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FEDERAL RAILROAD ADMINISTRATION
DEPARTMENT OF TRANSPORTATION
BEFORE THE SUBCOMMITTEE ON
TECHNOLOGY, ENVIRONMENT, AND AVIATION
OF THE
HOUSE COMMITTEE ON SCIENCE, SPACE, AND TECHNOLOGY

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Good morning, Mr. Chairman and members of the Subcommittee. The Administrator, Jolene Molitoris, testified earlier before the House Energy and Commerce Subcommittee on Transportation and Hazardous Materials, and the Senate Commerce Surface Transportation Subcommittee, and I am here today to underscore FRA's commitment and contribution to railroad safety.

Recently, we were confronted with two unfortunate incidents--the collision between a CSX freight train and an Amtrak train at Smithfield, North Carolina, on May 16, 1994, and the collision of three BN freight trains at Norway, Nebraska, on June 8, 1994. These tragedies again have brought home the knowledge that, despite the many advances in the struggle to promote railroad safety, setbacks still confront us.

In my testimony this morning, I will first review with you the railroad industry's recent safety record. In that context, I will detail our response to issues presented by the recent incident at Smithfield, North Carolina, and other challenges. I will address our efforts to enhance the agency's ongoing safety program, including our new "customer service" approach. In closing, I will address the current research and development efforts underway to improve rail safety and meet the challenge of emerging

technologies.

THE RAILROAD INDUSTRY'S SAFETY RECORD

In many respects the railroad industry experienced a mixed safety record in 1993. Overall, America's railroads continue to move passengers, hazardous materials, and other freight with a high degree of safety. Although we will never be satisfied as long as accidents and injuries continue to occur, the railroad mode is, by most measures, a very safe one today; and we are working hard to make further progress, especially because we recognize the increased risk of severe accidents that could result from denser operations, increased loads, and higher speeds. To improve safety, we must continue to reduce risk across a system of almost 300,000 track miles upon which America must increasingly rely to carry freight and passengers, as part of a balanced national transportation system. The Nation's railroads employ over 200,000 persons, operate over 1.2 million cars using 20,000 locomotives, and log over 600 million train miles each year.

As you know, in 1993 we experienced two serious passenger train accidents, at Gary, Indiana, where seven people lost their lives, and at Saraland, Alabama, where 47 people were killed. Both of these accidents illustrate the catastrophic consequences of human error. In Saraland, of course, that error appears to be one not attributable to a railroad or its employees. In addition, a severe freight train collision at Longview, Washington, claimed 5 crewmembers. More recently, we experienced fatal train collisions at Smithfield, North Carolina, and Norway, Nebraska. Much attention has focused on these tragedies, and I will detail our

responsive efforts later in my testimony.

In order to provide you with a broader report on the industry's overall safety performance, I must preface my comments with two cautions. First, our safety statistics for the full year of 1993 are preliminary. That is, these data are subject to slight revisions due to late and corrected reports. Historically, such revisions have not exceeded one or two percent of the totals for most data elements, so the numbers are substantially complete. Second, the data compiled here originate with the railroads. FRA does not have the resources to verify each and every report of accident cause; however, based on our involvement in selected accident investigations and spot review of underlying records, we believe that these data, in the aggregate, fairly reflect the true pattern of accident causation.

Train accidents continue to occur in the railroad system, but with low frequency, given the scale of railroad operations. A "train accident" involves the movement of on-track equipment that results in damage to railroad equipment or property equal to an amount above the current reporting threshold, as revised periodically for inflation. (FRA is in the process of changing that threshold in a rulemaking that will employ a statutorily mandated methodology for determining the proper dollar amount.) FRA believes that the rate of train accidents is a very useful barometer of the state of railroad safety. Certain highway-rail collisions qualify under the technical definition of "train accident." However, to avoid double counting and because they stem

from different causes, we have excluded those occurrences from the "train accident" numbers that will follow.

As measured by the train accident rate, 1993 was the second safest year for the railroads, surpassed in this respect only by 1992. The 1993 train accident rate was 4.25 per million train miles, as compared with the all-time low of 3.98 in 1992. In 1993, there were 2,608 train accidents, as compared with 2,359 in 1992. These data reflect the continuing significant improvement in railroad safety since 1978, when 10,991 train accidents occurred and the train accident rate reached 14.62 accidents per million train miles, almost three and one-half times what it is now. See attached chart, "Train Accidents."

After dramatic improvements in the period 1979-1986, the national train accident rate has held relatively constant. Although the frequency of train accidents remains very low, the situation has not been static.

In North Carolina, train accidents, excluding rail-highway accidents, for the 1989-1993 period were low compared to the rest of the nation.[1] Of the 9,785 reportable train derailments nationwide, 90 derailments occurred in North Carolina. See attached chart, "Accident Data Comparing North Carolina with the Rest of the Nation." For example, in Johnston County, North Carolina, only one derailment occurred for the entire 1989-1993

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[1] FRA cannot compute accident rates for a state because the data on train miles and employee hours are not broken down by state. We can however, provide absolute numbers on a state-by-state basis.

period. See attached chart, "Accident Data For Johnston County, North Carolina."

Overall the numbers of train accidents decreased for the period 1989-1993--

* United States except North Carolina

Year	Geographic Location	Derailments
1989	U.S.*	2,105
1989	NC	24
1990	U.S.*	2,121
1990	NC	25
1991	U.S.*	1,919
1991	NC	17
1992	U.S.*	1,723
1992	NC	11
1993	U.S.*	1,917
1993	NC	13

Nationwide signal accidents increased in 1993 over normal levels due to a high number of accidents in an automated hump yard. Track accidents and other accidents are up 19 percent over last year. Some of this increase in track-caused accidents may reflect the heavy rains that occurred in the Midwest during the spring and summer months, but a steep rise in the cost of replacement crossties--not offset by any adjustment for inflation--is another possible factor. Of the 2,608 reportable train accidents in 1993--

- 37% were caused by track;
- 33% were caused by human factors;
- 14% were caused by equipment;
- 2% were caused by signals; and

- 14% were caused by miscellaneous factors such as objects on the track, vandalism, and track-equipment interaction.

See attached chart, "Train Accidents by Cause." Although human factor accidents as a whole may be less severe with respect to monetary loss because many occur at low speed, some of our most serious accidents over the past few years have been caused by human factors.

Certain trends, unfortunately, are quite evident. Every year, half or nearly half of all deaths associated with railroading occur at highway-rail grade crossings, and 1993 was no exception: 625 of the 1,278 fatalities (49 percent) occurred in these accidents and incidents. Trespasser fatalities declined slightly, but also remained relatively high at 523, or 41 percent of all fatalities. Grade crossing and trespasser fatalities still account for about 90 percent of all fatalities. See attached chart, "1993 Total Fatalities."

It is encouraging to note, however, with regard to grade crossing statistics that although fatalities at grade crossings increased between 1992 and 1993, the absolute number of grade crossing accidents and incidents reached an all-time national low in 1993, or 4,892. There were 13,316 such events in 1978. See attached charts, "Highway-Rail Crossing Accidents" and "Grade Crossing Accident Data For North Carolina/Nation".

In North Carolina grade crossing accidents were relatively low compared to the national statistics. For example, in 1993 there were 168 grade crossing accidents in North Carolina out of 4,892

for the nation. In 1993, only five grade crossing accidents occurred in Johnston County, North Carolina. See attached charts, "Grade Crossing Accident Data for Johnston County, North Carolina" and "Grade Crossing Accident Data for North Carolina/Nation."

The transportation of hazardous materials by rail has continued to be remarkably safe. The number of train accidents resulting in a release of hazardous materials declined from 55 in 1989 to 28 in 1993, an improvement of 49 percent in four years. There were 136 such accidents in 1978. See attached chart, "Train Accidents involving Hazmat." Since 1980, there has been only one fatality caused by the release of hazardous materials during rail transportation, and that fatality occurred in 1986.

Railroad employee safety also showed some signs of improvement in 1993 in that the rate of on-duty casualties reached an all-time low of 5.9 per 200,000 person-hours; however, employee on-duty fatalities rose to 47 (including 3 at grade crossings), as compared with 34 (including 2 at grade crossings) in 1992. This figure for 1993 represents about 4 percent of all 1,278 fatalities. See attached chart, "Employee on Duty Casualties."

Compared to 1992 data on injuries and illnesses of employees on duty, on-duty employee injuries and illnesses for 1993 declined 14 percent to 15,384. We have also evaluated these statistics based upon a distinction between serious and non-serious injuries, with serious injuries being defined as those involving dislocation, fracture, amputation, hernia, concussion, internal injury, or loss of eye. In 1993, there were only 17 serious non-fatal injuries in

train accidents (events meeting the dollar threshold for damage) and 164 in train incidents (other events involving moving, on-track equipment), or 0.1 percent and 1.1 percent, respectively of all on-duty employee injuries and illnesses. See attached chart, "Serious Injuries to Employees on Duty." By contrast, there were 1,157 serious non-fatal injuries in non-train incidents, or 7.5 percent.

It should be underscored that 26 percent of employee deaths, 87 percent of employee injuries and illnesses, and 86 percent of serious employee injuries in 1993 were in "nontrain" incidents, which, as their name implies, have nothing to do with the movement of trains. A great many of them are slips and falls, sprains, back injuries, eye injuries, and the like that, unfortunately, continue to occur in hazardous industrial settings, including railroads and other industries.

We believe FRA's safety program has played an important role in this generally good safety picture. Of course, improving railroad finances over the last decade, industry safety initiatives, and the daily efforts of railroad employees and management have had a significant effect on the situation. We are striving constantly to improve on this record. We must continue to find ways to reduce the frequency of train accidents, hazardous materials releases, deaths, and injuries, as we strive to prevent the occurrence of tragedies such as the recent Smithfield accident.

SMITHFIELD ACCIDENT and FRA'S RESPONSE

In view of the May 16, 1994, accident at Smithfield, North Carolina, Transportation Secretary Federico Peña and Federal

Railroad Administrator Jolene M. Molitoris requested a special safety review on the securement of freight cargo on rail cars. A report is scheduled for completion near the end of July. FRA will comment on the contents of our review at that time.

To date, I can provide details of the nature and magnitude of the safety problem apparently presented by the Smithfield accident. I will discuss the authority and standards FRA has in place pertinent to this situation and the technological aspects concerning the collision.

First, please allow me to provide some background information concerning the incident. On May 16, 1994, at Smithfield, North Carolina, Amtrak Train 7 collided with a trailer extending from the normal clearance envelope of passing CSX freight Train R-176 on an adjacent main line. While the National Transportation Safety Board has yet to determine the probable cause of the accident, our preliminary investigation suggests that the front end of a loaded highway trailer on a flat car in the CSX train became disengaged from the "fifth wheel"[2] to which it should have been secured. The trailer then rotated to the side and into the path of the oncoming Amtrak train. Because of the relatively high closing speed of the two trains and the mass of the trailer, significant damage was incurred by the lead locomotive of the Amtrak train, killing the assistant engineer and seriously injuring the engineer. Upon striking the trailer, the Amtrak train derailed and rapidly

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[2] The "fifth wheel" is the hitch attachment system consisting of the kingpin and plate. See attached chart, "Identification of Hitch Parts."

decelerated, and a portion of the train "jackknifed," leading to a large number of passenger injuries.

