NATIONAL TRANSPORTATION SAFETY BOARD

Office of Railroad, Pipeline and Hazardous Materials Investigations
Washington, DC

TRACK & ENGINEERING FACTUAL REPORT

DCA17MR007

Union Pacific Railroad, Derailment with Hazardous Materials Release and Fire

Graettinger, Iowa
March 10, 2017

Accident

NTSB Accident Number:	DCA17MR007
Date of Accident:	March 10, 2017
Time of Accident:	12:50 a.m. (CST)
Railroad Owner:	Union Pacific
Train Operator:	Union Pacific
Type of Train and No:	Unit Ethanol Train, UEGKOT-09
Crew Members:	1 Engineer, 1 Conductor
Location of Accident:	Graettinger, IA

Track Group

Robert Joe Gordon
National Transportation Safety Board
Group Chairman/Railroad Accident Investigator

Mr. Tom Brown
Federal Railroad Administration—Region 6
Railroad Safety Inspector (Track)

Mr. Tim Sandusky
Iowa Department of Transportation
Rail Safety Investigator (Track)

Mr. Roy Morrison
Brotherhood of Maintenance of Way Employes Division

Mr. James “Butch” Moeller
Union Pacific Railroad
General Director of Maintenance of Way
Northern Region

Accident Summary

For a summary of this accident, refer to the *Accident Summary* report within this docket, DCA17MR007.

Accident Overview

Figure 1. Aerial view of accident site. (NTSB Photo)

Track Description

This portion of the Union Pacific Railroad (UP), the Estherville subdivision, consists of single main track between milepost 0.0 and milepost 79.3 with one passing siding. The subdivision originates in Goldfield, Iowa and ends in Superior, Iowa. The subdivision's average daily train count is one train every other day. During the on-scene

phase of the investigation, investigators reviewed tonnage records for the Estherville subdivision from milepost 48.49 to 70.56. According to records provided by UP the million-gross tonnage (MGT) was documented at 2.4 MGT.

The eastbound movements would traverse a grade ranging from +1.5 to -1.14 percent beginning at milepost 79.3 to milepost 56.45. From milepost 56.85 to the point of derailment (POD) at 56.80, an eastbound train was on a slightly descending grade of -0.2 percent. In the accident location, the track alignment was tangent.

UP inspects and maintains the main track on this portion of the Estherville Subdivision according to Federal Railroad Administration (FRA) Track Safety Standards (TSS) for Class 3 track, which allows for a maximum operating speed of 40 mph for freight trains and 60 mph for passenger trains; however, UP at the time of the accident restricted their freight train movements to a maximum operating speed of 30 mph or lower. UP does not operate any passenger trains on the Estherville Subdivision.

The accident train, UP train UEGKOT 09, was a unit train and "key train" with 3 locomotives (configured as 2 x 1, distributed power), two buffer cars and a total of 98 loaded tank cars containing ethanol which is designated by the U.S. Department of Transportation (DOT) as a Class 3 hazardous material.[1] The UEGKOT 09 was also classified as a high hazard flammable train.[2] However, the Estherville Subdivision, does

[1] Definition of "key train" is provided by Association of American Railroads (AAR) publication OT-55-O, Recommended Railroad Operating Practices for Transportation of Hazardous Materials, January 27, 2015. "Key trains" have speed restrictions and other operating criteria."; See 49 CFR 172.101, Purpose and Use of Hazardous Materials Table.

[2] In accordance with final rules HM-251 and HM-251C, carriers that operate high hazard flammable trains must perform a routing analysis that considers, at a minimum, 27 safety and security factors and select a route based on its findings. Additional requirements such as speed restrictions and enhanced braking systems also

not meet the definition of a Key Route as defined in the Association of American Railroads Circular OT-55-O.[3] Key routes are subject to increased track and wayside bearing inspection.

