

10. APTAPR-M-RP-010-98

Recommended Practice for Derailment Investigation Reports

Approved October 14, 1998
APTA PRESS Task Force

Authorized March 17, 1999
APTA Commuter Rail Executive Committee

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

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

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1666 K Street, N. W.
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Introduction

(This introduction is not a part of APTA PR-M-RP-010-98, Recommended Practice for 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 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 in the future. A major goal of the task group was to break down the traditional “finger-pointing” between 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:

- a) Provide a common derailment investigation form;
- b) Enable the collection of data from past derailments for the purposes of analyzing the causes of derailments and preventing recurrences; and
- c) Integrate the mechanical, equipment and operation departments’ responsibilities during a derailment investigation.

Participants

This recommended practice was prepared by the Low-Speed Derailment Working Group of the APTA PRESS Mechanical Committee's Wheel/Rail Interface Task Group. Members of this working group who participated in the preparation of this document were:

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APTA PR-M-RP-010-98

Recommended Practice for Derailment Investigation Reports

1. Overview

1.1 Scope

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 investigations procedures used by commuter agencies and intercity passenger railroads. It is intended to complement, not supercede, procedures already in place.

The passenger rail industry phased this recommended practice into practice over the six-month period from July 1 to December 31, 1999. The recommended practice took effect January 1, 2000.

1.2 Purpose

APTA has established a derailment database for archiving the information gathered using this form. Submission of the information to APTA for inclusion in the database is voluntary, and encouraged. Information in the APTA database will be accessible to all APTA members. The database will facilitate analyses of derailment causes with a goal of preventing similar incidents in the future.

2. References

3. Definitions

4. Using the derailment investigation form

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

- a) Cover sheet
- b) Operational Scenario, including Weather
- c) Track
- d) Equipment
- e) Additional Remarks

Detailed guidance for each of the blocks in Annex A are contained in Annex B, Derailment Investigation Form Instructions.

When a derailment occurs, the supervisor in charge of the investigation will take a copy of

Annex A and B to the scene. The supervisor is responsible for filling out the cover sheet, and ensuring the other sections are properly completed. Representatives from the Operations, Mechanical, and Track departments will be given their respective sections of Annexes A and B to fill out. Each section contains several stand-alone sheets to facilitate handling, and to enable further distribution of sheets 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. In addition, it is recommended that a copy be sent to APTA for entry into the APTA derailment database.

4.1 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.

4.2 Weather and operational scenario

This portion of the form contains two pages. A brief synopsis of the weather conditions are 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.

4.3 Track at derailment point

This portion of the form contains four separate pages. 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 page is devoted to recording items that might have been important to determining the cause of the derailment, such as recent maintenance activity, unusual conditions, e.g., kinks, etc. All information related to a turnout is contained on a separate sheet; if the derailment didn't occur on a turnout, this sheet can be discarded.

In addition to the information listed on the four track-pages, 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 five feet, instead of the normal 15 ½-foot increment.

4.4 Equipment

The equipment portion of the form contains three sheets. The first sheet contains basic vehicle data information 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 sheets are structured so separate sheets 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 the data is obtained once the equipment has been moved.

4.5 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.

4.6 Historical data collection

The Derailment Investigation Form is also designed to assist in the collection of information from past derailments to help build the APTA derailment database. In the Cover Sheet and Weather and Operational Scenario portions of the form are blocks within double lines. These items are to be filled out when reporting previous incidents. Even this limited information is useful when attempting to analyze the extent of a particular derailment problem.

5. Derailment database

APTA will maintain the derailment database. This information is archived and made available for use by APTA members through APTA. The database is written in Microsoft Access®, and is searchable by any combination of attributes. The format of the database, including the data entry protocol will be made available to APTA members upon request.

The final method of access to the database by APTA members has not been determined. APTA's intends to disseminate the database format at a future date to assist in collection of data. The information may be obtained through APTA.

Annex A**(informative)**

<input type="checkbox"/> I1 Study Ref: _____	Annex A DERAILMENT INVESTIGATION FORM		I2 Rev #: _____
I3 Agency Ref: _____			I4 Date: _____
I5 Reporting Agency			
I6 Owner	I6.1 Track:	I6.2 Equipment:	
I7 Person Filing Form	I7.1 Name:	I7.2 Number:	
I8 Incident	I8.1 Date:	I8.2 Time:	
I9 General Location			
I10 Equipment Type			

WEATHER

W1 Weather Conditions (circle all that apply)	Dry	Wet	Frozen	Windy	Calm	Fog
	Snow	Rain	Sleet	Other: _____		
W2 Temperature (°F)						

