DEPARTMENT OF TRANSPORTATION

Federal Railroad Administration

49 CFR Parts 216, 231, and 238

[Docket No. FRA–2021–0067, Notice No. 1]

RIN 2130–AC90

Passenger Equipment Safety Standards; Standards for High-Speed Trainsets

AGENCY: Federal Railroad Administration (FRA), Department of Transportation (DOT).

ACTION: Notice of proposed rulemaking (NPRM).

SUMMARY: FRA is proposing to amend its Passenger Equipment Safety Standards to modernize Tier I and Tier III safety appliance requirements; update the pre-revenue compliance documentation and testing requirements; establish crashworthiness requirements for individual Tier I-compliant vehicles equipped with crash energy management (CEM); establish standards for Tier III inspection, testing, and maintenance (ITM) and movement of defective equipment (MODE); incorporate general safety requirements from FRA's Railroad Locomotive Safety Standards for Tier III trainsets; and provide for periodic inspection of emergency lighting to ensure proper functioning.

DATES: Written comments must be received by June 2, 2023. Comments received after that date will be considered to the extent practicable without incurring additional expense or delay.

FRA anticipates it can resolve this rulemaking without a public, oral hearing. However, if FRA receives a specific request for a public, oral hearing prior to May 3, 2023, FRA will schedule one and will publish a supplemental notice in the **Federal Register** to inform interested parties of the date, time, and location of any such hearing.

ADDRESSES:

Comments: Comments related to Docket No. FRA–2021–0067, Notice No. 1, may be submitted by going to *http://www.regulations.gov* and following the online instructions for submitting comments.

Instructions: All submissions must include the agency name, docket name, and docket number or Regulatory Identification Number (RIN) for this rulemaking (2130–AC90). Note that all comments received will be posted without change to *https://www.regulations.gov,* including any personal information provided. Please see the Privacy Act heading in the **SUPPLEMENTARY INFORMATION** section of this document for Privacy Act information related to any submitted comments or materials.

Docket: For access to the docket to read background documents or comments received, go to *https://www.regulations.gov* and follow the online instructions for accessing the docket.

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SUPPLEMENTARY INFORMATION:

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Table of Abbreviations

The following abbreviations are used in this document's preamble:

ATC automatic train control
CE categorical exclusion
CEM crash energy management
CFR Code of Federal Regulations
EA environmental assessment
EIS environmental impact statement
ETF Engineering Task Force
FMECA Failure Modes, Effects, Criticality Analysis
FRA Federal Railroad Administration
HEP head-end power
ICC Interstate Commerce Commission
IIJA Infrastructure Investment and Jobs Act
ITM inspection, testing, and maintenance
LED light-emitting diode
LIA Locomotive Inspection Act
MCAT minimally compliant analytical track
MODE movement of defective equipment
mph miles per hour
MCAT minimally compliant analytical track
MU multiple-unit
NPRM notice of proposed rulemaking
OEM original equipment manufacturer
PA public address
PSWG Passenger Safety Working Group
PTC positive train control
RMS root mean squared
RSAC Railroad Safety Advisory Committee
U.S. United States

I. Executive Summary

This NPRM is based on recommendations from the Railroad Safety Advisory Committee (RSAC) [1] and will complete the Tier III passenger equipment safety standards.[2] This NPRM is proposing new requirements and revisions to two main subject areas: (1) requirements generally applicable to all passenger equipment, such as new passenger service pre-revenue safety performance demonstration, and vehicle design and dynamic qualification; and (2) requirements specific to Tier III passenger equipment, such as general safety requirements and safety appliances, inspection, testing, and maintenance, and movement of defective equipment. FRA estimates the 30-year costs of this proposed rule to be approximately $55.5 million, undiscounted, with the majority of the costs deriving from Tier III equipment ITM requirements. The present value of these costs is approximately $21.7 million, discounted at 7 percent, and $35.5 million, discounted at 3 percent; of note, however, the majority of the costs are incurred only if an operator

[1] RSAC was established to provide a forum for considering railroad safety issues and developing recommendations on rulemakings and other safety program areas. It includes representation from all FRA's major stakeholder groups, including railroads, labor organizations, suppliers, manufacturers, and other interested parties.

[2] Tier I passenger equipment is permitted to travel up to 125 mph; Tier II passenger equipment is permitted to travel up to 160 mph; and Tier III passenger equipment is permitted to travel up to 125 mph in a shared right-of-way and 220 mph in an exclusive right-of-way without highway-rail grade crossings.

chooses to take advantage of flexibilities in the rule.

The benefits of this proposed rule are estimated to be approximately $0.3 million, undiscounted. The majority of the benefits are derived from emergency communication and savings to the Federal Government. The present value is approximately $0.2 million, discounted at 7 percent, and $0.3 million, discounted at 3 percent.

In 2018, FRA issued a final rule adopting new and modified requirements governing the construction of conventional-speed and high-speed passenger rail equipment. FRA notes that it is important to consider the costs and benefits of this proposed rulemaking in conjunction with the costs and benefits of the 2018 rulemaking, as the current rulemaking is necessary to complete the regulatory framework set out in the 2018 final rule. Over the 30-year period of analysis for the 2018 final rule, FRA estimated net regulatory cost savings of $284.8 million (low range) to $541.9 million (high range), discounted at 7 percent. Annualized net regulatory cost savings totaled between $22.9 million and $43.7 million when discounted at a 7-percent rate.

The net costs of this proposed rule are estimated to be approximately $55.2 million, undiscounted. The annualized net costs are approximately $1.7 million, discounted at 7 percent.

NET REGULATORY COSTS

Impact	Present value 7%	Present value 3%
Costs	$21.67	$35.49
Benefits	0.22	0.26
Net Costs	21.45	35.23
Annualized Net Costs	*1.73*	*1.80*

II. Statutory Authority and Regulatory Development

In September 1994, the Secretary of Transportation (Secretary) convened a meeting of representatives from all sectors of the rail industry with the goal of enhancing rail safety. As one initiative of this Rail Safety Summit, the Secretary announced that DOT would begin developing safety standards for rail passenger equipment over a five-year period. In November 1994, Congress adopted the Secretary's schedule for implementing rail passenger equipment safety regulations and included it in the Federal Railroad Safety Authorization Act of 1994 (the Act), Public Law 103–440, 108 Stat. 4619, 4623–4624 (November 2, 1994). In the Act, Congress also authorized the Secretary to consult with various organizations involved in passenger train operations for purposes of prescribing and amending these regulations and to issue orders under it. See section 215 of the Act (codified at 49 U.S.C. 20133).

Since FRA promulgated the inaugural set of passenger equipment safety standards in May 1999, satisfying the Congressional mandate, FRA has engaged in a number of rulemakings to amend and enhance its passenger equipment safety requirements. Most pertinent to this proposed rulemaking, FRA published a final rule on November 21, 2018, adopting new and modified requirements governing the construction of conventional-speed and high-speed passenger rail equipment. See 83 FR 59182. FRA added a new tier of passenger equipment safety standards (Tier III) to facilitate the safe implementation of nation-wide, interoperable passenger rail service at speeds up to 220 miles per hour (mph). FRA also established crashworthiness and occupant protection requirements in the alternative to those previously specified for Tier I passenger trainsets. Additionally, FRA increased from 150 mph to 160 mph the maximum speed for passenger equipment that complies with FRA's Tier II requirements.

Due to the complexity of the Tier III safety requirements, FRA separated their establishment into two distinct rulemaking efforts. The 2018 final rule primarily established the occupant volume protection and other major structural requirements, such as brake and emergency systems requirements. This NPRM is proposing requirements that would complement those requirements and complete the Tier III rulemaking process.

This proposed rule is the product of consensus reached by FRA's RSAC, which accepted the task of reviewing passenger equipment safety needs and programs and recommending specific actions that could be useful to advance the safety of passenger service, including the development of standards for the next generation of high-speed trainsets. The RSAC established the Passenger Safety Working Group (PSWG) [3] to handle this task and develop recommendations for the full RSAC to consider.

In August 2019, the PSWG convened to discuss the topics considered previously by the ETF that were not included in the initial, Tier III final rule published November 21, 2018.[4] During this meeting, the PSWG reached consensus on revising or establishing, as appropriate, safety standards for Tier I and Tier III safety appliances and non-passenger carrying locomotives. The PSWG also reached consensus on requirements for CEM for a single car or locomotive; Tier III inspection, testing, and maintenance; and movement of defective equipment. On November 26, 2019, the RSAC voted to recommend the consensus items to FRA.

III. Technical Background and Overview

A. Passenger Electronic Hardware and Software Safety

With the proliferation of microprocessor control technologies, the integration of electronic hardware and software on passenger rail equipment has grown exponentially. Software-based electronic systems are currently used to manage virtually all critical subsystems on board a passenger train ranging from primarily passenger comfort features such as air temperature and wireless networking systems, to safety-critical controls and monitoring systems, particularly for braking, traction and diagnostics systems. These systems are generally separate from safety-critical train control technology, such as positive train control (PTC) and automatic train control (ATC), which are governed by part 236.

In the 1999 Passenger Equipment Safety Standards final rule,[5] FRA established § 238.105, Train electronic hardware and software safety, to address ''the growing role of automated systems to control or monitor passenger train safety functions.'' These requirements were revised in 2002 [6] to provide more clarity in the applicability of the requirements to subsystems traditionally considered to perform safety-critical functions and therefore expected to be implemented based on a failsafe philosophy. In 2012,[7] the section was further revised to codify the terms of waivers from the requirements then in § 238.105(d) to provide flexibility for systems to provide either a service or emergency brake application in the event of a hardware/software failure, in lieu of a full-service brake application alone, as originally written.

[3] The Engineering Task Force (ETF) was discontinued when the charter for RSAC expired on May 17, 2018. The RSAC was re-chartered on September 10, 2018, and on February 1, 2019, the RSAC established the PSWG to continue the work of the ETF.

[4] 83 FR 59182.

[5] 64 FR 25591 (May 12, 1999).

[6] 67 FR 19970 (Apr. 23, 2002).

[7] 77 FR 21356 (Apr. 9, 2012).

Also, in 2012, the Locomotive Safety Standards final rule [8] established subpart E of part 229, providing comprehensive requirements for locomotive electronics, and appendix F to part 229, providing recommended practices for design and safety analysis for locomotive electronics. With the publication of the first set of standards for microprocessor-based train control systems in 2005,[9] and requirements for statutorily mandated PTC systems in 2010, the 2012 locomotive electronics requirements and accompanying appendix F to part 229 correspondingly reflected many of the concepts and industry practices that had evolved since § 238.105 was first established in 1999. In doing so, this created slightly overlapping requirements because § 238.105 was not revised with similar language and passenger locomotives, especially cab cars and multiple-unit locomotives common to passenger operations, also qualify as locomotives under part 229 of this chapter and are therefore subject to part 229's requirements. For this reason, the PSWG decided to address the issue by recommending updates to § 238.105 to reconcile the requirements with subpart E of part 229 to help clarify the applicability of the requirements and remove or modify any that may potentially overlap.

These proposed updates to the passenger electronic hardware and software safety requirements in this NPRM would establish uniform safety standards applicable to all safety-critical electronic control systems, subsystems, and components on passenger equipment. At the same time, in recognition of some of the differences between passenger and freight operations, this NPRM would create separate electronic hardware and software safety requirements specifically for passenger operations. However, the proposed requirements are not intended to impact technology or software subject to other FRA regulations, such as 49 CFR part 236.

B. Updates to Pre-Revenue Compliance Documentation and Testing Requirements

FRA is updating the pre-revenue compliance documentation and testing requirements to address and clarify issues that have been identified by FRA and the industry during pre-revenue service testing acceptance for rolling stock, such as the types of testing and compliance validation required, the timing for such activities, and the documentation required. Additionally, with the establishment of Tier III, the additional flexibility afforded by the regulations that allow certain safety elements to be defined by the railroad (*e.g.,* the functionality of a passenger brake alarm) necessitates establishing the means to capture the design and validate the performance of such attributes. Further, experience gained from administering the current pre-revenue service acceptance testing plan requirements under § 238.111 since 1999 has provided FRA the perspective that the industry as a whole would benefit from a more detailed regulation governing the design validation and dynamic acceptance process for passenger rolling stock. This concept was acknowledged by the PSWG, and with considerable help and input from participants, a new approach was developed by creating proposed § 238.110. That section would address design criteria, testing, documentation, and approval, and would separate early-stage, design-related compliance validations (*e.g.,* carbody structure and safety appliances) from the later-stage, over-the-route running tests required under § 238.111, prior to putting the equipment into revenue service.

By separating design criteria from dynamic testing requirements, more clarity can be provided as to the expectations for passenger equipment compliance demonstration throughout the life cycle of a procurement. Proposed § 238.110 would also provide a means for railroads to document critical vehicle platform design criteria and operational performance requirements, systems integration requirements, and assumptions that are used to validate certain safety parameters (*e.g.,* friction coefficient used to determine the minimum required braking distance). The identification of these governing parameters would provide a means for FRA and the railroad to effectively validate safety requirements tied to what would otherwise be configurable criteria, *i.e.,* trainset elements that may differ between trainset manufacturers or trainset types, based on the operating environment, intended service, or even customer preference. It would also ensure that the limit of safe performance of the vehicles is clearly established and would require that new testing or validation be performed if the railroad intended to operate the passenger equipment outside of this established operating paradigm. For example, under this proposal, if a railroad has previously demonstrated a vehicle's safe operation at speeds up to only 100 mph, then additional testing and validation would be required to operate the same rolling stock at speeds above 100 mph. Similarly, if a railroad were to acquire passenger equipment from another railroad where it is operated with a longer minimum safe braking distance than it would be on the acquiring railroad, then the acquiring railroad would need to perform additional pre-revenue acceptance testing on its property to validate that that braking system is still compliant with the requirements of this part in the new operating environment.

Much of proposed § 238.110 formalizes and memorializes what is industry best practice. However, this proposal contains a significant addition above what is currently industry practice in the requirement for railroads to develop a ''vehicle qualification plan.'' This proposed plan would require the railroad to take into consideration the entire compliance demonstration process, from the early stages of a project through the creation of tools such as a compliance matrix. This would help ensure the railroad, rolling stock supplier, and FRA effectively work from the same ''sheet of music,'' by determining what regulatory metrics must be met to achieve compliance, and then what constitutes an effective method to demonstrate that compliance, either by validation testing, physical inspection, design review, analysis, calculation, computer modeling, or some combination thereof.

By proposing to separate the requirements that were intrinsically considered part of the current language in § 238.111 into two sections (§§ 238.110 and 238.111), FRA would be able to provide more clarity as to the procedural and documentation requirements for the entire compliance validation process, particularly for Tier III where the documentation of configurable elements may be essential to establishing the expected safety performance which is to be demonstrated. In this spirit, the proposal would refine and expand upon much of the current § 238.111 language to reinforce expectations and process considerations for key documentation, including test plans, procedures, and results. Further, more explicit expectations and examples have been provided for the types of validations required to occur during the final commissioning stages before equipment may enter into revenue service, in addition to how re-built or relocated equipment must be treated.

[8] 77 FR 21348 (Apr. 9, 2012).

[9] 70 FR 11052 (Mar. 7, 2005).

C. Exterior Side Door Safety Systems—New Passenger Cars and Locomotives

As with other components of passenger rail equipment, innovations in the design and construction of door safety systems have generated new issues for potential regulation. The proposed language in this rule for exterior side door safety systems incorporated in new passenger cars and locomotives, developed from recommendations by RSAC, would revise § 238.131 to address newer door designs, with a specific focus on plug doors (*i.e.,* doors composed of a sliding panel that opens and slides along the side of the car, rather than retract into a pocket; when closed, the door conforms to the side of the car to seal out environmental noise and minimize aerodynamic resistance). This proposed language would address the additional function of a plug door in regard to a high-speed trainset and the system design pursuant to American Public Transportation Association (APTA) standard PR–M–S–18–10, ''Standard for Powered Exterior Side Door System Design for New Passenger Cars.'' As revised, § 238.131 would establish provisions for passenger equipment equipped with plug-style side doors that do not provide a minimum 1.5-inch gap at the leading edge of the door when the emergency release mechanism is activated and permit a speed interlock to prevent operation of the emergency release mechanism when the vehicle is moving.

Although the proposed revisions to § 238.131 could require stakeholders to apply or construct additional signage or handles, the expected efficiency enhancement in the equipment procurement and development process resulting from acceptance of the existing functionality of the plug door design could justify any such burden.

D. Alternative Crashworthiness Requirements for Evaluating Tier I Equipment Utilizing Crash Energy Management (CEM) on Individual Vehicles

The final rule published on November 21, 2018, included crashworthiness requirements for certain Tier I trainsets, but not for individual passenger rail vehicles or locomotives. And although there is no requirement for the development of CEM components at the individual Tier I passenger rail vehicle or locomotive level, some railroads and other stakeholders have nonetheless demonstrated an increased interest in the construction and installation of CEM components at the individual passenger rail vehicle or locomotive level. To augment existing regulations on CEM and provide guidance for the development and use of CEM at the individual vehicle level, FRA proposes adding new requirements providing alternatives for evaluating crashworthiness and occupant protection of individual vehicles equipped with CEM based on the RSAC recommendations.

The proposed alternative requirements would provide guidance and a means for evaluating individual locomotives or passenger rail vehicles that are fully compliant with existing Tier I structural requirements and have additional CEM features incorporated into their structure to operate within conventional, Tier I-compliant trains. These evaluation requirements would not apply to Tier I trainsets designed to alternative crashworthiness requirements under § 238.201 and appendix G to part 238 or single pieces of equipment with traditionally compliant structures outfitted with pushback couplers as the only CEM feature.

By establishing alternative requirements for evaluating crashworthiness and occupant protection of Tier I equipment utilizing CEM on individual vehicles, FRA would create clarity and reduce uncertainty for stakeholders who pursue the development of CEM at the individual vehicle level. Such clarification could also reduce the burden and time required for FRA to evaluate compliance issues related to passenger equipment utilizing CEM on an individual vehicle.

E. Safety Appliances for Non-Passenger Carrying Locomotives and Passenger Equipment

Coinciding with the development of safety appliance requirements for Tier III equipment, the PSWG also looked at updating the safety appliance requirements for modern Tier I passenger equipment. While safety appliance regulations have long existed for passenger cars under 49 CFR part 231, these standards are derived, in most cases verbatim, from the requirements set forth by the Interstate Commerce Commission (ICC) in 1910 and guidance of the Master Car Builders Association around the turn of the twentieth century.[10] While these requirements have proven to be sufficient for the types of passenger cars they were explicitly developed to address (passenger train cars with wide vestibules, passenger train cars with open end platforms, and passenger train cars without end platforms), they generally have not been updated to reflect modern advancements in passenger train equipment or human ergonomics in over 100 years since they were adopted by the ICC. Likewise, they are based on individual cars that were common on railroads at the turn of the twentieth century, and do not reflect vehicle designs that utilize some form of semi-permanent coupling, such as fixed trainset configurations, or even married-pair, MU locomotives. The PSWG determined this would be a good opportunity to update the regulations to account for these modern vehicle types and apply more modern requirements, in addition to updating and reconciling the regulatory framework with the current APTA standard, APTA–PR–M–S–016–06, ''Standard for Safety Appliances for Rail Passenger Cars.'' Specifically, FRA is taking this opportunity to update some requirements to reflect more modern design requirements based on recommendations particularly relating to strength and attachment requirements. These new standards, developed by the PSWG, reflect the significant changes in material and engineering design practice that have occurred since the first standards were adopted, when timber and iron were still the predominant railcar building materials.

As modern Tier I passenger equipment is functionally similar to Tier III high-speed trainsets in many ways, FRA decided that a single baseline set of requirements could be adopted for certain passenger carrying vehicles. It should also be noted, however, that while this proposed rule would establish and clarify requirements that could be used for both new and existing passenger equipment, it is not intended to replace the established regulations. Because passenger railcars tend to have long service lives in North America, there will remain a perpetual need to maintain the existing regulations for cars built to those standards, in addition to private cars and special car types (*e.g.,* baggage) that are based on car types that are not addressed by contemporary standards.

This proposed rule would also create a new regulatory section for Tier I non-passenger carrying locomotives. The proposal incorporates applicable requirements from part 231 pertaining

[10] While various safety appliance standards were developed for different classes of equipment throughout the development of railroads in America, the publication titled, ''United Sates Safety Appliances for All Classes of Cars and Locomotives,'' M.C.B. Edition, published by Gibson, Pribble & Company, represents one of the first sets of comprehensives guidance on the matter. This guidance was later adopted by the ICC, and subsequently FRA, as regulation.

to passenger locomotives and various other car types that have historically been used to define the requirements for monocoque, semi-monocoque, and cowl unit [11] passenger road locomotives. Currently, the safety appliance requirements for road locomotives are primarily based on § 231.15 (Steam locomotives used in road service), and § 231.17 (Specifications common to all steam locomotives), which are also virtually unchanged from the original ICC standards. The existing regulations were not developed to specifically address the common designs utilized by diesel-electric or electric locomotives in passenger service within North America. Through the adoption of these proposed standards, FRA would help provide clarity and uniformity in how the Safety Appliance Act (49 U.S.C. ch. 203) is applied to all modern passenger road locomotives.

Current FRA regulations for safety appliances are based on longstanding statutory requirements for individual railroad cars used in general service. These requirements are primarily intended to keep railroad employees safe while performing their essential job functions. Historically, these duties have revolved around the practice of building trains by switching individual cars or groups of cars and are not specifically applicable to how modern, high-speed passenger equipment is designed and operated. The application of such appliances would require a significant redesign of high-speed rail equipment and would create aerodynamic problems particularly with respect to associated noise emissions. Therefore, FRA proposes to exempt Tier III (and certain Tier I) equipment from the following requirements of 49 U.S.C. ch. 203: (1) couplers that couple automatically by impact, and are capable of being uncoupled, without individuals having to go between the ends of equipment; and (2) secure sill steps and grab irons or handholds on the vehicle's ends and sides.

Rather than apply legacy requirements that are inappropriate for the proposed equipment design and service environment, this proposed rule focuses on how to provide a safe environment for employees as it pertains to modern high-speed equipment and operations. In this respect, the proposed rule would define specific safety appliance performance requirements applicable to these modern trainsets subject to the rule. By focusing on employee job functions, rather than mandating specific legacy designs for dissimilar equipment, the proposed approach would likely not only improve safety for railroad employees, but also provide flexibility for superior designs based on modern ergonomics and eliminate appliances that might otherwise encourage their use even though their functionality is moot (*e.g.,* riding on side sills despite an inability to couple/decouple cars).

Under 49 U.S.C. 20306, FRA may exempt a railroad or railroads from the above-identified statutory requirements for safety appliances based on evidence received and findings developed at a hearing demonstrating that the statutory requirements ''preclude the development or implementation of more efficient railroad transportation equipment or other transportation innovations under existing law.'' FRA notes that 49 U.S.C. 20306 does not require a separate public hearing as related to Tier III (and certain Tier I) equipment for each new vehicle design. FRA conducted hearings in 2009, 2019, and 2020 addressing both Tier III and Tier I trainsets.[12] Based on these hearings, FRA has determined that the equipment design regarding the application of safety appliances as proposed in this NPRM is substantially similar among the vehicle types.

Accordingly, FRA believes it is appropriate to consider relief under the discretionary process established under 49 U.S.C. 20306 and proposes to adopt the requirements proposed in this NPRM under its statutory authority as part of this rulemaking without holding an additional public hearing, as an additional public hearing would not develop any new facts.

F. Tier III Inspection, Testing, and Maintenance, and Movement of Defective Equipment

In developing new standards for modern high-speed trainsets, the PSWG deliberately separated later-stage design elements and operational-related requirements from those early-stage design issues that influence the vehicle platform (*e.g.,* vehicle carbody design requirements). In this manner, the 2018 final rule provided a level of regulatory certainty for Tier III procurements to move forward, while providing additional time for the PSWG to help mature the remaining standards governing elements that are more critical to the later-stage equipment production and operational testing phases of such procurements. Following this concept, the development of the inspection, testing, and maintenance (ITM) requirements for Tier III trainsets was identified as an essential part of this second rulemaking to help complete the Tier III regulatory framework. While many of the elements in the 2018 rulemaking established a certain level of safety from a design perspective, the ITM requirements are intended to ensure that railroads can maintain the expected level of safety throughout the life of the equipment.

To facilitate the development of appropriate ITM requirements, along with clarifying the applicability of general safety requirements (see Section III.G, General Tier III Safety Requirements, below) for modern high-speed trainsets, the PSWG considered the inspection and maintenance needs of modern trainsets based on current global practice, in comparison to longstanding North American practice established for locomotives, passenger equipment, and passenger brake systems codified in parts 229 and 238, respectively.

A guiding light for this effort has been the experience implementing, and relative success of, the ITM requirements established for Tier II equipment under subpart F of part 238. Unlike many of the explicit requirements and intervals used for conventional Tier I passenger equipment in subpart D of part 238, the Tier II requirements provide a broader approach to ITM, setting out various parameters the railroad must follow in determining the appropriate procedures and periodicity for inspections, tests, and maintenance specific to the equipment it operates, as approved by FRA. This approach utilizes the development of a comprehensive ITM program, appropriate for the equipment design and technology, that can then be enforced and managed through an FRA approval process that includes an annual review of the railroad's program to monitor its effectiveness. When this approach was established in the 1999 final rule, it marked a significant departure from conventional practice, but this departure was viewed as appropriate given the nature of high-speed trainset technology, and the fact that the equipment's operational limits would be more closely defined and overseen than for conventional equipment. Since this parallels the need and operational considerations for Tier III trainsets, the approach was viewed as a logical starting point for the PSWG. This rule, as proposed, reflects the desire of the PSWG to continue the success of the Tier II ITM approach,

[11] For the purposes of this rulemaking, ''cowl unit'' locomotives are locomotives with a traditional frame, but whose mechanical components and walkways are enclosed within a non-structural, non-load bearing element, typically made of steel or other metal alloy.

[12] *See* Docket numbers FRA–2006–25040, FRA–2019–0066, and FRA 2019–0068.

while incorporating lessons learned by FRA through applying subpart F of part 238 to the National Railroad Passenger Corporation's (Amtrak) Acela fleet.

In particular, the proposed rule maintains the approach of subpart F of part 238 and the concept that an ITM program for Tier III trainsets should have the flexibility to be modified and updated based on verifiable data and the evolution of technology integrated into these high-performance trainsets. The requirements, as proposed, effectively perform two regulatory functions. First, they would require the railroad to establish the safety-critical maintenance needs for the trainset and its components, the appropriate periods for inspections, and the means by which inspections or maintenance must be performed (*i.e.,* tools and methods). Second, they would establish the qualification requirements of the personnel designated to perform such activities.

Additionally, this proposed rule would establish requirements for the movement of defective Tier III equipment, should a non-compliant condition arise where efficient repairs cannot be performed (*e.g.,* such as an en-route failure of a safety-critical component). The requirements are intended to complement the ITM program, which would effectively establish the safe operating conditions required for the intended service of the trainsets and therefore be integrated into the same proposed subpart I. Together, these would require the railroad to establish the conditions under which defective equipment can be moved, the conditions movements may occur when defects are discovered during revenue service (*e.g.,* en-route failures), the associated procedures that must be followed, including identifying who may determine that the movement is safe to make, and documentation requirements.

G. General Tier III Safety Requirements

This proposed rule includes a number of provisions that would adopt certain relevant general safety requirements of part 229 and apply them to Tier III trainsets. As with most of the proposals in this NPRM, these provisions were developed from consensus recommendations by the RSAC.

Overall, the proposals cross-reference relevant sections of part 229 for Tier III trainsets aiming to distinguish legacy locomotive requirements of part 229 from those requirements more appropriate for modern high-speed passenger equipment. Additionally, the proposal would provide consistency between the general safety standards for Tier III trainsets and those standards applicable to trainsets qualified at other tiers, and to ensure that Tier III trainsets remain free of any condition that endangers the safety of the crew, passengers, or equipment.

FRA notes that the proposed rule text to implement this initiative would make various sections and specific requirements of part 229 directly applicable to Tier III trainsets by cross-reference, rather than simply repeat numerous similar or identical requirements in part 238. This approach hopefully fulfills the intent by resolving ambiguity about applicability of these part 229 requirements to Tier III trainsets and avoiding drafting errors in the future if a requirement under part 229 changes without otherwise similarly changing a companion provision under part 238. FRA recognizes that this part uses some traditional terms, such as locomotive, when describing certain requirements. However, the use of the term locomotive, or other similar terms, should not be an impediment to compliance with the requirements of this proposed rule. Where appropriate, additional clarifying language has been included in the section-by-section analysis or rule text, or both, to help make the requirement and its application clear. FRA invites comments on these sections, below.

In addition, FRA invites comment on whether it is more appropriate for part 229 not to apply to Tier III equipment, *in toto.* There may be some benefit in wholly separating Tier III from the requirements of part 229 for clarity and ease of use of the regulation. FRA notes, however, that even should part 229 be made not applicable to Tier III equipment, the requirements of the Locomotive Inspection Act codified at 49 U.S.C. ch. 207, would still apply independently. In inviting comment on this approach and its validity, FRA also seeks comment on whether it is more appropriate to make only certain sections under part 229 inapplicable to Tier III equipment, and if so, which sections specifically.

H. Congressional Mandates Under the Infrastructure Investment and Jobs Act

On November 15, 2021, President Biden signed into law the Infrastructure Investment and Jobs Act (IIJA), Public Law 117–58, 135 Stat. 429. As part of the IIJA, Congress directed FRA, as the Secretary's delegate, to promulgate regulations concerning periodic inspection plans for emergency lighting and pre-revenue service safety validation plans. Secs. 22406 and 22416. Congress also directed FRA, as the Secretary's delegate, to promulgate regulations ''as may be necessary for high-speed rail services[.]'' Sec. 22419 (codified at 49 U.S.C. 26103). Through this rulemaking, FRA is addressing both these substantive mandates while promulgating regulations that are necessary for the implementation of high-speed rail services in the United States.

Under Sec. 22406 of the IIJA, FRA must initiate a rulemaking to require that all rail carriers providing intercity passenger rail transportation or commuter rail passenger transportation develop and implement periodic inspection plans to ensure that passenger equipment offered for revenue service complies with the requirements of this part. This includes ensuring that, in the event of a loss of power, there is adequate emergency lighting available to allow passengers, crewmembers, and first responders to orient themselves to identify obstacles and to safely move through and evacuate from a rail car. This proposed rule would satisfy this requirement.

Under Sec. 22416 of the IIJA, any railroad providing new, regularly scheduled, intercity or commuter rail passenger transportation, an extension of existing service, or renewal of service discontinued for more than 180 days to develop and submit for review a comprehensive pre-revenue safety validation plan to FRA no less than 60 days prior to the start of revenue service. Once submitted, the railroad must adopt and comply with the plan. This section of the IIJA also requires FRA to develop conforming regulations to implement this section, which are proposed under § 238.108.

IV. Section-by-Section Analysis

Part 216—Special Notice and Emergency Order Procedures: Railroad Track, Locomotive and Equipment

Section 216.14 Special Notice for Repairs—Passenger Equipment

FRA proposes to revise § 216.14(c) to add a cross-reference to § 238.1003, which would contain the requirements for movement of defective equipment for Tier III trainsets. This change would harmonize part 216 with the proposed changes to part 238 contained in this rulemaking applicable to Tier III equipment.

Part 231—Railroad Safety Appliance Standards

Section 231.0 Applicability and Penalties

FRA is proposing to add paragraph (b)(6) to this section to harmonize part 231 with the changes proposed to part

238 in this NPRM. As FRA is proposing standalone and comprehensive safety appliance requirements for Tier III trainsets under proposed § 238.791, this rule would make part 231 not applicable to Tier III trainsets.

Part 238—Passenger Equipment Safety Standards

Subpart A—General

Section 238.5 Definitions

FRA is proposing to revise existing definitions and add new definitions to this part to clarify the meaning of important terms and minimize potential for misinterpretation of the rule. FRA requests public comment regarding the proposed terms to be defined in this section and whether definition of other terms is necessary.

FRA proposes to revise paragraph (2)(i), the definition of ''in service,'' to include a reference to the movement of defective equipment provisions of § 238.1003 for Tier III equipment.

FRA proposes to add a definition of ''clear length,'' as applied to handholds and handrails, to mean the distance about which a minimum 2-inch hand clearance exists in all directions around the handhold or handrail, with intermediate supports on handrails considered part of the clear length. FRA proposes to add this definition to clarify the appropriate measurement for determining compliance with part 238's requirements.

FRA proposes to add a definition of ''crew access side steps'' to mean a step or stirrup, or a series of steps or stirrups, located on the carbody side to assist an employee boarding the equipment or exiting from the equipment to ground level through an exterior side door dedicated for train crew use. FRA proposes to add this definition to clarify the safety measures necessary for crewmembers operating passenger equipment with no provisions for platform-level boarding.

FRA proposes to add a definition of ''representative segment of the route'' to mean either a continuous track section or a compilation of track no less than fifty miles in length that consists of a curvature distribution that is within two percent of the curvature distribution of the complete line segment (as evaluated using the root mean squared (RMS) of the differences between the two distributions), a segment or segments of tangent track over which the intended maximum operating speed can be sustained, and any bridges and special trackwork that are within the track section(s). Depending on the size of the railroad, a ''representative segment of the route'' could include the entire system in order for the ''representative segment of the route'' to consist of a segment of tangent track over which the intended maximum operating speed can be sustained, any bridges and special trackwork, and have a curvature distribution that is within two percent of the curvature distribution of the complete line segment (as evaluated using the RMS of the differences between the two distributions). FRA proposes to add this definition to clarify the appropriate methods of qualification testing for passenger equipment to determine compliance with requirements addressing vehicle/track interaction.

FRA proposes to define ''Tier IV system'' to mean any railroad that provides or is available to provide passenger service using non-interoperable technology that operates on an exclusive right-of-way without grade crossings, not comingled with Tier I, II, or III passenger equipment or freight equipment, and not physically connected to the general railroad system. FRA proposes to add this definition to establish a classification and foundation applicable to passenger equipment that is subject to FRA regulation but falls outside the scope of the existing tier classifications. Unlike what was recommended by the RSAC to FRA, FRA is not proposing to include language in the definition that references a particular type of regulatory framework. FRA notes that the type of regulatory mechanism FRA employs to ensure effective safety oversight would not be consequential to whether a particular technology is considered a ''Tier IV system.'' FRA welcomes comment on the use of the term ''Tier IV,'' or an alternative categorization, to identify the type of system described in this paragraph.

Section 238.19 Reporting and Tracking of Repairs to Defective Passenger Equipment

FRA is proposing to amend this section to harmonize the existing requirements with proposed new requirements applicable to Tier III passenger equipment. As part of the RSAC consensus recommendations, RSAC recommended that FRA issue regulations specific to Tier III equipment with respect to reporting and tracking of repairs made to defective Tier III equipment, so that these requirements would be included as part of the Tier III ITM requirements under proposed § 238.903. The recommended approach was based on the existing requirements codified under this section (§ 238.19). Yet, after further consideration, FRA is proposing to simply amend this section rather than add these requirements to subpart I, for clarity.

Specifically, FRA is proposing to amend paragraphs (a), (b), and (d). In proposed paragraphs (a)(4) and (5), FRA would add the term qualified individual to account for the nomenclature's use under subpart H and proposed subpart I for Tier III equipment.

In the proposed revision to paragraph (b), FRA would redesignate paragraph (b) as paragraph (b)(1) and add new paragraph (b)(2). In proposed paragraph (b)(2), FRA would add record retention requirements for reporting and tracking system records for Tier III equipment regarding the information in paragraph (a). FRA is also proposing that for Tier III equipment, the records be retained for at least one year.

In FRA's proposed revision to paragraph (d), FRA would revise the paragraph heading, redesignate paragraph (d) as paragraph (d)(1), and add new paragraph (d)(2). Under proposed paragraph (d)(2), FRA would add the requirement that operators of Tier III equipment designate locations where repairs to safety-critical systems on Tier III equipment can be made, including repairs to Tier III brake systems. This requirement would follow the requirements in existing paragraph (d)(4) that such designations be made in writing, that the written designations be provided to FRA and made available for inspection and copying, and that the list of repair points could not be changed without at least 30 days' advance notice provided to FRA.[13] Further, FRA would require that Tier III trainsets not leave designated brake repair points with anything less than the required operational braking capability. This means that a trainset could leave the designated brake repair point with less than its maximum designed braking capability, still retaining its required operational braking capability, but could not do so for a period exceeding 5 consecutive calendar days under proposed § 238.1003(d)(1). This proposal is based on international, service-proven practice and FRA's approach to inspection, testing, and maintenance.

FRA notes that it has introduced two new terms under proposed paragraph (d)(2), exclusive to Tier III equipment: required operational braking capability and maximum designed braking capability. As further discussed below under proposed §§ 238.903(a)(8) and 238.1003(d), the required operational braking capability with respect to Tier III equipment would be the capability of

[13] 64 FR 25540, 25587–25588.

the trainset to stop from its maximum operating speed within the signal spacing existing on the track over which the trainset is operating under the worst-case adhesion conditions defined by the railroad. This would also be consistent with § 238.731(b). Maximum designed braking capability would be the maximum braking capability of the Tier III trainset as designed—a performance element of a Tier III trainset that must be specified by the railroad under proposed § 238.110(d)(2)(ii).

Subpart B—Safety Planning and General Requirements

Section 238.105 Passenger Electronic Hardware and Software Safety

FRA is proposing to revise this section to clarify the requirements of this section and to reconcile overlapping requirements with subpart E of part 229 of this chapter. It has been FRA's experience over the last decade that much ambiguity exists with the correct application of part 238 requirements and similar requirements under part 229. In FRA's view, the requirements that are being proposed have been applicable to the passenger industry, consistent with the applicability dates listed in the introductory text of this section. FRA is also making clear that it is not expanding the applicability dates.

Under paragraph (a), FRA is proposing to make editorial changes and is also proposing to permit railroads to maintain the hardware and software safety program in either a written or an electronic format.

Additionally, FRA is proposing to swap current paragraphs (b) and (c) with each other, redesignating current paragraph (b) as paragraph (c) and current paragraph (c) as paragraph (b) for clarity and organizational purposes. Further, FRA is proposing to add a new requirement under proposed paragraph (b)(8). Proposed paragraph (b)(8) would make explicit that the safety analysis outlined in proposed paragraph (c) is a required part of the hardware and software safety program required under paragraph (a) of this section.

Under proposed paragraph (c), FRA is providing additional detail on how to perform the safety analysis that is being proposed under paragraph (b)(8). FRA is proposing to use the term ''safety analysis'' rather than the legacy term ''safety program,'' to make clear that this is an analysis to be conducted as part of the broader safety program rather than a standalone program. Additionally, FRA is proposing that the safety analysis establish and document the minimum requirements governing the development and implementation of all products subject to this section. Further, the safety analysis, as proposed, would be based on good engineering practice and should be consistent with the guidance contained in appendix F to part 229 of this chapter in order to establish that a product's safety-critical functions operate with a high degree of confidence in a fail-safe manner. As proposed, the safety analysis would be based on a formal safety methodology, to include a Failure Modes, Effects, Criticality Analysis (FMECA), verification and validation testing for all hardware and software components and their interfaces, and comprehensive hardware and software integration testing to ensure that the hardware and software system functions as intended.

FRA is proposing to revise paragraphs (d) and (e) simply by adding paragraph headings.

FRA is also proposing to add paragraph (f) to this section to make explicit which specific requirements from subpart E of part 229 are being made applicable to passenger equipment. Consistent with the discussion above regarding the applicability of this section, FRA is proposing to reference the applicability dates set forth in § 229.303(a)(1) and (2), to make clear that FRA is not intending to expand the applicability of these requirements. In proposed paragraphs (f)(1) through (6), FRA has listed each provision of subpart E of part 229 being made applicable to passenger equipment. Accordingly, if a provision in subpart E of part 229 is not listed in this paragraph (f), then that requirement would not be applicable to passenger equipment under this part.

Additionally, FRA is proposing to add paragraph (g) to this section. Proposed paragraph (g) would add a requirement that railroads prepare a Vehicle Communication and Control System Vulnerability Assessment identifying potential system vulnerabilities, associated risk (including exploit likelihood and consequences), countermeasures applied, and resulting risk mitigation.

Further, FRA is proposing to add paragraph (h) to this section, which would add a requirement that suppliers of safety-critical railroad products notify FRA of any safety-critical product failures. By requiring this notice to FRA, FRA may in turn help ensure that notice of the faulty product is provided to other possible users of the equipment.

Section 238.108 New Passenger Service Pre-Revenue Safety Performance Demonstration

Pursuant to Section 22416 of the IIJA, FRA is proposing to add requirements for new passenger service pre-revenue safety performance demonstration. This proposal incorporates the requirements of the IIJA and provides additional direction for railroads to assist them with the development and execution of pre-revenue safety and operational readiness demonstration. These proposed requirements would apply to any new passenger rail service subject to FRA safety jurisdiction, including line extensions and the resumption of service if passenger rail service has not been present on a line for more than 180 days. This proposed section would not apply to the temporary re-routing of existing passenger service due to weather events, emergency scenarios, or planned PTC maintenance under § 236.1005(g).

Through this proposed section, FRA would require railroads and project stakeholders to use safety and operational readiness as the deciding factors as to when revenue passenger service should begin over a line, rather than an earlier date influenced by other factors. As an example, FRA is aware of an instance where the use of emergency phones located in a railroad's stations knocked out the signal system of the railroad as the two systems were using the same support infrastructure (a router). However, this problem was only discovered through happenstance, and not part of an overall system safety and operational readiness evaluation before the rail service began. This example is provided to illustrate the scope of the intended safety performance demonstration and the critical evaluation necessary to accomplish the goals of this proposed section.

Proposed paragraph (a)(1) establishes who must submit a pre-revenue safety validation plan. The requirements would apply to any railroad subject to the requirements of part 238 regardless of tier of service, or any other responsible entity providing new, regularly scheduled, intercity or commuter passenger service, an extension of existing service, or the re-start of service that has been suspended or otherwise discontinued for more than 180 days. These requirements would apply regardless of whether the railroad is already operating similar service. For example, an existing commuter railroad that is already providing commuter service would still need to comply with the proposed requirements of this section for any new commuter rail line

or physical extension of its existing network. A plan would not be required for changes in service frequency or other modifications to existing services, such as changes to contract operators (or other contracted activities), or the addition of in-fill stations. However, a railroad proposing to operate new passenger service over a line that already provides passenger service would still be required to develop a plan under this section.

Proposed paragraph (a)(2) outlines the content requirements for the proposed pre-revenue safety validation plan and would require that it be submitted to FRA for review no less than 60 days prior to the start of the service's safety demonstration period, the requirements of which are outlined further in this section. Proposed paragraph (a)(2)(i) would require that the railroad provide the status of all appliable safety plans or regulatory programs, and any associated certifications, qualifications, and employee training required for the start of revenue service, that are enumerated in proposed paragraphs (a)(2)(i)(A) through (K). The railroad must be able to demonstrate that these programs, plans, certifications, qualifications, and employee training would be not only substantially complete and/or in place to support the service, but that it would also adequately execute the programs or plans as intended. FRA may look to validate this with field inspections during the service demonstration period. For example, if an employee (or contractor) is required to comply with the railroad's on-track safety program for the duties being performed, FRA would expect that field inspections would validate that the employee has received training and is knowledgeable on the requirements of the railroad's on-track safety program. In providing its pre-revenue safety validation plan, the railroad should pay particular attention to the completion of required activities, testing and certification (especially engineer and conductor certification), the adequacy of its training programs, and appropriate close-out or mitigation of any identified hazards as part of its system safety planning efforts. Additionally, the railroad would be required to provide data indicating which safety-related employees are required to receive training, qualifications or other certifications, and the status of those programs (the number who have completed each step) as identified in proposed paragraphs (a)(2)(i)(H) and (I). Completion of FRA's ''new starts'' process may satisfy this requirement.

