followed by the tapering off of the rate of that increase) and the safety inspection program is not clear from the information available. It is clear, however, that numbers of violations reports filed by inspectors are increasing along with the accident rate and that the complaint level is remaining constant.

A summary of the pertinent benchmarks in the Operating Practices Safety Inspection Program follows:

Table 32.—Operating Practices Safety Inspection Program Benchmarks

	FY 1975	FY 1976
Human factor accidents . . .	1,678	1,719
(per 1,000,000 train-miles)a	2.8	––
Violations reports filedb. . .	831	1,627
Complaints investigated. .	462 (of which 402 = hours of service)	466 (of which 391 = hours of service)
Number of inspections conducted (records)d . . .	299,154	350,203
Number of inspectors on boarde	29	32

a Hearings, supra. bPMM & CO., "Task V" Supra. cPMM & Co., "Task Ill," p. II-78. 'Appendix D. 'Appendix D.

Motive Power and Equipment Safety Inspection Program

The Motive Power and Equipment Safety Inspection Program covers locomotive inspection *(49* CFR *230* prescribes safety standards for locomotives); safety appliances inspection **(49** CFR **231** prescribes safety standards for automatic couplers, handholds, and grab irons, ladders, car end platforms, handbrakes, and steps on switching locomotives); railroad power brakes and drawbars inspection **(49** CFR **232** prescribes safety standards and inspection criteria for power brakes); and railroad freight car inspection **(49** CFR *215* prescribes minimum requirements for freight cars). Until **1974, there** was no differentiation made between locomotive inspectors and safety inspectors in other areas under this program. Since 1974, however, inspectors under the Motive Power and Equipment Safety Inspection Program have inspected for all standards that it covers. In terms of both personnel assigned to it and total dollar cost of direct inspection activity, this program is the largest; there are currently 91 inspectors on board. (See appendix D.)

Inspectors under this program personally inspect all types of locomotives, cars, and trains

[5] **402** of these complaints concerned alleged hours of service violations, PMM & Co,, "Task III, " p. II. 78.

[6] "The areas under consideration for regulation include railroad employee training standards, employee qualification standards, engineman medical standards, and Federal or carrier certification of railroads. PMM & Co., Task III, p. **66.**

[7] **"See** chapter V of this report for further discussion of employee fatalities.

[8] "See House hearings on Railroad Safety Authorization Act and Senate Appropriations Hearings for FY 1977, supra.

operating within their areas of responsibility. These inspections are designed to determine whether the carriers are inspecting and repairing their locomotives, cars, and trains in accordance with federally prescribed standards. The FRA inspectors, however, generally do not inspect the rolling stock until carrier personnel have had a reasonable opportunity to inspect it themselves. The FRA inspectors may inspect at any time, but, in the event of a train prepared for departure, they generally do not delay the departure for the purpose of performing an inspection. When a defect is found, the inspector may, by written order, remove the defective locomotive, car, or train from service. If a Federal inspector wishes to determine compliance with Federal standards by means of a test, he may request the carrier to perform that test and observe it as it takes place.

Inspectors are instructed to cover all inspection points within their territories "as uniformly as practicable" and to report to Washington on their inspection activities on or before October 1 every year. Each inspector is expected to know his own territory and to be familiar with the condition of rolling stock in that territory. In devising his inspection strategy, he also is instructed to make judgments concerning the relative importance of various inspection points and which of these may require more frequent inspections than others. These inspections are carried out within the context of the overall requirement that nine-tenths of the country's freight cars have mandatory inspections and shoppings every fourth and eighth year. The rest of the freight cars are to be inspected and shopped every 1 and 2 years.

The inspection program also has been used to identify a pattern of defects or failures, such as a higher-than-normal percentage of wheel failures on a specific type of car. When such a pattern is identified, the FRA provides the information to all of its inspectors and cooperates with the carriers and suppliers, as appropriate, to determine the cause of the failures and to prescribe the necessary corrective action.

