



An Overview of Risk Management in Public Transportation in North America

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- United States Federal Government
- U.S. Department of Transportation
 - ◆ FAA -- Federal Aviation Administration
 - ◆ FHWA -- Federal Highway Administration
 - ◆ FRA -- Federal Railroad Administration
 - ◆ FTA -- Federal Transit Administration
 - ◆
 - ◆ **RITA -- Research and Innovative Technology Administration**
- John A. Volpe National Transportation Systems Center
 - ◆ Office of Safety and Security
 - ◆ Rail and Transit Systems Division (RTV-3D)



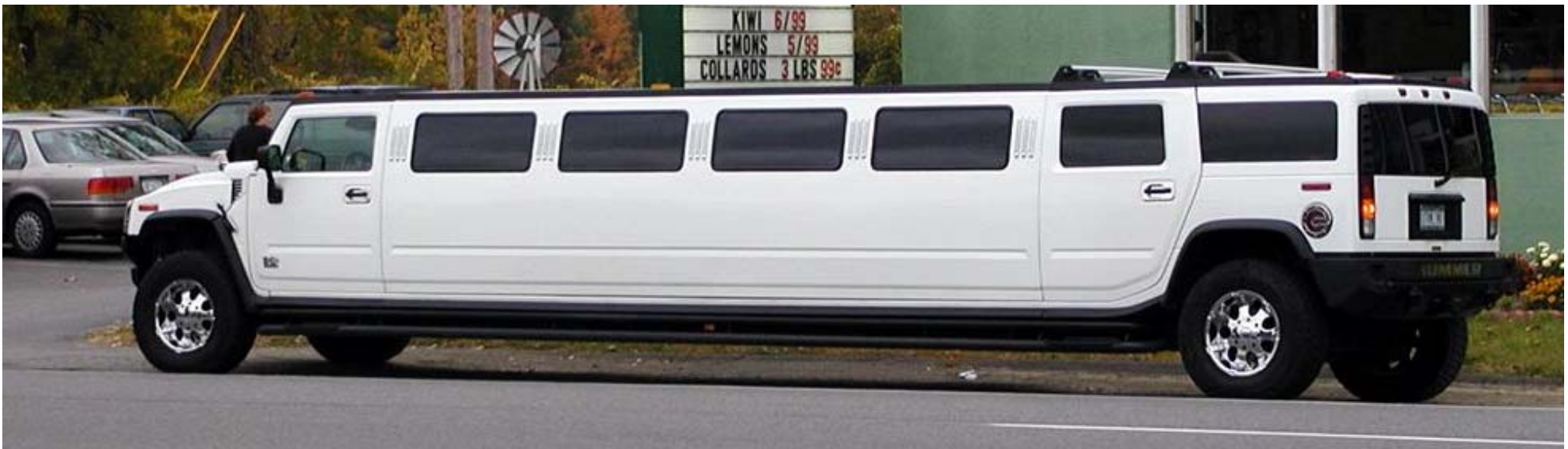
Acknowledgement and Disclaimer

- I would like to thank my colleagues at the Volpe Center and members of APTA's Risk Management Committee for their contribution.
- The views expressed on here are mine alone and do not necessarily reflect the views of the organizations mentioned in this presentation.

- The Spirit of Public Transportation
- The Scope and Process of Risk Management
- The Push for Performance-Based Safety Standards
- The Private-Public Partnership
- The Emerging Issues and Challenges *

The Image of North America

- North America is known for its
 - ◆ Busy Airports and Airspace
 - ◆ Interstate Highways
 - ◆ Jeep, SUV, Humvee and Big Limo





The Spirit of Public Transportation

- Federal Government has a dedicated agency for Transit Systems
- FTA - Public Transit and Mass Transit
- FRA - High-Speed Rail, Intercity, Commuter Rail
- **RITA - Transportation Research*, Development, & Demonstration**

- Multimodal & Cutting-Edge Development
- Public-Private Partnership (PPP)
- Commercial Management of Public Transportation Systems
- Insurance Programs for Risk Mitigation
- Different Roles in Risk Management and Safety

