



U.S. Department
of Transportation
**Federal Railroad
Administration**

Implementing High Speed Rail in the United States

Development of US High Speed Rail Safety Requirements

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Our Discussion

Development of High Speed Rail Safety Requirements

- FRA's Responsibilities
- FRA's Regulatory Development Tools
- FRA's High Speed Rail Challenges
- FRA's High Speed Rail Regulatory Approach



Federal Railroad Administration

FRA's Main Responsibilities:

- To Provide Safety Oversight of the General Railroad System
- To Develop Federal Safety Regulations for Railroads
- To Enforce Federal Regulations through Inspections and Safety Oversight
- To provide Safety Oversight for High Speed Rail operations in the United States



Current FRA Safety Regulations:

FRA's Current Safety Regulations for Railroads are:

- Published in Title 49, Code of Federal Regulations (CFR) Parts 200 to 299
- Developed over time – some have a long history
- Recent regulations commonly developed by industry consensus



FRA's Passenger Rail Division

Mission:

Provides technical expertise and direction in the execution and administration of Passenger Rail Safety Programs to ensure maximum safety in:

- High Speed Rail,
- Intercity Passenger Rail,
- Commuter Rail,
- Shared Use Operations.



FRA's Passenger Rail Division

Continued -

- Provides technical expertise for Passenger Train Emergency Preparedness, System Safety, Security, and other regulatory and non-regulatory matters specific to Passenger Rail.
- Provides direction to the Office of Railroad Safety field enforcement and headquarters staff regarding passenger issues.



FRA current Safety Regulations include requirements for:

- TIER I Equipment Safety Standards - for trains operating up to 125 mph (200 km/h).
 - Amtrak Intercity Service
 - Commuter Rail Operations
- TIER II Equipment Safety Standards - for high speed trains operating up to 150 mph (240 km/h).
 - Amtrak Acela Express Service (only current example)
- Track Safety Standards - track geometry, cant deficiency, and car body acceleration limits for speeds up to 200 mph (320 km/h).



FRA current Safety Regulations also include:

Requirements that are Speed Neutral:

- Hours of Service
- Engineer Certification
- Emergency Preparedness
- Medical Standards
- Signal and Train Control
- Alcohol and Drugs
- Workplace Safety
- Roadway Worker Safety
- Many others



HSR will require New Regulations

FRA can issue two types of Regulations or Rules:

- Rules of General Applicability (RGA) – Rules that apply to the General Railroad System.
 - Title 49 Code of Federal Regulations 200 - 299
- Rules of Particular Applicability (RPA) – Regulations that apply to a specific railroad or a specific type of operation.



FRA's Regulatory Process

Same for both RGAs or RPAs

1. Need for a regulation is identified:
 - Safety Issues identified through data analysis
 - Safety Issues identified through Accident Investigation
 - Government Mandates – Congressional Acts (RSIA-2008)
 - Safety Issues identified by the Rail Safety Advisory Committee (RSAC)
2. Rule text and supporting documentation is developed.
 - Notice of Proposed Rulemaking (NPRM)
3. Rule text and supporting documentation is published in the Federal Register.
 - Comments from the public requested.



Regulatory Process:

(continued)

4. Comments are received from the Public
 - Reviewed by FRA Staff
 - Public Hearing held as required

5. Final Rule Text and supporting documentation is developed.
 - Preamble Documentation Explains and Support FRA's position

6. Final Rule Text Published in the Federal Register
 - Regulation becomes Law



Rail Safety Advisory Committee (RSAC)

- The Rail Safety Advisory Committee is FRA's Federal Advisory Committee to assist in rulemaking.
- Federal Advisory Committee Act applies whenever the President or an agency establishes or uses an outside group to receive recommendations



RSAC Guiding Principles

- Decisions about the best approach to safety is made with full participation of all affected parties
- RSAC provides a continuing forum for advice and recommendations to FRA on major railroad safety issues
- RSAC seeks agreement on the facts and data underlying any real or perceived safety problems
- RSAC identifies cost-effective solutions to safety problems and regulatory options to implement solutions
- RSAC provides advice and recommendations on specific tasks assigned to it by FRA



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Rail Safety Advisory Committee (RSAC)

RSAC provides a forum where:

“all concerned stakeholders interested in railroad safety become more directly involved in improving rail safety through a collaborative rulemaking process”



FRA's tools for HSR Safety Requirements

Now that we have discussed the regulatory tools – we'll move next to discuss how will FRA address the many challenges of high speed rail



A Few HSR Challenges

- Current FRA regulations do not address equipment requirements for train speeds above 150 mph (240 km/h).
- Some existing speed neutral regulations may not be appropriate for trains operating at higher speeds (e.g. ballasted track, safety appliances, removable emergency windows, etc.).
- HSR systems will need to be compatible with some existing North American equipment (height, width, crashworthiness) to allow for some sharing of track.
- HSR systems should be operationally compatible with other HSR systems to allow for connections and growth of the system.



A Few HSR Challenges

- These and other challenges must be considered as we move forward with defining HSR in the United States.



