

# Switching Operations Fatality Analysis



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**Findings and Advisories  
of the SOFA Working Group  
Volume I:  
SOFA Report with Appendix A**

**March 2011 Update**

The SOFA Working Group was supported by the Federal Railroad Administration's Office of Safety and the Office of Research and Development. The final findings and Safety Advisories printed in this report are consensus findings and Safety Advisories established by the SOFA Working Group. The Federal Railroad Administration report number FRA/RRS-11/01, is published for the convenience of those wishing to obtain copies and for general information purposes. This report, including Volume II is available on the FRA website at <http://www.fra.dot.gov> by clicking on the SOFA emblem.

This Report contains information based on incident reports filed by railroad carriers under 49 U.S.C. Section 20901 or made by the Secretary of Transportation under 49 U.S.C. Section 20902. Under 49 U.S.C. Section 20903, no portion of a report made under section 20901 or 20902 can be used in a civil action for damages resulting from a matter mentioned in the report.

## **DEDICATION**

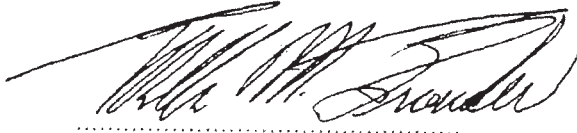
This study is based on 179 employee fatalities involving switching operations. Appropriately, we dedicate this report to those who lost their lives during railroad service. While reviewing each of these tragic events, the SOFA Working Group (SWG) endeavored to handle each case with respect and dignity.

The SWG recognizes that each family will forever bear the burden of its loss. The Group expresses its condolences and we hope the families may gain some comfort from this report. The goal is “Zero Fatalities” and our intent is that no other employee or family will experience this type of tragic event; a lesser goal is not an option.

## The SOFA Working Group

March 2011

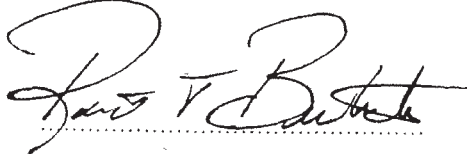
William M. Browder  
Director of Operations, Retired  
Association of American Railroads (AAR)



Steve Bruno  
Director of Regulatory Affairs  
Brotherhood of Locomotive Engineers and  
Trainmen (BLET)



Robert T. Butcher  
Operating Practices Inspector  
Federal Railroad Administration (FRA)



Gary Connors  
Operations Research Analyst, Retired  
Federal Railroad Administration (FRA)



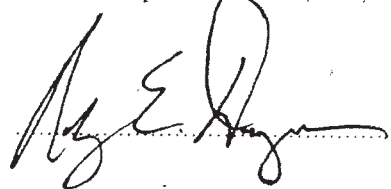
Michael K. Coplen  
Senior Evaluator, Manager Culture and  
Safety Performance Program  
Human Factors R&D Program  
Office of Research and Development  
Federal Railroad Administration (FRA)



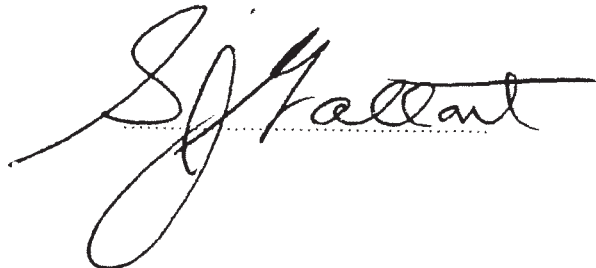
Gary W. Devall  
State Director  
Louisiana State Legislative Board  
United Transportation Union (UTU)



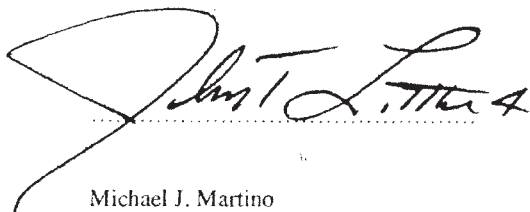
Ty E. Dragoo  
State Director  
Kansas State Legislative Board  
United Transportation Union (UTU)



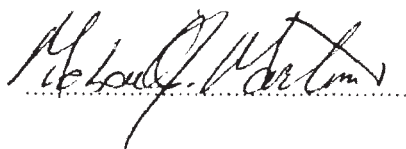
S. Joseph Gallant  
Operating Practice Specialist  
Accident Analysis Branch  
Federal Railroad Administration (FRA)



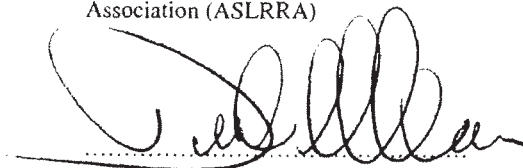
John T. Little, IV  
Chairman  
Tennessee State Legislative Board  
Brotherhood of Locomotive Engineers and  
Trainmen (BLET)



Michael J. Martino  
Senior Director of Operations  
Association of American Railroads (AAR)



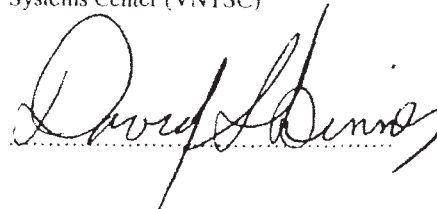
David Mears  
AVP-Equipment & Service  
American Short Line and Regional Railroad  
Association (ASLRRA)



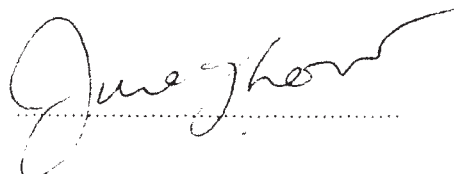
Phillip J. Qualy  
Minnesota State Legislative Director  
United Transportation Union (UTU)



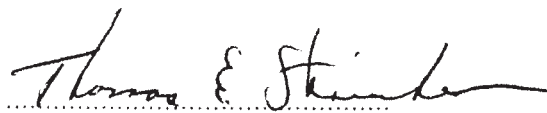
David Skinner  
Economist, Retired  
John A. Volpe National Transportation  
Systems Center (VNTSC)



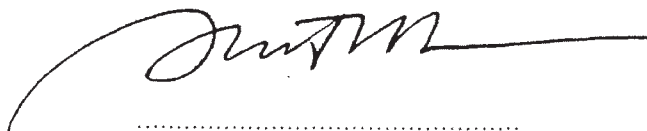
Juna Z. Snow, Ph.D.  
Evaluation Specialist  
Innovated Consulting/VNTSC



Thomas E. Streicher  
General Superintendent  
Safety, Security, and Operating Practices  
American Short Line and Regional Railroad  
Association (ASLRRA)



Robert S. Svob, Jr.  
Chairman, past  
Arizona State Legislative Board  
Brotherhood of Locomotive Engineers and  
Trainmen (BLET)



## **Acknowledgments**

The Switching Operations Fatality Analysis Working Group (SWG) greatly appreciates the ongoing support and encouragement it has received from Senior Vice President, Operations and Safety Robert C. VanderClute, Association of American Railroads (AAR), President Richard F. Timmons, American Short Line and Regional Railroad Association (ASLRRA), VP and National Legislative Representative John Tolman, Brotherhood of Locomotive Engineers and Trainmen (BLET), Administrator Joseph Szabo, of the Federal Railroad Administration (FRA), National Legislative Director James A. Stem, United Transportation Union (UTU). The SWG also acknowledges the following persons, and organizations, for their continuing support and dedication:

Paul T. Sorrow and Dennis R. Pierce  
National President  
Brotherhood of Locomotive Engineers and Trainmen (BLET)

Jo Strang  
Associate Administrator and Chief Safety Officer  
Federal Railroad Administration (FRA)

Mark E. Yachmetz  
Associate Administrator for  
Office of Railroad Policy and Development  
Federal Railroad Administration (FRA)

Mike Futhey  
International President  
United Transportation Union (UTU)

The present SWG expresses its appreciation to past SWG members who contributed their talents and energies to the SOFA process and this new report:

Danny Boyles  
Georgia State Legislative Director, Retired  
United Transportation Union (UTU)

David Brickey  
Michigan State Legislative Director, Retired  
United Transportation Union (UTU)

George J. Last  
Chairman, Retired  
Colorado State Legislative Board  
Brotherhood of Locomotive Engineers and Trainmen (BLET)

Thomas J. Perkovich  
Chairman, Retired  
Minnesota State Legislative Board  
Brotherhood of Locomotive Engineers and Trainmen (BLET)

John P. Smullen  
Minnesota State Legislative Director, past  
United Transportation Union (UTU)

The SWG is grateful to the FRA Office of Research and Development for support with the evaluation of the implementation issues related to the SOFA findings. In particular, the following persons provided expertise during the evaluation efforts: Michael Patton, Ph.D. (Utilization-Focused Evaluation), Debbie Bonnet (Fulcrum Corporation), and Joyce Ranney, Ph.D. (VNTSC). Also, the SWG thanks Margaret Kondracki and Lauren Alexander (Fulcrum Corporation); Hadar Rosenhand, Cathy Guthy, and Stephanie Morrow, Ph.D. (VNTSC); and Aaron Thompson (FRA) for their supportive work.

The SWG also acknowledges the efforts of the railroads and labor unions within the railroad industry for their participation during the SOFA Safety Forum of February 2010. Their attendance and input was extremely beneficial to the success of this report.

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## **List of Abbreviations and Terms**

### **ABBREVIATIONS**

CRM:	Crew Resource Management
FE:	In the October 1999 SOFA Report, FE meant “fatality of an employee.” Sometimes, it is used also to mean “fatally injured employee.”
PCF:	Possible Contributing Factor
RCL:	Remote Controlled Locomotives
SOFA:	Switching Operations Fatality Analysis
SSF:	SOFA Safety Forum (February 2010)
SSH:	Special Switching Hazard
SSH-CC:	Special Switching Hazard – Close Clearance; a frequently occurring SSH
SSH-IH:	Special Switching Hazard – Industrial Hazard; a frequently occurring SSH
SSH-ST:	Special Switching Hazard – Struck by Mainline Train; a frequently occurring SSH
SWG:	SOFA Working Group
TY&E:	Train, Yard, and Engine

### **TERMS**

Five Operating Recommendations: In its 1999 SOFA Report, the SWG made Five Operating Recommendations. The Five Operating Recommendations are shown in Appendix C.

Five Life Savers: After release of the 1999 SOFA Report, the SWG developed condensed versions of the Five Operating Recommendations. These shortened versions came to be known as the Five Lifesavers.

Railroad Industry: The combination of railroad management, labor, and government agencies conducting regulated railroad operations.

SOFA 1-5 Categories: In the 1999 SOFA Report, the SWG looked at 76 SOFA fatalities from January 1992-June 1998 and classified them into five different categories corresponding to the Five Operating Recommendations. For this report, we call these categories SOFA 1-5.

Special Switching Hazards: Beyond the five categories for SOFA 1-5, the SWG used fifteen categories corresponding to Special Switching Hazards (SSH) to classify cases. SSH applies to hazards which are not covered the original SOFA 1-5 categories. These SSH categories are shown in Table 2-1.

Possible Contributing Factors: The SWG conducted intense discussions of each case until there was an agreement on possible factors. The SWG used an approach to define possible factors based on consideration of a complex combination of operating characteristics, conditions, and events. The SWG did not attempt to rank these factors. Table 4-2 shows the most frequently used PCFs. Appendix E provides a full list of the PCFs used by the SWG.

Types of Close/No Clearance:

- No Clearance: Insufficient space for the employee to avoid being struck if passing or being passed by an object, structure, or equipment.
- Close Clearance: Insufficient space for the employee to take evasive action to avoid being struck by moving equipment that derails into an object, structure, or other equipment.
- Permanent Close/No Clearance: A fixed structure that remains in the same location from day to day, such as a building, loading dock, fence, post, beam, or other permanent structure, that an employee passes.
- Temporary Close/No Clearance: A movable object, including equipment on or near one track fouling another track, rolling stock on an adjacent track, stacks of cross ties, construction materials, and doors or gates left open, that passes by an employee or an employee passes.



## EXECUTIVE SUMMARY

### ES 1 INTRODUCTION

#### ES 1.1 Purpose

In support of achieving the Switching Operations Fatality Analysis (SOFA) goal of Zero Switching Fatalities, the purpose of this report is to:

- Present the analysis and findings of the SOFA Working Group (SWG) to the railroad industry.
- Offer ideas on improving the safety of Train, Yard, and Engine (TY&E) employees performing switching operations.
- Encourage implementation of improved safety practices with the cooperation of government, labor, and management.

#### ES 1.2 Background

The SWG was formed in 1998 and is made up of representatives from the Association of American Railroads (AAR), American Short Line and Regional Railroad Association (ASLRRA), Brotherhood of Locomotive Engineers and Trainmen (BLET), Federal Railroad Administration (FRA), and United Transportation Union (UTU). The SWG has issued two major reports before this one. The first was the 1999 SOFA Report. Based on a review of 76 fatalities, this report made Five Operating Recommendations which were subsequently summarized into the Five SOFA Lifesavers. The second report, the 2004 SOFA Update, included a review of an additional 48 switching fatalities and brought the total number of cases reviewed up from 76 to 124. This update also identified Special Switching Hazards (SSH) that were not necessarily preventable by one or more of the original Five Operating Recommendations.

##### ES 1.2.1 History of Switching Fatalities

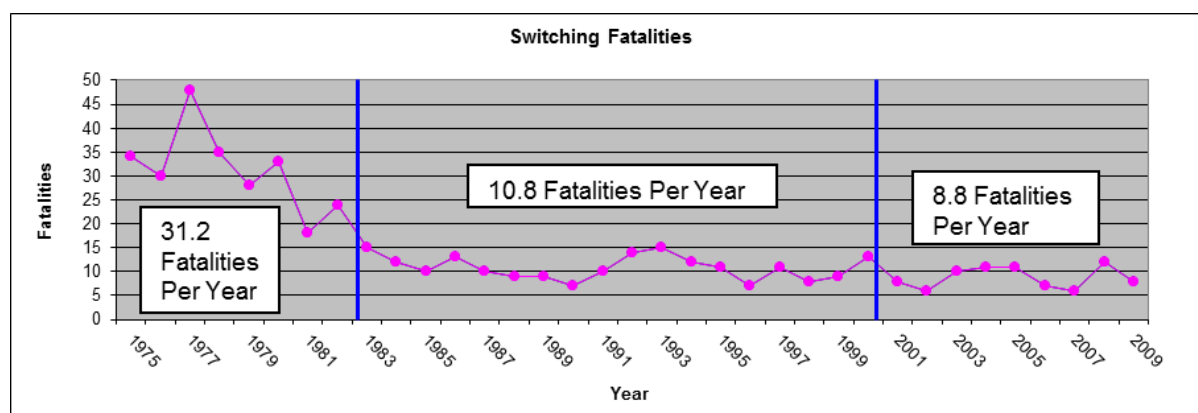


Figure ES-1 Switching Fatalities

## **ES 2 SOFA PROCESS**

### **ES 2.1 Six Step Process**

1. Case Selection: The selection criteria are all fatalities from 2004 through 2009 involving Train, Yard, and Engine (TY&E) employees who were:
  - Fatally injured while on the ground.
  - Fatally injured while riding on the outside of train equipment.
2. Case Review: The SWG followed four principle steps in reviewing a case: 1) Case presentation, 2) Recording the facts into a database, 3) Discussion, and 4) Agreement on one or more as Possible Contributing Factors (PCFs).
3. Classification of Cases: After review of all cases, the SWG classified the cases into one or more of the SOFA 1-5 categories. A case could also qualify for one or more of 15 different SSH categories.
4. Analysis – Searching for Commonalities: After case classification, the process of discovering ‘commonalities’ began. Commonalities, as used in this report, are shared characteristics among cases that may lead to a common solution.
5. Identification of Preliminary Findings: The SWG, based on the consensus of its members, developed preliminary findings. The SWG hosted a SOFA Safety Forum (SSF) with senior leaders in the railroad industry to participate in the further development of these findings and to increase SOFA awareness.
6. Development of Findings: The SWG used various ideas from the SSF and contributed its own thoughts to complete development of the findings.

## **ES 3 SWITCHING FATALITIES – UNDERSTANDING AND PREVENTION**

### **ES 3.1 Overview**

The SOFA Working Group (SWG) has reviewed 179 switching fatality cases from 1992 through 2009, an 18-year period. Figure ES-2 shows a year-by-year graph of those fatalities. There is a line in the middle of Figure ES-2 which divides the graph into two nine-year periods: the period from 1992 through 2000 and the period from 2001 through 2009.

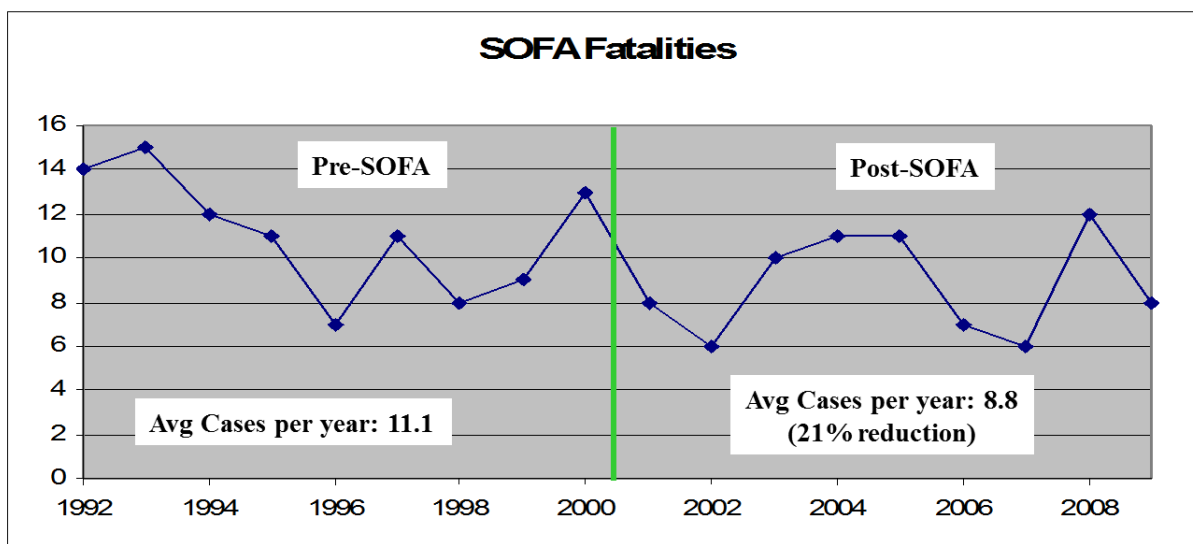


Figure ES-2 SOFA Fatalities

The SWG believes 2001 was the first year that the *1999 SOFA Report* could have had full effect on reducing fatalities. That means one way to interpret Figure 3-1 is to regard the first nine-year period (1992 – 2000) as the Pre-SOFA period and the second nine-year period (2001 – 2009) as the Post-SOFA period.

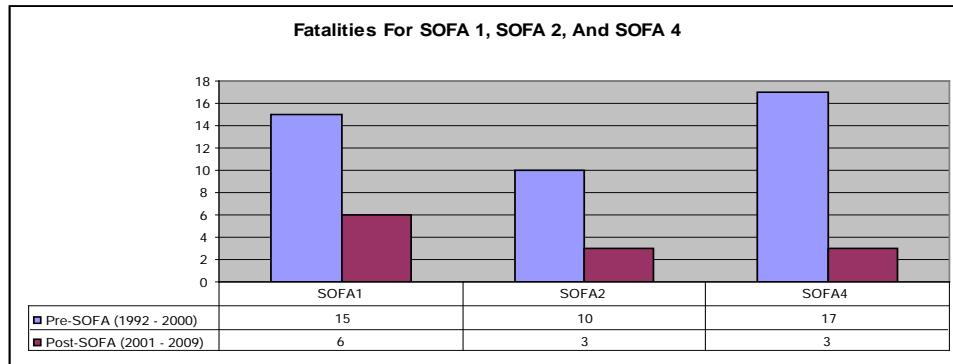
The average number of cases in the Pre-SOFA period is 11.1. During the next 9 years, the Post-SOFA period, the average number of cases dropped to 8.8, about a 21% reduction. Therefore, the railroad industry achieved some success in reducing SOFA fatalities since the first efforts to raise SOFA awareness. Table ES-1 shows the most prominent SOFA categories with the number of fatalities for the Pre and Post-SOFA periods.

Table ES-1: The Most Prominent SOFA Categories

SOFA Category	Description	Pre-SOFA (1992-2000)	Post-SOFA (2001-2009)	Total
SOFA5	FE had 1.5 years of experience or less or had inadequate training.	17	15	32
SSHCC	Special Switching Hazard: Close Clearance.	11	18	29
SSHIH	Special Switching Hazard: Industrial Hazard.	10	16	26
SOFA3	Lack of or inadequate job safety briefing.	11	12	23
SOFA1	Adjusting knuckles, adjusting drawbars, or installing EOT	15	6	21
SOFA4	Mixing hand and radio signals or specific distances were not given.	17	3	20
SSHST	Special Switching Hazard: Struck by Mainline Train.	7	13	20

### ES 3.2 Substantial Progress on SOFA 1, 2, and 4

Figure ES-3 shows a paired bar chart displaying the number of SOFA 1, 2, and 4 fatalities over two nine-year periods (Pre-SOFA versus Post-SOFA).



**Figure ES-3 Fatalities for SOFA 1, SOFA 2, and SOFA 4**

The paired bars for each case show an impressive reduction for SOFA 1, 2, and 4. SOFA 1 fatalities are down 60% from in the Pre-SOFA period to the 6 fatalities in the Post-SOFA period. SOFA 2 fatalities have declined 70% from 10 in the Pre-SOFA period to 3 in the Post SOFA period. The biggest improvement is in SOFA 4 where there has been a decline of over 80% from 17 fatalities in the Pre-SOFA period to 3 in the Post-SOFA period.

Operating Recommendations 1, 2, and 4 had a structure that highlighted pre-existing, procedural safety rules where compliance with the rules could be observed. This structure enabled the railroad industry to monitor the tasks associated with these operating recommendations and take corrective action when necessary.

### ES 3.3 No Substantial Progress on SOFA 3 (Lack of or inadequate job briefing)

SOFA 3 is the fourth largest category of SOFA fatalities. Table ES-1 on the previous page shows there has been no substantial progress on reducing SOFA 3 fatalities from the Pre-SOFA to the Post-SOFA periods.

#### ES 3.3.1 Briefings - Job or Safety (SOFA3) – SOFA Safety Advisory Statement 2010

The SWG believes ongoing communication is crucial among employees during the entire time switching operations are being performed, including periods when tasks are changing or when anomalies occur. A job briefing is a two-way exchange of information to reach an understanding of the tasks being performed.

Despite considerable efforts within the railroad industry, more than half of SOFA 3 fatalities in yards and industrial properties occurred when a job task changed and an update to the job briefing did not occur. The SWG believes more progress can be made in the area of work changes. When work changes occur, the employees involved may not maintain currency with these changes; thus, they may be unaware of the tasks to be performed, and this may place them in peril. The railroad industry must remain vigilant regarding fatalities, and when work changes

occur, employees must regroup, take appropriate steps to provide protection, and not proceed until an update to the job briefing is done.

### **ES 3.4 Little Progress on SOFA 5 (Employees with 1.5 years of experience)**

With 32 cases, SOFA 5 is the largest category of SOFA fatalities. Table ES-1 shows there has been little progress on reducing SOFA 5 fatalities from the Pre-SOFA to the Post-SOFA periods.

#### **ES 3.4.1 Inexperienced Employee (SOFA5) – SOFA Safety Advisory Statement 2010**

Since the 1999 Report, the SWG emphasis on mentoring has not achieved a substantial reduction in SOFA 5 fatalities. It is critical for the railroad industry to provide the inexperienced employee adequate OJT. Without abandoning the commitment to mentoring, the railroad industry should improve OJT to include targeted training for the inexperienced employee. Providing follow-up review of skills, and targeted training by the railroad industry enables an inexperienced employee to meet the demands of the job. Smaller railroads in particular may benefit from a review of their OJT, and improved follow-up with inexperienced employees.

### **ES 3.5 Close/No Clearance – A Growing Issue**

Close/No clearance is the second largest category of SOFA fatalities. Table ES-1 shows fatalities involving close/no clearances have increased from the Pre-SOFA to the Post-SOFA periods.

#### **ES 3.5.1 Close Clearance – SOFA Safety Advisory Statement 2010**

The SWG reemphasizes that removing the hazard is the best way to address close/no clearances. Yet, in many cases a railroad or industry will not be able to eliminate the close/no clearance condition. At the minimum, the SWG believes that proper signage should be implemented and be instructive to the employee. Additionally, the sign should be an appropriate distance from the close/no clearance location and on the same side. Signage must (a) announce the clearance issue and (b) instruct the employee who is controlling the movement to dismount and remain dismounted from the equipment while passing the close/no clearance location. One method to determine the signage design, appropriate distance, and position may be to organize a management-labor working group.

### **ES 3.6 Industrial Track Hazard - A Growing Issue**

Industrial Track Hazard is the third largest category of SOFA fatalities. Table ES-1 shows fatalities involving industrial track hazards have increased from the Pre-SOFA to the Post-SOFA periods.

#### **ES 3.6.1 Industrial Hazards – SOFA Safety Advisory Statement 2010**

Railroads and industries need to have Industry Track Agreements, practices, or policies in place, and these should contain oversight and enforcement of the safety provisions. Railroads must provide employees with the tools and/or assistance to allow them to safely perform their work while within an industry.

Employees need to be empowered to make a decision to stop work when an unsafe condition presents itself. Railroad managers must be educated to encourage employees to make a good faith effort to identify and report hazards at industries. Employees making a good faith effort to

identify and report hazards will not be subject to discipline, discrimination, or harassment for doing so.

Employees engaged in switching operations must not ride railroad equipment through a grade crossing during a shove movement. Industries need to educate and instruct all vehicle operators concerning separation between their vehicle and railroad equipment by being attentive to movements in the industry. At the minimum, the SWG believes that proper education and instruction should be implemented by the industry. Additionally, signage and lighting should be appropriate for the crossing protection needed.

### **ES 3.7 Struck By Mainline Trains - A Growing Issue**

Struck by Mainline Trains is tied for the sixth category of SOFA fatalities. Table ES-1 shows fatalities involving TY&E employees who are struck by mainline trains have increased from the Pre-SOFA to the Post-SOFA periods.

#### **ES 3.7.1 Struck By Mainline Train – SOFA Safety Advisory Statement 2010**

The SWG reemphasizes that communication is essential to eliminating fatalities related to Struck by Mainline Trains. Fatalities occur when employees are unaware of risks associated with doing work along mainline track – particularly at times of darkness and during winter months. Therefore, the railroad industry should insist upon consistent use of multiple methods to warn employees about oncoming on-track movements. Equally, warnings should be made to the approaching on-track movement of an employee's location when a crew member is outside of the locomotive cab. In addition, the railroad industry should consider improving employee visibility when performing work on the ground.

Employees must use job briefing procedures before dismounting the locomotive or doing work along mainline track to establish a safe method for performing their work. When possible, employees must dismount to the safe side. Empower employees to establish a safe location when stopping and/or performing work when on or near mainline track. The railroad industry must support employees in the use of individual discretion as part of an effort to determine a safe location to perform work.

### **ES 3.8 Fatalities during the Second Hour of Duty**

The number of SOFA fatalities during the second hour of duty is higher than any other on-duty hour. The number of fatalities (30) occurring during the second hour of duty is surpassed by only one SOFA category, SOFA 5. Therefore, the industry should develop safety campaigns and other safety-related measures to make the workforce aware of this issue and will lead to the elimination of second hour of duty fatalities.

## **ES 4 ADDITIONAL SUGGESTED ACTIONS**

### **ES 4.1 Empowerment and Discipline**

Safe practices in switching operations are the responsibility of all railroad industry employees. Employees must be able to make decisions on safe actions and be allowed to cease work in the interest of safety. As expressed in many of the railroad's empowerment statements, when performing safe actions employees should be free from reprisal by discipline, discrimination, or harassment when executing those safe actions. When using discretion to choose safe actions, the employee should use that discretion appropriately. An empowered work environment allows the railroad industry to progress toward attaining the SOFA goal of *Zero Fatalities*

### **ES 4.2 Transition the SWG From “Analysis” to “Analysis and Implementation”**

The initial SOFA tasking letters called for a task force (later named the SWG) to conduct an analysis of switching fatalities. Since the role of the SWG in promoting implementation is not clear in these letters, the SWG has focused on analysis of fatalities. However, the SWG is not fully satisfied with the effect of the first two reports in terms of implementation and reduction in switching fatalities. To make this and future reports more successful, the SWG needs to expand its role further in the implementation phase. SWG duties should not end upon issuance of this report, and continued stakeholder support throughout the implementation phase is essential.

### **ES 4.3 Conduct Annual SWG Meetings**

For this report, the SWG has met from January 2009 to December 2010. The frequency of meetings during this period (about once every month) made substantial demands on the members and their sponsoring organizations. After this report, the SWG recommends meeting three to four times a year to review current cases if needed, to monitor and identify trends, and to track the progress of industry implementation efforts. Reports and updates may not be issued every year. Instead, they would be issued if necessary in response to any emerging trends that demand action.

## **ES 5 ADDITIONAL INFORMATION**

Not all SOFA chapters are fully described in this Executive Summary but further information about areas of interest can be found in the following chapter locations:

- Chapter 4 – Notable Statistics and Observations
- Chapter 5 – SOFA-Defined Severe Injuries (Including definition of same)
- Chapter 6 – Evaluation of the SOFA Working Group for the Implementation of SOFA Findings
- Appendix A: SOFA 2010 Report (Summaries of 179 SOFA Fatalities Cases)

# 1 INTRODUCTION

## 1.1 Purpose

In support of achieving the Switching Operations Fatality Analysis (SOFA) goal of *Zero Switching Fatalities*, the purpose of this report is to:

1. Present the analysis and findings of the SOFA Working Group (SWG) to the railroad industry.
2. Offer ideas on improving the safety of Train, Yard, and Engine (TY&E) employees performing switching operations.
3. Encourage implementation of improved safety practices with the cooperation of government, labor, and management.

## 1.2 Background

### 1.2.1 Origin and Past Efforts of the SOFA Working Group

In February 1998, George A. Gavalla, Associate Administrator for Safety of the FRA, charged the SWG to: “Conduct a detailed fact-finding review and analysis of these incidents [switching fatalities] to determine whether trends or patterns can be found, identify best practices, and, if possible, formulate recommendations for the entire railroad industry based on the findings.” Appendix B contains Mr. Gavalla’s letter that includes this charge.

From Mr. Gavalla’s charge, the SWG was formed, made up of representatives from the Association of American Railroads (AAR), American Short Line and Regional Railroad Association (ASLRRA), Brotherhood of Locomotive Engineers and Trainmen (BLET), Federal Railroad Administration (FRA), and United Transportation Union (UTU).

The SWG has undertaken a number of activities since the release of its *SOFA Report: Findings and Recommendations of the SOFA Working Group*, in October 1999. That report was based on the review of 76 fatalities that occurred to TY&E employees engaged in switching operations from January 1, 1992 through July 1, 1998.

The SWG activities have been directed towards achieving the goal of *Zero Switching Fatalities*. These activities include:

- Drawing the attention of those engaged in switching operations to the Five Operating Recommendations made in the 1999 *SOFA Report*;
- Publishing a SOFA Update in August 2004 that included a review of the 48 switching fatalities that occurred from August 1998 through December 2003. This update brought the total number of cases reviewed up from 76 to 124. More details on this update are provided below;
- Identifying *Special Switching Hazards* (SSH) such as close clearance and being struck by mainline trains that resulted in switching fatalities that were not necessarily preventable by one or more of the original Five Operating Recommendations;

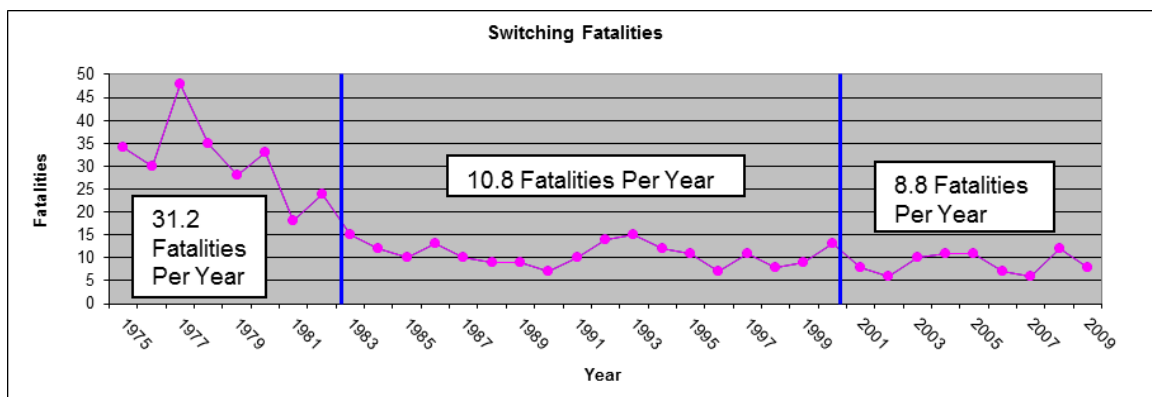


- Studying severe injuries, such as amputations, that cause harm to employees performing switching operations and publicizing information about the number and types of switching fatalities and severe injuries.

In serving as an update, this 2010 report describes SWG activities. These activities are important because from January 2004 through December 2009, there have been 55 switching fatalities not covered in the *SOFA Update, August 2004*.

### 1.2.2 History of Switching Fatalities

The SWG switching fatality review dates back to 1975. From 1975 through 1982, fatalities averaged 31.2 per year, far higher than in the years following. After 1982, fatalities began to decline, moving within a range of 7 to 15 per year through year 2000. During this period, the average fatalities-per-year was 10.8. 2001 was the first year that the SWG's recommendations could have resulted in noticeable change. From 2001 through 2009<sup>1</sup>, fatalities moved within in a range of 6 to 12 per year, averaging 8.8 fatalities-per-year. Although there has been some improvement, the need for immediate, preventive action is still urgent. Figure 1-1 provides a line chart that shows the number of switching fatalities from 1975 through 2009.



**Figure 1-1. Switching Fatalities, 1975 through 2009**

### 1.2.3 Operating Recommendations and the Five Lifesavers

In its 1999 *SOFA Report*, the SWG made Five Operating Recommendations based on review of 76 fatality cases occurring from January 1, 1992 through July 1, 1998. The SWG believed these Recommendations, each based on 8 to 12 fatality cases, when appropriately used in switching operations, would prevent fatalities. The Five Operating Recommendations are shown in Appendix C. Subsequently, the SWG developed condensed versions of each recommendation that may involve a series of steps. These shortened versions came to be known as

<sup>1</sup> Following the 1999 SOFA Report (76 older cases) the FRA improved the detail and consistency of their investigation process.

### **The Five Lifesavers:**

- Secure equipment before action is taken.
- Protect employees against moving equipment.
- Discuss safety at the beginning of a job or when a project changes.
- Communicate before action is taken.
- Mentor less-experienced employees to perform service safely.

#### **1.2.4 Additional Recommendations, October 1999 SOFA Report**

In addition to making Five Operating Recommendations in its 1999 *SOFA Report*, the SWG made additional recommendations concerning:

- Unexpected train movement
- Crew resource management concepts
- Review of severe injuries
- Maintenance of the SOFA Matrix
- Computer support for fatality investigation
- Continued review and monitoring of switching fatalities
- Team-oriented approach to switching fatality investigation

For the most part, ‘Additional Recommendations’ do not involve switching operations directly (unexpected train movement being the exception). However, the SWG believed these recommendations would help reduce risk in switching operations and facilitate the collection of fatality information.

#### **1.2.5 August 2004 SOFA Update**

This update increased the total number of cases reviewed from 76 to 124. Further, it divided the cases into two groups. The first group contained 64 cases that applied to the Five Operating Recommendations. The second group, Special Switching Hazards (SSH), contained 60 cases to which no Operating Recommendation applied. The SWG classified the SSH cases into eleven categories:

- Close Clearance
- Struck by Mainline Trains
- Employee Tripping, Slipping, Falling
- Free Rolling Railcars
- Unsecured Cars
- Equipment
- Struck by Motor Vehicle or Loading Device

- Unexpected Movement of Railcars
- Environment
- Drugs and Alcohol
- Miscellaneous

Chapter 4 of the August 2004 Update, entitled *SWITCHING FATALITIES – UNDERSTANDING AND PREVENTION*, provided new material in four areas:

- Close Clearance
- Struck by Mainline Train
- Job Briefing and Mentoring – Operating Recommendations 3 and 5
- Shoving as a Special Switching Hazard.

#### 1.2.6 Close Clearance

The update urged safety committees, engineering departments, and other railroad industry stakeholders to address the following aspects of close clearances.

- Where feasible, re-engineer and/or eliminate close clearances
- Provide safe clearance in future engineering projects
- Mark all permanent close clearance areas with highly visible signs.
- Expand job briefings (Operating Recommendation 3) to include:
  - Emphasis of dangers of equipment left fouling
  - Warnings to other crews when placing oversized cars on tracks adjacent to their work, and
  - Discussion of risks of passing trains when working near mainline

##### 1.2.6.1 Struck by Mainline Train

The update discussed the cases, but noted, “Other than general vigilance, awareness, and alertness to the switching environment, it is difficult to prescribe a preventive measure.”

### 1.2.6.2 Job Briefing and Mentoring

At the time, the SWG expressed concern about further identifying relevant recommendations. The update included more guidance by providing example job briefing instructions from various carriers. Additionally, the update encouraged:

- Training in effective job briefings
- Active communication to encourage mutual understanding
- Safely stopping job activity if work changes occur or a safety concern arises
- Resuming job activity only after a solution is reached and communicated
- Observing the principles of Train Crew Resource Management<sup>2</sup> (CRM).

### 1.2.6.3 Shoving as a Special Switching Hazard

The SWG noted 116 of the 124 fatalities occurred when equipment was moving; 53% involved shoving moves. The update included the following idea, “Wherever feasible, efforts should be made to avoid shove movements especially where light engines are involved. Greater use of procedures such as running around cars and changing ends should be utilized.”

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<sup>2</sup> Appendix I provides material on Train Crew Resource Management.

## **2 SOFA PROCESS**

### **2.1 Introduction**

The current SOFA Working Group (SWG) process followed six essential steps:

1. Case Selection
2. Case Review
3. Classification of Cases
4. Analysis – Searching for Commonalities
5. Identification of Preliminary Findings
6. Development of Findings

### **2.2 Case Selection**

The FRA investigates all on-duty employee fatalities as required by 49 U.S.C. Section 20903. The SWG identified and selected the case file for each fatality that met the SOFA selection criteria. The selection criteria for the new cases in this report are:

All fatalities from 2004 through 2009 involving Train, Yard, and Engine (TY&E) employees who were:

- Fatally injured while on the ground.
- Fatally injured while riding on the outside of train equipment.

During the SOFA process, each member examined the fatality investigation narrative for the selected cases. Supporting documentation was brought to the meetings.

### **2.3 Case Review**

The SWG followed four principle steps in reviewing a case: 1) presentation, 2) recording the facts, 3) discussion, and 4) agreement on possible factors.

#### **2.3.1 Presentation**

The SWG members studied all fatality investigation narratives for the meetings. However, for each case, one member was assigned to lead the review by examining the entire case file<sup>3</sup> and presenting the case to the SWG. The presenter completed a data sheet, which corresponded to the SOFA database<sup>4</sup> fields, consistently documenting case facts. The presenter diagrammed the site of the fatality to show the location of tracks, relevant equipment, employees, and other pertinent elements. After briefly summarizing the case for the SWG, the presenter highlighted relevant supporting documentation not found in the summary narrative and responded to questions.

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<sup>3</sup> A case file may contain witness statements, report of interviews, autopsy and/or medical examiner reports, federal toxicological testing, locomotive event recorder data, incident photographs and diagrams, “cell” phone information, and other documentation substantiating the case narrative.

<sup>4</sup> The SOFA database is discussed below in Section 2.8.

### 2.3.2 Recording the Facts

Using the data sheet prepared by the presenter, the quantitative and narrative case information were entered into the SOFA database during each case presentation. The data included:

- Overview information, such as date, time of incident, location, along with a narrative.
- Background information, such as weather, ground, and lighting conditions.
- Information on the fatally injured employee, such as age and experience.
- Information on the age and experience of involved crew members.
- Information on the movement of equipment and the position and actions of involved employees.

Section 2.8 provides more background on the SOFA database and a list of all data elements used in the SOFA database is provided in Appendix D.

### 2.3.3 Case Discussions

After each case presentation, SWG members discussed facts regarding operating characteristics, conditions, and events that contributed to the group understanding the circumstances of the fatality. Based on personal experience and professional expertise, group members suggested and considered theories and alternative explanations. Through extensive discussion, group members became very familiar with case details. The ultimate goal of the discussion was to agree on factors contributing to the fatality.

### 2.3.4 Agreement on Possible Factors

The SWG conducted intense discussions of each case until there was an agreement on possible factors. The SWG used an approach to define possible factors based on consideration of a complex combination of operating characteristics, conditions, and events. The SWG did not attempt to rank these factors. Instead, it characterized these factors through the use of one or more as *Possible Contributing Factors* (PCFs).

The SWG used the FRA Guide for Preparing Accident/Incident Reports<sup>5</sup> and its own defined codes as the basis for the PCFs. To each case, the SWG assigned as many PCFs as deemed applicable. However, the number of PCFs applied to a case did not exceed a number necessary to capture the essence of the circumstances of the fatality. Appendix E provides a list of the PCFs used by the SWG.

In some cases, there were circumstances that did not rise to the level of a PCF. In these cases, the circumstance was noted as an “External Factor”. Additional information not captured by a PCF or an External Factor was described in the “Other Remarks” section of the database.

## 2.4 Classification of the Cases

After review of all cases, the SWG classified the cases. For this report, the SWG took a different approach than previously used in the October 1999 SOFA Report and the August 2004 SOFA Update.

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<sup>5</sup> Appendix C of FRA Guide for Preparing Accident/Incident Reports (May 1, 2003 edition).

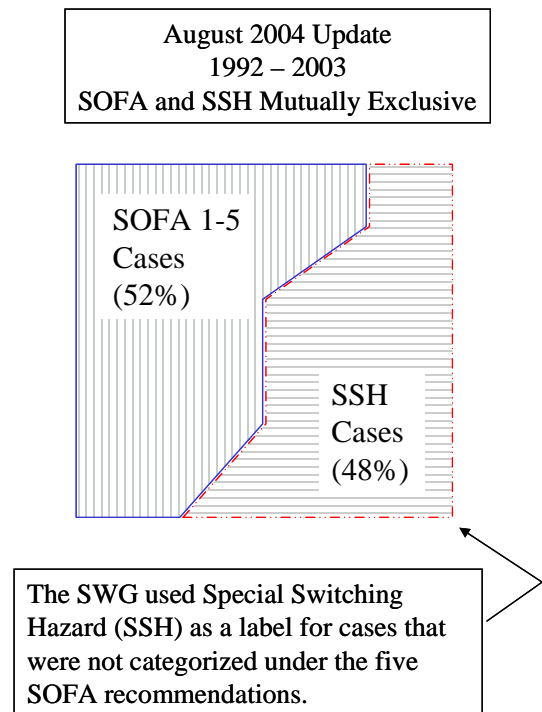
#### 2.4.1 October 1999 SOFA Report

The SWG looked at 76 SOFA fatalities from January 1992-June 1998 and classified them into five different categories corresponding to the Five Operating Recommendations. For this report, we call these SOFA 1-5 cases. For many fatalities, a case qualified for more than one category. If a fatality did not meet the criteria for one of these categories, it remained unclassified.

