National Transportation Safety Board

Washington, D.C. 20594

Safety Recommendation I-90-62 thru 64

Date: February 12, 1990

In reply refer to: R-89-90
through R-89-92

Mr. William H. Dempsey
President and Chief Executive Officer
Association of American Railroads
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About 4:30 a.m. mountain standard time on February 2, 1989, freight cars from Montana Rail Link Inc. (MRL) westbound train 1-121-28 (train 121) rolled eastward down a mountain grade and struck a stopped helper locomotive consist, Helper 1, in Helena, Montana. The locomotive consist of train 121 included three helper units (Helper 2) and three road units positioned at the head end of a 49-car train. The crewmembers of train 121 had uncoupled the locomotive units from the train to rearrange the locomotive consist while stopped on a mountain grade. In the collision and derailment, 15 cars from train 121 derailed, including 3 tank cars containing hydrogen peroxide, isopropyl alcohol, and acetone. Hazardous material released in the accident later resulted in a fire and explosions. About 3,500 residents of Helena were evacuated. Two crewmembers of Helper 1 were only slightly injured. The estimated damage (including clean-up and lading) as a result of this accident exceeded $6 million.[1]

The National Transportation Safety Board determined that the probable cause of this accident was the failure of the crew of train 1-121-28 to properly secure their train by placing the train brakes in emergency and applying hand brakes when it was left standing unattended on a mountain grade. Contributing to the accident was the decision of the engineer of Helper 2 to rearrange the locomotive consist and leave the train unattended on the mountain grade, and the effects of the extreme cold weather on the airbrake system of the train and the crewmembers. Also contributing was the failure of the operating management of the Montana Rail Link to adequately assess the qualifications and training of employees placed in train service.

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[1] For more detailed information, read Railroad Accident Report-- "Collision and Derailment of Montana Rail Link Freight Train with Locomotive Units, and Hazardous Materials Release at Helena, Montana, February 2, 1989." (NTSB/RAR-89/05)

Contributing to the severity of the accident was the release and ignition of hazardous materials.

Train 1-121-28 had the required initial terminal road train airbrake test before departing Laurel to determine train line leakage. The MRL Train Activity/Delay Report dated February 1, 1989, showed that the failure of the 64-car train to pass the air test was "due to cold." To pass the required airbrake test, a block of 16 cars was removed from the train as interchanged from the BN. The engineer stated that the train line leakage after a second air test (following the removal of the 16 cars) was 4 psi/min (49 CFR 232.12 requires 5 psi/min or less train line leakage). However, the relief engineer stated that he had taken exception to the train line pressure between Townsend and Helena, and told the Helper 2 engineer and Helena yard office "...the fact that the air flow indicator was at 14...." Although the helper engineer was made aware of the train line pressure concerns of the relief crew engineer, he did not take any action nor were there any instructions that required him to do so.

In accordance with MRL operating practices for mountain grade territory, the Helper 2 engineer increased the feed valve setting increasing train line pressure from 80 psi to 90 psi prior to departing Helena. This had the effect of increasing the air flow and thus the leakage rate. However, leakage tests were not required and none were performed. At intermediate terminals such as Helena, when the train consist is not changed, Federal regulations[2] only require that the train line be charged to within 15 psi of the feed valve setting on the locomotive. After making a 20-psi automatic brake reduction and release, it must be determined that the brakes on the rear car apply and release. Crews of trains with an EOT telemetry device must make the same 20-psi automatic brake reduction and release, but they only need to determine that the train line pressure reduces and then is being restored; they do not need to check the rear car to determine that its brakes have applied and released. Neither the Federal regulations nor the MRL operating practices require additional airbrake testing or provide specific procedures such as more stringent leakage requirements, increased frequency of airbrake testing, or diagnostic devices for airflow, when extreme cold weather conditions exist, even in mountain grade territory or when the feed valve setting has been increased. The Safety Board believes that had there been requirements to perform leakage tests in extreme cold weather, the outbound crew would have done so while train 1-121-28 was at Helena and the high air flow reported by the inbound engineer might have been verified providing an opportunity for a decision to either correct the cause of the high air flow or not operate train 1-121-28.

MRL does not equip its helper locomotives with receivers for EOT devices; therefore, the Helper 2 engineer, although at the head end of train 1-121-28 and in control of the train, had to rely on receiving EOT telemetry information by radio from the road engineer. This arrangement is not practical as it requires the road engineer to constantly monitor the EOT telemetry receiver and to radio the helper engineer of any changes displayed. However, once the road engineer had radioed the helper engineer that their

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[2] Road Train and Intermediate Terminal Train Air Brake Tests, 49 CFR 232.13.

train had cleared the Benton Avenue crossover, he provided no further information from the EOT telemetry display to the helper engineer. The road engineer did not inform the helper engineer that the EOT display had not changed when the automatic airbrake application was made at Austin. Had this information been radioed to the helper engineer, he might have suspected that there had either been a radio break or that there was a train line blockage and that all of the brakes may not have applied. Knowing this, the helper engineer could have decided that it was a dangerous risk to disconnect the locomotives from the train and rearrange the locomotive consist. The Safety Board believes that MRL should equip all helper locomotives operating at the head end of a train with an EOT telemetry receiver.

Therefore, the National Transportation Safety Board recommends that the Association of American Railroads:

> Inform its membership of the circumstances of the train accident and release of hazardous materials at Helena, Montana, on February 2, 1989. (Class II, Priority Action) (R-89-90)
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> Develop and implement procedures for the additional testing of a train airbrake system when operating in extreme cold weather, especially when the feed valve setting is changed and the train will be operated in mountain grade territory. (Class II, Priority Action) (R-89-91)
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> Encourage its membership to equip all helper locomotives operating at the head end of a train with an end-of-train telemetry receiving device. (Class II, Priority Action) (R-89-92)

Also as a result of its investigation of this accident, the Safety Board issued Safety Recommendations R-89-68 through R-89-77 to Montana Rail Link, Inc., R-89-78 and R-89-79 to the Burlington Northern Railroad Company, R-89-80 to the Secretary of the U.S. Department of Transportation, R-89-81 and R-89-82 to the Federal Railroad Administration, R-89-83 to the Research and Special Programs Administration, R-89-84 through R-89-87 to the City of Helena, R-89-88 to the State of Montana, and R-89-89 to the Lewis and Clark County Disaster and Emergency Services.

As a result of its investigation of this accident, the Safety Board also reiterated the following Safety Recommendations to the Research and Special Programs Administration, the Association of American Railroads, and the Federal Railroad Administration, respectively:

> In consultation with the Federal Railroad Administration and the Association of American Railroads, conduct a full testing and evaluation program to develop a head shield to protect DOT specification aluminum tank car ends from puncture and mandate installation of the head shield at an early date. (Class II, Priority Action) (R-85-61)
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> In consultation with the Federal Railroad Administration

and the Research and Special Programs Administration, conduct a full testing and evaluation program to develop a head shield to protect DOT specification aluminum tank car ends from puncture and mandate installation of the head shield at an early date. (Class II, Priority Action)(R-85-63)

In consultation with the Research and Special Programs Administration and the Association of American Railroads, conduct a full testing and evaluation program to develop a head shield to protect DOT specification aluminum tank car ends from puncture and mandate installation of the head shield at an early date. (Class II, Priority Action) (R-85-64)

KOLSTAD, Acting Chairman, and BURNETT, LAUBER, NALL, and DICKINSON, Members, concurred in these recommendations.

By: James L. Kolstad
Acting Chairman