FRA's HSR Regulatory Approach

Five Elements:

1. High Speed Passenger Rail Safety Strategy
2. RSAC Task with the Engineering Task Force
3. Rules of Particular Applicability for California HSR
4. System Safety
5. Rules of General Applicability



1. The High Speed Passenger Rail Safety Strategy

- FRA Developed a High Speed Passenger Rail Safety Strategy in November 2009.
- Safety Strategy laid out the challenges and some of the Safety issues that need to be addressed to make HSR a reality.
- FRA is continuously working on the challenges listed in the Safety Strategy and following the implementation plan.
- The document is available on the FRA WEB site <http://www.fra@dot.gov>



Evolving Tiers of Rail Passenger Service in the HSPRSS

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



Evolving Tiers of Rail Passenger Service

Tier	0	IA	IB	IC	II	III	IV	V
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		



2. RSAC Engineering Task Force

The Engineering Task Force is developing criteria for certain aspects of HSR train sets:

- Train set Crashworthiness
- Glazing Standards (windows)
- Passenger Occupied End Cars
- Luggage Retention
- Emergency Lighting
- Emergency Evacuation
- Trainset Width
- Trainset Floor Height
- Strategies for the Disabled (ADA)
- Other



RSAC Engineering Task Force

Engineering Task Force HSR Meetings:

- October 20 and 21, 2010 in Cambridge, MA
- January 11 and 12, 2011 in Orlando, FL
- February 14 and 15, 2011 in Washington, DC
- June 16 and 17 in Boston, MA



FRA and the ETF developed a new strategy and combined some of the HSPRSS Tiers into Tier III

- Tier III is now the designation for FRA's Highest-Speed Safety Requirements
- Tier III replaces:
 - HSPRSS Tier V
 - HSPRSS Tier IV
 - HSPRSS Tier IIIfrom previous charts and discussions.
- Tiers from FRA's High-Speed Passenger Rail Safety Strategy (HSPRSS) will continue to provide a basis for discussion of different operating environments, however, it is unlikely that they will be subject to individual regulations.
- Future Regulations will only address Tier I, Tier II, and Tier III.



Definition of Tier III

Tier III Operation

- Maximum operational speed above 125 mph.
- Exclusive right of way required above 125 mph
- No intermixing with freight or non Tier III passenger operation (Tier I or Tier II) at speeds above 125 mph.
- No grade crossings when operating above 125 mph.
- Operationally compatible with Tier I and Tier II equipment at speeds below 125 mph.
- Can operate in a Tier I environment at appropriate Tier I speeds.



Tier III Service Environment

- Dedicated Track for Speeds Above 125 mph
- Highly-Effective Train Control
- No grade crossings
- Right-of-way Safety Plan
- Maintenance-of-way Safety Plan

A System Safety Approach!



CFR Tier III

- FRA's desire for a nationwide high-speed rail network dictates that high-speed rail equipment be operable in three environments
 - On conventional track in conventional-speed ROW
 - On dedicated track in shared ROW
 - On dedicated high-speed tracks in dedicated high-speed ROW
 - FRA believes that High Speed Rail Equipment must be Operationally Compatible with Tier I Service.



Results of the ETF Meetings

- FRA identified some of the equipment requirements:
 - Operational Compatibility
 - Crashworthiness initially based on the ETF Tier I Criteria and Procedures
- Carbuilders were asked to determine the level of performance of existing HSR trainsets against the ETF Tier I Criteria and Procedures
- All Nine Carbuilders agreed to adopt the Crash Scenarios included in the ETF Tier I Criteria and Procedures Guidance Document



3. Rule of Particular Applicability

FRA is developing the requirements to be incorporated in the Rules of Particular Applicability by:

- Reviewing FRA regulations
- Reviewing North American Railroad Industry Standards
- Reviewing European and Asian HSR Standards
- Meeting with HSR operators around the world to identify issues and solutions
- Identifying best HSR practices
- Conducting technical meetings with California to develop appropriate criteria



HSR Projects require a Rule of Particular Applicability

Currently, we have ~~two~~ just one HSR project which will require FRA to Develop Rules of Particular Applicability or other Regulatory Guidelines:

- California High Speed Rail



Overview of Planned California HSR System

- Initial Segment San Francisco – Los Angeles
 - Up to 220 mph
- Operating Environment
 - Dedicated Track
 - San Jose – LA
 - Shared Track (proposed)
 - San Francisco – San Jose
 - LA – Anaheim
- Trainset Specification Targeted for Summer 2011

California High-Speed Train Map, Statewide Overview





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California will need an RPA or other FRA Regulatory Approach to Operate





4. System Safety

- FRA believes that the safety and reliability of a high speed rail system is dependent on a system approach and a system procurement.
- FRA believes that too many changes in configuration can upset the balance and cause unexpected safety issues.
- FRA wants the US High Speed Rail System – to the greatest extent practicable – to be based on a complete service proven system.



4. System Safety (Continued)

- FRA will consider adopting appropriate standards, inspection techniques, and maintenance practices that have been proven to work with the technology.
- In this manner, FRA expects to preserve the efficiency, reliability, and safety of the HSR system.



5. Rules of General Applicability

After we gain experience and validate the standards and requirements developed within the RSAC and RPA processes, FRA intends to move the requirements into Rules of General Applicability to apply to all future HSR projects.



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Questions?

Comments?

Good Rumors?