Houston Metrolink, TX



FREE MallRide Bus, Denver, CO



- Hybrid electric vehicles powered by a combination electric/compressed natural gas (CNG) engine
- Very quiet and clean

Type	Examples	Authorities
Railroad	AMTRAK, Commuter Rail Services, High-Speed Rail	FRA, MTA
Transit Rail	Light Rail, Subway, Metro, Monorail, AirTrains	FTA, MTA, Port Authority
Transit Bus	City Bus, Rapid Bus Transit, Shuttle Bus, Paratransit	State, MTA, Port Authority
Car/Van	Dial-a-Ride Car/Mini Van, Shared-Ride Car, Shared-Rental Car	State, MTA, County, City, Private Business
School Bus	Big Yellow Bus, Small Mini Van/Car	City School District
Other	Ferry, Water Bus	Port Authority

AirTrain – Airport Links



JFK, New York

San Francisco, CA



The Meaning of Risk Management

- For the Government
 - ◆ To understand the risks and monitor the trends
 - ◆ To inform the industry and the public about the risks
 - ◆ To develop minimum standards
 - ◆ To provide technical and financial support in R&D&D
- For the Business
 - ◆ To understand the risks and be prepared for the risks
 - ◆ To reduce the risk and mitigate the risk
 - ◆ To develop safety strategy and corporate policy on safety
 - ◆ To finance the remaining risk through insurance programs
- Risk Manager's job in North America is
 - ◆ More toward the financing and mitigation of risks

- To Understand the Risks
 - ◆ Reporting and Record Keeping of Accidents
 - National Transit Safety Database
 - Railroad Accident/Incident Reporting System
 - Highway-Rail Grade Crossing Accident Reporting System
 - Close-Call or Near-Miss Incident Reporting System *
- To Minimize the Risks
 - ◆ Development of Performance-Based Safety Standard
 - ◆ Working with Industry on Training, Education and R&D
 - ◆ Working with State Government on Auditing and Inspection *
 - ◆ “Risk-Informed” NPRM - Rulemaking Process
- To Advocate “System Safety” Practices

Risk Management as a Business

- Risk Management as a Corporate Function
 - ◆ Finance, Human Resource Management and Legal Service
- Risk Managers are active in:
 - ◆ RIMS - Risk and Insurance Management Society
 - ◆ APTA - Risk Management Committee *
- Safety Engineers are active in:
 - ◆ ANSI/ISA, ISO, SSS, RAMS, IEEE, ASQ, AIAA, SOLE, SRE
- Industry-Lead Standard Development
 - ◆ AAR - Manual of Standards & Recommended Practices (1984)
 - ◆ APTA - PRESS (Passenger Rail Equipment Safety Standard)
 - ◆ IEEE - RTVISC P1474.1:2000 (CBTC Performance & Functional Requirements)

