

# PROCEEDINGS OF THE HUMAN FACTORS WORKSHOP

Improving Railroad Safety  
Through Understanding

# close calls



April 23-24, 2003 Baltimore, MD



U.S. Department  
of Transportation

Federal Railroad  
Administration

Prepared by  
Volpe National Transportation  
Systems Center

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13. ABSTRACT (Maximum 200 words) On April 23 and 24, 2003, the Federal Railroad Administration's Office of Research and Development held a Human Factors Workshop: "Improving Railroad Safety Through Understanding Close Calls in Baltimore, Maryland." The purpose of the workshop was to educate the railroad industry on the benefits of understanding close call events and the challenges to the implementation and success of a close call reporting system. The workshop provided a forum for participants to discuss issues of concern to the railroad industry. A close call was defined as "an opportunity to improve safety practices in a situation or incident that has a potential for more serious consequences." These proceedings document the lessons learned from studying close call best practices in the railroad and airline industries. Included are summaries of the workshop presentations on lessons learned from existing close call systems in the airline and railroad industries. The proceedings also include feedback from workshop participants on lessons learned from their own "close call" experiences, benefits and barriers to implementing a close call management system, and Planning Committee recommendations for next steps in implementing a close call system for the railroad industry. Appendices contain supporting documentation.					
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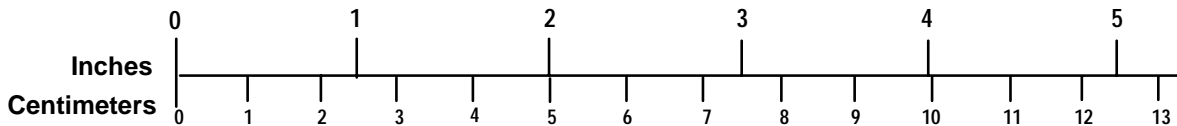
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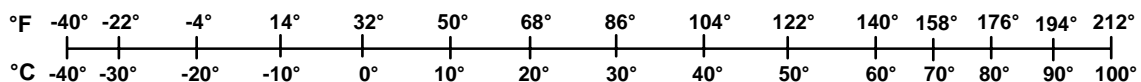
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## **PREFACE**

Railroads can reduce risk before an accident by systematically studying close calls. A close call is “an opportunity to improve safety practices in a situation or incident that has a potential for more serious consequences.” When individual events are analyzed collectively, railroads can identify safety hazards and develop solutions to these threats. This is a proactive way to manage safety.

A Planning Committee of key stakeholders worked together in designing a workshop to introduce the railroad industry to how other industries and some railroads have been benefiting from studying close calls. The *Human Factors Workshop: Improving Railroad Safety Through Understanding Close Calls* was sponsored by the Federal Railroad Administration’s Office of Research and Development and attended by stakeholders from industry, labor, and government.

These proceedings document the lessons learned from studying close call best practices in the railroad and airline industries. Included are summaries of the workshop presentations on lessons learned from existing close call systems in the railroad and airline industries. Also included is feedback from workshop participants on lessons learned from their own "close call" experiences, benefits and barriers to implementing a close call management system, and Planning Committee recommendations for next steps in implementing a close call system for the railroad industry.

Appendices contain supporting documentation:

- FRA Workshop Invitation
- Workshop Agenda
- Speaker Presentations
- Breakout Group Discussions
- Workshop Attendees
- References
- Speaker Biographies
- Close Calls White Paper
- Syncrude Case Study

For an electronic full-page version of speaker handouts, refer to [WWW.CLOSECALLSRAIL.ORG](http://WWW.CLOSECALLSRAIL.ORG).



## ACKNOWLEDGEMENTS

The success of the Close Calls Workshop was due to the efforts of the following groups and individuals.

The *Workshop Planning Committee* of key stakeholders easily worked together and assumed visibility as change agents for the industry. They became champions of the close calls reporting process, both within their own organizations and throughout the industry.

<i>Matthew Reilly</i>	American Short Line & Regional Railroad
<i>Jeffrey Moller</i>	Association of American Railroads
<i>Robert Harvey</i>	Brotherhood of Locomotive Engineers
<i>Tim DePaepe</i>	Brotherhood of Railroad Signalmen
<i>Demetra Collia</i>	Bureau of Transportation Statistics
<i>John Grundmann</i>	Burlington Northern Santa Fe Railway
<i>Thomas Raslear</i>	Federal Railroad Administration
<i>Scott Kaye</i>	Federal Railroad Administration
<i>Miriam Kloeppe</i>	National Transportation Safety Board
<i>Jim Remines</i>	National Transportation Safety Board
<i>Stephen Klejst</i>	New Jersey Transit
<i>Steve Fritter</i>	United Transportation Union
<i>James Stem</i>	United Transportation Union
<i>Jordan Multer</i>	Volpe National Transportation Systems Center
<i>Jane Saks</i>	Volpe National Transportation Systems Center

The *speakers* provided thought-provoking challenges to the participants.

Master of Ceremonies *Thomas Raslear*, Federal Railroad Administration (FRA)

*Jo Strang*, Deputy Associate Administrator for Railroad Development, FRA

*John Goglia*, National Transportation Safety Board member

Keynote speaker *Christopher Hart*, Assistant Administrator of the Federal Aviation Administration's (FAA's) Office of System Safety

Captain *Hank Krakowski*, Vice President of Safety and Security, United Airlines

*Don McClure*, Air Safety Coordinator for the Airline Pilots Association.

*Aidan Nelson*, Executive Director, Railway Safety, United Kingdom

*Helen Muir*, Cranfield University (United Kingdom), Professor of Aerospace Psychology, Head of Human Factors Group

*John Grundmann*, Assistant Vice President Systems Safety, Burlington Northern Santa Fe (BNSF)

The *FRA's Office of Research and Development* is appreciated for its vision of close calls as a way of improving rail safety, its funding of a workshop that became progressively more complex and extensive, and its trust in the members of the Planning Committee. FRA Senior Human Factors Program Manager *Tom Raslear* played a key role in getting the workshop off the ground.

The *Volpe National Transportation Systems Center* was responsible for the workshop planning and logistics support. The team was led by *Jordan Multer* and supported by *Jane Saks*, the workshop organizer. *Lorraine Brewer* was conference coordinator.

*Jane Saks*, *Jeff Bryan*, *Rachel Winkeller*, and *Linda Sharpe* were facilitators. *Kathy Blythe*, *Craig Austin*, *Felicity Dickenson*, and *Bob Marville* were note takers. All worked tirelessly to manage the behind-the-scenes surprises and ensure the workshop was a success from every standpoint.



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## EXECUTIVE SUMMARY

### What is a Close Call?

The U.S. Department of Transportation is working towards eliminating transportation-related fatalities and injuries in the United States.

The Bureau of Transportation Statistics (BTS) reports that a chain of contributing events precedes nearly all transportation incidents. If any of the events in the sequence fail to occur, that incident also might not occur. What you have instead is a “close call” or “near miss”<sup>1</sup>. Knowing more about the sequences of events that lead to accidents can help prevent future accidents. BTS goes on to say that current *modal* programs focus on collecting data only on reportable accidents and that ***high quality data on close calls is needed*** across all modes.

Railroads can reduce risk of an accident by analyzing close calls. A close call is "an opportunity to improve safety practices in a situation or incident that has a potential for more serious consequences." When individual close call events are analyzed collectively, railroads can identify safety hazards and develop solutions to these threats.

### Close Calls Workshop

In June 2002 the Federal Railroad Administration formed a broad-based Planning Committee, representing key stakeholders from industry, labor, and government. Their task was to decide how to introduce the railroad industry to the value of studying close calls as a way of improving safety.

They worked together over the next 10 months to design a workshop to meet that objective. The committee defined the agenda, the small discussion group format, and selected the speakers from other industries and railroads that have benefited from studying close calls. Each member of the Committee also briefed their own organization to encourage their attendance and support at the Workshop.

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<sup>1</sup> [HTTP://WWW.BTS.GOV/SDI/CONFERENCES/2002\\_01\\_09/PROJECT07/PROJECT7\\_OVERVIEW.PDF](http://www.bts.gov/sdi/conferences/2002_01_09/project07/project7_overview.pdf)

On April 23 and 24, 2003, the FRA's Office of Research and Development held a *Human Factors Workshop: Improving Railroad Safety Through Understanding Close Calls* in Baltimore, Maryland. The purpose of the workshop was to educate the railroad industry on the benefits of understanding close call events and to provide a forum for participants to discuss issues and build trust in developing solutions.

## Workshop Agenda

### *Day 1*

On the first day of the workshop, participants listened to panel presentations on existing close call systems in the airline industry, the United Kingdom's railway industry, and the Burlington Northern Santa Fe Railroad.

The first panel of speakers discussed lessons learned from close call systems in aviation. Keynote Speaker *Christopher Hart*, the FAA's Assistant Administrator for System Safety, advocated a shift in approach from a blame-the-individual culture to a systems-based approach in addressing unsafe conditions in transportation. This approach included studying patterns and learning from them.

Given that people make mistakes, it is the industry's task to figure out *why* the systems allowed or failed to prevent the mistake. From Mr. Hart's experience, "sharing safety information not only improves safety, it saves money."

*Captain Hank Krakowski*, Vice President of Safety and Security, United Airlines, provided an industry management perspective. He talked about United Airline's safety programs, which have saved lives. They are based on a Continuous Improvement Program, open communications, Flight Operations Quality Assurance (FOQA), and safety awareness programs.

*Don McClure*, Air Safety Coordinator for the Airline Pilots Association (ALPA), described the labor perspective. He cited the documented success of FOQA programs due to automated recording and analysis of routine flight data. He considers ASAP (Aviation Safety Action Program) a proactive and cost effective approach to flight safety, based on corporate commitment, a non-reprisal policy, mutual trust, and reporting incentives.

The second panel then talked about best practices in several existing railroad initiatives. *Aidan Nelson*, Executive Director, Railway Safety, United Kingdom, and *Helen Muir*, Cranfield University (U.K.), Professor of Aerospace Psychology, Head of Human Factors Group and Chair of the industry steering group for

the Confidential Incident and Analysis Reporting System (CIRAS), discussed CIRAS.

According to *Aidan Nelson*, the championing and development of CIRAS needs to come from within the industry. Operations and challenges are managed across organizational boundaries.

*Helen Muir* talked in detail about the CIRAS reporting process. Success has been measured in the use and trust in the system, and by raising an awareness of safety issues, maintaining confidentiality through its independence from rail companies.

*John Grundmann*, Assistant Vice President Systems Safety, Burlington Northern Santa Fe, concluded with a description of the BNSF Incident Reporting System. The 13 System Safety Hotlines were designed to capture a variety of safety information, including near-misses. BNSF is moving in the direction of collaborating with other railroads to aggregate and analyze data.

## *Day 2*

On the second day of the workshop, participants met in small discussion groups to discuss lessons learned from their own "close call" experiences. They then discussed the benefits and barriers to implementing a close call system for the railroad industry. Finally, participants discussed steps needed to develop close call systems within the U.S. railroads.

## **Results**

Participants said they were encouraged by guest speaker presentations on lessons learned from close call operational systems in the railroad and airline industries. They were particularly impressed with the opportunity to improve data collection and analysis to identify better solutions. Secondary goals of improved trust, communication, and collaboration were important as well.

In addition to the increased safety benefits of these existing models, there is the potential for major cost savings, since the railroad industry does not have to "reinvent the wheel" and can build on existing close call models.

Many workshop participants said that while the workshop made them more aware of the benefits of existing close calls systems, they were still concerned about the barriers to implementation; such as the current "blaming" culture, a need for data confidentiality, limited resources, and the current regulatory requirements.

Based on the turnout, discussions, and recommendations, the Planning Committee called the workshop successful. They said they were surprised by participants' positive reactions and comments. They expected more resistance from workshop participants to using a close call system approach, and were pleased at the number of participants expressing interest in moving forward.

## Recommendations

Given the positive feedback from participants, the Planning Committee made three recommendations.

### *Obtain Stakeholder Buy-In*

Just as the Planning Committee members briefed their managers in the fall of 2002 to obtain buy-in for this Close Calls Workshop, participants must brief their senior managers on what they learned at the workshop and seek support for the close calls concept. Workshop participants have all become part of a process. They need to act as champions in their own organization to successfully move forward.

As part of the stakeholder buy in, *the Planning Committee will prepare an executive briefing* to inform leaders of all stakeholders in the railroads, regulatory agencies, and labor unions about close calls and obtain their buy-in.

### *Initiate a Pilot Close Calls Project*

The Planning Committee felt that workshop speakers made a strong case and there were models from which the railroad industry could learn. While different stakeholder groups expressed concerns, there was an overall consensus from all breakout groups to move ahead slowly with a pilot project.

A pilot project represents a small-scale implementation and test of a close call reporting system for the railroad industry. It will allow industry stakeholders to assess its usability and effectiveness before committing to a larger scale effort with the industry making any changes system-wide. It will also provide a preview of a safety culture characterized by improved trust, communication, and collaboration, across and within industry groups.

In addition, the railroad industry does not have to “reinvent the wheel” but can instead build on existing, successful close call models.

Although the groups did not define the scope of the pilot project, the committee agreed that it was an important step. Railroads can

try out a close call system on a small scale, using a neutral third party to collect and analyze the data, and then can test whether or not a confidential, non-punitive system can increase safety in the railroad industry. All committee members hoped that this pilot would be the beginning of a larger process.

### *Continue Planning Committee Meetings*

The Planning Committee committed to continue to help the railroad industry move forward in studying close calls, and will continue to meet.

## **Conclusion**

This process has the potential for even larger scale improvements in the railroad industry. In order to institute a close call system, railroads will need to introduce and test out certain improvements to the safety culture.

- Taking a proactive, not a reactive approach to safety.
- Focusing on studying and learning from mistakes, not hiding and punishing them.
- Building trust within and between stakeholder groups.
- Improving communication.

These improvements will have an impact that is much larger than the pilot, or even the close call systems. In addition to having the potential for improving overall business practices and the safety culture, all areas of operation will benefit from improved trust and communications. Indirect benefits could include improved job satisfaction, performance, and morale.





# 1. INTRODUCTION

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On April 23 and 24, 2003, the Federal Railroad Administration (FRA) held the *Human Factors Workshop: Improving Railroad Safety Through Understanding Close Calls* in Baltimore, Maryland. The purpose of the workshop was to educate all railroad industry stakeholders on the benefits of understanding close call events and the challenges to their implementation.

## What is a Close Call?

A close call is:

***“When individual events are analyzed collectively, railroads can identify safety hazards and develop solutions to these risks”***

*“An opportunity to improve safety practices in a situation or incident that has a potential for more serious consequences.”<sup>2</sup>”*

Analyzing close calls provides railroads with a proactive way to manage safety. When individual events are analyzed collectively, railroads can identify safety hazards and develop solutions to these risks.

## Incident/Accident Reporting Systems

There is a growing trend within the transportation industry to proactively identify factors that contribute to unsafe events, and prevent or minimize the likelihood of their occurrence. To that end, the railroad industry is trying to identify some of the factors that contribute to accidents, and propose countermeasures that address those sources.

### Existing Incident/Accident Databases

Over the last decade, the number of reportable events in the FRA’s accident/incident reporting systems has declined. The lower accident frequencies make it more difficult to detect emerging trends related to unsafe events and conditions.

An alternative approach is needed to further reduce unsafe events in the railroad industry. Further reductions in the accident rate

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<sup>2</sup> Adapted from James Phimister et al., *Near-Miss Management Systems in the Chemical Process Industry*, Wharton School of Management, University of Pennsylvania.

require new approaches for collecting precursors to accidents and develop countermeasures. More proactive methods are needed.

Other transportation modes have developed incident reporting systems that collect information about close call events and hazardous incidents.

In addition, there are limits to the use and effectiveness of existing databases. Federal regulations require railroads to submit a report whenever the threshold for an incident is met. The perspective of others involved in the incident or who observed the incident may not be taken into account. The end result is that these databases provide an incomplete picture of the factors that contributed to the incident.

### **A Close Call Incident Reporting System**

Developing an incident reporting system based on close call events can enable the railroad industry to better identify the factors that contribute to unsafe events and develop more effective countermeasures. It can also serve as an early warning system, addressing problems proactively before they result in unsafe events.

A successful close call reporting system involves building trust to encourage the disclosure of close call information. Most reporting systems in other industries use a third party to collect and store the confidential information. To address the reluctance to report an incident when disciplinary actions could be imposed, systems should provide protection from liability or enforcement to individuals disclosing legitimate data.

***“Developing an incident reporting system based on close call events... serves as an early warning system”***

## **Close Call Workshop**

### **Background**

In the spring of 2002, the FRA’s Office of Research and Development decided to sponsor a workshop for the railroad industry to learn more about the safety benefits of understanding close calls and the challenges to implementation.

The FRA formed a Close Call Workshop Planning Committee, with 14 representatives from key management, union, and government stakeholder groups. The committee first addressed industry concerns that the FRA was planning to mandate an industry-wide close call system and/or further regulations in this area. When FRA assured the Planning Committee that this was not the case, and that it would be up to each carrier to decide whether

**“(The workshop) creates a dialog among industry stakeholders about the potential risks and benefits of establishing a close call system”**

they wanted to institute such a system, the group agreed to proceed.

During subsequent committee meetings, it became clear that preliminary work was necessary to ensure the workshop would be well attended and successful. The Planning Committee requested the Volpe National Transportation System Center (Volpe Center) to write a White Paper introducing the need for and the possibility of implementing a close call system for the railroad industry. This White Paper: *Improving Railroad Safety through Understanding Close Calls*, is included in the appendices of these Proceedings.

Committee members used this White Paper to brief the management of their respective organizations. Next they designed the Close Calls Workshop to create a dialog among industry stakeholders about the potential benefits and risks of establishing a close call system within the industry.

## **Planning Committee**

The Committee included the following industry stakeholders:

<i>Matthew Reilly</i>	American Short Line and Regional Railroad
<i>Jeffrey Moller</i>	Association of American Railroads
<i>Robert Harvey</i>	Brotherhood of Locomotive Engineers
<i>Tim DePaepe</i>	Brotherhood of Railroad Signalmen
<i>Demetra Collia</i>	Bureau of Transportation Statistics
<i>John Grundmann</i>	Burlington Northern Santa Fe Railway
<i>Thomas Raslear</i>	Federal Railroad Administration
<i>Scott Kaye</i>	Federal Railroad Administration
<i>Miriam Kloeppe</i>	National Transportation Safety Board
<i>Jim Remines</i>	National Transportation Safety Board
<i>Stephen Klejst</i>	New Jersey Transit
<i>Steve Fritter</i>	United Transportation Union
<i>James Stem</i>	United Transportation Union
<i>Jordan Multer</i>	Volpe National Transportation Systems Center
<i>Jane Saks</i>	Volpe National Transportation Systems Center



Planning Committee members, left to right: Miriam Kloeppel, Robert Harvey, Tim DePaepe, Thomas Raslear, Jeffrey Moller, James Stem, and Stephen Klejst

***“For the workshop to be successful it must be run by the industry, not the FRA”***

## Goals

The Planning Committee recognized that for the workshop to be successful, cooperation and support by all stakeholders was essential. While the FRA provided the funding, the Planning Committee agreed on the goals and recommended the workshop content and the format that would achieve those goals.

The Planning Committee decided that the participants would define the outcomes of the workshop. The Committee proposed the following workshop goals:

- Inform the railroad industry about the safety benefits of understanding close calls through the lessons learned and best practices from existing systems.
- Create a dialog among railroad industry stakeholders about safety.

## Agenda

The FRA’s Senior Human Factors Program Manager, *Tom Raslear*, introduced FRA Deputy Associate Administrator for Railroad Development, *Jo Strang*, who welcomed participants to the workshop. Next, *John Goglia* from the National Transportation Safety Board (NTSB) Board, provided a history of safety in the railroad industry, noting the current difficulty of reducing accidents below the current level.

The first panel of speakers discussed lessons learned from close call systems in aviation.

- Keynote speaker, *Christopher Hart*, Assistant Administrator of the FAA’s Office of System Safety

shared lessons learned from close call systems in the airline industry.

- Captain *Hank Krakowski*, Vice President of Safety and Security, United Airlines, provided an industry management perspective.
- *Don McClure*, Air Safety Coordinator for the Airline Pilots Association, described the labor perspective.

The second panel then talked about best practices in several existing railroad initiatives.

- *Aidan Nelson*, Executive Director, Railway Safety, United Kingdom, and *Helen Muir*, Cranfield University (U.K.), Professor of Aerospace Psychology, Head of Human Factors Group and Chair of the industry steering group for the Confidential Incident and Analysis Reporting System (CIRAS), discussed CIRAS.
- *John Grundmann*, Assistant Vice President Systems Safety, Burlington Northern Santa Fe, concluded with a description of the BNSF Incident Reporting System.

Participants spent Thursday morning in small discussion groups, made up of railroad industry stakeholders. Each discussion group consisted of similar numbers of stakeholders from government, labor, management and others.

***“[Participants] discussed lessons learned, [and] benefits and challenges to implementing a close call system in the U.S. railroad industry”***

They discussed lessons learned, benefits and challenges to implementing a close call system in the U.S. railroad industry, and the next steps to begin developing a close call approach for the railroad industry. Representatives from the individual breakout groups then shared what they learned with the whole group.

The Planning Committee then reviewed the comments from the breakout groups and recommended next steps for the industry. The workshop concluded with a question and answer session.

## **Audience**

The workshop was designed for Vice Presidents of Safety, Safety and Rules Directors and managers from the railroad labor unions. Participants also included individuals from the government, academia, and consultants.



## 2. UNDERSTANDING CLOSE CALLS

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### **Introductory Remarks – Tom Raslear** *Federal Railroad Administration*



Master of Ceremonies  
Tom Raslear, FRA

*Tom Raslear is the Senior Human Factors Program Manager in the FRA's Office of R&D. He is a member and former chair of the Department of Transportation's Human Factors Coordinating Committee.*

Tom Raslear acted as Master of Ceremonies and greeted workshop attendees. He gave the background leading to the workshop and reviewed the workshop goals and agenda. After defining close calls, he gave a brief history, pointing out the benefits and challenges. He then introduced Planning Committee members and described their role.

### **Welcome Participants – Jo Strang** *Federal Railroad Administration*



Jo Strang, FRA

*Jo Strang is currently the Deputy Associate Administrator for Railroad Development in the FRA. She oversees a variety of programs including research and development and the passenger and freight programs. She is the past Associate Director for railroad and transit accident investigation at the National Transportation Safety Board (NTSB), where she was responsible for rail and rail transit accident investigation in the United States.*

Jo Strang followed Mr. Raslear in welcoming workshop attendees. She pointed to the rail industry's progress towards the goal of achieving zero accidents and incidents. The number (as of 2002) of accidents and incidents (13,926) is down by 17% (from 16,918 in 2000). Ms. Strang said this is where studying close calls comes into play. Close calls are used to analyze data and learn what goes wrong before accidents happen. In turn, this will help prevent accidents.

## History of Close Calls - John Goglia

### National Transportation Safety Board



John Goglia, NTSB

***“The current aviation approach used to study close calls would be a great benefit to the railroad industry”***

***“(NTSB) recommendations have contributed to safety improvements in many areas”***

*Mr. Goglia has served on the NTSB since August 1995. He was instrumental in raising awareness of airport safety issues and recently hosted a joint government-industry conference to highlight airport safety trends and facilitate improvements. Mr. Goglia has participated in numerous high profile air, rail and bus accident investigations, including the ValuJet crash into the Florida Everglades in May 1998 and Amtrak's City of New Orleans fatal train crash at Bourbonnais, Illinois in March 1999.*

Mr. Goglia's presentation focused on the history of close calls in the rail industry. He began his presentation by saying that the current aviation approach used to study close calls would be a great benefit to the railroad industry. He pointed out even though there is the expected resistance to trying something new, the railroad industry could benefit from studying close calls.

### **Current Safety Trends**

Mr. Goglia gave an overview of current railroad and rail employee accident/incident trends. He pointed to a rapid decline in the 1980s and early 1990s from the peak years of 1978 and 1979, but said this rate had flattened out since the mid 1990s.

### **Industry Safety Improvements**

Based on investigations of numerous railroad accidents over the years, the NTSB has made many safety recommendations to the railroad industry. Mr. Goglia said these recommendations have contributed to safety improvements in many areas.

#### ***Railroad Operating Rules***

Mr. Goglia pointed to improvements in dispatcher operations workloads and the working culture. The industry has also improved periodic operating rules testing of employees, and has eliminated unsafe rules such as the restricted proceed signal.

#### ***Mechanical Conditions***

Recommendations have resulted in the following improvements:

- Nationwide adoption of two-way end-of-train devices
- Use of top and bottom shelf couplers on hazmat tank cars



- Nationwide removal from service of defective wheels
- Improved manufacturing and testing of airbrake components in cold weather conditions
- Improved traction motor mounts in transit operations

### *Track Conditions*

Mr. Goglia pointed to improvements in track conditions, including switches and turnouts.

### *Railway Worker Protection*

Recommendations to industry and government agencies have resulted in Federal regulations safeguarding workers on railroad rights-of-way, and new or improved railroad emergency response training and procedures.

### *Crashworthiness*

Recommendations have included improved locomotive crew cabs, nationwide crashworthiness standards for passenger equipment, and improved locomotive fuel tank integrity.

### *Human Performance*

Recommendations to industry and government agencies have resulted in improvements to drug and alcohol testing requirements, fatigue awareness, and crew resource management.

### *Transit Safety*

Mr. Goglia said there have also been gains in State oversight of rail rapid transit safety and improved attitudes of employees and management.

## **Future Challenges**

The proceeding safety improvements came about from NTSB recommendations. The railroad industry will receive greater benefits from becoming more proactive, collecting and analyzing data, and then initiating its own improvements.

Despite the reduction in the number of railroad accidents and incidents, Mr. Goglia said that other approaches are needed to lower this number further. He pointed out the downward trend in accidents is misleading since results of accidents are analyzed as they occur. In fact, ***in recent years the percentage of accidents and incidents involving fatalities has risen.***

***“Develop a close call system to better understand the underlying causes of accidents”***

## Recommendations

Mr. Goglia recommended the development of a close calls reporting system to better understand the underlying causes of accidents.

He concluded by saying the benefits of a close call system can be judged by looking at the airline industry's approach to lowering costs and the number of incidents. An airline may spend \$72 million on ground damage a year, direct costs associated with flights canceled, ticket upgrades, or hotel stays. An estimated \$0.5B billion a year is spent on ground damage and indirect costs. He recommended that the railroad industry "listen to all groups," not only to save money, but also to improve safety.