Proposed paragraph (a)(2)(ii) would require the railroad to provide a description of how it would measure ''substantial completion'' of the system. This must include items such as any tests or validations to be performed by contractors for facilities, structures, systems, or other major construction activities that must be performed before they can be accepted by the railroad, or before testing or revenue service can begin. Because system level testing and integration testing often require the availability of substantially complete infrastructure and supporting systems to conduct testing, the railroad must be able to demonstrate that it would have adequate access to these facilities to properly perform required testing under FRA's regulations. The availability of core infrastructure and systems is also necessary for the service demonstration period and FRA would require that the safety and acceptance of these core elements be addressed on their own merit, and that such activities would not conflict with required tests or other activities identified in this section due to schedule compression.

Further, should there be a host-tenant relationship, and the railroad submitting the pre-revenue safety validation plan is not the host railroad, then the host railroad and the railroad submitting the pre-revenue safety validation plan must coordinate. Specifically, FRA is concerned about host railroads scheduling construction activities unbeknownst to the railroad submitting the pre-revenue safety validation plan that could potentially interfere with the safety performance demonstration period (simulated service). To help resolve this concern, FRA is proposing to require that host railroads share pertinent information with the railroad submitting the pre-revenue safety validation plan (when not the host railroad).

Proposed paragraphs (a)(2)(iii) and (iv) would require the railroad to provide details on its proposed operations over the line, and its expectations and plans for its safety performance demonstration and simulated service required under this section. In each of these paragraphs, FRA has listed specific information requirements. These lists are not intended to be exhaustive. Specifically, under proposed paragraph (a)(2)(iv), the railroad would be required to provide its plans for simulated service (*e.g.,* the minimum number or days or successful runs), and its criteria for determining if the simulated service has been successful.

Proposed paragraph (b) outlines the requirements for the railroad's safety performance demonstration period (simulated service) to be performed to demonstrate operational readiness. The safety performance demonstration period would provide the railroad an opportunity to demonstrate operational readiness in a dynamic real-world environment, with all major elements and systems in place. The period may also be used by FRA to conduct inspections to validate that the railroad has effectively trained employees and executed its critical plans and programs.

Proposed paragraph (b)(1) specifies that a minimum period of simulated service must be successfully performed prior to the start of revenue service (to be expressed in days or number of runs as required under proposed paragraph (a)(2)(iv)). Proposed paragraph (b)(1)(i) provides requirements for new operations or physical extensions to existing services. These services require the most activities to ensure operational readiness and should be conducted using the full proposed schedule to ensure that the service schedule can be practically implemented to support safe operations. For example, the railroad must be able to demonstrate that the scheduled running times and turns can be performed reliably, even when factoring in common scenarios that might affect service, such as speed restrictions or mandatory directives. This would ensure that crews are not subjected to undue stress and potential safety concerns when revenue service begins, due to delays that could otherwise be avoided if the schedule and operational readiness had been validated. In FRA's experience, most new operations that voluntarily conducted a period of simulated service prior to commencing revenue service have required a minimum of two to six weeks of simulated service to address issues and ensure operational readiness. FRA notes, however, that the process is not necessarily intended to be linear, and certain activities may also be completed in parallel with the simulated service, when appropriate.

Proposed paragraph (b)(1)(ii) provides considerations for the re-start or re-routing of existing operations. For these situations, the amount of simulated service can vary greatly depending on the scope of the re-started or re-routed service. For example, the re-start of a discontinued service may necessitate running full, scheduled operations for a certain number of days, whereas re-routing of a service may only require a certain number of ''successful'' test runs. The railroad may reach out to and work with FRA in determining the appropriate period based on the individual circumstances.

Proposed paragraph (b)(2) would require the railroad to provide a daily

summary of the activities and results from the safety performance demonstration period, including discussion on any delays, system failures, unexpected events, close calls, or other safety concerns uncovered during simulated service.

Proposed paragraph (b)(3) would require the railroad to correct any safety deficiencies identified during the safety performance demonstration period prior to commencing revenue service. Additionally, this proposed paragraph would require that, if a safety deficiency cannot be corrected, then it must be addressed through mitigations or operational restrictions that would ensure the safety of the operation. Finally, this proposed paragraph would require a final report to be submitted to FRA addressing the complete safety performance demonstration period, specifically detailing the deficiencies uncovered and the associated corrections, mitigations, or operational restrictions imposed. FRA notes that it would reserve the right to require additional corrections, mitigations, or operational restrictions should it determine that those imposed by the railroad would not be sufficient to ensure the safety of the operation.

Proposed paragraph (c) would require a railroad to comply with its plan before revenue service may begin. It would also prohibit a railroad from amending its plan without first notifying FRA, to prevent a railroad from effectively ''moving the goal posts'' to commence revenue service by a pre-determined date if the requirements of the plan have not otherwise been met. In addition, this proposed paragraph would impose a general prohibition against commencing revenue service until the plan has been successfully completed by the railroad, to include the imposition of corrections, mitigation, or operational limitations as required by proposed paragraph (b)(3).

Section 238.110 Design Criteria, Testing, Documentation, and Approvals

To help clarify the compliance demonstration and approval process for passenger equipment, FRA is proposing new § 238.110. This proposed section is intended to complement § 238.111, as proposed to be revised in this NPRM. This section would require the railroad to establish the design criteria and provide the system description for the intended service against which the railroad is demonstrating safety compliance. This proposed section would also provide the ability for the railroad to define certain elements required for Tier III operations, as well as require the railroad to develop a vehicle qualification plan to establish how compliance would be demonstrated. Further, this proposal includes specific language for the demonstration of early-stage, vehicle design matters, such as carbody construction with respect to crashworthiness and safety appliances. In developing this language, FRA worked closely with industry subject matter experts through the RSAC to provide more detail about passenger vehicle compliance demonstration to help clarify the process. FRA welcomes any comments or considerations that might further improve the clarity of this section.

Proposed paragraph (a) outlines the scope of this section and its relationship with § 238.111. Proposed paragraph (a)(1) would make the requirements of this section applicable to new passenger equipment designs (*i.e.,* an equipment design that has not been previously used in revenue service in the U.S.), and rebuilt or modified equipment where the carbody structure or any safety-critical elements have been modified or replaced by a new design not identical to the original component.

While FRA has attempted to provide clear language with respect to when a vehicle design has been altered to a point where an updated demonstration of compliance with the safety standards would be required, FRA recognizes that this can be a matter of nuance, and additional feedback from FRA may be necessary as to when a modification to an existing vehicle platform may have crossed such a threshold. For instance, changes to the traction control or braking systems, modifications to trucks or suspensions systems, changes to the carbody structure or its material, or alterations that change the mass or center-of-gravity of the vehicle (and thus its dynamic performance), are all common examples of when a new safety assessment and compliance demonstration would likely be appropriate.

Under proposed paragraph (a)(2), previously accepted passenger vehicle designs would not be subject to the requirements of this section, except for the development and maintenance of a system description under proposed paragraph (d). Even though development of a vehicle qualification plan would not be required, FRA still would require railroads to develop a system description to capture the critical information of the operating environment of the equipment in case changes are made that would necessitate a new safety assessment and compliance demonstration.

Proposed paragraph (b)(1) would make the railroad responsible for maintaining any documents or evidence related to the design and performance of the vehicle that may be necessary to establish or demonstrate compliance with the safety regulations. Even if material is provided to FRA for review or approval, this would not relieve the railroad from the proper maintenance of its records in this regard. FRA would require that the railroad be able to produce relevant documentation, including any changes or modifications to one or more of the vehicles in its fleet should the need arise, as proposed under paragraph (b)(2). Proposed paragraph (b)(2) would also require that the documentation be maintained for the life of the equipment. If the equipment is leased or sold, this paragraph would require a copy of the documentation to be provided to the lessee or purchasing entity, respectively.

Under paragraph (c), FRA is proposing to require railroads develop a vehicle qualification plan. This plan would assist railroads in demonstrating compliance with the requirements of this proposed section. As proposed, the vehicle qualification plan would be comprised of a system description (which includes certain vehicle design assumptions) and a compliance matrix.

Proposed paragraph (c)(1)(i) contains the requirement for a railroad to develop a system description (a description of the intended operational environment for the equipment), which would cover topics listed under proposed paragraph (d)(1), as well as a listing of assumptions used when designing the equipment. This initial portion of the proposed system description would be for all passenger equipment. Additionally, railroads seeking to qualify Tier III equipment under this section would need to address the required elements for Tier III operations, as listed in proposed paragraph (d)(2).

Proposed paragraph (c)(1)(ii) introduces the concept of a comprehensive compliance matrix (matrix) that must be developed by the railroad to outline the means by which compliance with various safety requirements under FRA's regulations would be demonstrated. This matrix, as proposed, is an extrapolation of what FRA has historically expected under the current language of § 238.111, in that the railroad should be able to identify all tests required to demonstrate compliance under FRA's regulations—whether a carbody structural test to validate compliance with the occupied volume protection requirements, or a braking test performed during the final commissioning stages of a project. Both of these exemplar tests provide critical safety validation of the design and must

occur prior to the use of the equipment in revenue service. But as these two tests can occur years apart, it is not unusual for some to focus on the requirements of current § 238.111 as relating to only those activities that occur when full-scale dynamic testing has begun. By proposing to move this planning requirement into § 238.110 and expand language to require the development of a comprehensive test matrix at the early stages of a project, FRA would ensure the railroad and rolling stock supplier clearly articulate the intended means by which all critical compliance elements of FRA's regulations would be demonstrated. In doing so, the parties would also gain FRA's perspective and feedback on whether the means identified are adequate.

In practice, as proposed under paragraph (c)(1)(ii), FRA is envisioning the compliance matrix as being a table to help identify the requirements for which compliance must be demonstrated (keeping in mind that certain projects, such as equipment modifications, may only require a limited number of items to be assessed), and the means by which compliance would be demonstrated (*e.g.,* testing, analysis, calculations, computer modeling, etc.). This matrix would also allow all stakeholders to identify critical milestones in which an FRA observation, inspection, or approval may be necessary, particularly when testing is required. By doing this early in the process, FRA can work with the parties to set expectations and can coordinate participation or reviews where appropriate, to avoid delays due to inadequate documentation or failure to notify the agency of critical compliance-related activities. Moreover, FRA is contemplating including guidance in an appendix to this part to help guide railroads in properly developing compliance matrices and plans. FRA seeks comment as to whether such an appendix should be included or whether such guidance should be provided in a standalone document.

Proposed paragraph (c)(2) further outlines the process and timing by which a railroad's vehicle qualification plan would be approved. FRA is seeking comment on whether there is utility in explicit FRA approval of this item, the process described, and the timeframe proposed. Proposed paragraph (c)(2)(iii) would simply enforce the execution of the plan by the railroad.

In paragraph (d), FRA proposes that a railroad provide a description of the environment and service in which the passenger equipment is intended to operate (system description), key design criteria and physical characteristics of the equipment, and any assumptions used for key calculations or analysis. This information would help provide a baseline for the configuration and intended operating environment of the equipment against which the safety of the vehicle is being assessed. Such information would be useful when changes or modifications to a vehicle or its operating environment occur, or if the same equipment type is acquired by the railroad, or leased to another railroad, as it would provide a means for the railroad and FRA to determine if any new or different conditions, configurations, or operating parameters might require additional compliance testing or analysis.

For example, proposed § 238.791(j) would require an efficient handbrake or parking brake that is capable of holding a locomotive on the maximum grade condition identified by the operating railroad, or a minimum 3% grade, whichever is greater. If a railroad initially were to procure a passenger locomotive that operates over a network with a maximum grade of 1.3%, that railroad would be required to validate the sufficiency of the design and performance of the handbrake or parking brake when subjected to the minimum forces resulting from a 3% grade. If the same locomotive is leased to another railroad that operates over territory where the maximum grade is 3.5%, the original documentation must indicate to the acquiring railroad that additional validation may be necessary to ensure that the parking brake design is adequate for the characteristics of its new operating environment.

As another example, if a railroad is electing to follow the interior fixture attachment strength requirements under § 238.733(a)(2), which permit an attachment strength sufficient to resist applied loads of 5g longitudinal, 3g lateral, and 3g vertical when applied to the mass of the fixture, then appropriate discussion and documentation must be provided demonstrating the trainset does not experience a crash pulse in excess of 5g.

Proposed paragraph (d)(1) would require the railroad to provide a description of the operational environment to which the railroad's passenger equipment is subject. This would include the defining physical characteristics of the environment that all passenger equipment would operate within, regardless of whether the equipment is intended for conventional or high-speed operations. Paragraphs (d)(1)(i) through (iii), as proposed, would help the railroad categorize and describe the operating environment and conditions, and provides examples for each.

Of these, physical infrastructure as proposed under paragraph (d)(1)(i), would require the most extensive description, encapsulating a number of physical characteristics of the environment that may directly affect the safe operation of the equipment. In this portion of the system description, the railroad should be able to articulate the limiting track geometry (including turnout geometry), maximum grade, the minimum required stopping distance, and any other safety-critical limits or thresholds within which the equipment would be expected to operate safely. It is critical to note that the characteristics or limits listed are intended to help establish the operating limits of the equipment itself and are not intended simply to catalog the characteristics of the railroad.

For example, when identifying limiting track geometry conditions, if the equipment is not designed to navigate anything less than a turnout having a certain curvature, then that is a limiting track geometry condition for the equipment that must be identified. The railroad may own or have access to track with even more limiting geometry conditions, such as turnouts having even tighter curvatures within a yard. Yet, by identifying the known limitations of the equipment to navigate such trackwork, and making known the safe operating limits of the equipment, the railroad can craft operating rules or instructions to ensure that the equipment is either not operated on portions of the railroad where such geometry exists, or operated under appropriate limitations so that the equipment can safely navigate such geometry.

Similarly, proposed paragraph (d)(1)(ii) would require the railroad to identify the universe of systems that the equipment is expected to operate over or interface with. This would primarily include track circuits, control systems, electric traction systems, and wayside detectors and devices. Of particular importance would be those elements essential to signaling, train control, and active grade crossing warning systems. Here, the railroad must also be able to identify the core technologies (*e.g.,* DC, AC, audio frequency overlay) and systems utilized by any host railroads on the routes it is expected to operate over, and whether or not those systems themselves are operating and maintained within their original equipment manufacturer (OEM) specifications. This information can then be used to help the railroad

determine what systems integration and validation testing would be necessary as part of its pre-revenue service acceptance test plan, developed pursuant to § 238.111.

Systems integration has become a critical element in the safe introduction of new passenger equipment in recent years, particularly as it relates to effective track circuit shunting to ensure the safe operation of signal and grade crossing systems. Taking the time to identify and validate performance characteristics of the equipment over these systems within the context of §§ 238.110 and 238.111 would help the railroad ensure that both the passenger vehicle and wayside technologies are operating as designed, and assist in establishing special operating rules, maintenance procedures, or design changes, as necessary, to ensure safe interactions between the two.

Proposed paragraph (d)(1)(iii) would require the railroad to identify any special operating parameters or rules that might apply to the design and operation of the passenger equipment. At a minimum, this must include information on the design time and setup of the alerter, as this design time may need to account for other operating parameters, such as the required minimum stopping distance identified in proposed paragraph (d)(1)(i) of this section.

Proposed paragraph (d)(2) is intended to catalog design and operational variables specific to Tier III equipment. As many of the requirements pertaining to Tier III equipment are more performance-based and technology neutral, it is essential that the railroad identify specific design and operational parameters where such flexibility is provided, so that necessary safety thresholds can be identified and maintained with proper oversight. Braking systems received particular attention in this regard, during the RSAC process, as there are many different, proven approaches to braking technology and operational rules used on high-speed trainsets throughout the world. To this effect, proposed paragraphs (d)(2)(i) through (xiv) catalog the railroad's approach as it relates to Tier III braking technology.

Proposed paragraph (d)(2)(ii), as discussed above under § 238.19, would require the railroad to define the maximum designed braking capacity of the Tier III trainset.

Proposed paragraphs (d)(2)(iii) through (v) are of particular note, as these sections would define the use of emergency braking and its accessibility to crewmembers and the general public. Unlike most conventional operations, the application of an irretrievable emergency brake application may pose a safety risk to the occupants at very high speeds, or within certain locations (*e.g.,* tunnels or bridges), particularly if an immediate stop is unnecessary. As such, many systems throughout the world restrict access to only qualified crewmembers to initiate an irretrievable emergency brake application and utilize emergency brake ''alarms'' for passengers. These alarms notify the engineer that an emergency stop has been requested by a passenger and require the engineer to take some immediate action, while still allowing the engineer to continue train movement if an immediate stop is unnecessary, or if a different location may offer a more appropriate environment to address an emergency (*e.g.,* enabling a train to exit a tunnel if an alarm is activated due to the presence of smoke in a passenger cabin).

Proposed paragraphs (d)(2)(iii) and (iv) would require the railroad to identify both irretrievable emergency brake locations accessible only to crewmembers and passenger brake ''alarm'' locations (if used), respectively, within the Tier III trainset. A picture or diagram may be used to demonstrate compliance.

If passenger brake alarm technology is employed by the railroad, proposed paragraphs (d)(2)(v) through (vii) would require the railroad to specify certain operational aspects of the technology. For example, proposed paragraph (d)(2)(v) would require defining the time period in which the trainset remains under full control of the engineer after an alarm is pulled. Like an alerter, this is intended to ensure that the engineer acknowledges the alarm and takes appropriate action promptly. As proposed, if no action is taken by the engineer in response to the passenger brake alarm, then the trainset's brake system would be required to automatically initiate an irretrievable emergency brake to ensure the safety of the occupants, crew, and trainset.

Proposed paragraph (d)(2)(vi) would require the railroad to detail how the passenger brake alarm would function within station locations, as delayed application of the brakes would be unacceptable if the alarm is activated when a train is departing a station due to a passenger emergency, such as a passenger trapped in a door. Only once a train has safely cleared the station platform would the retrievable aspect of the passenger emergency brake alarm be allowed to engage. To this end, the railroad would have to identify how to achieve this, to ensure that both passengers and crew can immediately stop a train if a dangerous situation is encountered while leaving a station. Nonetheless, as discussed above, there is concern about situations when an engineer may decide against immediately stopping the train following activation of a passenger brake alarm at a station location, such as when in a tunnel if smoke is present. FRA believes that the above discussion provides the necessary clarity on this issue but invites comment.

Proposed paragraph (d)(2)(vii) would allow the railroad to further define the operation of a passenger brake alarm by detailing what steps must be taken by an engineer to retrieve control from a full-service brake application in the event an alarm is activated, within the timeframe proposed by paragraph (d)(2)(v).

Additional core braking parameters are defined in proposed paragraphs (d)(2)(viii) through (xiii). Proposed paragraph (d)(2)(viii) would require the railroad to identify and maintain a copy of the FRA-approved industry standard utilized to comply with § 238.731(f), which requires that main reservoirs be designed and tested according to a recognized industry standard. The railroad would be required to document the actual standard used to qualify main reservoirs for Tier III trainsets in its vehicle qualification plan. Any inspections or tests required by the standard must be incorporated into the railroad's ITM plan as well.

Proposed paragraph (d)(2)(ix) would require the railroad to identify the preset parameters by which it would determine if a Tier III trainset's wheel-slide protection has failed, as required by § 238.731(m)(3). The railroad would be required to document the corresponding operational restrictions within its ITM plan. Similarly, proposed paragraph (d)(2)(x) would require the railroad to provide information on brake system functionality, monitoring, and diagnostics, and any corresponding safety analysis. For example, if a railroad were to utilize an electronic brake system, it must ensure compliance with § 238.105 if deemed-safety critical.

Proposed paragraph (xi) would require the railroad to identify the worst-case grade condition for which the Tier III trainset must be secured.

In relation to § 238.751, proposed paragraphs (xii) and (xiii) would require the railroad to outline the functionality of the cab alerter system, and its integration with the braking system. Specifically, paragraph (xii) proposes to require the railroad to establish the parameters and scenarios in which the engineer must acknowledge the alerter, including which actions reset the timing, and which actions would be

ignored so that the engineer would be required to take some other action or directly acknowledge the alerter.[14] Proposed paragraph (xiii) would require the railroad to outline what steps must be followed by the engineer to recover control should a full-service brake application occur.

The remaining items proposed under paragraphs (d)(2)(xiv) through (xvi) are for optional features that a railroad may elect to include on Tier III rolling stock based on service-proven experience. If the railroad elects to use a technology other than a standard alerter pursuant to § 238.751(e), plans to utilize a feature to dim headlights for extended periods of time on Tier III dedicated rights-of-way pursuant to proposed § 238.767(c), or utilizes a flashing rate other than what is described in proposed § 238.769(b)(2)(i), then it would be required to comply with the requirements specific to each alternate technology as described in proposed paragraphs (d)(2)(xiv), (xv), and (xvi), respectively.

Proposed paragraph (e) outlines the means by which a railroad would be required to demonstrate compliance with the structural carbody design and crashworthiness requirements contained within parts 229 and 238, as applicable. This proposed paragraph would effectively codify FRA's longstanding guidance on the matter, and what the RSAC considered to be industry ''best practice.'' Specifically, proposed paragraph (e)(1) would make clear that compliance may be demonstrated by any appropriate combination of full-scale testing, validated computer modeling (*e.g.,* finite element analysis), or engineering calculations, including manual calculations using accepted and proven engineering formulas.

Designs incorporating dynamically activated CEM components may require additional scrutiny. In practice, some combination of all three is typically provided to establish compliance with structural and crashworthiness requirements. For example, a full-scale test could be used to demonstrate the strength of a collision post, but because this test involves the ultimate load of the material it may not be desirable or safe to conduct a full-scale test where plastic deformation, or even structural failure, would be possible. Consequently, computer modeling and engineering calculations may be used to predict the physical performance of collision posts under certain load conditions, but such modeling must be validated. To this end, testing may also be performed within the elastic-plastic range and, if the model shows good correlation to real-world testing under the same load conditions, FRA would consider the validated model to serve as an adequate demonstration of compliance for loading scenarios that are impractical or unsafe to test at full-scale. Because testing plays such a vital role to compliance demonstration, FRA seeks to ensure close coordination with railroads and their suppliers when such testing is required, especially where complex computer models require validation.

Proposed paragraph (e)(2) outlines the documentation expectations and FRA notification requirements when carbody or structural component testing would be necessary for new, re-built, or substantially modified passenger equipment. Because designs that utilize CEM components rely on the dynamic-plastic deformation of structural components in a predictable and controlled manner, Tier I alternative, Tier II, and Tier III passenger equipment that incorporate such technology would require additional scrutiny. As these designs require models that are used to analyze loading conditions that are more complex than simple, quasi-static loads, to ensure that adequate validation of such models is performed, FRA would require that carbody and crashworthiness test procedures associated with such equipment be submitted to FRA prior to any test being conducted for compliance purposes, as proposed under paragraph (e)(2). Under this proposal, FRA would notify the railroad if FRA intends to witness the test. This would not prohibit a railroad or supplier from conducting preliminary or ''proof of design'' testing without submitting the test procedures to FRA, provided such testing is not intended for validation or compliance demonstration purposes.

To address common interpretation issues related to passenger equipment safety appliances, FRA is proposing to mandate its otherwise voluntary, sample-equipment inspection process as part of proposed paragraph (f). To ensure consistency, the railroad would be required to submit designs for FRA review of all new passenger equipment or modified equipment that include carbody or structural modifications affecting the design of existing safety appliances, proposed to be validated as part of the sample-equipment inspection conducted in accordance with proposed paragraph (g)(2).

Proposed paragraph (g)(1) outlines the process and procedures for submittal and approval of design review, testing, and inspection documentation. FRA proposes to notify the railroad whether the submission is approved or disapproved within 60 days of the submission to FRA. Of particular note are the timeframes for document submission, and associated approval or disapproval, for each type of request. FRA invites comments on the practicality of these timeframes and whether approval of this documentation is necessary in all cases or at all.

Proposed paragraph (g)(2) contains the procedures for the sample-equipment inspection. Though this is commonly known as a sample-car inspection, FRA is proposing to call it a sample-equipment inspection to include different types of equipment that might not be considered a ''car,'' per se (*e.g.,* a Tier III trainset). Proposed paragraph (g)(2)(i) would require railroads to submit to FRA a request for such an inspection at least 45 days in advance of the proposed inspection date. As part of its request, the railroad would be required under proposed paragraph (g)(2)(i)(A) to provide FRA with the first available time and date that the sample equipment can be inspected. Also, under proposed paragraph (g)(2)(i)(B), the railroad would be required to submit, as part of its request, engineering drawings reflecting the design and configuration of the safety appliances, emergency systems and signage, and any other elements to be inspected by FRA as part of the sample-equipment inspection.

Proposed paragraph (g)(2)(ii) details the procedures to be followed should FRA take exception during the inspection. Proposed paragraph (g)(2)(iii) explains that should FRA take no exceptions during the inspection, FRA would provide the railroad with an inspection report stating as such.

Section 238.111 Pre-Revenue Service Acceptance Testing

With the proposed addition of § 238.110, FRA is proposing to revise § 238.111 to focus primarily on the activities associated with dynamic ''on-track'' testing and commissioning procedures that occur during the later stages of a project. These dynamic tests typically occur when prototype or production trainsets are ready to operate over the general railroad system.

Through the separation of static design and dynamic commissioning phases of rolling stock compliance with §§ 238.110 and 238.111, respectively, more clarity can be given to the process of assuring that passenger rolling stock is ready for revenue service. FRA envisions that initially the railroad would look to proposed § 238.110 to ensure compliance with static design

[14] Note, the specific alerter timing would be required under proposed § 238.110(d)(1)(iii).

requirements and items that can be examined as part of a sample-equipment inspection as a means to determine if prototype or production rolling stock is ready to start the dynamic and commissioning phase under § 238.111, even though some overlap may occur between the phases. For instance, it may be desirable to initiate some level of dynamic testing before carbody interiors are completed, which may necessitate the verification of emergency systems after preliminary dynamic testing has occurred.

Regardless, FRA intends that the railroad make use of the combined, pre-revenue planning process under §§ 238.110 and 238.111 to ensure that adequate testing occurs before production sets of equipment types leave the manufacturing facility, so that compliance and quality issues can be addressed by the manufacturer before moving too far ahead into dynamic testing, and thus limiting such issues to initial prototype units. This approach would allow certain elements to be separated so that railroads and manufacturers can take a more focused approach to compliance assurance and commissioning, thereby also allowing railroads to produce a more focused plan for the final stages of testing and commissioning of passenger rolling stock as part of their pre-revenue service acceptance test plans.

While the individual requirements within this section are intended to capture important elements to help validate and document compliance, of equal importance is the planning aspect of the section. FRA would require that railroads use the development and execution of their pre-revenue service acceptance test plans to take a holistic view of their testing and commissioning programs so as to provide both FRA, as well as themselves, insight as to how the various tests and validations would be organized and executed in an effective manner. So, while part of the effort intended by this proposed language is to identify all of the tests that need to be performed before a vehicle can enter revenue passenger service, FRA also would require that the railroad identify how all of these tests relate to each other and other activities that must occur (required preceding events), and the logical order in which they should occur.

Using qualification under § 213.345 as an example, a railroad must consider what core tests should be performed before high-speed testing begins (*e.g.,* tests for proper brake system operation to ensure the safety of the qualification testing), and what tests would require high-speed qualification or special test approval to be performed (*e.g.,* high-speed ATC/PTC tests). Identifying not only the universe of tests to be conducted, but also how those tests interrelate, would help the railroad, its suppliers, and FRA all work together from the same perspective in achieving the goal of putting the equipment safely in service.

Under this proposed revision, this section would remain divided primarily between requirements for ''new'' equipment that has never been used in revenue service before within the United States, and requirements for ''existing'' equipment that is, or has been previously, used within the United States. However, FRA is proposing significant revisions to this section to capture current practice for vehicle dynamic testing and qualification.

The first such significant revision is based on an RSAC recommendation, preferring that the requirements for ''new'' vehicles be outlined first, because they are more comprehensive. Thus, FRA is proposing to reorganize the language so that the requirements for ''new'' equipment are covered first, under paragraph (a) rather than as currently addressed under paragraph (b), and the less comprehensive requirements for ''existing'' equipment are moved to paragraph (b), rather than as currently addressed under paragraph (a). FRA notes, however, that this reorganization could lead to confusion for plans developed prior to the proposed publication of a final rule. While FRA does not foresee this as a problem for the execution of the intent of these requirements, it welcomes comment on whether this reorganization may pose any potential concerns and, if so, invites any potential solutions.

The fundamental requirements of this section would be contained in proposed paragraph (a)(1), which is based on current paragraph (b)(1). This proposed language outlines the minimum content that a railroad would be required to provide as part of a pre-revenue service acceptance testing plan (test plan or testing plan).

Proposed paragraphs (a)(1)(i) and (ii) would require the railroad to identify the physical characteristics and salient features that define both the equipment and its intended operating environment, respectively. The railroad should consider the equipment and its operating environment as parts of a whole within a systems approach to safety. In effect, these two proposed paragraphs ask the railroad to capture the ''control'' variables of the system whose configurations may have measurable effects on the performance of the passenger equipment and its overall safety. Items such as the wheel profile, axle and truck spacing, suspension characteristics, braking rates, mass, and center-of-gravity are just some examples (but in no way an exhaustive list) of the types of vehicle characteristics that must be identified under proposed paragraph (a)(1)(i) that can profoundly affect the safe performance of rolling stock. Similarly, the rail profile and cant, special trackwork geometry, maximum grade, effective track moduli, and signaling and grade crossing technology interfaces are just some examples of the characteristics of the operating environment for which the equipment's performance is being validated against, which would also be appropriate to identify under the requirements of the railroad's system description developed pursuant to § 238.110.

This ''systems'' perspective is key to the intent of §§ 238.110 and 238.111, as it would not only help the railroad establish and document the safety of the equipment, but also the equipment's known and proven configurations and operating conditions, such that a railroad may be able to identify any additional tests that may need to be performed if a vehicle characteristic is changed, or a vehicle is to be operated in a different environment with unproven characteristics (*e.g.,* different track circuit technology which may result in different shunting characteristics).

As the test plan is intended to be an umbrella plan to capture all of the necessary tests needed to demonstrate regulatory safety compliance for passenger equipment, this should include any waivers that are anticipated to be required, even if that test is part of a separate testing approval,[15] as these may be predecessors to, or needed for, other required tests. Thus, proposed paragraph (a)(1)(iii) of this section would require the railroad to identify any approvals, qualification, or waivers from other regulatory requirements in this chapter, that would be required to conduct certain tests under this plan. For example, if tests are to occur on a section of track before a block signal system has been installed, then a waiver from § 236.0(c)(2) may be necessary to test at speeds above 60 mph until the signal system if fully commissioned.

Proposed paragraph (a)(1)(iv) would require the railroad to identify the maximum speed and cant deficiency at which the equipment is intended to operate, as well as any intermediate qualifications it anticipates requesting prior to achieving the intended

[15] Such as § 213.345 or § 236.1035.

maximum speed and cant deficiency to facilitate testing and qualification. For example, if systems integration tests would be required to validate grade crossing functionality at a speed lower than the intended maximum speed and cant deficiency, then an intermediate qualification at a speed and cant deficiency less than the intended maximum would be necessary in order to accomplish such systems integration testing. Accordingly, FRA would expect such an intermediate qualification be referenced in this portion of the test plan.

Proposed paragraphs (a)(1)(v) through (vii) represent the core of the test plan. These proposed paragraphs are intended to capture the railroad's overall testing and commissioning plan and tie these tests to the procedures and records associated with them. FRA would caution the railroad or manufacturer not to overthink this critical part of the proposed regulation, as a simple table may be used to fulfill the requirements of these three proposed paragraphs. What matters most would be the information ascertained by the railroad pursuant to these paragraphs, and there would be no need for narrative or explanations if a succinct format such as a table or matrix is used.

More specifically, proposed paragraph (a)(1)(v) would require the railroad to provide a list of the tests to be conducted as part of its dynamic testing and commissioning phase. This list can be inclusive of all the tests expected to be performed or focused solely on those tests related to demonstrating compliance with regulatory requirements, as outlined in proposed paragraphs (a)(1)(vii)(A) through (D). The railroad should present these tests in some logical order, either chronologically, or by sub-system. Any interdependencies or predecessor requirements (such as waivers or certifications) should also be identified for each test.

The identification of predecessors is critical, as it would help all parties understand the critical path to completion of the testing and commissioning process and should logically tie to the estimated schedule proposed paragraph (a)(1)(vi) would require. FRA notes that the schedule identified in proposed paragraph (a)(1)(vi) is intended only to be an approximation, such as the month in which a test is to occur and anticipated duration, so that FRA can plan for resource needs to observe the testing, as appropriate, as the test program is executed. These dates can be modified as the test program matures, particularly if issues or delays occur. If this information is managed through a table or matrix, as suggested, it can be easily updated and provided to FRA, without modifications to the entire test plan.

Whereas proposed paragraphs (a)(1)(v) and (vi) would be used for planning purposes, the content of proposed paragraph (a)(1)(vii) is intended more for execution and recordkeeping. Proposed paragraph (a)(1)(vii) would require the railroad provide a list of all applicable test procedures and reports (including test results and post-test analysis, if required) associated with each test. Because this information may not be readily available at the time the initial plan is developed and provided to FRA, it would be acceptable if the information relevant to proposed paragraph (a)(1)(vii) is left blank until it becomes available. That is, FRA would expect the initial submission to include all information relevant to proposed paragraphs (a)(1)(v) and (vi), but except for any test procedures already developed, the information relevant to proposed paragraph (a)(1)(vii) may need to be supplied as the test program is executed. Further, because this document is intended to serve both for planning purposes and record documentation, it is understood that this would be a ''working'' document during the testing and commissioning phase.

Proposed paragraphs (a)(1)(vii)(A) through (D) of this section would provide a list of the safety-critical subjects that must be addressed in the railroad's test plan, and any relevant regulatory references. As stated previously, the railroad's test plan can include all the tests intended to be performed, or it can be focused on just those tests relevant to the regulatory requirements. Regardless of which approach is taken, those tests and documents that are intended to demonstrate compliance with one or more regulatory requirements should be clearly identified.

Proposed paragraph (a)(2) would provide the process by which a test plan required under proposed paragraph (a)(1) would be submitted. Because separate approval is necessary for high-speed operations (including testing approval), and final approval is required before Tier II and III trainsets may enter into service, FRA is proposing that pre-revenue test plans need only be submitted to FRA for review and awareness—not for approval. This would be consistent with how the process applies to Tier I passenger equipment today. FRA welcomes comments as to the necessity of this process and whether there is value in FRA explicitly approving such plans.

Proposed paragraph (a)(3) would require that test procedures included in the railroad's test plan contain at least the minimum information as further detailed in proposed appendix K to part 238.

FRA is not proposing to approve individual test procedures as recommended by the RSAC, as FRA does not see the utility in doing so. Instead, FRA is proposing that test procedures be made available to FRA upon request under proposed paragraph (a)(4). FRA believes this would have no impact on its ability to conduct audits of test procedures in advance of testing (particularly those tests that it intends to witness) and would, instead, likely remove a significant burden for both industry and FRA. Because current practice for most procurements is to have project documentation, such as test procedures, uploaded to a central, secure website where FRA and other stakeholders have access, allowing FRA to review test procedures when they become available and provide feedback as necessary would obviate the need for FRA approval.

Proposed paragraph (a)(5) would make clear that a railroad must adopt and comply with its own test procedures. Because many of the minimum requirements for procedures outlined in proposed appendix K to part 238 are intended to ensure tests are performed safely, and that records provide adequate documentation for showing compliance, tests that are not performed appropriately may necessitate re-testing.

Proposed paragraphs (a)(6) through (8) outline the process by which FRA would determine if the passenger equipment is ready to be entered into revenue service. It is based on current § 238.111(b)(4), (5), and (7). This process is intended to culminate the efforts resulting from §§ 238.110 and 238.111 and consider the railroad's and supplier's efforts in demonstrating compliance with the passenger equipment safety standards. Proposed paragraph (a)(6)(i) would require test results for Tier I equipment be made available upon request by FRA, with proposed paragraph (a)(6)(ii) requiring test results for Tier II and Tier III equipment to be submitted to FRA at least 60 days prior to the equipment being placed in revenue service. FRA notes that this timeframe may be longer or different, as appropriate, should the railroad also need to complete new passenger service pre-revenue safety demonstration under proposed § 238.108. Additionally, FRA notes that

the timeframe in this proposed paragraph is shorter than what is currently in effect under § 238.111(b)(4), and therefore invites comments on the appropriateness of the timeframe.

Proposed paragraph (a)(7) mirrors current § 238.111(b)(5) without substantive change, and FRA would accordingly rely on the substantive discussion contained in the May 1999 and November 2018 final rules.[16]

Under proposed paragraph (a)(8), explicit approval to operate in revenue service would be required for only Tier II and Tier III equipment, as currently required under § 238.111(b)(7), and FRA would also rely on the substantive discussions in the May 1999 and November 2018 final rules in this regard.[17] FRA is considering if there is value in expanding this approval to all tiers of equipment and invites comment on this question. FRA notes that this approval would not supersede any other certifications or approvals required, such as those under § 213.345 or § 238.913 for operation of the equipment on the general system, but FRA approval under this section would be required before the railroad may institute passenger service. If a railroad seeks to operate the equipment for non-testing reasons before this approval has been received (*e.g.,* demonstration runs or press events), the railroad would likewise be required to receive explicit FRA approval of such operations to ensure their safety. In this regard, the definition of ''tourist, scenic, historic, or excursion operations'' in § 238.5 makes clear that train movements of new passenger equipment for demonstration purposes are not tourist, scenic, historic, or excursion operations.[18]

Proposed paragraph (b) contains the pre-revenue testing and commissioning requirements for equipment that has been previously used within the United States. As discussed, these requirements are currently contained under § 238.111(a). The RSAC recommended that the requirements for new and previously used equipment be swapped in order to better reflect the order in which these requirements would be applied in practice, and the fact that new vehicles, by nature, have more requirements that must be met. FRA invites comment on this proposed change.

FRA is proposing to expand the requirements for vehicles that have been previously used in revenue service in the United States. Under paragraph (b)(1), the railroad would be required to verify the applicability of previous tests performed under paragraphs (a)(1)(vii)(A) through (D) of this section and perform such tests if previous test data does not exist, cannot be obtained, or does not support demonstration of safe operation within the intended operating environment. Additionally, proposed paragraph (b)(2) contains a record retention requirement, with proposed paragraph (b)(3) detailing what equipment would be considered previously used in revenue service.

Proposed paragraph (c) outlines the regulatory requirements for any modifications, major upgrades, or introduction of new technology on passenger equipment that is currently in revenue service. The proposed language establishes the scope of any pre-revenue testing, which would be expanded to include Tier I equipment, limited to only those safety-critical systems, sub-systems, or functionality that may be affected by the introduction of the changes or new technology. As always, FRA would encourage railroads and suppliers to reach out to FRA if there are any questions as to what the scope of this testing should include.

Section 238.115 Emergency Lighting

FRA is proposing to revise this section by adding new paragraph (c). Under proposed paragraph (c), FRA would include additional requirements for periodic inspection of emergency lighting systems pursuant to sec. 22406 of the IIJA. For consistency, the periodic inspection requirements for this paragraph are modeled after similar requirements for emergency windows in § 238.113. Like the requirements for emergency windows, FRA would expect the railroad to develop an inspection plan designed to capture a representative sample of the emergency lighting system designs used throughout its fleet. In this regard, cars of similar construction may still require unique sample sets, if the design and components are materially different.[19] To comply with the proposed requirement, the railroad must determine the total number of unique emergency system designs within its railcar fleet and utilize an appropriate statistical test method to determine the required sample size for each design type.

These proposed requirements, which would be in addition to the existing periodic inspection requirements specified under § 238.307(c)(5)(i), are intended to ensure that emergency lighting systems function as intended in accident scenarios, taking into consideration the operational conditions that might impact the performance of emergency lighting and associated electrical systems, particularly backup power supplies. An emergency lighting system may be compliant, by design, but fail if activated during revenue operations due to insufficient charging of the backup power supply. For example, to conserve fuel, many railroads turn off head-end power (HEP) on consists after their last revenue run. If the same consist is not provided sufficient time to charge its back-up power system before it is placed back in revenue service, the emergency lighting system may fail to meet the performance requirements of § 238.115. The railroad would be required to take into consideration these operational factors when determining an appropriate sampling method. FRA is also seeking comment on whether public address or emergency intercom systems should also have a similar testing requirement, as they are often powered by the same back-up power supply.

Section 238.131 Exterior Side Door Safety Systems—New Passenger Cars and Locomotives Used in Passenger Service

FRA is proposing to revise paragraph (a)(1) of this section, which describes certain requirements applicable to safety systems for powered exterior side doors. The proposed revisions address new door designs in high-speed trainsets, and specifically address trainsets equipped with plug-type exterior side doors that do not provide a minimum 1.5-inch gap at the leading edge of the door when the emergency release is activated. These proposed revisions would also permit a speed interlock preventing operation of the emergency release mechanism while the vehicle is moving.

For equipment with plug-type exterior side doors, the proposed revision to

[16] 64 FR 25540 and 83 FR 59182.

[17] *Id.*

[18] 67 FR 19969, 19971 (April 23, 2002) (''FRA recognizes that a train consisting of new passenger equipment that is operated for demonstration purposes is seemingly not conveying passengers to a particular destination as its principal purpose. However, the very usage of new passenger equipment, as opposed to antiquated equipment, and the clear business purposes of the train, distinguish such demonstration train operations from the class of train operations FRA intended to exclude from the requirements of the rule under § 238.3(c)(3). Any person wishing to operate such a demonstration train that does not comply with a requirement of the rule must file a request for a waiver and obtain FRA's approval on the waiver request prior to commencing the demonstration train's operation.'').

[19] For example, due to the age of a passenger car, two cars of similar design may actually utilize two very different lighting designs, particularly if one involves a third-party retrofit to replace an older system. The railroad should take this into account when designing its sampling methodology.

paragraph (a)(1) states that the requirements of section 2.9 (including section 2.9.1) of the APTA standard for the side door emergency release mechanism, identified in APTA standard PR–M–S–18–10, ''Standard for Powered Exterior Side Door System Design for New Passenger Cars,'' approved February 11, 2011, would be supplanted with three new regulatory requirements.

Proposed paragraph (a)(1)(i) describes the proposed requirements for the visual instructions, operation, and functionality of the emergency release mechanism for the plug-type exterior side door. It also proposes a requirement that some form of feedback must be provided to the passenger to alert the passenger that the emergency release mechanism has actuated. For example, a light activating over the door, or a sound played over a speaker in close proximity to the door, or a combination thereof, may satisfy the feedback requirement.

Proposed paragraph (a)(1)(ii) would establish requirements for the activation of the emergency release mechanism, specifying that activation must not require electric or pneumatic power and that access to the device not require the use of tools or other implements. This proposed paragraph also contains requirements specifying the appropriate amount of force necessary to activate interior and exterior emergency release mechanisms, along with requiring a manual resetting of the device.

Proposed paragraph (a)(1)(iii) would permit a speed interlock preventing operation of the emergency release mechanism when the vehicle is moving.

In proposing to revise paragraph (a)(1), FRA is considering further revisions regarding movements of locomotive consists within a yard, when those locomotives are not connected to passenger cars. There may be situations where traction power to the locomotives is inhibited by the door system as the door system may not be able to distinguish between the absence of passenger cars and an exterior side door being open. FRA invites comment on this issue.

