



U.S. Department
of Transportation
Federal Railroad
Administration

An Independent Evaluation of the Switching Operations Fatality Analysis 2010 Working Group's Processes

Office of Research
and Development
Washington, DC 20590



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REPORT DOCUMENTATION PAGE			<i>Form Approved</i> <i>OMB No. 0704-0188</i>
Public reporting burden for this collection of information is estimated to average 1 hour per response, including the time for reviewing instructions, searching existing data sources, gathering and maintaining the data needed, and completing and reviewing the collection of information. Send comments regarding this burden estimate or any other aspect of this collection of information, including suggestions for reducing this burden to Washington Headquarters Services, Directorate for Information Operations and Reports, 1215 Jefferson Davis Highway, Suite 1204, Arlington, VA 22202-4302, and to the Office of Management and Budget, Paperwork Reduction Project (0702-0288), Washington, D.C. 20503			
1. AGENCY USE ONLY (Leave blank)	2. REPORT DATE December 2009	3. REPORT TYPE AND DATES COVERED Technical Report	
4. TITLE AND SUBTITLE An Evaluation of the Switching Operations Fatality Analysis 2010 Working Group's Processes		5. FUNDING NUMBERS HG384/RR04 DTFR53-07-D00004-TO008	
6. AUTHOR(S) Deborah Bonnet, Michael Coplen, Michael Quinn Patton, Joyce Ranney & Juna Snow			
7. PERFORMING ORGANIZATION NAME(S) AND ADDRESS(ES) U.S. Department of Transportation/Research and Innovative Technology Administration/John A. Volpe National Transportation Systems Center, 55 Broadway, Cambridge, MA 02142-1093 Fulcrum Corporation, 2731 Prosperity Avenue, Suite B, Fairfax, VA 22031-4335		8. PERFORMING ORGANIZATION REPORT NUMBERS	
9. SPONSORING/MONITORING AGENCY NAME(S) AND ADDRESS(ES) U.S. Department of Transportation Federal Railroad Administration Office of Research and Development 1200 New Jersey Avenue, SE Washington, DC 20590		10. SPONSORING/MONITORING AGENCY REPORT NUMBER DOT/FRA/ORD-09/23	
11. SUPPLEMENTARY NOTES Program Manager: Michael Coplen, Federal Railroad Administration Task Monitor: Stephanie Morrow, John A. Volpe National Transportation Systems Center			
12a. DISTRIBUTION/AVAILABILITY STATEMENT This document is available to the public through the FRA Web site.		12b. DISTRIBUTION CODE	
13. ABSTRACT The Switching Operations Fatality Analysis (SOFA) Working Group was formed to analyze the factors contributing to fatalities in switching operations. The 2010 Working Group invited an independent team of evaluators to assess the thoroughness of the SOFA methodology with the goal of promoting the utilization of SOFA findings. This report, prepared by the evaluation team, describes the SOFA 2010 tools and processes and concludes that they are both systematic and rigorous. The railroad industry is urged to give careful consideration to the findings of the SOFA Working Group in the interest of improving rail yard safety in the years ahead.			
14. SUBJECT TERMS Evaluation, SOFA, Fatality, Rail		15. NUMBER OF PAGES 21	
		16. PRICE CODE	
17. SECURITY CLASSIFICATION Unclassified	18. SECURITY CLASSIFICATION OF THIS PAGE Unclassified	19. SECURITY CLASSIFICATION OF ABSTRACT Unclassified	20. LIMITATION OF ABSTRACT

NSN 7540-01-280-5500

Standard Form 298 (Rev. 2-89)
Prescribed by ANSI/NISO Std.
Z39.18
298-102

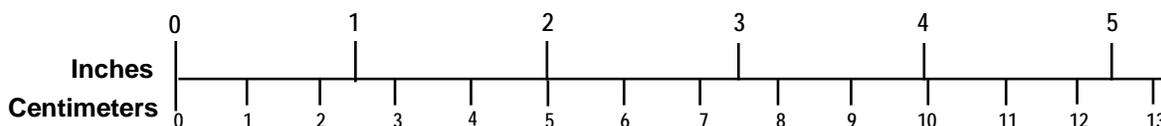
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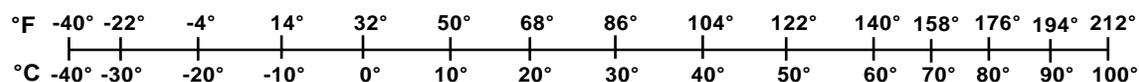
METRIC TO ENGLISH

