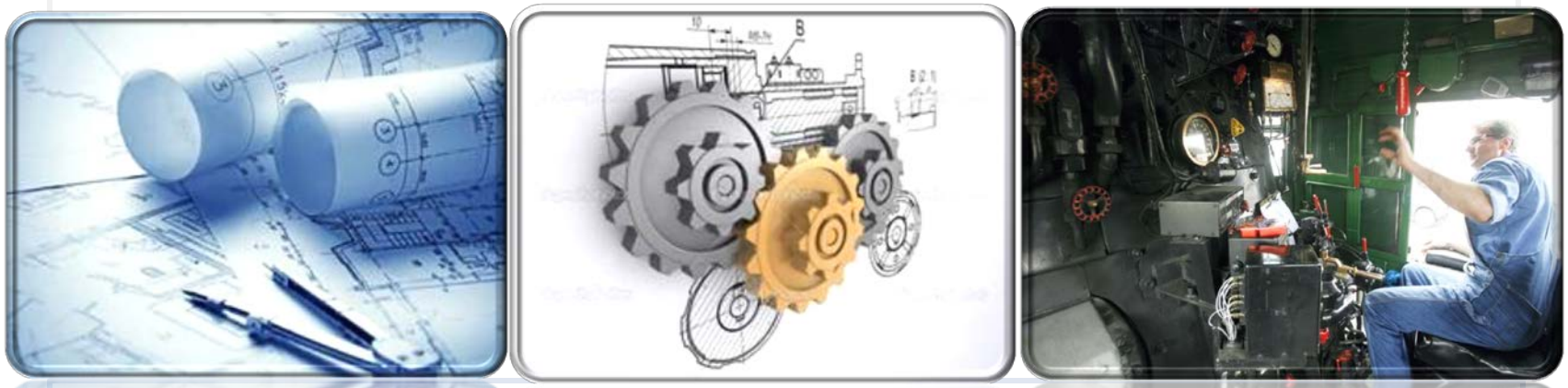
Engineering Task Force Update

to the



54th Railroad Safety Advisory Committee Meeting

November 5, 2015
Washington, DC

Outline

Task Force Introduction and Background

- ✓ Tier III Safety Appliances
- ✓ Incorporate 49 CFR Part 229 for Tier III
- P Alternative crashworthiness for single car/locomotive
- IP Tier III Safe Operation Plan (Subpart J)
- IP Tier III Inspection, Testing & Maintenance
- P Update 49 CFR 238.111 and other 238 misc. requirements
- NS Tier I passenger trainset/locomotive safety appliances

Status of Current Tasks

Objective	Result
Present remaining proposals for **application of 49 CFR Part 229 to Tier III** - seek ETF concurrence	complete
Present Tier III safety appliance - **attachment strength proposal** and seek ETF concurrence	complete
Resolve open issues related to **"single car/locomotive" alternative crashworthiness**	technical committee formed
Receive feedback on **Tier III Safe Operation Plan Proposal** and determine path forward	Need to further reconcile with SSP Rule
Present concept for Tier III ITM to gain initial feedback	complete

