Burlington Tests Show Signals Adequate

At the scene of the recent Naperville, Ill., accident, a test train was stopped short of the stop signal in all cases where the rules were obeyed

IN FIVE tests in the presence of representatives of the Interstate and Illinois Commerce Commissions, railway officers, newspaper men and others, the Chicago, Burlington & Quincy conclusively demonstrated that the disastrous collision at Naperville, Ill., on April 25, between the "Advance Flyer" and the "Exposition Flyer," in which 45 people were killed and 36 were seriously injured, could have been averted if the following train was operated in accordance with the rules and signal indications.

In making the tests, the Burlington used a 4,000-hp. Electro-Motive Diesel-electric locomotive, three coaches, one dining car, two Pullman tourist cars and three standard Pullman cars, all of conventional all-steel design and the identical type of cars that were in the "Exposition Flyer" on the day of the accident. Brake shoes were distributed throughout the train to compensate for the estimated weight of passengers on the regular train on that day. Water tanks on all cars were filled to capacity, as were the fuel tanks on the locomotive. The gross weight of the train was 2,146,610 lb., including the locomotive, cars, passengers, ballast and supplies. Brake-pipe pressure of 110 lb. was maintained throughout the tests.

Signal Visible 5,123 Ft.

As was reported on page 353 of the May issue of *Railway Signaling*, the collision occurred on track 2 when No. 11, the "Advance Flyer," stopped at Naperville for inspection after one of the trainmen thought he observed something fly from under the train. A few minutes later No. 11 was struck from the rear by No. 39. The second signal to the rear of No. 11 was displaying a yellow aspect, the "restricting" indication. This signal can be seen from an approaching train throughout a distance of 5,123 ft. before it is reached. The distance between this signal and the one immediately to the rear of the train, which latter signal displayed the "stop" indication, is 5,617 ft. The point of accident was 934 ft. beyond the "stop" signal. Throughout this entire distance the grade is slightly rolling and is calculated to average 0.04 per cent ascending for westward trains. The maximum authorized speed for No. 39 on track 2 in this area is 80 m. p. h.

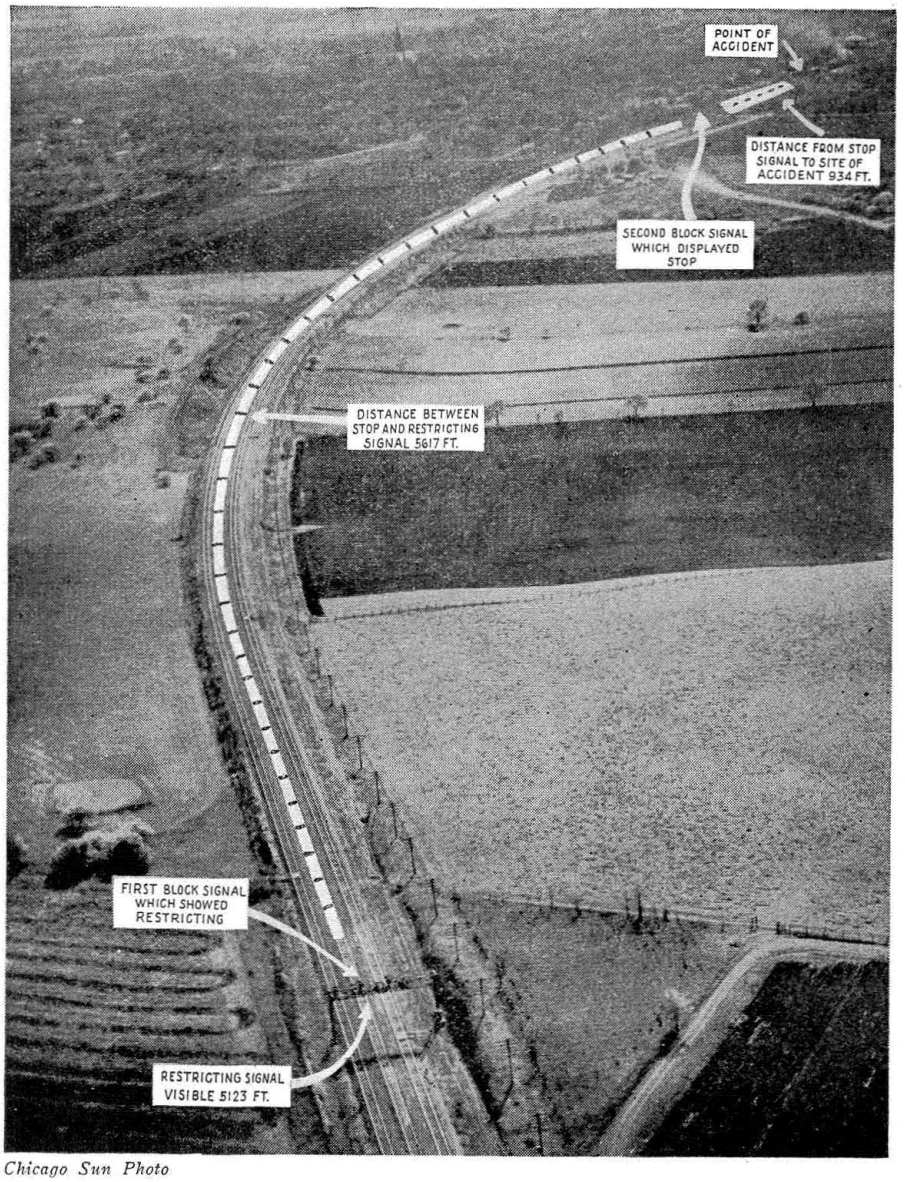
The following Burlington rules govern the operation of trains at this point:

