Federal Railroad Administration
Office of Railroad Safety

Accident Investigation Report
HQ-2020-1388

Union Pacific Railroad (UP)
Bancroft, Idaho, June 17, 2020

Note that 49 U.S.C. §20903 provides that no part of an accident or incident report, including this one, made by the Secretary of Transportation/Federal Railroad Administration under 49 U.S.C. §20902 may be used in a civil action for damages resulting from a matter mentioned in the report.

SYNOPSIS

On Wednesday, June 17, 2020, at approximately 8:24 p.m., MDT, a westbound Union Pacific Railroad Company, (UP) freight train, MNPPD-16 (Train 1), traveling at a recorded speed of 35 mph, derailed 31 cars on the UP Rocky Mountain Service Unit, Pocatello Subdivision near Bancroft, Idaho. Bancroft is approximately 50 miles east of Pocatello, Idaho.

The method of operation at the accident site is traffic control system (TCS) single main track. The point of derailment was at milepost (MP) 156.43. The 31 derailed cars were located at positions 34 through 64 from the head-end of the train and contained a mix of boxcars, refrigerated cars, and covered hoppers. The train consist included 105 loads, 76 empties, 13,107 feet and 15,560 tons, with 4 locomotives (two locomotives in the head end consist, one mid-train distributive power unit [DPU] and one rear DPU locomotive).

There were no injuries and the only release of hazardous materials was minimal fuel from refrigerated railroad car air conditioners. The estimated monetary damage to mechanical equipment was $3,304,202 and $495,741 to track and structures.

Weather at the time of the incident was reported as 44°F, dark and cloudy.

The Federal Railroad Administration (FRA) has concluded the probable cause of the accident was H504 -- buffing or slack action excessive, train make-up and a contributing cause H599--Other causes relating to train handling or make-up: engineer not receiving additional training prior to handling a train that substantially exceeded previous train qualifications related to the train's length and tonnage.

U.S. Department of Transportation
Federal Railroad Administration

FRA FACTUAL RAILROAD ACCIDENT REPORT

FRA File # HQ-UP-2020-0617-1388

TRAIN SUMMARY

1. Name of Railroad Operating Train #1	1a. Alphabetic Code	1b. Railroad Accident/Incident No.
Union Pacific Railroad Company	UP	0620RM027

GENERAL INFORMATION

1. Name of Railroad or Other Entity Responsible for Track Maintenance	1a. Alphabetic Code	1b. Railroad Accident/Incident No.
Union Pacific Railroad Company	UP	0620RM027

2. U.S. DOT Grade Crossing Identification Number	3. Date of Accident/Incident	4. Time of Accident/Incident
	6/17/2020	8:24 PM

5. Type of Accident/Incident
Derailment

6. Cars Carrying HAZMAT	7. HAZMAT Cars Damaged/Derailed	8. Cars Releasing HAZMAT	9. People Evacuated
10	0	0	0

10. Subdivision
UNION PACIFIC RAILROAD COMPANY - POCATELLO

11. Nearest City/Town	12. Milepost *(to nearest tenth)*	13. State Abbr.	14. County
BANCROFT	156.430	ID	CARIBOU

15. Temperature (F)	16. Visibility	17. Weather	18. Type of Track
44 °F	Dark	Cloudy	Main

19. Track Name/Number	20. FRA Track Class	21. Annual Track Density *(gross tons in millions)*	22. Time Table Direction
Single Main Track	Freight Trains-80, Passenger Trains-90	52.8	West

23. PTC Preventable	24. Primary Cause Code	25. Contributing Cause Code(s)
No	[H504] Buffing or slack action excessi	H503, H599