Update from October 2015 meeting

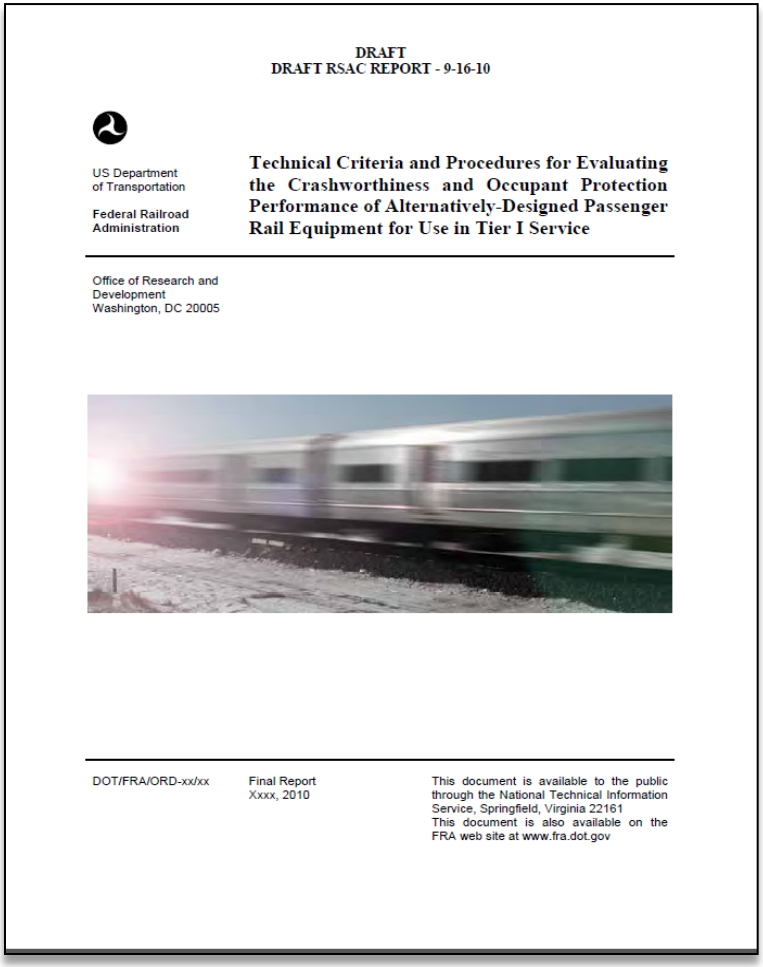
ETF Background

Engineering Task Force Established by Passenger Safety Working Group in **2009**

Original Task:
Develop alternative crashworthiness criteria and waiver guidance– published 10/28/2011

Current Task:
Provide recommendations for revised equipment regulations– under development

- *Includes completion of Tier III regulations*



DRAFT
DRAFT RSAC REPORT - 9-16-10

US Department of Transportation

Federal Railroad Administration

Technical Criteria and Procedures for Evaluating the Crashworthiness and Occupant Protection Performance of Alternatively-Designed Passenger Rail Equipment for Use in Tier I Service

Office of Research and Development
Washington, DC 20005

DOT/FRA/ORD-xx/xx

Final Report
Xxxx, 2010

This document is available to the public through the National Technical Information Service, Springfield, Virginia 22161
This document is also available on the FRA web site at www.fra.dot.gov

ETF Passenger Equipment Regulatory Plan

NPRM 1:
(Under Review)

- Tier I alternative crashworthiness
- Tier III crashworthiness standards
- Align Tier II MAS with new VTI rule (160mph)
- Codify Tier III Glazing and NPRM 1 consensus items
- Tier III Braking Systems

NPRM 2:
(In Development)

- Tier III Safety Appliances
- Incorporate 49 CFR Part 229 for Tier III
- Alternative crashworthiness for single car/locomotive
- Tier III Inspection, Testing & Maintenance
- Update Testing/Commissioning Requirements
- Tier I passenger trainset/loco safety appliances

Progress of NPRM 2 topics, to date…

✓ - substantially complete
IP – In Progress
P – Pending
NS – Not started

- ✓ Tier III Safety Appliances
- ✓ Incorporate 49 CFR Part 229 for Tier III
- IP Alternative crashworthiness for single car/locomotive
- P Tier III Safe Operation Plan (Subpart J)
- ✓ Tier III Inspection, Testing & Maintenance
- NS Update 49 CFR 238.111 requirements
- NS Tier I passenger trainset/locomotive safety appliances

Objectives from October Meetings

Objective	Result
Present draft ruletext for **application of 49 CFR Part 229 to Tier III** (except electronics) - seek ETF approval	**complete**
Present Tier III safety appliance – **location and dimensions proposal**	**complete**
Finalize draft **ruletext for Tier III Safety Appliances** and seek ETF approval	**complete**
Review **proposed ruletext for Tier III ITM** and seek ETF approval	**complete**