Section 238.139 Vehicle/Track System Qualification

As proposed, this section would adopt the general structure of § 213.345 of this chapter, which generally provides vehicle/track qualification requirements for equipment operating on FRA track Class 6 and above (or at speeds producing high cant deficiencies), for passenger equipment operating on lower-speed track classes. Similar to § 213.345, this new section would require demonstration that the equipment can operate safely and within the vehicle/track interaction safety limits specified in § 213.333 either through dynamic testing only, or through a combination of testing and simulations. A major tenet of this proposal is to provide transferability of vehicle qualification through the use of testing and simulations so that when moving equipment from one part of a system to another, or to another railroad's system, certain testing under § 238.111 does not need to be repeated. In this regard, this proposed section would serve as an extension and clarification of pre-revenue service acceptance testing under § 238.111, helping to provide greater specificity as to the pre-revenue service acceptance testing requirements with respect to vehicle/track qualification.

FRA makes clear that the proposed requirements of this section in no way modify or supplant the testing requirements in § 213.345; § 213.345 applies on its own and must be complied with when necessary. This proposal is to be complementary to § 213.345, filling the gaps in stability testing for passenger equipment not addressed under § 213.345. Specifically, and further discussed below, this section would address gaps in testing for new equipment through Class 5 track speeds and 6 inches of cant deficiency, and for previously qualified equipment through Class 6 track speeds and 6 inches of cant deficiency by adding, as an alternative, requirements for demonstrating compliance through dynamic testing over a representative segment of the route and minimally compliant analytical track (MCAT) simulations.

As discussed elsewhere, this section presents two paths for demonstrating compliance with the safety limits of § 213.333, as part of the pre-revenue service acceptance testing process. A railroad could elect to measure carbody and truck accelerations over the entirety of the system the vehicle is intended to operate (which is what is currently required), or it could measure those same accelerations over a representative segment of the system coupled with MCAT simulations. If a railroad elects the former, the resultant qualification would be applicable only for the territory over which compliance was demonstrated. If a railroad elects the latter path, then that resultant qualification under this section would be transferable to a new territory so long it was for the same FRA track class and cant deficiency. With that said, however, should a vehicle be subject to high-speed qualification testing under § 213.345, those requirements in § 213.345 apply regardless of the path chosen under this section.

FRA invites comment whether this section should cross-reference the suspension system safety requirements in § 238.227, whether § 238.227 requires any conforming changes, or whether any other changes are necessary in establishing the requirements proposed in this new section, including changes to part 213 of this chapter. FRA also invites comment on the nature of any such changes and, as appropriate, may provide for them in the final rule.

Under paragraph (a), FRA proposes that, for qualification purposes, the safety of the equipment must be demonstrated in an overspeed condition not to exceed 5 mph above the maximum proposed operating speed as specified in paragraph (a)(1). Proposed paragraph (a)(2) would require that the testing be conducted on track meeting the track safety requirements specified under part 213 for the class of track over which the equipment would operate, with an allowance for qualification testing to be conducted at a speed greater than that specified for the class of track should the combination of the proposed maximum operating speed and overspeed testing requirement exceed the maximum authorized speed for that track class.

Paragraph (b) would address the qualification of existing vehicle types and provide that such vehicle types previously qualified or permitted to operate be considered qualified under the requirements of this section for operation at the previously operated speeds and cant deficiencies over the previously operated track segment(s). FRA makes clear that this qualification applies only for operation over the previously operated track segment(s) and does not confer transferability of such qualification. To operate such vehicle types over new routes (even at the same track speeds and cant deficiencies), the qualification requirements contained in other paragraphs of this section must be met, in addition to any other applicable testing and qualification requirements.

Proposed paragraph (c) would contain the requirements for qualifying new vehicle types (or vehicle types previously qualified according to paragraph (b) for operation over new track segments). For clarity, FRA intends that vehicles being qualified under this proposed paragraph be tested under the requirements of this section through track Class 5 speeds and 6 inches of cant deficiency in addition to any testing required under part 213 of this chapter. This means that the

graduated method of demonstrating vehicle stability would start at track Class 2 speeds and 3 inches of cant deficiency, as discussed in more detail below.

Paragraph (c)(1)(i) would describe the proposed testing procedure for new vehicle types at track Class 1 speeds. The procedure described is aligned with FRA Safety Advisory 2013–02: Low-Speed, Wheel-Climb Derailments of Passenger Equipment With ''Stiff'' Suspension Systems (Safety Advisory).[20] Compliance would be demonstrated using computer simulations with a validated numerical model of the vehicle operating over the geometry conditions specified in the Safety Advisory at track Class 1 speeds plus 5 mph in the AW0 (no ''added weight'') and AW3 (maximum passenger) loading conditions. The simulation results must show that under these conditions wheel/rail forces do not exceed the safety limits in § 213.333.

Paragraph (c)(1)(i) would also require demonstration of compliance with APTA PR–M–S–014–06, Rev. 1, ''Standard for Wheel Load Equalization of Passenger Railroad Rolling Stock,'' Authorized June 1, 2017, which is accomplished by static testing to demonstrate that wheel unloading does not exceed the limits prescribed in the standard. FRA is proposing to incorporate by reference this APTA standard into this paragraph. APTA PR–M–S–014–06 establishes static wheel load equalization requirements to provide passenger equipment with the wheel unloading characteristics necessary to reduce the risk of low-speed wheel climb derailments. It also provides the test conditions, equipment, and procedures necessary to demonstrate compliance with the enumerated static wheel load equalization requirements. APTA PR–M–S–014–06 is reasonably available to all interested parties online at *www.apta.com.* Additionally, FRA will maintain a copy available for review.

FRA notes that APTA recently came out with a standard for evaluating low-speed vehicle curving performance of railroad passenger equipment, APTA PR–M–S–031–22, which follows the intent of FRA's Safety Advisory and provides additional detail on conducting simulations to evaluate curving performance. FRA therefore invites comment whether the final rule should reference APTA standard PR–M–S–031–22 in this section and on the effect it should be given.

Proposed paragraph (c)(1)(ii) specifies the testing necessary to demonstrate compliance with the safety limits in § 213.333 at speeds from track Classes 2 through 5 and up to 6 inches of cant deficiency. In order to be qualified under this section, a railroad must perform simulations, as specified in proposed paragraph (c)(2), in addition to the carbody and truck acceleration measurements under proposed paragraphs (c)(3) and (4) respectively. The results of simulations and dynamic testing must demonstrate that the safety limits in § 213.333 are not exceeded. This proposed paragraph would also provide a mechanism for transferability of the qualification under this proposed section to allow operation of previously qualified vehicles over new track segments at the same class of track and cant deficiency. This proposed paragraph would not provide transferability of any qualification conferred under § 213.345, however.

Again, FRA makes clear that the requirements of this section are intended to be complementary to those requirements found under § 213.345. FRA recognizes that in some scenarios, there may be overlap between the requirement proposed under this section and those under § 213.345. For example, when attempting to qualify a new vehicle type for operation at Class 4 track speeds, where up to 6 inches of cant deficiency would be produced, § 213.345 would require the use of carbody accelerometers and the performance of a lean test. As proposed, when attempting to qualify the same new vehicle type for the same service, this proposed section would also require the use of carbody accelerometers, in addition to truck accelerometers and MCAT simulations. So, while there may be overlap in certain requirements between these proposed requirements and existing requirements under part 213 (such as the use of carbody accelerometers), FRA views any as harmonious. The new vehicle type being qualified in this scenario would be subject to the following requirements: a lean test, the use of carbody and truck accelerometers, and MCAT simulations, with the testing and simulations starting at Class 2 track speeds and 3 inches of cant deficiency. FRA does invite comment, however, on whether there are any possible scenarios where there could be a conflict.

Paragraph (c)(2) describes the analysis procedure that is to be performed using an industry-recognized methodology. The analysis considers the vehicle under evaluation operating on analytically defined track segments representing minimally compliant track conditions as defined in appendix C to this part, and a track segment representative of the route over which the vehicle is to operate. These requirements are reflective of similar requirements in § 213.345 for track Class 6 and greater, but do not replace the testing and analysis required under § 213.345. This paragraph also requires a linear system analysis to identify the frequency and damping of the truck hunting modes. Damping of these modes must be at least 5%, up to the maximum intended operating speed + 5 mph considering equivalent conicities starting at 0.1 up to 0.6. The conicities range proposed is based on conicities prevalent on the Northeast Corridor. FRA invites comments on whether this proposed range is appropriate.

Proposed paragraphs (c)(3) and (4) would require representative route testing for all operations at track Class 2 through 5 speeds and up to 6 inches of cant deficiency. Testing shall include measurements of carbody lateral and vertical accelerations and truck lateral accelerations that must not exceed the safety limits specified in § 213.333.

In paragraph (d), FRA proposes to separate and explicitly define the qualification requirements for vehicle types previously qualified by simulation and testing under paragraph (c) of this section intended to operate on new track segments as defined in paragraphs (d)(1) through (3). FRA notes simulations are especially useful for demonstrating that, when qualified vehicles are intended to operate on a new route, the new vehicle/track system is adequately examined for deficiencies prior to revenue service operation.

Paragraph (d)(1) addresses vehicle types previously qualified in accordance with paragraph (c). These vehicles may be operated on other routes with the same track class designation and at the same or lower cant deficiency without additional testing, simulations, or FRA approval.

For vehicle types operating at speeds not to exceed Class 6 track speeds or at curving speeds producing greater than 5 inches of cant deficiency, but not exceeding 6 inches, paragraph (d)(2) would require that qualification testing on a representative segment of the new route be performed to demonstrate that the carbody lateral and vertical acceleration limits in § 213.333 are respected.

Proposed paragraph (d)(3) would require vehicle types that are previously qualified by testing alone to be subject to the requirements of paragraph (c) for new equipment.

Paragraph (e) would provide requirements for the content of the qualification testing plan, which would

[20] 50 FR 16358 (Mar. 14, 2013).

be submitted to FRA's Associate Administrator at least 60 days prior to conducting the testing. This 60-day period is to allow FRA sufficient time to review and approve the plan, and to seek clarification from the submitter as necessary. In some cases, the review and approval may be able to be accomplished in less than 60 days; in other cases, the process may take longer, especially if the plan is incomplete or if questions are raised. FRA is mindful of the concern that FRA not unduly delay testing, and at the same time recognizes that safety is better and more efficiently served by identifying potential safety issues early in the qualification process. FRA therefore encourages those planning to conduct qualification testing to approach FRA prior to the submission of their test plans should they have any questions or concerns about the testing and approval process.

As proposed, the test program would establish a program of tests that permit identification of the operating limits of the vehicle/track system and would include, as identified in the following proposed paragraphs: under (e)(1), a description of the representative segment of the route over which the vehicle is intended to be operated; under (e)(2), consideration of the operating environment during qualification testing, including operating practices and conditions, the signal system, highway-rail grade crossings, and trains on adjacent tracks; under (e)(3), identification of the maximum angle found on the gage face of the designed (newly profiled) wheel flange referenced to the axis of the wheelset (the wheel flange angle would be used to determine the Single Wheel L/V Ratio safety limit specified in § 213.333); under (e)(4), identification of the target maximum testing speed in accordance with paragraph (a) of this section and the maximum testing cant deficiency; and under (e)(5), the results of vehicle/track performance simulations required by this section.

Proposed paragraph (f) would contain the requirements for conducting the two-stage qualification testing upon FRA approval of the qualification test plan. The two-stage testing approach permits assessment of safe vehicle operation on tangent and curved track segments individually as the test speed is incrementally increased.

Stage-one testing, proposed under paragraph (f)(1), would require that for testing on tangent track (proposed under paragraph (f)(1)(i)), test speed is incrementally increased from maximum speeds corresponding to each track class to the target maximum test speed. Under paragraph (f)(1)(ii), testing speeds for curved track would start at that speed necessary to produce 3 inches of cant deficiency and would be incrementally increased until the maximum testing cant deficiency is achieved. The target maximum test speed and maximum testing cant deficiency are specified in the test plan. Incrementally increasing the testing speed would allow for assessment of the dynamic response of the vehicle with respect to the vehicle/track interaction safety limits specified in § 213.333 of this chapter and establish the maximum safe speed and cant deficiency.

Under paragraph (f)(2), FRA proposes requirements for stage-two testing of the vehicle over the representative segment of the route. As proposed, stage-two testing can begin only when stage-one testing has successfully demonstrated a maximum safe operating speed and cant deficiency. Under these proposed requirements, two round-trips over the representative segment of the route are required: the first is at the speed for which the railroad is seeking FRA approval for service (which may be limited by the results of stage-one testing); the second is performed at 5 mph above this speed. The orientation of the equipment (in the direction of travel) is to be reversed for each leg of the round-trip.

Under proposed paragraph (f)(3), if during stage-one and -two testing, any of the monitored safety limits are exceeded on any segment of track, testing may continue provided that the track location(s) where any of the limits are exceeded be identified and test speeds be limited at the track location(s) until corrective action is taken. Corrective action may include making an adjustment in the track, in the vehicle, or in both of these system components.

Proposed paragraph (f)(4) would require that Track Geometry Measurement System (TGMS) equipment be operated over the intended test route (the representative segment of the route) within 30 days prior to the start of the testing, to help ensure the integrity of the test results.

Proposed paragraph (g) would contain the requirements for reporting to FRA's Associate Administrator the results of the qualification testing program. The qualification test report must include all results obtained during the qualification test program. When simulations comprise a portion of the report, comparisons of the simulated accelerations to those measured during the testing must be submitted to demonstrate model validation. For purposes of model validation, the report should also include comparisons that demonstrate the accuracy of the model under various conditions, specifically: predicting the transfer of wheel loads when a vehicle is unbalanced, the transfer of wheel loads when the primary suspension is deflected to simulate twist or warp, and the frequency and damping ratio associated with dominant vehicle modes. FRA invites comment whether FRA should make these expectations explicit in the regulatory text for MCAT model validation under this part, and potentially under part 213 of this chapter as well. The qualification test report must be submitted no less than 60 days from the date the railroad intends to operate the equipment in revenue service.

Under paragraph (h)(1), FRA proposes to approve a maximum train speed and value of cant deficiency for revenue service, based on the test results and all other required submissions. FRA intends to provide an approval decision normally within 45 days of receipt of all the required information in the form of the qualification test report. FRA may impose conditions, as necessary, to help ensure safe operations at the maximum train speed and value of cant deficiency approved for revenue service.

Proposed paragraph (h)(2) would consider vehicle types previously qualified in accordance with paragraph (c) of this section for operations at Class 2 through 5 speeds, or at curving speeds producing up to 6 inches of cant deficiency, on one route to be approved for operation on another route at the same maximum speed and cant deficiency.

Proposed paragraph (i) makes clear that the documents required by this section must be provided to FRA by either: (1) the track owner; or (2) a railroad that provides service with the same vehicle type over trackage of one or more track owner(s), with the written consent of each affected track owner. For example, Amtrak is a railroad that provides passenger service over trackage often owned by other entities, usually freight railroads. Under this example, Amtrak would need the consent of the freight railroad (the affected track owner) to conduct the testing. This is to ensure that the track owner is fully apprised as to the status of the track owner's track in case any anomalies during testing should arise. In another example, Amtrak is also a track owner over whose trackage numerous passenger railroads operate, such as the Southeastern Pennsylvania Transportation Authority (SEPTA) and New Jersey Transit (NJT); under this scenario, Amtrak, as the track owner, would not need the consent of these railroads, but these railroads would

need Amtrak's consent when seeking vehicle/track system qualification under this section.

Section 238.201 Scope/Alternative Compliance

FRA is proposing to revise paragraph (a)(1) of this section to harmonize the language with other changes being proposed to part 238. Specifically, FRA would harmonize the language referencing the Safety Appliance Act (49 U.S.C. ch. 203) in an effort to make clear that Tier I equipment may follow either the current, legacy safety appliance requirements (49 CFR part 231, and §§ 238.229 and 238.230), or the proposed requirements under § 238.791. So, while the requirements of the Safety Appliance Act would continue to remain applicable, other means would be provided for complying with those statutory requirements.

Additionally, FRA proposes to correct a typographical error. Currently, this paragraph references § 232.2, which does not exist. FRA would correct that reference instead to § 232.3, the applicability section of part 232.

Section 238.230 Safety Appliances—New Equipment

FRA proposes to amend paragraph (a) of this section to clarify that a Tier I alternative passenger trainset that complies with the requirements of proposed § 238.791 is not subject to the requirements of this section.

Section 238.235 Safety Appliances for Non-Passenger Carrying Locomotives Used in Passenger Service

FRA is proposing to revise this section to identify the design standards for safety appliances on non-passenger carrying locomotives used in passenger service, in an effort to provide clarity and to remove the need for interpretation for the various requirements contained in 49 CFR part 231. Specifically, paragraph (a) proposes to clarify that these requirements are intended to apply to locomotives used in passenger service that utilize monocoque, semi-monocoque, or carbody construction common to most passenger road locomotives. FRA is inviting comment on this paragraph generally and, in particular, whether specific implementation dates are necessary (and, if so, what the implementation dates should be).

Because many of these proposed requirements were developed when the PSWG developed the safety appliances standards for Tier III trainsets (contained in proposed § 238.791), there is considerable overlap between the proposed requirements. Accordingly, FRA references proposed § 238.791 when provisions under this section are identical to those under § 238.791. In such situations, FRA relies on the analysis provided under § 238.791, rather than repeat it here.

Proposed paragraphs (b) through (e) of this section address attachment, fatigue life, handholds, and sill steps. The requirements proposed under each of these paragraphs are identical to the requirements under proposed § 238.791(b) through (e).

Proposed paragraph (f) contains the requirements for ground level access to (or egress to ground level from) the locomotive cab and other carbody side doors on a non-passenger carrying locomotive. This proposed paragraph contains the general requirement that exterior side locomotive cab access doors and other carbody side doors be equipped with appropriate safety appliances to permit safe access to the locomotive cab by employees and other authorized personnel from ground level. Because many passenger road locomotives do not utilize switching steps and platforms with external walkways, access to the locomotive cab or other compartments, or the locomotive's B end, is usually provided by an external door accompanied with a ladder and handhold arrangement. Accordingly, this proposed paragraph would provide the requirements for how such arrangements should be applied properly, based on the governing elements of part 231 and contemporary practice on diesel-electric and electric locomotives.

Proposed paragraph (f)(1) would provide the requirements for the number, location, dimension, and clearance for handholds at each ground level access location to the locomotive cab and other carbody side doors on a non-passenger carrying locomotive. These requirements would mirror similar provisions under proposed § 238.791(f). Additionally, proposed paragraph (f)(2) would make the requirements of proposed § 238.791(e)(2) and (3) applicable to steps at each of these locations.

Under proposed paragraph (g), concerning couplers on non-passenger carrying locomotives, FRA would make the coupler requirements of § 238.791(g) applicable to these locomotives.

Proposed paragraph (h) would provide requirements for uncoupling levers. As these requirements would very closely mirror similar requirements under proposed § 238.791(h), FRA relies on the same, supporting analysis. However, there is a notable difference between the two sections that should be highlighted. If a non-passenger carrying locomotive is equipped with a manual uncoupling lever, that lever must be operative from both sides of the locomotive, rather than just the left side of the equipment as proposed under § 238.791(h).

Proposed paragraph (i) would permit the coupler, end handholds, and uncoupling mechanism on the leading and trailing ends of a non-passenger carrying locomotive to be stored within a removable shroud to reduce aerodynamic effects. This mirrors the same requirement proposed under § 238.791(i).

Proposed paragraph (j) contains the requirement for a non-passenger carrying locomotive to be equipped with an efficient hand brake. This proposed paragraph also includes the term ''parking'' brake, acknowledging the brake's primary role on a locomotive as a device used to hold a locomotive or train at a static location, as opposed to a means to brake (slow or stop) the train, as applied to railcars before the wide adoption of pneumatic braking systems. In this respect, the proposed performance requirement based on a 3 percent grade, or the railroad's maximum grade (if greater), was also added to reflect common practice. This proposed requirement would mirror § 238.791(j).

Proposed paragraph (k)(1) provides for the arrangement of safety appliances on non-passenger carrying locomotives to facilitate certain maintenance tasks. Should a locomotive be equipped with appurtenances such as headlights, windshield wipers, marker lights, and other similar items required for the safe operation of the locomotive that are designed to be maintained or replaced from the exterior of the locomotive, then the locomotive must be equipped with handholds and steps meeting the requirements of this section to allow for the safe maintenance and replacement of these appurtenances. However, under proposed paragraph (k)(2), the requirements under proposed paragraph (k)(1) would not apply if railroad operating rules require, and actual practice entails, the maintenance and replacement of these components by maintenance personnel in locations that are protected by the requirements of subpart B of part 218 of this chapter and equipped with ladders and other tools to safely repair or maintain those appurtenances. The requirements of this proposed paragraph (k) mirror similar requirements proposed under § 238.791(k).

Paragraph (l) would require that any safety appliances installed at the option of the railroad must be approved pursuant to § 238.110.

Subpart H—Specific Requirements for Tier III Passenger Equipment

Section 238.701 Scope

This subpart contains 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. FRA proposes to revise the scope of this subpart by adding a reference to proposed § 238.110, to help clarify the compliance demonstration and approval process for this Tier III passenger equipment. FRA is also proposing to remove the undesignated center headings in this subpart (''Trainset Structure,'' ''Glazing,'' ''Brake System,'' ''Interior Fittings and Surfaces,'' ''Emergency Systems,'' and ''Cab Equipment'') to accommodate proposed additions and other changes.

Section 238.719 Trucks and Suspension

In this section, FRA proposes safety performance standards for Tier III suspension systems. These performance standards would require a suspension system design that reasonably prevents wheel climb, wheel unloading, rail rollover, rail shift, and vehicle overturn to ensure safe, stable performance and ride quality. The proposed requirements are consistent with the general standards for high-speed trainsets adopted by the railroad industry and regulatory bodies around the world, and the overall approach is based on the suspension system safety provisions in existing §§ 238.227 and 238.427.

Proposed paragraph (a)(1) would explain the general requirements applicable to Tier III trucks and suspension systems and describe the different track conditions and characteristics that must be taken into account when determining compliance with these requirements. Proposed paragraph (a)(2) would clarify the applicability of part 213 to Tier III trucks and suspension systems subject to this section, both while in general operation and during the pre-revenue service qualification and revenue service operation stages of operations.

Paragraph (b) would prohibit Tier III trainsets from operating under conditions that result in a steady-state lateral acceleration greater than 0.15g, as measured parallel to the car floor inside the passenger compartment. This paragraph would also require that Tier III trainsets comply with the carbody acceleration limits specified in § 213.333.

Paragraph (c) describes the proposed lateral acceleration performance standards, with specific reference to the appropriate train monitoring system response to the detection of truck hunting and explains that compliance with this paragraph would be subject to the limits defined in § 213.333.

Paragraph (d) proposes limits for wheelsets based on the distances between wheel flanges. Notably, paragraph (d)(3) proposes that the back-to-back distance between flanges of two wheels on the same axle not vary more than ¼ inch when measured at similar points on each wheel. The back-to-back distance is measured from the inside face of the wheel (the portion of the wheel facing the inside gage of the track) to the inside face of the other wheel. As proposed, the measurements from a point on the flange of one wheel to the same point on the opposite wheel's flange may not be more than ¼ inch when multiple measurements are taken around the circumference of the wheel at the flange location. When this is done, care should be taken to ensure that the measurement points are the same distance from a common, non-deformable reference point for consistency and accuracy of measurement.

FRA invites comments on this proposed section, including comment specifically on the appropriate track conditions and characteristics to be included in determining compliance with this section.

Section 238.723 Pilots, Snowplows, and End Plates

Under this section, FRA proposes requirements for pilots, snowplows, and end plates on passenger equipment, which aim to serve the same purposes as § 229.123 of this chapter, with slight modifications to address the unique characteristics of Tier III passenger equipment and operations. The most significant difference between the proposed requirements for pilots, snowplows, and end plates on Tier III passenger equipment and similar requirements in § 229.123 would be the increase in the maximum clearance from six inches to nine inches for a lead vehicle equipped with an obstacle deflector or truck (bogie)-mounted wheel guard. FRA is proposing this modification based on industry input to address the greater vertical movement of the lead vehicle during higher-speed passenger operations.

Section 238.725 Overheat Sensors

Proposed section 238.725 would make applicable to Tier III trainsets the same minimum requirements for the use and placement of overheat sensors currently applicable to Tier II trainsets under § 238.428. Section 238.428 requires overheat sensors for each Tier II equipment wheelset journal bearing, placed either onboard the equipment or at reasonable intervals along the railroad's right-of-way. FRA invites comment on this proposed application to Tier III trainsets to monitor wheelset journal overheating.

Section 238.745 Emergency Communication

FRA is proposing to add this section to address communication systems, to provide requirements for public address (PA) and intercom systems for Tier III trainsets. By adding these requirements, which FRA had intended to include in the 2018 final rule, FRA would harmonize the emergency communication requirements for Tier III trainsets with similar emergency system requirements (*i.e.,* emergency lighting) already established.

With one exception, the proposed emergency communication requirements for Tier III trainsets would be the same as the existing emergency communication requirements in § 238.121 for passenger trainsets, as stated in proposed paragraph (a). The exception would be for emergency communication back-up power systems, permitting alternative crash loadings instead of those required in § 238.121(c)(2). This proposed exception is detailed in paragraph (b), under which a railroad may seek to use the loading requirements defined in Section 6.1.4, ''Security of furniture, equipment and features,'' of Railway Group Standard GM/RT2100, Issue Four, ''Requirements for Rail Vehicle Structures,'' Rail Safety and Standards Board Ltd., December 2010, which FRA proposes to incorporate by reference in this paragraph. In particular, these loading requirements are the same as those for alternatively demonstrating adequate attachment strength of emergency lighting back-up power systems in Tier III trainsets discussed in the 2016 NPRM and 2018 final rule under § 238.743.[21] Accordingly, both the interior lighting fixtures and their emergency back-up power systems would be subject to the same alternative loading requirements. As in § 238.743, use of the alternative loading requirements would be carried out consistent with any conditions identified by the railroad, as approved by FRA.

[21] 81 FR 88006 (Dec. 6, 2016); 83 FR 59182 (Nov. 21, 2018).

Section 6.1.4 contains requirements for securement of furniture, on-board equipment, and other trainset features to help mitigate against injuries to passengers and crew from secondary impacts within the occupied volume. GM/RT2100 is available to all interested parties online at *www.rgsonline.co.uk/Railway_Group_Standards*. Additionally, FRA would maintain a copy available for review.

Section 238.747 Emergency Roof Access

In this section, FRA proposes requirements for emergency roof access to the cabs of Tier III trainsets. These requirements aim to ensure that the trainset design allows for proper roof access for rescue access purposes for cab occupants in Tier III trainsets. This emergency roof access point would be required only if trainset design does not allow cab occupants access to emergency roof access locations otherwise required in the passenger compartment of the trainset. The proposed requirements would also define the dimensions for the emergency roof access location while making specifically applicable paragraphs (b), (d), and (e) of § 238.123 (Emergency roof access).

Should train crewmembers occupying the Tier III cab have ready access to emergency roof access locations in the passenger compartment that comply with § 238.123, then the railroad would not need to comply with the requirements of this section, as the intent of the requirement (access to the roof of the trainset for cab occupants in emergency situations to facilitate rescue access) would be fulfilled. FRA also clarifies that the location of the emergency roof access point under this proposed section would not need to be directly over or into the cab, and could be a location behind the cab, so long as cab occupants have access.

Section 238.755 General Safety Requirements

Proposed § 238.755 is based on existing §§ 229.13, 229.41, and 229.45. Specifically, proposed paragraph (a) would cross-reference the requirements of § 229.41 for protection from personal injury. Proposed paragraph (b) would cross-reference the requirements of § 229.45, requiring that a Tier III trainset be free from conditions that would endanger the safety of the passengers, crew, or equipment. Moreover, FRA makes clear that it does not intend for this provision to be limited to the list of conditions identified under § 229.45. FRA would view other conditions not listed but still endangering the safety of passengers, crew, or equipment to be covered by this provision. Proposed paragraph (c) would make applicable the requirements of § 229.13 when multiple Tier III trainsets are coupled in remote- or multiple-control. FRA reiterates that although the term ''locomotive'' is used under § 229.13, the substantive requirements of this proposed paragraph are intended to be applied to Tier III trainsets, and thus should be read as such.

Section 238.757 Cab, Floors, and Passageways

Under § 238.757, FRA is proposing requirements for Tier III trainset cabs, floors, and passageways, and is basing these proposed requirements on § 229.119. Proposed paragraph (a), based on § 229.119(a) and (i), contains the requirements for Tier III trainset cab doors. This paragraph proposes that such trainset cab doors be equipped with a secure and operable device to lock the doors from both the inside and outside without impeding egress from the cab.

Proposed paragraph (b), based on § 229.119(b), would require that Tier III end-facing windows located in the leading end of the trainset be free of cracks, breaks, or other conditions that obscure the view of the right-of-way for the crew from their normal positions in the operating cab.

Proposed paragraph (c) would make applicable to Tier III trainsets the requirements of § 229.119(c).

Proposed paragraph (d), based on § 229.119(g) and (h), would require that cabs of Tier III trainsets shall be climate-controlled, providing both appropriate heating and air conditioning. This proposed paragraph also states that the inspection, testing, and maintenance requirements for the heating and air condition system be specified in the railroad's ITM program.

Section 238.759 Trainset Cab Noise

Under § 238.759, FRA is proposing requirements to address trainset cab noise, which are based on § 229.121. Proposed paragraph (a), based on § 229.121(a), would establish a maximum noise threshold that occupants of a Tier III trainset may be subjected to (85 A-weighted decibels (85 db(A))); prohibit railroads from modifying the cab in a manner that would cause the noise to exceed the maximum level; and require railroads to follow the testing protocols, outlined under proposed appendix I to part 238 (discussed further, below), to verify that the noise levels within the cab do not exceed the maximum level. Proposed paragraph (b) would contain the requirements addressing excessive noise reports. This paragraph is based on § 229.121(b) with minor editorial changes.

Section 238.761 Trainset Sanitation Facilities for Employees

Under § 238.761, FRA is proposing a set of requirements addressing crewmember sanitation facilities, which are based on § 229.137. Proposed paragraph (a) would require that if a railroad provides a crewmember sanitation compartment, as that term is defined under § 229.5, accessible only to the crew onboard a Tier III trainset, that compartment must meet the requirements of § 229.137 and be maintained in accordance with § 229.139. However, under proposed paragraph (b), should a railroad not provide such a sanitation compartment exclusively for crewmembers on board its trainset, the railroad would be required to provide access to sanitation facilities in accordance with § 229.137(b)(1)(i) in that employees should have ready access to railroad-provided sanitation facilities external to the trainset or sanitation facilities elsewhere on the trainset.

Again, FRA reiterates that although the term ''locomotive'' is used under § 229.137, the substantive requirements of this proposed paragraph are intended to be applied to Tier III trainsets, and thus should be read as such.

Section 238.763 Speed Indicator

Under § 238.763, FRA is proposing requirements addressing speed indicators for Tier III trainsets. Although these requirements are based on § 229.117, the requirements for speed indicators being proposed mark a significant departure from the traditional requirements under part 229. Proposed paragraph (a) provides that all Tier III trainsets be equipped with speed indicators, clearly readable for the engineer's normal position. Notably, the accuracy requirements under proposed paragraph (a)(1) would represent the biggest modification of the speed indicator requirements. Under this proposal, a Tier III speed indicator would be required to be accurate to within plus or minus 1.24 mph for speeds not exceeding 18.6 mph.[22] However, the accuracy would be permitted to deviate, linearly, up to plus or minus 5 mph for speeds not exceeding 220 mph. So, rather than specifying static accuracy based on whether one is above or below a certain speed, FRA would permit use of a

[22] These values are intended to correspond to 2 kilometers per hour (kph) and 30 kph.

sliding scale performance requirement. Under this proposal, accuracy of the speed indicator would be permitted to change in a linear relationship to the speed of the trainset. And, as the necessity for more precise accuracy diminishes the faster a Tier III trainset operates,[23] this requirement is reflective of the actual Tier III operating environment. Additionally, with the advances in digital technology, maintaining such an accuracy should not be as challenging.

Proposed paragraph (b) would require that the speed indicator output (what the engineer sees) be based on a system of independent, onboard speed measurement sources to comply with the accuracy requirements of proposed paragraph (a). At a minimum, FRA would expect that, from whatever source the speed is derived, there would be multiple (at least two) inputs provided by different sensors to ensure the accuracy of the speed as displayed to the engineer.

Proposed paragraph (c) permits the railroad to define the calibration frequency for the speed indicator in its ITM program.

Section 238.765 Event Recorders

Under this section, FRA is proposing a set of requirements addressing event recorders for Tier III trainsets. The requirements, as proposed, largely follow the event recorder requirements under § 229.135. However, FRA has made some changes to account for the different technology. Notably, under proposed paragraph (a), which would contain the general requirement that all Tier III trainsets be equipped with an in-service event recorder and is based on § 229.135(a), FRA would not require railroads to note the mere presence of an event recorder on FORM FRA F6180–49A or other record, as all Tier III trainsets would require event recorders.

Proposed paragraph (b) contains the specific data elements to be recorded by the event recorder and the level of recording accuracy necessary. Notably, proposed paragraph (b)(2) outlines the data elements to be recorded. This paragraph would cross-reference a large majority of data elements contained in § 229.135(b)(4), specifically, § 229.135(b)(4)(i) through (xv), (xvii), (xx) and (xxi). In addition, proposed paragraph (b)(2) lists several more data elements that are tailored toward Tier III trainsets, such as: the application and operation of the eddy current brake, if equipped ((b)(2)(i)); a passenger brake alarm request ((b)(2)(ii)); a passenger brake alarm override ((b)(2)(iii)); the activation of the bell ((b)(2)(iv)); and the trainset brake cylinder pressures ((b)(2)(v)). Finally, proposed paragraph (b)(2) would require the recorded data to be retained on a certified crashworthy event recorder memory module that meets the requirements of appendix D to part 229 of this chapter.

Proposed paragraph (c), which is based on § 229.135(c), would require that when an in-service event recorder is taken out of service, the date the device was removed from service would be annotated in the trainset's maintenance records, required in accordance with proposed § 238.777.

Proposed paragraph (d), which is based on § 229.135(d), would permit a Tier III trainset on which the event recorder has been taken out of service to continue in service only until the next pre-service inspection, as required by the railroad's ITM program under proposed § 238.903(c)(2).

Proposed paragraph (e) would make applicable to Tier III trainsets the requirements set forth in § 229.135(e) through (g).

Proposed paragraph (f) would require that event recorders be tested at intervals not to exceed 368 days, in accordance with § 229.27(c).

FRA again reiterates that although the term ''locomotive'' is used under § 229.135, the substantive requirements of this proposed paragraph are intended to be applied to Tier III trainsets, and thus should be read as such.

Section 238.767 Headlights

Under this section, FRA is proposing requirements for Tier III trainset headlights. As proposed under paragraph (a), each end of a Tier III trainset would be required to be equipped with a headlight comprised of at least two lamps that meets the angular, intensity, and illumination requirements of § 229.125(a).

Proposed paragraph (b) would prohibit Tier III trainsets from operating with a leading end in revenue service if a defective headlight is discovered during the pre-service inspection; under such circumstances, it would only be allowed to move in accordance with the requirements covering the movement of defective equipment under proposed § 238.1003(e). However, this proposed paragraph would permit continued operation of a trainset's leading end with a defective headlight if the defect is discovered while the trainset is in service in accordance with the requirements of proposed § 238.1003(b)(1) through (3).

Proposed paragraph (c) would permit the headlights of a Tier III trainset to be dimmed, which is consistent with existing § 229.125(c). However, because the headlight and auxiliary light standards are driven around the need for consistency and conspicuity when Tier III trainsets are used on a shared right-of-way, the performance requirements, themselves, would not directly address that it may be advantageous for a Tier III trainset to operate for extended periods of time with a lower candela setting. Specifically, whereas a conventional freight or passenger operation is likely to utilize the dim setting only when passing another train, idling, or as an alternative to marker lights, a Tier III trainset could operate for extended periods of time within a dedicated (and more protected) environment where the higher output may not be necessary or desired, particularly if the Tier III right-of-way is adjacent to or within a highway corridor. The use of this functionality, however, should be described by the railroad under proposed § 238.110(d)(2)(xv).

Proposed paragraph (d) would provide an allowance to use alternative lighting technology (*e.g.,* LED versus incandescent). It also would provide an exception to the requirement that the headlight consist of at least two lamps, as required by proposed paragraph (a). Further, this proposed paragraph (d) would require that if such alternative technology is used, then the railroad's ITM program plan must include procedures for determining that such headlights provide the illumination intensity required by proposed paragraph (a), and that the headlights can achieve the minimum illumination intensity under snow and ice conditions (*i.e.,* when there is a risk of snow and ice accumulation on the headlight).

Section 238.769 Auxiliary Lights

Under this section, FRA is proposing requirements addressing auxiliary lights for Tier III trainsets, based on similar requirements in § 229.125. Under proposed paragraph (a), FRA would establish the general requirement that Tier III trainsets operating in shared rights-of-way over public highway-rail grade crossings at speeds 20 mph or greater be equipped with auxiliary lights that conform to § 229.125(d)(1) though (3). FRA recognizes that § 229.125(d)(1) through (3) uses some traditional terms, such as ''locomotive,'' when describing the placement of auxiliary lights; however, the use of the term ''locomotive,'' or other similar terms, should not be an impediment to

[23] For example, a change in speed of 2 mph while operating at 220 mph is not as significant as an equivalent change in speed at 20 mph.

compliance with the requirements of this proposed paragraph.

Proposed paragraph (b) would permit auxiliary lights to be arranged in any manner specified in § 229.125(e)(1) through (2), and proposed paragraph (c) would require compliance with § 229.125(f).

Proposed paragraphs (d)(1) through (3) address requirements concerning defective auxiliary lights, and would require that a lead unit with a single defective auxiliary light be switched to a trailing position (or repaired) if discovered during the pre-service inspection. Although the proposal would permit a unit to continue in the lead position if a single defective auxiliary light is discovered while in service, a lead unit discovered with two defective auxiliary lights while in service would be allowed to continue in service only to the next forward location where repairs could be made.

Section 238.771 Marking Device

This section proposes a set of requirements for rear marker devices for Tier III trainsets, based generally on part 221. Proposed paragraph (a) contains the general requirement that Tier III trainsets be equipped with a rear marking device. Paragraph (a) would also require marking devices to conform with the characteristics of § 221.14(a)(1) through (a)(3), along with other requirements in proposed paragraphs (a)(1) and)(2) of this section.

Proposed paragraph (a)(1) would require that marking devices continuously illuminate, with proposed paragraph (a)(2) permitting alternative lighting technology so long as the railroad's ITM program plan contains procedures for determining that the marker lights conform with the requirements of proposed paragraphs (a) and (a)(1).

Proposed paragraph (b) specifies that the centroid of the marking device would be located 48 inches above the top of the rail.

Proposed paragraph (c) would require that marking devices be illuminated while the trainset is in service and that they be inspected as part of the pre-service inspection.

Proposed paragraph (d)(1) would specify that a trainset with a defective or inoperative marking device not be moved in revenue service if discovered as part of a pre-service inspection. However, proposed paragraph (d)(2) would permit movement to the next forward repair location if the marking device is discovered inoperative while the trainset in service.

Proposed paragraph (e) would provide an exception to equipping trainsets with a marking device in conformance with paragraph (a) by allowing a headlight set on dim to serve as a rear marking device.

Section 238.773 Cab Lights

This proposed section would require that cab lights comply with the requirements of § 229.127(a). It also would require that cab passageways and compartments be adequately illuminated.

FRA reiterates that although the term ''locomotive'' is used under § 229.127, the substantive requirements of this proposed section are intended to be applied to Tier III trainsets, and thus should be read as such.

Section 238.775 Trainset Horn

Proposed paragraph (a) would require that each Tier III trainset be equipped and arranged with a horn that conforms with § 229.129(a).

Proposed paragraph (b) provides an option for testing the trainset horn. Railroads would be able either to perform acceptance sampling in accordance with § 229.129(b)(1) or test each horn individually under the procedures of proposed paragraph (e).

Proposed paragraph (c) would require that, but for the exception under proposed paragraph (d), replacement trainset horns be tested individually in accordance with proposed paragraph (e). Under proposed paragraph (d), replacement trainset horns need not be tested if the replacement horn is of the same model of horn being replaced that had been successfully tested either in accordance with § 229.129(b)(1) or proposed paragraph (e).

Proposed paragraph (e) would require that trainset horns be individually tested in accordance with § 229.129(c), subject to one exception and one addition. The positioning of the microphone used for testing the trainset horn would be specified under proposed paragraph (e)(1), in lieu of complying with § 229.129(c)(7). Additionally, proposed paragraph (e)(2) would permit the records required under § 229.129(c)(10) to be kept electronically.

Although § 229.129 references the term ''locomotive,'' this should not prove an impediment to compliance, as substantive requirements of this proposed section are intended to be applied to Tier III trainsets.

Section 238.777 Inspection Records

This proposed section is generally based on § 229.23 insofar as certain periodic inspections must be performed at certain intervals and completion thereof must be recorded. In addition, and as discussed further below, certain other pertinent information must also be recorded and made available to railroad employees and FRA inspectors.

The most significant aspect of this proposed section is that FRA is not requiring use of FRA form F6180–49A (form 49A), or any future variants, to record the pertinent inspection data and other data that FRA necessitates under part 229 (such as the presence of an in-service event recorder in the remarks section of the form). FRA would permit users of Tier III equipment the option of using onboard technology to provide to the engineer the same type of information regarding the inspection state of the Tier III trainset as would be provided through use of form 49A under part 229 and its physical presence in the cab of a locomotive. As discussed below, should a railroad using Tier III equipment wish to use this option, the onboard technology would need to have the capability of informing the engineer that, at the time of use, the trainset has received all required periodic inspections. The technology would also need to be able to communicate the type of brake system used, and various other pieces of necessary information. On the other hand, should a railroad using Tier III equipment not elect this option, the railroad may still use a physical form under a transparent cover in the controlling cab of the Tier III trainset. Although a railroad would not be required to use form 49A for Tier III equipment specifically, this proposed paragraph should not be construed as absolving a railroad using Tier III equipment from complying with the applicable requirements for Tier I or II equipment it may also operate. For clarity, the periodic inspection information intended to be captured under this proposed section would be analogous to the periodic inspection information captured under § 229.23, albeit the periodic inspections would be conducted pursuant to a Tier III railroad's approved ITM program. FRA also welcomes comment on whether to make this option available to Tier I or II equipment.

Proposed paragraph (a) would establish a general requirement that for certain periodic inspections as defined by a Tier III railroad's ITM program, certain information be captured with respect to those inspections. Proposed paragraphs (a)(1) through (3) would specify the minimum information required for each inspection record: the date the last inspection was done, the name of the inspector conducting the work, and the name of the supervisor certifying the work was done correctly.

Proposed paragraph (b) would require that the locomotive engineer have access to information from the inspection record and summary report and identify digital (proposed paragraph (b)(1)) and physical methods (proposed paragraph (b)(2)) for enabling that access. Should a railroad using Tier III equipment elect to comply with proposed paragraph (b)(2), use of form 49A (or any future variant) to display or record the particular maintenance information listed in this proposed section would not be required; the railroad would be free to develop its own form unique to its needs for its Tier III equipment.

Proposed paragraph (c) would establish the requirements for a summary report. This summary report is similar in intent to FRA's form 49A (providing pertinent information regarding the state of the trainset to those in the controlling cab), requiring information that is consistent with what is required currently under part 229. However, use of FRA's form is not required for Tier III equipment, as discussed under proposed paragraph (b). This paragraph proposes that the summary report, in whatever form it takes, should contain certain information regarding the specific trainset such as the date(s) of the last periodic inspection required under the railroad's ITM program plan, whether there are any waivers of compliance granted by FRA under part 211 applicable to the trainset, the type of brake system used on the trainset, and whether the event recorder is out of service.

