



U.S. Department  
of Transportation

**Federal Railroad  
Administration**

1200 New Jersey Avenue, SE  
Washington, DC 20590

**JAN 25 2017**

Mr. Edward R. Hamberger  
President and CEO  
Association of American Railroads  
425 3rd Street SW  
Washington, DC 20024

Mr. Richard A. White  
Acting President and CEO  
American Public Transportation Association  
1300 I Street NW, Suite 1200 East  
Washington, DC 20005

Ms. Linda Bauer Darr  
President and Treasurer  
American Short Line and Regional Railroad Association  
50 F Street NW, Suite 7020  
Washington, DC 20001

**Re: Operations and Maintenance Manual Submissions for Positive Train Control  
Safety Plans**

Dear Mr. Hamberger, Mr. White, and Ms. Darr:

Under 49 U.S.C. § 20157(h)<sup>1</sup> and the regulations of the Federal Railroad Administration (FRA), a railroad is prohibited from operating a Positive Train Control (PTC) system in revenue service unless FRA has approved and certified the PTC system under Title 49 Code of Federal Regulations (CFR) Part 236 Subpart I, or FRA has otherwise authorized the railroad to conduct provisional revenue service operations to the extent necessary to enable the safe implementation and operation of the PTC system in phases.<sup>2</sup> To obtain PTC System Certification, a railroad must submit, among other things, an acceptable PTC Safety Plan (PTCSP) to FRA, and the PTCSP must be approved by FRA's Associate Administrator for Railroad Safety.<sup>3</sup>

---

<sup>1</sup> As amended by the Positive Train Control Enforcement and Implementation Act of 2015, Pub. L. No. 114-73, 129 Stat. 568, 576-82 (Oct. 29, 2015).

<sup>2</sup> 49 U.S.C. § 20157(h)(1)-(2); 49 CFR § 236.1015(a).

<sup>3</sup> 49 CFR § 236.1009(d)(1)-(4).

A critical element of FRA's PTC regulations is the requirement for each railroad to:

. . . catalog and maintain all documents as specified in the [PTC Development Plan] and PTCSP for the installation, maintenance, repair, modification, inspection, and testing of the PTC system and have them in one Operations and Maintenance Manual, readily available to persons required to perform such tasks and for inspection by FRA and FRA-certified state inspectors.<sup>4</sup>

During its review of the PTCSPs railroads have submitted to date, FRA has noted wide variations in the quality and volume of materials submitted to fulfill the Operations and Maintenance Manual (OMM) requirement. To aid railroads in preparing OMMs and PTCSPs, FRA has prepared the enclosed guidance outlining the following:

- The critical content of an OMM;
- The OMM elements to include with the PTCSP submission to FRA;
- FRA's expectations regarding the OMM elements; and
- Explanations of which changes require resubmission to FRA and a description of the type of information to resubmit to FRA.

Please share this information with your member railroads implementing PTC systems and creating OMMs in support of their requests for PTC System Certification.

If you have any questions regarding certification, please feel free to contact Mr. David Blackmore, Staff Director, Positive Train Control Division, at (312) 835-3903 or David.Blackmore@dot.gov, or Dr. Mark Hartong, Senior Scientific Technical Advisor, at (202) 493-1332 or Mark.Hartong@dot.gov.

Sincerely,



Robert C. Lauby  
Associate Administrator for Railroad Safety  
Chief Safety Officer

Enclosure

---

<sup>4</sup> 49 CFR § 236.1039(a).

## Enclosure

### Operations and Maintenance Manual Requirements Positive Train Control Safety Plan

#### A. Background on the Operations and Maintenance Manual Requirements

The purpose of this document is to provide guidance to railroads on the requirement to prepare and maintain an Operations and Maintenance Manual (OMM) under Title 49 Code of Federal Regulations (CFR) Section 236.1039, *Operations and maintenance manual*. This guidance also identifies which elements of the OMM must be included with a railroad's Positive Train Control Safety Plan (PTCSP), FRA's expectations regarding OMM elements, and information regarding changes to an OMM that require resubmission to FRA.

