



**APTA PR-M-RP-010-98, Rev. 2**

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**PRESS Mechanical Working Group**

# Derailment Investigation Reports

**Abstract:** This recommended practice provides a methodology and a standardized form for investigating passenger train derailments.

**Keywords:** derailments, investigation report, wheel/rail interface, wheel climb

**Summary:** This recommended practice contains a methodology and a standardized form for investigating passenger train derailments, with an emphasis on obtaining the data required to perform long-term analyses to help prevent future derailments.



## Foreword

The American Public Transportation Association is a standards development organization in North America. The process of developing standards is managed by the APTA Standards Program's Standards Development Oversight Council (SDOC). These activities are carried out through several standards policy and planning committees that have been established to address specific transportation modes, safety and security requirements, interoperability, and other topics.

APTA used a consensus-based process to develop this document and its continued maintenance, which is detailed in the [manual for the APTA Standards Program](#). This document was drafted in accordance with the approval criteria and editorial policy as described. Any trade name used in this document is information given for the convenience of users and does not constitute an endorsement.

This document was prepared by the Mechanical Working Group as directed by Passenger Rail Equipment Safety Standards (PRESS).

This document represents a common viewpoint of those parties concerned with its provisions, namely transit operating/planning agencies, manufacturers, consultants, engineers and general interest groups. The application of any recommended practices or guidelines contained herein is voluntary. APTA standards are mandatory to the extent incorporated by an applicable statute or regulation. In some cases, federal and/or state regulations govern portions of a transit system's operations. In cases where there is a conflict or contradiction between an applicable law or regulation and this document, consult with a legal adviser to determine which document takes precedence.

This document supersedes APTA PR-M-S-RP-010-98, Rev. 2, which has been revised. Below is a summary of changes from the previous document version:

- Document formatted to the new APTA standard format.
- Sections have been moved and renumbered.
- Scope and summary moved to the front page.
- Definitions, abbreviations and acronyms moved to the rear of the document.
- Two new sections added: "Summary of document changes" and "Document history."
- Some global changes to section headings and numberings resulted when sections dealing with references and acronyms were moved to the end of the document, along with other cosmetic changes, such as capitalization, punctuation, spelling, grammar and general flow of text.
- Names of participants updated.
- Removed references to external database for reports.
- Added Positive Train Control considerations.
- Clarified that this document is not meant to cover personnel considerations. It is meant only to address derailments with respect to vehicle track interaction.



## Table of Contents

Foreword .....	ii
Participants.....	iv
Introduction.....	vi
Scope and purpose .....	vii
<b>1. Using the Derailment Investigation Form .....</b>	<b>1</b>
1.1 Cover Sheet.....	1
1.2 Weather and Operational Scenario .....	1
1.3 Track at Derailment Point.....	1
1.4 Equipment.....	2
1.5 Additional Remarks .....	2
1.6 Historical data collection .....	2
Abbreviations and acronyms.....	3
Document history.....	3
<b>Appendix A (informative): Derailment Investigation Form .....</b>	<b>4</b>
<b>Appendix B (informative): Derailment Investigation Form instructions .....</b>	<b>15</b>



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The American Public Transportation Association greatly appreciates the contributions of the **PRESS Mechanical Working Group**, which provided the primary effort in the drafting of this document.

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## **Introduction**

*This introduction is not part of APTA PR-M-RP-010-98, Rev. 2, "Derailment Investigation Reports."*



During 1996 and 1997, several derailments occurred involving trains of several commuter agencies in the Northeastern United States, as well as Amtrak. These derailments were investigated using traditional methods, and in many cases a root cause was not determined. However, the “cluster” of derailments demanded that something be done. The APTA PRESS Mechanical Committee chartered the Wheel/Rail Interface Task Group to study these derailments and develop recommendations for reducing their occurrence. A major goal of the task group was to break down the traditional “finger-pointing” among operating, mechanical and track personnel, and recognize that all three disciplines must work together in an integrated system.

An investigation requires information, and at the beginning of the development of this recommended practice, the Wheel/Rail Interface Task Group found little useful information available. The task group assigned responsibility for developing a standard form to collect pertinent derailment information to the Low-Speed Derailment Working Group. The initial focus of the working group was solely low-speed, wheel-climb derailments, generally considered to be those occurring at speeds under 20 mph. As work progressed on the form, it became clear that the investigation form would be applicable to derailments at all speeds; hence the words “low-speed” have been eliminated from the final version.

This recommended practice is designed to achieve the following objectives:

1. Provide a common derailment investigation form.
2. Enable the collection of data from past derailments for the purposes of analyzing the causes of derailments and preventing recurrences.
3. Integrate the mechanical, engineering, and operation departments’ responsibilities during a derailment investigation.

This recommended practice does not cover the following:

1. Factors related to personnel and the management thereof
2. Individual and organizational human factors
3. Derailment events due to causes other than track or equipment defects

## **Scope and purpose**

This document provides a structured, systematic method to investigate derailments through the use of standard instructions and data forms. This form builds on existing derailment investigation procedures used by commuter agencies and intercity passenger railroads. It is intended to complement, not supersede, procedures already in place. This document is not meant to cover personnel considerations, nor human factors-related causes. It is meant only to address derailments with respect to vehicle- and/or track-related causes, including all infrastructure and mechanical defects.

# Derailment Investigation Reports

## 1. Using the Derailment Investigation Form

The Derailment Investigation Form, in Appendix A, is divided into the following major sections:

1. Cover Sheet
2. Operational Scenario and Weather
3. Track at Derailment Point
4. Equipment
5. Additional Remarks

Detailed guidance for each of the blocks in Appendix A is contained in Appendix B, “Derailment Investigation Form instructions.”

When a derailment occurs, the supervisor in charge of the investigation will take a copy of appendices A and B to the scene. The supervisor is responsible for filling out the cover sheet and ensuring that the other sections are properly completed. Representatives from the operations, mechanical and track departments will be given their respective sections of appendices A and B to fill out. Each section contains several stand-alone sections to facilitate handling and to enable further distribution among investigators.

Once all the sections have been completed, the investigation supervisor will reassemble them and continue analysis per the individual operators’ instructions. When the investigation is complete, a copy of the complete form should be distributed in accordance with the railroad’s procedures.

### 1.1 Cover Sheet

The Cover Sheet provides a location to record the basic information of the derailment, such as the date, time and general location. Spaces are provided for agency-specific information.