***"Listen to all groups, not only to save money but to improve safety"***

### 3. LESSONS LEARNED FROM CLOSE CALL SYSTEMS

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The first panel of speakers discussed lessons learned from close calls in the airline industry.

- *Christopher Hart* (Keynote Speaker), Global Aviation Information Network
- *Captain Hank Krakowski*, United Airlines Safety Culture – an Evolution of Learning and Cooperation
- *Don McClure*, Safety Programs that Increase the Safety Margin and Reduce Accident Risk

There was a question and answer session for all panelists at the end of the presentations.

This section summarizes each speaker's presentation. To view the full text of PowerPoint presentations, refer to the appendices, or the "More" link at the current website

[WWW.CLOSECALLSWORKSHOP.ORG](http://WWW.CLOSECALLSWORKSHOP.ORG).

#### **Global Aviation Information Network - Christopher Hart - Keynote Speaker**

*Assistant Administrator for System Safety, Federal Aviation Administration*



Chris Hart, FAA

*Mr. Hart is the FAA Assistant Administrator for System Safety, reporting directly to the FAA Administrator. The Office of System Safety supports numerous FAA and worldwide aviation safety program. It spearheads industry-wide safety activities, such as the Global Aviation Information Network (GAIN); and helps to identify key safety issues and emerging trends affecting safety.*

*Mr. Hart was formerly Deputy Administrator of the National Highway Traffic Safety Administration (NHTSA) and was a member of the NTSB.*

His presentation focused on the Global Aviation Information Network (GAIN).

## Sharing Safety Information

***“The hands-on front line folks are going to tell you they already knew about that problem”***

Mr. Hart said GAIN promotes the voluntary collection and sharing of safety information by and among users in the international aviation community. The goal is to develop tools and processes to enable the aviation community to make data-driven decisions beyond accidents or incidents. He said the GAIN approach is applicable to many other transportation modes.

Mr. Hart agreed with John Goglia’s comment about listening to your employees; “the hands-on, front line folks are going to tell you they already knew about that problem.”

To illustrate this point, Mr. Hart gave the following example. In 1974 strong winds forced a TWA plane to land on a rarely used Dulles runway. United Airlines pilots had previously reported that the approach chart was confusing but this information had not been shared with other airlines. The TWA plane hit a hill.

Mr. Hart said there are many links in the accident chain, which, if severed at any point, would avert an accident. He suggested that, while we must always maintain the accountability of the operator, we must also look at the system to determine not only how to reduce the likelihood of human error, but also how to reduce the seriousness of the consequences of human error.

## Worldwide Safety Statistics

***“There really is gold in those flight data recorders if we could just mine the information”***

Mr. Hart discussed the benefits of routine flight data recorder use. He pointed out that airlines with mature programs that review flight data recorders after every flight, have an accident rate six times lower than airlines that do not have such programs. He said that in the U.K., airlines have been routinely reviewing flight data recorders for more than 30 years, adding “there really is gold in those flight data recorders if we could just mine the information.”

Mr. Hart said that since 1996, when Norway introduced a non-punitive reporting program, the rail industry has seen an increase in the number of reported and analyzed near misses, and reported and analyzed events. At the same time there has been a reduction in lost time and accidents.

## Safety Data – the Challenge

Currently, only a minute percentage of safety data is collected and analyzed. Mr. Hart referred to the Heinrich Pyramid, in which a small number of accidents are reported, a slightly larger number of incidents are reported, and a very large number of close call occurrences go unreported.

**“The aviation community must look deeper than accidents and incidents to identify latent and emerging problems, and fix them before a mishap occurs”**

Mr. Hart quoted from the National Civil Aviation Review Commission’s 1997 report on avoiding aviation gridlock and reducing the accident rate; “the aviation community must look deeper than accidents and incidents to identify latent and emerging problems, and fix them before a mishap occurs.”

He asked whether the solution is to regulate more, punish more, increase training, or **share information to fix the system**. Information that is sought is on events (actions or failures to act) that are inadvertent, happen repeatedly and could be part of a link in an accident chain. Accidents typically result from the alignment of a combination of events.

Mr. Hart said the main challenges to information sharing are public disclosure of information, due to job sanctions and/or enforcement, criminal sanctions, and civil litigation, which, in the U.S., is the biggest fear. He said the scenario has changed in a very short time from “I’m afraid to collect information” to “I’m afraid to NOT collect information.”

He advocated shifting the current way of thinking from:

- you are highly trained, and if you did as you are trained you would not make mistakes, so this means you are not careful enough and should be punished...

to:

- you are human and humans make mistakes so let’s explore *why* the systems allowed or failed to accommodate your mistake, and **let’s improve the system!**

Mr. Hart said all accidents involve human factors. It is more helpful to assume that the problem resides largely in the system, not only in the individual.

## **GAIN – an Information Network**

GAIN is a network of information, not a large central database, providing the tools and processes to help the aviation safety analysts better manage safety information. It is an international, cooperative effort that will be privately owned and operated. GAIN is a voluntary program.

The conceptual predecessor to GAIN was the Aviation Safety and Reporting Program (ASRS) initiated in 1975; funded by the FAA and operated by NASA. Pilots, mechanics, and controllers were the primary users. [There was limited transaction immunity.] ASRS is now one of GAIN data sources, along with Flight Operations Quality Assurance (FOQA), Aviation Safety Action

**“GAIN (provides) the tools and processes to help the aviation safety analysts better manage safety information”**

***“GAIN is one of our best hopes for enhancing aviation safety in the next century”***

Program (ASAP), Line Operations Safety Audit LOSA), and Air Traffic Control (ATC).

Mr. Hart stated that the analytical tools being developed by GAIN could help experts and analysts by:

- Identifying issues
- Prioritizing risks
- Developing solutions
- Evaluating effectiveness

Former FAA Administrator Jane Garvey called GAIN “one of our best hopes for enhancing aviation safety in the next century.”

### **GAIN Infrastructure**

Five Working Groups and the FAA’s Office of System Safety (ASY) Program Office support a top level Steering Committee. Indirectly, a Government Support Team reports to the Steering Committee.

Industry takes a lead role. The Steering Committee, led by industry, consists of representatives from various airlines worldwide, aircraft manufacturers, unions, general aviation, the U.S. military, and the Flight Safety Foundation.

The Working Groups, whose members are primarily from industry, focus on five areas:

- Aviation Operator Safety Practices
- Analytical Methods and Tools
- Global Information Sharing Prototypes
- Government Support Team (representatives from several countries)
- Flight Ops/ATC Ops Safety Information Sharing
- Making GAIN Work

***“All segments of the industry must work together; management, labor, manufacturers, and governments”***

Mr. Hart said the key to a successful GAIN program is that “all segments of the industry must work together; management, labor, manufacturers, and governments.” He stressed the importance of the labor organizations buying into the program.

As these groups collect and analyze information, they begin to work together in sharing information. The FAA, the U.K.’s Civil Aviation Authority (CAA), and the U.K.’s Royal Aeronautical Society sponsored the first two GAIN conferences. Several airlines in the U.S. and Europe have hosted the conferences.

As collaborative and legal hurdles are overcome, GAIN has been able to focus on improving its analytical tools.

Mr. Hart said other government agencies and industry groups are now starting to take a look at GAIN and express an interest in

developing their own versions. These include other U.S. Department of Transportation agencies (U.S. Coast Guard, Federal Highway Administration, Office of Pipeline Safety), the Critical Infrastructure Assurance Office (CIAO), and the nuclear power, chemical manufacturing, public utilities, firefighter, and health care industries.

***“Sharing safety information not only improves safety, it saves money”***

### **The Airline Bottom Line**

The airline industry realized immediate benefits in operations and maintenance. More long-term accidents will be prevented. Sharing safety information “not only improves safety, it saves money.” Mr. Hart pointed to United Airlines where flap overspeed events were reduced by 90% in less than a year. He said the industry “has changed from pushing a safety rock up a hill to being a profit center.”

### **GAIN in the Future**

Mr. Hart quoted from the Institute of Medicine’s Committee on Quality of Health Care; “the focus must shift from blaming individuals for past errors to a focus on preventing future errors by designing safety into the system.”

He concluded by saying since September 11, GAIN has a future role in the area of security.

For more information, refer to the GAIN website found at [HTTP://GAINWEB.ORG/](http://GAINWEB.ORG/) .

## **United Airlines Safety Culture: an Evolution of Learning and Cooperation - Hank Krakowski**

*Vice President for Corporate Safety, Security and Quality Assurance, United Airlines*



Hank Krakowski,  
United Airlines

*Mr. Krakowski is the Vice President for Corporate Safety, Security and Quality Assurance at United Airlines. His responsibilities cover worldwide flight, operational, computer and maintenance functions, including emergency response. He was in charge of Flight Operations at United's Operations Control Center on September 11, 2001.*

His presentation focused on safety programs at United Airlines.

### **Update on United**

Mr. Krakowski began his presentation with a Chapter 11 update. The airline is running well with excellent operational and safety performance, was the number one airline with on-time flights, is not experiencing any safety or reliability issues, and has negotiated agreements with labor.

### **Continuous Improvement Program**

The mission of the Safety Department at United is to “find truth and facilitate change.” Mechanisms include self-disclosure, partnerships between stakeholders, systems auditing, and continuous improvement.

Mr. Krakowski said safety is a natural evolution and that “candid, open communication and Memorandums of Understanding between unions, regulators and managers is key.”

United uses the Continuous Improvement Safety Program to implement change and re-evaluate safety. At the ground level, weekly meetings between representatives from management, unions, and the FAA identify safety issues. At the airline operations level, safety data is generated and analyzed, and safety reports are written. In addition, United uses several internal and external auditing techniques to ensure all aspects of safety are evaluated. There are internal quality control audits within a department in addition to independent quality assurance audits. There are also external audits by the FAA, EPA, TSA, and OSHA.

***“The mission of the Safety Department at United is to find truth and facilitate change”***



The end result is that within United's Safety Department, management, regulators, employees, and the union all see the same current safety status updates.

***“Candid, open communication and MOUs between unions/regulators/managers are key”***

## **Communication – Key to Safety**

United's last crew fatality was in 1978 when a DC-8 ran out of fuel and crashed near the Portland airport. The NTSB determined that the probable cause of the accident was the failure of the captain to properly monitor the aircraft's fuel state and to properly respond to the low fuel reading.

Also contributing to the accident was the failure of the other two flight crew either to fully comprehend the criticality of the fuel state or to successfully communicate their concern to the captain. At that time, flight culture was that the “Captain is King,” and if a captain had a strong personality this made it difficult for other members of the flight crew to intervene.

Mr. Krakowski said United brought in the FAA to find out how to assess crew performance and how the captain could delegate certain tasks and use the knowledge of the crew.

Using crew resource management (CRM) tools, all United crewmembers are now trained to discuss safety issues with the captain. Mr. Krakowski said the captain's authority is strengthened, not undermined, through CRM. In addition, pilot simulator checks equally evaluate Command/Leadership/Resource (CLR), CRM, and flight skills.

## **Flight Operations Quality Assurance (FOQA)**

United is now using data driven analysis to improve safety by tracking if safety changes work. Mr. Krakowski said data collection is very important. Sixty percent of United's aircraft are equipped with FOQA recorders for downloading data at the end of the day.

***“Crews can request routine real time... data to predict problems before major events occur”***

### ***Data***

The FAA and industry are working together to aggregate deidentified data and identify trend data, such as unstable approaches, Terminal Control Area Resolution Advisory (TCAS RAs) and exceeding flap/speed. Flight management and the Airline Pilots Association (ALPA) then analyze changes required to procedures and training.

The ALPA Exceedence Guidance Team reviews identified data. If there is gross exceedence or data is significantly over limits, the union contacts the crew. This approach develops a trusting

relationship between management and the union in a learning environment.

### *Reporting Events*

Using FOQA, crews can request routine real time trending engine and system data to predict problems *before* major events occur, such as an engine shutdown. In the event there is a non-routine event, such as an engine surge or flap overspeed, the crew can request data to be downloaded.

FOQA trends aircraft performance; this prevents flights taking off if there is a manufacturing and engineering issue.

### *Quality Assurance Auditing – Case Study*

At United, QA auditing in an independent internal process. Mr. Krakowski said there has been a shift in philosophies from the traditional “compliance police” to the Joint Quality Review Team, based on the systems and processes of ISO 9000. This approach looks at how the system sets up the crew for success and failure.

QA auditing identifies non-compliance (direct violations), non-conformance (written procedures different from practices), and significant concerns (oversight and systems are weak).

Mr. Krakowski gave an example of a QA audit based on the following near-accident:

- An engine fails shortly after takeoff
- Instrument flight rule (IFR) conditions were in effect
- The first officer was the pilot
- The crew was late in identifying engine failure
- The first officer reacted improperly
- The plane came within 100 feet of a hill

A joint QA review team consisting of the FAA and the union found full FAA/United compliance at takeoff but identified the feeling there were proficiency problems. The Chief Safety Officer decided on a systems evaluation. The end results were 263 findings; eight of which were critical, which surprised pilots and United. Findings related to proficiency, safety, and the inexperience of some long-range relief pilots in making multiple takeoffs and landings. United made the decision to handle the occurrence as an accident and to look more closely at taking a systems approach to evaluating incidents.

Mr. Krakowski pointed out the strength of independent QA auditing is the ability to keep self-interests at bay.

***“There has been a shift in philosophies from the traditional ‘compliance police’ to the Joint Quality Review Team”***

## **Safety Awareness Program**

***“United’s vision is to create a total safety analysis culture overall and traverse departmental barriers”***

Mr. Krakowski said United’s vision is to “create a total safety analysis culture overall and traverse departmental barriers.” The mechanism for this vision is through three programs:

- Flight Safety Awareness Program (FSAP)
- Dispatch Safety Awareness Program (DSAP)
- Maintenance Safety Awareness Program (MSAP)

### ***Flight Safety Awareness Program (FSAP)***

FSAP provides the tools for open and honest discussions between management, unions, crews, and the FAA. If a crewmember sees or makes a mistake they receive immunity if they disclose the information in a timely manner, unless the incident shows willful disregard or is intentional.

***“FSAP provides the tools for open and honest discussions between management, unions, crews, and the FAA”***

The mechanism for self-disclosure is a memorandum of understanding (MOU) between the unions the FAA.

FSAP reports track altitude deviations, missed communications, and security issues. Pilots electronically submit these reports to the United Safety Department, which then classifies the occurrence and ranks the risk level.

FSAP reports are forwarded to Weekly Event Review Committee meetings for review by FAA, union, and United managers. Action taken depends on whether the incident is significant or ambiguous. The committee closes the issue outright or makes recommendations, generates a letter of “no action”, or issues a Notice of Violation (this is a rare event).

***“All groups need to communicate with each other to resolve safety issues quickly”***

### ***Dispatch Safety Awareness Program (DSAP)***

DSAP evolved from the success of the FSAP. It is used by United pilots, maintenance workers, and ground crew to “paint a full disclosure picture” of the safety environment related to flight dispatch. The program began in October 2002 and is already effective.

### ***Maintenance Safety Awareness Program (MSAP)***

United is currently revisiting the concept of maintenance safety with the new union leadership.

## **Safety Awareness Case Study**

United successfully followed FSAP procedures after recent problems with ice damage to engines of 14 Boeing 737s. Information was not readily available from ground maintenance personnel who may have thought they would be blamed.

***“The FOQA program has saved engines, aircraft, and lives”***

United used backchannel communication between ramp and maintenance staff, assuring them there would be no culpability. The review team found that ground personnel properly maintained engines, however, improvements were needed in engine operating procedures established by the company to be used by pilots. United subsequently worked with the engine manufacturer to develop improved procedures.

### **Saving Engines, Aircraft, and Lives**

According to Mr. Krakowski, the FOQA program has “saved engines, aircraft, and lives.” He pointed to cooperation, confidentiality, and communication as key to these successes. The lesson learned was that all groups need to communicate with each other to resolve safety issues quickly. He concluded that it is important for all groups to be able to talk to each other and that communication must be “robust, open, and honest.”

## **Safety Programs that Increase the Safety Margin and Reduce the Accident Risk - Don McClure**

*Air Safety Coordinator, Airline Pilots Association (ALPA)*



Don McClure, Airline Pilots Association

*Mr. McClure is the ALPA Safety Coordinator and is responsible for developing and implementing FOQA (Flight Operations Quality Assurance) and ASAP (Aviation Safety Action Program). He previously was a Captain with Eastern Air Lines for 26 years and has participated in air safety and accident investigations for the past 36 years.*

Mr. McClure’s presentation focused on using FOQA and ASAP to increase the flight safety margin and reduce accident risk.

### **FOQA Overview**

Mr. McClure began his presentation by defining FOQA as a program designed to enhance safety through the controlled, automated recording and analysis of flight data generated during routine line operations.

He pointed out the success of FOQA by European and Asian carriers for over 30 years. Even though the litigious environment is different compared to the U.S., data is respected. There is no concern over misuse by government agencies, and there is a long recognized need for anonymity in reporting. Mature international

***“FOQA... enhances safety through the controlled, automated recording and analysis of flight data generated during routine line operations”***

***“Mature international FOQA programs have proven hull loss prevention statistics”***

***“Crew feedback is essential to the success of FOQA”***

FOQA programs have improved hull loss prevention statistics compared to European and U.S. carriers *not* using FOQA.

## **Safety Trends**

An assessment of worldwide commercial jet hull loss accidents between 1959 and 1996 shows a high percentage of accidents occurred when aircraft were descending from cruising altitude to landing.

Mr. McClure pointed to several safety trends in the U.S. In 1997 the two top safety events by far were:

- High descent rate below 2,000 feet
- Low power on approach

Examining these data in greater detail, the location with the highest rate of descent was also the most frequent user of low power approaches. This location was Myrtle Beach, South Carolina. In both cases, the percentage difference between the Myrtle Beach data and the next highest airport data was extremely high.

Using FOQA to analyze the Myrtle Beach statistics, ALPA determined the standard flight plan with a higher altitude was designed to optimize fuel efficiency. Essentially, flight crews had to climb to 23,000 feet and then descend rapidly on flights lasting only 17 minutes. Reducing the flight plan to an altitude of 15,000 feet reduced the required descent and consequently resulted in a measurable reduction in flap damage (previously caused by pilots deploying flaps at higher speeds to cope with the need for rapid descents).

## **FOQA and Unstabilized Approaches**

Flight Operations has taken a pro-active approach to reducing unstabilized approaches by communicating safety information to the flight crews. Between 1998 and 1999 there were articles in various flight operations publications, postings on the FOQA Bulletin Board (postings for several were dedicated to stabilization issues), and briefings by check airmen.

Mr. McClure gave several examples of briefings, safety bulletins, and bulletin board postings. He said that these communication tools have been very effective in reducing the percentage of unstabilized approaches resulting from low power on approach and high descent rate.

Mr. McClure highlighted several initiatives with detailed graphs for US Airways flights approaching runway 23 at Charlotte, North Carolina airport.

***“FOQA is the highest level of safety management”***

Following installation of an Instrument Landing System (ILS) approach to runway 23 to replace the non-precision approach, six months later there was an 84% reduction in unstabilized approaches. This also increased the safety margin for other carriers. FOQA data not only was the incentive to install the ILS but also allowed ALPA to determine the safety impact of the installation.

### **Communication is Key to FOQA**

Mr. McClure stressed that crew feedback is essential to the success of FOQA, pointing to the various communication tools to get the message across:

- FOQA Bulletin Board
- Event of the Month
- Crew contact by ALPA gatekeeper
- Monthly data sent to the Fleet Manager
- Company safety publications
- Airport analysis page on the FOQA Alert

Ultimately, the industry will recognize that FOQA is the highest level of safety management.

### **ASAP Overview**

***“(ASAP)...is a cost effective approach to flight safety for the airlines, pilots, and the FAA”***

Next, Mr. McClure highlighted ASAP, calling the program a cost effective approach to flight safety for the airlines, pilots, and the FAA. He stressed that for ASAP to work; there must be a corporate commitment to air safety at the highest level and a corporate non-reprisal policy, as prerequisites. Flight crew feedback of safety information is also key to a successful program.

Using ASAP at US Airways, Mr. McClure described the benefits to having a safety action program in place.

### **Airline Commitment**

- Airline management at all levels must commit to the corporate safety mandate and support personnel and staff.
- Air Safety staff must provide corporate safety information.

***“For ASAP to work, there must be a corporate commitment to air safety and a corporate non-reprisal policy”***

### **ASAP Defined**

Mr. McClure identified the key features of ASAP:

- Identifies and resolves safety problems proactively
- Encourages airline and employee commitment, response, and accountability

- Provides strong reporting incentives
- Associated with NASA's ASRS program
- Provides safety benefits to airlines, pilots, the FAA, and the traveling public
- Addresses all ground and flight operations and procedures, Air Traffic Control, dispatch and aircraft performance, charting and instrument procedures, maintenance and minimum equipment lists (MEL), human factors, and technology and aircraft equipment.

### **ASAP Reports**

***“The ASAP report is the backbone of an air carrier ASAP program”***

Mr. McClure called the ASAP report “the backbone of an air carrier ASAP program.”

US Airways has based their ASAP reports on the British Airways equivalent reporting system. There are 58 mandatory reports relating to flight safety concerns or FAR deviations in three categories: Air Safety, Cabin Safety, and Disruptive Passenger Incident. Crews must file a report within 24 hours.

The airline offers several incentives for reporting incidents:

- Sole source protection
- A non-punitive approach to corrective action (FAA also)
- Confidentiality
- Anonymity after corrective action

***“[ASAP] maximizes the input of employees as an airline's most valuable safety resource”***

### **ASAP's Value to the Airline**

Mr. McClure said the bottom line is that ASAP:

- Maximizes the input of employees as an airline's most valuable safety resource.
- Offers a corrective action approach to resolve safety problems, and prevent incidents and accidents.
- Is cost-effective since investigative expenses (such as \$30K to defend US Airways, and \$60K for the FAA to prosecute) can be applied to corrective and safety initiatives.
- Shows mutual trust and a cross-disciplined approach to problem solving is key to the success of the program.

### **ASAP's Value to the Airline Industry**

Once ASAP is implemented and operating, the potential value is that since safety problems are more readily identified and resolved, the result is improved accident and incident prevention strategies.

Mr. McClure said this in turn leads to:

- Sharing strategies industry-wide
- Promoting FAA compliance through corrective actions
- NTSB assistance through proactive accident prevention recommendations
- Improvements in NAS (National Airspace System) operations

## Sharing Information Improves Safety

**“ASAP is not an immunity program”**

US Airways communicates ASAP findings through several publications. Mr. McClure gave examples of lessons learned, an altitude awareness alert, and a pilot safety bulletin (joint publication with ALPA). He pointed to the impact of these publications in reducing the number of altitude deviations at US Airways.

He concluded by saying an ASAP program is not an immunity program and it does not apply to deliberate acts or criminal activities. Rather it is a pro-active, corrective action safety program that requires a commitment from all stakeholders.

## Panel Discussion

After concluding their presentations, the speakers formed a panel and answered questions from the audience. Questions are identified by stakeholder group.

*Q: (Union participant to Hank Krakowski) What’s the difference between deliberate and non-deliberate actions?*

A: If a pilot overshoots a landing the incident is a judgment call, not a deliberate act. If a maintenance worker disregards a sign not to turn on an auxiliary power unit (APU), this is a deliberate act. The FAA/union/company representatives decide if an individual has crossed the threshold.

**“They’re not interested in attacking the individual but in finding out if it’s a system problem. Fix the system, not the individual”**

(Don McClure) – We worked on defining intentional and willful. Deliberate is when you know what your job duties are and don’t do them. The FAA relies on a three-person panel to decide if an incident is deliberate or not.

(Christopher Hart) – Regulations are broad. We need three groups working together to decide and make sure everyone’s interests are represented.

*Q: (Union participant to Don McClure) How do you get around confidentiality in using event recorder information?*

A: We have stringent requirements in getting raw flight data. It’s de-identified and the only person who knows the names is the ALPA representative. You can’t take a recorded event and use it



for discipline. Part 13 of the Federal regulations say that the FAA can't use data from FOQA against an employee. Companies are the same. They're not interested in attacking the individual but in finding out if it's a system problem. Fix the system, not the individual. Find out what's causing the problem, educate the group, and see results.

**"If security is breached we pull the plug on the program"**

*Q: (Union participant to Don McClure) How do you ensure recorded information won't be used for prosecution? What is the recourse if it's used? What are the consequences if data security is breached? How do you contact the crew?*

A: The ALPA gatekeeper can talk to the crew if needed. If security is breached we pull the plug on the program. There have been few, if any, breaches and the program hasn't been shut down.

*Q: (Union participant to Hank Krakowski) How are decisions made by the three-member panel and how are decisions made?*

A: At United two out of three need to agree.

(Don McClure) – Advisory circulars say it is a consensual process. The FAA has a final say if the panel is deadlocked.

(Christopher Hart) – It's rare that the FAA does this.

*Q: (Government participant to Don McClure) At what level is the FAA involved?*

A: The top level.

(Hank Krakowski) – This gives the FAA insight into carrier operations.

*Q: (Union participant to Don McClure) What is the difference between mandatory reporting events and voluntary reporting?*

A: Mandatory events are the ones we want you to report. Voluntary is for participation by carriers. There are only a few carriers that don't have a list of mandatory reporting events.

**"It's not an economic issue, it's about safety"**

*Q: (Government participant to Hank Krakowski) If there was no safety program and an aircraft experienced an unstable approach at an airport, how much would safety be a factor and how much economics because the company took a productivity hit?*

A: From a moral point of view we don't want crews to be put in this position. It's not an economic issue, it's about safety. Corporations are committed to safety.

(Don McClure) – Flight crews do their best to assess risk, and then factor in economic and safety impacts.



## 4. LESSONS LEARNED FROM EXISTING RAIL INITIATIVES

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The second panel of speakers discussed lessons learned from close calls in the rail industry.

- *Aidan Nelson*, Confidential Reporting: the U.K. Rail Experience.
- *Professor Helen Muir*, Impact of CIRAS on the U.K. Rail Industry.
- *John Grundmann*, Burlington Northern/Santa Fe (BNSF) Safety Hotline.

There was a question and answer session for all panelists at the end of the presentations.

This section summarizes each speaker's presentation. To view the full text of the PowerPoint presentation, see the appendices of these Proceedings.