In 1974, the locomotive and safety appliance inspection activities were combined in the Motive Power and Equipment Program. The ceiling for the locomotive inspection program was 51 and that for the safety appliance program was **64;** when the programs were combined, the new ceiling was 75. However, the operating practices program absorbed most of the extra positions not allocated to the consolidated program, so the absolute numbers of inspectors did not diminish. Since consolidation in *1974,* the Motive Power and Equipment Safety Inspection Program ceiling has been raised to **93,** of which 91 positions have been filled.

Nonetheless, equipment-related train accidents occur about as frequently as "human factor" accidents; however, their increase in FY **1976** over FY **1975** was 4 percent as opposed to **2.5** percent for human factors. This category of accidents, however, may be the one that can be most directly affected by the enforcement of safety standards, since there are fewer possibilities of intervening variables such as climate or human judgment that will directly cause equipment failure .20 If the safety standards are soundly based, then it should follow that compliance with those standards should lower the rate of such accidents caused by equipment failure. In FY *1974,* equipment failures was the second highest category of train accident cause, after track failures, In FY 1975, equipment failures causing accidents increased, but at a lower rate than failures in both the track and the human factors categories. As noted above, however, this slower rate of increase did not continue into FY 1976. The reason for the absence of any apparent downward trend in the equipment-related accident category in light of the inspection program and the increased number of inspectors is problematical. Further, from the figures in table **33,** it appears that there were **58,166** fewer inspections in FY 1976 than in FY 1975, with about the same number of inspectors. The reason for this is not clear.

[19] See Senate Appropriations Hearings for FY 1977, supra.

[20] This statement must obviously be qualified for certain aspects of the program —e. g., power brakes —which set down requirements that depend upon human beings for their implemental ion.

A summary of the pertinent benchmarks in the Motive Power and Equipment Safety Inspection Program follows:

Table 33.—Motive Power and Equipment Safety Benchmarks

	FY 1975	FY 1976
Equipment accidents	1,680	1,736
(per 1,000,000 train-miles)	2.3	--
Inspections conducted. ..	904,560	846,394
Number of inspectors on board.	75	82[d]

[a]Hearings, supra. [b]Appendix D. cPMM & CO., "Task III," p. II.47. [d]Present level is 91, see appendix D.

Signals and Train Control Inspection Program

The Signals and Train Control Inspection Program takes its authority from the Signal Inspection Act *(49* U.S.C. **25),** which is Section **25** of the Interstate Commerce Act, passed in **1920.** The regulations that implement this Act are contained in Signal Systems Reporting Requirements **(49** CFR *233),* Instructions Governing Applications for Approval of a Discontinuance of Material Modification of a Signal System (49 CFR 235), and Installation, Inspection, Maintenance and Repair of Signal Systems, Devices and Appliances (49 CFR 236). These regulations establish criteria for the testing, installation, and maintenance of signal systems so as to minimize the possibility of accidents due to inadequate signals, signal failure, or human error with regard to signals, including automatic block signal systems, interlocking signals, traffic control systems, automatic train stops, train control and cab signal systems, and dragging equipment, slide detectors, and other devices.

The inspection aspect of the Signals and Train Control Inspection Program requires that the carrier must perform all testing of safety devices that might be necessary, but inspection itself may be carried out by the FRA, regardless of whether a representative of the carrier is present at the time of inspection. The inspector must inform the carrier of the existence of any violations of the regulations; however, it falls to his discretion as to whether such unsafe or defective condition should be reported to Washington for prosecution.

Under this program, carried out by **28** FRA inspectors, each inspector is expected to give advance notice of the impending inspection to the railroad. However, unlike the other programs, there are specific requirements as to which items the inspector may inspect only when accompanied by a representative of the railroad and which items he may inspect unaccompanied. The inspector determines what remedial action is necessary and when it should take place. He also inspects, after a reasonable period of time, to ensure that it has taken place. The Signals and Train Control Inspection Program has grown from an authorized ceiling of 17 in FY 1970 to 29 in 1976, of which 20 were on board.