Government Regulation Update

- NPRM – Notice of Proposed Rulemaking – as collaboration with industry

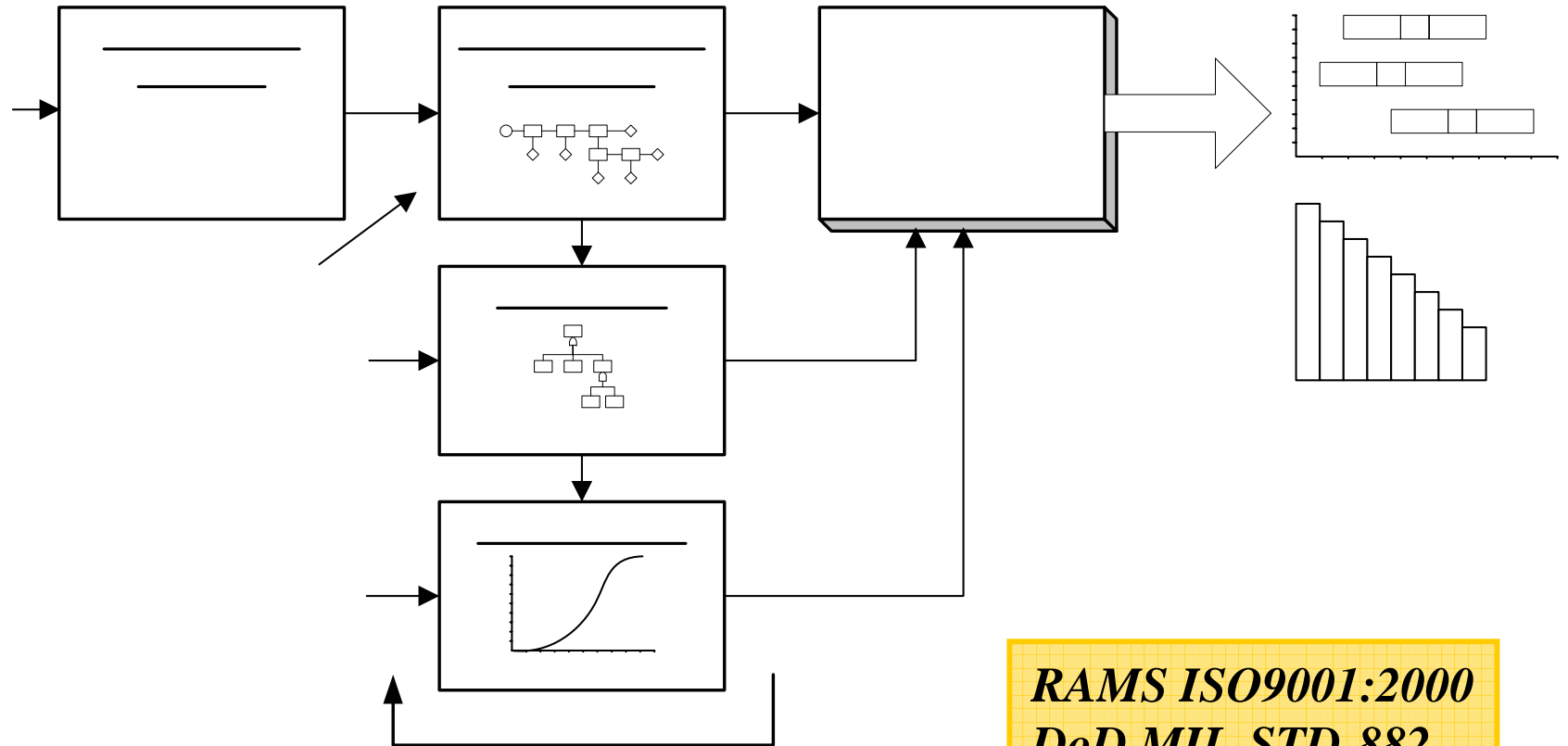
Title 49	Code of Federal Regulations (CFR)	Last Updates
Part 218	Railroad Operating Practices	1998
Part 228	Hours of Service of Railroad Employees	1998
Part 239	Passenger Train Emergency Preparedness	1998
Part 223	Safety Glazing Standards Locomotives, Passenger Cars and Cabooses	1999
Part 238	Passenger Equipment Safety Standards	1999
Part 209 and 211	Statement of Agency Policy Concerning Jurisdiction over the Safety of Railroad Passenger Operations and Waivers Related to Shared Use of the Tracks of the General Railroad System by Light Rail and Conventional Equipment.	1999
Part 220	Railroad Communications	2000
Part 231	Railroad Safety Appliance Standards	2001
Part 213	Track Safety Standards	2001
Part 209	Railroad Safety Enforcement Procedures	2003
Part 236 Subpart H	Performance-Based Safety Standards on Computer or Processor-Based Signal and Train Control Systems	2005
...	... more not listed	