As soon as FRA learned of this tragic accident, the FRA Administrator flew to the accident site to investigate personally. She was joined there by the FRA Regional Director and other members of the FRA accident investigation team. The Administrator also visited with injured passengers and crew and reported on preliminary findings and observations personally to the Secretary, who ordered the subject review.

We are currently studying all aspects of the Smithfield incident, including the technology of the equipment involved. To date, technological advancements allow the rail industry to utilize several types of trailer hitches, including the three types of hitches most commonly used to support the "fifth wheel" of trailers loaded on flat cars. These are (i) rigid non-retractable, (ii) wrench-operated retractable, and (iii) pull-up retractable. The rigid hitches are constructed in the fixed upright position and require loading using a crane or loading lift. The wrench-operated retractable hitches are raised or lowered using a power wrench to operate a long elevating screw and must be locked in the upright position. The pull-up retractable hitches are raised by pulling the hitch up with a holster tractor or other device and lowered by manually releasing a locking dog. Hitches may or may not be cushioned, depending on the design of the car.

There are ten types of heads or hitch top plates commonly used with the hitches described above. All types of top plates

incorporate a locking device to attach and secure the king pin of the trailer "fifth wheel" to the hitch assembly. See attached chart, "Identification of Hitch Parts."

Three types of securement devices are commonly used. These are (i) the screw type--which require manual locking and unlocking, (ii) the semi-automatic--which lock automatically during loading but require manual unlocking before unloading, and (iii) the automatic--which can be locked and unlocked during loading and unloading without manual operation of the locking device.

All types of kingpin locks have integral indicators which permit visual confirmation that the trailer kingpin is locked into the top plates. Most commonly, if the lock pin indicator protrudes from the top plate casting (approximately 1 to 1 1/2 inches), the lock is unsecured. This is easily detectable to the trained eye.

All hitch top plate kingpin locks can be manually unlocked by using a short pry bar or hammer or by manipulating an integral lock handle designed and installed for this purpose.

Flat cars designed for trailer-on-flat-car (TOFC) service are constructed with tire rub rails at the outside edges of the flat car deck, or at the centerline of the car. These tire rub rails serve as guides for trailer wheels during drive-on loading or unloading, and also prevent the wheels of the trailer from bouncing sideways off the deck of the flat car while entrained and in transit.

Loaded and empty trailers are secured to the intermodal flat cars by the locked hitch assembly at the "fifth wheel," and by the

resistance to trailer rear wheel lateral motion provided by the tire rub rails. See attached chart, "Identification of Hitch Parts." Movements of light chassis (trailer frames on wheel/tire assemblies without containers) do not have sufficient weight to keep the tires from bouncing over the rub rails when a train is in motion and are frequently secured to the rail car with either bands or chains. No other securement is necessary.

The loading of railroad cars, including flatcars and specialized intermodal cars, is generally the responsibility of shippers and intermodal terminal operators that tender the cars for transportation. Trailer Train (TTX), the industry entity that operates the intermodal rail car fleet, has written procedures governing all aspects of loading and inspection. TTX makes available these instructions and training aids to railroads and intermodal terminal operators. The Association of American Railroads Field Manual, Rule 27, requires periodic inspection and lubrication of hitches. AAR Specification M-928 requires that all trailer hitches have a positive lock to prevent the hitch from losing its grip on the kingpin. See attached chart, "Identification of Hitch Parts." Each lock must have an indicator, visible from each side of the car, to show that the kingpin is properly engaged. The primary check for proper engagement of the trailer lock would take place at the time of loading.

Although FRA standards do not specifically address trailer hitches or the loading of flat cars, our standards for train crew inspection of freight cars require that crew members inspect for

any "object extending to the side" (49 CFR Part 215, Appendix D) wherever a car is placed in a train and the train crew is responsible for the inspection.

Carrier operating rules uniformly require that subject railroad personnel, such as train crews, inspect passing trains for unsafe conditions, including dangerously shifted loads. Under 49 CFR Part 217, railroad operating rules are required to be filed with FRA. Carriers are required to instruct their employees in the operating rules. Carriers are also required to conduct periodic test and inspections to ensure compliance with the operating rules and to file records with FRA.

Current FRA rules do not directly address the responsibility of persons loading cars to comply with TTX instructions. Railroads do have strong commercial incentives to promote compliance with all requirements for securement of lading. However, railroads do not directly supervise or control loading. For some years, railroads have utilized contractors to load trailers or containers on flat car (TOFC/COFC) shipments on intermodal rail cars.

In general, securement of lading (including trailers and containers) has not been a major source of public safety concern in recent years. However, heavy utilization of equipment in TOFC/COFC service and continued pressure on operators of intermodal terminals to move trailers and containers swiftly have increased public concern. In addition, the collision at Smithfield together with the doubling of trailer/container train traffic in the last decade and the growth in passenger rail service demand a thorough,

comprehensive review of the standards and procedures used to secure freight on rail cars.

FRA exercises regulatory authority over all areas of railroad safety. In 1992, the Congress enacted legislation at the request of the Department of Transportation clarifying that FRA's regulatory authority extends to all persons performing functions related to the safety of railroad operations. Thus, FRA is currently reviewing lading securement to determine what type of action is necessary in this area. We are working closely with Amtrak and freight railroads to ensure a prompt analysis of all aspects of how freight is secured.

According to our accident database, during the last five years there have been 18 accidents involving shifting containers or trailers, not including the Smithfield accident. See attached chart, "Trailers or Containers On Flatcars." The chart describes the recent history of train accidents associated with shifted loads and TOFC/COFC where securement of containers or trailers was a factor in the accident. The data remains under review for relevance and significance. While the number of reported incidents similar to the Smithfield accident is low, we want to prevent future problems. A full assessment along with recommendations for future action will be provided as part of our report. I can say, however, that precautionary measures will be emphasized, consistent with FRA's safety mission, as we reinvent our safety program.

OVERVIEW OF FRA'S SAFETY PROGRAM

Including new positions to be filled this fiscal year, we employ in FRA's Office of Safety a headquarters staff of 87 and a field staff of 458, including support personnel. In addition, 135 State inspectors assist the Federal effort through the 31 State participation programs. Our Office of Chief Counsel, including the 29 members of the Safety Law Division, provides legal support for FRA's safety program. Our Office of Research and Development also contributes greatly to the safety program and is engaged in numerous studies and projects concerning the safety aspects of track, equipment, human factors, and emerging technologies.

In 1993 FRA conducted a total of 53,129 inspections in the various disciplines: 10,283 for track; 5,889, signal; 13,473, motive power and equipment; 12,979, operating practices; and 10,505, hazardous materials. In that year FRA also investigated 150 accidents and 1,700 complaints and gave 501 Operation Lifesaver[3] presentations to a total of over 100,000 people.

Our field operation constitutes the bulk of our human resources--nearly two-thirds of the 739 employees we are authorized in fiscal year (FY) 1994 are field employees in our eight regions. Supported by a clerical and administrative staff of 57, the 401 men and women of the field staff are the inspectors and professionals

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[3] Operation Lifesaver is a nationwide, non-profit public information and education program dedicated to reducing crashes, injuries, and fatalities at highway-rail grade crossings and along railroad rights-of-way.

who visit the railroads and make our enforcement system work, every day. In addition 136 inspectors from 31 states, including North Carolina, conduct inspections through our state participation program. North Carolina has 3 state inspectors who conduct track and motive, power, and equipment inspections.

Our Office of Safety is committed to a collaborative approach to achieving improved levels of safety in the railroad industry. FRA has developed a spirit of openness and cooperation with all our customer-beneficiaries: with rail labor, rail management, suppliers, State and local governments, and users of transportation services everywhere. By sharing information and discussing options and alternatives, we can marshal the creative genius of all elements of the rail industry and increase rail transportation safety.

President Clinton, in Executive Order 12862, entitled "Setting Customer Service Standards," has directed agencies to provide

> the highest quality service possible to the American people. Public officials must embark upon a revolution within the Federal Government to change the way it does business. This will require continual reform of the executive branch's management practices and operations to provide service to the public that matches or exceeds the best service available in the private sector.

In accomplishing this directive, we have already started a dialogue with our customers. In 1993 the Administrator initiated roundtable discussions with representatives from rail labor, management, suppliers, and other customers to discuss a single subject in depth. Most of our roundtable topics are related to safety. To

date, seven roundtables have been held, three more are scheduled, and more are contemplated. The participants have been enthusiastic about the opportunity to discuss directly with the Administrator the real rail issues they face and ideas for working with FRA more beneficially. We are not forgetting our "in-house" customers. Quarterly listening sessions for all FRA employees help everyone understand FRA's mission, policies, and program activities. It is an opportunity for sharing of crucial information.

Full use of existing FRA management tools will help us formulate standards and measure results to improve customer service. The National Inspection Plan, the Quality Improvement Program, and the Regional Inspection Points Program will anchor FRA's re-engineering process. These programs focus on our agency's key asset--the time that FRA inspectors have available to conduct inspections. We have worked hard, using these tools, to ensure that our inspectors spend their available time at locations of greatest need and to conduct quality inspections, rather than producing inspection reports and paper.

The National Inspection Plan, or "NIP," model allocates annual available inspection time to a railroad, by state, based on the railroad's risk factor history. The Quality Improvement Plan, or "QIP," which was simplified in 1992 in response to field recommendations, comprehensively analyzes inspector activity.

Another resource-allocation tool, the Regional Inspection Points Program, or "RIP," contains an extensive inventory of railroad operations (track miles, signal systems, train movements,

etc.) gathered by inspectors. Collection of RIP data has been planned so as not to unduly interfere with enforcement activity.

Using these management tools, our safety program managers are better able to focus inspectors' efforts on the safety matters deserving the greatest attention. Consequently, FRA has more accurate data about a railroad's level of safety and can strategically apply sanctions where necessary to deter unsafe practices. FRA recognizes the importance of immediately identifying and swiftly addressing any potential safety risks or unsafe practices that may exist for rail passengers, railroad employees, and the general public. FRA is making the review of reported incidents of unsafe practices a priority, as we shape our research and development program around the growing need for safety enhancement in all aspects of rail transportation.

SPECIFIC FRA SAFETY INITIATIVES, HIGHLIGHTING RESEARCH AND DEVELOPMENT EFFORTS

An Overview of FRA's Research and Development

The Office of Research and Development (OR&D) of FRA conducts research, development, testing, and evaluation projects to support directly the FRA's safety responsibility and to enhance the nation's railroad system as a significant transportation resource. OR&D works closely in coordinated and cooperative programs with other research organizations, other government agencies, industry associations, individual railroads, and railroad suppliers.

Human Factors Emphasis

As dictated by the continuing prominence of human factors in the train accident rate (33 percent of the total in 1993), FRA is placing renewed emphasis on the performance of safety-critical personnel. We do so by ensuring that human factors receive appropriate attention in our enforcement, regulatory, and research programs. For example, our safety personnel are urged to use disqualification authority and individual civil penalty liability where officers or employees of the railroad deliberately violate safety requirements.