#### 2.4.2 August 2004 SOFA Update

The SWG looked at 48 SOFA fatalities from July 1998 through December 2003 and again classified them into five different categories corresponding to the Five Operating Recommendations. As with the October 1999 SOFA Report, many fatalities qualified for more than one category. 52% of the cases reviewed since 1992 fit into one or more of the five SOFA categories.

However, the August 2004 Update took SOFA case classification a step further. The SWG wanted a way to characterize the cases which did not meet the criteria for the SOFA 1-5 cases; this amounted to 60 of the 124 cases reviewed (48%). These cases were classified into 11 categories called Special Switching Hazards (SSH). Figure 2-1 illustrates the idea that the two groups, the SOFA 1-5 cases and the SSH cases, were mutually exclusive.



**Figure 2-1 August 2004 Update**

### 2.4.3 December 2010 Update

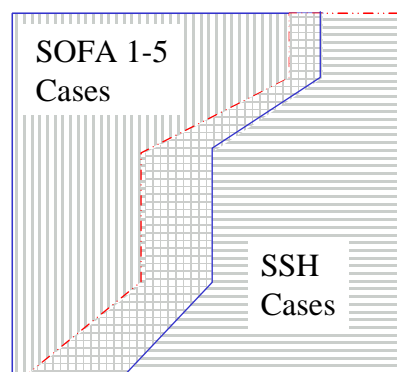
For this update, the SWG determined fatalities which qualified for one or more of the SOFA 1-5 categories could qualify also as an SSH. To be consistent, the SWG retroactively assigned this classification criteria to the 124 cases covered in the previous SOFA reports. This resulted in the 179 cases being classified as SOFA 1-5, SSH, or both.

Figure 2-2 shows the two groups (the five SOFA categories and the SSH) are no longer mutually exclusive and can overlap. In particular, it shows the number of cases categorized as an SSH grows because SOFA 1-5 cases can qualify as SSH.

The SWG made this decision because some of the SSH have emerged as large and growing fatality categories. As an example, Close Clearance is now the second largest SOFA fatality category. This new classification method provided a clear and complete case count for these SSH.

The SWG also expanded the number of SSH to 15 and gave each a shorthand code. These are shown in Table 2-1.

December 2010 Update  
SSH categories applied to all  
cases (SOFA and non-SOFA)



The number of Special Switching Hazards grows.

**Figure 2-2 December 2010 Update**

**Table 2-1: The 15 SSH Classifications Used By the SWG**

SSHCC: Close Clearance.	SSHFR: Free-Rolling Railcars.
SSHDR: Derailment.	SSHIIH: Industrial Hazard.
SSHDA: Drugs and Alcohol.	SSHMC: Miscellaneous.
SSHED: Electronic Device (Cell phone, MP3 player)	SSHST: Struck by Mainline Trains.
SSHET: Employee Tripping, Slipping, or Falling	SSHMV: Struck or struck by Motor Vehicle.
SSHEV: Environment.	SSHUM: Unexpected Movement of Railcars.
SSHEQ: Equipment.	SSHUC: Unsecured Cars.
SSHFC: Failure to Confirm Route of Movement.	

### 2.5 Analysis – Searching for Commonalities

After case classification, the process of discovering ‘commonalities’ began. Commonalities, as used in this report, are shared characteristics among cases that may lead to a common solution. The SOFA database with its search and retrieve abilities allows for rapid queries among the 179 cases. SWG members proposed ideas for SOFA database queries that revealed important commonalities. The SOFA database also produced tables imported into statistical software for further analysis. Commonalities between database elements discovered through this process led to findings.



## 2.6 Identification of Preliminary Findings

The SWG, based on the consensus of its members, developed preliminary findings. At this point, a finding amounted to a simple statement and the supporting analysis. On February 25, 2010, the SWG hosted a SOFA Safety Forum (SSF). The SSF included senior leaders in the railroad industry to participate in the further development of these findings and to increase awareness of the 2010 SOFA Report. Five preliminary findings were discussed at the SSF, and many ideas were generated. The SSF is discussed in Chapter 5 of this report.

## 2.7 Development of Findings

To develop the findings, the SWG discussed the ideas generated from the SSF about a month after it took place. The SWG used various ideas from the SSF and contributed its own thoughts to produce much of the content in Chapter 3. The 2010 SOFA Report reflects SSF attendee comments in the following sections:

- Section 2.9 Assumptions and Limitations (first two paragraphs)
- Section 3.3.4 Discussion For SOFA 3
- Section 3.4.4 Discussion For SOFA 5
- Section 3.5.4 Discussion For Close/No Clearance
- Section 3.6.4 Discussion For Industrial Hazards
- Section 3.7.4 Discussion For Struck by Mainline Train

Each finding in Chapter 3 includes a discussion of issues and remedies, and ends with a conclusion or a SOFA Safety Advisory Statement.

- The finding on SOFA 1, SOFA 2, and SOFA 4 ends with a conclusion. This means the report is evaluating the effectiveness of recommendations from previous reports, and there are no new recommendations or remedies beyond those provided in the 1999 SOFA Report.
- All other findings include a discussion of issues and corresponding remedies. Some of the remedies discussed may be deemed prohibitive to fully implement. Therefore the SWG offers ideas to mitigate these issues. The SWG urges railroads to evaluate further the suitability of remedies for their particular operating environment. A remedy should not be taken as a mandate for changing or writing new rules and is not intended to be exhaustive.
- Some findings end with a SOFA Safety Advisory Statement. These statements highlight remedies that advise an immediate change to a procedure or an action to improve safety.

## 2.8 SOFA Database

To help manage the six steps discussed above, the SWG has improved its data storage and retrieval capability. This capability took the form of a database from which facts and conclusions are retrieved. In many respects, the SOFA database was a focal point for the SOFA process and served several roles:

- Acted as a central place to record the facts and the conclusions for each case.
- Preserved the SWG's institutional knowledge about each fatality.
- Provided a framework for SWG discussions about cases.
- Allowed the SWG to assure data and conclusions were recorded consistently across cases.
- Provided management of a master table of possible factors.
- Allowed quick retrieval and query of information for commonalities and hypothesis testing.
- Facilitated the creation of tables, charts, and graphs important to the SOFA process.

With this report, the software used changed from an Excel® spreadsheet to an Access® database, both Microsoft® products. The software for earlier reports had limitations in terms of retrieving information quickly during analysis and deliberations. This new capability removed these limitations, allowed for greater coding consistency among cases, and improved the SWG's ability to discover commonalities. In essence, the storage of case information changed from a 'flat' file to a relational database, thus providing all the advantages (particularly rapid search capability) of this latter data-storage approach.

The database also improved the ability of the SWG to enhance data integrity. Throughout the study, the SWG looked for inconsistencies in past data and made corrections when needed. This effort to improve data quality will continue.

## 2.9 Assumptions and Limitations

The SWG used FRA fatality investigation case files, which provided the data used in their process. The SWG operates under the assumption that the investigations and associated case folders provide a reasonably complete and accurate account of events. The SWG purpose is to review cases not to reinvestigate cases. In many cases, years have passed since a fatality has occurred. Given this, the SWG does not visit the sites of those fatalities, nor does it typically contact railroad officials or others about these cases. However on occasion, a SWG member may be familiar with a case or have a point of contact that can provide additional insight. In these instances, the SWG avails itself of this information.

The SWG focuses its attention on investigation case files because they provide a wealth of detail from which SWG draws conclusions. Injury reports do not provide the detail needed to consistently evaluate and classify the cases. Basically, injury reports provide information on what happened, but not the circumstances leading up to what happened. For example, it is difficult to look at an injury report and conclude whether an inadequate job briefing played a role in the injury. Despite the limitations in terms of investigative detail, injury reports are still quite useful. They supply a good statistical overview on progress regarding safety in switching

operations. The SWG has used some of this information and provides an analysis of severe injuries in this report.

The findings in this report are limited to fatalities of TY&E employees who were fatally injured while on the ground or while riding on the outside of train equipment. They are based on a set of variables that are prevalent in switching operations. It is inappropriate to apply these results directly to other aspects of the railroad industry without further study. However, other studies may find the ideas and methods in this report are worthy of further investigation. The SWG hopes the report provides insights for future studies of railroad safety in other areas.

### 3 SWITCHING FATALITIES – UNDERSTANDING AND PREVENTION

#### 3.1 Overview

The SOFA Working Group (SWG) has reviewed 179 switching fatality cases from 1992 through 2009, an 18-year period. Figure 3-1 shows a year-by-year graph of those fatalities. There is a line in the middle of Figure 3-1 which divides the graph into two nine-year periods: the period from 1992 through 2000 and the period from 2001 through 2009.

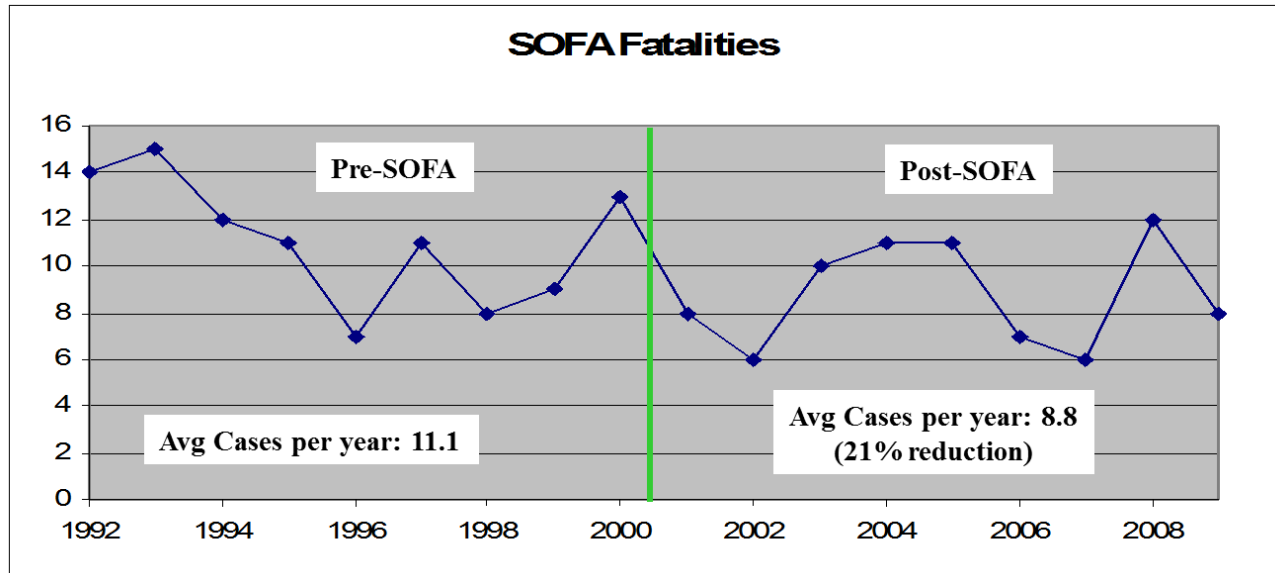
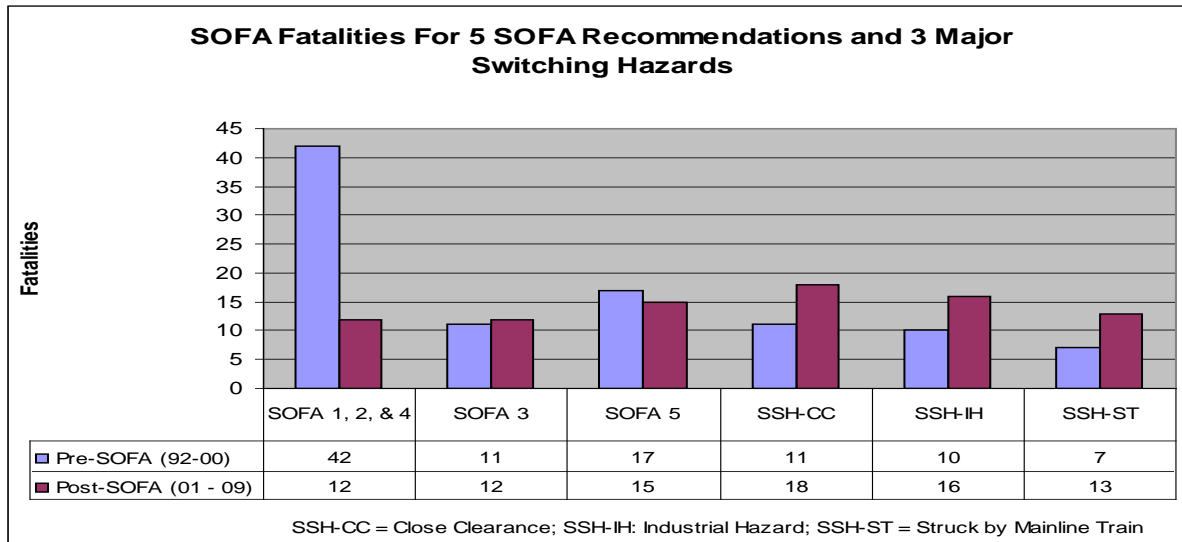


Figure 3-1: SOFA Fatalities by Year

The SWG issued its first SOFA report in October 1999, too late to influence the number of fatalities for 1999. During 2000, the SWG raised SOFA awareness through presentations at railroad industry meetings and forums. Also during 2000, the railroad industry educated its workforce about SOFA and the Five Lifesavers. SOFA efforts had little opportunity to have an effect during this roll-out period in 2000. This means 2001 was the first year that SOFA could have had full effect on reducing fatalities. One way to interpret Figure 3-1 is to regard the first nine-year period (1992 – 2000) as the Pre-SOFA period and the second nine-year period (2001 – 2009) as the Post-SOFA period.

The average number of cases in the Pre-SOFA period is 11.1. During the next 9 years, the Post-SOFA period, the average number of cases dropped to 8.8, about a 21% reduction. Therefore, the railroad industry achieved some success in reducing SOFA fatalities since the first efforts to raise SOFA awareness.

Figure 3-2 is a paired bar chart which provides a picture of where progress has been made in reducing SOFA fatalities and where more attention is needed. The first set of paired bars represents fatalities collectively for SOFA 1, 2, and 4. The reduction from 42 fatalities in the pre-SOFA period to 12 in the Post-SOFA period is a substantial 71% reduction. This substantial reduction runs across the board for SOFA 1, 2, and 4. This report will discuss SOFA 1, 2, and 4 in more detail below.



**Figure 3-2: SOFA Fatalities in Six Areas**

The other five sets of paired bars in Figure 3-2 show areas where improvement can be made by the railroad industry. The paired bars for both SOFA 3 and SOFA 5 show little or no progress and a discussion of those fatalities follows below. There are three SSH that are growing issues.

- Special Switching Hazard Close Clearances (SSH-CC) with 11 fatalities in the Pre-SOFA period versus 18 fatalities in the Post-SOFA period.
- Special Switching Hazard Industrial Hazard (SSH-IH) with 10 fatalities in the Pre-SOFA period versus 16 fatalities in the Post-SOFA period.
- Special Switching Hazard Struck by Mainline Train (SSH-ST) has almost doubled with 7 fatalities in the Pre-SOFA period versus 13 fatalities in the Post-SOFA period.

Table 3-1 shows the six largest SOFA categories. This chapter provides findings on these six SOFA categories. Although SOFA 2, ranking thirteenth, is no longer one of the top 6 SOFA categories, it also is covered in this chapter. Chapter 4 provides more details on all 20 SOFA categories.

**Table 3-1: SOFA Categories with the Most Fatalities**

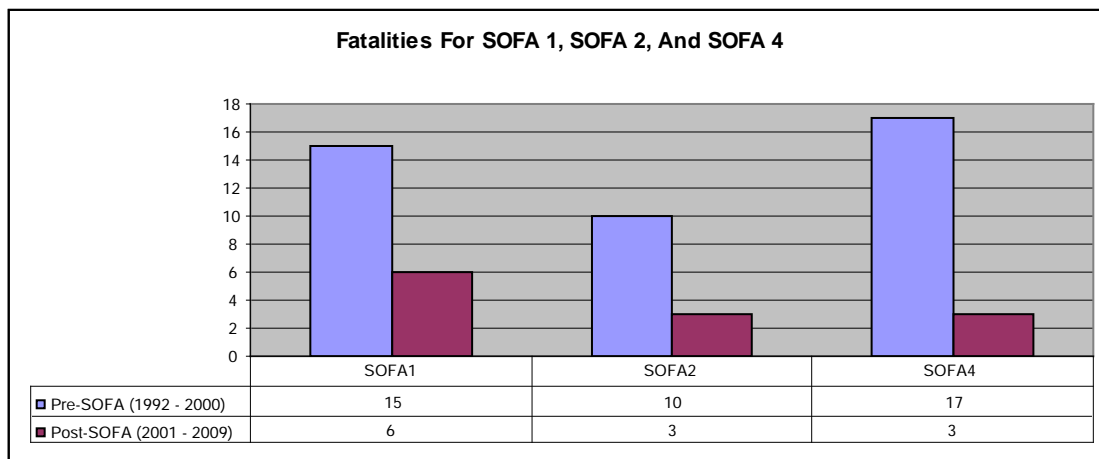
SOFA Classification	Description	Pre-SOFA (1992-2000)	Post-SOFA (2001-2009)	Total
SOFA5 – SA1	FE had 1.5 years of experience or less or had inadequate training.	17	15	32
SSHCC – SA2	Special Switching Hazard: Close Clearance.	11	18	29
SSHIH – SA3	Special Switching Hazard: Industrial Hazard.	10	16	26
SOFA3 – SA4	Lack of or inadequate job safety briefing.	11	12	23
SOFA1	Adjusting knuckles, adjusting drawbars, or installing EOT	15	6	21
SOFA4	Mixing hand and radio signals or specific distances were not given.	17	3	20
SSHST – SA5	Special Switching Hazard: Struck by Mainline Train.	7	13	20

### 3.2 Substantial Progression SOFA 1, 2, and 4

#### 3.2.1 Finding

There has been substantial progress on reducing fatalities related to SOFA 1, 2, and 4 since the SOFA Operating Recommendations were released in the October 1999 SOFA report.

Figure 3-3 shows a paired bar chart displaying the number of SOFA 1, 2, and 4 fatalities over two nine-year periods (Pre-SOFA versus Post-SOFA).



**Figure 3-3: Fatalities for SOFA 1, SOFA 2, and SOFA 4**

The paired bars for each case show an impressive reduction for SOFA 1, 2, and 4. SOFA 1 fatalities are down 60% from 15 fatalities in the Pre-SOFA period to the 6 fatalities in the Post-SOFA period. SOFA 2 fatalities have declined 70% from 10 in the Pre-SOFA period to 3 in the Post SOFA period. There has not been a SOFA 2 fatality since 2004. The biggest improvement is in SOFA 4 where there has been a decline of over 80% from 17 fatalities in the Pre-SOFA period to 3 in the Post-SOFA period.

### 3.2.1.1 Background

### 3.2.1.2 SOFA 1

The October 1999 SOFA report recognized SOFA 1 fatalities as those where the FE<sup>6</sup> was adjusting knuckles, adjusting drawbars, or installing an end-of-train device. To address these fatalities, the SWG developed Operating Recommendation 1:

*Any crew member intending to foul track or equipment must notify the locomotive engineer before such action can take place. The locomotive engineer must then apply locomotive or train brakes, have the reverser centered, and then confirm this action with the individual on the ground. Additionally, any crew member that intends to adjust knuckles/drawbars, or apply or remove EOT device, must insure that the cut of cars to be coupled into is separated by no less than 50 feet. Also, the person on the ground must physically inspect the cut of cars not attached to the locomotive to insure that they are completely stopped and, if necessary, a sufficient number of hand brakes must be applied to insure the cut of cars will not move.*

This recommendation has since been summarized as one of The Five Lifesavers:

*Secure equipment before action is taken.*

### 3.2.1.3 SOFA 2

The October 1999 SOFA report classified SOFA 2 fatalities as those where an FE was struck by equipment other than their own<sup>7</sup>. The report addressed this problem with Operating Recommendation 2:

*When two or more train crews are simultaneously performing work in the same yard or industry tracks, extra precautions must be taken:*

- **SAME TRACK**

*Two or more crews are prohibited from switching into the same track at the same time, without establishing direct communication with all crew members involved.*

- **ADJACENT TRACK**

*Protection must be afforded when there is the possibility of movement on adjacent track(s). Each crew will arrange positive protection for (an) adjacent track(s) through positive communication with yardmaster and/or other crew members.*

This recommendation has since been summarized as one of **The Five Lifesavers**:

*Protect employees against moving equipment.*

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<sup>6</sup> In the October 1999 SOFA Report, FE meant “fatality of an employee.”

<sup>7</sup> SOFA 2 refers to strikes on yard or industry tracks. It does not include FEs who were struck by trains on main track.

#### 3.2.1.4 SOFA 4

The October 1999 SOFA report recognized SOFA 4 fatalities as those where there was a combination of hand and radio signals and/or specific distances were not given during ongoing movement of equipment. To address these fatalities, the SWG created Operating Recommendation 4:

*When using radio communication, locomotive engineers must not begin any shove move without a specified distance from the person controlling the move. Strict compliance with “distance to go” communication must be maintained.*

*When controlling train or engine movements, all crew members must communicate by hand signals or radio signals. A combination of hand and radio signals is prohibited. All crew members must confirm when the mode of communication changes.*

This recommendation has since been summarized as one of **The Five Lifesavers**:

*Communicate before action is taken.*

The August 2004 SOFA Update included updated statistics on SOFA 1, 2, and 4, but did not provide additional guidance. The case numbers for the fatalities involving SOFA 1, 2, and 4 are shown in the Table 3-1 below. Appendix A of this report provides the narratives for these cases.

**Table 3-2: Case Numbers for SOFA 1, 2, and 4**

SOFA1	SOFA2	SOFA4
FE-1992-18	FE-1992-30	FE-1992-03
FE-1994-26	FE-1993-31	FE-1992-08
FE-1994-32	FE-1994-06	FE-1992-14
FE-1995-11	FE-1994-31	FE-1992-22
FE-1995-12	FE-1995-11	FE-1993-26
FE-1995-29	FE-1995-18	FE-1993-30
FE-1996-09	FE-1997-05	FE-1994-29
FE-1996-24	FE-1998-05	FE-1994-31
FE-1997-25	FE-1998-16	FE-1995-09
FE-1998-15	FE-2000-25	FE-1997-04
FE-1998-17	FE-2002-19	FE-1997-16
FE-1999-16	FE-2003-03	FE-1997-45
FE-1999-24	FE-2004-23	FE-1998-37
FE-2000-09		FE-1999-01
FE-2000-21		FE-1999-16
FE-2001-08		FE-2000-22
FE-2002-12		FE-2000-29
FE-2002-16		FE-2002-17
FE-2003-20		FE-2007-18
FE-2004-22		FE-2008-19
FE-2009-14		



### 3.2.2 Discussion

Operating Recommendations 1, 2, and 4 had a structure that highlighted procedural safety rules where compliance with the rules could be monitored. For example, SOFA 1 led to increased compliance with a rule-oriented procedure where employees had to request three-step protection before moving between cars and could not move until hearing “set and centered” as a response. Furthermore, it was possible to monitor compliance with the procedure and take corrective action when the procedure was not followed.

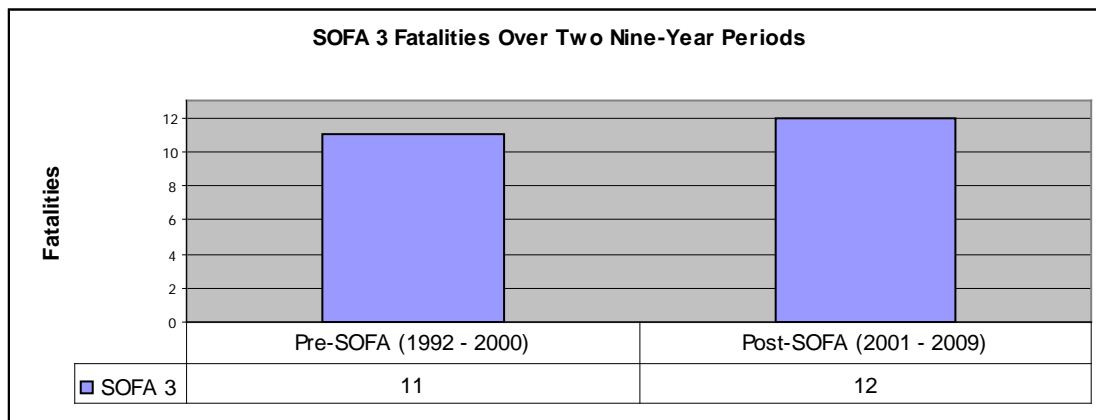
### 3.2.3 Conclusion

The railroad industry achieved a reduction in fatalities in SOFA incident category 1, 2, and 4 by focusing attention on the tasks associated with operating recommendations presented in the 1999 SOFA Report, since known as The Five Lifesavers. Pre-existing rules, in place at the time of the 1999 SOFA Report, enabled the railroad industry to monitor the tasks associated with these operating recommendations.

## 3.3 No Substantial Progress on SOFA 3 (Lack of or inadequate job briefing)

### 3.3.1 Finding

There has been no substantial progress on reducing fatalities related to SOFA 3 incidents since the SOFA Operating Recommendations were released in the 1999 SOFA report. SOFA 3 is the fourth largest category of SOFA fatalities. Figure 3-4 illustrates SOFA 3 fatalities over two nine-year periods (Pre-SOFA versus Post-SOFA) and an increase from 11 to 12 fatalities between the two periods. Appendix G provides a more detailed comparison between the Pre-SOFA and Post-SOFA periods for SOFA 3.



**Figure 3-4: SOFA 3 Fatalities Over Two Nine-Year Periods**

### 3.3.2 Background

The 1999 SOFA Report classified SOFA 3 fatalities as those involving a lack of or inadequate job briefing. The report addressed this problem with Operating Recommendation 3:

*At the beginning of each tour of duty, all crew members will meet and discuss all safety matters and work to be accomplished. Additional briefings will be held any time work changes are made and when necessary to protect their safety during their performance of service.*

This recommendation has since been summarized as one of **The Five Lifesavers**:

*Discuss safety at the beginning of a job or when a project changes.*

The August 2004 SOFA Update included more guidance on job briefings by providing example job briefing instructions from various carriers. Additionally, the update encouraged the following:

- Training in the art of job briefings
- Active communication to encourage mutual understanding
- Safely stopping job activity if work changes occur or a safety concern arises
- Resuming job activity only after a solution is reached and communicated
- Observing the principles of Train Crew Resource Management<sup>8</sup> (CRM).

The case numbers for the fatalities involving SOFA 3 are shown in the Table 3-3 below. Pages 7 - 12 in Appendix A of this report provide the narratives for these cases.

### 3.3.3 Statistical Background

Unlike fatalities for many SOFA categories, fatalities involving SOFA 3 are not concentrated in any one area. These fatalities occur on all types of track and for all movement types<sup>9</sup>. They occur when the FE is riding or on the ground. They occur for experienced and inexperienced employees. In short, a statistical analysis does not allow us to find a remedy by focusing only on a few situations.

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<sup>8</sup> Appendix I provides materials on Train Crew Resource Management.

<sup>9</sup> Push movements, shove movements, and free rolling cars.

**Table 3-3: Twenty-Three Cases of SOFA 3**

Case Number	Incident Date	Railroad	City	State	Job Description	Age
FE-1992-30	24-Jul-92	GBW	Wisconsin	WI	Freight Brakeman/Flagman	34
FE-1993-23	07-Jun-93	IC	Fulton	KY	Yard Brakeman/Helper	49
FE-1993-30	11-Aug-93	SP	Tracy	CA	Freight Brakeman/Flagman	47
FE-1993-47	13-Nov-93	GC	Macon	GA	Yard Conductor/Foreman	47
FE-1993-49	05-Dec-93	SOU	Atlanta	GA	Freight Conductor	59
FE-1994-29	15-Nov-94	CR	Painted Post	NY	Freight Brakeman/Flagman	57
FE-1995-09	17-Feb-95	CR	St. James	OH	Conductor	48
FE-1995-12	02-Mar-95	NS	Aiken	SC	Brakeman	46
FE-1999-01	12-Jan-99	CR	Port Newark	NJ	Conductor	54
FE-1999-11	02-Apr-99	DME	Waseca	MN	Brakeman	54
FE-2000-30	15-Oct-00	UP	Houston	TX	Fireman	47
FE-2001-03	11-Jan-01	NS	South Fork	PA	Engineer	52
FE-2002-16	16-Jun-02	BNSF	Memphis	TN	Engine Foreman	20
FE-2003-11	11-Apr-03	UP	Pocatello	ID	Conductor	55
FE-2004-26	07-Oct-04	BNSF	Teague	TX	Yard brakeman	60
FE-2004-28	01-Nov-04	BNSF	Bowdoin	MT	Conductor	45
FE-2004-30	17-Dec-04	BNSF	Radium	CO	Conductor	44
FE-2005-14	11-Apr-05	UP	Ogden	UT	Switchman	38
FE-2005-33	16-Nov-05	CSX	Lugoff	SC	Conductor	48
FE-2007-19	30-Aug-07	BNSF	Stockton	CA	RCL Operator	50
FE-2008-33	23-Sep-08	CSX	Darby	PA	Freight Conductor	46
FE-2008-37	15-Nov-08	MRL	Laurel	MT	Yard Brakeman	39
FE-2009-03	16-Jan-09	BNSF	Fort Sumner	NM	Freight Engineer,	59

### 3.3.4 Discussion

In a previous SOFA report, the SOFA working group used the term “job” and the phrase “work changes.” Since there has been no substantial progress on reducing SOFA 3 fatalities since the 1999 SOFA report, the SWG decided it would be helpful to define job and work changes. The SWG defines job as a set of interrelated and interdependent tasks. The phrase “work changes” is defined as a deviation or alteration of any task. Each crew member should consider the following five questions for each task or when the work changes from a previous job briefing:

- Who – Identify the person who will act
- What – Identify what act is about to be done
- Where – Identify where the action will occur
- When – Identify when the action occurs
- Why – Identify why the act is being done.

We believe these five questions are the foundation of an initial job briefing, and for subsequent job briefings, when applied to each task comprising the larger job at hand. Further, these five questions can be applied to any task, and a successful job briefing can be maintained. Some railroads successful in preventing fatalities related to job briefings attribute this to a continuous updating of the job status among all crew members.

In several cases where fatalities occurred, for instance in Struck by Mainline Trains, one or more of the five questions were known to each member of the affected crew. However, one or more of the questions, such as “When”, were not discussed or answered before action was initiated, resulting in a fatality.

The issues with job briefings were discussed thoroughly at the SOFA Safety Forum (SSF) and during SWG meetings. The following are issues and remedies for the railroad industry to consider.

#### 3.3.4.1 *Issue:* Unexpected Change in Circumstances

When an unexpected change in circumstances, such as a failure to couple, occurs, a departure from the original job briefing may happen without an updated job briefing. During the post-SOFA era, there were seven SOFA 3 fatalities in yards and industrial properties; five of these (FE-2002-16, FE-2005-14, FE-2005-33, FE-2007-19, and FE-2008-37) occurred when a change or anomaly occurred from the original job briefing. Case FE-2005-33 in Lugoff, SC is an instructive example:

*A three person crew shoving into an industry track found cars left foul of an adjacent track by industry employees. The conductor held a job briefing with the brakeman on the moves to be made, and the brakeman understood he would control the switching and car movements. After shoving the cars to make the coupling, the conductor told the brakeman the cars were coupled and he was in the clear. The brakeman attempted to uncouple from the cars, but failed. He then requested the engineer make a second move to create slack between the cars so they could be uncoupled. The engineer complied and the conductor who was in the foul of track and equipment suffered fatal injuries.*

**Remedy:** Management and employees must encourage all to remain vigilant for changes in or anomalies affecting the job tasks. Remind all crew members of the necessity to stop a job and request an update to the original job briefing when circumstances change<sup>10</sup>.

#### 3.3.4.2 *Issue:* Measuring the Effectiveness of the Application of Operating Recommendation 3

It is challenging to measure the effectiveness of the application of Operating Recommendation 3 (i.e., job briefing). Crafting an effective behavioral rule, practice, or procedure that can be assessed for compliance is difficult and suggests the railroad industry needs to go beyond the “rulebook” approach. The railroad industry and its employees should identify additional methods to make job briefings more effective.

**Remedy:** Adopt and/or reinforce training programs, such as Train Crew Resource Management<sup>11</sup> (CRM), that promote improved interpersonal communication, situational awareness, problem solving, decision making and teamwork, and provide strategies for appropriately challenging and questioning authority when safety could be jeopardized. The railroad industry should reemphasize the importance of job briefings and procedures for effective intra-crew communication, which has the potential to make a major contribution to switching operations safety. The railroad industry must continue to develop programs that provide a team-based framework for evaluating conditions, applying rules, and performing work tasks safely.

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<sup>10</sup> See Section 7.2 for the SWG position on empowerment and discipline.

<sup>11</sup> Appendix I provides materials on Train Crew Resource Management.

### 3.3.5 Briefings – Job or Safety (SOFA 3) – SOFA Safety Advisory Statement 2010

The SWG believes ongoing communication is crucial among employees during the entire time switching operations are being performed, including periods when tasks are changing or when anomalies occur. A job briefing is a two-way exchange of information to reach an understanding of the tasks being performed.

Despite considerable efforts within the railroad industry, more than half of SOFA 3 fatalities in yards and industrial properties occurred when a job task changed and an update to the job briefing did not occur. The SWG believes more progress can be made in the area of work changes. When work changes occur, the employees involved may not maintain currency with these changes; thus, they may be unaware of the tasks to be performed, and this may place them in peril. The railroad industry must remain vigilant regarding fatalities, and when work changes occur, employees must regroup, take appropriate steps to provide protection, and not proceed until an update to the job briefing is done<sup>12</sup>.

### 3.4 Little Progress on SOFA 5 (Employees with 1.5 Years of Experience)

#### 3.4.1 Finding

There has been little progress on reducing fatalities for SOFA 5 incidents since the SOFA Operating Recommendations were released in the first SOFA report in October 1999. With 32 cases, SOFA 5 is the largest category of SOFA fatalities. Figure 3-5 shows a bar chart displaying the number of SOFA 5 fatalities over two nine-year periods (Pre-SOFA versus Post SOFA). It shows little progress has been made on reducing SOFA 5 fatalities between the two nine-year periods.

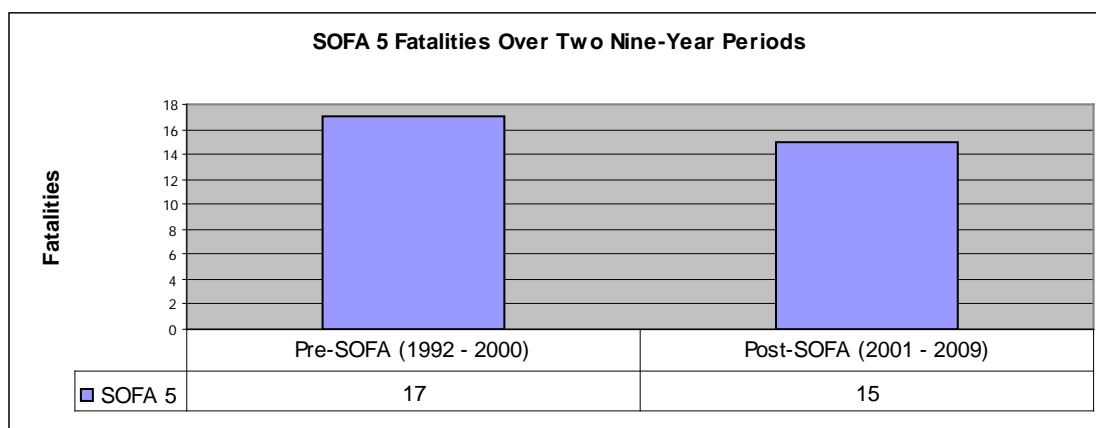


Figure 3-5: SOFA 5 Fatalities Over Two Nine-Year Periods

<sup>12</sup> See Section 7.2 for the SWG position on empowerment and discipline.

### 3.4.2 Background

While working on the first SOFA report in October 1999, the SWG was concerned with the number of inexperienced employees<sup>13</sup> who were fatally injured during switching operations and developed Operating Recommendation 5. Since the 2004 report, the SWG has used 1.5 years as the criteria for identifying SOFA 5 cases.

The 1999 report addressed the issue of inexperienced employees by creating Operating Recommendation 5:

*Crew members with less than one year of service must have special attention paid to safety awareness, service qualifications, on-the-job training, physical plant familiarity, and overall ability to perform service safely and efficiently. Programs such as peer review, mentoring, and supervisory observation must be utilized to insure employees are able to perform service in a safe manner.*

This recommendation has since been summarized as one of **The Five Lifesavers**:

*Mentor less-experienced employees to perform service safely.*

The SOFA update of August 2004 urged the railroad industry to include the principles of CRM<sup>14</sup> in their training programs to help reduce fatalities to inexperienced employees.

The cases fatalities involving SOFA 5 are shown in the Table 3-4 below. Pages 16 – 22 in Appendix A of this report provide the narratives for these cases.

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<sup>13</sup> The criteria used in the October 1999 report for identifying SOFA 5 cases were fatalities involving employees with 1 year or less craft experience. However, another FE with 1.5 years of craft experience was included in the SOFA 5 cases because he had a record of interrupted service, and hence, was still an inexperienced employee in the judgment of the SWG. SWG believes that an employee who has a limited familiarity of the physical work environment or has not been at a location for an extended period may be an “inexperienced employee”.

<sup>14</sup> Appendix I provides materials on Train Crew Resource Management.

**Table 3-4: 32 SOFA 5 Cases**

<i>Case Number</i>	<i>Incident Date</i>	<i>Railroad</i>	<i>City</i>	<i>State</i>	<i>Job Description</i>	<i>Age</i>
FE-1992-04	30-Jan-92	AGC	Polk County	FL	Yard Brakeman/Helper	32
FE-1992-16	02-Jun-92	IHRC	Henderson	KY	Freight Conductor	52
FE-1993-40	19-Oct-93	SOO	Leal	ND	Freight Brakeman/Flagman	43
FE-1993-47	13-Nov-93	GC	Macon	GA	Yard Conductor/Foreman	47
FE-1994-28	10-Nov-94	PTRA	Houston	TX	Yard Brakeman/Helper	31
FE-1994-31	06-Dec-94	CR	Campbell Hall	NY	Brakeman Trainee	28
FE-1995-29	04-Oct-95	CSXT	Riverdale	IL	Conductor	39
FE-1996-09	20-Mar-96	BRC	Bedford Park	IL	Conductor	28
FE-1996-12	15-Jun-96	CSX	Charlotte	NC	Switchman	36
FE-1996-17	07-Jul-96	NS	Sidney	IN	Conductor	29
FE-1996-22	03-Sep-96	DGNO	Dallas	TX	Brakeman	43
FE-1996-24	07-Oct-96	UP	Eagle Pass	TX	Engine Foreman	35
FE-1997-32	16-Oct-97	MRL	Laurel	MT	Switchman	22
FE-1998-16	01-Jun-98	BNSF	Lubbock	TX	Yard Conductor/Foreman	24
FE-1999-03	22-Jan-99	CR	Alexandria	NY	Conductor	45
FE-1999-14	19-May-99	NS	Cincinnati	OH	Conductor	36
FE-1999-24	14-Sep-99	AM	Van Buren	AR	Conductor	47
FE-2001-02	10-Jan-01	CSX	Chicago	IL	Conductor	42
FE-2002-16	16-Jun-02	BNSF	Memphis	TN	Engine Foreman	20
FE-2003-22	12-Sep-03	GC	Dublin	GA	Brakeman	45
FE-2004-20	02-Sep-04	BNSF	Clovis	NM	RCL Operator	26
FE-2004-25	07-Oct-04	UP	Springfield	IL	Student brakeman	31
FE-2004-28	01-Nov-04	BNSF	Bowdoin	MT	Conductor	45
FE-2005-14	11-Apr-05	UP	Ogden	UT	Switchman	38
FE-2005-18	13-May-05	DC	Detroit	MI	Yard Conductor	24
FE-2005-23	05-Jul-05	BNSF	Emporia	KS	Yard Helper	27
FE-2005-25	22-Jul-05	ATN	Ragland	AL	Brakeman	56
FE-2005-36	04-Dec-05	BNSF	Burlington	IA	Brakeman	34
FE-2006-14	10-Sep-06	ALS	East St. Louis	IL	Conductor	44
FE-2007-21	27-Oct-07	CSX	Russell	KY	Yard Foreman	52
FE-2008-15	26-May-08	CSX	Lumberton	NC	Freight Conductor	46
FE-2008-37	15-Nov-08	MRL	Laurel	MT	Yard Brakeman	39

### 3.4.3 Statistical Background

Table 3-5 shows fourteen SOFA 5 cases involved shove moves. Seven of these (50%) involved a failure to control the shove. This percentage is more than twice that of non-SOFA 5 cases involving shove moves (20%)<sup>15</sup>.

**Table 3-5: SOFA 5 Cases Involving a Shove Move – All Railroads Failure to Control the Shove**

	SOFA 5 Cases	Non-SOFA 5 Cases
<b>Cases with failure to control shove (24)</b>	7	17
<b>Total cases involving shoves (100)</b>	14	86
<b>Percentage for failure to control shove</b>	50%	20%

There is another notable statistic to keep in mind. Table 3-6 shows SOFA cases where there was a surviving crew member who also had 1.5 years of experience or less. The table shows 14 of the 32 SOFA 5 cases (44%) involved an inexperienced surviving crew member. The data suggests that a train crew with multiple inexperienced crew members faces an increased risk of a fatality.

**Table 3-6 Surviving Inexperienced Crew Member**

	SOFA 5 Cases	Non-SOFA 5 Cases
<b>Cases with surviving inexperienced employee on the FE's crew (31)</b>	14	17
<b>Total cases (179)</b>	32	147
<b>Percentage for surviving inexperienced employee</b>	44%	12%

Table 3-7 shows 12 of the 32 SOFA 5 cases (38%) involved a regional or short line railroad. This is more than twice the percentage of non-SOFA 5 cases (18%). Table 3-8 shows 20 of the 120 SOFA 5 cases (62%) involved a Class I railroad.

**Table 3-7: SOFA 5 Cases - Regional and Short Line Railroads**

	SOFA 5 Cases	Non-SOFA 5 Cases
<b>Cases with regional/short line RRs (39)</b>	12	27
<b>Total cases (179)</b>	32	147
<b>Percentage for regional/short line RRs</b>	37.5%	18.5%

**Table 3-8: SOFA 5 Cases – Class I Railroads**

	SOFA 5 Cases	Non-SOFA 5 Cases
<b>Cases Class I RRs (140)</b>	20	120
<b>Total cases (179)</b>	32	147
<b>Percentage for Class I RRs</b>	62.5%	81.5%

<sup>15</sup> Out of the 179 SOFA cases, 100 cases involved shove moves.



#### 3.4.3.1 Discussion

The issues with inexperienced employees were discussed thoroughly at the SOFA Safety Forum (SSF) and during SWG meetings. The following are issues and remedies for the railroad industry to consider.

#### 3.4.3.2 **Issue:** Possible Imbalance Between Classroom Training and OJT

There may not be an effective balance of classroom training and On-The-Job-Training (OJT) within the railroad industry. Although necessary, classroom rules training alone is not enough. OJT training may need to be reviewed to allow those with less than 1.5 years of experience more time to gain familiarity with the demands of the job. As an example, inexperienced employees shown in Table 3-3 above were fatally injured when they failed to control a shove movement.

Remedy: Review OJT programs. A well designed OJT program should make sure the inexperienced employee receives adequate training. Following the period of OJT, identify the areas of inadequacies of the inexperienced employee's skills to provide targeted training that will allow the employee to meet the demands of the job. Smaller railroads in particular may benefit from a review of their OJT and improved follow-up with inexperienced employees.