Timetable Rule 1—When a distant signal is displaying a restricting indication, trains must reduce speed at once and move at "restricted speed" until the indication of the next governing signal can be determined.

Book of Rules—Definition of "restricted speed": Proceed prepared to stop short of train, obstruction, or anything that may require the speed of a train to be reduced.

Rule 917, Book of Rules—When fogs, storms, or other conditions obscure the track or signals, speed of trains must be reduced to permit strict observance of signals and insure safety, regardless of time.

An extra engineman, qualified for passenger service, was used for the first two test runs, but because the three final runs were to be operated in a manner contrary to that required by the rules, they were operated by a road foreman of engines. In the first test the engineman was instructed to



Chicago Sun Photo

Aerial view looking west along the Burlington tracks

operate the train at 80 m. p. h., and, upon sighting the restricting signal, to comply with his understanding of the Burlington's rules, except that once the brakes were applied he was to allow the train to come to a stop.

In the actual test the train was running at 81 m. p. h. when the signal was sighted and the engineman made a brake-pipe reduction of 13 lb. The train came to a halt in 7,368 ft., 1,576 ft. short of the "stop" signal and 2,510 ft. short of the point of accident.

The second test was identical to the first, except that the engineman was instructed to operate the train at 85 m. p. h., 5 m. p. h. in excess of that authorized by timetable. In this test the actual speed was 86 m. p. h. at the time the brakes were applied, a single 12-lb. reduction being made. The train stopped at a point 7,913 ft. beyond the point where the brakes were applied, or 1,364 ft. short of the "stop" signal and 2,298 ft. from the scene of the previous week's collision.

In test No. 3, the engine was handled by a road foreman of engines, who was instructed to operate the train at 80 m. p. h. up to the distant signal and then to stop the train by a full service application of the brakes. As the front of the locomotive passed under the signal bridge, the brakes were applied by a split reduction totaling 30 lb., made in two equal parts. The total reduction was effective 26 seconds after the start of the initial use of the brake valve. The train continued 5,222 ft. before coming to a stop 395 ft. short of the "stop" signal and 1,329 ft. short of the point of accident.