Signals and train control accident statistics often are not broken out and treated separately by the FRA;[21] thus, it is not easy to gauge the frequency of accidents related to signal or train control failure or to relate the declining number of inspections conducted to the accident rate. However, in order to give an idea of the *relative* size of the signal and train control "problems," a summary of the pertinent benchmarks for which information is available follows:

Table 34.—Signal and Train Control Safety Inspection Program Benchmarks

	FY 1975	FY 1976
Signal and train control accidents.	n/a	n/a
(per 1,000,000 train-miles). .	n/a	n/a
Number of violations.	187	139
Inspections conducted. . .	82,522	69,226
Number of inspectors on board[c] ... , ...	28	28

[a]PMM & Co., "Task C" supra. [b]Appendix D. cAppendix D.

[21]Is, for instance, FRA testimony before the Senate Appropriations Committee, supra.

Hazardous Materials Safety Inspection Program

The Hazardous Materials Safety Inspection Program dates from 1908 and the Transportation of Explosives and Combustibles Act (18 U.S. C. $$831-835). In 1960, the Transportation of Explosives and Other Dangerous Articles Act (P. L. 86-710) expanded the definition of those "hazardous" materials covered to include "et iologic and radioactive" materials. The FRA of **1970** further broadened the authority of the Federal Government to deal with the transportation of hazardous materials and increased penalties for violations, which included requirements for a central reporting system for hazardous materials and accidents and an annual review of hazardous materials transportation by the Secretary of the Department of Transportation.

Under Title I of the Transportation Safety Act of 1974 (P. L. 93-633), the Materials Transportation Bureau (MTB) and the FRA both have jurisdiction to inspect for violation of regulations concerning the shipping of hazardous materials. MTB has jurisdiction over container manufacturers and intermodal shippers of hazardous materials; the FRA has jurisdiction for the enforcement of regulations governing railroad transportation of hazardous materials.

The MTB regulations are found at *49* CFR, 171-179. They set down requirements for handling cars containing hazardous materials. The cars must be placarded with signs that indicate the type of hazardous material they are carrying; the signs are specified in the regulations. [22] The hazardous materials covered by these regulations are as follows:

- explosives,
- gases,
- flammable liquids,
- flammable solids,
- oxidizers,
- poisonous materials,
- radioactive materials, and
- corrosive materials.

"See chapter X for a discussion of the hazardous materials program development t.

The inspection program, as the division of jurisdiction implies, is divided between the MTB and the FRA, with the MTB primarily responsible for container manufacturer inspection and the FRA responsible for railroad tank car inspection. The MTB has 4 inspectors nationwide and the FRA has 14. However, FRA recognizes the need for more inspectors and has requested an increase. At the present time, the FRA estimates that approximately 15 percent of the time of inspectors of other skills is spent on hazardous materials work. Thus, FRA contemplates relieving this burden and improving the efficiency of the hazardous materials safety inspection program by creating—in the long term—a stronger force of hazardous materials inspectors per region. 23

Hazardous materials inspection activities have increased significantly during the past several years, following the increasing amount of hazardous materials shipped by rail. The AAR estimates that 1.04 million carloads of hazardous materials are shipped annually through approximately 50,000 rail shippers' facilities. [z,]

These figures suggest that, given the present inspection level, the Hazardous Materials Safety Inspection Program is designed to spot-check compliance, with potentially high penalties for noncompliance and recordkeeping checks serving as a general disincentive to noncompliance. This inspection program differs from the others in that it is concerned with the involvement of hazardous materials in accidents and not with their causing railroad accidents. In a certain sense, the program is designed as an insurance program in light of the potential for extreme damage and injury posed by many of these materials. If an accident due to defective equipment, human error, or any other cause occurs, the hazardous materials program is intended to ensure that the hazardous materials do not compound the seriousness of the accident. Thus, the inspection strategy of this program might have

23 PNIM & Co,, "Task III" working papers.

24The number of carloads shipped is an elusive figure. The FRA has estimated that 0.9 million are shipped every 2 years. See PMM & Co., "Task 111", p. II-59.

been expected to be somewhat more intensive than the other programs. On the face, given the number of inspectors on board and inspections conducted, this does not seem to be the case. That the same number of inspectors made about twice as many violations reports from about 10,000 fewer inspections (reflecting primarily a decrease in records inspection) in FY 1976 than in 1975 may be significant in terms of the extent to which violations occur .25 The Hazardous Materials Inspection staff ceiling was raised from an authorized **3** in FY **1970** to *25* in FY 1976. There are now 14 FRA hazardous materials inspectors on board.