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OPERATING TRAIN #1

1. Type of Equipment Consist:	2. Was Equipment Attended?	3. Train Number/Symbol
Freight Train	Yes	MNPPD 16

4. Speed (recorded speed, if available)	Code	5. Trailing Tons (gross excluding power units)	6a. Remotely Controlled Locomotive? 0 = Not a remotely controlled operation 1 = Remote control portable transmitter 2 = Remote control tower operation 3 = Remote control portable transmitter - more than one remote control transmitter	Code
R - Recorded E - Estimated 35.0 MPH	R	15560		0

6. Type of Territory

Signalization: Signaled

Method of Operation/Authority for Movement: Signal Indication

Supplemental/Adjunct Codes: Q, J

7. Principal Car/Unit	a. Initial and Number	b. Position in Train	c. Loaded (yes/no)	8. If railroad employee(s) tested for drug/alcohol use, enter the number that were positive in the appropriate box	Alcohol	Drugs
(1) First Involved *(derailed, struck, etc.)*	UP 371407	34	no		0	0
(2) Causing *(if mechanical, cause reported)*				9. Was this consist transporting passengers?		No

10. Locomotive Units (Exclude EMU, DMU, and Cab Car Locomotives.)	a. Head End	Mid Train b. Manual	Mid Train c. Remote	Rear End d. Manual	Rear End e. Remote	11. Cars (Include EMU, DMU, and Cab Car Locomotives.)	Loaded a. Freight	Loaded b. Pass.	Empty c. Freight	Empty d. Pass.	e. Caboose
(1) Total in Train	2	0	1	0	1	(1) Total in Equipment Consist	105	0	76	0	0
(2) Total Derailed	0	0	0	0	0	(2) Total Derailed	1	0	30	0	0

12. Equipment Damage This Consist	13. Track, Signal, Way & Structure Damage
3304202	495741

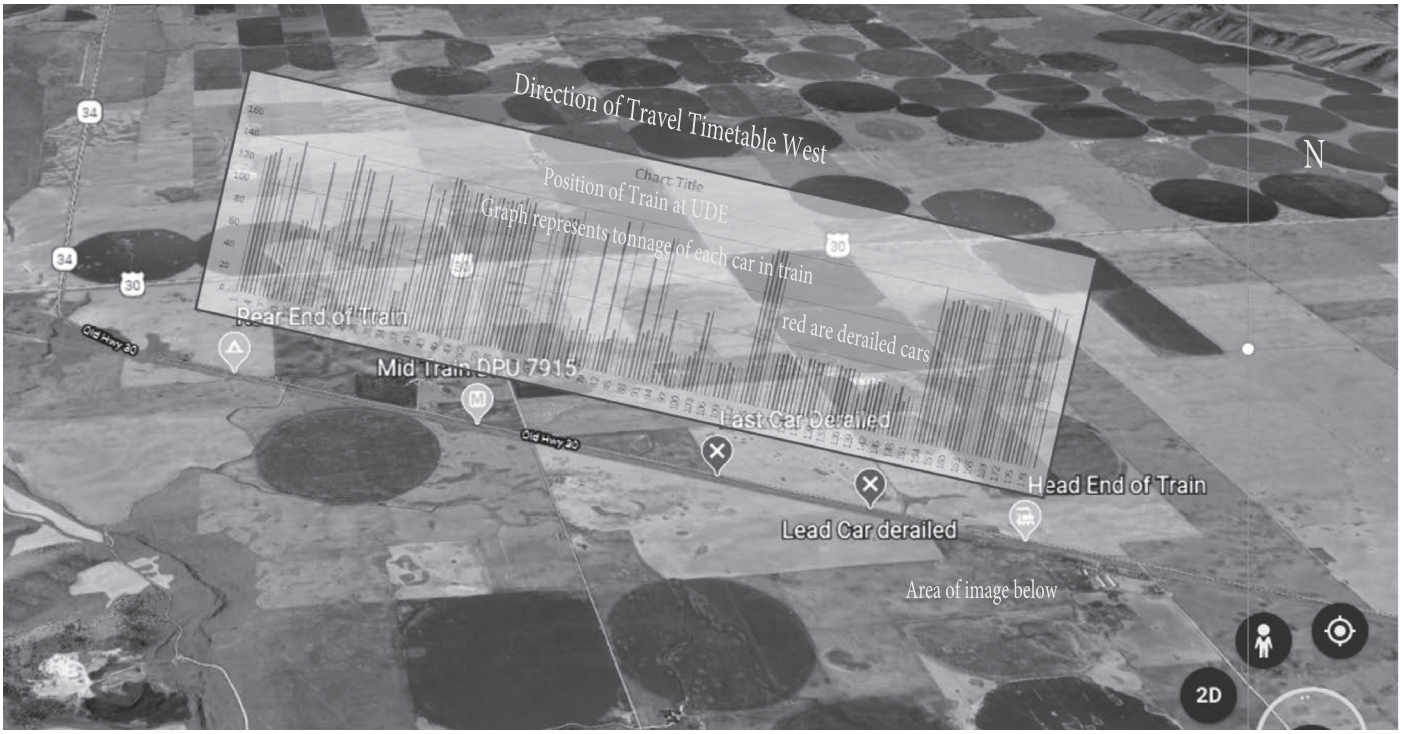
Number of Crew Members				Length of Time on Duty	
14. Engineers/Operators	15. Firemen	16. Conductors	17. Brakemen	18. Engineer/Operator	19. Conductor
1	0	1	0	Hrs: 6 Mins: 54	Hrs: 6 Mins: 54