Significant track structure damage in the immediate area of the derailment prevented detailed inspection of an intact track structure in the disturbed track area. During post-accident observations by investigators, it was noted that the track construction consisted of 90 pound, continuously welded rail (CWR), manufactured by various companies.[4] The CWR was seated in ten-inch single shoulder tie plates that lay between the bottom surface of the rail and the top surface of timber crossties. The rail was fastened through the tie plates to standard wooden crossties with conventional six inch cut track spikes. The spiking pattern used by UP prior to the derailment consisted of one rail-holding spike on the gage side and one rail holding spike on the field side. The crossties measured 9-inches by 7-inches by 8-feet 6-inch long, spaced 19.5 inches on center (nominal). The crossties were box anchored with rail anchors every other tie to restrain longitudinal movement of the CWR.[5] The track was supported by granite and limestone rock ballast.

apply.

[3] According to AAR Circular OT-55-O, a Key Route is any track with a combination of 10,000 car loads or intermodal portable tank loads of hazardous materials, or a combination of 4,000 car loadings of PIH or TIH (Hazard zone A, B, C, or D), anhydrous ammonia, flammable gas, Class 1.1 or 1.2 explosives, environmentally sensitive chemicals, Spent Nuclear Fuel (SNF), and High Level Radioactive Waste HLRW) over a period of one year.

[4] Continuous welded rail (CWR) means rail that has been welded together into lengths exceeding 400 feet.

[5] "Box Anchored" is a railroad terminology that means that each rail is affixed with two rail anchors at a given crosstie location and that those anchors (4 per crosstie) would bear on the sides of a crosstie in order to restrict the potential longitudinal movement of the rail; "Rail anchor" means those devices, which are attached to the rail and bear against the side of the crosstie to control longitudinal movement. Certain types of rail fasteners also act as rail anchors and control rail movement by exerting a downward clamping force on the upper surface of the rail base.

Railroad Bridge

Spanning Jack Creek was an eleven span, timber, open deck bridge that measured 152 feet long. The bridge was destroyed by the derailment and ensuing fire.

Figure 2. Bridge 56.72, spanning Jack Creek. Photo shows the bridge deck of the open deck bridge (UP Historical Photo)

Figure 3. Bridge 56.72, spanning Jack Creek. View of the open deck bridge substructure (UP Historical Photo)

According to UP documentation this bridge was last inspected on October 11, 2016. The inspection record shows that the bridge was built in 1937, the bridge deck ties were replaced in 1970. No exceptions were noted during this inspection. The UP bridge inspector did provide a comment on the report noting insufficient ballast on the approach to the bridge as follows: high end, first tie off of bridge hanging 2 ½".[6]

Figure 4. Jack Creek bridge destroyed as a result of the derailment and ensuing fire.

Point of Derailment and Rail Reconstruction Project

While on-scene investigators established the POD to be near MP 56.8 on the ballasted portion of track on the west approach of the bridge spanning Jack Creek based

[6] The bridge inspector's comment on the report indicated the high end of the bridge. During his interview with investigators, it was confirmed that the high end referred to the west end approach.

upon the amount of damage to the rail infrastructure and the resting location of the tank cars.

As part of this investigation, this technical working group began a project to recover, identify, and reconstruct the rails from the west approach and across the bridge spanning Jack Creek.[7] The total displaced rail measured about 400 feet on the north rail and south rails. The group recovered approximately 385 feet of the south rail and approximately 391 feet on the north rail. This rail was identified by manufacturer, manufacture dates, and rail fracture characteristics and was pieced back together to identify the first area of discontinuity. An inventory of all the recovered rail was made. The north and south rail pieces were labeled in sequential order, starting from the west and progressing east through the accident area.

[7] For more information, refer to the Materials Laboratory Factual Report-17-050 in this accident docket, DCA17MR007.

Figure 5-Photograph of rail rebuild.

While on scene, investigators inspected the non-derailed cars (1st through the 20th cars). Several wheels on the south side of the train exhibited fresh horizontal marks on the wheel tread (e.g. marks perpendicular to the wheel tread). Investigators did not observe any marks on the wheels that traveled over the north rail.[8] When a wheel of railroad rolling stock contacts a discontinuity in a rail, often perpendicular marks are left on the wheel tread; these marks are referred to as witness marks. These witness marks led members of the Track and Engineering group to focus on the south rail when trying to identify a

[8] For more information, refer to the Mechanical Group Factual Report in this accident docket, DCA17MR007.

discontinuity in the rail. As with the witness marks on the wheels, when a rolling stock wheel encounters a discontinuity in the rail, the rail ends can become disfigured. This disfiguration is referred to as rail end batter. Consistent with the direction of travel, this rail end batter is referred to as departing batter, or receiving batter. Investigators were unable to recover any pieces of rail that displayed definitive damage indicative of wheel departure or reception.

