

DEPARTMENT OF TRANSPORTATION

Federal Railroad Administration

49 CFR Parts 270 and 271

[Docket No. FRA-2015-0122, Notice No. 1]

RIN 2130-AC54

Fatigue Risk Management Programs for Certain Passenger and Freight Railroads

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

ACTION: Notice of proposed rulemaking (NPRM).

SUMMARY: Pursuant to the Rail Safety Improvement Act of 2008, FRA proposes to issue regulations requiring certain railroads to develop and implement a Fatigue Risk Management Program, as one component of the railroads' larger railroad safety risk reduction programs.

DATES: Written comments must be received by [INSERT DATE 60 DAYS AFTER DATE OF PUBLICATION IN THE FEDERAL REGISTER]. Comments received after that date will be considered to the extent practicable without incurring additional expense or delay.

ADDRESSES: Comments related to Docket No. FRA-2015-0122 may be submitted by going to <http://www.regulations.gov> and follow 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-AC54). Note that all comments received will be posted without change to <http://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 on any submitted comments or materials.

Docket: For access to the docket to read background documents or comments received, go to <http://www.regulations.gov>.

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I. Introduction and Executive Summary

A. Purpose of Rulemaking

This proposed rule is part of FRA’s efforts to improve rail safety continually and to satisfy the statutory mandate of Section 103 of the Rail Safety Improvement Act of 2008 (RSIA).¹ That section, codified at 49 U.S.C. 20156, requires Class I railroads; railroad carriers with inadequate safety performance (ISP), as determined by the Secretary; and railroad carriers that provide intercity rail passenger or commuter rail passenger transportation to develop and implement a safety risk reduction program to improve the safety of their operations. The section further requires a railroad’s safety risk reduction program to include a “fatigue management plan” meeting certain requirements.

This proposed rule, if finalized, would fulfill RSIA’s mandate for railroads to include fatigue management plans in their safety risk reduction programs by requiring railroads to develop and implement Fatigue Risk Management Programs (FRMPs).² As proposed, a railroad would implement its FRMP through an FRMP plan.

¹ Section 103, Pub. L. No. 110-432, Division A, 122 Stat. 4848 *et seq.*

² Section 20156 uses the term “fatigue management plans” so sections of this preamble discussing the statutory requirements likewise use this term, as do the sections discussing the Railroad Safety Advisory Committee task statement on fatigue and Fatigue Working Group. However, because section 20156 requires fatigue to be addressed as part of a railroad’s safety risk reduction program, for consistency with the terminology used in FRA’s final rules governing those programs (81 FR 53849 (Aug. 12, 2016) and 85 FR 9262 (Feb. 18, 2020)), elsewhere throughout this proposed rule, FRA uses the terms “fatigue risk management program” (FRMP) and “FRMP plan.”

Under this proposed rule, consistent with the mandate of Section 20156, an FRMP is a comprehensive, system-oriented approach to safety in which a railroad determines its fatigue risk by identifying and analyzing applicable hazards and takes action to mitigate, if not eliminate, that fatigue risk.³ As proposed, a railroad would be required to prepare a written FRMP plan and submit it to FRA for review and approval. A railroad's written FRMP plan would become part of its existing safety risk reduction program plan. A railroad would also be required to implement its FRA-approved FRMP plan, conduct an internal annual assessment of its FRMP, and consistent with Section 20156's mandate, update its FRMP plan periodically. As part of a railroad safety risk reduction program, a railroad's FRMP would also be subject to assessments by FRA.

B. Summary of Costs and Benefits

FRA estimated the costs and benefits of this proposed rule using discount rates of 3 and 7 percent over a ten-year time horizon. FRA presents monetized costs and benefits where possible and discusses those non-quantifiable elements qualitatively where data is lacking. Details on the estimated costs and benefits of this proposed rule can be found in the rule's economic analysis, which has been included in the docket.

In preparing the economic analysis, FRA estimated that the total costs and benefits over 10 years for the implementation of an FRMP and the fatigue training mitigation for Class I railroads and the 50 ISP railroads subject to this proposed regulation. FRA was unable to quantify costs or benefits for passenger railroads and

³ Risk is defined as a combination of the probability of an adverse event occurring and the potential severity of that adverse event. Fatigue increases the likelihood of certain negative events occurring. Therefore, reducing fatigue helps reduce fatigue-related risks. See United States Department of Transportation, *Partnering in Safety: Managing Fatigue: A Significant Problem Affecting Safety, Security, and Productivity*, 1999.

discusses the implementation of the proposed regulation qualitatively within the Regulatory Impact Analysis which has been placed into the docket.

FRA also estimated the total costs over 10 years to develop and monitor FRMP plans for Class I railroads, passenger and commuter railroads, and the 50 ISP railroads subject to this proposed regulation. The proposed regulation will also impose a new economic cost on the agency over the 10-year period, to review and audit the FRMPs.

Please see Table I.B for the total costs and benefits associated with the proposed rule.

Table I.B. 10-Year Costs and Benefits – Training Only Mitigation

		Present Value 7%	Present Value 3%	Annualized at 7%	Annualized at 3%
Calculation Aid	Costs				
A	Training Only (low)	\$2.02	\$2.04	\$0.29	\$0.24
B	Training Only (high)	\$4.13	\$4.18	\$0.59	\$0.49
C	FRMP Plan Creation	\$0.89	\$1.04	\$0.13	\$0.12
D	Government Costs	\$2.03	\$2.59	\$0.29	\$0.30
A+C+D	Total Cost (low)	\$4.94	\$5.68	\$0.70	\$0.67
B+C+D	Total Cost (high)	\$7.05	\$7.81	\$1.00	\$0.92
A+C	Total Cost w/o Government Costs (low)	\$2.91	\$3.08	\$0.41	\$0.36
B+C	Total Cost w/o Government Costs (high)	\$5.01	\$5.22	\$0.71	\$0.61
	Benefits				
	Training Only (low)	\$5.41	\$6.33	\$0.77	\$0.74
	Training Only (high)	\$21.65	\$25.34	\$3.08	\$2.97

II. Rulemaking Authority and Background

A. *RSIA*

1. *Mandate for Rulemaking on Railroad Safety Risk Reduction Programs*

The RSIA requires the Secretary of Transportation (Secretary) to issue regulations requiring certain railroads to develop and implement a “railroad safety risk reduction program.”⁴ Under RSIA, as part of their railroad safety risk reduction programs, railroads must analyze the risks associated with aspects of their operations that affect railroad safety and based on that risk analysis, railroads must, through their railroad safety risk reduction programs, mitigate risks to railroad safety.⁵ Among other requirements, the RSIA requires railroads to consult with “directly affected employees” and their labor organizations on the content of their safety risk reduction programs, including the fatigue management plan component.⁶

The Secretary delegated responsibility for carrying out the mandate of Section 20156 to the FRA Administrator.⁷

Section 20156(a)(1) mandates that each of the following types of railroads would have to comply with this proposed regulation: (1) Class I railroads; (2) railroad carriers with ISP; and (3) railroad carriers that provide intercity rail passenger or commuter rail passenger transportation. This preamble refers to the railroads that would be subject to this proposed rule as “covered railroads.”

To implement the requirements of Section 20156, FRA published the System Safety Program (SSP) final rule implementing the railroad safety risk reduction program mandate for passenger railroads on August 12, 2016.⁸ On February 18, 2020, FRA

⁴ Pub. L. No. 110-432, Div. A, sec. 103 (49 U.S.C. 20156).

⁵ Sec. 20156(d)(1).

⁶ 49 U.S.C. 20156(f) and (g)(1).

⁷ 49 CFR 1.89, 77 FR 49965 (August 17, 2012); *see also* 49 U.S.C. 103(g).

⁸ 81 FR 53849.

published the Risk Reduction Program (RRP) final rule implementing the mandate for Class I freight and ISP railroads.⁹

Both the SSP and RRP rules allow a railroad to tailor its program to its unique operating characteristics.¹⁰ All railroads that must develop either an RRP or an SSP would also have to develop an FRMP as a component of the RRP or the SSP.

Both RRP and SSPs reflect comprehensive, system-oriented approaches to improving safety, by which an organization formally identifies and analyzes applicable hazards and takes action to mitigate, if not eliminate, the risks associated with those hazards. RRP and SSPs provide a railroad with a framework for processes and procedures that can help it plan, organize, direct, and control its business activities in a way that enhances safety and promotes compliance with regulatory standards. As such, risk reduction and system safety programs are a form of “safety management system,” which is a term that generally refers to a comprehensive, systematic approach to managing safety throughout an organization.

Safety management systems were developed to ensure high safety performance in various industries, including aviation, passenger railroad, nuclear, and other industries with the potential for catastrophic accidents. For ease of understanding, the elements of a safety management system are typically grouped into larger descriptive categories. These descriptive categories include: (1) an organization-wide safety policy; (2) formal methods for identifying hazards, and for prioritizing and mitigating risks associated with those hazards; (3) data collection, data analysis, and evaluation processes to determine

⁹ 85 FR 9262. The RRP final rule also defines “railroad carriers with inadequate safety performance” to whom this proposed rule would apply. 49 CFR 271.13, 85 FR at 9316-9317.

¹⁰ SSP Final Rule at 81 FR 53849, August 12, 2016, and RRP Final Rule at 85 FR 9262, February 18, 2020.

the effectiveness of mitigation strategies and to identify emerging hazards; and (4) outreach, education, and promotion of an improved safety culture within the organization.

Effective implementation of all the elements of an RRP or SSP, including the FRMP this proposed rule would require, will foster continuous safety improvement.¹¹

2. Mandate for Rulemaking on Fatigue Management Plans

Sections 20156(d)(2) and (f) of the RSIA mandate that as part of a railroad's safety risk reduction program, a railroad must develop and implement a fatigue management plan "designed to reduce the fatigue experienced by safety-related railroad employees and to reduce the likelihood of accidents, incidents, injuries, and fatalities caused by fatigue."¹² The statute requires railroads to update their fatigue management plans at least once every two years, with each update subject to FRA review and approval.¹³ Section 20156(f)(2) also requires each railroad's fatigue management plan to take into account the varying circumstances of operations on different parts of its system, and to prescribe appropriate fatigue countermeasures to address the varying circumstances.

Finally, Section 20156(f)(3) requires a covered railroad to:

consider the need to include in its fatigue management plan elements addressing each of the following items, as applicable:

(A) Employee education and training on the physiological and human factors that affect fatigue, as well as strategies to reduce or mitigate the effects of fatigue, based on the most current scientific and medical research and literature.

(B) Opportunities for identification, diagnosis, and treatment of any medical condition that may affect alertness or fatigue, including sleep disorders.

(C) Effects on employee fatigue of an employee's short-term or sustained response to emergency situations, such as derailments and natural disasters, or engagement in other intensive working conditions.

¹¹ For a more detailed discussion of safety management systems and FRA risk reduction programs, see FRA's final RRP and SSP rules. 85 FR 9265 (RRP final rule) and 81 FR 53853-54 (SSP final rule).

¹² Sec. 20156(f)(1).

¹³ *Id.*

(D) Scheduling practices for employees, including innovative scheduling practices, on-duty call practices, work and rest cycles, increased consecutive days off for employees, changes in shift patterns, appropriate scheduling practices for varying types of work, and other aspects of employee scheduling that would reduce employee fatigue and cumulative sleep loss.

(E) Methods to minimize accidents and incidents that occur as a result of working at times when scientific and medical research have shown increased fatigue disrupts employees' circadian rhythm.

(F) Alertness strategies, such as policies on napping, to address acute drowsiness and fatigue while an employee is on duty.

(G) Opportunities to obtain restful sleep at lodging facilities, including employee sleeping quarters provided by the railroad carrier.

(H) The increase of the number of consecutive hours of off-duty rest, during which an employee receives no communication from the employing railroad carrier or its managers, supervisors, officers, or agents.

(I) Avoidance of abrupt changes in rest cycles for employees.

(J) Additional elements that the Secretary considers appropriate.

3. Authority for Rulemaking on Information Protection

Section 109 of the RSIA specifies that subject to specific exceptions, certain railroad safety risk reduction records obtained by the Secretary are exempt from the public disclosure requirements of the Freedom of Information Act (FOIA).¹⁴ Both the SSP and RRP final rules implement these authorized information protections. Further, FRA has concluded section 20118 is a FOIA Exemption 3 statute and, therefore, would exempt, as part of a railroad's safety risk reduction program, FRMP records in FRA's possession from mandatory disclosure under FOIA (unless one of two statutory exceptions apply).¹⁵

B. Fatigue and Fatigue Risk Management Plans

Humans have an approximately 24-hour sleep-wake cycle known as a "circadian rhythm." Rapid changes in the circadian pattern of sleep and wakefulness disrupt many physiological functions such as hormone releases, digestion, and temperature regulation.

¹⁴ 49 U.S.C. 20118.

¹⁵ 80 FR at 10957-10958.

Such disruptions may also impair human performance, and may cause a general feeling of debility until realignment is achieved. For instance, the experience of jet lag is comparable to the experience of working schedules that vary among different duty shifts, and similar disruptions in human performance occur. Research has shown that fatigue is a multivariate condition, being either directly or secondarily affected by physiological and environmental variables such as sleep loss, workload, stress, monotony, workplace ergonomics, age, health, medications, noise, and circadian disruption. Symptoms of fatigue include, but are not limited to, falling asleep, increased reaction time, loss of attentional capacity, and decline of short-term and working memory function which may impair performance, increase error, and increase accident risk.

The Federal government requires railroads to manage their employees' fatigue associated with railroad operations through prescriptive hours of service (HOS) limitations and rest requirements. *See* 49 U.S.C. 21103, 21104, and 21105 and regulations at 49 CFR part 228, subpart F (implementing 49 U.S.C. 21102 and 21109). HOS limitations are generally based on the assumption that fatigue simply increases as time passes; therefore, the longer the time on task, the greater the risk for fatigue. However, this approach does not account for factors such as sleep loss, amount of sleep, circadian rhythms, sleep quality (which may be impacted by environmental factors or sleeping accommodations), and even the effects of the type of task being performed on the resulting level of fatigue. Furthermore, the HOS limitations and rest requirements apply only to individuals who perform certain types of work and do not cover all railroad employees (*e.g.*, ordinarily, not maintenance-of-way employees or carmen). Laws and regulations following this model, therefore, may reduce, but cannot eliminate, the

conditions that contribute to fatigue.¹⁶ An FRMP, on the other hand, is intended to be a systematic program to address fatigue in a dynamic manner.

An FRMP is a form of a safety management system. Like the other elements of an RRP and an SSP, an FRMP implements organizational policies, processes, and procedures to reduce safety risk in a railroad's operations. An FRMP is a data-driven and scientifically-based process that allows for periodic review and management of safety risks associated with fatigue-related error(s). Like other safety management systems, an FRMP applies the risk management process to identify fatigue risks through the use of data-established, scientific principles. An FRMP includes collecting and analyzing fatigue-related safety data and implementing corrective actions – always encouraging continuous improvement. This proposed rule would require railroads to develop FRMPs that are consistent with these general principles.

An effective FRMP implements processes and procedures for measuring, modeling, managing, mitigating, and reassessing fatigue risk in a specific operational setting. The primary stakeholders—the main persons with the authority and/or interest to improve conditions to reduce fatigue—would implement FRMP processes. In the case of this specific rulemaking, that stakeholder group would include representation from management and labor (union representation, if applicable) and may also include scientific consultants.

By combining schedule assessment, operational data collection, continuous and systematic analysis, and both proactive and reactive fatigue mitigation techniques, guided

¹⁶ Thomas, G., Raslear, T., & Kuehn, G. (1997), *The effects of work schedule on train handling performance and sleep of locomotive engineers: a simulator study*, Report No. DOT/FRA/ORD-97-09), Washington, DC: Federal Railroad Administration; available at: <http://www.fra.dot.gov/eLib/details/L04245>.

by information provided by scientific studies of fatigue, an FRMP offers a way to conduct railroad operations more safely by offering a global, comprehensive, and specific approach that complements statutory or regulatory HOS limitations. An FRMP would provide an interactive and collaborative approach to improving operational performance and safety levels on a case-by-case basis. Therefore, an FRMP would permit a railroad to adapt policies, procedures, and practices to the specific conditions that create fatigue in a particular railroad setting. A railroad could tailor its FRMP to unique operational demands and focus on techniques for mitigating risk caused by fatigue that are practical within the specific operational environment. This flexibility would also allow a railroad to alter its FRMP based on changing needs, new research, data from an existing FRMP, comments from labor and management, and established best practices.

III. Railroad Safety Advisory Committee Process

In December 2011, FRA asked the Railroad Safety Advisory Committee (RSAC) to accept a task to address the fatigue management plan mandate of the RSIA.¹⁷ The RSAC voted to accept the task and on December 8, 2011, the RSAC formed the Fatigue Management Plans Working Group (Working Group). Members of the Working Group included physicians, human factors psychologists, railroad schedulers, and other representatives of railroad management and labor, as well as FRA employees.