A summary of the pertinent benchmarks in the Hazardous Materials Safety Inspection Program follows:

Table 35.—Hazardous Materials Safety Program Benchmarks

	FY 1975	FY 1976
Hazardous materials accidents	——	981
Violations reported b.	234	541
Inspections conducted C.	36,458	26,933
Number of inspectors on board d	18	18

a MTB reports. bPMM & ~0, "Task V" supra. c4MTB and 14 FRA inspectors, see appendix D. dAppendix D.

STATE PARTICIPATION PROGRAM

The Federal Railroad Safety Act of 1970 provided for the participation by States in a cooperative program with the Federal Government to carry out the investigative and surveillance activities related to safety regulations under the Act. States are eligible to participate if a State agency has regulatory jurisdiction over the subject of the regulations and if the FRA enters into a "certification" or "agreement" arrangement with the State. Under "certification," the FRA certifies that the State can carry out certain investigative or surveillance activities in the same way as the Federal Government. There are two stages of certification:

- Initial certification is provided for up to **3** years, during which time the State may develop its inspector capability to conform with the Federal requirements as to level of effort, and
- Full certification, at which time a State provides at least the minimum level of inspection effort required.

Under an "agreement," the FRA agrees with the State to cooperate in certain areas if the State is unable to qualify for or is not desirous of obtaining full certification. Federal funding for up to **50** percent of the allowed, safety inspections costs is available to States participating in the program.

To date, the FRA has promulgated regulations to implement the State participation program[2'] and four other sets of safety regulations under the *1970* Act. The additional four regulations are on: track safety, railroad freight car safety, railroad operating rules, and railroad accidents/ incidents reports, classification, and investigation. The FRA has promulgated procedural regulations to include two of these programs in the State participation program: track safety inspection and railroad freight car safety (equipment *only). As in* Federal inspection programs, the State participation program contemplates specialized inspectors for each of the included regulations.

The FRA began the State participation program in FY 1974, when Federal funding became available. The interest and level of State participation, however, has not been as high as might have been expected. By December 1977, **21** States were certified. The growth pattern of the State participation program follows:

[25] See appendix D.

26 CFR 212

Growth of State Participation Program

Date	*Number of States27*
7 74	5
3 '75	12
10' 77	19
12 '77	21

The reasons that States have not participated in greater numbers are varied. They include: lack of a State entity having jurisdiction, lack of funding, lack of sufficient railroad mileage to warrant participation, and reluctance to be tied to Federal funding. In addition, the State participation regulation has been controversial with States from the time it was first proposed, largely because of the high qualifications requirements set down by FRA for inspectors hired by States. The States believed that they could not find and/or pay inspectors with the level of experience and qualifications required by the FRA. The FRA, on the other hand, did not want two classes of inspectors for the same things. Thus, the FRA held firmly that the high level of experience was necessary. However, the FRA established the category of inspector trainees to give the States some flexibility in their initial hiring. Furthermore, FRA's Office of Safety Programs, in conjunction with the Office of Federal Assistance, has developed training programs geared to meet the needs of particular inspectors in particular States. Nonetheless, discrepancies between the salaries commanded by Federal inspectors and those that States are able to pay do exist, and some States report that they have had difficulty in hiring inspectors.

At the present time, the State inspection program has *28* track inspectors plus *8* trainees (of an authorized 46 inspectors) and 18 equipment inspectors (of an authorized 18) on board. (See appendix D for distribution of inspectors in relation to the Federal program.) Like the Federal inspect or, the State Participation inspector recommends enforcement action to Washington/FRA. By statute, the State can go to court to prosecute a violation only if the Federal Government fails to act within 180 days from the date of the violation.