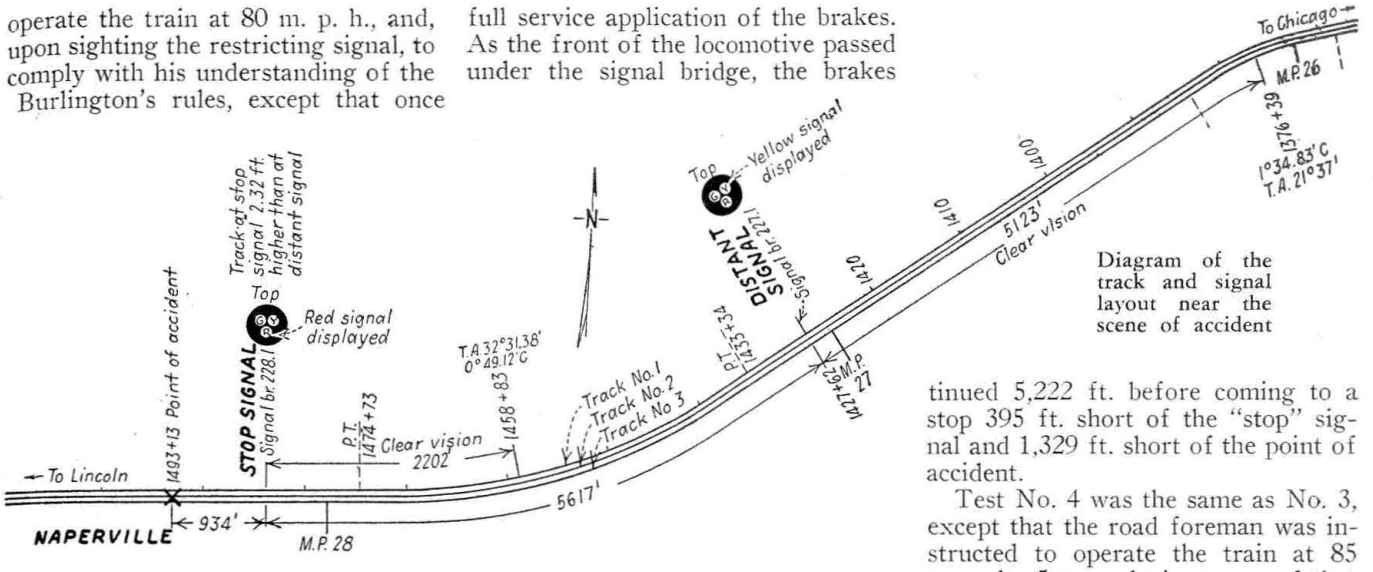


Diagram of the track and signal layout near the scene of accident

Test No. 4 was the same as No. 3, except that the road foreman was instructed to operate the train at 85 m. p. h., 5 m. p. h. in excess of that authorized by timetable. The brakes were applied in exactly the same manner as in test No. 3. The train stopped in a total distance of 5,584 ft., or 33 ft. short of the "stop" signal and 967 ft. short of the point of accident.

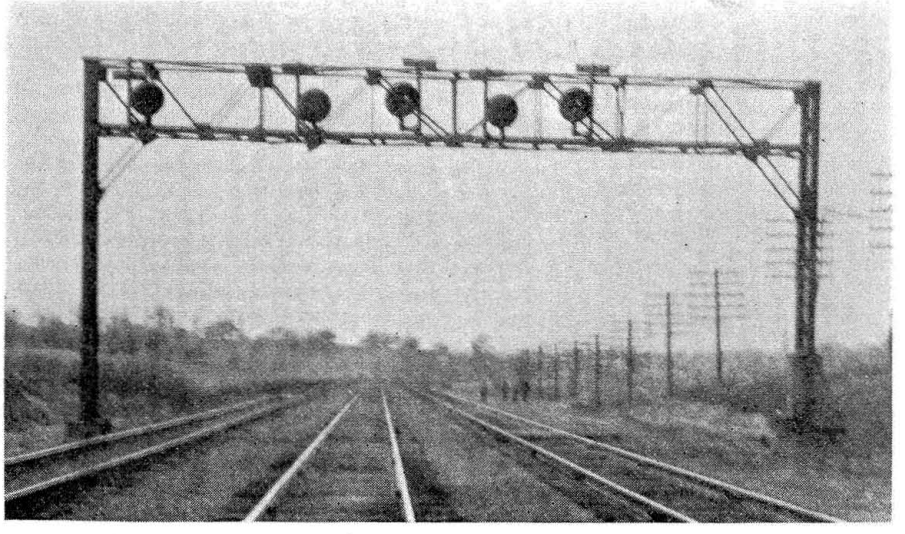
Emergency Application

In the final test, the road foreman operated the train at a speed of 86 m. p. h., and applied the brakes in emergency at a point 2,202 ft. east of the "stop" signal; that is, 3,136 ft. east of the point of collision. This point was selected for the purpose of the test by representatives of the Interstate and Illinois Commerce Commissions as the first place at which the "stop" signal could be clearly seen from the engineer's position in the cab. The train was brought to a stop in a distance of 3,529 ft., or 1,327 ft. beyond the "stop" signal, and 393 ft. beyond the point where the rear of No. 11 was struck by No. 39 on April 25.

Results of braking tests at Naperville, Ill., on the Chicago, Burlington & Quincy, May 2, 1946

Run No.	Speed in m.p.h.	Distance to stop in ft.	Brake Application
1	81	7,368	13 lb., single
2	86	7,913	12 lb., single
3	80	5,222	30 lb., split (two equal reductions fully effective in 26 seconds)
4	85	5,584	30 lb., split (two equal reductions fully effective in 26 seconds)
5	86	3,529	Emergency

Weather:
Partly cloudy. Temperature varied from 57 deg. to 68 deg.
Condition of rail:
Dry in all tests.
No wheels were slid during any of these tests.



View looking west at "distant" signal bridge