### 1.2 Weather and Operational Scenario

This portion of the form contains two pages. A brief synopsis of the weather conditions is included, followed by information associated with the operation of the train. In this section, the consist of the train is captured, along with the type of movement, e.g., deadhead. The second page of this section provides room for a sketch of the track layout and car locations. Attaching additional sheets and photos is encouraged.

### 1.3 Track at Derailment Point

This portion of the form contains four separate sections. The general alignment of the track at the derailment location is recorded, along with detailed data about the condition of the ties and the rails. One section is devoted to recording items that might have been important to determining the cause of the derailment, such as recent maintenance activity or unusual conditions (e.g., kinks). All information related to a turnout is contained in a separate section; if the derailment didn’t occur on a turnout, this section can be discarded.



**APTA PR-M-RP-010-98, Rev. 2**  
**Derailment Investigation Reports**

In addition to the information listed in these forms, a set of track notes shall be attached. The instructions for a low-speed derailment, i.e., one that occurred at a train speed of less than 20 mph, call for marking stations every 5 ft, instead of the normal 15½ ft increments.

## **1.4 Equipment**

The Equipment portion of the form contains three sections. The first sheet contains basic vehicle data that doesn't change from day to day. This Vehicle Data Sheet should be completed for each passenger train vehicle in the operator's inventory in advance of a derailment. When a derailment occurs, the supervisor in charge of the investigation should retrieve these already-completed forms for each of the vehicle types involved in the derailment.

The remaining sections are structured so separate forms are filled out for each vehicle suspected of contributing to the derailment. Some of the information may have to be completed once the equipment is moved to a yard or other facility. The investigation supervisor is responsible for ensuring that the data is obtained once the equipment has been moved.

## **1.5 Additional Remarks**

This section of the form provides a space for miscellaneous information. Additional sheets, e.g., railroad-specific forms, can be attached to this section.

## **1.6 Historical data collection**

The Derailment Investigation Form is also designed to assist in the collection of information from past derailments to help build an internal database for trend identification and analysis. Portions of the following sections are within double lines and represent data to be provided when reporting previous incidents: Cover Sheet, Weather and Operational Scenario.

## Related APTA standards

APTA PR-M-S-015-06, Wheel Flange Angle for Passenger Equipment

## Abbreviations and acronyms

<b>LTLF</b>	lateral track loading fixture
<b>MCO</b>	mid-chord offset
<b>POD</b>	point of derailment
<b>POF</b>	point of frog
<b>POS</b>	point of switch
<b>PTC</b>	Positive Train Control

## Document history

<b>Document Version</b>	<b>Working Group Vote</b>	<b>Public Comment/ Technical Oversight</b>	<b>Rail CEO Approval</b>	<b>Policy &amp; Planning Approval</b>	<b>Publish Date</b>
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The passenger rail industry phased this recommended practice into practice over the six-month period from July 1 to Dec. 31, 1999. The recommended practice took effect Jan. 1, 2000.

## Appendix A (informative): Derailment Investigation Form

### Derailment Investigation Form

#### COVER SHEET

I1 <b>Study Ref.:</b> Click here to enter text.	I2 <b>Rev. #:</b> Click here to enter text.
I3 <b>Agency Ref.:</b> Click here to enter text.	I4 <b>Date:</b> Click here to enter text.
I5 <b>Reporting Agency</b>	
I5.1 <b>Name:</b> Click here to enter text.	
I5.2 <b>Name:</b> Click here to enter text.	
I6 <b>Owner</b>	
I6.1 <b>Track:</b> Click here to enter text.	I6.2 <b>Equipment:</b> Click here to enter text.
I7 <b>Person Filing Form</b>	
I7.1 <b>Name:</b> Click here to enter text.	I7.2 <b>Number:</b> Click here to enter text.
I8 <b>Incident</b>	
I8.1 <b>Date:</b> Click here to enter text.	I8.2 <b>Time:</b> Click here to enter text.
I9 <b>General Location:</b> Click here to enter text.	
I10 <b>Equipment Type:</b> Click here to enter text.	

**APTA PR-M-RP-010-98, Rev. 2**  
**Derailment Investigation Reports**

**WEATHER**

<b>W1 Weather Conditions (Check All That Apply)</b>		
<input type="checkbox"/> Dry	<input type="checkbox"/> Windy	<input type="checkbox"/> Snow
<input type="checkbox"/> Wet	<input type="checkbox"/> Calm	<input type="checkbox"/> Rain
<input type="checkbox"/> Frozen	<input type="checkbox"/> Fog	<input type="checkbox"/> Sleet
<input type="checkbox"/> Other: Click here to enter text.		
<b>W2 Temperature (°F):</b> Click here to enter text.		

**OPERATIONAL SCENARIO**

<b>O1 Location:</b>		
<input type="checkbox"/> Yard	<input type="checkbox"/> Bridge	<input type="checkbox"/> Station
<input type="checkbox"/> Interlocking	<input type="checkbox"/> Crossing	<input type="checkbox"/> Main Line
<input type="checkbox"/> Other: Click here to enter text.		
<b>O2 Train Speed:</b>		
<b>O2.1 Actual (mph):</b> Click here to enter text.		<b>O2.2 Posted (mph):</b> Click here to enter text.
<b>O3 Train Handling:</b>		
<b>O3.1</b> <input type="checkbox"/> Power	Notch: Click here to enter text.	Amps: Click here to enter text.
<b>O3.2</b> <input type="checkbox"/> Brake	Type of Initiation: <input type="checkbox"/> Blended <input type="checkbox"/> Service <input type="checkbox"/> Emergency	
	If Emergency, Location of Brake Initiation: <input type="checkbox"/> Conductor Valve <input type="checkbox"/> Penalty Emergency Handle	
	Air Cylinder Pressure (psi): Click here to enter text. Dynamic (Notch/amps): Click here to enter text.	
<b>O3.3</b> <input type="checkbox"/> Coast		
<b>O4 Circumstance:</b>		
<input type="checkbox"/> In Service	<input type="checkbox"/> Shop	
<input type="checkbox"/> Deadhead	<input type="checkbox"/> Special	
<input type="checkbox"/> Other: Click here to enter text.		
<b>O5 Direction of Travel (Check Train Movement by Timetable Direction):</b>		
<input type="checkbox"/> East <input type="checkbox"/> West <input type="checkbox"/> North <input type="checkbox"/> South		
<b>O6 PTC Territory:</b> <input type="checkbox"/> Yes <input type="checkbox"/> No		