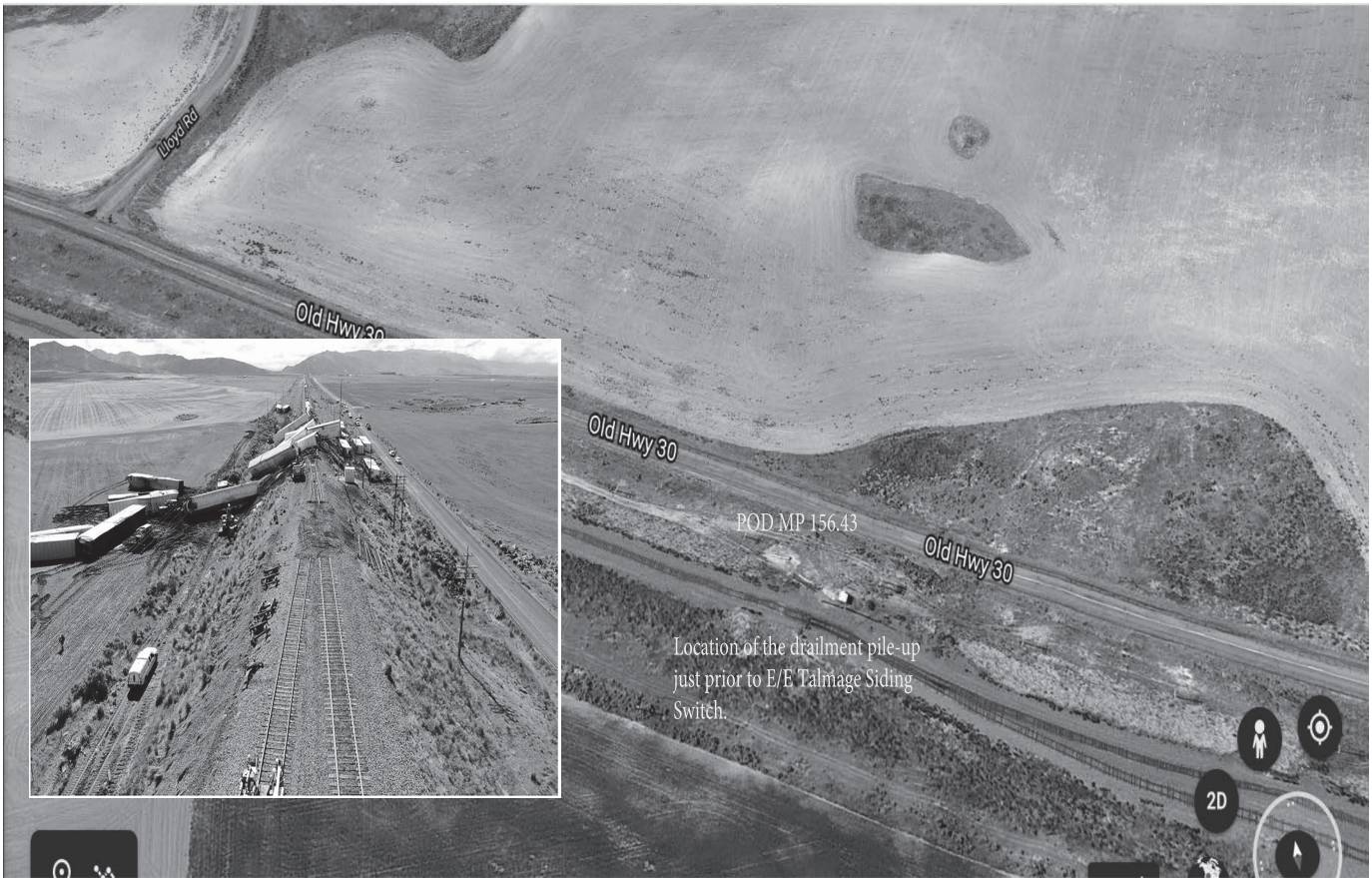
Casualties to:	20. Railroad Employees	21. Train Passengers	22. Others	23. EOT Device?	24. Was EOT Device Properly Armed?
				No	N/A
Fatal	0	0	0	25. Caboose Occupied by Crew?	No
Nonfatal	0	0	0		