The Working Group formed three Task Forces to address particular aspects of the RSIA mandate in more detail: (1) the Education and Training Task Force; (2) the

¹⁷ *Railroad Safety Advisory Committee Task Statement: Fatigue Management Plans*, Task No.: 11-03, Dec. 8, 2011. The Task Statement read as follows:

review the mandates and objectives of the [RSIA] related to the development of Fatigue Management Plans, determine how medical conditions that affect alertness and fatigue will be incorporated into Fatigue Management Plans, review available data on existing alertness strategies, consider the role of innovative scheduling practices in the reduction of employee fatigue, and review the existing data on fatigue countermeasures.

Scheduling Task Force; and (3) the Infrastructure and Environment Task Force. The Task Forces met multiple times throughout 2012 and 2013 and the Working Group itself met eight times during the same period.

After initially reaching consensus on draft rule text in June 2013, the Working Group did not reach consensus as to how its recommendations should be implemented. The Task Forces had developed a multitude of documents, which Labor representatives on the Working Group wanted published as appendices to the regulation. Railroad management members of the Working Group, on the other hand, asserted that the documents should not be published as appendices to the regulation, but instead recommended that the documents be made available on the FRA website and in the rulemaking docket for all parties to use in the required consultation process as part of developing railroads' FRMPs. As a result, in late 2013, FRA withdrew the task from the RSAC, and as the agency worked to implement other aspects of the safety risk reduction program mandate of the RSIA (*i.e.*, the RRP and SSP rules), the Agency began developing a rule specifically to address the RSIA's mandate that fatigue management plans be included as part of railroads' safety risk-reduction programs.

Although the RSAC did not make a consensus recommendation to FRA related to fatigue, FRA believes that information developed and documented during the RSAC process is informative and will be very useful to railroads required to develop FRMP plans. FRA made minor amendments to the June 2013 draft rule text to clarify it and make it more consistent with similar rule text in the SSP and RRP rules. However, the substance of this proposed rule text is the same as the draft rule text the Working Group voted to approve.

Accordingly, the proposals in this NPRM reflect FRA's consideration of the Working Group's recommended rule text and the documents developed by each of the three Task Forces. Those RSAC-developed documents are included in the rulemaking docket.

The RSIA does not mandate, and this NPRM does not propose to include, language specifically addressing the predictability of work schedules. However, the RSIA does require railroads to consider scheduling practices, of which predictability is one factor. There is significant discussion of predictability throughout this notice, particularly when describing the Task Force discussions and the complex issues addressed in the Task Force documents that will inform railroads' analysis of fatigue risks and their efforts to mitigate the identified fatigue risks in consultation with employees and labor organizations. However, the proposed rule requires railroads to consider several factors, including work schedule predictability, but does not require any particular factor to be analyzed.

The NPRM also does not propose to include the Task Force documents as appendices to this proposed rule. As FRA previously explained to the members of the Working Group, many of these documents are written informally, for the use of railroads and labor in developing FRMP plans. The documents are best practices generated by the Working Group, but are not specifically FRA guidance and, therefore, should not be in an appendix to an FRA regulation. In addition, the content of the Task Force documents is subject to change based on advances in fatigue science, changes in railroad operations, and experience with FRA's SSP and RRP rules and the development and implementation of FRMPs and FRMP plans. The Task Force documents should be easy to update as

necessary so that they are most beneficial to those using them. If they were published as appendices to the regulation, changing them would require the cumbersome process of publishing them in the *Federal Register*, and the industry would be left with outdated or less useful documents until revisions could be completed. For the convenience of readers, however, the full text of each of these documents can be found in the docket for this rulemaking.

B. *Task Forces*

As noted above, paragraph (f)(3) of Section 20156 requires railroads to consider including 10 different elements in their fatigue management plans.

The Working Group assigned the Education and Training Task Force to address section 20156(f)(3) subparagraphs (A), (B), (E), and (F), specifically:

- Employee education and training on the physiological and human factors that affect fatigue;
- Medical and scientific research-based fatigue mitigation strategies;
- Opportunities for identification, diagnosis, and treatment of any medical condition that may affect alertness or fatigue, including sleep disorders;
- Methods to minimize accidents and incidents during circadian low periods; and
- Alertness strategies.

The Task Force produced a document outlining existing railroad fatigue educational resources; a document outlining potential fatigue training topics; fatigue education dissemination and evaluation strategies; and a document outlining fatigue countermeasures.

The Working Group assigned the Scheduling Task Force to address subparagraphs (D), (H), and (I) of the required elements outlined in section 20156(f)(3).

The task statement specifically included:

- Innovative scheduling practices;
- On duty call practices;

- Work and rest cycles;
- Increased consecutive days off;
- Other aspects of employee scheduling that would reduce employee fatigue and cumulative sleep loss;
- The increase of the number of consecutive hours of off-duty rest; and
- Avoidance of abrupt changes in rest cycles for employees.

The Working Group assigned the Infrastructure and Environment Task Force to address subparagraphs (C) and (G) of section 20156(f)(3) including:

- Effects on employee fatigue of an employee's short term or sustained response to emergency situations;
- Opportunities to obtain restful sleep at lodging facilities; and
- Effects of environmental conditions (*e.g.*, temperature, vibrations, etc.) on employee fatigue.

The Task Force created documents on emergency work, lodging facilities, and dispute resolution.

IV. FRMP Considerations

This proposed rule, if finalized, will fulfill the requirement of paragraph (d) of Section 20156 that a covered railroad's railroad safety risk reduction program include a fatigue management plan. This rule would amend both Parts 270 and 271, adding a subpart to both parts requiring railroads to develop and implement FRMPs. This section provides a summary of potential methods and considerations for developing and maintaining a FRMP. FRA welcomes comments on the discussion in this section, including thoughts on how to develop and maintain an effective FRMP. Unless specifically identified as a statutory or regulatory requirement, the information and suggestions contained in this section are not meant to bind the public in any way, and is intended only to provide clarity to the public regarding this proposal and information to aid in compliance if the proposal is finalized.

A. *General Overview*

This proposed rule would require each covered railroad to establish and periodically update an FRMP plan, which explains the railroad's method of analysis of fatigue risks and the processes for implementing the FRMP. FRA would review and approve the FRMP plan. FRA proposes that requirements for the filing, approval, and amendment of the FRMP plan be made the same as for other components of RRP or SSP plans so those requirements are not set forth in this proposed rule. Instead, the proposed rule text cites to the sections of the SSP and RRP rules that contain those procedures.¹⁸ Because railroads will have submitted their SSP plans or RRP plans to FRA under part 270, subpart C, or part 271, subpart D before this proposed rule becomes final, railroads would need to amend their SSP plan or RRP plan to include an FRMP plan. Thus, a railroad would follow the procedures in § 270.201(c) or § 271.303 to amend its SSP plan or RRP plan.

As part of their FRMP, covered railroads would be required to identify fatigue-related safety hazards, to assess the risks associated with those hazards, and to prioritize those risks for mitigation. These railroads would be required to consider certain categories of risk as part of the FRMP, and to consider the development and implementation of policies and practices to reduce risks, related specifically to the items identified in the RSIA as items railroads are required to consider.

FRA proposes that railroads be required to adopt and implement their FRMP through an FRMP plan describing the railroads' processes for conducting their fatigue-risk analysis, including the processes for the identification of fatigue-related railroad

¹⁸ 49 CFR 271.301 Filing and approval, 271.303 Amendments, and 49 CFR 270.201 Filing and approval.

safety hazards and resulting risks, processes for the development and implementation of mitigation measures, processes for the evaluation of the FRMP and its effectiveness, and procedures for the review and update of the FRMP plan. The FRMP plan would also describe processes, milestones, and timelines for the implementation of the FRMP.

Finally, the proposed rule contains no express requirements on information protection or consultation, because the information protection and consultation requirements in the RRP and SSP rules would apply to the FRMP, the FRMP plan, and their related documents, just as those requirements would apply to similar documents on other aspects of the RRP or SSP. As required by the RSIA, fatigue management plans are required elements of a railroad's statutorily-mandated railroad safety risk reduction program. Therefore, the statutory requirements on information protection and consultation, implemented in the SSP and RRP final rules, would also apply to the documents required by this proposed rule to implement the required fatigue component of each railroad's RRP or SSP. Regarding information protection, as with RRP and SSP, only information compiled or collected solely for developing, implementing, or evaluating a railroad's FRMP would be protected.¹⁹

B. Roles and Responsibilities

Consistent with the program requirements of an RRP or SSP,²⁰ an FRMP is an ongoing program that supports continuous safety improvement, and requires systematic evaluation and management of risks. An FRMP is more than a document; it is a living

¹⁹ For a detailed discussion of information protection, *see* the SSP final rule at 81 FR 53855-56 and 53878-82, and RRP final rule at 85 FR 9266-9272 and 9279-9282. For more information on the consultation requirements, *see* the SSP final rule at 81 FR 53856, 53882-87 and 49 CFR part 270 app. B, and RRP NPRM at 85 FR 9266, 9299-9303.

²⁰ 49 CFR 271.101(a), 270.101, and 270.103(p)(vii).

program that is implemented by members of the organization who regularly meet to review data on fatigue indicators, analyze contributing factors to fatigue, take necessary actions (reactive and proactive) to mitigate fatigue, objectively audit the effectiveness of the system, and take corrective action continuously to improve the system. Consistent with comments made at the Working Group meetings, FRA expects most railroads will form a dedicated fatigue management committee to implement the program. The committee should include representatives of all departments and groups, including labor representatives as appropriate, that have a role in reporting, managing, and mitigating fatigue.

SSPs and RRP require outreach to employees so that they can understand why certain actions are taken, or why certain safety procedures are introduced or changed.²¹ As this relates to an FRMP, it means that all safety-related personnel need to understand the corporate policies that underlie the FRMP; these may include policies and procedures that govern: fatigue reporting, fitness-for-duty, absence due to fatigue, incident reporting, employee privacy, and prohibitions on coercion to perform duties while fatigued.

As provided in the RSIA, the three main stakeholders in the FRMP are railroad management, railroad employees (including nonprofit employee labor organizations), and FRA. Each of these stakeholders plays an important role in implementing an FRMP successfully. Railroad management must develop, document, and implement an FRMP, tailored to the size of the railroad, in a collaborative environment with relevant stakeholders; it must also then allocate the resources required to implement any fatigue countermeasures in a timely fashion. FRA notes that the RSIA, in multiple places,

²¹ 49 CFR 271.107 and 270.103(i)(4).

specifically requires railroads to develop and implement elements of their programs based on the latest scientific principles.²² FRA will review, and as appropriate, approve each railroad’s FRMP plan, and evaluate to ensure that the railroads are complying with their plans.

These general roles and functions are not an exhaustive description of the various actions each group could take during the development and execution of the FRMP.

C. Components of an FRMP

As proposed, a railroad’s FRMP must consist of actions taken by the railroad pursuant to formally documented policies, processes, and procedures intended to mitigate fatigue risk. It incorporates specific components that enable the following: (1) identifying safety hazards associated with fatigue; (2) assessing the risks associated with identified hazards; (3) prioritizing risks for mitigation and implementing mitigation strategies for those risks; and (4) tracking the performance and effectiveness of each mitigation strategy and reviewing and revising an FRMP based on results.

1. Identifying Safety Hazards

a. Examples of Methods of Identifying Safety Hazards

A risk-based hazard analysis²³ identifies operational processes, procedures, or activities that increase the likelihood of fatigue, and lays the foundation for subsequent assessment and mitigation of risks associated with the fatigue hazards identified.

Hazards may be identified through quantitative, data-driven methods; through qualitative

²² 49 U.S.C. 20156(f)(3)(A) and (E) specifically require railroads to consider scientific and medical research, in determining whether to include certain elements in their FRMP. The other elements of § 20156(f)(3) require railroads to consider various scientific concepts, such as medical conditions, cumulative fatigue, and circadian rhythms.

²³ Although the RSIA uses the term “risk analysis,” FRA uses “risk-based hazard analysis” because it is more consistent with the terminology used in the SSP and RRP rules, as defined in 49 CFR 270.5 and 49 CFR 271.5.

processes such as discussions, interviews, and brainstorming; or through a combination of both approaches. Identifying a hazard does not guarantee that it will be selected for mitigation.

In general, data-driven methods identify and record hazards through a systematic process that allows for tracking and further analysis. These methods could use various types of recorded observations, such as records of actual schedules, efficiency testing, accident/incident investigations, company audits, employee surveys, close-call or hazardous condition reports, and others. Simulations may also be used to identify potential hazards and to estimate the potential severity of outcomes.

Understanding the current conditions within a railroad is critical for a railroad's ability to identify fatigue hazards accurately. Important sources of information include current schedules, train lineups, throughput, and operating practices. Employee reports of fatigue or fatigue-related errors and incidents, and information on the work schedules that led up to them, would also be valuable. Likewise, employees may be able to provide information regarding travel assignments and random duty reports.

Comprehensive and objective accident, incident, and error analyses can also be conducted to determine when fatigue has been a potential contributing factor. The identified fatigue-sensitive situations can then be addressed to mitigate or to avoid them in the future. For example, if analyses identify a high probability of a specific error occurring during the hours when employees are highly susceptible to fatigue, engineering or procedural safeguards could potentially be put in place to minimize or eliminate the possibility of that error recurring.

In addition to data-driven methods, qualitative methods that are often founded on expert judgment can be very effective at identifying fatigue hazards. Examples of qualitative hazard identification methods include, but are not limited to, the following:

- *Brainstorming* may be useful for identifying hazards in new or novel systems. Ideally, it involves all key stakeholders, is relatively quick and easy, and can be applied to a wide range of systems. Because brainstorming is commonly unstructured, it may not be comprehensive. The success of brainstorming depends heavily on the expertise of the participants and may be susceptible to the influence of group dynamics.
- *Checklists* are inventories of known hazards. They can be used by people who are not experts in the operation or system being analyzed, to capture a wide range of existing knowledge and experience, and help ensure that common and obvious problems are not discounted, minimized, or overlooked. However, checklists may be less useful for unusual operations or systems, may inhibit expansive thinking, or may overlook hazards that have not been previously or widely observed.
- *Failure Modes and Effects Analysis (FMEA)* is a reliability assessment technique built upon a detailed system description used to evaluate the ways in which basic system processes, components, or subcomponents can fail to perform safely. FMEA considers all the potential ways a component could fail, the effects of these failures on the system, possible causes of the failures, and how the failures might be mitigated. *See* Figure 1. FMEA is a systematic and rigorous evaluation approach that can yield a detailed record of the hazard identification process, and can be applied to a wide range of types of systems. However, it primarily focuses on single point-of-failure

modes rather than combinations of failures, relies heavily upon individuals with detailed system knowledge, and can be both time-consuming and expensive.

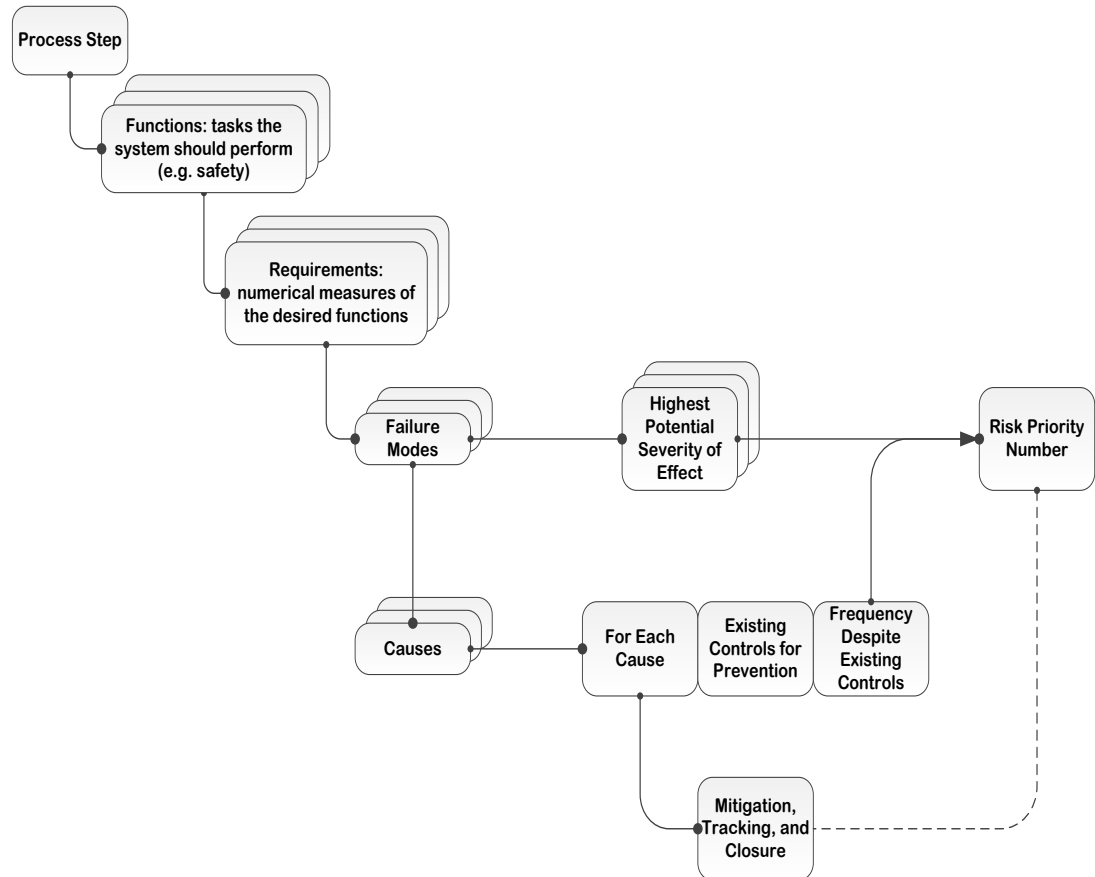


Figure 1. General Structure of Failure Modes and Effects Analysis

- *Structured What-If Technique (SWIFT)* is a form of facilitated brainstorming, typically carried out on a higher-level system description with relatively few subcomponents, involving a multidisciplinary team of experts. The facilitator uses various prompts, such as “what if,” “could someone,” or “has anyone ever” questions to initiate discussion within the group. SWIFT creates a detailed record of the hazard identification process, and can consume less time than some other methods. However,

successful application requires careful preparation, relies on the expertise and experience of the team, and depends heavily on the skills of the facilitator.

