



---

# **Risk Reduction – What it is and How it Works**

**Robert C. Lauby**  
**Acting Associate Administrator for Railroad Safety**  
**Chief Safety Officer**  
**Federal Railroad Administration**

**State Managers Meeting**  
**August 2013**  
**San Antonio, Texas**

---



# Today's Presentation

---



1. Introduce Risk Reduction.
  2. Explain How it Works.
  3. Explain How it can be Applied.
  4. Describe the Status of FRA's new Risk Reduction Regulations.
  5. Describe Labor's Role in Risk Reduction.
  6. Questions and Discussion.
-



# Railroad Safety Improvement Act of 2008

---



The Railroad Safety Improvement Act of 2008 contained numerous requirements for new regulations including:

- » Positive Train Control
- » Conductor Certification
- » Training Standards
- » Roadway Worker Protection
- » Risk Reduction Programs
- » And others...

# Impetus of RSIA



**Graniteville, SC  
January 6, 2005**

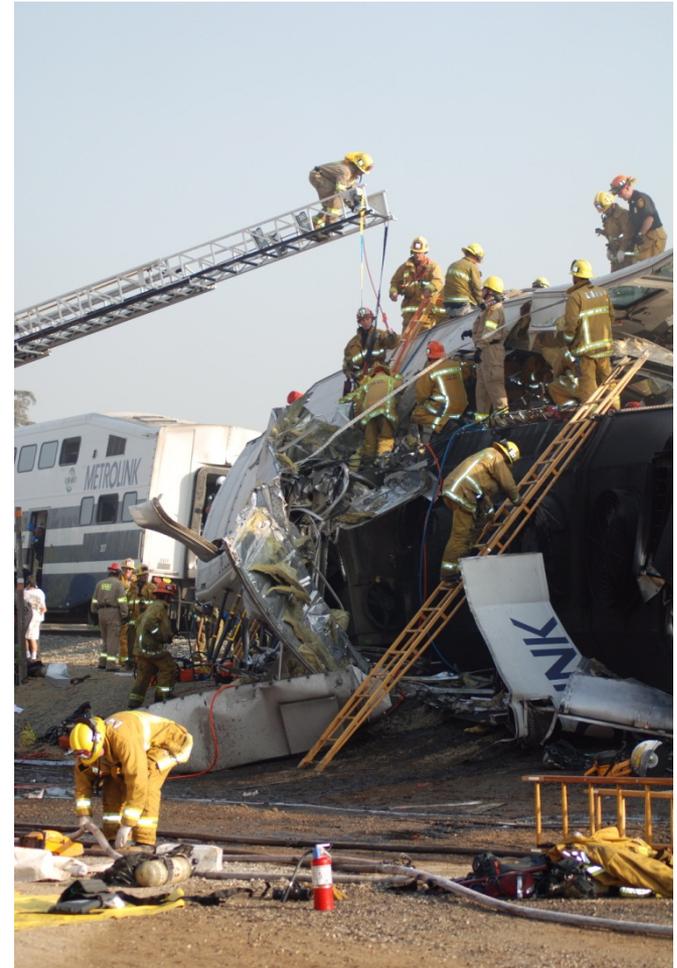
**9 Dead  
250 Injured  
5400 Evacuated 2 weeks**

# Impetus of RSIA

**Chatsworth, CA**

**September 12, 2008**

**26 Killed , 131 Injured**





# Rail Safety Improvement Act of 2008

---



The Act requires the following:

Not later than 4 years after the date of enactment of the Rail Safety Improvement Act of 2008, the Secretary of Transportation, by regulation, shall require each railroad carrier that is a Class I railroad, a railroad carrier that has inadequate safety performance (as determined by the Secretary), or a railroad carrier that provides intercity rail passenger or commuter rail passenger transportation ... to develop a railroad safety risk reduction program ... that **systematically evaluates railroad safety risks on its system and manages those risks in order to reduce the numbers and rates of railroad accidents, incidents, injuries, and fatalities.**

---



# What is a Risk Reduction Program?

---



A Risk Reduction Program ...  
**systematically** evaluates railroad safety risks on its system and manages those risks in order to reduce the numbers and rates of railroad accidents, incidents, injuries, and fatalities.

---



# Many Names for Risk Reduction



---

Risk Reduction Programs

Safety Management Systems

Hazard Management Systems

System Safety Program

Hazard Analysis

C3RS

Safe 2 Safer

---



# Many Names for RRP and RRP Programs

---



Risk Reduction Programs

Safety Management Systems

**Different**

Hazard Management Systems

**Flavors of the**

System Safety Program

**Same Concept**

Hazard Analysis

C3RS

Safe 2 Safer

---



# Risk Reduction – What is It?

---

## The Traits:

- It is a structured, documented, systematic process to identify potential hazards and appropriate methods for their elimination or control.
- A continuous process that should ideally be applied throughout all phases of a system life cycle.
- A method for documenting both hazards and mitigation strategies.
- It is both PROACTIVE – prevents accidents and REACTIVE – learns from accidents



# All Risk Reduction Programs Identify Hazards

---



Identifying and mitigating hazards is a key component of Risk Reduction Programs.