Proposed paragraph (d) would permit compliance with § 229.23 as satisfying the requirements of this section.

Section 238.781 Current Collectors

This proposed section would apply many of the requirements for the use of current collectors in part 229 to passenger equipment and trainsets, with some changes. Proposed paragraphs (a)(1) and (b) would apply requirements from part 229 through cross-references, and proposed paragraph (a)(4) would impose requirements similar to those in part 229, with minor changes. Other paragraphs in this proposed section would contain requirements with no direct counterpart in part 229.

Paragraph (a) proposes requirements for pantographs and other overhead collection systems. Paragraph (a)(1) proposes to apply the requirements of § 229.77(a) to Tier III equipment. Paragraphs (a)(2) and (3) have no counterparts in part 229, and propose requirements to provide additional protection for engineers and other personnel by requiring the electrical grounding of insulated parts to reduce the risk of electric shock and by enabling an engineer to identify the position of and secure the pantograph without mounting the roof of the trainset.

Proposed paragraph (a)(4), which is based on § 229.81(a), would require that, for pantographs used on Tier III trainsets, a means be provided to safely lower the pantograph in the event of an emergency, permitting the use of an emergency pole, subject to certain requirements (such as properly marking where the pole can be safely handled and keeping the pole free from moisture and damage when not in use). Paragraph (a)(4) proposes an additional requirement that a railroad's ITM program identify an alternate means of securement and electrical isolation of a damaged pantograph when automatic methods are not possible.

Paragraph (b) proposes to apply the requirements of §§ 229.79 and 229.81(b) to trainsets equipped with pantographs and third-rail shoes. Although the requirements of §§ 229.79 and 229.81(b) use the term ''locomotive,'' rather than ''trainset,'' the proposed language of paragraph (b) would clarify the application of these requirements to Tier III trainsets.

Section 238.783 Circuit Protection

This section proposes requirements for the protection of electrical circuits used within a Tier III trainset. Proposed paragraph (a) describes the general requirements for circuit protection in Tier III passenger equipment. Proposed paragraphs (b) and (c) would provide requirements for more specific categories of circuit protection, with proposed paragraph (b) addressing lightning protection and proposed paragraph (c) addressing overload and ground fault protection. For purposes of this section, the term ''lightning arrestor'' includes a surge arrestor that also functions as a lightning arrestor.

Section 238.785 Trainset Electrical System

Under this section, FRA is proposing requirements addressing various aspects of a Tier III trainset's electric system and is proposing to apply by cross-reference certain electrical system requirements for locomotives in part 229. Proposed paragraph (a) would address the insulation or grounding of metal parts and apply by cross-reference requirements of §§ 229.83 and 238.225 to trainsets.

Proposed paragraph (b) would address high voltage markings on doors, cover plates, or barriers, and apply by cross-reference the requirements of § 229.85. Although in § 229.85 the words ''Danger-High Voltage'' or ''Danger'' appear with just each word's first letter capitalized, FRA makes clear that use of all capital letters (*i.e.,* ''DANGER–HIGH VOLTAGE'' or ''DANGER'') would also be acceptable. However, font size, symbols, and colors must comply with a national or international standard recognized by the railroad industry, and labels must be retro-reflective. FRA also makes clear that the proposed requirements for marking doors, cover plates, or barriers under this paragraph would apply to the external surfaces of any doors, cover plates, or barriers, and that the marking must be conspicuous and legible. The purpose of these proposed requirements would be negated if the markings were hidden on surfaces blocked from ready view or were otherwise indistinguishable from the external surface, or if the language conveying the warning were illegible.

Proposed paragraph (c) would apply the requirements for hand-operated electrical switches in § 229.87 to Tier III trainsets.

Under the proposed requirements of paragraph (d), trainsets would be subject to the requirements for conductors, jumpers, and cable connections in §§ 229.89 and 238.225(a). As clarification, while § 229.89 refers to cable and jumper connections for a locomotive, proposed paragraph (d) would apply such requirements to Tier III trainsets.

Paragraph (e), as proposed, describes requirements for energy storage systems (batteries and capacitors) on Tier III trainsets. Paragraph (e)(1), which addresses batteries, proposes to apply the requirements of § 238.225(b) and also proposes an additional requirement: battery circuits must include an emergency battery cut-off switch to completely disconnect the energy stored in the batteries from the load.

Paragraph (e)(2), which has no counterpart in part 229, proposes requirements for the design of capacitors for high-energy storage on trainsets and would require that such capacitors be isolated by a fire-resistant barrier from passenger seating areas and the trainset cabs (proposed paragraph (e)(2)(i)) and that the capacitors be designed to protect against overcharging (proposed paragraph (e)(2)(ii)).

Paragraph (f) proposes to apply the requirements for power dissipation resistors in § 238.225(c) to Tier III trainsets, with one additional proposed requirement: power dissipation resistor circuits must incorporate warning or protective devices for low ventilation air

flow, over-temperature, and short circuit failures.

Paragraph (g) proposes to apply the requirements for electromagnetic interference and compatibility in § 238.225(d), so that the onboard electronic equipment, among other things, not produce electrical noise that interferes with the trainline control and communications or wayside signaling systems. In addition to applying the requirements of § 238.225(d), FRA is proposing an additional requirement: electrical and electronic systems of equipment must be capable of operation in the presence of external electromagnetic noise sources.

In paragraph (h), FRA proposes requirements for motors and generators in use on a Tier III trainset. Proposed paragraph (h)(1) contains a general requirement that all motors and generators would be in proper working order or safely cut-out and isolated. Proposed paragraph (h)(2) would require that if motors and generators are equipped with support brackets, bearings, isolation mounts, or guards, those items would be present and function properly as defined by the railroad's ITM program.

Section 238.791 Safety Appliances

Under this section, FRA is proposing a comprehensive set of requirements addressing safety appliances for Tier III trainsets. As described in paragraph (a), this section may also be applied to Tier I passenger-carrying vehicles and trainsets. Non-passenger-carrying passenger locomotives that are not part of an integrated trainset design would be covered under proposed § 238.235. A railroad or supplier may still utilize the relevant passenger rail car safety appliance standards contained in part 231 of this chapter, if appropriate. The proposed safety appliance standards in this section, however, are intended to address modern passenger rail vehicle designs considerations and updated ergonomics from the recommendations provided by APTA and the international car builders represented in the PSWG. FRA notes that the application of these proposed requirements to Tier I equipment would be an all-or-none approach, like the alternative crashworthiness requirements under § 238.201 and appendix G to this part. This means that Tier I equipment would either follow all the requirements, as proposed under this section, or comply with the existing safety appliance requirements for Tier I equipment; however, no mixing of the two sets of requirements would be permitted.

Proposed paragraph (b) outlines the requirements for the attachment of safety appliances to the structural carbody of passenger rail equipment. These requirements are subdivided into two main categories: attachment by mechanical fasteners (*e.g.,* rivets, bolts), and attachment by welding. Proposed paragraph (b)(1) would establish the minimum fastener mechanical strength and fatigue resistance, as provided by a ½-inch SAE Grade 5 bolt, or equivalent, by means of one- or two-piece rivets, Huck bolts®, or threaded fasteners. To ensure that threaded fasteners remain appropriately secured, proposed paragraphs (b)(1)(i) through (v) would provide the acceptable methods that must be followed to ensure that bolts or nuts used to secure the appliance to the carbody do not become loose.

Proposed paragraph (b)(2) addresses the minimum requirements for appliances, sub-assemblies, brackets, and supports that are welded as a means of attachment to the structural carbody. Proposed paragraph (b)(3) would further identify when brackets or supports (*e.g.,* tapping blocks) can be considered part of the structural carbody. FRA notes that there is a small but important distinction between the intended treatment of brackets or supports in paragraphs (b)(2) and (3). Proposed paragraph (b)(2) would apply specifically to brackets and supports that are considered components of the appliance itself (*e.g.,* to add stiffness), as distinguished from supports used for the sole purpose of attaching the appliance to the carbody under proposed paragraph (b)(3).

Proposed paragraph (b)(4) would require that safety appliance designs facilitate the regular inspection of their attachment points to ensure threaded connections are not loose and welds show no signs of premature failure. Proposed paragraph (b)(5) would provide for the use of a minimum factor of safety of two, if the design loads in proposed paragraphs (d)(4)(ii) or (e)(4)(ii) are used as the method of determining appliance strength. FRA makes clear that this proposed requirement would apply only if the design load methodology for appliance strength is utilized, as a factor of safety would not be necessary if the traditional (*e.g.,* ⅝-inch diameter steel, or a material providing an equivalent level of mechanical strength) approach is used.

Proposed paragraph (c) would establish that the appliance and its attachment must be designed to account for fatigue, particularly as it relates to the size of welded connections. Because of the high-vibrational environment in which safety appliances are utilized, particularly where reciprocal engines are also present (*e.g.,* diesel-electric locomotive, diesel multiple-unit), the PSWG wanted to ensure designs accounted for environmental service factors, in addition to obvious static loads. Traditional threaded connections do occasionally come loose in such environments when not secured properly, but generally remain attached, whereas a welded connection may fail completely, without warning, if such considerations are not taken into account. This was a primary concern raised in discussions within the PSWG when alternative language to §§ 238.229 and 238.230 was being considered for welded appliances and components. Therefore, proposed paragraph (c) is intended to complement the other requirements for welded appliances outlined in more detail within this section, to help address many of these concerns.

Proposed paragraphs (d) and (e) address the pertinent requirements for the design of all handholds and sill steps, respectively. FRA notes that the proposed text represents an organizational change from the RSAC recommendations. Because handholds and sill steps are the most common types of safety appliances installed on passenger rail equipment, and the requirements can vary depending on their location and function, FRA believes that by consolidating requirements for all handholds and sill steps, it can avoid repeating requirements that are common to all locations (*e.g.,* clearance, strength) while more succinctly delineating the requirements for specific locations (*e.g.,* end handholds). FRA welcomes comments towards the utility of this approach, and the value of possibly including accompanying drawings in a final rule.

Proposed paragraph (d)(1) would detail the number of handholds required, and any critical dimensions depending on the function, location and arrangement (*i.e.,* horizontal or vertical) of each type of handhold. Proposed paragraph (d)(1)(i) would require handrails to be present at all passenger side door locations but note that internal handrails installed to comply with the requirements of § 38.97(a) or § 38.115(a) of this title, Americans with Disabilities Act Accessibility Specifications for Transportation Vehicles, may be used to satisfy this requirement, recognizing that this would likely be the primary method of compliance.

Proposed paragraph (d)(1)(ii) addresses the minimum requirements for locations where external access to the cab of a trainset, power car, or

locomotive is provided, other than for passenger access. These locations typically include one or more vertical handholds and sill steps stacked in ''ladder'' arrangement for crewmembers to access the cab from the ground level.

Proposed paragraph (d)(1)(iii) addresses the requirements for all side handholds. Side handholds are required at any location where sill steps are installed, including those required by statute or regulation, and optional installations. A major goal of the PSWG was to address the various arrangements that have been developed over the years to provide better ergonomics. For example, some passenger equipment designs incorporate two horizontal handholds above side sill steps located at car ends, as opposed to the single horizontal handhold design codified under part 231 for most passenger cars. The multiple handhold arrangement was adopted to provide better ergonomics for crews riding on car ends performing switching moves and other activities, while providing a lower handhold for stability from the ballast level. Proposed paragraphs (d)(1)(iii)(A) through (F) provide specific dimensions for the different types of arrangements that are commonly used on modern passenger rail equipment.

Proposed paragraph (d)(1)(iv) provides the requirements for end handholds. End handholds are generally required at the end of any car where a coupler is installed that requires crewmembers to manually couple, uncouple, or make electrical or pneumatic connections, as detailed in this section. The PSWG recommendations added additional language to address position requirements for vehicles with tapered (aerodynamic noses), included in proposed paragraph (d)(1)(iv)(C), and when the use of an uncoupling lever is acceptable in lieu of a separate end handhold, as contained in proposed paragraph (d)(1)(iv)(E). Perhaps most significantly, this rule would codify the exception proposed in paragraph (d)(1)(iv)(F) that end handholds would not be required at the ends of vehicles equipped with an automatic coupling mechanism that can be safely operated from inside the appropriate cab of the vehicle and does not require a person to go between vehicle units. This approach has been adopted in numerous, recent equipment designs that incorporate some level of semi-permanent connection (*e.g.,* trainsets, married pair MUs), or utilize a ''fully-automated'' coupling device that can couple or decouple and make all electrical and pneumatic connections without the need for manual intervention. Often these couplers (commonly referred to as ''transit type'' couplers) can be monitored and controlled from the cab of a trainset. FRA is utilizing its authority under 49 U.S.C. 20306 to codify this exception through this rulemaking process.[24] By doing so, FRA anticipates it would eliminate the need for additional waiver requests on the subject and better incorporate modern technology and equipment designs, as the statutory provision intends.

Proposed paragraphs (d)(2) and (3) provide the required minimum handhold dimension and hand clearance requirements.

Proposed paragraph (d)(4) contains the handhold strength and rigidity requirements with proposed paragraph (d)(4)(i) providing an option to utilize the traditional 5/8-inch wrought-iron or steel equivalency strength for those that prefer to design appliances using the traditional approach. In turn, proposed paragraph (d)(4)(ii) reflects the new, design strength approach, as recommended by the PSWG.

Proposed paragraph (d)(5) addresses the use of multiple handholds when arranged vertically in a ''ladder'' type arrangement, often used by crewmembers to access cabs or carbody doors from the ground level.

The requirements for different sill step arrangements are consolidated within proposed paragraph (e) of this section. Proposed paragraph (e)(1)(i) would specify the locations where sill steps must be equipped and proposed paragraphs (e)(1)(ii) and (iii), respectively, the required dimensions. Proposed paragraph (e)(1)(iv) would provide exceptions for where side sill steps are not required. Specifically, under proposed paragraph (e)(1)(iv)(A), side sill steps would not be required if steps are provided for an exterior cab access door in a location where a crewmember can ride the equipment with an unobstructed view of the track ahead. This would reduce the need to have redundant safety appliances where the cab ladder arrangement can be effectively used to safely perform switching moves. Under proposed paragraph (e)(1)(iv)(B), sill steps, as with end handholds, would not be required at locations equipped with an automatic coupling mechanism that can be safely operated from inside the appropriate cab of the vehicle and does not require ground intervention from a person to go on, under, or between the equipment such as to couple air, electric, or other connections. As with other safety appliance requirements proposed in this section, FRA proposes to adopt these common exceptions from the statutory need to equip a vehicle with sill steps by the authority provided in 49 U.S.C. 20306. Doing so would also remove the need for continued waiver requests under this authority for modern passenger equipment designs.[25]

Proposed paragraph (e)(2) provides the various required dimensions for various sill step arrangements. Proposed paragraph (e)(2)(i) would establish the minimum tread length as 10 inches, which is the useable length of the step where a person could place their foot, excluding any construction features such as bend radii where someone could not step onto a flush surface of the step. Proposed paragraph (e)(2)(ii) would establish the clear (unobstructed) distance required above the usable tread of a step. This dimension has historically been referred to as the clear ''depth'' in part 231. The PSWG recommended use of the term ''clear distance'' in the proposal, to avoid historical confusion regarding the meaning of the term ''depth,'' which could also be interpreted as meaning the distance from the outside vertical plane of a step.

Proposed paragraph (e)(2)(ii)(A) would require that a Tier III trainset have a minimum of at least 4.7 inches of clear distance, whereas proposed paragraph (e)(2)(ii)(B) would provide the traditional 8-inch clear distance requirement for Tier I equipment. In discussions with the PSWG, industry requested that FRA adopt the service-proven clear distance based on international standards (4.7 inches). The PSWG noted that this standard has proven appropriate for international high-speed passenger equipment as it reduces the potential pocket size that can be a major contributor to aerodynamic noise. Additionally, the PSWG noted that this standard would help avoid the need for potential modifications to the carbody underframe of service-proven, high-speed trainsets if manufacturers were required to increase the clear distance length to the historical 8 inches. In a continuing effort to harmonize FRA regulations with service-proven international standards to facilitate the implementation of service-proven, high-speed rail in the United States, FRA is proposing to adopt this recommendation. However, as these proposed regulations may also apply to Tier I equipment, FRA is proposing to retain the requirement that Tier I

[24] For further discussion on FRA's proposed use of its discretionary authority under 49 U.S.C. 20306, see section III.E, above, Safety Appliances for Non-Passenger Carrying Locomotives and Passenger Equipment.

[25] *Id.*

equipment maintain a minimum clear distance of at least 8 inches.

Proposed paragraph (e)(2)(iii) would specify the required clear space from the outside edge of a sill step. The purpose of this dimension is to allow the user to have enough room to firmly place the ball of their foot on the step. The most common application of this requirement would be where a step is built directly into the side of a vehicle, or into the pocket of the carbody or side sill of a locomotive or passenger vehicle. The term ''clear space'' is being introduced here to avoid confusion with similar terms, such as clear length and depth. FRA welcomes comments on other terminology that might be considered for this dimension.

Proposed paragraph (e)(2)(iv) would adopt a maximum vertical rise between consecutive sill steps. This proposed requirement is intended to ensure that vertical spacing is ergonomic for users in multiple sill step arrangements, particularly those used in a ladder-type arrangement, and is derived from other regulations such as those for box car ladders outlined in § 231.1(e) of this chapter. Similarly, proposed paragraph (e)(2)(v) would require that proper clearance be provided behind a sill step and running gear or any other moving parts. This is intended to ensure that the truck or other moving part of a passenger vehicle does not come into contact with the boot (foot) of a crewmember riding on a sill step or cab access ladder. This would also effectively prohibit steps being installed directly onto such moving parts, which could present an unsafe condition if the equipment starts to move.

Proposed paragraph (e)(3) would establish the requirements for sill step tread surfaces and provide some examples for acceptable methods. Railroad and suppliers should consider the appropriate anti-skid material to use depending on the functionality of the sill step. For example, if a sill step is also intended to function as a handhold, then it should utilize an anti-skid material that does not affect the use of the handhold. This proposed language would also require that enclosed steps, such as those built into the side sill or carbody of equipment, have at least 50 percent of the tread area as open space to help prevent the minor build-up of snow or ice from impacting the utility of the anti-skid surface.

Proposed paragraph (e)(4) provides the strength requirements for sill steps. These requirements would be similar to those the PSWG recommended for other appliances in this section, but also include an empirical requirement for sill steps constructed with a rectangular cross-section.

Proposed paragraph (f) addresses the minimum crew access locations for new passenger trainsets and individual pieces of equipment. It is intended to ensure that vehicles designed to provide only high-level boarding for passengers also have a means for crewmembers to board a trainset or passenger car from ground level, or alight from one to the ground. Specifically, proposed paragraphs (f)(1)(i) through (iii) would detail when such access locations must be provided and when low-level boarding or cab access locations can be used to satisfy this requirement.

Proposed paragraphs (f)(2)(i) and (ii) provide the requirements for steps and handholds utilized in crew access locations, primarily referencing similar requirements proposed in this section. FRA is also including additional provisions recommended by the PSWG in proposed paragraphs (f)(2)(iii) and (iv), which would allow for crew access steps to be retractable, or for portable ladders to be utilized in lieu of permanently installed external steps, respectively. These proposed requirements were added to address concerns with aerodynamic noise contribution, particularly on Tier III trainsets. If portable ladder arrangements are used, they should be readily accessible to crewmembers, designed to provide strength equivalent to or greater than that required for sill step arrangements in this section, and be securely attached to the equipment.

Proposed paragraph (g)(1) details where ''automatic'' couplers must be equipped, and their functionality, as required by 49 U.S.C. ch. 203. FRA is proposing to codify exemptions from the need to install automatic couplers and their associated appliances (*e.g.,* uncoupling levers, end handholds) on passenger trainsets or equipment with semi-permanent connections, or at the ends of trainsets where couplers are only intended for rescue purposes, as detailed in proposed paragraph (g)(2). As described previously, FRA is proposing to use its authority under 49 U.S.C. 20306 to permanently adopt these exclusions for which waivers are commonly requested for modern trainset and MU passenger equipment designs, and FRA believes this would help reduce the burden associated with such requests.[26]

Proposed paragraph (h) provides the requirements for uncoupling levers or devices and would require uncoupling levers or devices on each vehicle end equipped with an automatic coupler, as required under proposed paragraph (g) of this section. Proposed paragraphs (h)(1)(i) and (ii) would require that an automatic coupler be equipped with either a traditional, manual uncoupling lever or some other uncoupling mechanism operated by controls located in the appropriate cab, or other secure location in a trainset, respectively. Additionally, proposed paragraph (h)(1)(ii) provides that additional uncoupling levers or handles on the coupler that serve only as a backup to the remotely operated mechanism would not be subject to the requirements of proposed paragraph (h)(2).

Proposed paragraph (h)(2) would require that manual uncoupling levers be installed so that the automatic coupler may be operated from the left side of the equipment, as determined when facing the end of the equipment, from ground level without requiring a person to go between cars or equipment units and have a clearance around the handle of 2, preferably 2½, inches. This proposed performance requirement for manual uncoupling levers is a slight departure from the traditional requirements for such appliances under part 231. Yet, FRA believes that adherence to the more rigid, traditional measurement requirements from the coupler to the outside edge of the equipment is not appropriate, as it becomes difficult to determine the proper place at which to measure when equipment ends are tapered. Additionally, by setting the performance requirement as requiring a person to be able to operate the coupler without going between cars or equipment units, the requirement can be easily and objectively measured.

Proposed paragraph (i) would permit the automatic coupler, end handholds, and uncoupling mechanism on the leading and trailing ends of a trainset unit to be located within a removable shroud to reduce aerodynamic effects.

Proposed paragraph (j) would provide that trainsets, and equipment units or sections of trainsets that are not semi-permanently coupled to an adjacent equipment unit or section of trainset, must be equipped with an efficient parking or hand brake capable of holding the trainset, equipment unit, or section of trainset on at least a 3-percent grade, or on the worst-case grade conditions identified by the operating railroad. This proposal is consistent with that for use of worst-case grade conditions under proposed § 238.110.

Proposed paragraph (k)(1) provides for the arrangement of safety appliances on trainsets and equipment units to facilitate certain maintenance tasks.

[26] *Id.*

Should a trainset or equipment unit be equipped with appurtenances such as headlights, windshield wipers, marker lights, and other similar items required for the safe operation of the trainset or equipment unit that are designed to be maintained or replaced from the exterior of the equipment, then the equipment must have handholds and steps meeting the requirements of this section to allow for the safe maintenance and replacement of these appurtenances.

However, under proposed paragraph (k)(2), the requirements under proposed paragraph (k)(1) would not apply if railroad operating rules require, and actual practice entails, the maintenance and replacement of these components by maintenance personnel in locations protected by the requirements of subpart B of part 218 of this chapter equipped with ladders and other tools to safely repair or maintain those appurtenances.

Paragraph (l) would require that any safety appliances installed at the option of the railroad must be approved pursuant to proposed § 238.110.

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

Section 238.901 Scope

This proposed subpart would contain specific inspection, testing, and maintenance requirements.

Section 238.903 General Requirements

Proposed § 238.903 would provide an overview of the general requirements applicable to Tier III passenger equipment. Most of these requirements are referenced and described in more detail in other sections of part 238. Accordingly, this proposed section would address the ITM program for Tier III passenger equipment, and specifically the content of the program and the procedures and intervals for performance of inspection, testing, and maintenance activities; requirements for the safe operation of a Tier III trainset; required safety inspections; and requirements for the training and qualification program and retention of records.

Proposed paragraph (a) contains the general requirement that railroads operating Tier III equipment would have an ITM program that contains detailed information regarding the inspection, testing, and maintenance procedures necessary for the railroad to safely maintain and operate its Tier III passenger equipment.

Proposed paragraphs (b)(1) through (8) list specific informational requirements to be discussed in detail as part of the railroad's ITM program. Most notably, proposed paragraph (b)(8) would require the railroad to describe the required operational braking capability for the trainset. Consistent with § 238.731(b), required operational braking capability is proposed as the capability of the trainset to stop from its maximum operating speed within the signal spacing existing on the track over which the trainset is operating under the worst-case adhesion conditions defined by the railroad. Under this proposed requirement, FRA would require railroads to detail the total effective braking power necessary to achieve this performance standard. FRA recognizes that this would mark a significant change in how the health of the brake system is categorized as further discussed under proposed § 238.1003(d)(1). FRA notes that a railroad would need to establish and verify the required operational braking capability during the dynamic testing and commissioning of the trainset under § 238.111.

Proposed paragraph (c) would require that trainsets receive thorough inspections from qualified individuals. It would prohibit a trainset from being put into service with any safety-critical defect until that defect is repaired, except for defects discovered in the brake system during a pre-service inspection under proposed paragraph (c)(2)(i). Proposed paragraphs (c)(1) through (5) would list the specific safety inspections required in addition to any inspection required under subpart H of this part.

A pre-departure inspection, as proposed under paragraph (c)(1), would mean trainset system verifications, inspections, or functional tests that must be performed prior to departure from terminal locations or when operating ends or crews are changed.

Pre-service inspections, as proposed under paragraph (c)(2), would mean those inspections to be performed before a trainset goes into passenger service. They would be conducted at locations where such inspections can be performed safely and properly, typically in a shop location, but also at terminal locations provided a qualified individual performing the inspection can safely go on, under, or between the equipment. This inspection is proposed to be performed before a trainset enters revenue service, at an interval of no more than every 48 hours. As proposed, this inspection would ensure the trainset is safe to enter revenue service, similar to the mechanical and brake inspections required of Tier I trains under subpart D; however, the specifics of the pre-departure inspection proposed here for Tier III trainsets would be defined by each individual railroad in its ITM program. FRA is also proposing certain minimum requirements for pre-service inspections.

Under proposed paragraph (c)(2)(i), the procedures for pre-service inspections would cover all the items required by a pre-departure inspection under proposed paragraph (c)(1). FRA is also proposing to include the specific exception for the brake system as discussed elsewhere in this NPRM in that, should the pre-service inspection uncover an issue with brake system, but yet the brake system still meet or exceed the required operational braking capability, the trainset may enter passenger service, assuming no other safety-critical defect is discovered. However, in accordance with proposed § 238.1003(d)(1), this practice would be permitted only for up to 5 consecutive calendar days, at which time the trainset could no longer continue in service and would be required to have the brake system fully repaired. Further, should a pre-service inspection reveal that the brake system no longer meets the required operational braking capability, then the trainset would not be permitted to enter or continue in passenger service and must move immediately to a repair location with the trainset not being able to depart the repair location until all defects were repaired.

Paragraph (c)(2)(ii) proposes another minimum requirement in that an interior inspection of the trainset must be performed of the emergency systems to ensure proper functionality of certain emergency systems (such as public address, intercom, and emergency lighting systems) and to ensure that any permitted tools or other implements necessary for emergency egress are present.

Paragraph (c)(3) proposes that the railroad's ITM program have one comprehensive section or chapter where the railroad would detail all the required brake inspections to be performed on the trainset, to include the procedures for performing those inspections, along with the periodicity of inspections. This would include brake system inspections performed as part of other inspections, such as a pre-service inspection. FRA envisions this section or chapter of a railroad's ITM program as a central repository of the brake system inspections for ease of reference and use. This discussion is equally applicable to proposed paragraph (c)(4), with respect to truck inspections.

Under paragraph (c)(5), FRA is proposing that the railroad detail all other safety-critical periodic inspections

that are required to maintain the safety of the trainset. Rather than attempt to exhaustively list all those types of inspections, FRA is placing the responsibility on the railroad to thoroughly evaluate and document the required safety-critical inspections. FRA would expect to see inspections of the electrical and train control systems, as examples. However, consistent with FRA's overall approach to high-speed train inspection, testing, and maintenance, FRA would provide the railroad discretion in the development of its ITM program, subject to FRA's review and approval, discussed below.

To set a baseline, FRA is proposing under paragraph (d) that the railroad specify in its initial ITM program submission the initial scheduled maintenance intervals for Tier III equipment. Deviations from this baseline for safety-critical components could only be implemented when approved by FRA, and those changes would require justification by accumulated, verifiable operating data.

Proposed paragraph (e) contains the training and qualification program requirements for individuals performing inspections, testing, or maintenance on Tier III trainsets. Proposed paragraph (e)(1) would require the railroad to identify which inspections, tests, or maintenance tasks require special training or qualification.

Proposed paragraph (e)(2) would require the railroad to develop a training and qualification program for those tasks identified under proposed paragraph (e)(1) of this section that, at a minimum, addresses those items listed under § 238.109(b).

Proposed paragraph (e)(3) would require the railroad to maintain a list of those individuals designated as qualified pursuant to the railroad's training and qualification program to perform those tasks identified in proposed paragraph (e)(1). The railroad would be required to make those records available to FRA upon request.

Proposed paragraph (e)(4) contains the proposed, overarching requirement that only those individuals qualified pursuant to the railroad's training and qualification program can inspect, test, or maintain safety-critical components or systems on Tier III equipment. This approach was recommended by the RSAC to avoid more specifically defining those who can or cannot perform certain inspection, testing, or maintenance tasks under the regulation.

Proposed paragraph (f) specifies that the railroad would maintain records of each inspection required under proposed paragraph (c) for at least one year from the date of the inspection.

Section 238.905 Compliance

This proposed section would require the railroad to adopt and comply with its ITM program once approved by FRA under proposed § 238.913.

Section 238.907 Standard Procedures for Safely Performing Inspection, Testing, Maintenance, and Repairs

Proposed paragraph (a) would require the railroad to establish standard procedures addressing the performance of inspection, testing, maintenance, and repair tasks, and identify the informational, approval, enforcement, and review processes that must be included in the procedures. Under proposed paragraph (a)(5), ''the railroad's official responsible for safety'' would be the party who must approve the written standard procedures; however, FRA invites comment whether it would be more appropriate to designate the head of high-speed rail maintenance, the chief maintenance officer, some other railroad official, or a combination thereof, as the ''railroad's official responsible for safety.''

Proposed paragraph (b) clarifies that FRA does not intend for the ITM program required by this subpart I to address employee working conditions related to the performance of the inspections, tests, and maintenance required by the program. Such working conditions are the purview of the Occupational Health and Safety Administration.

Section 238.909 Quality Control/Quality Assurance Program

This proposed section would require that each railroad establish an inspection, testing, and maintenance quality control/quality assurance program for the purpose of ensuring that each railroad performs its inspections, testing, and maintenance in accordance with its approved ITM program. Either the railroad or its contractors would be able to perform compliance responsibilities related to the quality control program established under this proposed section.

Section 238.911 Inspection, Testing, and Maintenance Program Format

This proposed section establishes the format in which the ITM program would be submitted to FRA for review and approval.

Proposed paragraph (a) would require that the railroad prepare a complete ITM program covering all components, systems, or sub-systems on a Tier III trainset, regardless of whether the railroad deems those components, systems, or sub-systems safety-critical. This would include all inspections, tests, and maintenance tasks required, the intervals and periodicity of those inspections, tests, and maintenance tasks, and all associated information and procedures required for the railroad and its personnel to implement the program. The purpose behind this proposed requirement is to allow FRA to ensure that the railroad has properly captured all safety-critical items. Under proposed paragraph (b), below, the railroad would be required to submit a condensed version of the program addressing only the safety-critical elements as deemed by the railroad. FRA notes that under proposed § 238.913, FRA would approve the ITM program addressing only those safety-critical elements. Additionally, once the ITM program has received its initial approval, FRA would not expect submission of the complete ITM program with any future amendment to a safety-critical portion.

Proposed paragraph (b) would require the railroad to submit a condensed version of the ITM program, with only the program items identified as safety-critical by the railroad. It would be this condensed version of the ITM program that FRA would approve under § 238.913. Nevertheless, FRA has identified certain components or systems that are always considered safety-critical, such as the operation of emergency equipment, emergency back-up systems, trainset exits, and trainset safety-critical hardware and software systems.

FRA invites comment on the utility of this approach.

Section 238.913 Inspection, Testing, and Maintenance Program Approval Procedure

Under this section, FRA is proposing the procedures for the submission and approval of the railroad's ITM program.

Proposed paragraph (a) describes requirements for both the initial submission of the ITM program and the submission of amendments. With respect to the initial submission, the proposed language under paragraph (a)(1) explains that the ITM program must be submitted no less than 180 days prior to the commencement of revenue service. FRA makes clear though, that the mileage accumulated during dynamic qualification testing must be accurately recorded in the maintenance records of the trainsets so that prior to entering revenue service, the trainset is current on all required inspection, tests, and maintenance required under the ITM based on the mileage of the trainset. Thus, if a certain maintenance interval is specified in miles, FRA expects that the milage incurred during

dynamic pre-revenue testing would be used when determining whether maintenance of the equipment is necessary. FRA recognizes that for the dynamic testing of Tier III equipment, the test procedures required under § 238.111 and appendix K must include the inspection, testing, and maintenance procedures to be followed to ensure testing is conducted safely.

Proposed paragraph (a)(2) would require that an amendment to an approved ITM program must be submitted for approval not less than 60 days prior to the railroad's proposed implementation date. FRA welcomes comments on the appropriate review period for both the initial submission and the submission of program amendments.

Proposed paragraph (b) identifies the required content for the ITM program or program amendment submission. As proposed, not only must the railroad submit the ITM program or amendment itself, but it must also include the primary point of contact for the program or amendment and affirm that the program or amendment was provided to the designated representatives of railroad employees along with a list of the names and addresses of those persons.

Proposed paragraph (c) would require the railroad to provide a copy of the ITM program or amendment to the designated representatives of railroad employees responsible for the equipment's operation, and inspection, testing, and maintenance under this subpart. Additionally, this proposed paragraph would impose a deadline of 45 days for providing comment to FRA. Proposed paragraphs (c)(1) through (3) would outline the required process for each comment.

Proposed paragraphs (d)(1) and (2) would explain the approval process for the initial ITM program submission and amendments, the timing of FRA's review and approval determination, and the requirement to correct a program or amendment if FRA discovers a deficiency during its review.

Notably, under proposed paragraph (d)(3), at any time after its approval determination, FRA would retain the ability to review the program and amendments under its general inspection authority and to require further corrections to the ITM program or amendment. Submittal of a revised program or amendment made pursuant to this paragraph would follow the submittal procedures detailed in proposed paragraphs (d)(1) and (2).

Proposed paragraph (e) would establish requirements for the annual review of the ITM program, addressing the scheduling of such review with FRA and the designated representatives of railroad employees.

Subpart J—Movement of Defective Tier III Passenger Equipment

Section 238.1001 Scope

This proposed subpart would contain specific requirements for the movement of Tier III passenger equipment that is defective.

Section 238.1003 Movement of Defective Tier III Passenger Equipment

Under § 238.1003, FRA is proposing the procedural requirements for the movement of defective Tier III equipment. These requirements would address defective conditions identified during a pre-service inspection and defective conditions discovered during revenue service operations.

Except as explained in proposed § 238.903(c)(2)(i) and paragraph (d) of this section, proposed paragraph (a) would describe the general prohibition on the movement of a Tier III trainset with a defect identified during a pre-service inspection and specify that such a trainset may only move pursuant proposed paragraph (e), as explained in more detail below.

Proposed paragraph (b) would describe the procedural requirements for the movement of a Tier III trainset with a safety-critical defect discovered during revenue service operations (such as during a pre-departure inspection under proposed § 238.903(c)(1)) and between required pre-service inspections. Under these proposed requirements, an individual qualified pursuant to proposed § 238.903(e) would be required to make a determination, consistent with railroad operating rules, that it is safe to move the trainset (proposed paragraph (b)(1)). It would be permissible for such a qualified individual to make this determination remotely based on information provided by on-site personnel, provided that a qualified individual performs an on-site inspection of the defect when the trainset arrives at the first location where an on-site inspection by a qualified individual is possible.

After determining that it is safe to move the defective trainset, the qualified individual would be required to notify the train crew of the authorized speed and destination, and any other operational restrictions on the movement of the non-compliant trainset, pursuant to proposed paragraph (b)(2). The qualified individual may provide this notice through the tagging process described in proposed paragraph (b)(3) or through the automated tracking system described in proposed paragraph (c), which would adopt the requirements of § 238.15(c)(3).

Proposed paragraph (d) addresses the requirements for the movement of a trainset that experiences an in-service failure of the braking system. During PSWG meetings, there was significant discussion regarding the applicability of these requirements to trainsets with advanced technology brake systems and automated reporting systems that provide the engineer with real-time information concerning the operative brakes within the trainset. Specifically, there was discussion that these modern Tier III trainsets are designed and equipped with a braking capability that most often exceeds what is necessary for routine operational braking. Thus, FRA is proposing a balanced approach that considers the operational capability of these trainsets without compromising safety.

A such, under proposed paragraph (d)(1), a trainset may continue in service for no more than 5 consecutive calendar days (to include leaving a repair point) so long as the trainset meets or exceeds its required operational braking capability. As discussed above under proposed § 238.903(a)(8), the railroad would be required to describe in detail in its ITM program this required operational braking capability. Additionally, FRA clarifies that consistent with the proposal under § 238.19(d)(2), after 5 consecutive calendar days elapse, a Tier III trainset may not leave a designated brake repair point with anything less than a brake system that is free from defects, regardless of whether the trainset meets or exceeds its required operational braking capability (*i.e.,* with 100% operative brakes). This would mean a Tier III trainset may leave a designated brake repair point with less than its maximum designed braking capability, so long as it retains its required operational braking capability pursuant to § 238.731(b). FRA is proposing this approach based on industry's input, which is consistent with international, service-proven operational practice.

Under paragraph (d)(2), FRA is proposing requirements for a trainset that has in-service failure of the brake system bringing it below the required operational braking capability. FRA is proposing that in such a situation, a trainset may only move in service until its next pre-service inspection in accordance with railroad operating rules relating to the percentage of operative brakes and at a speed no greater than the maximum authorized speed as

determined by § 238.731(e)(4), so long as the requirements of paragraph (b) of this section are otherwise fully met. Under this proposal, if a pre-service inspection becomes due on such a trainset, and the brake system has not been repaired, then the trainset may not be used in passenger service until such repairs are made.

As part of the comment process for this proposed rulemaking, FRA welcomes input on the appropriateness of these proposed requirements for the movement of defective trainsets equipped with advanced technology brake systems.

Under proposed paragraph (e), a railroad would be permitted to move a trainset with a safety-critical defect discovered during a pre-service inspection for purposes of repair without complying with the procedural requirements of proposed paragraph (b), provided the movement is without passengers, within a yard, at speeds not to exceed 10 mph, and for the sole purpose of repair. FRA is also proposing that, should a railroad elect to repair a trainset with a safety-critical defect in place, it would be required, at a minimum, to apply a tag that complies with proposed paragraph (b)(3) to provide notice that the trainset is defective and not in service. FRA makes clear that the tag is to be applied while the trainset is non-compliant; once the repair is made, the tag may be removed, and the trainset placed into service.

Proposed paragraph (f), which is identical to § 238.17(f), makes clear that the movement of a defective Tier III trainset subject to a Special Notice for Repair under part 216 would continue to be subject to the restrictions in a Special Notice.

Appendix C to Part 238—Minimally Compliant Analytical Track (MCAT) Simulations Used for Qualifying Passenger Vehicles To Operate on Track Classes 2 Through 5 and Up to 6 Inches of Cant Deficiency

This proposed appendix would contain requirements for using computer simulations to comply with the vehicle/track system qualification testing requirements specified in § 238.139. These simulations would be performed using a track model containing defined geometry perturbations at the limits that are permitted for a specific class of track and level of cant deficiency. This track model is known as Minimally Compliant Analytical Track (MCAT). These simulations would be used to identify vehicle dynamic performance issues prior to service or, as appropriate, a change in service, and demonstrate that a vehicle type is suitable for operation on the track over which it is intended to operate. FRA notes that, for the short warp (a_{12}) MCAT segment in figure 1, the profile deviations for the inside and outside rails appear in reverse order from their counterparts in appendix D to part 213. This change aims to address the risk of low-speed, wheel-climb derailment, and FRA welcomes comment on the need for a similar change to appendix D to part 213.

For simulations measuring hunting perturbation involving tangent track segments, FRA proposes the use of a high-conicity, wheel-rail profile combination approved by FRA that produces a minimum conicity of 0.4 for wheelset lateral shifts up to flange contact. FRA has added to the docket a file that reflects wheel-rail profile combinations FRA has found acceptable in the past, and welcomes comment on this data or the incorporation of such combinations into the regulation.

As noted under the discussion of proposed § 238.139, Vehicle/track system qualification, the proposed requirements are intended to complement existing requirements for higher speed and higher cant deficiency operations in part 213 of this chapter. Specifically, this appendix would apply to operations up to 6 inches of cant deficiency on lower-speed track classes, and would have no impact on part 213 requirements for operations over 6 inches of cant deficiency on such track classes. By illustration, proposed table 6 would apply to track Classes 2 through 5 where cant deficiency exceeds 5 inches but is not more than 6 inches, while table 7 of appendix D to part 213 currently applies to track Classes 1 through 5 where cant deficiency exceeds 6 inches. Although there would be no direct conflict in application of the respective appendices, FRA notes in particular that the differences in repeated surface limits and repeated alinement limits between the two tables may not necessarily be explained by the differences in cant deficiency alone. FRA therefore welcomes comments on the potential impact of the proposed changes, will evaluate any comments received, and will consider revisions to both parts 213 and 238 in the final rule or a future rulemaking.

Appendix I to Part 238—Tier III Trainset Cab Noise Test Protocol

In proposed appendix I to part 238, which is modeled after appendix H to part 229 of this chapter, FRA presents proposed testing protocols to verify that the noise levels within the cab of a Tier III trainset comply with the requirements established in § 238.759(a)(1). These proposed protocols address measurement instrumentation, test site requirements, procedures for measurement, and recordkeeping. In this proposal, FRA is intending to align these measurement procedures with those used in international practice and welcomes comments on any relevant international practice that could contribute to the further development of the proposed protocols. FRA also notes that although the requirements proposed in this appendix are very similar to those under appendix H to part 229, this appendix would also contain a separate set of requirements due to subtle but significant differences. Notably, the test proposed under this appendix would be under dynamic conditions, while the trainset is moving, whereas the test under appendix H to part 229 is under static conditions, not involving equipment movement.

Appendix J to Part 238—Alternative Requirements for Evaluating the Crashworthiness and Occupant Protection Performance of a Tier I Passenger Trainset Equipped With Crash Energy Management Features

Proposed appendix J would establish a framework that enables the evaluation of an individual piece of Tier I passenger equipment for compliance with crash energy management (CEM) requirements. Current regulations provide for the assessment of CEM components in the context of a complete trainset. Although a railroad, equipment manufacturer, or other party is not required to incorporate CEM features into an individual piece of Tier I equipment, this proposed appendix would provide direction for the development of these features for a single vehicle, rather than a complete trainset. Under the framework of this proposed appendix, single pieces of rail equipment that are fully compliant with existing Tier I structural requirements, and have additional CEM features, could operate within conventional, Tier I-compliant trains.

Proposed appendix J would define in-line and offset collision scenarios for locomotives, cab cars, and intermediate cars. As proposed, the crashworthiness requirements contained in proposed appendix J would not apply to Tier I alternatively designed trainsets or single pieces of equipment with traditionally compliant structures outfitted with pushback couplers as the only CEM feature.

Current industry standards served as a model for the crashworthiness requirements proposed in this

appendix, and FRA welcomes comments addressing the consistency between the appendix and industry standards.

Appendix K to Part 238—Minimum Information for Test Procedures

FRA is proposing to add appendix K to part 238 to contain the minimum information necessary for test procedures associated with the required testing to be performed pursuant to the railroad's pre-revenue service acceptance testing plan under § 238.111. This is to ensure that testing is performed in a safe and controlled manner, and that the testing captures information critical to the demonstration of compliance. FRA understands this level of information may not be available for all tests at the time of initial submission of a test plan; however, if a test procedure relied on for a test does not contain this minimum level of information, FRA may take exception to it and require the test be repeated or the test procedure updated. This determination may be made in advance of testing (*e.g.,* if FRA personnel plan to witness the testing) or as part of a records review, and FRA encourages railroads and their suppliers to pay particular attention to the quality and content of their test procedures and records to avoid any such issues.