Our program to control alcohol and drug use in railroad operations further underscores our commitment. This is an area in which we have made significant progress. In 1988, our total positive rate for alcohol and drugs in post-accident testing was 6 percent. The prior year, 1987, was punctuated by serious alcohol- and drug-involved accidents, including the Chase, Maryland, collision. All of our data indicate that the picture is improving, as testing programs and voluntary peer prevention efforts take hold.

I am particularly happy to report that, based on data that are substantially complete, random drug testing in the railroad industry last year showed a reduction in positive test results for the fourth consecutive year. Reports indicate that of more than 42,000 random tests administered in 1993, only 0.7 percent of employees tested positive. In 1993 mandatory post-accident testing, 2 percent of employees tested positive for prohibited use

of alcohol or drugs, down from 6 percent in 1988, and slightly less than the 2.1 percent recorded in 1992. In "reasonable cause" breath alcohol testing, 1.6 percent of employees tested positive, down from a high of 4.5 percent in 1988, but slightly higher than 1.16 percent in 1992. In 1993, 1.9 percent of employees tested positive for drugs in reasonable cause tests, down from a high of 3.6 percent in 1989 and down from 2.07 percent in 1992. Our preliminary information indicates that in only one of the accidents in 1993 that we investigated was a person who tested positive for drugs or alcohol involved in the cause.

FRA continues to support necessary chemical testing and voluntary efforts to address substance abuse in the railroad work place. On February 15, in response to the Omnibus Transportation Employee Testing Act of 1991 ("Hollings/Danforth Act"), FRA published additional alcohol and drug rules. These amendments require railroads to conduct random alcohol testing and mandatory "reasonable suspicion" testing for alcohol and drugs.

We also actively enforce our rule on qualification of locomotive engineers, which seeks to prevent deficiencies in operator fitness, training, and performance.

However, the current reality is that human performance continues to be a factor in train accidents and incidents, as well as in non-train fatalities and injuries. One of the chief problems appears to be fatigue related not to violations of the Hours of Service Act, but rather, perhaps, to variable work schedules and lack of time off. If Congress adopts our legislation authorizing

pilot programs under the Hours of Service Act, we can begin to address these certifiably legal sources of fatigue.

Unfortunately, fatigue is not readily susceptible to an instant solution. Precipitous action could very well make the situation worse, rather than better. However, in addition to proposing this pilot-project authority, we have initiated actions that, over time, will permit us to achieve a better understanding of underlying performance problems. These actions include better definition of existing work and rest cycles and basic research concerning the extent and manner in which irregular hours and other stresses affect fatigue and locomotive operator performance.

FRA is presently sponsoring two research projects on fatigue. First, FRA's Office of Policy has a research project with the Volpe National Transportation Systems Center concerning locomotive crew-calling practices and the relationship of calling practices to crew fatigue. Diaries on work and rest activity will be collected from approximately 400 locomotive engineers. So far at least 200 diaries have been returned from employees on three different railroads. The Volpe Center will be collecting additional diaries from engineers on two other railroads. Employees are asked to rate their degree of "sleepiness" and the quality of their sleep. Second, FRA's Office of Research and Development has a project to evaluate 56 locomotive engineers on simulated, realistic duty cycles and to determine which criteria are critical to engineer alertness. This project, which also deals with the effects of stress, is using FRA's locomotive and train-handling simulator at

IIT Research Institute in Chicago. Because only one engineer can operate the simulator at a time and each test requires a week, it will take approximately two years to complete this study. The project is designed to test degradation of engineer performance under known schedule and operating conditions, including work/rest cycles, circadian displacement, sleep deprivation, temperature, humidity, vibration, noise, and related variables. The project is expected to yield results that could be used to develop regulations affecting hours of service, crew-calling and scheduling practices, alertness monitoring, locomotive cab environment, or other matters involving crew vigilance.

Positive Train Control Systems

FRA is placing the highest priority on promoting the early implementation of new technology that can prevent train-to-train collisions, overspeed derailments, and impacts with on-track workers and their equipment. These objectives can be achieved through positive train control technology that intervenes if the engineer fails to remain alert, becomes incapacitated, or makes an error of recollection or judgment.

Automatic train control (ATC) is by no means new to the railroad industry, but traditional signal-based systems are very costly and are deployed on only a small portion of the system today. Traditional ATC could not be cost justified across the National rail system. To ensure the widest possible application and the greatest flexibility to integrate new safety systems, we

need to develop the potential of communication-based technology that can provide positive train control at a lower cost.

Since the early 1980s, the North American railroads have been working to develop a family of technologies known as Advanced Train Control Systems or "ATCS." These systems include a "work order reporting" systems to track freight cars, a locomotive health monitoring function, positive train control features and other attributes. ATCS would utilize a central communications platform to unify all systems. An on-board computer on each controlling locomotive would communicate with the central office through digital data radio.

One major western railroad is already using the ATCS work order reporting feature, and several railroads are using ATCS communication platforms to replace landlines used for various purposes. However, thus far no railroad has deployed the ATCS train control features.

As a part of a study required by the Rail Safety Enforcement and Review Act, FRA recently reviewed the status of ATCS as applied to positive train control. Working under an interagency agreement, the Institute for Telecommunications Sciences (ITS), U.S. Department of Commerce, performed a technical evaluation in support of that review. After evaluating the ATCS specifications pertinent to train control (with particular emphasis on the Data Communication System), ITS found that ATCS is a very capable system at a high state of readiness. ITS recommended independent modeling of control flows and demonstration of the technology in a suitably

challenging environment to bring the system to full implementation.

ATCS specifications provide for an open architecture that ensures compatibility of components from many manufacturers and that provides interoperability among equipped locomotives of all railroads. Given the widespread nature of joint operations (e.g., where Amtrak operates over freight railroads), interoperability is important to holding down the cost of positive train control.

Even as ATCS has been progressing to its current mature stage, the railroads have been implementing less complex technologies to achieve many of the business benefits of ATCS. Further, the range of options for advancing positive train control has continued to grow. Currently, the railroads are reviewing a number of alternatives for achieving the safety objectives of positive train control, using elements of ATCS while holding costs down to a level that might be justified by accident avoidance benefits.

The Union Pacific Railroad (UP) and the Burlington Northern Railroad (BN) recently announced the start of a major positive train control test program on over 600 miles of their major lines in States of Washington and Oregon. FRA is monitoring and informally supporting that privately funded effort. UP and BN will evaluate (i) use of the Global Positioning System (GPS) to determine train location, in lieu of transponders placed in the gage of the rail (as contemplated in the ATCS specifications) and (ii) the use of both VHF and UHF data radio communications (rather than only UHF/900mHz as contemplated by ATCS). The Association of American Railroads Board of Directors has voted to support this

test program, and AAR is tasked with maintaining technical liaison to ensure interoperability of the UP/BN system with systems that may be deployed at a later time.

FRA believes that next-generation positive train control technology can be demonstrated and deployed on key segments of the National rail system over the next few years. Working with the Brotherhood of Railroad Signalmen and the AAR, we have already reviewed the accident data to determine how many accidents are preventable by positive train control (i.e., an average of about 21 accidents, 5-6 fatalities, and 74 non-fatal injuries per year). We have requested funding for FY 1995 to develop a risk analysis model to identify those categories of rail lines where safety benefits may support installation of positive train control technology. We are funding enhancement of Amtrak's existing signal system for the Northeast Corridor between New York and Boston to complete positive train control features and to support high speed service. We will be working with other DOT agencies to ensure that Federal investments play a strategic role in promoting deployment of positive train control where it proves beneficial.

FRA also recognizes that a communication-based train control system has significant potential to interface with a wide range of railroad sensors and detector systems (like wayside detectors that are already tied into existing signal systems), as well as technologies developed to improve safety and efficiency in other modes of transportation (such as proposed Intelligent Vehicle Highway Systems). Although many possible applications may not be

feasible to apply to a route system of 145,000 miles, we need to be looking for opportunities to maximize the combined value of private and public investments in our transportation system. Without question, advanced technology for railroad communication and train control will provide such opportunities as we enter the next century.

Research on Bridge Integrity Monitoring System

FRA recognizes that intermodal intersections present safety risk for which coordinated responses may be needed. As a result of the tragic Amtrak accident in September, 1993, at Saraland, Alabama, FRA undertook an evaluation of technologies which can be applied to detect a misaligned or otherwise hazardous railroad bridge. The study has been completed, and we are preparing the report for publication.

The study confirmed that train accidents caused by defective bridges are extremely rare. It further indicates that many types of sensors have been used, and many advanced technologies can be applied, to detect a misaligned or otherwise defective bridge. However, after a detection is made, that information must somehow be relayed to the crew of an approaching train. The major expense of any such system lies in interconnecting the sensors into the existing railroad signal system, which is an extremely reliable fail-safe system. Any sensor system installed on the railroad must also be designed on the fail-safe principle, and any sensor system failure will therefore generate false alarms and disruption to

traffic. These tradeoffs must be carefully weighed to determine whether proposed applications of this state-of-the-art technology will result in an actual safety improvement which outweighs the relatively high costs of installation and disruption due to system false alarms while protecting against a relatively rare hazardous event.

Under the direction of Secretary Peña, all of the surface transportation administrations of DOT--the Federal Highway Administration, the Coast Guard, and the Federal Transit Administration, as well as FRA, are cooperating with each other and working together to address the bridge safety issue, since it affects all of the surface transportation modes. It is our objective to assure that the best technical approach be followed when risk of damage to a bridge warrants application of special protection.

Highway-Rail Crossing Emphasis

Grade crossing accident statistics indicate that we must do more to curb the occurrence of highway-rail tragedies. In 1993 Secretary Peña directed FRA, the Federal Highway Administration (FHWA), the Federal Transit Administration, and the National Highway Traffic Safety Administration to develop a new comprehensive action plan for improvement of safety at crossings. This was the first time in history that these modes had worked so closely as a team to address these critical transportation safety problems.

The Grade Crossing Action Plan was announced on June 13, 1994.

The Action Plan proposals include greater emphasis on traffic law enforcement, public education, corridor reviews, crossing elimination, private crossings, and trespass prevention. For example, the Action Plan provides for enhancement of traffic laws at crossings by developing police officer and judicial outreach training programs, and updating the state laws on highway crossings. In addition, the Action Plan includes rail corridor safety improvement reviews to perform case studies on crossing consolidation and closure, to review the allocation of responsibility for selection and installation of warning devices at public crossings, and to ensure that state and local governments consider the use of stop signs where warranted. The Action Plan will increase public awareness through mass media and youth campaigns.

The Action Plan, includes legislation, HR 4630, the "Rail-Highway Grade Crossing Safety Act of 1994," which would amend Title 23 of the U.S. Code by giving greater flexibility to the States. The bill would allow the States to grant cash incentives to local governments for projects that permanently close crossings when matched with funds by the railroad involved and use 100 percent Federal funding for grade crossing closing projects. Signal improvements are currently eligible for 100 percent funding, while closings require States to provide a 10 percent match. The bill provides financial incentives for conducting rail corridor reviews rather than performing the traditional single grade crossing assessments. The bill would also increase Federal funding for

Operation Lifesaver from $400,000 to $600,000 per year.