#### 3.4.3.3 **Issue:** Finding Enough Experienced Employees to Mentor New Employees

Mentoring was a method suggested in the 1999 SOFA report to acclimate the new hire employee to the railroad environment and its dangers. As the rate of attrition grows and the number of new hires increases, it can be a challenge to find those who can or will work with the new hire employee as a mentor. Changes in crew size, sometimes through introduction of new technologies, have made mentoring more challenging.

Inexperienced employees may face the possibility of a different mentor each day or, find themselves without a "mentor" who is willing or capable. Even if good mentors can be found, inexperienced employees may believe they already know correct procedures, tuning out their mentors at critical moments.

Remedy: Set criteria for good mentors, recruit them, and ensure inexperienced employees have a good mentor on the crew. Emphasize personal accountability to the new hire. The inexperienced employee should respect the mentoring process that equates to good listening and a willingness to apply the safe practices that are taught.

#### 3.4.3.4 **Issue:** Risk of Fatality Increased When Crews Have More Than One Inexperienced Employee

The risk of a fatality occurring is compounded when there is more than one inexperienced employee on the crew (See Table 3-4). The inexperienced employee may face difficulties in performing at an effective level because of the relative short period of time spent in the craft or because of the amount of time spent in training. Having multiple inexperienced employees on the same crew possibly creates an excessive burden on each crew member.

Remedy: Avoid making up crews with more than one inexperienced employee. When inexperienced employees are working, an effort should be made not to place multiple employees with less than 1.5 years of experience on the same crew. If this is not possible, local management should be notified immediately of the crew make up.

### 3.4.3.5 **Issue:** Productivity Expectations From Management and Crew May Not Change

Productivity expectations from management and crew may not change when an inexperienced crew member is present. An inexperienced employee may feel pressured to proceed with a task even when he or she is uncertain about the situation.

Remedy: The railroad industry has an obligation to ensure inexperienced employees understand their safety is far more important than productivity. Accordingly, the railroad industry needs to adjust productivity expectations while inexperienced employees gain competency.

### 3.4.3.6 **Issue:** Measuring the Effectiveness of the Application of Operating Recommendation 5

It is challenging to measure the effectiveness of the application of Operating Recommendation 5 (i.e., Inexperienced Employee). Crafting an effective behavioral rule, practice, or procedure that can be assessed for compliance is difficult and suggests the railroad industry needs to go beyond the traditional, “rulebook” approach.

Remedy: The railroad industry should identify additional methods to make education, training, and mentoring of inexperienced employees more effective, including a method to provide feedback on what approaches and techniques work well.

## 3.4.4 **Inexperienced Employee (SOFA 5) – SOFA Safety Advisory Statement 2010**

Since the 1999 Report, the SWG emphasis on mentoring has not achieved a substantial reduction in SOFA 5 fatalities. It is critical for the railroad industry to provide the inexperienced employee adequate OJT. Without abandoning the commitment to mentoring, the railroad industry should improve OJT to include targeted training for the inexperienced employee. Providing follow-up review of skills, and targeted training by the railroad industry enables an inexperienced employee to meet the demands of the job. Smaller railroads in particular may benefit from a review of their OJT, and improved follow-up with inexperienced employees.

## 3.5 Close/No Clearance – A Growing Issue

### 3.5.1 Finding

Fatalities due to close or no clearances are a growing issue.

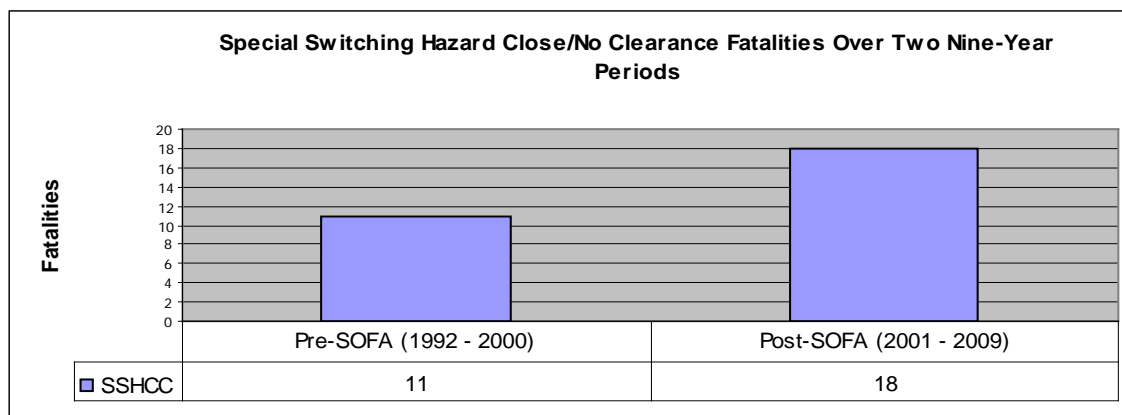


Figure 3-6: SSH Close/No Clearance Fatalities Over Two Nine-Year Periods

Close/No clearance is the second largest category of SOFA fatalities. Figure 3-6 displays the number of close/no clearance fatalities over two nine-year periods, pre-SOFA versus post-SOFA. It shows fatalities due to close/no clearances are a growing issue and could imply the guidance provided in the August 2004 SOFA Update (See Section 3.5.2 immediately below) has had little or no effect.<sup>16</sup>

### 3.5.2 Background

In the August 2004 SOFA Update, the SWG addressed close clearances in a chapter entitled *SWITCHING FATALITIES – UNDERSTANDING AND PREVENTION*. This chapter provided the SWG’s definition of close clearance and urged safety committees, engineering departments, and other railroad industry stakeholders to address all aspects of close clearances including:

- Re-engineer and/or eliminate close clearances, where feasible
- Provide safe clearance in future engineering projects
- Mark all permanent close clearance areas with highly visible signs
- Expand job briefings (Operating Recommendation 3) to include:
  - Emphasis of dangers of equipment left fouling
  - Warnings to other crews when placing oversized cars on tracks adjacent to their work
  - Discussions of risks of passing trains when working near mainline

The cases for fatalities involving close/no clearance are shown in the Table 3-7 on the next page. Pages 22-28 in Appendix A of this report provide the narratives for these cases.

### 3.5.3 Definitions

Terminology can be problematic when discussing close/no clearance situations. The SWG defined the following terms in creating this 2010 report. These definitions arose from the analysis of the 179 cases from 1992-2010.

No Clearance: Insufficient space for the employee to avoid being struck if passing or being passed by an object, structure, or equipment.

*Example - FE-2000-23: A three person local switching crew was in the process of setting cars into a track within an industry. The switchman was riding the side ladder of the leading end of the leading car as it went into the building. The doorway would not clear a man riding on the side of the car and the trainman was fatally injured as he was compressed between it and the car he was riding.*

Close Clearance: Insufficient space for the employee to take evasive action to avoid being struck by moving equipment that derails into an object, structure, or other equipment.

*Example - FE-2009-26: A two-person RCL crew shoved five empty cars into a snow-covered industry track. Ice build-up on the track caused the lead car of the movement to derail. The RCL*

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<sup>16</sup> Some growth is due to the increased number of cases in which the FE also was struck by a mainline train: Zero cases in the pre-SOFA years versus four cases in the post-SOFA years. If the four cases in which the FE was struck by a mainline train are removed, there is still growth from the pre-SOFA years to the post-SOFA years.

*operator, riding the lead car and controlling the move, was crushed against the side of an industry building and fatally injured.*

**Permanent Close/No Clearance:** A fixed structure that remains in the same location from day to day, such as a building, loading dock, fence, post, beam, or other permanent structure, that an employee passes.

*Example – FE-1996-12: Yard crew, engineer, conductor and switchman, switching at an industry. While crew was shoving two cars to a spot inside an industry building, FE (switchman) was rolled between lead box car and unloading platform. Platform or building was not marked with any type of ‘no-clearance’ or ‘close clearance’ signage.*

**Temporary Close/No Clearance:** A movable object, including equipment on or near one track fouling another track, rolling stock on an adjacent track, stacks of cross ties, construction materials, and doors or gates left open, that passes by an employee or an employee passes.

*Example – FE-2006-26: A three person switching crew working with a student switchman began switching following a safety briefing. Two rail cars kicked toward a track stalled foul of the clearance point on the adjacent track. The next car switched was rolling free when the footboard yardmaster/switch foreman and student switchman saw that the cars were fouling the clearance point. The footboard yardmaster/switch foreman in an attempt to board and stop the free rolling car became trapped between the sides of the cars and carried for a distance between the cars.*

Table 3-10 provides a breakout by type of clearance and track for the 29 cases. It suggests the mix of close/no clearance hazards encountered by employees is different on industry track versus other track.

**Table 3-9: 29 Cases Involving Close/No Clearance**

Case Number	Incident Date	Railroad	City	State	Job Description	Age
FE-1993-27	04-Aug-93	UP	Pryor	OK	Freight Brakeman/Flagman	42
FE-1994-06	20-Jan-94	UP	Fall City	NE	Freight Conductor	44
FE-1994-12	12-Apr-94	SP	Houston	TX	Yard Conductor/Foreman	62
FE-1995-33	11-Dec-95	NS	Toledo	OH	Brakeman	53
FE-1995-34	14-Dec-95	CSXT	Monroe	NC	Conductor	54
FE-1996-12	15-Jun-96	CSX	Charlotte	NC	Switchman	36
FE-1998-05	04-Feb-98	BRC	Bedford Park	IL	Yard Conductor/Foreman	42
FE-1998-19	01-Jul-98	NS	Buechel	KY	Utility Employee	54
FE-2000-16	22-May-00	CSX	Richmond	VA	Brakeman	38
FE-2000-23	28-Jul-00	UP	St. Louis	MO	Switchman	48
FE-2000-30	15-Oct-00	UP	Houston	TX	Fireman	47
FE-2001-31	10-Oct-01	PAL	Clayburn	KY	Conductor	38
FE-2001-40	24-Dec-01	NS	Lynchburg	VA	Conductor	30
FE-2002-09	21-Mar-02	NS	Claymont	DE	Engineer	45
FE-2002-19	08-Aug-02	CWRO	Cleveland	OH	Switchman	53
FE-2005-18	13-May-05	DC	Detroit	MI	Yard Conductor	24
FE-2005-25	22-Jul-05	ATN	Ragland	AL	Brakeman	56
FE-2005-27	09-Aug-05	AM	Rogers	AR	Conductor	23
FE-2005-36	04-Dec-05	BNSF	Burlington	IA	Brakeman	34
FE-2006-14	10-Sep-06	ALS	East St. Louis	IL	Conductor	44
FE-2006-26	28-Dec-06	UP	Sioux City	IA	Yard Foreman	57
FE-2008-06	05-Mar-08	WSOR	Random Lake	WI	Freight Conductor	55
FE-2008-15	26-May-08	CSX	Lumberton	NC	Freight Conductor	46
FE-2008-31	10-Sep-08	INRD	Terre Haute	IN	Freight Conductor	42
FE-2008-33	23-Sep-08	CSX	Darby	PA	Freight Conductor	46
FE-2009-06	28-Jan-09	UP	Council Bluffs	IA	Yard Foreman	41
FE-2009-11	28-Feb-09	BNSF	Buchanan	NM	Freight Conductor	56
FE-2009-20	24-Jun-09	ATN	Albertville	AL	Freight Conductor	33
FE-2009-26	29-Dec-09	BNSF	Minneapolis	MN	RCL Operator	44

**Table 3-10: Type of Clearance and Track**

	Permanent	Temporary	Total
Industry Track	10	4	14
Other Track	4	11	15
<b>Total</b>	14	15	29

### 3.5.4 Statistical Background

Table 3-11 shows 14 of the 29 close/no clearance fatality cases (48%) occurred on industry track. This is more than twice the percentage of other, non-Close/No Clearance cases (20%).

**Table 3-11: Close/No Clearance Industry Track Cases**

	Close/No Clearance Cases	Non-Close/No Clearance Cases
Cases on industry track (44)	14	30
<b>Total cases (179)</b>	29	150
<b>Percentage for industry track</b>	48%	20%

Table 3-12 shows 7 of the 29 close/no clearance fatality cases (24%) involved derailments. This percentage is three times more than other, non-Close/No Clearance cases (7%). All seven derailments for close/no clearance cases occurred on industry track.

**Table 3-12: Close/No Clearance Derailment Cases**

	Close/No Clearance Cases	Non-Close/No Clearance Cases
Cases with derailments (17)	7	30
<b>Total cases (179)</b>	29	150
<b>Percentage for derailments</b>	24%	7%

### 3.5.5 Discussion

The issues with close/no clearance were discussed thoroughly at the SSF and during SWG meetings. Many permanent close/no clearance structures have existed in the industry before standards, of any kind, were established. The following are issues, remedies, and possible mitigations for the railroad industry to consider.

#### 3.5.5.1 *Issue:* Removal of Close/No Clearance Conditions

Removal of close/no clearance conditions in some instances is deemed cost-prohibitive.

Remedy: Eliminate close/no clearance conditions, and provide safe clearance in future engineering projects.

Mitigation(s): Improve signage to be standardized and instructional. Inadequate signage issues typically can be addressed at a lower cost, including maintenance, than other engineering remedies. In addition, increase illumination and/or lighting at night.

#### 3.5.5.2 *Issue:* Employee Unfamiliar with Close/No Clearance Hazards

Sometimes an employee is unfamiliar with the close/no clearance hazards on railroad and/or industrial properties.

Remedy: Prepare employees to identify and avoid close/no clearances. Examples include the following:

- Provide job aids, such as maps that highlight close/no clearances.
- Discuss the location and potential for close/no clearances in job briefings.
- Assist employees with little or no familiarity with the physical characteristics at that location, such as working with a person familiar with that location.
- Encourage employees to inspect the work site before acting.
- Report close/no clearance issues (e.g., no signage, temporary obstruction) through established procedures. Responsible parties must follow up on these reports, ensure the workforce is notified, and take corrective action.
- Share near-miss and close-call experiences with employees.

#### 3.5.5.3 *Issue:* Practices for Handling Close/No Clearances are Inconsistent

Practices for handling close/no clearances are inconsistent across the railroad industry or within a particular property. An employee can be uncertain of when one should inspect the work site, when to walk instead of ride, or which side of the car to ride. Even when standards exist, some employees deviate from best practices for years without consequences; deviation from best practice can become the norm.

Remedy: Establish standards on how employees should handle close/no clearance situations so they know when to walk or when and where to ride. The concepts behind “defensive switching” come into play here, including the following:

- Look for hazards
- Ride the side away from hazards
- Plan for the worst case scenario, such as a derailment, and prepare an escape strategy
- Maintain focus and avoid distractions, such as holding unnecessary conversations, doing paperwork, or using cell phones

#### **3.5.6 Close Clearances – SOFA Safety Advisory Statement 2010**

The SWG reemphasizes that removing the hazard is the best way to address close/no clearances. Yet, in many cases a railroad or industry will not be able to eliminate the close/no clearance condition. At the minimum, the SWG believes that proper signage should be implemented and be instructive to the employee. Additionally, the sign should be an appropriate<sup>17</sup> distance from the close/no clearance location and on the same side. Signage must: (a) announce the clearance issue and (b) instruct the employee who is controlling the movement to dismount and remain dismounted from the equipment while passing the close/no

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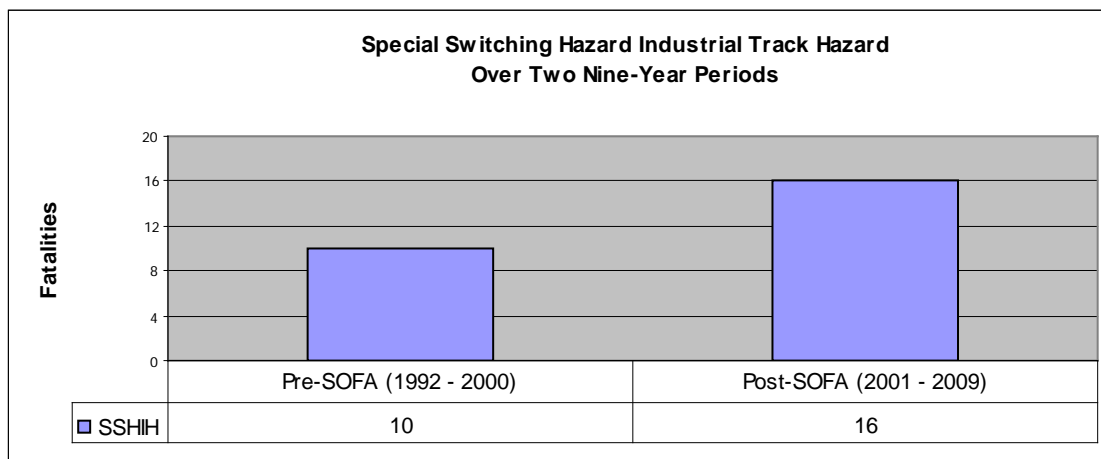
<sup>17</sup> The use of the term “appropriate” is intended to address the possibility that the sign may be posted too close or too far from the hazard. Too much distance may contribute to the employee forgetting the warning.

clearance location. One method to determine the signage design, appropriate distance, and position may be to organize a management-labor working group.

### 3.6 Industrial Track Hazard – A Growing Issue

#### 3.6.1 Finding

Industrial Track Hazard is the third largest category of SOFA fatalities. Figure 3-7 shows a bar chart displaying the number of fatalities involving industrial track hazards over two nine-year periods (Pre-SOFA versus Post SOFA). It shows fatalities involving industrial track hazards are a growing issue.



**Figure 3-7: Special Switching Hazard Industrial Track Hazard Over Two Nine-Year Periods**

#### 3.6.2 Background

Industrial Track Hazard is a new category of SOFA fatality and has not been used in previous SOFA reports. Industrial Track Hazards include cases where a structure, vehicle, or temporary obstruction on industrial track played a significant role in 26 SOFA fatalities. It can include cases where the action of industrial plant employees played a role. Not all fatalities on industrial track qualify for this category. There are many cases where the actions of the train crew entirely account for the PCFs cited for a case. For example, a case where the crew failed to follow proper radio protocol would be categorized as a SOFA 4<sup>18</sup> case, not an Industrial Track Hazard case even though it may occur on industrial track. Using the criteria discussed above, 26 of the 44 fatalities which occurred in industrial track qualified as cases involving an industrial track hazard.

<sup>18</sup> SOFA 4 Criteria: Move controlled by a combination of hand and radio signals or specific distances were not given.



The cases for the fatalities involving industrial track hazards are shown in the Table 3-13 below. Pages 47 – 52 in Appendix A of this report provide the narratives for these cases.

**Table 3-13: 26 Cases Involving Industrial Track Hazards**

Case Number	Incident Date	Railroad	City	State	Job Description	Age
FE-1992-33	15-Oct-92	BN	Omaha	NE	Yard Brakeman/Helper	32
FE-1993-27	04-Aug-93	UP	Pryor	OK	Freight Brakeman/Flagman	42
FE-1993-30	11-Aug-93	SP	Tracy	CA	Freight Brakeman/Flagman	47
FE-1993-53	30-Dec-93	CR	Brook Park	OH	Yard Conductor/Foreman	61
FE-1994-28	10-Nov-94	PTRA	Houston	TX	Yard Brakeman/Helper	31
FE-1995-33	11-Dec-95	NS	Toledo	OH	Brakeman	53
FE-1996-12	15-Jun-96	CSX	Charlotte	NC	Switchman	36
FE-1998-19	01-Jul-98	NS	Buechel	KY	Utility Employee	54
FE-2000-16	22-May-00	CSX	Richmond	VA	Brakeman	38
FE-2000-23	28-Jul-00	UP	St. Louis	MO	Switchman	48
FE-2003-12	06-Jun-03	CSXT	Kingsport	TN	Brakeman	35
FE-2004-14	18-May-04	NS	Elwood	IN	Freight Brakeman	35
FE-2005-18	13-May-05	DC	Detroit	MI	Yard Conductor	24
FE-2005-23	05-Jul-05	BNSF	Emporia	KS	Yard Helper	27
FE-2005-24	18-Jul-05	UP	Memphis	TN	Brakeman	59
FE-2005-25	22-Jul-05	ATN	Ragland	AL	Brakeman	56
FE-2005-27	09-Aug-05	AM	Rogers	AR	Conductor	23
FE-2005-36	04-Dec-05	BNSF	Burlington	IA	Brakeman	34
FE-2006-12	21-Aug-06	FEC	Rockledge	FL	Freight Conductor	45
FE-2006-22	04-Dec-06	UP	Carson	CA	RCL Operator	35
FE-2008-06	05-Mar-08	WSOR	Random Lake	WI	Freight Conductor	55
FE-2008-15	26-May-08	CSX	Lumberton	NC	Freight Conductor	46
FE-2008-31	10-Sep-08	INRD	Terre Haute	IN	Freight Conductor	42
FE-2008-40	03-Dec-08	DRIR	Denver	CO	Freight Conductor	33
FE-2009-20	24-Jun-09	ATN	Albertville	AL	Freight Conductor	33
FE-2009-26	29-Dec-09	BNSF	Minneapolis	MN	RCL Operator	44

### 3.6.3 Statistical Background

Table 3-14 shows 14 of the 26 industrial hazard cases (54%) involved close/no clearance. This percentage is far higher than for other types of non-Industrial Track Hazard cases (10%).

**Table 3-14: Industrial Track Hazard Close/No Clearance**

	<b>Industrial Track Hazard Cases</b>	<b>Non-Industrial Track Hazard Cases</b>
<b>Cases involving close/no clearance (29)</b>	14	15
<b>Total cases (179)</b>	26	153
<b>Percentage for close/no clearance</b>	54%	10%

Table 3-15 shows 7 of the 26 industrial hazard cases (27%) involved derailments. This percentage is more than three times the percentage for other, non-Industrial Track Hazard cases (7%). All seven derailments involved close/no clearance issues.

**Table 3-15: Industrial Track Hazard Derailments**

	<b>Industrial Track Hazard Cases</b>	<b>Non-Industrial Track Hazard Cases</b>
<b>Cases involving derailments (17)</b>	7	10
<b>Total cases (179)</b>	26	153
<b>Percentage for derailments</b>	27%	7%

Table 3-16 shows 6 of the 26 industrial hazard cases (23%) involved motor vehicles. This percentage is more than ten times the percentage for other, non-Industrial Track Hazard cases (2%).

**Table 3-16: Industrial Track Hazard Motor Vehicles (Struck By)**

	<b>Industrial Track Hazard Cases</b>	<b>Non-Industrial Track Hazard Cases</b>
<b>Cases involving motor vehicles (9)</b>	6	3
<b>Total cases (179)</b>	26	153
<b>Proportion for motor vehicles</b>	23%	2%

Appendix G in Volume II provides additional statistics on industrial track hazard cases.

### 3.6.4 Discussion

The issues with industrial track hazards were discussed thoroughly at the SSF and during SWG meetings. The following are issues and remedies for the railroad industry to consider.

#### 3.6.4.1 *Issue:* Industry Track Agreements May Not Be Current

“Industry Track Agreements”<sup>19</sup> may not be current, require notification of a change in conditions, and/or may allow conditions to become unsafe due to changes over time. Review of agreements is inconsistent across the railroad industry. Shippers/receivers utilizing the same industrial lead may have different industry track agreements.

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<sup>19</sup> The term Industry Track Agreements as used in this report encompasses similar terms within the industry such as track agreement, lease/service agreement, side track agreement, etc.

Remedy: Implement consistent content, oversight, and enforcement of industry track agreements.

- Agreements, practices, or policies should include the following provisions:
  - Maintenance of track and walkways. This includes ice and snow removal, clearing of debris alongside the track, and immediate removal of objects or debris blocking the track or walkway. This directly impacts the decision of the ground-service employee to walk or ride equipment.
  - Removal of close/no clearance conditions. (See section 3.5.5.1)
  - Needs assessment for the installation and maintenance of lighting.
  - Marking of private industry road crossings clearly.
  - Definition and control of the separation of road and plant vehicle operations from rail traffic.
  - Definition and control of the separation of non-railroad personnel from railroad switching operations.
  - Notification to appropriate railroad personnel of a change in conditions.
- Oversee and enforce industry track agreements.
  - Empower employees to stop work when hazards that endanger the crew are identified and notify the proper authority immediately<sup>20</sup>. Safety concerns must override the desire to complete a task.
  - Respond to reports of unsafe conditions. A failure to respond leaves the hazard uncorrected and degrades confidence in the reporting system.
  - Conduct inspections to ensure compliance with industry track agreements. Railroad managers and safety committees as appropriate should involve themselves and conduct visits to industry property.
  - Visit the property to ensure close/no clearance issues have been eliminated or mitigated. Check the condition of walkways and track during the visit<sup>21</sup>. If new problems are identified, alert the customer.

#### 3.6.4.2 *Issue:* Training in Plant Characteristics May Be Inconsistent

Training in plant characteristics may be inconsistent. An employee who is unfamiliar with an industrial property may not be aware of the industrial hazards. Job aids such as maps usually do not exist.

Remedy: Prepare employees to identify and avoid industry hazards. Examples include the following:

- Provide job aids, such as maps that highlight industrial hazards.
- Discuss the location and potential for industrial hazards in job briefings.

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<sup>20</sup> See Section 7.2 for the SWG position on empowerment and discipline.

<sup>21</sup> Table 3-7 shows 27% of Industrial Track Hazard Cases involve a derailment. The majority of these are due to an obstruction on the track.

- Assist employees with little or no familiarity with the physical characteristics at that location, such as working with a person familiar with that location.
- Encourage employees to inspect the work site before acting.
- Share near-miss and close-call experiences with employees.

#### 3.6.4.3 **Issue:** Collisions with Motor Vehicles While Riding Railroad Equipment

Nine employees died in a collision with a motor vehicle while riding railroad equipment during a shove movement over a grade crossing.

**Remedy:** An employee must not ride railroad equipment through a grade crossing during a shove movement.

- Advise industry to educate and instruct vehicle operators on separation of non-railroad personnel from railroad switching operations.
- Needs assessment for the installation and maintenance of lighting
- Marking of public and private industry road crossings clearly.
- Definition and control of the separation of road and plant vehicle operations from rail traffic.

### 3.6.5 **Industrial Hazards – SOFA Safety Advisory Statement 2010**

Railroads and industries need to have Industry Track Agreements, practices, or policies in place, and these should contain oversight and enforcement of the safety provisions. Railroads must provide employees with the tools and/or assistance to allow them to safely perform their work while within an industry.

Employees need to be empowered to make a decision to stop work when an unsafe condition presents itself<sup>22</sup>. Railroad managers must be educated to encourage employees to make a good faith effort to identify and report hazards at industries. Employees making a good faith effort to identify and report hazards will not be subject to discipline, discrimination, or harassment for doing so.

Employees engaged in switching operations must not ride railroad equipment through a grade crossing during a shove movement. Industries need to educate and instruct all vehicle operators concerning separation between their vehicle and railroad equipment by being attentive to movements in the industry. At the minimum, the SWG believes that proper education and instruction should be implemented by the industry. Additionally, signage and lighting should be appropriate for the crossing protection needed.

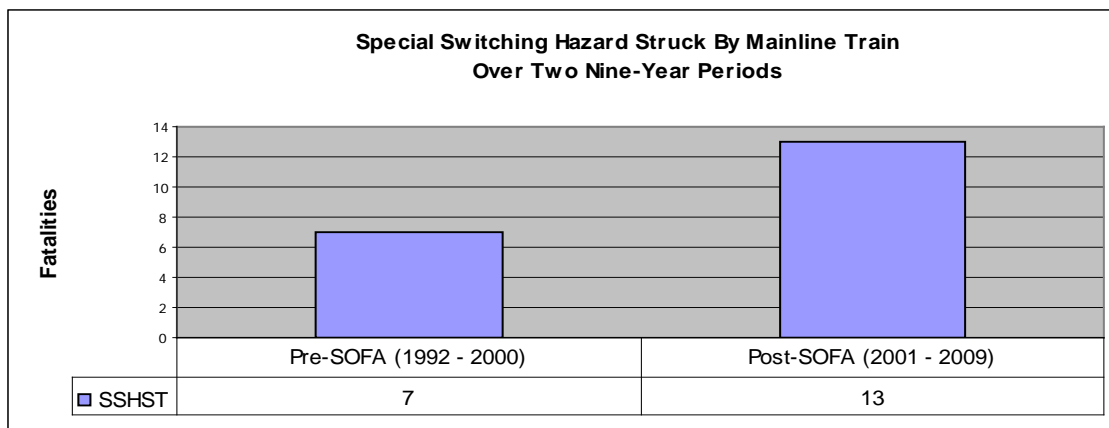
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<sup>22</sup> See Section 7.2 for the SWG position on empowerment and discipline.

### 3.7 Struck by Mainline Trains – A Growing Issue

#### 3.7.1 Finding

Struck by Mainline Trains, with 20 cases, is tied for the sixth largest category of SOFA fatalities. Figure 3-8 displays the number of struck by mainline train fatalities over two nine-year periods (Pre-SOFA versus Post-SOFA). It shows fatalities for TY&E employees who are struck by mainline trains is a growing issue and a cause for concern. It implies the guidance provided in the August 2004 SOFA Update (see Section 3.7.2 below) has had little or no effect.



**Figure 3-8: Special Switching Hazard Struck By Mainline Trains Over Two Nine-Year Periods**

#### 3.7.2 Background

The SWG identified this issue in the August 2004 SOFA Update Chapter 4 titled *SWITCHING FATALITIES – UNDERSTANDING AND PREVENTION*. In this chapter, the update discussed cases in which employees were fatally struck by mainline trains. The update provided no recommendation except to say, “Other than general vigilance, awareness, and alertness to the switching environment, it is difficult to prescribe a preventive measure.”

The case numbers for the fatalities involving employees struck by mainline trains are shown in the Table 3-17 below. Pages 54 – 58 in Appendix A of this report provide the narratives for these cases.

**Table 3-17 - 20 Cases For Employees Struck By Mainline Trains**

Case Number	Incident Date	Railroad	City	State	Job Description	Age
FE-1992-20	07-Jul-92	SSW	Conlen Siding	TX	Freight Engineer	58
FE-1993-13	13-Apr-93	CSX	Dwale	KY	Freight Brakeman/Flagman	44
FE-1996-17	07-Jul-96	NS	Sidney	IN	Conductor	29
FE-1997-22	18-Jul-97	MNCW	Stamford	CT	Conductor	40
FE-1997-36	02-Dec-97	BNSF	Emporia	KS	Freight Conductor	50
FE-2000-32	28-Dec-00	UP	Dupo	IL	Switchman	52
FE-2000-33	29-Dec-00	BNSF	Gillette	WY	Conductor	29
FE-2001-02	10-Jan-01	CSX	Chicago	IL	Conductor	42
FE-2001-03	11-Jan-01	NS	South Fork	PA	Engineer	52
FE-2001-40	24-Dec-01	NS	Lynchburg	VA	Conductor	30
FE-2002-09	21-Mar-02	NS	Claymont	DE	Engineer	45
FE-2004-28	01-Nov-04	BNSF	Bowdoin	MT	Conductor	45
FE-2004-30	17-Dec-04	BNSF	Radium	CO	Conductor	44
FE-2005-02	10-Jan-05	UP	Buena Vista	AR	Conductor	52
FE-2008-01	08-Jan-08	UP	Waukegan	IL	Passenger Brakeman	59
FE-2008-03	03-Feb-08	NS	Chicago	IL	Freight Conductor	28
FE-2008-33	23-Sep-08	CSX	Darby	PA	Freight Conductor	46
FE-2009-06	28-Jan-09	UP	Council Bluffs	IA	Yard Foreman	41
FE-2009-08	07-Feb-09	BNSF	Holbrook	AZ	Freight Conductor	43
FE-2009-09	08-Feb-09	UP	Herington	KS	Freight Conductor	26

### 3.7.3 Statistical Background

Tables 3.18 shows fifteen of the 20 cases (75%) involving strikes by mainline trains occurred in the dark<sup>23</sup>. This is well above the percentage (40%) that occurred for other, non-Struck by Mainline Trains cases.

<sup>23</sup> For this study, the SWG defined “dark” as the period from ½ hour after sunset to ½ hour before sunrise.

**Table 3-18 Struck by Mainline Trains - Dark**

	Struck by Mainline Train Cases	Non-Struck by Mainline Train Cases
Cases occurring in the dark (78)	15	63
<b>Total cases (179)</b>	20	159
<b>Percentage for cases in the dark</b>	75%	40%

Thirteen of the 20 cases (65%) involving strikes by mainline trains occurred during December, January, and February. This is more than twice the percentage (27%) for other, non-Struck by Mainline Trains cases (see Table 3-19).

**Table 3-19 Struck by Mainline Trains During Dec, Jan, and Feb**

	Struck By Mainline Train Cases	Non-Struck by Mainline Train Cases
Cases occurring Dec – Feb (56)	13	43
<b>Total cases (179)</b>	20	159
<b>Percentage for cases Dec - Feb</b>	65%	27%

Appendix G in Volume II provides additional statistics on struck by mainline train cases.

#### 3.7.4 Discussion

The issues with Struck by Mainline Trains were discussed thoroughly at the SSF and during SWG meetings. The following are issues and remedies for the railroad industry to consider.

##### 3.7.4.1 **Issue:** Working Conditions May Compromise Employee Awareness

Working conditions, specifically darkness and winter months, compromise employee awareness. Darkness is clearly an issue: 75% of Struck by Mainline Trains fatalities occurred in the dark. Winter months are also clearly an issue: 65% of the Struck by Mainline Trains fatalities occurred from December through February. Together, 55% of Struck by Mainline Trains occurred in the dark and during winter months.

Risk to train-crew members increases in the dark, but they may not fully understand the extent to which “darkness” contributes to fatalities. Some job procedures or the design of personal protective equipment may not be adequate to address issues confronting train-crew members while working in the dark. Moreover, outer clothing worn during winter months can restrict hearing and peripheral vision; therefore, extra caution should be exercised.

**Remedy:** Use multiple warning methods. A single audible or a visual warning by itself may not be enough. A warning from one device can be misconstrued or forgotten by an employee highly focused on the task at hand. Use of multiple methods (radio, horn, bell, headlight, high-visibility clothing, etc.) reduces the likelihood for the employee to misinterpret or forget, and increases the chance the warning gets through to the employee.

##### 3.7.4.2 **Issue:** Current Procedures and Training for Stopping Along the Mainline May Be Inadequate

Current procedures and training for stopping along the mainline to do work could be inadequate. In particular, mandatory inspection procedures, such as locomotive, roll-by, and hotbox inspections, can put locomotive engineers and trainmen at risk when there is no safe location to conduct the inspection. Depth perception and recognition of train speed may contribute to a

fatality when working in the dark due to impaired awareness of an approaching train. Struck by Mainline Trains is the most likely cause of fatal injuries to locomotive engineers.

Remedy: Develop, implement, and/or improve procedures for stopping to do work along mainline track.

- Encourage Train, Yard, and Engine (TY&E) employee use of current job briefing procedures for stopping to do work along mainline track. A job briefing in this situation should include this progression:
  - Determine a safe location to stop.
  - Assess if inspection can be conducted from the field side (i.e., the safe side).
  - Decide if necessary to dismount from the locomotive.
    - When an employee dismounts, dismount to the field side.
    - If unable to dismount to the field side, do the following:
      - Identify all approaching on-track movements in immediate work location, if applicable.
      - Decide the safest time to dismount.
      - Stay out of the foul of the mainline track.
      - Be alert because adequate warning may not be provided.
      - Plan for the worst case scenario, and plan an escape strategy.
- Provide employees the discretion to determine the first safe location or time to conduct mandatory inspections.

#### 3.7.4.3 *Issue:* Occasional Inadequate Communication Between Crew Members, Crews, Dispatchers, and Yardmasters

Communication is inadequate at times between crew members, crews, dispatchers, and yardmasters when stopped or when doing work on or near the mainline track. Lack of communication places crew members in peril of being struck by on-track movements.

Remedy: Improve communication at all levels. Comprehensive and ongoing communication between all involved employees is vital before a crew member dismounts the locomotive to do required work.

- Promote effective communication among and between crew members by utilizing established programs, such as Train Crew Resource Management<sup>24</sup>.
- Employees should not leave the cab without first communicating intentions. *Think outside the cab by communicating within.*
- Encourage crews to communicate with, and provide warnings to, fellow crew members working outside of the cab.

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<sup>24</sup> Appendix I provides materials on Train Crew Resource Management.



- Provide employees the discretion to establish a safe work zone that involves communication between that crew, the dispatcher and/or yardmaster, and other on-track movements.

### **3.7.5 Struck by Mainline Train – SOFA Safety Advisory Statement 2010**

The SWG reemphasizes that communication is essential to eliminating fatalities related to Struck by Mainline Trains. Fatalities occur when employees are unaware of risks associated with doing work along mainline track – particularly at times of darkness and during winter months. Therefore, the railroad industry should insist upon consistent use of multiple methods to warn employees about oncoming on-track movements. Equally, warnings should be made to the approaching on-track movement of an employee's location when a crew member is outside of the locomotive cab. In addition, the railroad industry should consider improving employee visibility when performing work on the ground.

Employees must use job briefing procedures before dismounting the locomotive or doing work along mainline track to establish a safe method for performing their work. When possible, employees must dismount to the safe side. Empower employees to establish a safe location when stopping and/or performing work when on or near mainline track. The railroad industry must support employees in the use of individual discretion as part of an effort to determine a safe location to perform work<sup>25</sup>.

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<sup>25</sup> See Section 7.2 for the SWG position on empowerment and discipline.

### 3.8 Fatalities During the Second Hour of Duty

#### 3.8.1 Finding

The number of SOFA fatalities during the second hour of duty is higher than any other on-duty hour. The number of fatalities (30) occurring during the second hour of duty is surpassed by only one SOFA category, SOFA 5. Figure 3-9 shows a bar chart displaying the number of fatalities against the number of hours the FE was on duty. The number of fatalities during the second hour is clearly the largest. The second hour of duty may correspond to the first hour of actual switching operations, considering, the first hour on duty is generally consumed with assembling the crew, reviewing paperwork, job and safety briefings, and traveling to the work site.

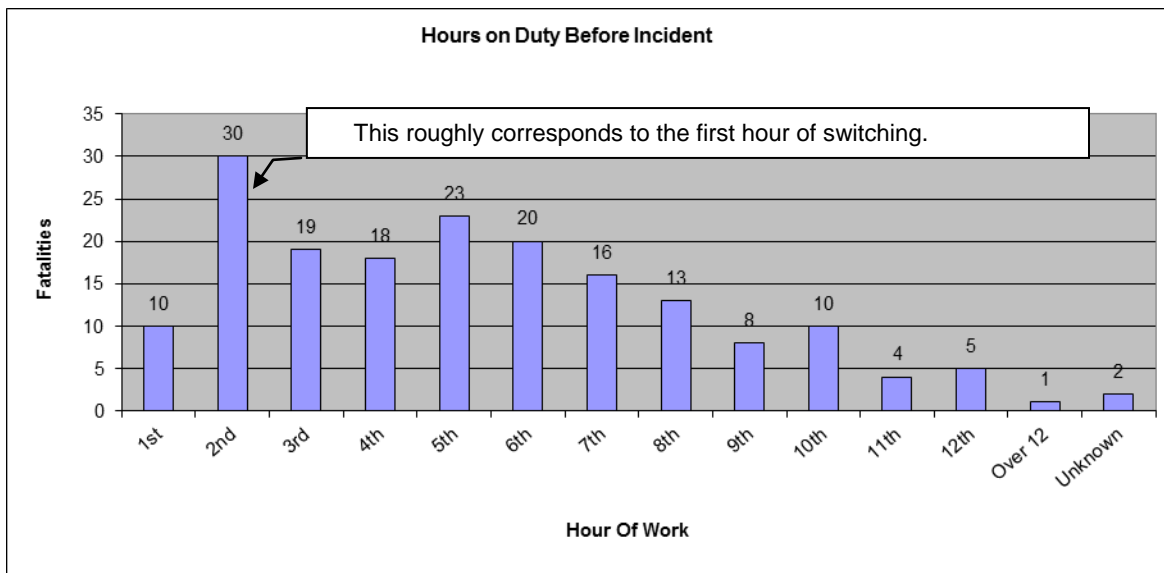


Figure 3-9: Hours on Duty Before Incident

Figure 3-10 suggests that this type of fatality is a growing issue.

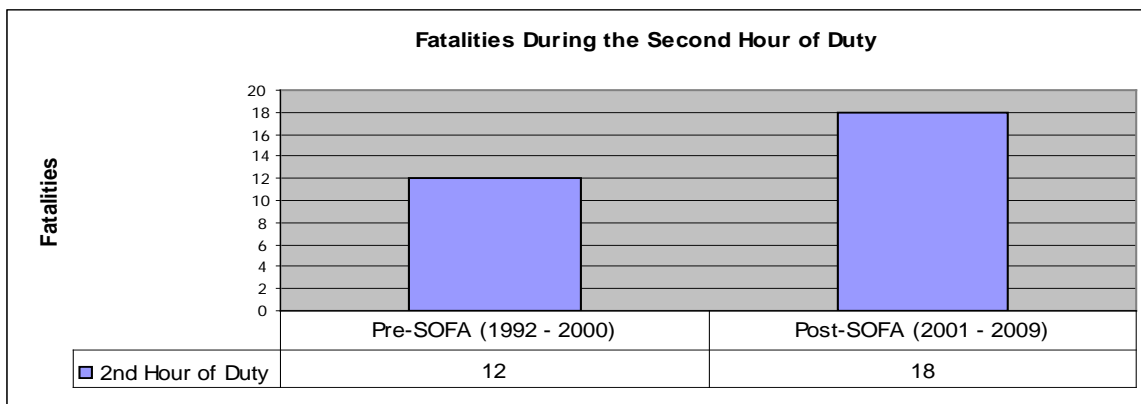


Figure 3-10: Fatalities During the Second Hour of Duty Over Two Nine-Year Periods

### 3.8.2 Background

This is a new finding that has not been covered in previous SOFA reports. The cases involving fatalities during the second hour of duty are shown in Table 3-20 below. Pages 66 – 71 in Appendix A of this report provide the narratives for these cases.

**Table 3-20: Case Numbers for Fatalities During The Second Hour of Duty**

Case Number	Incident Date	Railroad	City	State	Job Description	Age
FE-1992-03	28-Jan-92	BN	Willmar	MN	Yard Brakeman/Helper	57
FE-1992-33	15-Oct-92	BN	Omaha	NE	Yard Brakeman/Helper	32
FE-1993-26	15-Jul-93	CR	Anderson	IN	Yard Brakeman/Helper	43
FE-1993-35	02-Sep-93	ATSF	Carlsbad	NM	Freight Conductor	55
FE-1993-53	30-Dec-93	CR	Brook Park	OH	Yard Conductor/Foreman	61
FE-1994-02	04-Jan-94	BN	Hastings	NE	Conductor	46
FE-1994-04	18-Jan-94	CSXT	Bainbridge	GA	Conductor	45
FE-1994-29	15-Nov-94	CR	Painted Post	NY	Freight Brakeman/Flagman	57
FE-1995-17	21-Mar-95	SP	Bassett	CA	Conductor	55
FE-1995-29	04-Oct-95	CSXT	Riverdale	IL	Conductor	39
FE-1998-15	26-May-98	BRC	Bedford Park	IL	Yard Conductor/Foreman	57
FE-1999-14	19-May-99	NS	Cincinnati	OH	Conductor	36
FE-2000-13	21-Apr-00	BNSF	Galesburg	IL	Engine Foreman	60
FE-2000-21	07-Jul-00	CKRY	Wichita	KS	Conductor	39
FE-2000-32	28-Dec-00	UP	Dupo	IL	Switchman	52
FE-2001-14	08-Apr-01	BNSF	Clark	OK	Conductor	35
FE-2002-12	14-May-02	UP	Pine Bluff	AR	Switchman	53
FE-2003-03	11-Feb-03	CNIC	Flat Rock	MI	Brakeman	57
FE-2003-04	16-Feb-03	CSXT	Syracuse	NY	RCL Operator	36
FE-2003-12	06-Jun-03	CSXT	Kingsport	TN	Brakeman	35
FE-2003-35	07-Dec-03	UP	San Antonio	TX	RCL Operator	37
FE-2004-20	02-Sep-04	BNSF	Clovis	NM	RCL Operator	26
FE-2007-21	27-Oct-07	CSX	Russell	KY	Yard Foreman	52
FE-2007-25	28-Dec-07	BNSF	Bristol	IL	Freight Brakeman	62
FE-2008-01	08-Jan-08	UP	Waukegan	IL	Passenger Brakeman	59
FE-2008-03	03-Feb-08	NS	Chicago	IL	Freight Conductor	28
FE-2008-19	08-Jun-08	UP	La Porte	TX	Yard Brakeman	47
FE-2008-24	08-Jul-08	BNSF	Fridley	MN	Utility Employee	40
FE-2008-37	15-Nov-08	MRL	Laurel	MT	Yard Brakeman	39
FE-2009-08	07-Feb-09	BNSF	Holbrook	AZ	Freight Conductor	43

### 3.8.3 Statistical Background

Tables 3.21 and 3.22 below suggest that many of these fatalities occur when yard crews leave the office and prepare for the first switching task of the day or road crews prepare their trains to leave the yard location.