In support of a request for PTC System Certification, each railroad must provide in its PTCSP a "complete description of the specific procedures and test equipment necessary to ensure the safe and proper installation, implementation, operation, maintenance, repair, inspection, testing, and modification of the PTC system."<sup>1</sup> In addition, FRA's regulations require each railroad to "catalog and maintain all documents as specified in the [PTC Development Plan (PTCDP)] and PTCSP for the installation, maintenance, repair, modification, inspection, and testing of the PTC system," and to maintain all these documents "in one Operations and Maintenance Manual."<sup>2</sup> FRA's regulations do not require submission of the entire OMM with the railroad's PTCSP; rather, the railroad must provide in its PTCSP the information required under 49 CFR § 236.1015, *PTC Safety Plan content requirements and PTC System Certification*, including descriptions of the railroad's maintenance procedures and certain key documents of the OMM as identified below.<sup>3</sup> The OMM must be maintained according to the railroad's configuration management control plan and any additional configuration/revision control measures specified in the PTCDP and PTCSP, and the OMM must be readily available for inspection by FRA and FRA-certified state inspectors.<sup>4</sup>

It is imperative that each railroad maintain a comprehensive program within its organization to monitor the well-functioning of its PTC system maintenance efforts. The OMM is a tool to assist a railroad with managing, scheduling, and controlling the maintenance of PTC system equipment. A primary objective of the OMM requirement is to ensure that railroads manage their PTC systems to achieve maximum equipment and operational readiness and to maximize rail safety. The OMM must provide detailed guidance about the installation, maintenance, repair, modification, inspection, and testing of the PTC system throughout the system's lifecycle.<sup>5</sup>

---

<sup>1</sup> See, e.g., 49 CFR §§ 236.1015(d)(7)–(12).

<sup>2</sup> 49 CFR § 236.1039(a).

<sup>3</sup> See 49 CFR §§ 236.1015, 236.1039.

<sup>4</sup> See 49 CFR §§ 236.1009(h), 236.1037(a)(3), 236.1039(a)–(c).

<sup>5</sup> 49 CFR § 236.1039(a)–(d).



## B. Information Required to be in a Railroad's OMM

To ensure a PTC system functions properly under 49 CFR § 236.1005, *PTC Safety Plan content requirements and PTC System Certification*, a railroad must maintain the PTC system and equipment within specifications through preventive maintenance, and it must identify and correct potential problems before the PTC system and equipment become inoperable.<sup>6</sup>

As referenced above and as specified in 49 CFR § 236.1015(d)(7), a railroad's PTCSP must contain a "complete description of the specific procedures and test equipment necessary to ensure the safe and proper installation, implementation, operation, maintenance, repair, inspection, testing, and modification of the PTC system on the railroad and establish safety-critical hazards are appropriately mitigated." This same paragraph requires the "procedures, including calibration requirements" to be consistent with or explain deviations from the equipment manufacturer's recommendations. Under 49 CFR § 236.1015(d)(12), the PTCSP must also contain a "complete description of each record necessary to ensure the safety of the system that is associated with periodic maintenance, inspections, tests, adjustments, repairs, or replacements, and the system's resulting conditions, including records of component failures resulting in safety-relevant hazards."

Accordingly, based on the PTCSP requirements of 49 CFR § 236.1015(d)(7) and (d)(12), a railroad's OMM under 49 CFR § 236.1039, *Operations and Maintenance Manual*, must catalog, at a minimum, the following information:

1. Comprehensive procedures developed in accordance with reliability-centered maintenance principles<sup>7</sup> for planned maintenance, repair, modification, inspection, and testing of the PTC system's safety-critical hardware, software, firmware, and equipment (hereinafter "maintenance");
2. Minimum actions and requirements for planned maintenance;
3. Scheduling and control of the performance of maintenance tasks;

---

<sup>6</sup> See 49 CFR §§ 236.1009(d)(3), 236.1015(d)(7)–(12).

<sup>7</sup> For purposes of this guidance, FRA considers "reliability" to consist of two fundamental concepts: adequacy and operating reliability. Adequacy is the ability of the PTC system to support rail operations at all times, taking into account scheduled and reasonably expected unscheduled outages of system components. Operating reliability of the PTC system is the ability of the PTC system to withstand sudden disturbances or unanticipated loss of system components.

The PTC system will achieve an adequate level of reliability if it meets each of the following descriptions:

1. The PTC system is controlled to stay within acceptable limits during normal conditions;
2. The PTC system performs acceptably after credible contingencies;
3. The PTC system limits the impact and scope of instability and cascading outages when they occur;
4. The PTC system is protected from damage by operating within system limits;
5. The functioning of the PTC system can be restored immediately if it is impaired; and
6. The PTC system has the ability to support rail operations at all times, taking into account scheduled and reasonably expected unscheduled outages of system components.

