

OVERVIEW OF 2003 RAILROAD EMPLOYEE FATALITIES

EXECUTIVE SUMMARY

This document, entitled “2003 Railroad Employee Fatalities: Case Studies and Analysis,” was developed to promote and enhance awareness of many unsafe behaviors and conditions that typically contribute to railroad employee fatalities, and is intended to assist railroad industry stakeholders in their efforts to prevent similar tragedies.

This document contains the following materials:

- Narrative reports which provide in-depth coverage of 2003's 16 railroad employee fatalities, helping readers to visualize the accident scene and chain of events leading up to the fatalities, and the post-accident investigation process;
- *Summaries, preceding each narrative report, which highlight important elements of each individual fatality, particularly the possible contributing factors (PCFs).* This format allows the reader to walk through and analyze each fatality scenario, identifying ways the fatalities could have been prevented. PCFs are expressed as brief narrative statements such as “Crane manuals, which were available to the crew, lacked instructions on the proper removal of the crane’s counter weight.”

The summaries also list Selected Factors which identify where and when the individual fatalities occurred, particulars about the fatally injured parties (i.e. age, years of service, training, and certification where applicable), craft and positions of the other workers, and major activities of fatally injured employees at the time of the incidents;

- *Overall findings for the 2003 fatalities (see Pages 2-7)* which identify *who* the majority of fatally injured employees were (i.e. craft, job position, age group, and years of service); *what* most were doing at the time of the incidents; *when* most were fatally injured (i.e. time of year and time of day); *where* most incidents occurred (i.e. type of railroad); and most importantly, *why* most fatalities occurred in terms of *PCFs*; and
- Bar and pie charts (*Appendices A through I*) which illustrate the above findings.

COMPLEXITY OF FATALITIES

Fatalities usually resulted from a chain of events or the errors of more than one individual, as revealed by the PCFs for each fatality. *In 2003, approximately 56 percent of all fatalities had three or more PCFs. Fatalities ranged in complexity from only one PCF to five PCFs.*

As an example, Report FE-34-03 describes a complex fatal incident in which a Bridge and Building Mechanic, acting as Watchman/Lookout for the rest of the Maintenance of Way gang, was fatally injured when struck by an on-coming freight train. The incident involved the following five PCFs:

- At the time of the incident, the Bridge and Building Mechanic was distracted from his role as Watchman/Lookout because he was performing other duties (operating a snow blower to remove snow from pedestrian walkways), in non-compliance with Federal regulations and railroad safety rules concerning roadway worker protection;
- The Foreman also acted in non-compliance with the above Federal regulations and railroad safety rules when he instructed the fatally injured employee to perform other duties in addition to his role as Watchman/Lookout;
- The investigation revealed that Massachusetts Bay Commuter Railroad (MBAX) gangs routinely used train approach warning to provide on-track safety due to an historic reluctance of CSX, Incorporated (CSX) to issue MBAX work gangs foul time, a much safer method;
- Although the CSX crew reported that the train's headlight was on at the time of the accident, the remaining MBAX crew reported that it was not. Investigators could not establish who was correct. However, the near blizzard conditions limited visibility for all concerned, despite overhead illumination at the station; and
- According to statements provided by the CSX Dispatcher and train crew, they were not aware that an MBAX snow removal gang was working at the Wellesley Farms passenger station. Since all rail traffic over this section of the railroad (CSX freight, Amtrak passenger, and Massachusetts Bay Transit Authority commuter trains) operated under a contract agreement with MBAX, there should have been communication between MBAX and the CSX Dispatcher, especially considering the inclement weather conditions.

FINDINGS

WHO were most of the fatally injured employees?

- ***Craft: Transportation and Engine Employees***

In 2003, Transportation and Engine (T&E) employees represented approximately 69 percent of railroad employee fatalities and Maintenance of Way (MOW) employees approximately 31 percent. In 2003, no fatalities occurred to Maintenance of Equipment and Signal and Train Control employees.

(See [Appendix A](#), 3-D pie chart entitled “2003 Railroad Employee Fatalities By Craft.”)

- **Position: Conductors**

In 2003, approximately 38 percent of all fatally injured employees were Conductors. Switchmen and Brakemen, who ranked second, comprised approximately 13 percent each of all fatally injured employees. Other fatally injured employees included a Carpenter, Electrician, Bridge Mechanic, Track Foreman, Bridge and Building Mechanic, and Yard Foreman.

(See [Appendix B](#), stacked bar chart entitled “2003 Railroad Employee Fatalities by Craft and Position.”)

- **Experience: Split between five or fewer years and 21-35 years**

Most fatally injured employees in 2003 had either worked five or fewer years or were very experienced with 21-35 years, each group representing approximately 38 percent each of all fatally injured employees.

(See [Appendix C](#), stacked bar chart entitled “2003 Railroad Employee Fatalities: Years of Service by Craft.”)

- **Age Range: 36-45 years**

In 2003, approximately 31 percent of all fatally injured employees were concentrated in the 36-45 year range, with employees in the 26-35 year range a close second at 25 percent. Approximately 75 percent of all fatally injured employees were at least 36 years old.

(See [Appendix C](#), cluster bar chart entitled “2003 Railroad Employee Fatalities: Age Ranges by Craft.”)

WHAT were most of the fatally injured employees doing when they were fatally injured?

- **Activity: Switching**

In 2003, approximately 63 percent of fatally injured employees were involved in switching (including two who were switching with remote control locomotives), and approximately 19 percent were fatally injured while maintaining track. Other activities in which employees were fatally injured in 2003 included preparing a crane for shipment, clearing snow from a pedestrian walkway, and operating a train to its destination.