We are already well positioned to begin a new initiative in this area. In response to the President's Budget for Fiscal Year 1994, the Congress has funded a small cadre of grade crossing safety and trespasser-prevention managers--the first FRA field resources fully dedicated to grade crossing and trespasser safety. These individuals will work with FHWA to help State and local communities design and execute corridor safety improvement programs. We will also be working to bring to a swift conclusion the Congressionally-mandated rulemaking on maintenance of grade crossing warning systems, for which the notice of proposed rulemaking (NPRM) was issued on January 11, 1994. Further, FRA will move promptly to require auxiliary locomotive lighting that will make trains more conspicuous to motorists.

Track Inspection and Detection

FRA is applying state-of-the-art inspection and detection systems to improve track safety and the ability of the railroads to better maintain their track.

The phenomenon of weakened crossties failing to restrain the forces of a passing train, so that the rails spread and allow a "drop-in" derailment, has been, and is, the leading single cause of train accidents, although many of the accidents are on low-speed track and result in relatively minor damage. The major difficulty in controlling this problem is that the real ability of a crosstie to perform its job is not well correlated with its external

appearance, so various railroad and/or FRA inspectors reach different opinions over when any single tie must be replaced. Using existing inspection and maintenance strategies, railroads continue to replace many more ties than performance would really dictate, in order to assure adequate gage restraint by assuring that most ties appear sound.

To solve this problem, we have developed the Gage Restraint Measurement System (GRMS), which can continuously test the ties at speeds up to 30 mph. The test car paints the exact locations which have weak crossties and validates that other locations remain adequate for service despite poor appearance. This concept is now coming of age.

Major railroads, including Burlington Northern, CSX, and Kansas City Southern, have accepted the principle of gage restraint testing as embodied in the GRMS. FRA has granted a waiver request from CSX to use the GRMS as an alternative to existing crosstie strength requirements in the Track Safety Standards, those provisions which have caused such debate in the past.

This waiver may pave the way to implement this sophisticated test method as an alternate track safety standard--the original goal of the research and a clear case of research contributing to adapting FRA's safety regulations to the state of the art while assisting the industry in improving the effectiveness of necessary maintenance.

PASSENGER ISSUES

Amtrak and Commuter Railroads

In FRA's judgment, Amtrak and the other passenger railroads have had a strong safety record overall, especially as that record relates to accidents caused by mechanical problems on passenger cars. See attached chart, "Federal Railroad Administration Accident Statistics Regarding Passenger Equipment Safety," which analyzes data on Amtrak.

In response to the findings by General Accounting Office that Amtrak did not have adequate inspection procedures for passenger trains, Amtrak developed a set of pre-departure requirements. The requirements were coordinated with the FRA Office of Safety. An assessment is currently underway by FRA inspectors to determine the effectiveness of the Amtrak inspection procedures. A report of this survey will be made to Amtrak in the near future.

FRA has begun to conduct an intensive nationwide compliance survey on the Amtrak system. In addition, FRA is working with Amtrak to ensure that Amtrak has defined minimum safety standards for safety-critical components and will verify compliance with those standards through field inspections.

Finally, FRA will in the near future propose revised requirements for inspecting safety-critical components of conventional passenger equipment with regard to power brake safety and is working to develop safety standards appropriate to the next generation of high speed rail equipment that will first begin

operating in the Northeast Corridor toward the end of this decade.

High Speed Rail

FRA is working with Amtrak to examine potential safety issues related to Amtrak's procurement of the next generation of Northeast Corridor high speed rail equipment. Current regulations permit train operations to 110 miles per hour under specified conditions. Amtrak operates Metroliner service to 125 miles per hour between Washington and New York under a longstanding waiver. Of course, the Northeast Corridor from Washington to New York is principally dedicated to passenger movements during peak hours, and the line is fully grade-separated. Many enhancements in the safety of operations have been made along this route, and we continue to look for additional opportunities to reduce accident risk.

The challenge now before us is to define conditions under which high speed rail can be safely provided on other corridors where passenger and freight operations share the right of way and many highway-rail crossings currently exist. FRA has approached this challenge with both short-term and longer-term strategies. The long-term strategy began with the extensive set of high speed ground transportation safety studies under our research and development program. This strategy will, over a period of several years, yield a broad range of generic safety standards for high speed rail.

Our short-term strategy focuses on the North End of the Northeast Corridor (New York to Boston), where speeds to 150 miles per hour will be required to meet statutory trip-time goals. The

North End is a very active program for which the Administration has requested substantial resources, and we are committed with Amtrak to seeing this project to a successful implementation. We are working with Amtrak and other participants to ensure that safety is its foundation. We also recognize that this planning process provides a valuable opportunity to test our general high speed rail safety objectives against very concrete challenges. Stated differently, specific focus on the North End will be necessary both to deliver safety guidance for that project in a timely manner and to provide the experience on which generic standards can later be founded.

We have interwoven our long-term and short-term strategies in the following way, summarized by the technical subject matter:

High speed trainsets. The first acquisition of trainsets for service at greater than 125 miles per hour will be Amtrak's procurement of 24 electric trainsets and 2 non-electric trainsets under the Northeast Corridor Improvement Project. FRA is working intensively with Amtrak to ensure that all significant safety-relevant objectives are incorporated into its forthcoming procurement. This dialogue is providing important insights that will help FRA as we move toward generic high-speed-rail equipment standards.

Our generic rulemaking for high speed equipment will begin this year, and we will conduct the rulemaking at a pace consistent with (i) faithful completion of statutorily mandated rulemakings and (ii) progress in development of other high speed corridors.

Meanwhile, a very important element of equipment safety--the power brake system--will be addressed through our current revision of the power brake regulations.

Track safety. Track safety at speeds above 110 miles per hour requires careful attention to vehicle/track interaction, as well as the track structure itself. Our forthcoming notice of proposed rulemaking on revision of the Track Safety Standards will address this issue.

Signals and train control. The North End presents special challenges because of Amtrak's determination that much of the infrastructure of the existing cab signal/automatic train control system should be used as a building block for a new system. The new system will meet critical performance criteria that FRA has asked Amtrak to employ in designing its system:

- Positive stop, i.e., the train control system will not allow a train to pass a key control point without authorization, even if the operator acknowledges the cab signal indication;
- Speed control, including civil-engineering speed restrictions (at curves, bridges, stations) and temporary slow orders; and
- Protection of maintenance-of-way forces working on track.

Because Amtrak's proposed system involves novel technology and will affect multiple operators on the Northeast Corridor, FRA will soon propose an appropriate order. The scope of this proceeding will be positive train control on the Northeast Corridor under future

conditions where train speeds increase.

At a later date, FRA will deal with signal and train control performance requirements on other high speed corridors. Because the technology employed on those corridors may be communications-based and software-driven, it may present unique regulatory issues regarding verification of fail-safe characteristics. That rulemaking will, of necessity, be undertaken only after technology development has reached a more advanced stage.

Highway-rail crossings. The North End of the Northeast Corridor has 15 highway-rail grade crossings remaining, and we are working to make further reductions in this number. Under no circumstances will train speeds over any remaining crossings exceed 100 miles per hour, and further improvements in crossing warning systems will be undertaken as necessary. Under section 1036 of the Intermodal Surface Transportation Efficiency Act (ISTEA), FRA is funding several promising approaches to risk reduction at grade crossings, including an installation of four-quadrant gates and a vehicle-detection system at the School Street crossing in Groton, Connecticut. FRA is also working with States and developers to examine barrier systems capable of preventing entry onto a high speed rail line.

FRA's guidelines under section 1010 of ISTEA prohibit any at-grade crossings where train speeds exceed 125 miles per hour and permit crossings above 110 miles per hour only if effective barrier and detection systems, interlocked with the signal system, are successfully demonstrated and implemented. As the range of options

for warning/detection systems and barrier technology continues to grow and additional corridor projects proceed, it will be timely to conduct a rulemaking on grade crossings as an element of high speed rail safety.

System safety integration. Ensuring that overall system safety has been planned as an integral element of a high speed rail program requires attention to integration of safety measures and, in addition, consideration of a wide range of safety issues that are not addressed by existing FRA standards. Since these issues involve potentially complex tradeoffs among possible countermeasures, once certain basic standards have been shown to be satisfied, it will always be appropriate to consider a high speed rail project as a whole and on its own merits.

At an appropriate time in the planning process, FRA expects to conduct a North End system safety proceeding to address such matters as security of the right of way (against inadvertent incursion, vandalism, trespassing, etc.), detection of damage to structures, operating rules and practices, emergency preparedness, etc. That proceeding may yield insights that will help FRA fashion a more generic approach to acceptance of system safety plans applicable to high speed operations.

Track aspects of high speed operations are being addressed in the revisions to the Track Safety Standards currently being drafted and which should be issued as proposed rules in 1994. As high speed operations begin to develop outside the Corridor, many other issues will confront us, perhaps the greatest of which is grade

crossing protection. At higher train speeds, grade crossing collisions become an increasing threat to the railroad vehicles involved and their occupants. Accordingly, FRA is sponsoring research on innovative systems, such as mobile barriers, designed to prevent the intrusion of vehicular traffic onto the railroad right of way rather than just warning that traffic of oncoming trains. Of course, if entirely new systems on completely separate rights of way are developed, we will need to address those through more comprehensive rules that recognize the interdependent nature of the components of such systems. For example, a maglev system or a 200-m.p.h., stand-alone, steel-wheel system raises many issues we do not yet face in operations that take a more phased approach. In this way, we plan to provide high speed ground transportation the regulatory attention it merits in the large scheme of railroad safety, knowing that our limited resources must focus on immediate needs without losing sight of the future.

THE ADMINISTRATION'S PROPOSED LEGISLATION

Previous rail safety legislation, including the Rail Safety Improvement Act of 1988 and the Rail Safety Enforcement and Review Act (1992), mandated that FRA undertake significant rulemaking and reporting responsibilities. In addition, FRA has identified a number of other priority areas for regulatory action on its own initiative, for a total of more than 40 safety regulatory projects and reports to Congress. Recognizing the need to complete this significant agenda, we have proposed a statutory reauthorization that does not seek extensive new enforcement powers or duties.

Passage of the Federal Railroad Safety Authorization Act of 1994 (H.R. 4545 as introduced on request by Chairman Swift) will enable FRA to fulfill its safety mission by focusing its limited resources in large part on existing regulatory mandates. This four-year authorizing legislation includes a number of elements which would significantly advance safety on our Nation's railroads. Highlights include:

- A provision that would allow FRA to approve pilot projects under the Hours of Service Act, permitting the selection implementation of innovative joint proposals from rail labor and management that vary from existing statutory requirements;
- A technical amendment to permit FRA to base a determination that an individual is unfit for safety-sensitive service upon the individual's violation of Federal railroad safety statutes; and
- A revision changing FRA's annual reporting requirement to a biennial reporting calendar.

This approach is consistent with the Department's efforts to make government work better and more responsively. We look to work in partnership with the Congress, as we "reinvent" our entire approach to our safety and enforcement responsibilities.