V. Regulatory Impact and Notices

A. Executive Order 12866

This proposed rule is not a significant regulatory action within the meaning of Executive Order (E.O.) 12866 (''Regulatory Planning and Review'') and DOT Order 2100.6A (''Rulemaking and Guidance Procedures'').

FRA has prepared and placed in the docket (FRA–2021–0067) a Regulatory Impact Analysis (RIA) addressing the economic impacts of this proposed rule. The RIA estimates the costs and benefits of this proposed rule over a 30-year period. FRA used discount rates of 7 and 3 percent with these estimates. For the 30-year period analyzed, the net costs of this proposed rule are estimated to be approximately $55.2 million, undiscounted. The present value is approximately $21.4 million, discounted at 7 percent, and $35.2 million, discounted at 3 percent. The annualized net costs are approximately $1.7 million and $1.8 million, discounted at 7 and 3 percent, respectively.

The analysis of this proposed rule includes estimates of costs associated with the proposed requirement for low-speed vehicle/track system qualification, emergency roof access for certain Tier III trainsets, as well as for the inspection, testing, and maintenance of high-speed trainsets. FRA estimates that the 30-year total costs of this proposed rule would be approximately $55.5 million, undiscounted. The present value is approximately $21.7 million, discounted at 7 percent, and $35.5 million, discounted at 3 percent.

REGULATORY COST SUMMARY

	Vehicle track analyses	Emergency roof access cost	ITM costs	Total costs	Discounted 7%	Discounted 3%
Total	$1,350,000	$1,650,000	$52,500,000	$55,500,000	$21,669,972	$35,489,848
Annualized					1,746,305	1,810,666

This analysis also estimates the benefits associated with: (A) railroads not needing to apply for a waiver for pilots, snowplows, and end plates installed on Tier III trainsets; (B) railroads not having to redesign Tier III trainsets to account for legacy attachment strength requirements for emergency communication equipment back-up power fixtures; (C) modernizing the safety appliance requirements for Tier III and certain Tier I passenger equipment, and for certain non-passenger carrying locomotives (reducing the need for railroads to seek statutory exemptions); and (D) a reduction in the administrative burden of processing, reviewing, and implementing safety regulatory waivers. FRA estimates a 30-year total benefits of approximately $0.3 million, undiscounted, for this proposed rule. The present value is approximately $0.2 million, discounted at 7 percent, and $0.3 million, discounted at 3 percent.

REGULATORY BENEFITS SUMMARY

	Pilots, snowplows, end plates	Emergency communications	Safety appliances	Government benefits	Total benefits	Discounted 7%	Discounted 3%
Total	$18,576	$150,000	$55,728	$74,304	$298,608	$224,959	$256,003
Annualized						18,129	13,061

The net costs of this proposed rule are estimated to be approximately $55.2 million, undiscounted. The present value is approximately $21.4 million, discounted at 7 percent, and $35.2 million, discounted at 3 percent. The annualized net costs are approximately $1.7 million and $1.8 million, discounted at 7 and 3 percent, respectively.

NET REGULATORY COSTS

Impact	Present value 7%	Present value 3%
Costs	$21.67	$35.49
Benefits	0.22	0.26
Net Costs	21.45	35.23

NET REGULATORY COSTS—Continued

Impact	Present value 7%	Present value 3%
Annualized Net Costs	*1.73*	*1.80*

Details on the estimated costs and benefits of this proposed rule can be found in the RIA associated with this docket. FRA invites comments on the costs and benefits associated with this proposed rule.

B. Regulatory Flexibility Act and Executive Order 13272

The Regulatory Flexibility Act of 1980 [27] and E.O. 13272 [28] require agency review of proposed and final rules to assess their impacts on small entities. An agency must prepare an Initial Regulatory Flexibility Analysis unless it determines and certifies that a rule, if promulgated, would not have a significant economic impact on a substantial number of small entities. Pursuant to the Regulatory Flexibility Act (5 U.S.C. 605(b)), the Administrator of the Federal Railroad Administration certifies that this rule will not have a significant economic impact on a substantial number of small entities.

C. Paperwork Reduction Act

FRA is submitting the information collection requirements in this proposed rule to the Office of Management and Budget (OMB) for approval under the Paperwork Reduction Act of 1995.[29] The sections that contain the new or revised information collection requirements and the estimated time to fulfill each requirement are as follows:

CFR section	Respondent universe	Total annual responses (A)	Average time per responses (B)	Total annual burden hours (C) = A * B	Wage rate (D) [30]	Total cost equivalent (E) = C * D
229.47(a)–(b)—Emergency Brake Valve—Marking brake pipe valve as such.	FRA anticipates zero submissions for stencils and markings.					
238.7—Waivers	34 railroads	12.00 waivers	6 hours	72.00	$77.44	$5,575.68
238.15(b)—Movement of passenger equipment with power brake defects—Limitations on movement of passenger equipment containing a power brake defect at the time a Class I or IA brake test is performed—Passenger equipment tagged or information is recorded as prescribed under § 238.15(c)(2).	34 railroads	1,000.00 tags	3 minutes	50.00	77.44	3,872.00
—(c) Limitations on movement of passenger equipment in passenger service that becomes defective en route after a Class I or IA brake test—Tagging of defective equipment.	34 railroads	288.00 tags	3 minutes	14.40	77.44	1,115.14
—(c)(4) Conditional requirement—Notice between employees.	The estimated paperwork burden for this regulatory requirement is covered under § 238.15(a)–(b).					
238.17—Movement of passenger equipment with other than power brake defects—Tagging of defective equipment.	34 railroads	200.00 tags	3 minutes	10.00	77.44	774.40
—(e) Special requisites for movement of passenger equipment with safety appliance defects.	The estimated paperwork burden for this regulatory requirement is covered under § 238.17.					
—(e)(4) Crewmember notifications	The estimated paperwork burden for this regulatory requirement is covered under § 238.17.					
238.19(b)—Reporting and tracking defective passenger equipment—Retention or availability of records for Tier I and Tier III (Revised requirement).	For Tier I trainsets, FRA determined since the 1990s retention and availability of records for reporting and tracking defective passenger equipment are performed by the railroad industry as part of their normal business operations. For Tier III, FRA anticipates zero railroad submissions during this 3-year ICR period.					
—(d)(1) List of repair points—Railroads operating long-distance intercity and long-distance Tier II passenger equipment.	This ICR only affects Amtrak, which has submitted the necessary list of power brake repair points. FRA does not anticipate any changes or updates to this list over the next few years. Consequently, there is no burden associated with this requirement.					
—(d)(2) List of repair points—Railroads operating Tier III passenger trainsets (New requirement).	FRA anticipates zero railroad submissions during this 3-year ICR period.					
238.21(b)—Special approval procedure—Petitions for special approval of alternative standard.	34 railroads	1.00 petition	16 hours	16.00	77.44	1,239.04
—(c) Petitions for special approval of alternative compliance	34 railroads	1.00 petition	40 hours	40.00	77.44	3,097.60
—(f) Comments on petitions	Manufacturers and public.	2.00 comments	1 hour	2.00	77.44	154.88
238.103(c)—Fire safety analysis for procuring new passenger cars and locomotives.	1 new railroad	1.00 analysis	150 hours	150.00	77.44	11,616.00
—(d) Fire safety analysis for existing passenger cars and locomotives—Revised fire safety analysis for leased or transferred equipment.	34 railroads	1.00 revised analysis.	10 hours	10.00	77.44	774.40
238.105(a)–(e)—Passenger electronic hardware and software safety—Safety program including safety analysis for new and existing railroads (Revised requirement).	2 new railroads.	2.00 program plans.	150 hours	300.00	77.44	23,232.00

[27] 5 U.S.C. 601 *et seq.*

[28] 67 FR 53461 (Aug. 16, 2002).

[29] 44 U.S.C. 3501 *et seq.*

[30] Throughout the tables in this document, the dollar equivalent cost is derived from the 2020 Surface Transportation Board's Full Year Wage A&B data series using the appropriate employee group hourly wage rate that includes 75-percent overhead charges.

[31] Totals may not add due to rounding.

CFR section	Respondent universe	Total annual responses	Average time per responses	Total annual burden hours	Wage rate	Total cost equivalent
		(A)	(B)	(C) = A * B	(D) [30]	(E) = C * D
—(f) Additional requirements (Revised requirement)	FRA anticipates zero railroad submissions during this 3-year ICR period.					
—(g) Vehicle Communication and Control System Vulnerability Assessment—Railroad to assess and identify potential system vulnerabilities and resulting risk mitigation as part of the overall Railroad System Safety Plan required by part 270; PTC system must comply with the requirements in § 236.1033 (New requirement).	37 railroads	12.30 assessments.	20 hours	246.00	77.44	19,050.24
—(h) Notification of product failure—Notification to FRA (New requirement).	20 suppliers	0.33 notifications.	1 minute	0.01	77.44	0.77
238.107—Inspection, testing, and maintenance plan—Development of maintenance plan for new railroads.	1 new railroad	1.00 maintenance plan.	150 hours	150.00	77.44	11,616.00
—(d) Inspection, testing, and maintenance plan for existing railroads—Maintenance plan review.	34 railroads	34.00 maintenance plan reviews.	20 hours	680.00	77.44	52,659.20
238.108(a)—New passenger service pre-revenue safety performance demonstration—Pre-revenue safety validation plan (New requirement due to Sec. 22416 of the IIJA).	37 railroads	3.00 plans	63 hours	189.00	77.44	14,636.16
—(b)(2) Daily summary of the activities provided to FRA by railroads (New requirement).	37 railroads	29.00 summary reports.	30 minutes	14.50	77.44	1,122.88
—(b)(3) Railroad to provide a final report to FRA (New requirement).	37 railroads	3.00 reports	2 hours	6.00	77.44	464.64
—(c) Compliance—Railroads to notify FRA on proposed amendments (New requirement).	37 railroads	1.00 plan modification.	15 hours	15.00	77.44	1,161.60
238.109(b)—Training, qualification, and designation program—Development of training program/curriculum for new railroads.	1 new railroad	1.00 training program.	160 hours	160.00	77.44	12,390.40
—(b) Training employees and supervisors	The associated burdens relating to the training of employees and supervisors have been addressed previously when FRA calculated the economic costs of the regulation.					
—(b)(13) Recordkeeping—Employees and trainers—Training qualifications.	34 railroads	488.00 records	3 minutes	24.40	77.44	1,889.54
238.110(b)(1)—Design criteria, testing, documentation, and approvals—Documentation and recordkeeping (New requirement).	The estimated paperwork burden for this regulatory requirement is covered under paragraphs (b)(2) through (g)(2) of this section.					
—(b)(2) Recordkeeping or documentation (New requirement)	37 railroads	1.00 retention of document.	5 minutes	.08	77.44	6.20
—(c)(1)(ii) Vehicle qualification plan—Compliance matrix (New requirement).	37 railroads	1.00 new or modified plan.	75 hours	75.00	77.44	5,808.00
—(c)(2) Approval of the vehicle qualification plan—Vehicle qualification plan disapproved in part—Resubmission (New requirement).	FRA anticipates zero railroad submissions during this 3-year ICR period.					
—(d) System description (operating environment) and design criteria (New requirement).	37 railroads	11.67 system descriptions.	75 hours	875.25	77.44	67,779.36
—(e)(2)(i) Structural carbody crashworthiness compliance—A test plan submission to FRA (New requirement).	37 railroads	1.00 new or modified test plan.	8 hours	8.00	77.44	619.52
—(e)(2)(ii) Structural carbody crashworthiness compliance—Finite element analysis results submitted to FRA (New requirement).	37 railroads	1.00 analysis	10 hours	10.00	77.44	774.40
—(f) Safety Appliances (New requirement)	The estimated paperwork burden for this regulatory requirement is covered under paragraphs (g)(1) and (g)(2) of this section.					
—(g)(1)(i) Approval of design review documentation, tests, and inspections—Design review, testing, and inspection documentation (New requirement).	37 railroads	1.00 new or modified documentation.	4 hours	4.00	77.44	309.76
—(g)(1)(ii) Approval of design review documentation, tests, and inspections—Resubmission of revised document (New requirement).	37 railroads	1.00 revised document.	1 hour	1.00	77.44	77.44
—(g)(2)(i) Approval of design review documentation, tests, and inspections—Sample-equipment inspection—Request (New requirement).	37 railroads	1.00 request	1 hour	1.00	77.44	77.44
—(g)(2)(ii) Approval of design review documentation, tests, and inspections—Railroad to address all exceptions taken and then, if directed by FRA, request a reinspection pursuant to (g)(2)(i) of this section (New requirement).	37 railroads	1.00 re-request	1 hour	1.00	77.44	77.44
238.111(a)(1)–(2)—Pre-revenue service acceptance testing—Passenger equipment designs that have not been used in revenue service in the U.S.—Plan and submission to FRA (previously under § 238.111(b)(1)–(2)) (Revised requirement).	37 railroads	2.00 new and modified plans.	192 hours	384.00	77.44	29,736.96

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—(a)(3)–(4) Test procedures containing minimum information listed in appendix K to this part to be provided to FRA as part of pre-revenue service acceptance testing plan test procedures (previously under § 238.111(b)(3)–(4)) (Revised requirement).	The estimated paperwork burden for this regulatory requirement when it comes to the test plan development is covered under § 238.111(a). Additionally, the reporting of the test results is covered under § 238.111(a)(6)(ii).					
—(a)(6)(i) Tier I passenger equipment: Test results made available to FRA upon request (previously under § 238.111(b)(4)) (Revised requirement).	33 railroads	1.00 test result	4 hours	4.00	77.44	309.76
—(a)(6)(ii) Tier II & Tier III passenger equipment: Report of test results to FRA (previously under § 238.111(b)(4)) (Revised requirement).	4 railroads	1.00 letter	4 hours	4.00	77.44	309.76
—(a)(7) Correction of safety deficiencies—Railroads can petition FRA for a waiver of a safety regulation under the procedure specified in part 211 (previously under § 238.111(b)(5)).	FRA anticipates zero railroad submissions during this 3-year ICR period.					
—(b) Passenger equipment that has previously been used in revenue service in the U.S.—Railroads to verify the applicability of previous tests performed under § 238.111(a)(1)(vii)(A)–(D) (previously under 238.111(a)(1)) (Revised requirement).	37 railroads	1.33 plans	16 hours	21.28	77.44	1,647.92
—(c) Modifications, new technology, and major upgrades (Revised requirement).	The estimated paperwork burden for this regulatory requirement is covered under § 238.111(a).					
238.115(c)—Emergency lighting—Periodic inspection (New requirement).	The inspection time and mechanical testing are covered under the economic cost. Consequently, there is no PRA burden.					
238.131(a)—Exterior side door safety systems—new passenger cars and locomotives used in passenger service—Labels and visual guidelines (Revised requirement).	FRA anticipates zero railroad submissions during this 3-year ICR period.					
—(b) Exterior side door safety systems—new passenger cars and locomotives used in passenger service—Failure Modes, Effects, Criticality Analysis (FMECA).	1 new railroad	1.00 analysis ..	80 hours	80.00	77.44	6,195.20
238.133(a)—Exterior side door safety systems—Passenger cars and locomotives used in passenger service—By-pass device verification—Functional test plans.	1 new railroad	1.00 plan	4 hours	4.00	77.44	309.76
—(b) Unsealed door by-pass device—Notification to railroad's designated authority by train crewmember of unsealed door by-pass device.	The associated burdens related to safety job briefings have been addressed previously when FRA calculated the economic costs of the regulation.					
—(c) En route failure—Safety briefing by train crew when door by-pass device is activated.	34 railroads	100.00 topic-specific briefings and notifications.	2 minutes	3.33	77.44	257.88
—(c) Notification to designated RR authority by train crewmember that door by-pass device has been activated.	The estimated paperwork burden for this regulatory requirement is covered above under § 238.133(c).					
—(c)(1) On-site qualified person (QP) description to a qualified maintenance person (QMP) off-site that equipment is safe to move for repairs.	The estimated paperwork burden for this regulatory requirement is covered above under § 238.133(c).					
—(c)(2) QP/QMP notification to crewmember in charge that door by-pass has been activated and safety briefing by train crew.	The estimated paperwork burden for this regulatory requirement is covered above under § 238.133(c).					
—(d) Records	34 railroads	100.00 records	2 minutes	3.33	77.44	257.88
—(d) Records of unintended opening of a powered exterior side door.	The estimated paperwork burden for this regulatory requirement is covered above under § 238.133(d).					
—(g)(2) RR record of by-pass activations found unsealed	The estimated paperwork burden for this regulatory requirement is covered above under § 238.133(d).					
238.135(a)(1)—Operating practices for exterior side door safety systems—Daily job briefings.	The associated burdens related to daily job briefings have been addressed previously when FRA calculated the economic costs of the regulation.					
—(c) Railroads' request to FRA for special consideration to operate passenger trains with exterior side doors or trap doors, or both, open between stations.	The estimated paperwork burden for this regulatory requirement is covered above under § 238.7 or § 238.21.					
—(c)(4) Railroads' response to FRA request for additional information concerning special consideration request.	The estimated paperwork burden for this regulatory requirement is covered above under § 238.7 or § 238.21.					

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—(d) Operating rules on how to safely override a door summary circuit or no-motion system, or both, in the event of an en route exterior side door failure or malfunction on a passenger train (Note: Includes burden under § 238.137).	1 new railroad	1.00 operating rule.	8 hours	8.00	77.44	619.52
—(d) Railroads to provide a copy of written operating rules to train crewmembers and control center personnel.	Railroads were required to complete the requirements of this subsection by December 6, 2018, so the estimated paperwork burden is zero.					
—(e) Railroads' training of train crewmembers on requirements of this section.	The associated burdens relating to the training of train crewmembers have been addressed previously when FRA calculated the economic costs of the regulation. FRA estimates the paperwork burdens associated with training recordkeeping under § 238.109 or under the OMB control numbers 2130–0596 or 2130–0533.					
—(e) Railroads' training of new employees	The associated burdens relating to the training of train crewmembers have been addressed previously when FRA calculated the economic costs of the regulation. FRA estimates the paperwork burdens associated with training recordkeeping under § 238.109 or under the OMB control numbers 2130–0596 or 2130–0533.					
—(g) RR operational/efficiency tests of train crewmembers & control center employees.	The associated burdens relating to operational testing or observation of operating crewmembers and control center personnel have been previously addressed when FRA calculated the economic costs of the regulation.					
238.139(e)—Vehicle/track system qualification—New vehicle type qualification testing plan (New requirement).	33 railroads	1.00 testing plan.	120 hours	120.00	77.44	9,292.80
—(e) Vehicle/track system qualification—Existing vehicle type qualification testing plan (New requirement).	FRA anticipates zero railroad submissions during this 3-year ICR period.					
—(g) Vehicle/track system qualification—Qualification testing results (New requirement).	The estimated paperwork burden for this regulatory requirement is covered above under paragraph (e) of this section.					
—(i)(1) Vehicle/track system qualification—Document retention (New requirement).	33 railroads	1.00 record	10 minutes	.17	77.44	13.16
—(i)(2) Vehicle/track system qualification—Written consent of each affected track owner (New requirement).	33 railroads	2.00 written consents.	30 minutes	1.00	77.44	77.44
238.201(b)—Scope/alternative compliance—Supporting documentation demonstrating compliance.	The estimated paperwork burden for this regulatory requirement is covered above under § 238.21.					
—(b) Notice of tests sent to FRA 30 days prior to commencement of operations.	The estimated paperwork burden for this regulatory requirement is covered above under § 238.111(a)(4).					
238.229(c)—Safety appliances—Welded safety appliances—Written lists submitted to FRA by the railroads.	1 new railroad	1.00 list	1 hour	1.00	77.44	77.44
—(d) Defective welded safety appliance or welded safety appliance bracket or support—Tagging.	34 railroads	4.00 tags	3 minutes	.20	59.89	11.98
—(d) Notification to crewmembers about non-compliant equipment.	34 railroads	2.00 notices	1 minute	.03	77.44	2.32
—(g) Inspection plans	1 new railroad	1.00 plan	16 hours	16.00	77.44	1,239.04
—(h) Inspection personnel—Training	The associated burdens relating to training of inspection personnel have been addressed previously when FRA calculated the economic costs of the regulation. FRA estimates the paperwork burdens associated with the retention of training records under § 238.109.					
—(j)(1)(iv) Remedial action: Defect/crack in weld—A record of the welded repair.	The associated burdens relating to inspections have been addressed previously when FRA calculated the economic costs of the regulation. FRA estimates the paperwork burdens associated with the retention of inspection records under § 238.229(k).					
—(j)(2)(iv) Petitions for special approval of alternative compliance—Impractical equipment design.	The estimated paperwork burden for this regulatory requirement is covered above under § 238.21.					
—(k) Records of the inspection and repair of the welded safety appliance brackets.	The estimated burden for this regulatory requirement is covered below under § 238.303 and under the OMB control number 2130–0004 (§ 229.21).					
238.230(b)(1)—Safety Appliances—New equipment—Inspection record of welded equipment by qualified employee.	FRA anticipates zero railroad submissions during this 3-year ICR period.					
—(b)(3) Welded safety appliances: Documentation for equipment impractically designed to mechanically fasten safety appliance support.	FRA anticipates zero railroad submissions during this 3-year ICR period.					
238.231—Brake System—Inspection and repair of hand/parking brake: Records (under FRA Form 6180.49A).	The estimated paperwork burden for this requirement is covered under § 238.303 and under the OMB control number 2130–0004.					
—(h) Procedures verifying hold of hand/parking brakes	1 new railroad	1.00 procedure	2 hours	2.00	77.44	154.88
238.237(a)–(b)—Automated monitoring- Documentation for alerter/deadman control timing.	1 new railroad	1.00 document	2 hours	2.00	77.44	154.88
—(d) Defective alerter/deadman control: Tagging	34 railroads	25.00 tags	3 minutes	1.25	59.89	74.86

CFR section	Respondent universe	Total annual responses (A)	Average time per responses (B)	Total annual burden hours (C) = A * B	Wage rate (D) [30]	Total cost equivalent (E) = C * D
238.303—Exterior calendar day mechanical inspection of passenger equipment: Notice of previous inspection.	FRA anticipates zero railroad submissions during this 3-year ICR period.					
—(e)(15) Dynamic brakes not in operating mode: Tag	34 railroads	50.00 tags	3 minutes	2.50	59.89	149.73
—(e)(15)(ii) Conventional locomotives equipped with inoperative dynamic brakes: Tagging.	The estimated paperwork burden for this regulatory requirement is covered above under § 238.303(e)(15).					
—(e)(17) MU passenger equipment found with inoperative/ineffective air compressors at exterior calendar day inspection: Documents.	FRA anticipates zero railroad submissions during this 3-year ICR period.					
—(e)(17)(v) Written notice to train crew about inoperative/ineffective air compressors.	The estimated paperwork burden for this regulatory requirement is covered above under § 238.303(e)(15).					
—(e)(18)(iv) Records of inoperative air compressors	The estimated paperwork burden for this regulatory requirement is covered below under § 238.303(g).					
—(g) Record of exterior calendar day mechanical inspection (Other than locomotives) (* Note: Includes burden for records of inoperative air compressors under § 238.303(e)(18)(iv)).	34 railroads	1,734,115.00 daily inspection records.	1 minute	28,901.92	77.44	2,238,164.68
238.305—Interior calendar day mechanical inspection of passenger cars—Tagging of defective end/side doors.	34 railroads	540.00 tags	3 minutes	27.00	77.44	2,090.88
—(f) Records of interior calendar day inspection	34 railroads	3,102,865.00 daily inspection records.	1 minute	51,714.42	77.44	4,004,764.68
238.307(a)(2)—Periodic mechanical inspection of passenger cars and unpowered vehicles—Alternative inspection intervals: Notifications.	34 railroads	2.00 notices	5 hours	10.00	77.44	774.40
—(c)(1) Notice of seats and seat attachments broken or loose.	34 railroads	200.00 notices	2 minutes	6.67	59.89	399.47
—(e)(1) Records of each periodic mechanical inspection	34 railroads	5,184.00 inspection records.	1 hour	5,184.00	59.89	310,469.76
—(e)(2) Detailed documentation of reliability assessments as basis for alternative inspection interval.	34 railroads	2.00 documents.	100 hours	200.00	77.44	15,488.00
238.311—Single car test—Tagging to indicate need for single car test.	34 railroads	50.00 tags	3 minutes	2.50	59.89	149.73
238.313(h)—Class I Brake Test—Record for additional inspection for passenger equipment that does not comply with § 238.231(b)(1).	34 railroads	15,600.00 records.	30 minutes	7,800.00	59.89	467,142.00
238.315(a)(1)—Class IA brake test—Notice to train crew that test has been performed (verbal notice).	The associated burdens related to briefings have been addressed previously when FRA calculated the economic costs of the regulation.					
—(f)(5) Communicating signal tested and operating as intended.	The associated burdens related to briefings have been addressed previously when FRA calculated the economic costs of the regulation.					
238.317—Class II brake test—Communicating signal tested and operating as intended.	The associated burdens related to briefings have been addressed previously when FRA calculated the economic costs of the regulation.					
238.321—Out-of-service credit—Passenger car: Out-of-use notation.	The estimated paperwork burden for this regulatory requirement is covered under § 238.307 and under OMB control number 2130–0004 under § 229.23(d)–(g).					
238.445(a)—Automated Monitoring—Performance monitoring: alerters/alarms.	There are no paperwork burdens associated with this subsection. FRA corrects its previous overinclusion.					
—(c) Monitoring system: Self-test feature: Notifications	There are no paperwork burdens associated with this subsection. FRA corrects its previous overinclusion.					
238.703—Quasi-static compression load requirements—Document to FRA on Tier III trainsets.	1 new railroad	.33 document	40 hours	13.20	77.44	1,022.21
238.705—Dynamic collision scenario—Model validation document to FRA for review and approval.	1 new railroad	.33 validation document.	40 hours	13.20	77.44	1,022.21
238.707—Override protection—Anti-climbing performance evaluation for Tier III trainsets.	1 new railroad	.33 evaluation	40 hours	13.20	77.44	1,022.21
238.709—Fluid entry inhibition—Information to demonstrate compliance with this section of a Tier III trainset.	1 new railroad	.33 analysis	20 hours	6.60	77.44	511.10
238.721—Glazing—Cab glazing; end facing—Documentation containing technical justification.	3 glass manufacturers.	.33 technical documentation.	60 hours	19.80	77.44	1,533.31
—(a)(6) Marking of end-facing exterior windows for Tier III trainsets.	Windows are, customarily, automatically marked during the production process. Therefore, there will be no additional burden to mark the windows.					

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—(b) Cab Glazing; side-facing exterior windows in Tier III cab—Each end-facing exterior window in a cab shall, at a minimum, provide ballistic penetration resistance that meets the requirements of appendix A to part 223 (Certification of Glazing Materials).	3 glass manufacturers.	.33 analysis	10 hours	3.30	77.44	255.55
—(b) Marking of side-facing exterior windows in Tier III Trainsets.	Windows are, customarily, automatically marked during the production process. Therefore, there will be no additional burden to mark the windows.					
—(c) Non-Cab Glazing; Side-facing exterior windows—Tier III—compliance document for Type II glazing.	3 glass manufacturers.	.33 analysis	20 hours	6.60	77.44	511.10
—(c) Marking of side-facing exterior windows—Tier III Trainsets—non-cab cars.	Windows are, customarily, automatically marked during the production process. Therefore, there will be no additional burden to mark the windows.					
—(c)(2) Alternative standard to FRA for side-facing exterior window intended to be breakable and serve as an emergency window exit (option to comply with an alternative standard).	3 glass manufacturers.	.67 alternative analysis.	5 hours	3.35	77.44	259.42
238.731(a)—Brake Systems—RR analysis and testing Tier III trainsets' maximum safe operating speed.	The estimated paperwork burden for this regulatory requirement is covered under § 238.111(a).					
—(d) Tier III trainsets' passenger brake alarm—legible stenciling/marking of devices with words ''Passenger Brake Alarm'' (Including the design of the sticker).	1 new railroad	53.33 stencilings.	1 hour (design) + 2 minutes (marking).	55.11	59.89	3,300.54
—(f) Main reservoir test/certification	1 new railroad	.33 certification	6 hours	1.98	59.89	118.58
—(h) Main reservoir tests—Inspection, testing and maintenance program (ITM).	1 railroad	.33 ITM plan ...	10 hours	3.30	77.44	255.55
—(j) Brake application/release—Brake actuator design with approved brake cylinder pressure as part of design review process.	1 railroad	.33 design	40 hours	13.20	77.44	1,022.21
—(o) Train securement—Tier III equipment: demonstrated securement procedure.	1 railroad	.33 procedure	8 hours	2.64	77.44	204.44
238.733—Interior fixture attachment—Analysis for FRA approval (Tier III).	1 railroad	.33 analysis/ document.	20 hours	6.60	77.44	511.10
238.735—Seat crashworthiness standard (passenger & cab crew)—Analysis for FRA approval (Tier III).	1 railroad	.33 analysis/ document.	40 hours	13.20	77.44	1,022.21
238.737—Luggage racks—Analysis for FRA approval (Tier III).	1 railroad	.33 analysis/ document.	20 hours	6.60	77.44	511.10
238.741—Emergency window egress and rescue access—Plan to FRA for passenger cars in Tier III trainsets not in compliance with sections 238.113 or 238.114.	1 railroad	.33 plan	60 hours	19.80	77.44	1,533.31
238.743—Emergency Lighting—Analysis for FRA approval (Tier III).	1 railroad	.33 analysis/ test.	60 hours	19.80	77.44	1,533.31
238.745—Emergency communication—Marking of each intercom intended for passenger use on Tier III trainsets as specified in § 238.121 (New requirement; note the existing burden associated with Tier I & Tier II trainsets is covered under OMB control no. 2130–0576).	3 railroads	277.00 marked intercom locations.	5 minutes	23.08	77.44	1,787.32
238.747—Emergency roof access for cab occupants—Marked emergency roof access locations on Tier III trainsets as specified in § 238.123(a), (d), and (e) (New requirement; note the existing burden associated with Tier I & Tier II trainsets is covered under OMB control no. 2130–0576).	3 railroads	104.00 marked emergency roof access locations.	30 minutes	52.00	77.44	4,026.88
238.751—Alerters—Alternate technology—Analysis for FRA approval (Tier III).	1 railroad	.33 analysis/ test.	40 hours	13.20	77.44	1,022.21
238.759—Trainset cab noise—Performance standards for Tier III trainsets—Recordkeeping on cab noise test protocol as set forth in appendix I to this part (New requirement).	3 railroads	1.00 record	5 minutes	.08	77.44	6.20
238.761—Trainset sanitation facilities for employees as specified in §§ 229.137 and 229.139—Defective locomotive toilet facility—Tagging, notation on daily inspection report (New requirement; note the existing burden associated with Tier I & Tier II trainsets is covered under OMB control no. 2130–0552).	FRA anticipates zero submissions for this 3-year ICR period.					
238.765—Event recorders (New requirement)	FRA anticipates zero railroad submissions during this 3-year ICR period.					
238.775—Trainset horn—Testing of the trainset horn sound level in accordance with § 229.129(c)—Written report and record retention (New requirement).	3 railroads	.33 written report.	1 hour	.33	77.44	25.56
238.777(e)(2)—Inspection Records—Copy of summary report made available to the engineer and to FRA upon request (New requirement).	FRA anticipates zero railroad submissions during this 3-year ICR period.					

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238.785—Trainset electrical system—High voltage markings: doors, cover plates, or barriers (New requirement).	FRA anticipates zero railroad submissions during this 3-year ICR period.					
238.791—Safety appliances (New requirement)	The estimated paperwork burden for this regulatory requirement is covered under §§ 238.110 (design) and 238.901 et seq. (records).					
238.903—Trainset Inspection, Testing, and Maintenance Requirements for Tier III Passenger Equipment—Program (New requirement).	3 railroads	.67 plan	150 hours	100.50	77.44	7,782.72
—(f) Retention of records	3 railroads	10,140.00 records.	5 minutes	845.00	77.44	65,436.80
238.907—Standard procedures for safely performing inspection, testing, and maintenance, and repairs (New requirement).	The estimated paperwork burden for this requirement is covered under § 238.903.					
238.909—Quality control/quality assurance program (New requirement).	The estimated paperwork burden for this requirement is covered under § 238.903.					
238.911—Inspection, testing, and maintenance program format—A condensed version of the program that contains only those items identified as safety-critical by the railroad submitted for approval by FRA (New requirement).	3 railroads	.67 condensed program.	2 hours	1.34	77.44	103.77
238.913(a)(1)—Inspection, testing, and maintenance program approval procedure—Initial submission (New requirement).	The estimated paperwork burden for this requirement is covered under § 238.903.					
—(a)(2) Inspection, testing, and maintenance program approval procedure—Submission of amendments (New requirement).	FRA anticipates zero railroad submissions during this 3-year ICR period.					
—(b)(3) Inspection, testing, and maintenance program approval procedure—Statement affirming that the railroad has provided a copy of the program or amendments on designated representatives of railroad employees as required under paragraph (c) of this section (New requirement).	3 railroads	.67 affirming statement.	5 minutes	.06	77.44	4.65
—(c) Inspection, testing, and maintenance program approval procedure—Comment—Railroad to provide a copy to the designated representatives of railroad employees responsible for the equipment's operation, inspection, testing, and maintenance under this subpart, of each submission filed with FRA (New requirement).	3 railroads	.33 comment	5 hours	1.65	77.44	127.78
—(d)(1) Inspection, testing, and maintenance program approval procedure—FRA's notification to railroads (New requirement).	3 railroads	.33 review of deficiency.	2 hours	.66	77.44	51.11
—(d)(2) Inspection, testing, and maintenance program approval procedure—Amendments in response to FRA's disapproval (New requirement).	FRA anticipates zero railroad submissions during this 3-year ICR period.					
—(d)(3) Inspection, testing, and maintenance program approval procedure—Resubmission of initial submission or amendments in response to FRA's identification of deficiencies after approval (New requirement).	The estimated paperwork burden for this requirement is covered above under paragraph (d)(1) of this section.					
—(e) Inspection, testing, and maintenance program approval procedure—Annual review—Railroad to provide written notice to FRA and the designated representatives of the railroad's employees prior to the annual review (New requirement).	FRA anticipates zero railroad submissions during this 3-year ICR period.					
238.1003(a)–(e)—Movement of defective Tier III passenger equipment—Tagging to indicate ''non-complying trainset'' (New requirement).	FRA anticipates zero railroad submissions during this 3-year ICR period.					
—(f) Movement of defective Tier III passenger equipment—Movement is made in accordance with the restrictions contained in the Special Notice under part 216 (New requirement).	FRA anticipates zero railroad submissions during this 3-year ICR period.					
Total [31]	37 railroads	4,871,540 Responses.	N/A	98,889	N/A	7,401,389

All estimates include the time for reviewing instructions; searching existing data sources; gathering or maintaining the needed data; and reviewing the information. Pursuant to 44 U.S.C. 3506(c)(2)(B), FRA solicits

comments concerning: Whether these information collection requirements are necessary for the proper performance of the functions of FRA, including whether the information has practical utility; the accuracy of FRA's estimates of the burden of the information collection requirements; the quality, utility, and clarity of the information to be collected; and whether the burden of collection of information on those who are to respond, including through the use of automated collection techniques or other forms of information technology, may be minimized. For information or a copy of the paperwork package submitted to OMB, contact Ms. Arlette Mussington, Information Collection Clearance Officer, at 571–609–1285 or Ms. Joanne Swafford, Information Collection Clearance Officer, at 757–897–9908. Organizations and individuals desiring to submit comments on the collection of information requirements should direct them via email to Ms. Mussington at *arlette.mussington@dot.gov* or Ms. Swafford at *joanne.swafford@dot.gov*.

OMB is required to decide concerning the collection of information requirements contained in this rule between 30 and 60 days after publication of this document in the **Federal Register**. Therefore, a comment to OMB is best assured of having its full effect if OMB receives it within 30 days of publication. FRA is not authorized to impose a penalty on persons for violating information collection requirements that do not display a current OMB control number, if required. FRA intends to obtain current OMB control numbers for any new information collection requirements resulting from this rulemaking action prior to the effective date of the final rule. The OMB control number, when assigned, will be announced by separate notice in the **Federal Register**.

D. Federalism Implications

Executive Order 13132, Federalism,[32] requires FRA to develop an accountable process to ensure ''meaningful and timely input by State and local officials in the development of regulatory policies that have federalism implications.'' ''Policies that have federalism implications'' are defined in the Executive Order to include regulations that have ''substantial direct effects on the States, on the relationship between the national government and the States, or on the distribution of power and responsibilities among the various levels of government.'' Under Executive Order 13132, the agency may not issue a regulation with federalism implications that imposes substantial direct compliance costs and that is not required by statute, unless the Federal government provides the funds necessary to pay the direct compliance costs incurred by State and local governments, the agency consults with State and local governments, or the agency consults with State and local government officials early in the process of developing the regulation. Where a regulation has federalism implications and preempts State law, the agency seeks to consult with State and local officials in the process of developing the regulation.

FRA has analyzed this proposed rule in accordance with the principles and criteria contained in Executive Order 13132. FRA has determined that this proposed rule has no federalism implications, other than the possible preemption of State laws under 49 U.S.C. 20106. Therefore, the consultation and funding requirements of Executive Order 13132 do not apply, and preparation of a federalism summary impact statement for the proposed rule is not required.

E. International Trade Impact Assessment

The Trade Agreements Act of 1979[33] prohibits Federal agencies from engaging in any standards or related activities that create unnecessary obstacles to the foreign commerce of the United States. Legitimate domestic objectives, such as safety, are not considered unnecessary obstacles. The statute also requires consideration of international standards and, where appropriate, that they be the basis for U.S. standards.

FRA has assessed the potential effect of this rulemaking on foreign commerce and believes that its proposed requirements are consistent with the Trade Agreements Act. The proposed requirements are safety standards, which, as noted, are not considered unnecessary obstacles to trade. Moreover, FRA has sought, to the extent practicable, to state the proposed requirements in terms of the performance desired, rather than in more narrow terms restricted to a particular design or system.

F. Environmental Impact

FRA has evaluated this proposed rule in accordance with the National Environmental Policy Act[34] (NEPA), the Council of Environmental Quality's NEPA implementing regulations,[35] and FRA's NEPA implementing regulations.[36] FRA has determined that this proposed rule is categorically excluded from environmental review and therefore does not require the preparation of an environmental assessment (EA) or environmental impact statement (EIS). Categorical exclusions (CEs) are actions identified in an agency's NEPA implementing procedures that do not normally have a significant impact on the environment and therefore do not require either an EA or EIS.[37] Specifically, FRA has determined that this proposed rule is categorically excluded from detailed environmental review.[38]

The main purpose of this rulemaking is to amend FRA's Passenger Equipment Safety Standards by adding safety standards to facilitate the safe implementation of high-speed rail at speeds up to 220 mph (Tier III). This rulemaking would not directly or indirectly impact any environmental resources and would not result in significantly increased emissions of air or water pollutants or noise. In analyzing the applicability of a CE, FRA must also consider whether unusual circumstances are present that would warrant a more detailed environmental review.[39] FRA has concluded that no such unusual circumstances exist with respect to this proposed rule and it meets the requirements for categorical exclusion.[40]

Pursuant to Section 106 of the National Historic Preservation Act and its implementing regulations, FRA has determined this undertaking has no potential to affect historic properties.[41] FRA has also determined that this rulemaking does not approve a project resulting in a use of a resource protected by Section 4(f).[42] Further, FRA reviewed this proposed rulemaking and found it consistent with Executive Order 14008, Tackling the Climate Crisis at Home and Abroad.[43]

[32] 64 FR 43255 (Aug. 10, 1999).

[33] 19 U.S.C. ch. 13.

[34] 42 U.S.C. 4321 *et seq.*

[35] 40 CFR parts 1500–1508.

[36] 23 CFR part 771.

[37] 40 CFR 1508.4

[38] See 23 CFR 771.116(c)(15) (categorically excluding ''[p]romulgation of rules, the issuance of policy statements, the waiver or modification of existing regulatory requirements, or discretionary approvals that do not result in significantly increased emissions of air or water pollutants or noise'').

[39] 23 CFR 771.116(b).

[40] 23 CFR 771.116(c)(15).

[41] *See* 54 U.S.C. 306108.

[42] *See* Department of Transportation Act of 1966, as amended (Pub. L. 89–670, 80 Stat. 931); 49 U.S.C. 303.

[43] 86 FR 7619 (Feb. 1, 2021).

G. Executive Order 12898 (Environmental Justice)

Executive Order 12898, Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations,[44] and DOT Order 5610.2C[45] require DOT agencies to achieve environmental justice as part of their mission by identifying and addressing, as appropriate, disproportionately high and adverse human health or environmental effects, including interrelated social and economic effects, of their programs, policies, and activities on minority populations and low-income populations. The DOT Order instructs DOT agencies to address compliance with Executive Order 12898 and requirements within the DOT Order in rulemaking activities, as appropriate, and also requires consideration of the benefits of transportation programs, policies, and other activities where minority populations and low-income populations benefit, at a minimum, to the same level as the general population as a whole when determining impacts on minority and low-income populations. FRA has evaluated this proposed rule under Executive Order 12898 and the DOT Order and has determined that it would not cause disproportionately high and adverse human health and environmental effects on minority populations or low-income populations.

H. Executive Order 13175 (Tribal Consultation)

FRA has evaluated this proposed rule in accordance with the principles and criteria contained in Executive Order 13175, Consultation and Coordination with Indian Tribal Governments, dated November 6, 2000. The proposed rule would not have a substantial direct effect on one or more Indian tribes, would not impose substantial direct compliance costs on Indian tribal governments, and would not preempt tribal laws. Therefore, the funding and consultation requirements of Executive Order 13175 do not apply, and a tribal summary impact statement is not required.

I. Unfunded Mandates Reform Act of 1995

Under section 201 of the Unfunded Mandates Reform Act of 1995,[46] each Federal agency ''shall, unless otherwise prohibited by law, assess the effects of Federal regulatory actions on State, local, and tribal governments, and the private sector (other than to the extent that such regulations incorporate requirements specifically set forth in law).'' Section 202 of the Act[47] further requires that ''before promulgating any general notice of proposed rulemaking that is likely to result in the promulgation of any rule that includes any Federal mandate that may result in expenditure by State, local, and tribal governments, in the aggregate, or by the private sector, of $100,000,000 or more (adjusted annually for inflation) in any 1 year, and before promulgating any final rule for which a general notice of proposed rulemaking was published, the agency shall prepare a written statement'' detailing the effect on State, local, and tribal governments and the private sector. This proposed rule will not result in the expenditure, in the aggregate, of $100,000,000 or more (as adjusted annually for inflation) in any one year, and thus preparation of such a statement is not required.

J. Energy Impact

Executive Order 13211, Actions Concerning Regulations That Significantly Affect Energy Supply, Distribution, or Use, requires Federal agencies to prepare a Statement of Energy Effects for any ''significant energy action.''[48] FRA evaluated this proposed rule under Executive Order 13211 and determined that this regulatory action is not a ''significant energy action'' within the meaning of Executive Order 13211.

K. Privacy Act

In accordance with 5 U.S.C. 553(c), DOT solicits comments from the public to better inform its rulemaking process. DOT posts these comments, without edit, to *www.regulations.gov,* as described in the system of records notice, DOT/ALL–14 FDMS, accessible through *www.dot.gov/privacy.* To facilitate comment tracking and response, we encourage commenters to provide their name, or the name of their organization; however, submission of names is completely optional. Whether or not commenters identify themselves, all timely comments will be fully considered. If you wish to provide comments containing proprietary or confidential information, please contact the agency for alternate submission instructions.