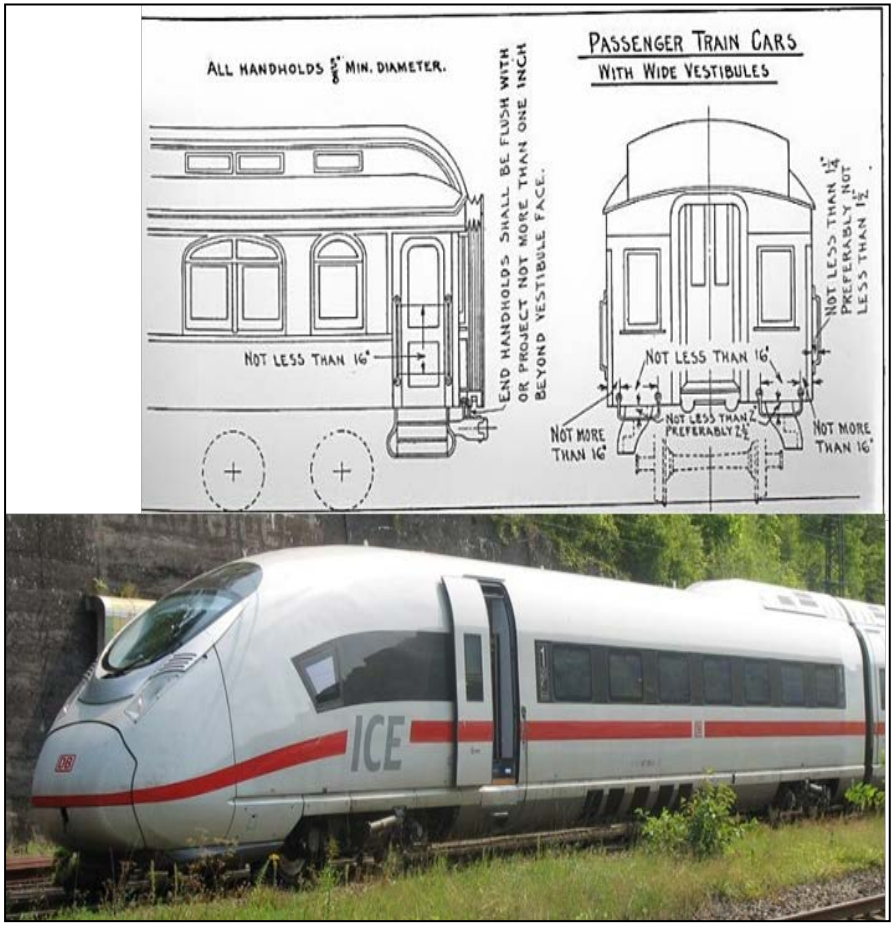
Tier III Safety Appliances Task Status

A working committee was created to develop recommendations to ETF

4 of 4 topics have been resolved, as of October 2015

The committee has divided the task into 4 major areas:

1. Application (Proposal 1) ✓
2. Location & Size ← Fall 2015
3. Appliance Strength ✓
4. Attachment Strength ✓



Tier III Safety Appliances

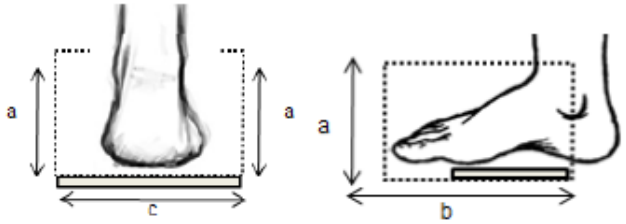
Proposal 3 (Location and Dimensions)

Objectives:

1. Examine ergonomics and safe use within HSR constraints (e.g. aerodynamic noise)
2. Determine appropriate size and placement of Tier III appliances

Recommendations were presented to ETF on October 22, 2015.

For efficiency, proposal was folded directly into the proposed ruletext (a separate vote was NOT taken).



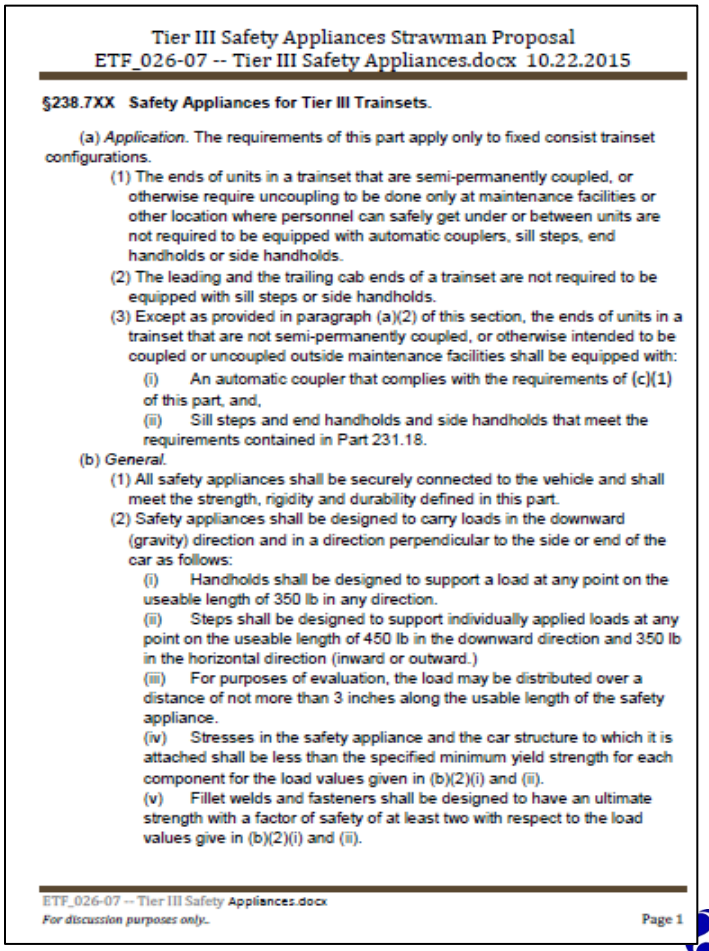
Tier III Safety Appliances

Proposed Ruletext

Draft strawman ruletext was developed based on ETF discussions and proposals

Tier III safety appliances will likely reside in Part 238 (not 231) – same as Tier II

NPRM 2 will likely require a dedicated public hearing to comply with statute



Tier III Safety Appliances Strawman Proposal
ETF_026-07 -- Tier III Safety Appliances.docx 10.22.2015

§238.7XX Safety Appliances for Tier III Trainsets.

(a) *Application.* The requirements of this part apply only to fixed consist trainset configurations.