4. Description of the methods, materials, tools, and personnel needed for PTC system maintenance;
5. Detection of hidden failures or malfunctions;<sup>8</sup> and
6. Test procedures to determine material readiness of the PTC system's safety-critical hardware, software, firmware, and equipment.

Each railroad must include in its PTCSP the following critical elements of the OMM:

1. A list identifying the PTC system's safety-critical hardware,<sup>9</sup> software, firmware, and other equipment; and
2. A Maintenance Index Page (MIP) summarizing the planned maintenance prescribed for each piece of safety-critical PTC system hardware, software, firmware, and other equipment. Each MIP must be an index of the complete set of maintenance requirements applicable to the PTC system's safety-critical hardware, software, firmware, and other equipment. MIPs must contain the following information:
  - a. Identification of each of the PTC system's safety-critical hardware, software, firmware, and other equipment;
  - b. A brief description of the maintenance actions to be done, presented as an imperative sentence (e.g., "change fuel oil filter" or "measure system tangential sensitivity");
  - c. Identification of the applicable reference publications.<sup>10</sup> The MIPs must clearly identify each reference publication, but should not duplicate the reference

---

<sup>8</sup> Hidden failures are typically failures of one or more components that occur in parallel with no indication of failure for each individual component. Given two components in parallel that individually could satisfy a function, for example, one of the two components could fail but since each one by itself can satisfy the function, only when the second one fails will the functional failure become evident. Therefore, the failure of the first component is potentially critical.

<sup>9</sup> The statutory definition of "hardware" is "a locomotive apparatus, a wayside interface unit (including any associated legacy signal system replacements), switch position monitors needed for a positive train control system, physical back office system equipment, a base station radio, a wayside radio, a locomotive radio, or a communication tower or pole." 49 U.S.C. § 20157(i)(2). FRA recognizes, however, that each type of PTC system could include additional types of hardware and a category of hardware identified in the statutory definition might not apply to a particular railroad's PTC system.

<sup>10</sup> A "reference publication" is a publication pertaining to the PTC system, subsystem, or component in which the detailed sequence of steps to be followed in performing the maintenance action can be found. The reference publications must include all the information required to perform the maintenance actions. Supporting documentation references are incorporated into the list of references and, unless directed by a procedural step, are not required to be used in conjunction with performing a maintenance requirement. They may be referenced to gain a better understanding of the procedural steps, general safety precautions, or higher level requirements if confusion exists regarding the direction provided. The references must supply the data necessary to properly do the work (e.g., pressure settings, temperature settings, brush tension, limiting speed, tolerances, and levels). The necessary data can generally be found in the individual equipment or system technical manual, system operating manual, or equipment drawings.



publications. An MIP is not intended to be a comprehensive and detailed set of railroad maintenance processes and procedures applicable to a PTC system and all of its components, but, rather, must be a summary guide of the maintenance processes and procedures a railroad has developed and follows, be cataloged in the OMM, and be maintained under the railroad's configuration management control plan;

- d. Identification of the frequency at which each maintenance requirement must be performed;
- e. Identification of each prerequisite, i.e., the situation that must exist for the maintenance to be accomplished; and
- f. Identification of the required test equipment, materials, parts (i.e., any items that are an integral part of the test equipment), tools, and miscellaneous items necessary to perform the maintenance action.

Except for the critical elements identified above, and the OMM requirement that must be included in the PTCSP under 49 CFR § 236.1015(d)(8),<sup>11</sup> FRA does not require or request that a railroad include additional OMM information as part of the railroad's PTCSP submission.

Proper maintenance is critical to maintaining acceptable PTC equipment performance levels and to ensuring the PTC system functions properly as required under 49 CFR § 236.1005, *Requirements for Positive Train Control systems*, and 49 U.S.C. § 20157. Additionally, personnel and environmental safety are paramount in conducting routine preventive maintenance. It is the railroad's responsibility to ensure these objectives are met. Under 49 CFR § 236.1039(d) and other applicable provisions,<sup>12</sup> FRA will conduct periodic inspections of the railroad's OMM and the railroad's maintenance practices to verify:

- 1. The railroad has completed each of the maintenance actions and requirements in the MIP and complied with the procedures identified in the OMM;
- 2. The maintenance described in and required by the MIP is appropriate and applicable to the installed equipment;
- 3. The maintenance completed was done correctly in accordance with the referenced maintenance documents listed in the OMM. "Correctly" includes, but is not limited to, the following:
  - a. Safety precautions were observed;
  - b. Proper tools and materials were used;
  - c. Tag-out procedures were correct when applicable;

---

<sup>11</sup> Under 49 CFR § 236.1015(d)(8), the PTCSP must contain "A complete description of any additional warning to be placed in the Operations and Maintenance Manual in the same manner specified in § 236.919 and all warning labels to be placed on equipment as necessary to ensure safety."