<p>LENGTH (APPROXIMATE)</p> <p>1 inch (in) = 2.5 centimeters (cm)</p> <p>1 foot (ft) = 30 centimeters (cm)</p> <p>1 yard (yd) = 0.9 meter (m)</p> <p>1 mile (mi) = 1.6 kilometers (km)</p>	<p>LENGTH (APPROXIMATE)</p> <p>1 millimeter (mm) = 0.04 inch (in)</p> <p>1 centimeter (cm) = 0.4 inch (in)</p> <p>1 meter (m) = 3.3 feet (ft)</p> <p>1 meter (m) = 1.1 yards (yd)</p> <p>1 kilometer (km) = 0.6 mile (mi)</p>
<p>AREA (APPROXIMATE)</p> <p>1 square inch (sq in, in²) = 6.5 square centimeters (cm²)</p> <p>1 square foot (sq ft, ft²) = 0.09 square meter (m²)</p> <p>1 square yard (sq yd, yd²) = 0.8 square meter (m²)</p> <p>1 square mile (sq mi, mi²) = 2.6 square kilometers (km²)</p> <p>1 acre = 0.4 hectare (he) = 4,000 square meters (m²)</p>	<p>AREA (APPROXIMATE)</p> <p>1 square centimeter (cm²) = 0.16 square inch (sq in, in²)</p> <p>1 square meter (m²) = 1.2 square yards (sq yd, yd²)</p> <p>1 square kilometer (km²) = 0.4 square mile (sq mi, mi²)</p> <p>10,000 square meters (m²) = 1 hectare (ha) = 2.5 acres</p>
<p>MASS - WEIGHT (APPROXIMATE)</p> <p>1 ounce (oz) = 28 grams (gm)</p> <p>1 pound (lb) = 0.45 kilogram (kg)</p> <p>1 short ton = 2,000 pounds (lb) = 0.9 tonne (t)</p>	<p>MASS - WEIGHT (APPROXIMATE)</p> <p>1 gram (gm) = 0.036 ounce (oz)</p> <p>1 kilogram (kg) = 2.2 pounds (lb)</p> <p>1 tonne (t) = 1,000 kilograms (kg) = 1.1 short tons</p>
<p>VOLUME (APPROXIMATE)</p> <p>1 teaspoon (tsp) = 5 milliliters (ml)</p> <p>1 tablespoon (tbsp) = 15 milliliters (ml)</p> <p>1 fluid ounce (fl oz) = 30 milliliters (ml)</p> <p>1 cup (c) = 0.24 liter (l)</p> <p>1 pint (pt) = 0.47 liter (l)</p> <p>1 quart (qt) = 0.96 liter (l)</p> <p>1 gallon (gal) = 3.8 liters (l)</p> <p>1 cubic foot (cu ft, ft³) = 0.03 cubic meter (m³)</p> <p>1 cubic yard (cu yd, yd³) = 0.76 cubic meter (m³)</p>	<p>VOLUME (APPROXIMATE)</p> <p>1 milliliter (ml) = 0.03 fluid ounce (fl oz)</p> <p>1 liter (l) = 2.1 pints (pt)</p> <p>1 liter (l) = 1.06 quarts (qt)</p> <p>1 liter (l) = 0.26 gallon (gal)</p> <p>1 cubic meter (m³) = 36 cubic feet (cu ft, ft³)</p> <p>1 cubic meter (m³) = 1.3 cubic yards (cu yd, yd³)</p>
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Updated 6/17/98

ACKNOWLEDGEMENTS

The authors extend gratitude to the SOFA Working Group Chair, Joseph Gallant, who requested and facilitated this review, and to the current SOFA Working Group members for their open and enthusiastic participation in this evaluation: Stephen Bruno, William Browder, Robert Butcher, Gary Devall, Ty Dragoo, John T. Little, David Mears, Phillip Qualy, Thomas Streicher, and Robert Svob, Jr. In addition, we thank database analyst Gary Connors and past SOFA Working Group members for their valuable insights: Danny Boyles, David Brickey, George Last, Thomas Perkovich, David Skinner, and John Smullen.

The Federal Railroad Administration funded this evaluation through a contract with Fulcrum Corporation and an interagency agreement with the Volpe National Transportation Systems Center.