- *Operating Hazard Analysis (OHA)* is when a team or individual uses various sources of information to identify hazards resulting from the operation and maintenance of a system, following a structured and formal process. In addition to the engineering design analysis at which FMEA excels, OHA is structured so that human performance and human interactions can be included in the analysis. Information sources can include analyses of known hazards, written procedures and manuals, engineering system descriptions, and other materials to analyze detailed procedures performed during system operation.

- *Hazard identification software programs* are designed to support the identification of hazards using a systematic method. Programs are available that provide structured guidance for identifying general hazards or only fatigue-specific hazards. Such software may also offer the ability to catalog the resultant fatigue-related risks to help railroads prioritize risks.

- *Employee workshops* may be used to engage employees in the railroad's hazard analysis. Employees can share their experiences and concerns relating to fatigue with the goal of identifying fatigue hazards, related risks, and potential solutions or mitigations.

These are just some of the methods available for identifying hazards. Each has advantages and disadvantages, and a combination of two or more methods may minimize any shortcomings.

b. Specific Fatigue-Related Hazards to Consider

A number of individual, organizational, or environmental factors can contribute to the likelihood of fatigue. As provided in the RSIA, these factors should be among the many items considered during a hazard analysis.²⁴

- *General health and medical conditions.* According to the National Sleep Foundation,²⁵ there are several medical conditions or treatments of those conditions that may affect alertness. They include, but are not limited to, obstructive sleep apnea, insomnia, periodic limb movement disorder (restless leg syndrome), hypersomnia/narcolepsy (excessive daytime sleepiness), delayed sleep phase syndrome (circadian misalignment), depression, anxiety, bruxism (teeth grinding), night sweats, night terrors, nocturia (waking several times throughout the night to urinate), poor sleep efficiency, and residual effects of neurological damage (*e.g.*, stroke).

- *Scheduling issues.* Systemic or particular scheduling and crew-calling practices and issues may affect opportunities for employees to obtain sufficient quality and quantity of sleep. Related issues that increase fatigue risks include, but are not limited to, the following:

- On-duty call practices;
- Work and rest cycles;
- Frequency and duration of days off;
- Changes in start times;
- Policies regarding napping; and
- Policies and practices regarding marking-off.

²⁴ See 49 U.S.C. 20156(c).

²⁵ <https://sleepfoundation.org/sleep-disorders-problems>

The level of predictability of work assignments, particularly those assignments that occur at night, can influence the ability of employees to anticipate work assignments and obtain necessary off-duty sleep. Note that work shift or duty tour predictability alone will not necessarily eliminate fatigue risk, and it is possible for highly predictable schedules to also have high exposure to fatigue. Other factors such as time of shift, work-to-rest ratio, and the speed and direction of shift rotation may also play a role in the employee's ability to plan for and obtain sufficient sleep.²⁶

An FRA report²⁷ found that high variability in shift start times contributes to fatigue. Furthermore, FRA research also established that the probability of rail accidents increases as fatigue increases.²⁸ Thus, reducing start time variability could potentially increase safety. In addition to examining the relationship between start time variability and fatigue, the report contains information on statistical methods, including analyzing variance of start times and calculating a hazard function, which can be used to compare work locations, types of jobs, and changes in policies and procedures, with regard to fatigue.

Job characteristics can also be a factor, including, but not limited to, whether the work is physically demanding, whether the work requires extended travel to a reporting point, and whether the employees are called upon to respond to emergencies. In general, a railroad that effectively manages the combined effects of crew scheduling, employee

²⁶ Rosa, R.R. & Colligan, M. J., *Plain language about shiftwork* (DHHS [NIOSH] Publication No. 97-145) (1997), Cincinnati, OH: National Institute for Occupational Safety and Health, available at: <http://www.cdc.gov/niosh/docs/97-145/pdfs/97-145.pdf>.

²⁷ Raslear, T. G., *Start time variability and predictability in railroad train and engine freight and passenger service employees* (Report No. DOT/FRA/ORD-14/05) (2014), Washington, DC: U.S. Department of Transportation.

²⁸ Raslear, T. G., Hursh, S. R., & Van Dongen, H. P. A., Predicting cognitive impairment and accident risk, in H. P. A. Van Dongen & G. A. Kerkhof (Eds.), *Progress in Brain Research*, Vol. 190 (pp. 155–167), Amsterdam, The Netherlands: Elsevier B. V. (2011).

rostering, additional tasks assigned to employees, schedule changes, and other factors should succeed at minimizing fatigue-inducing conditions.

2. Assessing Risks Associated with Identified Hazards

As mandated by the RSIA, a FRMP must systematically identify fatigue hazards and evaluate fatigue safety risks on the railroad system. The goal of this hazard analysis is to identify work schedules and other conditions that put employees at risk for a level of fatigue that compromises safety.

Different jobs may have different fatigue related risks. As such, it is important to examine the hazards associated with each job. A systematic assessment of risk involves: (1) determining the severity and likelihood of potential incidents associated with the hazards identified; (2) assessing risk by evaluating the relative risk of each identified hazard and how it impacts established safety performance targets and/or by ranking hazards based on risk; and (3) systematically determining the order in which risks should be addressed. Selecting the criteria and methods for establishing priorities in advance will promote consistent decision making over time. However, flexibility is needed as risk tolerance levels or prioritizations can change over time as circumstances dictate.

One tool that railroads may want to consider using to assess their fatigue-related risk is a biomathematical model. A biomathematical model of performance and fatigue that has been properly validated and calibrated predicts accident risk based on analyzing identified periods of wakefulness and periods available for sleep. Validation of a biomathematical model of human performance and fatigue means determining that the output of the model actually measures human performance and fatigue levels. There are two dimensions to this validation. The first is that the model must be demonstrated to be

consistent with currently established science in the areas of human performance, sleep, and fatigue level. The second part of the validation process involves determining that the model output has a statistically reliable relationship with the risk of a human-factors accident caused by fatigue, and that the model output does not have such a relationship with accident risks not associated with human factors.

Calibration of the biomathematical model involves the assignment of numerical values to represent aspects of empirical observations, similar to marking degrees on a thermometer. In the case of human fatigue level and performance, the calibration of a fatigue scale would start with the assignment of values ranging from “not fatigued” to “severely fatigued.” The calibration process starts during the validation process with the assignment of model output values to data bins for “not fatigued” and “severely fatigued.” The next step consists of determining the fatigue threshold. Given a scale for human fatigue level and performance, and a relationship between that scale and human factors accident risk, a final calibration point would determine the value at which fatigue becomes unacceptable because the increase in accident risk at that level compromises safety; this is the fatigue threshold. Railroads choosing to use biomathematical fatigue modeling in their schedule analysis will need to establish a fatigue threshold.

Currently, FRA has validated and calibrated two commercially available biomathematical fatigue models. These are the Fatigue Avoidance Scheduling Tool (FAST) and the Fatigue Audit InterDyne (FAID). However, any validated and calibrated

biomathematical fatigue model may be used in schedule analysis. An FRA-sponsored report details how any biomathematical fatigue model may be validated and calibrated.²⁹

FRA expects that new methods for measuring and assessing fatigue risk will continue to be developed. If the system provides a scientifically valid measure of fatigue risk, whether using a biomathematical modeling tool or another system, its use is acceptable for purposes of developing and implementing an FRMP.

As discussed below, there are many ways to measure fatigue risk. The system or metric a railroad ultimately chooses to measure its fatigue risk will depend on a variety of factors and will be unique to each railroad. For example, regardless of whether scheduled service is covered under statutory HOS requirements (49 U.S.C. Ch. 211), passenger train employee HOS regulations (49 CFR part 228, subpart F), or no HOS limitations, a railroad should consider whether to include in its FRMP an analysis of at least two consecutive cycles of the work schedules (the period within which the work schedule repeats) of its safety-related railroad employees. Analyzing more than one cycle of a work schedule can provide information about cumulative fatigue effects that would not be apparent if only one work schedule cycle were analyzed. However, railroads will need to determine how many work schedule cycles to examine based on factors such as start time variability, shift start and end time, and type of work being performed.

When looking at job tasks, some form of a Haddon matrix can be helpful in determining the risk associated with a particular hazard. Figure 2 shows a basic Haddon risk matrix, which can be customized to represent categories of probability and severity

²⁹ Hursh, S.R., Raslear, T.G., Kaye, A.S., & Fanzone, J.F., *Validation and calibration of a fatigue assessment tool for railroad work schedules, summary report* (Report No. DOT/FRA/ORD-06/21) (2006), Washington, DC: U.S. Department of Transportation.

that are meaningful and useful to the railroad. Such a matrix provides a visual representation of risks. As shown in the matrix, when the probability of an incident is low and severity is low, the risk is also low. Conversely, when the probability of an incident is high and severity is high, the risk is also high.

RISK ASSESSMENT CHART			
	LOW SEVERITY	MEDIUM SEVERITY	HIGH SEVERITY
HIGH PROBABILITY			
MEDIUM PROBABILITY			
LOW PROBABILITY			

RISK KEY	HIGH	MEDIUM	LOW
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Figure 2. Haddon Risk Matrix

For example, overnight schedules will inevitably include the period identified as the Window of Circadian Low.³⁰ This low point in performance could be evaluated in relation to the duties to be performed at that time because an expected raised level of

³⁰ The Window of Circadian Low is the time between 2:00 a.m. and 6:00 a.m. where individuals are normally adapted to sleep and performance of tasks during this period may be degraded. See Advisory Circular 120-100, *Basics of Aviation Fatigue*, 06/07/10, U.S. Department of Transportation.

fatigue is of greater concern if it coincides with the performance of critical or difficult tasks.

Using a fatigue model can be helpful for determining both frequency and severity of fatigue risk associated with specific schedules. Modeling is extremely useful because it applies scientific principles about fatigue to find the specific operational and employee factors that could contribute to significant performance changes due to fatigue. In general, modeling cannot consider non-duty-related causes of fatigue, individual differences related to sleep loss tolerance, and individual differences in circadian phase and amplitude. Because of these limitations, modeling should never be used to contradict an individual's reported fatigue level. However, these models can take into account the complex interactions among human physiology, work, and rest times. In the absence of such a model, the interaction of these factors would be very difficult to specify.

For example, if a fatigue model identified a particular type of work schedule that would benefit from fatigue mitigation, the railroad may discover underlying systems issues and factors (*e.g.*, inadequate rest facilities, lack of napping opportunities) that not only contribute to fatigue-related risks on that work schedule, but also on other schedules. The use of fatigue modeling in this way provides railroads with a method for systematically identifying and addressing the overall underlying system risks—not just the risks for a given work schedule.

3. Prioritizing Risks and Implementing Mitigation

Risk assessment processes must include a method for determining which risks most urgently require mitigation, which could be addressed at a later time, and which are minor enough that simply monitoring the hazard would be sufficient. Methods

commonly used in Safety Management Systems include, but are not limited to, ranking all risks based on their risk score, or setting a risk tolerance threshold. If the risk assessment process includes a risk tolerance threshold, hazards whose associated risk is above that threshold should be addressed; those with risk below the threshold need not be mitigated, but should be monitored for change. If a risk tolerance threshold is not used, the risks should be tackled in whatever priority order is established during the risk assessment. Once the assessment of risks associated with fatigue hazards has been completed, as part of their FRMP, railroads must develop and implement mitigations to reduce as many of those risks as possible.

Based on an analysis of the factors that lead to fatigue and practical mitigation alternatives, one or more mitigation options may be applied to reduce fatigue associated with specific schedules or situations. Risk mitigations are changes to the way things are done, or to the conditions under which things are done, that can reduce either the likelihood or the severity of a hazard. Examples of mitigations range from small actions, such as replacing a faded sign to improve visibility, to very large interventions, such as a system-wide rule change or technology implementation and associated training. The mitigations selected must be tailored to address at least one of the risks assessed. Railroads should, however, be alert to potential unintended consequences of mitigations, and be careful to select mitigations that minimize the possibility of inadvertently increasing other risks.

There are many ways railroads can mitigate the specific risk types that are required under the RSIA as part of an FRMP to be considered for mitigation. Below are some examples of how a railroad may mitigate these fatigue risks.

If the risk assessment shows that fatigue risks to the population of safety-related railroad employees associated with general health and medical conditions meet the railroad's established criteria for requiring mitigation, there are several approaches that can be taken. The railroad can establish new policies, such as those requiring periodic screening for specific medical conditions. The railroad can establish practices (*e.g.*, exercise breaks or making healthy foods more available) that encourage greater general health and fitness to reduce the likelihood of sleep apnea. The railroad can also take steps to increase awareness of medical conditions that affect alertness. This can be accomplished by providing information about the specific medical condition, its risk factors, prevalence, and how to recognize symptoms, or by identifying when to seek treatment, how to obtain a diagnosis, and treatment options.

Information relevant to determining when to seek treatment can include the time of onset, duration of symptoms, related health factors, comorbid conditions, and observations from the employee or family. Observation of these factors can be helpful in distinguishing a condition such as transient insomnia, which often resolves on its own, from chronic insomnia, which frequently requires medical treatment. Railroads could consider informing their safety-related employees that information from family members may provide insight into a sleep disorder of which an employee may otherwise be unaware.

Railroads can collect information regarding the medical professionals involved in diagnosis. For some disorders, this may only involve an individual's primary care physician. Other disorders may require consultation from a neurologist, sleep specialist, cognitive behavioral therapist, or other medical professionals. In addition, it may be

helpful to list or describe the diagnostic tests involved and the typical time required to obtain diagnosis. For example, a diagnosis of obstructive sleep apnea may require a sleep study such as a polysomnography, which generally requires an individual to spend the night in a sleep center.

Lastly, treatment options could be discussed. For some sleep disorders, behavioral modifications or lifestyle changes, such as weight loss, may be sufficient to address the medical condition. Other medical conditions may require breathing assistance via continuous positive airway pressure, medical devices (such as night guards or mandibular advancing devices), or medication.

Sometimes scheduling issues affect the opportunities of safety-related railroad employees to obtain sufficient quality and quantity of sleep. When the risk assessment determines that the risks associated with those schedules meets the railroad's established criteria for requiring mitigation, methods for mitigating those risks could include: (1) identifying methods to minimize accidents and incidents that occur as a result of working at times when scientific and medical research has shown that increased fatigue levels disrupt employees' circadian rhythm; and (2) developing and implementing alertness strategies, such as policies on napping, to address acute drowsiness and fatigue while an employee is on duty.

Alertness strategies are generally classified into two broad categories: preventative and operational. Preventative countermeasures are designed to minimize sleep loss and reduce the disruption to circadian cycles. The benefits of preventative

countermeasures can be long-lasting.³¹ Operational countermeasures are designed to enhance alertness and task performance and are generally only effective for a short time.³²

Work schedule systems are typically designed to organize the timing and structure of work to maximize efficiency and productivity, and seldom are these schedules designed to minimize the safety risks associated with work schedules that are incompatible with human biological limitations, such as circadian rhythm.³³ Fatigue risk in an industry that operates 24 hours a day, 7 days per week is not just dependent on how many hours per day a person is permitted to work, or the amount of time that a person is required to be off-duty between periods of work. Other significant factors that influence the level of fatigue risk include the time of day that an employee works, the number of consecutive hours worked, direction and frequency of schedule rotation, the number of consecutive days that an employee works, amount of sleep, and sleep quality. In addition, individual factors such as sleep disorders, age, and “morningness/eveningness” as well as natural circadian rhythms and environmental and social factors may affect one’s fatigue level and alertness.³⁴ Developing work schedules that reduce the risks of

³¹ Preventative countermeasures include: Adequate sleep/minimizing sleep loss, strategic napping at times such as before working or during an interim release period, good sleep habits/environment to maximize opportunities for good quality sleep, limiting work schedule modification/maximizing schedule predictability, diet, exercise, fatigue education, model-based schedule optimization/innovative scheduling and staffing practices, and opportunities to identify, diagnose, and treat sleep disorders.

³² Operational countermeasures include: Alertness aids including, workplace napping, split sleep, rest breaks, self and peer monitoring, mental stimulation, worker status alerting or monitoring technologies, strategies for shifting an employee’s biological clock, bursts of physical activity, increasing the number of consecutive hours of off-duty rest, during which an employee receives no communication from the employing railroad’s managers, supervisors, officers, or agents, and avoiding abrupt changes in rest cycles for employees by improving schedule predictability.

