

Presentation to the Full Rail Safety Advisory Committee

Washington, DC,
March 18, 2010

Engineering Task Force

Status Update

The Passenger Rail industry is on the cusp of tremendous growth.

Pressure from:

- Congestion of highway systems,
- Carbon emissions concerns,
- Gasoline prices, and the
- Desire/need for modern passenger service.

Demand has increased for passenger service.

- New and innovative designs are desirable.
- Carbuilders have a variety of vehicles working in other parts of the world that can fill US transportation needs.

FRA is receiving waiver petitions for use of alternative railcar designs.

Waivers are complicated processes:

- High workload item for FRA.
- Require a great deal of information and investigation.
- Takes months to review and render a decision.
- Positive results are not guaranteed.
- Risky to the petitioner.

High Speed Passenger Rail Safety Strategy framed the issues.

The High Speed Passenger Rail Safety Strategy was discussed at the full RSAC meeting on September 10, 2009 in Washington, DC.

The strategy acknowledged the current FRA requirements.

1. **TIER I** Equipment Safety Standards for trains operating up to 125 mph.
2. **TIER II** Equipment Safety Standards for high speed trains operating up to 150 mph.
3. **Track Safety Standards** that specify track geometry, cant deficiency, and car body acceleration limits for speeds up to 200 mph (FRA Classes 1 – 9).

The Strategy also acknowledged that there was work to be done.

- Worldwide equipment standards need to be reviewed to develop guidance for trains operating up to 220 mph.
- New rules that amend the Passenger Equipment Safety Standards and Track Safety Standards for Tier I and Tier II train operations need to be advanced.

RSAC Engineering Task Force

The RSAC Engineering Task Force is part of the ongoing strategy to amend the Passenger Equipment Safety Standards.

Guidelines are needed for a variety of passenger rolling stock.

- Diesel Multiple Units (DMUs)
- Electric Multiple Units (EMUs)
- Crash Energy Management (CEM) passenger car designs
- High Speed Rail equipment

The FRA described expanded Tiers of rail Passenger Service in the strategy.

Tier	0	IA	IB	IC	II	III	IV	V
Description	Regional rail	Conventional	Emerging HSR	HSR Regional	HSR Mixed Operations	HSR Mixed Passenger	HSR Dedicated	HSR Express
Max. Speed mph	0-65	0-79	80-110	111-125	126-150	0-150	0-150	0-200/220
Other traffic on same track	None (or temporally separated)	Mixed passenger and freight	Mixed passenger and freight	Mixed passenger and freight	Mixed passenger and freight	Conventional passenger only	None	None
Track class	- Class 4	- Class 4	- Class 5/6	- Class 7	- Class 8	- Class 8	- Class 8	- Class 9
Signals, train control	Traffic control	PTC	PTC; vital and perimeter protection above 90	PTC; vital and perimeter protection above 90	Per IC and ROW safety strategy integrated			
Public highway-rail grade crossings	Automated warning; supplementary measures where warranted	Automated warning; supplementary measures where warranted	Sealed corridor; evaluate need for presence detection and PTC feedback	Barriers above 110, see 213.247 Presence detection tied to PTC above 110	See IC None above 125	See IC None above 125	None at any speed	None at any speed

Tiers of rail Passenger Service described in the strategy.

Private highway-rail grade crossings	Automated warning or locked gate	Automated warning or locked gate	Automated warning or locked gate and dispatch control over entry	None or as above	None above 125	None above 125	None at any speed	None at any speed
ROW safety plan	System Safety Program / Collision Hazard Analysis				SSP/CHA and specific approval process for new service similar to 236.361			
MOW safety management plan	Address within SSP framework; no separate approval required				Separate plan approval; integrate with SSP/CHA			
Equipment	CEM – end frame strength dynamic test	Present Tier I plus Cab End Frame Strength, or equivalent safety (including option for alternative to buff strength)			Present Tier II (including option for alternative to buff strength)	See Tier IA-C	Define	Define
Occupied car forward	OK	OK			Prohibited	Up to 125 mph only	OK	Prohibited
On-board emergency systems	Per Parts 238 and 239 (including glazing, emergency egress and rescue access, lighting, signage, etc.)							
System Safety Programs	Required; Review is for completeness; Audits for follow through				Integrate Subpart G, Part 238	Required; FRA reviews management decisions and may disapprove		

The Engineering Task Force will work on two phases.