OPERATIONAL SCENARIO – 1

O1 Location (circle choice)	Yard Interlocking Bridge Crossing Station Main Line Other: _____		
O2 Train Speed	O2.1 Actual: _____ mph	O2.2 Posted: _____ mph	
O3 Train Handling (circle choice)	O3.1 Power	Notch: _____ Amps: _____	
	O3.2 Brake	Type of Initiation: _____	Blended: _____ Service: _____ Emerg: _____
		If Emergency: indicate location of brake initiation: Conductor Valve Penalty Emerg. Handle	
	Air (Cyl. Press): _____ psi Dynamic(Notch/amps)		
	O3.3 Coast		

04 Circumstance	In Service	Deadhead	Shop	Special	
	Other:				
05 Dir. of Travel	East	West	North	South (circle train movement by timetable direction)	
06 Consist	In each block below, list the vehicles in the consist by road number in the direction of travel beginning in the top left. Circle the derailed vehicles. If a boxcar or baggage car derailed, indicate if the car was loaded or empty. For trains longer than 14 cars, ensure the derailed cars, and three cars either side are listed.				
Dir. of Travel	1	2	3	4	
5	6	7	8	9	
10	11	12	13	14	
07 Derailment Vehicle Information	For each of the derailed vehicles indicated above, provide the following detailed information in order of the direction of travel.				
07.1 Vehicle road Number	07.2 Vehicle Type	Total	Derailed		
		07.3 Trucks	07.4 Axles	07.5 Trucks	07.6 Axles

OPERATIONAL SCENARIO - 2

08 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 closeup views of the equipment, and broken equipment found trackside, track at point of derailments, ties, etc.	

TRACK AT DERAILMENT POINT - 1

T1	Attach a copy of the track notes to this form . See derailment investigation instruction for special guidance.					
T2 General Alignment	Tangent	Curve	Spiral			
T3 Curvature	T3.1 Direction (in dir. of travel)		T3.2 Nominal Amount			
	Left	Right	Radius		Deg	MCO (chord length)
T4 Special Trackwork	None	Turnout	Diamond			
	Slip Switch ft	Crossover	(distance btwn track centers)			
T5 Superelevation	inches					
T6 Grade	Percent		Up	Down		
T7 Gage	T7.1 Unloaded		inches			
	T7.2 Loaded		inches			
	T7.3 Method		Estimated		LTLF	Other
T8 FRA Class	1	2	3	4	5	6
	7	8	9			
T9 Electrification (if applicable)	3 rd Rail (Provide sketch of third rail configuration at least two train lengths before and after derailment point paying particular attention to gap locations.)					
	Catenary (Provide sketch of catenary configuration at least two train lengths before and after derailment point paying particular attention to air gap & phase break locations)					

T10 Ties	T11 Type																																						
<table border="1"> <tr> <td>T10.2 Condition</td> <td>New</td> <td>Good</td> <td>Fair</td> <td>Poor</td> <td></td> </tr> <tr> <td>T10.3 Fastener</td> <td colspan="5">Manufacturer _____ Type _____</td> </tr> <tr> <td rowspan="2">T0.4 Tie Plates (circle all applicable)</td> <td>Left Rail</td> <td colspan="2">Single Shoulder</td> <td>Double Shoulder</td> <td>Flat</td> </tr> <tr> <td></td> <td colspan="2">Other Canted</td> <td></td> <td></td> </tr> <tr> <td rowspan="2">T0.5 Ballast Condition</td> <td>Right Rail</td> <td colspan="2">Single Shoulder</td> <td>Double Shoulder</td> <td>Flat</td> </tr> <tr> <td></td> <td colspan="2">Other Canted</td> <td></td> <td></td> </tr> </table>						T10.2 Condition	New	Good	Fair	Poor		T10.3 Fastener	Manufacturer _____ Type _____					T0.4 Tie Plates (circle all applicable)	Left Rail	Single Shoulder		Double Shoulder	Flat		Other Canted				T0.5 Ballast Condition	Right Rail	Single Shoulder		Double Shoulder	Flat		Other Canted			
T10.2 Condition	New	Good	Fair	Poor																																			
T10.3 Fastener	Manufacturer _____ Type _____																																						
T0.4 Tie Plates (circle all applicable)	Left Rail	Single Shoulder		Double Shoulder	Flat																																		
		Other Canted																																					
T0.5 Ballast Condition	Right Rail	Single Shoulder		Double Shoulder	Flat																																		
		Other Canted																																					
T0.5 Ballast Condition	Good	Fair	Poor	Other _____																																			

TRACK AT DERAILMENT POINT - 2

LEFT RAIL	T11.1 Type	Welded Type of Weld _____			
		Insulated	Not insulated		
	T11.2 Section	(eg. 136RE)			
	T11.3 Mill/Year				
	T11.4 Profile	New	Worn (Attach profile)		
	T11.5 Gage Face	Dry Clean	Smooth Rough	Lubricated Lipped	Contaminated Hash Marks
	T11.6 Gage Face Angle	degrees			
	T11.7 Nominal Cant	(e.g. 1:40)			
	T11.8 Lubrication	Tribometer Reading	Top	Gage Face	
	Type				
	Distance applied prior to point of derailment			ft.	