³³ Raslear, T.G., Gertler, J., & DiFiore, A., *Work schedules, sleep, fatigue, and accidents in the US railroad industry*, *Fatigue: Biomedicine, Health & Behavior*, 1, 99-115 (2013), available at: <http://www.fra.dot.gov/eLib/details/L04272>.

³⁴ Horne, J. A., & Östberg, O., *A self-assessment questionnaire to determine morningness-eveningness in human circadian rhythms*, *International Journal of Chronobiology*, 4, 97–110 (1976).

fatigue as part of a systematic FRMP may help a railroad balance its productivity and safety needs.

4. *Summary of the Work of the FRMP Working Group's Task Forces*

The FRMP Working Group's Task Forces extensively discussed mitigation of identified fatigue risks in the areas set forth in the RSIA.

a. *The Education and Training Task Force*

The Education and Training Task Force focused on the content and dissemination of training on the fatigue issues specific to the railroad industry. The Education and Training Task Force began by preparing a document summarizing existing fatigue training and education materials and highlighting the diversity of the materials and some of the major topics they covered. The document also includes information on other fatigue educational resources, including The Railroaders' Guide to Healthy Sleep Web site, existing FRA fatigue-related publications, other rail-related fatigue training and educational resources, and general fatigue resources.

The Education and Training Task Force also created the "Training Topics" document, which identifies appropriate fatigue-related training topics. The "Training Topics" document covers four major categories: introductory fatigue training, off-duty fatigue issues, preventative strategies, and operational strategies. The Task Force members agreed on the content of most of the sections and subsections. A few topics represented major areas of concern for both railroad labor and railroad management.

Both labor and management members of the Task Force asked that a section on the role of individual differences in fatigue related to vulnerability, countermeasure

efficacy, and performance be included in the “Training Topics” document as a topic for introductory fatigue training.

The Education and Training Task Force thoroughly discussed the “Training Topics” section on shiftwork as a cause of fatigue. Much of this discussion centered on predictability issues inherent in this type of work schedule and differing perspectives on how to address predictability.

Members of the Education and Training Task Force representing labor organizations also expressed major concerns with the “Training Topics” section on commuting. Specifically, labor did not feel the commuting section adequately captured the extended commuting requirements of some employees (*e.g.*, maintenance-of-way), and the concern that extended commuting is a required activity that contributes to employee fatigue, even though it occurs during off-duty hours.

In 2019, FRA released a report examining the relationship between accidents and incidents involving maintenance-of-way employees and their work schedules to determine the role of fatigue in such accidents and incidents.³⁵ This report may help address some of the concerns raised by the Education and Training Task Force regarding fatigue issues experienced by these employees.

The section of the Training Topics document on scheduling had the most areas of concern and protracted discussion, particularly on the issue of schedule predictability.

The Task Force discussed that a fatigue education and training program must have the following characteristics to be effective: (1) the program must be technically correct, reflecting current scientific understanding of the issue being addressed; (2) information

³⁵ Kumagai, J.K. & Harnett, M., *Data analysis for maintenance-of-way worker fatigue*, Washington, DC: Federal Railroad Administration (2019), retrieved from: <https://www.fra.dot.gov/eLib/Details/L1984.3>.

must be meaningful and useful to the intended audience; (3) the materials must be disseminated appropriately; and (4) the program's impact must be evaluated.

Furthermore, the Task Force discussed the following basic elements of any fatigue training and education program.

(1) Fatigue definitions: Fatigue is a complex state that is characterized by a lack of alertness and reduced mental and physical performance, often accompanied by drowsiness.³⁶ Railroads may also wish to provide other definitions that will be used throughout the training and education program, including those that are unique to the railroad.

(2) Signs and symptoms of fatigue: Although signs and symptoms of fatigue can vary among individuals in both their presence and magnitude, it is useful to review common signs and symptoms of fatigue. These should not be limited to physiological symptoms such as excessive blinking, yawning, or physiological discomfort, but also should include fatigue-related performance decrements such as increased reaction time.

(3) Causes of fatigue: Although individual differences play a significant role in how an individual will react to different causes of or risk factors for fatigue, some of the main causes of fatigue should be highlighted. These include: amount of sleep, quality of sleep, amount of time since last sleep (*i.e.*, number of continuous hours awake), time of day (circadian rhythm), workload and time on task, amount of recuperative time between wakeful episodes, sleep disorders and co-morbid conditions (*e.g.*, stress, depression, anxiety, post-traumatic stress disorder), general health, and family factors (including caregiver responsibilities). In addition, employees may provide anecdotal information of

³⁶ United States Department of Transportation, *Partnering in Safety: Managing Fatigue: A Significant Problem Affecting Safety, Security, and Productivity*, p. 5 (1999).

fatigue factors for a particular job and a railroad may consider this information in addressing causes of fatigue in its training program.

(4) Circadian rhythm: An individual's circadian rhythm dictates when he or she will be most alert and at what times he or she will feel the most fatigued. Employees should have a general understanding of the circadian rhythm, how it affects fatigue levels, how it is impacted by the light-dark cycle, and its role in such processes as body temperature, brain wave activity, and other biological functions.

(5) Individual differences: As part of a fatigue training and education program, the role individual differences play in fatigue should be understood. For example, there is a great deal of variability of sleep requirements among individuals. Some individuals may feel rested and alert after as few as 5 hours of sleep, while others may require 10 or more hours of sleep to feel rested and alert. These sleep requirements vary due to such factors as the exact phase and amplitude of an individual's circadian rhythm, activity level, age, fatigue sensitivity, and health. Furthermore, some individuals may be more sensitive to the effects of fatigue, and efficacy of countermeasures may vary depending on the individual.

(6) Fatigue misconceptions: There are some misconceptions associated with fatigue. Individuals are often poor judges of both their own fatigue level and the efficacy of fatigue countermeasures. This is an opportunity to debunk certain ineffective countermeasure myths and also to discuss the limitations associated with effective countermeasures. Certain stereotypes regarding fatigue can be addressed as well. For example, experiencing fatigue does not automatically indicate weakness or a lack of motivation.

(7) Shiftwork: Many railroads operate 24 hours a day, 7 days a week, 365 days a year. This operational schedule requires employees to work different shifts. Passenger and freight operations, different railroad classes, and different jobs will all have different shiftwork needs. Some jobs will work a dedicated shift, while other jobs can be unpredictable and be based on a variety of factors including train schedules, employee availability, and other needs. When discussing shiftwork, training content will be influenced by a particular railroad's operations and collective bargaining agreements. However, discussions of shiftwork should provide information on the fatigue risks associated with night work, split shifts, consecutive shifts worked, and working different shifts throughout the week. This information should include strategies to cope with those shifts occurring during circadian lows.

(8) Illnesses and stress: Although it would be impractical to discuss the impact of every possible illness and stressor on fatigue, it nevertheless is worthwhile to discuss how illnesses and stress in general can impact sleep quality. Furthermore, some stressors and illnesses can lead to sensitization to fatigue-inducing factors.

(9) Consequences of fatigue: The potential consequences of fatigue are numerous and varied. However, from a training perspective, the key information to convey is the relationship between fatigue and performance. Although individual differences will influence how fatigue affects performance, in general, as fatigue levels increase, task performance decreases, and this decrease in performance increases accident risk.

(10) Introduction to FRA FRMP regulations: A railroad may choose to provide an overview of FRA regulations regarding the requirements for FRMPs. This overview

can highlight any changes to operations as a result of the promulgation of the FRMP regulation as well as highlight the key requirements that all FRMPs must contain.

(11) Railroad FRMP: Following information on FRA FRMP regulations, a railroad may wish to take time to familiarize its employees with its own FRMP. Railroads should highlight any new policies or procedures associated with the creation of the FRMP as well as detail any changes or benefits that have resulted from its implementation. A railroad may also wish to provide employees with a mechanism to provide feedback about the FRMP as part of the railroad's own periodic review process. In addition, a railroad should familiarize its employees with its procedures and processes for reporting fatigue levels and fatigue mark-off policies.

As provided in the RSIA, any training and education program should be based on a foundation of the most current medical and scientific research;³⁷ FRA interprets this to include relevant statistical information, to the extent possible. FRA notes that resources that provide information on the prevalence of sleep disorders, the number of Americans not obtaining adequate sleep, and the mental and physical implications that result are available and updated annually.³⁸ Sleep research collected from and related to railroad employees of various crafts is also available.

³⁷ 49 U.S.C. 20156(f)(3)(A).

³⁸ Example resources include:

Calabrese, C., Mejia, B., McInnis, C. A., France, M., Nadler, E., & Raslear, T. G., Time of day effects on railroad roadway worker injury risk, *Journal of Safety Research*, 61, pp. 53-64 (2017).
Dorrian, J., Baulk, S. D., & Dawson, D., Work hours, workload, sleep and fatigue in Australian Rail Industry employees, *Applied Ergonomics*, 42(2), pp. 202-209 (2011).
Dorrian, J., Hussey, F., & Dawson, D., Train driving efficiency and safety: examining the cost of fatigue, *Journal of Sleep Research*, 16, pp. 1-11 (2007).
Gertler, J., Difiore, A., & Raslear, T., *Fatigue Status of the U.S. Railroad Industry*, Washington, DC: U.S. Department of Transportation, Federal Railroad Administration (2013).
Gertler, J., & Viale, A., *Work Schedules and Sleep Patterns of Railroad Maintenance of Way Workers*, Washington, DC: U.S. Department of Transportation, Federal Railroad Administration (2006).

The Education and Training Task Force also identified training topics addressing off-duty fatigue issues and preventative strategies. These included common sleep disorders, physiological versus subjective assessments of fatigue, lifestyle factors, nutrition and hydration, exercise, substance use, the home environment, and commuting.

The Task Force also created a “Dissemination Strategies” document outlining steps railroads should consider when choosing delivery approaches for fatigue education and training, and suggesting methods railroads could use for successful evaluation of a fatigue education and training program. The “Dissemination Strategies” document identifies and discusses the following ten elements of an effective dissemination and evaluation plan listed below.

1. *Goals*: The first step in an effective dissemination and evaluation plan is determining and documenting the goals for the training and education program. The primary question to ask at this step is: What is the desired outcome of the training and education program? Different railroads may have different training goals and these goals will help shape how information is presented to employees.

2. *Objectives*: When considering objectives of a fatigue training and education program, determine specific areas of accomplishment for each goal. Once those areas have been established, the next step is to determine what will be required to measure success.

Kumagai, J. & Harnett, M. Data Analysis for Maintenance-of-Way Worker Fatigue (2019), available at: https://www.fra.dot.gov/eLib/details/L19843#p1_z50_gD_IRT.
Sussman, D., & Coplen, M., Fatigue and Alertness in the United States Railroad Industry Part 1: The Nature of the Problem, *Transportation Research Part F: Traffic Psychology and Behaviour*, 3(4), pp. 211-220 (2000).
Raslear, T.G., Gertler, J., & DiFiore, A., Work schedules, sleep, fatigue, and accidents in the US railroad industry, *Fatigue: Biomedicine, Health & Behavior*, 1, pp. 99-115 (2013), available at: <http://www.fra.dot.gov/eLib/details/L04272>.
<https://www.cdc.gov/sleep/index.html> and <https://www.sleepfoundation.org/>

3. *Measuring Success*: There is no single “correct” way to measure success. However, any measure of success should indicate if the material reached the intended audience, was understood, and had a positive effect. Evaluation strategies may be direct, such as administering a quiz to test knowledge of a particular topic, or indirect, such as looking at safety culture change as a result of training. Neither method is superior to the other, but multiple evaluation strategies may provide a more comprehensive understanding of program efficacy.

4. *Employees Covered*: An effective dissemination and evaluation plan should identify the employees covered by the different elements of a training and education program. There may be some elements of a program that apply to all railroad employees, while other elements may only apply to a particular craft, shift, or schedule type. At this stage, thought should also be given to any special needs a covered group may have. For example, if a large percentage of a covered group does not have email access, disseminating information via email would be neither practical nor effective.

5. *Content*: Perhaps the most important element to consider when developing a dissemination and evaluation plan is the content to be presented. At this step, proposed fatigue training and education content should be reviewed to make sure it is accurate and relevant to the covered groups.

6. *Source*: Care should be given to ensure that information presented comes from credible and trusted sources.

7. *Presentation Medium*: At this stage in the process, the program designer should determine the most effective methods to present different elements of the fatigue training and education program. Some information may be best suited for in-person

training while other information might be best conveyed through publications. Some presentation media to consider include in-class training, informational videos, handouts, peer-to-peer efforts, job briefings, and conferences or other meetings. Depending on the covered group's access to the Internet, Web resources such as Web-based training, emails, Web sites, blogs, and social media could also be used. The preceding examples are not an exhaustive list, and each railroad will need to tailor its presentation media based on the identified goals, objectives, and employees to be covered.

8. *Access*: Fatigue training and education should be an ongoing process. Therefore, it is important that employees have easy access to information. Employees should have a way to revisit information that was previously presented. Examples of making information accessible could include providing access to fatigue presentations on the company Intranet after an initial classroom presentation, handouts after a one-time job briefing, or posters that highlight key points.

9. *Availability*: At this step, a railroad developing a fatigue training and education program should consider strategies for promoting awareness of the availability of training and educational materials.

10. *Challenges*: The challenges related to effectively disseminating and evaluating information as part of a fatigue training and education program will vary greatly. These challenges could include a variety of issues, such as difficulty reaching a particular group, lack of resources to present a topic as originally planned, or even glitches in Web technology. Determining how best to deliver information in a manner that is understandable, appropriate, and engaging to different employee groups will

present its own set of challenges. At this stage, potential challenges should be identified as well as solutions for overcoming or mitigating these challenges.

Finally, the Education and Training Task Force created a document that highlights and explains two general categories of fatigue countermeasures (preventative and operational), and provides examples of each. Preventative countermeasures, as the name suggests, are countermeasures designed to minimize sleep loss and reduce the disruption of circadian cycles and the benefits of preventative countermeasures can be long-lasting. Operational countermeasures are designed to enhance alertness and task performance while on duty and are generally only effective for a short time.

b. Scheduling Task Force

The FRMP Working Group's Scheduling Task Force discussed the scheduling issues that affect fatigue. However, several issues prevented agreement on scheduling including: (1) the need to differentiate between employees covered by HOS limitations (covered service employees) and employees not covered by such requirements; (2) the need for waivers and/or pilot projects to implement scheduling practices that might conflict with existing HOS limitations; (3) disagreement on whether using biomathematical fatigue models is appropriate for freight operations; (4) potential conflict with existing collective bargaining agreements; and (5) how much emphasis should be placed on an employee's work schedule predictability. The Scheduling Task Force did not produce a document.

c. Infrastructure and Environment Task Force

The Infrastructure and Environment Task Force provided guidelines it suggested railroads should consider to mitigate fatigue when employees are involved in emergency

work. The Task Force interpreted an emergency based on the nonapplication language in the HOS laws at 49 U.S.C. 21102(a). Specifically, the “Emergency Work” document provides that an emergency for purposes of the guidelines is defined in 49 U.S.C. 21102(a)(1)-(4), which states that the HOS requirements do not apply to situations involving a casualty, an unavoidable accident, an act of God, or a delay resulting from a cause unknown and unforeseeable to a railroad carrier or its officer or agent in charge of the employee when the employee left a terminal.

This definition incorporates a wide variety of emergency situations, including those referred to in section 20156(f)(3)(C), “derailments and natural disasters, or engagement in other intensive working conditions.” The employees responsible for responding to these emergency situations may include employees performing functions not covered by HOS requirements, and the “Emergency Work” document makes clear that the Infrastructure and Environment Task Force intended it to apply to these employees as well. For example, the “Emergency Work” document includes provisions such as relief assignments when an emergency is anticipated to extend more than 16 hours, and provisions to offer relief lodging for employees both between shifts of extended work at an emergency location, and, if necessary, for an employee to rest before commuting home after an extended period of emergency service. Such provisions would provide some protection against fatigue for those employees not subject to HOS requirements and, if the emergency situation resulted in the nonapplication of the HOS laws, for employees performing service normally covered by the HOS limitations.

The Task Force also created two documents; “Accommodations” and “Dispute Resolutions,” focused on mitigating fatigue related to issues at lodging facilities. The

first document, “Accommodations,” includes guidelines for accommodations where employees rest during off-duty periods, and the second document, “Dispute Resolutions,” provides dispute resolution procedures for issues arising with lodging facilities that interfere with an employee’s ability to rest.³⁹ The Task Force made clear that the “Accommodations” and “Dispute Resolution” documents were intended to apply to all employee lodging, even lodging that is not “railroad provided” (*e.g.*, commercial hotels).

The Task Force indicated that the accommodations guidelines are intended to provide elements for discussion during the required consultation between management and labor about a railroad’s FRMP, rather than to provide minimum standards for lodging facilities. The Task Force did not expect every lodging facility would meet all of the listed criteria. The Task Force agreed that while the listed elements were desirable, they may not be possible at all locations, and, in some cases, collective bargaining agreements might provide for other arrangements. For example, while the guidelines recommend a single occupancy room, some existing labor agreements may provide for four employees to a room. Similarly, while a full or double bed may be preferred, there may be locations where this is not an option and only single beds are available at the only available lodging facility.