(1) The ends of units in a trainset that are semi-permanently coupled, or otherwise require uncoupling to be done only at maintenance facilities or other location where personnel can safely get under or between units are not required to be equipped with automatic couplers, sill steps, end handholds or side handholds.

(2) The leading and the trailing cab ends of a trainset are not required to be equipped with sill steps or side handholds.

(3) Except as provided in paragraph (a)(2) of this section, the ends of units in a trainset that are not semi-permanently coupled, or otherwise intended to be coupled or uncoupled outside maintenance facilities shall be equipped with:

(i) An automatic coupler that complies with the requirements of (c)(1) of this part, and,

(ii) Sill steps and end handholds and side handholds that meet the requirements contained in Part 231.18.

(b) *General.*

(1) All safety appliances shall be securely connected to the vehicle and shall meet the strength, rigidity and durability defined in this part.

(2) Safety appliances shall be designed to carry loads in the downward (gravity) direction and in a direction perpendicular to the side or end of the car as follows:

(i) Handholds shall be designed to support a load at any point on the useable length of 350 lb in any direction.

(ii) Steps shall be designed to support individually applied loads at any point on the useable length of 450 lb in the downward direction and 350 lb in the horizontal direction (inward or outward.)

(iii) For purposes of evaluation, the load may be distributed over a distance of not more than 3 inches along the usable length of the safety appliance.

(iv) Stresses in the safety appliance and the car structure to which it is attached shall be less than the specified minimum yield strength for each component for the load values given in (b)(2)(i) and (ii).

(v) Fillet welds and fasteners shall be designed to have an ultimate strength with a factor of safety of at least two with respect to the load values give in (b)(2)(i) and (ii).

ETF_026-07 -- Tier III Safety Appliances.docx
For discussion purposes only.
Page 1

Tier III 229/ITM Task Group *Update*

Analysis of Part 229 application complete–draft language developed

Significant discussions were held on Tier III ITM since March – ruletext proposed

229/ITM TG Tasks:

1. Determine appropriate application of Part 229 to Tier III
2. Develop requirements for Tier III Inspection, Testing and Maintenance (ITM) ← complete ✓

§229 Reference	Topic	Adopted for Tier III?	New §238	Status
	Electrical System			
§229.77	Current collectors.	modified	238.7E1	closed
§229.79	Third rail shoes.	superseded	238.7E1	closed
§229.81	Emergency pole; shoe insulation.	superseded	238.7E1	closed
§229.83	Insulation or grounding of metal parts.	yes	238.7E2	closed
§229.85	High voltage markings: doors, cover plates, or barriers.	modified	238.7E3	closed
§229.87	Hand-operated switches.	modified	238.7E4	closed
§229.89	Jumpers; cable connections.	modified	238.7E5	closed
§229.91	Motors and generators.	superseded	238.7E6	closed
	Internal Combustion Equipment			
~~§229.93~~	~~Safety cut-off device.~~	~~no~~		~~open~~
~~§229.95~~	~~Venting.~~	~~no~~	-	~~closed~~
~~§229.97~~	~~Grounding fuel tanks.~~	~~no~~	-	~~closed~~
~~§229.99~~	~~Safety hangers.~~	~~no~~	-	~~closed~~
~~§229.101~~	~~Engines.~~	~~no~~	-	~~closed~~
	Steam Generators			
~~§229.103~~	~~Safe working pressure; factor of safety.~~	~~no~~		~~open~~
~~§229.105~~	~~Steam generator number.~~	~~no~~	-	~~closed~~
~~§229.107~~	~~Pressure gauge.~~	~~no~~	-	~~closed~~
~~§229.109~~	~~Safety valves.~~	~~no~~	-	~~closed~~

Example of 229-Tier III Cross-reference Table.

Tier III General Safety (Part 229)

Documents Approved at October 2015 ETF

229 Subject	Document Number
Electrical Systems	ETF-229+ITM_020-02
General Safety Requirements	ETF-229+ITM_021-01
Industrial Hygiene	ETF-229+ITM_022-01
Exterior Appurtenances	ETF-229+ITM_023-01
Trucks and Suspension	ETF-229+ITM_024-01
Event Recorder	ETF-229+ITM_025-01
Speed Indicator	ETF-229+ITM_026-01
Electronics	Spring 2016

A brief review of FRA's Inspection, Testing, and Maintenance Approach for HSR Operations

Regulations set minimum requirements for Plan contents and describe approval/renewal process