Table 3-21 shows 18 of 30 cases (60%) during the second hour of duty occurred on yard tracks. This is about 14% higher than the percentage for cases during other hours of duty (46%).

**Table 3-21: 2<sup>nd</sup> Hour of Duty, Yard Track**

	<b>Cases During 2nd Hour of Duty</b>	<b>Cases During Other Duty Hours</b>
<b>Cases occurring on yard track (87)</b>	18	69
<b>Total cases (179)</b>	30	149
<b>Percentage for yard track</b>	60%	46%

Table 3-22 shows 23 of 30 cases (77%) during the second hour of duty occurred while the FE was on the ground. Cases during the second hour of duty are almost 20 percentage points higher than for cases during the other hours of duty.

**Table 3-22: 2<sup>nd</sup> Hour of Duty, FE on the Ground**

	<b>Cases During 2nd Hour of Duty</b>	<b>Cases During Other Duty Hours</b>
<b>Cases with FE on the ground (110)</b>	23	87
<b>Total cases (179)</b>	30	149
<b>Percentage for FE on the ground</b>	77%	58%

Appendix G in Volume II provides additional statistics on fatalities during the second hour of duty.

#### 3.8.4 Discussion

This is a new finding that emerged through SWG deliberations that occurred after the February 25, 2010 SSF.

Accounting for the time it takes for crews to assemble, review paperwork, conduct job and safety briefings, and travel to the work site, the second hour of duty essentially becomes the first hour the crew is actually on or about rolling stock or other equipment. This is when the crew then separates to begin switching operations. This means the first job or task for the day often occurs during the second hour of duty. Yard and road crews are often involved in these second-hour fatalities and have been fatally injured while performing their initial switching tasks.

#### 3.8.5 Conclusion

The high number of SOFA fatalities (30) during the second hour of duty rivals other major SOFA issues such as SOFA 5 – Inexperienced Crew Members (32 fatalities) and Close/No Clearance (29 fatalities). Therefore, the industry should develop safety campaigns and other safety-related measures to make the workforce aware of this issue, and will lead to the elimination of second hour of duty fatalities.

## 4 NOTABLE STATISTICS AND OBSERVATIONS

### 4.1 Introduction

This chapter provides some additional statistics and observations about the 179 cases reviewed by the SOFA Working Group (SWG).

### 4.2 Classification of SOFA Cases

Table 4-1 provides a summary of the 20 SOFA categories and the number of cases in each category. The total in the fifth column on the table exceeds 179 because a SOFA case can qualify for more than one category. A chronological listing of all SOFA cases with their corresponding SOFA categories can be found in Appendix H.

**Table 4-1: Classification of SOFA Cases**

SOFA Classification	Description	Pre-SOFA (1992-2000)	Post-SOFA (2001-2009)	Total	Cumulative Percentage
SOFA5	FE had 1.5 years of experience or less or had inadequate training.	17	15	32	10.1%
SSHCC	Special Switching Hazard: Close Clearance.	11	18	29	19.2%
SSHIH	Special Switching Hazard: Industrial Hazard.	10	16	26	27.4%
SOFA3	Lack of or inadequate job safety briefing.	11	12	23	34.7%
SOFA1	Adjusting knuckles, adjusting drawbars, or installing EOT	15	6	21	41.3%
SOFA4	Mixing hand and radio signals or specific distances were not given.	17	3	20	47.6%
SSHST	Special Switching Hazard: Struck by Mainline Train.	7	13	20	53.9%
SSHET	Special Switching Hazard: Employee Tripping, Slipping, or Falling	9	9	18	59.6%
SSHDR	Special Switching Hazard: Derailment.	6	11	17	65.0%
SSHUC	Special Switching Hazard: Unsecured Cars.	9	6	15	69.7%
SSHFR	Special Switching Hazard: Free-Rolling Railcars.	8	6	14	74.1%
SSHMC	Special Switching Hazard: Miscellaneous.	9	5	14	78.5%
SOFA2	Struck by equipment other than their own on yard or industry track.	10	3	13	82.6%
SSHUM	Special Switching Hazard: Unexpected Movement of Railcars.	9	3	12	86.4%
SSHEQ	Special Switching Hazard: Equipment.	7	4	11	89.9%
SSHMV	Special Switching Hazard: Struck or struck by Motor Vehicle.	2	7	9	92.7%
SSHEV	Special Switching Hazard: Environment.	3	4	7	95.0%
SSHFC	Special Switching Hazard: Failure to Confirm Route of Movement.	4	3	7	97.2%
SSHDA	Special Switching Hazard: Drugs and Alcohol.	4	1	5	98.7%
SSHED	Special Switching Hazard: Electronic Device (Cell phone, MP3 player)	1	3	4	100.0%
	<b>TOTALS</b>	<b>169</b>	<b>148</b>	<b>317</b>	

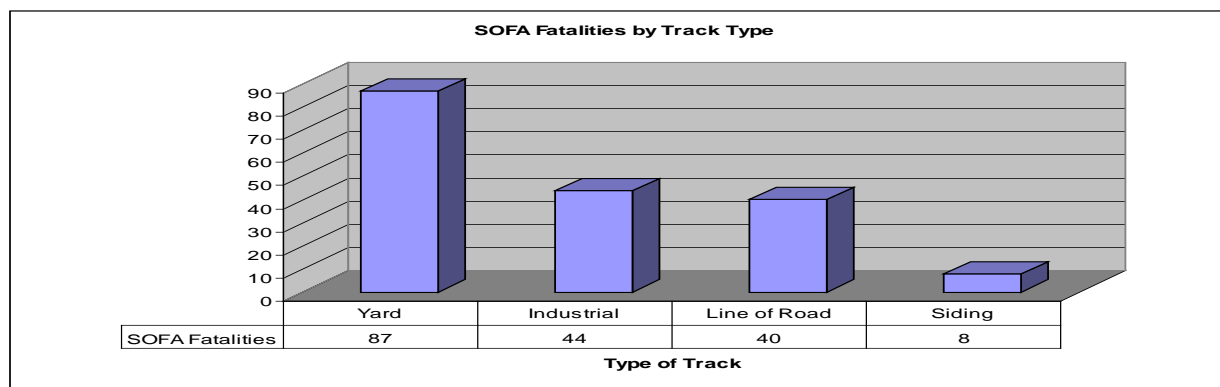
#### 4.2.1 Most Frequent PCFs

83 PCFs were assigned 372 times to the 179 cases, about two per case. Table 4-2 shows the PCFs used more than five times. Section 2.3.4 describes how the SWG used PCFs in the case reviews. A complete table of the PCFs used by the SWG can be found in Appendix E.

**Table 4-2: Most Frequently Used PCFS**

PCF Code	Description	Occurrences
H990	Employee on or fouling track	80
H316	Poor intra-crew communication about work in progress	31
M411	Close or no clearance	27
H307	Shoving movement, man on or at leading end of movement, failure to control	24
H998	Employee falling from moving equipment	15
H399	Other general switching rules (Provide detailed description in narrative)	14
H997	Failure to provide adequate space between equipment	14
H317	Failure to communicate unsafe condition	13
H702	Switch improperly lined	12
H199	Employee physical condition, other (Provide detailed description in narrative)	10
M599	Other miscellaneous causes (Provide detailed description in narrative)	9
H210	Radio communication, failure to comply	9
H211	Radio communication, improper	8
H021	Failure to apply hand brakes on car(s) (railroad employee)	8
H996	Insufficient training	8
H306	Shoving movement, absence of man on or at leading end of movement	8
M101	Snow, ice, mud, gravel, coal, etc. on track	7
H310	Failure to couple	7
H989	Lack of skill or practical wisdom gained by personal knowledge or action. (Provide description in narrative.)	7
H305	Instruction to train/yard crew improper	7
M302	Highway user inattentiveness	7
H302	Cars left foul	6
H999	Other train operation/human factors (Provide detailed description in narrative)	6
H018	Failure to properly secure hand brake on car(s) (railroad employee)	6

#### 4.3 Type of Track



**Figure 4-1: SOFA Fatalities by Track Type**

Figure 4-1 shows 87, almost half of the 179 SOFA fatalities, occurred on yard track.

#### 4.4 Type of Movement

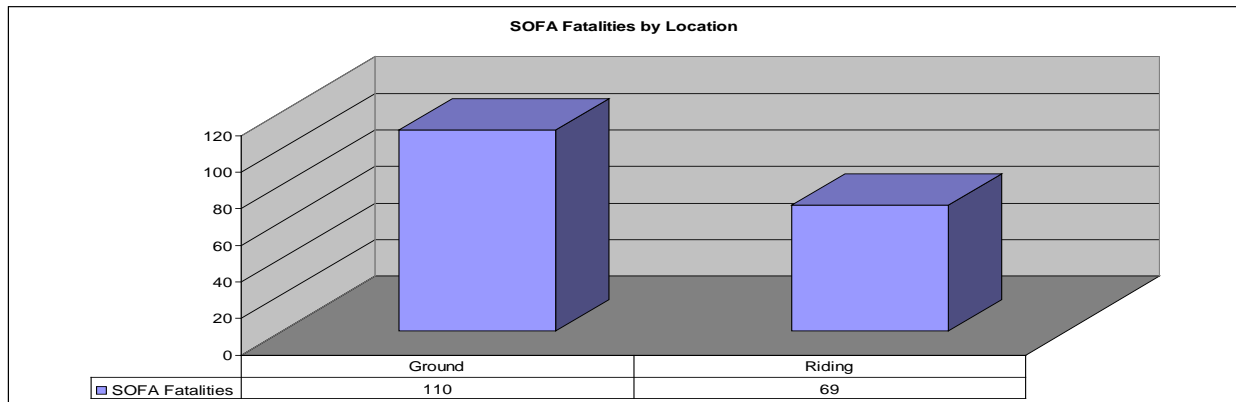
**Table 4-3: SOFA Fatalities by Type of Movement**

<b>Movement</b>	<b>Conventional</b>	<b>RCL</b>	<b>Without Motive Power / Unknown</b>	<b>Total</b>
Equipment Being Pulled	38	1		39
Equipment Being Shoved	93	7		100
Equipment Free Running	3	2	31	36
Not Applicable			4	4
<b>Total</b>	<b>134</b>	<b>10</b>	<b>35</b>	<b>179</b>

Note: In four cases, the FE encountered an industrial hazard while walking and was not struck by train equipment. These cases are listed as “Not Applicable.”

Table 4-3 shows 100 fatalities occurred during shove moves, more than half. Table 4-3 also includes a column on ten incidents involving Remote Controlled Locomotives (RCL). The SWG does not believe it is possible to form conclusions regarding RCL with only ten observations especially without good yearly data on the frequency of RCL use.

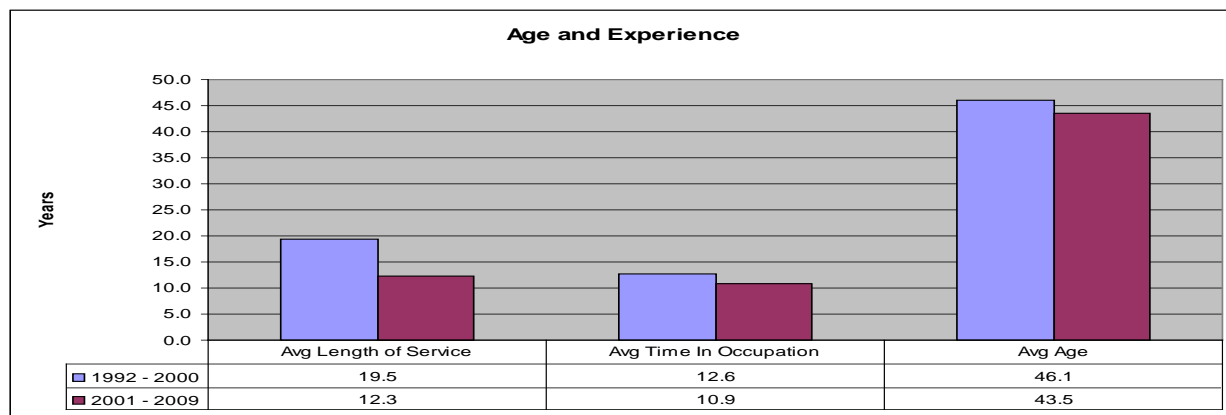
#### 4.5 FE’s Location



**Figure 4-2: SOFA Fatalities by Location**

Figure 4-2 shows an FE was more likely on the ground than riding when fatally injured. However, there were 69 cases when the FE was riding, 38.5% of the total.

## 4.6 FE Age and Experience

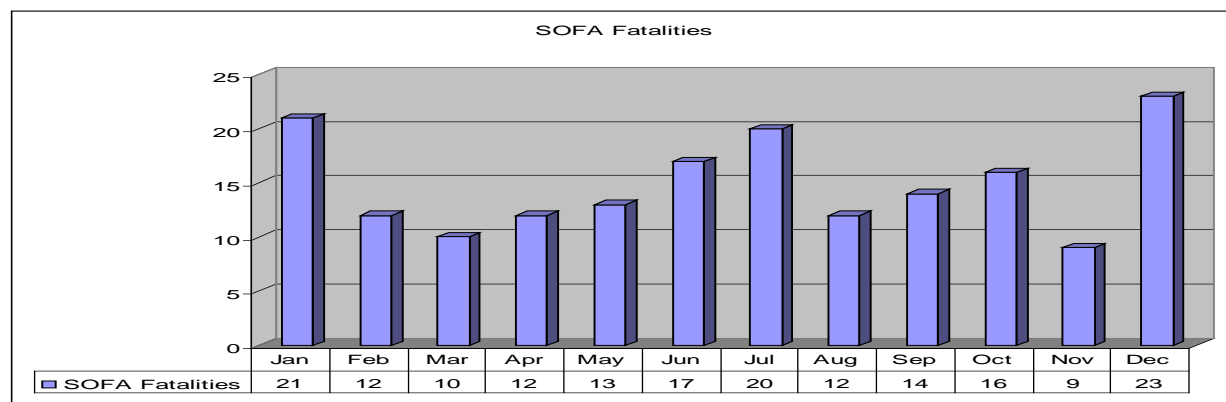


**Figure 4-3: Age and Experience**

Figure 4-3 shows that age and experience for fatally injured employees has declined from the Pre-SOFA period to the Post-SOFA period. The gap for the two periods is especially large for length of service. The chart suggests that issues with SOFA 5<sup>26</sup>, employees with 1.5 years of experience or less, continue to present challenges to the railroad industry.

## 4.7 Fatalities in Cold Weather States During Winter and Other States During Summer

Figure 4-4 illustrates SOFA fatalities by month. January, July, and December are the only months with 20 or more fatalities. The SWG decided to look at these monthly statistics for cold weather states<sup>27</sup> and other states (i.e., states not classified as cold weather states).



**Figure 4-4: SOFA Fatalities By Month**

Figure 4-5 shows there were 31 fatalities in cold-weather states during meteorological winter<sup>28</sup> (December, January, and February). Notice the bars for winter are relatively higher than other times during the year. The spike in December, the first month of winter, is almost five times

<sup>26</sup> See section 3.4 for more on SOFA 5.

<sup>27</sup> For the purposes of this report, the SWG used these states as cold weather states: Maine, New Hampshire, Vermont, Massachusetts, Rhode Island, Connecticut, New York, New Jersey, Pennsylvania, Ohio, Indiana, Michigan, Illinois, Wisconsin, Minnesota, Iowa, Nebraska, North Dakota, South Dakota, Montana, Wyoming, Colorado, Utah, Idaho, and Alaska.

<sup>28</sup> This report will use the word “winter” to refer to meteorological winter from hereon.



higher than the low months in June, August, and November. Table 4-4 compares the fatalities in these states to other months of the year. Cold-weather states accounted for more than half (55%) of the fatalities in winter and less than half (41%) during other months of the year. This difference suggests there is increased risk in cold-weather states during winter. The median temperature for these incidents was 21 degrees Fahrenheit. July, the hottest month of the year, also has a relatively high number of fatalities compared to other months.

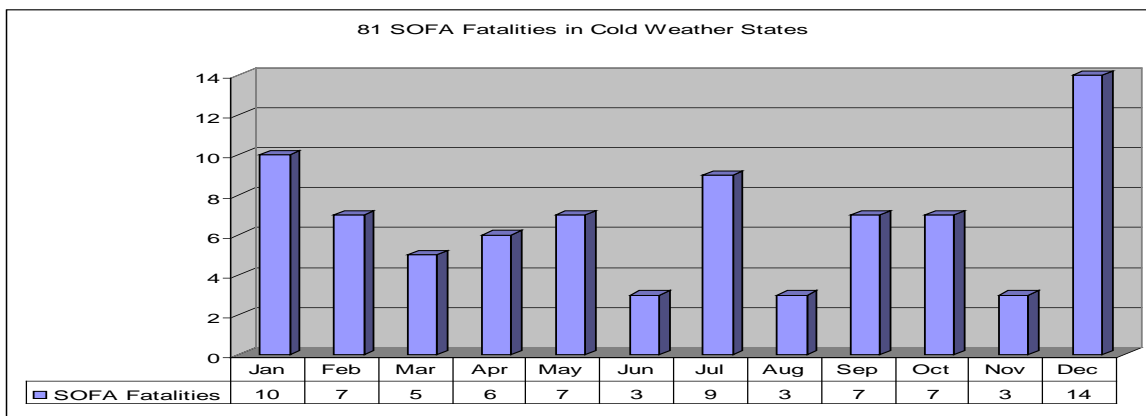


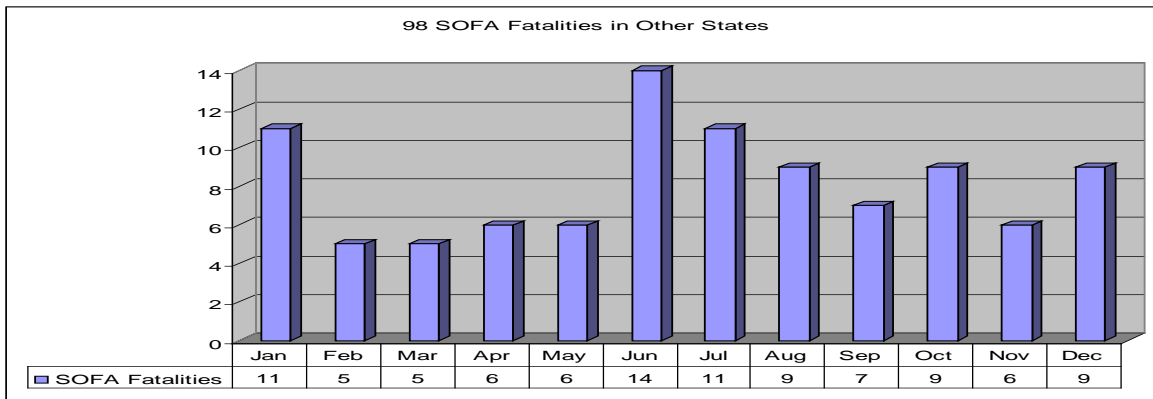
Figure 4-5: SOFA Fatalities By Month For Cold-Weather States

Table 4-4: Fatalities in Cold-Weather States

	Dec, Jan, Feb	Other Months
<b>Fatalities Cold Weather States (81)</b>	31	50
<b>Fatalities All States (179)</b>	56	123
<b>Percentage For Cold Weather States</b>	55%	41%

Conversely, Figure 4-6 shows there were 34 fatalities in other states (i.e., states not classified as cold weather states) during meteorological summer<sup>29</sup> (June, July, August). The bars for summer are relatively higher than other times during the year. The spike in June, the first month of summer, is almost three times higher than the low months in February and March. Table 3-36 compares the fatalities in these states to other months of the year. Other states accounted for more than half (69%) of the fatalities in summer and less than half (49%) during other months of the year. This difference suggests there is increased risk in other states during summer. The median temperature for these incidents was 80 degrees Fahrenheit. January, the coldest month of the year, also has a relatively high number of fatalities compared to other months.

<sup>29</sup> This report will use the word “summer” to refer to meteorological summer from here on.



**Figure 4-6: SOFA Fatalities By Month For Other (Non-Cold-Weather) States**

**Table 4-5: Fatalities in Other (Non-Cold-Weather) States**

	Jun, Jul, Aug	Other Months
<b>Fatalities For Other (Non-Cold Weather) States</b>	34	64
<b>Fatalities All States</b>	49	130
<b>Percentage For Other States</b>	69%	49%

The above Figures 4-5 and 4-6 suggest the onset of cold weather (December in cold-weather states and January in other states) may create conditions for increased risk of fatalities. Figures 4-5 and 4-6 also suggest the onset of hot weather (June in other states and July in cold-weather states) may create conditions for increased risk of fatalities. The railroad industry may want to consider additional preparation and education of the workforce on adapting to changing conditions in summer and winter. Appendix H provides additional information on fatalities in winter and summer.

#### 4.8 High Risk Holiday Periods

Historically the SWG has been monitoring the high risk periods for holidays for some time. Particularly the following two high risk periods.

- One week period bracketing Independence Day (July 4th.).
- Three-week period bracketing Christmas (December 25th) and New Year's Day (January 1).

Table 4-6 shows high fatalities for December and July, the four “high-risk” holiday weeks for fatalities. There were 19 fatalities during the four high-risk weeks from 1992 to 2009. The percentage of weeks when there was a switching fatality, 26.4%, is higher during the high-risk weeks than the percentage for the other 48 weeks, 18.5%.

**Table 4-6: SOFA Fatalities During the Four High-Risk Weeks**

	<b>Four High-Risk Weeks</b>	<b>48 Other Weeks</b>
<b>Weeks with a SOFA fatality (179)</b>	19	160
<b>Total number of weeks (936)</b>	72	864
<b>Percentage for weeks with SOFA fatalities</b>	26.4%	18.5%

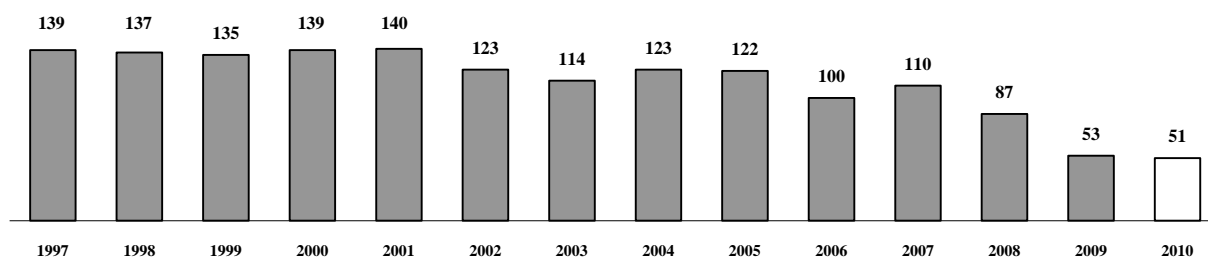
It is not clear that the higher rate of fatalities during the high-risk weeks is due to conditions that are unique to the holidays. The higher rate of fatalities could be due to the winter and summer effects which are addressed immediately above. Since the SWG cannot determine if the “holiday” effect is separate and independent of the “seasonal” effects discussed above, it decided to monitor this issue rather than issue a finding on it.

## 5 SOFA-Defined Severe Injuries

### 5.1 Introduction

In addition to switching fatalities, SOFA-defined severe injuries are a source of considerable harm to Train, Yard, and Engine (TY&E) employees. 1,522 severe injuries -- 201 of which were amputations (13.2 percent) -- occurred, 1997 through 2009, to these employees.

Incidence has declined over the years, with the appearance of stages, as shown by three shaded sections in Figure 5-1. In 2010, there were 51 severe injuries January through October v. 42 in the corresponding period of 2009. (Ten months of 2010 was the most up-to-date period available at time of publication.) However, based on ten months, it would be premature to make any prediction about the number of injuries that will occur in 2010, full-year. Or years after.



**Figure 5-1: SOFA-defined Severe Injuries by year, 1997 through October 2010**

(Note: 1997 is the first year these injuries can be defined based on the interests of SWG)

#### 5.1.1 Chapter Overview

This chapter discusses SOFA-defined severe injury topics: importance, definition, SOFA Working Group (SWG) interest, data potential for further understanding of switching fatality issues, recent declines, and seasonality. Throughout, focus is given to possible relationships with switching fatalities. Descriptions by selected attributes and track locations are provided in Appendix J.

### 5.2 Importance of Severe Injuries

Severe injuries can involve major trauma. As mentioned, while in recent years these injuries have declined, continuing existence indicates the importance of safety efforts devoted towards elimination. As with switching fatalities, SWG maintains zero tolerance to severe injuries, the goal being complete elimination.

SWG has interest in factors causing these injuries. An important question -- not easily answered because of data considerations given the interests of SWG -- is whether such factors are similar to those causing switching fatalities? Translated into preventive action, the issue becomes, will SOFA findings 'spill over' to eliminate severe injuries? Or are additional efforts required? Again, data considerations, such as not being able to assign Possible Contributing Factors (PCF) codes, make some answers problematic.

### 5.3 Definition of SOFA-defined Severe Injuries

1997 is the first year severe injuries, as defined by SWG, can be determined as a result of additional anatomical specificity in *FORM FRA F 6180.55a* (the '55a') coding, and development of seven circumstance codes that allow some sequencing of events preceding an injury. Switching fatalities based on investigations can be determined further back. Thus, the SWG study and surveillance period for severe injuries is five-years shorter than for fatalities.

For compatibility with switching fatalities, SWG included only TY&E employees, believing these employees were the most likely to engage in similar switching operations. *Severe injuries*, based on a verifiable diagnosis, were formally defined by SWG as (1) potentially life threatening; (2) having a high likelihood of permanent loss of function, permanent occupational limitation, or other permanent disability; (3) likely to result in significant work restrictions; and (4) involving a high-energy impact to the human body. *Severe injuries* include amputation, dislocation of the neck, loss of eye, electric shock or burn, and fracture to any bone except the lower arm, fingers, foot, and toes (Table 5-1). These injuries include only those required to be reported to the FRA.

**Table 5-1: Definition of SOFA-defined Severe Injuries**

Type	Body Location
Fracture	Upper arm, upper leg, knee, lower leg, ankle, heel, eye, skull, neck, spine, upper back, lower back, shoulder, collar bone, rib/rib cage, hips, and multiple fractures
Amputation	Any body part
Dislocation	Neck
Loss of eye	One or both
Electric Shock/burn	Eye, ear, nose, mouth/teeth, skull, and neck
Other burn	Eye, ear, nose, mouth/teeth, skull, and neck

Illnesses to TY&E employees potentially meet the SOFA-defined criteria for severe injuries, with the one exception of resulting from a high-energy impact. However, SWG has not studied these illnesses, or included illnesses in counts of severe injuries. Such illnesses would include heat/sun stroke, freezing/frostbite, noise-induced hearing loss, poisoning, and dust diseases affecting the lungs.

Most SOFA-defined severe injuries involve fractures (83 percent). The distribution of severe injuries by nature of injury, 1997 through 2009, is shown Table 5-2.

**Table 5-2: SOFA-defined Severe Injuries by Nature of Injury, 1997 through 2009**

Nature of Injury	FRA Nature of Injury Code	Number	Percent (%)
Fracture	#70	1,263	83.0
Amputation	#80	201	13.2
Other Burns	#50	45	3.0
Electric Shock/Burns	#40	10	0.6
Dislocation	#60	3	0.2
<b>totals</b>		1,522	100.0%

#### 5.4 SOFA Interest in Severe Injuries

In issuing its first switching fatality report in 1999, SWG's interest in severe injuries developed based on:

1. Type of information available about severe injuries, recognizing that the associated events are not investigated or reported like switching fatalities;
2. Extent to which the available information allows determination of whether these injuries have a similar PCF basis as switching fatalities -- or whether different processes are involved; and
3. Whether there is potential for making findings in operating procedures to affect prevention.

With those interests in mind, and its knowledge gained from studying switching fatality events, SWG undertook an analysis of SOFA-defined severe injuries in 2000 and published a report in July 2001.<sup>30</sup> Given the nature of information available (i.e., not investigated like fatalities), SWG could not conclusively link SOFA Recommendations to severe injuries, but published its results in the interest of railroad safety. However, this was not interpreted as meaning that SOFA 1-5 Recommendations do not have value in severe-injury prevention. (Note: At the time of this report (2001), SWG had not formally developed a classification system for Special Switching Hazards (SSH). Development of the SSH classification system began in 2002. Hence, SSHs were not explicitly analyzed in its injury report, although there was mention of 'close clearances.')

As an example of possible fatality-event linkage, historically amputations comprise about 13 percent of all severe injuries. In particular, a lower body amputation resulting from equipment movement may involve SOFA 1-5 and/or SSH. Indeed, the difference between a fatality and a severe injury may only involve prompt medical intervention. Other examples could be given to illustrate that some severe injuries may involve SOFA 1-5 and/or SSH. Thus, SOFA findings may have a 'spill over' effect resulting in prevention of some potential severe-injury events, and even injuries of lesser severity affecting employees engaged in switching operations. But, again because of data limitations, difficulty exists in estimating how many such events have been, or could be, prevented.

In publishing its injury report, SWG did not offer any special preventive measures other than recognition that these injuries occur with a frequency warranting caution among employees, and scrutiny among railroads and government officials, as well as the affiliated safety community.

<sup>30</sup> See *Severe Injuries to Train and Engine Service Employees: Data Description and Injury Characteristics*. July 2001. Available at: <http://www.fra.dot.gov/us/content/1781> [accessed September 2010]

Since the SWG 2001 injury report, SWG could only monitor, as in its quarterly updates, the incidence of severe injuries and provide descriptive information.

### 5.5 Information Difficulties in Determining Causes of SOFA-defined Severe Injuries

Table J.1 (See Appendix J) displays the information available about severe injuries, based on *FRA Form F 6180.55a*. A short narrative description may be provided if circumstances cannot be fully captured in coded information. As mentioned above, unlike switching fatalities, most severe injuries are not investigated. In issuing its SWG 2001 report, SWG said:

*The SOFA Working Group has looked at the injury data from the perspective of the knowledge gained from its detailed investigation of Fes [fatalities, employees] where the circumstances surrounding, and leading up to, a FE where {sic} identified. The SOFA Working Group realizes that serious [severe] injuries are not investigated the way FEs are; hence, it is not always possible to identify these circumstances. The implication of this is clear: it is not possible for the SWG to tell if one or more of its five safety recommendations applies to a particular Serious [Severe] Injury event.<sup>31</sup>*

In saying “it is not always possible to identify these circumstances” SWG was not suggesting injury information is not of value or incomplete. Rather, for the issues of interest to SWG, as assignment of PCFs and classification as SOFA 1-5 and/or SSH, determination could not be made. Appendix J contains a discussion (**Using *FORM FRA F6180.55a* Information about Severe Injuries, and Further Analysis, to Better Understand Switching Fatalities**) about using *FRA Form F 6180.55a* information to potentially better understand switching fatalities and issues relevant to these fatalities, as well as suggestions for further analyses.

### 5.6 Declines in SOFA-defined Severe Injuries

In 2002, SOFA-defined severe injuries began to decline although not consistently year-to-year (Figure 5-1). For the years, 1997 through 2001 severe injuries averaged 138.0 per year. For 2002 through 2007, an average of 115.3 per year occurred. In 2008, there were 87 severe injuries. Then in 2009 injuries declined to 53, a 13-year low.

Of interest to SWG is why this decline occurred. Currently, SWG cannot provide an answer. A similar decline, although the timing pattern is somewhat different, is also evident in the larger casualty series (not including deaths) involving TY&E employees of which SOFA-defined severe injuries are a subset (Figure 5-2).

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<sup>31</sup> *ibid*





Attempt has been made to determine if some severe injury types declined more than others, thus potentially providing insights into reasons for the overall decline, particularly in 2008 and 2009. Indication does exist for variation for some severe injury types based on proportionality. Proportional variation by track type exists (Appendix J, Table J.8). There is also proportional variation among event types (Appendix J, Table J.9) and states (Appendix J, Table J.10). However, such proportional differences appear too small to isolate a specific cause (s) internal to railroad operations.

Possibly the decline is associated with broad-based economic conditions as reflected by overall activity levels (e.g., train and switching miles, freight car loadings). As an observation, declines in severe injuries began in 2002 and are acute in 2008 and 2009. These years coincide with downturns in overall economic activity, although the decline in the larger casualty series began earlier in 2001 (Figure 5-2). More conclusive evidence of an economic role likely would have to come from observing injury levels in future years having normal economic conditions, and from understanding long-term, operational trends which may also cause severe injuries to decline. As well, any discussion of reasons for the decline should consider operational change, and safety program effectiveness.

Notwithstanding, as mentioned, SWG cannot offer conclusive reasons why SOFA-defined severe injuries have declined. Declines appear to be broad based across railroads and regions. SWG intends to continue its interest into reasons for the decline. SWG invites members of the safety community to analyze the decline. Primary focus, however, should be proactive in trying to prevent the severe-injury events still occurring, in accordance with SWG's goal of zero tolerance.

## 5.7 Seasonality and Winter Months

December, January, February, and March historically have relatively high counts of severe injuries, but all months have risk for SOFA-defined severe injuries (Figure 5-3). While likely winter conditions play a role, all of the reasons for increases in these months are not known.

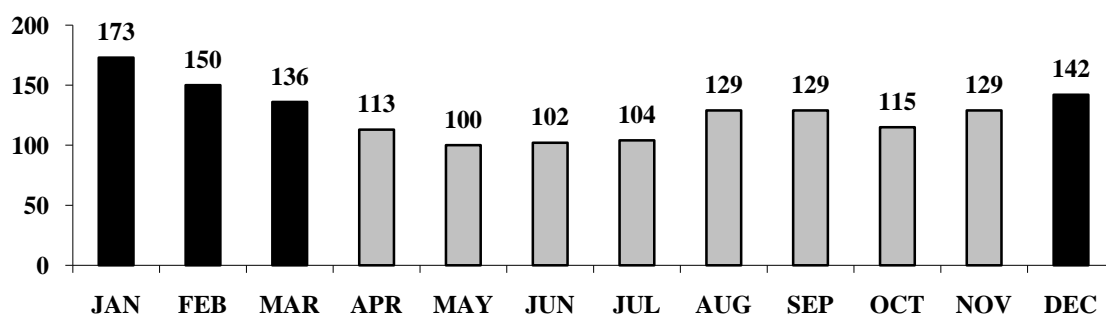
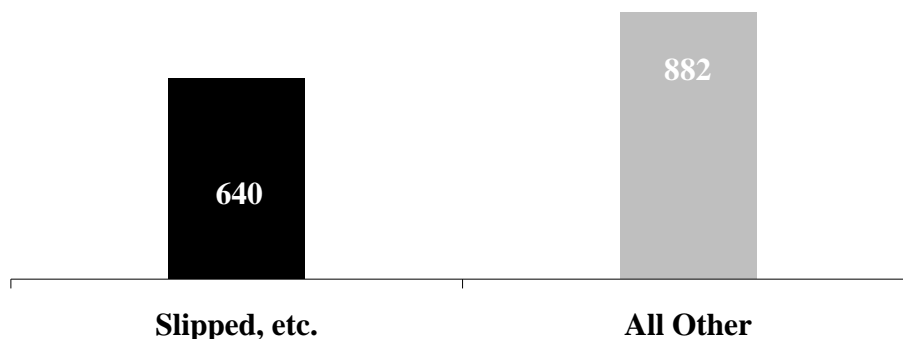


Figure 5-3: SOFA-defined Severe Injuries, by month, 1997 through 2009

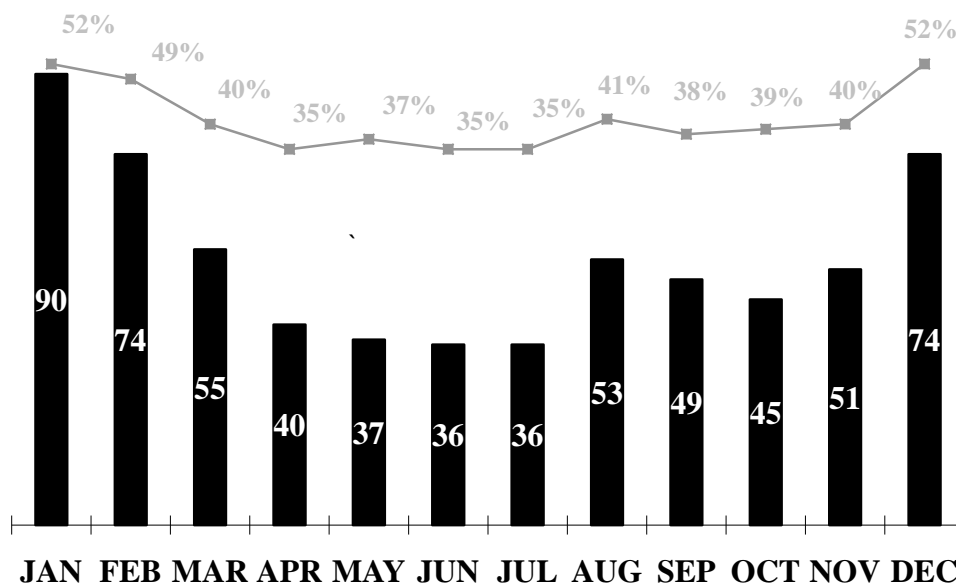
### 5.7.1 Cluster of Slipped, Fell, Stumbled, etc., Injury Types...Increases in winter Months

The composition of severe injuries by event type contains a large cluster. There were 640 SOFA-defined severe injuries, 1997 through 2009, resulting from ‘slipped, fell, stumbled, etc.’ (FRA Event Codes #51-54, and 70) -- 42 percent of the total 1,522 injuries occurring during this period (Figure 5-4). Other clusters of severe injuries by event types are much smaller (Table J-9).



**Figure 5-4: Composition of 1,522 Severe Injuries: Slipped, Fell, Stumbled, etc. v. All Other Types, 1997 through 2009**

Winter appears to be a factor in ‘slipped, fell, stumbled, etc.’ events. During December, January, February, and March, 1997 through 2009, the percent of this injury type is 48 v. 38 percent for other months (Figure 5-5).



**Figure 5-5: Severe Injuries Attributable to Slipped, Fell, Stumbled, etc., by month, 1997 through 2009**

## 5.8 Going Forward

SWG at times has encountered difficulties in answering safety questions about severe injuries. Some of these difficulties were not based entirely on available data. Time and resources available to SWG has limitations. Given its charge, most of SWG's time and resources are used to review and discuss fatalities. SWG invites other safety groups to use severe injuries as a way of understanding safety issues and hazards.

## 6 EVALUATION OF THE SOFA WORKING GROUP FOR THE IMPLEMENTATION OF SOFA FINDINGS

### 6.1 Introduction

In preparation for the SOFA Working Group (SWG) reconvening in January 2009, the Chair of the working group contacted past SWG members, one of whom represented the FRA Office of Research and Development (R&D). The SWG requested research and evaluation support from R&D, and specifically asked for implementation support to develop and refine strategies for dissemination of SOFA findings and implementation of action ideas in the railroad industry.

Upon release of the 1999 SOFA Report, the railroad industry responded with the implementation of safety programs to promote the use of the SOFA findings and recommendations; however, the extent that these efforts have been sustained or had an impact over the past 10 years is unclear.

To support the current formation of the SWG, R&D assembled a professional team with backgrounds in education, human-factors research, program development, and utilization-focused evaluation<sup>32</sup>. The evaluation team operated in support of the SOFA goal of *Zero Fatalities* with a purpose to foster (a) the use of SOFA findings and (b) the implementation of effective safety practices.

### 6.2 Evaluation Goals

Using a case study approach, the evaluation team studied the SOFA process and immersed itself in the SWG activities by embedding a team member within the group. In addition to providing technical support for 2010 SOFA Report, the evaluation team aimed for the following goals:

- Understand the implementation of past SOFA findings.
- Create a SOFA theory of action, represented in a logic model.
- Clarify and describe SWG process.
- Develop stakeholder engagement strategies for implementation of new and prior SOFA findings (i.e., The Five Lifesavers).
- Facilitate use of SOFA findings in the railroad industry.

These evaluation goals are connected inextricably to the intended use of the SOFA findings in the railroad industry to reach the ultimate goal of *Zero Fatalities*.

### 6.3 Background

The goal of the 1999 SOFA Report was to make recommendations that, when implemented would reduce the incidence of fatalities and any related injuries in switching operations. Accordingly, the recommendations focused on actions that could be taken by the FRA and the railroad industry to improve the safety of switching operations. The SWG identified the

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<sup>32</sup> Patton, M.Q. (2008). *Utilization-Focused Evaluation* (4<sup>th</sup> ed.). Thousand Oaks, CA: Sage.

following five approaches to improving safety that “can impact the occurrence of unsafe acts, or latent conditions, that contribute to incidents” (1 - 5) and promote a culture of safety in the workplace.

- Improved design of equipment used in yards, rolling stock, worksite and layout.
- Improved training or communication procedures, such as job briefings.
- Revised or re-emphasized rules and procedures.
- Improved track or equipment maintenance.
- Modifications to management policy and workplace culture.

Safety culture is the combinations of attitudes, values, beliefs, norms, and perceptions that employees at every level of an organization share in relation to safety, safe behaviors, and practices (Clarke, 2000). It refers to the extent to which individuals and groups will commit to personal responsibility for safety; act to preserve, enhance and communicate safety information; strive to actively learn, adapt and modify (both individual and organizational) behavior based on lessons learned from mistakes; and be held accountable or strive to be honored in association with these values (von Thaden, Kessel & Ruengvisesh, 2008, adapted from Wiegmann, Zhang, von Thaden, Sharma & Mitchell, 2002:8). This definition combines key issues such as personal commitment, responsibility, communication, and learning in ways that are influenced strongly by processes instantiated by upper-level management, but also influence the behavior of everyone in the organization (cf. Wiegmann et. al, 2004).

Overall a safety-culture may drive resource management decisions, shape organizational climate, and influence the development of organizational processes. Safety culture represents a complex understanding wherein an organization must evaluate its strengths and vulnerabilities to promote the creation of a consistent, positive safety culture.

The key in any safety-culture improvement program is to develop effective measures to evaluate the current state of a particular safety culture, as well as to determine whether interventions have been effective in achieving a desired cultural change (Coplen, 1999). Therefore, indicators of safety culture within an organization first must be identified and then be measured specifically before any training or procedural changes should be introduced and expected to be accepted within the organization. Without identification and measurement of the safety-culture baseline, unidentified barriers may hinder effective implementation of safe practices (Coplen, 1999). This assertion of how to make change in safety practice when implementing new safety programs provides insight into why the degree of change expected by the 1999 SWG did not occur, and in what way the 2010 SWG should proceed with the railroad industry to promote change as a result of the 2010 findings.