### **Confidential Reporting: the U.K. Rail Experience - Aidan Nelson**

*Policy and Standards Director, Railway Safety and Standards Board, United Kingdom*



Aidan Nelson, RSSB  
(United Kingdom)

*Mr. Nelson is the Policy and Standards Director of the Railway Safety and Standards Board (RSSB) in the United Kingdom. The not-for-profit industry board is owned by the rail safety industry and supported by the Safety Advisory Committee and the unions.*

Mr. Nelson's presentation focused on confidential reporting of railway accidents.

### **Responsibilities for Accidents**

Mr. Nelson quoted how engine drivers complain of the placement of signals and that only rarely, or after an accident occurs are improvements made. When a fatal accident occurs the railway servants are liable for manslaughter, while the railway companies who are really to blame for providing defective equipment escape

“scott-free.” Mr. Nelson said his source was *Safe Railway Working* by Clement Stretton, published in 1893. He questioned if anything had changed between then and now relating to accident liability – the company or the individual.

## **A Pilot Reporting System**

In June 1999 a pilot Confidential Incident Reporting and Analysis System (CIRAS) was established in Scotland at the University of Strathclyde. The railway industry supported CIRAS in principle but did not include program funding in their business plans.

## **Developing a National CIRAS**

Mr. Nelson said a catastrophic railway accident at Ladbroke Grove generated parliamentary interest in CIRAS. Over 70 railway companies have now committed to supporting CIRAS.

CIRAS is operated by a broad-based industry steering group, chaired by Mr. Nelson. There is currently 77,000 railway staff enrolled, with 80,000 forecasted for 2003/2004. CIRAS operates across organizational boundaries.

Mr. Nelson pointed out cost concerns over mailing out the CIRAS journal four times a year to all enrollees. He said a core service provider is contracted nationally by the RSSB and that this is a challenge because of the European Union. Regional centers are funded by a levy on the number of enrollees.

## **CIRAS Challenges**

Mr. Nelson said the transition from an academic pilot program to a national program was “not without pain.”

### *Confidentiality*

He cautioned the audience about intellectual property rights (IPR) in a commercial environment and how issues of confidentiality led to the creation of a trust to own the data and license the system. He also cautioned about the need to test CIRAS to ensure it is confidential.

### *Cost*

Cost reduction was still an issue and there was a need to creatively count the number of CIRAS enrollees. One suggestion was not to fully count the people performing the work.

**“CIRAS operates across organizational boundaries”**

**“Issues of confidentiality led to the creation of a trust to own the data and license the system”**

***“There is still a widely held management concern that blame is alive and well”***

### ***Commitment***

Mr. Nelson stressed the need to commit to CIRAS through a Railway Group Safety Plan. He said the Railway Group Standard is an industry standard mandating enrollment of safety critical staff employed by network and train operators (Railway Group) in CIRAS. The challenge is to handle the supply chain to Railway Group members within a contractual framework.

Mr. Nelson said some organizations still feel they don't need CIRAS. Of the organizations that do subscribe, he said there is still a widely held management concern that “blame is alive and well.” He cautioned about local managers keeping the supply of CIRAS forms under surveillance.

### ***Quality of Response***

Depending on the safety climate, the managerial response to a CIRAS report can be defensive, rather than helping to address the issue. This reflects the manager's self-justification within the organization. Mr. Nelson said an independent peer review of responses “raises the quality considerably.”

### **Managing CIRAS**

Mr. Nelson said the RSSB is the managing agent for the CIRAS Charitable Trust. Board members are members of CIRAS. An RSSB stakeholder chairs the Trust. RSSB facilitates the independently chaired industry steering group and funds the independent ***neutral*** chair of that group (Professor Helen Muir; a fellow panelist at this workshop). Mr. Nelson stressed the importance of the governance of CIRAS being separate from the management of CIRAS.

Funding costs for the core CIRAS facility are £0.75 million (\$1.25M). Mr. Nelson said costs are recovered from the general funding of RSSB.

RSSB takes an annual census of enrolled staff and researches the effectiveness of CIRAS. The Board also responds to issues relating to rulebook or standards ambiguity

### **RSSB's CIRAS Committee**

RSSB's newly formed CIRAS committee focuses on RSSB's safety leadership role within the rail industry. Mr. Nelson said the committee represents all rail sectors.

The committee works principally from CIRAS national report data, cross-referenced with industry safety performance data.

**“Don’t underestimate management challenges – you’re likely to fail if you do”**

Additional analyses are requested from the CIRAS core facility as needed. Mr. Nelson pointed out the risk of data overload.

The committee determines and then monitors RSSB actions in response to safety issues by identifying key issues for research, influencing national initiatives and standards of the Railway Group Safety Plan, identifying sources of risk, and initiating topic-based workshops.

### **Future Challenges**

**“For CIRAS to be successful the champion and lead development must come from within the industry”**

Mr. Nelson stressed the need for all parties to accept that there are challenges. “Don’t underestimate management challenges – you’re likely to fail if you do.”

CIRAS is an “integral component of a wider human error management program rather than a bolt on attachment.”

For CIRAS to be successful, the champion and lead development must come from *within* the industry. This creates ownership and minimizes skepticism.

Mr. Nelson said the greatest skeptics are the U.K. regulators and junior and middle managers because RSSB hasn’t yet sold the system to them. “It’s about attitudes, beliefs, and behaviors.”

In conclusion, Mr. Nelson said “CIRAS is effective when everyone is in it together for a highly safe railroad.”

## Impact of CIRAS on the U.K. Rail Industry - Helen Muir *Professor of Aerospace Psychology, Cranfield University*



Helen Muir,  
Cranfield University  
(United Kingdom)

***“CIRAS is an independent facility that rail industry employees can confidentially report safety-related concerns to, and expect a response”***

*Professor Muir is Professor of Aerospace Psychology and Head of the Department of Human Factors and Air Transport at Cranfield University in the United Kingdom.*

*Professor Muir was recruited by the rail industry to oversee the Railway industry’s Confidential Incident and Analysis Reporting System (CIRAS). She is currently Chair of the CIRAS National Steering Committee, which is developing tools for rail confidential incident reporting. Professor Muir’s presentation focused on the impact of CIRAS on the rail industry.*

### **What is CIRAS**

Professor Muir described CIRAS as an independent facility that rail industry employees can confidentially report safety-related concerns to, and expect a response. The expectation is that by analyzing CIRAS reports, the end result will be a positive contribution to a safer railway system in the U.K.

Since November 1999, 77,000 rail industry staff have been enrolled and briefed in CIRAS, 2,500 reports have been submitted, and an independent audit has showed no breaches of confidentiality.

### **The Challenge**

After a serious rail accident at Ladbroke Grove the U.K. Rail Industry made the decision to develop a national reporting scheme.

Professor Muir pointed out that although CIRAS sounded like a good idea theoretically, there was some initial reticence from parts of the industry.

The challenge was to obtain buy-in from the various industry groups that CIRAS would be entirely confidential, and then develop a CIRAS infrastructure.

- Initially an Implementation Group representing all industry groups (unions, train operating companies, maintenance companies, rail authorities and independent technical consultants) developed the system.
- A Steering Committee with representatives from all stakeholders then took over and is responsible for the overall management of the system.
- An independent Charitable Trust was established to be the custodians of the CIRAS data.

## National Database and Regional Centers

Professor Muir said the U.K. National system was based on a successful pilot CIRAS scheme that had been developed in Scotland, using face-to-face interviews. She pointed out the human factors benefit of this approach had been that people were able to talk to each other face to face.

The Implementation Group who developed the National Scheme divided the country into three regions to reflect the regional cultures. These were administered by different organizations: a university, a consultant, and a government agency. Regional liaison groups (representing the companies and unions) addressed safety issues reported.

**“Our plan is not necessarily your plan”**

Professor Muir recommended assessing a system that would work well in the United States, based on regional differences, saying “our plan is not necessarily *your* plan”. In the U.K., the regional administrators all followed the same standards but had different approaches to the business processes. Professor Muir pointed out there may be one regional center in the future.

## Reporting Process

The *CIRAS Journal* is mailed to all railway staff enrolled in CIRAS. On the back of each journal is a form for reporting a safety related incident or situation to CIRAS. Alternatively, individuals can use a toll free phone number to report the same information.

**“[CIRAS] journals are a way to keep the system alive”**

The name, address, and phone number listed on these forms or reported by phone is confidential and is not input into CIRAS. Forms are returned to individuals after data is collected. Within a month the report must be input into a National CIRAS database, managed by the CIRAS Charitable Trust.

Professor Muir pointed out that “[CIRAS} journals are a way to keep the system alive” and that people are reading them.

## Feedback

CIRAS generates several reports:

- *National Report*. A semi-annual update on CIRAS database information and new safety concerns relevant to staff in other areas, sent to railway companies and the unions
- Company reports
- Sector topic reports

In addition, responses to previously reported incidents are reported in the *CIRAS Journal*.



## Who Enrolls in CIRAS?

- *Main contractors*; drivers, signalers, safety-critical and safety-related staff.
- Railway infrastructure contractors and subcontractors.
- *Infrastructure staff nationwide*. Since this group of 80,000 is highly mobile, a fourth center, in addition to the three regional centers, will be operational later in 2003.

***“The CIRAS database is audited to ensure confidentiality of reported information”***

## National Standards

Professor Muir said the CIRAS database is audited to ensure confidentiality of reported information. Railway staff are also briefed about security using training videos and manuals, to reassure individuals that their personal data is secure.

## CIRAS Principles

Professor Muir listed the principles governing CIRAS:

- Accept reports from any rail industry employee.
- Accept any safety related subject relating to employee health and any human factors aspects of engineering and operations.
- CIRAS is in addition to company reporting systems.
- Keep personal information of reporters confidential.
- Make personal responses available to employees of participating companies.
- Do not process real time reports.
- Make information the property of the CIRAS National Trust.
- The National Steering Group will determine how CIRAS will operate

***“CIRAS is in addition to company reporting systems”***

## Company Obligations

Professor Muir listed the obligations of companies participating in CIRAS:

- Commit sufficient resources to prepare considered responses to reports.
- Nominate a point of contact from the company.
- Promote CIRAS through briefings and other means.
- Pay subscriptions on time.
- Support the National Steering Group.

## Deliverables

Professor Muir listed CIRAS deliverables to stakeholders:

- Provide managers with safety insights and best practices.
- Provide analyzed CIRAS reports.
- Function as an outlet for responding to individual safety-related issues. Professor Muir said unions believe very strongly in this service.
- Assist managers in prioritizing actions agreed to in safety plans, which contribute to the Railway Group Safety Plan.

## How is CIRAS Used?

Railway company managers and the unions use CIRAS information in different ways:

- *RSSB* uses it to identify underlying deficiencies and trends at an industry level and as input into strategic planning.
- *Unions* use it as a communication tool and to promote a positive safety culture.
- *Train operating companies* use it to see if specific concerns have been addressed after submitting reports to CIRAS, and to share information and best practices among companies.
- *Track maintenance contractors and the London Underground* use it to tackle cross-company issues. Professor Muir said the London Underground found this aspect of CIRAS “extremely useful.”

**“Unions use [CIRAS] as a communication tool and to promote a positive safety culture”**

## How Effective is CIRAS?

A recent independent review of CIRAS effectiveness by an independent market research company found a high level of awareness of CIRAS and its broad purpose.

- Professor Muir said that “overall, CIRAS was seen as independent from the rail companies” and “the confidentiality of the CIRAS organization was never in doubt.”
- CIRAS was generally seen as effective in raising the awareness of safety issues, being a safety valve for staff, and shaming some companies into action.
- There was strong support for the *CIRAS Journal* – it is viewed as very effective and worth the cost.

**“Overall, CIRAS was seen as independent from the rail companies and the confidentiality of the CIRAS organization was never in doubt”**

However, CIRAS *was not always found to be effective* in generating an acceptable response from companies or in resolving issues resulting in tangible improvements.

***“The secret has been getting everyone together at the beginning”***

***“The challenge will be to open CIRAS to more individuals and organizations, at the same time as ensuring that at no stage, data confidentiality is breached ”***

## **Achievements**

Professor Muir pointed to several major achievements:

- Establishing a confidential national reporting system used by thousands of railway staff and supported by industry.
- Establishing trust among the stakeholders.

Professor Muir said “the secret has been getting everyone together at the beginning so they can build the system themselves” and added “this sends a clear message out to employees and industry that the Railway industry cares about safety.”

She continued “the existence and support for a confidential reporting system enables the railway industry to provide a clear demonstration of its commitment to safety to both staff and to the traveling public.”

## **Future Challenges**

Professor Muir noted that as the rail industry changes, so too must CIRAS. She gave the example of contract changes for train operating companies impacting the regional structure of CIRAS.

Other challenges include operating costs; Professor Muir said CIRAS journals are being reviewed to determine if costs can be reduced without any impact on quality.

In conclusion, Professor Muir said that data collection is an on-going process and that the challenge will be to open CIRAS to more individuals and organizations, at the same time as ensuring that at no stage, data confidentiality is breached.

## **BNSF Safety Hotline: Near Miss Information to Create a Safety Working Environment - John Grundmann**

*Assistant Vice President Systems Safety, Burlington Northern Santa Fe Railway*



John Grundmann,  
BNSF

*John Grundmann is Assistant Vice President for Safety and Operations Support at the Burlington Northern Santa Fe Railway (BNSF). Mr. Grundmann is responsible for setting safety improvement and program development strategy, and for the field safety strategy implementation group, the grade crossing safety group, and safety reporting to BNSF and FRA. He is also responsible for dispatcher manpower planning, scheduling, and workload balancing.*

Mr. Grundmann's presentation highlighted the implementation of a BNSF call reporting system.

### **System Safety Hotline**

BNSF implemented a system safety hotline in the early 1990s to provide employees with a voice to improve the company's safety and working conditions. The hotline developed from a periodically reviewed voice mailbox to a live person-staffed call-answering center.

***“The original intention of the hotline was not to solely capture “near misses”***

The hotline was designed to capture calls in several safety categories; policy, contractors (for example, contractors at on-site track work not complying with safety rules), policy problem solving (for example, changing the reimbursement policy for purchasing safety boots), environmental conditions, and quality of life (for example, lighting issues). These categories have since been expanded.

Our goal was to provide a communication channel between front line employees and senior management, to relay their concerns. Mr. Grundmann said the original intention of the hotline was not to solely capture “near misses.” However, they do get one “near miss” call every two to three months, such as a train being switched to a track with another train on it, but which did not result in an accident.

Each of the 13 divisions within BNSF has its own hotline.

Current procedures are unable to provide complete confidentiality, since Federal regulations require the employer to decertify an employee once it becomes aware of an infraction. Some of the calls received could result in employees being ‘decertified’

because of a violation. Mr. Grundmann said “we are trying to get groups to come up with alternative disciplinary actions.”

## **800# Safety Hotline Protocol**

Hotline calls are handled as follows:

1. An employee calls the hotline.
2. A third party receives the call and assigns a case number, so that the employee can call back later or can be contacted (by the third-party person).
3. The third party classifies the call in one of five categories, and forwards the call to the responsible party within the railroad.
4. The responsible party sends written confirmation to the third party once the issue is resolved.
5. A report is generated weekly and sent to senior management.
6. Audits on randomly selected cases ensure that corrections described in the confirmation were actually implemented.
7. Safety-related calls are sifted out from the hotline calls.

This system ensures a short turnaround. Parties responsible have only until the next Friday (up to six business days) to receive an answer. Unanswered calls are included in the weekly reports sent to the senior management and may get “high visibility,” resulting in a “Why wasn’t this answered?!” response.

***“There is less than one failure for every 200 million possible incidents – this is phenomenal!”***

Mr. Grundmann gave the following example of using the hotline protocol to resolve a call. After a crew van nearly backed over an employee, the issue was resolved by rearranging the employee pick-up area so that the van no longer had to back up. Some other situations may not be so easily resolved, but Mr. Grundmann said progress is being made.

## **Benefits**

Mr. Grundmann pointed out the following benefits since the hotline was implemented:

- There are significantly fewer ‘adversarial’ confrontations between groups.
- A measure of the ‘true failure rate’ is that there is less than one failure for every 200 million possible incidents – this is phenomenal!

- The number of calls has dropped from hundreds per week to dozens per week.
- Supervision is more direct.

## Future Challenges

Mr. Grundmann noted there are still challenges for the BNSF hotline.

- With 13 hotlines for the 13 divisions, data can be lost since the system is decentralized.
- There needs to be better agreement on what is a “near miss.”
- “We often don’t get enough information to provide a real and true analysis on a situation to provide the best solution.”

**“There needs to be better agreement on what is a near miss”**

## Next Steps

Mr. Grundmann said that BNSF is looking at the following hotline improvements:

- Request employees to report near miss events on the hotline.
- Capture near miss calls as a separate category or place them in a different database.
- Problem solve near misses for “best practices” solutions.
- Distribute reports to all affected locations and employees.

BNSF is also looking at partnering with other railroads to pull together resources and identify trends from aggregated information.

Mr. Grundmann said even though event recorder downloads have been used more punitively in the past, they can also be used as a diagnostic tool to determine equipment problems as well as procedures.

## Panel Discussion

**“The investigators found out that no one will give out names – an effective wall!”**

After concluding their presentations, the speakers formed a panel and answered questions from the audience. Questions are identified by stakeholder group.

*Q: (Industry participant to Aidan Nelson) You said that 2,500 reports were collected. Have you seen any trends, yet? Also, if a lawyer requests information, are you obligated to give it?*

*A: We have done a basic analysis on the data. The two reports provided on the CD (for this workshop) provide our findings so*

far. On the lawyer question, the issue has not come up in civil suits. There have been more legal investigations. The investigators found out that no one will give out names – an effective wall!

*Q: (Union participant to John Grundmann) You mentioned that there was a maximum of 14 days before something could be taken care of? Can you explain?*

A: This is the maximum period of time that a call can go on the report without being addressed by senior management, but not necessarily taken care of. However, I have never seen an item linger on a report.

*Q: (Industry participant to John Grundmann) Can you address whether your reporting system is adding to the complexity of the procedures in your railroad?*

A: There is a single rulebook that is getting more complex. This is an issue with us. We plan to do a poll with local engineers then consult with the FRA to stay in compliance.

**“I wish that executives had to see people telling families of losses”**

*Q: (Industry participant to Aidan Nelson) Is there one U.K. operations rulebook?*

Yes, but it is complex and over 250 pages.

*Q: (Government participant to Aidan Nelson) Since the privatization of British Rail, there have been well-publicized accidents, but really no incidents have taken place. What do you attribute safety improvement to in the last decade?*

A: We had a major accident in the 1980's. A lot of initiatives went into place in 1994. We have made progress in many areas. We are now a lot smarter with human factors in accidents. I wish that executives had to see people telling families of losses.

(Helen Muir) Generally, we have understood more of how to make safer systems. Engineers have become better in understanding what makes a safe system. We're now working on human factors. The data has helped a lot.

*Q: (Union participant to John Grundmann) I am interested in Aidan and Helen's program because the response could be monitored and the program could be made better from those responses. Does BNSF's system have this same level of monitoring?*

A: It has, but it is not as rigorous. There are no formal quality checks. It is done through the third party. When the third party was brought on, training was tight to get them up to speed on the knowledge of railroad terms, issues, and so forth.

**“You must bring the third parties to the same knowledge level for the system to work”**

(Helen Muir) – You must bring the third parties to the same knowledge level for the system to work.

*Q: (Government participant to John Grundmann) To get ‘buy-ins’ from the railroad industry in developing their database, which is the driver that develops memorandums of understanding?*

A: The Safety department is the driver, separate from the operations department.

*Q: (Industry participant to John Grundmann) You mentioned that the 3<sup>rd</sup> party sifted through calls to get safety related calls. With responsibility delegated out, how much control did you have?*

A: The first step is safety team meetings. The escalation process went to the hotline if the issue wasn’t resolved.

*Q: (Industry participant to John Grundmann) Most investigations are what type?*

A: Facility.



## 5. DISCUSSION GROUPS

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Four discussion groups, each representing a cross section of all stakeholders, met separately to discuss a series of questions related to close calls.

A facilitator from the Volpe Center led each group discussion and note takers, also from the Volpe Center, recorded the discussion. To help identify trends, the note takers also identified the stakeholder group (government, industry, union, or academic) where appropriate, not the individual's name.

The four groups each discussed the following questions:

- What lessons were learned from the workshop speakers?
- What are the benefits to understanding close calls?
- What are the barriers to understanding close calls?
- What are the next steps to understanding close calls?

Discussions were lively in all groups as facilitators encouraged all participants to share their points of view and concerns.

This section summarizes the combined responses from each of the four discussion groups to these questions. Comments are grouped by theme. Quotation marks and bulleted comments are quotes from individuals in the discussion groups. They represent exact quotes, except where changes were made to improve clarity or protect the speaker's anonymity.

See the appendices for the detailed responses to questions on which this summary is based.

### Overview

Speaker presentations generated a high level of audience interest in what could be accomplished with a close call system for the railroad industry.

All groups agreed that *an organized approach to sharing information about close calls* will be useful, and the right thing to do. The benefits will transform a reactive system to a proactive system. There will be a culture change from an industry that blames individuals for close calls and incidents, to one that focuses on a system that learns from information on close calls and makes

improvements to address accident precursors and therefore improves safety.

Common themes among all groups included:

- Track problems and create a close calls database. “This is the right thing to do!”
- Obtain commitment and buy-in from “each leg of the stool” (three stakeholder groups: labor, industry management, regulatory).
- Develop a pilot close calls program using new model or an existing working model.
- Educate all stakeholders by disseminating lessons learned on an ongoing basis.

The following comments are grouped into three main sections.

- Benefits of Understanding Close Calls
- Barriers to a Close Call System
- Implementation Issues

Many issues (i.e., trust) were simultaneously identified as barriers to a new system, issues to address in implementation, and benefits to be gained, if a successful system is achieved. It is an incremental process. As the system is established and used in a pilot, small steps will be taken that build confidence that change is possible. With that added confidence, more growth and risk-taking is possible.

What follows are a series of brainstormed comments, grouped together for relevancy. They may not be fully clarified or elaborated.

## **Benefits of Understanding Close Calls**

### **Improved Collection of Data on Close Calls**

There is currently no comprehensive way to capture close call information. A close call system will uncover a higher percentage of incidents from all perspectives. It would gain data otherwise lost from cover-ups/forgetting. It is desirable to “debrief the crew to identify large and small issues.” There is a need to have a system in place to talk about issues confidentially “to enable a cathartic change”.

## **Close Call Incident Analysis Will Provide More Information and Better Solutions**

According to participants, by collecting and analyzing close call data railroads will be able to “pay attention to problems and enable better solutions.” Multiple reports on the related close calls will give a sense of the scope of the problem, “identify systemic issues/problems and identify patterns”.

The system will enable the discovery of precursors and root causes of accidents and incidents. By providing accurate information it will be “easier to identify true causes and reduce the pursuit of ‘red herrings’ under the present system. The punishment associated with reporting can result in the intentional misreporting of events.” “We will benefit from identifying real problems and pursuing real solutions, cost effectively, rather than red herrings wastefully.”

Through better understanding of risks the industry will uncover better solutions, resulting in data-driven decision making. The industry then will be able to “target resources to biggest problem and help to set priorities.”

A close call system helps identify system deficiencies, and also what works well. With information on close calls, railroads “can identify why the close call did NOT become an accident.”

Anecdotal evidence can provide lessons learned. Close calls “allow industry to identify best practices.”

## **Improved Safety**

Close call systems help improve safety in a variety of ways. It helps directly -- studying precursors to accidents/incidents has the potential of saving lives and preventing catastrophic losses. Design engineers will learn how to design safer systems.

Indirectly, it “demonstrates [the industry’s] commitment to safety. Having fewer accidents will “improve the image of railroad industry and “increase public trust in railroads.”

## **Safety Culture Change**

According to participants, in order to introduce a close call system, the industry will need to begin making a variety of changes that will in themselves provide a variety of benefits.

- Close call systems “convert a safety program from being a reactive system to a proactive system.”
- Close call systems also “sets up positive professional atmosphere “ and “increases accountability on all levels.”

- Employees will feel more “empowered to make suggestions for change.”
- [The]“system should be built with everyone updating the process and information.”

Close call systems make it all right to tell the truth without the perception of negative repercussions. “This program can break the negative spiral of if you tell the truth, you get disciplined and maybe dismissed.” “The truth does NOT set you free. The truth is held against you, so it breeds liars who will break the law.” In talking about an incident, one participant said, “If there was no penalty for telling the truth, would he have lied? Probably not.”

In the long run, these changes should improve working conditions and therefore, also work attitude and morale.

### **Improved Collaboration and Trust**

Collaboration and trust are also hallmarks of a good close call system. To have a system requires increased trust among all parties.

At the same time, the installation and use of a system over time is itself a “mechanism for culture change from adversary to a team.”

- Increases employee/management trust. “If you don’t have the trust as a foundation, all of this isn’t going to happen in the first place.”
- Changes the culture from FRA being an adversary to being part of a team.
- Enhances cooperation between labor, management, and FRA and builds consensus from top to bottom.
- Results in increased level of trust. If people trust each other they’re more likely to report problems without fear of reprisals. “People have to have faith and get into real issues.”
- Results in “better use of manpower if part of a team”.
- Allows stakeholders to focus on training time and resources since they trust information (*a key issue for one discussion group*).

### **Better Communication and Sharing of Information**

There is a need for better communication that is only possible with more trust. More trust will subsequently bring more open and honest communication.

- There should be better communication among railroads.
- There is an opportunity to tap knowledge, resources, and expertise in industry.
- “If we have an open work place with [shared] goals of improvements it would be a benefit.”

There is also a strong and related desire to share lessons learned, in order to avoid repeating the same mistakes. Suggestions included:

- Publish useful information, not just information in a database, using a formal process (i.e., lessons learned in CIRAS Journal).
- Recognize that other countries have the same problems; discover best practice from international sources.

### **Improved Cost Savings and Use of Resources**

Additional benefits will appear as better business practices through better resource allocation.

- Safety contributes to the bottom line, not just as a cost - follow the U.K.’s example; once safety is realized, benefits follow.
- Prevention means less time lost on job and saves money (industry).
- Avoids litigation. Cost savings in insurance/legal claims - fewer claims paid out; less loss of life and injury.
- Operating efficiency and decreased repair costs.
- Doing business better may lead to more autonomy.
- Industry and unions can see business benefits --“A proactive response to learning leads to less regulation.”

### **Barriers to Introducing and Using a Close Call System**

This topic generated the most discussion among all groups. Although many concerns were expressed, the groups did not consider them to be insurmountable obstacles.

