



National Transportation Safety Board

Washington, D.C. 20594

Safety Recommendation

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About 1:45 p. m. eastern daylight time on May 31, 1995, Maryland Rail Commuter (MARC) Train No. 425, en route to Washington, D.C. (Washington), derailed within the "K" Interlocking¹ at Washington's Union Station.² The MARC train had 61 passengers and 3 crewmembers on board at the time of the accident; no injuries were reported. The derailment resulted in almost \$164,000 in property damages, cancellation of 16 other MARC trains, and delays to 10 National Railroad Passenger Corporation (Amtrak) trains.

The Safety Board's accident investigation disclosed that the MARC commuter train was operating from Amtrak's Northeast Corridor main track No. 3 to track No. 40 within the "K"

¹ Track and signal appliances so arranged and interconnected that appropriate signal indications govern train movements in successive, sequential order.

² For further details about the accident investigation, see NTSB Docket No. ATL-95-FR-018.

interlocking at Union Station. The MARC commuter train, which consisted of one locomotive unit and five commuter passenger cars, was operating in push fashion with a control cab car at the head of the train. It was traversing the No. 326 slip switch³ onto track No. 7, and was travelling at a recorded speed of about 11 miles-per-hour when the two rear passenger cars and the locomotive derailed. The Safety Board determined that a wheel on the second from the last car in the consist contacted the receiving end of the right hand guard rail of the slip switch.

The slip switch was one of five such installations at Union Station purchased by Amtrak from Cogifer, Inc.,⁴ (Cogifer) in 1990. The guard rail was designed to guide the wheelset so that the opposite wheel would align on the proper side of the turnout frog.⁵ Safety Board investigators found an accumulation of metal shavings in the throat area of the frog and observed that the guard rail was displaced from its normal position. The 9-foot-long guard rail was secured in six places by bolts to bracing blocks that were welded to the guard rail tie plates. Investigators found that the welds connecting the bracing blocks to the guard rail tie plates were fractured on five of the six blocks; the weldments had been made at Cogifer's factory. Investigators had the guard rail, securement blocks, and guard rail tie plates removed for examination by the Safety Board's metallurgical laboratory.

During metallurgical examination at the Safety Board's laboratory, investigators observed that the rail assembly bracing blocks had separated from the guard rail tie plates at the weld areas. The manufacturer's drawing specified that 3/8-inch wide fillet welds be applied to all four sides of the block. Examination disclosed that the side of each block facing the guard rail had not been welded to the base. These nonwelded sides appeared to have been beveled in preparation for welding. Investigators were unable to determine why the beveled edges had not been welded to the guard rail tie plates.

Examination of the weld connection fracture on the north end of the guard rail revealed that a fatigue crack had originated in the weld at the beveled edge of the bracing block. The lack of weld at the edges facing the guard rail would have produced high stresses at the ends of the side fillet welds, making the welds sensitive to cracking. The remaining weld fractures had been mechanically damaged as a result of movement between the mating fractures; therefore, the mode of fracture could not be determined for these blocks. The Safety Board believes that these fractures originated in the same area as the weld fracture on the north end.

The fillet welds at the base of all except the north bracing blocks were apparently deposited in a single welding pass. On all the fillet welds, one leg was less than the 3/8-inch size

³ Used primarily in passenger terminals, slip switches are specially designed to be used in coordination with track crossings to afford train movement flexibility to a greater number of tracks than conventional switch arrangements afford.

⁴ Until its bankruptcy and closure in December 1993, Cogifer, Inc., manufactured specialty rail products; the firm that has taken over Cogifer's facility does not manufacture specialty rail products.

⁵ A turnout frog enables the wheel running on a rail to cross a diverging rail.

specified. The weld on the north block was multilayered, suggesting that a welding repair had been made to correct a cracking problem at the base of the bracing block. This repair weld contained numerous defects, including severe undercutting, gaping holes, and lack of fusion, which indicate poor welding practice, and also made the bracing block welds prone to cracking.

Immediately after the accident, Amtrak staff inspected the other four Cogifer-manufactured frogs and guard rails and found that they also were welded only on three sides of the bracing blocks. Because of the locations of the welds and the normal build-up of dirt and grease, Amtrak officials determined that the integrity of the weldments could not be verified either by normal track inspections or by monthly switch inspections. They therefore initiated an inspection program using dye penetrants to determine the weld integrity of the other Cogifer trackwork installations on all Amtrak properties. Amtrak elected to replace the Union Station weldment connections with hooked flanges.

Because the apparent defects originated in a controlled manufacturing environment, the Safety Board has serious concerns that other such defective installations may be in service at other rail properties. How many and where other such installations are in place cannot be determined from the manufacturer's records. Therefore, the Safety Board believes that railroad and transit operators having similar trackwork in place should immediately inspect those installations to determine their integrity. The National Transportation Safety Board recommends that the Association of American Railroads, the American Short Line Railroad Association, and the American Public Transit Association:

Notify your members of the circumstances of this accident and urge that they inventory their rail systems to determine whether any trackwork installations manufactured by Cogifer, Inc., are in place, and if so, immediately inspect all welds within those installations to determine their integrity. In the interim, take such operational measures as necessary to ensure the safety of train movements over those trackwork installations. (Class I, Urgent Action) (R-95-34).

The National Transportation Safety Board is an independent Federal agency with the statutory responsibility "to promote transportation safety by conducting independent accident investigations and by formulating safety improvement recommendations" (Public Law 93-633). The Safety Board is interested in any action taken as a result of its safety recommendations. Therefore, it would appreciate a response from you regarding action taken or contemplated with respect to the recommendation in this letter. Please refer to Safety Recommendation R-95-34.

Chairman HALL, Vice Chairman FRANCIS, and Member HAMMERSCHMIDT concurred in these recommendations.

By: 
Chairman