#### 6.4 Evaluation Standards

A safety program delivered through education, outreach, or accountability is not considered a means to a predefined end, but rather, a practice that has different, sometimes conflicting, meanings for various stakeholders. A safety program evaluation provides illumination, evidence, and understanding to foster informed decisions about complex and dynamic programs and their contexts. To acknowledge this ambiguity, evaluation criteria should derive from stakeholder issues, emphasizing the intended change as an innovation within specific contexts. In cooperation with stakeholder collaboration, an evaluator can provide knowledge, foster

understanding, and facilitate improvement toward the desired goal or change. The standards of professional evaluation practice, the *Guiding Principle*<sup>33</sup> and the *Program Evaluation Standard*<sup>34</sup>, suggest evaluators operate with greater independence and in stakeholder interest, and therefore support the evaluator role as facilitative.

Under certain conditions, an evaluator may assist programs in adapting program implementation through presenting suggestions for altering program design. The design and planning processes link to ongoing improvement through analysis of implementation strengths and weaknesses. This describes the role of the evaluation team, and the standards by which it made its assertions about the SWG process.

## 6.5 Evaluation Approach, Method, & Phases

The evaluation team used a case study approach, retrospective and prospective in scope, looking at current effects of previous SOFA reports to (a) understand the potential causes of those effects and (b) inform future planning and potential trajectories for action of the SWG. The evaluation team employed multiple research methods, including document analysis, logic models, participant observation, individual SWG member interviews, and stakeholder review, in a systematic and responsive manner during the evaluation period of 15 months.

The following table outlines the key evaluation activities with the SWG since January 2009.

**Table 6-1 Key Evaluation Events Timeline with the SWG**

SWG Reconvene	Logic Model	SWG Member Discussions	Themes Logic Model	SWG Reunion	Process Eval Report Logic Model	SSF Prep Task w/ SWG	SSF Planning & Event		SSF Theme Analysis SSF Report Outline SSF Report Draft SOFA Finding Report Release			
Jan	Feb	Jul	Aug	Sept	Oct	Dec	Jan	Feb	Mar	May	Jun	Dec
2 0 0 9							2 0 1 0					

### 6.5.1 Document Analysis of Past Implementation Strategies

The first phase of the evaluation involved understanding the history of SOFA and what happened since first report released in October 1999. The findings within the 1999 SOFA Report were disseminated widely to the railroad industry using multiple implementation strategies, but not without difficulties.

Following the release of the 1999 SOFA Report, SWG labor members reported to the SWG that the Five Major Safety Recommendations were being implemented but were being used as a basis of elevated discipline, which was not the intent of the “the Five Lifesavers”. The process for how the Lifesavers should be implemented became a focus of the SWG. Consequently, SWG developed guidelines, which were influenced by the 1999 edition of the Program Evaluation Standards, to assist in more effective implementation. (See Appendix K for further description of the SOFA Implementation Guidelines for Five Major Safety Recommendations.)

Further document analysis involved systematic review of meeting notes from a series of 30-person teleconferences held after the 1999 SOFA Report release, during 2000 and 2001. The

<sup>33</sup> American Evaluation Association (2004). *Guiding Principles for Evaluators*. <http://www.eval.org/Publications/GuidingPrinciples.asp>

<sup>34</sup> Joint Committee on Standards for Educational Evaluation (1994). *The Program Evaluation Standards*. Thousand Oaks, CA: Sage.

analysis of these notes revealed eight prominent categories of activities reportedly being implemented by the railroad industry during that time. The following table presents the activities organized by purpose, described using example products or program outputs, and categorized by outcomes possibly demonstrated from those strategies.

**Table 6-2: 2000-01 Reported Implementation Activities Related to the SOFA Recommendations**

<i>Strategy Purpose</i>	<i>Example Description</i>	<i>Use</i>
SOFA Promotional Items	<ul style="list-style-type: none"> <li>- Magnets, stickers, and “5 Lifesaver” cards</li> <li>- SOFA-created video (or carrier-created videos)</li> <li>- Poster campaign, “Five-Lifesavers”, in yard offices</li> </ul>	<ul style="list-style-type: none"> <li>- Outreach</li> <li>- Educational</li> </ul>
SOFA Events	<ul style="list-style-type: none"> <li>- National SOFA Day</li> <li>- SOFA Action Plan within service units</li> <li>- SOFA Coordinators who are past SWG members or safety leaders</li> </ul>	<ul style="list-style-type: none"> <li>- Outreach</li> <li>- Educational</li> </ul>
Safety Policy	<ul style="list-style-type: none"> <li>- SOFA recommendations adapted into operating and safety rule books and testing</li> <li>- Three-point protection process</li> <li>- Safety Committees comprised of employees and management</li> </ul>	<ul style="list-style-type: none"> <li>- Accountability</li> </ul>
Performance Measurement	<ul style="list-style-type: none"> <li>- Switching yard audits or “Safety Review”</li> <li>- Efficiency testing</li> <li>- Work practices observations</li> <li>- “Ride-alongs” by managers</li> </ul>	<ul style="list-style-type: none"> <li>- Accountability</li> <li>- Outreach</li> </ul>
Safety Training Programs	<ul style="list-style-type: none"> <li>- TY&amp;E employee training program (incorporate the SOFA report and video)</li> <li>- Crew Resource Management with focus on the “Five Lifesavers”</li> <li>- Supervisor classes include a SOFA segment/module</li> <li>- Operating Department Rules/CRM/SOFA class for employees</li> </ul>	<ul style="list-style-type: none"> <li>- Educational</li> <li>- Accountability</li> </ul>
Mentoring	<ul style="list-style-type: none"> <li>- Orange armbands worn by employees with less than one year of service who may need special attention</li> <li>- Formal employee-to-employee mentoring established</li> </ul>	<ul style="list-style-type: none"> <li>- Educational</li> <li>- Accountability</li> </ul>
Communication (to stakeholders)	<ul style="list-style-type: none"> <li>- Meetings for employees, carrier- and labor-supported</li> <li>- “SOFA Safety Blitz” to employees throughout carrier system</li> <li>- Correspondence to employees from carrier leadership</li> <li>- Correspondence to employee families from carrier leadership</li> <li>- Correspondence to customer from carrier leadership</li> <li>- Newsletters to employees</li> </ul>	<ul style="list-style-type: none"> <li>- Outreach</li> <li>- Educational</li> <li>- Accountability</li> </ul>
Signage	<ul style="list-style-type: none"> <li>- Proper signage, particularly close or no clearance signs, be maintained by customer</li> </ul>	<ul style="list-style-type: none"> <li>- Accountability</li> </ul>

The analysis revealed the extent to which any of these strategies had an impact or were sustained during the following decade was unknown and would require further inquiry to understand. Without the establishment of monitoring systems at the time when reported program activities were implemented, no data were captured to track and evaluate the impact and sustainability of such programs.

However, this evaluative review of past implementation activities suggests that future safety program planning efforts should include the development of methods to track and monitor implementation programs for ongoing evaluation and program improvement by railroad industry stakeholders.

### 6.5.2 Logic Modeling of SWG Theory of Action

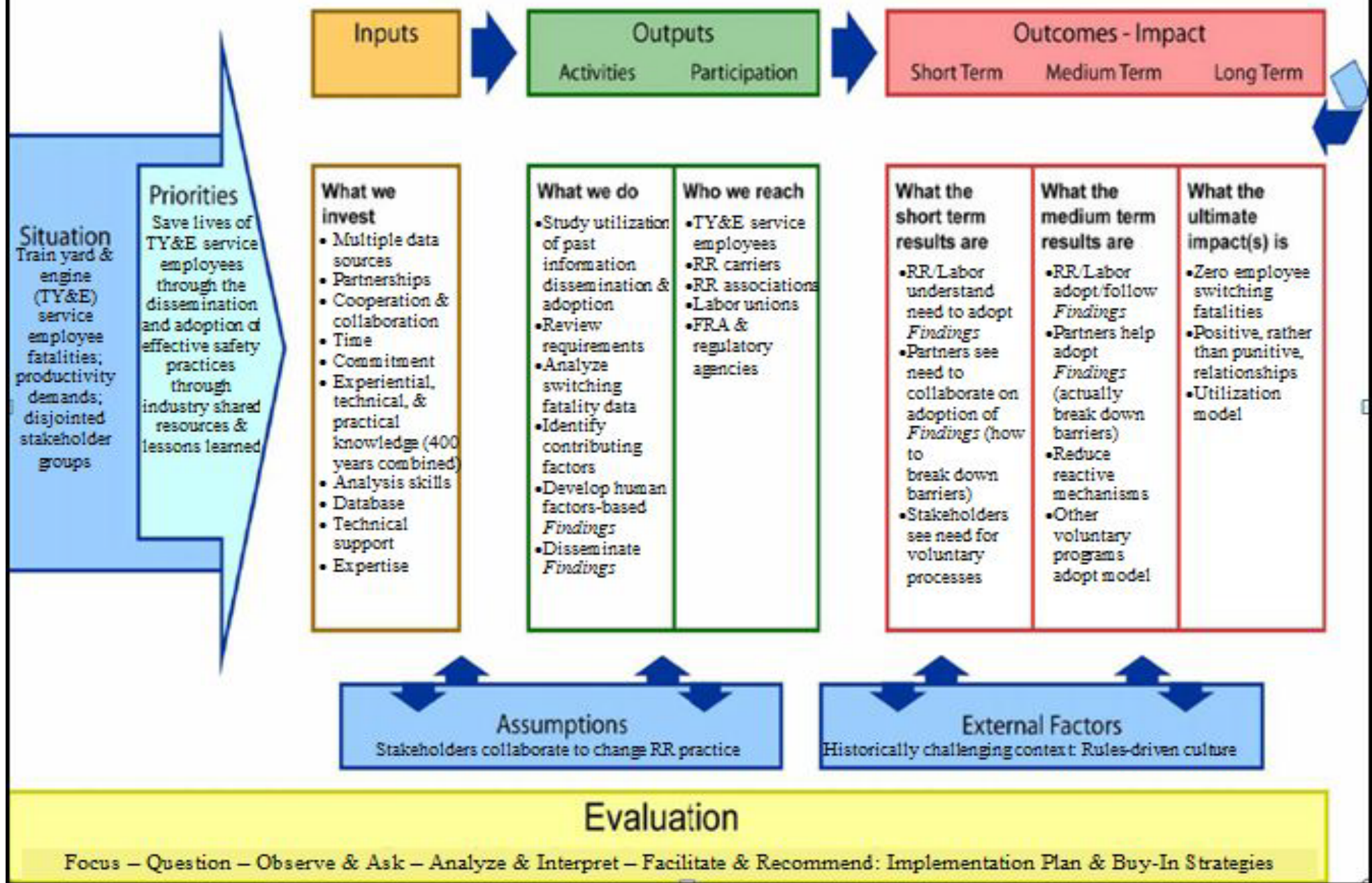
In spite of the aforementioned strategies and guidelines for implementation, which appear to have held the attention of the railroad industry for a period of time, the number of switching operations fatalities eventually accumulated to a critical point when the request was made for the SOFA Working Group to reconvene in 2009.

A concurrent request emerged for the evaluation team to inform and guide alternative implementation approaches that contribute to the greater, more sustained, utilization future SOFA findings. In February 2009 and at the invitation of the SWG, an evaluation team member attended the SWG meeting in Chicago to facilitate conversation about how to attain greater and more lasting impact with the 2010 report. As a first step for the SWG, the evaluation team recommended clarification of the intended actions and outcomes the SWG that would achieve its goal of *Zero Fatalities*. The evaluation team then visually represented the SWG process as a theory of action logic model for the group to further refine.

Logic models assist in more effective planning, implementation, evaluation, and communication within programs and across stakeholders. The visual representation describes logical linkages among resources, activities, outputs, audiences, and outcomes related to a specific problem or situation. Once a program has been described in terms of the logic model, critical measures of performance can be identified. Further, the model helps to identify partnerships integral to enhancing program performance. First steps involve assessing the situation and articulating the priorities. The SWG discussed its theory for action and reviewed four iterations of a logic model through its process; the final version is shown in Figure 6-1.



Figure 6.1: SOFA Working Group Theory of Action Logic



### 6.5.3 Process Evaluation

After articulating a theory of action through a logic model, the evaluation team sought to understand and validate the SWG process from an external perspective. The evaluation team captured, formally and systematically, the lessons learned about past implementation of SOFA findings by key stakeholders in railroad industry as they emerged during the SOFA process. The evaluation team observed and participated in SWG meetings, and documented the SWG current processes and reflective actions.

The evaluation team concluded that the SOFA process is systematic, rigorous, comprehensive, and objective. Furthermore, the findings of the SWG are valid, significant, and worthy of the railroad industry's thoughtful attention and bold response.

These conclusions were based on the following observations:

1. The SOFA Working Group is appropriately constituted.
2. The SOFA Working Group is cohesive and resistant to political influences.
3. SOFA 2010 is explicitly designed for utilization.
4. Information analyzed by the Working Group was complete, sound, and varied.
5. SOFA case analyses are meticulous.
6. The Working Group reaches consensus on key conclusions about each case.
7. Aggregation of SOFA case data was rigorous.
8. The SOFA Working Group practices continuous improvement.
9. The process evaluation was thorough and independent. (See Appendix L for the Process Evaluation Report.)

### 6.5.4 SWG Interviews

A next step was to identify the current situation and priorities for the SWG in its considerations for the implementation and utilization of its SOFA findings. To this end, an evaluation team member conducted individual, face-to-face interviews with nine of the 10 SWG members present at the August 2009 SOFA meeting; three interviews were with members who had served previously as a SWG member.

Members revealed historically challenging conditions in which the railroad workers operate. The productivity pressures within the railroad industry are intrinsic and systemic. An authoritative management style with regard to rules has fostered a resistance on the part of labor to support changes in worker practices. Subsequently, the litigious and defensive cycle of worker performance comprises the work environment.

The "Just get it done" work ethic and the "It won't happen to me" mind-sets were prevalent in the railroad industry and presented themselves as persistent barriers to the adoption of the 1999 SOFA "Five-Lifesavers" recommendations; therefore, they arise as the dominant challenges in designing the implementation plan for the 2010 report. Most "ballast level" SOFA members reported changing their own behaviors as a result of being on SWG. The results progressively focused a key inquiry question to guide the current SWG through its work: *What can the SWG*

*do to help facilitate this behavior change and improve safety culture in switching operations more broadly?*

#### 6.5.5 SOFA Working Group Reunion

A meeting that included participation of the past and present SWG members provided an opportunity for a reflective discussion of implementation issues through an interactive review of the SWG interview themes from the previous meeting. Members at the reunion validated the themes and shared their personal experiences and multiple perspectives on the persistent implementation barriers.

The past SWG members discussed their impressions of why the last SOFA report findings, which were issued explicitly as recommendations to the railroad industry, were not adopted as they had intended. Through an expertly facilitated discussion by an evaluation team member, insight was gained as to why recommendations may have been co-opted into rules over time: *They read like rules.*

A shift in focus was posited regarding the power of *not* issuing explicit recommendations, but reporting simply the findings. However, the caveat of this process was that the SWG would have to strive to involve key stakeholder groups early – prior to report release.

A conclusion and assertion from the process evaluation was the importance and critical need to involve key stakeholders *during* the process of the SWG *before* the report was written, finalized, and released to the railroad industry. The goals of involving stakeholders, asking for their participation, and collaborating with key stakeholders were to create a buzz, prepare the railroad industry for the forthcoming report, and encourage the stakeholders to generate ideas for how to implement the findings.

#### 6.5.6 SOFA Safety Forum

After the SWG reunion, ideas were generated around starting the outreach campaign to the railroad industry, such as through a press release, to start the buy-in process early. Furthermore, an event was suggested that would engage key stakeholders in the preliminary findings. This event could structure the stakeholder engagement through a mix of whole group and small group activities.

The event goals would be three-fold: (a) to preview the SOFA findings, (b) to announce the forthcoming 2010 Report release, and (c) to encourage stakeholder consideration of appropriate and specific actions they will want to take in response to the SOFA findings. The underlying importance is for stakeholder involvement during the process and to build capacity for use of the findings. Among other advantages, this utilization-focused approach would recognize that solutions are formulated best in context, and acknowledge that the most appropriate fix for a given problem would likely vary from carrier to carrier and site to site.

Consequently, the SWG decided to convene an event that became known as the SOFA Safety Forum (SSF) was held on February 25, 2010. Fifty-five senior safety leaders representing 19 railroad-industry organizations participated in the SSF (See Table 6-3).

**Table 6-3 SOFA Safety Forum (SSF) Attendee Affiliation List**

Washington, D. C., February 25, 2010

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Association of American Railroads (AAR)  
American Short Line and Regional Railroad Association (ASLRRA)  
Amtrak  
Anacostia & Pacific  
Brotherhood of Locomotive Engineers and Trainmen (BLET)  
Burlington Northern Santa Fe (BNSF)  
Canadian National (CN)  
Canadian Pacific (CP)  
CSX  
Federal Railroad Administration (FRA)  
Iowa Interstate  
Kansas City Southern (KCS)  
Norfolk Southern (NS)  
OmniTRAX  
RailAmerica  
Union Pacific (UP)  
United Transportation Union (UTU)  
Watco Companies  
Wheeling & Lake Erie

#### Engagement Approach

The evaluation team played an instrumental role in facilitating and guiding the event planning and execution. The small-groups (a) affirmed the credibility of the SOFA finding, (b) identified related issues, (c) explained potential barriers, and (d) discussed action ideas for utilizing the findings in the railroad industry.

The small groups were balanced with representatives from labor, management, and government to mirror the composition of the SWG and to foster equitable discussion. Five small groups consisted of 14 persons: 11 attendees, 2 SWG representatives, and 1 facilitator. The evaluation team members served as the small-group facilitators. Two SWG members participated in the role of SWG representative present to clarify and listen to any issues or questions regarding the SOFA process or switching fatality data cases.

A note-taker captured the breadth of each group discussing with any attributions made anonymous and any identities confidential in analysis, reporting, and reference to themes. The transcribed notes were verified for accuracy by the facilitators and SWG representatives present at their respective tables. Once verified, the evaluation team systematically and iteratively analyzed the content deductively to reveal themes to code the data. Then the evaluation team re-analyzed the content using previously identified themes to code the data inductively. Table 6-4 organizes the data themes by the key SOFA finding discussed in each small group and by the three areas of discussion. (See Appendix K for the transcripts of the small-group notes, which have been made anonymous, and are organized by theme.)

The SWG achieved the goals it set for the forum, and considered the implications for the railroad industry when asserting or recommending a particular practice or policy. The SWG deliberated the SSF themes in finalizing their report and in planning its release to the railroad industry. The

process that revealed itself through the reflection, participation, and direction of the SWG demonstrates potential as a model for other industry and safety programs. (See Appendix K for a table that summarizes the SSF process through action phases and illustrated by guiding questions for each key activity.)

The SOFA Safety Forum emerged as an unprecedented approach in the railroad industry for engaging key stakeholders in discussion with each other about the SOFA key findings prior to the 2010 SOFA Report release.

**Table 6-4: SSF Themes by SOFA Key Finding**

<b>Finding</b>	<b>Issues</b>	<b>Barriers</b>	<b>Actions</b>
<i>Job Briefing</i>	<ul style="list-style-type: none"> <li>• Term suggests one-way communication</li> <li>• Unclear scope of briefing</li> <li>• Appropriate or best approach in practice not implemented uniformly</li> </ul>	<ul style="list-style-type: none"> <li>• Productivity pressure, “Just get the work done.”</li> <li>• Individualism; individual exception to safety risk, “Can’t happen to me.”</li> </ul>	<ul style="list-style-type: none"> <li>• Need two-way communication</li> <li>• Identify and disseminate best practices</li> </ul>
<i>Mentoring</i>	<ul style="list-style-type: none"> <li>• Lack of consensus on quality mentor criteria</li> <li>• Influx of new hires with &lt;1.5 yrs.’ experience</li> <li>• Small or one-person crews</li> <li>• Not all experienced employees are candidates to be mentors</li> </ul>	<ul style="list-style-type: none"> <li>• Personality conflicts</li> <li>• Lack of agreements between carrier and labor</li> <li>• Training and education use rote instructional approaches</li> <li>• Disinterest/unwillingness to mentor</li> </ul>	<ul style="list-style-type: none"> <li>• Experiential learning approaches, such as OJT</li> <li>• Positive remedial learning</li> <li>• Carrier-Labor Partnerships</li> <li>• Program monitoring/feedback</li> </ul>
<i>Close Clearance</i>	<ul style="list-style-type: none"> <li>• Influx of new hires with &lt;1.5 yrs.’ experience</li> <li>• Unsafe equipment &amp; working conditions</li> <li>• Changing communications medium and strategies</li> <li>• Too many rules; complex; non-standardization</li> </ul>	<ul style="list-style-type: none"> <li>• Individualism</li> <li>• Lack of teamwork</li> <li>• Practice from habits not education</li> <li>• Lack of or unenforced agreements between carriers and clients</li> <li>• Lack of communication systems</li> </ul>	<ul style="list-style-type: none"> <li>• Situational awareness</li> <li>• Defensive switching</li> <li>• Safety rules revision</li> <li>• Safety site visits</li> <li>• Safety hotlines</li> <li>• Communication with clients</li> </ul>
<i>Industrial Hazards</i>	<ul style="list-style-type: none"> <li>• Influx of new hires with &lt;1.5 yrs.’ experience</li> <li>• Worker disempowered</li> <li>• Unclear management buy-in/support</li> <li>• Inconsistent signage</li> </ul>	<ul style="list-style-type: none"> <li>• Lack of or unenforced agreements between carriers and clients</li> <li>• Lack of communication systems</li> <li>• Lack of education or training</li> </ul>	<ul style="list-style-type: none"> <li>• Safety site visits</li> <li>• Safety hotlines</li> <li>• Communication with clients, employees, and supervisors</li> <li>• Initiate/Enforce industry agreements</li> <li>• Improve signage</li> </ul>
<i>Struck by Mainline Train</i>	<ul style="list-style-type: none"> <li>• Unsupervised industry</li> <li>• Unclear communication strategies</li> <li>• Punitive environment; employee blame</li> <li>• Variable yard design and equipment</li> </ul>	<ul style="list-style-type: none"> <li>• Seasonal stressors on work duties and relationships</li> <li>• Inadequate communication</li> <li>• Depression in winter months</li> <li>• Inadequate job briefing</li> </ul>	<ul style="list-style-type: none"> <li>• Situational awareness</li> <li>• Defensive switching</li> <li>• Share responsibility</li> <li>• Active supervision</li> <li>• Equipment improvements</li> </ul>

## 6.6 Conclusion

As presented in this chapter, the purpose of the evaluation team and its work with the SWG focused on the utilization of SOFA report findings and implementing effective safety practices. Over time, the focus shifted progressively toward facilitating the ways the SWG can engage railroad industry stakeholders, prior to report release, to embrace SOFA findings, solicit their input, and generate action ideas for implementation in an ongoing effort to reach the goal of *Zero Fatalities*.

An overarching engagement strategy revealed itself through the delivery of the SSF: the power of presenting the preliminary SOFA findings to key stakeholder groups and including time for interactive discussion. (See Appendix K for a list of the outreach and initial implementation efforts by the SWG.) The unique event provided a first start, but the momentum must be sustained.

Moreover, in reflection of the SSF reactions and stakeholder discussions, the SWG continues to serve a significant role to the railroad industry through its analysis of FEs and dissemination of findings. The evaluation team asserts that the SWG can fill an even greater, more instrumental role in implementing its findings across the railroad industry by reviewing in an ongoing, continuous manner: (a) switching fatality cases, and (b) safety program implementation efforts. Following a *clearinghouse* model, the SWG would operate as a think-tank and could review successful aspects of safety programs and disseminate them to the railroad industry as “effective practices” for implementation in the railroad industry. Ultimately, the ongoing review meetings of the SWG will promote greater utilization of SOFA findings and promote a railroad safety culture to reach the goal of *Zero Fatalities*.

## 7 ADDITIONAL SUGGESTED ACTIONS

### 7.1 Introduction

In Chapter 3, Switching Fatalities – Understanding and Prevention - the SOFA Working Group (SWG) suggested remedies and developed advisory statements for specific situations that are encountered in switching operations. The remedies and advisory statements in Chapter 3 addressed five specific areas: job briefings, mentoring, close clearances, industrial hazards, struck by main line trains. This chapter covers suggested actions that either apply to more than one of the areas covered in Chapter 3 or improvements the SWG should make to its own role and approach.

### 7.2 Empowerment and Discipline

Safe practices in switching operations are the responsibility of all railroad industry employees. Employees must be able to make decisions on safe actions and be allowed to cease work in the interest of safety. As expressed in many of the railroad's empowerment statements, when performing safe actions employees should be free from reprisal by discipline, discrimination, or harassment when executing those safe actions. When using discretion to choose safe actions, the employee should use that discretion appropriately. An empowered work environment allows the railroad industry to progress toward attaining the SOFA goal of *Zero Fatalities*.

### 7.3 FRA Fatality Investigation Process and Data Collection

We support FRA efforts to enhance the investigative process through an objective means to identify potential operational, organizational, and behavioral issues. In the SOFA 1999 report at section 5.1.3 the SWG committed among other things to “seek new lessons learned.” To that end we ask FRA to extend the process to include compiling data on issues, such as inappropriate pressure from co-workers, managers, or others that may have influenced behaviors that could lead to the occurrence of a fatality.

### 7.4 SWG Improvements

#### 7.4.1 Transition the SWG From “Analysis” to “Analysis and Implementation”

Past SOFA tasking letters<sup>35</sup> called for a task force (later named the SWG) to conduct an analysis of switching fatalities. The SWG accomplished the analytical duties called for in these tasking letters with the October 1999 SOFA Report, the 2004 SOFA Update, and this report. The role of the SWG in promoting implementation is not clear in the tasking letters. The Group is not fully satisfied with the effect of the first two reports in terms of implementation and reduction in switching fatalities. To make this and future reports more successful, the SWG needs to expand its role further in the implementation phase. Each stakeholder organization has ideas concerning implementation. SWG duties should not end upon issuance of this report, and continued stakeholder support throughout the implementation phase is essential.

#### 7.4.2 Conduct Annual SWG Meetings

For this report, the SWG has met from January 2009 to December 2010. The frequency of meetings during this period (about once every month) made substantial demands on the members and their sponsoring organizations. The SWG recommends meeting three to four times a year to review current cases if needed, to monitor and identify trends, and to track the progress of

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<sup>35</sup> See Appendix B.

railroad industry implementation efforts. Reports and updates may not be issued every year. Instead, they would be issued if necessary in response to any emerging trends that demand action. The benefits of this approach are:

- Case review is done while information is still fresh and those familiar with the cases may be reached to provide clarification.
- SWG can spot trends while they are emerging and take appropriate action in informing the railroad industry.
- SWG can monitor railroad industry best practices and implementation of ideas. Deepen the SWG involvement in these areas as needed.
- Case review workload is no longer condensed, but is spread over a longer time period. SWG members are no longer tied to an intense two-year schedule when it is time to produce an updated SOFA report.
- The SOFA effort remains dynamic and has a presence in the railroad industry.
- Reduces the blanket turnover of members and enhances the transfer of knowledge to new members of the SOFA process.

#### 7.4.3 Improve the SOFA Database

The SOFA database includes over 200 data elements<sup>36</sup>. While most of these data elements were useful during analysis and deliberations, some were never used<sup>37</sup>. The SWG should continue its improvement of its data elements; scrub the data elements to maintain integrity, and consider removing elements which have not proven useful. The SWG also should look for opportunities to add new data elements as changes in railroad industry practice emerge and fatality investigations continue to improve<sup>38</sup>.

During the SSF Job Briefing breakout session there was a discussion about expanding the criteria for SOFA 5. The proposed expansion would include cases where an action or inaction by an inexperienced employee may have contributed to the fatality of another employee. The SWG responded by reviewing all case data for employee experience and found many older cases did not contain data on the experience level of the surviving crew members<sup>39</sup>. In cases where experience data was present, the SWG often could not determine the role of the inexperienced crew member. After examining all cases, the SWG found only one clear instance where the action of an inexperienced employee may have contributed to the fatality of another employee. This case, for the purposes of our study, has not been included in the count of SOFA 5 cases. The SWG will consider this issue again during its next series of case reviews.

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<sup>36</sup> Section 2.8 provides background on the SOFA database and its important role in the SOFA process.

<sup>37</sup> Many of these data elements were unused because the data was not available in the great majority of the cases reviewed.

<sup>38</sup> A data element to track cases with Remote Controlled Locomotives is an example of a data element which the SWG recently added in response to a change in industry practice.

<sup>39</sup> Following the 1999 SOFA Report (76 older cases) the FRA improved the detail and consistency of their investigation process.



# Appendix A: SOFA Cases 1992 - 2009

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## **SOFA 1: Adjusting knuckles, adjusting drawbars, or installing EOT**

FE-1992-18    20-Jun-92   CNW    Northlake                    IL    Yard Conductor/Foreman    AGE:   42

Crew was in the process of coupling cars together in a class track. Standing equipment was not properly secured before conductor fouled the track to adjust couplers and the equipment rolled back in and coupled him up.

FE-1994-26    17-Oct-94   UP        Donaldsonville            LA    Freight Brakeman/Flagman   AGE:   36

Crew switching in class yard, brakeman attempted to cross between equipment separated by an insufficient distance, and engineer moved locomotive in the wrong direction, coupling him up.

FE-1994-32    13-Dec-94   UP        Thorton                    CA    Freight Brakeman/Flagman   AGE:   48

Crew coupling up cars in an industry track, brakeman attempted to couple air between cars when unexpected movement of railcars occurred, resulting in his fatal injury.

FE-1995-11    24-Feb-95   ATSF    Amarillo                   TX    Engine Foreman               AGE:   44

Two crews working in the same yard from opposite ends, one crew dropped ten free rolling cars in on top of the cut where the other crew's foreman was installing the E.O.T. at the opposite end. Cars impacted with sufficient force to knock down and run over the foreman.

FE-1995-12    02-Mar-95   NS        Aiken                      SC    Brakeman                      AGE:   46

Switch crew was pulling a cut of cars out of an industry. Brakeman stepped in track gauge to open knuckle on the rear car at the same time crew shoved back to kick two cars that ran over the brakeman.

FE-1995-29    04-Oct-95   CSXT    Riverdale                   IL    Conductor                      AGE:   39

Crew performing switching in class yard. Switch foreman placed himself between the rails to adjust a mis-aligned coupler on the fifteenth car after the cut was stretched. Switch foreman was facing the coupler with his back to a cut of seven cars that rolled in on top of him and coupled him up.

FE-1996-09    20-Mar-96   BRC       Bedford Park               IL    Conductor                      AGE:   28

Three-person crew was switching in class yard, coupling between sixth and seventh car failed to couple. Conductor stopped locomotive and went between the cars to straighten the drawbar, and twenty-three cars rolled in behind him and coupled him up.

## **SOFA 1: Adjusting knuckles, adjusting drawbars, or installing EOT**

FE-1996-24 07-Oct-96 UP Eagle Pass TX Engine Foreman AGE: 35

Three-person crew was switching in class yard, locomotive failed to couple to cut of seven standing cars. Yard foreman used hand signals to separate the locomotive by twenty feet. While adjusting the locomotive drawbar, the seven cars rolled in and coupled him up.

FE-1997-25 15-Aug-97 UP Elko NV Yard Brakeman/Helper AGE: 53

Crew was switching in class yard. Helper was attempting to adjust the drawbar in order to couple to three cars about forty feet away that had not coupled the first time. While adjusting the drawbar, the helper did not notice the three free-rolling cars coming back in on him and the cars coupled him up.

FE-1998-15 26-May-98 BRC Bedford Park IL Yard Conductor/Foreman AGE: 57

Crew was working in one track in class yard with helper controlling engine moves, conductor was adjusting coupler when three free rolling cars struck him from behind and coupled him up.

FE-1998-17 05-Jun-98 NS Hapeville GA Yard Conductor/Foreman AGE: 48

Three-person crew was performing industrial switching using a runaround track, the yard foreman was attempting to couple up two super-cushion boxcars in a curve with power attached in a shove movement. Drawbars bypassed and yard foreman was crushed between the ends of the two cars.

FE-1999-16 23-Jun-99 UP Redding CA Conductor AGE: 57

A three person switching crew was shoving a cut of cars down a track with the intent of coupling to another cut that was sitting in the track. It was hard to shove the cars and the conductor told the brakeman to look for closed angle cocks. The brakeman found a closed angle cock when the shove move was within two car lengths of a coupling, informed the conductor, and opened it. The conductor was crushed and killed between the leading car of the shove and the head car to be coupled to when the shove move unintentionally accelerated just prior to coupling.

FE-1999-24 14-Sep-99 AM Van Buren AR Conductor AGE: 47

A two person switching crew was in the process of shoving ten cars onto a clear track, with the intention of cutting three off, and pulling out the other seven cars out. The conductor counted down the cars via radio, and the engineer stopped one half-car lengths after the last radio transmission of one-half cars to go. Subsequently, the engineer discovered that the conductor had stepped in between the cars and had been coupled up.

## **SOFA 1: Adjusting knuckles, adjusting drawbars, or installing EOT**

FE-2000-09 09-Mar-00 IHB Riverdale IL Engine Foreman AGE: 43

The employee was struck by an unsecured cut of cars that rolled into him while he was attempting to adjust the coupler or drawbar.

FE-2000-21 07-Jul-00 CKRY Wichita KS Conductor AGE: 39

Employee was struck by his own train when he tripped and fell onto the rail as he stepped in between moving equipment to open a knuckle while walking backwards.

FE-2001-08 03-Mar-01 BNSF Willmar MN Switchman AGE: 36

The switchman of a three person yard switching crew made a cut on a block of cars sitting on a yard track and told the engineer to pull the cars out. Apparently, as the cars were being pulled out, the switchman stepped between the gauge of the track and was struck and killed by the remaining cars on the track that had begun to roll in the same direction as the cars being pull out of the track.

FE-2002-12 14-May-02 UP Pine Bluff AR Switchman AGE: 53

The switchman of a three-person yard switching crew asked the engineer to stretch a track. Noticing that there was a separation between the forth and fifth head cars, the switchman went in to align the couplers. The switchman was coupled up when unsecured cars rolled in on him.

FE-2002-16 16-Jun-02 BNSF Memphis TN Engine Foreman AGE: 20

A yard foreman, with 18-months of service, along with his helper, engineer and a utility employee had just finished making up a train in the yard. However, the crossover from the track on which the train had been made had to be cut. This last minute instruction led to an increased level of conversation among the crew, yard foreman, utility employee and the yardmaster. The yard foreman jumped on a ATV, rode it to the cut point, separated the train; and, when the cut not attached to the locomotive rolled, he was caught between the two sections of the train and killed.

FE-2003-20 26-Aug-03 LC Chester SC Conductor AGE: 29

A three-person crew that included a brakeman trainee was switching an industry when the conductor requested a short back up move when the cars he intended to couple to did not couple. A short time later and after failed attempts to contact the conductor the trainee discovered him dead and lying between the cars he had been trying to couple together.

## **SOFA 1: Adjusting knuckles, adjusting drawbars, or installing EOT**

FE-2004-22 20-Sep-04 AA Saline MI Conductor AGE: 46

A conductor while engaged in switching operations attempted to uncouple freight cars from the locomotive, and was caught between the locomotive and these cars. The cars had not had their brakes secured as operating rules dictated they should. The conductor was killed.

FE-2009-14 10-May-09 CSX Selkirk NY Yard Conductor AGE: 33

A lone remote control operator was working in a yard track coupling cars together to pull to place on a departure track. All cars had not coupled properly when switched into the track, and one car had the knuckle missing on the end of the car. The operator replaced the knuckle, then began movement to couple the track. Shortly after beginning the move to couple, the operator made a radio transmission for help when crushed between equipment because drawbars by-passed.

## **SOFA 2: Struck by equipment other than their own on yard or industry track.**

FE-1992-30 24-Jul-92 GBW Wisconsin WI Freight Brakeman/Flagman AGE: 34

The road job's brakeman was trying to help the switch crew make up his train. The brakeman was in between cars on an active track being used by the switch crew and was killed when the cars he was between moved upon being struck by a cut of free rolling cars.

FE-1993-31 12-Aug-93 ATSF Evandale TX Freight Brakeman/Flagman AGE: 52

Upon detraining, brakeman was struck and killed by another railroad's yard job working in the same small yard. Members of both crews saw each other but the brakeman apparently did not see the short line crews shove move.

FE-1994-06 20-Jan-94 UP Fall City NE Freight Conductor AGE: 44

Conductor riding side of two cars to be kicked, he moves to the opposite side of car to work hand brake and is immediately struck by locomotives standing on adjacent track creating a no-clearance condition. Conductor was not aware that the locomotives had arrived at that location since he had last been there.

FE-1994-31 06-Dec-94 CR Campbell Hall NY Brakeman Trainee AGE: 28

The brakeman trainee was on the caboose to direct the shove move of the three engines, three cars and a caboose toward Track 1 in the yard. The shove move continued although the only radio transmission after getting the move started was "the derail is off." The movement, which reached approximately 19 mph, struck standing equipment after diverging through two mis-aligned switches and killed the brakeman trainee.

## **SOFA 2: Struck by equipment other than their own on yard or industry track.**

FE-1995-11 24-Feb-95 ATSF Amarillo TX Engine Foreman AGE: 44

Two crews working in the same yard from opposite ends, one crew dropped ten free rolling cars in on top of the cut where the other crew's foreman was installing the E.O.T. at the opposite end. Cars impacted with sufficient force to knock down and run over the foreman.

FE-1995-18 03-May-95 CSXT Evansville IN Conductor AGE: 52

Conductor was struck and killed by a shove move on the track adjacent to where he was working. Communication about the move on that adjacent track had been conveyed to the conductor via the "bleeder," a utility type employee.

FE-1997-05 02-Feb-97 CR Burns Harbor IN Engine Foreman AGE: 54

Two yard jobs working on adjacent tracks. The conductor of one is studying his switch list as the other job is shoving into the adjacent track. Conductor is struck and killed by the lead car of the adjacent track shove move.

FE-1998-05 04-Feb-98 BRC Bedford Park IL Yard Conductor/Foreman AGE: 42

Conductor and switchman making hoses on track 12, last transmission by conductor is "I think I got all the hoses after that next one...." Conductor later found to have been struck and killed by a free rolling car on the adjacent track.

FE-1998-16 01-Jun-98 BNSF Lubbock TX Yard Conductor/Foreman AGE: 24

Two yard engines working on adjacent tracks. One left a car fouling a clear track being used by the other engine. The foreman directing the shove move of the lite locomotives was crushed when his engine consist cornered the car fouling the adjacent track.

FE-2000-25 11-Aug-00 BNSF Port of Los Angeles CA Freight Brakeman AGE: 36

Employee was struck and killed by the lead car of another switching movement that was operating on the adjacent yard track.

FE-2002-19 08-Aug-02 CWR Cleveland OH Switchman AGE: 53

A two person crew was switching cars in a yard and, without the trainman's knowledge, another switching crew had set cars into a track adjacent to the one being used by the first crew. The set out included a wide ladle car and it created a clearance issue on the adjacent track. Some time later, the trainman was riding the lead car down the track adjacent to the wide ladle car and was killed when he was rolled between the car he was riding and the wide ladle car sitting on the adjacent track.

## **SOFA 2: Struck by equipment other than their own on yard or industry track.**

FE-2003-03    11-Feb-03    CNIC    Flat Rock                      MI    Brakeman                      AGE:    57

A three-person crew (engineer, conductor, brakeman) were stopped and the engineer and conductor were awaiting the brakeman's return from the "Trim Shanty". During this time, another crew was in the process of shoving a cut of cars down a track that was located between where the brakeman's crew were waiting and the Shanty. The brakeman exited the Shanty and was struck by the shove move as he crossed the tracks to get to his crew. The shove move was being preceded by two of the striking train's crew who were riding in a van at the time.

FE-2004-23    04-Oct-04    NS            Harrisburg                      PA    Conductor                      AGE:    58

A switch job was shoving cars into a yard track while another switch job was shoving cars on an adjacent track. The two tracks were separated by an 18 foot access road. The conductors discussed their movements with each other prior to the incident. The conductor of one switch job improperly position himself next to the adjacent track, and was struck by the other shoving movement.

## **SOFA 3: Lack of or inadequate job safety briefing.**

FE-1992-30    24-Jul-92    GBW    Wisconsin                      WI    Freight Brakeman/Flagman    AGE:    34

The road job's brakeman was trying to help the switch crew make up his train. The brakeman was in between cars on an active track being used by the switch crew and was killed when the cars he was between moved upon being struck by a cut of free rolling cars.

FE-1993-23    07-Jun-93    IC            Fulton                          KY    Yard Brakeman/Helper            AGE:    49

Crew performing switching duties in class yard failed to have a clear understanding of movements being made. Results were that the rear brakeman was run over by moving equipment. There were no witnesses, but a hand brake was applied. It was thought that the brakeman had gone between the equipment on the ground to release the low hand brake.

FE-1993-30    11-Aug-93    SP            Tracy                              CA    Freight Brakeman/Flagman    AGE:    47

Crew performing industry switching. Brakeman attempted to couple air hoses while conductor gave engineer instructions to shove the movement. Resulting movement was unexpected to brakeman who was fatally injured.

FE-1993-47    13-Nov-93    GC            Macon                              GA    Yard Conductor/Foreman        AGE:    47

Trainmaster became involved with crew performing switching in class yard without knowledge of the conductor who was coupling air hoses on a cut of cars. Cars were shoved without his knowledge while he was in the foul of the movement. Movement ran over conductor and killed him.

### **SOFA 3: Lack of or inadequate job safety briefing.**

FE-1993-49    05-Dec-93    SOU    Atlanta    GA    Freight Conductor    AGE: 59

Change in operating procedure between two crews swapping equipment resulted in conductor being struck by unexpected movement while he was in the foul of the track.

FE-1994-29    15-Nov-94    CR    Painted Post    NY    Freight Brakeman/Flagman    AGE: 57

Crew switching in class yard failed to establish and maintain effective communications. Subsequent changes in switching line-up by the conductor resulted in trainman who was in the foul of Track 7 being struck by unexpected movement of equipment.

FE-1995-09    17-Feb-95    CR    St. James    OH    Conductor    AGE: 48

Arbitrary change in switching operations by conductor resulted in him being unexpectedly struck and fatally injured by approaching cars while he was fouling the track.

FE-1995-12    02-Mar-95    NS    Aiken    SC    Brakeman    AGE: 46

Switch crew was pulling a cut of cars out of an industry. Brakeman stepped in track gauge to open knuckle on the rear car at the same time crew shoved back to kick two cars that ran over the brakeman.

FE-1999-01    12-Jan-99    CR    Port Newark    NJ    Conductor    AGE: 54

A three person industry switching crew was in the process of switching cars back and forth over a private crossing equipped with an in-ground hand throw switch. The brakeman was at the switch and the conductor was going back and forth from one set of cars to another. The conductor shouted to the brakeman that he wanted the next move down one track but the cars started down the other. The brakeman tried to warn the conductor who had his back to the move and then stopped the move but too late to save the conductor who was hit and run over by the leading car of the shove.

FE-1999-11    02-Apr-99    DME    Waseca    MN    Brakeman    AGE: 54

A three person yard switching crew was switching and the conductor was pulling pins while the brakeman was taking orders from him and working the yard tracks during a flat switching operation. The conductor cut off three cars that rolled into other cars on the track. The brakeman was run over by these cars.

FE-2000-30    15-Oct-00    UP    Houston    TX    Fireman    AGE: 47

Employees failed to discuss movement, resulting in employee falling from locomotive platform and being rolled between the locomotive and the elevated walkway.



### **SOFA 3: Lack of or inadequate job safety briefing.**

FE-2001-03    11-Jan-01   NS        South Fork                    PA   Engineer                    AGE: 52

The engineer and conductor of a road train were told to stop and check their locomotives for flat spots. Once stopped, and without a job briefing the locomotive engineer left the lead unit and shortly thereafter, was struck and killed by a passing mainline train.