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Executive Summary

This report documents the evaluation of the processes used by the Switching Operations Fatality Analysis (SOFA) 2010 Working Group to analyze the 54 fatalities in switching operations that occurred from January 2004 to November 2009. Using accepted professional standards for evaluation, the evaluation team concluded that the SOFA analyses are systematic, rigorous, comprehensive, and objective. Furthermore, the findings of the SOFA 2010 Working Group are valid, significant, and worthy of the railroad industry's thoughtful attention and bold response. These conclusions are 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.

1. Introduction

Since early 2009, the SOFA Working Group has been preparing for its third major report, to be released in 2010. The Working Group has applied its tools and processes for analyzing train yard tragedies, refined over its 12 years of experience, to the 54 fatalities that occurred since January 2004. At the same time, the Working Group has worked diligently to ensure widespread and effective use of its 2010 findings to achieve the goal of zero switching deaths. The group has reviewed successes and disappointments from its past efforts, called upon evaluation professionals for guidance, and used principles of utilization-focused evaluation (Patton, 2008) to inform its work.

The evaluation team has examined SOFA against accepted professional standards for evaluation (Joint Committee on Standards for Educational Evaluation, 1994; American Evaluation Association, 2004). We have found the Working Group's methods appropriate and its findings valid. We offer this report, first, to highlight the credibility of SOFA findings, and second, to document how SOFA works for the benefit of other similar initiatives that may draw on SOFA's lessons.

1.1 Background

The SOFA Working Group first convened in February 1998 in response to a letter from a senior official of the Federal Railroad Administration (FRA) to industry leaders. The letter expressed concern that during the prior 6 years, 66 train and engine service employees had been fatally injured in incidents *other than* major train collisions and called for a task force consisting of representatives from labor, management, and FRA to find a way to prevent these tragic occurrences. The letter went on to say:

“The Team will conduct a detailed fact finding and review and analysis of these incidents to determine whether trends or patterns can be found, identify best practices, and, if possible, formulate recommendations for the entire industry based on the findings. . . . The findings and recommendations from this team are neither intended to be used in a rulemaking process nor to otherwise lead to formal action by FRA. Rather, railroads will be able to evaluate the team’s findings and recommendations with respect to their individual operating requirements. . . .”

1.1.1 SOFA 1999

The SOFA Working Group met almost monthly for 20 months to analyze the 76 fatalities that involved railroad employees engaged in switching operations from January 1, 1992, through July 1, 1998. As the work proceeded, the group learned that:

- The summary reports prepared by FRA investigators alone were not sufficient; to understand the underlying causal factors required reviewing entire case files, including photographs of the site and statements of eye witnesses.
- To find trends and patterns across cases, the Working Group needed a codified database of standardized information. One was developed and continues to evolve.

- Although FRA investigation reports tried to establish a single probable cause, fatalities more often resulted from the coming together of a complex set of factors. The SOFA process turned to possible contributing factors rather than probable cause and accommodated more than one factor per case.
- Shortly after beginning its evaluation process, the SOFA Working Group accepted Human Factors support offered by the Office of Research and Development at FRA and the Volpe National Transportation Systems Center. This assistance proved valuable to the development of systematic and rigorous processes for analyzing individual cases and synthesizing across cases.

The *SOFA Report: Findings and Recommendations of the SOFA Working Group*, released in October 1999, identified five operating recommendations, later shortened to *5 Lifesavers*:

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

The report offered additional recommendations to the industry concerning:

- Unexpected train movement
- Crew resource management

Finally, the report recommended the following to the SOFA Working Group and FRA:

- 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

All of the last set of recommendations were carried out, including the publication of SOFA's *Severe Injuries to Train and Engine Service Employees: Data Description and Injury Characteristics*, published in July 2001.

1.1.2 SOFA 2004

The SOFA Working Group continued to meet from time to time. *Findings and Recommendations of the SOFA Working Group: August 2004 Update* was based on the expanding database that added to the original 76 switching fatalities another 48 that occurred between July 1998 and December 2003. The five operating recommendations (*5 Lifesavers*) were further validated. The 2004 report also identified *10 Special Switching Hazards*:

- Close clearance
- Struck by main-line trains
- Free rolling rail cars
- Employee tripping, slipping, falling
- Unsecured cars
- Unexpected movement of rail cars
- Equipment issues
- Struck by motor vehicle or loading device
- Drugs and alcohol

