

# 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.

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## 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.

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- 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.

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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.

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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.

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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.

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- 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.

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- 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.

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| 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 temporarily 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.

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**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                 |
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| 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 temporarily 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 |                             |                   |                   |
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# Tiers of rail Passenger Service described in "Appendix B".

|                                      |  |  |  |                  |  |   |                   |                   |
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# Tier I Standards

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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                 |
|-------------------------------------|---|---|--|--|---|-----------------------------|-------------------|-------------------|
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# Tier II through Tier V Standards

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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

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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.

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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.

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*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

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- **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

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

# Philadelphia, PA

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

# Atlanta, GA

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

## Orlando, FL

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- 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.

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- 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).

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- 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

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| No. | Issue                                 | Status  |
|-----|---------------------------------------|---|
| 1   | Collision with conventional equipment | Buy-in on approach and on most details.<br>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.<br><b>OPEN</b> - 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<br><b>OPEN:</b> develop procedures.  |

# ETF Scorecard

## March 10, 2010

### TF Meeting Document

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| 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.<br>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.<br><b>OPEN</b> - 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  | <b>Truck attachment OPEN</b>           | FRA has decided to keep current regulation and to solicit new proposals for criteria from industry.<br><b>TF to review and develop consideration for Euro Standards</b>   |
| 11  | Interior fixture attachment            | Buy-in with current regulation.   |
| 12  | Occupant protection features           | Buy-in with current industry standards<br><b>OPEN</b> – define which version? (locomotive seat requirements) most likely newest APTA version  |

# The Engineering Task Force is an ongoing effort.

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

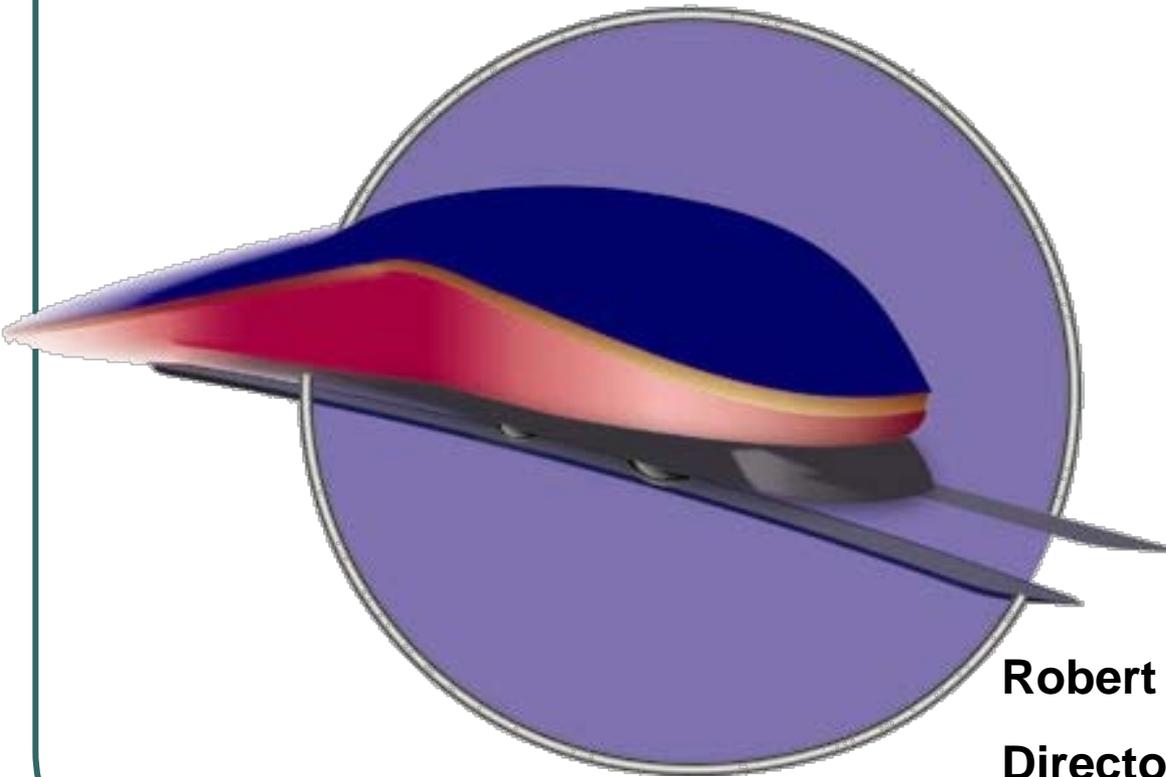
# Future Engineering Task Force Meetings.

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

# Questions?

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