26. Latitude	27. Longitude
42.670993900	-111.788400000

SKETCHES

Sketch - Sketch





NARRATIVE

For clarity and uniformity in this report, directions will be given per timetable directions for east and west, and times will be given in MDT unless otherwise indicated.

Circumstances Prior to the Accident

The MNPPD-16 originated from UP's North Platte, Nebraska, yard as a mixed manifest key train with two head end locomotives (UP 9070/6550), one mid-train DPU (UP 7915) placed between lines 118 and 119, and one rear DPU locomotive (UP 2716). The train's consist included 181 cars total with 105 loads, 76 empties, 13,107 feet, and 15,560 tons. This type of consist configuration was relatively new across this territory as UP had just recently started running these "very long trains (VLT)" in the Pocatello Subdivision. VLT is a recently coined phrase typically characterizing trains that have lengths in excess of 12,000 feet.

The train was released for shipment on June 16, 2020, at 4:17 p.m., CDT, after receiving a class I initial terminal air brake test and pre-departure mechanical inspection by qualified mechanical inspectors in North Platte. No defects were noted during this inspection on any railcars in train's consist. The train was scheduled to travel from North Platte to its destination of Portland, Oregon, with no set outs or pickups en-route. The train was equipped with Positive Train Control (PTC) and an energy management (EM) (cruise control) system for fuel conservation.

After departing from North Platte, and receiving two en-route crew changes at Cheyenne and Rawlings, Wyoming, the train arrived Green River, Wyoming on June 17, 2020, at approximately 3:27 p.m., MDT. A train crew consisting of a locomotive engineer and conductor, reported for duty on Wednesday, June 17, 2020, at 1:30 p.m., MST, at Green River. This was the crew's away from home terminal, and both had received their statutory required off-duty time. The crew was assigned to operate westbound UP train MNPPD-16 from Green River, to Pocatello. The Pocatello crew already on duty when the train arrived at UP's Green River yard, collected the necessary paperwork, including the train profile and general track bulletins and proceeded to board the train.