1.1.3 Ongoing Efforts to Promote SOFA Recommendations

In addition to reviewing fatalities and issuing reports, the SOFA Working Group and others have used several means to educate and motivate the railroad industry—from carrier leaders to workers at the ballast level—to take the necessary actions to ensure safety in switching operations. For a time, the FRA Administrator held monthly conference calls with carrier, labor, and FRA leaders to hear what steps they had taken. The Working Group members took every opportunity to speak publicly about SOFA and to reinforce its messages privately. It examined and encouraged further inquiry into promising safety technologies. A goal of zero switching fatalities was announced. A memorandum, *Best Practices Guidelines for Implementing Operating Recommendations* (March 2000), was issued to encourage education and a positive, judicious approach to implementation and to discourage use of the operating recommendations as a basis for discipline. There were occasional safety alerts when new hazards were identified. A SOFA video was produced and distributed, and a Web site was created. The railroad industry took the lead in creating Crew Resource Management, a generic training program for train and engine employees. The *5 Lifesavers* was printed and distributed nationwide on hats, pens, wallet-size cards, refrigerator magnets, stickers, and switch-list covers.

The Volpe Center has kept the SOFA Working Group and others current on trends in switching operations fatalities by issuing quarterly reports of the number of deaths that appear to be related to SOFA’s 1999 and 2004 findings.¹ The Third Quarter 2009 report concluded that *fatalities related to operating recommendations have dropped substantially* since SOFA began, although hazard-related fatalities have not.

1.2 SOFA 2010

The SOFA Working Group was reconvened in January 2009 with the charge to analyze switching operation fatalities that occurred after December 2003, add them to the database of fatalities between 1992 and 2003, and issue an updated report in early 2010. As of November 1, 2009, there were 54 new fatalities, bringing the total to 178—an average of 10 per year.

¹ “Switching Fatality and Severe Injury Updates” are compiled on the basis of investigation reports, without the benefit of the SOFA Working Group’s analyses, and should therefore be regarded as preliminary.

Despite extensive efforts and evident successes, the 2010 Working Group was dissatisfied with SOFA's effectiveness. The goal of zero fatalities had not been achieved. There was a sense that attention to the *5 LifeSavers* and *10 Special Switching Hazards* had waned since the fanfare surrounding their introduction. The group was particularly concerned that SOFA's recommendations had been lifted up as *special* rules—whose violation is often treated as especially egregious—rather than as an encouragement to focus on education and collaborative problem-solving. The hope of achieving deep systemic shifts toward organizational cultures where safety takes precedence over productivity had not been realized. To a person, Working Group labor representatives said that, as a result of SOFA participation, they had become far more attuned to safety issues and had substantially changed their behaviors when back on the job. Yet, how to meaningfully extend their personal awakenings to colleagues throughout the industry remained unclear.

“A chart is not going to wake anyone up. I'm not saying to show pictures of corpses, but just talk about how bad it could be and that it is your choice. These images and discussions here helped me change. Because of what I learned here, it woke me up.”

“How many cases have we had that people ran with a pin lifter? I did that for years, but I didn't know that was a SOFA recommendation. Sure, maybe someone told me not to do it, but until I served here and read the cases, I didn't realize the importance that this recommendation is followed.”

With these disappointments in mind, the Working Group invited a professional evaluator to its February 2009 meeting to facilitate conversation about how to attain greater and more lasting impact with the 2010 report. The group engaged in a logic modeling process to clarify the outcomes it hoped to achieve (see Appendix A). This exercise led to three important conclusions:

- SOFA had been fairly successful in getting the message of railroad safety out, but the findings and recommendations were too seldom used effectively.
- The credibility of SOFA's processes and findings would be key to subsequent use and implementation of the 2010 report.
- Effective utilization of the findings would depend not only on the report itself, but also on the various ways of engaging stakeholders, and planning for utilization needed to begin well in advance of the report's release.

The present report is one element of the emerging utilization strategy for SOFA 2010.

2. SOFA Process Evaluation

The SOFA 2010 Working Group submitted itself to the scrutiny of five seasoned evaluation professionals, the authors of this report (see Appendix B).² The evaluation team was first formed for two purposes: (1) to advise the SOFA Working Group on ways to encourage effective use of SOFA findings and (2) to assist in the preparation of the 2010 SOFA report. As our work with the Working Group evolved, two additional purposes emerged. It became clear that SOFA represents an exceptionally systematic and comprehensive model—one that may well serve as an exemplar for other initiatives in the railroad industry and even beyond. Thus, this process evaluation report was also conceived as a way (3) to highlight the credibility of SOFA findings, and (4) to document how SOFA works for the benefit of other similar initiatives.

