R-229

NATIONAL TRANSPORTATION SAFETY BOARD
WASHINGTON, D.C.

ISSUED: December 11, 1978

Forwarded to:

Mr. J. J. McDonough
Acting Chairman
Chicago Transit Authority
P.O. Box 3555
Chicago, Illinois 60654

SAFETY RECOMMENDATION(S)

R-78-60 and 61

About 6:25 p.m., on September 1, 1978, northbound Chicago Transit Authority (CTA) Lake-Dan Ryan train No. 29 struck the rear of another Lake-Dan Ryan train, No. 934, that was standing at a signal near Wabash Avenue and Harrison Street in Chicago, Illinois. Nine passengers were injured, and damage was estimated to be $9,658.

In compliance with the operating rules, train No. 934, consisting of eight self-propelled cars, had stopped at the signal near Wabash Avenue and Harrison Street. This signal, which is a timed-approach signal to the home signal at Tower 12 interlocking, was displaying a red indication. Its purpose is to space trains admitted to the downtown track loop by the Tower 12 home signal.

Train No. 29, also consisting of eight self-propelled cars, had departed 95th Street Station at 4:52 p.m., 4 minutes late, and had made all station stops before the collision without incident. The motorman of train No. 29 knew that train No. 934 was ahead and had seen it move around the curve at Wabash Avenue and Harrison Street. His view of train No. 934 then was blocked by a building on the inside of the curve. He stated that as he rounded the curve he saw the rear of train No. 934 about 25 feet ahead but that although he applied the emergency brakes, train No. 29 collided with the rear of train No. 934. All wheels on the rear truck of the last car of train No. 934 and the lead wheels of the lead truck of the second car of train No. 29 were derailed.

Trains are operated in the accident area by cab signal indications of an automatic train control (ATC) system. There is a permanent 15-mph speed restriction through the curve at Wabash Avenue and Harrison Street that is imposed by the ATC system. The motorman of train No. 29 stated that as his train approached the curve in which the accident occurred, his cab signal indication was green. It first changed to a "yellow 35," then to a "yellow 15," before he entered the curve. (The numbers 35 and 15 indicate the maximum authorized speeds for those cab signal indications.) The motorman said he reduced the speed of his train to less than 15 mph as he entered the curve, and that he never received a red or flashing red cab signal aspect as he should have beginning 662 feet from the rear of train No. 934.

Sight distance tests disclosed that the rear of a train standing at the same location as train No. 934 first is visible to the motorman of a following train at a distance of 108 feet. Stopping tests indicated that an emergency application of the brakes at a speed of 15 mph could have stopped train No. 29 in 42 feet. Tests of the on-board ATC equipment and wayside signal equipment disclosed no faults.

The present ATC configuration allows a train to enter an occupied signal block. As the train enters the occupied block, the cab signal indication immediately changes to red and the motorman is required to stop. However, the motorman can reduce the train's speed to 2 to 3 mph, obtain a flashing red cab signal aspect, and continue in the block without stopping, even though the rules require him to stop. The ATC should be designed so that the operator of a train receiving a red cab signal has no choice but to stop and remain standing for a predetermined time.

The ATC bypass button, which cuts out the ATC, was not properly sealed on train No. 29; and it was therefore accessible for a motorman to use without its use being detected. The seal used on the ATC bypass button should be unique in application and unavailable to train employees. More positive control over the application of the seal would insure against unauthorized access to and use of the bypass button.

Therefore, the National Transportation Safety Board recommends that the Chicago Transit Authority:

> Insure that the automatic train control will require a train to be stopped upon entering a red signal block and remain stopped for a predetermined period before resuming movement at restricted speed after proper authorization. (Class II, Priority Action) (R-78-60)

Insure that the protective seal to the automatic train control bypass button is properly affixed before each terminal departure and that the seals are available only to personnel authorized to apply them. (Class II, *Priority Action*) (R-78-61)

KING, Chairman, DRIVER, Vice Chairman, McADAMS and HOGUE, Members, concurred in the above recommendations.

By: James B. King
Chairman