FE-2002-16    16-Jun-02   BNSF    Memphis                    TN   Engine Foreman                AGE: 20

A yard foreman, with 18-months of service, along with his helper, engineer and a utility employee had just finished making up a train in the yard. However, the crossover from the track on which the train had been made had to be cut. This last minute instruction led to an increased level of conversation among the crew, yard foreman, utility employee and the yardmaster. The yard foreman jumped on a ATV, rode it to the cut point, separated the train; and, when the cut not attached to the locomotive rolled, he was caught between the two sections of the train and killed.

FE-2003-11    11-Apr-03   UP        Pocatello                    ID   Conductor                    AGE: 55

A road conductor was riding the point of a 122-car shove down a track that was partially out of service. The out of service portion was marked by a red flag and derail. The crew was not able to stop the movement before the car being ridden by the conductor went over the derail, landed on its side and crushed the conductor to death.

FE-2004-26    07-Oct-04   BNSF    Teague                    TX   Yard brakeman                AGE: 60

A four person yard crew moving cars from the south end of the yard and lacing air hoses after each cut had the brakeman working alone at the north end of the yard. During the job briefing the crew agreed not to switch cars into track 102 where the brakeman was working. Brakeman was found between cars on track 103 at the time of the incident with leg severed below the groin, and died eight later.

FE-2004-28    01-Nov-04   BNSF    Bowdoin                    MT   Conductor                    AGE: 45

An eastbound train stopped on the siding waiting the passage of a westbound train. The engineer saw the headlight of the approaching train, and observed his conductor get up and exit on the live track side of the locomotive, contrary to rules. While attempting to cross to the other side of the track to conduct an inspection, the conductor paused in the middle of the track and the approaching train, sounding the horn and with headlight on bright, struck the conductor still standing on the track.

### **SOFA 3: Lack of or inadequate job safety briefing.**

FE-2004-30 17-Dec-04 BNSF Radium CO Conductor AGE: 44

An eastbound train was stopped on the siding waiting for the passage of two westbound trains. The first train, approaching at a speed of 20 -23 mph, was observed by the engineer and heard the train sounding its whistle and bell. The conductor on the standing train got up and without a word, departed the locomotive's cab to conduct a roll-by inspection and stepped off the standing train locomotive on the live side between tracks. The approaching train struck the conductor, killing the conductor.

FE-2005-14 11-Apr-05 UP Ogden UT Switchman AGE: 38

A remote control assignment was switching on the east end of the yard. While making a shove movement into a yard track with a helper riding on the leading end of a tank car, the movement struck 28 standing cars in the track causing the helper to fall from the tank car, which then ran over helper.

FE-2005-33 16-Nov-05 CSX Lugoff SC Conductor AGE: 48

A three person crew shoving into an industry track found cars left foul of an adjacent track by industry employees. The conductor held a job briefing with the brakeman on the moves to be made, and the brakeman understood he would control the switching and car movements. After shoving the cars to make the coupling, the conductor told the brakeman the cars were coupled and he was in the clear. The brakeman attempted to uncouple from the cars, but failed. He then requested the engineer make a second move to create slack between the cars so they could be uncoupled. The engineer complied and the conductor who was in the foul of track and equipment suffered fatal injuries.

FE-2007-19 30-Aug-07 BNSF Stockton CA Yard Brakeman AGE: 50

A remote control operator controlling a shoving movement was riding the leading end of the two car move when he struck the side of another standing car. The standing car fouled the crossover switch which the movement was lined to operate through, killing the operator.

FE-2008-33 23-Sep-08 CSX Darby PA Freight Conductor AGE: 46

After reaching their destination, a two person crew was instructed to secure their freight train at a location beyond the normal crew change point. The location was on double track on a bridge near a parking lot where a relief crew could reach the train. The conductor left the cab of the locomotive without job-briefing with the Engineer and without his hand-held radio. He crossed in front of the locomotive and walked eastward across the bridge between the two tracks. There was poor footing and almost no clearance between the two tracks. An eastbound approaching train, operating at 26 mph, observed the conductor, sounded the whistle, turned the head lights to bright, and tried to stop. The eastbound train struck and killed the conductor who was walking in the foul.

### **SOFA 3: Lack of or inadequate job safety briefing.**

FE-2008-37 15-Nov-08 MRL Laurel MT Yard Brakeman AGE: 39

A three person crew, operating a local freight train, moved their locomotives to a make-up track. After a job briefing, the switchman proceeded to make sure the train was together and the air hoses were coupled. The switchman did not observe sixteen cars at the end of the train were not coupled. A few minutes later, he radioed he was going between to make an air hose. The Engineer said: "Set and centered." A few minutes earlier, the Conductor was walking the head-end and found a gap. Without communicating with the Switchman, the Conductor instructed the Engineer to pull forward so that he could open knuckles and prepare for a reverse movement to a coupling. Apparently, when the train moved forward, the 16 cars at the rear of the train began to roll, just as the Switchman was reaching in to connect an air hose. The 16 free-rolling cars struck the standing portion of the train and killed the Switchman.

FE-2009-03 16-Jan-09 BNSF Fort Sumner NM Freight Engineer, AGE: 59

A two person road freight train crew was operating on the main track westbound when the engineer exited the cab of the controlling locomotive to go to the trailing locomotive. The conductor, a qualified locomotive engineer, took over operation of the locomotive and train. After several minutes when the engineer had not returned, the conductor stopped the train and went in search of the engineer and notified the dispatcher. A following westbound train found the engineer on a parallel road where he had fallen from the train. The engineer died as a result of injuries sustained in the fall.

### **SOFA 4: Move controlled by a combination of hand and radio signals or specific distances were not given.**

FE-1992-03 28-Jan-92 BN Willmar MN Yard Brakeman/Helper AGE: 57

A four-person crew (engineer, switch foreman, 2 switchman) had just shoved cars into track 11 and held onto one for track 9. The switch foreman got the switch for 9, noticed his front switchman standing near cars on track 11, and rode the locomotive onto the lead. After the 11th switch was lined for the lead, the switch foreman kicked the single car into track 9. The front switchman was struck and killed by the free rolling car.

FE-1992-08 11-Mar-92 FEC Fort Pierce FL Yard Conductor/Foreman AGE: 36

This case involved the conductor riding a car into Track 8. The car derailed at the spiked switch and the conductor was subsequently killed. The conductor's last radio transmission was "...we're lined in eight rail, three or four cars to a joint." Movement stopped after car had derailed and side swiped adjacent car.

#### **SOFA 4: Move controlled by a combination of hand and radio signals or specific distances were not given.**

FE-1992-14    01-Jun-92   ATSF   Escondido                      CA   Freight Conductor                      AGE:   58

Brakeman had control of the move and told the engineer, by radio, to back up six cars to a coupling. The brakeman assumed that the conductor would “pick-up” the move when it came into his (the conductor’s) view. The movement continued until it struck sitting cars on the track which, when moved, killed the conductor who was in between them.

FE-1992-22    25-Jul-92   UP       Portland                      OR   Freight Brakeman/Flagman   AGE:   54

A three-person crew had arrived at the yard, pulled their train into a track, cut off the engines and were given permission to return to the other end of the yard via an adjacent clear track. The conductor remained on the end originally entered and the brakeman stayed with the engineer. The brakeman got what he thought was the proper switch, instructed the engineer by radio to back up and, apparently turned his back on the move. Before the brakeman had a chance to mount the returning locomotives, he was struck and killed by the movement that continued for 400 feet before stopping when the engineer noticed the brakeman between the gauge of the rail in front of the locomotives.

FE-1993-26    15-Jul-93   CR       Anderson                      IN   Yard Brakeman/Helper                      AGE:   43

After the brakeman had tied the locomotives onto a cut of cars in the yard, the engineer received an instruction, via radio, from the brakeman to “shove to hold more cars.” The engineer began to shove and didn’t stop until he was on the other end of the track. The brakeman was run over by the shove move. There was no evidence of any other radio transmissions concerning the shove move.

FE-1993-30    11-Aug-93   SP       Tracy                              CA   Freight Brakeman/Flagman   AGE:   47

Crew performing industry switching. Brakeman attempted to couple air hoses while conductor gave engineer instructions to shove the movement. Resulting movement was unexpected to brakeman who was fatally injured.

FE-1994-29    15-Nov-94   CR       Painted Post                      NY   Freight Brakeman/Flagman   AGE:   57

Crew switching in class yard failed to establish and maintain effective communications. Subsequent changes in switching line-up by the conductor resulted in trainman who was in the foul of Track 7 being struck by unexpected movement of equipment.

FE-1994-31    06-Dec-94   CR       Campbell Hall                      NY   Brakeman Trainee                              AGE:   28

The brakeman trainee was on the caboose to direct the shove move of the three engines, three cars and a caboose toward Track 1 in the yard. The shove move continued although the only radio transmission after getting the move started was “the derail is off.” The movement, which reached approximately 19 mph, struck standing equipment after diverging through two mis-aligned switches and killed the brakeman trainee.

#### **SOFA 4: Move controlled by a combination of hand and radio signals or specific distances were not given.**

FE-1995-09 17-Feb-95 CR St. James OH Conductor AGE: 48

Arbitrary change in switching operations by conductor resulted in him being unexpectedly struck and fatally injured by approaching cars while he was fouling the track.

FE-1997-04 29-Jan-97 UP Mason City IA Conductor AGE: 48

Conductor and engineer were moving toward engine house area with lite engines and using hand signals. The conductor stopped the movement to line a switch. The engineer while waiting heard and acted upon an unidentified radio transmission "come ahead 21." The engineer initiated the shove movement and eventually, the conductor was struck from behind and killed.

FE-1997-16 06-Jun-97 CMRC Bay City MI Conductor AGE: 50

Conductor began a move using radio communication to shove a cut of cars approximately twenty-five car lengths to a coupling. After the move had begun the engineer didn't hear another radio transmission from his conductor. The shove move eventually collided with the cars that were to be coupled to. The conductor was crushed in the collision and it was later determined that the portable radio being used by the conductor may have lost enough of it's charge to effect the transmission.

FE-1997-45 26-Dec-97 UP Boise ID Freight Conductor AGE: 55

Conductor was riding equipment while setting hand brakes. Move was being shoved; improper radio communication.

FE-1998-37 28-Dec-98 IC Durrant MS Conductor AGE: 55

Shove movement was not properly controlled by radio communication and resulted in a collision with a fallen tree which caused the derailment and death of the conductor.

FE-1999-01 12-Jan-99 CR Port Newark NJ Conductor AGE: 54

A three person industry switching crew was in the process of switching cars back and forth over a private crossing equipped with an in-ground hand throw switch. The brakeman was at the switch and the conductor was going back and forth from one set of cars to another. The conductor shouted to the brakeman that he wanted the next move down one track but the cars started down the other. The brakeman tried to warn the conductor who had his back to the move and then stopped the move but to late to save the conductor who was hit and run over by the leading car of the shove.

#### **SOFA 4: Move controlled by a combination of hand and radio signals or specific distances were not given.**

FE-1999-16    23-Jun-99   UP       Redding                    CA   Conductor                    AGE: 57

A three person switching crew was shoving a cut of cars down a track with the intent of coupling to another cut that was sitting in the track. It was hard to shove the cars and the conductor told the brakeman to look for closed angle cocks. The brakeman found a closed angle cock when the shove move was within two car lengths of a coupling, informed the conductor, and opened it. The conductor was crushed and killed between the leading car of the shove and the head car to be coupled to when the shove move unintentionally accelerated just prior to coupling.

FE-2000-22    24-Jul-00   PARN   Skagway                    AK   Conductor                    AGE: 55

A two-person yard switching crew was in the process of moving their light locomotives to a track where it was to be stored for the night. The conductor was on the leading end of the unit and directing the move by radio communication. After instructing the engineer to stop, the conductor got off the locomotive, lined two switches and told the engineer to back up. The engineer backed up until he placed the unit at the location where it is always left without further radio contact from his conductor. The conductor was struck and killed by the locomotive and found, by the engineer, under the locomotive's fuel tanks.

FE-2000-29    09-Sep-00   BNSF   Keokuk                    IA   Conductor                    AGE: 53

While shoving one car into an industry site, and using radio communication, the switch foreman was run over by the leading wheel as the shove move continued until coupling was made.

FE-2002-17    16-Jul-02   NS       Bonlee                    NC   Brakeman                    AGE: 55

While shoving lite engines back to train on mainline, employees failed to control the movement by radio, resulting in a collision with a standing train.

FE-2007-18    25-Aug-07   IHB     East Chicago                    IL   Yard Conductor                    AGE: 43

A two person conventional yard switching assignment was shoving a cut of cars into a track with the conductor controlling the move by radio. Radio communicaton between the conductor and engineer ceased, the movement was stoped, and the conductor was found by the engineer beneath the equipment.

#### **SOFA 4: Move controlled by a combination of hand and radio signals or specific distances were not given.**

FE-2008-19    08-Jun-08    UP        La Porte                      TX    Yard Brakeman                      AGE: 47

A three person train crew was performing switching operations at an industrial location. The brakeman controlling movements by radio, instructed the engineer to back up four cars to a coupling.

The engineer, watching in the side mirror of the locomotive, noticed the cars moving down curved track instead of the straight track to the coupling. The switch target as seen in the mirror indicated the switch was lined for the spur track, not the straight track. The engineer saw someone walk in front of the movement and it was determined later to be the brakeman, who was struck and killed by the erroneous movement. Cellular telephone records indicated the brakeman had made or received several telephone calls, including a two-minute call during the time of the fatal shove over the misaligned switch.

#### **SOFA 5: FE had 1.5 years of experience or less or had inadequate training.**

FE-1992-04    30-Jan-92    AGC        Polk County                      FL    Yard Brakeman/Helper                      AGE: 32

Industry switch crew, engineer and two flagmen, both flagmen rode the lower steps of the leading end of the lead locomotive. FE (flagman) was on left side, the other flagman on right side. After 2000 feet into this light engine movement the surviving flagman noticed the FE stopped talking and he crossed over to the FE's side and saw FE lying next to the track behind movement. Investigation showed FE either slipped off the fireman's side or tripped while dismounting or attempting to remount from the fireman's side. FE had six months experience.

FE-1992-16    02-Jun-92    IHRC        Henderson                      KY    Freight Conductor                      AGE: 52

Road switcher R90371-26, was switching cars at Fulton Yard in Fulton, Kentucky. The conductor on the job had ridden shove movement into track seven and secured car and remained at that location while the remainder of the crew switched cars between track seven and track five. At 4:25 a.m., after free rolling the last car into track seven, and while coupling to cars on lead to shove clear of track six, the conductor called via the radio and stated he had been hurt. The conductor was found beneath the L-1 wheel of GATX 10818 in the gauge of track seven and later expired due to injuries sustained.

FE-1993-40    19-Oct-93    SOO        Leal                              ND    Freight Brakeman/Flagman                      AGE: 43

A three-person train crew was in the process of picking up 18 cars off a siding. The trainman had 10 weeks of experience, forgot to remove the derail, and was killed when the leading car he was riding derailed on top of him. During the stop, the conductor remained in the cab of the lead locomotive with the engineer.

## **SOFA 5: FE had 1.5 years of experience or less or had inadequate training.**

FE-1993-47 13-Nov-93 GC Macon GA Yard Conductor/Foreman AGE: 47

Trainmaster became involved with crew performing switching in class yard without knowledge of the conductor who was coupling air hoses on a cut of cars. Cars were shoved without his knowledge while he was in the foul of the movement. Movement ran over conductor and killed him.

FE-1994-28 10-Nov-94 PTR A Houston TX Yard Brakeman/Helper AGE: 31

Yard switch crew, engineer, conductor and brakeman, spotting paper mill. FE (brakeman) instructed by conductor to de-train and stay at road crossing while he spotted track. FE found in nearby wood chip auger/conveyer system after mill crew started up the system while crew searched for missing FE. Mill crew was instructed by conductor not to start equipment until FE was located. FE was not familiar with the dangers associated with this mill process. FE had 5 months experience.

FE-1994-31 06-Dec-94 CR Campbell Hall NY Brakeman Trainee AGE: 28

The brakeman trainee was on the caboose to direct the shove move of the three engines, three cars and a caboose toward Track 1 in the yard. The shove move continued although the only radio transmission after getting the move started was "the derail is off." The movement, which reached approximately 19 mph, struck standing equipment after diverging through two mis-aligned switches and killed the brakeman trainee.

FE-1995-29 04-Oct-95 CSXT Riverdale IL Conductor AGE: 39

Crew performing switching in class yard. Switch foreman placed himself between the rails to adjust a mis-aligned coupler on the fifteenth car after the cut was stretched. Switch foreman was facing the coupler with his back to a cut of seven cars that rolled in on top of him and coupled him up.

FE-1996-09 20-Mar-96 BRC Bedford Park IL Conductor AGE: 28

Three-person crew was switching in class yard, coupling between sixth and seventh car failed to couple. Conductor stopped locomotive and went between the cars to straighten the drawbar, and twenty-three cars rolled in behind him and coupled him up.

FE-1996-12 15-Jun-96 CSX Charlotte NC Switchman AGE: 36

Yard crew, engineer, conductor and switchman, switching at an industry. While crew was shoving two cars to a spot inside an industry building, FE (switchman) was rolled between lead box car and unloading platform. Platform or building was not marked with any type of 'no-clearance' or 'close clearance' signage. FE was last seen by conductor on the ground next to movement in a 'cut-out' space in the unloading platform. The conductor reported that there is enough room for a man to clear the movement in this 'cut-out'. After hearing a strange noise the conductor instructed engineer to stop the movement. FE was rolled for 21 feet between boxcar and platform. FE had one year of experience.



**SOFA 5: FE had 1.5 years of experience or less or had inadequate training.**

FE-1996-17	07-Jul-96	NS	Sidney	IN	Conductor	AGE: 29
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Road crew, engineer and conductor, while stopped on siding track to meet an opposing train, FE (conductor) detrained to perform a roll-by inspection of other train. FE stepped off his train shortly before opposing trains arrival then stood in that trains track while trying to adjust his portable radio. Opposing train struck FE at this point. FE had one year of experience.

FE-1996-22   03-Sep-96   DGN   Dallas   TX   Brakeman   AGE: 43

Yard switch crew, engineer, conductor and brakeman, while switching at an industry on a downhill grade experienced an unwanted run away car. While FE (brakeman) was in position on a car and setting a hand brake, the car started to roll away from the crew. FE continued to try to apply hand brake in an effort to stop the car. When discovering that the car was rolling away, the conductor attempted to slow and stop it by putting wood blocks under the wheels. The car accelerate to 30 to 35 mph. FE did not detrain before car collided with seven other cars at that speed. FE had three weeks experience.

FE-1996-24	07-Oct-96	UP	Eagle Pass	TX	Engine Foreman	AGE: 35
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Three-person crew was switching in class yard, locomotive failed to couple to cut of seven standing cars. Yard foreman used hand signals to separate the locomotive by twenty feet. While adjusting the locomotive drawbar, the seven cars rolled in and coupled him up.

FE-1997-32   16-Oct-97   MRL   Laurel   MT   Switchman   AGE: 22

Yard switch crew, engineer, switch foreman and switchman, were shoving a cut 41 cars up a grade to a stop. While this was taking place the ground crew boarded the first two cars so they could apply the hand brakes. FE (switchman) fell off the first car while attempting this. This car was found to have a brake platform with a decreasing width. Under the hand brake this platform was found to be 2 inches under the required width over a length of about 30 inches. FE had 10 months experience.

FE-1998-16	01-Jun-98	BNSF	Lubbock	TX	Yard Conductor/Foreman	AGE: 24
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Two yard engines working on adjacent tracks. One left a car fouling a clear track being used by the other engine. The foreman directing the shove move of the lite locomotives was crushed when his engine consist cornered the car fouling the adjacent track.

FE-1999-03    22-Jan-99   CR    Alexandria    NY   Conductor    AGE: 45

A three person local switching crew was shoving a loaded covered hopper down an industrial lead. The conductor was riding on one side of the car and the brakeman was riding the other. As the car was shoved over a private crossing, the accumulation of ice and snow lifted the car off the rails and it tipped over and onto the conductor who was killed as a result of the derailment.

## **SOFA 5: FE had 1.5 years of experience or less or had inadequate training.**

FE-1999-14 19-May-99 NS Cincinnati OH Conductor AGE: 36

A conductor with one year of service was riding in the stairwell of the leading locomotive. He was directing the move by radio when he realized too late that the move would not clear the standing equipment. He was crushed between the handrail of his locomotive and the standing locomotive.

FE-1999-24 14-Sep-99 AM Van Buren AR Conductor AGE: 47

A two person switching crew was in the process of shoving ten cars onto a clear track, with the intention of cutting three off, and pulling out the other seven cars out. The conductor counted down the cars via radio, and the engineer stopped one half-car lengths after the last radio transmission of one-half cars to go. Subsequently, the engineer discovered that the conductor had stepped in between the cars and had been coupled up.

FE-2001-02 10-Jan-01 CSX Chicago IL Conductor AGE: 42

Conductor with 14-months service was struck and killed by passing mainline train while attempting to board locomotive at crew-change point.

FE-2002-16 16-Jun-02 BNSF Memphis TN Engine Foreman AGE: 20

A yard foreman, with 18-months of service, along with his helper, engineer and a utility employee had just finished making up a train in the yard. However, the crossover from the track on which the train had been made had to be cut. This last minute instruction led to an increased level of conversation among the crew, yard foreman, utility employee and the yardmaster. The yard foreman jumped on a ATV, rode it to the cut point, separated the train; and, when the cut not attached to the locomotive rolled, he was caught between the two sections of the train and killed.

FE-2003-22 12-Sep-03 GC Dublin GA Brakeman AGE: 45

A two-person train crew was in the process of setting off and picking up cars in a small yard. The conductor, who had 8 weeks of experience, was killed when the leading car of the shove struck him as he stepped into its path.

FE-2004-20 02-Sep-04 BNSF Clovis NM Conductor/switchman AGE: 26

A two person remote control crew switching in the yard when an empty tank car passed through a switch and derailed, this caused the car to shake and bounce violently. The conductor/switchman lost his hold on the car and fell off between the rails, and was run over and killed.

## **SOFA 5: FE had 1.5 years of experience or less or had inadequate training.**

FE-2004-25    07-Oct-04    UP       Springfield       IL    Student brakeman       AGE: 31

A road train pulling around the connection track derailed nine cars while pulling. The student brakeman located to the side of the track where the cars derailed was crushed when a car derailed and fell over. The student brakeman did not follow instructions given him at a job briefing given by the train conductor shortly before the incident occurred.

FE-2004-28    01-Nov-04    BNSF    Bowdoin       MT    Conductor       AGE: 45

An eastbound train stopped on the siding waiting the passage of a westbound train. The engineer saw the headlight of the approaching train, and observed his conductor get up and exit on the live track side of the locomotive, contrary to rules. While attempting to cross to the other side of the track to conduct an inspection, the conductor paused in the middle of the track and the approaching train, sounding the horn and with headlight on bright, struck the conductor still standing on the track.

FE-2005-14    11-Apr-05    UP       Ogden       UT    Switchman       AGE: 38

A remote control assignment was switching on the east end of the yard. While making a shove movement into a yard track with a helper riding on the leading end of a tank car, the movement struck 28 standing cars in the track causing the helper to fall from the tank car, which then ran over the helper.

FE-2005-18    13-May-05    DC       Detroit       MI    Yard Conductor       AGE: 24

A 24-year-old conductor with 3 months experience died of injuries he sustained when the car he was riding on derailed and he was crushed between the car and a steel I-beam.

FE-2005-23    05-Jul-05    BNSF    Emporia       KS    Yard Helper       AGE: 26.8

A three person train crew was switching cars on industrial track when the train passed through a misaligned crossover switch and collided with a car out to foul on an adjacent track. The trainman was crushed on impact against this car.

FE-2005-25    22-Jul-05    ATN    Ragland       AL    Brakeman       AGE: 56

A two person switching crew conducted a job briefing associated with switching operations at an industry plant. The crew coupled 10 empty covered hopper cars and commenced the move with the conductor riding the B- end of a covered hopper. The car being shoved struck a drainage grate lying in the gage of the track and swerved off the track onto a concrete apron of the same height as the track. The conductor was trapped between the car and the concrete wall and dragged along the wall for a distance of 16 feet, killing him. Clearance between the wall and car was 27 inches; The US Department of Labor requires a minimum clearance of 30 inches unless the lesser clearance is conspicuously marked, which it wasn't.

## **SOFA 5: FE had 1.5 years of experience or less or had inadequate training.**

FE-2005-36 04-Dec-05 BNSF Burlington IA Brakeman AGE: 34

A three person switch crew held a job briefing with the intent to deliver 125 car loads of coal onto five (5) industry tracks. Only the engineer was familiar with the industry plant and its tracks. The engineer offered to operate the locomotive into the plant to allow the rest of the crew to become more familiar with the work area; the other crew members declined. The track passes under an overhead walkway with only 5 1/2 inch clearance between the part of the car on which the brakeman was riding, and a support beam of the walkway. The brakeman failed to take heed of this situation and was fatally injured when he was crushed between the car and the support member.

FE-2006-14 10-Sep-06 ALS East St. Louis IL Conductor AGE: 44

A two person crew was in the process of making up a locomotive consist using two adjacent tracks. After setting over one of the locomotives, the conductor rode the leading end of the two locomotives into the adjacent track. When his head signals went out of sight, the movement was stopped and the engineer went back to discover the conductor crushed between the locomotive they set out and the locomotive he was riding.

FE-2007-21 27-Oct-07 CSX Russell KY Yard Foreman AGE: 52

A 52 year old yard foreman with 6 months service was crushed and killed while riding the leading end of a five locomotive consist when it passed through a mis-aligned crossover switch and collided with a standing train on an adjacent track.

FE-2008-15 26-May-08 CSX Lumberton NC Freight Conductor AGE: 46

A three person train crew operated a freight train consisting of three locomotives and 97 loaded coal hoppers. The conductor had one year of experience – interrupted by a four month furlough – and a student engineer were a part of the train crew. The train crew began shoving to spot the coal hoppers into a generating plant. The conductor had not work in this plant previously but was told plant employees would help if needed. The conductor rode the shove movement giving car counts via radio. The last radio transmission from the conductor to the student engineer, who was operating the train, was “give me all you’ve got, then “stop.” The lead two cars had plowed through a large pile of coal knocking the conductor from the car, crushing the conductor.

## **SOFA 5: FE had 1.5 years of experience or less or had inadequate training.**

FE-2008-37 15-Nov-08 MRL Laurel MT Yard Brakeman AGE: 39

A three person crew, operating a local freight train, moved their locomotives to a make-up track. After a job briefing, the switchman proceeded to make sure the train was together and the air hoses were coupled. The switchman did not observe sixteen cars at the end of the train were not coupled. A few minutes later, he radioed he was going between to make an air hose. The Engineer said: "Set and centered." A few minutes earlier, the Conductor was walking the head-end and found a gap. Without communicating with the Switchman, the Conductor instructed the Engineer to pull forward so that he could open knuckles and prepare for a reverse movement to a coupling. Apparently, when the train moved forward, the 16 cars at the rear of the train began to roll, just as the Switchman was reaching in to connect an air hose. The 16 free-rolling cars struck the standing portion of the train and killed the Switchman.

### **Special Switching Hazard: Close Clearance.**

FE-1993-27 04-Aug-93 UP Pryor OK Freight Brakeman/Flagman AGE: 42

A three person industrial switching crew was shoving three cars down a track. The conductor was on the ground, ahead of the move and the brakeman was riding the side of the leading end of the leading car. A bush created a clearance issue and the brakeman stepped around the side of the leading car to the end of the car just as it began to derail. The brakeman was killed when he fell from the derailling car.

FE-1994-06 20-Jan-94 UP Fall City NE Freight Conductor AGE: 44

Conductor riding side of two cars to be kicked, he moves to the opposite side of car to work hand brake and is immediately struck by locomotives standing on adjacent track creating a no-clearance condition. Conductor was not aware that the locomotives had arrived at that location since he had last been there.

FE-1994-12 12-Apr-94 SP Houston TX Yard Conductor/Foreman AGE: 62

A three person switching crew was in the process of switching out the car repair shop. The foreman had taken a position on the trailing end of the third leading car as the move was being shoved into a track having a close clearance condition that involved a protective grate that covered a winch. The foreman was knocked off the car by the covering, fell in front of the leading wheels of the forth leading car, and was later pronounced dead at the hospital.

## Special Switching Hazard: Close Clearance.

FE-1995-33    11-Dec-95   NS       Toledo                      OH   Brakeman                      AGE:   53

A three-person crew was called to switch an industry that all were very familiar with. During the switching moves, the brakeman was inside an area with no clearances between the cars and the hand railings installed on the walls. He was making coupling and, according to the conductor and engineer, upon completion of that work, ordered the engineer to haul out of the building where the conductor would take over the next move to be performed. Subsequently, a plant employee observed the brakeman slumped beside the track, rushed to assistance, call 911 and notified the conductor that his man was down. The brakeman died later on at the hospital of crushing wounds incurred when he was rolled between the cars being pulled out and the railing.

FE-1995-34    14-Dec-95   CSXT    Monroe                      NC   Conductor                      AGE:   54

A three-person crew (engineer, conductor & conductor trainee) was called to operate a local freight train. During a switching operation at a yard, the conductor was riding nine cars down a clear track and directing the shove move by radio. When the engineer did not hear any more radio transmissions from the conductor, he stopped the move and found the conductor dead and lying beside the track he had been shoving down. Post accident investigation revealed that he had been struck by a truck trailer door positioned on a flat car standing on an adjacent track and that had been left open and swinging freely. The investigation revealed that a vandal had broken into the trailer and stolen material from it.

FE-1996-12    15-Jun-96   CSX       Charlotte                      NC   Switchman                      AGE:   36

Yard crew, engineer, conductor and switchman, switching at an industry. While crew was shoving two cars to a spot inside an industry building, FE (switchman) was rolled between lead box car and unloading platform. Platform or building was not marked with any type of 'no-clearance' or 'close clearance' signage. FE was last seen by conductor on the ground next to movement in a 'cut-out' space in the unloading platform. The conductor reported that there is enough room for a man to clear the movement in this 'cut-out'. After hearing a strange noise the conductor instructed engineer to stop the movement. FE was rolled for 21 feet between boxcar and platform. FE had one year of experience.

FE-1998-05    04-Feb-98   BRC       Bedford Park                      IL   Yard Conductor/Foreman                      AGE:   42

Conductor and switchman making hoses on track 12, last transmission by conductor is "I think I got all the hoses after that next one...." Conductor later found to have been struck and killed by a free rolling car on the adjacent track.

## Special Switching Hazard: Close Clearance.

FE-1998-19    01-Jul-98   NS        Buechel                      KY   Utility Employee                      AGE:   54

A three person local switching crew (conductor, engineer and utility employee) had just begun to pull five cars out of an industrial loading dock while the conductor and the utility employee began to walk toward the door providing egress out of the dock area. Suddenly, according to the conductor, the utility employee allegedly tripped on some material on the dock, grabbed the side of the outgoing cut of cars and was pulled between the car he was holding onto and the handrail structure that accompanied the stairs leading from the platform to the door. He died two weeks later.

FE-2000-16   22-May-00   CSX        Richmond                      VA   Brakeman                      AGE:   38

A three person road switching crew was in the process of spotting loaded coal cars at a unloading facility that was equipped with a “shaker” that helped empty each car. The shaker’s position causes a close clearance condition. The conductor was riding one side of the leading coal car and the brakeman was riding the other. Although having a clear view of the fouling equipment, the brakeman did not get off the car as the conductor had expected and was crushed between it and the fouling shaker equipment.

FE-2000-23    28-Jul-00   UP        St. Louis                      MO   Switchman                      AGE:   48

A three person local switching crew was in the process of setting cars into a track within an industry. The switchman was riding the side ladder of the leading end of the leading car as it went into the building. The doorway would not clear a man riding on the side of the car and the trainman was killed as he was compressed between it and the car he was riding.

FE-2000-30    15-Oct-00   UP        Houston                      TX   Fireman                      AGE:   47

Employees failed to discuss movement, resulting in employee falling from locomotive platform and being rolled between the locomotive and the elevated walkway.

FE-2001-31    10-Oct-01   PAL        Clayburn                      KY   Conductor                      AGE:   38

A three-person, local freight train crew was switching a plant and had 2 engines 6 cars and a caboose when they moved over a small bridge and coupled to 5 standing cars in the storage track. The conductor made the coupling and told the engineer to pull the cars out of the track. The conductor got on the side of the trailing end of the second last car in the cut and was knocked off the car by a metal pole adjacent to the storage track. He fell between the car he was riding and the last car in the cut being pulled. He died when the lead wheels of the last car rolled over him.

## Special Switching Hazard: Close Clearance.

FE-2001-40 24-Dec-01 NS Lynchburg VA Conductor AGE: 30

A conductor, engineer and conductor in training had been transported to an unattended train standing on a siding a portion of which was in a tunnel adjacent to the main track. After storing their equipment, the conductor and the conductor in training left the locomotive to release hand brakes on the train. The conductor was killed when she failed to step in between two boxcars of her train as the conductor in training had done and was subsequently struck by a passing mainline train.

FE-2002-09 21-Mar-02 NS Claymont DE Engineer AGE: 45

A locomotive engineer had been dropped off at the head end of his train while the conductor was taken to the rear to check on the REM. After crossing over the ATK corridor mainline tracks, and beginning to board his locomotive, the engineer was dragged off the stairs of the locomotive and killed by a passing 110 MPH passenger train.

FE-2002-19 08-Aug-02 CWR Cleveland OH Switchman AGE: 53

A two person crew was switching cars in a yard and, without the trainman's knowledge, another switching crew had set cars into a track adjacent to the one being used by the first crew. The set out included a wide ladle car and it created a clearance issue on the adjacent track. Some time later, the trainman was riding the lead car down the track adjacent to the wide ladle car and was killed when he was rolled between the car he was riding and the wide ladle car sitting on the adjacent track.

FE-2005-18 13-May-05 DC Detroit MI Yard Conductor AGE: 24

A 24-year-old conductor with 3 months experience died of injuries he sustained when the car he was riding on derailed and he was crushed between the car and a steel I-beam.

FE-2005-25 22-Jul-05 ATN Ragland AL Brakeman AGE: 56

A two person switching crew conducted a job briefing associated with switching operations at an industry plant. The crew coupled 10 empty covered hopper cars and commenced the move with the conductor riding the B- end of a covered hopper. The car being shoved struck a drainage grate lying in the gage of the track and swerved off the track onto a concrete apron of the same height as the track. The conductor was trapped between the car and the concrete wall and dragged along the wall for a distance of 16 feet, killing him. Clearance between the wall and car was 27 inches; The US Department of Labor requires a minimum clearance of 30 inches unless the lesser clearance is conspicuously marked, which it wasn't.



## Special Switching Hazard: Close Clearance.

FE-2005-27 09-Aug-05 AM Rogers AR Conductor AGE: 23

A three person crew prepared to spot cars at a loading dock with the brakeman riding on the cars being moved. Clearance at the loading dock is restricted, though no notice of this condition was posted. As the engineer proceeded with the shove, the brakeman noticed the conductor was pinned between the dock and the car body.

FE-2005-36 04-Dec-05 BNSF Burlington IA Brakeman AGE: 34

A three person switch crew held a job briefing with the intent to deliver 125 car loads of coal onto five (5) industry tracks. Only the engineer was familiar with the industry plant and its tracks. The engineer offered to operate the locomotive into the plant to allow the rest of the crew to become more familiar with the work area; the other crew members declined. The track passes under an overhead walkway with only 5 1/2 inch clearance between the part of the car on which the brakeman was riding, and a support beam of the walkway. The brakeman failed to take heed of this situation and was fatally injured when he was crushed between the car and the support member.

FE-2006-14 10-Sep-06 ALS East St. Louis IL Conductor AGE: 44

A two person crew was in the process of making up a locomotive consist using two adjacent tracks. After setting over one of the locomotives, the conductor rode the leading end of the two locomotives into the adjacent track. When his head signals went out of sight, the movement was stopped and the engineer went back to discover the conductor crushed between the locomotive they set out and the locomotive he was riding.

FE-2006-26 28-Dec-06 UP Sioux City IA Yard Foreman AGE: 57

A three person switching crew working with a student switchman began switching following a safety briefing. Two rail cars kicked toward a track stalled foul of the clearance point on the adjacent track. The next car switched was rolling free when the footboard yardmaster/switch foreman and student switchman saw that the cars were fouling the clearance point. The footboard yardmaster/switch foreman in an attempt to board and stop the free rolling car became trapped between the sides of the cars and carried for a distance between the cars.

FE-2008-06 05-Mar-08 WSO Random Lake WI Freight Conductor AGE: 55

A three-person crew (engineer, conductor, and student conductor) arrived at an industrial spot where they were required to spot 2 loads. This industry had not been spotted for about a month and three inches of accumulated snow was covering packed ice on the spur track. The conductor rode the leading end of the first car adjacent to the standing train on the main track and the student conductor rode the opposite side of the same car, controlling the movement by radio. Due to the build-up of packed ice and mud in the flange-way the car derailed into the side of cars left standing on the main track, and the conductor was crushed between the cars.

## Special Switching Hazard: Close Clearance.

FE-2008-15 26-May-08 CSX Lumberton NC Freight Conductor AGE: 46

A three person train crew operated a freight train consisting of three locomotives and 97 loaded coal hoppers. The conductor had one year of experience – interrupted by a four month furlough – and a student engineer were a part of the train crew. The train crew began shoving to spot the coal hoppers into a generating plant. The conductor had not work in this plant previously but was told plant employees would help if needed. The conductor rode the shove movement giving car counts via radio. The last radio transmission from the conductor to the student engineer, who was operating the train, was “give me all you’ve got, then “stop.” The lead two cars had plowed through a large pile of coal knocking the conductor from the car, crushing the conductor.

FE-2008-31 10-Sep-08 INRD Terre Haute IN Freight Conductor AGE: 42

The conductor of a two person local freight crew was riding the leading end on the side of a tank car during an industry switching job. The conductor was crushed and killed when the leading car derailed and struck a stack of bundled wood railroad ties adjacent to the track. The car derailed on compacted aggregate which had been placed as an adhoc crossing on the industry track. The shove movement was proceeding at 7 mph on track with a 5 mph maximum speed.

FE-2008-33 23-Sep-08 CSX Darby PA Freight Conductor AGE: 46

After reaching their destination, a two person crew was instructed to secure their freight train at a location beyond the normal crew change point. The location was on double track on a bridge near a parking lot where a relief crew could reach the train. The conductor left the cab of the locomotive without job-briefing with the Engineer and without his hand-held radio. He crossed in front of the locomotive and walked eastward across the bridge between the two tracks. There was poor footing and almost no clearance between the two tracks. An eastbound approaching train, operating at 26 mph, observed the conductor, sounded the whistle, turned the head lights to bright, and tried to stop. The eastbound train struck and killed the conductor who was walking in the foul.

FE-2009-06 28-Jan-09 UP Council Bluffs IA Yard Foreman AGE: 41

A four person yard switching crew was pulling cars up to make a shoving movement into a yard track, while a road train was approaching in the same direction on the main track adjacent to the switching lead. The conductor riding in the second locomotive of the yard switcher exited the cab and got off on the live side next to the main track, fouling the main track, and was struck by the passing road train.

## **Special Switching Hazard: Close Clearance.**

FE-2009-11    28-Feb-09   BNSF   Buchanan                      NM   Freight Conductor                      AGE:   56

A two person road train with the conductor riding the end car made a shoving movement into the siding to leave cars on the siding. The movement was controlled by radio communications from the conductor during the shove. During the shove movement the conductor was knocked off when the conductor impacted a tie bundle closely positioned next to the rail. The impact caused the conductor to be knocked off the equipment and killed.

FE-2009-20    24-Jun-09   ATN     Albertville                      AL   Freight Conductor                      AGE:   33

A two person crew was shoving cars into spot at an industry with the conductor controlling the movement via radio communications. The conductor gave car counts from 12 down to 3 during the shove, and shortly after that transmission the engineer stopped the movement when he heard an "OH" transmission. The conductor was found deceased on the leading end of the lead car on the platform, pinned against a car of scrap metal.

FE-2009-26    29-Dec-09   BNSF   Minneapolis                      MN   RCL Operator                      AGE:   44

A two-person RCL crew shoved five empty cars into a snow-covered industry track. Ice build-up on the track caused the lead car of the movement to derail. The RCL operator, riding the lead car and controlling the move, was crushed against the side of an industry building and fatally injured.

## **Special Switching Hazard: Derailment.**

FE-1992-08    11-Mar-92   FEC     Fort Pierce                      FL   Yard Conductor/Foreman                      AGE:   36

This case involved the conductor riding a car into Track 8. The car derailed at the spiked switch and the conductor was subsequently killed. The conductor's last radio transmission was "...we're lined in eight rail, three or four cars to a joint." Movement stopped after car had derailed and side swiped adjacent car.

FE-1993-27    04-Aug-93   UP       Pryor                      OK   Freight Brakeman/Flagman                      AGE:   42

A three person industrial switching crew was shoving three cars down a track. The conductor was on the ground, ahead of the move and the brakeman was riding the side of the leading end of the leading car. A bush created a clearance issue and the brakeman stepped around the side of the leading car to the end of the car just as it began to derail. The brakeman was killed when he fell from the derailling car.

## Special Switching Hazard: Derailment.

FE-1993-40 19-Oct-93 SOO Leal ND Freight Brakeman/Flagman AGE: 43

A three-person train crew was in the process of picking up 18 cars off a siding. The trainman had 10 weeks of experience, forgot to remove the derail, and was killed when the leading car he was riding derailed on top of him. During the stop, the conductor remained in the cab of the lead locomotive with the engineer.

FE-1994-03 14-Jan-94 BN Amarillo TX Conductor AGE: 57

A three-person crew reported for duty and later was in the process of shoving cars down a track with the switch foreman riding the point. At the same time, another yard switching job was pulling cars in the opposite direction on an adjacent track and derailed. The foreman immediately told the other crew that they were on the ground and then told his engineer to stop the shove he was riding. The foreman was found crushed between the car he was riding and the car that derailed on the adjacent track.

FE-1998-37 28-Dec-98 IC Durrant MS Conductor AGE: 55

Shove movement was not properly controlled by radio communication and resulted in a collision with a fallen tree which caused the derailment and death of the conductor.

FE-1999-03 22-Jan-99 CR Alexanderia NY Conductor AGE: 45

A three person local switching crew was shoving a loaded covered hopper down an industrial lead. The conductor was riding on one side of the car and the brakeman was riding the other. As the car was shoved over a private crossing, the accumulation of ice and snow lifted the car off the rails and it tipped over and onto the conductor who was killed as a result of the derailment.

FE-2001-21 13-Jul-01 CPRS Bensenville IL Conductor AGE: 55

The three-person crew had just finished kicking a flat car into a clear track and the conductor was about to mount the leading end of a cut of cars to be kicked into another track further down the lead. As the conductor issued instructions to the engineer to begin the move, and to the crew, the flat car had not cleared the fouling point to the lead. The shove move rode up onto the flat car derailing the car the conductor was riding on which crushed him to death.

FE-2003-11 11-Apr-03 UP Pocatello ID Conductor AGE: 55

A road conductor was riding the point of a 122-car shove down a track that was partially out of service. The out of service portion was marked by a red flag and derail. The crew was not able to stop the movement before the car being ridden by the conductor went over the derail, landed on its side and crushed the conductor to death.

## Special Switching Hazard: Derailment.

FE-2004-20 02-Sep-04 BNSF Clovis NM Conductor/switchman AGE: 26

A two person remote control crew switching in the yard when an empty tank car passed through a switch and derailed, this caused the car to shake and bounce violently. The conductor/switchman lost his hold on the car and fell off between the rails, and was run over and killed.