Some of the barriers are translated into implementation strategies, such as need for top-level buy in and policies relates to defining and handling close call information. Common barriers were the following.

#### **Need Rule Waivers**

There exist serious legal impediments to implementing a close call system in the current environment. Any progress will require a change in regulations.

FELA is a fault-based system. There is a perception of the “blame game” with everyone blaming everyone else for accidents.

One participant stated, “Right now, if I see that someone is speeding, then I *have* to decertify him. Are there other ways around it?” FRA will need to “give relief on the punitive part of CFR240 – there needs to be a cooperative spirit.”

One industry participant said, “[I would] prefer to talk to a jury saying that I am aware of this situation [safety injury situations] and am trying to resolve them, than say we know nothing about it.”

### **Need a Culture Change**

There is a need for new paradigm to balance substance and procedures. There is a long history of distrust among all parties. “There is a lack of trust, integrity, and patience.”

The following table reflects comments made at the workshop regarding how the three stakeholder groups view each other.

### Stakeholder Perception of Each Other: Sample Comments

Stakeholder	FRA	Industry	Labor
<b>FRA perception of:</b>		<p>Railroads don't want anyone in their business.</p> <p>There is a huge bureaucracy of railroads.</p> <p>I can't see how a railroad like ___ can implement things if they "lose things" as it is...</p>	<p>It is hard to move from an adversarial stance of a "them versus us" culture and a long term "code of silence."</p>
<b>Industry management perception of:</b>	<p>Most transportation people don't trust the FRA</p>	<p>There is a history of inaction and a long line of failed programs</p>	<p>Employees think everything is to be blamed on working conditions.</p> <p>According to a manager from industry, labor leaders "take away [more] control" than the industry would like."</p>
<b>Labor perception of:</b>	<p>Most transportation people don't trust the FRA.</p> <p>There is a perceived self-interest of regulators by unions.</p> <p>There is a fear of regulations and increased audits.</p> <p>A current militaristic disciplinary process.</p>	<p>Humans will err, but industry thinks <b>everything</b> is a human factor. Industry says, "it's the employee's fault".</p> <p>Unions are concerned about internal punitive actions.</p> <p>First Line supervisors will beat up on me.</p> <p>Management focus on statistics.</p> <p>Workers fear litigation if they report close call.</p>	

Some of the other rifts are between employees and management in all groups. "Then there is also trouble between railroads (i.e., Short lines and Class lines)."

One participant said, "We need an independent third party [to facilitate] since it's difficult to move away from the traditional adversarial stance."

## **Risks to Confidentiality**

Everyone agreed that even though confidentiality would be hard to achieve it is very important. There were fears about breaches in confidentiality and the resulting impact, especially since confidentiality has been breached in the past. Participants said they want to protect information from attorneys (as part of discovery), punitive use by railroads or Federal agencies, and the media.

“True confidentiality is hard to achieve, there would have to be quality control.” “The third party collecting data should be getting data not specifically for one company, but for the different major carriers, so they don’t know where the incidents happened.”

## **Safety Not Rewarded by Industry in Ways that Count**

Some believe that, “Safety is not on the decision maker’s scorecard; [performance evaluations is] measured on productivity more than safety.” “The conflict is that performance is measured on productivity – the trainmaster is told to get that train out!”

“Some CEOs want to reduce number of injuries to make statistics look better. The result is a cover up.” In some railroads, “managers are rewarded for reported safety statistics. This creates incentives for not reporting incidents.”

## **Individual Resistance to Change**

There was concern that “most workers are unwilling to change.” Each person will want to know, “what’s in it for me?”

There was also concern that some resistance may be due to a belief that there will not be a long-term commitment to close calls. The industry has a history of failed programs. “I don’t think the union would buy into the program, they would think it is the ‘flavor of the month’.”

## **Funding/Resources**

There were a variety of concerns about the resource implications of instituting a close call system.

- Initial loss of productivity
- We need financial support - who will pay?
- Will we spend more money on safety? This may displace other safety activities
- Lack of technology to collect data



## **Measuring Return on Investment**

It seems important to be able to document the business benefits of other close call systems. We “need to build a different business plan for each of the stakeholders.”

When running a pilot project, use it to prove the business benefits of a close call system for the railroad industry. “If you cannot make the business case (benefit) you cannot sell the system.”

According to an industry representative, we “need OBJECTIVE info to “sell” to senior management -- ‘You are asking me to spend money and can’t tell me if the program is successful? -- You have to objectively prove that it will work!’ ”

Some felt that “it may be difficult to apply lessons learned from airlines to railroads. Methods of operation are different and potential benefits to railroads less than airline benefits.” For example, “in the airline industry, if something goes wrong, the rest of the system doesn’t shut down (for example, a hydraulic pump on a plane doesn’t shut down the hydraulic system in the plane – there is usually a ‘back up’ system that keeps the plane running). In the rail industry, if something goes wrong, the system shuts down in ‘safe-mode.’ This might affect implementation.” An academic rebutted these comments by saying “Pilots still break rules.”

## **Implementation Issues**

All groups, although concerned about the potential barriers to success, recommended that the industry should go forward and consider incorporating a plan to reduce and overcome barriers.

### **Critical Success Measures for Close Call System**

Even though discussion group remarks were very diverse, several key critical success measures were repeated across all groups.

- Obtain stakeholder buy-in
- Develop a model pilot program
- Simplify rules and guidelines
- Improve collaboration and trust
- Improve ongoing communication and sharing of information

The following issues related to the suggested next steps in creating a system for understanding and analyzing close calls.

## **Obtain Stakeholder Buy-In**

All agreed that to move forward we “need buy in from EVERYONE.” The following suggestions were made:

- Top management support from all stakeholder groups is critical; sell the idea to the CEO.
- According to a union representative, there is a need to “facilitate local worker involvement. We need people on the ground to buy in and feel trust and be part of the process.”
- Also need top/middle/bottom buy-in.
- First line management can help solve problems. In the U.K., middle management is a barrier to coordination between boardroom and shop floor.
- “Get buy-in from the FRA from the get-go.”
- “We have someone governed by FTA. They [the FTA] probably need to be represented here, as well.”

There was a difference of opinion about whether to solicit support from Congress to address liability issues. An industry representative said, “we need to have Congress pass a mandate to drive this program. When someone said, “no, we don’t want Congress to mandate it to the FRA.” The response was “we three need to come together first, then go to Congress to get their support.”

Not only is there a need for participation by all stakeholders, there is a related hope for “equality/parity by all stakeholders.” Also, all stakeholders need to be involved from the beginning.

- There was also support to identify individuals or a small team, including all stakeholders, to champion the system. We “need a champion within the industry, who will push it through ‘thick and thin’.”
- The participants also felt that, we need “mutually beneficial solutions”. “Customize ‘what’s in it for me’ to each stakeholder.”
- Encourage risk taking as first step. Next, help stakeholders become committed to change and participate actively in it.

## **Develop a Model Pilot Program**

The following issues were identified as needing to be addressed in planning a close call pilot system.

### *Establish pilot site(s)*

- “See if you get any takers for a pilot program.”  
Consider pilot programs in different venues/locations

(e.g. short lines, Class 1, passenger, switching).  
“Identify individual to “find” and broker a close call system and set up framework.”

- Use aviation industry for benchmarks/case studies; “Don’t reinvent the wheel - use FAA GAIN Program as guide.” “The U.K. CIRAS model is valuable for setting up close calls across the railroad industry and share information.”
- “Move away from passenger versus freight – every program has failed when we try to split them up. We have to do it, together,” said a union representative.

### *Get commitment and agreement from all stakeholders*

- When developing a pilot test program, “obtain commitment/buy-in from top management of all stakeholder groups.”
- “Get an agreement of the mission statement of the goals of the pilot program from all stakeholder groups.”

### *Use other organizations as models*

- Understand which government programs are successful and pass on this information.
- Look at NTSB as a model -- they don’t prevent, they investigate using retrospective studies and safety teams. They have a different data collecting process, but their information is good

### *Learn from our own experience in this area*

- “Coordinate with other efforts already underway. We do have safety culture committees in the northern region of my railroad...they have employee evaluation forms done anonymously by other employees that try to uncover worker issues. We use it for testing, programming and training.”
- Form groups to look at existing data to identify problems (e.g., SOFA (Switching Operations Fatality Analysis), SACPs (Safety Assurance and Compliance Programs), RSAC (Railroad Safety Advisory Committee)

### *Set expectations up front*

- “Don’t look for too much right away. Start small; build from successes. If you start big, there will be too many problems at the start. If we start small, we will be able to gradually build on it.”

- What is an objective measure of success? Research “how to measure success”; we need an objective way.

### *Keep stakeholders involved throughout pilot*

- “We need a summit meeting of stakeholders to keep this going. FRA is the governor.”
- Identify the process and resources required. “The government pays for initial phase.” “Develop a Memorandum of Understanding between unions, management, and FRA.”

### *Collect lessons learned*

- Compile lessons learned study across and within industry to show value of the system. “Best practices are out there but not nationwide”.
- Include cultural problems in lessons learned.

## **Determine Data Collection Mechanism**

There were many suggestions related to data collection issuers.

### *Information to collect*

“Systematically collect data about close calls so it can be seen that certain situations would help other systems having the same types of issues.” Determine data needed and how it will be used. There needs to be specifics on what type of data needs to be collected, an objective way to show the information collected. Collect information on:

- Why the close call occurred
- Why is it acceptable to co-workers and managers
- Frequency of occurrence
- Where and when does this occur
- Type of equipment
- Worker profile

### *How to collect data*

Develop standardized operating rules and procedures (template) for capturing all relevant information on incidents and train people in utilizing these procedures.

### *Address confidentiality issue*

- Address data liability and confidentiality issues – “truthful reporting is not a numbers game.” Data should be administered by third party outside the industry to “push beyond the barriers”. This could be either an outside academic consultant, such as Aidan Nelson, or

government agencies, such as USCG, FHWA/FTA/Volpe. The third party should be non-regulatory and non-enforcing, and have some railroad knowledge.

- Get reporters of close calls to do it truthfully [by good forms and training]. “I don’t think that these guys are ‘liars.’ It [incorrect information] is often due to ignorance of how to fill out forms, confusing fields, non-uniform filling out of things”.

### *Use a third party to collect data*

- Have third party document best practices. “There are places that you can identify by the type of situations -- everyone will know which facility the incident occurred at.”
- “How do you know if data is legitimate?” There was concern expressed for legitimacy of data reported, quality control - people might turn others in if they are mad at them. Anticipate how to test the system.

## **Need Close Call Definitions**

Participants had questions about what fits the close call definition.

- A “close call” is subjective in eyes of person – what is a close call? People have options in defining it. They have to decide whether it is more beneficial is to call an incident a “close call” or “injury.”
- An industry representative asked, “How do I know if info applies to my railroad” “If the information gets to a national level; how do I know if it applies to my company?” Another responded, “set process to see if it will apply to your company; ask people on the ground if it’s a problem in their company and will this information help them.”
- “Set up operating rules nationwide.” There is a lack of policy specifics relating to close call information. Another said, “One size does not fit all.” There are many technical differences between companies; this means some companies have a data advantage over others.

## **Adapt or Improve Rules, and Policies and Guidelines**

There were many comments related to this area throughout the workshop.

- Get rid of autocratic regulations. Agencies need to take a look at the rules that are really successful. We need a “no reprisal” system for employees; for example, work with FRA about making 49CFR 240 more flexible.
- “There is tension between the pursuit of safety and production objectives,” said by an industry representative. [Reassess Human Resources programs and] reward managers for improvements in safety.
- Need better operating procedures/processes. Rules need to cover each close call scenario. Evaluate problems with policy and procedure. Need to simplify practices. Rules are complex and operators have information overload. Make it easier to understand written rules.

### **Improve Training**

A number of training issues were raised, many related to recent changes in the industry.

- Promote training for continuity and follow-through.
- Training is more of a challenge now than it has ever been. With a smaller number of crews there are fewer resources for new employees. Industry is also changing from “old heads”, with a history of generations of families working for the railroad, being replaced by those with no family railroad employment history with people with whom they could learn and discuss issues.
- According to an industry representative, “Twenty years ago the FRA published investigative accidents but they no longer do this. This needs to be reactivated so everyone knows what’s going on and can use information as training tool on railroad safety. These reports identified the railroads by name; in the future name should not be included.”
- Don’t assume all operators have the same knowledge base. Include operational instructions or job briefing.
- There is a need for team building to help build consensus and foster two-way communication.

### **Provide Ongoing Communication**

Disseminate safety diagnostic information faster and to lower levels within organization. Communication tools that were suggested include the following.

- Web site
- Newsletter
- Regular meetings

## Themes by Stakeholder Group

Participants represented their own interests in their discussions, yet opinions tended to be shared across stakeholder groups. All groups talked about conflicts and lack of trust, needing mutually beneficial solutions, individual's resistance to change, and the need for keeping data confidential.

However some clear differences were apparent, most of which are quite predictable and reflect the current state of distrust and resentment.

- *Labor* and *industry management* participants talked equally about wanting a cooperative spirit and fewer regulations, disliking FELA, and needing a third party to manage a close call system
- *Labor* participants talked extensively about being punished for telling the truth and wishing they didn't have to falsify reports out of fear of reprisal. They talked more about the conflicting rules and disliking their complexity.
- Of all the groups, *labor* was most concerned with the lack of trust between management and employees, and the need for team building, consensus throughout the organization on decisions, and better two-way communication.
- *Labor* participants disliked the punitive discipline process that leads to a fear of punishment and litigation, talked the most about loss of lives, and were concerned about the difficulty of transferring lessons learned from other industries.
- *Industry management* participants wanted more professionalism and efficiency -- saving time and money. They were frustrated with the difficulty of "selling" ideas to senior management, and saw a history of failed programs. They saw rules as generally helpful.
- The only concern that stood out for regulators was not wanting to waste time studying the wrong thing,





## 6. RECOMMENDATIONS

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### Workshop Observations

The number of participants attending the workshop surpassed the Planning Committee's expectations; they expected one third fewer participants. Based on participants' reactions and comments, the Committee called it "a successful close calls workshop." They had expected more resistance from workshop participants to the use of a close call system.

*"This is the opportunity to move forward"*

While the different stakeholder groups expressed concerns, all stakeholder groups expressed an interest in moving forward. The Planning Committee noted the strong support across the board. Participants made several suggestions, for example, overcoming regulatory hurdles such as CFR 49 Part 240; a prerequisite to reporting events associated with rule violations.

The Planning Committee announced their commitment to continue to help the railroad industry study close calls and stressed, "this is the opportunity to move forward."

### Key Recommendations

The Planning Committee made three key recommendations.

#### Obtain Buy-In from Stakeholders Managers

Just as the Planning Committee briefed their managers in the fall of 2002 to obtain buy-in for this Close Calls Workshop, workshop attendees must brief their senior managers on what they learned at the workshop and "sell" the close calls concept.

*"Workshop participants...need to be champions in their own organization if this approach is to successfully move forward"*

Workshop participants have all become part of a process. They need to act as champions in their own organization if this approach is to successfully move forward.

#### Prepare an Executive Briefing for Stakeholder Leaders

The Planning Committee will prepare an executive briefing to inform leaders in the railroads, regulatory agencies, and labor

unions about close calls and obtain their commitment to the process.

Some of the topics suggested for the briefing were:

- Addressing the “Catch 22” nature of willful violations specified in federal regulations, where people who report information are punished for reporting their close call.
- Explaining how safety-related decisions are often driven by erroneous data, due to the punitive nature with which the information is also used, and the subsequent failure of reporters to give accurate information.
- Discussing the impact of the expected retirement of a significant percentage of the experienced workforce within the next seven to 10 years. System safety will be adversely affected without the knowledge of those experienced workers. Close call reporting offers an opportunity to begin to capture that knowledge.

The executive briefing will include a candid discussion about what can and cannot be achieved within a given period of time.

### **Initiate a Pilot Close Calls Project**

The Planning Committee stated that workshop speakers made a strong case for a close call system and there were models from which the railroad industry could follow and learn.

There was support from all discussion groups to move ahead slowly with a pilot project on an experimental basis.

- *Scope.* Although the scope of the pilot project was not defined, the committee agreed that it was a good next step, giving the railroad industry the opportunity to try out a close call system on a small scale.
- *Testing.* Users will be able to test whether or not a confidential, non-punitive system is possible and can improve safety in the railroad industry. All committee members hoped that a pilot would be the beginning of a larger process.
- *Location.* The Planning Committee will find a pilot location to pilot test the model.
- *Regulatory Concerns.* There are certain regulatory hurdles that need to be addressed through a waiver process before the pilot can move forward. The Planning Committee will work with the FRA’s Office of Safety in supporting non-punitive reporting of safety-related information by railroad employees. This would include addressing locomotive engineer concerns about

**“There was support from all breakout groups to move ahead slowly with a pilot project”**

decertification when reporting, so that engineers are not liable when they talk about close calls that would otherwise not be reported. This will build trust and confidence in the pilot reporting system.

### **Continue Planning Committee Meetings**

The Planning Committee will continue to hold meetings to plan and oversee the rollout and management of the pilot. They will also be responsible for periodic updates and progress reports.

### **Conclusion**

***“Get the message out to stakeholders at all levels”***

The FRA’s Tom Raslear concluded the workshop with the following comments:

“The workshop far exceeded my expectations for what the outcome would be.”

“Get the message out to stakeholders at all levels. Build momentum, otherwise it ultimately will not succeed.”



# **APPENDICES**



## **APPENDIX A. FRA WORKSHOP INVITATION**

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U.S. Department of Transportation  
Federal Railroad Administration Administrator  
1120 Vermont Ave NW  
Washington, DC 20590

Dear Colleague:

A strategic goal of the Federal Railroad Administration (FRA) is to promote safety by working toward the elimination of rail-related fatalities, injuries and incidents. Railroads can reduce risk before an accident by systematically studying "close calls." Accidents are often preceded by close calls that provide a warning of an impending accident. A close call is "an opportunity to improve safety practices in a situation or incident that has a potential for more serious consequences." When individual close calls are analyzed collectively, railroads can identify safety hazards and develop solutions to these hazards before an accident happens. Analyzing close calls is a proactive way to manage safety. Because FRA believes that this proactive safety technique has significant potential for enhancing safety in the railroad industry, I invite you to a workshop entitled, Improving Safety through Understanding Close Calls.

Members of the Close Call Planning Committee, composed of railroad labor crafts and industry management, have worked together during the last seven months to design this workshop. The purpose of the workshop is to engage all the stakeholders in the railroad industry in a dialogue on the benefits and challenges in developing and operating a close call database. The FRA's Human Factors Research Program is sponsoring this workshop with support from the Office of Safety and the Volpe National Transportation Systems Center. The workshop will take place Wednesday, April 23 and Thursday, April 24, 2003, at the Baltimore Hyatt Regency.

A close call system is not intended to be a regulatory program. The Workshop will provide an opportunity for senior industry stakeholders to learn the value of studying close calls and the challenges posed in setting up and using this information. This workshop will focus on the voluntary and confidential use of close calls within a railroad to pro actively identify factors that contribute to unsafe events.

The enclosed brochure and White Paper provide additional information. I look forward to a productive dialogue and meeting with you at the workshop.

Sincerely,

Allan Rutter  
Administrator





## **APPENDIX B. WORKSHOP AGENDA**

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### **Wednesday, April 23**

- 12:00 P.M. Registration and Refreshments
- 1:00 P.M. Welcome  
Tom Raslear, FRA, Office of R&D  
Jo Strang, FRA Deputy Administrator for Railroad Development  
  
John Goglia, NTSB Board member
- 1:45 P.M. Panel 1 -- Lessons Learned from Close Call Systems  
Keynote Speaker: Christopher Hart, Assistant Administrator for System Safety, FAA  
(Break at 2:35)
- 2:50 P.M. Captain Hank Krakowski, Vice President for Corporate Safety, Security & Quality Assurance, United Airlines  
Don McClure, Air Safety Coordinator, Air Line Pilots Association  
(Break at 4:05)
- 4:20 P.M. Panel 2 -- Lessons Learned from Existing Rail Initiatives  
Aidan Nelson, Director, Policy & Standards, Rail Safety Standards Board, UK  
Helen Muir, Professor Aerospace Psychology, Cranfield University, UK  
John Grundmann, Asst. Vice President Systems Safety, Burlington Northern Santa Fe
- 6:00 P.M. Wrap-up and Close followed by Reception

### **Thursday, April 24**

- 7:30 A.M. Continental Breakfast
- 8:30 AM Welcome to Day 2
- 8:40 A.M. Breakout Group Dialog among Railroad Industry Stakeholders:  
Benefits and Challenges of Understanding Close Calls  
(Break at 10:15)
- 11:45 A.M. Breakout Groups Report Out in Large Group
- 12:25 P.M. Lunch
- 1:15 P.M. Planning Committee Panel
- 2:00 P.M. Wrap-up and Close



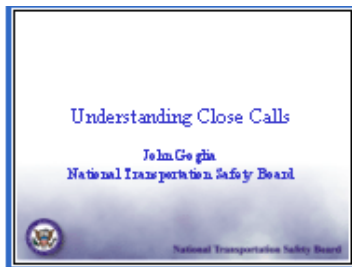
## **APPENDIX C. SPEAKER PRESENTATIONS**

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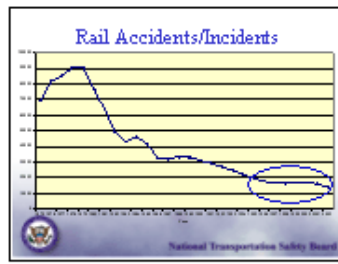
- John Goglia
- Christopher Hart
- Hank Krakowski
- Don McClure
- Aidan Nelson
- Helen Muir
- John Grundmann

*Note: for full page presentations, go to [WWW.CLOSECALLSRAIL.ORG](http://WWW.CLOSECALLSRAIL.ORG).*

## John Goglia – Understanding Close Calls

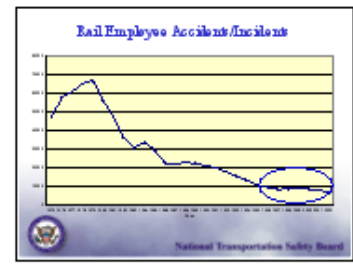


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## John Goglia – Understanding Close Calls ...continued

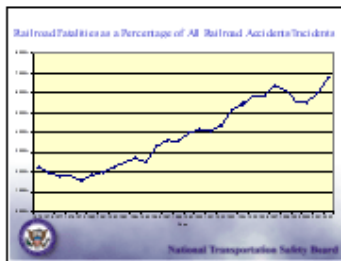
Industry Safety Improvements

- State Oversight of Railroad Transit Safety



National Transportation Safety Board

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11

Future Improvements

- Close call: an opportunity to improve safety practices based on a candidate incident that has the potential for more serious consequences.



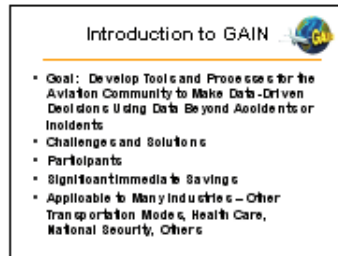
National Transportation Safety Board

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# Christopher Hart – Global Aviation Information Network (GAIN)



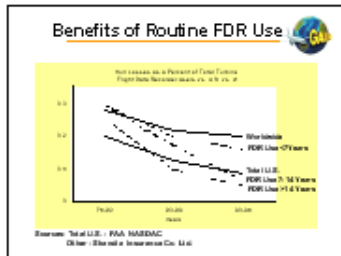
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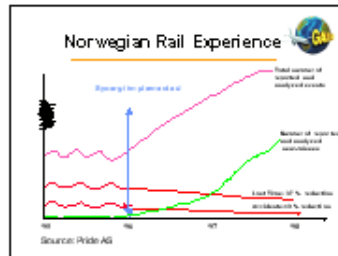
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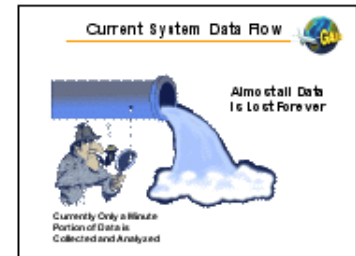
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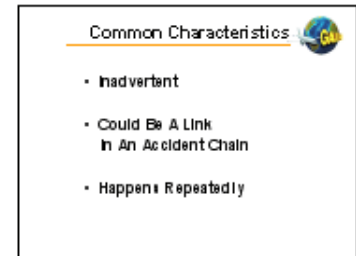
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# Christopher Hart – Global Aviation Information Network (GAIN) ...continued

So Should We... 


- Regulate More?
- Punish More?
- Increase Training?

**OR...**

**Share Information to Fix the System?**


☰

10

Fix the Person or the System? 


Is the Person Clumsy?

Or is the Problem ...

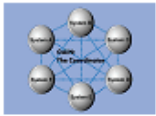


The Step???

11

GAIN is: 

- A network – **NOT A BIG CENTRAL DATABASE**
- Privately owned and operated
- An international cooperative effort
- Voluntary




12


Former FAA Administrator Jane Garvey: 

**"GAIN is one of our best hopes for enhancing aviation safety in the next century."**


GAIN III World Conference  
November 1988

13

Information: The Fuel for Our Engine 




14

Concerns That Discourage Collection and Analysis 

- Public Disclosure
- Job Sanctions and/or Enforcement
- Criminal Sanctions
- Civil Litigation

15

Shifting the Paradigm 

How It Is Now	How It Should Be
You are highly trained	You are human
and	and
If you did as trained, you would not make mistakes	Humans make mistakes
so	so
You weren't careful enough	Let's also explore why the system allowed, or failed to accommodate, your mistake
so	and
You should be <b>PUNISHED!</b>	Let's <b>IMPROVE THE SYSTEM!</b>


☰

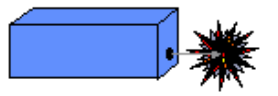
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Challenges 



17

Is This Light Random? 



18

# Christopher Hart – Global Aviation Information Network (GAIN) ...continued

Is This Light Random?