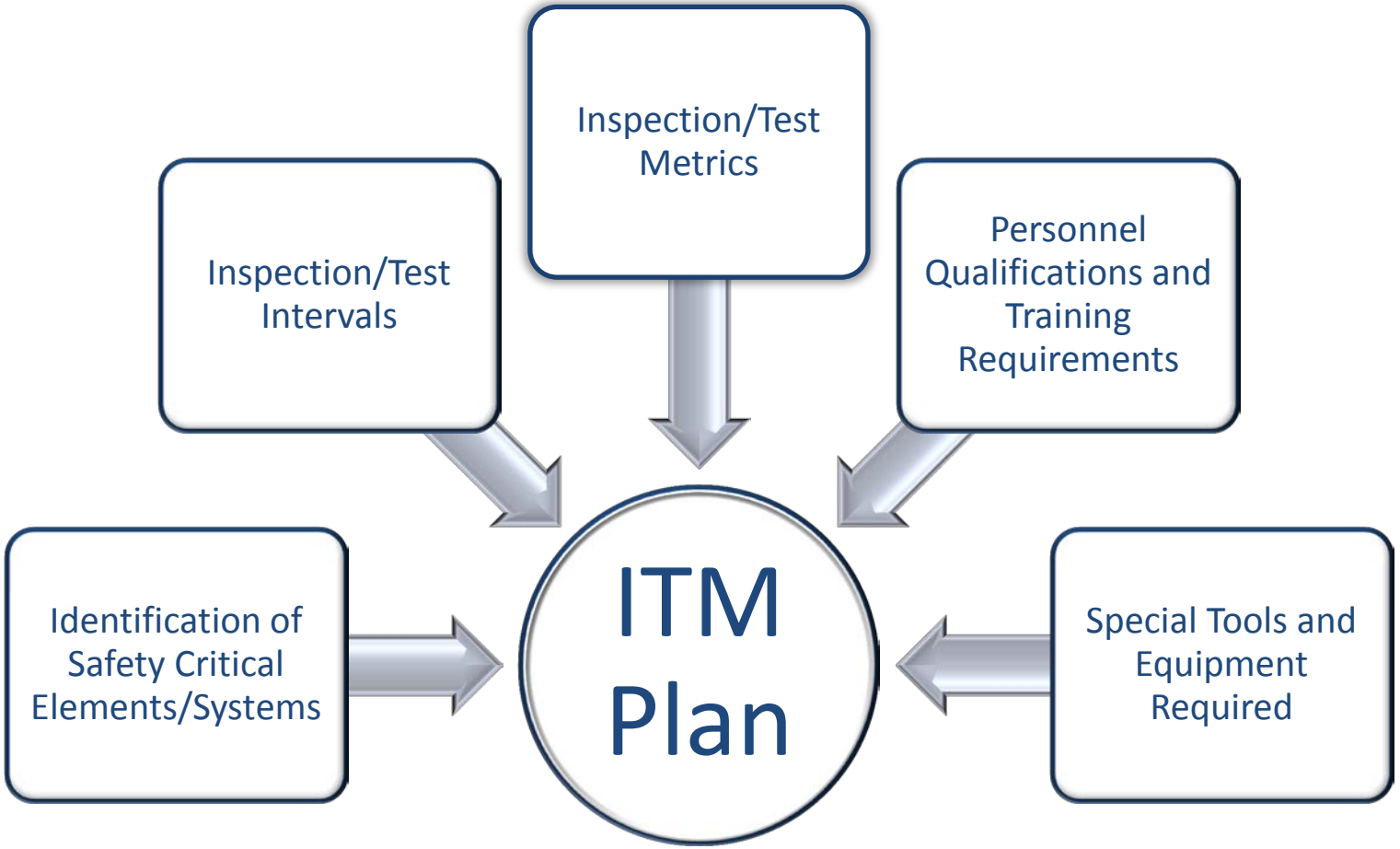
Process includes collaborative review involving FRA, the railroad (or its contractors), labor, and the manufacturer

Approach:

- **Safety Management –** establish appropriate technology specific requirements and audit against the approved plan
- **Technology Neutral** – recognize that some metrics must be defined by the system and technology implemented, not prescribed
- **Annual Review** – allows for changes over time due to statistical performance, lessons learned, and component/design changes

Tier III Inspection, Testing, and Maintenance

Components of an ITM Program



Review of Tier III ITM (Subpart I) Proposal

Proposal based largely on Tier II regulations and established Tier III principles