Tier I requirements

Tier II and above requirements

The Engineering Task Force is initially addressing Tier I equipment standards.

Tier	0	IA	IB	IC	II	III	IV	V
Description	Regional rail	Conventional	Emerging HSR	HSR Regional	HSR Mixed Operations	HSR Mixed Passenger	HSR Dedicated	HSR Express
Max. Speed mph	0-65	0-79	80-110	111-125	126-150	0-150	0-150	0-200/220
Other traffic on same track	None (or temporally separated)	Mixed passenger and freight	Mixed passenger and freight	Mixed passenger and freight	Mixed passenger and freight	Conventional passenger only	None	None
Track class	- Class 4	- Class 4	- Class 5/6	- Class 7	- Class 8	- Class 8	- Class 8	- Class 9
Signals, train control	Traffic control	PTC	PTC; vital and perimeter protection above 90	PTC; vital and perimeter protection above 90	Per IC and ROW safety strategy integrated			
Public highway-rail grade crossings	Automated warning; supplementary measures where warranted	Automated warning; supplementary measures where warranted	Sealed corridor; evaluate need for presence detection and PTC feedback	Barriers above 110, see 213.247 Presence detection tied to PTC above 110	See IC None above 125	See IC None above 125	None at any speed	None at any speed

Tiers of rail Passenger Service described in "Appendix B".

Private highway-rail grade crossings	Automated warning or locked gate	Automated warning or locked gate	Automated warning or locked gate and dispatch control over entry	None or as above	None above 125	None above 125	None at any speed	None at any speed
ROW safety plan	System Safety Program / Collision Hazard Analysis				SSP/CHA and specific approval process for new service similar to 236.361			
MOW safety management plan	Address within SSP framework; no separate approval required				Separate plan approval; integrate with SSP/CHA			
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System Safety Programs	Required; Review is for completeness; Audits for follow through				Integrate Subpart G, Part 238	Required; FRA reviews management decisions and may disapprove		

Tier I Standards

Covers the following operations:

- | | |
|---------------------|---------------|
| • Regional Rail | 0 – 65 mph |
| • Conventional Rail | 0 – 79 mph |
| • Emerging HSR | 80 – 110 mph |
| • HSR Regional | 111 – 125 mph |

Future Engineering Task Force initiatives will address Tier II through Tier V equipment standards.

Tier	0	IA	IB	IC	II	III	IV	V
Description	Regional rail	Conventional	Emerging HSR	HSR Regional	HSR Mixed Operations	HSR Mixed Passenger	HSR Dedicated	HSR Express
Max. Speed mph	0-65	0-79	80-110	111-125	126-150	0-150	0-150	0-200/220
Other traffic on same track	None (or temporally separated)	Mixed passenger and freight	Mixed passenger and freight	Mixed passenger and freight	Mixed passenger and freight	Conventional passenger only	None	None
Track class	- Class 4	- Class 4	- Class 5/6	- Class 7	- Class 8	- Class 8	- Class 8	- Class 9
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Occupied car forward	OK	OK			Prohibited	Up to 125 mph only	OK	Prohibited
On-board emergency systems	Per Parts 238 and 239 (including glazing, emergency egress and rescue access, lighting, signage, etc.)							
System Safety Programs	Required; Review is for completeness; Audits for follow through				Integrate Subpart G, Part 238	Required; FRA reviews management decisions and may disapprove		

Tier II through Tier V Standards

Covers the following operations:

- HSR Mixed Operation Tier II 126 – 150 mph
- HSR Mixed Passenger Tier III 0 – 150 mph
- HSR Dedicated Tier IV 0 – 150 mph
- HSR Express Tier V 0 – 200/220 mph

Engineering Task Force strategy

The strategy is to:

explore the possibility of describing a new tiered series of standards for the entire operating system, *including equipment*, in lieu of the current two-tiered structure that focuses on equipment only.