We concluded that the SOFA analyses are systematic, rigorous, comprehensive, and objective. *The findings are valid, significant, and worthy of the railroad industry's thoughtful attention and bold response.* We base these claims on the following:

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.

The balance of this report elaborates upon each of these conclusions.

2.1 The SOFA Working Group Is Appropriately Constituted

The 2010 SOFA Working Group consists of 11 members representing carrier management, labor, and FRA. Members are appointed by their respective organizations:

- Association of American Railroads (one member),
- American Short Line and Regional Railroad Association (ASLRRA) (two members),³
- Brotherhood of Locomotive Engineers and Trainmen (three members),
- United Transportation Union (three members), and
- Federal Railroad Administration (two members).

²The evaluation team and its methods are described later in Section 2.9.

³Two members of the ASLRRA rotate attendance at SOFA meetings.

Collectively, the Working Group brings 359 years of railroad experience and ranges in age from 26 to 65. Two members were on the 1999 and 2004 SOFA Working Groups and one additional member participated in 2004, thereby bringing continuity to the process.

Members are selected not only for their experience but also for analytic, communication, and teamwork skills—important factors in their collective success as a working group.

2.2 The SOFA Working Group Is Cohesive and Resistant to Political Influences

The SOFA Working Group is highly cohesive, and its members are adamant in claiming this as instrumental to SOFA's success. A shared commitment to the importance of the work—saving lives—has pulled the group through some taxing conflicts. The Chairman's skillful leadership has helped cultivate productive group norms of persistent questioning and spirited debate and balanced by mutual respect and ego containment. Other unwritten rules include:

- Working Group members leave their sector allegiances at the door. Getting to the truth of each case trumps protecting turf.
- All SOFA deliberations are private. What is said in the SOFA meeting room stays in the SOFA meeting room.
- SOFA members enjoy the backing of the organizations they represent. Their leaders respect the confidential and collaborative nature of the work and refrain from interfering with the group's deliberations and conclusions.

Most notably, SOFA has succeeded where many others have failed by overcoming the traditionally adversarial relations among labor, management, and regulators, deeply ingrained in the railroad industry, to achieve quality collaborative work:

“It's a good, collaborative group. The operations work well. . . . We are dealing with real people, and everyone is allowed to express their opinion. It is an effective process, and it does a very good job of getting to the root causes and contributing factors of these accidents. I was surprised to see how much information was provided by the field investigators. They do very comprehensive work that gives us a chance to do a real evaluation based on the facts, which have survived through the whole investigative process.”

The Working Group seemed pleased by an evaluation team member's mention that it took all morning of the first day of observation for her to tell who was who—that is, to distinguish among the management, labor, and government representatives; and furthermore, it was based on the attendees' stories, not how they looked or spoke, the opinions they expressed, or the positions they took.

Yet another indicator of the SOFA Working Group's camaraderie is that six former members, now retired, traveled at their own expense to the September 2009 meeting to reunite with their colleagues. While there, they donated several hours to participate in utilization planning for SOFA 2010.

2.3 SOFA 2010 Is Explicitly Designed for Utilization

As mentioned previously, SOFA 2010's second meeting focused on utilization of the report that would be released a year hence. The logic modeling exercise aided in reflecting on past practices and bringing use to the forefront. Throughout the year, the Working Group drew in experts to aid in thoughtful reflection on what worked before, what did not, and how things have changed since 1999.

A pivotal realization occurred at the September 2009 meeting. Amid concerns that past SOFA recommendations had been instituted as rules, an alert observer noted that recommendations were written in a way that read like rules: "*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.*"⁴ Even when translated into the more user-friendly *5 Lifesavers*, SOFA recommendations can still be read as rules: "*Discuss safety at the beginning of a job or when a project changes.*"

This insight contributed to the decision to engage the report's intended users in interpretation and decisions for action, thereby deepening their understanding of the implications of the findings. Planning turned toward involving labor, management, and government in a collaborative examination of the data beyond the confines of the SOFA Working Group.⁵

Among other advantages, this utilization-focused approach would recognize that solutions are best formulated in context, and acknowledge that the best fix for a given problem would likely vary from carrier to carrier and site to site.

2.4 Information Analyzed by the Working Group Was Complete, Sound, and Varied

By "complete," we mean that *all* fatalities within SOFA's scope are analyzed.