In the Track Safety Inspection Program, State inspectors/trainees work in the State participation program in 14 of the 31 States to which Federal inspectors are assigned. In five of these States, the number of State inspectors/trainees exceeds the number of Federal inspectors; in six, State and Federal inspectors are equal in number; and in the remaining three, Federal inspectors outnumber State inspectors. In addition, six States that have no Federal track safety inspectors assigned to them have State inspectors/trainees participating in this program. The basis for the assignment of State track safety inspectors is, by Federal regulation, that one inspector be assigned for every *4,400* miles of track in-State and that each mile of track be inspected once every 2 years.

In the case of the freight car equipment standards, there is greater overlap of Federal and State inspectors: only one State that does not have Federal freight car equipment inspectors assigned to it is participating. Six of the remaining eight States have fewer State inspectors than Federal inspectors, one has the same number and one has more. While problems of coordination may occur as a result of the presence of Federal and State inspectors, the doubling up of Federal and State inspector assignments does not necessarily constitute duplication of effort because Federal inspectors may have inspection responsibility in States other than the ones to which they are assigned. The basis for the assignment of freight equipment inspectors is the assumption that a .5-percent sample of freight cars originated and terminated be inspected annually, which number is divided by a factor developed by FRA that represents the number of inspection points in each State.

One of the attractive features of the State participation program, from many States' point of view, is the possibility of Federal funding for their safety inspection efforts. However, the States must submit extensive information to obtain initial certification and on an annual basis to maintain full certification. Many States have complained about the paperwork involved, but

'"PMM & Co., "Task II I," p, III. .!.

of the States which were critical of the State participation rules at the outset (during the public comment period on the proposed regulation), only two—Wyoming and Kentucky—are not currently in the program.

In order to receive funding, a State must apply for a grant-in-aid from FRA. Up to *50* percent of the direct and allowable indirect costs associated with the safety program can be approved for funding. In applying for this *50* percent funding, the State must declare that:

It will provide necessary funds to finance costs in excess of Federal payments; and

- Aggregate expenditures for railroad safety, exclusive of Federal funds, will not fall below the average level of expenditures during the 2 fiscal years preceding *1970* or previously provided to FRA.

In 1977, the FRA funded State track safety inspection at approximately **$580,000** and State freight car safety inspection at approximately $250,000. These expenditures extended inspection in the track and freight car safety areas by **39** fully qualified inspectors and 6 trainees. (See appendix D for details of funding.)

RAILROAD INSPECTION PROGRAMS

As stated earlier, the FRA envisions that its inspection programs are to ensure compliance with Federal standards rather than to discover defects and directly to prevent accidents. The FRA believes that this latter responsibility belongs properly to the railroads. Furthermore, it has incorporated certain inspection requirements on the part of the railroads into FRA regulations. In addition to the Federal view of their responsibilities, however, the railroads undertake to perform inspections that accomplish a variety of purposes for the well-being of their operation—including safety. Track geometry, signal systems, and car inspections, for instance, all contain both preventive maintenance and safety promotion goals.

Although inspections of railroad facilities and equipment dates back many years prior to establishment of Federal or State standards and regulations, the existence of Federal standards for track cars, locomotives, signal and train control systems, and train operation has resulted in a certain uniformity among railroad inspection programs. This uniformity stems from prescriptions in the regulations that dictate such things as frequency of inspection, length of time employees can be on duty, and the like.

Another phenomenon that has grown in part from the regulatory structure is the similarity between most railroad inspection efforts and the FRA inspection programs. Although divided along the same programmatic lines, the railroad inspection programs nonetheless differ in two key ways from the Federal inspection programs:

- The railroad inspection programs are designed to detect defects before they become serious enough to cause damage or violate the standards; for this reason, together with the Federal Government's requirements, railroad inspection is more frequent than Federal/State participation inspection.
- Frequently, the person charged with the responsibility of detecting the defect is also charged with the responsibility of correcting it.

"These comments are contained in the FRA Public Docket, RSSP-1 and 2.