In the area of the derailment the 90-pound rails were manufactured by Inland Steel Company and Illinois Steel Company. The majority of the rail was manufactured between 1925 and 1930; one rail section was manufactured in 1937; and another section was manufactured in 1957. Several pieces of rail from the derailment site were labeled and sent to the NTSB Materials Lab for group examination. From the north rail, those pieces were 10N, 11N, 12N, 13N, 14N, 15N, 16N, and 17N. From the south rail, the pieces sent were 4S, 5S, and 10S, with sections of 3S and 6S torch cut away from the larger fragments.

The rail piece 10S measured 3 feet, 4 inches. This piece exhibited a fracture surface on the west side of the rail consisting of transverse and vertical components. Head batter was also present on this fracture.

Damages Estimates

UP engineering personnel conveyed that the initial damage estimates for engineering damages were $2,410,940. UP installed 15 track panels at the POD on the main track where the track damages required total renewal. The bridge structure spanning Jack Creek was replaced. This estimate included costs for the installation of 15 track panels, associated ballast and on-track materials and renewal of the CWR, and the

replacement of the bridge structure spanning Jack Creek.[9] The UP opted to replace the destroyed 152' bridge with a bridge measuring 180'. This estimate does not include additional costs associated with train equipment and environmental remediation efforts.

Post-Accident Inspection and Testing of Track

On March 10, 2017, an FRA track safety inspector accompanied by a UP representative conducted a hi-rail inspection from MP 49.09 to MP 69.34 on both sides of the derailment area to assess the overall condition of the track. This inspection was also conducted to identify any additional broken rails that could have occurred under the derailing train prior to the point of derailment. No broken rails were found during this inspection. Track from MP 54.53 to MP 49.09 (east of the derailment), and track from MP 58.0 to MP 69.34 (west of the derailment) was inspected. MP 54.53 to MP 58.0 was not inspected because of equipment occupying the track and the derailment equipment. Overall track conditions were as follows: 90lb CWR rail, rail anchoring was consistent with no longitudinal movement noted, track surface was fair for intended FRA Class 3 track, no gage issues were identified, and the tie condition was reported as poor in many areas.

On March 11, 2017, investigators conducted a walking inspection from MP 57.10 to MP 56.35, this inspection was conducted up to the disturbed track and the derailed rail cars on both sides of the accident bridge. The FRA inspectors completed an inspection report showing seven defects identified; the identified deviations from FRA standards included: four crosstie distribution defects, one insufficient number of crossties in a rail segment, one rail fastener defect, and one concentrated load between the base of rail and

[9] UP uses pre-built 40-foot track panels.

tie plate. This walking inspection found the overall surface condition to be fair. Periodic gage measurements were taken on both tangent track and the curve east of the derailment with no gage defects found. There were no rail joints in this track segment and no exceptions were taken to the rail anchoring; no longitudinal movement noticed in either direction. The FRA inspector noted that the tie condition on this track segment was poor in many areas.

In the area of the derailment, the track structure was misaligned as a result of derailment forces. Investigators took gage measurements, observed track alignment, and measured track surface leading into the disturbed track. No exceptions were taken to the track geometry in the track segment from MP 57.10 into the derailment area. Investigators noted profile conditions ranging from ¾ inch to 1- ¼ inches in the areas with defective crossties.

Figure 6. Split, broken crossties not holding fasteners in the track immediately west of the accident area near MP 56.9. (NTSB Photo)

Figure 7. Split, broken crossties not holding fasteners in the track west of the accident area near MP 56.9. (NTSB Photo)

Track Geometry Tests

UP conducted a survey with a track geometry car once per year on the Estherville subdivision. The last geometry survey through the area of the derailment was conducted on August 15, 2016. No geometry conditions or deviation from FRA minimum standards were identified between MP 54.16 and MP 57.64, this includes the derailment footprint. The FRA had not conducted a survey using test vehicles from the Automated Track Inspection Program (ATIP) on the UP-Estherville subdivision.