The “Dispute Resolution” document recognizes that employees will first seek to resolve issues at lodging facilities with on-site staff, such as the front desk at a hotel. The “Dispute Resolution” document recommends that FRMP plans include a railroad contact

³⁹ Under 49 U.S.C. 21106, a railroad may provide sleeping quarters for employees, and any individuals employed to maintain the right-of-way of a railroad carrier, only if the sleeping quarters are clean, safe, and sanitary, give those employees and individuals an opportunity for rest free from the interruptions caused by noise under the control of the carrier, and provide indoor toilet facilities, potable water, and other features to protect the health of employees. Further, 49 CFR part 228, subpart C, provides additional requirements for railroad-provided sleeping quarters.

with authority over lodging decisions and require that contact to make a good faith effort to resolve lodging issues in a timely manner so the employee can obtain adequate rest before returning to duty. For example, if the heat is not working in a given room, the lodging facility will likely move the employee to a different room. However, if there were no other rooms available, or if the issue were something like electric power being out at an entire facility, the railroad contact should become involved to assist the employee in finding alternate lodging.

The “Dispute Resolution” document provides that FRMP plans should contain a dispute resolution process covering sleeping accommodations provided by or through the railroad. It should be noted that this process is not intended to supplant or modify the requirements established by 49 CFR 228.333, *Remedial action*, as part of the Camp Car regulation. The Task Force suggested that any FRMP dispute resolution process should be designed to address problems associated with the sleeping accommodations that would interfere with an employee obtaining adequate rest. As part of the FRMP plan, the Task Force recommended that railroads identify a protocol for contacting a railroad representative should resolution with a lodging facility fail.

The Task Force identified parameters it recommended employer-provided lodging should meet to the extent practicable. FRA notes that interim rest facilities provided by passenger train operators under 49 CFR 228.409, *Requirements for railroad-provided employee sleeping quarters during interim releases and other periods available for rest within a duty tour*, are subject to the requirements of that section. As such, the Task Force’s suggested parameters are not applicable to interim rest facilities under § 228.409. In addition, local labor agreements may supersede or supplement some of the elements of

these parameters. The parameters the “Dispute Resolution” document identifies include structural factors, availability of meal accommodations, building safety and security, and personal hygiene and sanitation.

The Task Force “Dispute Resolution” document does not define “adequate rest,” nor does it specify the conditions at a lodging facility that would prevent an employee from obtaining adequate rest. Employees covered by HOS laws or regulations would be required to receive the amount of off-duty time provided under the relevant laws or regulations. For other employees, rest requirements may depend on the situation, or may be provided by a collective bargaining agreement or other mechanism. However, the Task Force “Dispute Resolution” document suggests that if an issue arises at a lodging facility that interferes with an employee’s ability to obtain rest, the employee should receive the amount of rest he or she would have had if the lodging issue had not occurred. For example, if there are no towels in the room when an employee arrives, but the front desk promptly brings towels upon request, this should not hinder the employee’s ability to get adequate rest. On the other hand, if an employee is provided a room with a broken bed, and it takes five hours to locate another room or bed, the railroad may need to adjust the time an employee is required to return to duty so the employee can obtain adequate rest.

Lastly, as part of its discussions, the Task Force identified circumstances when employees may have to work under excessive fatigue conditions. In these instances, when, despite best efforts, employees must work under conditions identified as having an excessive risk for fatigue, the Task Force discussed that the specific risks and hazards associated with operations under excessive fatigue should be identified. Once identified,

an excessive fatigue protocol can be implemented for employees at risk. The Task Force suggested that railroads may wish to consider formalizing these protocols into a Workplace Fatigue Policy. They also suggested that a fatigue policy may be an effective way to communicate how operations will be handled when employees are working under fatigued conditions. This policy could be system-wide or site or craft specific. A fatigue policy may include information about: (1) roles and responsibilities of employees and supervisors when working under excessive fatigue conditions; (2) maximum shift length; (3) control measures for specific jobs, tasks, or operations; (4) fatigue self-assessment checklists; (5) identification of errors that are more likely to happen when fatigued and procedures to reduce the likelihood of these errors; (6) procedures for managing employees working under excessive fatigue conditions; (7) procedures for reporting potential hazards and risks; and (8) procedures for when an employee is too fatigued to continue work (*e.g.*, temporary work assignment).

5. Tracking Performance

As required in 49 CFR 270.103(p)(1)(viii) and 49 CFR 271.105(c)(3), FRA proposes that each railroad must develop a system to track identified risks and mitigation strategies within the FRMP. Railroads must continually monitor all identified risks, not just risks that are currently being targeted for mitigation. As a railroad's FRMP matures, mitigation strategies are implemented, and operations change, risks will also change. A railroad may find that certain risks have been essentially eliminated, while others may have been significantly reduced, and previously undetected risks may emerge. As risks develop, the system must be able to incorporate these newly identified risks into their processes.

Evaluation of fatigue-related information might show that some mitigation strategies do not meet expectations for effectively reducing fatigue. It could also show that changes in schedules, the addition of new technologies, turnover in the workforce, added demands for service, and other operational changes could present new fatigue hazards or change the risks associated with hazards already known. When either of these circumstances arises, the fatigue risk landscape is altered, and the railroad should again use the risk factor analysis processes to address those changes.

For risks being mitigated, the railroad should note the date the mitigation strategy was implemented and track the progress and success of the mitigation strategy over time. Risks that are not mitigated or have not been mitigated to the extent desired should be evaluated for changes in mitigation strategies, as appropriate. Risks that have been successfully eliminated should be noted, and new risks that have emerged should be assessed for probability and severity and incorporated into the railroad's risk assessment catalog. Existing risks should also be reviewed for changes in probability and severity. As a railroad reviews its fatigue-related risks and risk tolerance, the risks to be mitigated and the types of mitigation strategy to be used may change over time. Evaluation might also show that some portion of the FRMP is not being implemented as designed. It could also identify aspects of the program that, even though they are working as designed, are not effective. In any of these instances, the evaluation could lead to program improvements.

Finally, consistent with 49 CFR 271.107, an effective FRMP includes feedback mechanisms and regular information updates about the system to all affected employees to encourage cooperative participation in the FRMP.

V. Section-by-Section Analysis

FRA proposes to amend 49 CFR part 270 (SSP) by adding a new subpart E, and to amend 49 CFR part 271 (RRP) by adding new subpart G. As proposed, each of these new subparts would be titled “Fatigue Risk Management Programs;” substantively identical; and set forth the requirements for railroads to develop and implement FRMPs as part of their SSPs or RRP. FRA also proposes to amend: § 270.103(a)(1) to ensure a railroad’s SSP plan includes subpart E, by replacing the word “section” with the word “part”; § 271.101(a) by adding an FRMP to the list of required elements of an RRP; and § 271.201, to include an FRMP plan as a required component of an RRP plan.

The new subparts would require each railroad subject to part 270 or part 271 (covered railroads) to establish and implement an FRMP that is supported by an FRA-approved written FRMP plan, as a component of a railroad’s SSP or RRP. This proposed rule would also require covered railroads to review their FRMP annually, and if necessary, make FRA-approved updates to their plans. FRA is proposing this rule in its effort to improve rail safety continually and to satisfy the statutory mandate in 49 U.S.C. 20156. FRA seeks comments on all aspects of the proposed rule.

Sections 270.401 and 271.601—Definitions

Proposed §§ 270.401 and 271.601 contain definitions for terms used in this NPRM. The sections include proposed definitions for the terms: contributing factor, fatigue, fatigue-risk analysis, FRMP, FRMP plan, and safety-related railroad employee. The proposed definitions are intended to clarify the meaning of important terms used in this proposed rule and to minimize potential misinterpretation of the regulations. FRA is proposing to define “contributing factor” as a circumstance or condition that helps cause

a result (*i.e.*, fatigue). Contributing factors do not necessarily cause fatigue by themselves, but they can increase the likelihood fatigue will occur, or can increase the severity of fatigue when it does occur. Eliminating or mitigating contributing factors may not eliminate fatigue and associated risk, but doing so can moderate the frequency with which it occurs, or reduce the severity of fatigue consequences.

While the RSIA did not define “fatigue,” FRA is proposing to define “fatigue” consistent with the DOT operational definition⁴⁰ of the term, as “a complex state characterized by a lack of alertness and reduced mental and physical performance, often accompanied by drowsiness.”

FRA proposes to define “fatigue risk analysis” as a risk-based analysis that is focused on the hazards and risks associated with fatigue. In 49 CFR 271.103(b), a covered railroad is required to conduct a risk-based hazard analysis of its operations that includes: (1) identification of hazards; and (2) a calculation of risk by determining and analyzing the likelihood and severity of potential events associated with those hazards. *See also* 49 CFR 270.5, definition of risk based hazard management. FRA proposes to define FRMP as fatigue risk management program, and the FRMP plan is the documentation that describes the processes and procedures a railroad uses to implement its FRMP.

Section 20156(f)(1) requires a railroad to have a fatigue management plan designed to reduce the fatigue experienced by “safety-related employees.” FRA proposes to define “safety-related railroad employee” consistent with the definition of the term in 49 U.S.C. 20102. As proposed, “safety-related railroad employee” would mean a person:

⁴⁰ United States Department of Transportation, *Partnering in Safety: Managing Fatigue: A Significant Problem Affecting Safety, Security, and Productivity*, 1999; p. 5.

(1) subject to 49 U.S.C. 21103, 21104, or 21105 or 49 CFR part 228 subpart F (the hours of service laws and regulations); (2) involved in railroad operations, but not subject to the hours of service laws and regulations; (3) who inspects, installs, repairs or maintains track, roadbed, signal and communication systems, and electric traction systems including a roadway or railroad bridge worker; (4) who is a hazmat employee as defined in 49 U.S.C. 5102(3); (5) who inspects, repairs, or maintains locomotives, passenger cars, or freight cars; or (6) who is the employee of any person who enters into a contractual relationship with the railroad either to perform significant safety-related services on the railroad's behalf or to utilize significant safety-related services provided by the railroad for railroad operations purposes, if the person performs one of the functions identified in paragraphs (1) through (5).

The SSP and RRP rules do not use the term “safety-related employee” because the RSIA does not limit the railroad safety risk reduction requirement to these employees. *See* 49 U.S.C. 20156(a)-(e). FRA requests comment on whether the proposed definition of “safety-related employee” captures the intended scope of Congress’s mandate for fatigue management plans in Section 20156.

FRA requests public comment on these proposed definitions and whether other terms used in this proposal should be defined.

Section 270.403 and 271.603—Purpose and Scope of a FRMP

Proposed §§ 270.403 and 271.603 explain the purpose and scope of the proposed rule. As proposed, paragraph (a) of each section states that the purpose of the subparts is to require railroads to develop and implement FRMPs to improve railroad safety through

structured, proactive processes and procedures to identify and mitigate the risks associated with fatigue on their employees.

Proposed paragraph (b) of these sections address the scope of the proposed rule and would require railroads to develop their FRMPs to reduce the fatigue of their safety-related railroad employees and to reduce the risk of railroad accidents, incidents, injuries, and fatalities where the fatigue of any of these employees is a contributing factor.⁴¹

Proposed paragraph (b) further requires each railroad, in developing its FRMP, to identify and evaluate, systematically, the fatigue-related railroad safety hazards and risks on its system, determine the degree of risk associated with each hazard, and manage those risks to reduce the fatigue that its safety-related railroad employees experience. This system-wide fatigue risk identification and evaluation process must account for the varying circumstances of railroad operations on different parts of its system. The railroad would then be required to employ in its FRMP the appropriately identified fatigue risk mitigation strategies to address those varying circumstances.⁴²

Section 270.405 and 271.605—General Requirements; Procedure

These proposed sections set forth the rule’s general requirements. Paragraph (a) in each of these sections would require each railroad subject to either RRP or SSP to establish and implement an FRMP fully as part of its SSP or RRP. As proposed, these paragraphs would also require each railroad to develop and implement an FRMP plan to

⁴¹ The RSIA requires railroads “to reduce the likelihood of accidents, incidents, injuries, and fatalities caused by fatigue.” Fatigue is a complex and multifaceted condition with varying effects among individuals; however, it is not always the primary cause of an accident or incident. The presence of fatigue can increase the likelihood of an accident happening, or it can make the consequences of an accident more severe. FRA uses the term “contributing factor” to make clear that railroads may choose mitigations that address either the likelihood or the severity of an accident, incident, injury, or fatality caused in part by fatigue.

⁴² See 49 CFR 270.407(c) and 271.607(c).

support its FRMP. A railroad's FRMP plan would be required to meet the requirements of proposed § 270.409 or § 271.609, and be approved by FRA under the processes in subpart C of part 270 or subpart D of part 271. Consistent with Section 20156's mandate for railroads to update their fatigue mitigation plans periodically, proposed paragraph (a) would also require railroads to update their FRMP plans as necessary as part of the annual, internal assessment of the railroad's SSP or RRP already required by existing §§ 270.303 and 271.401. FRA believes the annual internal assessment should be sufficient for a railroad to determine whether any aspect of its FRMP plan requires updating. FRA requests comments on whether the annual internal assessment provides an appropriate mechanism and timing for evaluating and updating railroads' FRMP plans.

Proposed paragraph (b) of these sections would require a railroad to explain in its FRMP plan its method for analyzing fatigue risks and its process(es) for implementing its FRMP.

Proposed paragraphs (c) of these sections would require railroads to submit their FRMP plans to FRA for approval either within six months of publication of a final rule in this proceeding or within the applicable existing timelines in parts 270 and 271 for filing SSP or RRP plans. These paragraphs would also require railroads to follow the existing processes in parts 270 and 271 for submitting updates of their FRMP plans to FRA for approval.

Proposed paragraph (d) would require FRA to approve or disapprove railroads' FRMP plans (and any updates) under the existing approval processes in parts 270 and 271 applicable to FRA approval of railroad SSP plans and RRP plans.

Section 270.407 and 271.607—Requirements for an FRMP

Proposed §§ 270.407 and 271.607 set forth the proposed requirements for railroads' FRMPs. As proposed, paragraph (a) of these sections sets forth the general requirement that a railroad subject to part 270 or 271 would have to establish and implement an FRMP that meets certain requirements.

Proposed paragraph (b) of these sections contains the minimum requirements for the fatigue-risk analysis part of a railroad's FRMP. These paragraphs specify that a railroad's fatigue-risk analysis must include identification of fatigue-related railroad safety hazards, assessment of the risks associated with those hazards, and prioritization of those risks for mitigation. The proposed paragraph also requires that the fatigue risk analysis consider, at a minimum, three categories of risk factors:

(1) general health and medical conditions that can affect the fatigue levels of safety-related railroad employees;

(2) scheduling issues that can affect the opportunities of safety-related railroad employees to obtain sufficient quality and quantity of sleep; and

(3) characteristics of each job category worked by safety-related railroad employees that can affect the fatigue levels and risk for fatigue of safety-related railroad employees.

Railroads are not limited to consideration of these three types of risk factors in their FRMPs and FRA encourages railroads to consider other relevant factors based on developments in fatigue science. The types of principles and processes that inform a fatigue-risk analysis are well-established and, as discussed in detail above and in the preamble of the SSP and RRP proposed rules, have been adopted into industry standards

and described in detail in other written resources. See 77 FR 55375 and 80 FR 10953. For example, as discussed in those preambles, MIL-STD-882,⁴³ APTA's *Manual for the Development of System Safety Program Plans for Commuter Railroads*,⁴⁴ and FRA's *Collision Hazard Analysis Guide: Commuter and Intercity Passenger Rail Service* discuss how to conduct risk analyses in detail.⁴⁵ A railroad subject to this part could use any of these resources when developing and conducting a fatigue-risk analysis. FRA requests public comment as to whether additional resources are necessary to help railroads comply with the requirements of this proposed section and if so, what type of additional resources would be necessary.

Paragraph (c) of these sections would require a railroad as part of its FRMP to develop and implement mitigation strategies that improve safety by reducing the risk of railroad accidents, incidents, injuries, and fatalities where fatigue of any of its safety-related railroad employees is a contributing factor. These paragraphs state that as a railroad develops and implements mitigation strategies, it would be required to consider, at a minimum, the railroad's policies, practices, and communication. Paragraphs (c)(1)-(3) describe each of these three areas of consideration in more detail.

Paragraph (c)(1) would require railroads to consider developing and implementing policies to reduce the risk of the exposure of its safety-related railroad employees to fatigue-related railroad safety hazards on its system.

⁴³ Department of Defense, *Standard practice system safety*, (MIL-STD-882E) (2012), retrieved from <https://www.dau.edu/cop/armysoh/DAU%20Sponsored%20Documents/MIL-STD-882E.pdf> (last accessed on July 27, 2020).

⁴⁴ <https://www.trbtss.org/wp-content/uploads/2016/03/APTA-Safety-Management-System-Manual.pdf> (last accessed on July 27, 2020).

⁴⁵ <https://www.fra.dot.gov/eLib/Details/L03191> (last accessed on July 27, 2020).

Paragraph (c)(2) would require railroads to consider developing and implementing operational practices to reduce the risk of the exposure of its safety-related railroad employees to fatigue-related railroad safety hazards on its system.