<sup>12</sup> See, e.g., 49 CFR §§ 236.1009(d)(3), 236.1009(h), 236.1015(d)(7)–(12), 236.1039.

- d. If a hazardous material was involved, the proper personal protective equipment was used and in good material condition, and the hazardous material disposal was conducted correctly; and
  - e. Reference documents, procedures, and processes are being maintained according to the railroad's configuration management control plan and any additional configuration/revision control measures specified in the PTCDP and PTCSP and are the most current; and
4. The MIP and the full OMM are consistent and correct.<sup>13</sup>

FRA will also analyze the railroad's recorded reasons for non-accomplishment of required maintenance, if any, to determine railroad trends and actions taken to improve maintenance and to comply with the conditions of PTC System Certification and the railroad's PTCSP and OMM.

### C. Changes to a Railroad's Maintenance Procedures

Once FRA has approved a railroad's PTCSP and granted PTC System Certification, the railroad is responsible for identifying and obtaining FRA's written approval for any changes to the PTC system or maintenance procedures, as described in the railroad's PTCSP and the cross-referenced OMM, that could impact the proper and safe functioning of the PTC system or the conditions of the PTC System Certification. A railroad is prohibited from making any changes (as defined by 49 CFR § 236.1021) to its PTCSP or the cross-referenced OMM unless the railroad files a request for amendment (RFA) to the applicable PTCSP with FRA under the RFA procedures in 49 CFR § 236.1021, and the FRA Associate Administrator for Railroad Safety approves the RFA in writing.

As described below, FRA interprets "changes" to include three categories:

1. Minor: A change that does not have any adverse impact on the PTC system's risk register,<sup>14</sup> PTCSP, or PTC System Certification or any impact to other entities beyond the railroad that is facilitating the change;
2. Major: A change that poses a potential safety risk to the operating railroad during implementation or operation of the PTC system; however, the resulting change has only a minor effect on the safety system, has no change to the principal risk register, and does not impact the railroad's PTCSP or PTC System Certification; and
3. Significant: A change that has an impact on rail operations and the safety management system or principal risk register and potential to impact the railroad's PTCSP or PTC System Certification.

---

<sup>13</sup> 49 CFR § 236.1039(a)–(b).

<sup>14</sup> A risk register (also known as a risk log or hazard log) is a risk management tool used to fulfill regulatory compliance by acting as a repository for all risks identified and includes additional information about each risk, e.g., nature of the risk, reference and owner, and mitigation measures. ISO 73:2009 Risk management—Vocabulary [1] defines a risk register to be a "record of information about identified risks." See, e.g., 49 CFR § 236.1015(d)(1).

FRA believes “minor” changes do not require a railroad to file an RFA with FRA, but, under 49 CFR § 236.1021, *Discontinuances, material modifications, and amendments*, an RFA is required for either a “major” or “significant” change because such a change would constitute a “[m]odification of a safety critical element of a PTC system” under 49 CFR § 236.1021(h).

In its RFA, a railroad must identify any areas, systems, components, equipment, or appliances of the product or processes that are affected by any proposed change and the corresponding regulatory standards. The railroad must assess the physical and/or functional effects of the proposed change on any areas, systems, components, equipment, or appliances of the product or process. Please refer to 49 CFR § 236.1021(d) for a list of the information a railroad must provide in an RFA. As part of its RFA, FRA requests that the railroad provide the railroad’s current MIP and the modified MIP, updated to include the proposed change(s).

FRA expects that submission and approval of the current MIP, and modified MIP, as explained in this guidance, should provide sufficient information to FRA about the railroad’s maintenance processes and procedures to ensure the safety and reliability of the PTC system, while providing each individual railroad with the necessary flexibility to maintain the complete detailed OMM in a manner that best supports the railroad’s organizational structure and operational needs.