L. Analysis Under 1 CFR Part 51

As required by 1 CFR 51.5, FRA has summarized the standards it is proposing to incorporate by reference and shown the reasonable availability of those standards in the section-by-section analysis of this rulemaking document (see the discussions of §§ 238.139(c)(1)(i) and 238.745(b)). APTA standard PR–M–S–18–10 is currently approved for the location where is appears in the amendatory text; no change to the standard is proposed.

List of Subjects

49 CFR Part 216

Railroad safety, Reporting and recordkeeping requirements.

49 CFR Part 231

Railroad safety.

49 CFR Part 238

Incorporation by reference, Passenger equipment, Railroad safety, Reporting and recordkeeping requirements.

The Proposed Rule

For the reasons discussed in the preamble, FRA proposes to amend chapter II, subtitle B of title 49 of the Code of Federal Regulations as follows:

PART 216—SPECIAL NOTICE AND EMERGENCY ORDER PROCEDURES: RAILROAD TRACK, LOCOMOTIVE AND EQUIPMENT

■ 1. The authority citation for part 216 continues to read as follows:

Authority: 49 U.S.C. 20102–20104, 20107, 20111, 20133, 20701–20702, 21301–21302, 21304; 28 U.S.C. 2461 note; and 49 CFR 1.89.

■ 2. Revise § 216.14(c) to read as follows:

§ 216.214 Special notice for repairs—passenger equipment.

* * * * *

(c) Railroad passenger equipment subject to a Special Notice may be moved from the place where it was found to be unsafe for further service to the nearest available point where the equipment can be repaired, if such movement is necessary to make the repairs. However, the movement is subject to the further restrictions of §§ 238.15 and 238.17, or § 238.1003 of this chapter.

PART 231—RAILROAD SAFETY APPLIANCE STANDARDS

■ 3. The authority citation for part 231 continues to read as follows:

Authority: 49 U.S.C. 20102–20103, 20107, 20131, 20301–20303, 21301–21302, 21304; 28 U.S.C. 2461, note; and 49 CFR 1.89.

[44] 59 FR 7629 (Feb. 16, 1994).

[45] Available at: *https://www.transportation.gov/sites/dot.gov/files/Final-for-OST-C-210312-003-signed.pdf.*

[46] Public Law 104–4, 2 U.S.C. 1531.

[47] 2 U.S.C. 1532.

[48] 66 FR 28355 (May 22, 2001).

■ 4. Add § 231.0(b)(6) to read as follows:

§ 231.0 Applicability and penalties.

* * * * *

(b) * * *

(6) Tier III passenger equipment as defined in § 238.5 of this chapter (*i.e.,* 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).

* * * * *

PART 238—PASSENGER EQUIPMENT SAFETY STANDARDS

■ 5. The authority citation for part 238 continues to read as follows:

Authority: 49 U.S.C. 20103, 20107, 20133, 20141, 20302–20303, 20306, 20701–20702, 21301–21302, 21304; 28 U.S.C. 2461 note; and 49 CFR 1.89.

Subpart A—General

■ 6. Amend § 238.5 by adding in alphabetical order definitions of ''clear length'', ''crew access side access steps'', ''representative segment of the route'', and ''Tier IV system'', and revising the definition of ''in service''. The additions and revision read as follows:

§ 238.5 Definitions.

* * * * *

Clear length means, as applied to handholds and handrails, the distance about which a minimum 2-inch hand clearance exists in all directions around the handhold or handrail. Intermediate supports on handrails may be considered part of the clear length.

* * * * *

Crew access side steps means a step(s) or stirrup(s) located on the side of the car to assist an employee in entering or existing through an exterior side door for train crew use.

* * * * *

In service, when used in connection with passenger equipment, means—

* * * * *

(2) * * *

(i) Is being handled in accordance with §§ 238.15, 238.17, 238.305(d), 238.503(f), or 238.1003 as applicable;

* * * * *

Representative segment of the route means—

(1) A continuous track section or multiple track sections no less than 50 miles in length that consist of—

(i) A curvature distribution as described below;

(ii) A segment or segments of tangent track over which the intended maximum operating speed can be sustained; and

(iii) Any bridges and special-trackwork that are within the track section or track sections.

(2) If each of a railroad's line segments is less than 50 miles, then the ''representative segment of the route'' means one complete line segment that consists of the conditions described in paragraphs (1)(ii) and (iii) of this definition.

(3) A track section as described under paragraph (1) of this definition shall have a curvature distribution that is within 2% of the curvature distribution of the complete line segment, evaluated using the root mean squared (RMS) of the differences between the two distributions.

* * * * *

Tier IV system means any railroad that provides or is available to provide passenger service using non-interoperable technology that operates on an exclusive right-of-way without grade crossings, not comingled with freight equipment or Tier I, II, or III passenger equipment, and not physically connected to the general railroad system.

* * * * *

■ 7. In § 238.19, revise paragraphs (a)(4) and (5), (b), and (d) to read as follows:

§ 238.19 Reporting and tracking of repairs to defective passenger equipment.

(a) * * *

(4) The determination made by a qualified person, qualified maintenance person, or other qualified individual on whether the equipment is safe to run;

(5) The name of the qualified person, qualified maintenance person, or other qualified individual making such a determination;

* * * * *

(b) *Retention of records.* At a minimum, each railroad shall keep the records described in paragraph (a) of this section in accordance with the following:

(1) For Tier I equipment, one periodic maintenance interval for each specific type of equipment as described in the railroad's inspection, testing, and maintenance plan required by § 238.107. FRA strongly encourages railroads to keep these records for longer periods of time because they form the basis for future reliability-based decisions concerning test and maintenance intervals that may be developed pursuant to § 238.307(b).

(2) For Tier III equipment, at least one year.

* * * * *

(d) *List of repair points.* (1) Railroads operating long-distance intercity and long-distance Tier II passenger equipment shall designate locations, in writing, where repairs to passenger equipment with a power brake defect will be made. Railroads operating these trains shall designate a sufficient number of repair locations to ensure the safe and timely repair of passenger equipment.

(2) Railroads operating Tier III passenger trainsets shall designate locations, in writing, where repairs to safety-critical items on passenger equipment, including those with a power brake defect will be made. The railroad shall designate brake system repair point(s) in the inspection, testing, and maintenance program required by § 238.903(a). No Tier III trainset shall depart a brake system repair point where repairs can be made with brake system defect unless that trainset has its required operational braking capability, and not for a period to exceed 5 consecutive calendar days.

(3) The railroad shall provide the list required under either paragraph (d)(1) or (2) of this section to FRA's Associate Administrator and make it available to FRA for inspection and copying upon request. The designations made in such lists shall not be changed without at least 30 days' advance written notice to FRA's Associate Administrator.

Subpart B—Safety Planning and General Requirements

■ 8. Amend § 238.105 by revising the undesignated introductory text, paragraphs (a), (b), (c), the paragraph headings of (d) and (e), and adding paragraphs (f) through (h). The revisions and additions read as follows:

§ 238.105 Passenger electronic hardware and software safety.

Except as provided below under paragraph (f) of this section, the requirements of this section apply to electronic hardware and software used to control or monitor safety functions in passenger equipment ordered on or after September 8, 2000, and such components implemented or materially modified in new or existing passenger equipment on or after September 9, 2002.

(a) *General.* The railroad shall develop, adopt, and comply with a hardware and software safety program to guide the design, development, testing, integration, and verification of safety-critical passenger equipment electronic software and hardware. The hardware and software safety program may be maintained in either a written or an electronic format.

(b) *Safety program.* The hardware and software safety program shall include a

description of how the following will be accomplished, achieved, carried out, or implemented to ensure safety and reliability:

(1) The hardware and software design process;

(2) The hardware and software design documentation;

(3) The hardware and software hazard analysis;

(4) Hardware and software safety reviews;

(5) Hardware and software hazard monitoring and tracking;

(6) Hardware and software integration safety testing;

(7) Demonstration of overall hardware and software system safety as part of the pre-revenue service testing of the equipment; and

(8) Safety analysis that follows the requirements of paragraph (c) of this section.

(c) *Safety analysis.* The safety analysis shall establish and document the minimum requirements that will govern the development and implementation of all products subject to this section, and be based on good engineering practice and should be consistent with the guidance contained in appendix F to part 229 of this chapter in order to establish that a product's safety-critical functions will operate with a high degree of confidence in a fail-safe manner. The hardware and software safety analysis shall be based on a formal safety methodology that includes a Failure Modes, Effects, Criticality Analysis (FMECA); verification and validation testing for all hardware and software components and their interfaces; and comprehensive hardware and software integration testing to ensure that the hardware and software system functions as intended.

(d) *Fail safe requirements.* * * *

(e) *Compliance.* * * *

(f) *Additional requirements.* The requirements of this paragraph are applicable as set forth under § 229.303(a)(1) and (2) of this chapter. In addition to complying with paragraphs (a) through (e) of this section, electronic hardware and software used to control or monitor safety functions in passenger equipment must also comply with only the following requirements of subpart E of part 229 of this chapter:

(1) Section 229.309(a)(1) through (6), Safety-critical changes and failures;

(2) Section 229.311(a), (c), and (d)(1) through (3), Review of SAs;

(3) Section 229.313, Product testing results and records;

(4) Section 229.315, Operations and maintenance manual;

(5) Section 229.317(a), Training and qualification program; and

(6) Section 229.319, Operating personnel training.

(g) *Vehicle Communication and Control System Vulnerability Assessment.* The railroad shall prepare a Vehicle Communication and Control System Vulnerability Assessment identifying potential system vulnerabilities, associated risk (including exploitation likelihood and consequences), countermeasures applied, and resulting risk mitigation. The PTC system must comply with the requirements in § 236.1033 of this chapter.

(h) *Notification of product failure.* Suppliers will notify FRA of all safety-critical product failures without undue delay.

■ 9. Add a new § 238.108 to read as follows:

§ 238.108 New passenger service pre-revenue safety performance demonstration.

(a) *Pre-revenue safety validation plan*—(1) *General.* Any railroad subject to this part providing new, regularly scheduled, intercity or commuter passenger service, an extension of existing service, or a renewal of service that has been discontinued for more than 180 days shall develop and submit for review a comprehensive pre-revenue service safety validation plan. Such plan shall include pertinent safety milestones and a minimum period of simulated revenue service to validate the safe integration of major systems and operational readiness, and that all safety-sensitive personnel are properly trained and qualified as outlined in this section.

(2) *Plan contents.* A pre-revenue safety validation plan shall be submitted to FRA 60 days prior to the commencement of the safety performance demonstration period containing, at a minimum, the following:

(i) The status of all appliable safety plans or regulatory programs, and any associated certifications, qualifications, and employee training required for the start of revenue service including, but not limited to, the following:

(A) Railroad workplace safety procedures, programs, and training pursuant to part 214 of this chapter;

(B) A drug and alcohol program pursuant to part 219 of this chapter;

(C) If required, information on the status of PTC certification or any request for amendment under part 236 of this chapter, and compliance with conditions and requirements of § 236.1015 of this chapter as required by the host railroad's PTC safety plan. If the railroad submitting the pre-revenue safety validation plan is not the host railroad, the host railroad must acknowledge in writing that all requisite testing, validation, or other conditions have been satisfactorily met for the use of the tenant's PTC system in revenue service;

(D) A bridge management program pursuant to part 237 of this chapter;

(E) Passenger equipment compliance validation and testing conducted pursuant to §§ 238.110 and 238.111;

(F) Inspection, testing, and maintenance programs, as required under this part;

(G) Emergency preparedness planning pursuant to part 239 of this chapter, with a focus on first responder outreach and employee training;

(H) Locomotive engineer and conductor training, qualification and certification programs under parts 240 and 242 of this chapter;

(I) Training, qualification, and oversight program for safety-related railroad employees under part 243 of this chapter, to include information and data indicating the number of safety-related employees required to receive training and qualification, and information regarding the roles and responsibilities of executing the program between the railroad and its contractors;

(J) A system safety program plan pursuant to part 270 of this chapter, with particular focus on the status of mitigations and actions associated with hazard logs and risk assessments that have a direct impact on the safety of the operation; and,

(K) Speed limit action plans required under 49 U.S.C. 20169, if applicable.

(ii) A detailed description of the completeness of the system. This description must, at a minimum, include completeness descriptions of the vehicles, signals, crossings, stations, train control systems, track structure, wayside systems, signage, rule books, and employee staffing. For any area that is not expected to be complete when the system performance demonstration period commences, the railroad must provide an explanation as to why completeness or substantial completeness is not necessary for the demonstration of safe operations. If the railroad submitting the pre-revenue safety validation plan is not the host railroad, the host railroad must provide the railroad submitting the pre-revenue safety validation plan pertinent information regarding any scheduled construction activities planned during the system performance demonstration period and their anticipated completion date. The railroad submitting the pre-revenue safety validation plan must then explain why completeness or

substantial completeness of the host railroad construction activities is not necessary for the demonstration of safe operations.

(iii) A detailed description of the operating plan including schedules, headways, equipment required, equipment staging locations, crew schedules, grade crossing locations, signal locations, timetable, general orders, special instructions, and other relevant information regarding the regular railroad operations. This description must also include a summary of the operating plan that includes, at a minimum, the number of vehicles required to operate the plan, the number of crewmembers per day, the number of round trips per crewmember, and the total number of trips per day.

(iv) The period of simulated service prior to revenue passenger service (expressed either in days or number of completed train trips) necessary to demonstrate operational readiness and reliability, to include successful completion of any safety-critical activities required (*e.g.,* crewmember training and qualification) and clear pass/fail criteria that, at a minimum, accounts for on-time performance, signal and crossing failures, and vehicle and on-board systems failures.

(b) *Safety performance demonstration period.* The railroad shall conduct a period of simulated service prior to revenue passenger service, with the specific period provided in the railroad's pre-revenue safety validation plan pursuant to paragraph (a)(2)(iv) of this section. During this period, the railroad shall demonstrate that all necessary infrastructure and systems (to include traction power, signals/train control, and dispatching), vehicles, wayside equipment, timetable, operating instructions, and training and familiarization are properly integrated and will safely operate in the operating environment and under the service demands for which they are intended. Prior to commencing the safety performance demonstration period, the railroad will have successfully completed pre-revenue service acceptance testing under § 238.111 and have obtained certification of its PTC system or approval of any requests for amendment under part 236 of this chapter, if required.

(1) *Simulated service requirements.* The railroad shall demonstrate the successful completion of the safety performance demonstration period in accordance with the pass/fail criteria required under paragraph (a)(2)(iv) of this section.

(i) For new passenger service or extension of existing service, the safety performance demonstration period must be conducted while executing the full schedule over the entire route utilizing all stations and systems intended to operate at the start of revenue passenger service. The period shall be of sufficient duration to demonstrate that all safety-related employees are properly trained and able to execute the railroad's programs and plans identified in paragraph (a)(2)(i) of this section. The railroad shall also demonstrate its ability to operate its planned schedule when speed restrictions, mandatory directives, or other common situations arise that may impact operations.

(ii) For the re-starting or permanent re-routing of existing service, the safety performance demonstration period may be conducted using a modified schedule or dedicated test trains accounting for crew and equipment availability. The period shall be of sufficient duration to demonstrate that all safety-related employees are properly trained and able to execute the railroad's programs and plans identified in paragraph (a)(2)(i) of this section, with particular attention to employees or groups of employees, who are not actively engaged in the existing operations.

(2) *Daily summary report.* During the safety performance demonstration period, the railroad will provide FRA a daily summary of the activities performed and results. Additionally, any delays, system failures, unexpected events, close calls, or other safety concerns shall be described in detail.

(3) *Final report.* The railroad shall correct any safety deficiencies identified during the safety performance demonstration period prior to commencing revenue service. If safety deficiencies cannot be corrected, the railroad shall impose appropriate mitigations or operational limitations on the operation of the railroad that are designed to ensure that the railroad can operate safely. Corrections, mitigations, or operational limitations shall be discussed in a final report to FRA addressing the complete safety performance demonstration period. FRA may require additional corrections, mitigations, or operational limitations to ensure the safety of the operation.

(c) *Compliance.* After submitting a plan pursuant to paragraph (a) of this section, the railroad shall adopt and comply with such plan and may not amend the plan without first notifying the Associate Administrator of the proposed amendment. Revenue service may not begin until the railroad has completed the requirements of its plan, including the minimum safety performance demonstration period required by the plan and correcting any safety deficiencies identified or, for deficiencies that cannot be corrected, imposing appropriate mitigations or operational limitations on the operation of the railroad that are designed to ensure that the railroad can operate safety, as required by paragraph (b)(3) of this section.

■ 10. Add § 238.110 to read as follows:

§ 238.110 Design criteria, testing, documentation, and approvals.

(a) *Scope.* Each railroad shall provide the pertinent design criteria and documentation, as defined within this section, to obtain required approvals for aspects of the design of passenger equipment subject to the requirements of this part prior to performance of on-site, dynamic acceptance testing under § 238.111 of this chapter.

(1) *Applicability.* Except for passenger equipment defined in paragraph (a)(2) of this section, the requirements of this section apply to all passenger equipment that qualifies under one of the following conditions:

(i) A passenger equipment design that has not been used in revenue service in the United States.

(ii) Rebuilt or modified passenger equipment where the carbody structure or any safety-critical elements have been modified or replaced by a new design not identical to the original component's design. Submittals shall be required only to verify the safe operations of the modified system/sub-system and any safety-critical systems affected by such change.

(2) *Previously accepted passenger equipment designs.* Except for paragraph (d) of this section, passenger equipment designs that are the same as passenger equipment designs previously used in the United States are not subject to the requirements of this section.

(b) *Documentation and recordkeeping.* (1) Railroads are required to obtain or develop; review; and evaluate all documentation in support of demonstrating compliance with the design and testing requirements of this section.

(2) The railroad shall retain a copy of the documentation required under paragraph (b)(1) of this section for the lifetime of the equipment and make it available to FRA for review upon request. If the equipment is leased or sold to another entity, a copy of the documentation shall be provided to the lessee or purchasing entity.

(c) *Vehicle qualification plan*—(1) *Plan content.* Prior to conducting any design reviews or tests, the railroad

shall develop a vehicle qualification plan that is comprised of the following:

(i) *System description and design assumptions.* As part of the vehicle qualification plan, the railroad shall include a description of the equipment's intended operating environment (system description) as detailed in paragraph (d)(1) of this section and a list of design assumptions. Railroads operating Tier III equipment must also address the required elements for Tier III operations as detailed in paragraph (d)(2) of this section.

(ii) *Compliance matrix.* In addition to the system description and design assumptions, the railroad shall develop and submit to FRA a compliance matrix identifying all safety requirements with which compliance must be demonstrated to include those requirements specified in paragraphs (e) and (f) of this section.

(2) *Approval of the vehicle qualification plan.* (i) The vehicle qualification plan shall be submitted by the railroad for FRA review at least 60 days before the first relevant design review and/or test. FRA shall notify the railroad within 30 days of receipt of the railroad's submission that the vehicle qualification plan is approved, disapproved or disapproved in part. The notification shall also identify those documents and/or tests that FRA will require to be submitted for review and approval.

(ii) If disapproved or disapproved in part, FRA shall explain the reason(s) on which the disapproval is based, and the measures needed to obtain approval. Upon receipt of notification by FRA of the disapproval or disapproval in part, the railroad shall revise the vehicle qualification plan to address the measures identified by FRA to obtain approval, and resubmit to FRA in accordance with paragraph (c)(2)(i) of this section.

(iii) The railroad shall adopt and comply with the approved vehicle qualification plan, including completion of all design review and/or testing required by the plan.

(d) *System description (operating environment) and design criteria.* The railroad shall maintain a system description to include relevant safety-critical elements affected by the intended operating environment. The system description shall identify common criteria, design assumptions, or other parameters that govern the design, maintenance, and safe operation of the equipment it operates, particularly as it relates to safety-critical features and systems.

(1) *Required elements common to all types of passenger equipment.* The following is a list of elements common to all railroad passenger equipment subject to this part.

(i) Infrastructure characteristics, to include governing or limiting geometry (including turnouts), maximum grade, minimum required braking or safe stopping distance, and rail or grinding profile (if maintained).

(ii) Systems integration elements, to include types of train control systems, types of signal systems, grade crossing system types, and traction power systems (if used).

(iii) Railroad operational parameters, to include alerter timing.

(2) *Required elements for Tier III operations.* The following is a list of elements specific to railroad passenger equipment used in Tier III operations. The railroad shall—

(i) Identify the assumptions used to calculate the worst-case braking adhesion conditions.

(ii) Specify the maximum designed braking capacity.

(iii) Identify the on-board locations where crewmembers can initiate an irretrievable emergency brake application.

(iv) Identify the on-board locations of passenger brake alarms.

(v) Specify the time period for train operations to remain under the full control of the engineer after a passenger brake alarm is activated.

(vi) Detail the manner or means used to confirm that the trainset has safely cleared the boarding platform in which the application of a passenger brake alarm will no longer immediately initiate an irretrievable emergency brake application.

(vii) Detail the railroad procedures to be followed and trainset controls that must be activated to retrieve the full-service brake application described in § 238.731(d)(5).

(viii) Identify and maintain the approved standard for designing and testing main reservoirs, in accordance with § 238.731(f).

(ix) Specify the parameters set by the railroad to determine if the wheel-slide protection system has failed to prevent wheel-slide.

(x) Provide the details of the brake system functionality, monitoring, and diagnostics and any corresponding safety analysis.

(xi) Identify the worst-case grade condition on which Tier III equipment must be effectively secured while unattended.

(xii) Specify the operational parameters under which the engineer must acknowledge the alerter in order for train operations to remain under the full control of the engineer.

(xiii) Provide the procedures to retrieve a full-service brake application as described in § 238.751(c).

(xiv) Provide an analysis that confirms the ability of the railroad's alternate technology to provide an equivalent level of safety if a standard alerter is not used.

(xv) Provide information on the use of the headlight dimming functionality for Tier III trainsets when operating on a dedicated right-of-way.

(xvi) Identify and maintain the approved standard procedure for use of flashing lights at public highway-rail grade crossings if an alternative to the flashing rate for auxiliary lights under § 238.769(b) is used.

(e) *Structural carbody crashworthiness compliance.* (1) *Carbody and component crashworthiness design.* New or modified passenger equipment structural carbody designs must demonstrate compliance with the minimum applicable crashworthiness requirements of parts 229 and 238 of this chapter. Designs that include crash-energy management (CEM) components must also comply with appendix J to this part. Compliance may be demonstrated by any of the following methods:

(i) Full-scale testing;

(ii) Quasi-static and dynamic analysis performed by a validated computer model supported by quasi-static test results; or

(iii) Engineering calculations.

(2) *Carbody and component crashworthiness compliance testing.* For any tests intended to be used for the purpose of demonstrating compliance with this section, the railroad must submit the following to FRA no later than 60 days prior to the start of testing:

(i) A test plan and associated procedures; and

(ii) Finite element analysis results.

(f) *Safety Appliances.* New or modified passenger equipment must be equipped with safety appliances according to the applicable requirements of this part. The railroad shall submit design review documentation in accordance with paragraph (g)(1) of this section for FRA review. Compliance shall be validated through a sample-equipment inspection in accordance with paragraph (g)(2) of this section.

(g) *Approval of design review documentation, tests, and inspections for Safety Appliances*—(1) *Design review, testing, and inspection documentation.*

(i) Design review, testing, or inspection documentation shall be submitted to FRA in advance for review.

FRA shall notify the railroad within 60 calendar days that the submission is approved, disapproved, or disapproved in part. If disapproved or disapproved in part, FRA shall explain the reason on which the disapproval is based, and the measures needed to obtain approval.

(ii) Upon receipt of notification by FRA of the disapproval or disapproval in part, the railroad shall revise the documentation to address the measures identified by FRA to obtain approval. The revised documentation shall be reviewed and approved in accordance with paragraph (g)(1)(i) of this section.

(2) *Sample-equipment inspection.* (i) The railroad shall request a sample-equipment inspection from FRA by—

(A) Notifying FRA with the first available date and location that the sample equipment can be inspected, which will be at least 45 days in advance of the inspection; and

(B) Submitting engineering drawings reflecting the design and configuration of the safety appliances, emergency systems and signage, and any other elements to be inspected as part of the sample-equipment inspection.

(ii) Should FRA take exception during the inspection, FRA will provide the railroad an inspection report documenting the exceptions taken within 30 days of the sample-equipment inspection. The railroad shall address all exceptions taken and then, if directed by FRA, request a reinspection pursuant to paragraph (g)(2)(i) of this section.

(iii) If the sample equipment conforms, then FRA will indicate that no exceptions are noted on the inspection report.

■ 11. Revise § 238.111 to read as follows:

§ 238.111 Pre-revenue service acceptance testing.

(a) *Passenger equipment designs that have not been used in revenue service in the United States.* Before using passenger equipment for the first time on its system that has not been used in revenue service in the United States, each railroad shall—

(1) *Pre-revenue service acceptance test plan contents.* Develop a pre-revenue service acceptance test plan for the equipment that, at a minimum, includes the following:

(i) A description of the passenger equipment, its physical characteristics, the version or type of safety-critical features installed (*e.g.,* type of brake system), and any other features that may be relevant to the testing to be conducted.

(ii) A description of the railroad, systems, and conditions against which the pre-revenue service acceptance test plan is intended to demonstrate safe operation in accordance with the railroad's system description and design criteria required under § 238.110(d). This includes the physical characteristics of the railroad, any known physical constraints (*e.g.,* clearance requirements), track geometry constraints (*i.e.,* turnouts), systems integration requirements, required alerter timing, and the minimum required stopping distance of the railroad pursuant to § 238.231(a), § 238.431(a), or § 238.731(b).

(iii) An identification of any approvals, qualifications, or waivers of FRA safety regulations required for the testing or for revenue service operation of the equipment.

(iv) An identification of the maximum speed and cant deficiency at which the equipment is intended to operate.

(v) A list of all tests to be conducted, indicating any interdependences or predecessor requirements that may exist, and a list of any testing of the equipment that has been previously performed.

(vi) A schedule for conducting the testing.

(vii) An identification of the applicable test procedures, test results or reports, and post-test analysis required by this part, corresponding to paragraph (a)(1)(v) of this section detailing the approach to verify—

(A) Safe vehicle-track system interaction in accordance with §§ 213.57, 213.329, 213.345, 238.139, or any applicable combination thereof.

(B) The brake system functional requirements and performance of the system and components in accordance with §§ 238.231, 238.431, or 238.731.

(C) That vehicle noise emission levels comply with part 210 of this chapter.

(D) That locomotive or trainset cab noise complies with §§ 229.121 or 238.759.

(E) Systems integration and compatibility with technology utilized on the routes the equipment is intended to operate over, to include—

(*1*) The signaling systems and track circuit technology over which the equipment will operate, to include ATC and PTC testing under part 236 of this chapter;

(*2*) The grade crossing warning system technology utilized; and

(*3*) Equipment inspection technology and defect detectors.

(2) *Pre-revenue service acceptance test plan submission.* Except as provided for under § 239.139(e), the pre-revenue service acceptance test plan shall be submitted for FRA review at least 30 days before the start of testing.

(3) *Test procedures.* Each test procedure shall include at a minimum the information contained in appendix K to this part.

(4) *Test procedure availability.* Test procedures utilized for compliance demonstration shall be made available to FRA upon request.

(5) *Compliance with test plan and procedures.* The railroad shall comply with its pre-revenue service acceptance test plan and associated test procedures, including fully executing the tests required by the plan.

(6) *Test results.* Except as required by §§ 213.57, 213.329, 213.345, or 238.139—

(i) Test results for Tier I equipment will be made available to FRA upon request.

(ii) Test results for Tier II and Tier III equipment shall be submitted to FRA at least 60 days prior to the equipment being placed in revenue service.

(7) *Correction of safety deficiencies.* The railroad shall correct any safety deficiencies identified in the design of the equipment or in the ITM procedures, discovered during the testing. If safety deficiencies cannot be corrected by design changes, the railroad shall impose operational limitations that are designed to ensure that the equipment can operate safely. For Tier II and Tier III passenger equipment, the railroad shall comply with any operational limitations imposed by the Associate Administrator on the revenue service operation of the equipment for cause stated following FRA review of the results of the test program under paragraph (a)(6)(ii) of this section. This section does not restrict a railroad from petitioning FRA for a waiver of a safety regulation under the procedures specified in part 211 of this chapter.

(8) *Approval.* For Tier II or Tier III passenger equipment, the railroad must obtain approval from the Associate Administrator before placing the equipment in revenue service. The Associate Administrator will grant such approval if the railroad demonstrates compliance with the applicable requirements of this part.

(b) *Passenger equipment design that has previously been used in revenue service in the United States.* (1) For passenger equipment design that has previously been used in revenue service in the United States, as defined in paragraph (b)(3) of this section, each railroad shall verify the applicability of previous tests performed under paragraphs (a)(1)(vii)(A) through (D) of this section and perform such tests if previous test data does not exist, cannot be obtained, or does not support

demonstration of safe operation within the intended operating environment.

(2) Retain a description of such testing and make such description available to FRA for inspection and copying upon request.

(3) For purposes of paragraph (b) of this section, passenger equipment design that has previously been used in revenue service in the United States means—

(i) The actual equipment used in such service;

(ii) Equipment manufactured identically to that actual equipment; and

(iii) Equipment manufactured similarly to that actual equipment with no material differences in safety-critical components or systems.

(c) *Modifications, new technology, and major upgrades.* Prior to implementing a modification, installing a new technology, and/or conducting a major upgrade to any system component or sub-system that impacts a safety-critical function on passenger equipment that has been used in revenue service in the United States, the railroad shall follow the procedures specified in paragraph (a) of this section prior to placing the equipment in revenue service with such modification, new technology, or major upgrade. Testing shall be required only to verify the safe operations of any safety-critical systems affected by such change.

■ 12. Add § 238.115(c) to read as follows:

§ 238.115 Emergency lighting.

* * * * *

(c) At an interval not to exceed 184 days, as part of the required periodic mechanical inspection, each railroad shall test a representative sample of the emergency lighting systems on its passenger cars to determine that they operate as intended when the cars are in revenue service. The sampling method must conform with a formalized, statistical test method.

■ 13. Revise § 238.131(a)(1) to read as follows:

§ 238.131 Exterior side door safety systems—new passenger cars and locomotives used in passenger service.

(a) * * *

(1) Be built in accordance with APTA standard PR–M–S–18–10. In particular, locomotives used in passenger service shall be connected to or interlocked with the door summary circuit to prohibit the train from developing tractive power if an exterior side door in a passenger car is not closed, unless the door is under the direct physical control of a crewmember for their exclusive use. APTA standard PR–M–S–18–10, ''Standard for Powered Exterior Side Door System Design for New Passenger Cars,'' approved February 11, 2011 is incorporated by reference into this section with the approval of the Director of the Federal Register under 5 U.S.C. 552(a) and 1 CFR part 51. You may obtain a copy of the incorporated document from the American Public Transportation Association, 1666 K Street NW, Suite 1100, Washington, DC 20006 (telephone 202–496–4800; *www.apta.com*). You may inspect a copy of the document at the Federal Railroad Administration (FRA) and the National Archives and Records Administration (NARA), Contact FRA at: Docket Clerk, 1200 New Jersey Avenue SE, Washington, DC; *FRALegal@dot.gov; https://railroads.dot.gov.* For information on the availability of this material at NARA, visit *www.archives.gov/federal-register/cfr/ibr-locations.html* or email *fr.inspection@nara.gov.* Equipment with plug-type exterior side doors, section 2.9 (including section 2.9.1) of the APTA standard regarding the emergency release mechanism shall be replaced with the following requirements:

(i) Visual instructions for emergency operations of each plug-type exterior side door shall be provided. A manual interior and exterior emergency release mechanism shall be provided at each plug-type exterior side door. A clearly labeled emergency release mechanism, when activated, shall unlatch the door, disengage or unlock the local door isolation lock (if engaged), remove power from the door operator or controls, and allow the door to be moved to the open position. Feedback must be provided to the passenger to indicate that the mechanism has been actuated.

(ii) The emergency release mechanism shall not require the availability of electric or pneumatic power to activate. The emergency release actuation device shall be readily accessible, without the use of tools or another implement. The force necessary to actuate the interior emergency release mechanism shall not exceed 20 lbf. The force necessary to actuate the exterior emergency release mechanism shall not exceed 30 lbf using a lever type mechanism or 50 lbf using a ''T'' handle type mechanism. When actuated, the emergency release mechanism shall override any local door isolation locks, and it shall be possible to manually open the released door with a force not to exceed 35 lbf. The emergency release mechanism shall require a manual reset.

(iii) A speed interlock preventing operation of emergency release mechanism when vehicle is moving is permitted.

* * * * *

■ 14. Add § 238.139 to read as follows:

§ 238.139 Vehicle/track system qualification.

Pursuant to a railroad's pre-revenue service acceptance test plan under § 238.111, a railroad must demonstrate that its equipment does not exceed the safety limits of § 213.333 of this chapter. A railroad may demonstrate compliance by measuring the carbody and truck accelerations in accordance with § 213.333 over the entirety of the territory the vehicle is intended to operate, or by complying with the below enumerated requirements of this section. Nothing in this section affects a railroad's responsibility to comply with § 213.345 of this chapter.

(a) *General.* Qualification testing shall demonstrate that the vehicle/track system will not exceed the wheel/rail force safety limits and the carbody and truck acceleration criteria specified in § 213.333 of this chapter—

(1) Up to and including 5 mph above the proposed maximum operating speed; and

(2) On track meeting the requirements for the class of track associated with the proposed maximum operating speed. For purposes of qualification testing, speeds may exceed the maximum allowable operating speed for the class of track in accordance with the test plan approved by FRA under § 238.111.

(b) *Existing vehicle type qualification.* Except as otherwise provided by FRA, vehicle types previously qualified or permitted to operate prior to (INSERT DATE OF PUBLICATION OF FINAL RULE), shall be deemed qualified under the requirements of this section for operation at the previously operated speeds and cant deficiencies. However, equipment deemed meeting the requirements of this section pursuant to this paragraph (b) does not have transferability of qualification.

(c) *New vehicle type qualification.* Vehicle types that were not previously qualified under this section, or deemed qualified under paragraph (b) of this section, shall be qualified in accordance with the following:

(1) *Qualification methods.* To demonstrate that new vehicle types will not exceed the wheel/rail force safety limits and the carbody and truck acceleration criteria specified in § 213.333—

(i) When operated over Class 1 track, the vehicle type shall demonstrate the ability to negotiate a 12-degree curve with a coefficient of friction representative of dry track conditions

(*i.e.,* 0.5) and 3-inch track warp variations with the following wavelengths: 10, 20, 40, and 62 feet. The demonstration shall be done by simulating such track geometry conditions at speeds up to 5 mph above track Class 1 speeds, and the suspension system(s) shall meet the APTA truck equalization standard, APTA PR–M–S–014–06. The results of the simulation under both the AW0 and AW3 loading conditions shall not exceed the wheel/rail forces safety limits specified in § 213.333 of this chapter.

(ii) When operated over track Classes 2 through 5 at speeds producing no more than 6 inches of cant deficiency, the vehicle type shall be qualified by simulations performed under paragraph (c)(2) of this section and the measurement of carbody and truck accelerations during qualification testing in accordance with paragraphs (c)(3) and (4) of this section. If successful, the testing shall result in a transferable qualification with respect to the requirements of this section so long as the equipment is used at the same track class and cant deficiency.

(iii) APTA PR–M–S–014–06, Rev. 1, ''Standard for Wheel Load Equalization of Passenger Railroad Rolling Stock,'' Authorized June 1, 2017, is incorporated by reference into this section with the approval of the Director of the Federal Register under 5 U.S.C. 552(a) and 1 CFR part 51. All approved material is available for inspection at FRA and at the National Archives and Records Administration (NARA). Contact FRA at: Federal Railroad Administration Docket Clerk, 1200 New Jersey Avenue SE, Washington, DC; *FRALegal@dot.gov; https://railroads.dot.gov.* For information on the availability of this material at NARA, visit *www.archives.gov/federal-register/cfr/ibr-locations.html* or email *fr.inspection@nara.gov.* The material is also available from the American Public Transportation Association, 1666 K Street NW, Washington, DC 20006; *www.apta.com.*

(2) *Simulations.* (i) Analysis of vehicle/track performance (computer simulations) shall be conducted using an industry recognized methodology on—

(A) Minimally compliant analytical track (MCAT) conditions for the respective track class(es) as specified in appendix C to this part; and

(B) A track segment representative of the full route on which the vehicle type is intended to operate. Both simulations and physical examinations of the route's track geometry shall be used to determine a track segment representative of the route.

(ii) Linear system analysis shall be performed to identify the frequency and damping of the truck hunting modes. It shall be demonstrated that the damping of these modes is at least 5 percent, up to the intended operating speed +5 mph considering equivalent conicities starting at 0.1 up to 0.6.

(3) *Carbody acceleration.* For vehicle types intended to operate at track Class 2 through 5 speeds and up to 6 inches of cant deficiency, qualification testing conducted over a representative segment of the route on which the vehicle type is intended to operate shall demonstrate that the vehicle type will not exceed the carbody lateral and vertical acceleration safety limits specified in § 213.333 of this chapter.

(4) *Truck lateral acceleration.* For vehicle types intended to operate at track Class 2 through 5 speeds and up to 6 inches of cant deficiency, qualification testing conducted over a representative segment of the route on which the vehicle type is intended to operate shall demonstrate that the vehicle type will not exceed the truck lateral acceleration safety limit specified in § 213.333 of this chapter.

(d) *Previously qualified vehicle types.* Vehicle types previously qualified by simulation and testing in accordance with paragraph (c) of this section for a track class and cant deficiency on one route may be qualified for operation at the same class and cant deficiency on another route in accordance with the following:

(1) Vehicle types previously qualified by simulation and testing in accordance with paragraph (c) of this section on one route shall not require additional simulations, testing, or approval so long as operated on routes with the same track class designation and at the same or lower cant deficiency.

(2) For vehicle types intended to operate at speeds not to exceed Class 6 track or at any curving speed producing more than 5 inches of cant deficiency, but not exceeding 6 inches, qualification testing conducted over a representative segment of the new route shall demonstrate that the vehicle type will not exceed the carbody lateral and vertical acceleration safety limits specified in § 213.333 of this chapter.

(3) Vehicle types previously qualified by testing alone shall be subject to the requirements of paragraph (c) of this section for new equipment.

(e) *Qualification testing plan.* To obtain the data required to support the qualification program outlined in paragraphs (c) and (d) of this section, the track owner or railroad shall submit a qualification testing plan to FRA's Associate Administrator at least 60 days prior to testing, requesting approval to conduct the testing at the desired speeds and cant deficiencies. This test plan shall provide for a test program sufficient to evaluate the operating limits of the track and vehicle type and shall include—

(1) Identification of the representative segment of the route on which the vehicle type is intended to operate for qualification testing;

(2) Consideration of the operating environment during qualification testing, including operating practices and conditions, the signal system, highway-rail grade crossings, and trains on adjacent tracks;

(3) The maximum angle found on the gage face of the designed (newly profiled) wheel flange referenced with respect to the axis of the wheelset that will be used for the determination of the Single Wheel L/V Ratio safety limit specified in § 213.333 of this chapter when conducting simulations in accordance with (c)(2) of this section;

(4) A target maximum testing speed in accordance with paragraph (a) of this section and the maximum testing cant deficiency; and

(5) The results of vehicle/track performance simulations that are required by this section.

(f) *Qualification testing.* Upon FRA approval of the qualification testing plan, qualification testing shall be conducted in two sequential stages as required in this subpart.

(1) Stage-one testing shall include demonstration of acceptable vehicle dynamic response of the subject vehicle as speeds are incrementally increased—

(i) On a segment of tangent track, from maximum speeds corresponding to each track class to the target maximum test speed; and

(ii) On a segment of curved track, from the speeds corresponding to 3 inches of cant deficiency to the maximum testing cant deficiency.

(2) When stage-one testing has successfully demonstrated a maximum safe operating speed and cant deficiency, stage-two testing shall commence with the subject vehicle over a representative segment of the route as identified in paragraph (e)(1) of this section. A round-trip test run shall be conducted over the representative route segment at the speed the railroad will request FRA to approve for such service. An additional round-trip test run shall be conducted at 5 mph above this speed. The equipment shall be oriented differently in each leg of the round-trip test run.

(3) When conducting stage-one and stage-two testing, if any of the monitored safety limits are exceeded on

any segment of track, testing may continue provided that the track location(s) where any of the limits is exceeded be identified and test speeds be limited at the track location(s) until corrective action is taken. Corrective action may include making an adjustment in the track, in the vehicle, or in both of these system components.

(4) Prior to the start of the qualification testing program, a qualifying Track Geometry Measurement System (TGMS) specified in § 213.333 of this chapter shall be operated over the intended route within 30 calendar days prior to the start of the qualification testing program.

(g) *Qualification testing results.* The track owner or railroad shall submit a report to FRA's Associate Administrator detailing all the results of the qualification program. When simulations are submitted as part of vehicle qualification, this report shall include a comparison of simulation predictions to the acceleration data recorded during full-scale testing. The report shall be submitted at least 60 days prior to the intended operation of the equipment in revenue service over the route.

(h) *Approvals.* (1) Based on the test results and all other required submissions, FRA will approve, for new vehicle types qualified per paragraph (c) of this section, a maximum train speed and value of cant deficiency for revenue service, normally within 45 days of receipt of all the required information. FRA may impose conditions necessary for safely operating at the maximum approved train speed and cant deficiency.

(2) Previously qualified vehicle types operating at track Class 2 through 5 speeds, or at curving speeds producing up to 6 inches of cant deficiency, on one route may be qualified and approved for operation at the same class and cant deficiency on another route provided the vehicle types have been previously qualified by simulation and testing in accordance with paragraph (c) of this section for the same track class and cant deficiency.

(i) *Document retention.* The documents required by this section must be provided to FRA by:

(1) The track owner; or

(2) A railroad that provides service with the same vehicle type over trackage of one or more track owner(s), with the written consent of each affected track owner.

Subpart C—Specific Requirements for Tier I Passenger Equipment

■ 15. Revise § 238.201(a)(1) to read as follows:

§ 238.201 Scope/alternative compliance.

(a) * * *

(1) This subpart contains requirements for railroad passenger equipment operating at speeds not exceeding 125 miles per hour. All such passenger equipment remains subject to the safety appliance requirements contained in Federal statute at 49 U.S.C. chapter 203 and in applicable FRA regulations in this part 238, at part 231, and § 232.3 of this chapter. Unless otherwise specified, these requirements only apply to passenger equipment ordered on or after September 8, 2000, or placed in service for the first time on or after September 9, 2002.

* * * * *

■ 16. Revise § 238.230(a) to read as follows:

§ 238.230 Safety appliances—new equipment.

(a) *Applicability.* Except as provided in § 238.791, this section applies to passenger equipment placed in service on or after January 1, 2007.

* * * * *

■ 17. Revise § 238.235 to read as follows:

§ 238.235 Safety appliances for non-passenger carrying locomotives used in passenger service.

(a) *Application.* The requirements of this section apply to all non-passenger carrying locomotives, used in passenger service, that specifically utilize monocoque, semi-monocoque, or are a cowl unit, built on or after (INSERT EFFECTIVE DATE OF FINAL RULE), unless the requirements of part 231 of this chapter are applied.

(b) *Attachment.* All safety appliances shall be securely fastened to the car body structure and meet the requirements of § 238.791(b).

(c) *Fatigue life.* The safety appliance, the support or bracket to which the safety appliance is attached, and the carbody structure to which the safety appliance is directly attached or the support or bracket is attached, shall be designed for a fatigue life as specified under § 238.791(c).