CONCLUSION

FRA's safety program, which has helped produce dramatic improvements in railroad safety in the last decade, is being reinvented in many ways to enable FRA to meet the challenges of this decade and the next century. We are establishing or improving several programs that will enhance our ability to make rational regulatory and enforcement decisions based on better data on inspections, compliance, accidents, and incidents and that will result in even higher quality customer service. The changes we are implementing are prompted by the policy initiatives of the President and the Secretary and by the sound advice of the experienced and capable career professionals in our Offices of Safety, Research and Development, and Chief Counsel and in participating State programs. FRA is committed to working with all segments of the railroad industry to improve railroad safety. At the Federal, State, and local levels, we continue to strengthen existing programs and cultivate new programs that bring us closer to achieving our goal--improved safety.

In closing, Mr. Chairman, thank you for inviting us here today. We will be happy to respond to any questions.

TABLE OF ATTACHMENTS

1. "Train Accidents"
2. "Train Accidents by Cause"
3. "1993 Total Fatalities"
4. "Accident Data Comparing North Carolina with the Nation"
5. "Accident Data for Johnston County, North Carolina"
6. "Highway-Rail Crossing Accidents"
7. "Grade Crossing Accident Data for North Carolina/Nation"
8. "Grade Crossing Accident Data for Johnston County, N.C."
9. "Train Accidents involving Hazmat"
10. "Employee on Duty Casualties"
11. "Serious Injuries to Employees on Duty"
12. "Federal Railroad Administration Accident Statistics Regarding Passenger Equipment Safety"
13. "Recent Accidents Involving Securement of Trailers or Containers on Flat Cars"
14. "Identification of Hitch Parts"

RECENT ACCIDENTS INVOLVING SECUREMENT OF TRAILERS OR CONTAINERS ON FLAT CARS

During the period from January 1989 to February 1994, there were 18 accidents caused by trailers or containers that either fell from, or shifted on, the flat car on which they were riding. The following chart summarizes those 18 accidents.

FRA Cause Code*	1989	1990	1991	1992	1993	1994	Total
E11C, 12C, 13C, and 19C	3	0	2	2	0	0	7
M206	3	2	0	2	1	1	9
M207	0	0	1	1	0	0	2
Total	6	2	3	5	1	1	18

Although the cause codes used by the railroads to report the accidents differ, the type of accident, as determined by the accident description contained in the Rail Equipment Accident/ Incident Report (Form FRA F 6180.54), is basically the same. Eleven of the accidents involved trailers; six involved containers; and one, that occurred on 11/24/92, could not be determined. The 18 accidents occurred on 11 different railroads as follows:

- -CSX Transportation, Inc.- (4)
- -Union Pacific Railroad Co.- (3)
- -The Atchison, Topeka and Santa Fe Railway Co.- (2)
- -Southern Pacific Transportation Co.- (2)
- -St. Louis Southwestern Railway Co.- (1)
- -Norfolk Southern Railway Co.- (1)
- -Illinois Central Railroad Co.- (1)
- -Consolidated Rail Corp.- (1)
- -Soo Line Railroad Co.- (1)
- -Burlington Northern Railroad Co.- (1)
- -Southern Pacific, Chicago-St. Louis Corp.- (1)

***FRA Cause Codes (from the FRA Guide to Preparing Accident/Incident Reports)**

TRAILER OR CONTAINER ON FLATCAR
E11C Broken or defective tiedown equipment
E12C Broken or defective container
E13C Broken or defective container
E19C Other trailer or container on flat car defects

LOADING PROCEDURES
M206 Trailer or container tiedown equipment improperly applied
M207 Overload/improperly loaded container/trailer on flat car

TRAIN ACCIDENT DATA COMPARING NORTH CAROLINA WITH THE REST OF THE NATION

* United States except North Carolina.
** Exclusive of highway-rail accidents.

YEAR	STATE	**TRAIN ACCIDENTS	DERAILMENTS	COLLISIONS	OTHERS
89	U.S.*	2,852	2,105	292	455
89	NC	46	24	13	9
TOTALS		2,898	2,129	305	464
90	U.S.*	2,850	2,121	312	417
90	NC	29	25	3	1
TOTALS		2,879	2,146	315	418
91	U.S.*	2,630	1,919	257	454
91	NC	28	17	4	7
TOTALS		2,658	1,936	261	461
92	U.S.*	2,338	1,723	204	411
92	NC	21	11	3	7
TOTALS		2,359	1,734	207	418
93	U.S.*	2,594	1,917	203	474
93	NC	18	13	3	2
TOTALS		2,612	1,930	206	476

(NOTE: "OTHERS" INCLUDES THE FOLLOWING CATEGORIES OF TRAIN ACCIDENTS: "OBSTRUCTION," "EXPLOSION-DETONATION," "FIRE OR VIOLENT RUPTURE.")

GRADE CROSSING ACCIDENT DATA FOR NORTH CAROLINA/NATION

*** United States except North Carolina**

YEAR	STATE	ALL GRADE CROSSING ACCS.	AUTO	TRUCK	TRUCK TRAILER	BUS	SCHOOL BUS	MOTOR CYCLE	PED	OTHER
89	U.S.*	6,337	3,972	1,504	583	15	4	31	83	145
89	NC	188	126	39	22	0	0	0	1	0
TOTAL		6,525	4,098	1,543	605	15	4	31	84	145
90	U.S.*	5,511	3,406	1,356	474	8	8	26	89	144
90	NC	202	137	43	22	0	0	0	0	0
TOTAL		5,713	3,543	1,399	496	8	8	26	89	144
91	U.S.*	5,214	3,178	1,322	481	8	3	12	84	126
91	NC	172	101	45	22	0	0	0	2	2
TOTAL		5,386	3,279	1,367	503	8	3	12	86	128
[illegible]	U.S.*	4,731	2,859	1,164	460	6	1	19	81	141
	NC	178	131	23	18	0	0	2	1	3
[illegible]AL		4,909	2,990	1,187	478	6	1	21	82	144
93	U.S.*	4,724	2,811	1,148	521	2	2	16	81	143
93	NC	168	109	30	22	0	0	0	2	5
TOTAL		4,892	2,920	1,178	543	2	2	16	83	148

*TRAIN ACCIDENT DATA FOR JOHNSON COUNTY, NORTH CAROLINA

YEAR	TRAIN ACCIDENT	DERAILS	COLLISIONS	GRADE** CROSSING	OTHERS
89	1			1	
90	1			1	
91	1	1			
92					
93	1			1	
TOTALS	4	1		3	

* Includes any accident exceeding the current reportable threshold ($6,300.00).

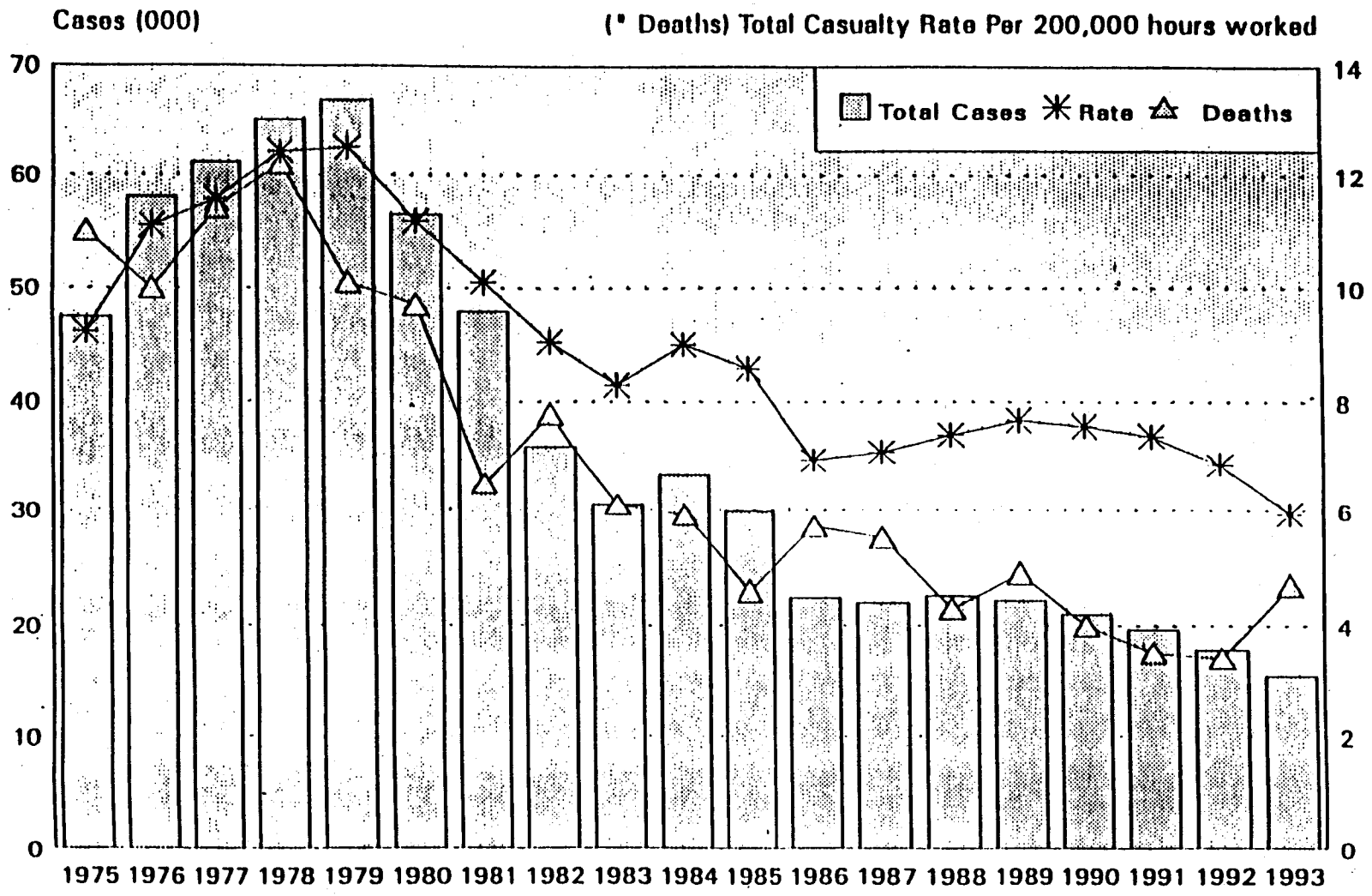
** Includes any impact between a rail and a highway user at a highway-rail crossing.

