U.S. Department of Transportation
Federal Railroad Administration

Federal Railroad Administration, Office of Railroad Safety

Accident Investigation Summary Report HQ-2022-1643

Union Pacific Railroad Company (UP) – Derailment
Gothenburg, Nebraska
May 26, 2022

1. EXECUTIVE SUMMARY

On May 26, 2022, at approximately 7:28 a.m., CDT, the Union Pacific Railroad Company's (UP) eastbound Train Symbol CWTOK-24 consisting of a total of 294 loaded coal cars, derailed 30 cars at Milepost (MP) 246.66, traveling at a recorded speed of 50 miles per hour (MPH). This loaded coal train comprised six locomotives arranged in a distributed power unit (DPU) configuration (2:3:1) and was operating on the UP Great Plains Service Unit's Kearney Subdivision in Dawson County, Nebraska.

In the aftermath of the derailment, the Locomotive Engineer promptly issued an emergency radio announcement and contacted the UP Train Dispatcher for immediate assistance. The Conductor performed a walking inspection of the train. Emergency services, including the Gothenburg Police Department, Lexington Fire and EMS, and Dawson County Emergency Management, were dispatched. Damage estimates totaled $1,180,021, with $1,090,021 attributed to equipment and $90,000 to track repairs, including 1,400 feet of Main Track 3 and 200 feet of Main Track 2.

No internal rail defects were identified during an inspection of the broken rail at the Point of Derailment (POD). However, a surface profile deviation (uneven rail surface) and a fixed structure (concrete grade crossing) in a private road crossing were present. FRA determined that the stresses imposed on the rail by equipment crossing the fixed structure likely contributed to the rail failure under load.

The UP geometry car EC4 inspected Main Track 3 on April 4, 2022, noting no surface conditions at or near the POD location. The derailment was caused by defects in the rail and joint bars, which resulted from an ordinary break.[1] Another factor was that the rail's surface was uneven. The FRA investigation found that the rail broke due to increased stress generated on the rail at the POD.

[1] **Ordinary break** means a partial or complete break in which there is no sign of a fissure, and in which none of the other defects described in this section is found.

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2. ACCIDENT SEQUENCE OF EVENTS

On May 26, 2022, the Union Pacific Railroad's eastbound Train Symbol CWTOK-24 consisting of 294 cars, a loaded coal train with six locomotives in a 2 head end, 3 mid train DPU, and 1 rear of train DPU configuration the train was traveling from North Platte, Nebraska, to Oak Creek, Wisconsin. The train was 16,322 feet long and carried 42,042 tons of coal.

The derailment occurred on the Kearney Subdivision of the UP Great Plains Service Unit near Gothenburg, Nebraska. This segment has three mainline tracks designated as Main Tracks 1, 2, and 3, with a maximum authorized speed of 70 mph. At the time of the incident, a speed restriction of 60 mph was in effect at the POD due to a known track profile issue. The route operates under Centralized Traffic Control (CTC) with Positive Train Control (PTC) enhancements.

The crew, consisting of a Locomotive Engineer and a Conductor, began their shift at 2:40 a.m., CDT, at UP's Bailey Yard. The crew had been provided their required rest period. The required mechanical inspection and initial air brake test were completed at Bailey Yard with no issues noted and no special restrictions applied to the train.

At around 7:28 a.m., CDT, after traveling approximately 51 miles. The train experienced an undesired emergency brake application at a grade crossing at MP 246.66 while traveling at a recorded speed of 50 mph on Main Track 3. When the train derailed the lead locomotives was using Dynamic 1 mode, while the mid-train and rear DPUs were idling. The Trip Optimizer (TO) system was engaged at the time of the derailment.

Lines 45-48 derailed upright, Lines 41-44 derailed and lay on their sides on the south side of Main Track 3, while lines 15-40 piled up, blocking Main Tracks 2 and 3 (Figure 1). Main Track 1 remained clear.