(d) *Handholds.* Handholds used on non-passenger carrying locomotives subject to this section shall meet the applicable requirements of § 238.791(d).

(e) *Sill steps.* Sill steps used on non-passenger carrying locomotives subject to this section shall meet the applicable requirements of § 238.791(e).

(f) *Ground level access to the locomotive cab and other carbody side doors.* Non-passenger carrying locomotives subject to the requirements of this section shall be equipped with appropriate safety appliances at exterior side locomotive cab access doors and other carbody side doors, to permit safe access to the locomotive cab by employees and other authorized personnel from ground level.

(1) *Handholds.* Each exterior locomotive cab side access door that provide access to the locomotive cab shall be equipped with two vertical handholds, one on each side of the door, which shall—

(i) Have a minimum diameter of 5/8 inch.

(ii) Have a distance from the bottom clear length of the vertical handholds not to exceed 54 inches above top of rail.

(iii) Be installed so as to have a clear length extending at least 60 inches, or as high as practicable based on carbody design, above the floor of the cab. The design shall enable a person to safely turn around in order to exit the trainset. A smaller handhold, providing at least 16 inches clear length, may be installed above the exterior cab access door opening on the inside of the equipment to facilitate a person's ability to safely turn around.

(iv) Have a clearance distance between the vehicle body of a minimum of 2 inches, preferably 2½ inches for the entire length, except when a combination of handholds, additional attachment points, or both, are necessary due to the carbody design, length of the handhold, or both.

(2) *Steps.* Exterior side doors that provide access to the locomotive cab shall be equipped with steps meeting the requirements of § 238.791(e)(2) and (3).

(g) *Couplers.* Couplers used on non-passenger carrying locomotives subject to this section shall comply with the requirements of § 238.791(g).

(h) *Uncoupling levers or devices.* (1) *General.* Each end of a non-passenger carrying locomotive subject to the requirements of this section equipped with an automatic coupler required by paragraph (g) of this section shall have either—

(i) A manual, double-lever type uncoupling lever, operative from either side of the locomotive; or

(ii) An uncoupling mechanism operated by controls located in the locomotive cab, or other secure location. Additional manual uncoupling levers or handles on the coupler provided only as a backup for that remotely operated mechanism are not subject to paragraph (h)(2) of this section.

(2) *Manual uncoupling lever or device.* Manual uncoupling levers shall be applied so that the automatic coupler can be operated from either side of the equipment, from ground level without

requiring a person to go between cars or equipment units. Manual uncoupling levers shall have a minimum clearance of 2 inches, preferably 2½ inches, around the handle.

(i) *Shrouding.* The automatic coupler, end handholds, and uncoupling mechanism on the leading and trailing ends of a non-passenger carrying locomotive may be stored within a removable shroud to reduce aerodynamic effects.

(j) *Hand brakes.* Non-passenger carrying locomotives subject to the requirements of this section shall be equipped with an efficient hand or parking brake capable of holding the locomotive on the maximum grade condition identified by the operating railroad, or a minimum 3% grade, whichever is greater.

(k) *Safety appliances for appurtenances and windshields.* (1) Non-passenger carrying locomotives subject to the requirements of this section having appurtenances such as headlights, windshield wipers, marker lights, and other similar items required for the safe operation of the trainset or trainset unit must be equipped with handholds and steps meeting the requirements of this section if the appurtenances are designed to be maintained or replaced from the exterior of the trainset or equipment.

(2) The requirements of paragraph (k)(1) of this section do not apply if railroad operating rules require, and actual practice entails, the maintenance and replacement of these components by maintenance personnel in locations protected by the requirements of subpart B of part 218 of this chapter equipped with ladders and other tools to safely repair or maintain those appurtenances.

(l) *Optional safety appliances.* Safety appliances installed at the option of the railroad shall be approved by FRA pursuant to § 238.110.

Subpart H—Specific Requirements for Tier III Passenger Equipment

■ 18. Amend subpart H to part 238 by removing undesignated center headings ''Trainset Structure'', ''Glazing'', ''Brake System'', ''Interior Fittings and Surfaces'', ''Emergency Systems'', and ''Cab Equipment''.

■ 19. Revise § 238.701 to read as follows:

§ 238.701 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. Passenger seating is permitted in the leading unit of a Tier III trainset if the trainset complies with the crashworthiness and occupant protection requirements of this subpart, and the railroad has an approved right-of-way plan under § 213.361 of this chapter and an approved HSR–125 plan under § 236.1007(c) of this chapter. Demonstration of compliance with the requirements of this subpart is subject to FRA review and approval under §§ 238.110 and 238.111.

■ 20. Add § 238.719 to read as follows:

§ 238.719 Trucks and Suspension.

(a) *General requirements.* (1) Suspension systems shall be designed to reasonably prevent wheel climb, wheel unloading, rail rollover, rail shift, and a vehicle from overturning to ensure safe, stable performance and ride quality under the following conditions:

(i) In all operating environments as defined by the railroad under §§ 238.110(d) and 238.111(a)(1)(ii); and

(ii) At all track speeds and over all track qualities consistent with the Track Safety Standards in part 213 of this chapter, up to the maximum operating speed and maximum cant deficiency for which the equipment is qualified.

(2) All passenger equipment shall meet the safety standards for suspension systems contained in part 213 of this chapter, or alternative standards providing at least equivalent safety if approved by FRA under the provisions of § 238.21. In particular—

(i) *Pre-revenue service qualification.* All passenger equipment shall demonstrate safe operation during pre-revenue service qualification in accordance with § 213.345 of this chapter and is subject to the requirements of § 213.329 of this chapter.

(ii) *Revenue service operation.* All passenger equipment in service is subject to the requirements of §§ 213.329 and 213.333 of this chapter.

(b) *Carbody acceleration.* A passenger car shall not operate under conditions that result in a steady-state lateral acceleration greater than 0.15g, as measured parallel to the car floor inside the passenger compartment. Additional carbody acceleration limits are specified in § 213.333 of this chapter.

(c) *Lateral truck accelerations (hunting).* Each trainset shall be equipped with a system capable of detecting hunting on all trucks as defined in § 213.333 of this chapter (criteria based on reference location defined in § 213.333(k)(2) of this chapter). If truck hunting is detected, the train monitoring system shall provide an alarm to the controlling cab, and the train shall be slowed to a speed at least 5 mph less than the speed at which the truck hunting stopped.

(d) *Wheelsets.* Unless further clarified in the railroad's approved ITM plan, each trainset shall comply with the following limits and be free of the following defective conditions:

(1) The distance between the inside gauge of the flanges on non-wide flange wheels may not be less than 53$^{3}/_{32}$ inches or more than 53⅜ inches.

(2) The distance between the inside gauge of the flanges on wide flange wheels may not be less than 53 inches or more than 53$^{3}/_{32}$ inches.

(3) The back-to-back distance of flanges of wheels mounted on the same axle shall not vary more than ¼ inch when measured at similar points around the circumference of the wheels.

■ 21. Add § 238.723 to read as follows:

§ 238.723 Pilots, Snowplows, End Plates.

Each lead vehicle must be equipped with a pilot, snowplow, or end plate that extends across both rails. The minimum clearance above the rail of the pilot, snowplow, or end plate is 3 inches. In general, the maximum clearance is 6 inches. For a lead vehicle equipped with an obstacle deflector or truck-mounted wheel guard (or both) to minimize the risk of derailment from substantial obstacles that pass beneath them and into the path of the wheels, the maximum clearance is 9 inches.

■ 22. Add § 238.725 to read as follows:

§ 238.725 Overheat sensors.

Overheat sensors for each wheelset journal bearing shall be provided. The sensors may be placed either onboard the equipment or at reasonable intervals along the railroad's right-of-way.

■ 23. Add § 238.745 to read as follows:

§ 238.745 Emergency communication.

(a) Except as provided in paragraph (b) of this section, Tier III trainsets shall comply with the emergency communication requirements specified in § 238.121.

(b) Emergency communication back-up power systems shall, at a minimum, be capable of operating after experiencing the individually applied accelerations defined in either of the following paragraphs:

(1) Section 238.121(c)(2); or

(2) Section 6.1.4, ''Security of furniture, equipment and features,'' of GM/RT2100, provided that—

(i) The conditions of § 238.705(b)(2) are met;

(ii) The initial shock of a collision or derailment is based on a minimum load of 5g longitudinal, 3g lateral, and 3g vertical; and

(iii) Use of the standard is carried out under any conditions identified by the railroad, as approved by FRA.

(c) Railway Group Standard GM/RT2100, Issue Four, ''Requirements for Rail Vehicle Structures,'' December 2010, is incorporated by reference into this section with the approval of the Director of the Federal Register under 5 U.S.C. 552(a) and 1 CFR part 51. All approved material is available for inspection at the Federal Railroad Administration (FRA) and the National Archives and Records Administration (NARA). Contact FRA at: Federal Railroad Administration Docket Clerk, 1200 New Jersey Avenue SE, Washington, DC; *FRALegal@dot.gov; https://railroads.dot.gov.* For information on the availability of this material at NARA, visit *www.archives.gov/federal-register/cfr/ibr-locations.html* or email *fr.inspection@nara.gov.* It is available from Rail Safety and Standards Board Ltd., Communications, RSSB, Block 2 Angel Square, 1 Torrens Street, London, England EC1V 1NY; *www.rgsonline.co.uk.*

■ 24. Add § 238.747 to read as follows:

§ 238.747 Emergency roof access.

Each cab of a Tier III trainset shall have an emergency roof access location for crewmembers occupying the cab, unless the crewmembers have direct access to an emergency roof access point located in a passenger compartment of the trainset. Each emergency roof access location shall have a minimum opening of 26 inches longitudinally by 24 inches laterally and comply with the emergency roof access requirements specified in § 238.123(b), (d), and (e).

■ 25. Add § 238.755 to read as follows:

§ 238.755 General safety requirements.

(a) *Protection against personal injury.* Tier III trainsets shall comply with § 229.41 of this chapter.

(b) *General condition.* All systems and components on a trainset shall be free of conditions that endanger the safety of the passengers, crew, or equipment. Such conditions may include those conditions listed in § 229.45 of this chapter, but are not limited thereto.

(c) *Control of multiple trainsets.* Except when a trainset is moved in accordance with § 238.1003, when multiple trainsets are coupled in remote- or multiple-control, the railroad will comply with the requirements of § 229.13 of this chapter.

■ 26. Add § 238.757 to read as follows:

§ 238.757 Cabs, floors, and passageways.

(a) *Cab doors.* Tier III trainset cab doors shall be equipped with a secure and operable device to lock the door from the outside that does not impede egress from the cab and a securement device that is capable of securing the door from inside of the cab.

(b) *End-facing cab windows.* End-facing cab windows of the lead trainset cab shall be free of cracks, breaks or other conditions that obscure the view of the right-of-way for the crew from their normal position in the cab.

(c) *Cab floors, passageways, and compartments.* Tier III trainsets will comply with § 229.119(c) of this chapter.

(d) *Cab climate control.* Each lead cab in a Tier III trainset shall be heated and air conditioned. The heating, ventilation, and air conditioning system shall be inspected and maintained to ensure that it operates properly and meets the railroad's performance standard which shall be defined in the inspection, testing, and maintenance program.

■ 27. Add § 238.759 to read as follows:

§ 238.759 Trainset cab noise.

(a) *Performance standards for Tier III trainsets.* (1) The average noise levels in the trainset cab shall be less than or equal to 85 dB(A) when the trainset is operating at maximum operating speed. Compliance shall be demonstrated during the trainset qualification testing as required by § 238.111.

(2) A railroad shall not make any alterations during maintenance, or otherwise modify the cab, to cause the average sound level to exceed the requirements in paragraph (a)(1) of this section.

(3) The railroad or manufacturer shall follow the test protocols set forth in appendix I to this part to determine compliance with paragraph (a)(1) of this section and, to the extent reasonably necessary to evaluate the effect of alterations during maintenance, to determine compliance with paragraph (a)(2) of this section.

(b) *Maintenance of trainset cabs.* (1) If a railroad receives an excessive-noise report, and if the condition giving rise to the noise is not required to be immediately corrected under this part, the railroad shall maintain a record of the report, and repair or replace the item or component identified as substantially contributing to the noise—

(i) On or before the next periodic inspection required by the railroad's inspection, testing, and maintenance program; or

(ii) At the time of the next major equipment repair commonly used for the particular type of maintenance needed if the railroad determines that the repair or replacement of the item or component requires significant shop or material resources that are not readily available.

(2) A railroad has an obligation to respond to an excessive noise report filed by a trainset cab occupant. The railroad meets its obligation to respond to an excessive noise report, as set forth in paragraph (b)(1) of this section, if the railroad makes a good faith effort to identify the cause of the reported noise, and where the railroad is successful in determining the cause, if the railroad repairs or replaces the items that cause the noise.

(3)(i) A railroad shall maintain a written or electronic record of any excessive noise report, inspection, test, maintenance, and replacement or repair completed pursuant to paragraph (b) of this section, and the date on which that inspection, test, maintenance, and replacement or repair occurred. If a railroad elects to maintain an electronic record, the railroad must satisfy the conditions listed in § 227.121(a)(2)(i) through (v) of this chapter.

(ii) The railroad shall retain these records for a period of one year.

(iii) The railroad shall establish an internal, auditable, monitorable system that contains these records.

■ 28. Add § 238.761 to read as follows:

§ 238.761 Trainset sanitation facilities for employees.

(a) Tier III trainsets that are equipped with a sanitation compartment, as this term is defined in § 229.5 of this chapter, accessible only to train crewmembers shall meet the requirements set forth in § 229.137 of this chapter, and be maintained to the requirements of § 229.139 of this chapter.

(b) Railroads that do not provide sanitation compartments solely for use by crewmembers on board Tier III trainsets shall provide an alternate arrangement in accordance with § 229.137(b)(1)(i) of this chapter.

■ 29. Add § 238.763 to read as follows:

§ 238.763 Speed indicator.

(a) Each trainset controlling cab shall be equipped with a speed indicator which is—

(1) Accurate within ±1.24 mph for speeds under 18.6 mph, then increasing linearly up to ±5 mph at 220 mph; and

(2) Clearly readable from the engineer's normal position under all light conditions.

(b) The speed indicator shall be based on a system of independent on-board speed measurement sources guaranteeing the accuracy level specified in paragraph (a)(1) of this section under all operational conditions.

The system shall be automatically monitored for inconsistencies and the engineer shall be automatically notified of any inconsistency potentially compromising this accuracy level.

(c) The speed indicator shall be calibrated periodically as defined in the railroad's inspection, testing, and maintenance program.

■ 30. Add § 238.765 to read as follows:

§ 238.765 Event recorders.

(a) *Duty to equip and record.* Except as provided in paragraphs (c) and (d) of this section, a trainset shall have an in-service event recorder, of the type described in paragraph (b)(2) of this section, to record data from the lead cab and other locations within the trainset. The event recorder shall record the most recent 48 hours of operational data of the trainset on which it is installed.

(b) *Equipment requirements.* (1) Event recorders shall monitor and record data elements or information needed to support the data elements required by this paragraph with at least the accuracy required of the indicators displaying any of the required data elements to the engineer.

(2) A trainset shall be equipped with an event recorder with a certified crashworthy event recorder memory module that meets the requirements of appendix D to part 229 of this chapter. The certified crashworthy event recorder memory module shall be mounted for its maximum protection. (Although other mounting standards may meet this requirement, an event recorder memory module mounted in a non-crush zone area of the trainset and above the platform level is deemed appropriate ''for its maximum protection.'') The event recorder shall record, and the certified crashworthy event recorder memory module shall retain, the data elements or information needed to support the data elements as specified in § 229.135(b)(4)(i) through (xv), (xvii), (xx), and (xxi). In addition, the event recorder shall record, and the certified crashworthy event recorder memory module shall retain, the following data elements or information needed to support the following data elements:

(i) Application and operation of the eddy current brake, if so equipped;

(ii) Passenger brake alarm request;

(iii) Passenger brake alarm override;

(iv) Bell activation; and

(v) Trainset brake cylinder pressures.

(c) *Removal from service.* Notwithstanding the duty established in paragraph (a) of this section to equip trainsets with an in-service event recorder, a railroad may remove an event recorder from service. If a railroad knows that an event recorder is not monitoring or recording required data, the railroad shall remove the event recorder from service. When a railroad removes an event recorder from service, a qualified person shall record the date that the device was removed from service in the trainset's maintenance records, required in accordance with § 238.777.

(d) *Response to defective equipment.* Notwithstanding the duty established in paragraph (a) of this section to equip Tier III trainsets with an in-service event recorder, a trainset on which the event recorder has been taken out of service as provided in paragraph (c) of this section may remain in service only until the next pre-service inspection, as required by § 238.903(c)(2). A trainset with an inoperative event recorder is not deemed to be in improper condition, unsafe to operate, or a non-complying trainset under § 238.1003, and, other than the requirements of appendix D to part 229 of this chapter, the inspection, testing, and maintenance of event recorders are limited to the requirements set forth in subpart I of this part.

(e) *Preserving accident data, relationship to other laws, and disabling event recorders.* In addition to the requirements of paragraphs (a) through (d) of this section, § 229.135(e) through (g) of this chapter apply to Tier III trainset event recorders.

(f) *Annual test.* At a minimum, event recorders shall be tested at intervals not to exceed 368 days in accordance with § 229.27(c) of this chapter.

■ 31. Add § 238.767 to read as follows:

§ 238.767 Headlights.

(a) Except as provided in paragraphs (c) and (d) of this section, each end of a Tier III trainset shall be equipped with a headlight comprised of at least two lamps, one of which shall be illuminated when the trainset is in use. Each lamp, when illuminated, shall comply with the angular, intensity, and illumination requirements of § 229.125(a) of this chapter.

(b) The leading unit of a trainset with a headlight not in compliance with the requirements of paragraph (a) of this section shall not be moved in revenue service if the defective headlight is discovered during the pre-service inspection required by § 238.903(d)(1), and may only move in accordance with § 238.1003(e). The leading unit of a trainset with a headlight not in compliance with the requirements of paragraph (a) of this section that is discovered while the trainset is in service may continue in service only to the nearest forward location where either the leading unit can be switched, repairs necessary to bring the trainset into compliance can be made, or the trainset can be moved according to the procedures specified in § 238.1003(b)(1) through (3).

(c) Headlights may be provided with a device to dim the light. The use of this feature for Tier III trainsets operating on a dedicated right-of-way shall be described by the railroad in its system description required under § 238.110(d)(2)(xv).

(d) If Tier III trainsets are equipped with headlights incorporating alternative technology, the number of lamps specified in paragraph (a) of this section does not apply, and—

(1) The railroad's inspection, testing, and maintenance program shall include procedures for determining that such headlights provide the illumination intensity required by paragraph (a) of this section; and

(2) A means must be provided to ensure that the minimum illumination intensity required by paragraph (a) of this section can be achieved under the snow or ice conditions expected in the geographic region in which the trainsets will be operated.

■ 32. Add § 238.769 to read as follows:

§ 238.769 Auxiliary lights.

(a) Trainsets operated at a speed greater than 20 mph in a shared right-of-way over one or more public highway-rail grade crossings shall be equipped with operative auxiliary lights, in addition to the headlight required by § 238.767. Auxiliary lights shall conform with § 229.125(d)(1) though (3) of this chapter.

(b) Auxiliary lights required by paragraph (a) of this section may be arranged in any manner specified in § 229.125(e)(1) through (2) of this chapter.

(c) In addition to the requirements of paragraphs (a) and (b) of this section, auxiliary lights required by paragraph (a) of this section shall comply with § 229.125(f).

(d)(1) A lead unit of a trainset with only one operative auxiliary light must be repaired or switched to a trailing position before departure from the place where a pre-service inspection is required under § 238.903(d)(1) for that trainset.

(2) A lead unit of a trainset with only one operative auxiliary light that is discovered after the trainset enter service may continue to be used in passenger service:

(i) Until the next scheduled inspection of the trainset where the repairs necessary to bring the trainset into compliance can be made; or

(ii) According to the procedures specified in the railroad's inspection, testing, and maintenance program.

(3) A lead unit of a trainset with two failed auxiliary lights may only proceed to the next forward location where repairs can be made. This movement must be made according to the procedures specified in § 238.1003(b)(1) through (3).

■ 33. Add § 238.771 to read as follows:

§ 238.771 Marking device.

(a) Except for paragraph (d)(3) of this section, the trailing end of each trainset shall be equipped with at least one marking device conforming with the characteristics specified in § 221.14(a)(1) through (3), along with the following other requirements:

(1) An arrangement to continuously illuminate when on the trailing end of the train; and

(2) For marker lights incorporating alternative technology, the railroad's inspection, testing, and maintenance program shall include procedures for determining that such marker lights meet the requirements of paragraphs (a) and (a)(1) of this section.

(b) The centroid of the marking device shall be located at a minimum of 48 inches above the top of the rail.

(c) Trailing end marking devices shall operate when the trainset is in service and be inspected as defined in the railroad's inspection, testing, and maintenance program.

(d)(1) A trainset with a marking device not in compliance with the requirements of paragraph (a) of this section shall not be moved in revenue service if the defective marking device is discovered during the pre-service inspection required by § 238.903(c)(2).

(2) Whenever a marking device prescribed in this section becomes inoperative en route, the train may be moved to the next forward location where the marking device can be repaired or replaced.

(3) A trainset's trailing end headlight illuminated on the dim setting satisfies the requirements of a highly visible marking device as described in paragraph (a) of this section.

■ 34. Add § 238.773 to read as follows:

§ 238.773 Cab lights.

Each trainset cab shall have cab lights in conformance with the requirements of § 229.127(a) of this chapter. Cab passageways and compartments shall also be adequately illuminated.

■ 35. Add § 238.775 to read as follows:

§ 238.775 Trainset horn.

(a) Each leading end of trainset shall be equipped with a horn that conforms to the requirements of § 229.129(a) of this chapter.

(b) Each trainset horn shall be individually tested under paragraph (e) of this section, or through acceptance sampling under § 229.129(b)(1) of this chapter, to ensure compliance with paragraph (a) of this section.

(c) Except as provided in paragraph (d) of this section, each trainset equipped with a replacement horn shall be tested, in accordance with paragraph (e) of this section, before the next specified test required by the railroad inspection, testing and maintenance program.

(d) Trainsets that have already been tested individually under paragraph (e) of this section, or through acceptance sampling under § 229.129(b)(1) of this chapter, shall not be required to undergo sound level testing when equipped with a replacement trainset horn, provided the replacement trainset horn is of the same model as the horn that was replaced and the mounting location and type of mounting are the same.

(e) Testing of the trainset horn sound level shall be in accordance with § 229.129(c) of this chapter, with the following exceptions:

(1) In lieu of § 229.129(c)(7) of this chapter, the microphone shall be located 100 feet forward of the front-most car body structure of the trainset, four feet above the top of the rail, at an angle no greater than 20 degrees from the center line of the track, and oriented with respect to the sound source according to the manufacturer's recommendations. The observer shall not stand between the microphone and the horn.

(2) Reports required by § 229.129(c)(10) of this chapter may be maintained electronically.

■ 36. Add § 238.777 to read as follows:

§ 238.777 Inspection records.

(a) For certain periodic inspections, as defined by the railroad's inspection, testing, and maintenance program required under subpart I of this part, the railroad shall maintain a record of the inspection that shall contain at a minimum:

(1) The date the last periodic inspection was performed as required by the railroad's inspection, testing, and maintenance program;

(2) The name of the person conducting the inspection; and

(3) The name of the supervisor certifying that the inspection was performed.

(b) The information contained in the inspection record and summary report required under paragraph (c) of this section shall be made available to the engineer so that the engineer knows the trainset is ready for service. The inspection record and summary report shall be made available to the engineer by either—

(1) Electronic displays provided in the cab or other FRA-approved devices located within the trainset; or

(2) Being physically displayed in hardcopy form under a transparent cover in a conspicuous place in the cab of each trainset.

(c) The summary report shall be generated that provides pertinent information to review and will be made available to FRA upon request. At a minimum, the summary report shall include information such as the periodic inspection dates, applicable waivers, the type of brake system used (*e.g.,* regenerative versus rheostatic), whether the trainset's event recorder is out of service, the car number, the date of manufacture, the number of propulsion motors, the manufacturer's information, and verification that all required inspections have been performed.

(d) Compliance with the requirements of § 229.23 of this chapter shall satisfy the requirements of this section.

■ 37. Add § 238.781 to read as follows:

§ 238.781 Current collectors.

(a) *Overhead Collector Systems.* (1) Pantographs shall comply with § 229.77(a) of this chapter.

(2) Each overhead collector system, including the pantograph, shall be equipped with a means to electrically ground any uninsulated parts to prevent the risk of electrical shock on personnel working on the system.

(3) Means shall be provided to permit the engineer to determine that the pantograph is in its lowest position, and for securing the pantograph if necessary, without the need to mount the roof of the trainset.

(4) Each pantograph shall be equipped with a means to safely lower the pantograph in the event of an emergency. If an emergency pole is used for this purpose, that part of the pole which can be safely handled shall be marked to so indicate. This pole shall be protected from moisture and damage when not in use. The means of securement and electrical isolation of a damaged pantograph, when automatic methods are not possible, shall be addressed in the railroad's inspection, testing, and maintenance program.

(b) *Third Rail Shoes.* Trainsets equipped with pantographs and third-rail shoes shall comply with §§ 229.79 and 229.81(b) of this chapter.

■ 38. Add § 238.783 to read as follows:

§ 238.783 Circuit protection.

(a) *General.* Circuits used for purposes other than propelling the equipment shall be provided with a circuit breaker or equivalent current-limiting devices located as near as practical to the point of connection to the source of power for that circuit. Such protection may be omitted from circuits controlling safety-critical devices.

(b) *Lightning protection.* The main propulsion power line shall be protected with a lightning arrestor, automatic circuit breaker, and overload relay. The lightning arrestor shall be run by the most direct path possible to ground. These overload protection devices shall be housed in an enclosure designed specifically for that purpose with the arc chute vented directly to outside air. Safety-critical circuits shall be protected against lightning damage. Should safety-critical circuits be adversely affected in such an instance, the trainset shall default to a safe condition.

(c) *Overload and ground fault protection.* Head-end power, including trainline power distribution, shall be provided with both overload and ground fault protection.

■ 39. Add § 238.785 to read as follows:

§ 238.785 Trainset electrical system.

(a) *Insulation or grounding of metal parts.* Tier III trainsets shall comply with § 229.83 of this chapter.

(b) *High voltage markings: doors, cover plates, or barriers.* Tier III trainsets shall comply with § 229.85 of this chapter.

(c) *Hand-operated electrical switches.* Tier III trainsets shall comply with § 229.87 of this chapter.

(d) *Conductors, jumpers, and cable connections.* Tier III trainsets shall comply with §§ 229.89 and 238.225(a) of this chapter.

(e) *Energy storage systems.* (1) *Batteries.* In addition to complying with the requirements of § 238.225(b), battery circuits shall include an emergency battery cut-off switch to completely disconnect the energy stored in the batteries from the load.

(2) *Capacitors for high-energy storage.* If provided, capacitors shall be—

(i) Isolated from the cab and passenger seating areas by a fire-resistant barrier; and

(ii) Designed to protect against overcharging and overheating.

(f) *Power dissipation resistors.* In addition to complying with the requirements of § 238.225(c), power dissipation resistor circuits shall incorporate warning or protective devices for low ventilation air flow, over-temperature, and short circuit failures.

(g) *Electromagnetic interference and compatibility.* In addition to complying with the requirements of § 238.225(d), electrical and electronic systems of equipment shall be capable of operation in the presence of external electromagnetic noise sources.

(h) *Motors and generators.* (1) All motors and generators shall be in proper working order, or safely cut-out and isolated.

(2) If equipped, support brackets, bearings, isolation mounts, and guards shall be present, function properly, and function as intended, as specified in the railroad's inspection, testing, and maintenance program.

■ 40. Add § 238.791 to read as follows:

§ 238.791 Safety appliances.

(a) *Applicability.* This section applies to Tier III trainsets. The requirements of this section may also be applied to Tier I passenger cars and Tier I alternative passenger trainsets in lieu of the requirements of §§ 238.229 and 238.230, or part 231 of this chapter, as applicable.

(b) *Attachment.* Safety appliances must be attached by either mechanical fasteners meeting the requirements of paragraph (b)(1) of this section, or by welds meeting the requirements of paragraph (b)(2) of this section.

(1) *Mechanical fasteners.* Safety appliance mechanical fasteners shall have tensile strength and fatigue resistance equal to or greater than a ½ inch (12 mm) diameter SAE Grade 5 steel bolt. Fasteners must be one- or two-piece rivets, Huck bolts®, or threaded fasteners secured by one of the following methods:

(i) Self-locking feature, including locknut and locking bolt, that meets the prevailing torque requirements for locking fasteners such as those specified by the Industrial Fastener Institute for the applicable grade and size fastener used.

(ii) Locking device that provides the minimum prevailing first removal torque value for locking fasteners, such as those specified by the Industrial Fastener Institute for the applicable grade and size fastener used.

(iii) Wedge-locking washers consisting of two symmetrically designed washers that have inclined ramps on the sides in mutual contact and non-slip contact surfaces on the sides in contact with the nut and work piece. Washer and nut or bolt arrangements utilizing similar locking principles are also acceptable.

(iv) Lock washers that meet the requirements for lock washers specified by the Industrial Fastener Institute for the applicable grade and size fastener used.

(v) Locking tab, cotter pin, or safety wire that restricts rotation of the bolt, or nut, or both.

(2) *Welded Safety Appliances.* Welds for safety appliances, connections, safety appliance subassemblies, and brackets or supports shall be—

(i) Designed and fabricated in accordance with the welding process and the quality control procedures contained in the applicable American Welding Society Standard, the Canadian Welding Bureau Standard, or an equivalent nationally or internationally recognized welding standard;

(ii) Performed by an individual possessing the qualifications to be certified under the applicable American Welding Society Standard, the Canadian Welding Bureau Standard, or an equivalent nationally or internationally recognized welding qualification standard;

(iii) Inspected by an individual qualified to determine that the welding has been performed in accordance with the requirements in paragraph (b)(2)(i) of this section. A written or electronic record of the inspection shall be retained by the railroad operating the equipment and shall be provided to FRA upon request. At a minimum, this record shall include the date, time, and location of the inspection, and the identification and qualifications of the person performing the inspection.

(iv) Repaired in accordance with the requirements of paragraphs (b)(2)(i) through (iii) of this section.

(3) *Carbody.* Brackets or supports welded in accordance with paragraphs (b)(2)(i) through (iii) of this section and meeting the strength requirements in paragraphs (c), (d)(4)(ii), and (e)(4)(ii) of this section shall be considered part of the carbody structure.

(4) *Inspection.* Except for couplers and handbrakes, all safety appliances, and brackets or supports shall, as far as practicable, be installed to facilitate inspection of attachments, whether mechanical fasteners or welds.

(5) *Strength.* Welds, if used, and mechanical fasteners shall be designed to have an ultimate strength with a factor of safety of at least two with respect to the load values specified in paragraphs (d)(3)(ii) and (e)(4)(ii) of this section.

(c) *Fatigue life.* The safety appliance, the support or bracket to which the safety appliance is attached, and the carbody structure to which the safety appliance is directly attached or the support or bracket is attached, shall be designed for a fatigue life of 10 million

cycles based upon the service vibration environment.

(d) *Handholds.* (1) *Number, location, and orientation.* (i) *Exterior side door passenger access handholds.* (A) A vertical handhold shall be provided for passengers on both sides of steps (one on each side) used for boarding or alighting. Internally installed handrails, as that term is used under part 38 of this title, may be used to satisfy the requirements of this paragraph, and if used must meet the applicable requirements for handrails specified in § 38.97(a) or § 38.115(a) of this title.

(B) Each vertical handhold provided for passengers shall be positioned so that the bottom clear length shall not be more than 54 inches above top of rail.

(ii) *Exterior cab access handholds.* (A) Except as provided in paragraph (f)(2)(iv) of this section, a vertical handhold shall be provided for crewmembers and other authorized personnel on both sides (one on each side) of any exterior cab access door, if equipped.

(B) Vertical handholds provided for cab access doors shall have a clear length extending above the floor of the cab at least 48 inches, and where practicable at least 60 inches or as high as feasible based on carbody design, enabling a person to safely turn around. A smaller handhold, providing at least 16 inches of clear length, may be installed above the exterior cab access door opening on the inside of the equipment to facilitate a person's ability to safely turn around.

(iii) *Side handholds.* (A) At least one side handhold, preferably two, shall be provided at each location equipped with a sill step, and be oriented either vertically, horizontally, or a combination thereof, relative to the carbody. Each side handhold shall provide at least 16 inches of clear length. At least 12 inches of the clear length of each horizontal side handhold shall be directly over the sill step.

(B) If one horizontal handhold is used it shall be not less than 58.5 nor more than 64.5 inches above top of rail.

(C) If two horizontal handholds are used, one horizontal handhold shall be at most 54 inches above top of rail. The second horizontal handhold shall be 54 to 58 inches above the step.

(D) If one vertical handhold is used, its lowest clearance point shall be at most 54 inches above top of rail. Its highest clearance point shall be at least 70 inches above top of rail. The handhold shall be located above the clear length of the step.

(E) If two vertical handholds are used, the lowest clearance point of each vertical handhold shall be at most 54 inches above top of rail. The highest clearance point of each vertical handhold shall be at least 58 inches above the step. Each set of vertical handholds shall be spaced not less than 16 inches nor more than 22 inches apart. To align two vertical handholds with the sill steps, the handholds shall be located in the longitudinal direction such that the inside face of the outboard handhold is no more than 2 inches outboard of the inside face of the outboard vertical leg of the step and is no less than 10 inches outboard from the inside face of the inboard vertical leg.

(F) When a combination of horizontal and vertical handholds is used, the horizontal handhold shall be 54 to 58 inches above the step. The lowest clearance point of the vertical handhold shall be at most 54 inches above top of rail. The highest clearance point of the vertical handhold shall be at least 70 inches, preferably 78 inches above top of rail. One continuous handhold may be used as long as it meets the dimensional requirements of this paragraph.

(iv) *End handholds.* (A) Except as provided in paragraph (d)(1)(iv)(F) of this section, two horizontal end handholds shall be provided at each end of a vehicle or trainset unit equipped with an automatic coupler, as described in paragraph (g) of this section, with one on each side of the vehicle or trainset unit. Each end handhold shall provide at least 16 inches of clear length.

(B) There shall be no more than 16 inches between the side of the vehicle or trainset unit to the useable clear length of an end handhold, measured horizontally.

(C) If the equipment is designed with a tapered nose, the side of the car shall be determined based on the outer dimension of the tapered nose where the end handhold is attached.

(D) End handholds shall be positioned no more than 50 inches from top of rail. Handholds may be attached to any primary structure (*e.g.,* carbody frame; or pilot, or plow on cab cars), provided the dimension requirements in paragraph (d)(1)(iv)(A) of this section are met.

(E) An uncoupling lever may be used as an end handhold if it meets the requirements of paragraphs (b), (c), and (d) of this section.

(F) End handholds are not required at the ends of vehicles equipped with an automatic coupling mechanism that can be safely operated from inside the appropriate cab of the vehicle and does not require ground intervention from a person such as to go on, under, or between to couple air, electric or other connections.

(2) *Handhold dimensions.* Regardless of location or orientation, the minimum diameter for each handhold listed under paragraph (d)(1) of this section shall be no less than ⅝ inch.

(3) *Clearance.* All handholds listed under paragraph (d)(1) of this section shall have a clearance between the handhold and carbody of at least 2 inches, preferably 2½ inches, for the entire clear length, except when a combination of handholds, or additional attachment points, or both, are necessary due to the carbody design, or length of the handhold, or both. In such cases, alternate ergonomic configurations may be used instead, subject to FRA approval.

(4) *Strength and rigidity.* Handholds shall meet either of the following strength and rigidity requirements:

(i) They must be made of ⅝-inch diameter steel, or a material providing an equivalent level of mechanical strength; or

(ii) They must be designed to support a load of 350 lbs at any point on the useable length, in any direction, and shall be rigidly attached to the carbody structure such that the maximum elastic deflection at the midpoint of an unsupported span under 50 percent of the applied 350-lb load shall be no greater than L/120, where L is the unsupported length of the span. Stresses in the handhold and the carbody structure to which it is attached shall be less than the minimum yield strength for the load values specified in this paragraph. For purposes of evaluation, the load may be distributed over a distance of not more than 3 inches along the usable clear length of the handhold.

(5) *Multiple handholds.* When multiple handholds are arranged in a ladder-style configuration, each handhold shall meet the requirements of this paragraph (d) and shall not have a vertical rise between handholds exceeding 18 inches.

(e) *Sill steps.* (1) *Number and location.* (i) Except as provided in paragraph (e)(1)(iv) of this section, two sill steps shall be provided at each end of a vehicle or trainset unit equipped with an automatic coupler, with one on each side of the vehicle or trainset unit no more than 18 inches from the end of the vehicle or trainset unit to the useable clear length of the sill step. For vehicle or trainset ends equipped with shrouding or aerodynamic treatments that taper toward the center of the vehicle or trainset unit, the 18 inches shall be measured from the point where the shrouding or aerodynamic treatment begins to taper.

(ii) The sill step tread shall be no more than 24 inches, preferably no more than 22 inches, above top of rail.

(iii) The outside edge of the sill step tread shall be no more than 2 inches inside of any carbody structure located directly above the sill step and below the lowest side handhold.

(iv) Sill steps are not required—

(A) If an exterior cab access door or an exterior passenger access door is equipped with handholds and steps, as required by this section, and is located such that an employee riding on the step has an unobstructed view of the track ahead.

(B) At the ends of vehicles equipped with an automatic coupling mechanism that can be safely operated from inside the appropriate cab of the vehicle and does not require ground intervention from a person such as to go on, under, or between to couple air, electric or other connections.

(2) *Dimensions.* (i) The minimum clear length of the tread of the sill step shall be 10 inches.

(ii) The minimum clear distance above the usable clear length of each step shall be—

(A) 4.7 inches for Tier III trainsets.

(B) 8 inches for applicable Tier I equipment as specified in paragraph (a) of this section.

(iii) The minimum clear space from the outside edge of the sill step shall be 6 inches for the entire usable clear length of the step, of which at least 2 inches shall be tread surface.

(iv) Sill steps shall not have a vertical rise between treads exceeding 18 inches.

(v) Proper clearance must be provided between steps and the vehicle running gear to provide proper clearance from moving parts.

(3) *Sill step tread surface.* The portion of the tread surface area of each sill step that is normally contacted by the foot shall be treated with an anti-skid material or be slip resistant by texturing of the metal surface in such a way that it lasts the life of the car. Some examples of acceptable methods are: diamond plate or stamped, upset, or expanded metal. For enclosed step designs, at least 50 percent of the tread area shall be open space.

(4) *Strength and rigidity.* Sill steps shall meet either of the following strength and rigidity requirements:

(i) If a rectangular cross-section is used, the sill step shall have a minimum ½-inch-thick by 2-inch-wide cross-sectional area. Alternate material sections may be used if they meet the strength and rigidity of a ½-inch-thick by 2-inch-wide steel section. Sill or crew steps exceeding 18 inches (457 mm) in depth shall have an additional tread and be laterally braced; or

(ii) Sill steps shall be designed to support individually applied loads at any point on the useable length of 450 lbs in the downward direction and 350 lbs in the horizontal direction (inward or outward). Stresses in the sill step and the carbody structure to which it is attached shall be less than the minimum yield strength for the load values specified in this paragraph. For purposes of evaluation, the load may be distributed over a distance of not more than 3 inches along the usable clear length of the sill step.

(f) *Crew access.* (1) *Ground-level crew access.* (i) Crewmembers shall be provided the means where they can board and alight the equipment from ground level, safely.

(A) For a trainset, or any section of a trainset that is not semi-permanently connected to an adjacent unit of the same trainset, a minimum of four locations, two per side, shall be provided.

(B) For single vehicles or trainset units that are not semi-permanently connected to an adjacent vehicle or trainset unit, a minimum of two locations, one per side, shall be provided.

(ii) Exterior side doors used for passenger boarding and alighting that provide ground-level access equipped with handholds meeting the requirements of paragraphs (d)(1)(i), (d)(2), and (d)(3) of this section may be used to satisfy the requirements of paragraph (f)(1)(i) of this section so long as access to the controlling cab can be gained from the interior of the trainset.

(iii) An exterior cab access side door that provides access to the trainset cab and is equipped with handholds meeting the requirements of paragraphs (d)(1)(ii), (d)(2), and (d)(3) of this section may be used to satisfy the requirements of paragraph (f)(1)(i) of this section so long as access to the interior of the trainset can be gained from the trainset cab.

(2) *Ground level crew access side steps.* (i) Except as provided in paragraph (f)(2)(iv) of this section, for each location provided for crewmember ground-level access under paragraph (f)(1)(i) of this section, steps shall be provided that comply with the requirements of paragraphs (e)(2) through (4) of this section and meet the following requirements:

(A) The outside edge of the tread of the step shall be not more than 3 inches inside of the edge of the door threshold; and

(B) The bottom tread shall be not more than 24 inches, preferably not more than 22, inches above top of rail.

(ii) Handholds meeting the requirements of paragraphs (d)(1)(ii), (d)(2), and (d)(3) of this section shall be provided at each location where ground level crew access steps are provided.

(iii) The steps required under paragraph (f)(2)(i) may be retractable.

(iv) Portable ladders equipped with handrails designed for safe access from ground level can also be used in lieu of crew side access steps.

(g) *Couplers.* (1) Except as provided in paragraph (g)(2) of this section, trainset units shall be equipped with automatic couplers at each end. The coupler shall—

(i) Couple on impact; and

(ii) Uncouple by either activation of a traditional uncoupling lever, or some other type of uncoupling mechanism that does not require a person to go on, under, or between the trainset units.

(2) An automatic coupler is not required—

(i) At trainset unit ends that are semi-permanently coupled to an adjacent trainset unit; or

(ii) Where the coupler on the leading and trailing ends of a trainset is only used for rescue purposes. The railroad shall develop and implement rescue procedures that assure employee safety during rescue operations are included as part of its inspection, testing, and maintenance program.

(h) *Uncoupling levers or devices.* (1) *General.* Each trainset unit end equipped with an automatic coupler required by paragraph (g)(1) of this section shall have either—

(i) A manual uncoupling lever; or,

(ii) An uncoupling mechanism operated by controls located in the appropriate cab, or other secure location in a trainset. Additional manual uncoupling levers or handles on the coupler provided only as a backup for that remotely operated mechanism are not subject to paragraph (h)(2) of this section, but shall allow use from outside the gage of the track, or in accordance with railroad procedures.

(2) *Manual uncoupling lever or device.* Manual uncoupling levers shall be applied so that the automatic coupler can be operated from the left side of the trainset unit as determined when facing the end of the trainset unit, from ground level without requiring a person to go between cars or trainset units. Manual uncoupling levers shall have a minimum clearance of 2 inches, preferably 2½ inches, around the handle.

(i) *Shrouding or aerodynamic treatments.* The automatic coupler, end

handholds, and uncoupling mechanism on the leading and trailing ends of a trainset unit may be located within a removable shroud to reduce aerodynamic effects.

(j) *Hand brakes.* Trainsets, and trainset units or sections of trainsets that are not semi-permanently coupled to an adjacent trainset unit or section of trainset, must be equipped with an efficient parking or hand brake capable of holding the trainset, trainset unit, or section of trainset on at least a 3-percent grade, or on the worst-case grade conditions identified by the operating railroad, as approved by FRA.

(k) *Safety appliances for appurtenances and windshields.* (1) Trainsets and trainset units having appurtenances such as headlights, windshield wipers, marker lights, and other similar items required for the safe operation of the trainset or trainset unit must be equipped with handholds and steps meeting the requirements of this section, if the appurtenances are designed to be maintained or replaced from the exterior of the trainset or equipment.