The engineer noted during the interview process that he did not take exception to the condition of the locomotives but mentioned the DPUs had intermittent "comm loss" prior to departing Green River. The crew, with the engineer seated at the locomotive controls and the conductor seated in the conductor's seat of the lead locomotive, departed Green River on June 17, 2020, at 3:58 p.m., MDT.

In the accident area, trains operate on single main track owned and maintained by UP. Trains operate by signal indication through a traffic control system (TCS) controlled by a UP dispatcher located in Omaha, Nebraska.

The derailment occurred at the east end of Talmage siding at MP 156.43 with a maximum track speed of 70 mph Per UP's Rocky Mountain Service Unit, Pocatello Subdivision Timetable No. 7 dated May 18, 2020. Due to speed restrictions on numerous cars throughout Train 1's consist, the maximum authorized speed of Train 1 was 50 mph, with its speed at the time of derailment 35 mph. Of the 31 cars derailed, 29 were empty railcars weighing less than 50 tons with 28 of the 29 empties equipped with end of cushioning devices.

Approaching the accident location from east traveling west on single main track starting at MP 152.04,

there are no curves in the track through the derailment site only tangent track. The grade from MP 152.04 to the derailment location is undulating descending grade. The grade at MP 152.04 to MP 153.20 changes from level grade to -1.05 percent descending grade. For about 4/10th of a mile the grade levels out (153.20-153.60) then descends -.81 percent for 3/10th of a mile (153.60-153.90). The grade from MP 153.90 to the east end of Talmage siding, MP 155.97 descends -1.07 percent, where it levels out through the accident site to MP 156.50.

Interviews conducted by the Federal Railroad Administration (FRA) revealed the trip was uneventful excluding the occasional communication loss between the head end power and mid/rear DPUs. It was also identified during the interview process and based solely on the crew statements that the train traveled from Green River with the engineer at the controls of the locomotive, however, the train had the energy management (EM) system (cruise control) engaged until the engineer took control of the train around MP 153.40 as the crew stated they encountered signal aspects less favorable than approach that would have them stopping at Control Point (CP) Bancroft.

The Accident

At approximately 8:19 p.m., as the train was negotiating the descending grade between MP 153 and MP 156, the engineer disengaged the train's EM system as the crew was on advance toward a signal at MP 157.52 displaying an approach aspect which would require the train to be prepared to stop at the next signal CP Bancroft at MP 160.5.

As the engineer disengaged the train's EM system, they synchronized the lead controlling locomotive with the mid-train DPU locomotive, as this would mirror the dynamic braking effort of the lead locomotives. This left the rear DPU locomotive fenced (independent/isolated) in power to keep the cars bunched while traversing the descending grade.

At 8:22:08 p.m., the engineer made an 8-psi automatic brake pipe reduction as the train approached a speed of 49 mph, applying the air brakes throughout the train. As the controlling locomotive slowed from 49 mph to 40 mph, the engineer released the automatic air brakes at 8:23:46 p.m. and attempted to continue the slowing of the train with the use of locomotive dynamic brakes.

At 8:24:22 p.m., and the speed of the controlling locomotive at 35 mph, the train experienced an undesired emergency (UDE) brake application and came to a complete stop by 8:25:02 p.m.

Just before the train experienced the UDE brake application, the crew stated they had experienced a slight run-in that felt like slack action. After the train went into emergency, the crew could see, using the side mirrors, that there were several cars derailed.

The crew informed the dispatcher of the situation as the conductor started walking the train to ascertain the extent of damage. The walking inspection revealed 31 pieces of railroad rolling stock, lines 34 through 64 from the head end, had derailed.

The derailment occurred at MP 156.43 on the UP's Pocatello Subdivision, between stations Talmage and Bancroft. This is a remote agricultural area approximately 50 miles east of Pocatello.

The crew was not injured, however, the accident met Title 49 Code of Federal Regulations (CFR) Part 219 applicability and the crew was transported to a local clinic for post-accident toxicology testing and then to their home terminal, Pocatello, for release from duty.