19

Accidents Result From a Combination of Events

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20

Information Overload

21

All Accidents Involve Human Factors

- Pilots
- Air Traffic Controllers
- Mechanics
- Cabin Crew
- Dispatchers
- Ramp Personnel
- Airport Operators
- Manufacturers
- Designers
- Management: Agency/Corporate

= 100%

22

GAIN Provides:

Tools and Processes to Help Aviation Community Members Use Their Data Better

23

GAIN Organization

24

Steering Committee

- Airlines
  - JetBlue (Chow)
  - Alaska Airlines
  - American Airlines
  - Middle East Airlines
  - Japan Airlines
  - Air Transport Association
  - Int'l Air Transport Association
  - Regional Airline Association
- Manufacturers
  - Airbus
  - Boeing
- Labor
  - Air Line Pilots Association
  - Int'l Association of Machinists & Aerospace Workers
  - National Air Traffic Controllers Association
  - General Aviation
  - National Business Aviation Association
  - Helicopter Association Int'l
  - U.S. Military
  - Flight Safety Foundation

25

Working Groups

- Working Group A
  - Aviation Operator Safety Practices
- Working Group B
  - Analytical Methods and Tools
- Working Group C
  - Global Information Sharing Prototypes
- Government Support Team (GST)
  - Several Countries, JAA, European Commission, ICAO
- Working Group E
  - Flight Ops/ATC Ops Safety Information Sharing

26

Moral: Joint Effort Required

All Segments of the Industry Must Work Together

- Management
- Labor
- Manufacturers
- Governments

27



## Christopher Hart – Global Aviation Information Network (GAIN) ...continued

Many Have Already Begun The Process



Sharing

Foundation: Collecting and Analyzing

• Airlines  
• Manufacturers  
• States  
• Countries

28

Savings



OPERATIONS & MAINTENANCE

Investigate Accidents

29

Others Who Are Interested

Transportation Department

- Coast Guard, MARAD (IMISS)
- Highway Administration
- Railroad Administration
- Pipeline Safety

30

Others (cont)

- Critical Infrastructure Assurance Office (CIAO)
- Nuclear Power
- Chemical Manufacturing
- Public Utilities
- Firefighters
- Health Care Industry

31

The Health Care Industry

To Err Is Human:  
Building a Safer Health Care System

"The focus must shift from blaming individuals for past errors to a focus on preventing future errors by designing safety into the system."

Institute of Medicine, Committee on Quality of Health Care in America, 1999

32

The Future:

**Role of GAIN**

In

**Security???**

33

Want To Get Involved?

**Next GAIN World Conference:**  
**Rome, June 18-19, 2003**

Sponsored by



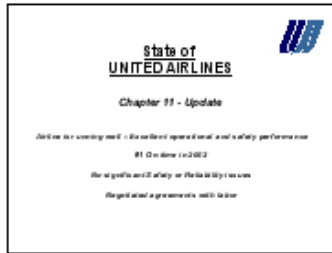
[www.gainweb.org](http://www.gainweb.org)

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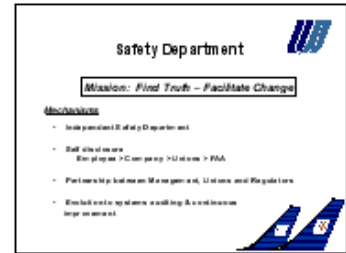
# Hank Krakowski – United Airlines Safety Culture



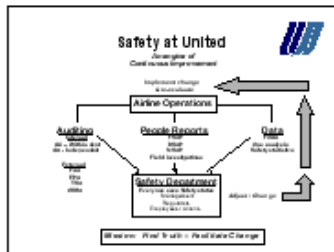
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## Hank Krakowski – United Airlines Safety Culture ...continued

**Safety Program I – Flight**  
*John P. A. Smith*

**Quality Assurance Auditing**

**Shift in Philosophy**

**Compliance police / (Traditional)**  
**Systems & Processes (ISO 9000)**  
**(QAR / QAR and Safety Review Team)**

**Identify:**  
- How can we do it better?  
- How can we do it better?  
- How can we do it better?





10

**Safety Program I**  
*John P. A. Smith*

**Quality Assurance Auditing**

**QAR / QAR**

**Engine failure**  
**QAR / QAR**

**Final Decision / QAR**

**Checklist**  
**Checklist**

**Checklist**  
**Checklist**




11

**Safety Program I**  
*John P. A. Smith*

**Quality Assurance Auditing**

**QAR / QAR**

**Full FAA / FAA**  
**Full FAA / FAA**

**Full FAA / FAA**  
**Full FAA / FAA**

**Full FAA / FAA**  
**Full FAA / FAA**




12

**Safety Program I – Flight**  
*John P. A. Smith*


**FSAP – Flight Safety Awareness Program**

**Provides atmosphere for open and honest discussion**

- Management
- Crew
- FAA

**Provides protections for Company & Crews (unless willful / disregard or intentional)**

**Requires solid agreements & understandings between unions / management / FAA**

13

**Safety Program I – Flight**  
*John P. A. Smith*

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**Safety Program I – Flight**  
*John P. A. Smith*

**FSAP – Flight Safety Awareness Program**

**Provides atmosphere for open and honest discussion**

**Provides protections for Company & Crews (unless willful / disregard or intentional)**

**Requires solid agreements & understandings between unions / management / FAA**







15

**Recent FSAP / ASAP example**  
*John P. A. Smith*

**DEAF (Delayed Flight / Air Safety)**

- Very successful
- Provides a safe environment
- Provides a safe environment
- Provides a safe environment

16

**Safety at United**  
*John P. A. Smith*



**Diagram illustrating the safety process:**

**Aviation Operations**  
**Aviation Operations**

**Aviation Operations**  
**Aviation Operations**

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**Aviation Operations**

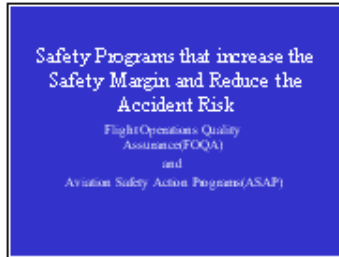



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# Don McClure - Safety Programs that Increase the Safety Margin and Reduce the Accident Risk



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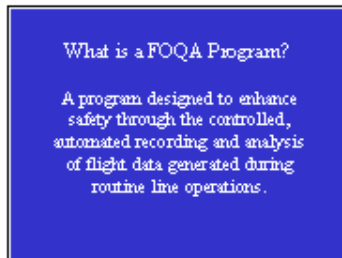


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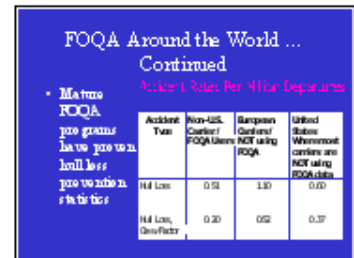
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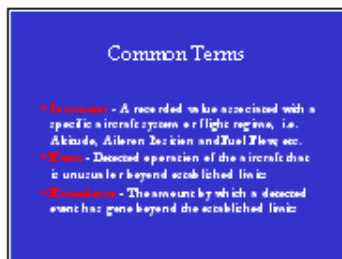
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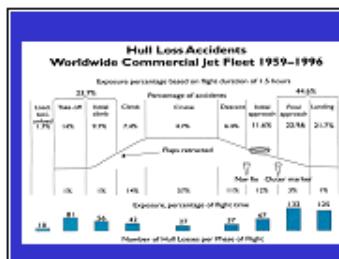
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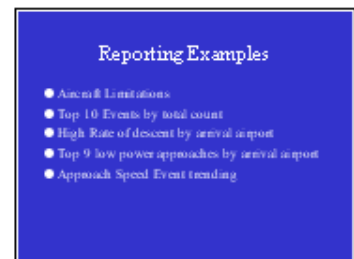
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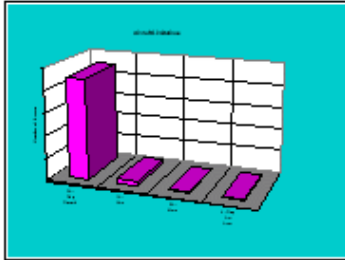


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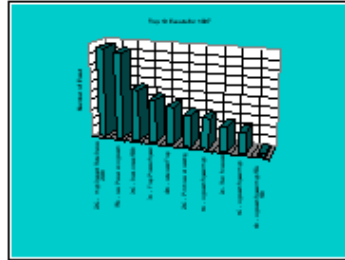


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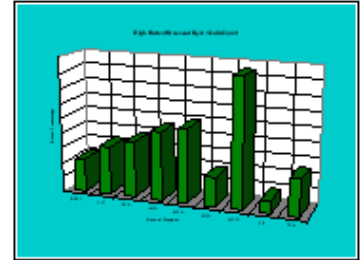
## Don McClure - Safety Programs that Increase the Safety Margin and Reduce the Accident Risk ...continued



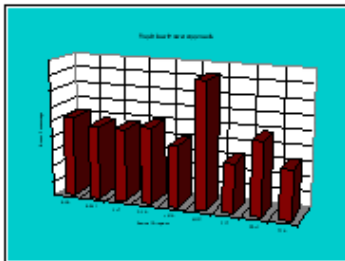
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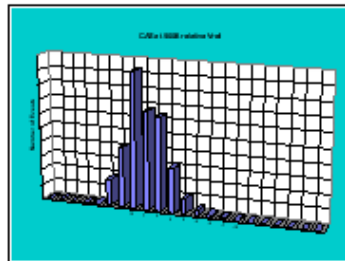
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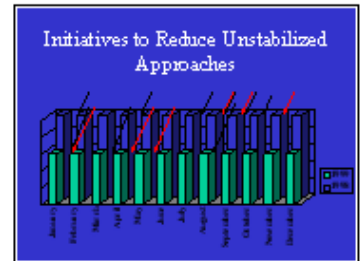
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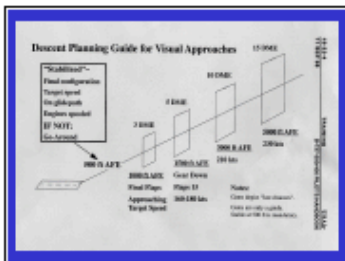
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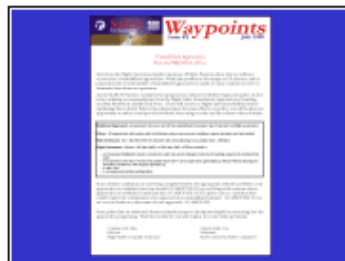
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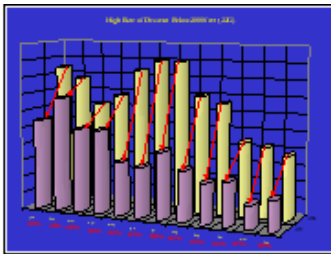


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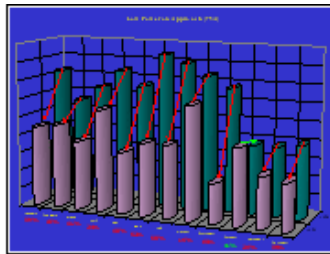


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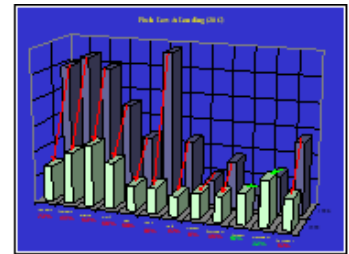
## Don McClure - Safety Programs that Increase the Safety Margin and Reduce the Accident Risk ...continued



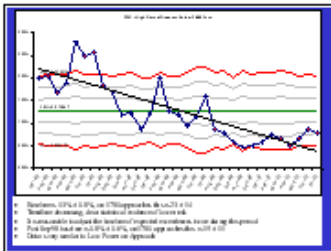
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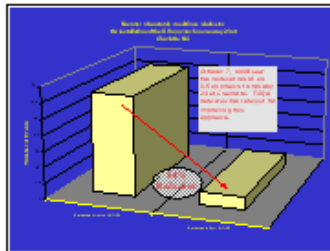
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Crew Feedback is Essential

- ROQA Bulletin Board
- "Event of the Month"
- Crew contact by ALPA Gatekeeper
- Monthly data available to Fleet Manager
- Promotion through Company Safety Publication
- Airport analysis page ROQA alert


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Ultimately ...  
the industry will recognize that  
ROQA is the highest level safety  
management

26

INTRODUCTION TO



ASAP

27

## Don McClure - Safety Programs that Increase the Safety Margin and Reduce the Accident Risk ...continued



**AIRLINE SAFETY PROGRAM**

- A Corporate Commitment at the highest level to Air Safety is a prerequisite for ASAP
- A Corporate Non-reprisal policy must be put in place

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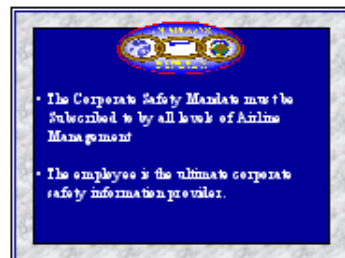


**New Management Supports Safety**

ASAP Non-Reprisal Policy

Management's support of the ASAP program is a key element of a successful safety program. Management should ensure that the ASAP program is fully supported and that all employees are encouraged to report safety concerns without fear of reprisal.

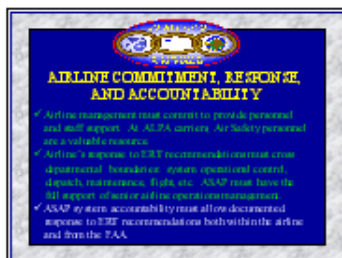
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**AIRLINE SAFETY PROGRAM**

- The Corporate Safety Mandate must be subscribed to by all levels of Airline Management
- The employee is the ultimate corporate safety information provider.

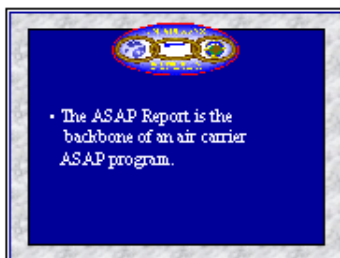
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**AIRLINE COMMITMENT, PERSONNEL, AND ACCOUNTABILITY**

- Airline management must commit to provide personnel and staff support to ASAP activities. Air Safety personnel are available resources.
- Airline's response to ERT recommendations must cover departmental, leadership, systems, operational control, dispatch, maintenance, flight, etc. ASAP must have the full support of senior airline operational management.
- ASAP systems accountability must allow documented response to ERT recommendations both within the airline and from the FAA.

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**AIRLINE SAFETY PROGRAM**

- The ASAP Report is the backbone of an air carrier ASAP program.

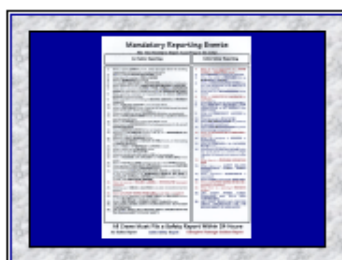
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ASAP Report Form

The ASAP report form is a key document used to collect and analyze safety information. It includes sections for incident description, contributing factors, and recommendations.

33



**Mandatory Reporting Events**

This slide lists various safety events that require mandatory reporting to the FAA, such as controlled flight into terrain, loss of control, and runway excursions.

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**KEY ELEMENTS OF ASAP**

- PROACTIVE SAFETY PROGRAM IDENTIFICATION AND RECOGNITION
- STRONG REPORTING INCENTIVES
- ASSOCIATION WITH NASA, ASRS
- AIRLINE AND EMPLOYEE COMMITMENT, RESPONSE, AND ACCOUNTABILITY
- TIGHT SAFETY BENEFITS TO AIRLINE, PILOTS, THE FAA, AND THE TRAVELLING PUBLIC

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**ASAP's Value to the Airline . . .**

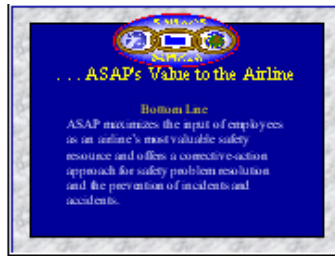
- ASAP builds mutual trust through cooperative safety relationships between employees, ATSA, the FAA, and an airline management.
- ASAP's network manages a proactive, reliable, and timely response. This approach recognizes that all parties to the agreement share the responsibility for the safety of passengers and crew members for each, to get the aircraft.
- These relationships directly create procedures being operating smoothly and reliably, long term, available to them. No one's fault or responsibility.

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## Don McClure - Safety Programs that Increase the Safety Margin and Reduce the Accident Risk ...continued



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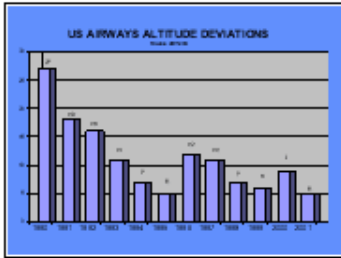
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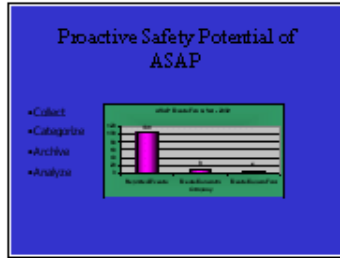
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## Don McClure - Safety Programs that Increase the Safety Margin and Reduce the Accident Risk ...continued



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**SCOPE OF ASAP**

Any report which describes a flight safety concern or possible FAA deviation should be considered. At a minimum, ASAP should seek to address:

- ✓ All phases of ground and flight operations and procedures
- ✓ Air Traffic Control
- ✓ Dispatch, load, and aircraft performance
- ✓ Charting and instrument procedures
- ✓ Maintenance and MEL
- ✓ Human Factors
- ✓ Technology and aircraft equipment

48

**FLIGHT SAFETY BENEFITS TO AIRLINES, PILOTS, AND THE FAA ...**

- ✓ Corrective-action approach allows preventative actions to be taken by those given flight safety responsibilities. ASAP allows real actions to potential flight safety hazards identified by employees with natural applications to training, and flight operations procedures.
- ✓ ASAP is cost-effective. Previously unutilized, operational, and maintenance expenses can now be applied to corrective and safety measures.

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**What an ASAP Program is Not**

- ✓ It is not an amnesty program.
- ✓ It does not apply to deliberate acts.
- ✓ It does not apply to criminal activities.

**What an ASAP Program is**

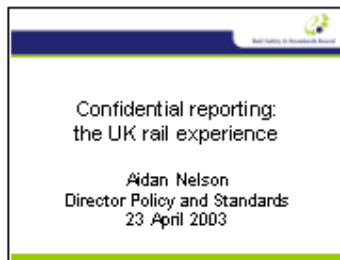
- ✓ ASAP is a proactive, corrective action-based safety program.
- ✓ ASAP requires an equal commitment by all partners, company, FAA and employees.

51

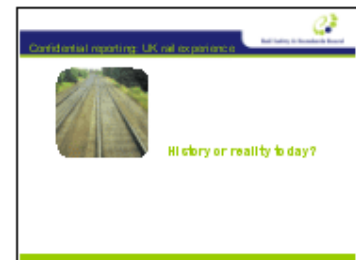
## Aidan Nelson - Confidential Reporting; the UK Rail Experience



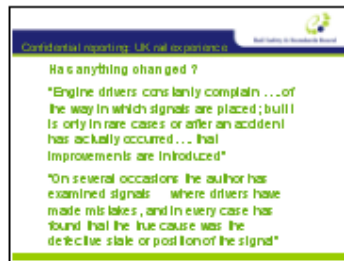
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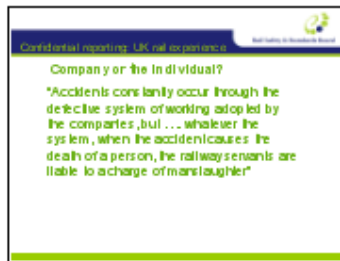
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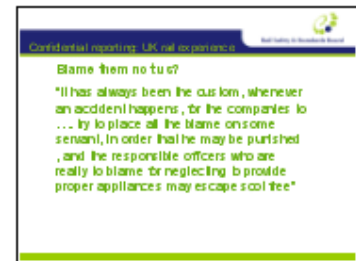
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9

## Aidan Nelson - Confidential Reporting; the UK Rail Experience ...continued

Confidential reporting: UK rail experience

Developing the national system

Broadly based industry steering group led and facilitated by RSSB predecessors managed the process

Concerns as to cost led to engagement of "freemovers" being conditional on there being a competitive procurement strategy

Core service provider contracted nationally, regional centres funded by a levy on number of staff enrolled

10

Confidential reporting: UK rail experience

Some problems on the way

The transition from academically provided to commercially provided service was not without pain

IPR issues led us to a new taxonomy and reverse filling historic data lull

Issues of trust and confidentiality led to the creation of a trust to own the taxonomy, the data and fund to license use of system

Creative counting of staff to be enrolled

11

Confidential reporting: UK rail experience

Commitment this to be underpinned

Railway Group Safety Plan

Railway Group Standard directly mandates enrollment of safety critical staff employed by the work rail and train operators (The Railway Group)

Supply chain to Railway Group members has to be handled within contractual framework

12

Confidential reporting: UK rail experience

But we have an open safety culture

Some organisations still feel they don't need CIRAS

However the nature of the reports into the system illustrates that there is still a widely held concern that "blame" is alive and well in management thinking

Watch for local managers keeping the supply of CIRAS forms under surveillance

13

Confidential reporting: UK rail experience

Why report to CIRAS?

Quite a few early reports are, at least the system, in particular that it really is confidential

Because when reported an issue openly nothing was done and we know that the CIRAS system guarantees a response

CIRAS operates across organisational boundaries

14

Confidential reporting: UK rail experience

Quality of response


Too often the managerial response to a CIRAS report is defensive

This often reflects that the responding manager feels that self justification is necessary within the organisation

Independent peer review of responses raises quality considerably

15

Confidential reporting: UK rail experience



Our role in CIRAS

16

Confidential reporting: UK rail experience

Governance

We facilitate, fund and act as managing agent for the CIRAS Trust

Our nominated trustee chairs the Trust

We facilitate the independently chaired industry steering group on which we have membership

We fund the independent chair of the industry steering group

17

Confidential reporting: UK rail experience

Management

We fund the core CIRAS facility and recover the costs from the general funding of RSSB

We provide procurement services

We undertake the annual census of enrolled staff

We undertake research to review the effectiveness of the system – e.g. CIRAS Journals

18

## Aidan Nelson - Confidential Reporting; the UK Rail Experience ...continued

Confidential reporting: UK rail experience

We too are members of CIRAS  
All ours left are within the scope of the system

We also provide the lead managerial response on issues related to ambiguity in and for the Interpretation of the Rule Book and other Railway Group Standards

19

Confidential reporting: UK rail experience

RSSB CIRAS Committee (1)  
Newly formed, operates in the context of our safety leadership role within the rail industry

Works principally from CIRAS national report cross referenced with wider industry safety performance data and intelligence

Will require additional analysis from the CIRAS core facility as required

20

Confidential reporting: UK rail experience


RSSB CIRAS Committee (2)  
**Determines necessary RSSB action:**

- Identify issues for further research
- Key issues monitored within quarterly and annual safety performance reports, or generate a requirement for a special topic reporting
- Influence Railway Group Safety Plan, national initiatives and standards
- Identify courses of risk for discussion at the RSSB risk review forum
- Initiate topic based workshops

Monitors progress / close out of actions

21

Confidential reporting: UK rail experience



In conclusion:

22

Confidential reporting: UK rail experience

In short

- Don't underestimate the management challenges in creating a high integrity confidential reporting system
- Don't see it as a 'bolt on', rather see it as an integral component of your wider human error management programme
- Champion and lead development from within the industry to create ownership and minimise scepticism

23



Rail Safety & Standards Board

24

## Helen Muir – Impact of CIRAS

Cranfield

**Impact of CIRAS**  
CIRAS the Confidential Incident and Analysis Scheme for Rail Industry

- Facility to confidentially report safety concerns.
- Concerns can be acted upon in constructive manner
- Natural reticence to report.

1

Cranfield

**Since November 1999**

- Currently over 77,000 staff enrolled
- Over 2,500 reports received
- No instances of breach of confidentiality

2

Cranfield

**Mission**

CIRAS will provide a confidential route for employees in the railway industry to report safety related concerns to an independent body with the expectation that they will receive a considered response. Analysis of all these reports will contribute positively to a safer railway.

3

Cranfield

**CIRAS Development**

- Challenge
- Implementation Group
- Steering Committee
- Charitable Trust

4

Cranfield

**Development Plan**

- Scottish Pilot Scheme
- 3 Regions
- Safety Critical and Safety Related Staff
- Tenders invited
- Regional Centre 1 - Scotland and North of England
- Regional Centre 2 - Middle England
- Regional Centre 3 - South of England
- CIRAS National Database

5

Cranfield

**Reporting System**

- Reports to Regional Centres
- Regional Liaison Committee
- Regional Journals
- Information to CIRAS National Database
- CIRAS National Reports (2 per year)
- Company Reports
- Sector Topic Reports

6

Cranfield

**National Standards**

- Training Regional Providers
- Rail Staff Briefing
- Auditing Performance

7

Cranfield

**Enrolment**

- Drivers, Signallers, Safety Critical and Safety Related of main contractors
- Railway Infrastructure contractors and main subcontractors
- Fourth centre

8

Cranfield

**CIRAS Principles**

- Accepts reports from any employee in rail industry
- Any safety related subject (engineering, health, operations)
- CIRAS additional to company reporting schemes
- Reports personal details kept confidential
- Personal responses available to employees of participating companies
- System not for real-time reports
- All information property of CIRAS Charitable Trust
- Method of operating CIRAS determined by National Steering Group

9

## Helen Muir – Impact of CIRAS ...continued

Cranfield

Obligations on Participating Companies

- Commit sufficient resources to prepare considered responses to reports
- Nominate a company representative
- Promote use of CIRAS (briefings etc.)
- Pay subscription
- Support National Steering Group

10

Cranfield

Deliverables to Industry Stakeholders

- Insights and practices to assist managers
- Analysis of reports received
- Outlet for responding to individual safety related issues
- Intelligence to assist managers with priorities for actions and to Railway Group Safety Plan

11

Cranfield

Use of CIRAS Information

- Railway Safety Standard Board
- Trade Unions
- Train Operating Companies (TOCs)
- Track Maintenance Contractors
- London Underground
- Health and Safety Executive (HSE)

12

Cranfield

Independent Market Research into Effectiveness of CIRAS

- 10 interviews from rail staff in 3 regions
- High level of awareness of CIRAS and broad purpose
- Independent from rail companies
- Confidentiality never in doubt
- Effective for:
  - raising awareness of safety issues
  - safety valve for staff
  - sharpening some companies into action
- Strong support for journals
- Not always effective in achieving acceptable response from companies
- Not always resolving issues resulting in tangible improvements

13

Cranfield

Achievements and Future Challenges

- Establishment of National System
- Support, confidentiality and trust
- Review of Journals
- Changes in Rail Industry
- New Technology
- Second Generation

14

## John Grundman – BNSF Hotline Process

BNSF Hotline Process

John Grundmann AVP Safety  
April 23, 2003

1

BNSF Safety Hotline

Near Miss Information to  
Create a Safety Working  
Environment

2

System Safety Hotline

- Designed to capture safety categories:
  - Policy
  - Environmental Conditions
  - Contractors
  - Quality of Life
  - Safety Books
- Not intended solely as a capture mechanism for "near misses"
- Safety Hotline captures 1 "near miss" every 2 – 3 months

3

800# Safety Hotline Protocol

- Employee calls hotline
- Call is answered by 3<sup>rd</sup> party network
- All safety related calls to system safety
- System safety places calls into 5 categories
- Disinbutes calls to responsible party – field / HQ
- Correct issue – send written confirmation with remedy to system safety
- Report sent to senior management
- Quarterly random sampling to ensure corrections made as described in confirmation

4

Near Miss Hotline Call

- Example:
  - After loading crew van with luggage and people van made reverse movement to turn around and heading backed over employee.
- Solution:
  - Structure employee pick-up area so vans do not have to make a reverse movement when loaded. Van pulls forward to begin trip.