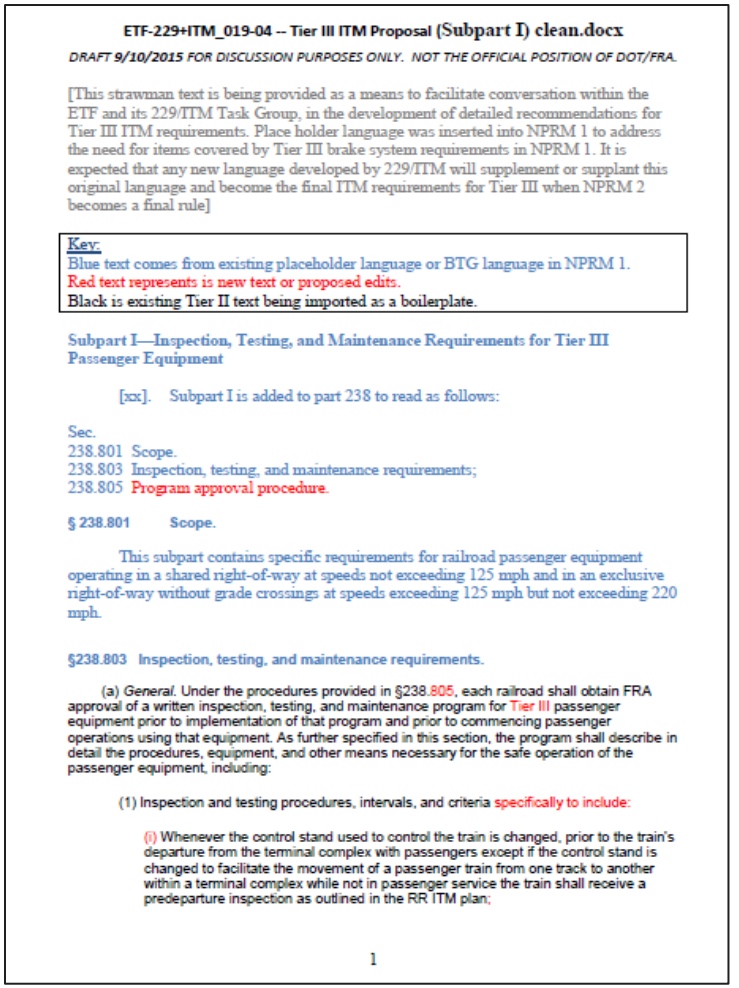
Includes modifications for lessons learned, particularly program submission and review/renewal process

Proposal includes key to provide insight as to origins of content:

a) Tier II (49 CFR Part 238, Subpart G)

b) NPRM 1 language (BTG brake language)

c) New content for Tier III



ETF-229+ITM_019-04 -- Tier III ITM Proposal (Subpart I) clean.docx

DRAFT 9/10/2015 FOR DISCUSSION PURPOSES ONLY. NOT THE OFFICIAL POSITION OF DOT/FRA.

[This strawman text is being provided as a means to facilitate conversation within the ETF and its 229/ITM Task Group, in the development of detailed recommendations for Tier III ITM requirements. Place holder language was inserted into NPRM 1 to address the need for items covered by Tier III brake system requirements in NPRM 1. It is expected that any new language developed by 229/ITM will supplement or supplant this original language and become the final ITM requirements for Tier III when NPRM 2 becomes a final rule]

Key:
Blue text comes from existing placeholder language or BTG language in NPRM 1.
Red text represents is new text or proposed edits.
Black is existing Tier II text being imported as a boilerplate.

Subpart I—Inspection, Testing, and Maintenance Requirements for Tier III Passenger Equipment

[xx]. Subpart I is added to part 238 to read as follows:

Sec.
238.801 Scope.
238.803 Inspection, testing, and maintenance requirements;
238.805 Program approval procedure.

§ 238.801 Scope.

This subpart contains specific requirements for railroad passenger equipment operating in a shared right-of-way at speeds not exceeding 125 mph and in an exclusive right-of-way without grade crossings at speeds exceeding 125 mph but not exceeding 220 mph.

§238.803 Inspection, testing, and maintenance requirements.