Engineering Task Force work on structural standards.

New tiered standards would describe a range of operating environments and, for each such environments, would specify—

- Basic end strength and CEM performance.
- Side strength and roof strength as a function of weight.
- Fixture securement.
- Acceptable occupant accelerations and restraint strategies.

FRA's Action Plan also included finalizing the end strength rule.

FRA will finalize the pending cab end strength rule and then will define additional options for compliance with tiered passenger car safety standards.

End Strength rule was completed in January 2010.

Review of the Engineering Task Force Activities

- **First Meeting**
 - September 23-24, 2009 – Cambridge, MA
- **Second Meeting**
 - November 3-4, 2009 – Philadelphia, PA
- **Third Meeting**
 - January 7-8, 2010 – Atlanta, GA
- **Fourth Meeting**
 - March 9-10, 2010 – Orlando, FL

Cambridge, MA

- Technical Presentations from Volpe
- Initial Strawman presented
- Baseline for future discussions
- Questions for/from Industry
- Homework assignments
- Industry Conference Calls / Meetings

Philadelphia, PA

- Presentations from Railroads
- Presentations from Carbuilders
- Refined Strawman (Criteria and Procedures)
- Agreements on some criteria/procedures
- FRA and Industry positions established

Atlanta, GA

- Discussed and Clarified the Criteria and Procedures
- Confirmed areas of consensus
- Identified remaining issues
- Established teams to explore issues and make recommendations

Orlando, FL

- Cleared up all remaining issues except Truck Attachment
- Confirmed areas of consensus
- Established team to explore Truck Attachment issue and make recommendations
- Established plans for developing the guidance document

The ETF Criteria addresses the following items.

- 238.203 Train Collision Dynamic Analysis
- 238.205 Colliding Car Override (Dynamic)
- 238.207 Colliding Car Override (Plastic)
- 238.209 Entry of Fluids
- 238.211 End Frame Integrity
- 238.213 End Frame Integrity

The ETF Criteria addresses the following items (continued).

- 238.217 Side Structure
- 238.215 Roof Integrity
- 238.119 Truck Attachment
- 238.221 Glazing
- 238.223 Interior Fixture Attachment

ETF Scorecard

March 10, 2010

TF Meeting Document

No.	Issue	Status
1	Collision with conventional equipment	Buy-in on approach and on most details. FRA has decided to use intrusion criteria based on Appendix F for pass/fail criteria for evaluating preservation of operating cab.
2	Occupant volume integrity	Buy-in on approach and details of Options A, B & C. OPEN - Develop details in the procedures.
3	Colliding car override	Buy-in on approach, input criteria quantities and values, and on pass/fail criteria quantities. On values for pass/fail criteria.
4	Coupled equipment override	Buy-in on approach, input criteria quantities and values, and on pass/fail criteria quantities. On values for pass/fail criteria.
5	Fluid entry	Buy-in with current regulation
6	End structure integrity of cab end	Buy-in with Appendix F OPEN: develop procedures.