## Methods of Identification:

- Data Analysis
  - Physical Observations by Expert Panels or Safety Committees
  - Close Call Reports
  - Accident Investigation
-



# Benefits of Hazard Analysis

---



## HAZARD ANALYSIS:

- Allows hazards to be identified and documented
- Allows relative Risk to be Calculated
- Allows Hazards to be Prioritized
- Provides priorities in Mitigating Hazards

# Definition of Risk

---

**RISK = Hazard Severity x Hazard Frequency**

- Risk is not necessarily a Pure Number like an Accident Rate
- Dependent on the Definition of Severity
- Dependent on the Approach to Identifying Frequency

**However –**

Risk allows head to head comparison and prioritization of different Hazards.

---



# Hazard Identification Process



- A kind of “safety brainstorming”, to identify as many hazards as are possible and credible.
- Works best with “Expert Panels”\* that:
  - Conduct site surveys,
  - Interview site personnel,
  - Review data such as accident/ injury records, equipment records/ failures, other systems data, etc.

**\* AKA Hazard Management Teams**

How many potential hazards can you identify in this picture?



Crossovers can cause or escalate a derailment and result in secondary collisions.



Highway overpass is potential source of vehicles or other objects falling on track.



Freight cars indicate siding where equipment can roll out and foul main line.



Unprotected bridge support could be damaged in a derailment and cause a collapse.





# Railroads Should Develop Hazard Analysis Models

---



- The Hazard Analysis Model should include:
    - Severity Definitions
    - Frequency Definitions
    - Risk Matrix
    - Recommended Responses
    - Hazard Management Plan
  - Military Standard 882 contains a valid approach
-



# The Hazard Model should be Customized for the Railroad

---



## Hazard Analysis Model:

- The analysis method selected should be robust and comprehensive.
  - The method should be detailed enough to assist in managing risk.
  - The method should identify and document the hazards and hazard mitigation.
  - The method should be designed to provide long term hazard management assistance as the system changes and matures.
-



# RRPs need Hazard Severity and Probability Definitions

---



- The railroad must decide on what hazard severity and probability definitions to use.
  - Definitions must be in terms that are easily understood and applied.
  - Frequency of events can be defined as the number of events that can reasonably be expected during a year of operation or the life of the fleet.
-



# Sample Hazard Probability Categories: MS-882

DESCRIPTION	LEVEL	SPECIFIC INDIVIDUAL ITEM	FLEET OR INVENTORY
FREQUENT	A	Likely to occur frequently	Continuously Experienced
PROBABLE	B	Will occur several times in life of an item	Will occur frequently
OCCASIONAL	C	Likely to occur sometime in life of an item	Will occur several times
REMOTE	D	Unlikely but possible to occur in life of an item	Unlikely but can reasonably be expected to occur
IMPROBABLE	E	So unlikely, it can be assumed occurrence may not be experienced	Unlikely to occur, but possible



# Sample Hazard Severity Categories: MS-882



CATEGORY	SEVERITY	CHARACTERISTICS
<b>I</b>	Catastrophic	Death, system loss, or severe environmental damage.
<b>II</b>	Critical	Severe injury, severe occupational illness, major system or environmental damage.
<b>III</b>	Marginal	Minor injury, minor occupational illness, or minor system or environmental damage.
<b>IV</b>	Negligible	Less than minor injury, occupational illness, or less than minor system or environmental damage.



# The Hazard Assessment Approach

---

The Hazard Management Team would be responsible for:

- Documenting the Hazard
- Determining severity
- Determining frequency or probability of occurrence.
- Determining whether to eliminate, control, or accept the hazard



# Sample Hazard Assessment Matrix 882C



FREQUENCY OF OCCURANCE	HAZARD CATEGORIES			
	1 CATASTROPHIC	2 CRITICAL	3 MARGINAL	4 NEGLIGIBLE
(A) FREQUENT	1A	2A	3A	4A
(B) PROBABLE	1B	2B	3B	4B
(C) OCCASIONAL	1C	2C	3C	4C
(D) REMOTE	1D	2D	3D	4D
(E) IMPROBABLE	1E	2E	3E	4E