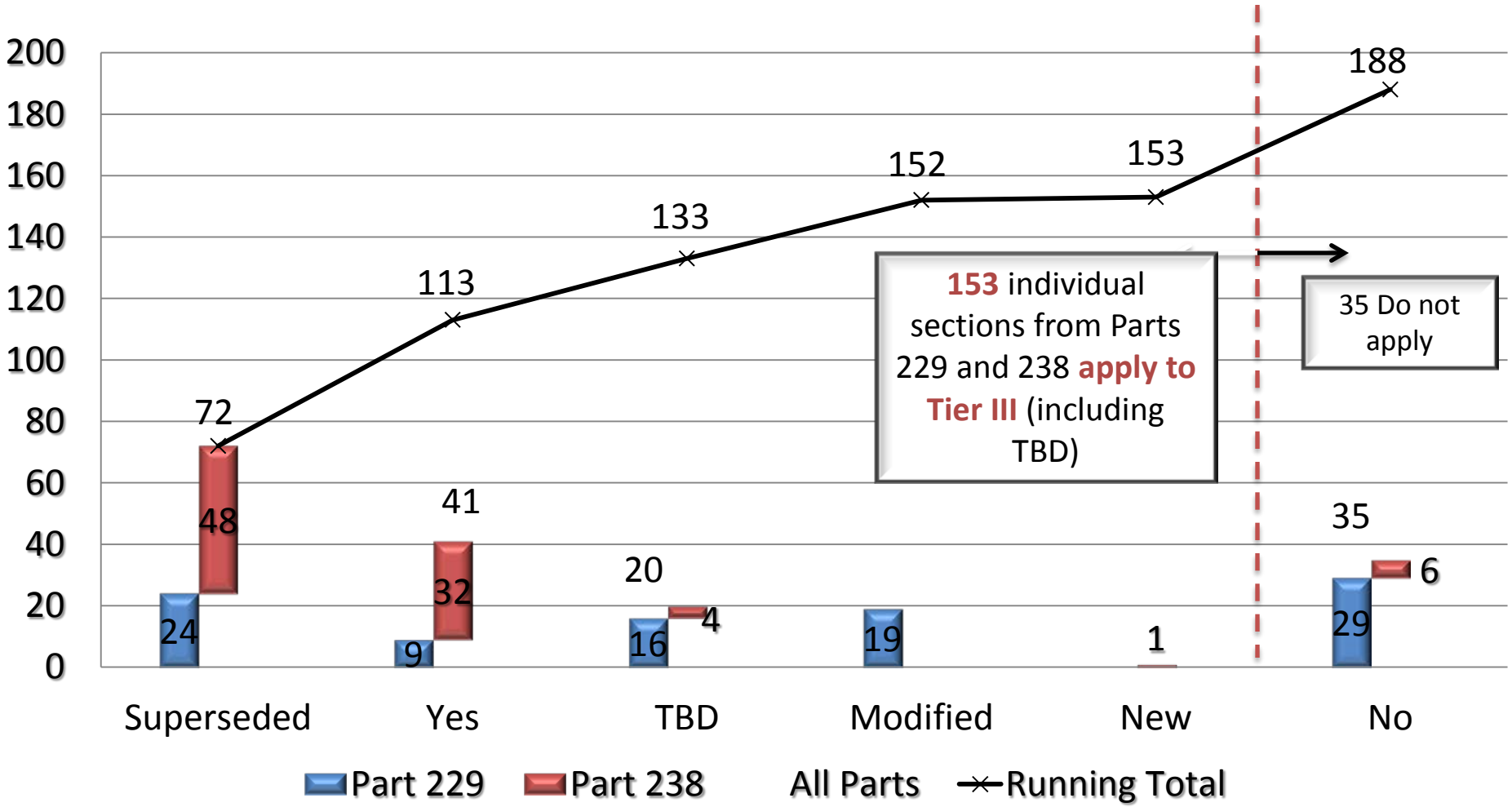
(a) *General.* Under the procedures provided in §238.805, each railroad shall obtain FRA approval of a written inspection, testing, and maintenance program for Tier III passenger equipment prior to implementation of that program and prior to commencing passenger operations using that equipment. As further specified in this section, the program shall describe in detail the procedures, equipment, and other means necessary for the safe operation of the passenger equipment, including:

(1) Inspection and testing procedures, intervals, and criteria specifically to include:

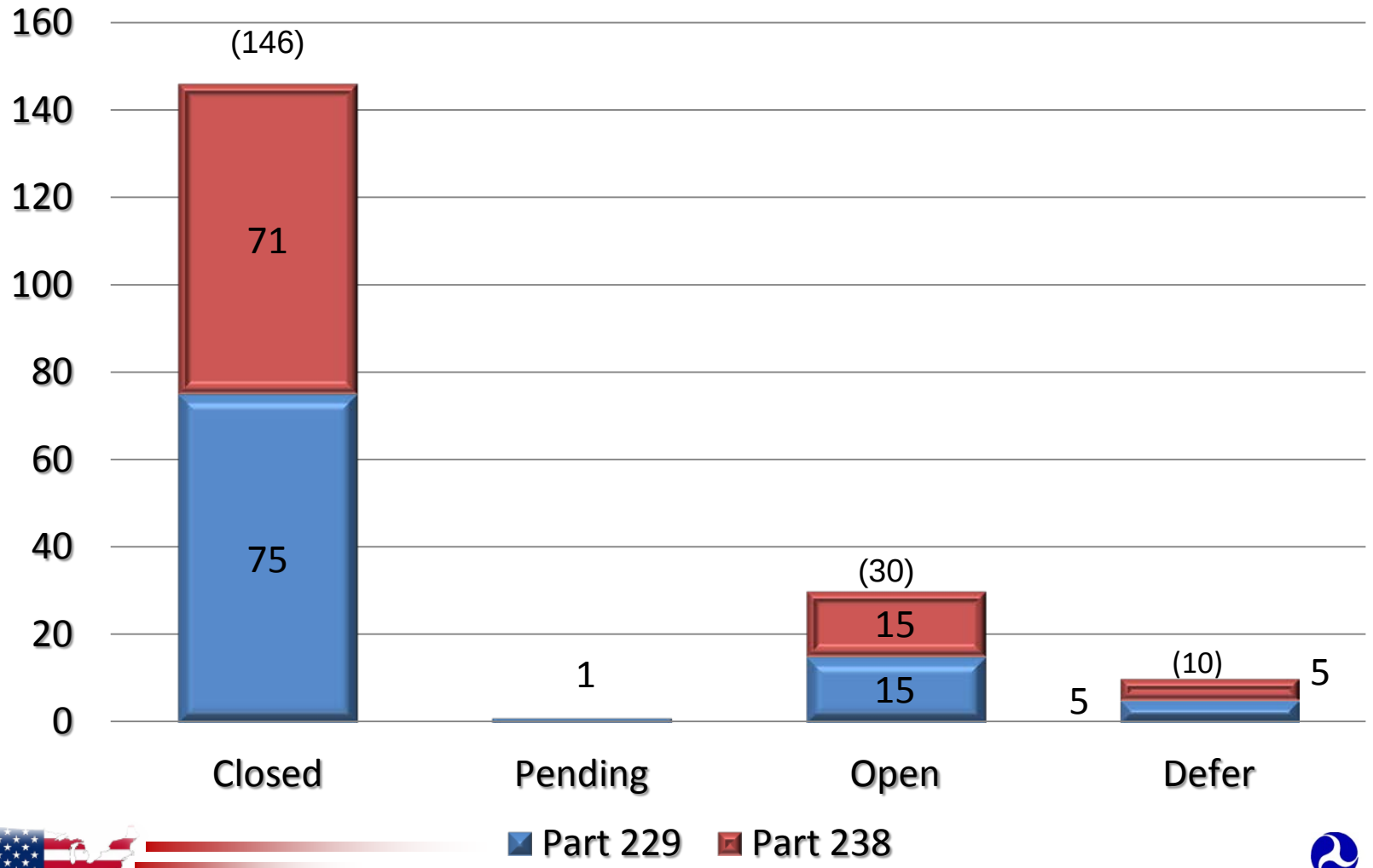
(i) Whenever the control stand used to control the train is changed, prior to the train's departure from the terminal complex with passengers except if the control stand is changed to facilitate the movement of a passenger train from one track to another within a terminal complex while not in passenger service the train shall receive a predeparture inspection as outlined in the RR ITM plan;