Paragraph (c)(3) would require railroads to consider developing and implementing training, education, and outreach methods to deliver fatigue-related information effectively to its safety-related railroad employees. At a minimum, a railroad must consider the need to include employee education and training on the physiological and human factors that affect fatigue and strategies to reduce or mitigate the effects of fatigue based on the most current scientific and medical research and literature. If a railroad chooses to include these subjects in its training, this training would supplement the requirement in 49 CFR part 243 to develop minimum training standards for each occupational category that includes a list of the Federal railroad safety laws, regulations, and orders that an employee is required to comply with by adding employee fatigue education and training topics that relate to employee safety independent of any regulatory or statutory requirements.

Paragraph (d) proposes requirements for a railroad to develop and implement procedures and processes for monitoring and evaluating its FRMP. Monitoring and evaluation are necessary parts of a railroad's FRMP; they enable a railroad to determine whether the FRMP is effectively reducing the numbers and rates of railroad accidents, incidents, injuries, and fatalities where fatigue is a contributing factor.

Section 270.409 and 271.609—Requirements for a FRMP Plan

Proposed §§ 270.409 and 271.609 would require a railroad to adopt and implement its FRMP through an FRMP plan that meets certain requirements. As

proposed, paragraph (a) of these sections would require railroads to develop their FRMP plans in consultation with directly-affected employees and FRA would have to approve a railroad's FRMP. The existing consultation and approval processes of parts 270 and 271 would apply.

Proposed paragraph (b) would require the FRMP plan to describe specific, fatigue-related goals of the FRMP and clear strategies for attaining those goals.

Proposed paragraph (c) addresses the methods a railroad uses to develop its FRMP plan. Proposed paragraph (c)(1) would require an FRMP plan to describe the railroad's method(s) for conducting the fatigue-risk analysis as part of its FRMP.⁴⁶ While FRA understands that railroads subject to a final FRMP rule would likely need to develop processes unique to their own operations, FRA expects that railroads' fatigue-risk analysis processes will use techniques similar to those currently used in other safety management systems. This section also specifies information railroads must include in an FRMP plan's description of a railroad's fatigue-risk analysis. FRA requests comment on whether additional resources are necessary to help railroads comply with the requirements of this proposed section and if so, what type of resources would be helpful.

Proposed paragraph (c)(2) would require an FRMP plan to describe the railroad's processes for identifying and selecting mitigation strategies, and for monitoring identified hazards while the risk associated with the hazard is being mitigated.

Proposed paragraph (c)(3) would require an FRMP plan to describe a railroad's processes for monitoring and evaluating the overall effectiveness of the FRMP and the

⁴⁶ As previously discussed, railroads could look to well-established safety management systems which describe processes for conducting a fatigue-risk analysis, such as MIL-STD-882, APTA's *Manual for the Development of System Safety Program Plans for Commuter Railroads*, and FRA's *Collision Hazard Analysis Guide: Commuter and Intercity Passenger Rail Service*.

mitigation strategies, along with procedures for reviewing and updating the FRMP. As noted above, FRA anticipates this review will be the same as for the overall SSP or RRP.

Proposed paragraph (d) of this section would require an FRMP plan to describe how the railroad will implement its FRMP. As proposed, a railroad may implement its FRMP in stages, provided the FRMP is fully implemented and operational within 36 months of FRA's approval of the plan. This implementation plan would cover the entire implementation period and contain a timeline (beginning with the date FRA approves the railroad's FRMP plan) describing when the railroad will achieve specific and measurable implementation milestones.

Consistent with 49 CFR 270.103(p)(2)(i) and 49 CFR 271.203(b)(3), as part of the implementation description, proposed paragraph (d)(1) would require a railroad to include a description of the roles and responsibilities of each position or job function with significant responsibility for implementing the railroad's FRMP (including any positions or job functions held by an entity or contractor that provides significant FRMP services for the railroad).

Consistent with 49 CFR 271.225(b)(2), proposed paragraph (d)(2) would require a railroad to include a description of the planned timeline for meeting the milestones required for the FRMP plan to be fully implemented. Proposed paragraphs (d)(3) and (d)(4) would require a railroad to describe how it will make significant changes to the FRMP, and procedures for consultation with directly affected employees on substantive amendments to the FRMP plan.

Proposed paragraph (e) would require that a railroad submit its FRMP plan to FRA by amending its SSP plan or RRP plan. Since this proposed rule would be

published as a final rule after the SSP and RRP final rules are in effect and railroads have submitted their SSP plans or RRP plans to FRA under part 270, subpart C, or part 271, subpart D, railroads would need to amend their SSP plans or RRP plans to include an FRMP plan. Thus, as proposed, a railroad would follow the procedures in § 270.201(c) or § 271.303 to amend its SSP plan or RRP plan. FRA proposes that an FRMP plan is not considered a safety-critical amendment of an SSP plan for the purposes of § 270.201(c)(1)(ii), so a railroad should be able to submit the FRMP plan to FRA as an amendment to its SSP plan or RRP plan 60 days before the proposed effective date of the FRMP plan. If a railroad is initially not required to submit an SSP plan or RRP plan, but is later required to, the railroad must include an FRMP plan as part of its SSP plan or RRP plan submission to FRA, or submit the FRMP plan by (INSERT DATE 240 DAYS AFTER DATE OF PUBLICATION OF THE FINAL RULE IN THE FEDERAL REGISTER), whichever is later. FRA will review the railroads' FRMP plans under the amendment process in § 270.201(c)(2) or § 271.303(c).

VI. Regulatory Impact and Notices

A. Executive Order 12866 and DOT Regulatory Policies and Procedures

This proposed rule is a non-significant regulatory action within the meaning of Executive Order 12866 (EO 12866) and DOT's Administrative Rulemaking, Guidance, and Enforcement Procedures in 49 CFR part 5.

FRA has prepared and placed a Regulatory Evaluation addressing the economic impact of this proposed rule in the docket (Docket No. FRA-2015-0122). The Regulatory Evaluation contains estimates of the costs and benefits of this proposed rule that are likely to be incurred over a ten-year period. FRA estimated the costs and benefits

of this proposed rule using discount rates of 3 and 7 percent. FRA was unable to quantify the costs and benefits for all the elements within the proposed regulation for both passenger and freight railroads. FRA presents monetized costs and benefits where possible and discusses those non-quantified elements qualitatively where data was lacking.

Section 103 of the RSIA mandates that FRA (as delegated by the Secretary) require certain railroads to establish a railroad safety risk reduction program, of which an FRMP is a required component. This proposed rule is part of FRA's efforts to improve rail safety continually and to satisfy the statutory mandate in the RSIA.

FRA anticipates railroads will develop and implement mitigation strategies that are either cost-beneficial or cost-neutral to the railroad. FRA requests public comment on this assumption. FRA is particularly interested in the experience of railroads that have already utilized mitigation strategies to reduce the risk of the exposure of safety-related railroad employees to fatigue-related railroad safety hazards on their systems; specifically, whether the railroads have realized costs and benefits from the development and implementation of such mitigation strategies, and how much those strategies cost the railroads to implement.

The Regulatory Evaluation analyzes two mitigation strategies to quantify potential costs and benefits that railroads may achieve through the proposed regulation: training and screening for sleep conditions. However, since the proposed regulation gives railroads the flexibility to select the mitigation strategies that would work best for them rather than prescribing standards, there is a high amount of uncertainty in FRA's

costs and benefit estimates, specifically pertaining to the training mitigation, as FRA is unsure how railroads will implement the various mitigations.

The costs and benefits⁴⁷ associated with the proposed rule are presented in Table VI-1 below:

Table VI-1. Summary of Total 10-Year Impact (2018 Dollars) (in millions)

		Present Value 7%	Present Value 3%	Annualized at 7%	Annualized at 3%
Calculation Aid	Costs				
A	Training Only (low)	\$2.02	\$2.04	\$0.29	\$0.24
B	Training Only (high)	\$4.13	\$4.18	\$0.59	\$0.49
C	FRMP Plan Creation	\$0.89	\$1.04	\$0.13	\$0.12
D	Government Costs	\$2.03	\$2.59	\$0.29	\$0.30
A+C+D	Total Cost (low)	\$4.94	\$5.68	\$0.70	\$0.67
B+C+D	Total Cost (high)	\$7.05	\$7.81	\$1.00	\$0.92
A+C	Total Cost w/o Government Costs (low)	\$2.91	\$3.08	\$0.41	\$0.36
B+C	Total Cost w/o Government Costs (high)	\$5.01	\$5.22	\$0.71	\$0.61
	Benefits				
	Training Only (low)	\$5.41	\$6.33	\$0.77	\$0.74
	Training Only (high)	\$21.65	\$25.34	\$3.08	\$2.97

FRA is interested in comments addressing the Regulatory Evaluation’s methodology for establishing the accident pool used to calculate benefits as well as establish the effectiveness rates of mitigations. Specifically, FRA seeks public input on the studies used to establish the effectiveness rates and the use of all human factor accidents within the benefit pool. As the proposed regulation does not specifically require railroads to implement specific mitigations, but rather allows railroads to implement the mitigation that best addresses their specific fatigue risks, FRA requests

⁴⁷ Unless otherwise noted, costs and benefits are presented in 2018 dollars.

comments on any costs and benefits that might be associated with the elements that FRA was unable to quantify.

FRA's analysis shows there are many factors that are difficult to quantify both for passenger and freight railroads. Where possible, FRA's Regulatory Evaluation estimates costs and benefits for each element within the proposed regulation. FRA also requests comments on the elements that are qualitatively discussed. Given current railroad business and operational practices, this analysis demonstrates the fatigue training element, an element that all railroads will most likely implement, may be cost effective. FRA also believes the napping mitigation presented within the Regulatory Evaluation's alternative analysis could be cost beneficial. However, given the uncertainty surrounding the use of alertness as a measure of reduced fatigue, in an effort to not overestimate the benefits associated with the proposed regulation, FRA does not present the findings regarding napping in the main analysis of the Regulatory Evaluation. Despite the uncertainty, FRA believes that there could be significant reduction in fatigue with the implementation of a napping mitigation. Not only do various studies support the idea that napping reduces fatigue, but a large number of Class I railroads already have policies supporting napping, which suggests that the benefits outweigh the costs for those railroads.

B. Regulatory Flexibility Act and Executive Order 13272; Initial Regulatory Flexibility Assessment

The Regulatory Flexibility Act of 1980 (5 U.S.C. 601 *et seq.*) and Executive Order 13272 (67 FR 53461, Aug. 16, 2002) require agency review of proposed and final rules to assess their impacts on small entities. An agency must prepare an Initial

Regulatory Flexibility Analysis (IRFA) unless it determines and certifies that a rule, if promulgated, would not have a significant economic impact on a substantial number of small entities. FRA is publishing this IRFA to aid the public in commenting on the potential small business impacts of the requirements in this NPRM. FRA invites all interested parties to submit data and information regarding the potential economic impact on small entities that would result from the adoption of the proposals in this NPRM. FRA will consider all information, including comments received in the public comment process, to determine whether the rule will have a significant economic impact on small entities.

1. *Reasons FRA is Considering the Proposed Rule*

FRA is initiating this NPRM pursuant to 49 U.S.C. 20156, which provides that FRA, by delegation from the Secretary, shall require certain railroads to develop and implement an FRMP as part of either their SSP or RRP.

2. *Objectives and the Legal Basis for the Proposed Rule*

This NPRM proposes to implement the FRMP element of the statutory mandate by requiring each Class I freight railroad, each railroad that provides intercity rail passenger transportation or commuter rail passenger transportation, and each ISP railroad to develop and implement an FRMP as one component of a larger railroad safety RRP or SSP. A detailed discussion of the objectives and legal basis for the proposed rule is provided in Section III of the preamble.

3. Description and Estimate of the Number of Small Entities Affected

The Regulatory Flexibility Act of 1980 (5 U.S.C. 601, *et seq.*) requires a review of proposed and final rules to assess their impact on small entities, unless the Secretary certifies that the rule would not have a significant economic impact on a substantial number of small entities. “Small entity” is defined in 5 U.S.C. 601 as a small business concern that is independently owned and operated, and is not dominant in its field of operation. The U.S. Small Business Administration (SBA) has authority to regulate issues related to small businesses, and stipulates in its size standards that a “small entity” in the railroad industry is a for-profit “line-haul railroad” that has fewer than 1,500 employees, a “short line railroad” with fewer than 500 employees, or a “commuter rail system” with annual receipts of less than seven million dollars. *See* “Size Eligibility Provisions and Standards,” 13 CFR part 121, subpart A. In addition, section 601(5) of the Small Business Act defines “small entities” as governments of cities, counties, towns, townships, villages, school districts, or special districts with populations less than 50,000 that operate railroads.

Federal agencies may adopt their own size standards for small entities in consultation with SBA and in conjunction with public comment. Thus, in consultation with SBA, FRA has published a final statement of agency policy that formally establishes “small entities” or “small businesses” as railroads, contractors, and shippers that meet the revenue requirements of a Class III railroad⁴⁸—\$20 million or less in inflation-adjusted annual revenue—and commuter railroads or small government jurisdictions that serve populations of 50,000 or less.⁴⁹

⁴⁸ *See* 49 CFR part 1201.1.

⁴⁹ *See* 68 FR 24891 (May 9, 2003) (codified at Appendix C to 49 CFR part 209).

The universe of entities this NPRM would affect includes only those small entities that can reasonably be expected to be directly affected by the provisions of this rule. In this case, the universe consists of railroads that would be subject to the requirements under 49 CFR part 270 and under the RRP rule. For the purposes of this analysis, 736 railroads would be considered “small entities,” since they are Class III freight railroads. Of the 736 small entities, 695 are on the general system and could be potentially impacted by the proposed regulation.⁵⁰ Since FRA does not currently know which railroads will be considered ISP railroads, but an ISP railroad could be either a Class II or Class III railroad, FRA is unable to provide a more accurate impact that the proposed regulation would have on small entities.

For purposes of this analysis, this proposed rule will apply to 35 commuter or other short-haul passenger railroads and two intercity passenger railroads, the National Railroad Passenger Corporation (Amtrak) and the Alaska Railroad Corporation (ARC).⁵¹ Neither of the intercity passenger railroads is considered a small entity. Amtrak serves populations well in excess of 50,000, and the ARC is owned by the State of Alaska, which has a population well in excess of 50,000.

Based on the definition of “small entity,” only one commuter or other short-haul passenger railroad is considered a small entity: the Hawkeye Express (operated by the Iowa Northern Railway Company).

The impact of the proposed regulation on these small entities is unknown, since FRA is allowing the railroads to decide their fatigue mitigations based on their specific

⁵⁰ Both the SSP rule and RRP rule exempts railroads not on the general system. See 49 CFR 270.3(b) and 49 CFR 271.3(b).

⁵¹ There are State-sponsored intercity passenger rail services, the majority of which will be part of Amtrak's SSP.

needs instead of mandating that railroads adopt specific mitigation programs. Furthermore, FRA estimates that only 50 ISP railroads would be impacted by the proposed regulation, which is approximately 7 percent of small entities, assuming all the 50 ISP railroads are considered small entities. FRA estimates that the 50 ISP railroads would be impacted over the course of 10 years, at a rate of approximately 5 ISPs per year. This estimate is consistent with the RRP final rule that FRA has published. Therefore, because of the uncertainty surrounding both the number of ISP railroads that would be considered small entities as well as the impact that the proposed regulation would have on those small entities, the impact that the NPRM would have on small entities is unclear. FRA requests comments about the impact that the proposed regulation would have on both freight and passenger rail small entities.

4. Description of the Projected Reporting, Recordkeeping, and Other Requirements

The rule will require an ISP railroad to develop and implement an FRMP under an RRP or SSP plan that FRA has reviewed and approved. There are several reporting and recordkeeping costs associated with the proposed regulation. Since the railroads have the flexibility to adjust their FRMPs to their specific risks, these costs will vary based on the respective risks as well as the size of the ISP railroad. While FRA is unable to estimate the burden that the proposed regulation would have on small entities, FRA expects that the impact will be proportional to the number of employees as well as the mitigation strategy that is implemented. Other mitigation strategies such as screening for sleep disorders could include costs that are higher.

While FRA is unable to identify the specific railroads that would be considered ISPs, to estimate the potential impact that developing an FRMP would have on an ISP

railroad, FRA used the average Class III revenue to estimate the impact.⁵² Per the American Short Line and Regional Railroad Association (ASLRRA), the average Class III railroad has an annual average revenue of \$4.75 million. FRA estimated the annual cost to ISP railroads at \$60,052, with approximately five ISP railroads incurring this cost per year. The \$60,052 cost consists of an annual average of \$53,228⁵³ for FRMP program development and \$7,274 for employee training.⁵⁴ The total 10-year cost that would impact a single ISP railroad would be \$121,004.⁵⁵ The annual cost represents approximately 2.5 percent of the average Class III railroad's revenue.⁵⁶ However, as this estimate is based off of the average annual Class III railroad revenue, and there could be a large variance in the revenue of Class III railroads, FRA requests comments regarding the annual revenue of Class III railroads as well as the impact the proposed regulation would have on Class III railroads.

FRA has identified several possible reporting and recordkeeping costs associated with the proposed regulation such as:

- 1) development, submission to FRA, and recordkeeping of the FRMP plan;
- 2) identification of the specific fatigue risks that impact the specific ISP; and
- 3) recordkeeping associated with fatigue training.