## Hazard Risk Index (HRI)

## HRI #

1A, 1B, 1C, 2A, 2B, 3A  
 1D, 2C, 2D, 3B, 3C  
 1E, 2E, 3D, 3E, 4A, 4B  
 4C, 4D, 4E



- 1 Unacceptable, eliminate hazard.
- 2 Undesirable, upper management decision to accept or reject risk.
- 3 Acceptable with management review
- 4 Acceptable without review

**SAMPLE  
HAZARD ANALYSIS  
WORKSHEET**

HAZARD IDENTIFICATION						MITIGATION APPROACH					
Hazard Number	Hazard Description	Cause	Effects	S	P	Mitigation Strategy	R e v i s e	R e v i s e	Status	Responsibility	Comments
1.1	Cab Car Grade Crossing Collision with Industrial Vehicle	Collision at Industrial Grade Crossing located at Milepost 234.5.	Cab car penetrated and derailed. Severe/Fatal Injuries to crew and passengers.	2	C	SHORT TERM: Reduce train speed from 50 mph to 30 mph to reduce severity and increase effective sight distance. Remove brush in the area of the grade crossing to increase visibility.	3	D	Closed	Operations Department Track & Signals Dept.	See Revised Time Table dated 11-01-2005.
				2	C	MEDIUM TERM: Petition state to add crossing gates to crossing.	3	E	Open	Admin. Government Affairs	Include in the FY 2007 Request
				2	C	LONG TERM: Work with industry to Eliminate Grade Crossing	4	E	Open	Grade Crossing Safety Committee	Meet with ACME Steel to negotiate construction of an overpass to increase safety and reduce delivery delays.
1.2	Cab Car Collision with Freight rolling stock	Vandals release hand brakes on cut of cars located on industry siding.	Cab car strikes freight cars. Cab car penetrated. Severe/Fatal Injuries to crew and passengers.	2	B	SHORT TERM: Increase local police patrols in the areas of greatest risk. Add lighting in the area of the siding.	2	E	Open	Security RR Police Dept. Facilities	Develop MOU with local police department to patrol area. Include improved lighting enhancements in the annual budget.
				2	B	MEDIUM TERM: Install automatic derail to prevent freight cars from fouling main.	3	E	Open	Track & Signals Dept...	Include automatic derail in the track capital budget.



# “What can make an accident more severe?”



- Train Speed
  - Yard
  - Mainline
- Drop from Height
  - Bridges
  - Elevated Track
- Striking a fixed Object
  - Bridge support
  - Bridge structure
- Fire Potential
- Submersion
- Other

**Mobile Alabama Amtrak Accident - September 22, 1993**  
**Lead Locomotive after striking the end of a through girder bridge**  
**at about 72 mph.**



**Mobile Alabama Amtrak Accident  
September 22, 1993  
Submerged Passenger Cars**





# RRP Teams Identify Hazards and Mitigations

---



RRP Hazard Management Team consists of :

- Knowledgeable individuals
- Representatives from
  - System Safety
  - Operations
  - Mechanical
  - Track and Signals
  - Labor
  - Joint users
  - Contract operators
  - Host railroads
  - Other Stakeholders (EMS, State DOT, FRA, etc.)



# Personal Bias Should be Set Aside

---



Other qualified individuals may participate, but,  
the Expert Panel should remain

**INDEPENDENT!**



# FRA is Currently Developing RRP Requirements

---



**System Safety Rule:** commuter and intercity passenger railroads.

- Product of the RSAC System Safety Rule Task Group
  - NPRM Issued in September 2012 (consensus)
  - Final Rule planned for Fall 2013
-



# FRA is Currently Developing RRP Requirements

---



## Risk Reduction Rule: Class I Freight Railroads

- Product of the RSAC Risk Reduction Working Group
- NPRM planned for Fall 2013(consensus)
- Final Rule planned for Spring 2014



# RSIA Identifies a Role for Labor in RRP Programs

---



## **The Act requires the following:**

... Each railroad carrier required to submit a railroad safety risk reduction program under subsection (a) shall consult with, employ good faith and use its best efforts to reach agreement with, all of its directly affected employees, including any non-profit employee labor organization representing a class or craft of directly affected employees of the railroad carrier, on the contents of the safety risk reduction program.

---



# There are Additional Roles for Labor in RRP Programs

---



Potential Areas for Labor Participation:

- Close Call Programs
- Hazard Management Teams
- Expert Panels
- Risk Reduction Program Reviewers



# Risk Reduction Programs Benefit from Participation

---



## Final Points:

- A Risk Reduction Program cannot reach its full potential to improve rail safety without participation of the individuals who operate the system.
  - The role for labor as reviewers and participants in Risk Reduction Programs is vital for the success of the program.
  - Labor needs to stand up and be counted!
-



---

# Questions & Discussion

---