FE-2004-25 07-Oct-04 UP Springfield IL Student brakeman AGE: 31

A road train pulling around the connection track derailed nine cars while pulling. The student brakeman located to the side of the track where the cars derailed was crushed when a car derailed and fell over. The student brakeman did not follow instructions given him at a job briefing given by the train conductor shortly before the incident occurred.

FE-2005-18 13-May-05 DC Detroit MI Yard Conductor AGE: 24

A 24-year-old conductor with 3 months experience died of injuries he sustained when the car he was riding on derailed and he was crushed between the car and a steel I-beam.

FE-2005-25 22-Jul-05 ATN Ragland AL Brakeman AGE: 56

A two person switching crew conducted a job briefing associated with switching operations at an industry plant. The crew coupled 10 empty covered hopper cars and commenced the move with the conductor riding the B- end of a covered hopper. The car being shoved struck a drainage grate lying in the gage of the track and swerved off the track onto a concrete apron of the same height as the track. The conductor was trapped between the car and the concrete wall and dragged along the wall for a distance of 16 feet, killing him. Clearance between the wall and car was 27 inches; The US Department of Labor requires a minimum clearance of 30 inches unless the lesser clearance is conspicuously marked, which it wasn't.

FE-2008-06 05-Mar-08 WSO Random Lake WI Freight Conductor AGE: 55

A three-person crew (engineer, conductor, and student conductor) arrived at an industrial spot where they were required to spot 2 loads. This industry had not been spotted for about a month and three inches of accumulated snow was covering packed ice on the spur track. The conductor rode the leading end of the first car adjacent to the standing train on the main track and the student conductor rode the opposite side of the same car, controlling the movement by radio. Due to the build-up of packed ice and mud in the flange-way the car derailed into the side of cars left standing on the main track, and the conductor was crushed between the cars.

## **Special Switching Hazard: Derailment.**

FE-2008-31 10-Sep-08 INRD Terre Haute IN Freight Conductor AGE: 42

The conductor of a two person local freight crew was riding the leading end on the side of a tank car during an industry switching job. The conductor was crushed and killed when the leading car derailed and struck a stack of bundled wood railroad ties adjacent to the track. The car derailed on compacted aggregate which had been placed as an adhoc crossing on the industry track. The shove movement was proceeding at 7 mph on track with a 5 mph maximum speed.

FE-2008-35 15-Oct-08 CSX Decatur AL Freight Conductor AGE: 28

A three person crew, operating a freight train on line-of-road, was setting out 30 cars from a controlled siding to a yard track. After making the cut on the train the conductor instructed the engineer to pull ahead three cars and following a 10 minute interval instructed the engineer to back up 12 cars. After moving about six car lengths the engineer heard and felt a collision. The shove movement had collided with the crew's standing train left foul of the movement. The conductor was riding the lead car which derailed and turned over, crushing the conductor. The conductor, a set back engineer, sent one text message and received three messages while making the cut on the controlled siding and making the shove movement into the yard.

FE-2009-20 24-Jun-09 ATN Albertville AL Freight Conductor AGE: 33

A two person crew was shoving cars into spot at an industry with the conductor controlling the movement via radio communications. The conductor gave car counts from 12 down to 3 during the shove, and shortly after that transmission the engineer stopped the movement when he heard an "OH" transmission. The conductor was found deceased on the leading end of the lead car on the platform, pinned against a car of scrap metal.

FE-2009-26 29-Dec-09 BNSF Minneapolis MN RCL Operator AGE: 44

A two-person RCL crew shoved five empty cars into a snow-covered industry track. Ice build-up on the track caused the lead car of the movement to derail. The RCL operator, riding the lead car and controlling the move, was crushed against the side of an industry building and fatally injured.

## **Special Switching Hazard: Drugs and Alcohol.**

FE-1993-46 12-Nov-93 ATSF Farewell TX Freight Conductor AGE: 41

A three person industrial switching crew had been working together to get the switches lined and the derail off in preparation for a shove move into the plant. The conductor was on the leading end of the lead car and the brakeman was on the trailing end of the same car. The conductor was crushed by a car he had set out without setting a hand brake. The car rolled into a car he and his brakeman were riding and impairment (drugs) contributed to the fatality.

## **Special Switching Hazard: Drugs and Alcohol.**

FE-1996-30 16-Dec-96 UP Clinton IA Brakeman AGE: 51

A three-person crew was in the process of switching a plant when the conductor sent the locomotive and cars out of one track toward the brakeman who was to handle the switches and direct the cars into another track. The conductor stopped the move after the cars had cleared an industry road crossing and the engineer waited to receive instructions from the brakeman. However, the brakeman had mounted the second head car behind the locomotives and had apparently slipped or fell from that position and was found dead by the engineer and conductor lying between and beneath the fourth head car. The brakeman tested positive for THCA & THC.

FE-1998-02 24-Jan-98 BNSF Omaha NE Yard Conductor/Foreman AGE: 47

A three person switching crew was working in close proximity to another switching crew and, after some discussion, but no absolute understanding of the move just made by the other crew, began to pull down the switching lead. As they approached a mis-aligned switch, the foreman jumped off the moving locomotive, ran to the switch and was in the process of "flopping it over" when the leading wheels of the locomotive entered the switch, popped the handle up, striking the foreman in the face and killing him. Post accident testing indicated that drug impairment may have contributed to the fatality.

FE-1999-24 14-Sep-99 AM Van Buren AR Conductor AGE: 47

A two person switching crew was in the process of shoving ten cars onto a clear track, with the intention of cutting three off, and pulling out the other seven cars out. The conductor counted down the cars via radio, and the engineer stopped one half-car lengths after the last radio transmission of one-half cars to go. Subsequently, the engineer discovered that the conductor had stepped in between the cars and had been coupled up.

FE-2004-13 13-May-04 MSO Sturgis MI Conductor AGE: 38

A two person road switching crew was making a shoving movement with the trainmen crossing over on the brake platform of the lead end of the lead car. The conductor fell from the car and was run over by own equipment. The conductor tested positive for THC.

## **Special Switching Hazard: Electronic Device (Cell phone, MP3 player)**

FE-2000-33 29-Dec-00 BNSF Gillette WY Conductor AGE: 29

A two-person freight train crew was about to be passed by another freight train at a location on line-of-road. The conductor of the stopped train got up out of his seat, exited the leading locomotive and crossed over the track on which the on-coming train was proceeding. The conductor was struck and killed by the lead locomotive of the passing train.

## **Special Switching Hazard: Electronic Device (Cell phone, MP3 player)**

FE-2004-25    07-Oct-04    UP       Springfield       IL    Student brakeman       AGE: 31

A road train pulling around the connection track derailed nine cars while pulling. The student brakeman located to the side of the track where the cars derailed was crushed when a car derailed and fell over. The student brakeman did not follow instructions given him at a job briefing given by the train conductor shortly before the incident occurred.

FE-2008-19    08-Jun-08    UP       La Porte       TX    Yard Brakeman       AGE: 47

A three person train crew was performing switching operations at an industrial location. The brakeman controlling movements by radio, instructed the engineer to back up four cars to a coupling.

The engineer, watching in the side mirror of the locomotive, noticed the cars moving down curved track instead of the straight track to the coupling. The switch target as seen in the mirror indicated the switch was lined for the spur track, not the straight track. The engineer saw someone walk in front of the movement and it was determined later to be the brakeman, who was struck and killed by the erroneous movement. Cellular telephone records indicated the brakeman had made or received several telephone calls, including a two-minute call during the time of the fatal shove over the misaligned switch.

FE-2008-35    15-Oct-08    CSX       Decatur       AL    Freight Conductor       AGE: 28

A three person crew, operating a freight train on line-of-road, was setting out 30 cars from a controlled siding to a yard track. After making the cut on the train the conductor instructed the engineer to pull ahead three cars and following a 10 minute interval instructed the engineer to back up 12 cars. After moving about six car lengths the engineer heard and felt a collision. The shove movement had collided with the crew's standing train left foul of the movement. The conductor was riding the lead car which derailed and turned over, crushing the conductor. The conductor, a set back engineer, sent one text message and received three messages while making the cut on the controlled siding and making the shove movement into the yard.

## **Special Switching Hazard: Employee Tripping, Slipping, or Falling**

FE-1992-15    01-Jun-92    BN       Seattle       WA    Switchman       AGE: 42

A four-person crew (engineer, switch foreman, 2 switchman) had 3 cars with them when they coupled onto 56 cars standing on a yard track. They were told to pull the head 16 cars and leave the remaining 40 there. They were also told that the 16 had been separated from the remaining 40. The crew pulled the 19 cars out of the track and per radio instructions from the switchman, began a shove into another track. As the movement entered the track it was struck by the 40 car cut that had been left on the first track. The switchman died falling from the cars while getting on and off the free rolling cut to set hand brakes in an attempt to stop them.



## Special Switching Hazard: Employee Tripping, Slipping, or Falling

FE-1993-11 27-Mar-93 SP Guadalupe CA Freight Brakeman/Flagman AGE: 39

A four person crew (engineer, conductor, 2 brakeman) were in the process of pulling one track out and then intended to shove back into another track to pick up more cars. The head brakeman was in control of the move. The rear brakeman was found dead adjacent to the track that was pulled. Evidence suggests that the rear brakeman may have mounted, or tried to mount the car that ran him over as the cut was pulled out of the track.

FE-1993-26 15-Jul-93 CR Anderson IN Yard Brakeman/Helper AGE: 43

After the brakeman had tied the locomotives onto a cut of cars in the yard, the engineer received an instruction, via radio, from the brakeman to “shove to hold more cars.” The engineer began to shove and didn’t stop until he was on the other end of the track. The brakeman was run over by the shove move. There was no evidence of any other radio transmissions concerning the shove move.

FE-1995-23 21-Jul-95 CR Hershey PA Conductor AGE: 61

A three-person crew was switching an industry. The conductor had directed a few switching moves and then instructed the engineer to haul out of the plant. The conductor was observed by a plant employee riding on the trailing end of the first of two tank cars being pulled out of the plant. Moments later the conductor fell between the cars and was killed when he was run over by the trailing car in the two car move.

FE-1996-30 16-Dec-96 UP Clinton IA Brakeman AGE: 51

A three-person crew was in the process of switching a plant when the conductor sent the locomotive and cars out of one track toward the brakeman who was to handle the switches and direct the cars into another track. The conductor stopped the move after the cars had cleared an industry road crossing and the engineer waited to receive instructions from the brakeman. However, the brakeman had mounted the second head car behind the locomotives and had apparently slipped or fell from that position and was found dead by the engineer and conductor lying between and beneath the fourth head car. The brakeman tested positive for THCA & THC.

FE-1997-02 12-Jan-97 UP S Fontana CA Conductor AGE: 60

A three-person road crew arrived at a siding, pulled into the siding and stopped their train. They then cut off their locomotive consist, ran around the 50 loaded cars in their train, and tied onto the opposite end. The conductor and brakeman then positioned themselves on the leading end of the shove move and directed the engineer by radio to begin the shove into the plant. As the move entered a descending grade into the plant, the slack ran out, the conductor lost his hold on the leading car, fell in front of the car he was riding, was run over and died.

## Special Switching Hazard: Employee Tripping, Slipping, or Falling

FE-1997-18    24-Jun-97   UP    Portland    OR   Yard Conductor/Foreman    AGE: 53

A three person yard switching crew was in the process of pulling a five car articulated cut of cars from out of one track with the intent of moving them to another. The yard foreman was killed when he was run over by the leading wheels of the trailing car. It appears that the foreman tried to release a hand brake at the trailing end of the second to the last car and while attempting to do so, stumbled, fell and was run over by the trailing car.

FE-1997-32    16-Oct-97   MRL    Laurel    MT   Switchman    AGE: 22

Yard switch crew, engineer, switch foreman and switchman, were shoving a cut 41 cars up a grade to a stop. While this was taking place the ground crew boarded the first two cars so they could apply the hand brakes. FE (switchman) fell off the first car while attempting this. This car was found to have a brake platform with a decreasing width. Under the hand brake this platform was found to be 2 inches under the required width over a length of about 30 inches. FE had 10 months experience.

FE-2000-21    07-Jul-00   CKRY    Wichita    KS   Conductor    AGE: 39

Employee was struck by his own train when he tripped and fell onto the rail as he stepped in between moving equipment to open a knuckle while walking backwards.

FE-2003-25    24-Sep-03   BNSF    Fresno    CA   Switch Foreman    AGE: 35

A three person switching crew was shoving a cut of cars into a yard track and the switching foreman was riding the leading end of the 35 car cut. There was no air in the train line and the engineer was using engine brake to control the shove during the 50 car lengths of clear track to be shoved prior to making a coupling on other cars in the same track. Twenty cars into the move the foreman was either dislodged or fell from the leading end of the movement and was run over by the sixth head car of the shove.

FE-2004-03    14-Jan-04   NS    Kankakee    IL   Freight Conductor    AGE: 40

A two person crew was switching on the yard lead when the conductor, with 4 years experience, gave a "kick" sign via radio. The conductor wearing ice creepers pulled the pin and was struck by his own cut of cars and killed.

FE-2004-13    13-May-04   MSO    Sturgis    MI   Conductor    AGE: 38

A two person road switching crew was making a shoving movement with the trainmen crossing over on the brake platform of the lead end of the lead car. The conductor fell from the car and was run over by own equipment. The conductor tested positive for THC.

## Special Switching Hazard: Employee Tripping, Slipping, or Falling

FE-2004-20 02-Sep-04 BNSF Clovis NM Conductor/switchman AGE: 26

A two person remote control crew switching in the yard when an empty tank car passed through a switch and derailed, this caused the car to shake and bounce violently. The conductor/switchman lost his hold on the car and fell off between the rails, and was run over and killed.

FE-2006-04 02-Apr-06 LSI Palmer MI Freight Conductor AGE: 51

A road switcher was shoving 60 cars toward cars previously moved. The conductor, riding the cars, gave the locomotive engineer shoving distances via radio. Following the last transmission, the locomotive engineer felt the distance was incorrect, but continued the shove while attempting to communicate with the conductor. Failing to contact the conductor, the engineer stopped the movement and walked along the cars until he found the conductor's body wedged between the wheels of a car. The conductor was fatally injured.

FE-2006-18 13-Oct-06 UP Watsonville CA Brakeman AGE: 49

An RCL crew consisting of two operators (a conductor and brakeman) were switching approximately 60 cars. The crew did a radio job briefing to address movement and three cars were moving into a track when the conductor saw the brakeman rolling under the passing cars. As a result the brakeman was fatally injured.

FE-2007-12 08-Jul-07 BNSF Berry AZ Freight Conductor AGE: 37

A conductor was in the process of setting 9 cars into a siding when radio communication with the engineer stopped. The engineer walked back to check on the conductor and found him under a freight car.

FE-2008-16 29-May-08 UP Amarillo TX Yard Conductor AGE: 35

A four person switching crew free rolled four loaded ingot cars toward track three with the conductor, who was to operate the handbrake, riding the leading end of the lead car. When the cars did not stop where they should the crew took the locomotive down track three to find the conductor.

The vertical handbrake support bracket had broken off at the deck of the car and caused the conductor to fall and be run over by the cars. The support bracket, which should have been bolted to the car, had been welded and the weld failed.

## **Special Switching Hazard: Employee Tripping, Slipping, or Falling**

FE-2009-03    16-Jan-09   BNSF   Fort Sumner                   NM   Freight Engineer,                   AGE:   59

A two person road freight train crew was operating on the main track westbound when the engineer exited the cab of the controlling locomotive to go to the trailing locomotive. The conductor, a qualified locomotive engineer, took over operation of the locomotive and train. After several minutes when the engineer had not returned, the conductor stopped the train and went in search of the engineer and notified the dispatcher. A following westbound train found the engineer on a parallel road where he had fallen from the train. The engineer died as a result of injuries sustained in the fall.

## **Special Switching Hazard: Environment.**

FE-1993-53    30-Dec-93   CR       Brook Park                   OH   Yard Conductor/Foreman           AGE:   61

A three-person yard crew was in the process of switching a plant. The brakeman was at the plant doors and the conductor and engineer had hauled out to put away a car that had been removed from the plant. After the conductor had tied onto the cars to go into the plant and begun to shove toward the plant, the car that had just been placed on an adjacent track rolled out, fouled the conductor's movement, and crushed him between the leading car and the rolling car.

FE-1999-03    22-Jan-99   CR       Alexanderia                   NY   Conductor                                   AGE:   45

A three person local switching crew was shoving a loaded covered hopper down an industrial lead. The conductor was riding on one side of the car and the brakeman was riding the other. As the car was shoved over a private crossing, the accumulation of ice and snow lifted the car off the rails and it tipped over and onto the conductor who was killed as a result of the derailment.

FE-2000-02    02-Jan-00   CIRR   Cedar Springs                   GA   Conductor                                   AGE:   49

A two person switching crew was in the process of switching cars in a storage yard and the conductor was riding the leading end of a cut of cars being shoved down a track. The move was taking place in dense fog and in darkness when the car he was riding collided with other cars on an adjacent track that were fouling the track he was on. The conductor was killed as a result of the collision.

FE-2001-08    03-Mar-01   BNSF   Willmar                   MN   Switchman                                   AGE:   36

The switchman of a three person yard switching crew made a cut on a block of cars sitting on a yard track and told the engineer to pull the cars out. Apparently, as the cars were being pulled out, the switchman stepped between the gauge of the track and was struck and killed by the remaining cars on the track that had begun to roll in the same direction as the cars being pull out of the track.

## **Special Switching Hazard: Environment.**

FE-2004-03    14-Jan-04   NS       Kankakee                    IL   Freight Conductor                    AGE: 40

A two person crew was switching on the yard lead when the conductor, with 4 years experience, gave a "kick" sign via radio. The conductor wearing ice creepers pulled the pin and was struck by his own cut of cars and killed.

FE-2008-06    05-Mar-08   WSO       Random Lake                    WI   Freight Conductor                    AGE: 55

A three-person crew (engineer, conductor, and student conductor) arrived at an industrial spot where they were required to spot 2 loads. This industry had not been spotted for about a month and three inches of accumulated snow was covering packed ice on the spur track. The conductor rode the leading end of the first car adjacent to the standing train on the main track and the student conductor rode the opposite side of the same car, controlling the movement by radio. Due to the build-up of packed ice and mud in the flange-way the car derailed into the side of cars left standing on the main track, and the conductor was crushed between the cars.

FE-2009-26    29-Dec-09   BNSF       Minneapolis                    MN   RCL Operator                    AGE: 44

A two-person RCL crew shoved five empty cars into a snow-covered industry track. Ice build-up on the track caused the lead car of the movement to derail. The RCL operator, riding the lead car and controlling the move, was crushed against the side of an industry building and fatally injured.

## **Special Switching Hazard: Equipment.**

FE-1992-08    11-Mar-92   FEC       Fort Pierce                    FL   Yard Conductor/Foreman                    AGE: 36

This case involved the conductor riding a car into Track 8. The car derailed at the spiked switch and the conductor was subsequently killed. The conductor's last radio transmission was "...we're lined in eight rail, three or four cars to a joint." Movement stopped after car had derailed and side swiped adjacent car.

FE-1994-03    14-Jan-94   BN       Amarillo                    TX   Conductor                    AGE: 57

A three-person crew reported for duty and later was in the process of shoving cars down a track with the switch foreman riding the point. At the same time, another yard switching job was pulling cars in the opposite direction on an adjacent track and derailed. The foreman immediately told the other crew that they were on the ground and then told his engineer to stop the shove he was riding. The foreman was found crushed between the car he was riding and the car that derailed on the adjacent track.

## Special Switching Hazard: Equipment.

FE-1995-02    11-Jan-95   CR    Indianapolis    IN   Conductor    AGE: 51

A three-person crew was in the process of switching a plant. The conductor was riding the leading end of the lead car during an eight-car shove. He had notified the engineer that he had mounted the moving car and told him by radio to continue shoving. When the engineer did not hear any more from the conductor, he stopped and the brakeman walked back to find the conductor had been run over by five of the eight cars being shoved. An exception was taken by the FRA for the absence of the "BR" end handhold that could have been used to assist the conductor in moving from the side of the car to the end of the car.

FE-1996-22    03-Sep-96   DGN    Dallas    TX   Brakeman    AGE: 43

Yard switch crew, engineer, conductor and brakeman, while switching at an industry on a downhill grade experienced an unwanted run away car. While FE (brakeman) was in position on a car and setting a hand brake, the car started to roll away from the crew. FE continued to try to apply hand brake in an effort to stop the car. When discovering that the car was rolling away, the conductor attempted to slow and stop it by putting wood blocks under the wheels. The car accelerate to 30 to 35 mph. FE did not detrain before car collided with seven other cars at that speed. FE had three weeks experience.

FE-1996-24    07-Oct-96   UP    Eagle Pass    TX   Engine Foreman    AGE: 35

Three-person crew was switching in class yard, locomotive failed to couple to cut of seven standing cars. Yard foreman used hand signals to separate the locomotive by twenty feet. While adjusting the locomotive drawbar, the seven cars rolled in and coupled him up.

FE-1997-32    16-Oct-97   MRL    Laurel    MT   Switchman    AGE: 22

Yard switch crew, engineer, switch foreman and switchman, were shoving a cut 41 cars up a grade to a stop. While this was taking place the ground crew boarded the first two cars so they could apply the hand brakes. FE (switchman) fell off the first car while attempting this. This car was found to have a brake platform with a decreasing width. Under the hand brake this platform was found to be 2 inches under the required width over a length of about 30 inches. FE had 10 months experience.

FE-1999-12    09-Apr-99   UP    Richland    WA   Conductor    AGE: 58

A three-person road switcher was in the process of dropping a car into a track. However, the locomotive was fouling the track the car was to enter. The brakeman, realizing this, jumped from the trailing end of the car and ran to the leading end to try and stop the car. The conductor, who was standing near the fouling corner of the locomotive, started up the stairwell of the locomotive when he realized what was happening. However, the stairwell was obstructed with a metal rod that had been welded into place and prevented the conductor an escape route. He was subsequently crushed between the striking car and the metal rod.

### Special Switching Hazard: Equipment.

FE-2001-03    11-Jan-01   NS       South Fork           PA   Engineer     AGE: 52

The engineer and conductor of a road train were told to stop and check their locomotives for flat spots. Once stopped, and without a job briefing the locomotive engineer left the lead unit and shortly thereafter, was struck and killed by a passing mainline train.

FE-2003-23	14-Sep-03	UP	Ogden	UT	Conductor	AGE: 53
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A four-person yard switching crew had been working together and classifying cars into various tracks throughout the morning. The conductor was on the leading end of a two car free rolling cut of cars moving at 3 miles per hours when he fell from the leading end and was run over by the car he had been riding.

FE-2008-16	29-May-08	UP	Amarillo	TX	Yard Conductor	AGE: 35
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A four person switching crew free rolled four loaded ingot cars toward track three with the conductor, who was to operate the handbrake, riding the leading end of the lead car. When the cars did not stop where they should the crew took the locomotive down track three to find the conductor. The vertical handbrake support bracket had broken off at the deck of the car and caused the conductor to fall and be run over by the cars. The support bracket, which should have been bolted to the car, had been welded and the weld failed.

FE-2009-14	10-May-09	CSX	Selkirk	NY	Yard Conductor	AGE: 33
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A lone remote control operator was working in a yard track coupling cars together to pull to place on a departure track. All cars had not coupled properly when switched into the track, and one car had the knuckle missing on the end of the car. The operator replaced the knuckle, then began movement to couple the track. Shortly after beginning the move to couple, the operator made a radio transmission for help when crushed between equipment because drawbars by-passed.

### Special Switching Hazard: Failure to Confirm Route of Movement.

FE-1992-22	25-Jul-92	UP	Portland	OR	Freight Brakeman/Flagman	AGE: 54
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A three-person crew had arrived at the yard, pulled their train into a track, cut off the engines and were given permission to return to the other end of the yard via an adjacent clear track. The conductor remained on the end originally entered and the brakeman stayed with the engineer. The brakeman got what he thought was the proper switch, instructed the engineer by radio to back up and, apparently turned his back on the move. Before the brakeman had a chance to mount the returning locomotives, he was struck and killed by the movement that continued for 400 feet before stopping when the engineer noticed the brakeman between the gauge of the rail in front of the locomotives.

## Special Switching Hazard: Failure to Confirm Route of Movement.

FE-1997-04    29-Jan-97   UP        Mason City                IA    Conductor                                AGE: 48

Conductor and engineer were moving toward engine house area with lite engines and using hand signals. The conductor stopped the movement to line a switch. The engineer while waiting heard and acted upon an unidentified radio transmission "come ahead 21." The engineer initiated the shove movement and eventually, the conductor was struck from behind and killed.

FE-1999-01    12-Jan-99   CR        Port Newark                NJ    Conductor                                AGE: 54

A three person industry switching crew was in the process of switching cars back and forth over a private crossing equipped with an in-ground hand throw switch. The brakeman was at the switch and the conductor was going back and forth from one set of cars to another. The conductor shouted to the brakeman that he wanted the next move down one track but the cars started down the other. The brakeman tried to warn the conductor who had his back to the move and then stopped the move but to late to save the conductor who was hit and run over by the leading car of the shove.

FE-2000-22    24-Jul-00   PARN    Skagway                        AK    Conductor                                AGE: 55

A two-person yard switching crew was in the process of moving their light locomotives to a track where it was to be stored for the night. The conductor was on the leading end of the unit and directing the move by radio communication. After instructing the engineer to stop, the conductor got off the locomotive, lined two switches and told the engineer to back up. The engineer backed up until he placed the unit at the location where it is always left without further radio contact from his conductor. The conductor was struck and killed by the locomotive and found, by the engineer, under the locomotive's fuel tanks.

FE-2004-10    10-Mar-04   MNC        Stanford                        CT    Yard Brakeman                                AGE: 46

A three person crew switching in the yard was building commuter trains. During a shove movement the brakeman aligned a power operated switch for a shoving movement, gave instructions to the engineer to make the shove, failed to confirm the route of movement, fouled the live track, and was struck by the movement. The engineer observed the movement was going down the wrong track but did not stop the movement until it struck equipment on the track. The engineer looked forward following the impact and saw the brakeman lying between the guage of the rail.

FE-2005-04    26-Jan-05   PHL        Los Angeles                CA    Yard Conductor                                AGE: 52

A conductor was struck and killed by his own cut of cars when he lined switches, thought the cars were going to one track, and turned his back of the cars. The cars came back down on the track he was fouling, and struck and killed the conductor.



## **Special Switching Hazard: Failure to Confirm Route of Movement.**

FE-2008-19    08-Jun-08   UP        La Porte                      TX   Yard Brakeman                      AGE:   47

A three person train crew was performing switching operations at an industrial location. The brakeman controlling movements by radio, instructed the engineer to back up four cars to a coupling.

The engineer, watching in the side mirror of the locomotive, noticed the cars moving down curved track instead of the straight track to the coupling. The switch target as seen in the mirror indicated the switch was lined for the spur track, not the straight track. The engineer saw someone walk in front of the movement and it was determined later to be the brakeman, who was struck and killed by the erroneous movement. Cellular telephone records indicated the brakeman had made or received several telephone calls, including a two-minute call during the time of the fatal shove over the misaligned switch.

## **Special Switching Hazard: Free-Rolling Railcars.**

FE-1992-03    28-Jan-92   BN        Willmar                      MN   Yard Brakeman/Helper                      AGE:   57

A four-person crew (engineer, switch foreman, 2 switchman) had just shoved cars into track 11 and held onto one for track 9. The switch foreman got the switch for 9, noticed his front switchman standing near cars on track 11, and rode the locomotive onto the lead. After the 11th switch was lined for the lead, the switch foreman kicked the single car into track 9. The front switchman was struck and killed by the free rolling car.

FE-1992-09    09-Apr-92   ATSF    Cheto                      AZ   Freight Engineer                      AGE:   54

A three-person crew was called to operate a road local and arrived at a location where an eight-car drop would be necessary. After a job briefing, the engineer was at the throttle, the conductor at the switch and the brakeman was riding the first car of the drop, "A" end. The engineer began to pull, the brakeman lifted the pin, the engineer accelerated the locomotive beyond the switch, the conductor got the switch and the cars began free rolling into the yard. However, the speed of the movement would not allow the brakeman to safely dismount and, just before impact with another cut of cars, the brakeman attempted to dismount from the car he was riding and was killed as the cars rolled over him.

FE-1992-34    23-Oct-92   GTW    Dearborn                      MI   Freight Brakeman/Flagman                      AGE:   49

A three person train crew found it necessary to drop a car by and in doing so, the car hung up fouling the switch and blocking the locomotive into the track it had cleared up on. The crew decided to "stake" the car to clear the track in which the locomotive sat. This process requires a board or pole placed between the locomotive and car to move the car when it cannot be coupled to. The brakeman was killed when the board used slipped, the car started to move toward the locomotive and the brakeman was caught between the two pieces of equipment.

## Special Switching Hazard: Free-Rolling Railcars.

FE-1994-06    20-Jan-94    UP        Fall City                    NE    Freight Conductor                    AGE: 44

Conductor riding side of two cars to be kicked, he moves to the opposite side of car to work hand brake and is immediately struck by locomotives standing on adjacent track creating a no-clearance condition. Conductor was not aware that the locomotives had arrived at that location since he had last been there.

FE-1994-16    05-Jul-94    BN        Essex                        MT    Freight Brakeman/Flagman    AGE: 59

A three-person work train crew was in the process of dropping 14 cars they thought were empty into a quarry-loading track. The brakeman was riding the leading and brake end of the car. As the cars were separated from the engine, he set the high brake on the car he was riding. However, because there were residual materials in many of the cars, the weight added momentum to the cars and the brakeman got off and back on between two other cars in an attempt to set more hand brakes. When the cut of cars collided with a ballast pile, used as a bumping post, that was located at the end of the track, he was crushed to death between the two cars he was trying to apply hand brakes.

FE-1995-11    24-Feb-95    ATSF    Amarillo                    TX    Engine Foreman                    AGE: 44

Two crews working in the same yard from opposite ends, one crew dropped ten free rolling cars in on top of the cut where the other crew's foreman was installing the E.O.T. at the opposite end. Cars impacted with sufficient force to knock down and run over the foreman.

FE-1998-05    04-Feb-98    BRC       Bedford Park                IL    Yard Conductor/Foreman    AGE: 42

Conductor and switchman making hoses on track 12, last transmission by conductor is "I think I got all the hoses after that next one...." Conductor later found to have been struck and killed by a free rolling car on the adjacent track.

FE-2000-13    21-Apr-00    BNSF    Galesburg                    IL    Engine Foreman                    AGE: 60

A three person switching crew was in the process of hauling cars over the hump and the foreman of the crew was observing the move from between his track and another track that was being used by another yard job. The foreman was killed when he fouled and then was struck by a free rolling car on the adjacent track.

FE-2001-21    13-Jul-01    CPRS    Bensenville                    IL    Conductor                        AGE: 55

The three-person crew had just finished kicking a flat car into a clear track and the conductor was about to mount the leading end of a cut of cars to be kicked into another track further down the lead. As the conductor issued instructions to the engineer to begin the move, and to the crew, the flat car had not cleared the fouling point to the lead. The shove move rode up onto the flat car derailing the car the conductor was riding on which crushed him to death.

## Special Switching Hazard: Free-Rolling Railcars.

FE-2003-04 16-Feb-03 CSXT Syracuse NY Switchman AGE: 36

A two person crew was flat switching in a yard when the switchman, needed a break. He mentioned it to the yard foreman and they decided to go to break after one last car was “kicked” into a specific track. A short time after the car had been released, the foreman’s operating control unit indicated a “no poll” failure and the locomotive shut down. When the foreman couldn’t contact the switchman he went looking for him. The brakeman was found struck and killed by the last car that had been “kicked.”

FE-2006-18 13-Oct-06 UP Watsonville CA Brakeman AGE: 49

An RCL crew consisting of two operators (a conductor and brakeman) were switching approximately 60 cars. The crew did a radio job briefing to address movement and three cars were moving into a track when the conductor saw the brakeman rolling under the passing cars. As a result the brakeman was fatally injured.

FE-2006-26 28-Dec-06 UP Sioux City IA Yard Foreman AGE: 57

A three person switching crew working with a student switchman began switching following a safety briefing. Two rail cars kicked toward a track stalled foul of the clearance point on the adjacent track. The next car switched was rolling free when the footboard yardmaster/switch foreman and student switchman saw that the cars were fouling the clearance point. The footboard yardmaster/switch foreman in an attempt to board and stop the free rolling car became trapped between the sides of the cars and carried for a distance between the cars.

FE-2007-15 27-Jul-07 CN Fulton KY Yard Conductor AGE: 46

A road switching assignment while switching cars in the yard, free rolled cars into a yard track, and the conductor who was working in the track called via radio stating he had been hurt and needed help. The conductor was found in the gauge of track beneath the L-1 wheel of a car. The conductor later expired due to the injuries sustained.

FE-2008-16 29-May-08 UP Amarillo TX Yard Conductor AGE: 35

A four person switching crew free rolled four loaded ingot cars toward track three with the conductor, who was to operate the handbrake, riding the leading end of the lead car. When the cars did not stop where they should the crew took the locomotive down track three to find the conductor.

The vertical handbrake support bracket had broken off at the deck of the car and caused the conductor to fall and be run over by the cars. The support bracket, which should have been bolted to the car, had been welded and the weld failed.

## Special Switching Hazard: Industrial Hazard.

FE-1992-33 15-Oct-92 BN Omaha NE Yard Brakeman/Helper AGE: 32

A three-person yard crew was in the process of spotting cars over a material unloading pit and after the first of the cars was spotted the switch foreman took the locomotive out of the plant building to get the other car for spotting. The switchman remained in the building, set a handbrake on the spotted car and awaited the return of the foreman with the engine and second car to be spotted. The switchman was killed when he ended up falling into the second pit and was crushed by the industrial machinery located within.

FE-1993-27 04-Aug-93 UP Pryor OK Freight Brakeman/Flagman AGE: 42

A three person industrial switching crew was shoving three cars down a track. The conductor was on the ground, ahead of the move and the brakeman was riding the side of the leading end of the leading car. A bush created a clearance issue and the brakeman stepped around the side of the leading car to the end of the car just as it began to derail. The brakeman was killed when he fell from the the derailing car.

FE-1993-30 11-Aug-93 SP Tracy CA Freight Brakeman/Flagman AGE: 47

Crew performing industry switching. Brakeman attempted to couple air hoses while conductor gave engineer instructions to shove the movement. Resulting movement was unexpected to brakeman who was fatally injured.

FE-1993-53 30-Dec-93 CR Brook Park OH Yard Conductor/Foreman AGE: 61

A three-person yard crew was in the process of switching a plant. The brakeman was at the plant doors and the conductor and engineer had hauled out to put away a car that had been removed from the plant. After the conductor had tied onto the cars to go into the plant and begun to shove toward the plant, the car that had just been placed on an adjacent track rolled out, fouled the conductor's movement, and crushed him between the leading car and the rolling car.

FE-1994-28 10-Nov-94 PTR A Houston TX Yard Brakeman/Helper AGE: 31

Yard switch crew, engineer, conductor and brakeman, spotting paper mill. FE (brakeman) instructed by conductor to de-train and stay at road crossing while he spotted track. FE found in nearby wood chip auger/conveyer system after mill crew started up the system while crew searched for missing FE. Mill crew was instructed by conductor not to start equipment until FE was located. FE was not familiar with the dangers associated with this mill process. FE had 5 months experience.

## Special Switching Hazard: Industrial Hazard.

FE-1995-33 11-Dec-95 NS Toledo OH Brakeman AGE: 53

A three-person crew was called to switch an industry that all were very familiar with. During the switching moves, the brakeman was inside an area with no clearances between the cars and the hand railings installed on the walls. He was making coupling and, according to the conductor and engineer, upon completion of that work, ordered the engineer to haul out of the building where the conductor would take over the next move to be performed. Subsequently, a plant employee observed the brakeman slumped beside the track, rushed to assistance, call 911 and notified the conductor that his man was down. The brakeman died later on at the hospital of crushing wounds incurred when he was rolled between the cars being pulled out and the railing.

FE-1996-12 15-Jun-96 CSX Charlotte NC Switchman AGE: 36

Yard crew, engineer, conductor and switchman, switching at an industry. While crew was shoving two cars to a spot inside an industry building, FE (switchman) was rolled between lead box car and unloading platform. Platform or building was not marked with any type of 'no-clearance' or 'close clearance' signage. FE was last seen by conductor on the ground next to movement in a 'cut-out' space in the unloading platform. The conductor reported that there is enough room for a man to clear the movement in this 'cut-out'. After hearing a strange noise the conductor instructed engineer to stop the movement. FE was rolled for 21 feet between boxcar and platform. FE had one year of experience.

FE-1998-19 01-Jul-98 NS Buechel KY Utility Employee AGE: 54

A three person local switching crew (conductor, engineer and utility employee) had just begun to pull five cars out of an industrial loading dock while the conductor and the utility employee began to walk toward the door providing egress out of the dock area. Suddenly, according to the conductor, the utility employee allegedly tripped on some material on the dock, grabbed the side of the outgoing cut of cars and was pulled between the car he was holding onto and the handrail structure that accompanied the stairs leading from the platform to the door. He died two weeks later.

FE-2000-16 22-May-00 CSX Richmond VA Brakeman AGE: 38

A three person road switching crew was in the process of spotting loaded coal cars at a unloading facility that was equipped with a "shaker" that helped empty each car. The shaker's position causes a close clearance condition. The conductor was riding one side of the leading coal car and the brakeman was riding the other. Although having a clear view of the fouling equipment, the brakeman did not get off the car as the conductor had expected and was crushed between it and the fouling shaker equipment.

## Special Switching Hazard: Industrial Hazard.

FE-2000-23    28-Jul-00   UP       St. Louis                      MO   Switchman                      AGE:   48

A three person local switching crew was in the process of setting cars into a track within an industry. The switchman was riding the side ladder of the leading end of the leading car as it went into the building. The doorway would not clear a man riding on the side of the car and the trainman was killed as he was compressed between it and the car he was riding.

FE-2003-12    06-Jun-03   CSXT   Kingsport                      TN   Brakeman                      AGE:   35

A three person industrial switching crew was shoving one car on a track that ran down the middle of a two-lane road and that was located in an industrial area. The conductor was riding on one side of the car and the brakeman was riding on the other. As the move approached a standing eighteen-wheel truck awaiting permission to back into the same area that the railroad was servicing, the driver began to back up, jack-knifed the trailer, and struck the brakeman crushing him between the truck box and the car he was riding.

FE-2004-14    18-May-04   NS       Elwood                      IN   Freight Brakeman                      AGE:   35

Three person crew was spotting cars at industry, when a highway-user (semi-tractor) backed out of an unloading location. After completing the backing movement the highway-user pulled forward into side of train movement, striking and killing brakeman who was riding the side of equipment.

FE-2005-18    13-May-05   DC       Detroit                      MI   Yard Conductor                      AGE:   24

A 24-year-old conductor with 3 months experience died of injuries he sustained when the car he was riding on derailed and he was crushed between the car and a steel I-beam.

FE-2005-23    05-Jul-05   BNSF   Emporia                      KS   Yard Helper                      AGE: 26.8

A three person train crew was switching cars on industrial track when the train passed through a misaligned crossover switch and colided with a car out to foul on an adjacent track. The trainman was crushed on impact against this car.

FE-2005-24    18-Jul-05   UP       Memphis                      TN   Brakeman                      AGE:   59

A train crew shoving cars to spot on an industry track when the brakeman riding the leading end of the shove movement, was killed when the movement struck a semi-tractor and trailer which had entered the private road crossing in front of the trains movement. The brakeman jumped from the car he was riding and the trailer of the semi-trailer jackknifed crushing the brakeman between the trailer and rail car.

## Special Switching Hazard: Industrial Hazard.

FE-2005-25    22-Jul-05   ATN    Ragland                      AL   Brakeman                      AGE: 56

A two person switching crew conducted a job briefing associated with switching operations at an industry plant. The crew coupled 10 empty covered hopper cars and commenced the move with the conductor riding the B- end of a covered hopper. The car being shoved struck a drainage grate lying in the gage of the track and swerved off the track onto a concrete apron of the same height as the track. The conductor was trapped between the car and the concrete wall and dragged along the wall for a distance of 16 feet, killing him. Clearance between the wall and car was 27 inches; The US Department of Labor requires a minimum clearance of 30 inches unless the lesser clearance is conspicuously marked, which it wasn't.

FE-2005-27    09-Aug-05   AM     Rogers                      AR   Conductor                      AGE: 23

A three person crew prepared to spot cars at a loading dock with the brakeman riding on the cars being moved. Clearance at the loading dock is restricted, though no notice of this condition was posted. As the engineer proceeded with the shove, the brakeman noticed the conductor was pinned between the dock and the car body.

FE-2005-36    04-Dec-05   BNSF   Burlington                      IA   Brakeman                      AGE: 34

A three person switch crew held a job briefing with the intent to deliver 125 car loads of coal onto five (5) industry tracks. Only the engineer was familiar with the industry plant and its tracks. The engineer offered to operate the locomotive into the plant to allow the rest of the crew to become more familiar with the work area; the other crew members declined. The track passes under an overhead walkway with only 5 1/2 inch clearance between the part of the car on which the brakeman was riding, and a support beam of the walkway. The brakeman failed to take heed of this situation and was fatally injured when he was crushed between the car and the support member.

FE-2006-12    21-Aug-06   FEC     Rockledge                      FL   Freight Conductor                      AGE: 45

A train was shoving cars to industry for spotting with the conductor riding the leading end of the leading car. A utility employee was providing protection for highway traffic at one of two road crossing the train would cross. When the train entered the road crossing it struck a semi-tractor trailer and the conductor sustained fatal injuries.

FE-2006-22    04-Dec-06   UP     Carson                      CA   Brakeman                      AGE: 35

A two-person crew, performing switching operation with a remote control locomotive, were in the process of shoving six cars over a highway-rail grade crossing equipped with an active warning system. The conductor was riding the leading end of the shove move and struck a truck cab that drove in front of the movement. The conductor died days later as a result of the collision.

## Special Switching Hazard: Industrial Hazard.

FE-2008-06 05-Mar-08 WSO Random Lake WI Freight Conductor AGE: 55

A three-person crew (engineer, conductor, and student conductor) arrived at an industrial spot where they were required to spot 2 loads. This industry had not been spotted for about a month and three inches of accumulated snow was covering packed ice on the spur track. The conductor rode the leading end of the first car adjacent to the standing train on the main track and the student conductor rode the opposite side of the same car, controlling the movement by radio. Due to the build-up of packed ice and mud in the flange-way the car derailed into the side of cars left standing on the main track, and the conductor was crushed between the cars.

FE-2008-15 26-May-08 CSX Lumberton NC Freight Conductor AGE: 46

A three person train crew operated a freight train consisting of three locomotives and 97 loaded coal hoppers. The conductor had one year of experience – interrupted by a four month furlough – and a student engineer were a part of the train crew. The train crew began shoving to spot the coal hoppers into a generating plant. The conductor had not work in this plant previously but was told plant employees would help if needed. The conductor rode the shove movement giving car counts via radio. The last radio transmission from the conductor to the student engineer, who was operating the train, was “give me all you’ve got, then “stop.” The lead two cars had plowed through a large pile of coal knocking the conductor from the car, crushing the conductor.

FE-2008-31 10-Sep-08 INRD Terre Haute IN Freight Conductor AGE: 42

The conductor of a two person local freight crew was riding the leading end on the side of a tank car during an industry switching job. The conductor was crushed and killed when the leading car derailed and struck a stack of bundled wood railroad ties adjacent to the track. The car derailed on compacted aggregate which had been placed as an adhoc crossing on the industry track. The shove movement was proceeding at 7 mph on track with a 5 mph maximum speed.