TRACK

The charts that follo w summarize the required frequency of inspect ons by inspect on program and type:

Track[29]

Class of track	Type of track	Frequency
1,2,3	Main track and sidings	Weekly with at least 3 calendar days between inspections or before use of track, if used less than once a week, or twice weekly with at least 1 calendar day between inspections, if the track carried passenger trains or more than 10 million gross tons of traffic during preceding year
1,2,3	Other than main track and sidings	Monthly with at least 30 calendar days between in spections
4,5,6		Twice weekly with at least 1 calendar day between inspections

In add tion to the above, inspections are made in accordance with the following FRA regulations:

- Each switch and track crossing must be inspected on foot at least monthly, except for track used less than once a month, in which case inspection must be made before it is used.
- A search must be made at least once per year for internal defects in certain classes of rails. If new rail is inductively or ultrasonically inspected and all internal defects are removed before or within *6* months after installation, the next search for internal defects need not be made until 3 years later.
- Special inspection must be made of track involved in a fire, flood, severe storm, or other occurrence which might have damaged track structures as soon as possible after the occurrence.

MOTIVE AND POWER EQUIPMENT[30]

Freight Car Inspection

The general practice in the industry is to inspect freight cars at interchange points, in major *yards* or terminals, and as required by the **500-**mile inspection rule.[31] Cars are inspected visually at these points.

As part of the inspection made of cars at points where cars are placed in trains to detect such defects as those listed above, dates stenciled on the sides of cars are noted to determine if any time limits, as prescribed by FRA and/or the AAR,[32] have expired with respect to car age as well as to such periodic attention as:

- Detail inspection of truck components (wheels, *axles,* bearings, etc.), couplers, cushioning units, center sills, body bolsters, and center plates;
- Single-car testing of air brakes (IDT—or in-date test);
- Cleaning, oiling, and single-car testin$_g$ of air brakes (COT&S—or clean, oil, test, and stencil);
- Replacement of plain bearing lubricators; and
- Lubrication of roller bearings.

29 Track Safety Standards. FRA, Office of Safety, March 1975. (49 CFR 213).

30 PMM& Co., "Task 111, " section IV.

31 *Railroad Freight Car Safety Standards,* Federal Railroad Administration, Office of Safety, June 1975. (49 CFR215).

32 *Field Manual of the Interchange Rules,* Association of American Railroads, Washington, D.C., Jan. 1, 1977, cited in PMM & Co., Task III.

Further, lading on open cars, such as flats and bulkhead flats, is inspected to see that it has not shifted and that it is properly secured, and closed cars are opened for such inspection when there is evidence, such as leaning of the car, that the lading may have shifted.

Cars are usually inspected in train yards by regularly assigned car inspectors either riding slowly on a special cart or walking along each side of a group of cars.

Detail inspection, as well as any necessary repair or replacement of the components is made on a repair track or at a car shop. This inspection is made on high utilization cars within **24** months after construction or reconditioning and within each succeeding 12-month interval, and on other cars within 96 months after construction or reconditioning and within each succeeding 48-month interval.

After cars are assembled for movement in an outbound train, the air brake system is tested for leaks by charging the system and observing **a** gauge to ensure that the air pressure losses remain within limits specified by FRA. Such a test, as well as inspection of the air brake cylinder on each car for excessive piston travel (indicating reduced braking force), also is made at intervals of not more than *500* miles on trains that move more than this distance without being disassembled.

Locomotive Inspection[23]

The locomotive inspection regulations consist of four subparts which govern tests and inspections for the following aspects of Locomotives: (a) boilers and appurtenances; (b) steam locomotives and tenders; (c) other than steam locomotives and appurtenances; (d) multiple-operated electronic units. Each of these subparts requires various tests and inspection intervals for certain of the components that it covers. A summary of those requirements follows:

[33] **49** CFR 230

Locomotive Inspection

	Inspection interval	Test interval
Boilers and appurtenances		
Boiler	4 years (interior) 5 years (exterior)	
	Inspected and tested before put in service and when sufficient number of flues are removed to allow interior to be examined	
Other **than steam** locomotive **and appurtenances**		
Brake equipment/main reservoir		18 months
• Visible insulation and electrical connections	month	
. Nonsteam boilers	Whenever sufficient number of tubes are removed to allow inspection	
Steam locomotives and tenders		
• Stay bolts		1 month
• Steam gauges		3 months
• Safety valves		**3** months
Water glasses and gauge cooks		Before each trip
Multiple-operated electric units	**Every 24** hours when in service	
• Multiple operated electric units/main reservoirs		**2** years
• Train signal system		Before each trip
Insulation		1 year
Visible insulation/electrical connections		1 month