*GRADE CROSSING ACCIDENT DATA FOR JOHNSTON COUNTY, NORTH CAROLINA

YEAR	ACCIDENT	AUTO	TRUCK	TRUCK TRAILER	BUS	SCHOOL BUS	MOTOR CYCLE	PED	OTHER
89	4	3	1						
90	8	5	3						
91	2	2							
92	5	4	1						
93	5	1	2	1				1	
TOTAL	24	15	7	1				1	

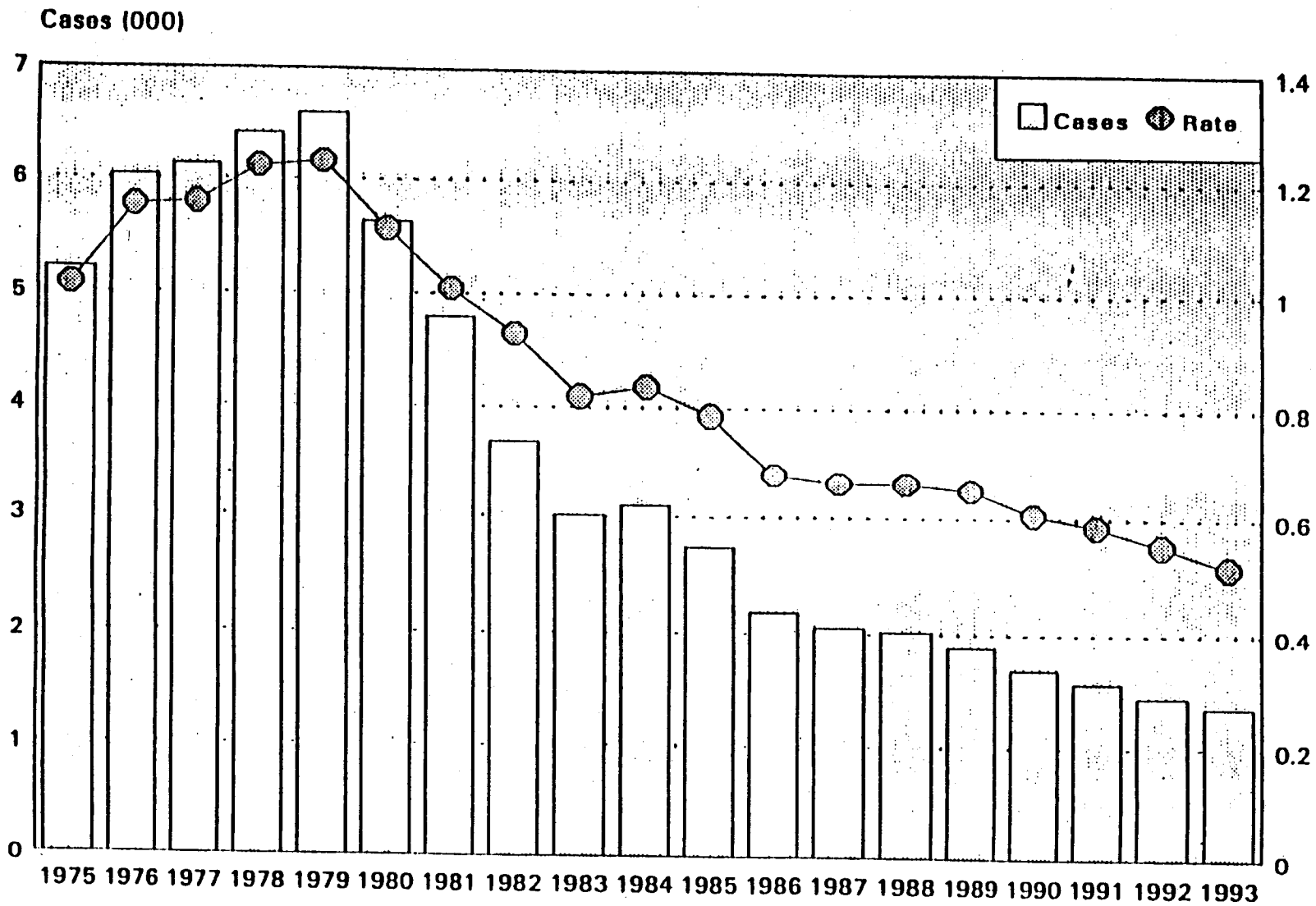
* Includes any impact between a rail and a highway user at a highway-rail crossing.

EMPLOYEE ON DUTY CASUALTIES



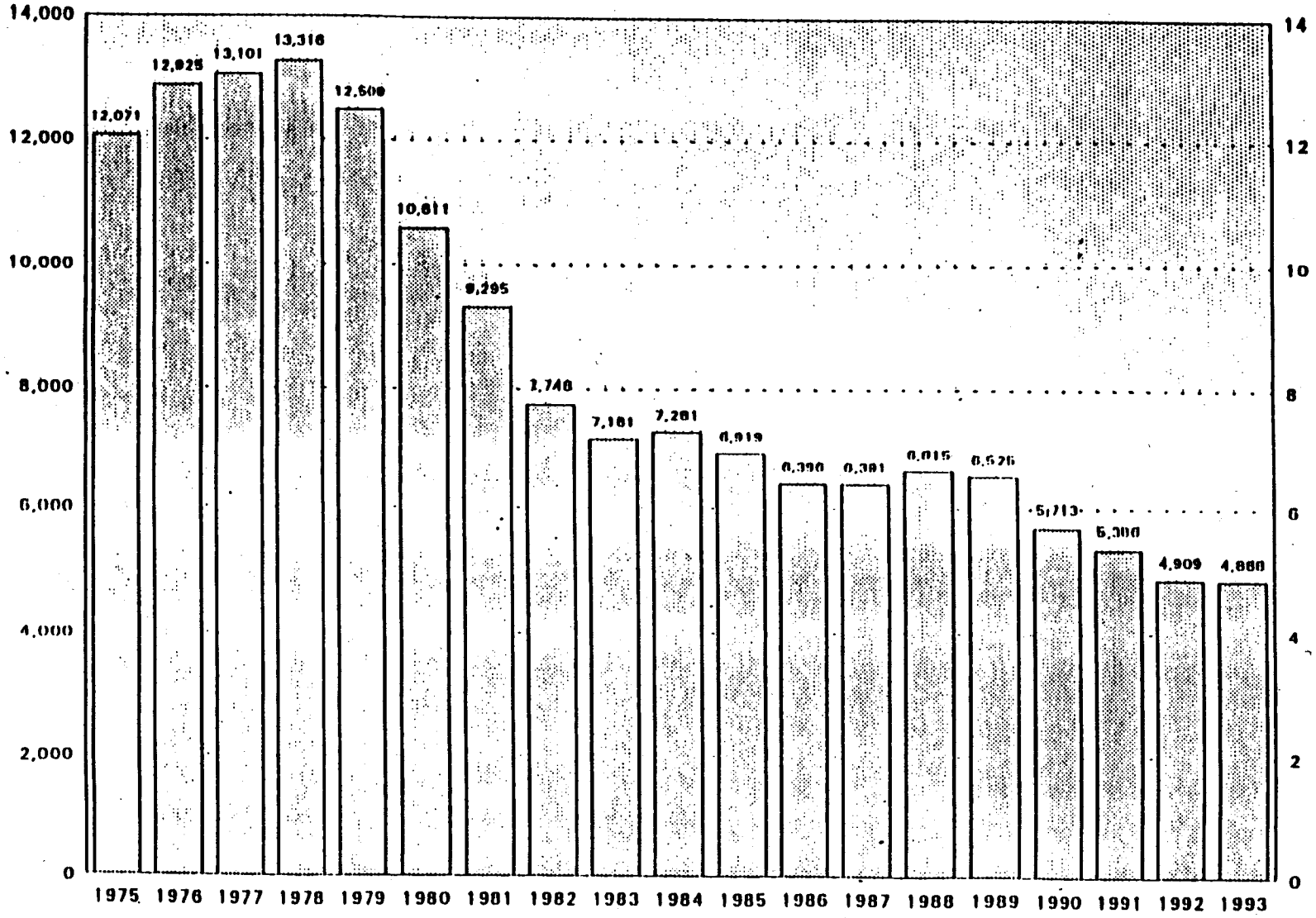
Total cases include fatalities, plus nonfatal injuries and illnesses.
* Deaths have been divided by 10 to maintain scaling.
1993 counts are preliminary.

SERIOUS INJURIES : EMPLOYEES ON DUTY



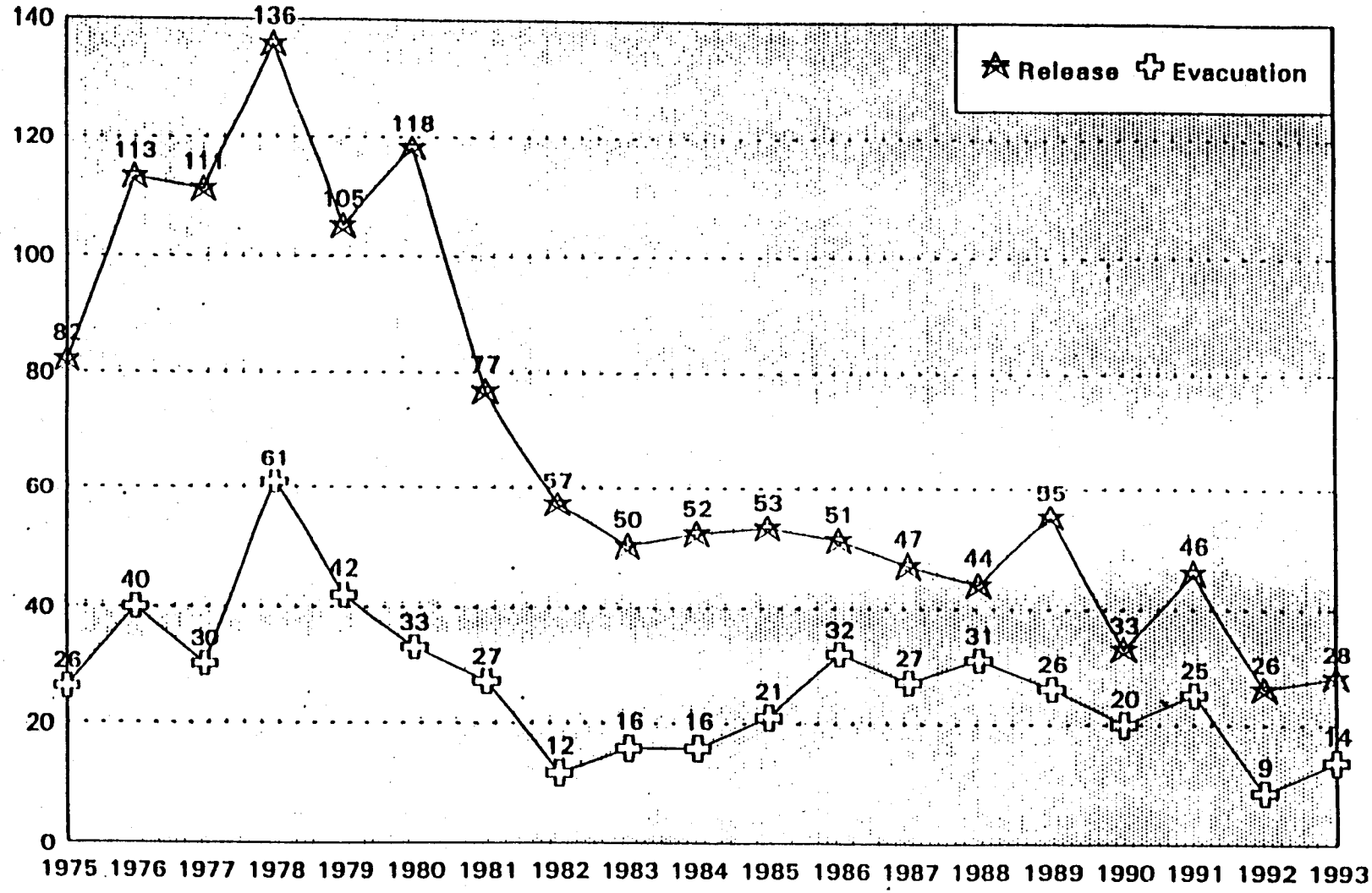
Amputations, fractures, hernias, concussions, internal injuries, loss of eye, dislocations
1993 counts are preliminary