(2) The requirements of paragraph (k)(1) do not apply if railroad operating rules require, and actual practice entails, the maintenance and replacement of these components by maintenance personnel in locations protected by the requirements of subpart B of part 218 of this chapter equipped with ladders and other tools to safely repair or maintain those appurtenances.

(l) *Optional safety appliances.* Safety appliances installed at the option of the railroad shall be approved by FRA pursuant to § 238.110.

■ 41. Add subpart I to part 238 to read as follows:

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

Sec.

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

§ 238.901 Scope.

This subpart contains specific requirements for inspection, testing, and maintenance of Tier III passenger equipment.

§ 238.903 General requirements.

(a) *General.* Each railroad operating Tier III passenger equipment shall have a written inspection, testing, and maintenance program, approved pursuant to § 238.913.

(b) *Program contents.* The program shall provide detailed information, consistent with the requirements set forth in this subpart, on the inspection, testing, and maintenance procedures necessary for the railroad to safely maintain and operate its Tier III passenger equipment. This information shall include a detailed description of—

(1) Inspection procedures, intervals, and acceptance/rejection criteria addressing applicable reliability-based monitoring and inspections based on appendix E to this part or an equivalent national or international standard;

(2) Test procedures and intervals;

(3) Scheduled preventative maintenance intervals;

(4) Maintenance procedures;

(5) Special testing equipment or measuring devices required to perform inspections and tests;

(6) The training, qualification, and designation of employees and contractors to perform inspections, tests, and maintenance pursuant to the requirements of paragraph (h) of this section;

(7) Out-of-service procedures to protect out-of-service equipment, to account for time out of service, and how the railroad will return out-of-service equipment back to service; and

(8) The required operational braking capability.

(c) *Specific safety inspections.* The program required under paragraph (a) of this section shall ensure that all Tier III passenger trainsets receive thorough safety inspections by qualified personnel designated by the railroad at regular intervals. Each inspection identified in this paragraph shall be performed on Tier III trainsets in accordance with the test procedures and inspection criteria and at the intervals defined by the railroad's approved inspection, testing, and maintenance program. Except as specified in paragraph (c)(2)(i) of this section regarding defects in a trainset's braking system, if any system or component that is defined as safety-critical under § 238.911(b) is found to be defective or otherwise non-compliant during these inspections, the trainset shall not be put into service until that condition is rectified. In addition to other inspections required under subpart H of this part, the following inspections shall be performed on each trainset:

(1) Pre-departure inspections, *i.e.,* trainset system verifications, inspections, or functional tests that must be performed prior to departures from terminal locations where operating ends or operating crews are changed. Pre-departure inspection procedures must include—

(i) Verification of application and release of the service and emergency brakes using the monitoring system; and

(ii) Functional tests of the passenger access exterior side doors.

(2) Pre-service inspections, *i.e.,* inspections conducted at identified locations where such inspections can be safely and properly conducted prior to the trainset entering service after the previous pre-service inspection, at a period not to exceed 48 hours. At a minimum, pre-service inspections must include—

(i) All items covered under paragraph (c)(1) of this section. Defects with the brake system discovered during a pre-service inspection shall be handled in accordance with § 238.1003(d)(1), except that if a trainset's braking system is discovered having less than the required operational braking capability, it shall move immediately to a repair point under the provisions of § 238.1003(b) and (e).

(ii) An interior inspection of emergency systems, ensuring functionality of certain systems (such as the public address and intercom systems) including a determination that any required tools or other implements necessary for emergency egress are present.

(3) Brake system inspections.

(4) Truck inspections.

(5) Other safety-critical periodic inspections.

(d) *Inspection, testing and maintenance intervals.* The program shall identify the railroad's initial scheduled inspection, testing, and maintenance intervals for Tier III equipment. Changes to scheduled inspection, testing, and maintenance intervals of safety-critical components, as identified by § 238.911(b), shall be implemented only when approved by FRA under § 238.913. Such changes must be justified by accumulated, verifiable operating data.

(e) *Training and qualification program.* The program required under

this subpart shall describe the training, qualification, and designation program established by the railroad to qualify individuals to inspect, test, and maintain the equipment.

(1) The railroad shall identify which inspection, testing, or maintenance tasks require special training or qualifications.

(2) The training and qualification program shall, at a minimum, address the items in § 238.109(b).

(3) A list of all personnel and contractors designated as qualified to perform activities specific to paragraph (e)(1) of this section, training material, and records shall be maintained and made available to FRA upon request.

(4) Only individuals qualified under the railroad's program may inspect, test, or maintain components or systems the railroad deems safety-critical.

(f) *Retention of records.* At a minimum, the railroad shall keep the records of each inspection required under paragraph (c) of this section. Each record shall be maintained for at least one year from the date of the inspection.

§ 238.905 Compliance.

After the railroad's inspection, testing, and maintenance program is approved by FRA pursuant to § 238.913, the railroad shall adopt and comply with the program, and perform—

(a) All inspections and tests described in the program in accordance with the procedures and criteria for the components that the railroad identifies as safety-critical; and

(b) All maintenance tasks described in the program in accordance with the procedures and intervals for the components that the railroad identifies as safety-critical.

§ 238.907 Standard procedures for safely performing inspection, testing, and maintenance, and repairs.

(a) The railroad shall establish standard procedures for performing all safety-critical or potentially hazardous inspection, testing, maintenance, and repair tasks. These standard procedures shall—

(1) Describe in detail each step required to safely perform the task;

(2) Describe the knowledge necessary to safely perform the task;

(3) Describe any precautions that shall be taken to safely perform the task;

(4) Describe the use of any safety equipment necessary to perform the task;

(5) Be approved by the railroad's official responsible for safety;

(6) Be enforced by the railroad's supervisors responsible for accomplishing the tasks; and

(7) Be reviewed annually by the railroad and its designated employee representatives pursuant to § 238.913(e).

(b) The inspection, testing, and maintenance program required by this section is not intended to address and should not include procedures to address employee working conditions that arise in the course of conducting the inspections, tests, and maintenance set forth in the program. When reviewing the railroad's program, FRA does not intend to review any portion of the program that relates to employee working conditions.

§ 238.909 Quality control/quality assurance program.

Each railroad shall establish an inspection, testing, and maintenance quality control/quality assurance program. The railroad or its contractor(s), or both, shall ensure that inspections, testing, and maintenance are performed in accordance with the railroad's approved inspection, testing, and maintenance program.

§ 238.911 Inspection, testing, and maintenance program format.

The railroad's inspection, testing, and maintenance program established pursuant to this subpart I shall be comprised of—

(a) The complete inspection, testing, and maintenance program for all components, systems, or sub-systems on a Tier III trainset, whether safety-critical or not, to include all inspections, tests, and maintenance tasks required, the intervals and periodicity of those inspections, tests, and maintenance tasks, and all associated information and procedures required for the railroad and its personnel to implement the program. The railroad shall submit the complete program to FRA along with the condensed version required under paragraph (b) of this section for FRA review to ensure that the railroad has properly classified a particular inspection, test, or maintenance task as safety-critical or not. Should FRA identify a particular inspection, test, or maintenance task as safety-critical, the railroad shall include the particular inspection, test, or maintenance task in the condensed version of the program under paragraph (b) of this section.

(b) A condensed version of the program that contains only those items identified as safety-critical by the railroad. The railroad shall submit this version for approval by FRA, as provided in § 238.913. The operation of emergency equipment, emergency back-up systems, trainset exits, and trainset safety-critical hardware and software systems shall be deemed safety-critical.

§ 238.913 Inspection, testing, and maintenance program approval procedure.

(a) *Submission*—(1) *Initial submission.* The railroad shall submit for approval an inspection, testing, and maintenance program not less than 180 days prior to commencing revenue service. The program shall be submitted to the Associate Administrator.

(2) *Submission of amendments.* If the railroad seeks to amend an approved program, the railroad shall file with the Associate Administrator for approval of such amendment not less than 60 days prior to the proposed implementation date of the amendment.

(b) *Contents.* Each program or amendment shall contain the following:

(1) The information prescribed in this subpart for such program or amendment;

(2) The name, title, address, and telephone number of the primary point of contact for the program or amendment; and

(3) A statement affirming that the railroad has provided a copy of the program or amendment on designated representatives of railroad employees as required under paragraph (c) of this section, together with a list of the names and addresses of those persons.

(c) *Comment.* Each railroad shall provide a copy to the designated representatives of railroad employees responsible for the equipment's operation, inspection, testing, and maintenance under this subpart, of each submission filed with FRA. Designated representatives will then have 45 days from the date of filing to provide any comment to FRA.

(1) Each comment shall set forth specifically the basis upon which it is made and contain a concise statement of the interest of the commenter in the proceeding.

(2) Each comment shall be submitted to the Associate Administrator.

(3) The commenter shall certify that a copy of the comment was provided to the railroad.

(d) *Approval*—(1) *Initial submission.* Within 60 days of receipt of each initial inspection, testing, and maintenance program, FRA will conduct a formal review of the program. FRA will then notify the primary railroad contact person in writing whether the inspection, testing, and maintenance program is approved and, if not approved, the specific points in which the program is deficient. If a program is not approved by FRA, the railroad shall amend its program to correct all deficiencies and resubmit its program with the required revisions not later than 45 days prior to commencing revenue service. The railroad shall not

implement its inspection, testing, and maintenance program until approved by FRA.

(2) *Amendments.* FRA will review each proposed amendment to the program within 45 days of receipt. FRA will then notify the primary railroad contact person and the designated employee representatives in writing whether the proposed amendment has been approved by FRA and, if not approved, the specific points in which the proposed amendment is deficient. The railroad shall correct any deficiencies and file the corrected amendment prior to implementing the amendment.

(3) *Identification of deficiencies after approval.* Should FRA identify deficiencies within the program following initial approval of a program or approval of an amendment, FRA will notify the railroad of the specific points in which the program or amendment is deficient. The railroad must resubmit its program or amendment with the necessary revisions for review and approval in accordance with paragraph (d)(1) or (2) of this section.

(e) *Annual review.* The inspection, testing, and maintenance program required by this section shall be reviewed by the railroad annually. The railroad shall provide written notice to the Associate Administrator and the designated representatives of the railroad's employees at least one month prior to the annual review. If the Associate Administrator or their designee indicates a desire to be present, the railroad shall provide a scheduled date and location for the annual review. If the Associate Administrator requests the annual review be performed on another date but the railroad and the Associate Administrator are unable to agree on a date for rescheduling, the annual review may be performed as scheduled.

■ 42. Add subpart J to part 238 to read as follows:

Subpart J—Movement of Defective Tier III Passenger Equipment

Sec.

Subpart J—Movement of Defective Tier III Passenger Equipment

§ 238.1001 Scope.

This subpart contains specific requirements for the movement of defective Tier III passenger equipment.

§ 238.1003 Movement of defective Tier III passenger equipment.

(a) Except as provided in § 238.903(c)(2)(i) and paragraph (d)(1) of this section, a Tier III trainset with one or more safety-critical items not in compliance with the railroad's approved inspection, testing, and maintenance program identified during a pre-service inspection required by § 238.903(c)(2) shall not be moved in revenue service and may only be moved in accordance with paragraph (e) of this section.

(b) A Tier III trainset with one or more safety-critical items not in compliance with the railroad's approved inspection, testing, and maintenance program identified while en route to its destination after its pre-service inspection is performed and before its next pre-service inspection is performed, may be moved only after the railroad has complied with the following:

(1) An individual qualified under the training and qualification program implemented pursuant to § 238.903(e) determines that it is safe to move the trainset, consistent with the railroad's operating rules. If appropriate, this determination may be made based upon a description of the defective condition provided by a crewmember. If the determination required by this paragraph is made by an off-site, qualified individual based on a description of the defective condition by on-site personnel, then a qualified individual shall perform a physical inspection of the defective equipment at the first location possible to verify the description of the defect provided by the on-site personnel.

(2) The qualified individual who made the determination in paragraph (b)(1) of this section notifies the train crew, in accordance with the railroad's operating rules, of the maximum authorized speed, authorized destination, and any other operational restrictions that apply to the movement of the non-compliant trainset. This notification may be achieved through the tag required by paragraph (b)(3) of this section.

(3) The qualified individual securely attaches to the control stand on each control cab of the trainset a tag bearing the words ''NON–COMPLIANT TRAINSET'' and containing the following information:

(i) The trainset, and unit or car number;

(ii) The name, job title, location, and signature if possible, of the qualified individual making the determination that the non-compliant trainset is otherwise safe to move;

(iii) The location and date of the inspection that led to the discovery of the non-compliant item;

(iv) A description of each non-compliant item;

(v) Movement restrictions, if any; and

(vi) The authorized destination of the trainset.

(c) Automated tracking systems used to meet the tagging requirements contained in paragraph (b)(3) of this section must comply with § 238.15(c)(3).

(d) In the event of an in-service failure of the braking system—

(1) The trainset may continue in service for no more than 5 consecutive calendar days so long as the trainset meets or exceeds its required operational braking capability.

(2) When below the required operational braking capability, the trainset may remain in service until the next pre-service inspection and proceed only in accordance with railroad operating rules relating to the percentage of operative brakes and at a speed no greater than the maximum authorized speed as determined by § 238.731(e)(4), so long as the requirements of paragraph (b) of this section are otherwise fully met.

(e) Except as provided in paragraph (d)(1) of this section, a trainset with one or more safety-critical items not in compliance with the railroad's approved inspection, testing, and maintenance program may be moved without passengers, within a yard, and at speeds not to exceed 10 mph, without meeting the requirements of paragraph (b) of this section where the movement is solely for the purpose of repair. A railroad shall ensure that the movement is made safely. If the railroad elects to repair the equipment in place, it shall, at a minimum, tag the equipment in accordance with paragraph (b)(3) of this section to make clear that the trainset is defective.

(f) Nothing in this section authorizes the movement of Tier III equipment subject to a Special Notice for Repair under part 216 of this chapter unless the movement is made in accordance with the restrictions contained in the Special Notice.

■ 43. Revise appendix C to part 238 to read as follows:

Appendix C to Part 238—Minimally Compliant Analytical Track (MCAT) Simulations Used for Qualifying Passenger Vehicles To Operate on Track Classes 2 Through 5 and up to 6 Inches of Cant Deficiency

(a) This appendix contains requirements for using computer simulations to comply with the vehicle/track system qualification testing requirements specified in § 238.139.

These simulations shall be performed using a track model containing defined geometry perturbations at the limits that are permitted for a specific class of track and level of cant deficiency. This track model is known as Minimally Compliant Analytical Track (MCAT). These simulations shall be used to identify vehicle dynamic performance issues prior to service or, as appropriate, a change in service, and demonstrate that a vehicle type is suitable for operation on the track over which it is intended to operate.

(b) As specified in § 238.139(c), MCAT shall be used for the qualification of new vehicle types intended to operate at track Classes 2 through 5 speeds, or at any curving speed producing no more than 6 inches of cant deficiency. In addition, as specified in § 238.139(d)(2), MCAT shall be used to qualify on new routes vehicle types that have previously been qualified, by testing only, on other routes.

(1) *Validation.* To validate the vehicle model used for simulations under this part, the track owner or railroad shall obtain vehicle simulation predictions using measured track geometry data, chosen from the same track section over which testing shall be performed as specified in § 238.139(c)(2)(ii). These predictions shall be submitted to FRA in support of the request for approval of the qualification testing plan. Full validation of the vehicle model used for simulations under this part shall be determined when the results of the simulations demonstrate that they replicate all key responses observed during qualification testing.

(2) *MCAT layout.* MCAT consists of nine segments, each designed to test a vehicle's performance in response to a specific type of track perturbation. The basic layout of MCAT is shown in figure 1 of this appendix, by type of track (curving or tangent), class of track, and cant deficiency (CD). The values for wavelength, λ, amplitude of perturbation, a, and segment length, d, are specified in this appendix. The bars at the top of figure 1 show which segments are required depending on the speed and degree of curvature.

(i) *MCAT segments.* MCAT's nine segments contain different types of track deviations in which the shape of each deviation is a versine having wavelength and amplitude varied for each simulation speed as further specified. The nine MCAT segments are defined as follows:

(A) *Hunting perturbation (a_1).* This segment contains an alinement deviation having a wavelength, λ, of 10 feet and amplitude of 0.25 inch on both rails to test vehicle stability on tangent track.

(B) *Gage narrowing (a_2).* This segment contains an alinement deviation on one rail to reduce the gage from the nominal value to the minimum permissible gage or maximum alinement (whichever comes first).

(C) *Gage widening (a_3).* This segment contains an alinement deviation on one rail to increase the gage from the nominal value to the maximum permissible gage or maximum alinement (whichever comes first).

(D) *Repeated surface (a_9).* This segment contains three consecutive profile variations on each rail.

(E) *Repeated alinement (a_4).* This segment contains two consecutive alinement variations on each rail.

(F) *Single surface (a_{10}, a_{11}).* This segment contains a maximum permissible profile variation on one rail. If the maximum permissible profile variation alone produces a condition which exceeds the maximum allowed warp condition, a second profile variation is also placed on the opposite rail to limit the warp to the maximum permissible value.

(G) *Single alinement (a_5, a_6).* This segment contains a maximum permissible alinement variation on one rail. If the maximum permissible alinement variation alone produces a condition which exceeds the maximum allowed gage condition, a second alinement variation is also placed on the opposite rail to limit the gage to the maximum permissible value.

(H) *Short warp (a_{12}).* This segment contains a pair of profile deviations to produce a maximum permissible 10-foot warp perturbation. The first is on the inner rail, and the second follows 10 feet farther on the outside rail. Each deviation has a wavelength, λ, of 20 feet and variable amplitude for each simulation speed as described below. This segment is to be used only on curved track simulations.

(I) *Combined perturbation (a_7, a_8, a_{13}).* This segment contains a down and out combined geometry condition on the outside rail in the body of the curve. If the variations produce a condition which exceeds the maximum allowed gage condition, a second variation is also placed on the opposite rail as for the MCAT segments described in paragraphs (b)(2)(i)(F) and (G) of this appendix. This segment is to be used for all curved track simulations at speeds producing no more than 6 inches of cant deficiency on track Classes 2 through 5.

(ii) *Segment lengths.* Each MCAT segment shall be long enough to allow the vehicle's response to the track deviation(s) to damp out. Each segment shall also have a minimum length as specified in table 1 of this appendix, which references the distances in figure 1 of this appendix. For curved track segments, the perturbations shall be placed far enough in the body of the curve to allow for any spiral effects to damp out.

(iii) *Degree of curvature.* (A) For each simulation involving assessment of curving performance, the degree of curvature, D, which generates a particular level of cant deficiency, E_u, for a given speed, V, shall be calculated using the following equation:

$$D = \frac{E_a + E_u}{0.0007 \times V^2}$$

Where

D = Degree of curvature (degrees).
V = Simulation speed (mph).
E_a = 3 inches for Class 2 and 6 inches for Classes 3 through 5.
E_u = Cant deficiency (inches).

(B) Table 2 of this appendix depicts the degree of curvature for use in MCAT simulations of passenger equipment performance on Class 2 through 5 track, based on the equation in paragraph (b)(2)(iii)(A) of this appendix.

(3) *Required simulations*—(i) *General.* To develop a comprehensive assessment of vehicle performance, simulations shall be performed for a variety of scenarios using MCAT. These simulations shall be performed on tangent or curved track, or both, depending on the level of cant deficiency and speed (track class) as summarized in table 3 of this appendix.

(A) All simulations shall be performed using the design wheel profile and a nominal track gage of 56.5 inches, using tables 4, 5, or 6 of this appendix, as appropriate. In addition, all simulations involving the assessment of curving performance shall be repeated using a nominal track gage of 57.0 inches, using tables 5 or 6 of this appendix, as appropriate.

(B) For tangent track segments, all simulations on the hunting perturbation shall be repeated using a high-conicity, wheel-rail profile combination approved by FRA that produces a minimum conicity of 0.4 for wheelset lateral shifts up to flange contact.

(C) All simulations shall be performed using a wheel/rail coefficient of friction of 0.5.

(ii) *Vehicle performance on tangent track Classes 2 through 5.* For maximum vehicle speeds corresponding to track Classes 2 through 5, the MCAT segments described in paragraphs (b)(2)(i)(A) through (G) of this appendix shall be used to assess vehicle performance on tangent track. A parametric matrix of MCAT simulations shall be performed using the following range of conditions:

(A) *Vehicle speed.* Simulations shall demonstrate that at up to 5 mph above the proposed maximum operating speed, the vehicle type shall not exceed the wheel/rail force and acceleration criteria defined in the Vehicle/Track Interaction Safety Limits table in § 213.333 of this chapter. Simulations shall also demonstrate acceptable vehicle dynamic response by incrementally increasing speed, as shown in table 2, up to 5 mph above the proposed maximum operating speed for each track class (in 5 mph increments).

(B) *Perturbation wavelength.* For each speed, a set of two separate MCAT simulations shall be performed. In each MCAT simulation for the perturbation segments described in paragraphs (b)(2)(i)(B) through (G) of this appendix, every perturbation shall have the same wavelength. The following two wavelengths, λ, shall be used: 31, and 62 feet. The hunting perturbation segment described in paragraph (b)(2)(i)(A) of this appendix has a fixed wavelength, λ, of 10 feet.

(C) *Amplitude parameters.* Table 4 of this appendix provides the amplitude values for the MCAT segments described in paragraphs (b)(2)(i)(A) through (G) of this appendix for each speed of the required parametric MCAT simulations. The last set of simulations shall

be performed at 5 mph above the proposed maximum operating speed, as shown in table 2, using the amplitude values in table 4 that correspond to the proposed maximum operating speed.

Figure 1 of Appendix C to Part 238 MCAT Simulations on Curved Track (Cant Deficiency ≤6 Inches) Track Layout

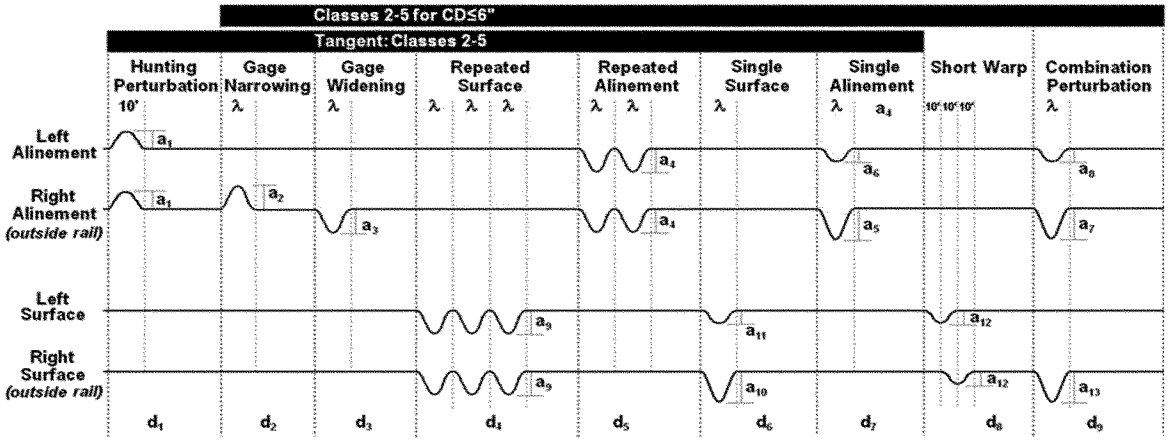

TABLE 1 OF APPENDIX C TO PART 238—MINIMUM LENGTHS OF MCAT SEGMENTS

Distances (ft)								
d_1	d_2	d_3	d_4	d_5	d_6	d_7	d_8	d_9
1,000			1,500	1,000				

TABLE 2 OF APPENDIX C TO PART 238—DEGREE OF CURVATURE FOR USE IN MCAT SIMULATIONS (TRACK CLASSES 2 THROUGH 5) CANT DEFICIENCY ≤6 INCHES

	Tangent	Cant deficiency			
		Class 2 Ea[1] = 3″, Class 3 through 5 Ea = 6″			
		3″	4″	5″	6″
Class 2:					
30 mph	0	9.52	.....	.....	.....
35 mph	0	9.52	.....	.....	.....
Class 3:					
35 mph	0	10.50	11.66	12.83	13.99
40 mph	0	8.04	8.93	9.82	10.71
45 mph	0	6.35	7.05	7.76	8.47
50 mph	0	5.14	5.71	6.29	6.86
55 mph	0	4.25	4.72	5.19	5.67
60 mph	0	3.57	3.97	4.37	4.76
65 mph	0	3.57	3.97	4.37	4.76
Class 4:					
65 mph	0	3.04	3.38	3.72	4.06
70 mph	0	2.62	2.92	3.21	3.50
75 mph	0	2.29	2.54	2.79	3.05
80 mph	0	2.01	2.23	2.46	2.68
85 mph	0	2.01	2.23	2.46	2.68
Class 5:					
85 mph	0	1.78	1.98	2.17	2.37
90 mph	0	1.59	1.76	1.94	2.12
95 mph	0	1.59	1.76	1.94	2.12

[1] "Ea" means actual elevation.

TABLE 3 OF APPENDIX C TO PART 238—SUMMARY OF REQUIRED VEHICLE PERFORMANCE ASSESSMENT USING SIMULATIONS

	New vehicle types
Curved Track: cant deficiency ≤6 inches	Curving performance simulation: required for track classes 2 through 5.
Tangent track	Tangent performance simulation: required for track classes 2 through 5.

Table 4 of Appendix C to Part 238—Track Class 2 Through 5 Amplitude Parameters (in Inches) for MCAT Simulations on Tangent Track

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		Gage 56.5"			
		Class 2	**Class 3**	**Class 4**	**Class 5**
Passenger	Max. Operating Speed (mph)	30	60	80	90
	Max. Simulation Speed (mph)	35	65	85	95

MCAT Segments	**Parameter**	**Segment Description**
Hunting	a_1	(b)(1)(i)
Gage Narrowing	a_2	(b)(1)(ii)
Gage Widening	a_3	(b)(1)(iii)
Repeated Surface	a_9	(b)(1)(ii)
Repeated Alinement	a_4	(b)(1)(iii)
Single Surface	a_{10}, a_{11}	(b)(1)(vi)
Single Alinement	a_5, a_6	(b)(1)(vii)
Short Warp	a_{12}	
Combined Perturbation	a_7, a_8, a_{13}	

		Amplitude Parameters (inches)			
Wavelength λ = 10ft	a_1	0.250	0.250	0.250	0.250
Wavelength λ = 20ft	a_{12}				
Wavelength λ = 31ft	a_2	0.500	0.500	0.500	0.500
	a_3	1.250	1.250	1.000	0.750[1]
	a_4	2.250[1,2]	1.313[1,2]	1.125[1,2]	0.563[1,2]
	a_5	3.000[1]	1.750[1]	1.500[1]	0.750[1]
	a_6	1.750	0.500	0.500	0.000
	a_7				
	a_8				
	a_9	2.063[1,2]	1.688[1,2]	1.500[1,2]	0.938[1,2]
	a_{10}	2.750[1]	2.250[1]	2.000[1]	1.250[1]
	a_{11}	0.750	0.500	0.750	0.250
	a_{13}				
Wavelength λ = 62ft	a_2	0.500	0.500	0.500	0.500
	a_3	1.250	1.250	1.000	0.750
	a_4	2.250[2]	1.313[2]	1.125[2]	0.563[2]
	a_5	3.000	1.750	1.500	0.750
	a_6	1.750	0.500	0.500	0.000
	a_7				
	a_8				
	a_9	2.063[2]	1.688[2]	1.500[2]	0.938[2]
	a_{10}	2.750	2.250	2.000	1.250
	a_{11}	0.750	0.500	0.750	0.250
	a_{13}				

1 – No 31ft limit; 62ft limit used
2 – 75% of single perturbation limits used

Table 5 of Appendix C to Part 238 Track Class 2 Through 5 Amplitude Parameters (in Inches) for MCAT Simulations on Curved Track With Cant Deficiency ≥3 and ≤5 Inches

		Gage 56.5"				Gage 57.0"			
		Class 2	Class 3	Class 4	Class 5	Class 2	Class 3	Class 4	Class 5
Passenger	Max. Operating Speed (mph)	30	60	80	90	30	60	80	90
	Max. Simulation Speed (mph)	35	65	85	95	35	65	85	95
MCAT Segments	**Parameter**	**Segment Description**				**Segment Description**			
Hunting	a_1								
Gage Narrowing	a_2	(b)(1)(ii)				(b)(1)(ii)			
Gage Widening	a_3	(b)(1)(iii)				(b)(1)(iii)			
Repeated Surface	a_9	(b)(1)(ii)				(b)(1)(ii)			
Repeated Alinement	a_4	(b)(1)(iii)				(b)(1)(iii)			
Single Surface	a_{10}, a_{11}	(b)(1)(vi)				(b)(1)(vi)			
Single Alinement	a_5, a_6	(b)(1)(vii)				(b)(1)(vii)			
Short Warp	a_{12}	(b)(1)(viii)				(b)(1)(viii)			
Combined Perturbation	a_7, a_8, a_{13}	(b)(1)(ix)				(b)(1)(ix)			
		Amplitude Parameters (inches)				**Amplitude Parameters (inches)**			
Wavelength λ = 10ft	a_1								
Wavelength λ = 20ft	a_{12}	1.125[2]	1.000[2]	0.875[2]	0.750[2]	1.125[2]	1.000[2]	0.875[2]	0.750[2]
Wavelength λ = 31ft	a_2	0.500	0.500	0.500	0.500	1.000	1.000	1.000	0.500
	a_3	1.250	1.250	1.000	0.500	0.750	0.750	0.500	0.500
	a_4	2.250[1,3]	0.938[3]	0.750[3]	0.375[3]	2.250[1,3]	0.938[3]	0.750[3]	0.375[3]
	a_5	3.000[1]	1.250	1.000	0.500	3.000[1]	1.250	1.000	0.500
	a_6	1.750	0.000	0.000	0.000	2.250	0.500	0.500	0.000
	a_7	2.250[1,3]	0.938[3]	0.750[3]	0.375[3]	2.250[1,3]	0.938[3]	0.750[3]	0.375[3]
	a_8	1.000	0.000	0.000	0.000	1.500	0.188	0.250	0.000
	a_9	2.063[1]	1.688[1]	1.500[1]	0.938[1]	2.063[1]	1.688[1]	1.500[1]	0.938[1]
	a_{10}	2.750[1]	2.250[1]	2.000[1]	1.250[1]	2.750[1]	2.250[1]	2.000[1]	1.250[1]
	a_{11}	0.500	0.250	0.250	0.000	0.500	0.250	0.250	0.000
	a_{13}	2.063[1,3]	1.688[1,3]	1.500[1,3]	0.938[1,3]	2.063[1,3]	1.688[1,3]	1.500[1,3]	0.938[1,3]
Wavelength λ = 62ft	a_2	0.500	0.500	0.500	0.500	1.000	1.000	1.000	0.625
	a_3	1.250	1.250	1.000	0.625	0.750	0.750	0.500	0.500
	a_4	2.250[3]	1.313[3]	1.125[3]	0.469[3]	2.250[3]	1.313[3]	1.125[3]	0.469[3]
	a_5	3.000	1.750	1.500	0.625	3.000	1.750	1.500	0.625
	a_6	1.750	0.500	0.500	0.000	2.250	1.000	1.000	0.125
	a_7	2.250[3]	1.313[3]	1.125[3]	0.469[3]	2.250[3]	1.313[3]	1.125[3]	0.469[3]
	a_8	1.000	0.063	0.125	0.000	1.500	0.563	0.625	0.000
	a_9	2.063	1.688	1.500	0.938	2.063	1.688	1.500	0.938
	a_{10}	2.750	2.250	2.000	1.250	2.750	2.250	2.000	1.250
	a_{11}	0.500	0.250	0.250	0.000	0.500	0.250	0.250	0.000
	a_{13}	2.063[3]	1.688[3]	1.500[3]	0.938[3]	2.063[3]	1.688[3]	1.500[3]	0.938[3]

1 – No 31ft limit; 62ft limit used
2 – 62ft cross-level limit
3 – 75% of single perturbation limits used

Table 6 of Appendix C to Part 238 Track Class 2 Through 5 Amplitude Parameters (in Inches) for MCAT Simulations on Curved Track With Cant Deficiency >5 Inches and ≤6 Inches)

		Gage 56.5"				Gage 57.0"			
		Class 2	Class 3	Class 4	Class 5	Class 2	Class 3	Class 4	Class 5
Passenger	Max. Operating Speed (mph)	30	60	80	90	30	60	80	90
	Max. Simulation Speed (mph)	35	65	85	95	35	65	85	95

MCAT Segments	Parameter	Segment Description				Segment Description			
Hunting	a_1								
Gage Narrowing	a_2	(b)(1)(ii)				(b)(1)(ii)			
Gage Widening	a_3	(b)(1)(iii)				(b)(1)(iii)			
Repeated Surface	a_9	(b)(1)(ii)				(b)(1)(ii)			
Repeated Alinement	a_4	(b)(1)(iii)				(b)(1)(iii)			
Single Surface	a_{10}, a_{11}	(b)(1)(vi)				(b)(1)(vi)			
Single Alinement	a_5, a_6	(b)(1)(vii)				(b)(1)(vii)			
Short Warp	a_{12}	(b)(1)(viii)				(b)(1)(viii)			
Combined Perturbation	a_7, a_8, a_{13}	(b)(1)(ix)				(b)(1)(ix)			
		Amplitude Parameters (inches)				Amplitude Parameters (inches)			
Wavelength λ = 10ft	a_1								
Wavelength λ = 20ft	a_{12}		0.875	0.875	0.750		0.875	0.875	0.750
Wavelength λ = 31ft	a_2		0.500	0.500	0.500		0.750	0.750	0.500
	a_3		0.750	0.750	0.500		0.750	0.500	0.500
	a_4		0.563[1]	0.563[1]	0.375[1]		0.563[1]	0.563[1]	0.375[1]
	a_5		0.750	0.750	0.500		0.750	0.750	0.500
	a_6		0.000	0.000	0.000		0.000	0.250	0.000
	a_7		0.500	0.500	0.333		0.500	0.500	0.333
	a_8		0.000	0.000	0.000		0.000	0.000	0.000
	a_9		0.750[1]	0.750[1]	0.750[1]		0.750[1]	0.750[1]	0.750[1]
	a_{10}		1.000	1.000	1.000		1.000	1.000	1.000
	a_{11}		0.000	0.000	0.000		0.000	0.000	0.000
	a_{13}		0.667	0.667	0.667		0.667	0.667	0.667
Wavelength λ = 62ft	a_2		0.500	0.500	0.500		1.000	0.875	0.625
	a_3		1.250	0.875	0.625		0.750	0.500	0.500
	a_4		0.938[1]	0.656[1]	0.469[1]		0.938[1]	0.656[1]	0.469[1]
	a_5		1.250	0.875	0.625		1.250	0.875	0.625
	a_6		0.000	0.000	0.000		0.500	0.375	0.125
	a_7		0.833	0.583	0.417		0.833	0.583	0.417
	a_8		0.000	0.000	0.000		0.083	0.083	0.000
	a_9		1.313[1]	0.938[1]	0.750[1]		1.313[1]	0.938[1]	0.750[1]
	a_{10}		1.750	1.250	1.000		1.750	1.250	1.000
	a_{11}		0.000	0.000	0.000		0.000	0.000	0.000
	a_{13}		1.167	0.833	0.667		1.167	0.833	0.667

1 – 75% of single perturbation limits used

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■ 44. Add Appendix I to part 238 to read as follows:

Appendix I to Part 238—Tier III Trainset Cab Noise Test Protocol

This appendix prescribes the procedures for the in-cab noise measurements for Tier III trainsets at speed. The purpose of the cab noise testing is to ensure that the noise levels within the cab of the trainset meet the minimum requirements defined within § 238.759(a)(1).

I. Measurement Instrumentation

The instrumentation used shall conform to the measurement instrumentation requirements prescribed in paragraph I of appendix H to part 229 of this chapter.

II. Test Site Requirements

The test site shall meet the following requirements:

(1) The passenger trainset shall be tested over a representative segment of the railroad and shall not be tested in any site specifically designed to artificially lower in-cab noise levels.

(2) All windows, doors, cabinets seals, etc., must be installed in the trainset cab and be closed.

(3) The heating, ventilation, and air conditioning (HVAC) system or a dedicated heating or air conditioner system must be operating on high, and the vents must be open and unobstructed.

III. Procedures for Measurement

(1) $L_{Aeq, T}$ is defined as the A-weighted, equivalent sound level for a duration of T seconds, and the sound level meter shall be set for A-weighting with slow response.

(2) The sound level meter shall be calibrated with the acoustic calibrator immediately before and after the in-cab tests. The calibration levels shall be recorded.

(3) Any change in the before and after calibration level(s) shall be less than 0.5 dB.

(4) The sound level meter shall be located:

(i) Laterally as close as practicable to the longitudinal centerline of the cab, adjacent to the engineer's seat;

(ii) Longitudinally at the center of the engineer's nominal seating position; and

(iii) At a height 1,219 mm (48 inches) above the floor.

(5) The sound measurements shall be taken autonomously within the cab.

(6) The sound level shall be recorded at the maximum approved train speed ± 3km/h (±1.86 mph).

(7) After the trainset speed has become constant at the maximum test speed and the in-cab noise is continuous, $L_{Aeq, T}$ shall be measured, either directly or using a 1-second sampling interval, for a minimum duration of 30 seconds at the measurement position ($L_{Aeq, 30s}$).

IV. Recordkeeping

To demonstrate compliance, the entity conducting the test shall maintain records of the following data. The records created under this procedure shall be retained and made readily accessible for review for a minimum of three years. All records may be maintained in either written or electronic form.

(1) Name(s) of persons conducting the test, and the date of the test.

(2) Description of the passenger trainset cab being tested, including: model number, serial number, and date of manufacture.

(3) Description of sound level meter and calibrator, including: make, model, type, serial number, and manufacturer's calibration date.

(4) The recorded measurement during calibration and for the microphone location during operating conditions.

(5) The recorded measurements taken during the test.

(6) Other information as appropriate to describe the testing conditions and procedure.

(7) Where a trainset fails a test and is re-tested under the provisions of section III(7) of this appendix, the suspected reason(s) for the failure.

■ 45. Add Appendix J to part 238 to read as follows:

Appendix J to Part 238—Alternative Requirements for Evaluating the Crashworthiness and Occupant Protection Performance of a Tier I Passenger Trainset Equipped With Crash Energy Management Features

General

As required by § 238.110(e)(1), this appendix applies to single pieces of passenger equipment that are fully compliant with existing Tier I structural requirements, provide additional CEM features, and are intended for interoperable use within conventional, Tier I-compliant trains. The requirements of this appendix do not apply to Tier I alternatively designed trainsets, or single pieces of equipment fully compliant with existing Tier I structural requirements outfitted with pushback couplers as the only CEM feature. Each new, fully Tier I-compliant single vehicle design equipped with additional CEM features shall be subject to the following collision scenarios to ensure appropriate performance of the crush zone and stable load transmission.

In-Line Collision Scenario Between Identical Trains

The new single car or locomotive design shall be placed into a reference train composed of vehicles of similar design, the details of which depend upon whether the single car is a locomotive, cab car, or an intermediate car. The vehicles shall be in-line without offset between adjacent cars. The reference train shall be subjected to a collision with an identical train on level, tangent track as described below. This symmetric scenario may be simulated by a collision of the reference train moving at one-half the collision speed into a rigid, stationary plane whose normal direction is parallel to the direction of travel (representing the plane of symmetry). Each car in both trains shall have a weight corresponding to AW0 and shall not have the brakes applied.

Non-Passenger Carrying Locomotives

For non-passenger carrying locomotives with CEM features, the reference train shall consist of five of the non-passenger carrying CEM locomotives. The closing speed for this collision scenario is that which is sufficient to exhaust the design energy-absorption capacity of the leading locomotive crush zone.

CEM-Equipped Cab Cars

For evaluation of the performance of a CEM-equipped cab car, the reference train shall consist of five such CEM-equipped cab cars. If the CEM-equipped cab cars are not all of symmetric design, each end of the trailing four cars shall have the same crush zone as that of the non-cab end of the non-symmetric cab car under evaluation. The closing speed for this collision scenario is that which results in dissipation of no less than 75 percent of the design energy-absorption capacity of at least one crush zone at the colliding interface.

CEM-Equipped Intermediate Cars

Evaluation of the performance of CEM-equipped intermediate cars shall be performed using a reference train consisting of four identical intermediate cars behind a leading vehicle with the following characteristics:

(a)(1) The leading vehicle shall be decelerated to zero by:

(i) A prescribed motion equivalent to a constant, longitudinal deceleration of 8g; or

(ii) An application of forces resulting in a deceleration of at least 8g.

(2) The point of application of the motion constraint or the measurement of the resulting speed shall be located in the rear half of the leading vehicle.

(b) The trailing end of the leading vehicle shall have the same crash characteristic as the adjacent end of the coach to be assessed (if the evaluation vehicle is of a symmetric design), or the same crash characteristic as the trailing end of the coach to be assessed (if the evaluation vehicle is of a non-symmetric design), where:

(1) The crush zone shall be represented with the same degree of detail as the coach to be assessed; and

(2) Any additional potential contact surfaces shall be represented, at a minimum, as rigid geometry.

(c) The forward structure of the leading vehicle may be modelled:

(1) Identically to the coach to be assessed;

(2) As a lumped mass model with a stiffness not less than the coach to be assessed; or

(3) As rigid.

(d) The criteria for preservation of survival space in § 238.705(b)(1)(i) and (ii) shall apply to the deformable portion of the lead vehicle, excluding its crush zone.

(e) The four remaining identical intermediate cars (including the intermediate car being assessed) shall follow the leading vehicle described, because CEM-equipped intermediate cars cannot be placed in the lead position in a train. The intermediate car to be assessed shall be placed immediately behind the leading vehicle; all other vehicles are not part of the assessment and may be simplified.

(f) The closing speed for this collision scenario is that which results in dissipation of no less than 75 percent of the design energy-absorption capacity of at least one crush zone at the colliding interface.

Offset Collision Scenario Between Identical Trains

An offset simulated collision between identical trains shall be run under the conditions defined in § 238.707(a) for locomotive- or cab car-led trains.

The performance of the evaluated single vehicle in the in-line and offset collision scenarios shall meet the deformation requirements in § 238.705(b)(1)(i) and (ii), and, if the single vehicle being evaluated is a cab car or locomotive, the requirements in § 238.705(b)(3)(i) through (iv).

■ 46. Add appendix K to part 238 to read as follows:

Appendix K to Part 238—Minimum Information for Test Procedures

The following is the minimum information necessary to be provided to FRA as part of pre-revenue service acceptance testing plan procedures under § 238.111(a)(3):

(a) A clear statement of the test objectives. One of the principal test objectives shall be to demonstrate that the equipment meets the safety requirements specified in this part when operated in the environment in which it is to be used.

(b) Dates, times, and locations of the pre-revenue service tests to permit FRA observation of such tests.

(c) Any special safety precautions to be observed during testing.

(d) A description of the railroad property or test facilities to be used to conduct the testing.

(e) Prerequisites for conducting each test.

(f) A detailed description of how the testing is to be conducted. This description shall include all the following:

(1) Identification of the equipment and on-board sub-systems to be tested.

(2) The method for testing.

(3) The instrumentation to be used.

(4) The means by which the test results will be recorded and reported.

(5) A description of the information or data to be obtained.

(6) A description of any criteria to be used as safety limits during the testing.

(7) The acceptance criteria to be used to evaluate the equipment and on-board sub-systems performance. If acceptance is to be based on extrapolation of less than full-level testing results, the analysis to be done to justify the validity of the extrapolation shall be described.

(g) Inspection, testing, and maintenance procedures to be followed to ensure testing is conducted safely.

Issued in Washington, DC.

Amitabha Bose,

Administrator.

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