As one would expect, a SOFA case begins with a fatality; specifically, the accidental death of an on-duty train or engine employee while performing switching operations. All railroad-related deaths are reported immediately to the National Response Center, which alerts the Team Leader of FRA's Accident Analysis Branch (who is also the SOFA Chairman). Cases are assigned to one of FRA's eight regions for investigation. The region appoints one or more FRA investigators to go to the site as soon as possible to begin work. Teams are preferred; in the case of a switching operation death, the SOFA Working Group prefers that the Inspector in Charge be an Operating Practices Inspector or another inspector trained in human factors.

Investigation protocols are spelled out precisely and clearly in FRA's 101-page *Accident Investigation Guidelines: General Compliance Manual, Part IV, Chapter 9* (2006). The process is complex and thorough. FRA investigators interview virtually everyone with firsthand knowledge of the case. They examine the site and equipment involved and consult records, photos, maps, etc. When necessary, FRA investigators may subpoena witnesses, require the

⁴ Recommendation 3.

⁵ As of this writing, details of this plan are still in development.

production of records, exhibits, and other evidence, administer oaths, and take testimony. A given case may involve collaborating with local law enforcement and emergency response authorities, state and local investigators, the National Transportation Safety Board, and/or the Occupational Safety and Health Administration.

Investigation reporting forms are long and detailed. They involve narratives as well as checklists and fill-in-the-blank items and conclude with the investigation team's conclusions regarding probable cause and contributing factors. Supporting documentation is attached.

Investigation Fatality Memoranda are submitted to Regional Review Groups, which may require additional information or corrections before forwarding the complete report to the Accident Analysis Branch at FRA Headquarters, whose Team Leader then determines which cases are within SOFA's scope. In advance of SOFA meetings, all members are provided the Investigation Fatality Memorandum. Supporting documentation (sometimes as thick as 6 inches) is brought to the meeting.

Veteran SOFA members have noticed a marked improvement in the quality of investigation reports over time. This is due, at least in part, to improvements in the Manual recommended by SOFA in 1999 and 2004, response to the SOFA recommendation to conduct investigations in teams, and regional-level training provided by the Accident Analysis Branch Team Leader.

2.5 SOFA Case Analyses Are Meticulous

Although all SOFA Working Group members read all Fatality Memoranda in advance, one member is assigned to dig deeply into each case, examining the entire case file. The presenter completes a data sheet corresponding to the SOFA database fields for basic facts such as time of day of the occurrence and the deceased's age, length of service, and date of last formal safety training. He or she sketches the accident site to show the location of tracks, relevant equipment, workers, and other pertinent elements for use in a formal presentation. After briefly summarizing the case for the Working Group, the presenter highlights particularly relevant supporting documentation not found in the summary narrative and then responds to questions.

At that point, the group disassembles into impromptu small group discussions. These subgroups often request supporting documents, such as photos, which are then passed around to the other groups. Eventually the Working Group reconvenes as a committee of the whole for further discussion and debate. They share theories, alternative explanations, and hunches. By the end, most group members are very familiar with the details of the case.

This year, Google Earth has proven a useful tool. The aerial view of the accident site was instrumental to understanding at least one case. Other sources outside the case file are occasionally consulted, but only rarely and with the group's permission.

The team frequently conducts integrity checks of the SOFA database to assure accuracy and completeness of the data. Whereas past SOFA Working Groups have used spreadsheets, the 2010 Working Group employed a former FRA operations researcher to create a well-designed Microsoft Access database, complete with tabs and pulldown menus. The group uses an LCD projector to display the forms as they are completed. This helps keep the conversation on track and makes it possible to look up similar cases from the past to ensure consistency. The database

consultant plays the additional role of reminding the group of definitions, criteria for possible contributing factors, and so on, thereby contributing to the integrity of the database as well as the focus of conversation.

The evaluation team was impressed with the Working Group's tenacity. The case analysis process is exhaustive, penetrating, and self-reflective. For any given case, some group members have experienced or witnessed similar situations. They can picture the circumstances clearly, and often ask out loud, "What would I have done? Have I ever made that mistake?" and are visibly shaken when the answer is "yes."

2.6 The Working Group Reaches Consensus on Key Conclusions about Each Case

The most important database elements are also those requiring the most judgment. Possible contributing factors and external circumstances are assigned only with unanimous agreement. Case abstracts of about three sentences, which are published, are wordsmithed by consensus.