⁵² The Class II and Class III average costs per railroad come from the 2015 Edition of the ASLRRA Facts and Figures.

⁵³ An average is used to better account for the impact as the cost schedule varies as the number of ISP railroads increases. See the RIA in the docket for more information on the cost structure for ISP railroads.

⁵⁴ Calculation: \$53,228 (program development cost) + \$7,274 (ISP employee training costs) = \$60,052 (Annual cost for 5 ISP railroads).

⁵⁵ Calculation: $([\$60,052 / 5 \text{ (ISP railroads)}] \text{ (annual cost to ISP)}) \times 10 \text{ (number of years)} = \$121,004 \text{ (10-year cost to single ISP railroad)}$.

⁵⁶ Calculation: $\$121,004 \text{ (annual cost to ISP)} / \$4,750,000 \text{ (average annual Class III revenue)} = 0.025 \text{ or } 2.5 \text{ percent}$.

More information about the burden and associated costs for each of the projected reporting, recordkeeping, and other requirements can be found in the information collection request FRA will be submitting to the Office of Management and Budget (OMB) under the Paperwork Reduction Act of 1995, 44 U.S.C. 3501, *et seq.* FRA requests comments regarding the recordkeeping burden that the proposed regulation would have on ISP railroads to ensure that all cost elements of recordkeeping and how those elements would impact Class III railroads are captured.

5. Identification of Relevant Federal Rules that May Duplicate, Overlap, or Conflict with the Proposed Rule

While the proposed FRMP rule would be a component of the RRP and SSP rules, the proposed FRMP would specifically address fatigue-related risks and is aimed at mitigating those risks specifically. As such, there will be some coordination needed to ensure that a railroad's FRMP is developed and worked into the railroad's RRP or SSP. Regardless, considering that the proposed FRMP is a subpart within both RRP and SSP, neither RRP nor SSP provide any elements, outside of the proposed regulation, that are designed to mitigate fatigue related risk specifically. As such, FRA does not expect there to be any relevant Federal rules that would duplicate, overlap with, or conflict with the proposed regulations in this NPRM.

6. Significant Regulatory Alternatives

Within the preamble above, FRA outlines the various fatigue risks that railroads need to address. FRA does not specifically state, however, in what manner the railroads must address those risks. One alternative is for railroads to not create an FRMP and to continue to address their fatigue risks as they have currently been doing. This would result in the railroads violating the RSIA mandate. In addition, if railroads continue to

address their fatigue risks as they have in the past, FRA expects that safety would continue to be negatively impacted because the fatigue risks are not adequately addressed currently. Since railroads have some flexibility in how they design their FRMPs, it is expected that the impact of each FRMP on a railroad will be minimal as the flexibility in implementing mitigations will most likely be done in a cost effective manner. FRA expects that railroads will consider the cost of the mitigation as well as the fatigue risks when creating their FRMPs.

FRA invites all interested parties to submit data and information regarding the potential economic impact that would result from adoption of the proposals in this NPRM. FRA will consider all comments received in the public comment process when making a determination.

C. Federalism

Executive Order 13132, “Federalism” (64 FR 43255, Aug. 10, 1999), 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.” The Executive Order defines “policies that have federalism implications” 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 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 analyzed this NPRM consistent with the principles and criteria contained in Executive Order 13132. FRA has determined the proposed rule would not have substantial direct effects on States, on the relationship between the national government and States, or on the distribution of power and responsibilities among the various levels of government. In addition, FRA has determined this proposed rule would not impose substantial direct compliance costs on State and local governments. Therefore, the consultation and funding requirements of Executive Order 13132 do not apply.

This NPRM proposes to add subpart E, Fatigue Management Plans, to 49 CFR part 270 and subpart G, Fatigue Management Plans, to 49 CFR part 271. FRA is not aware of any State with regulations similar to this proposed rule. However, FRA notes that this part could have preemptive effect by the operation of law under 49 U.S.C. 20106. Section 20106 provides that States may not adopt or continue in effect any law, regulation, or order related to railroad safety or security that covers the subject matter of a regulation prescribed or order issued by the Secretary of Transportation (with respect to railroad safety matters), unless the State law, regulation, or order (1) qualifies under the “essentially local safety or security hazard” exception to sec. 20106; (2) is not incompatible with a law, regulation, or order of the U.S. Government; and (3) does not unreasonably burden interstate commerce.

In sum, FRA analyzed this proposed rule consistent with the principles and criteria in Executive Order 13132. FRA has determined this proposed rule has no

federalism implications and has determined it is not required to prepare a federalism summary impact statement for this proposed rule.

D. International Trade Impact Assessment

The Trade Agreement Act of 1979 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 Act also requires consideration of international standards, and, where appropriate, that they be the basis for U.S. standards. This rulemaking is purely domestic in nature and will not affect trade opportunities for U.S. firms doing business overseas or for foreign firms doing business in the United States.

E. Paperwork Reduction Act

The information collection requirements in this proposed rule are being submitted for approval to the Office of Management and Budget (OMB) under the Paperwork Reduction Act of 1995, 44 U.S.C. 3501, *et seq.* The sections that contain the new information collection requirements and the estimated time to fulfill each requirement are as follows:

CFR Section/Subject	Respondent Universe	Total Annual Responses	Average Time per Response	Total Annual Burden Hours	Total Annual Dollar Cost Equivalent ⁵⁷
270.409 – Fatigue Risk Management Program Plan (FRMP Plan) as part of its SSP – Comprehensive FRMP plan meeting all of this section’s requirements and under Part 270 subpart C.	35 passenger railroads	12 plans	60 hours	720 hours	\$63,144
– (c)(3)(ii) -- Annual internal FRMP Plan assessments/reports conducted by RRs	35 passenger railroads	12 evaluations/reports	2 hours	24 hours	\$1,824

⁵⁷ The dollar equivalent cost is derived from the 2018 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.

– FRMP plans found deficient by FRA and requiring amendment	35 passenger railroads	4 amended plans	30 hours	120 hours	\$9,588
– Review of amended FRMP plans found deficient and requiring further amendment by RRs	35 passenger railroads	1 further amended plan	15 hours	15 hours	\$1,199
– Consultation requirements -- RR consultation with its directly affected employees on FRMP Plan	35 passenger railroads	12 consultations (w/labor union reps.)	2 hours	18 hours	\$1,368
(Proposed rule) 271.609 – Fatigue Risk Management Program Plan (FRMP Plan) as part of its RRP – Comprehensive written FRMP Plan meeting all of this section’s requirements and under Part 271 subpart d.	7 Class I railroads	2 plans	90 hours	180 hours	\$15,786
	15 ISP railroads	5 plans	50 hours	250 hours	\$21,925
– (c)(3)(ii) -- Annual internal FRMP Plan assessments/reports conducted by RRs	7 Class I + 15 ISP railroads	7 evaluations/reports	2 hours	14 hours	\$1,064
– Consultation requirements -- RR consultation with its directly affected employees on FRMP Plan	7 Class I railroads	2 consultations (w/labor union reps.)	1.5 hours	3 hours	\$228
	15 ISP railroads	5 consultations (w/labor union reps.)	1 hours	5 hours	\$380
– FRMP plans found deficient by FRA and requiring amendment	7 Class I railroads	1 amended plan	40 hours	40 hours	\$3,196
	15 ISP railroads	3 amended plans	20 hours	60 hours	\$4,794
– Review of amended FRMP plans found deficient and requiring further amendment by RRs	7 Class I railroads	1 further amended plan	20 hours	20 hours	\$1,598
	15 ISP railroads	2 further amended plans	10 hours	20 hours	\$1,598
Totals	35 railroads	69 responses	N/A	1,489 hours	\$127,692

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. Hodan Wells, Information Collection Clearance Officer, Federal Railroad Administration, at 202-493-0440.

Organizations and individuals desiring to submit comments on the collection of information requirements should direct them to Ms. Hodan Wells via e-mail at *Hodan.Wells@dot.gov*.

OMB is required to make a decision concerning the collection of information requirements contained in this proposed 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. The final rule will respond to any OMB or public comments on the information collection requirements contained in this proposal.

FRA is not authorized to impose a penalty on persons for violating information collection requirements which 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*.

F. *Environmental Assessment*

FRA has evaluated this proposed rule consistent with the National Environmental Policy Act (NEPA; 42 U.S.C. 4321, *et seq.*), the Council of Environmental Quality's NEPA implementing regulations at 40 CFR parts 1500–1508, and FRA's NEPA

implementing regulations at 23 CFR part 771 and determined that it 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 regulations that do not normally have a significant impact on the environment and therefore do not require either an EA or EIS. *See* 40 CFR 1508.4. Specifically, FRA has determined that this proposed rule is categorically excluded from detailed environmental review pursuant to 23 CFR 771.116(c)(15), “[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.”

The purpose of this rulemaking is to propose requirements for certain railroads to develop and implement an FRMP, as one component of the railroads' larger railroad safety risk reduction programs. This rule does not directly or indirectly impact any environmental resources and will not result in significantly increased emissions of air or water pollutants or noise. Instead, the proposed rule is likely to result in safety benefits. In analyzing the applicability of a CE, FRA must also consider whether unusual circumstances are present that would warrant a more detailed environmental review. *See* 23 CFR 771.116(b). FRA has concluded that no such unusual circumstances exist with respect to this proposed regulation and the proposal meets the requirements for categorical exclusion under 23 CFR 771.116(c)(15).

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. *See* 16 U.S.C. 470. FRA has also determined that this rulemaking

does not approve a project resulting in a use of a resource protected by Section 4(f). *See* Department of Transportation Act of 1966, as amended (Pub. L. 89-670, 80 Stat. 931); 49 U.S.C. 303.

G. Executive Order 12898 (Environmental Justice)

Executive Order 12898, Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations, and DOT Order 5610.2B⁵⁸ 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 it would not cause disproportionately high and adverse human health and environmental effects on minority populations or low-income populations.

H. Unfunded Mandates Reform Act of 1995

Under Section 201 of the Unfunded Mandates Reform Act of 1995 (2 U.S.C. 1531), each Federal agency “shall, unless otherwise prohibited by law, assess the effects

⁵⁸ Available at: <https://www.transportation.gov/regulations/dot-order-56102b-department-transportation-actions-address-environmental-justice>.

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 (2 U.S.C. 1532) 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.

I. Energy Impact

Executive Order 13211 requires Federal agencies to prepare a Statement of Energy Effects for any “significant energy action.” 66 FR 28355, May 22, 2001. FRA evaluated this NPRM under Executive Order 13211, and determined this NPRM is not a “significant energy action” under the Executive Order 13211.

J. Privacy Act Statement

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. In order 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.

List of Subjects

49 CFR Part 270

Fatigue; Penalties; Railroad safety; Reporting and recordkeeping requirements; and System safety.

49 CFR Part 271

Fatigue; Penalties; Railroad safety; and Reporting and recordkeeping requirements; Risk reduction.

The Proposed Rule

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

PART 270- SYSTEM SAFETY PROGRAM- [AMENDED]

1. The authority citation for Part 270 continues to read as follows:

Authority: 49 U.S.C. 20103, 20106-20107, 20118-20119, 20156, 21301, 21304, 21311; 28 U.S.C. 2461, note; and 49 CFR 1.89.

2. Section 270.103(a)(1) is revised to read as follows:

§ 270.103 System safety program plan.

Each railroad subject to this part shall adopt and fully implement a system safety

program through a written SSP plan that, at a minimum, contains the elements in this section and in subpart E of this part. This SSP plan shall be approved by FRA under the process specified in § 270.201.

3. Add subpart E to read as follows:

Subpart E—Fatigue Risk Management Programs

§ 270.401 Definitions.

As used in the subpart—

Contributing factor means a circumstance or condition that helps cause a result.

Fatigue means a complex state characterized by a lack of alertness and reduced mental and physical performance, often accompanied by drowsiness.

Fatigue-risk analysis means a railroad's analysis of its operations that:

- (1) Identifies and evaluates the fatigue-related railroad safety hazards on its system(s); and

- (2) Determines the degree of risk associated with each of those hazards.

FRMP means a Fatigue Risk Management Program.

FRMP plan means a Fatigue Risk Management Program plan.

Safety-related railroad employee means:

- (1) A person subject to 49 U.S.C. 21103, 21104, or 21105;

- (2) Another person involved in railroad operations not subject to 49 U.S.C. 21103, 21104, or 21105;

- (3) A person who inspects, installs, repairs or maintains track, roadbed, signal and communication systems, and electric traction systems including a roadway worker or railroad bridge worker;

(4) A hazmat employee defined under 49 U.S.C. 5102(3);

(5) A person who inspects, repairs, or maintains locomotives, passenger cars, or freight cars; or

(6) An employee of any person who utilizes or performs significant railroad safety-related services, as described in § 270.103(d)(2), if that employee performs a function identified in paragraphs (1) through (5) of this definition.

§ 270.403 Purpose and scope of a Fatigue Risk Management Program (FRMP).

(a) *Purpose.* The purpose of an FRMP is to improve railroad safety through structured, systematic, proactive processes and procedures that a railroad subject to this part develops and implements to identify and mitigate the effects of fatigue on its employees.

(b) *Scope.* A railroad shall:

(1) Design its FRMP to reduce the fatigue its safety-related railroad employees experience and to reduce the risk of railroad accidents, incidents, injuries, and fatalities where the fatigue of any of these employees is a contributing factor;

(2) Develop its FRMP by systematically identifying and evaluating the fatigue-related railroad safety hazards on its system, determining the degree of risk associated with each hazard, and managing those risks to reduce the fatigue that its safety-related railroad employees experience. This system-wide fatigue risk identification and evaluation process must account for the varying circumstances of a railroad's operations on different parts of its system; and

(3) Employ in its FRMP the fatigue risk mitigation strategies a railroad identifies as appropriate to address those varying circumstances.

§ 270.405 General requirements; procedure.

(a) Each railroad subject to this part shall:

(1) Establish and implement an FRMP as part of its SSP; and

(2) Establish an FRA-approved FRMP plan as a component of a railroad's FRA-approved SSP plan and then update its FRMP plan as necessary as part of the annual internal assessment of its SSP under § 270.303.

(b) A railroad's FRMP plan must explain the railroad's method of analysis of fatigue risks and the railroad's process(es) for implementing its FRMP.

(c)(1) A railroad shall submit an FRMP plan to FRA for approval no later than either the applicable timeline in § 270.201(a) for filing its SSP plan or (INSERT DATE SIX MONTHS AFTER DATE OF PUBLICATION OF THE FINAL RULE IN THE FEDERAL REGISTER).

(2) A railroad shall submit updates to its FRMP plan under the process for amending its SSP plan in § 270.201(c).

(d) FRA shall review and approve or disapprove a railroad's FRMP plan and amendments to that plan under the process for reviewing SSP plans and amendments in §§ 270.201(b) and (c), respectively.

§ 270.407 Requirements for an FRMP.

(a) *In general.* An FRMP shall include an analysis of fatigue risks and mitigation strategies, as described in paragraphs (b) and (c) of this section.

(b) *Analysis of fatigue risks.* A railroad shall conduct a fatigue-risk analysis as part of its FRA-approved FRMP, which includes identification of fatigue-related railroad safety hazards, assessment of the risks associated with those hazards, and prioritization of

risks for mitigation. At a minimum, a railroad must consider the following categories of risk factors:

(1) General health and medical conditions that can affect the fatigue levels among the population of safety-related railroad employees;

(2) Scheduling issues that can affect the opportunities of safety-related railroad employees to obtain sufficient quality and quantity of sleep; and

(3) Characteristics of each job category of safety-related railroad employees work that can affect fatigue levels and risk for fatigue of those employees.

(c) *Mitigation strategies.* A railroad shall develop and implement mitigation strategies to reduce the risk of railroad accidents, incidents, injuries, and fatalities where fatigue of any of its safety-related employees is a contributing factor. At a minimum, in developing and implementing these mitigation strategies, a railroad shall consider the railroad's policies, practices, and communication related to its safety-related railroad employees.

(1) *Policies.* A railroad shall consider developing and implementing policies to reduce the risk of the exposure of its safety-related railroad employees to fatigue-related railroad safety hazards on its system. At a minimum, a railroad shall consider these policies:

(i) Providing opportunities for identification, diagnosis, and treatment of any medical condition that may affect alertness or fatigue, including sleep disorders;

(ii) Identifying methods to minimize accidents and incidents that occur as a result of working at times when scientific and medical research have shown increased fatigue disrupts employees' circadian rhythms;

(iii) Developing and implementing alertness strategies, such as policies on napping, to address acute drowsiness and fatigue while an employee is on duty;

(iv) Increasing the number of consecutive hours of off-duty rest, during which an employee receives no communication from the employing railroad or its managers, supervisors, officers, or agents; and

(v) Avoiding abrupt changes in rest cycles for employees.

(2) *Practices.* A railroad shall consider developing and implementing operational practices to reduce the risk of exposure of its safety-related railroad employees to fatigue-related railroad safety hazards on its system. At a minimum, a railroad shall consider these practices:

(i) Minimizing the effects on employee fatigue of an employee's short-term or sustained response to emergency situations, such as derailments and natural disasters, or engagement in other intensive working conditions;

(ii) Developing and implementing scheduling practices for employees, including innovative scheduling practices, on-duty call practices, work and rest cycles, increased consecutive days off for employees, changes in shift patterns, appropriate scheduling practices for varying types of work, and other aspects of employee scheduling to reduce employee fatigue and cumulative sleep loss; and

(iii) Providing opportunities to obtain restful sleep at lodging facilities, including employee sleeping quarters provided by the railroad carrier.