Post-Accident Investigation

On June 29, 2020, the FRA began an investigation of this accident. FRA investigators requested all

necessary event recorder downloads, dispatcher audio files, records, forms, and other documentation necessary to conduct the final analysis and conclusion concerning the facts of the accident.
The following analysis and conclusions represent the findings of the FRA investigation.

Analysis and Conclusions

Analysis Toxicological Testing: FRA Post-Accident Forensic Toxicology Result Reports indicate the employees tested had negative test results.

Conclusions: FRA determined drugs and alcohol were not a primary or contributing factor in this accident.

Analysis – Fatigue: FRA uses an overall effectiveness rate of 63 as the baseline for fatigue analysis. This is the level at which the risk of a human factors related accident is calculated to be equal to chance. Any schedule that violates the overall effectiveness rate on the date of the accident or in the days leading up to the accident are considered to be at risk of fatigue contributing to the accident. The higher the FAID score, the higher fatigue exposure. Below this baseline, fatigue is not considered as probable for an employee. Software sleep settings vary according to information obtained from each employee. If an employee does not provide sleep information, FRA uses the default software settings.

FRA obtained fatigue-related information, including work history, for all train operating employees involved in this accident. Based on the Fatigue Audit InterDyne (FAID) analysis, fatigue was not probable for any of the crew members involved in the accident.

Conclusion: FRA concluded fatigue did not contribute to the cause or severity of this accident.

Analysis - Track: The track through the accident area consisted of Continuous Welded Rail (CWR) on wood ties with a Pandrol “Safelok- I” driven clip fastening system. There was no evidence of missing or defective fasteners. No excessive rail seat abrasion was found. Average tie spacing was 24 inches between tie centers. The track ballast is crushed granite. The tie cribs appeared to be full with an average of 18 to 24 inches of shoulder ballast.

A review of the railroad’s track inspection records revealed no defective conditions were identified in the area of the derailment.

Conclusion - Track: FRA determined track conditions did not contribute to the cause or severity of the incident.

Analysis – Signal and Train Control: FRA reviewed logs and records of two defect detectors traversed by the train prior to the derailment site. No exceptions were noted during the records inspection. The investigation revealed signals were operating as intended.

Conclusion: FRA concluded signal and train control did not contribute to the cause or severity of the derailment.

Analysis – Mechanical (Locomotives): The train consisted of two head end locomotives (UP 9070/6550), one mid-train (DPU), (UP 7915) placed between lines 118 and 119 from the head end, and one rear DPU locomotive (UP 2716).

FRA reviewed UP mechanical records for the locomotives and neither mechanical nor maintenance defects were noted.

Analysis – Mechanical (Cars): The train originated at North Platte, with
181 cars on June 16, 2020. FRA’s records review of Train 1 indicated the train received a Class I Brake Test and mechanical inspection by qualified mechanical inspectors at North Platte on June 16, 2020 at 1:30 p.m., CDT.

Conclusion:FRA concluded the mechanical condition of the locomotives and cars was not a factor in the derailment.

Analysis- Train Make-up: Train 1 consisted of 181 cars of mixed freight car types, 105 loaded cars, and 76 empty cars. The train was powered by four locomotives, two on the head end (UP 9070 and UP 6550), one mid train DPU (UP 7915 line 63 from the head end of train), and one rear end DPU (UP 2716).

Although the train was in compliance with UP train make-up rules at the time of the incident, the weight of the consist was not evenly distributed. One focal point of the FRA's investigation was the train make-up centered on the 34 empty railcars averaging 47.3 tons per car located directly behind the first 28 loaded cars averaging 129.2 tons per car. This block of 62 cars was located between the head end locomotives and the mid train DPU locomotive.