Each case analysis is given as much time and attention as necessary to reach consensus. Some are completed in 1 hour; others take most of a day. The group's commitment to give each case its full attention and to adhere to the consensus process takes precedence over any concerns about time or efficiency. A SOFA cycle begins with an inventory of several years' of cases, and the group meets for 3 days each month until it is done.

2.7 Aggregation of SOFA Case Data Was Rigorous

The SOFA database is thoroughly cleaned. Quantitative analyses are appropriate to the data and the research questions. Qualitative analyses, which venture beyond the raw numbers to capture important themes by drawing on the Working Group's experience and judgment, are nevertheless well grounded in the data; evaluation team members expert in qualitative methods monitored for this as they observed and led the discussions about SOFA's overarching findings.

2.8 The SOFA Working Group Practices Continuous Improvement

The Working Group is to be commended for its commitment to ongoing improvement. SOFA 1999 did good work, but SOFA 2004 did better, and SOFA 2010 better still. For example, on the basis of the lessons learned in the aftermath of the 1999 report, the SOFA Working Group issued implementation guidelines. When case codes were found inadequate, they were revised and prior cases were recoded. When spreadsheets became unwieldy, the SOFA Working Group converted to a database. When investigation reports were found incomplete, FRA rewrote the manual and retrained the investigators. When the Working Group needed help in getting its findings used, it called in experts in evaluation utilization and invited the present process evaluation. More examples abound.

2.9 The Process Evaluation Was Thorough and Independent

The evaluation was performed by five seasoned evaluation professionals (see Appendix B for biographical information). The evaluators were independent of the SOFA Working Group and used established professional standards for evaluation to assess the SOFA processes.

The evaluation team members attended between two and four SOFA 2010 meetings each. Altogether we observed more than one dozen case analyses and led four full-group discussions covering, such topics as SOFA's theories of change, efforts to motivate and support use of earlier reports, what has worked toward that end, and barriers to implementing SOFA recommendations in particular and railroad safety in general. One of those discussions included six retired SOFA members as well as the 2010 Working Group. We have read past SOFA reports, the FRA Accident Investigation Guidelines, and various other documents pertaining to SOFA's history.

In addition, we conducted individual face-to-face interviews with 10 of the 11 Working Group members and their database management consultant, providing them opportunity to voice reservations and concerns anonymously. We have been briefed by the SOFA Chair on several occasions, conferred with the database management consultant, and examined the database itself.

The evaluation team found the Working Group fully cooperative, candid, and responsive to requests for documents and information.

3. Conclusions

The evaluation team reiterates: the SOFA analyses are systematic, rigorous, comprehensive, and objective. The findings are valid, significant, and worthy of the railroad industry's thoughtful attention and bold response.