5

Next Steps

- Request "near miss" events called into hotline
- Capture as sixth category or place in a separate data base
- Problem solve nearmisses for "best practice" solutions
- Distribute to all affected sites/employees

6





## **APPENDIX D. BREAKOUT GROUP DISCUSSIONS**

---

Four breakout groups, representing all stakeholders, met separately to discuss a series of pre-determined close call questions.

- What lessons were learned from the workshop speakers?
- What are the benefits to understanding close calls?
- What are the barriers to understanding close calls?
- What are the next steps to understanding close calls?

This section contains the detailed responses from each of the four breakout groups to the questions above. Most are direct quotations, but some responses have been changed to improve clarity or protect the speaker's anonymity. If the speaker's stakeholder affiliation is important, it is included in parentheses.

For a summary of breakout group comments, refer to Section 6.

### **What Lessons Were Learned from the Speakers?**

Speaker presentations generated a high level of audience interest in what could be accomplished with a close call system for the railroad industry. Even though breakout group remarks were very diverse, several key critical success measures were repeated across all groups:

- Stakeholder buy-in
- Improved collaboration and trust
- Better communication and sharing of information
- Simplified rules and guidelines

The following comments are grouped by theme.

## **Improved Collection of Data on Close Calls**

- Track problems and create a close calls database.
- There is no comprehensive way to capture experiences.
- Collect information on:
  - Why close call occurred
  - Why is it acceptable to co-workers and managers
  - Frequency of occurrence
  - Where and when does this occur
  - Type of equipment
  - Worker profile
- Need system in place to talk about issues confidentially, to enable a cathartic change.
- Gain data otherwise lost from cover-ups/forgetting.
- UK CIRAS model is valuable for setting up close calls across the railroad industry and share information (union).
- Identify individual to “find” and broker a close call system and set up framework.
- Implement a pilot program in new territory.
- Near miss is subjective in eyes of person – what is a close call? Employee bumps self on rail/bumped by passing equipment while leaning out/failure to be told of passing train.

## **Close Call Incident Analysis**

- Pay attention to problems; enable solutions.
- Close calls allow industry to identify best practices (industry).
- Use pilot studies to quantify benefits.
- Generate manpower and equipment cost savings from more close calls awareness.

## **Stakeholder Buy In**

- Need cooperation from all stakeholders and “mutually beneficial solutions” (Said by union representative).
- Upper management support is critical.
- First line management can solve problems.
- In the UK, middle management is a barrier to coordination between boardroom and shop floor. Need top/middle/bottom buy-in (union agreed, despite different interests).

## **Changed Rules and Guidelines**

- Get rid of autocratic regulation; agencies take a look at the rules that are really successful.
- Need a “no reprisal” system for employees.
- There is tension between the pursuit of safety and production objectives (industry).
- Need better operating procedures/processes.
- Rules are complex and operators have information overload.
- Need to simplify practices (industry).
- Rules need to cover each close call scenario (union).
- Evaluate problems with policy and procedures.
- Understand written rules.
- Rules must be complied with (but management encourages procedural violations to keep traffic moving).
- Make quality improvements in the contractor selection and rules compliance process.

## **Improved Collaboration/Trust**

- Need for increased trust among all parties.
- “Most transportation people don’t trust the FRA.”
- Change the culture from FRA being an adversary to being part of a team. If people trust each other they’re more likely to report problems without fear of reprisals. “People have to have faith and get into real issues.”
- If stakeholders trust information they can better focus training time and resources (*key issue for one breakout group*).
- Union rep reported cover up of a close call by railroad management.

## **Better Communication/Sharing of Information**

- “There should be inter-communication amongst railroads.”
- Need for better communication.
- Debrief the crew to identify large and small issues.
- “System should be built with everyone updating the process and information.”
- Publish information, not just information in a database, using a formal process.
- Disseminate lessons learned.

## **Improved Training**

- Improve training.
- Promote training for continuity and follow-through.
- Industry is changing -“old heads” with a history of generations of families working for the railroad being replaced by those with no family railroad employment history to discuss issues with.
- With a smaller number of crew members there are fewer resources for new employees.
- Twenty years ago the FRA published investigative accidents but no longer do this – needs to be reactivated so everyone knows what’s going on and can use information as training tool on railroad safety. These reports identified the railroads by name. In the future name should not be included. (industry).
- Don’t assume all operators have the same knowledge base – include operational instructions or job briefing.

## **Human Factors Issues**

- Humans will err (mentioned by many groups).
- Several groups identified communication failures in close calls. Humans process information differently and must be accommodated.
- Avoid complacency.
- Fatigue is a factor – employees become complacent.
- Stay focused and watch out for routines.

## **Learning from Experiences Before Close Calls Become Accidents**

- Clearing snow at interlocking plant and train came unexpectedly – lesson is before fouling track, obtain “foul time” from dispatcher and implement more formal rules with railway workers.
- Inexperienced operator at swing bridge did not know about need to swing bridge to equalize temperature; end result was difficulty in aligning and higher potential for injury and train delays. Solution is to use key factor analysis to formalize.
- Train operators anticipate signals and pass signals at Stop, overriding safety device. This remains a problem for the railroad. Other railroads use signal awareness forms with success and call out signal aspects.
- Block limit granted and confirmed; dispatcher erred with wrong control point.

- Signal bridge visibility problem reported through “tribal knowledge” – happens at times, no report generated, just discussions between parties and managers lose data.
- More false train stops occur than are reported, there is poor communication with no follow up, no procedures, and no responsibility or accountability.
- Know where signals are located in the dark and call in information on the radio.
- Ensure all communications are on the same radio frequency.
- Inspect switches for quality prior to operational release.
- Produce a checklist and flowchart guides.
- Review job briefings prior to a trip.
- Ensure there are multiple signals and yearbooks.
- Identify equipment failure or lack of equipment, react to it, and fix it right away.
- Use technology and engineering controls to prevent problems.
- Never place yourself in danger zone.

## What are the Benefits of Understanding Close Calls?

All groups agreed that this organized approach to *sharing information about close calls* would be useful, and the right thing to do. The benefits will transform a reactive system to a proactive system. There will be a culture change from an industry that blames individuals for close calls/incidents to one that focuses on a system that learns from information on close calls and makes improvements.

The following comments are grouped by theme.

### Safety Culture Change

- “Converts a safety program from being a reactive system to a proactive system” (member of the Planning Committee).
- Results in data-driven decision making.
- Increases public trust in railroads.
- Increases accountability on all levels.
- Increases employee/management trust - (Union) “Trust is the caviar in this list. I don’t see if you don’t have the trust as a **foundation**, all of this isn’t going to happen in the first place.”
- Starts breaking negative spiral; makes it OK to tell the truth without repercussions; sets up positive professional atmosphere:

- This program can break the negative spiral of “Tell the truth > discipline > dismissal”... The truth does NOT set you free. ... Truth is held against you, so it breeds liars who will break the law (union).
- This program will bring about a setting of professionalism (industry). [Comment from audience – Good luck!]
- A person may set up a fake explanation in order to save his job (union).
- If someone ended up killing him, would that person have said the same thing? (industry).
- Yes, possibly (union).
- If there were no penalty for telling the truth, would he have lied? (union).
- Probably not (industry).
- Employees empowered to make suggestions for change.
- Improved working conditions/attitude/morale.

### **Better Understanding of Risks and Better Solutions**

- Multiple reports give scope to problem – target resources to biggest problem and help to set priorities.
- Identifies systemic issues/problems and identify patterns.
- Enables discovery of root causes.
- Identifies *true* causes and reduces ‘red herrings;’ provides accurate information:
  - We end up pursuing ‘red herrings’ under the present system. This wastes time (government).
  - [Under the present system] we end up falsifying FRA reports, which is far more serious (union).
- Can focus on why close call did not become an accident.
- Identifies what industry is NOT doing right.

### **Increased Collaborative Information Sharing**

- Uncovers higher percentage of incidents.
- Enhances cooperation between labor, management, and FRA (industry) and builds consensus from top to bottom (union).
- Recognition that problem is shared by others, including other countries.
- Discover best practice from international sources.

- Team building - help build consensus and foster two-way communication (union).
- “Better use of manpower if part of a product team” (Planning Committee member).
- Mechanism for culture change from adversary to team.
- Improved training (union – stressed by several) (**key issue for one breakout group**).
- Opportunity to tap knowledge, resources, and expertise in industry.
- “If we have an open work place with goals of improvements it would be a benefit.”

### **Improved Safety**

- Demonstrates commitment to safety.
- Helps design engineers design safer systems.
- Non-punitive way to improve safety.
- Anecdotal evidence can provide lessons learned.
- Prevents catastrophic losses.
- Human cost savings “I think that it will be easy to show cost savings so we don’t have to tell their [locomotive’ engineers and railroad workers’] wives their husbands aren’t coming home” (union).
- “Dead men don’t tell good stories.”
- “Takes profit motive out of safety,” even though costs may be saved intact (union).

### **Improved Cost Savings and Use of Resources**

- Allows safety to be shown as contributing to bottom line, not just as a cost. Follow the UK’s example; once safety is realized, benefits follow. Industry and unions see business benefits, “a pro-active response to learning leads to less regulation” (industry).
- Prevention means less time lost on job and saves money (industry).
- Information sharing is cost saving to company.
- Cost savings in insurance/legal claims - fewer claims paid out; less loss of life and injury (union).
- Avoids litigation.
- Operating efficiency and decreased repair costs (industry).
- Benefit is from obtaining real problems and pursuing real solutions, cost effectively, rather than red herrings wastefully (government).

## Miscellaneous

- Can identify new technologies to reduce human error/expand on existing technologies.
- Prevent unneeded regulations (industry) but also improve rules, regulations, operating procedures.
- We are talking about creating accurate information.
- We must get rid of the concept of “misdemeanor charges, life sentences” (union).

## What are the Barriers to Understanding Close Calls?

This topic generated the most discussion among all groups. Although many concerns were expressed, the groups did not consider them to be insurmountable obstacles. Common themes included:

- “Them versus us” culture
- Lack of policy specifics relating to close call information
- Legal impediments
- No top level buy-in
- Need changes in regulations

The following comments are grouped by theme.

### Need a Culture Change/Rulemaking Waivers

- Failure to consider benefits of safety culture.
- Need for new paradigm; balance substance/procedure.
- Long history of distrust (*key issue for one breakout group*).
- Hard to move from adversarial stance (union).
- “Us versus Them” and a long term “code of silence”:
  - Employee/management
  - Railroads/FRA
  - FRA/employees
  - Between and within carriers
  - Short lines/class lines
  - Field distrusts FRA and its culture, for example the 240 Rule. Need independent third party since it’s difficult to move away from the traditional adversarial stance. Labor especially sensitive to mandated discipline under these rules.
- Will FRA give relief on the punitive part of CFR240 – “there needs to be a cooperative spirit” (industry).



- FELA is fault-based system - “Right now, if I see that someone is speeding, then I *have* to decertify him. Are there other ways around it?” (industry).
- Perception of the “Blame Game” with everyone blaming everyone else for accidents:
  - Industry thinks everything is human factor, employees think everything is working conditions
  - Industry says “it’s still the individuals’ fault, management says it is the employee’s fault, employees think it is the working conditions”
- Fear of regulations.
- Increased audits.
- Self interest of regulators (union).
- Complexity of rules “Three step slowed railroad down – there has to be a better way” (union).
- Differing view; rules help people remember and help focus on safety (union).
- Lack of trust, integrity, and patience – history of inaction and a long line of failed programs (industry).
- “Railroads don’t want anyone in their business.”
- Railroads are decentralized (contrasting view below).
- Huge bureaucracy of railroads.
- Current militaristic disciplinary process (union).
- Internal punitive actions – union concern:
  - 1st Line supervisors “will beat up on me”
  - Inspectors have “no ability to write violations”
  - Management focus on statistics, worker fear of litigation if report close call
- Labor leaders “take away control” (industry).

### **Lack of Buy-In/Commitment**

- “Need buy-in from EVERYONE” – varying levels of commitment among stakeholders.
- Concern there will not be a long-term commitment to close calls.
- Barrier is a lack of high status leadership within ALL stakeholder hierarchies (government).
- “I don’t think the union would buy into the program, they would think it is the flavor of the month.”
- Participation by all stakeholders.
- Equality/parity by all stakeholders.
- No equality of people involved in the planning process.
- All stakeholders are not involved from the beginning.

- Varied levels of commitment within and among stakeholder groups:
  - Safety is not on the decision-maker's scorecard; [performance evaluations is] measured on productivity more than safety. Managers rewarded for reported safety statistics, creates incentives for not reporting incidents (in some railroads, not all). Conflict is that performance is measured on productivity (ex. Trainmaster is told to **get that train out!**)
  - Managers rewarded for safety *statistics* (Another Labor person offered this word as first was forming thoughts)... problem is that if a bonus is not rewarded, manager 'punishes' those under him (union).
  - Totally disagrees with above statement...if managers don't do specific things listed in their job description they will be evaluated accordingly (at least in the northern region of U. Pac.) (industry).
  - Performance should be based on activities, not on statistics (industry).
  - I say, look at the incidents, some may disagree. If a manager is found to have falsified information he will be fired! (industry).
  - It seems to be a localized problem by carrier (several others).
- Need buy in from FRA.
- Need a champion within the industry.
- History of failed programs.

### **Individual Resistance to Change**

- Most workers unwilling to change; attitudes may be due to generational change; need to work overtime.
- New people are not coming up from the ranks to replace retiring Boomers and don't have practical experience. Generation X work ethic is different - unwilling to work weekends. Gung-ho on program changes then interest fades.
- "What's in it for me?"

### **Risks to Confidentiality**

- Primary concern for one breakout group. Everyone agreed that it would be the hardest to achieve but also the most important. There was fear about breach in confidentiality and what that would entail:

- Confidentiality of data collected (Government - “if we can address confidentiality we can move down the road”).
- Keep carrier confidential, too. “The third party collecting data should be getting data not specifically for your company, but for the four different major carriers, so you don’t know where the incidents happened.”
- Fear reflects badly on own performance. “Labor is concerned about punitive part of confidentiality. If I report, will it come down on me? (union).
- Protect info from attorneys (discovery).
- Punitive use by RR or Fed agencies or lawyers.
- Don’t want to see name in the newspaper.
- Confidentiality has been breached in the past.
- Avoid “one brother ratting on another.”
- “True confidentiality is hard, there would have to be quality control.”
- Ability to shield information from legal processes (industry). Would prefer to talk to a jury saying that they are aware of this situation [safety injury situations] and are trying to resolve them, than say we know nothing about it.
- Talked about trying to implement “Red Block” [An alcohol and drug use prevention program – see web site [HTTP://REDBLOCK.COM/](http://REDBLOCK.COM/)] -- those who resisted implementing that program will probably resist implementing this program (union and industry).

### **Implementation Issues**

- There needs to be specifics on what type of data needs to be collected; an objective way to show the information collected that will show the program is a success and encourage its use across the board.
- How do you know if data is legitimate.
- Concern for legitimacy of data reported, quality control - people might turn others in if they are mad at them. (Anticipate how to test system) “There needs to be certain things they want people to report as opposed to anything” (industry).

### **Need Close Call Definitions and Policies**

- Hard to translate knowledge into safety policy.
- What is an objective measure of success?

- How do you define success? “National system will look at patterns, inaccurate reports are less likely to have a pattern.”
- Person has to decide whether there is more of a benefit is to call an incident a “close call” or an “injury.”
- “How to know if info applies to my railroad” - “If the info gets to a national level; how do I know if it applies to my company?” (industry).
- “Set process to see if it will apply to your company; ask the people on the ground if it is a problem in their company and will this info help them.”
- One size does not fit all.
- Many technical differences between companies; this means some companies have a data advantage over others (government).
- Set up operating rules nationwide (union).
- Best practices are out there but not nationwide (all stakeholders).

### **Funding/Resources**

- Initial loss of productivity.
- “We need financial support.”
- Who will pay?
- This may displace other safety activities (need resources for this).
- Will we spend more money on safety?
- “Federal Government should fund it because they fund FAA.”
- Lack of technology to collect data.

### **Measuring Return on Investment**

- Need a business case quantifying return on investment.
- If you cannot make the business case (benefit) you cannot sell the system...Railroads are getting bigger – getting harder to implement a system across a railroad.
- Need OBJECTIVE info to “sell” to SR. Management - “You are asking me to spend money and can’t tell me if the program is successful. You have to objectively prove that it will work” (industry).
- I can’t see how a railroad like CSX can implement things if they “lose things” as it is...then there is trouble between railroads (union).
- Talked about how high-speed rail in Illinois as a case in how business case was not clearly made [business, politics] (several people).

- Also cited Operation Lifesaver as a program that has not reached its potential (union).
- It may be difficult to apply learnings from airlines to railroads. Method of operation different - has to be incorporated; potential benefits to railroads less than airline benefits:
  - In airline industry, if something goes wrong, the rest of the system doesn't shut down (example, hydraulic pump on a plane doesn't shut down the hydraulic system in the plane – there is usually a 'back up' system that keeps the plane running). In rail industry, if something goes wrong, the system shuts down in 'safe-mode.' Point is, this might result in affecting implementation (union).
  - Plane – once flying, gravity always in effect. Rail – once moving – momentum always in effect. Consequences are different, emphasis is different (industry).
  - Air is more black/white, but there are still 'gray areas' that are similar in rails. Pilots still break rules (academic).
- Need to build a business plan for each of the stakeholders (government).

## **What Are the Next Steps in Understanding Close Calls?**

Common themes amongst all groups included:

- “This is the Right Thing to Do!”
- Obtain commitment and buy-in from “each leg of the stool” (stakeholder group).
- Develop a pilot close calls program using new model or existing working model.
- Educate all stakeholders by disseminating lessons learned.

The following comments are grouped by theme.

### **Obtain Stakeholder Buy-In**

- Coordinate stakeholders.
- Sell to CEO; get top people on board - not present here but they should be (government).
- Get commitment/buy-in from top management of all stakeholder groups.
- Be committed to change.
- Encourage risk taking for first step.

- Facilitate local worker involvement - “need people on the ground to buy in and feel trust and be part of the process” (union).
- “Buy-in from the FRA from the get-go.”
- Remove fear of reprisal (union).
- [Solicit] support from Congress to address liability issues:
  - We need to have Congress to pass a mandate to drive this program (industry).
  - No, we don’t want Congress to mandate it to the FRA (several in all sectors).
  - We three need to come together, first, then go to Congress to get their support (union).
- We have someone governed by FTA. They [the FTA] probably need to be represented here, as well.
- Identify individuals/small team to champion system (industry).
- Form small team, including all stakeholders, to champion program.
- Need a champion who will push it through “thick and thin.”

### **Develop a Model Pilot Program**

- Need a summit meeting of stakeholders to keep this going. FRA is the governor (government).
- Obtain commitment/buy-in from top management of all stakeholder groups.
- Move away from passenger vs. freight – every program has failed when we try to split them up. We have to do it, together (union).
- See if you get any takers for a pilot program.
- Consider pilot programs in different venues/locations (e.g. short lines, Class 1, passenger, switching).
- Don’t reinvent the wheel - use FAA GAIN Program as guide (industry).
- Get an agreement of the mission statement of the goals of the pilot program from all stakeholder groups.
- Identify the process and resources required (government).
- Have government pay for initial phase.
- Develop MOU between unions, management, and FRA.
- Present data so there is consensus and buy-in from all stakeholders:
  - Research “how to measure success” - need objective way.

- Compile lessons learned study of lessons across and from industry to show value of system.
- Understand which government programs are successful and pass on this information (government).
- Understand the truth of the problems.
- Cultural problems are lessons learned
- Don't look for too much right away - start small.
- Start small, build from successes. If you start big, there will be too many problems at the start. If we start small, we will be able to gradually build on it (union).
- Work with FRA about making 49CFR 240 more flexible.

### **Determine Data Collection Mechanism**

- Determine data needed and how it will be used.
- Address data liability and confidentiality issues – “truthful reporting - not a numbers game.”
- Data should be administered by third party outside the industry - outside academic consultants [Aidan Nelson] to “push beyond the barriers” or government agencies - USCG, FHWA/FTA/Volpe. Third party should be non-regulatory, non-enforcing, with some railroad knowledge (union).
- Have third party put together best practices studies “There are places that you can identify by the type of situations knowing and will know which facility the incident occurred at.”
- “Systematically collect data about close calls so it can be seen that certain situations would help other systems having the same types of issues.”
- A template would be useful (union).
- Develop standardized operating rules and procedures (template) for capturing all relevant information on incidents and train people in utilizing these procedures (industry).
- Coordinate with other efforts already underway:
  - We do have safety culture committees in the northern region of my railroad...they have employee evaluation forms done anonymously by other employees that try to uncover worker issues. We use it for testing, programming and training (industry).
  - Use aviation industry for benchmarks/case studies.

## Address Data Issues

- Report close calls truthfully - it's not a numbers game. Some CEOs want to reduce number of injuries to make statistics look better. Result is a cover up (union).
- "I don't think that these guys are 'liars.' It [incorrect information] is often due to ignorance of how to fill out forms, confusing fields, non-uniform filling out of things" (union).
- NTSB is different [probably a different focus on activities from railroad safety boards]...they don't prevent, they investigate...safety teams try to prevent first...NTSB is proud that they are not proactive, they are reactive...I think that they *should* be that way...different collecting process, but their information is *good* (union).
- "I'm not sure that 'consistent investigation' is best way. It tends to *narrow* the investigation [in what they will look for, finding possible solutions, etc.]" (industry).
- Look at *existing data* to identify problems (e.g. SOFA, SACPs, RSAC):
  - SOFA – Switching Operations Fatality Analysis
  - SAP – Safety Action Plan
  - SACP - Safety Assurance and Compliance Program
  - RSAC – Railroad Safety Advisory Committee

## Provide Ongoing Communication

- Develop web site (industry).
- Produced close calls newsletter.
- Continue ongoing dialog – regular meetings (government).
- Disseminate safety diagnostic information faster and to lower levels within organization:
- We have grade crossings set-up with diagnostic sensors (example, light is out) that is sent to a central spot that will get it fixed (union).
- Standardize signal system/signs across nation (union).



## APPENDIX E. WORKSHOP ATTENDEES

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<i>Last Name</i>	<i>First Name</i>	<i>Organization</i>
<b>Category – Union</b>		
Aycock	Robert	Brotherhood of Locomotive Engineers
Boyles	Dan	United Transportation Union
Brickey	David	United Transportation Union
Carlton	Jack	Brotherhood of Locomotive Engineers
DePaepe	Tim	Brotherhood of Railroad Signalmen
Dunlevy	Donald	PA State Legislative Board
Fields	Carl	Brotherhood of Locomotive Engineers
Foster	Roy	United Transportation Union
Fritter	Steve	United Transportation Union
Haley	Kelly	Brotherhood of Railroad Signalmen
Harvey	Robert	Brotherhood of Locomotive Engineers
Inclima	Richard	Brotherhood of Maintenance of Way Employees
Keebler	William	Brotherhood of Railroad Signalmen
Kertesz	Kenneth	Brotherhood of Locomotive Engineers
Koonce	John	Brotherhood of Locomotive Engineers
Last	George	Brotherhood of Locomotive Engineers
Mundy	C.	ATDD
O'Brien	Thomas	Brotherhood of Locomotive Engineers
Perkovich	Thomas	Brotherhood of Locomotive Engineers
Ramsey	Jack	United Transportation Union
Smullen	John	United Transportation Union
Sorg	Robert	Brotherhood of Locomotive Engineers

<b>Last Name</b>	<b>Nickname</b>	<b>Organization</b>
Stem, Jr.	James	United Transportation Union
Svob, Jr.	Robert	AZ Legislative Board
Szabo	Joseph	United Transportation Union
Todd	Terry	Brotherhood of Locomotive Engineers
Verna	Vincent	AZ BLE Legislative Board
Way	C. Edward	IL State Legislative Board – BLE

### **Category - Industry**

Aumend	Lee	RailAmerica Inc.
Browning	Don	Norfolk Southern Corporation
Capobianco	Anthony	Long Island Railroad
Donlen	James	NJ Transit
Ferrone	Neil	CONRAIL
Gelder	Royal	Belt Railway Co. of Chicago
Gibbons	William	Long Island Railroad
Goodine	Fred	WMATA
Grizard	William	APTA
Hall	Peter	AMTRAK
Hull	John	APTA
Jackson	Fred	Metrolink SCRRA
Karambir	Cheema	Santa Clara Valley Transportation Authority
Keane	Robert	Canadian National Railway
Kenyon	Robert	Union Pacific Railroad Co.
Kienzler	James	Canadian Pacific Railway
Klejst	Stephen	NJ Transit Rail Operations
Leopold	Thomas	Kansas City Southern Railway
Lindsey	Alan	BNSF Railway
Mayden	Louis	Indiana Harbor Belt Railroad
Meana	Mark	AMTRAK
Mogan	Dennis	METRA

<b>Last Name</b>	<b>Nickname</b>	<b>Organization</b>
Moller	Jeffrey	Association of American Railroads
Roark	James	Union Pacific Railroad (Northern Region)
Roberts	Rick	CSX Transportation
Snyder	David	Virginia Railway Express

### **Category - Government**

Bridges	Bernadette	MD Transit Administration
Cacini	Richard	TSI
Coplen	Michael	Federal Railroad Administration
Ditmeyer	Steven	Federal Railroad Administration
Elston	Ralph	Federal Railroad Administration
Kaye	Albert	Federal Railroad Administration
Kloeppel	Miriam	National Transportation Safety Board
Lozeau	David	Chicago Transit Authority
Mao	David	Federal Railroad Administration
Markos	Stephanie	US DOT Volpe Center - DTS-75
McCown	Robert	Federal Railroad Administration
Morgan	Curtis	Texas Transportation Institute
Multer	Jordan	US DOT Volpe Center
Popkin	Stephen	US DOT Volpe Center
Pulciana	Don	Transport Canada-Rail Safety
Raslear	Thomas	Federal Railroad Administration
Remines	James	National Transportation Safety Board
Rhodes	Linda	Chicago Transit Authority
Sposato	Suzanne	US DOT Volpe Center
Stemple	Mark	Charlotte Area Transit System
Sussman	Don	US DOT Volpe Center
Taylor	Simon	Marc Train Service
Thompson	Phyllis	Chemical Safety Board
Tsai	Thomas	Federal Asian Pacific American Council

<b>Last Name</b>	<b>Nickname</b>	<b>Organization</b>
Weeks	Gerald	National Transportation Safety Board

### **Category - Research**

Gertler	Judith	Foster-Miller, Inc.
Kohli	K. Vijay	Fulcrum Corporation
Laveson	Jack	Fulcrum Corporation
Philbrick	Karen	University of Denver
Reinach	Stephen	Foster-Miller, Inc.
Stentz	Terry	University of Nebraska-Lincoln

### **Category – Speaker**

Goglia	John	National Transportation Safety Board
Grundmann	John	BNSF Railroad
Hart	Christopher	Federal Aviation Administration
Krakowski	Henry	United Airlines
McClure	Don	Air Line Pilots Association
Muir	Helen	Cranfield University
Nelson	Aidan	Rail Safety & Standards Board
Strang	Jo	Federal Railroad Administration

### **Category – Vendor**

Dzinski	Donald	Egis Semaly
Keppen	William	Keppen & Associates

## APPENDIX F. SPEAKER BIOGRAPHIES

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### John Goglia

John Goglia has served as a Member of the NTSB since August 1995. With more than 30 years experience in the aviation industry, he is the first Board Member to hold an FAA aircraft mechanic's certificate.