Signal Inspection

Signal mechanisms, switch circuit controllers, and electric locks are visuall$_y$ inspected for broken, missing, or worn parts; and signal mechanisms, electric locks, relays, and lightning arresters are tested in accordance with the manufacturer's specifications. Track switches equipped with a circuit controller connected to the switch point are adjusted, if necessary, to ensure that the control circuits will be open or shunted, or both, when the switch point is not in the proper position. Testing of wire and cable insulation, when dry, consists of measuring the resistance to the flow of electrical current by use of a megohmmeter to determine if the resistance is within the minimum limits allowable by FRA regulations.

Signal Inspection[34]

	inspection interval	Test interval
Signal mechanisms	6 months	2 years
Switch circuit controllers	3 months	**3** months
Electric locks	2 years	2 years
Relays		2 years
Lightning arresters		1 year
Wire and cable insulation:		
Not designed for underground low-voltage use with part underground or in trunking		5 years
Not designed for underground low-voltage use with no part underground or in trunking		**8** years
Designed for underground low-voltage use		8 years
Local signal wiring		8 years
Lead-covered signal power cable		8 years
Underground signal pow;r lines not lead sheathed		5 years

ANALYSIS OF RAILROAD INSPECTION

Many of the railroad employees who are responsible for the various inspections described above also are responsible for their repair. Thus, there is an incentive built into the system for the railroad employee to (a) detect and (b) eliminate any defect discovered, because he is accountable for any failure that takes place whether it be attributed to inadequate inspection or inadequate workmanship. There is no reason for "passing the buck." However, because the same employee is responsible for detection/repair of defects for both operational and safety reasons, it is difficult to ascertain the direct safety inspection costs incurred by the railroads. In fact, in man$_y$ instances, the railroads do not have cost accounting systems that are capable of providing such data.

Although the quality of inspections varies among railroad companies, many defects in railroad facilities and equipment are detected through inspections performed by the railroad inspectors. Furthermore, each railroad's own operating and safety rules require train inspections by various employees in addition to those required by Federal or State regulations. Examples of operating and safety rules that require such inspections are the following, which were extracted from the rules published by one of the railroads interviewed as part of this stud$_y$:

[34] *Rliles, Standar~is, aHd I}zstructiom for Railroad Si,gyal Systms,* Federal Railroad Administration, Bureau of Railroad Safety, November 1969, taken from PMM & Co., "Task III," Section IV.

Operating Rule No. **714.** Employees must, when practicable, observe passing trains and, when unsafe conditions are noticed, endeavor to stop the train and notify the train dispatcher when possible.

Safety Rule No. **160.** Train crews will inspect their train where stopped for operating reasons when time permits .35

Nonetheless, despite the high level of inspection effort required, the continuing high accident rate raises questions both about the extent to which the railroads comply with the inspection requirements as well as about the extent to which inspection can help to avert accidents. The effectiveness of the railroad inspection efforts depends, in part, on the thoroughness of their efforts, their ability to detect "unsafe" conditions, and the degree to which the standards they inspect against provide appropriate safety levels.

Furthermore, determining the relationship between the railroad inspection efforts and the Government inspection programs, as mentioned earlier, is problematical because of the unified operational and safety purposes that inform the railroad's own inspection programs, and because of the unquantifiable "motivational power" of the Federal inspection programs. Even if Federal inspection programs succeed in "motivating" compliance with the inspection requirements, their effectiveness is still contingent on the same three variables as is the effectiveness of railroad inspection programs.

The FRA's ability to motivate compliance through its inspection program, however, depends, in part, on how the railroads view the regulatory requirements and how they view the penalties for noncompliance. Thus, while raising questions about the "content" of the inspection program requirements, questions must also be raised about the effectiveness of the penalty structure. Exploration of these two questions shows that they are intertwined and that they go to the heart of the inspection program.

