



National Transportation Safety Board

Washington, D.C. 20594

Safety Recommendation

Date: April 16, 2002

In reply refer to: R-02-14

Mr. Richard K. Davidson
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The National Transportation Safety Board is an independent Federal agency charged by Congress with investigating transportation accidents, determining their probable cause, and making recommendations to prevent similar accidents from occurring. We are providing the following information to urge your organization to take action on the safety recommendation in this letter. The Safety Board is vitally interested in this recommendation because it is designed to prevent accidents and save lives.

This recommendation addresses track conditions on the Union Pacific Railroad's (UP's) Beaumont Subdivision and the effectiveness of the UP's track inspection activities, including management oversight. The recommendation is derived from the Safety Board's investigation of the May 27, 2000, derailment of UP train QFPLI-26 at Eunice, Louisiana, and is consistent with the evidence we found and the analysis we performed. As a result of this investigation, the Safety Board has issued three safety recommendations, one of which is addressed to the UP. Information supporting this recommendation is discussed below. The Safety Board would appreciate a response from you within 90 days addressing the actions you have taken or intend to take to implement our recommendation.

On Saturday, May 27, 2000, about 11:48 a.m., 33 of the 113 cars making up eastbound UP train QFPLI-26 derailed near Eunice, Louisiana. Of the derailed cars, 15 contained hazardous materials and 2 contained hazardous materials residue. The derailment resulted in a release of hazardous materials with explosions and fire. About 3,500 people were evacuated from the surrounding area, which included some of the business area of Eunice. No one was injured during the derailment of the train or the subsequent release of hazardous materials. Total damages exceeded \$35 million.¹

The National Transportation Safety Board determined that the probable cause of the May 27, 2000, derailment of UP train QFPLI-26 was the failure of a set of joint bars that had

¹ For more information, see National Transportation Safety Board, *Derailment of Union Pacific Railroad Train QFPLI-26 at Eunice, Louisiana, May 27, 2000*, Railroad Accident Report NTSB/RAR-02/03 (Washington, D.C.: NTSB, 2002).

remained in service with undetected and uncorrected defects because of the UP's ineffective track inspection procedures and inadequate management oversight.

During wreck-clearing operations, a rail with pieces of two broken joint bars attached to its east end was found. The following day, investigators located a similar rail with broken pieces of joint bars attached. Metallurgists at the site indicated that the two pairs of broken joint bars matched, which was later reaffirmed by a closer examination at the Safety Board's Materials Laboratory.

Investigators were more confident that the broken pair of joint bars had played a role in the derailment after observing that the top corner of the end face of the rail exhibited visible evidence of having been deformed by the impact of wheels moving over the top corner of the rail end. This is significant in that it demonstrates that the separated rail and joint bars had, for a time, remained in place while the wheels of a moving train passed over them. Such damage would not have been present if the joint bars had broken as a result of forces generated during the derailment.

Based on the engineer's statements, on the physical evidence exhibited by the broken joint bars and the damage to the end face of the rail that is consistent with wheel impact, and on the laboratory examination of the joint bars, the Safety Board concluded that the joint bars found at the point of the derailment had broken before the arrival of the accident train, which allowed the rail to become misaligned.

The UP track inspector explained that his inspection territory consisted of about 84 miles of the Beaumont Subdivision, from milepost (MP) 507 to MP 590.75, which he inspects using a Hy-Rail vehicle. The track inspector stated that he did the track inspections at speeds between 20 and 25 mph on continuous welded rail track and between 15 and 20 mph on jointed rail.

On the day after the derailment, Safety Board investigators inspected the track west of the derailment site with a Hy-Rail vehicle. A walking inspection was conducted east of the derailment site. During the walking inspection, joint bars with visible vertical cracks were found. Subsequent inspections during the following days identified additional cracked and broken joint bars on either side of the derailment area.

The investigators noted that the cracks they found in the joint bars were not visible to a track inspector using a Hy-Rail vehicle. An inspector driving such a vehicle across a rail joint could see only the tops of the two joint bars on the driver's side and the joint bar on the gage side of the track on the passenger side. The joint bar on the field side of the track on the passenger side of the vehicle was not visible.

The vehicle the track inspector used during his track inspections was a 1996 Chevrolet 1-ton super-cab pickup truck with Fairmont Hy-Rail equipment. Although forward visibility will vary somewhat depending on the seat adjustment and the height of the driver, an inspector in the driver's seat cannot see a track component that is less than about 28 feet in front of the vehicle. With a newer model of pickup truck (having a shorter hood), the track component is not visible unless it is at least 19.5 feet in front of the operator. With a flat-front inspection vehicle, an operator can see a track component at a distance of about 9.5 feet.