As a Board Member, he has been instrumental in raising awareness of airport safety issues, including the importance of airport crash fire and rescue operations, and the dangers of wildlife at airports. He recently hosted a joint government-industry conference to highlight airport safety trends and facilitate improvements. He has been an outspoken advocate for greater compassion and sensitivity in dealing with surviving family members of victims of transportation accidents. In recognition of his dedication to helping grieving families, the National Air Disaster Alliance awarded him its 2001 Aviation Safety Award.

Mr. Goglia has participated in numerous air, rail and bus accident investigations. He chaired the Board's public hearings on the ValuJet crash into the Florida Everglades. He has been the on-scene member at the Fox River Grove, IL grade-crossing accident that killed seven high school students in a school bus, the Silver Spring, MD commuter rail collision, and the Bourbonnais, IL fatal train crash involving Amtrak's *City of New Orleans*.

Prior to becoming a Board Member, Mr. Goglia held numerous positions in the airline industry and was involved for more than 20 years as a union flight safety representative on accident investigation teams. For 12 years, he operated his own aircraft service company.

### John Grundmann

John Grundmann is Assistant Vice President Safety and Operations Support at the Burlington Northern Santa Fe Railway (BNSF).

He leads the team responsible for setting strategy for safety improvement and program development, the field safety strategy implementation group, the grade crossing safety group, and safety reporting to BNSF and FRA. His operations support responsibilities include dispatcher manpower planning, scheduling and workload balancing. He previously held the positions of

General Director of Transportation, where he was responsible for implementing and monitoring the operations and scheduling of dispatchers for BNSF's state-of-the-art Network Operations Center (NOC).

Throughout his career with the railroad, Mr. Grundmann has had extensive operations experience both in the field (switchman/brakeman, trainmaster) and at the headquarters level (superintendent of operations, terminal superintendent). He holds a degree in Business Administration from the American University in Washington D.C.

## **Christopher Hart**

Chris Hart is the Assistant Administrator for System Safety at the FAA. Reporting directly to the Administrator, the Office of System Safety provides data, analytical tools and processes, safety risk assessments and other assistance to numerous FAA and worldwide aviation safety programs; spearheads industry-wide safety activities, such as the Global Aviation Information Network (GAIN); and helps to identify key safety issues and emerging trends affecting safety.

Mr. Hart's previous positions have included: Deputy Administrator of the National Highway Traffic Safety Administration (NHTSA), member of the NTSB where he had specialized interests in human factors and the impact of automation on transportation systems, Deputy Assistant General Counsel to the Department of Transportation, managing partner of Hart & Chavers, a Washington D.C. law firm, and attorney with the Air Transport Association.

Mr. Hart has a law degree from Harvard Law School, and he earned a Master's degree (magna cum laude) in Aerospace Engineering from Princeton University. He is a pilot with commercial multi-engine and instrument ratings.

## **Hank Krakowski**

Hank Krakowski is Vice President for Corporate Safety, Security and Quality Assurance at United Airlines. His responsibilities cover worldwide flight, operational, computer and maintenance functions, including emergency response.

He joined United as a pilot in 1978 and has served as Director of Flight Crew Planning and most recently as Director of Flight Operations Control. He was in charge of Flight Operations at United's Operations Control Center on September 11th 2001.

In addition to his officer duties, Captain Krakowski also flies the Boeing 737 out of O'Hare. He is a rated Flight Dispatcher, a practicing Aircraft Mechanic and an air show pilot with the Chicago-based Lima aerobatic demonstration flight team. He has served as chairman of communications and national spokesman for the Air Line Pilots Association. He holds a master's degree in Business & Management and a bachelor's degree in mechanical engineering from St. Louis University.

## **Don McClure**

Don McClure is Air Safety Coordinator, Airline Pilots Association. He is responsible for Development and implementation of Flight Operational Quality Assurance (FOQA) and Aviation Safety Action Programs (ASAP). He was also a Captain with Eastern Air Lines, Inc., from 1964 to 1990.

Captain McClure has participated in Air Safety and Accident Investigation activities for ALPA from 1967 to the present. Positions held include: Central Air Safety Chairman, EAL; Chief Accident Investigator, EAL; Chairman, ALPA National Accident Investigation Board; Chairman, ALPA Flight Recorder Committee; and Instructor, ALPA Basic Accident Investigation Course. He has flown 40 different types of General Aviation Aircraft, with a total flight time of more than 14,000 hours and has participated in more than 20 major aircraft accident investigations.

## **Helen Muir**

Helen Muir is Professor of Aerospace Psychology, Cranfield University and Head of the Department of Human Factors and Air Transport. The work that she and her team have implemented has been used to support changes to a series of airworthiness regulations in the UK, in countries within the EEC community, USA and Canada. While research initially focused on the aviation environment, the team has supported projects in other safety critical industries including rail, shipping and offshore.

Professor Muir was recruited by the railway industry to oversee the development of the Rail Industry Confidential Incident and Analysis Reporting System (CIRAS). She currently is Chair of the National Steering Committee. Her team is assisting the industry in developing tools for rail accident reporting.

She is also a consultant and serves on a range of committees associated with Human Performance in safety critical industries. She is a member of the CAA Airworthiness Requirements Board and is an independent advisor to the Health and Safety Laboratories. She is also a Fellow of the Royal Aeronautical

Society and helped to establish their Human Factors Group (acting as Chair for the first five years).

Personal recognition includes being the first psychologist to receive an award from the Royal Aeronautical Society (the B.W.O.Townsend Award) and being awarded the Order of the British Empire in 1993. In 1998 the Royal Aeronautical Society awarded her the Roger Green Medal and the Southern California Safety Institute also presented her with the Award of Excellence in Cabin Safety. In 1999 she was awarded the Whittle Safety Award by the International Federation of Airworthiness. Professor Muir holds an MA in Psychology, a PhD from the University of London, and is a Chartered Psychologist.

## **Aidan Nelson**

Aidan Nelson is Executive Director of Railway Safety for the United Kingdom. He is responsible for policy, standards and industry leadership projects.

Mr. Nelson began his career in the railway industry in front line operating roles. He moved into freight and passenger business management then became Director of Regional Railways North East. With the restructuring of the railway industry, Mr. Nelson moved to Railtrack as Director of the North East and London North Eastern zones. He developed Railtrack's Line Safety Directorate before moving to its Safety and Standards Directorate (S&SD) as Deputy Director, where he was responsible for industry safety strategy and planning



## APPENDIX G. CLOSE CALLS WHITE PAPER

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### Improving Railroad Safety through Understanding Close Calls

#### Summary

Railroads can reduce risk before an accident by systematically studying close calls. Analyzing close calls is a proactive way to manage safety. A close call is "an opportunity to improve safety practices in a situation or incident that has a potential for more serious consequences." When individual events are analyzed collectively, railroads can identify safety hazards and develop solutions to these threats.

The development of successful close call systems share several common features that involve building trust to encourage disclosure of close call information. These features include using a third party to collect and store the information, confidential reporting, and limited protection for sources from liability or enforcement.

The Federal Railroad Administration's Office of Research and Development is sponsoring a workshop for the railroad industry to learn more about the safety benefits of studying close calls. The workshop will also provide a forum for participants to discuss issues and build trust.

#### Introduction

***Accidents may be preceded by "close calls" that warn us of a safety problem***

During the last 23 years, the Concorde jet suffered a series of tire blowouts on the landing gear. The blowouts ruptured fuel tanks, damaged hydraulic lines, electrical wires, and engines. Except for the damage to the aircraft, there were no fatalities.

On July 26, 2000, an Air France Concorde jet blew a tire, rupturing a fuel tank and catching fire. The plane crashed shortly after takeoff killing 109 passengers and crew. A tragic accident like the Concorde may be preceded by several close calls similar to the accident, that do not result in catastrophe or harm to people, equipment, or the environment. These close call events provide an opportunity to proactively manage safety. Instead of waiting for an

accident to occur, these events provide valuable information on which the railroad can act to reduce risk.

**Railroads can target the greatest risks to safety**

Over the last decade, the railroad industry achieved significant progress in improving the safety of railroad operations. However, as the number of reportable events declines, additional reductions become more difficult to obtain. When the number of reportable accidents decreases, accident data becomes less valuable in determining the sources of risk. Also, when safe outcomes do occur, there is nothing to capture the organizations' attention; safety is invisible<sup>1</sup>.

Railroads maximize safety by addressing areas that pose the greatest safety risk. Close calls can provide information to monitor risk and manage safety.

**Other modes and industries successfully use close call information to manage safety**

The aviation industry uses close calls as part of its safety management process. In the United States, the aviation industry created the Aviation Safety Reporting System (ASRS) and the Global Aviation Information Network (GAIN). The success of these industry-wide systems led to the creation of company-specific systems for evaluating close calls. The analysis of close calls within airlines enables them to identify safety concerns specific to their organization.

ScotRail, a passenger railroad in Scotland, created the Confidential Incident Reporting and Analysis System (CIRAS). After a trial period, other railroads in the United Kingdom adopted this system to improve their safety management processes.

Evaluating close calls is also part of the safety management process in other industries like the chemical process and nuclear power industries. In those industries the probability of an accident is relatively low, but the adverse consequences are high.

This paper discusses the safety benefits of analyzing close calls and the lessons learned by organizations that successfully use those events as part of their safety management process.

## **What Is a Close Call?**

A commonly used definition of a "close call" refers to an event that *could have* resulted in personal injury, property damage, or environmental damage, *but did not*. However, this definition is too narrow. For example, events that cause injuries, or property damage, but do not reach the threshold for reporting can still provide information about system safety. When these events are used to evaluate system safety, they signal a weakness that, if left

alone, could result in more serious consequences. Small accidents may be predictive of larger accidents to come.

Instead, the following definition is proposed:

*An opportunity to improve safety practices based on a condition or incident with a potential for more serious consequences<sup>2</sup>*

This definition ties close calls to the safety management process. It highlights the opportunity to reduce risk by understanding the factors that lead to an unsafe event.

**Decide on a threshold for what events count as close calls**

Using this definition, a threshold must be set to decide what events count as close calls. This definition could be used broadly to include many cases, or narrowly to include only a few cases. Potential cases include:

- Events that happen frequently, but have low consequences (e.g., lifting objects that put employees at risk for minor injuries such as sprains)
- Events that happen infrequently but have the potential for high consequences (e.g., a train that proceeds past a red signal without proper authority)
- Events that cause an accident that is below the Federal Railroad Administration's (FRA) reporting threshold (e.g., an event that causes an injury requiring first aid, such as a cut)
- Events that are above the FRA threshold where the potential exists for a far greater accident (e.g., a slow speed collision with only minor damage to the equipment)

Ultimately, what events are considered close calls depend on how these events are used in the safety management process.

## **Safety Benefits of Analyzing Close Calls**

The benefits of using close calls lay in how they are systematically used in the safety management process. A safety system is the combination of procedures, equipment, and training, used to manage safety. Close calls represent an opportunity to identify and correct weaknesses in the railroad's safety system prior to an unsafe event.

After implementing changes in safety, managers can use close calls to monitor the effectiveness of these changes in railroad operations over time. Safety managers and labor organizations can use information gathered from close call events in ways that range from reactive to proactive.

**Reactively analyzing close calls identifies why unsafe events occur after safety has been compromised**

### **Reactive Approach**

Reactively analyzing close calls identifies why unsafe events occur *after* safety has been compromised.

In a reactive approach, close calls are analyzed like reportable accidents to understand the contributing factors. Analyzing individual events makes it possible to identify where safety is compromised and develop solutions to these threats.

Recommendations made by the Switching Operations and Fatality Analysis (SOFA) working group illustrate how the analysis of accident and injury data can improve safety<sup>3</sup>. The SOFA working group analyzed fatalities and injuries in switching operations and identified several contributing factors. Based upon this analysis, the group proposed five safety recommendations to the railroad industry.

**Proactively analyzing close calls looks at several cases to find trends or patterns before safety is compromised**

### **Proactive Approach**

In a proactive approach, close calls and reportable accidents are collectively analyzed to identify trends or patterns related to failures or weaknesses in the safety system.<sup>4</sup> As the number of *reportable* events, like accidents have declined, the predictive value of this information has decreased, since there are fewer outcomes to suggest trends.<sup>5</sup> Close calls provide additional information to guide decisions related to safety management.

Also, proactively using close call information in safety management focuses attention on the future, so that the past does not repeat itself.<sup>2</sup> There are many benefits to using close call events proactively.

***Close calls can show where current weaknesses exist in the safety system.*** Close calls occur more frequently than reportable events, like accidents. Therefore, monitoring close calls can identify trends where protection is missing or could be improved, prior to an accident.

For example, a train collision took place in 1999 at Paddington in the United Kingdom, when the locomotive engineer passed a red signal. Following the accident, investigators discovered that the red signal at this location had been violated on eight previous occasions due to problems with the signal system.

***Close calls can be used to monitor changes in safety over time.***

The higher frequency of events increases the sensitivity for detecting new failures as well as existing ones. Thus, the railroad can adapt to the conditions that change gradually over time as well as unexpected events.

***Monitoring close calls can uncover hidden conditions previously not exposed by looking at reportable accidents alone.*** Hidden conditions such as design defects, gaps in supervision, unworkable procedures, and inadequate training may be present for years before they combine with local circumstances to result in an accident.<sup>5</sup> Where observable failures may be unique to an event, hidden conditions are more likely to be consistent across a range of events. Close calls can identify patterns over time and across facilities.

## **Who Benefits from Analyzing Close Calls**

***Everyone benefits from using close calls to control safety***

When close call events are analyzed, everyone benefits:

- An effective program for collecting information about close call events shifts safety awareness to individuals at all levels of the organization. Safety becomes a concern for everyone.
- All groups see economic benefits in reducing costs associated with reductions in time lost from injuries, damage to railroad property, damage to the environment, and time required to move the customers goods. Productivity improves when the railroads can more effectively schedule train and maintenance operations.

## **Lessons Learned from Organizations that Analyze Close Calls**

Organizations that successfully analyze close calls share information well. They:

- Encourage disclosure by building and maintaining trust between the railroad parties
- Engage front-line staff in the design of the system to build the trust necessary to foster disclosure
- Structure the system so that information can be easily organized and analyzed
- Provide continuous feedback to people at all levels of the railroad

### **Encourage disclosure by building and maintaining trust**

Features that encourage the disclosure of close call events include: using a third party to collect and store the information, screening close calls for inclusion, confidential reporting, and limited protection for sources from liability or enforcement.<sup>6</sup>

Third parties are neutral organizations that collect and store the close calls. In addition to collecting the information, they can check the information for accuracy, appropriateness, and

completeness. With CIRAS, the reporting system developed by ScotRail in the United Kingdom, individuals provide information about a close call by mail or telephone to an independent third party. After receiving the initial report, the source may receive a call from the third party to acquire more detailed technical, environmental, and personal information and to verify the accuracy of the information.

It is important that only appropriate information is entered into the system. Does the event meet the definition of a close call? When a close call is reported, someone must determine whether it should be included in the system. One positive way of filtering close calls is to include the stakeholders in the decision. For example, in the GAIN system, two representatives, one from the FAA and one from a labor organization, decide whether to include the information in the system, using a team approach to handling close call events that provides mutual protection.

***Assuring confidentiality makes individuals more comfortable disclosing information***

Confidentiality in reporting encourages individuals to feel more comfortable disclosing close call information. CIRAS removes identifiers (e.g., name, location) and the information is stored in a database, to protect the identity of the individual reporting the information. The original forms are returned to the individual and no copies are made.

***Limited protection from liability and enforcement allows freer information exchanges***

Protecting people and organizations from liability and enforcement creates an environment where employees and managers feel comfortable disclosing information. Successful close call systems, like the ASRS database also protect the person disclosing information from disciplinary action. However, this protection does not provide immunity from all unsafe behavior. Behavior that willfully or recklessly places others in danger (i.e. sabotage or substance abuse) must be dealt with responsibly.

Drawing the line between acceptable and unacceptable behavior and communicating that information throughout the organization poses a significant challenge to the successful use of close calls.

### **Engage Front-Line Staff in the Design of the System**

Successful implementation of a close call system requires acceptance by a broad segment of the railroad community. The best way to achieve this is to involve users from all stakeholder groups in the system definition and design.

### **Structure Systems to Organize and Analyze Information**

To facilitate the analysis of close calls, effective systems are structured to easily obtain information for an accident model of

how the system should work. In CIRAS, information is grouped in terms of human factors and plant/technical failures. The model addresses factors at both the individual and organizational level. This includes errors made by the front-line staff such as detection failures and application of the wrong rule. It also includes errors associated with management such as resource allocation, staffing, procedural failures, and equipment design.

### **Provide Feedback to All Levels of the Organization**

Sharing information with individuals at other locations sensitizes them to the potential hazards. Successful safety management systems that use close call events provide feedback at all levels of the organization. There are several advantages.

*Feedback from close call systems enables people to track the threats to safety and weaknesses of the system over time.* The railroad industry can better adapt to emerging threats to system safety as conditions change. Several close call systems (CIRAS and ASRS) produce reports for the industry that describe trends or patterns across an organization.

Feedback, however, must be used properly to manage safety. While it is helpful to measure the effectiveness of a solution in resolving a problem using close calls, it is counterproductive to set a goal of simply reducing the total number of close calls. One nuclear power plant that set goal of reducing the total number of disclosed close calls achieved a 50% reduction in disclosures in the first month followed by a greater reduction in subsequent months.<sup>7</sup> However, none of this had impact on the actual occurrence of the problem.

*Feedback allows people to monitor the success of specific solutions.* It is important to determine the degree to which a solution corrected a failure.

*Timely feedback from the system can be given to the person who reported the close call.* Giving timely feedback after someone discloses a close call shows that the information is valued and encourages continued disclosure.

## **Next Steps**

Successful implementation of a close call system requires acceptance by a broad segment of the railroad community. Creating acceptance requires a dialog about how close calls will be used to build trust among the stakeholders. Any discussion will need to involve the participation of all stakeholders. While some members of the railroad community are familiar with the use of close calls, many others are not.

**Learn more about  
using close calls and  
discuss issues at a  
workshop**

The FRA's Office of Research and Development is sponsoring a workshop for railroad industry to learn more about the benefits of using close calls to manage safety within a railroad. Several speakers will:

- Share how their organization or industry uses close calls to manage safety
- Identify challenges to the development and use of close calls, and discuss solutions to those challenges

The workshop will provide an opportunity for participants to raise issues that concern the railroad industry and propose solutions.

## References

- <sup>1</sup> Weick, K. (1991). Organizational culture as a source of high reliability. *California Management Review*. 29: 112-127.
- <sup>2</sup> Phimister, J.R. Oktem U., Kleindorfer P.R., and Kunreuther H. (2000). *Near-Miss Management Systems in the Chemical Process Industry*. <http://opim.wharton.upenn.edu/risk/downloads/01-03-JP.pdf>.
- <sup>3</sup> Switching Operations Fatality Analysis Working Group. (1999). *Switching Operations Fatality Analysis: Findings and Recommendations of the SOFA Working Group*.
- <sup>4</sup> van der Schaaf, T.W. (1991). A framework for designing near miss management systems. In *Near Miss Reporting as a Safety Tool* (ed. Van der Schaaf, T.W., Lucas, D.A., and Hale, A.R). Boston: Butterworth Heinemann, 27-34.
- <sup>5</sup> Reason, J. (1998). Safety culture: Some theoretical and practical issues. *Work and Stress*. 12 (3): 293-310.
- <sup>6</sup> (Davies, J.B., Wright, L., Courtney, E., and Reid H. (2000). Confidential incident reporting on the UK railways CIRAS System. *Cognition, Technology, and Work*. 2:117-125.
- <sup>7</sup> Ives, G. (1991) "Near miss" reporting pitfalls for nuclear power plants in *Near Miss Reporting as a Safety Tool* (ed. Van der Schaaf, T.W., Lucas, D.A., and Hale, A.R). Boston: Butterworth Heinemann, 51-56.

To obtain additional copies of this paper or for more information about the workshop, contact:

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## APPENDIX H. SYNCRUDE CASE STUDY

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Although this case study is not from the transportation industry, it is included in this Appendix since it makes an excellent business case for studying close calls.



### CASE STUDY<sup>3</sup>

*Organization – Syncrude Canada Ltd.*

*Website URL - [HTTP://WWW.SYNCRUDE.COM/](http://www.syncrude.com/)*

*Program Name – Loss Management*

*Program Launch – Early 1980's*

#### *About Syncrude –*

Syncrude Canada Ltd. is the world's largest producer of crude oil from oil sands.<sup>4</sup> It also is the largest single source producer in Canada, currently supplying 13 percent of Canada's petroleum requirements. Syncrude has been in existence since 1964, with production beginning in 1978. It manages and operates all oil sands activities on behalf of the numerous companies comprising the Syncrude Project joint venture. The Project's operations consist of three principal stages: mining, extraction and upgrading. Through the use of water-based extraction technology, Syncrude separates oil from the sand that is surrounded by a water barrier. Since 1984, output of crude oil has more than doubled annually while unit-operating costs have been cut in half. But while Syncrude is recognized as a highly productive and profitable organization, it also is known and has

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<sup>3</sup> This case study was prepared by Dr. Phyllis G. Thompson of the U.S. Chemical Safety and Hazard Investigation Board. The CSB is an independent, non-regulatory federal agency whose mission is to investigate and help prevent chemical-related incidents at commercial facilities. The case study is based on information identified through Internet research, review of documents provided by Syncrude, and interviews conducted with company employees and other knowledgeable individuals. No separate attempt has been made to independently assess this information or Syncrude's near miss program and its results.

<sup>4</sup> [HTTP://WWW.ENERGY.GOV.AB.CA/COM/SANDS/INTRODUCTION/OIL+SANDS.HTM](http://www.energy.gov.ab.ca/com/sands/introduction/oil+sands.htm)

been formally acknowledged for its corporate social and environmental responsibility and commitment to sustainable development.

### **Program Details –**

#### General Concept and Administration

Syncrude's emphasis on near miss reporting is an integral part of the company's comprehensive loss management initiative, which embraces business practices related to safety of the people in the company, health of people outside of the company and overall protection of the environment. At Syncrude, loss control management, defined by Bird as "the application of effective management skills to the control of loss from the risk of business"<sup>5</sup>, is *the* way of (profitably) doing business and safety is an operational strategy.

The company subscribes to the philosophy that a safe, healthy, financially secure, and content worker is more productive. Its view is that safety is not a business expense. . .but lack of safety is. And lack of safety represents both a direct expense (e.g., investigation costs, production downtime, medical expenses, damage to equipment or product, sick pay, repairs, legal costs, court fines) and indirect expense (e.g., employers and public liability claims, business interruption, product liability, training of replacement staff, loss of goodwill, loss of corporate image) that Syncrude has determined it cannot and will not accept. Syncrude's attitude toward loss management evidences itself even in contracts that Syncrude awards, which include loss management elements and take into consideration what prospective vendors offer their own employees in the way of, for example, safety programs and benefit packages.

In explaining its comprehensive approach to safe operations, Syncrude's Chairman and Chief Executive Officer (CEO) has emphasized that "putting people first" is the surest route to success in business. With that as a guiding philosophy, and with support starting at the very top of the company and continuing down through the management structure, Syncrude has instituted a rigorous, proactive program focused on preventing trouble before it occurs as a means of furthering the cause of its bottom line objectives. Syncrude's loss management program defines and is its way of doing business, and has led to inculcation of an effective safety-based culture throughout the company.

Syncrude recognizes there may be easier, less expensive alternatives to its systematic, comprehensive effort program, but its position is that those ad hoc alternatives would prove more costly in the long term. Consistent with this position, it has elected not to address safety in isolation, making it, instead, a core element of its integrated approach to loss management. This macromanagement model of loss control permits Syncrude to rapidly realize the cost effectiveness and bottom line impact of its program. By identifying actual losses, Syncrude is able to put contingencies in place to prevent future losses. By identifying potential losses, it is able to put preventative measures in place before losses occur.

Syncrude admits it is difficult for it to calculate how much effect any single part of the tightly integrated program has had on the company's overall performance. This includes near miss reporting, which started about the same time as Syncrude's overall loss management program. Syncrude defines a near miss as an undesired event, which, under

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<sup>5</sup> Bird and Germain, *Loss Control*, 29.

slightly different circumstances, could have resulted in harm to people, damage to property or loss to process. Like an actual incident, it might result from hazardous conditions, non-compliance behavior or inadequate operational documents (e.g., job standards; training materials). From its perspective, the only difference between an actual incident and a near miss incident is that the latter involves no perceivable loss. It investigates both in the same manner, searching for root causes and corrective actions. Syncrude believes its integrated approach to loss management, and its objective of continuous improvement in every aspect of its operation, yield benefits that increase over time. It believes the safer it is, the more profitable it is. And it believes that its use of near miss information is driving down the number of actual incidents. Significantly, it has tangible proof of the validity of those beliefs.