Of particular note, is that 28 of the 34 empty cars (not to be associated with the 28 loaded cars directly behind the headend locomotives) and 106 of the total 181 cars in the train were equipped with cushioned draw bars. The draft gear travel on these cushioned drawbars is 10 inches with up to an additional 2 to 3 inches in component wear. Using 23 inches of travel as an average per cushioned equipped car, a block of 28 cars can have up to 54 feet of free travel within that block of cars and 106 cars throughout the train can have up to 203 feet of free travel. It is this free travel that will allow the cars to stretch out and bunch up throughout the train as it traverses the undulating terrain. What is significant about the 28 loaded cars directly behind the lead locomotives is their average weight per car of 129.2 tons, in contrast to the 34 empty light weight cars averaging 47.3 tons per car.

The amount of free travel within the train and the distribution of a large block of empty cars sandwiched between a large block of heavy cars on the head end and the trailing tonnage behind the mid-train DPU locomotive played a significant role as to the cause of the derailment.

Conclusion: FRA determined the train make-up and tonnage profile is a contributing factor to the cause of the incident. H504 -- buffing or slack action excessive, train makeup.

Analysis- Operating Practices: An interview with the crew confirmed the train was PTC and EM equipped, and was operated by those systems from Green Riverto approximate MP 153.10. when the engineer disengaged the EM system in preparation of an anticipated stop due to signal aspects showing less favorable than clear approaching to CP Bancroft. It is standard practice to disengage the EM system when preparing for a planned stop.

A review of locomotive event recorder downloads and track profile revealed prior to the derailment the train was running with the (DPUs) in asynchronous mode with the fence up between them and the lead locomotive consist. When the engineer took control of the train, he synced the lead locomotive consist with the mid DPU and operated them in dynamic braking while leaving the rear DPU fenced and remaining in power. The decision to remain in power on the rear DPU unit was an attempt to keep the slack in the train bunched as the train negotiated the descending grade.

The following is a break-down of the speed of train as recorded by the lead locomotive, mid train locomotive and rear locomotive in the following format (lead/mid train/rear of train) as it traversed the undulating descending grade between MP 153 and the undesired emergency (UDE) the occurred at MP 157.0.

The engineer took over control of the train from the EM system at the recorded time of 8:19:12 p.m., and

approximate location of MP 153. At this point, the lead 1/3 of the train is on a descending grade and the rear 2/3 of the train on a level grade, and the train speed was 46/47/44. Assisted by the descending grade you can see the lead and mid train locomotives accelerating faster than the rear of the train allowing the free travel (slack) in the train to stretch out.

At MP 154, the majority of the train is on an approximate 1.0 percent descending grade with a .5 mile section of level grade in the middle of the train and the speed throughout the train is 45/48/45. The descending grade averaging 1.0 percent continues until approximately MP 156 where the grade levels out for another .5 miles.

At MP 155, the speed throughout the train is 47/50/50. As the head end of the train approaches MP 156, the speed throughout the train is 48/48/45 (the rear end of the train is on the level grade between MP 154 and MP 153. At the time of the UDE, the speed throughout the train is 35/40/40. Since the point where the engineer had taken over control of the train, he had been using the dynamic brakes of the synchronized lead and mid train locomotive to assist in maintaining his speed, until the point the train approached 49 mph, where he applied air brakes to assist in his speed reduction.

As the head end of the train reaches the level grade at MP 156, this greatly assists the lead locomotive to slow the tonnage on the head end of the train, as evident by the 35 mph, however, the mid train and rear locomotives are still at 40 mph with all the trailing tonnage bunching up behind the mid-train DPU as most of the rear portion of the train is on a descending grade.

As the in-train forces created by the slowing head end tonnage and the rear end tonnage moving 5 mph faster, these two opposing forces met in the block of empty cars between the lead locomotives and mid train DPU, creating the force necessary to squeeze and lift one of the empty car's wheels off its running path and leading to the derailment and pile up of empty cars lines 34 to 64 behind the lead locomotives and up to, but not including, the mid train DPU locomotive.