(See [Appendix D](#), stacked bar chart entitled “2003 Railroad Employee Fatalities by Craft and Activity.”)

WHERE did most of the railroad employee fatalities occur?

- ***Type of Railroad: Class I Freight Railroads***

In 2003, 75 percent of all railroad employee fatalities occurred on Class I freight railroads, 12.5 percent on Class II and III railroads, and another 12.5 percent on commuter/passenger railroads. These railroad categories employed approximately 78 percent, approximately 11 percent, and approximately 11 percent of the nation’s total railroad employees, respectively.

(See [Appendix E](#), 3-D bar [cylinder] chart entitled “2003 Railroad Employee Fatalities by Type of Railroad.”)

WHEN did most of the fatalities occur?

- ***Season: Fall***

In 2003, 37.5 percent of all fatalities occurred in the fall, 25 percent in the winter, and 18.75 percent each in the spring and summer.

(See [Appendix E](#), pie chart entitled “2003 Railroad Employee Fatalities by Season of Year.”)

- ***Time of Day: Day by a Large Margin***

Data of the U.S. Naval Observatory, Astronomical Applications Department, provided the precise times for sunrise and sunset for the specific dates and locations of the fatalities. To distinguish fatalities which occurred during daylight from those which occurred during darkness, this analysis employs the definitions of “day” as at sunrise through sunset, and “night” as immediately after sunset until sunrise. In 2003, approximately 63 percent of the fatalities occurred during the day and approximately 37 percent during the night.

(See [Appendix F](#), pie chart entitled “2003 Railroad Employee Fatalities by Time of Day.”)

WHY did most of the fatalities occur?

- **Major three PCF Categories in descending order:**
 - Miscellaneous Contributing Factors
 - Train Operation and Human Factors
 - Mechanical and Electrical Failures
- **Most PCFs: Miscellaneous Contributing Factors¹**
 - In 2003, approximately 52 percent of all PCFs to the 16 fatalities were Miscellaneous Contributing Factors, followed by approximately 41 percent which were Train Operation and Human Factors².
 - In 2003, the remaining approximately 7 percent of all PCFs were Mechanical and Electrical Failures. Specifically, they included a coupler mismatch (high/low), other coupler and draft system defects, and a defective switch machine.

(See [Appendix G](#), 3-D pie chart entitled “2003 Railroad Employee Fatalities: Major Possible Contributing Factor Categories.”)

Break-down of Train Operation & Human Factors

- ***Of all the Train Operation & Human Factors in 2003, two sub-categories predominated: Human Factors, Track at approximately 61 percent and Switching Rules at approximately 17 percent.***

Human Factors, Track included fouling track or positioning oneself in front of or between rail equipment; failure to obtain foul time in the proper manner; unsafe dismantling of a crane’s counter weight and boom; improper use of fall protection equipment; and non-compliance with On-Track Safety and Roadway Worker Protection regulations.

¹ During 2003, Miscellaneous Contributing Factors included environmental conditions; unusual operational situations; inadequate preparation of employees; inadequate coordination and/or communication between affected parties; systemic problems, such as inadequate efficiency testing in particular areas; highway collisions; and inexperience.

² During 2003, Train Operation and Human Factors included improper use of brakes; improper radio communication; non-compliance with general switching rules; errors in train handling; improperly lined switches; and human factors/track, such as fouling the track, failure to obtain foul time, or improper use of fall protection equipment.

General Switching Rules violations included failure to couple and inadequate safety precautions for riding a cut of cars (i.e. footing and hand hold not secure).

(See [Appendix H](#), cluster bar chart entitled “2003 Railroad Employee Fatalities: Train Operation & Human Factors Involved.”)

Break-down of Miscellaneous Contributing Factors

- ***Two sub-categories predominated: Environmental Conditions and Inadequate Coordination at approximately 26 percent each, together over half of all Miscellaneous Contributing Factors.***

Environmental Conditions included poor visibility because of inadequate artificial light at night, heavy snow, or visual obstructions such as track curvature, buildings, stationary equipment, and train headlights. Other Environmental Conditions included moving equipment not heard by employees because of competing noise, and snow or ice on the track.

Inadequate Coordination included lack of communication among employees, lack of cooperation among employees, inadequate coordination between affected railroads, and supervisory problems (i.e. an employee failed to comply with his supervisor’s instructions, and a supervisor gave unsafe instructions).

- ***Ranking second, Unprepared Employees represented approximately 18 percent of all Miscellaneous Contributing Factors.***

Inadequate preparation of employees included inadequate briefings; no or inadequate training provided; or no or inadequate instructional materials (e.g. manuals, manufacturer’s operational instructions, technical bulletins, etc.) provided.

- ***Systemic Problems ranked third at approximately 13 percent of all Miscellaneous Contributing Factors.***

System Problems included inadequate efficiency testing in particular areas, inadequate management oversight of specific types of operations (e.g. switching with remote control locomotives); and a railroad’s propensity for using a less safe method (train approach warning rather than the foul time method).

- ***The remaining sub-categories, Unusual Operational Situations, Inexperience, and Highway Collisions comprised approximately 9 percent and approximately 4 percent each, respectively. Unusual Operational Situations included application of the emergency brake to avoid an accident, and improperly de-boarding moving equipment.***

(See [Appendix I](#), 3-D angled bar chart entitled “2003 Railroad Employee Fatalities: Miscellaneous Contributing Factors.”)