Right Rail	T12.1 Type	Welded Type of Weld _____	Jointed Insulated Not insulated		
	T12.2 Section	(eg. 136RE)			
	T12.3 Mill/Year				
	T12.4 Profile	New	Worn (Attach profile)		
	T12.5 Gage Face	Dry Clean	Smooth Rough	Lubricated Lipped	Contaminated Hash Marks
	T12.6 Gage Face Angle	degrees			
	T12.7 Nominal Cant	(e.g. 1:40)			
	T12.8 Lubrication	Tribometer Reading	Top	Gage Face	
		Type			
	Distance applied prior to point of derailment			ft.	

TRACK AT DERAILMENT POINT - 3

T13	General Comments	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 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.
-----	-------------------------	--

TRACK AT DERAILMENT POINT - 4**TURNOUT INFORMATION (If derailment occurred on a turnout)**

T14 Train Route (circle two)	Straight Trailing	Diverging Facing
T15 Location (Specify location of point of derailment in turnout relative to either Point of Switch (POS) or Point of Frog (POF) (e.g. six feet past POS on curved stock rail))		
T16 Type	Frog Number _____ Symmetrical Tangential	Curved Asymmetrical Straight
T17 Type of Switch Point	Undercut Housed Straight Other:	Housetop Curved
T18 Type of Frog	Number _____ Self Guarded	Straight Curved Movable Point
T19 Turnout Comments		

EQUIPMENT - 1

Vehicle Data Sheet

NOTE: 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	Vehicle Type		
E2	Propulsion System		
E3	Minimum Design Curve Radius		feet
E4	Nominal Coupler Swing (Side-to-Side)		degrees
E5	Distance from Coupler Pivot to Pulling Face		inches
E6	Distance from Coupler Pivot to Coupler Pocket Exit		inches
E7	Width of Coupler Shank		inches
E8	Truck Type		
E9	Truck Wheel Base		inches
E10	Primary Suspension Type		
E11	Nominal Wheel Diameter		inches
E12	Truck Swing Pivot	A-end B-end	(deg.)
E13	Design Wheel Unloading		percent
E14	Truck Mounted Lubricators	Flange Tread	None
E15	Equipment Sketch (Use this block to sketch the equipment axle/wheel configuration, showing the B/F and A end and the direction of travel)		

EQUIPMENT - 2 - Vehicle**(Fill out separate sheet for vehicle suspected of contributing to the derailment)**

NOTE: All couplers and trucks on all derailed vehicles must be inspected. The coupler on the vehicles not derailed, but immediately adjacent to the derailed vehicles must also be inspected.

E16 Vehicle No.		A end			
E17 Vehicle End Derailed (check appropriate blocks)					
E18 COUPLERS					
E18.1 Coupler Inspection (check blocks when complete)					
F18.2 Damage		OK		OK	
F18.3 Swing		OK		OK	
F18.4 Pocket Damage		OK		OK	
E18.5 Stop Clearance		L/S	R/S	L/S	R/S
E19 TRUCKS					
E19.1 Trucks Derailed (check appropriate blocks)					
E19.2 Serial Numbers					
F19.3 Primary Suspension Condition		OK		OK	
F19.4 Leveling Valve Configuration		(1)	(2)	(1)	(2)
F19.5 Air Springs		L/S	R/S	L/S	R/S
F19.6 Side Bearing Clearance		L/S	R/S	L/S	R/S
E19.7 Center Bearing Condition		OK		OK	
E19.8 Pedestal Liner Condition		OK		OK	
E19.9 Last Overhaul Date (month/year)					
E20 Equipment Remarks Note defects for all items not checked OK above.					