HIGHWAY-RAIL CROSSING ACCIDENTS



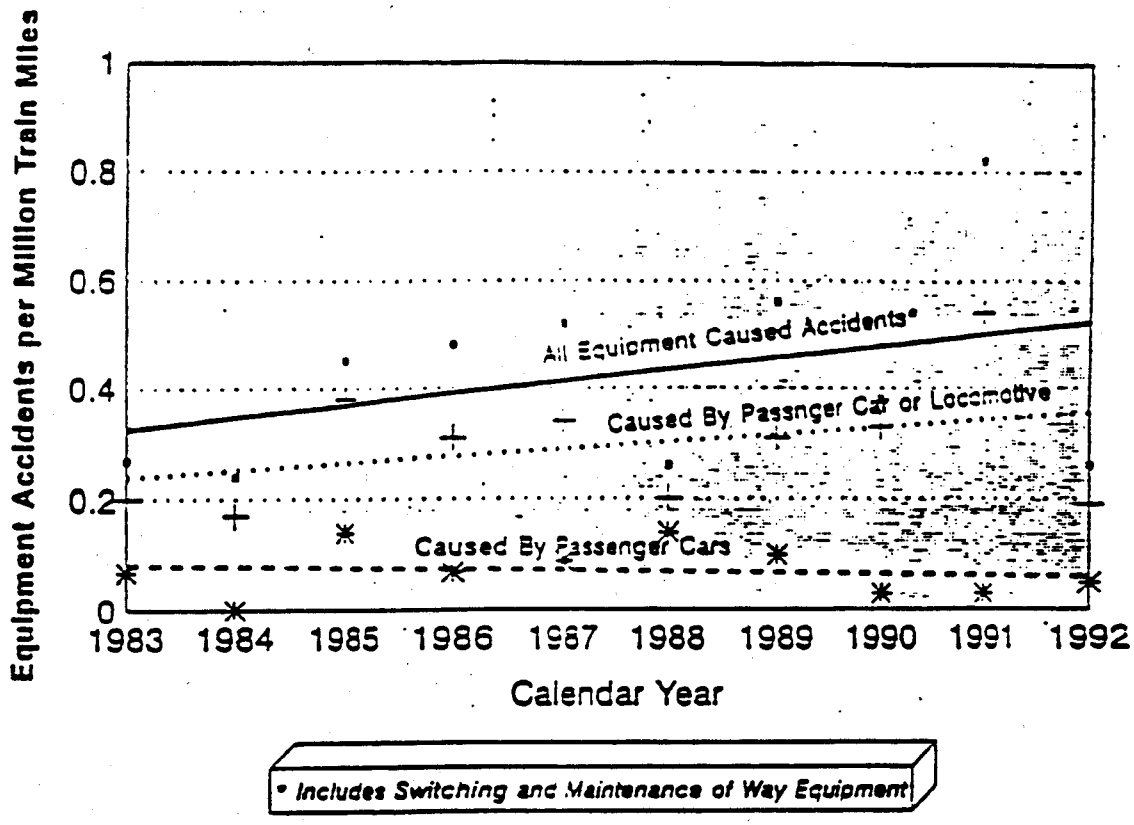
1993 counts are preliminary.

TRAIN ACCIDENTS INVOLVING HAZMAT



The number of accidents that resulted in an evacuation is a subset of accidents in which there was a release of hazardous materials. Highway-rail accidents are excluded. The counts for are preliminary

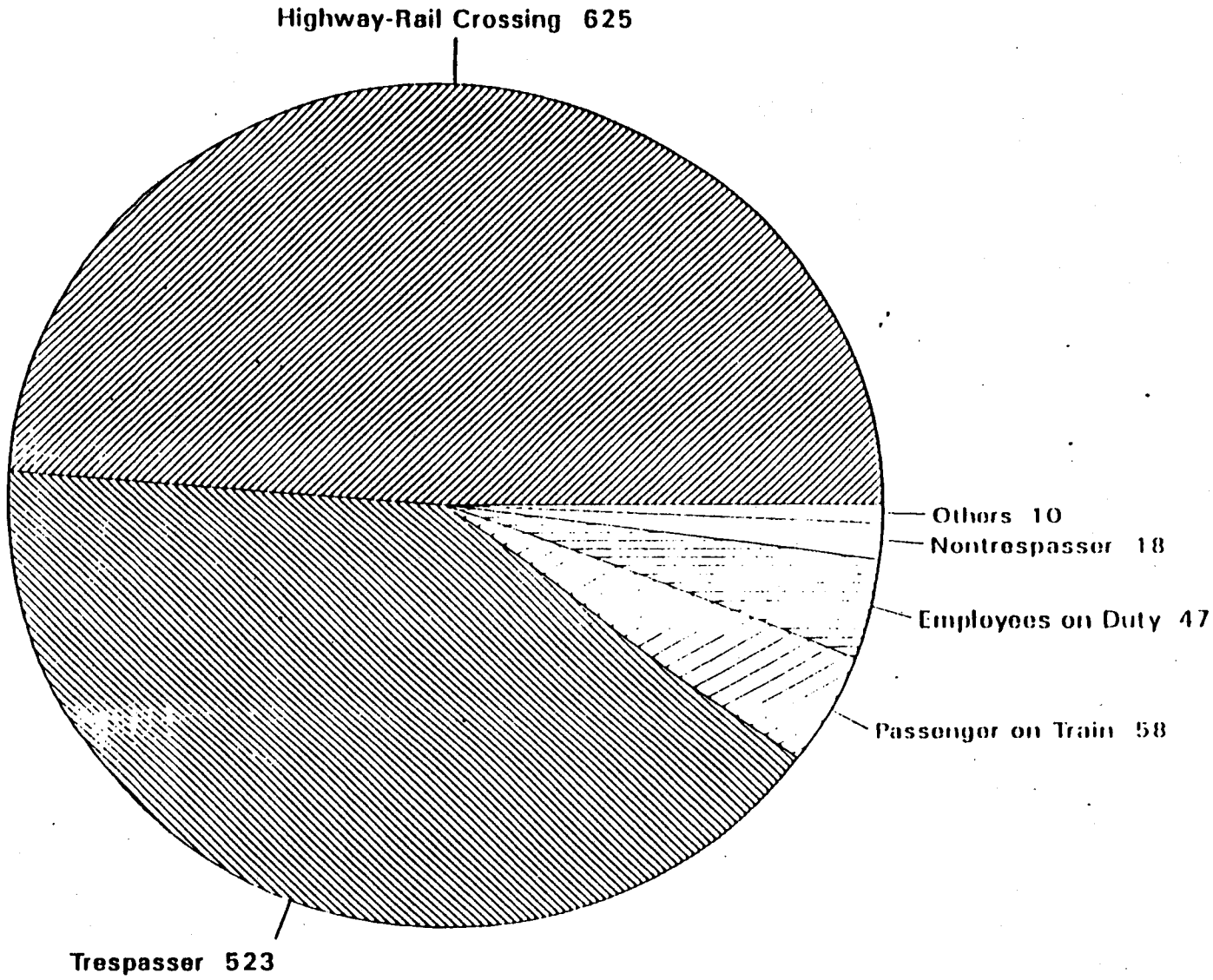
FEDERAL RAILROAD ADMINISTRATION
ACCIDENT STATISTICS REGARDING
PASSENGER EQUIPMENT SAFETY



Appendix I of the GAO report displays Amtrak's accident/injury data as reported to the FRA. The GAO report uses this data to support the recommendation that Amtrak implement minimum safety standards for passenger railcars. While the FRA does not take issue with the recommendation, closely examining the statistics shows that the ten year accident history for passenger cars reflects a much more positive record than is conveyed by the GAO report's portrayal of the data. The results of FRA's analysis are shown above.

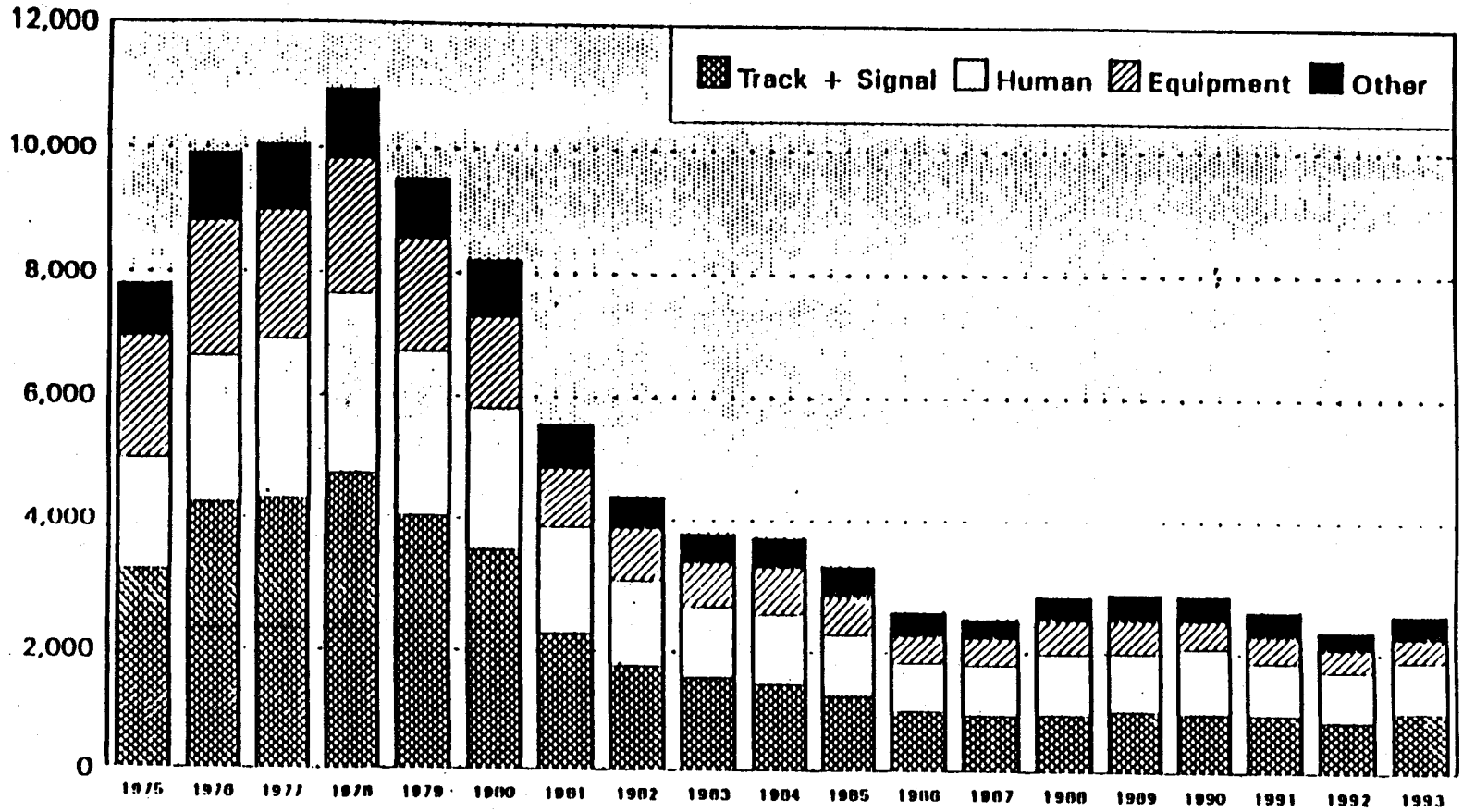
The upper trend line represents Amtrak's overall equipment-caused accidents normalized per million train miles. This trend line comes directly from the data published in the GAO report's Appendix I and includes accidents caused by switching equipment and by maintenance of way equipment. The middle trend line represents the accident rate for passenger equipment including locomotives. The lowest trend line represents the rate for accidents caused by defective passenger cars only. The data in this disaggregated form shows that the frequency of accidents caused by passenger car defects is extremely low, and no negative trend is evident.