Figure 1: Derailment Site

Immediately after the incident, the Locomotive Engineer broadcast an emergency message and contacted the UP Train Dispatcher for help. The Conductor inspected the train on foot and a passing train on Main Track 1 reported seeing smoke and dust from the site.

At 7:30 a.m., the Gothenburg Police Department received a report from a local resident about the damaged train and large smoke cloud at Highway 30 near MP 246.66. Emergency services, including the Gothenburg Police Department, Lexington Fire and EMS, and Dawson County Emergency Management, were dispatched. The damage was estimated at $1,180,021, including $1,090,021 for equipment and $90,000 for track repairs. Repairs were needed for 1,400 feet of Main Track 3 and 200 feet of Main Track 2. Switch damage was noted on Main Track 3.

3. INVESTIGATION AND ANALYSIS

FRA investigated this derailment starting on May 26, 2022.

Operating Practices
FRA reviewed the event recorder data and found that the train handling before the derailment was consistent with UP's operating procedures. The Trip Optimizer (TO) system was engaged, and the data showed no issues with train handling. Both the Engineer and Conductor followed all relevant regulations and operating rules. There were no anomalies or severe slack actions detected in the train's operation.

Track
At the POD, the track was tangent with a 0.15 percent descending grade. The rail was Control Cooled (CC) Nippon Steel 136 RE, installed in 2003, and was constructed with continuous welded rail (CWR) on concrete ties properly anchored with no visible longitudinal rail movement detected.

Main Track 3 was classified as FRA Class 5, allowing speeds up to 70 mph, but was restricted to 60 mph due to a known 1.25-inch surface profile deviation located at the private road crossing (DOT #817757T) and noted on a UP track inspection report from May 18, 2022. The profile deviation at this location, was scheduled for repair on June 6, 2022, and an ultrasonic test conducted on May 24, 2022, found no internal rail defects.

Figure 2: Batter marks on the broken rail

FRA identified batter marks on the receiving rail face that is consistent with the wheels traversing a broken rail (Figure 2). The rail failure was attributed to a weak structure that was foundational to the surface profile condition unable to properly support the load. As a result, the

rail at the POD suffered a sudden break under load as the equipment moved from a stiff track modulus[2] to a softer modulus with indication of a failing support structure at the profile location. The fracture face and chevrons present at the POD are indicative of a rail failure under extreme forces typically exhibited during derailment events.

Motive Power and Equipment
Inspection records of the locomotives showed no issues that would have contributed to the accident. FRA inspected the wheels of freight cars that did not derail and found witness marks consistent with traveling over a broken rail. These marks increased in severity from the first locomotive wheels to the last car up until the point of derailment.

Signal
Signal data showed that the signal at MP 247.5 changed from clear to restricted proceed before the derailment. The hand throw switch at MP 246.85 functioned correctly before the derailment and was damaged during the incident. The signal system did not contribute to the accident.

Toxicological Analysis and Fatigue
Toxicological tests for both the Engineer and Conductor were negative for drugs and alcohol. Impairment caused by drug or alcohol use did not contribute to the accident.

FRA used the Fatigue Audit InterDyne (FAID) Tool to assess fatigue levels. Both the Engineer and Conductor had FAID scores below the fatigue threshold of 63, indicating that fatigue was not a factor in the accident.

4. CONCLUSION

FRA's investigation into the derailment of UP Train CWTOK-24 on May 26, 2022, determined that the primary cause of the accident was a rail failure (ordinary break) due to a surface profile deviation located at a private road crossing (DOT #817757T).

The investigation also revealed no evidence of deficiencies, irregularities, or non-compliance with the train handling, and no issues detected in the performance of Trip Optimizer system or train operations.

The track at the POD had a known surface profile deviation that was discovered by UP on May 18, 2022, and scheduled for repair on June 6, 2022, but was not addressed prior to this incident.

[2] Track modulus is a measure of the vertical stiffness of a railroad track's foundation. It is an important parameter for assessing the condition and performance of a railway track structure.