EQUIPMENT - 3 - Derailed Wheels

E21 Profile Standard	AAR-1BWF AAR-1BNF Other											
E21 Fill out the following information for each wheel suspected as contributing to the derailment. Measure the current profile of each wheel and attach to this form.												
F22 Car Road No.												
E23 Position	R1	L1	R2	L2	R3	L3	R4	L4	R5	L5	R6	L6
E24 Tape Size (in.)												
E25 Class												
E26 Tread Wear												
E27 Flange Wear												
E28 Witness Groove New												
Flange Surface												
Flange Angle												
Back-to-Back Wheel Spacing												
Miles/Months Since Truing/ Change out												
Location of Last Truing												
Machine and Cutter model												

ADDITIONAL REMARKS

R1 SIGNIFICANT CONSEQUENCES	
R2 SIMILAR OCCURRENCES	refer to other reports
R3 REPORTED CAUSE	
R4 ATTACHMENTS	(Each Car Sheet for 2 trucks, 6 axles, 12 wheels, 2 couplers) Track Notes

Annex B**(informative)****DERAILMENT INVESTIGATION FORM INSTRUCTIONS****DERAILMENT FORM**

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 sheets
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	Circle all items that are appropriate (<i>wet, rain, windy, etc</i>)
W2	Temperature	Outside temperature (°F)

OPERATIONAL SCENARIO - 1

Line No	Title	Instruction
O1	Location	Circle all items which 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	What was Power setting? a) Notch or b) Amps
O3.2	Brake	a) If brakes were applied how were they applied? Service brake or emergency brake? Was blended brake active?
		b) If emergency brake, indicate how initiated: by conductors valve, penalty or emergency handle.
		C) amount of brake cylinder pressure for air brake or/and notch or amps for dynamic brake
O4	Circumstance	Indicate the move circumstance, was it in service routine or was it going to the shop or a movement in the yard, etc,
O5	Direction of Travel	Circle the train movement direction by time table direction
O6	Consist	In each block list the individual vehicles in the consist by road number in the direction of travel. Circle the derailed vehicles. For long trains ensure the derailed cars and three cars 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)

OPERATIONAL SCENARIO - 1 (*CONTINUED*)

Line No	Title	Instruction
O7	Derailed Vehicle Information	
O7.1	Vehicle Number	Vehicle road number
O7.2	Vehicle Type	Vehicle type (<i>A/p-44 loco or comet II cab car, etc</i>)
O7.3	Total Trucks	Total trucks in the vehicle
O7.4	Total Axles	Total axles in the vehicle
O7.5	No. Of Derailed Trucks	Number of derailed trucks in each vehicle
O7.6	No. of Derailed Axles	Number of derailed axles in each vehicle
O7.7	Derailed Wheels	Note which wheels derailed using the convention contained in item E15.

OPERATIONAL SCENARIO - 2

Line No	Title	Instruction
O8	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, and broken equipment found trackside, track at point of derailments, ties, etc.

TRACK AT DERAILMENT POINT - 1

Line No	Title	Instruction
T1	Track Notes	Attach a copy of the track notes. Enter Mid-ordinate, loaded gage, and crosslevel measured at 5-ft intervals about two car length past point of the derailment and four car lengths before 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, or 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 15'6" 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	Put grade and direction in the appropriate boxes
T7	Gage	Measured track gage
T7.1	Unloaded	Unloaded track gage
T7.2	Loaded	Track gage under load (specify load, rerailer, crane, etc.)
T7.3	Method	Method used for loaded gage measurement (<i>LTLF, estimated, track geometry car, etc.</i>)
T8	FRA Class	Circle FRA Track Class
T9	Electrification	If the track is electrified and the vehicles involved use electricity for propulsion then, for 3rd Rail electrification: provide sketch of third rail configuration at least two train lengths before and after derailment point paying particular attention to gap locations. For Catenary system provide sketch of catenary configuration at least two train lengths before and after derailment point paying particular attention to air gap & phase break locations.

TRACK AT DERAILMENT POINT - 1 (CONTINUED)

Line No	Title	Instruction		
T10	Ties			
T10.	Type	Note type of ties (<i>wood, concrete, etc</i>)		
1				
T10.	Condition	New	New tie	
2		Good	seasoned	
		Fair	plate cutting	
		Poor	poor lateral and vertical support	
T10.	Fastener	Note fastener manufacture and type (<i>Cut Spike, Pandrol</i>)		
3				
T10.	Tie Plates	For left and right rail circle all the items that are appropriate to de-scribe the tie plates. (<i>Double shoulder, canted, none</i>)		
4				
T10.	Ballast Condition	Good	Good, clean ballast	
5		Fair	Good ballast mixed with fine material	
		Poor	ballast with lots of fine and mud pumping	
		Other	no ballast, road crossing, etc	