**APTA PR-M-RP-010-98, Rev. 2**  
**Derailment Investigation Reports**

<sup>07</sup> **Work Zone:**  Yes  No

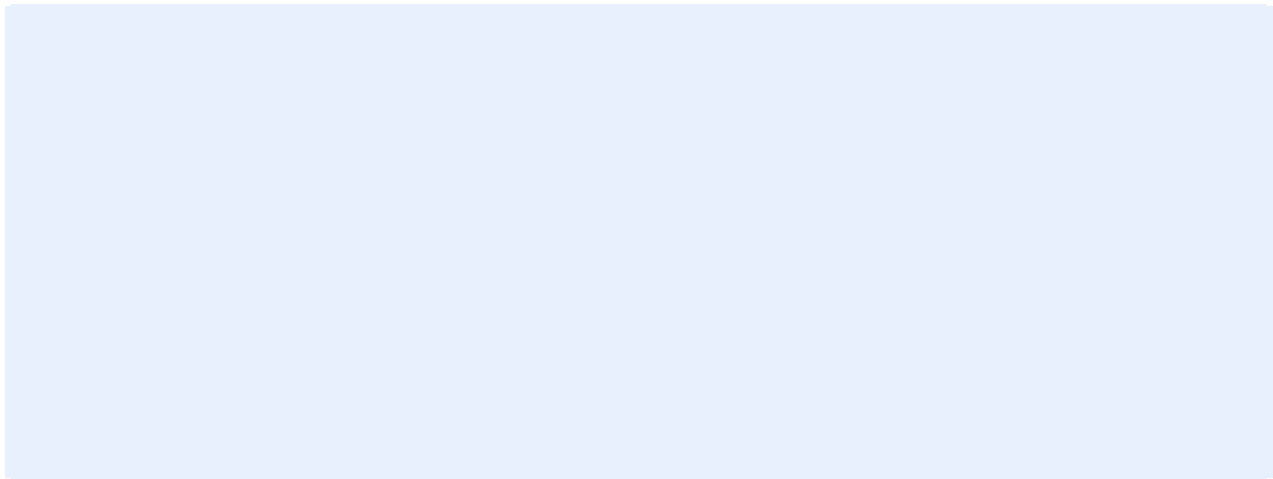
<sup>08</sup> **Consist:** In each block below, list the vehicles in the consist by road number in the direction of travel beginning in the top left. Use a check to indicate the derailed vehicles. If a boxcar or baggage car derailed, indicate whether the car was loaded or empty. For trains longer than 14 cars, ensure that the derailed cars and three cars on either side are listed.

Direction of Travel	<input type="checkbox"/> 1 Click here.	<input type="checkbox"/> 2 Click here.	<input type="checkbox"/> 3 Click here.	<input type="checkbox"/> 4 Click here.
<input type="checkbox"/> 5 Click here.	<input type="checkbox"/> 6 Click here.	<input type="checkbox"/> 7 Click here.	<input type="checkbox"/> 8 Click here.	<input type="checkbox"/> 9 Click here.
<input type="checkbox"/> 10 Click here.	<input type="checkbox"/> 11 Click here.	<input type="checkbox"/> 12 Click here.	<input type="checkbox"/> 13 Click here.	<input type="checkbox"/> 14 Click here.

<sup>09</sup> **Derailment Vehicle Information:** For each of the derailed vehicles indicated above, provide the following detailed information in order of the direction of travel.

09.1 Vehicle Road Number	09.2 Vehicle Type	Total		Derailed		
		09.3 Trucks	09.4 Axles	09.5 Trucks	09.6 Axles	09.7 Wheels
Click here.	Click here.	Click here.	Click here.	Click here.	Click here.	Click here.
Click here.	Click here.	Click here.	Click here.	Click here.	Click here.	Click here.
Click here.	Click here.	Click here.	Click here.	Click here.	Click here.	Click here.
Click here.	Click here.	Click here.	Click here.	Click here.	Click here.	Click here.
Click here.	Click here.	Click here.	Click here.	Click here.	Click here.	Click here.

<sup>010</sup> **Movement Description:** Sketch track layout, car locations and direction of train movement over at least one train length prior to and during the incident.



NOTE: Attach photos of derailment site including overall and close-up views of the equipment, and broken equipment found trackside, track at point of derailments, ties, etc.

**APTA PR-M-RP-010-98, Rev. 2**  
**Derailment Investigation Reports**

**TRACK AT DERAILMENT POINT**

T1 Attach a copy of the track notes to this form. See derailment investigation instruction for special guidance.

T2 <b>General Alignment:</b> <input type="checkbox"/> Tangent <input type="checkbox"/> Curve <input type="checkbox"/> Spiral	
T3 <b>Curvature:</b>	
T3.1 Direction (in Direction of Travel): <input type="checkbox"/> Left <input type="checkbox"/> Right	
T3.2 Nominal Amount: <input type="checkbox"/> Radius: Click here to enter text. <input type="checkbox"/> Degrees: Click here to enter text. <input type="checkbox"/> MCO: Click here to enter text.	
T4 <b>Special Trackwork:</b> <input type="checkbox"/> None <input type="checkbox"/> Turnout <input type="checkbox"/> Diamond Slip Switch Crossover (ft): Click here to enter text.	
T5 <b>Superelevation (in.):</b> Click here to enter text.	
T6 <b>Grade (%):</b> Click here to enter text. <input type="checkbox"/> Up <input type="checkbox"/> Down	
T7 <b>Gage:</b> Unloaded (in.): Click here to enter text. Loaded (in.): Click here to enter text. Load: Click here to enter text. Method: <input type="checkbox"/> Estimated <input type="checkbox"/> LTLF <input type="checkbox"/> Other: Click here to enter text.	
T8 <b>FRA Class:</b> <input type="checkbox"/> 1 <input type="checkbox"/> 2 <input type="checkbox"/> 3 <input type="checkbox"/> 4 <input type="checkbox"/> 5 <input type="checkbox"/> 6 <input type="checkbox"/> 7 <input type="checkbox"/> 8 <input type="checkbox"/> 9	
T8 <b>Electrification (if applicable):</b>	
<p>Third Rail:</p> <div style="background-color: #e0e0ff; height: 150px; width: 100%;"></div> <p>Provide a sketch of the third rail configuration at least two train lengths before and after the derailment point, paying particular attention to gap locations.</p>	<p>Catenary:</p> <div style="background-color: #e0e0ff; height: 150px; width: 100%;"></div> <p>Provide a sketch of the catenary configuration at least two train lengths before and after the derailment point, paying particular attention to air gap and phase break locations.</p>