- Final rule (49-CFR Part 236 Subpart H) published on March 7, 2005

Performance-Based Safety Standard

- Traditional Environment:
 - ◆ Static Technology
 - ◆ Fixed Hardware-Driven Implementation
 - ◆ Relatively “Simple” Functionality
- Today’s Environment:
 - ◆ Dynamic/Rapid Changing Technology
 - ◆ Customizable Software-Driven Implementation
 - ◆ Relatively “Complex” Functionality
- The Paradigm Shift:
 - ◆ Business:
 - From code conformance
 - To risk management
 - To “system safety” practice
 - ◆ Government:
 - From a more Prescriptive Regulation
 - To a more Performance-Based Regulation
- Consensus Rulemaking:
 - ◆ Technology Neutral
 - ◆ Data-Driven Requirements
 - ◆ Risk-Informed ***

Generic Risk Assessment Model (FRA)

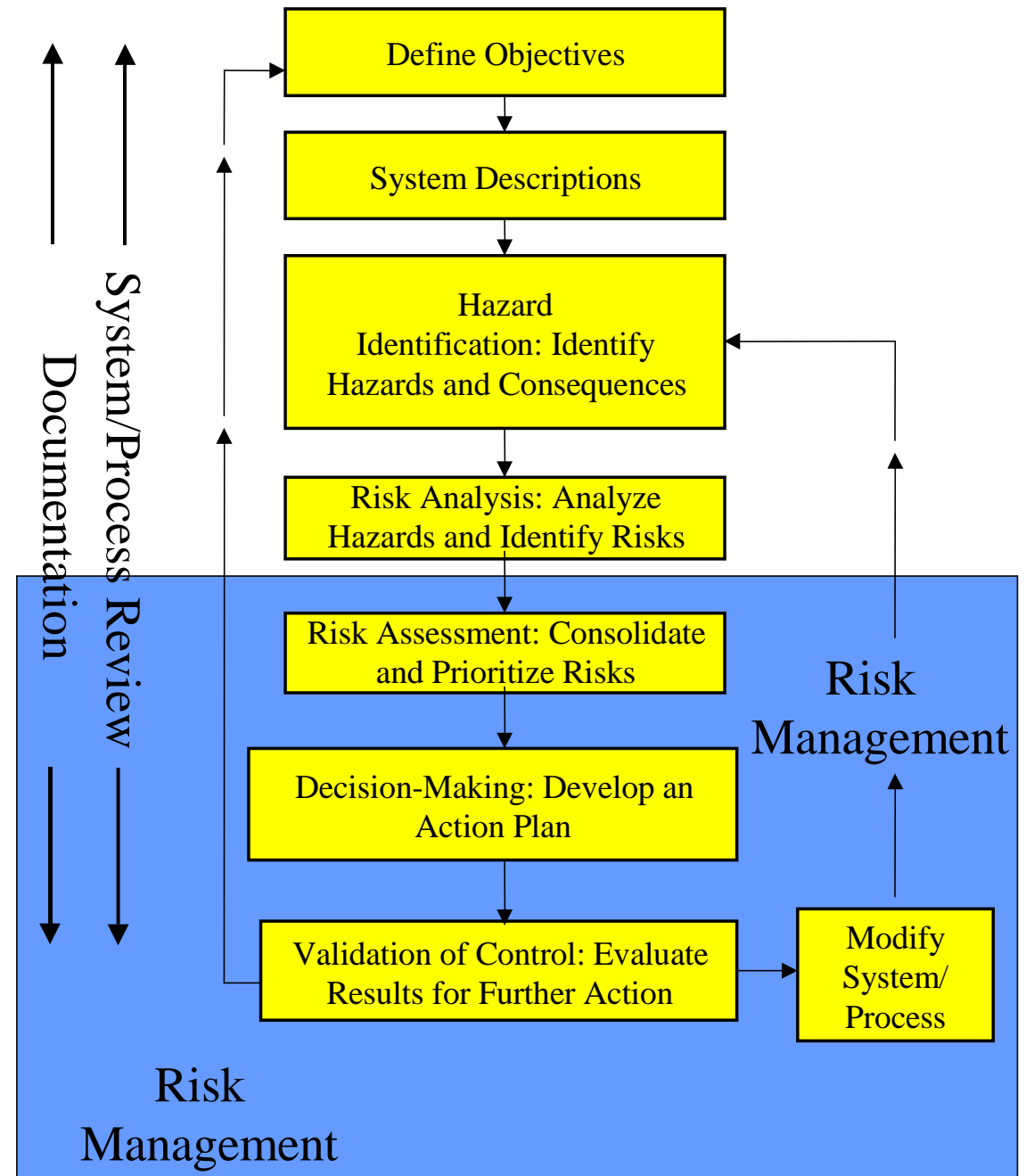


- * **Previous Models**
- Modifying NASA's Model
- **FMEA/CIL**
- **Hazard Reports**