FE-2008-40 03-Dec-08 DRIR Denver CO Freight Conductor AGE: 33

A two person crew performed a shoving movement with the conductor riding the leading end of a bulkhead flatcar. A tractor-trailer operated over the crossing in front of the movement. The tractor-trailer was moving at about 18 mph when it occupied the crossing protected only by cross bucks in front of the train movement. The conductor, who was riding on the crossover platform, radioed the engineer in an attempt to stop the movement, but the leading car of the train struck the side of the trailer at about 5 mph. The impact crushed and killed the conductor.



## **Special Switching Hazard: Industrial Hazard.**

FE-2009-20    24-Jun-09    ATN    Albertville                      AL    Freight Conductor                      AGE:    33

A two person crew was shoving cars into spot at an industry with the conductor controlling the movement via radio communications. The conductor gave car counts from 12 down to 3 during the shove, and shortly after that transmission the engineer stopped the movement when he heard an "OH" transmission. The conductor was found deceased on the leading end of the lead car on the platform, pinned against a car of scrap metal.

FE-2009-26    29-Dec-09    BNSF    Minneapolis                      MN    RCL Operator                      AGE:    44

A two-person RCL crew shoved five empty cars into a snow-covered industry track. Ice build-up on the track caused the lead car of the movement to derail. The RCL operator, riding the lead car and controlling the move, was crushed against the side of an industry building and fatally injured.

## **Special Switching Hazard: Miscellaneous.**

FE-1992-33    15-Oct-92    BN        Omaha                      NE    Yard Brakeman/Helper                      AGE:    32

A three-person yard crew was in the process of spotting cars over a material unloading pit and after the first of the cars was spotted the switch foreman took the locomotive out of the plant building to get the other car for spotting. The switchman remained in the building, set a handbrake on the spotted car and awaited the return of the foreman with the engine and second car to be spotted. The switchman was killed when he ended up falling into the second pit and was crushed by the industrial machinery located within.

FE-1992-39    16-Nov-92    TTIS    Maysville                      KY    Freight Conductor                      AGE:    35

A two-person train crew was taking a coal train down a 3 percent grade and through an eight-degree curve when the train separated at the 17th head car. The cause of the separation was a broken knuckle. To remove the partially broken knuckle, the conductor decided that he had to impact the standing cars with the 17 head cars. On his third attempt, the couplers by-passed and the corners of the 18th and 17th head cars came together at the push pole pads crushing the conductor between them.

FE-1993-20    22-May-93    ATSF    El Paso                      TX    Yard Conductor/Foreman                      AGE:    46

A three person switching crew was in the process of shoving cars into a track in the TOFC yard. The switch foreman was directing the move when he was struck from behind by the left front fender of a hostler truck and run over by its rear wheels.

## Special Switching Hazard: Miscellaneous.

FE-1993-22    04-Jun-93   SEPT    Devon                      PA   Road Passenger Engineer    AGE:   29

A commuter train locomotive engineer fell from the operating compartment of the train he was operating while it was moving. Two minutes before he fell speed had been reduced from 61 to 51 MPH.

FE-1993-35    02-Sep-93   ATSF    Carlsbad                      NM   Freight Conductor                      AGE:   55

A three-person crew, accompanied by an engineer and a brakeman trainee, were trying, for the second time to make a coupling between two cars in a yard. The conductor was allowing the brakeman trainee to learn radio use and had just told him to tell the engineer to come back for another attempt at coupling. The brakeman turned toward the locomotives, relayed the conductor's instructions, looked back at the conductor and saw him impaled between the knuckles of the two cars.

FE-1994-04    18-Jan-94   CSXT    Bainbridge                      GA   Conductor                                      AGE:   45

A three person switching crew was in the process of shoving cars down an industrial lead. The conductor and brakeman were riding the end platform of a tank car and, as the move approached a highway/rail grade crossing, the brakeman gave the engineer a car count in which to stop. As a result, there was some "slack action" and the conductor fell from the end platform onto the rail and was pronounced dead at the hospital over five hours later.

FE-1995-17    21-Mar-95   SP            Bassett                                      CA   Conductor                                      AGE:   55

A three-person crew was called to operate a road local and arrived at a location where some plant switching was to take place. After lining up their cars, the two locomotives and two cars began a shove move on the brakeman's radio command. The brakeman was walking adjacent to the track on which the cars were being shoved and had his back to the move. He was killed when he suddenly crossed the tracks in front of the movement and was struck. The move stopped immediately. Post accident investigation revealed that the brakeman was concerned about the results of a medical examination that were due the next day.

FE-1998-28    26-Oct-98   CCP       Cicero                                      IL   Engineer                                      AGE:   42

An engineer, having just gone off duty, was distracted and subsequently struck and killed by a lite engine move being operated by a hostler. The hostler was operating the locomotive consist from the trailing end at the time and did not have anyone on the leading end when the engineer was struck.

## Special Switching Hazard: Miscellaneous.

FE-2000-17 31-May-00 UP Pine Bluff AR Engine Foreman AGE: 47

A three person yard switching crew was in the process of moving their light locomotives through a series of crossover switches however, the switchman had gone to the yard office for another list of cars to switch and the foreman, who had two (2) years of service, was directing the lite engine move by radio. The foreman told the engineer to stop, the foreman got off the leading end of the lead locomotive to line switches, he then told the engineer to continue backing up. Shortly thereafter, the foreman was crushed in a side collision between the locomotive consist he was directing and other cars standing on an adjacent track.

FE-2001-14 08-Apr-01 BNSF Clark OK Conductor AGE: 35

The conductor of a road switcher pulled his train into a yard, got off, made a cut behind three cars and told the engineer to pull ahead to clear a crossover switch he intended to use. After getting the crossover, he mounted the leading end of the move and told the engineer to come back seven cars. Three car lengths later, the movement passed through one end of another crossover switch in reverse position and diverted the movement into the side of a standing cut of cars crushing the conductor to death.

FE-2005-13 06-Apr-05 NS Selma AL Brakeman AGE: 48

A road train after contacting the yard switcher, obtained permission to enter the yard to set out 24 cars. When the road train cleared the yard the switcher train resumed switching activities in the yard, and following a shove movement toward a yard track, the conductor on the yard switcher saw the body of road train's brakeman between the rails in front of the yard switcher locomotive.

FE-2005-23 05-Jul-05 BNSF Emporia KS Yard Helper AGE: 26.8

A three person train crew was switching cars on industrial track when the train passed through a misaligned crossover switch and colided with a car out to foul on an adjacent track. The trainman was crushed on impact against this car.

FE-2008-24 08-Jul-08 BNSF Fridley MN Utility Employee AGE: 40

A Utility Man working on Track 11 was bleeding the air from cars to be humped. An RCL job, working on Track 10, prepared to shove 84 cars toward the "hump." Following their shove to the "hump" the utility employee was found dead on track 10, having been run over by the shove movement. The Coroner's report suggested suicide.

## **Special Switching Hazard: Miscellaneous.**

FE-2009-09    08-Feb-09    UP        Herington                      KS    Freight Conductor                      AGE:    26

A two person road train crew was doubling back to their train on main track one with the conductor walking between main track one and main track two giving hand signals to the engineer. The conductor was fouling main track two when another train operating on main track two struck and killed the conductor. A van driver located across from the conductor's position attempted to warn the conductor by yelling at him.

## **Special Switching Hazard: Struck by Mainline Train.**

FE-1992-20    07-Jul-92    SSW        Conlen Siding                      TX    Freight Engineer                      AGE:    58

A two-person crew was called to deadhead to a siding and bring the train that was there and tied down into the yard. Upon arrival at the train, the conductor began releasing handbrakes on the train and the engineer began releasing handbrakes and inspecting the four head end locomotives. An approaching 60 MPH mainline train whistled for a highway crossing at grade and the conductor stopped what he was doing and positioned himself to do a roll by train inspection. His engineer was killed when he was struck by the passing train as he stepped out from between two of his units and began walking adjacent to, and in the foul of, the main track.

FE-1993-13    13-Apr-93    CSX        Dwale                                      KY    Freight Brakeman/Flagman                      AGE:    44

A three-person crew reported for duty and was transported to a location where they took control of a mainline train. En-route, their work included swapping rear end marking devices. The brakeman apparently became confused, stepped into and began walking within the gauge of the main track, and was struck in the back by a passing mainline train.

FE-1996-17    07-Jul-96    NS        Sidney                                      IN    Conductor                                      AGE:    29

Road crew, engineer and conductor, while stopped on siding track to meet an opposing train, FE (conductor) detrained to perform a roll-by inspection of other train. FE stepped off his train shortly before opposing trains arrival then stood in that trains track while trying to adjust his portable radio. Opposing train struck FE at this point. FE had one year of experience.

FE-1997-22    18-Jul-97    MNC        Stamford                                      CT    Conductor                                      AGE:    40

A conductor/flagman was assigned to protect contractor workers that were installing construction poles near a passenger station platform. To better observe the work, the conductor/flagman placed himself within the gauge of a "live" main track and was struck and killed by a passing train.

## Special Switching Hazard: Struck by Mainline Train.

FE-1997-36 02-Dec-97 BNSF Emporia KS Freight Conductor AGE: 50

The three-person crew had just finished making up their train at the yard. The conductor, for unknown reasons, had positioned himself on the “live” main trackside of his train, near the second and third locomotives. The conductor was struck and killed by a passing main track train that had approached the area from the opposite direction than that the conductor’s train was to proceed.

FE-2000-32 28-Dec-00 UP Dupo IL Switchman AGE: 52

A three-person yard switching crew was in the process of pulling cars down a long lead that ran parallel to a main track. The switchman was standing between the cars that were being pulled out onto the lead and the main track. While the cars were being moved, a main line train approached his location. The switchman, with nowhere to go, was struck by the passing main line train and killed by a blow to the head.

FE-2000-33 29-Dec-00 BNSF Gillette WY Conductor AGE: 29

A two-person freight train crew was about to be passed by another freight train at a location on line-of-road. The conductor of the stopped train got up out of his seat, exited the leading locomotive and crossed over the track on which the on-coming train was proceeding. The conductor was struck and killed by the lead locomotive of the passing train.

FE-2001-02 10-Jan-01 CSX Chicago IL Conductor AGE: 42

Conductor with 14-months service was struck and killed by passing mainline train while attempting to board locomotive at crew-change point.

FE-2001-03 11-Jan-01 NS South Fork PA Engineer AGE: 52

The engineer and conductor of a road train were told to stop and check their locomotives for flat spots. Once stopped, and without a job briefing the locomotive engineer left the lead unit and shortly thereafter, was struck and killed by a passing mainline train.

FE-2001-40 24-Dec-01 NS Lynchburg VA Conductor AGE: 30

A conductor, engineer and conductor in training had been transported to an unattended train standing on a siding a portion of which was in a tunnel adjacent to the main track. After storing their equipment, the conductor and the conductor in training left the locomotive to release hand brakes on the train. The conductor was killed when she failed to step in between two boxcars of her train as the conductor in training had done and was subsequently struck by a passing mainline train.

## Special Switching Hazard: Struck by Mainline Train.

FE-2002-09 21-Mar-02 NS Claymont DE Engineer AGE: 45

A locomotive engineer had been dropped off at the head end of his train while the conductor was taken to the rear to check on the REM. After crossing over the ATK corridor mainline tracks, and beginning to board his locomotive, the engineer was dragged off the stairs of the locomotive and killed by a passing 110 MPH passenger train.

FE-2004-28 01-Nov-04 BNSF Bowdoin MT Conductor AGE: 45

An eastbound train stopped on the siding waiting the passage of a westbound train. The engineer saw the headlight of the approaching train, and observed his conductor get up and exit on the live track side of the locomotive, contrary to rules. While attempting to cross to the other side of the track to conduct an inspection, the conductor paused in the middle of the track and the approaching train, sounding the horn and with headlight on bright, struck the conductor still standing on the track.

FE-2004-30 17-Dec-04 BNSF Radium CO Conductor AGE: 44

An eastbound train was stopped on the siding waiting for the passage of two westbound trains. The first train, approaching at a speed of 20 -23 mph, was observed by the engineer and heard the train sounding its whistle and bell. The conductor on the standing train got up and without a word, departed the locomotive's cab to conduct a roll-by inspection and stepped off the standing train locomotive on the live side between tracks. The approaching train struck the conductor, killing the conductor.

FE-2005-02 10-Jan-05 UP Buena Vista AR Conductor AGE: 52

A two person crew experienced engine problems and a following train, after a job briefing involving the crews of the two trains and the Dispatcher, decided the following train would shove the lead train off the main track onto a siding. In the process of shoving, the conductor of the leading train dismounted a covered hopper car and was struck and killed by the other train passing on the adjacent track. The accident occurred on a curved section of track, in a restricted speed zone. Had a bell or whistle been sounded, or had the Conductor dismounted on the other side of his train, the accident might have been avoided.

## Special Switching Hazard: Struck by Mainline Train.

FE-2008-01    08-Jan-08    UP        Waukegan                    IL    Passenger Brakeman                    AGE: 59

A four-person commuter train crew (No. 355) arrived at their destination station and prepared to back the train from the northbound track through the crossovers south of the platform, and onto the southbound track where it would be worked as a southbound train by another crew. The crew would then go off-duty. Ordinarily, the brakeman would line both switches. However, the Extraboard Engineer while backing the train through the crossovers shouted down to the Brakeman that he would get the south crossover switch when the engine cleared it and stopped. The Brakeman agreed and stayed at the north cross-over switch. After the Engineer aligned the switch and returned to the locomotive cab. The Brakeman walking south toward the train gave the Engineer two confusing, contradictory signals. As the Brakeman was stooping to examine or attempting to line the south crossover switch (which the Engineer had already lined), a following train (No. 357) moving northward on Main Track No. 1 passed the head-end of job No. 355 and struck the brakeman killing him. The striking train was not ringing the locomotive's bell as it passed the standing train.

FE-2008-03    03-Feb-08    NS        Chicago                    IL    Freight Conductor                    AGE: 28

A conductor and engineer were transported to their train on main track two and boarded. The ground conditions between main tracks two and one were very poor. The ground was covered by 5 inches of snow; however, the ambient lighting was good. On the south side of the standing train, the footing was good, but the lighting was poor. After receiving 3-Point Protection, the conductor dismounted the lead locomotive and proceeded to walk west, between the two main tracks, on the north side of his standing train, to untie handbrakes. An approaching westbound freight train sounded the whistle for the conductor walking in the foul and the conductor ducked between two freight cars to clear the oncoming movement. The conductor then reemerged from his safe location foul of the adjacent main track. He was struck by the westbound train and died 42 hours later.

FE-2008-33    23-Sep-08    CSX        Darby                    PA    Freight Conductor                    AGE: 46

After reaching their destination, a two person crew was instructed to secure their freight train at a location beyond the normal crew change point. The location was on double track on a bridge near a parking lot where a relief crew could reach the train. The conductor left the cab of the locomotive without job-briefing with the Engineer and without his hand-held radio. He crossed in front of the locomotive and walked eastward across the bridge between the two tracks. There was poor footing and almost no clearance between the two tracks. An eastbound approaching train, operating at 26 mph, observed the conductor, sounded the whistle, turned the head lights to bright, and tried to stop. The eastbound train struck and killed the conductor who was walking in the foul.

FE-2009-06    28-Jan-09    UP        Council Bluffs                    IA    Yard Foreman                    AGE: 41

A four person yard switching crew was pulling cars up to make a shoving movement into a yard track, while a road train was approaching in the same direction on the main track adjacent to the switching lead. The conductor riding in the second locomotive of the yard switcher exited the cab and got off on the live side next to the main track, fouling the main track, and was struck by the passing road train.

## **Special Switching Hazard: Struck by Mainline Train.**

FE-2009-08    07-Feb-09   BNSF    Holbrook                    AZ   Freight Conductor                    AGE:   43

A two person crew had boarded their train on main track two and the conductor began walking the train making an inspection. At that time another train approaching on main track one observed the conductor walking in the foul of main track one. The engineer on the approaching train switched the headlight from dim to bright to alert the conductor on the ground. A van driver beside the track also attempted to get the attention of the conductor without success. The train on main track two struck and killed the conductor.

FE-2009-09    08-Feb-09   UP        Herington                    KS   Freight Conductor                    AGE:   26

A two person road train crew was doubling back to their train on main track one with the conductor walking between main track one and main track two giving hand signals to the engineer. The conductor was fouling main track two when another train operating on main track two struck and killed the conductor. A van driver located across from the conductor's position attempted to warn the conductor by yelling at him.

## **Special Switching Hazard: Struck or struck by Motor Vehicle.**

FE-1994-20    20-Sep-94   ARR     Clear Site                    AK   Freight Brakeman/Flagman    AGE:   49

A three-person work train crew was shoving their train on the main line. The locomotive engineer was operating the locomotive and the brakeman and conductor were in the caboose. A tractor-trailer pulled over the crossing and was struck by the shove move, derailing the caboose and killing the brakeman.

FE-1999-05    17-Feb-99   KCS     Kansas City                    MO   Freight Conductor                    AGE:   26

A three person switching crew was working in a piggy-back facility and had just finished shoving a cut of cars down a track to be worked by the piggy-packers (equipment used to load and unload TOFC/COFC rail shipments). The conductor was returning to the locomotive when he was struck and killed by one of the piggy-packers.

FE-2001-39    22-Dec-01   NS        Eden                            NC   Brakeman                            AGE:   50

A three-person, local switching crew that included a conductor in training were in the process of shoving a cut of cars over a highway road crossing at grade. The brakeman was riding one corner of the leading car and the conductor in training was riding the opposite side of the car. All warning devices were in operation when a van struck the leading end of the car knocking the brakeman off the car and under the leading wheels.



## **Special Switching Hazard: Struck or struck by Motor Vehicle.**

FE-2003-12 06-Jun-03 CSXT Kingsport TN Brakeman AGE: 35

A three person industrial switching crew was shoving one car on a track that ran down the middle of a two-lane road and that was located in an industrial area. The conductor was riding on one side of the car and the brakeman was riding on the other. As the move approached a standing eighteen-wheel truck awaiting permission to back into the same area that the railroad was servicing, the driver began to back up, jack-knifed the trailer, and struck the brakeman crushing him between the truck box and the car he was riding.

FE-2004-14 18-May-04 NS Elwood IN Freight Brakeman AGE: 35

Three person crew was spotting cars at industry, when a highway-user (semi-tractor) backed out of an unloading location. After completing the backing movement the highway-user pulled forward into side of train movement, striking and killing brakeman who was riding the side of equipment.

FE-2005-24 18-Jul-05 UP Memphis TN Brakeman AGE: 59

A train crew shoving cars to spot on an industry track when the brakeman riding the leading end of the shove movement, was killed when the movement struck a semi-tractor and trailer which had entered the private road crossing in front of the trains movement. The brakeman jumped from the car he was riding and the trailer of the semi-trailer jackknifed crushing the brakeman between the trailer and rail car.

FE-2006-12 21-Aug-06 FEC Rockledge FL Freight Conductor AGE: 45

A train was shoving cars to industry for spotting with the conductor riding the leading end of the leading car. A utility employee was providing protection for highway traffic at one of two road crossing the train would cross. When the train entered the road crossing it struck a semi-tractor trailer and the conductor sustained fatal injuries.

FE-2006-22 04-Dec-06 UP Carson CA Brakeman AGE: 35

A two-person crew, performing switching operation with a remote control locomotive, were in the process of shoving six cars over a highway-rail grade crossing equipped with an active warning system. The conductor was riding the leading end of the shove move and struck a truck cab that drove in front of the movement. The conductor died days later as a result of the collision.

## **Special Switching Hazard: Struck or struck by Motor Vehicle.**

FE-2008-40 03-Dec-08 DRIR Denver CO Freight Conductor AGE: 33

A two person crew performed a shoving movement with the conductor riding the leading end of a bulkhead flatcar. A tractor-trailer operated over the crossing in front of the movement. The tractor-trailer was moving at about 18 mph when it occupied the crossing protected only by cross bucks in front of the train movement. The conductor, who was riding on the crossover platform, radioed the engineer in an attempt to stop the movement, but the leading car of the train struck the side of the trailer at about 5 mph. The impact crushed and killed the conductor.

## **Special Switching Hazard: Unexpected Movement of Railcars.**

FE-1992-16 02-Jun-92 IHRC Henderson KY Freight Conductor AGE: 52

Road switcher R90371-26, was switching cars at Fulton Yard in Fulton, Kentucky. The conductor on the job had ridden shove movement into track seven and secured car and remained at that location while the remainder of the crew switched cars between track seven and track five. At 4:25 a.m., after free rolling the last car into track seven, and while coupling to cars on lead to shove clear of track six, the conductor called via the radio and stated he had been hurt. The conductor was found beneath the L-1 wheel of GATX 10818 in the gauge of track seven and later expired due to injuries sustained.

FE-1992-30 24-Jul-92 GBW Wisconsin WI Freight Brakeman/Flagman AGE: 34

The road job's brakeman was trying to help the switch crew make up his train. The brakeman was in between cars on an active track being used by the switch crew and was killed when the cars he was between moved upon being struck by a cut of free rolling cars.

FE-1993-23 07-Jun-93 IC Fulton KY Yard Brakeman/Helper AGE: 49

Crew performing switching duties in class yard failed to have a clear understanding of movements being made. Results were that the rear brakeman was run over by moving equipment. There were no witnesses, but a hand brake was applied. It was thought that the brakeman had gone between the equipment on the ground to release the low hand brake.

FE-1993-47 13-Nov-93 GC Macon GA Yard Conductor/Foreman AGE: 47

Trainmaster became involved with crew performing switching in class yard without knowledge of the conductor who was coupling air hoses on a cut of cars. Cars were shoved without his knowledge while he was in the foul of the movement. Movement ran over conductor and killed him.

## **Special Switching Hazard: Unexpected Movement of Railcars.**

FE-1993-49    05-Dec-93    SOU    Atlanta    GA    Freight Conductor    AGE: 59

Change in operating procedure between two crews swapping equipment resulted in conductor being struck by unexpected movement while he was in the foul of the track.

FE-1994-29    15-Nov-94    CR    Painted Post    NY    Freight Brakeman/Flagman    AGE: 57

Crew switching in class yard failed to establish and maintain effective communications. Subsequent changes in switching line-up by the conductor resulted in trainman who was in the foul of Track 7 being struck by unexpected movement of equipment.

FE-1995-09    17-Feb-95    CR    St. James    OH    Conductor    AGE: 48

Arbitrary change in switching operations by conductor resulted in him being unexpectedly struck and fatally injured by approaching cars while he was fouling the track.

FE-1997-19    24-Jun-97    NS    Rowesville    SC    Conductor    AGE: 21

The engineer and conductor of a local road switcher were reassembling their train at a siding halfway through their work assignment. After running around the inbound cars, making a couple of switches to line up their train for the return trip, the conductor tied the EOT device onto the rear car, came back to the switch, and told the engineer to back up five cars. The engineer did not get any other radio instructions after three cars and stopped. The conductor was found dead having been run over by the leading car and not having reversed the siding switch as he had intended to do.

FE-1999-32    17-Nov-99    UP    Linoln    NE    Brakeman    AGE: 57

A three person local switching crew had cut away from their train on the main track and proceeded to pull by the switch providing access to a clear track. The brakeman was at the switch and the conductor had removed the derail from the clear track and was awaiting the shove move at the point where the cut would be made. Meanwhile, the brakeman, who was to have gotten the switch from the main to the clear track, was walking between the gauge of the mainline track toward the remaining portion of his train. The conductor saw the cars being shoved toward the remaining portion of his train and shouted to the brakeman and then to the engineer to stop. The brakeman with his back to the move was hit and run over by the leading car of the shove.

FE-2002-22    02-Sep-02    CSXT    Madisonville    KY    Conductor    AGE: 52

A two-person road crew stopped at a yard to make a set-off. The conductor made the cut on his train, instructed the engineer to haul ahead to clear the switches into the yard, lined the switches into what he thought was Track 4 and told the engineer to begin backing the set off into the yard. The conductor was struck and killed by the leading end of the shove move as it entered Track 3.

## **Special Switching Hazard: Unexpected Movement of Railcars.**

FE-2003-35   07-Dec-03   UP   San Antonio   TX   Conductor   AGE: 37

A pitch/catch remote control operation was being run by a single operator who was struck and killed during a yard operation by his own locomotive. He stepped in front of its movement as he was headed for the other end of a crossover switch that he intended to line for the route he intended his engine to use.

FE-2008-37   15-Nov-08   MRL   Laurel   MT   Yard Brakeman   AGE: 39

A three person crew, operating a local freight train, moved their locomotives to a make-up track. After a job briefing, the switchman proceeded to make sure the train was together and the air hoses were coupled. The switchman did not observe sixteen cars at the end of the train were not coupled. A few minutes later, he radioed he was going between to make an air hose. The Engineer said: "Set and centered." A few minutes earlier, the Conductor was walking the head-end and found a gap. Without communicating with the Switchman, the Conductor instructed the Engineer to pull forward so that he could open knuckles and prepare for a reverse movement to a coupling. Apparently, when the train moved forward, the 16 cars at the rear of the train began to roll, just as the Switchman was reaching in to connect an air hose. The 16 free-rolling cars struck the standing portion of the train and killed the Switchman.

## **Special Switching Hazard: Unsecured Cars.**

FE-1992-15   01-Jun-92   BN   Seattle   WA   Switchman   AGE: 42

A four-person crew (engineer, switch foreman, 2 switchman) had 3 cars with them when they coupled onto 56 cars standing on a yard track. They were told to pull the head 16 cars and leave the remaining 40 there. They were also told that the 16 had been separated from the remaining 40. The crew pulled the 19 cars out of the track and per radio instructions from the switchman, began a shove into another track. As the movement entered the track it was struck by the 40 car cut that had been left on the first track. The switchman died falling from the cars while getting on and off the free rolling cut to set hand brakes in an attempt to stop them.

FE-1993-46   12-Nov-93   ATSF   Farewell   TX   Freight Conductor   AGE: 41

A three person industrial switching crew had been working together to get the switches lined and the derail off in preparation for a shove move into the plant. The conductor was on the leading end of the lead car and the brakeman was on the trailing end of the same car. The conductor was crushed by a car he had set out without setting a hand brake. The car rolled into a car he and his brakeman were riding and impairment (drugs) contributed to the fatality.

## Special Switching Hazard: Unsecured Cars.

FE-1994-02    04-Jan-94    BN       Hastings                    NE    Conductor                    AGE:    46

A three-person crew were in the process of pulling a cut of cars out of a track and leaving two additional cuts sitting separately in the track. The helper was riding the cut out of the track and the foreman was last seen walking between the two remaining cuts of cars. Evidence suggests that the foreman attempted to cross over the tracks between the cars being pulled out and the first of two remaining cuts of cars when he was crushed between the cars being pulled out and the second cut of cars after they were impacted by the third, unsecured cut.

FE-1995-16    06-Apr-95    WC       Argoe                        WI    Conductor                    AGE:    45

A two-person crew was switching at a siding in single-track territory. The conductor left a portion of his train on the mainline and went into the siding with a cut of cars. While in on the siding, the cars left on the mainline and, as post accident investigation revealed, had been left with the air “bottled”, rolled away. The crew chased the runaway cars with the conductor riding the leading end of the lead car and the engineer, 23 cars away, shoving as directed by radio commands from the conductor. The shove move struck the runaway cars and the conductor was crushed to death as a result of the collision.

FE-1996-09    20-Mar-96    BRC       Bedford Park                IL    Conductor                    AGE:    28

Three-person crew was switching in class yard, coupling between sixth and seventh car failed to couple. Conductor stopped locomotive and went between the cars to straighten the drawbar, and twenty-three cars rolled in behind him and coupled him up.

FE-1996-31    18-Dec-96    IC       Chicago                        IL    Conductor                    AGE:    45

A three-person yard crew was in the process of switching a plant. The brakeman was at the plant doors and the conductor and engineer had hauled out to put away a car that had been removed from the plant. After the conductor had tied onto the cars to go into the plant and begun to shove toward the plant, the car that had just been placed on an adjacent track rolled out, fouled the conductor’s movement, and crushed him between the leading car and the rolling car.

FE-1997-25    15-Aug-97    UP       Elko                            NV    Yard Brakeman/Helper       AGE:    53

Crew was switching in class yard. Helper was attempting to adjust the drawbar in order to couple to three cars about forty feet away that had not coupled the first time. While adjusting the drawbar, the helper did not notice the three free-rolling cars coming back in on him and the cars coupled him up.

FE-1998-15    26-May-98    BRC       Bedford Park                IL    Yard Conductor/Foreman     AGE:    57

Crew was working in one track in class yard with helper controlling engine moves, conductor was adjusting coupler when three free rolling cars struck him from behind and coupled him up.

## Special Switching Hazard: Unsecured Cars.

FE-2000-09 09-Mar-00 IHB Riverdale IL Engine Foreman AGE: 43

The employee was struck by an unsecured cut of cars that rolled into him while he was attempting to adjust the coupler or drawbar.

FE-2001-08 03-Mar-01 BNSF Willmar MN Switchman AGE: 36

The switchman of a three person yard switching crew made a cut on a block of cars sitting on a yard track and told the engineer to pull the cars out. Apparently, as the cars were being pulled out, the switchman stepped between the gauge of the track and was struck and killed by the remaining cars on the track that had begun to roll in the same direction as the cars being pull out of the track.

FE-2002-12 14-May-02 UP Pine Bluff AR Switchman AGE: 53

The switchman of a three-person yard switching crew asked the engineer to stretch a track. Noticing that there was a separation between the forth and fifth head cars, the switchman went in to align the couplers. The switchman was coupled up when unsecured cars rolled in on him.

FE-2003-05 18-Feb-03 CSXT Cheektowaga NY Switch Foreman AGE: 51

A three person switching crew was in the process of shoving cars into a track at an industry. The switch foreman was riding the leading end of the shove and directing the move when he was struck by the cut of cars that they had left on another track and which had rolled out and into his shove move.

FE-2004-22 20-Sep-04 AA Saline MI Conductor AGE: 46

A conductor while engaged in switching operations attempted to uncouple freight cars from the locomotive, and was caught between the locomotive and these cars. The cars had not had their brakes secured as operating rules dictated they should. The conductor was killed.

FE-2006-13 25-Aug-06 NS Chicago IL Conductor AGE: 43

During a flat switch operation, the conductor attempted to couple cars attached to his locomotive with 2 cars standing on the track. The coupling did not occur and a short time later, the conductor was found run over by one of the two standing cars.

FE-2007-25 28-Dec-07 BNSF Bristol IL Freight Brakeman AGE: 62

A three person crew switchig at an industry was trying to control equipment that failed to couple to equipment left on the main track. While attempting to stop the equipment the brakeman was pulled between the equipment that fouled on an adjacent track and was crushed.

## Fatalities During The Second Hour of Duty

FE-1992-03      1/28/1992 BN      Willmar                      MN      Yard Brakeman/Helper                      AGE:      57

A four-person crew (engineer, switch foreman, 2 switchman) had just shoved cars into track 11 and held onto one for track 9. The switch foreman got the switch for 9, noticed his front switchman standing near cars on track 11, and rode the locomotive onto the lead. After the 11th switch was lined for the lead, the switch foreman kicked the single car into track 9. The front switchman was struck and killed by the free rolling car.

FE-1992-33      10/15/1992 BN      Omaha                      NE      Yard Brakeman/Helper                      AGE:      32

A three-person yard crew was in the process of spotting cars over a material unloading pit and after the first of the cars was spotted the switch foreman took the locomotive out of the plant building to get the other car for spotting. The switchman remained in the building, set a handbrake on the spotted car and awaited the return of the foreman with the engine and second car to be spotted. The switchman was killed when he ended up falling into the second pit and was crushed by the industrial machinery located within.

FE-1993-26      7/15/1993 CR      Anderson                      IN      Yard Brakeman/Helper                      AGE:      43

After the brakeman had tied the locomotives onto a cut of cars in the yard, the engineer received an instruction, via radio, from the brakeman to “shove to hold more cars.” The engineer began to shove and didn’t stop until he was on the other end of the track. The brakeman was run over by the shove move. There was no evidence of any other radio transmissions concerning the shove move.

FE-1993-35      9/2/1993 ATSF      Carlsbad                      NM      Freight Conductor                      AGE:      55

A three-person crew, accompanied by an engineer and a brakeman trainee, were trying, for the second time to make a coupling between two cars in a yard. The conductor was allowing the brakeman trainee to learn radio use and had just told him to tell the engineer to come back for another attempt at coupling. The brakeman turned toward the locomotives, relayed the conductor’s instructions, looked back at the conductor and saw him impaled between the knuckles of the two cars.

FE-1993-53      12/30/1993 CR      Brook Park                      OH      Yard Conductor/Foreman                      AGE:      61

A three-person yard crew was in the process of switching a plant. The brakeman was at the plant doors and the conductor and engineer had hauled out to put away a car that had been removed from the plant. After the conductor had tied onto the cars to go into the plant and begun to shove toward the plant, the car that had just been placed on an adjacent track rolled out, fouled the conductor’s movement, and crushed him between the leading car and the rolling car.

## Fatalities During The Second Hour of Duty

FE-1994-02      1/4/1994 BN      Hastings      NE      Conductor      AGE:      46

A three-person crew were in the process of pulling a cut of cars out of a track and leaving two additional cuts sitting separately in the track. The helper was riding the cut out of the track and the foreman was last seen walking between the two remaining cuts of cars. Evidence suggests that the foreman attempted to cross over the tracks between the cars being pulled out and the first of two remaining cuts of cars when he was crushed between the cars being pulled out and the second cut of cars after they were impacted by the third, unsecured cut.

FE-1994-04      1/18/1994 CSXT      Bainbridge      GA      Conductor      AGE:      45

A three person switching crew was in the process of shoving cars down an industrial lead. The conductor and brakeman were riding the end platform of a tank car and, as the move approached a highway/rail grade crossing, the brakeman gave the engineer a car count in which to stop. As a result, there was some "slack action" and the conductor fell from the end platform onto the rail and was pronounced dead at the hospital over five hours later.

FE-1994-29      11/15/1994 CR      Painted Post      NY      Freight Brakeman/Flagman      AGE:      57

Crew switching in class yard failed to establish and maintain effective communications. Subsequent changes in switching line-up by the conductor resulted in trainman who was in the foul of Track 7 being struck by unexpected movement of equipment.

FE-1995-17      3/21/1995 SP      Bassett      CA      Conductor      AGE:      55

A three-person crew was called to operate a road local and arrived at a location where some plant switching was to take place. After lining up their cars, the two locomotives and two cars began a shove move on the brakeman's radio command. The brakeman was walking adjacent to the track on which the cars were being shoved and had his back to the move. He was killed when he suddenly crossed the tracks in front of the movement and was struck. The move stopped immediately. Post accident investigation revealed that the brakeman was concerned about the results of a medical examination that were due the next day.

FE-1995-29      10/4/1995 CSXT      Riverdale      IL      Conductor      AGE:      39

Crew performing switching in class yard. Switch foreman placed himself between the rails to adjust a mis-aligned coupler on the fifteenth car after the cut was stretched. Switch foreman was facing the coupler with his back to a cut of seven cars that rolled in on top of him and coupled him up.

FE-1998-15      5/26/1998 BRC      Bedford Park      IL      Yard Conductor/Foreman      AGE:      57

Crew was working in one track in class yard with helper controlling engine moves, conductor was adjusting coupler when three free rolling cars struck him from behind and coupled him up.



## Fatalities During The Second Hour of Duty

FE-1999-14      5/19/1999 NS      Cincinnati      OH      Conductor      AGE:      36

A conductor with one year of service was riding in the stairwell of the leading locomotive. He was directing the move by radio when he realized too late that the move would not clear the standing equipment. He was crushed between the handrail of his locomotive and the standing locomotive.

FE-2000-13      4/21/2000 BNSF      Galesburg      IL      Engine Foreman      AGE:      60

A three person switching crew was in the process of hauling cars over the hump and the foreman of the crew was observing the move from between his track and another track that was being used by another yard job. The foreman was killed when he fouled and then was struck by a free rolling car on the adjacent track.

FE-2000-21      7/7/2000 CKRY      Wichita      KS      Conductor      AGE:      39

Employee was struck by his own train when he tripped and fell onto the rail as he stepped in between moving equipment to open a knuckle while walking backwards.

FE-2000-32      12/28/2000 UP      Dupo      IL      Switchman      AGE:      52

A three-person yard switching crew was in the process of pulling cars down a long lead that ran parallel to a main track. The switchman was standing between the cars that were being pulled out onto the lead and the main track. While the cars were being moved, a main line train approached his location. The switchman, with nowhere to go, was struck by the passing main line train and killed by a blow to the head.

FE-2001-14      4/8/2001 BNSF      Clark      OK      Conductor      AGE:      35

The conductor of a road switcher pulled his train into a yard, got off, made a cut behind three cars and told the engineer to pull ahead to clear a crossover switch he intended to use. After getting the crossover, he mounted the leading end of the move and told the engineer to come back seven cars. Three car lengths later, the movement passed through one end of another crossover switch in reverse position and diverted the movement into the side of a standing cut of cars crushing the conductor to death.

FE-2002-12      5/14/2002 UP      Pine Bluff      AR      Switchman      AGE:      53

The switchman of a three-person yard switching crew asked the engineer to stretch a track. Noticing that there was a separation between the fourth and fifth head cars, the switchman went in to align the couplers. The switchman was coupled up when unsecured cars rolled in on him.

## Fatalities During The Second Hour of Duty

FE-2003-03      2/11/2003   CNIC   Flat Rock                      MI   Brakeman                      AGE:      57

A three-person crew (engineer, conductor, brakeman) were stopped and the engineer and conductor were awaiting the brakeman's return from the "Trim Shanty". During this time, another crew was in the process of shoving a cut of cars down a track that was located between where the brakeman's crew were waiting and the Shanty. The brakeman exited the Shanty and was struck by the shove move as he crossed the tracks to get to his crew. The shove move was being preceded by two of the striking train's crew who were riding in a van at the time.

FE-2003-04      2/16/2003   CSXT   Syracuse                      NY   Switchman                      AGE:      36

A two person crew was flat switching in a yard when the switchman, needed a break. He mentioned it to the yard foreman and they decided to go to break after one last car was "kicked" into a specific track. A short time after the car had been released, the foreman's operating control unit indicated a "no poll" failure and the locomotive shut down. When the foreman couldn't contact the switchman he went looking for him. The brakeman was found struck and killed by the last car that had been "kicked".

FE-2003-12      6/6/2003   CSXT   Kingsport                      TN   Brakeman                      AGE:      35

A three person industrial switching crew was shoving one car on a track that ran down the middle of a two-lane road and that was located in an industrial area. The conductor was riding on one side of the car and the brakeman was riding on the other. As the move approached a standing eighteen-wheel truck awaiting permission to back into the same area that the railroad was servicing, the driver began to back up, jack-knifed the trailer, and struck the brakeman crushing him between the truck box and the car he was riding.

FE-2003-35      12/7/2003   UP      San Antonio                      TX   Conductor                      AGE:      37

A pitch/catch remote control operation was being run by a single operator who was struck and killed during a yard operation by his own locomotive. He stepped in front of its movement as he was headed for the other end of a crossover switch that he intended to line for the route he intended his engine to use.

FE-2004-20      9/2/2004   BNSF   Clovis                      NM   Conductor/switchman                      AGE:      26

A two person remote control crew switching in the yard when an empty tank car passed through a switch and derailed, this caused the car to shake and bounce violently. The conductor/switchman lost his hold on the car and fell off between the rails, and was run over and killed.

FE-2007-21      10/27/2007   CSX   Russell                      KY   Yard Foreman                      AGE:      52

A 52 year old yard foreman with 6 months service was crushed and killed while riding the leading end of a five locomotive consist when it passed through a mis-aligned crossover switch and collided with a standing train on an adjacent track.

## Fatalities During The Second Hour of Duty

FE-2007-25    12/28/2007 BNSF   Bristol                      IL    Freight Brakeman                      AGE:    62

A three person crew switchig at an industry was trying to control equipment that failed to couple to equipment left on the main track. While attempting to stop the equipment the brakeman was pulled between the equipment that fouled on an adjacent track and was crushed.

FE-2008-01            1/8/2008 UP            Waukegan                      IL    Passenger Brakeman                      AGE:    59

A four-person commuter train crew (No. 355) arrived at their destination station and prepared to back the train from the northbound track through the crossovers south of the platform, and onto the southbound track where it would be worked as a southbound train by another crew. The crew would then go off-duty. Ordinarily, the brakeman would line both switches. However, the Extraboard Engineer while backing the train through the crossovers shouted down to the Brakeman that he would get the south crossover switch when the engine cleared it and stopped. The Brakeman agreed and stayed at the north cross-over switch. After the Engineer aligned the switch and returned to the locomotive cab. The Brakeman walking south toward the train gave the Engineer two confusing, contradictory signals. As the Brakeman was stooping to examine or attempting to line the south crossover switch (which the Engineer had already lined), a following train (No. 357) moving northward on Main Track No. 1 passed the head-end of job No. 355 and struck the brakeman killing him. The striking train was not ringing the locomotive's bell as it passed the standing train

FE-2008-03            2/3/2008 NS            Chicago                      IL    Freight Conductor                      AGE:    28

A conductor and engineer were transported to their train on main track two and boarded. The ground conditions between main tracks two and one were very poor. The ground was covered by 5 inches of snow; however, the ambient lighting was good. On the south side of the standing train, the footing was good, but the lighting was poor. After receiving 3-Point Protection, the conductor dismounted the lead locomotive and proceeded to walk west, between the two main tracks, on the north side of his standing train, to untie handbrakes. An approaching westbound freight train sounded the whistle for the conductor walking in the foul and the conductor ducked between two freight cars to clear the oncoming movement. The conductor then reemerged from his safe location foul of the adjacent main track. He was struck by the westbound train and died 42 hours later.

FE-2008-19            6/8/2008 UP            La Porte                      TX    Yard Brakeman                      AGE:    47

A three person train crew was performing switching operations at an industrial location. The brakeman controlling movements by radio, instructed the engineer to back up four cars to a coupling. The engineer, watching in the side mirror of the locomotive, noticed the cars moving down curved track instead of the straight track to the coupling. The switch target as seen in the mirror indicated the switch was lined for the spur track, not the straight track. The engineer saw someone walk in front of the movement and it was determined later to be the brakeman, who was struck and killed by the erroneous movement. Cellular telephone records indicated the brakeman had made or received several telephone calls, including a two-minute call during the time of the fatal shove over the misaligned switch.

## Fatalities During The Second Hour of Duty

FE-2008-24      7/8/2008 BNSF Fridley      MN      Utility Employee      AGE:      40

A Utility Man working on Track 11 was bleeding the air from cars to be humped. An RCL job, working on Track 10, prepared to shove 84 cars toward the “hump.” Following their shove to the “hump” the utility employee was found dead on track 10, having been run over by the shove movement. The Coroner’s report suggested suicide.

FE-2008-37      11/15/2008 MRL      Laurel      MT      Yard Brakeman      AGE:      39

A three person crew, operating a local freight train, moved their locomotives to a make-up track. After a job briefing, the switchman proceeded to make sure the train was together and the air hoses were coupled. The switchman did not observe sixteen cars at the end of the train were not coupled. A few minutes later, he radioed he was going between to make an air hose. The Engineer said: “Set and centered.” A few minutes earlier, the Conductor was walking the head-end and found a gap. Without communicating with the Switchman, the Conductor instructed the Engineer to pull forward so that he could open knuckles and prepare for a reverse movement to a coupling. Apparently, when the train moved forward, the 16 cars at the rear of the train began to roll, just as the Switchman was reaching in to connect an air hose. The 16 free-rolling cars struck the standing portion of the train and killed the Switchman.

FE-2009-08      2/7/2009 BNSF Holbrook      AZ      Freight Conductor      AGE:      43

A two person crew had boarded their train on main track two and the conductor began walking the train making an inspection. At that time another train approaching on main track one observed the conductor walking in the foul of main track one. The engineer on the approaching train switched the headlight from dim to bright to alert the conductor on the ground. A van driver beside the track also attempted to get the attention of the conductor without success. The train on main track two struck and killed the conductor.