ETF Scorecard

March 10, 2010

TF Meeting Document

No.	Issue	Status
7	End structure integrity of non-cab end	Collision posts: Buy-in to extending collision post exception for articulated equipment to include CEM equipment. Corner posts: FRA has decided to keep current required force levels, but allow them to be applied to corner structure, and not explicitly require a corner post. OPEN - develop procedures
8	Roof integrity	Buy-in with current regulation
9	Side structure integrity	FRA has decided to keep current regulation and to solicit new proposals for criteria from industry.
10	Truck attachment OPEN	FRA has decided to keep current regulation and to solicit new proposals for criteria from industry. TF to review and develop consideration for Euro Standards
11	Interior fixture attachment	Buy-in with current regulation.
12	Occupant protection features	Buy-in with current industry standards OPEN – define which version? (locomotive seat requirements) most likely newest APTA version

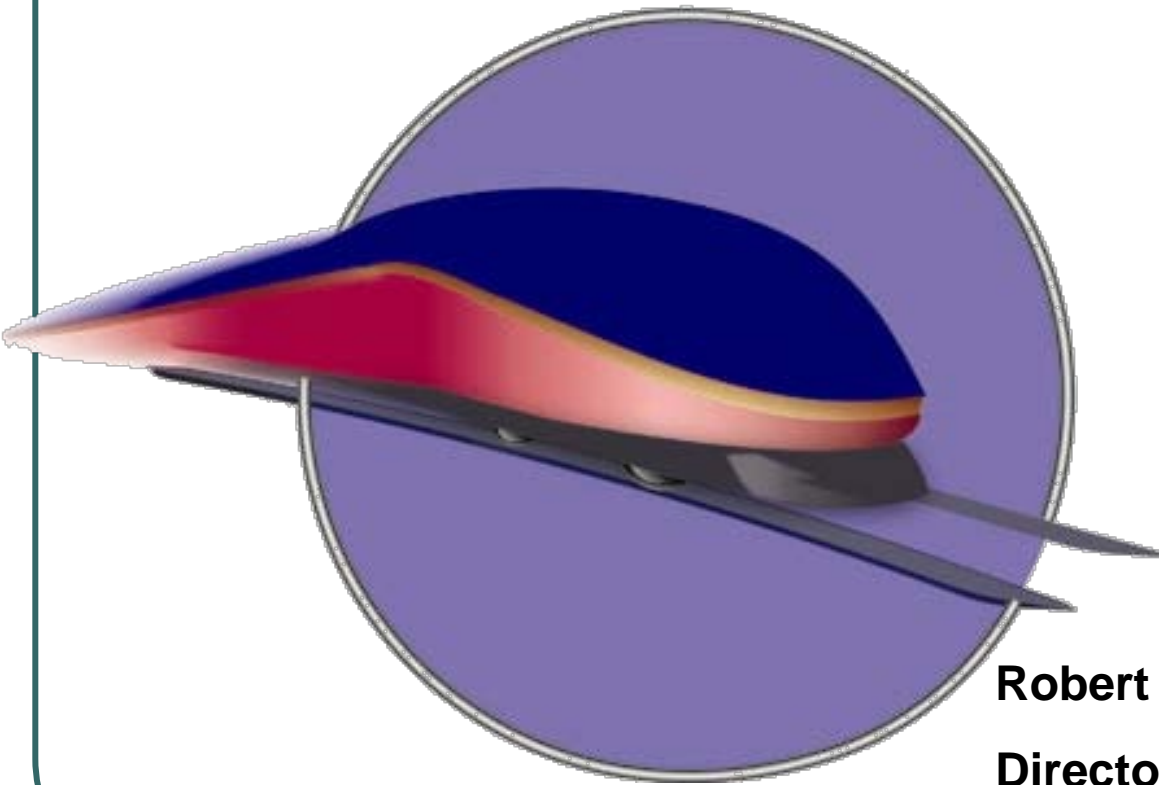
The Engineering Task Force is an ongoing effort.

- Volpe will develop a document based on the Orlando meeting that will be published in draft form by the Middle of April.

Future Engineering Task Force Meetings.

- Future meetings will be scheduled to begin to explore Criteria for alternate rail vehicle standards at the Tier II to Tier V level.

Questions?



Robert C. Lauby

Director, Passenger Rail Division

robert.lauby@dot.gov