Investigators found that in the 5 months before the derailment, UP track inspectors had detected and replaced 128 defective joint bars. However, after the derailment, various walking inspections of the entire 44-mile section of jointed rail revealed 403 defective joint bars, indicating that regular track inspections had resulted in a significant number of defective joint bars remaining undetected.

Federal Railroad Administration (FRA) records of track inspections of the Beaumont Subdivision for the 5 years preceding the accident document a history of weak tie conditions and cracked joint bars in the jointed rail section of the subdivision. Ideally, FRA track inspections should echo the railroad's own track inspections. During a walking inspection in 1996, the FRA discovered 36 broken joint bars and identified areas with weak crossties. Again in 1997 and 1998, FRA inspections revealed defective joint bars. FRA inspectors inspected the track in January 1999 and discovered areas with insufficient crossties and defective joint bars. An inspector returned for a follow-up inspection in March 1999 and found that the situation had been corrected; however, he found defective tie conditions at 11 locations and 2 cracked joint bars.

As evidenced by the numerous joint bars that were found with fatigue cracks of varying lengths, a joint bar with a fatigue crack can remain in service for some time before failing completely. And although fatigue crack growth rates will vary depending on the type and frequency of forces exerted upon the joint bars, a fatigue crack, once initiated, can be expected to grow until it causes complete failure of the bar. Laboratory examination of the pair of broken joint bars found at the derailment site revealed that the fractures in those bars resulted from fatigue cracks, and while it cannot be determined when the cracks were initiated, they were certainly evident in the bars for some time before the bars failed in this accident. The Safety Board concluded that the UP track inspection procedures in use before the derailment were inadequate in that inspectors identified only a small proportion of the cracked or broken joint bars on the subdivision, with the result that defective joint bars that should have been replaced were allowed to remain in service.

In addition to the defective joint bars, investigators became aware of defective switch ties that were itemized on track inspection reports 6 weeks before the derailment, on March 11, April 7, and April 15. These switch ties remained in service, notwithstanding the six inspections per week for the 6-week period between April 15 and the derailment on May 27.

After the derailment, a thorough inspection of the jointed rail territory revealed track conditions that did not meet the requirements of class 3 track, and these conditions had likely existed for some time. As noted earlier, the inspection method used by UP track inspectors was inadequate to detect the significant number of cracked or broken joint bars in the inspection area, and Federal rules require that such defective bars be replaced if the track is to maintain its class 3 classification and be approved for 40 mph operations. Therefore, the Safety Board concluded that had the track of the Beaumont Subdivision been properly assessed, trains would not have been permitted to operate at a speed of 40 mph until appropriate repairs were made.

Despite inspection methods that were generally inadequate to identify all defective joint bars, enough defects were noted to demonstrate that defective joint bars were a frequent and persistent problem on the subdivision. For the 2-month period before the derailment, there were

numerous records of defective joint bars and of joint bars with missing or defective bolts. For example, in the week before the derailment, the UP track inspector found three rail joints at which both joint bars had broken, which is the same type of failure that was found at the location of the derailment.

The manager of track maintenance told investigators that he reviewed the track inspection reports at the end of each month, but he did not scrutinize them. Had he done so, he may have noted the recurring problems associated with joint bars. The three broken pairs of joint bars that were found and replaced just days before the derailment should have alerted management to the potential for other occurrences of total joint bar failure. This is especially true given that, as noted above, joint bars normally provide evidence, such as cracks, of impending failure before complete failure actually occurs. Managers who reviewed the track reports closely would have been aware that track inspections were not always identifying weakened joint bars in time to prevent future failures and potential risk to trains. The Safety Board therefore concluded that if UP management had thoroughly examined track inspection reports, they may have determined that track inspections were not identifying joint bar defects that could, over time, lead to complete joint bar failure.

The National Transportation Safety Board therefore makes the following safety recommendation to the Union Pacific Railroad:

Change your track inspection programs to ensure that managers are making use of all available information about track conditions, including railroad and Federal Railroad Administration track inspection reports, to identify trends or problem areas and to monitor the effectiveness of daily track inspections. (R-02-14)

The Safety Board also issued safety recommendations to the Federal Railroad Administration and the Association of American Railroads. In your response to the recommendation in this letter, please refer to Safety Recommendation R-02-14. If you need additional information, you may call (202) 314-6607.

Chairman BLAKEY, Vice Chairman CARMODY, and Members HAMMERSCHMIDT, GOGLIA, and BLACK concurred in this recommendation.

By: Marion C. Blakey
Chairman