(3) *Communications.* A railroad shall consider developing and implementing training, education, and outreach methods to deliver fatigue-related information effectively to its safety-related railroad employees. At a minimum, a railroad shall

consider including in its employee education and training information on the physiological and human factors that affect fatigue, as well as strategies to reduce or mitigate the effects of fatigue, based on the most current scientific and medical research and literature.

(d) *Evaluation.* A railroad shall develop and implement procedures and processes for monitoring and evaluating its FRMP to assess whether the FRMP effectively meets the goals its FRMP plan describes, as required under § 270.409(b).

(1) The evaluation shall include, at a minimum:

(i) Periodic monitoring of the railroad's operational environment to detect changes that may generate new hazards;

(ii) Analysis of the risks associated with any identified hazards; and

(iii) Periodic safety assessments to determine the need for changes to its mitigation strategies.

(2) A railroad shall evaluate newly-identified hazards, and hazards associated with ineffective mitigation strategies, through processes for analyzing fatigue risks described in the railroad's FRMP plan.

(3) Any necessary changes not addressed prior to a railroad's annual internal assessment must be included in the internal assessment improvement plans required under § 270.303.

§ 270.409 Requirements for a FRMP plan.

(a) *In general.* A railroad shall adopt and implement its FRMP through an FRA-approved FRMP plan, developed in consultation with directly affected employees as described under § 270.107. A railroad FRMP plan must contain the elements described

in this section. A railroad must submit the plan to FRA for approval under the criteria of subpart C.

(b) *Goals.* An FRMP plan must contain a statement that defines the specific fatigue-related goals of the FRMP and describes strategies for reaching those goals.

(c) *Methods.* (1) *Analysis of fatigue risk.* An FRMP plan shall describe a railroad's method(s) for conducting its fatigue-risk analysis as part of its FRMP. The description shall specify:

(i) The scope of the analysis, which is the covered population of safety-related railroad employees;

(ii) The processes a railroad will use to identify fatigue-related railroad safety hazards on its system and determine the degree of risk associated with each fatigue-related hazard identified;

(iii) The processes a railroad will use to compare and prioritize identified fatigue-related risks for mitigation purposes; and

(iv) The information sources a railroad will use to support ongoing identification of fatigue-related railroad safety hazards and determine the degree of risk associated with those hazards.

(2) *Mitigation strategies.* An FRMP plan shall describe a railroad's processes for:

(i) Identifying and selecting fatigue risk mitigation strategies; and

(ii) Monitoring identified fatigue-related railroad safety hazards.

(3) *Evaluation.* An FRMP plan shall describe:

(i) A railroad's processes for monitoring and evaluating the overall effectiveness of its FRMP and the effectiveness of fatigue-related mitigation strategies the railroad uses under § 270.407; and

(ii) A railroad's procedures for reviewing the FRMP as part of the annual internal assessment of its SSP under § 270.303 and for updating the FRMP plan under the process for amending its SSP plan under § 270.201(c).

(d) *FRMP implementation plan.* A railroad shall describe in its FRMP plan how it will implement its FRMP. This description must cover an implementation period not to exceed 36 months, and shall include:

(1) A description of the roles and responsibilities of each position or job function with significant responsibility for implementing the FRMP, including those held by employees, contractors who provide significant FRMP-related services, and other entities or persons that provide significant FRMP services;

(2) A timeline describing when certain milestones that must be met to implement the FRMP fully will be achieved. Implementation milestones shall be specific and measurable;

(3) A description of how a railroad may make significant changes to the FRMP plan under the process for amending its SSP plan in § 270.201(c); and

(4) The procedures for consultation with directly affected employees on any subsequent substantive amendments to the railroad's FRMP plan. The requirements of this section do not apply to non-substantive amendments (*e.g.*, amendments that update names and addresses of railroad personnel).

(e) *Submittal.* A railroad shall amend its SSP plan submitted under subpart C of this part to include its FRMP plan that meets the requirements of this section no later than (INSERT DATE 240 DAYS AFTER DATE OF PUBLICATION OF THE FINAL RULE IN THE FEDERAL REGISTER).

(1) A railroad shall follow the procedures in § 270.201(c) to amend its SSP plan.

(2) An FRMP plan is not considered a safety critical amendment for the purposes of § 270.201(c)(ii).

(3) If a railroad was not required to submit an SSP plan initially, but is required to do so at a later date, the railroad shall either include an FRMP plan as part of its SSP plan submission under § 270.201(a), or submit its FRMP plan in accordance with the procedures for amending its SSP plan under § 270.201(c) no later than (INSERT DATE 240 DAYS AFTER DATE OF PUBLICATION OF THE FINAL RULE IN THE FEDERAL REGISTER), whichever is later.

PART 271-RISK REDUCTION PROGRAM- [AMENDED]

4. The authority citation for Part 271 continues to read as follows:

Authority: 49 U.S.C. 20103, 20106-20107, 20118-20119, 20156, 21301, 21304, 21311; 28 U.S.C. 2461, note; and 49 CFR 1.89.

5. Revise and republish Section 271.101(a) to read as follows:

§ 271.101 Risk reduction programs.

(a) *Program required.* Each railroad shall establish and fully implement an RRP meeting the requirements of this part. An RRP shall systematically evaluate railroad safety hazards on a railroad's system and manage the resulting risks to reduce the number and rates of railroad accidents/incidents, injuries, and fatalities. An RRP is an ongoing

program that supports continuous safety improvement. A railroad shall design its RRP so that it promotes and supports a positive safety culture at the railroad. An RRP shall include the following:

- (1) A risk-based hazard management program, as described in § 271.103;
- (2) A safety performance evaluation component, as described in § 271.105;
- (3) A safety outreach component, as described in § 271.107;
- (4) A technology analysis and technology implementation plan, as described in § 271.109;
- (5) RRP implementation and support training, as described in § 271.111;
- (6) Involvement of railroad employees in the establishment and implementation of an RRP, as described in § 271.113; and
- (7) An FRMP as described in § 271.607.

6. Section 271.201 is revised to read as follows:

§ 271.201 General.

A railroad shall adopt and implement its RRP through a written RRP plan containing the elements described in this subpart and in § 271.609. A railroad's RRP plan shall be approved by FRA according to the requirements contained in subpart D of this part.

7. Add subpart G to read as follows:

Subpart G—Fatigue Risk Management Programs

§ 271.601 Definitions.

As used in the subpart—

Contributing factor means a circumstance or condition that helps cause a result.

Fatigue means a complex state characterized by a lack of alertness and reduced mental and physical performance, often accompanied by drowsiness.

Fatigue-risk analysis means a railroad's analysis of its operations that:

(1) Identifies and evaluates the fatigue-related railroad safety hazards on its system(s) and;

(2) Determines the degree of risk associated with each of those hazards.

FRMP means a Fatigue Risk Management Program.

FRMP plan means a Fatigue Risk Management Program plan.

Safety-related railroad employee means:

(1) A person subject to 49 U.S.C. 21103, 21104, or 21105;

(2) Another person involved in railroad operations not subject to 49 U.S.C. 21103, 21104, or 21105;

(3) A person who inspects, installs, repairs or maintains track, roadbed, signal and communication systems, and electric traction systems including a roadway worker or railroad bridge worker;

(4) A hazmat employee defined under 49 U.S.C. 5102(3);

(5) A person who inspects, repairs, or maintains locomotives, passenger cars, or freight cars; or

(6) An employee of any person who utilizes or performs significant railroad safety-related services, as described in § 271.205(a)(3), if that employee performs a function identified in paragraphs (1) through (5) of this definition.

§ 271.603 Purpose and scope of a Fatigue Risk Management Program (FRMP).

(a) *Purpose.* The purpose of an FRMP is to improve railroad safety through structured, proactive processes and procedures a railroad subject to this part develops and implements. A railroad's FRMP shall systematically identify and evaluate the fatigue-related railroad safety hazards on its system, determine the degree of risk associated with each hazard, and manage those risks to reduce the fatigue that its safety-related railroad employees experience and to reduce the risk of railroad accidents, incidents, injuries, and fatalities where the fatigue of any of these employees is a contributing factor.

(b) *Scope.* A railroad shall:

(1) Design its FRMP to reduce the fatigue its safety-related railroad employees experience and to reduce the risk of railroad accidents, incidents, injuries, and fatalities where the fatigue of any of these employees is a contributing factor;

(2) Develop its FRMP by conducting a system-wide fatigue-risk analysis that accounts for the varying circumstances of its operations on different parts of its system; and

(3) Employ in its FRMP the fatigue risk mitigation strategies the railroad identifies as appropriate to address those varying circumstances.

§ 271.605 General requirements; procedure.

(a) Each railroad subject to this part shall:

(1) Establish and implement an FRMP as part of its RRP; and

(2) Establish an FRA-approved FRMP plan as a component of a railroad's FRA-approved RRP plan and then update the FRMP plan as necessary as part of the annual internal assessment of its RRP under § 271.401.

(b) A railroad's FRMP plan must explain the railroad's method of analysis of fatigue risks and the railroad's process(es) for implementing its FRMP.

(c)(1) A railroad shall submit an FRMP plan to FRA for approval no later than either the applicable timeline in § 271.301(b) for filing its RRP plan or (INSERT DATE SIX MONTHS AFTER DATE OF PUBLICATION OF THE FINAL RULE IN THE FEDERAL REGISTER), whichever is later; and

(2) A railroad shall submit updates to its FRMP plan under the process for amending its RRP plan in § 271.303.

(d) FRA shall review and approve or disapprove a railroad's FRMP plan under the process for reviewing RRP plans in § 271.301(d) and updates to the railroad's FRMP plan under the process for reviewing amendments to an RRP plan in § 271.303(c).

§ 271.607 Requirements for an FRMP.

(a) *In general.* An FRMP shall include an analysis of fatigue risks and mitigation strategies described in paragraphs (b) and (c) of this section.

(b) *Analysis of fatigue risks.* A railroad shall conduct a fatigue-risk analysis as part of its FRA-approved FRMP, which includes identification of fatigue-related railroad safety hazards, assessment of the risks associated with those hazards, and prioritization of risks for mitigation. At a minimum, railroads must consider the following categories of risk factors, as applicable:

(1) General health and medical conditions that can affect the fatigue levels among the population of safety-related railroad employees;

(2) Scheduling issues that can affect the opportunities of safety-related railroad employees to obtain sufficient quality and quantity of sleep; and

(3) Characteristics of each job category safety-related railroad employees work that can affect fatigue levels and risk for fatigue of those employees.

(c) *Mitigation strategies.* A railroad shall develop and implement mitigation strategies to reduce the risk of railroad accidents, incidents, injuries, and fatalities where fatigue of any of its safety-related employees is a contributing factor. At a minimum, in developing and implementing these mitigation strategies, a railroad shall consider the railroad's policies, practices, and communications related to its safety-related railroad employees.

(1) *Policies.* A railroad shall consider developing and implementing policies to reduce the risk of the exposure of its safety-related railroad employees to fatigue-related railroad safety hazards on its system. At a minimum, a railroad shall consider these policies:

(i) Providing opportunities for identification, diagnosis, and treatment of any medical condition that may affect alertness or fatigue, including sleep disorders;

(ii) Identifying methods to minimize accidents and incidents that occur as a result of working at times when scientific and medical research have shown increased fatigue disrupts employees' circadian rhythms;

(iii) Developing and implementing alertness strategies, such as policies on napping, to address acute drowsiness and fatigue while an employee is on duty;

(iv) Increasing the number of consecutive hours of off-duty rest, during which an employee receives no communication from the employing railroad or its managers, supervisors, officers, or agents; and

(v) Avoiding abrupt changes in rest cycles for employees.

(2) *Practices.* A railroad shall consider developing and implementing operational practices to reduce the risk of exposure of its safety-related railroad employees to fatigue-related railroad safety hazards on its system. At a minimum, a railroad shall consider these practices:

(i) Minimizing the effects on employee fatigue of an employee's short-term or sustained response to emergency situations, such as derailments and natural disasters, or engagement in other intensive working conditions;

(ii) Developing and implementing scheduling practices for employees, including innovative scheduling practices, on-duty call practices, work and rest cycles, increased consecutive days off for employees, changes in shift patterns, appropriate scheduling practices for varying types of work, and other aspects of employee scheduling to reduce employee fatigue and cumulative sleep loss; and

(iii) Providing opportunities to obtain restful sleep at lodging facilities, including employee sleeping quarters provided by the railroad carrier.

(3) *Communication.* A railroad shall consider developing and implementing training, education, and outreach methods to deliver fatigue-related information effectively to its safety-related railroad employees. At a minimum, a railroad shall consider communications regarding employee education and training on the physiological and human factors that affect fatigue, as well as strategies to reduce or mitigate the effects of fatigue, based on the most current scientific and medical research and literature.

(d) *Evaluation.* A railroad shall develop and implement procedures and processes for monitoring and evaluating its FRMP to assess whether the FRMP effectively meets the goals its FRMP plan describes under § 271.609(b).

(1) The evaluation shall include, at a minimum:

(i) Periodic monitoring of the railroad's operational environment to detect changes that may generate new hazards;

(ii) Analysis of the risks associated with any identified hazards; and

(iii) Periodic safety assessments to determine the need for changes to its mitigation strategies.

(2) A railroad shall evaluate newly-identified hazards, and hazards associated with ineffective mitigation strategies, through processes for analyzing fatigue risks described in the railroad's FRMP plan.

(3) Any necessary changes not addressed prior to a railroad's annual internal assessment must be included in the internal assessment improvement plans required under § 271.403.

§ 271.609 Requirements for a FRMP plan.

(a) *In general.* A railroad shall adopt and implement its FRMP through an FRA-approved FRMP plan, developed in consultation with directly affected employees as described under § 271.207. A railroad FRMP plan must contain the elements described in this section. The railroad must submit the plan to FRA for approval under the criteria of subpart D.

(b) *Goals.* An FRMP plan must contain a statement that defines the specific fatigue-related goals of the FRMP and describes strategies for reaching those goals.

(c) *Methods.* (1) *Analysis of fatigue risk.* An FRMP plan shall describe a railroad's method(s) for conducting its fatigue-risk analysis as part of its FRMP. The description shall specify:

(i) The scope of the analysis, which is the covered population of safety-related railroad employees;

(ii) The processes a railroad will use to identify fatigue-related railroad safety hazards on its system and determine the degree of risk associated with each fatigue-related hazard identified;

(iii) The processes a railroad will use to compare and prioritize identified fatigue-related risks for mitigation purposes; and

(iv) The information sources a railroad will use to support ongoing identification of fatigue-related railroad safety hazards and determine the degree of risk associated with those hazards.

(2) *Mitigation strategies.* An FRMP plan shall describe a railroad's processes for:

(i) Identifying and selecting fatigue risk mitigation strategies; and

(ii) Monitoring identified fatigue-related railroad safety hazards.

(3) *Evaluation.* An FRMP plan shall describe:

(i) A railroad's processes for monitoring and evaluating the overall effectiveness of its FRMP and the effectiveness of fatigue-related mitigation strategies the railroad uses under § 271.607; and

(ii) A railroad's procedures for reviewing the FRMP as part of the annual assessment of its RRP under § 271.401 and for updating the FRMP plan under the process for amending its RRP plan under § 271.303.

(d) *FRMP implementation plan.* A railroad shall describe in its FRMP plan how it will implement its FRMP. This description must cover an implementation period not to exceed 36 months, and shall include:

(1) A description of the roles and responsibilities of each position or job function with significant responsibility for implementing the FRMP, including those held by employees, contractors who provide significant FRMP-related services, and other entities or persons that provide significant FRMP services;

(2) A timeline describing when certain milestones that must be met to implement the FRMP fully will be achieved. Implementation milestones shall be specific and measurable;

(3) A description of how the railroad may make significant changes to the FRMP plan under the process for amending its RRP plan in § 271.303; and

(4) The procedures for consultation with directly affected employees on any subsequent substantive amendments to the railroad's FRMP plan. The requirements of this section do not apply to non-substantive amendments (*e.g.*, amendments that update names and addresses of railroad personnel).

(e) *Submittal.* A railroad shall amend its RRP plan submitted under subpart D of this part to include its FRMP plan that meets the requirements of this section no later than (INSERT DATE 240 DAYS AFTER DATE OF PUBLICATION OF THE FINAL RULE IN THE FEDERAL REGISTER).

(1) A railroad shall follow the procedures in § 271.303 to amend its RRP plan.

(2) If a railroad was not required to submit an RRP plan initially, but is required to do so at a later date, the railroad shall either include an FRMP plan as part of its RRP

plan submission under § 271.301 or submit its FRMP plan in accordance with the procedures for amending its RRP plan under § 271.303 no later than (INSERT DATE 240 DAYS AFTER DATE OF PUBLICATION OF THE FINAL RULE IN THE FEDERAL REGISTER), whichever is later.

Issued in Washington, D.C.

Quintin C. Kendall,
Deputy Administrator.