**APTA PR-M-RP-010-98, Rev. 2**  
**Derailment Investigation Reports**

<b>T10 Ties</b>	
T10.1 Type: Click here to enter text.	
T10.2 Condition: <input type="checkbox"/> New <input type="checkbox"/> Good <input type="checkbox"/> Fair <input type="checkbox"/> Poor	
T10.3 Fastener Manufacturer: Click here to enter text. Type: Click here to enter text.	
T10.4 Tie Plates (Check All Applicable): Left Rail: <input type="checkbox"/> Single Shoulder <input type="checkbox"/> Double Shoulder <input type="checkbox"/> Flat <input type="checkbox"/> Other Canted Right Rail: <input type="checkbox"/> Single Shoulder <input type="checkbox"/> Double Shoulder <input type="checkbox"/> Flat <input type="checkbox"/> Other Canted	
T10.5 Ballast Condition: <input type="checkbox"/> Good <input type="checkbox"/> Fair <input type="checkbox"/> Poor <input type="checkbox"/> Other: Click here to enter text.	
<b>T11 Left Rail</b>	
T11.1 Type: <input type="checkbox"/> Welded <input type="checkbox"/> Jointed	
Type of Weld: <input type="checkbox"/> Field Weld <input type="checkbox"/> Plant Weld	Type of Joint: <input type="checkbox"/> Insulated <input type="checkbox"/> Not Insulated
T11.2 Section (e.g., 136RE): Click here to enter text.	
T11.3 Mill/Year: Click here to enter text.	
T11.4 Profile: <input type="checkbox"/> New <input type="checkbox"/> Worn (Attach Profile)	
T11.5 Gage Face (Check All That Apply): <input type="checkbox"/> Dry <input type="checkbox"/> Lubricated <input type="checkbox"/> Clean <input type="checkbox"/> Hash Marks <input type="checkbox"/> Smooth <input type="checkbox"/> Contaminated <input type="checkbox"/> Rough-Lipped	
T11.6 Gage Face Angle (deg.): Click here to enter text.	
T11.7 Nominal Cant (e.g., 1:40): Click here to enter text.	
T11.8 Lubrication: Click here to enter text.	
Tribometer Reading, Top: Click here to enter text. Gage Face: Click here to enter text.	
Type: Click here to enter text.	
Distance Applied Prior to Point of Derailment (ft): Click here to enter text.	

**APTA PR-M-RP-010-98, Rev. 2**  
**Derailment Investigation Reports**

<b>T12 Right Rail</b>	
T12.1 Type: <input type="checkbox"/> Welded <input type="checkbox"/> Jointed	
Type of Weld: <input type="checkbox"/> Field Weld <input type="checkbox"/> Plant Weld	Type of Joint: <input type="checkbox"/> Insulated <input type="checkbox"/> Not Insulated
T12.2 Section (e.g., 136RE): <a href="#">Click here to enter text.</a>	
T12.3 Mill/Year: <a href="#">Click here to enter text.</a>	
T12.4 Profile: <input type="checkbox"/> New <input type="checkbox"/> Worn (Attach Profile)	
T12.5 Gage Face (Check All That Apply):	
<input type="checkbox"/> Dry	<input type="checkbox"/> Lubricated
<input type="checkbox"/> Smooth	<input type="checkbox"/> Contaminated
<input type="checkbox"/> Clean	<input type="checkbox"/> Hash Marks
<input type="checkbox"/> Rough-Lipped	
T12.6 Gage Face Angle (deg.): <a href="#">Click here to enter text.</a>	
T12.7 Nominal Cant (e.g., 1:40): <a href="#">Click here to enter text.</a>	
T12.8 Lubrication: <a href="#">Click here to enter text.</a>	
Tribometer Reading, Top: <a href="#">Click here to enter text.</a> Gage Face: <a href="#">Click here to enter text.</a>	
Type: <a href="#">Click here to enter text.</a>	
Distance Applied Prior to Point of Derailment (ft): <a href="#">Click here to enter text.</a>	

<b>T13</b>	<p><b>General Comments:</b> Note unusual conditions just prior to and/or at point of derailment, such as twists, dips, kinks, loose joints, metal shavings, deposits, recent M/W activity, latest rail grinding, date and type of last lubrication, etc. Indicate whether there is evidence of track movement under load in either the vertical or lateral direction. Also describe how many defective ties, if any, were found within two train lengths of the point of derailment.</p> <p><a href="#">Click here to enter text.</a></p>
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**APTA PR-M-RP-010-98, Rev. 2**  
**Derailment Investigation Reports**