"PMM & Co., "Task III, " Section IV,

There has been controversy about the penalty structure. Some are strongly of the opinion that penalty levels should be raised (either the minimum, the maximum, or both) in order to make a violation less tolerable financially to the railroads.[36] Proponents of this position would agree with the GAO observation recorded in a 1975 letter to the Secretary of Transportation. Director of Resources and Economic Development Henry Eschwege wrote:

> . . .One FRA inspector we accompanied observed four freight cars with defective airbrakes in a train about to depart. . . He reported these defects to the trainmaster. . . The trainmaster ordered the train to depart with the defective freight cars.
>
> A (railroad) official told us that the trainmaster did not have company authorization to operate freight cars with safety defects; however, a railroader would not necessarily consider defective brakes on a few cars intermixed throughout a large train to be a serious safety defect because the brake power of the remaining cars would be sufficient.
>
> The railroad was subject to a fine in this case, but the FRA inspector said that, because of the small amount of the fine involved (in this case **$250** for each defective car), it was more advantageous for the railroad to pay the fine than disrupt a train which was otherwise ready to leave. 37

Proponents of the argument to raise the penalty for such violations would point to this case as an illustration of the insufficiency of motivation provided by the minimum penalty established by the statute. They would make an economic argument that if it had cost more to move the train under violation than to take it out of service, the trainmaster would have taken it out of service. The FRA, on the other hand,

[36] See, for example, *Hearings on the Federal Railroad Safety Authorization Act of 1976*, supra.

[37] 4-11-75 letter from Henry Eschwege, Director, Resources and Economic Development Division, U.S. General Accounting Office, to the Secretary of Transportation, (B-164497(5))

testified during the hearings on the 1976 Safety Authorization Act that raising the penalties would not in itself promote greater safety. In arguing for the abolition of minimum penalties rather than for their increase, then-Administrator Hall observed, "Simply penalizing a railroad which has very little cash *to* start with does not help in terms of giving that railroad the ability to correct the deficiency ."[38] During those same hearings, railroad officials echoed those sentiments, stating that they were abiding by the safety standards as conscientiously as they could and that if they had to pay increased penalties that would mean taking money from somewhere else.[39] This type of discussion may not do much to illuminate the issue of whether increased penalties would increase railroad motivation to comply with safety standards; however, it does make it clear that "motivation" must be provided within the "real world" of the industry's financial condition and that penalties are but one variable in that world.

From this framing of the issue, it appears that the issue of program content may lie dormant within the controversy about penalties. It is difficult to know how widespread such an occurrence as that cited by GAO is, but if railroads do sometimes make their own judgments about the relative importance of certain safety standards (albeit in conjunction with the existing penalties in mind), then perhaps such judgments indicate something about the nature of the regulations themselves. Are the standards used by both the FRA and the railroads to inspect the appropriate standards? Are they sometimes skirting around the perceived periphery of the safety problem, as indicated in the GAO report? The Association of American Railroads raised a similar concern about the nature of the standards being enforced by the FRA inspection program. In comments to the Office of Technology Assessment on the issues surrounding the subject of railroad safety, the AAR stated its view that the standards are essentially those used by the railroad industry for many years and went on to say:

> In promulgating these regulations FRA has not addressed the following questions: 1) have circumstances developed for which these previously developed recommended standards are no longer appropriate? 2) are these recommended industry standards not generally being observed? If so, has that resulted in additional track- and equipment-related accidents and has that created a safety problem? **3)** were the industry standards ever intended as absolute rules, or as merely recommendations of good—or of financially justifiable—practices? and 4) was there real evidence of widespread "violations" of the industry standards in the first place, such as would make Federal adoption justified?[40]

The first three questions are particularly germane; if the railroad industry itself has questions about the appropriateness of standards for which it is by and large the source, that may be reason enough to look beyond the inspection programs to the substance and the credibility of the standards against which inspections are made and upon which any enforcement strategy must inevitably be based. In this real sense, the effectiveness of the Federal and of the railroad safety inspection programs is interdependent with the regulations and standards on which they are based.

[38] Hearings on the 1976 Railroad Safety Authorization Act, supra.
[39] Ibid.
[40] Association of American Railroads, *Comments on Safety-Related Issues*, submitted to OTA, Dec. 1, 1977, p. 14.