### ***Operational Features and Procedures***

The effectiveness of Syncrude's near miss reporting effort relies on worker training, information collection, information analysis, action planning, implementation assessment, and feedback and reward systems.<sup>6</sup>

***Worker Training*** - New Syncrude and contract employees are given a site-wide orientation, a departmental orientation and an area-specific orientation. Contractors also take a Construction Safety Training System (CSTS) or equivalent course before coming to any of Syncrude's oil sands operations. All workers are trained in programs such as "New Worker Initiative," and "Field Level Risk Assessment" (FLRA).

Syncrude believes FLRA probably is the way in which workers best learn about the importance of near miss reporting because it emphasizes, prior to workers beginning their jobs, the identification of hazardous conditions, substandard performance, and other factors about which Syncrude wants to be kept informed. Syncrude considers this training, and the worker's acceptance of and commitment to the need to report near misses, the last barrier and defense against incidents because it occurs just before work has begun and often long after job assessments, risk assessments, engineering, and other formalized processes have been completed. Following this initial phase of their training, Syncrude continues to support its new workers by requiring every new employee to have a mentor working with him or her. This mentoring is especially important when two factors converge, as they are now doing due to a major expansion effort at Syncrude: areas are under construction and workers assigned to those locations are new to the site.

After being employed for a period of time, most mine employees take a specialized course on "Loss Control Reporting", which deals with why and how to effectively report problems, including near misses and actual incidents. The problems they are asked to report are not limited to injuries and property (facility/equipment) damage. Syncrude also collects reports in the following categories: occupational illness, loss of containment, fire/explosion, production, security, and environmental. Shortly it will begin asking for and analyzing reports on business/administrative problems.

***Information Collection*** – One way Syncrude captures information on near misses is through pocket cards that employees and contractors fill out, anonymously if they wish.

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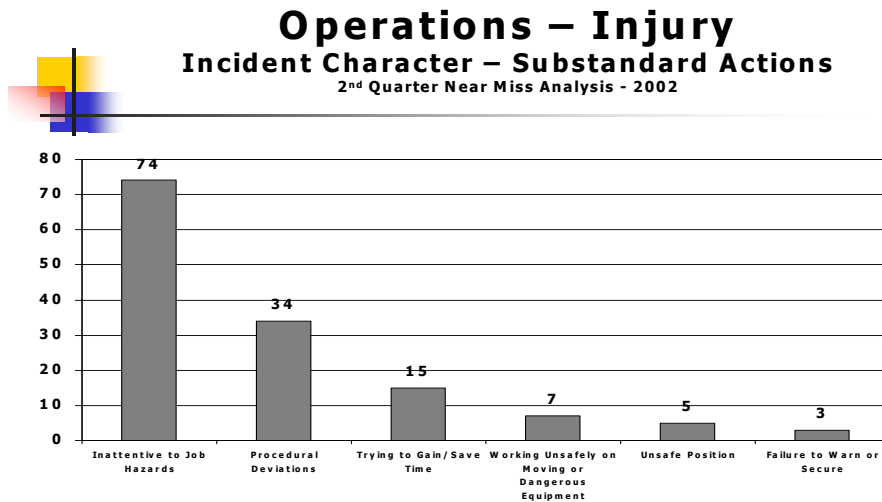
<sup>6</sup> While mining has been used for many of the following examples, the other Departments also are actively engaged in near miss initiatives.

(See Syncrude's Near Miss Card on the last page of this case study.) The cards, which vary somewhat in format depending on the operation and department, are used to collect information on and classify reported errors as near misses, hazardous conditions and non-compliance (i.e., tasks or actions done contrary to established rules or procedures). They also permit persons to report both compliance and situations warranting commendation, that is, observations of tasks or actions completed correctly and safely and observations of jobs well done.

Information on the cards is entered into a central database that contains current and historical details about all near miss and actual incidents, as well as hazardous condition and compliance data. The database provides consistency in the treatment of data and is at the heart of the automated reporting system, giving Syncrude the ability to provide instantaneous feedback, generate sophisticated analyses and track open and closed actions.

People are more inclined to use the cards, as opposed to preparing the traditional, formal incident reports, since they make reporting easy and simple. In a single year, for example, one department received 9,270 card reports. Consistent with the overall corporate profile, the number of actual loss incidents has decreased as card reporting has increased. Other benefits noted by departments have been reduced injuries, increased damage reporting, and employees who today are better able to recognize hazards and at-risk behaviors and are not hesitant to report them.

Card information is monitored and training is provided to help improve report quality. Syncrude takes some action on every report, even if it is only to notify the submitter that it was received and that the company appreciates the person's contribution. In order to break the incident chain, Syncrude works backward from the observed event through the sequence of steps that led to the near miss. This reverse engineering approach allows Syncrude to identify, link and understand the conditions existing prior to the near miss so appropriate actions can be designed to prevent recurrence. Everyone is kept informed of the status of efforts being taken to address reported events, such as near misses, through such means as notices on bulletin boards and information in the company's internal newsletter. Significant reports and actions are specially highlighted (e.g., installation of sidewalks in an area where pedestrians and vehicles were sharing the same street space, with the potential for occurrence of life-threatening actual events). As part of the maintenance effort to keep program awareness high, individuals are publicly recognized and rewarded (e.g., through receipt of stickers, and entry of their reports into drawings held for modest prizes) for submitting cards.



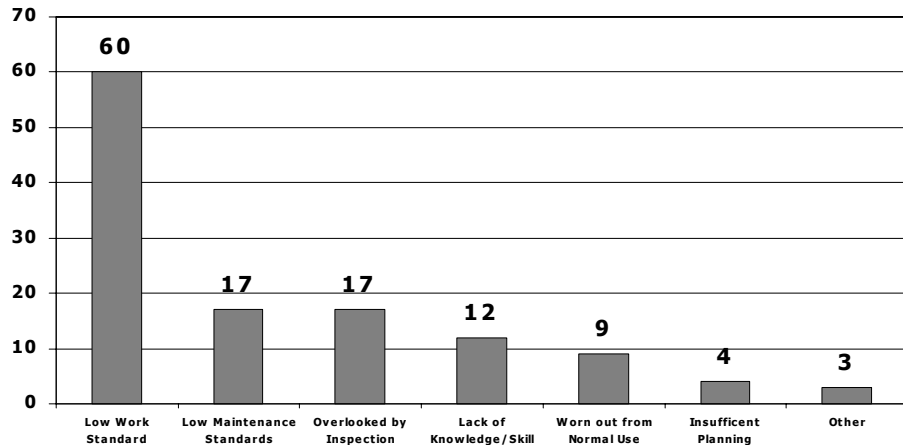
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**Information Analysis** – Every quarter, and then again annually, Syncrude’s Mine Department compiles statistics on near misses in mining. It derives the information from reports submitted by both its employees and contractors in the Department’s various divisions (e.g., Mine Operations, Mine Maintenance). Details contained within those reports are examined from a variety of perspectives, and translated into quantifiable, objective terms consistent with Bird’s emphasis on what must be done in order to manage loss by measuring performance. Once the incident reports are categorized to show the organizational unit from which they were received, and by the general nature of consequences reflected in the reports (damage and injury), further analysis occurs. As the following examples indicate, this analysis involves breaking down information in the reports into ever finer detail, looking at that information in terms of incident character, basic causes, substandard actions, causal factors, equipment involved, and locations.

## Operations – Damage

### Incident Character – Basic Causes

2<sup>nd</sup> Quarter Near Miss Analysis- 2002

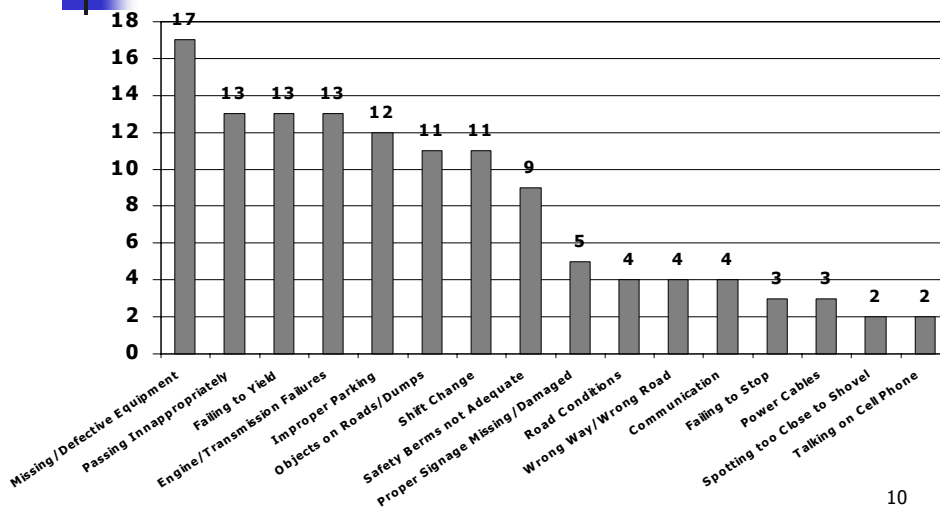


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## Operations – Damage

### Driving and Operating Procedures – Causal Factors

2<sup>nd</sup> Quarter Near Miss Analysis - 2002



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**Action Planning** – Based on its analysis of information contained in near miss reports, Syncrude develops a strategy for addressing noted problems. This might involve, for example, identifying questions that must be answered, policies and standards that must be reviewed, equipment changes that must occur, or training that must be developed. Specific action items are developed, assigned to lead individuals along with due dates, and tracked to completion. The following action descriptions are taken from a list of 70 action items prepared in the case of an initiative involving vehicle near misses on haul roads.

- Study the visibility and road conditions categories on the LCR and recommend improvements.
- Ensure that signal/clearance lights are being upgraded to L.E.D. lighting.
- Review and revise existing berm standards to ensure visibility at intersections.
- Study training and orientation packages to ensure that people have learned material and that they are tested.
- Find out worst-case scenario for hauler stopping distance.

**Implementation Assessment** – Program implementation involves two major steps: data management and corrective action evaluation. Syncrude has an extensive Loss Management information system that has evolved over 25 years and serves as the nerve center for the near miss program. It currently is undergoing revision to improve its “user friendliness” and to incorporate a standardized design for capturing near misses and hazardous conditions company-wide. The system is comprised of over 50 Oracle tables sitting on at least four different servers, with applications (including an automated Management of Change application) linked (or planned for linkage) to corporate budget, work order, medical and other related tables.

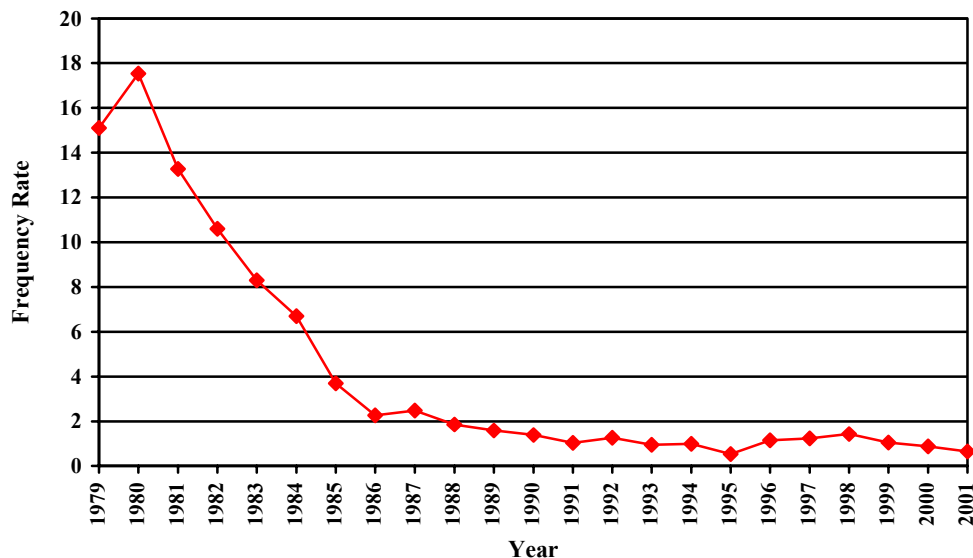
With information in hand, Syncrude is able to study near miss events to design appropriate corrective actions. Teams may be convened to work on a problem through development of an action plan, conduct of a continuing series of analytical meetings, execution of specific assignments and preparation of action reports. However, as the company is encouraging near miss reporting with the goal of driving up the number of reports, it cannot and does not measure its success in addressing near misses by whether the total number of near misses goes down. Instead, it focuses on measuring its success based on whether the number of actual incidents decline and whether the kind of near misses being reported changes. It believes it has succeeded in both cases, pointing out, as one example, the fact that the number of incidents between haulers and light vehicles has declined while the number of haulers on the roads has increased.

**Feedback and Reward Systems** - Those responsible for the Mine Department's near miss reporting effort prepare a quarterly near miss study for mine management, team leaders and the Mine Safe Operating Committee. The information in the study is shared, through team meetings, with all mine workers. Some other Syncrude departments have similar reporting and analytical initiatives specific to their own operations.

Workers throughout the company have tangible incentives, in the form of quarterly gainshare checks, to address productivity and safety goals. The formula for calculating gainshare checks takes into account both production costs relative to targets, as well as the lost time injury (LTI) frequency rate. Being under budget and being safe translate into being rewarded. Checks are distributed corporate-wide when quarterly performance on at least one of the performance indicators is better than the previous best record.

Syncrude's goal is to achieve a corporate culture in which employees are so careful that injuries do not occur and, as a result, LTIs do not exist. The result of Syncrude's 20-year-history of working to reduce injury frequency rates (including both medical aid and lost time injuries) is reflected in the following graph of mine department employee injuries. It serves as evidence that incentive programs, coupled with effective near miss programs, can drive both incidents and associated injuries downward. While the graph reflects only the mine department, the injury records for the entire corporation and for Syncrude contractors mirror this downward trend.

**Year End Recordable Injury Frequency Rate  
Syncrude Mining Employees**





### **Program Results and Evaluation**

Syncrude has been able to measurably document benefits in at least three areas that are attributable to near miss information and its overall loss management programs: operational productivity, cost savings, and efficiency.

**Operational Productivity** - Incidents rates have decreased even as near miss reporting has increased. Syncrude calculates frequency rates using the formula

$$\frac{I * 200,000}{T}$$

T

where:

- I is the number of medical aid and lost time incidents (while classifying an incident in the medical aid category might be problematic, (i.e., was medical aid actually required), an incident is classified in the lost time category if any hours are missed over and above the day of an incident),
- 200,000 is the number of hours a “typical” small company’s employees would work in a year (this is an industry standard of measurement applied in the mining, construction and oil industries), and
- T is YTD exposure hours (i.e., the number of hours actually worked).

Less incidents and more hours worked translate into greater productivity. They also translate into tangible savings. One area of savings has been in insurance premiums. As Syncrude has demonstrated the effectiveness of its loss management program (e.g., through decreases in the frequency rates of incidents), insurance rates have dropped.

**Cost Savings** - Improvements in Syncrude’s safety record have led to substantial, direct savings of at least one million dollars annually in insurance costs (for worker compensation for injuries and for coverage for property damage) and much more influence over the property insurance terms offered by its private sector carriers. It has one of the lowest insurance premiums for worker coverage in either the oil or mining industries in Canada. Syncrude’s insurance premiums are set by the government chartered, independently operated Worker’s Compensation Board (Board), whose regulations encompass the majority of employers and employees in the province and whose funding comes exclusively from the regulated employers.

The Board bases employers’ premium rates on the type of industry and the frequency and severity of injuries for the industry. Syncrude is the first company in the province to have the Board set its premium based on the company’s measured safety record instead of on the standard applied to its industry. This customized “savings for safety” incentive,

while not a standard underwriting approach, is viewed by the Board as a promising way of encouraging appropriate organizations to initiate comprehensive efforts similar to Syncrude's. Appropriate organizations are those meeting the criteria of corporate size, health and safety program sophistication, and disability management.

Like all covered employers, Syncrude is only required to report an injury to the Board if that injury results in the worker being off beyond the day of the injury. Although the Board does not require near miss reporting, the Alberta Provincial Government's Dept. of Human Resources and Employment (HRE) does. In addition to fatalities and injuries requiring hospitalization for more than 2 days, HRE requires three categories of near miss events to be reported to its Division of Workplace Health and Safety (equivalent to a U.S. state's OSHA): (1) unplanned or uncontrolled explosion, fire or flood that causes a serious injury or has the potential of causing a serious injury; (2) collapse or upset of a crane, derrick or hoist; (3) collapse or failure of any component of a building or structure necessary for the structural integrity of the building or structure.

Syncrude estimates that, across the board, it annually saves between \$150 - \$200 million dollars... about ten percent of its annual crude oil production... as a result of improved operational reliability attributable to the success of its loss management programs across all operations (i.e., mining, extraction, utilities, refining). Safety translates into lower operating costs, and control over costs allows control over and improvement of margins.

Early in its existence Syncrude realized it would pay a price, literally, if it failed to run a safe company. Its property insurance and worker compensation rates would be higher. Production could suffer due to absence of injured employees from the job, the need for more frequent repair of equipment, and shortened useful life of capital assets. In short, over two decades ago Syncrude acknowledged that unsafe operations could place it at a competitive disadvantage, and it began to address that challenge. Its efforts have been successful and everyone has benefited. As its employees and contractors work smarter and safer, the company saves money. It shares those savings with employees, providing further incentive for them to improve safety. The statistics show that those incentives and the emphasis on preventing incidents work.

- Syncrude today has over ten times fewer injuries than in earlier years. Its goal is to have zero injuries on site that cause anyone to have to miss work.
- According to Syncrude Corporate Loss Management, employees and contractors combined worked a total of approximately 21 million hours in 2002. Through the end of 2002 the lost time injury rate, again for both employees and contractors combined, was 0.10 per 200,000 hours (which is approximately 100-person years) worked. This translates into 10 lost time injuries for the 21 million hours.

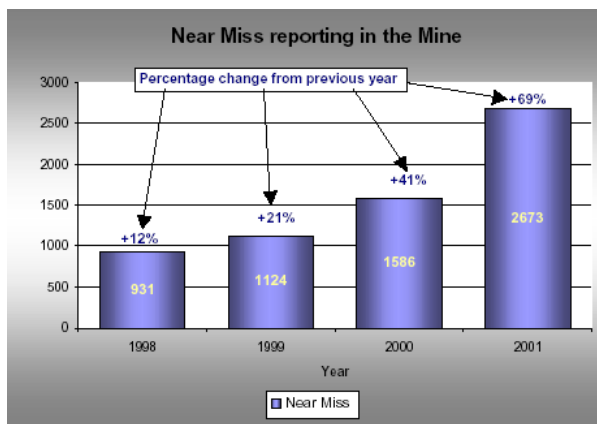
- In addressing the 0.10 injury rate for 2002, Syncrude's year-end stewardship report states this was "...our lowest year end value ever recorded." By comparison, for 2001 the injury rate was 0.15. The 2002 year-end performance represents a 33% decrease in the lost time frequency rate over 2001 even while workforce exposure hours increased by 35%.
- The reduction in lost time injuries has occurred despite the fact that, beginning in 2002, Syncrude has engaged in a major construction program to expand the entire plant (e.g., physical size, amount of equipment, production capability) by at least fifty percent. In addition, this expansion has been coupled with a major hiring initiative.

Due to its focus on safety and near miss management, Syncrude has been able to effectively control for the risk of exposing employees. . .experienced as well as inexperienced. . . to new occurrences of potentially hazardous conditions.

**Efficiency** - Studies done on reported near misses have resulted in operational changes. For example, a study done in 1997 and 1998 led to the realization that, given the number of near misses between heavy haulers and light vehicles, it was only a matter of time before there would be an actual collision. A collision had the potential to cause severe consequences. In order to prevent those incidents, Syncrude examined factors that could contribute to a collision: road and intersection design, hauler design, lighting, inattentiveness, sign standards, driving standards. A comprehensive action log was developed, and actions tracked to completion, in order to address noted deficiencies. To date, Syncrude has not experienced any collisions and attributes the lack of incidents to its proactive, systematic use of near miss information.

### Lessons Learned -

As near miss reporting has increased, incidents have decreased, employees have received financial rewards, and Syncrude has realized increased productivity and decreased operating costs. The benefits have been significant and sustainable. In order to reach the point where it is today, the program has been modified over time in a number of areas



and currently is under review to see where it might again be strengthened. One item agreed to by Syncrude's Senior Loss Management Advisors is that the company needs and will construct a common data system for capturing near misses, hazardous conditions, and other associated information.

Syncrude's proactive, results-oriented approach to identifying and correcting substandard conditions before an incident occurs takes energy, commitment and time. However, as Syncrude has learned, it returns tangible benefits to the bottom line, as well as in the form of situational awareness, attention to safety and to the environment in which employees work, management and worker accountability, and information on near misses (and incidents) that were reported and acted upon. By identifying and correcting near miss and hazardous conditions and unsafe behaviors, all of which have been proven to be leading indicators of actual incidents, the chain of events that ultimately results in loss is broken. Whether that loss comes in the form of equipment damage or human injury, it is a loss Syncrude will not accept. Syncrude's efforts are designed to ensure it need not face such losses and its record proves those efforts have been highly effective.

While Syncrude recognizes that any near miss reporting system must be industry-specific, it also has learned that certain principles apply regardless of the industry sector. Based on its experiences, Syncrude would advise those interested in establishing a similar program to keep the following recommendations in mind:

### *Structure*

- make the program a regular, not a separate, part of organizational operations.
- keep all aspects of the system as simple to understand, easy to use and convenient to operate as possible to facilitate reporting, feedback, and action.
- have a single, company-wide reporting, data collection and management system, not separate systems for different operating units, since data needed in initial reports is the same regardless of the operating unit.

### *Actions*

- use severity and potential impact of near misses as the criteria for deciding the priority to assign to a near miss report, the general approach and specific actions to take, and the level of resources to devote to addressing the problem.
- make a conscience decision about the need for action on every report and, if action is warranted, track it to completion.

### *Involvement*

- have key, if not total, management support before initiating the program.
- empower employees to take actions on unsafe conditions and acts.

***Feedback***

- accept anonymous reports, but educate workers on the need to submit at least enough information to permit some type of action to occur.
  
- have a standardized way of formally letting submitters know their near miss report was received and is getting some level of attention.
- have a standardized way of letting everyone regularly know about ongoing as well as completed action(s) taken on at least major reported near misses, minimally including in the widely distributed status report the date each near miss was reported, a description of each near miss event and a description of the action(s) being taken on each reported event.
- provide periodic update reports on actions underway when their completion spans an extended period of time.
- provide public recognition and token rewards to those who report near misses, making it clear that reporting is a positive step.



SIDE 1 – Near Miss Reporting Card

**Work Observation**

<b>Department:</b>	<b>Division:</b>	<b>Team – Area:</b>
<b>Company:</b>	<b>Location:</b>	<b>Observer:</b>
<b>Date:</b>	<b>Mode of Operation:</b> <input type="checkbox"/> Shutdown <input type="checkbox"/> Normal	
<b>Activity Observed:</b>		
<b>Personal Contact Made</b> <input type="checkbox"/> YES <input type="checkbox"/> NO		
<b>Item</b>	<b>Safe</b>	<b>At Risk</b>
<b>Personal Protective Equipment</b> – appropriate for task, in good condition <b>Comment:</b>		
<b>Line of Fire</b> - safe positioning, pinch points <b>Comment:</b>		
<b>Balanced Grip, Position, Traction</b> – not in danger of overreaching, falling, sliding, etc. <b>Comment:</b>		
<b>Focused on Job at Hand</b> – eyes and mind on task, good view of work. <b>Comment:</b>		
<b>Access and Egress</b> – clear path to move to and from area, easy access to equipment <b>Comment:</b>		
<b>Screens/Guards in Place</b> – required screens, hoarding, flagging in place <b>Comment:</b>		
<b>Housekeeping</b> – area free of debris, material, tripping hazards <b>Comment:</b>		
<b>Use of Tools &amp; Equipment</b> – right tool/equip. for job, safety devices and guards in place <b>Comment:</b>		
<b>Use of Vehicles or Mobile Equipment</b> – following rules and regulations, spotter required <b>Comment:</b>		
<b>Codes, Practices, Procedures</b> – e.g. permits, lockouts and isolations, tagging, excavations, vessel entries <b>Comment:</b>		
<b>Rigging and Hoisting</b> – following proper lifting practices, lifting devices in good condition, <b>Comment:</b>		
<b>ACTION TAKEN:</b> Record on other side, with any more comments		

SIDE 2 – Near Miss Reporting Card



*SAFE ACTION*

<b>Department:</b>	<b>Division:</b>	<b>Team – Area:</b>		<b>Location</b>
<b>Date:</b>	<b>Observer:</b>	<b>Company:</b>		<b>Mode of Operation:</b> <input type="checkbox"/> Shutdown <input type="checkbox"/> Normal
<input type="checkbox"/> <b>Compliance/Commendation</b>		<input type="checkbox"/> <b>Near Miss</b>	<input type="checkbox"/> <b>Hazardous Condition</b>	<input type="checkbox"/> <b>Non Compliance/At Risk</b>
<input type="checkbox"/> <b>Rules/Procedures</b>	<input type="checkbox"/> <b>Housekeeping</b>	<input type="checkbox"/> <b>Tools/Equip./Bldg.</b>	<input type="checkbox"/> <b>Vehicles/Mobile Equip./Road</b>	<input type="checkbox"/> <b>PPEs</b>
<b>What Did You Observe?</b>				
<b>What Action Did You Take?</b>				
■				





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[WWW.ASY.FAA.GOV/SAFETY\\_DATA](http://WWW.ASY.FAA.GOV/SAFETY_DATA)

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[WWW.GAINWEB.ORG](http://WWW.GAINWEB.ORG)

United Kingdom Confidential Incident Reporting System (CIRAS)

[HTTP://WWW.CIRAS.ORG.UK/](http://WWW.CIRAS.ORG.UK/)

Bureau of Transportation Statistics Safety Data Action Plan

[HTTP://WWW.BTS.GOV/SDI/SDAP000913.HTML](http://WWW.BTS.GOV/SDI/SDAP000913.HTML)