**Turnout Information (if Derailment Occurred on a Turnout)**

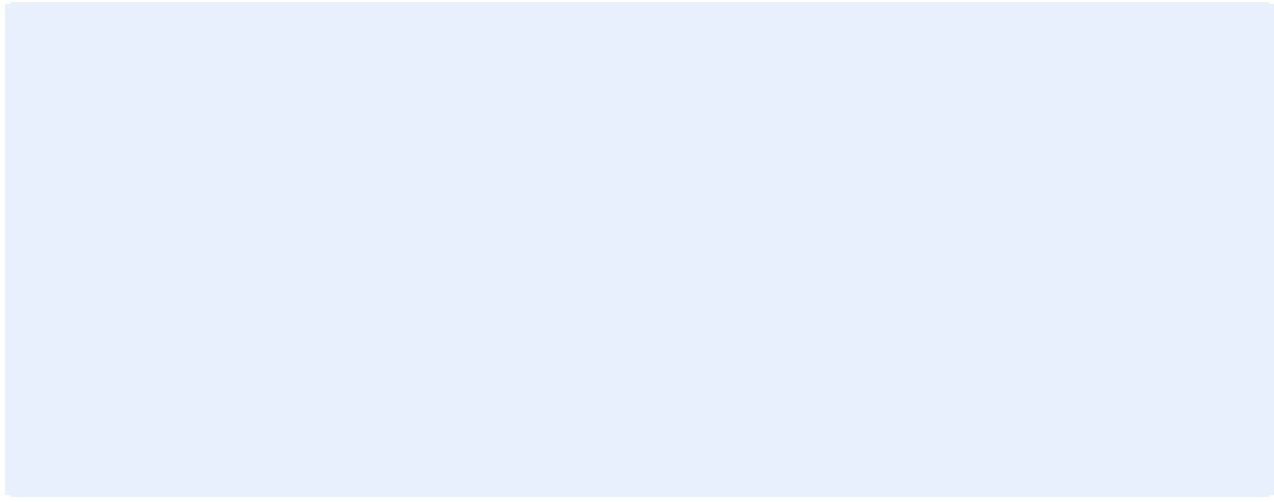
<p><b>T14 Train Route (Check Two):</b></p> <table style="width: 100%;"><tr><td><input type="checkbox"/> Straight</td><td><input type="checkbox"/> Facing</td></tr><tr><td><input type="checkbox"/> Diverging</td><td><input type="checkbox"/> Trailing</td></tr></table>	<input type="checkbox"/> Straight	<input type="checkbox"/> Facing	<input type="checkbox"/> Diverging	<input type="checkbox"/> Trailing		
<input type="checkbox"/> Straight	<input type="checkbox"/> Facing					
<input type="checkbox"/> Diverging	<input type="checkbox"/> Trailing					
<p><b>T15 Location:</b> Specify location of point of derailment in turnout relative to either point of switch (POS) or point of frog (POF); e.g., “6 ft past POS on curved stock rail.”</p> <p><a href="#">Click here to enter text.</a></p>						
<p><b>T16 Type</b></p> <p>Frog Number: <a href="#">Click here to enter text.</a></p> <p><input type="checkbox"/> Curved   <input type="checkbox"/> Straight   <input type="checkbox"/> Symmetrical   <input type="checkbox"/> Asymmetrical   <input type="checkbox"/> Tangential</p>						
<p><b>T17 Type of Switch Point (Check All That Apply):</b></p> <table style="width: 100%;"><tr><td><input type="checkbox"/> Undercut</td><td><input type="checkbox"/> Housetop</td><td><input type="checkbox"/> Curved</td></tr><tr><td><input type="checkbox"/> Housed</td><td><input type="checkbox"/> Straight</td><td><input type="checkbox"/> Other: <a href="#">Click here to enter text.</a></td></tr></table>	<input type="checkbox"/> Undercut	<input type="checkbox"/> Housetop	<input type="checkbox"/> Curved	<input type="checkbox"/> Housed	<input type="checkbox"/> Straight	<input type="checkbox"/> Other: <a href="#">Click here to enter text.</a>
<input type="checkbox"/> Undercut	<input type="checkbox"/> Housetop	<input type="checkbox"/> Curved				
<input type="checkbox"/> Housed	<input type="checkbox"/> Straight	<input type="checkbox"/> Other: <a href="#">Click here to enter text.</a>				
<p><b>T18 Type of Frog</b></p> <p>Number: <a href="#">Click here to enter text.</a></p> <p><input type="checkbox"/> Straight   <input type="checkbox"/> Movable Point   <input type="checkbox"/> Self-Guarded Curved</p>						
<p><b>T19 Turnout Comments:</b></p> <p><a href="#">Click here to enter text.</a></p>						

**APTA PR-M-RP-010-98, Rev. 2**  
**Derailment Investigation Reports**

**EQUIPMENT**

**Vehicle Data Sheet**

This sheet should be filled out for each type of vehicle owned by the railroad and kept on file. The appropriate sheets shall then be made available to the derailment investigation team.

E1 <b>Vehicle Type:</b> Click here to enter text.
E2 <b>Propulsion System:</b> Click here to enter text.
E3 <b>Minimum Design Curve Radius (ft):</b> Click here to enter text.
E4 <b>Nominal Coupler Swing, Side to Side (deg.):</b> Click here to enter text.
E5 <b>Distance from Coupler Pivot to Pulling Face (in.):</b> Click here to enter text.
E6 <b>Distance from Coupler Pivot to Coupler Pocket Exit (in.):</b> Click here to enter text.
E7 <b>Width of Coupler Shank (in.):</b> Click here to enter text.
E8 <b>Truck Type:</b> Click here to enter text.
E9 <b>Truck Wheel Base (in.):</b> Click here to enter text.
E10 <b>Primary Suspension Type:</b> Click here to enter text.
E11 <b>Nominal Wheel Diameter (in.):</b> Click here to enter text.
E12 <b>Truck Swing Pivot (deg.)</b> A End: Click here to enter text. B End: Click here to enter text.
E13 <b>Design Wheel Unloading (%):</b> Click here to enter text.
E14 <b>Truck-Mounted Lubricators:</b> <input type="checkbox"/> Flange <input type="checkbox"/> Tread <input type="checkbox"/> None
E15 <b>Equipment Sketch:</b> 
Use this block to sketch the equipment axle/wheel configuration, showing the B/F and A end and the direction of travel

**APTA PR-M-RP-010-98, Rev. 2**  
**Derailment Investigation Reports**

**Vehicle (fill out separate sheet for vehicle suspected of contributing to the derailment)**

This sheet should be filled out for each type of vehicle owned by the railroad and kept on file. The appropriate sheets shall then be made available to the derailment investigation team.