1993 TOTAL FATALITIES



All deaths associated with highway-rail accidents are included in highway-rail total.
Three on-duty employees are included and also appear in the employee on duty count.

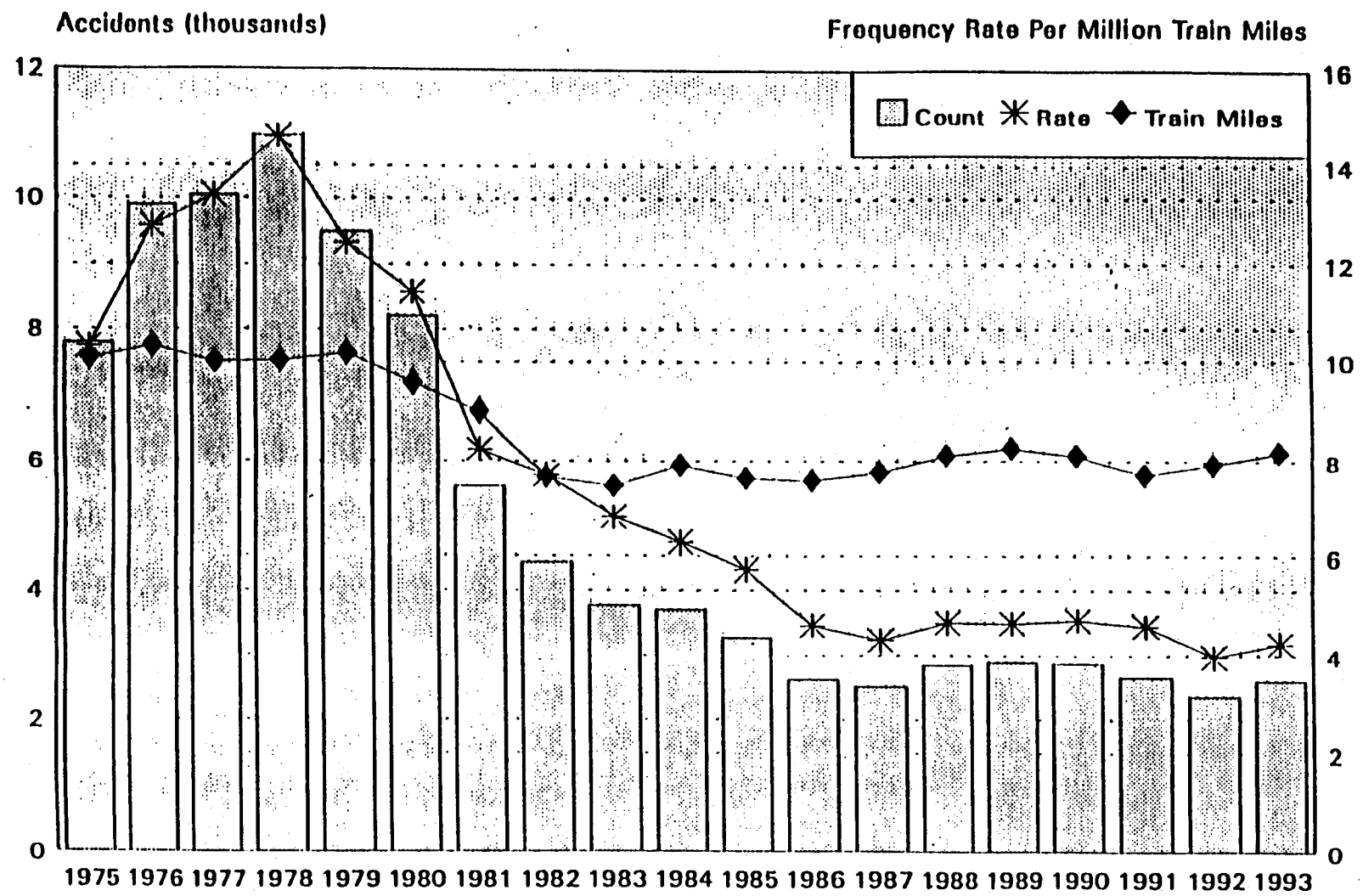
TRAIN ACCIDENTS BY CAUSE



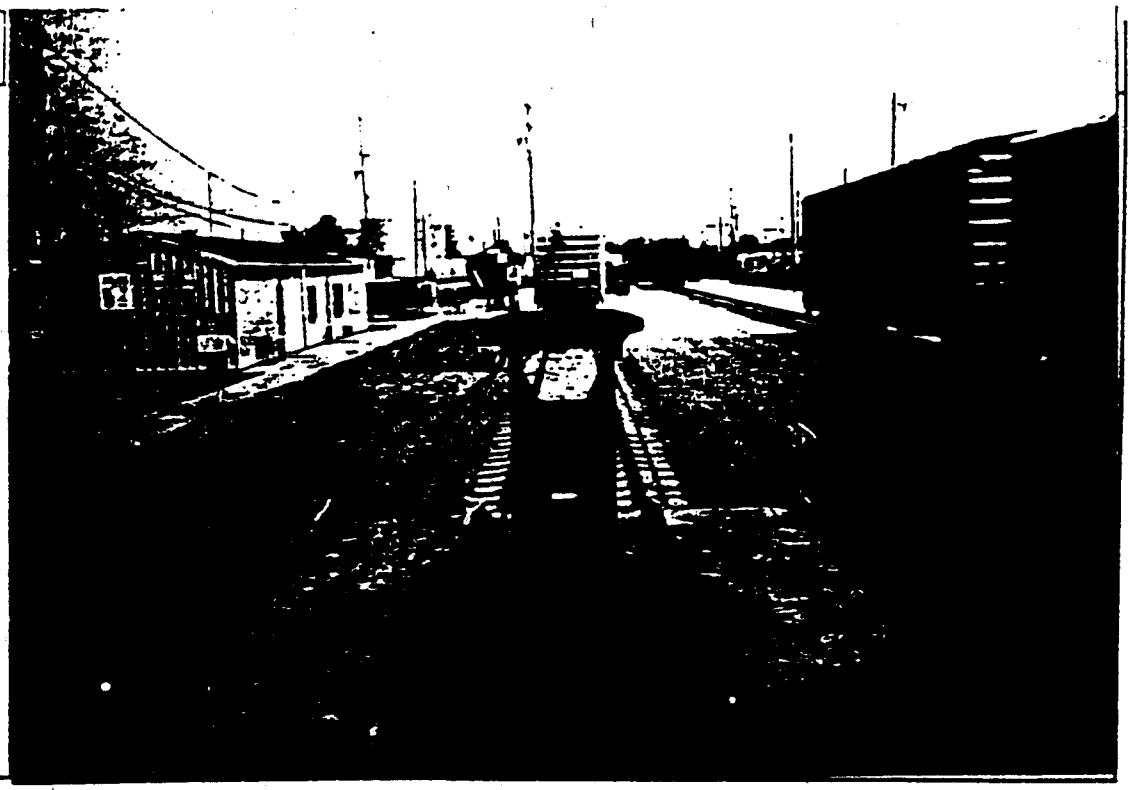
	1975	1976	1977	1978	1979	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993
Total	7,793	9,896	10,040	10,991	9,492	8,205	5,582	4,411	3,776	3,712	3,275	2,620	2,512	2,864	2,898	2,879	2,658	2,359	2,608
Other	866	1,107	1,080	1,181	987	932	697	563	458	472	439	355	288	359	396	371	388	293	368
Equipment	1,906	2,172	2,064	2,169	1,815	1,458	1,016	795	636	661	559	433	430	512	601	426	416	353	300
Human	1,846	2,359	2,559	2,844	2,600	2,323	1,596	1,284	1,101	1,098	998	816	856	1,031	982	1,095	887	864	864
Track + Signal	3,175	4,258	4,337	4,797	4,050	3,492	2,273	1,769	1,581	1,481	1,279	1,016	938	952	1,019	988	988	849	1,016

1993 counts are preliminary
Excludes highway-rail accidents/incidents

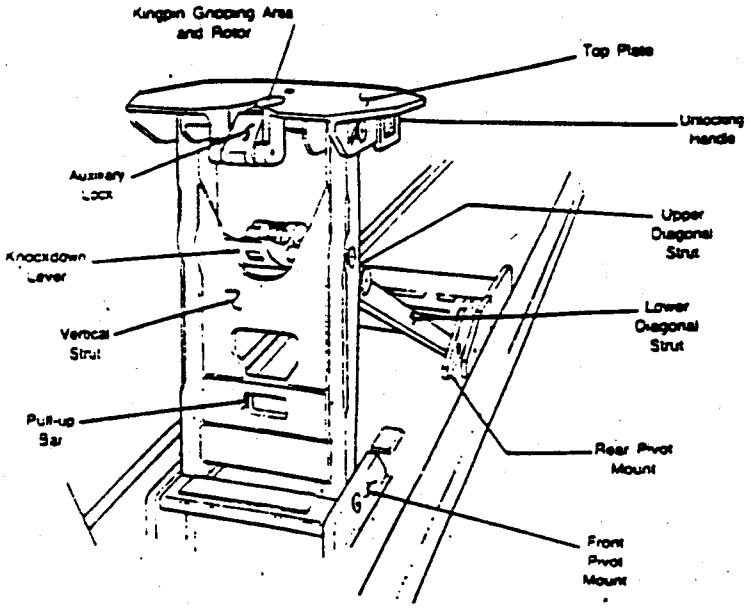
TRAIN ACCIDENTS



In order to obtain comparable scaling, train miles have been divided by 100,000 in this chart.
Train miles are displayed using the left axis.
Excludes highway-rail accidents/incidents. 1993 counts are preliminary.



General Information	Identification of Hitch Parts	Tractor Operated Hitches



Pullman Semi-Automatic Rigid Hitch