TRACK AT DERAILMENT POINT - 2

Line No	Title	Instruction		
T11	Left Rail			
T11.	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.		
1				
T11.	Section	Note the rail size and section (<i>eg 136RE</i>)		
2				
T11.	Mill/Year	Note the Roll year and manufacturer as stamped on the rail		
3				
T11.	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.		
4				
T11.	Gage Face	Circle all items appropriate to describe the gage face of the rail (<i>dry, clean, rough, etc</i>)		
5				
T11.	Gage Face Angle	Measured gage face angle.		
6				
T11.	Nominal Cant	Nominal design rail cant		
7				
T11.	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.		
8				

TRACK AT DERAILMENT POINT - 2 (CONTINUED)

Line No	Title	Instruction
T12	Right Rail	
T12.	Type	If a 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.
1		
T12.	Section	Note the rail size and section (<i>e.g. 136RE</i>)
2		
T12.	Mill/Year	Note the Roll year manufacturer as stamped on the rail
3		
T12.	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.
4		
T12.	Gage Face	Circle all items appropriate to describe the gage face of the rail (<i>dry, clean, rough, etc</i>)
5		
T12.	Gage Face Angle	Measured gage face angle.
6		
T12.	Nominal Cant	Nominal design rail cant
7		
T12.	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.
8		

TRACK AT DERAILMENT POINT - 3

Line No	Title	Instruction
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 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
	5.1.1.1 Track Derailment	at Point 4

Line No	Title	Instruction
T14	Train Route	Note the train movement through the turnout (<i>Facing straight move</i>)
T15	Location	Specify location of point of derailment (POD) in turnout relative to either Point of Switch (POS) or Point of Frog (POF) also indicate distance between POF and POS. (e.g. six feet past POS on curved stock rail)
T16	Type	Include all information defining the turnout. Like 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. Circle all that are appropriate.
T18	Type of Frog	Note frog number and circle all appropriate items.
T19	Turnout Comments	Any comments about the turnout and condition of turnout or switch.

EQUIPMENT-1

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 parameters. 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? E1, E2, etc.
E2	Propulsion System	What is the propulsion system for this car? Diesel? Catenary? etc.
E3	Minimum Design Curve Radius	What is the minimum design curve radius for this car ? (from vehicle specifications)
E4	Nominal Coupler Swing	What is the nominal angle that coupler can swing from side to side?
E5	Distance from Coupler Pivot to Pulling Face	Give the distance from coupler pivot to pulling face.
E6	Distance from Coupler Pivot to Coupler Pocket Exit	Give the distance from coupler pivot to coupler pocket exit.
E7	Width of Coupler Shank	What is the width of coupler shank?
E8	Truck Type	What is truck type? GSI ? Pioneer? etc.

Line No	Title	Instruction
E9	Truck Wheel Base	What is truck wheel base in inches?
E10	Primary Suspension Type	What is primary suspension type for this truck?(eq. Coil spring, chevron, equalizer, metal-metal, etc)
E11	Nominal Wheel Diameter	Give nominal wheel diameter .
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	Circle 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.

EQUIPMENT-2

Vehicle

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

Line No	Title	Instruction
E16	Vehicle No.	Enter the railroad vehicle road number
E17	Vehicle End Derailed	Check the appropriate column(A/end or B/end or both) to indicate the car end which derailed
E18	COUPLERS	
E18.1	Coupler Inspection	Check the appropriate column 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, note all defects in the "Equipment Remarks" section.
E18.3	Swing	Verify that 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.

Line No	Title	Instruction
E19	TRUCKS	
E19.1	Trucks Derailed	Check appropriate column (A/end or B/end, or both) to indicate all trucks derailed on the car.
E19.2	Serial Numbers	Enter the derailed truck frame serial number. It is stamped into truck frame I.D. plate. If plate is not installed, 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 which would inhibit journal housing travel and check if OK. If not OK, note all defects in the "Equipment Remarks" section.
E19.9	Last Overhaul Date	Enter derailed truck new or overhaul date from truck I.D. plate or maintenance records.
E20	Equipment Remarks	Enter a description of all defects for items not checked as OK.

EQUIPMENT-3**Derailed Wheels**

Line No	Title	Instruction
E21	Profile Standard	Circle the appropriate wheel profile or note other profile used by the railroad.
E22	Car Road Number	Enter the derailed vehicle road number.
E23	Position	Enter the wheel position numbers to label the top of each column. Wheels are numbered L-1 through L-6 and R-1 through R6 counting from the B (or F) end of the car.
E24	Tape Size	Enter the tape size of all wheels.
E25	Class	Enter the class designation of all wheels. It is a single capital letter stamped in the wheel hub front face.(A, B, L, etc.)
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 (dry, rough, smooth, lubricated, scored, hash marks, etc.)
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/Change out	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.

ADDITIONAL REMARKS

Line No	Title	Instruction
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)