E16 <b>Vehicle No.:</b>			
E17 <b>Vehicle End(s) Derailed:</b>		<input type="checkbox"/> A End	<input type="checkbox"/> B End
E18 <b>Couplers</b>	E18.1 <b>Coupler Inspection (Check Blocks When Complete)</b>	<input type="checkbox"/> OK	<input type="checkbox"/> OK
	E18.2 <b>Damage</b>	<input type="checkbox"/> OK	<input type="checkbox"/> OK
	E18.3 <b>Swing</b>	<input type="checkbox"/> OK	<input type="checkbox"/> OK
	E18.4 <b>Pocket Damage</b>	<input type="checkbox"/> OK	<input type="checkbox"/> OK
	E18.5 <b>Stop Clearance</b>	Left: Click here. Right: Click here.	Left: Click here. Right: Click here.
E19 <b>Trucks</b>	E19.1 <b>Trucks Derailed</b>	<input type="checkbox"/> A End	<input type="checkbox"/> B End
	E19.2 <b>Serial Numbers</b>	Click here to enter text.	Click here to enter text.
	E19.3 <b>Primary Suspension Condition</b>	<input type="checkbox"/> OK	<input type="checkbox"/> OK
	E19.4 <b>Leveling Valve Configuration</b>	<input type="checkbox"/> (1) <input type="checkbox"/> (2)	<input type="checkbox"/> (1) <input type="checkbox"/> (2)
	E19.5 <b>Air Springs</b>	<input type="checkbox"/> Left side OK <input type="checkbox"/> Right side OK	<input type="checkbox"/> Left side OK <input type="checkbox"/> Right side OK
	E19.6 <b>Side Bearing Clearance</b>	Left: Click here. Right: Click here.	Left: Click here. Right: Click here.
	E19.7 <b>Center Bearing Condition</b>	<input type="checkbox"/> OK	<input type="checkbox"/> OK
	E19.8 <b>Pedestal Liner Condition</b>	<input type="checkbox"/> OK	<input type="checkbox"/> OK
	E19.9 <b>Last Overhaul (Month/Year)</b>	Click here to enter text.	
E20 <b>Equipment Remarks:</b> Note defects for all items not checked OK above. Click here to enter text.			

**APTA PR-M-RP-010-98, Rev. 2**  
**Derailment Investigation Reports**

**Derailed Wheels**

E21 <b>Profile Standard:</b> <input type="checkbox"/> APTA PR-M-S-015-06 <input type="checkbox"/> Other: <a href="#">Click here to enter text.</a>												
E21 Fill out the following information for each wheel suspected of contributing to the derailment. Measure the current profile of each wheel and attach to this form.												
E22 <b>Car Road Number:</b> <a href="#">Click here to enter text.</a>												
E23 <b>Position</b>	R1	L1	R2	L2	R3	L3	R4	L4	R5	L5	R6	L6
E24 <b>Tape Size (in.)</b>												
E25 <b>Class</b>												
E26 <b>Tread Wear</b>												
E27 <b>Flange Wear</b>												
E28 <b>Witness Groove</b>												
E29 <b>Flange Surface</b>												
E30 <b>Flange Angle</b>												
E31 <b>Back-to-Back Wheel Spacing</b>												
E32 <b>Miles/Months Since Trueing/Changeout</b>												
E33 <b>Location of Last Trueing</b>												
E34 <b>Machine and Cutter Model</b>												

ADDITIONAL REMARKS

<sup>R1</sup> **Significant Consequences:**

Click here to enter text.

<sup>R2</sup> **Similar Occurrences:**

Click here to enter text.

<sup>R3</sup> **Reported Cause:**

Click here to enter text.

<sup>R4</sup> **Attachments:**

Click here to enter text.

## Appendix B (informative): Derailment Investigation Form Instructions

### COVER PAGE

Line No.	Title	Instruction
I1	Study Ref.	Leave blank.
I2	Rev. #	Revision number for this form
I3	Agency Ref.	Internal agency's reference or file number
I4	Date	Date of this form
I5	Reporting Agency	Agency reporting the derailment and filing this form
I6	Owner	Put the owners' names in the blocks.
I6.1	Track	Track owner
I6.2	Equipment	Equipment owner
I7	Person Filing Form	Note your contact information in these blocks.
I7.1	Name	Name of person supervising completion of the forms
I7.2	Number	Phone number of the person supervising completion of the forms
I8	Incident	Date and time of incident
I8.1	Date	Date of incident
I8.2	Time	Time of incident
I9	General Location	Describe general location where derailment occurred ( <i>NY Penn Station, Track 2, Near switch 83, etc.</i> ).
I10	Equipment Type	Describe type of equipment involved ( <i>ALP44 Pushing, Comet cars, etc.</i> ).

### WEATHER

Line No.	Title	Instruction
W1	Weather Conditions	Check all items that are appropriate ( <i>wet, rain, windy, etc.</i> ).
W2	Temperature	Outside temperature (°F)

**APTA PR-M-RP-010-98, Rev. 2**  
**Derailment Investigation Reports**

**OPERATIONAL SCENARIO**

<b>Line No.</b>	<b>Title</b>	<b>Instruction</b>
O1	Location	Check all items that are appropriate ( <i>Station, Interlocking, etc.</i> ).
O2	Train Speed	Train speed prior to brake application
O2.1	Actual	Actual train speed from log or engineer
O2.2	Posted	Posted train speed
O3	Train Handling	
O3.1	Power	Was power setting notch or amps?
O3.2	Brake	<ul style="list-style-type: none"> <li>• If brakes were applied, how were they applied? Service brake or emergency brake? Was blended brake active?</li> <li>• If emergency brake, indicate how initiated: by conductor's valve, penalty or emergency handle.</li> <li>• Amount of brake cylinder pressure for air brake and/or notch or amps for dynamic brake.</li> </ul>
O3.3	Coast	
O4	Circumstance	Indicate the move circumstance; was it in routine service, was it going to the shop or a movement in the yard, etc.?
O5	Direction of Travel	Check the train movement direction by timetable direction.
O6	PTC Territory	Indicate whether the train was in PTC territory.
O7	Work Zone	Indicate whether the train was in a work zone.
O8	Consist	In each block, list the individual vehicles in the consist by road number in the direction of travel. Check the derailed vehicles. For long trains, ensure that the derailed cars and three cars on either side are listed. If a boxcar or baggage car derailed, indicate if the car was loaded or empty. (This information can be obtained in the field or from the log.)
O9	Derailed Vehicle Information	
O9.1	Vehicle Road Number	Vehicle road number
O9.2	Vehicle Type	Vehicle type ( <i>Alp-44 loco or comet II cab car, etc.</i> )
O9.3	Total Trucks	Total trucks in the vehicle
O9.4	Total Axles	Total axles in the vehicle
O9.5	Derailed Trucks	Number of derailed trucks in each vehicle
O9.6	Derailed Axles	Number of derailed axles in each vehicle
O9.7	Derailed Wheels	Note which wheels derailed using the convention contained in item E15.
O10	Movement Description	Sketch track layout, car locations and direction of train movement over at least one train length prior to and during the incident. Attach photos of derailment site, including overall and close-up views of the equipment, broken equipment found trackside, track at point of derailments, ties, etc.