RAMS ISO9001:2000
DoD MIL-STD-882
NRC Fault Tree
49 CFR 236, 234, 209
 ...

Master Log Diagram

- Risk Management is a part of this System Safety Process
- Management Order, 8040.4
- Other procedures:
 - ◆ Job hazard reporting/analysis
 - ◆ Preliminary hazard analysis
 - ◆ On-going hazard and risk analysis
 - ◆ System Safety Program Plan (SSPP)



Example of Risk Assessment Matrix

- MIL-STD-822
- Simple
- Easy-to-Do

Severity Scale Definitions	
Catastrophic	Results in fatalities and/or loss of the system.
Critical	Severe injury and/or major system damage.
Marginal	Minor injury and/or minor system damage.
Negligible	Less than minor injury and/or less than minor system damage.

RISK ASSESSMENT MATRIX				
	Severity			
Likelihood	Negligible	Marginal	Critical	Catastrophic
Frequent				
Probable				<i>High</i>
Occasional			<i>Serious</i>	
Remote		<i>Medium</i>		
Improbable	<i>Low</i>			

Multiple Insurance Programs

- Self-Insured or Self-Administrated Programs
 - ◆ often by large transit properties for worker's comp.
- Participation in State/Local Government Programs
 - ◆ often by small transit properties in large states
- TPA (Third Party Accident) Insurance Programs
 - ◆ for passenger, motorist, and trespasser
- CGL (Commercial/Comprehensive General Liability) Programs
 - ◆ for building, workshop, infrastructure and other assets
- OCIP (Owner-Controlled Insurance Program)
 - ◆ for construction/testing projects with limited time periods
- Excess Insurance
 - ◆ for catastrophic but rare events - natural disaster or terrorism

OC Transpo & GO Transit, Canada

O-Train, City of Ottawa



GO-Train, Great Toronto



- System Safety Program Plan (SSPP) Documents
 - ◆ Safety Policy Statement
 - ◆ Safety Technical Requirements
 - ◆ Operations Plan
 - ◆ Inspection & Maintenance Plan
 - ◆ Commissioning & Acceptance Test Plan
 - ◆ Safety Training Policy
 - ◆ Emergency Management Plan
 - ◆ Quality Assurance Plan
 - ◆ Safety Case
- Regulated vs. Un-regulated Systems *
 - ◆ CPR's "Swiss Cheese"

Emerging Issues and Challenges

- Diversify the Public Transportation
 - ◆ Public-Private Partnership (PPP) for Multimodal Development
 - ◆ Passenger & Freight Share-Use of Railroad Infrastructure
- New Technologies in Public Transportation
 - ◆ ITS/CCTV, GPS/PTC, Alert or Crash Avoidance Systems
 - ◆ Liability of Driver-Less or Fully Automated Systems
- Regulatory Requirements
 - ◆ American with Disabilities Act (ADA)
 - ◆ Measuring Safety by Performance
- Effective Risk Management
 - ◆ Partner with Industry - Hire Consultants for some works
 - ◆ Tender/Competitive Outsource - Develop the Best Insurance Programs

- North America is in a transition for a rapid development of public transportation system
 - ◆ the implementation of new technology in public transportation
 - ◆ the implementation of new performance-based standard
- The diversification makes the system quick to respond the changes and much efficient in economic terms
- New technology will work better when organizational barriers are removed
- Government has an important role in System Safety, but business could help (or do more) in managing the risk of public transportation.
- Insurance is the mean to a solution, but not the solution itself!

Is this the New Concept of Public Transportation?



Questions & Comments

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