1

Application of Existing Regulations to Tier III



Status of NPRM 2 – Specific to Tier III (Parts 229 and 238)



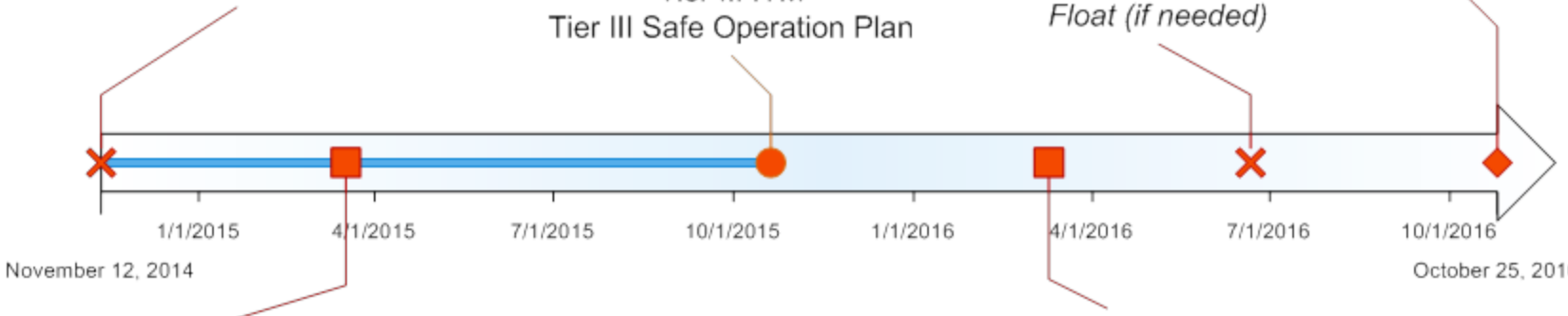
Future Meetings

11/12/2014
November 2014 ETF Meeting
Agreement in principle:
Tier III 229 Applicability (Part 1)
Tier III Safety Appliances - Applicability

10/20/2015
Fall 2015 ETF Meeting
ETF Approval of Draft Text for:
Tier III 229 Regulations
Tier III Safety Appliances
Tier III ITM
Tier III Safe Operation Plan

10/25/2016
Fall 2016 ETF Meeting
ETF Approval of NPRM 2

6/21/2016
Summer 2016 ETF Meeting
Float (if needed)



3/17/2015
March ETF Meeting
Agreement in principle:
Tier III 229 Applicability (Part 2)
Tier III Safety Appliances – Strength & Attachment

3/10/2016
Spring 2016 ETF Meeting
Agreement in principle:
Single car / locomotive ALT. crashworthiness
Revisions to 238.111 – Pre-revenue Test Requirements
Misc. Tier III (238)
Tier I passenger equipment safety appliance reorganization