The table below depicts the lead locomotives location and speed of the lead, mid-train DPU and rear DPU locomotives as they negotiate the terrain between MP 153 and the point where the UDE occurred.

Milepost (MP) Lead Locomotive	Recorded speeds from lead/mid-train/rear locomotives	Comments
MP 153	08:19:12—46 mph/47 mph/44 mph	Lead 1/3 of train on descending grade
MP 154	08:20:31—45 mph/48 mph/45 mph	Lead 1/3 of train passing over level terrain
MP 155	08:21:49—47 mph/50 mph/50 mph	Lead 2/3 of train on descending grade
MP 155.3	08:22:08—49 mph/52 mph/48 mph	Air brakes applied
MP 156.6	08:23:46—40 mph/44 mph/40 mph	Air brakes released
MP 157.0	08:24:22—35 mph/40 mph/40	UDE occurred/ lead portion of

	mph	train transitioned through level terrain with heavy dynamic brakes applied/ rear 2/3 of train was on descending grade

Conclusion:FRA found that the train handling employed to slow the train to a planned stop was reasonable based on the engineer's previous experience and training, however, given Train 1's train make-up, length and the undulating terrain at this location, controlling in-train forces became unmanageable to prevent the derailment of empty cars placed ahead of the mid-train DPU locomotive. FRA determined the probable cause of the accident was H504 -- buffing or slack action excessive, train makeup. Additionally, FRA found the engineers lack of experience with a train of this length may have also contributed to the cause of the derailment. Cause code H503--buffing or slack action excessive, train handling.

Analysis- Training and Qualifications: A review of crewmember records found crewmembers had valid certifications, and no exceptions were noted with testing or hours of service records. However, during crew interviews, the engineer noted this was the longest and heaviest train he had handled over this territory to date.

The engineer's previous skills evaluation was performed on a train with the following characteristic: 142 cars, 10,686 tons and 9,087 feet. Comparing this evaluation train ride with the characteristic of Train 1 (181 cars, 15,560 tons and 13,107 feet) reveals a significant difference in tonnage and weight.

Title 49 CFR 240.127 *Criteria for examining skills performance*, requires a railroad to have procedures for examining the performance skills of a person being evaluated for qualification to determine whether that person has the skills to safely operate locomotives and/or trains in the most demanding class or type of service the person will be permitted to perform.

It was determined that in December of 2020, UP updated their simulator training for engineers to include train handling scenarios with trains having the characteristics of 174 cars (169 loads and 5 empties), 12,579 tons and 12,550 feet and a locomotive configuration of 2 headend, 2 mid-train DPUs and an end of train device. In February of 2021, the training was amended to include train characteristics of 177 cars (to include 60 empties), 22,065 tons, 15,173 feet and a locomotive configuration of 3 headend, 2 mid-train DPUs and 2 end of train DPUs.

Conclusion: FRA determined that the engineer's previous experience and qualification were with trains of significantly less length and tonnage of Train 1's characteristics. The engineer's lack of previous experience and training with a train of this length and tonnage may have contributed to the cause of this incident. Cause code H599--other causes relating to train handling or train makeup.

Overall Conclusion: After an investigation of locomotive and car conditions, signal systems, track surface/structure and train handling, FRA investigators did not identify evidence to suggest these factors led to the cause of this derailment.

FRA's investigation did determine the train make-up and tonnage profile in conjunction with changing grades in terrain during a planned stop, did contribute to the cause and severity of this accident.

Probable Cause

FRA determined the probable cause of the accident was H504 -- buffing or slack action excessive, train

makeup.

Contributing Factors

FRA determined UP had no formal training initiated for engineers handling trains of extreme length or tonnage until December of 2020, approximately six months after this incident. The engineer not having previous training or experience with trains of this length or may have contributed to the accident. H599 – other causes relating to train handling or train makeup.

FRA determined the engineer's management of in-train forces may have contributed to the accident. H503--buffing or slack action excessive, train handling.