Internal Rail Tests

UP provided the last two ultrasonic rail test reports for the Estherville subdivision. The most recent test through the accident area was conducted on May 24, 2016. One

defective rail condition was identified between MP 50.25 and MP 61.12. At MP 56.54 a defective plant weld was identified. UP installed a replacement rail on May 27, 2016.

The previous ultrasonic rail test conducted through the area of the derailment occurred on July 14, 2015. The report showed that no defective rails were identified between MP 48.84 and MP 61.25; this includes the footprint of the derailment.

UP Track Inspections

As part of the accident investigation, a qualified FRA track safety inspector reviewed UP's track inspection records to determine compliance with FRA regulations. The track inspection records from July 1, 2016 to March 9, 2017, from milepost 0.0 to milepost 78.46 on the Estherville Subdivision were reviewed.

FRA regulations found in 49 CFR Part 213 require that a rail carrier's track inspection records be prepared and signed on the day of the inspection for frequency of compliance with the FRA TSS. FRA track inspection records are required to reflect actual field conditions and deviations from the FRA/TSS. UP elected to operate at FRA Class 3 speeds requiring UP's personnel to inspect the main track at least once per calendar week.

Main track inspection frequencies were met on the segment through the derailment footprint requiring weekly inspections, while the segment requiring two inspections weekly was met every week except between February 19 – 25, when only one inspection was made. All weekly siding inspection frequencies were met. Although the Estherville subdivision did not meet the definition of a Key Route, as mentioned above, UP had

increased the frequency of track inspections on the subdivision from once a week to twice a week under the Compliance Agreement with the FRA (See factual discussion below).

Review of UP track inspection records also showed that the UP-track inspectors had documented marginal tie conditions between Emmetsburg, Iowa, MP 44.5 and Superior, Iowa, MP 78.4. The inspector documented 49 locations with defective tie condition between July 1, 2016 and November 4, 2016.

The track in the area of the derailment was last inspected on March 9, 2017, by a qualified UP track inspector. The track inspection record noted two defects between milepost 48.49 to milepost 78.46, an area that includes the derailment footprint. The two recorded defects were at rail joints that had less than two bolts per rail end on CWR. These defective conditions were not near the accident area and were repaired before traffic. This inspection was the last movement over the track area before the accident.

FRA/UP Compliance Agreement

Under 49 CFR Part 209, the FRA has many enforcement options available including civil penalties, criminal penalties, compliance orders, and emergency safety orders. In response to a June 2016, UP high hazard flammable train derailment in Mosier, Oregon, the UP entered into a compliance agreement with the FRA. The compliance agreement was signed on December 22, 2016. This compliance agreement required the UP agree to remedial actions to improve compliance with 49 CFR Part 213, and other safety requirements. A selection of those terms appears below:[10]

[10] A complete copy of the compliance agreement appears in NTSB docket DCA17MR007.

- Inventory curves with specified track components
- Increase walking or Gage Restraint Measurement System (GRMS) inspections of track with specified physical characteristics
- Implement a program to eliminate elastic fasteners utilizing lag screws to secure tie plates
- Implement increased track inspections

Because of the compliance agreement, the UP was required to conduct hi-rail or walking track inspections of the Estherville subdivision twice weekly, conduct track geometry car inspections at least three times per year, conduct ultrasonic rail testing at least two times per year, and conduct GRMS testing at least once per year.

Employee Interviews

Investigators interviewed UP employees responsible for the inspection and maintenance of the Estherville subdivision as part of the investigation. A summary of those interviews appears below.

Manager of Track Maintenance

The Manager of Track Maintenance (MTM) had been a manager for UP in this area for more than 20 years. At the time of the accident, he was responsible for the track maintenance on about 350 miles of track. This includes main track, branch lines, industrial leads, and yard tracks. The MTM supervises 15 track department personnel; utilizing this group of employees to maintain the assigned track.