**APTA PR-M-RP-010-98, Rev. 2**  
**Derailment Investigation Reports**

**TRACK AT DERAILMENT POINT**

<b>Line No.</b>	<b>Title</b>	<b>Instruction</b>
T1	Note	Attach a copy of the track notes. Enter Mid-ordinate, loaded gage and crosslevel measured at 5 ft intervals about two car lengths past the point of the derailment and four car lengths before the point of derailment. If simulations are to be done, give general curvature, crosslevel and gage, and also give lateral and vertical deviations for each rail along the track at intervals not to exceed 5 ft for four car lengths before and two car lengths after the point of derailment.
T2	General Alignment	Indicate if the derailment was on tangent, curve or spiral track.
T3	Curvature	Track curvature
T3.1	Direction	Curve turn direction in direction of travel
T3.2	Nominal Amount	Nominal curvature in degrees, radius or mid-chord offset (MCO). For MCO, give the chord length. If unknown, take the average of 10 alignment measurements centered on the point of derailment at 15 ft, 6 in., stations.
T4	Special Trackwork	Indicate if the derailment was in a turnout, diamond, slip switch or crossover, and indicate the distance between track centers.
T5	Superelevation	Design superelevation in inches
T6	Grade	Enter grade and direction.
T7	Gage	
T7.1	Unloaded	Unloaded track gage
T7.2	Loaded	Track gage under load (specify load, reailer, crane, etc.)
T7.3	Method	Method used for loaded gage measurement ( <i>LTLF, estimated, track geometry car, etc.</i> ).
T8	FRA Class	Check FRA track class.
T9	Electrification	If the track is electrified and the vehicles involved use electricity for propulsion, then for third rail electrification, provide sketch of third rail configuration at least two train lengths before and after the derailment point, paying particular attention to gap locations. For a catenary system provide a sketch of the catenary configuration at least two train lengths before and after the derailment point, paying particular attention to air gap and phase break locations.
T10	Ties	
T10.1	Type	Note type of ties ( <i>wood, concrete, etc.</i> ).
T10.2	Condition	New: New tie Good: Seasoned Fair: Plate cutting Poor: Poor lateral and vertical support
T10.3	Fastener Manufacturer/Type	Note fastener manufacturer and type ( <i>Cut Spike, Pandrol</i> ).



**APTA PR-M-RP-010-98, Rev. 2**  
**Derailment Investigation Reports**

<b>Line No.</b>	<b>Title</b>	<b>Instruction</b>
T10.4	Tie Plates	For left and right rail, check all the items that are appropriate to describe the tie plates ( <i>double shoulder, canted, none</i> ).
T10.5	Ballast Condition	Good: Good, clean ballast Fair: Good ballast mixed with fine material Poor: Ballast with lots of fine and mud pumping Other: No ballast, road crossing, etc.
T11	Left Rail	
T11.1	Type	If welded or jointed section in the area of the derailment, indicate if the weld is a field weld or plant weld. If jointed, indicate if it is an insulated joint or not, 4- or 6-hole bars, and if bolts appeared tight.
T11.2	Section	Note the rail size and section ( <i>e.g., 136RE</i> ).
T11.3	Mill/Year	Note the roll year and manufacturer as stamped on the rail.
T11.4	Profile	Examine the rail profile and indicate if it is new or worn. Measure with profilometer or other suitable device and attach it to the form.
T11.5	Gage Face	Check all items appropriate to describe the gage face of the rail ( <i>dry, clean, rough, etc.</i> ).
T11.6	Gage Face Angle	Measured gage face angle
T11.7	Nominal Cant	Nominal design rail cant
T11.8	Lubrication	Use a tribometer to measure the coefficient of friction on the top and gage face of rail, if possible. Include the type of lubrication, and the location prior to the point of derailment (in feet) where applied.
T12	Right Rail	
T12.1	Type	If welded or jointed section in the area of the derailment, indicate if the weld is a field weld or plant weld. If jointed, indicate if it is an insulated joint or not, 4- or 6-hole bars, and if bolts appeared tight.
T12.2	Section	Note the rail size and section ( <i>e.g., 136RE</i> ).
T12.3	Mill/Year	Note the roll year and manufacturer as stamped on the rail.
T12.4	Profile	Examine the rail profile and indicate if it is new or worn. Measure with profilometer or other suitable device and attach it to the form.
T12.5	Gage Face	Check all items appropriate to describe the gage face of the rail ( <i>dry, clean, rough, etc.</i> ).
T12.6	Gage Face Angle	Measured gage face angle
T12.7	Nominal Cant	Nominal design rail cant

**APTA PR-M-RP-010-98, Rev. 2**  
**Derailment Investigation Reports**

Line No.	Title	Instruction
T12.8	Lubrication	Use a tribometer to measure the coefficient of friction on the top and gage face of rail, if possible. Include the type of lubrication, and the location prior to the point of derailment (in feet) where applied.
T13	General Comments	Note unusual conditions prior to and/or at point of derailment, e.g., twists, dips, kinks, loose joints, deposits, recent M/W activity, latest rail grinding, date and type of last lubrication, etc. Indicate whether there is evidence of track movement under load in either the vertical or lateral direction. Also describe how many defective ties, if any, were found within two car lengths of the point of derailment.
T14	Train Route	Note the train movement through the turnout ( <i>facing straight move</i> ).
T15	Location	Specify location of point of derailment in turnout relative to either point of switch (POS) or point of frog (POF) ( <i>e.g., 6 ft past POS on curved stock rail</i> ).
T16	Type	Include all information defining the turnout, such as the frog number, if the switch points are straight or curved, symmetrical or asymmetrical or of tangential design ( <i>No. 8, asymmetrical, straight</i> ).
T17	Type of Switch Point	What kind of switch point is at this location? Check all that are appropriate.
T18	Type of Frog	Note frog number and check all appropriate items.
T19	Turnout Comments	Add any comments about the turnout and condition of turnout or switch.

## EQUIPMENT

### Vehicle Data Sheet

This sheet should be filled out for each type of vehicle owned by the railroad and kept on file. The information on this sheet is the nominal or design value for each parameter. The appropriate sheets shall be made available to the derailment investigation team.