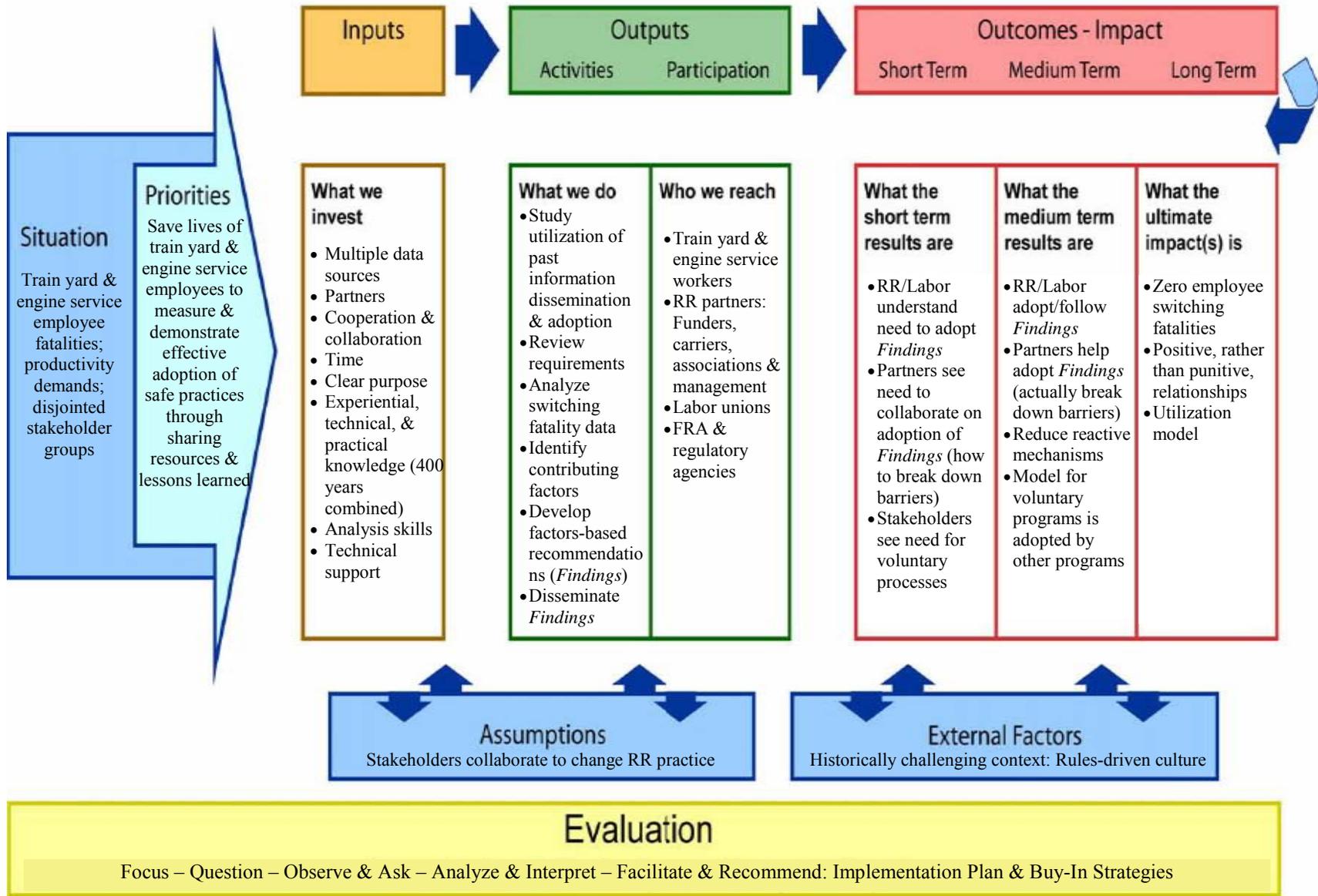
We look forward with optimism to the impact of SOFA 2010's utilization-focused efforts.

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APPENDIX A

SOFA Working Group Process Logic Model



APPENDIX B

The Evaluation Team

Deborah Bonnet is Director of Evaluation for Fulcrum Corporation, an engineering firm based in the Washington, D.C., area. She has conducted more than 120 studies in her 35-year evaluation career, in most cases as the principal investigator. She earned an M.S. in human factors from Virginia Tech and an M.B.A. from Indiana University and has held various leadership positions in the American Evaluation Association.⁶

Michael Coplen is Senior Evaluator and Manager of Culture and Safety Performance Studies for the Federal Railroad Administration, Office of Research and Development, Human Factors Program. He began his career as a railroad brakeman and engineer and later earned an M.A. in organizational behavior from the University of Nebraska. His 15 years as an evaluation practitioner include membership on the first SOFA Working Group. He was awarded the 2009 Alva and Gunnar Myrdal Government Award by the American Evaluation Association for successful evaluation use in FRA and promotion of evaluation methods in the Federal Government.

Michael Quinn Patton is an independent evaluation consultant, former president of the American Evaluation Association, and author of five major books on evaluation, including *Utilization-Focused Evaluation*. After receiving his Ph.D. in sociology from the University of Wisconsin, he served for many years on the faculties of the University of Minnesota and the Union Institute. He has worked with organizations and programs at the international, national, state, and local levels, and with philanthropic, not-for-profit, private sector, and government programs as a generalist working across the full range of efforts at improving human effectiveness and results.

Joyce Ranney is a senior program evaluator in the Human Factors Research and System Applications Center of Innovation at the Volpe National Transportation Systems Center. In the past several years, she has conducted five major multiyear evaluation studies in the railroad industry showing significant bottom-line improvements in safety and safety culture. She holds a B.S. in speech from Southern Illinois University and a Ph.D. from the University of California at Los Angeles in organization behavior.

Juna Snow is Principal Consultant of InnovatEd Consulting and a subcontractor with the Volpe Center. With more than 15 years of experience in educational development, research, and evaluation, she serves on the faculty of the University of Illinois at Urbana-Champaign, where she earned an M.S. in ecology and a Ph.D. in education. She chairs the Research on Evaluation Special Interest Group of the American Educational Research Association.

⁶ <http://www.eval.org>