The MTM told investigators that from MP 0 to MP 32.2 on the Estherville Subdivision, the UP had laid larger rail section about 10 to 12 years ago. He stated that

"part of the Estherville Sub is in pretty decent shape". During the interview investigators discovered that a high percentage (about 90%) of rail defects are discovered in the section of the subdivision with 90 lb. rail. He said that they weren't experiencing many service failures (broken rails) in the accident area, and that they hadn't had a derailment in the area in over 20 years prior to this accident. When asked about bridge inspections the MTM stated that he doesn't see reports from those inspections.

Track Inspector

The Track Inspector for the Estherville Subdivision had over 40 years of service with the UP; he had been a track inspector for about 34 years. He had been inspecting the Estherville Subdivision for about 25 years. He was assigned a territory that consisted of about 185 miles of main track. In addition to this main track, he inspects over 100 track switches and different yard and industry tracks. He normally inspects alone, with the exception being that he is occasionally accompanied by an FRA inspector or railroad manager.

Because of the compliance agreement between the FRA and the UP, the number of required inspections changed in December 2016. Now the entire 185 miles is required to be inspected twice weekly and according to the track inspector "so my territory basically doubled". When asked if he had anyone helping with the extra inspections, he stated that a section foreman was "kind of helping out a little bit until we get it figured out". Due to the increased frequency requirement, sometimes he will inspect about 80 miles of track in one day. He inspects track primarily from a hi-rail vehicle; and works on average 50 to 55 hours per week. He typically inspects at a speed of about 20 mph. When asked if the quality of

his inspections had been impacted by the increased frequency requirements he said, “I like to think no, but they might have a little”.

He was the last qualified inspector to traverse the track prior to the accident; this inspection occurred the day before the accident. He took no exception to the track in the area of the derailment. He said that the track in the area of the accident was an area of concern for him because of the 90 pound rail and condition of the ties, but he said it was not his biggest area of concern in all of his territory. He had larger concern over the jointed 90 pound rail in the Tara subdivision where there was higher traffic. The only issue that he remembered in the area [of the derailment] during his many years of inspection was a broken rail west of the bridge. He said that he has not had to issue speed restrictions for track conditions in the accident area recently. When asked about his interaction with the bridge inspectors, he stated that he does not normally join the bridge inspectors when they are conducting their work.

Section Foreman

The Section Foreman was qualified to conduct track inspection by the UP. He had been inspecting when needed to assist the regular track inspector. He recalled that his last inspection through the accident area was about a week before the accident, and that he took no exception to the track condition in the area. He said that he is familiar with UP and FRA standards and called the regular track inspector if he had any questions.

Bridge Inspector

The Bridge Inspector had been employed by UP since 2004. He had been in the bridge department the entire time and started inspecting bridges in 2008. He is assigned to

inspect about 425 bridges and between 180 and 200 culverts. He explained the bridge inspection frequency and process. He said that the accident bridge is inspected twice per year and was last inspected in October of 2016. He said that the bridge over Jack Creek was built in 1937. He described the bridge as being in good condition and that it was not a bridge of concern. He had conducted the last inspection and discussed his findings from that inspection with investigators. During the October 2016 inspection, he had noted a condition off of the west end of the bridge he described as a gap under the tie with ballast churned up in the area. He said that during that inspection “it wasn’t an issue”. He said that if he found a defective condition he would notify the track department and that he is able to protect the track by placing a speed restriction on the track.

Regulatory Oversight

The FRA's Office of Railroad Safety regulates safety throughout the Nation's railroad industry. To carry out its mission, FRA staff includes about 400 Federal safety inspectors who operate out of eight regional offices. Railroads that are part of the general system in the state of Iowa are overseen by FRA Region 6, headquartered in Kansas City, Missouri. In addition to federal inspectors, the state of Iowa Department of Transportation has inspectors that work in conjunction with FRA staff. Safety inspectors focus primarily on five safety disciplines when conducting inspections for compliance and enforcement; those disciplines are:

- Hazardous Materials
- Motive Power and Equipment
- Operating Practices

•Signal and Train Control

•Track

FRA Region 6 personnel are responsible for the oversight of the general railroad system operating in the following states:

- Colorado
- Iowa
- Kansas
- Missouri
- Nebraska
- Wyoming (South East)
- Illinois (South)

Track inspections in Region 6 are carried out using a staff of 16 safety inspectors:10 FRA inspectors, 2 Iowa state inspectors, 2 Missouri state inspectors and 2 Illinois state inspectors.