Line No.	Title	Instruction
E1	Vehicle Type	What kind of vehicle is this? ( <i>E1, E2, etc.</i> )
E2	Propulsion System	What is the propulsion system for this car? ( <i>diesel, system catenary, etc.</i> )
E3	Minimum Design Curve Radius	What is the minimum design curve radius for this car in feet (from vehicle specifications)?
E4	Nominal Coupler Swing, Side to Side	What is the nominal angle the coupler can swing from side to side?
E5	Distance from Coupler Pivot to Pulling Face	Give the distance from coupler pivot to pulling face in inches.
E6	Distance from Coupler Pivot to Coupler Pocket Exit	Give the distance from coupler pivot to coupler pocket exit in inches.
E7	Width of Coupler Shank	Enter the width of the coupler shank in inches.
E8	Truck Type	What is truck type? ( <i>GSI, Pioneer, etc.</i> )
E9	Truck Wheel Base	Enter the truck wheel base in inches.
E10	Primary Suspension Type	Enter the primary suspension type for this truck ( <i>coil spring, chevron, equalizer, metal-metal, etc.</i> ).
E11	Nominal Wheel Diameter	Give the nominal wheel diameter in inches.
E12	Truck Swing Pivot	Enter the value for both the A end and B end in degrees.
E13	Design Wheel Unloading	Percent of level, nominal weight on wheel
E14	Truck-Mounted Lubricators	Check the appropriate value.
E15	Equipment Sketch	This block is to be used to correlate the vehicle direction of motion, A/F and B ends, and the axle/wheel numbering system for your system.

**APTA PR-M-RP-010-98, Rev. 2**  
**Derailment Investigation Reports**

**Vehicle**

This sheet should be filled out for each vehicle suspected of contributing to the derailment. All couplers and trucks on the derailed vehicle must be inspected. The couplers on vehicles not derailed, but immediately adjacent to derailed vehicles, must also be inspected.

<b>Line No.</b>	<b>Title</b>	<b>Instruction</b>
E16	Vehicle No.	Enter the railroad vehicle road number
E17	Vehicle End(s) Derailed	Check the appropriate column (A end or B end or both) to indicate the car end that derailed.
E18	Couplers	
E18.1	Coupler Inspection	Check the appropriate box to indicate the coupler inspected. The coupler on each derailed car end must be inspected.
E18.2	Damage	Inspect the coupler for damage and check if OK. If not OK, then note all defects in the "Equipment Remarks" section.
E18.3	Swing	Verify that the coupler can swing freely throughout its full range of motion and check if OK. If not OK, note all defects in the "Equipment Remarks" section.
E18.4	Pocket Damage	Inspect coupler pocket area for damage and check if OK. If not OK, note all defects in the "Equipment Remarks" section.
E18.5	Stop Clearance	Measure the clearance between the coupler shank and the right and left coupler stops. Enter the measured dimension for each side.
E19	Trucks	
E19.1	Trucks Derailed	Check appropriate column (A end, B end or both) to indicate all trucks derailed on the car.
E19.2	Serial Numbers	Enter the derailed truck frame serial number stamped into the truck frame ID plate. If plate is not installed, the serial number is cast into inside surface of frame member.
E19.3	Primary Suspension Condition	Inspect primary suspension springs for broken/cracked coils or spring leafs, bottomed out coils, broken spring seats, etc., and check if OK. If not OK, note all defects in the "Equipment Remarks" section.
E19.4	Leveling Valve Configuration	Check the appropriate box (1) or (2) to indicate if the derailed truck air springs are controlled by one or two leveling valves.
E19.5	Air Springs	Inspect the air springs for full inflation on each side of all derailed trucks and check if OK. If not OK, note all defects in the "Equipment Remarks" section.
E19.6	Side Bearing Clearance	Measure the side bearing clearance for each side of all derailed trucks and enter measured dimensions for each side.
E19.7	Center Bearing Condition	Inspect the center bearing condition and check if OK. If not OK, note all defects in the "Equipment Remarks" section.
E19.8	Pedestal Liner Condition	Inspect derailed truck pedestal liners for cracks or other damage that would inhibit journal housing travel, and check if OK. If not OK, note all defects in the "Equipment Remarks" section.

**APTA PR-M-RP-010-98, Rev. 2**  
**Derailed Investigation Reports**

Line No.	Title	Instruction
E19.9	Last Overhaul Date	Enter derailed truck new or overhaul date from truck ID plate or maintenance records.
E20	Equipment Remarks	Enter a description of all defects for items not checked as OK.

**Derailed Wheels**

Line No.	Title	Instruction
E21	Profile Standard	Check the appropriate wheel profile or note other profile used by the railroad.
E22	Car Road Number	Enter the derailed vehicle road number.
E23	Position	Wheels are numbered L1 through L6 and R1 through R6, counting from the B (or F) end of the car.
E24	Tape Size	Enter the tape size of all wheels in inches.
E25	Class	Enter the class designation of all wheels. It is a single capital letter stamped in the wheel hub front face ( <i>A, B, L, etc.</i> ).
E26	Tread Wear	Enter the wheel rim thickness for all wheels using the AAR standard wheel gage.
E27	Flange Wear	Enter the flange thickness for all wheels using the AAR standard wheel gage.
E28	Witness Groove	Indicate if a witness groove is present. If present, record depth of the groove.
E29	Flange Surface	Enter surface finish description of all wheel flanges ( <i>dry, rough, smooth, lubricated, scored, hash marks, etc.</i> ).
E30	Flange Angle	Enter the flange angle of all wheels as measured by a wheel profilometer gauge (Car Shop function).
E31	Back-to-Back Wheel Spacing	Enter the back-to-back wheel dimensions for all wheel/axle sets.
E32	Miles/Months Since Trueing/Changeout	Enter appropriate data utilizing shop maintenance records.
E33	Location of Last Trueing	Enter appropriate data utilizing shop maintenance records.
E34	Machine and Cutter Model	Enter appropriate data utilizing shop maintenance records.

**APTA PR-M-RP-010-98, Rev. 2**  
**Derailment Investigation Reports**

**ADDITIONAL REMARKS**

<b>Line No.</b>	<b>Title</b>	<b>Instruction</b>
R1	Significant Consequences	Indicate significant consequences.
R2	Similar Occurrences	Indicate if there are any similar types of derailments and refer to other reports.
R3	Reported Cause	What was reported as the cause of the derailment?
R4	Attachments	Indicate attachments with this form (pictures, drawings, track notes, each car sheet, trucks, wheels, etc.).