FRA track inspection records from 2015 through the day of the accident were reviewed. The last inspection by an FRA Safety Inspector through the derailment area was conducted on December 13, 2016.[11] This inspection report noted no defective conditions; however, a comment stating that the track was snow covered during the inspection was provided. The comment also documented a discussion of marginal tie condition between

[11] 49 Code of Federal Regulation 209.03 defines an FRA Safety Inspector as an FRA safety inspector, a state inspector participating in railroad safety investigations and surveillance activities under part 212 of this chapter, or any other official duly authorized by FRA.

Superior, IA and Emmetsburg, IA, (this includes the derailment location).

The same safety inspector conducted an inspection from MP 78.4 to MP 44.0 on August 10, 2016. The inspector documented ten locations with crossties not meeting the minimum requirements of FRA track safety standards. On this report, the following comment was provided:

> Crosstie condition marginal from MP 49 Emmetsburg to MP 78 Superior. Within this area some very marginal tie conditions exist from MP 60 Graettinger to MP 70 south end of Estherville. Numerous areas with 5-10 or more ties in a row defective or nearly so. FRA class 2 speeds exist from MP 72 to 78. FRA class 3 speeds exist from MP 72 to the worst of the marginal ties extending to MP 49. This is an ethanol route with higher risk, especially on the most marginal area for ties and it [sic] being operated at FRA class 3 speeds.

Two FRA track inspections were conducted over the subject portion of the Estherville subdivision in 2015. These inspections were conducted in March and July by different inspectors. These reports documented eleven defective conditions with nine of those being locations with defective crossties. In March 2015, one FRA inspection report contains the following comment:

> Tie condition between MP 48 and 78 is in poor condition and approaching defective condition for intend [sic] class in many areas.

In July 2015, an FRA inspector provided the following comment on an FRA inspection report:

From MP 70 to MP 49 tie condition is marginal for the FRA class of track being operated in areas. Many areas where these ties are very close to the end of their life and another winter cycle will most likely put these areas in noncompliance. This is also a major ethanol hauling route.

FRA Inspection and Enforcement Data

According to inspection and enforcement data obtained from the FRA, of the 42,076 track miles operated by UP in the nation, 24,390 exist in FRA Region 5 and Region 6.[12] UP operates 12,170 miles in Region 5 and 12,220 in Region 6. NTSB investigators obtained inspection and observation data from the FRA. The following table shows Fiscal Year (FY) 2016 data across both regions for inspections and observations:

Region	Inspections	Observations	Units	SubUnits	Defects	Violations
5	8,932	40,469	474,074	134,656	44,258	3,846
6	5,242	22,197	239,956	57,205	21,782	1,504

Table 1. Data on Region 5 and 6 Inspections and Observations. (FRA Enforcement Data)

From these inspections, in FY 2016, Region 6 FRA assessed 42 total civil penalties and assessed seven civil penalties against UP for deviation from FRA TSS. While in Region 5 FRA assessed 253 total civil penalties and assessed 83 civil penalties against UP for deviation from FRA TSS. Accident data specific to track related derailments provided by the FRA suggests a greater frequency in region 5 compared to region 6.

Additional information comparing accident statistics on regions 5 and 6 along with

[12] Federal Railroad Administration Fiscal Year 2016 Enforcement Report; Data provided by FRA; Track miles figure was provided by the FRA and represents all main tracks, sidings and yards.

a MGT comparison across all regions in North America was provided by the FRA. This information is included in NTSB docket DCA17MR007.

FRA Interview

The Regional Administrator (RA) for FRA Region 6 was interviewed by NTSB investigators. The RA had been employed by the FRA for about 32 years and has been in the current position for about 5 years. The interview focused primarily on the following:

- Planning of inspection activities; use of the Regional Inspection Plan (RIP) and the National Inspection Plan (NIP).
- Regional guidance given to Track Inspectors; use of enforcement tools.
- Portable Track Loading Fixtures (PTLF); to supplement visual inspections.
- The 2016 Compliance Agreement between FRA and UP.

The RA explained that both the NIP and the RIP are tools used to manage resources while conducting compliance inspections on the nation's railroads. He also told investigators that the inspection plans factor hazards when allocating resources.

When asked about guidance given to inspectors regarding the use of enforcement options; such as recommending a civil penalty be assessed against a railroad, the RA stated, "our guidance gives the inspectors flexibility, based on their judgement and the criteria that we have built into the general manual, to make decisions".

Investigators asked the RA how the 2016 FRA/UP Compliance Agreement affects the inspection activity on the UP-Estherville Subdivision. The RA answered, "It has absolutely no bearing on the Estherville Subdivision." He said that it was his understanding

that the compliance agreement applies to main track territory, not branch line territory. When asked for clarification regarding the difference between branch track and main track he said that “a branch line is usually kind of a stub end track with much lower densities”. Investigators informed the RA that the Estherville Subdivision is FRA Class 3 Track, where trains operate at up to 30 MPH and asked if class of track is considered when designating a track as branch or main track. The RA said, “not to my knowledge”.

Post-Accident Actions

On November 13, 2017, the UP officials informed investigators of the following post-accident actions on the Estherville and nearby subdivisions since the accident:

- Year to date (YTD) [2017] regional gangs have installed 8,605 cross ties since the derailment in March (4,415 on the Estherville Sub, 2,195 on the Ft. Dodge Sub, and 1,995 on the Tara Sub).
- Union Pacific's 2018 capital program, though Board Approval has not been provided as of today's date [November 13, 2017] (Board of Directors meet this week - November 15th and 16th) includes the Grain Line cross tie program (143k ties going in the Estherville, Ft. Dodge, Laurens, and Tara Subs).
- Included in the 2018 capital program, all bridge approaches on the aforementioned Subdivisions will be fortified with 10-foot approach ties.
- UP has reduced all 30mph subdivisions to 25 mph (class 2) on these Grain Lines.
- UP has reduced the portion of the 49-mph subdivision to 40 mph.
- UP has increased rail detector car test frequency on the Grain Lines from once per year to twice per year.

- UP is on plan to complete all of the requirements of the FRA Compliance Agreement by the end of the year.
    - Track Inspections generally increased per the FRA Compliance Agreement, including additional track inspectors, GRMS testing, geometry car inspections, and rail detector car inspections.
    - Specifically, UP increased track inspections on Class 3 track by one additional test per year. Mainline and siding inspections increased from twice annually to three times per year.

On November 16, 2017, FRA officials informed investigators of the following post-accident actions on the Estherville subdivision since the accident:

- FRA has conducted a comprehensive inspection of the track structure on UP's Estherville Subdivision, where the accident occurred. UP has corrected the conditions noted during that inspection.
    - UP has put on a divisional tie gang to correct the defects identified by FRA inspectors and added an additional 150 ties per mile under the 90 pound rail. As of November 2017, the UP regional gang has installed 8,605 cross ties since the derailment in March 2017. (4,415 on the Estherville Sub, 2,195 on the Ft. Dodge Sub, and 1,995 on the Tara Sub).
- FRA inspectors returned to the Estherville Subdivision in May of 2017. The inspectors conducted walking and hi-rail inspections between MP 78.4 and MP 0.0; with the only exclusion being between MP 59.0 and MP 48.59. As a result of these inspections, 58 defective track conditions were noted. Of these 58 defective conditions, 40 locations with defective crossties and 5 locations with rail fasteners

not maintaining track gage were reported. The reports included no recommendations for civil penalty as a result of these inspections.

- FRA continues to monitor UP's efforts to address the issues raised in the December 2016 Compliance Agreement related to deficiencies in UP's track inspection and maintenance programs. Because of FRA's oversight;
    - UP has increased track inspections per the Compliance Agreement. Inspections include track inspectors, GRMS testing, geometry car inspections, and rail detector car inspections.
    - UP is on schedule to complete all the requirements of the FRA Compliance Agreement by the end of the year.
- FRA has scheduled its Automated Track Inspection Program car to inspect the Estherville and surrounding subdivisions in second quarter 2018.

[END OF REPORT]