



Signaling Order Issued by I.C.C.

ON June 17, the Interstate Commerce Commission issued an order requiring the railroads to install block signaling on all lines where freight trains are operated at 50 m.p.h. or more or passenger trains 60 m.p.h., and train-stop, train-control or continuous cab signaling on all tracks where any train is operated at 80 m.p.h. or more. Based on information filed with the Commission by the railroads at the hearing on this subject at Cincinnati last October, the block signal system may

be required on approximately 18,586 mi. where no such signaling is now in service, and additional protection in the form of train-stop, train control or cab signaling may be required on 27,156 mi.

Based on train speeds, the block system is ordered on 18,586 mi. where no such signaling is now in service and on which train movements are authorized by the use of timetable and train orders.

Presumably the requirements for a block system can be met by the installation of either the manual block system or the automatic block system, and as a part of the order the Commission included rules which are to apply to the use of manual block if used.

Explanatory Material

Along with the order, the Commission included an extensive statement of the issues involved in this proceeding with explanations of data on train speeds and track mileages, as well as train accidents on the railroads. Some of this statement by the Commission is abstracted herewith.

Miles Operated

A revised summary of the basic data, introduced by defendants, shows that all Class I line-haul carriers operate passenger trains over 236,553.6 mi. of track and freight trains over 242,740.6 mi. of track. An analysis of the

| Maximum authorized speed in miles per hour | Automatic Block Miles of Track | | | Manual Block Miles of Track | | | Time-table and train orders only Miles of track | Total miles of track |
|--|--------------------------------|--------------------------------------|----------|-----------------------------|--------------------------------------|---------|---|----------------------|
| | Signals only | Signals, time-table and train orders | Total | Signals only | Signals, time-table and train orders | Total | | |
| Passenger trains: | | | | | | | | |
| 60-69 | 6,351.0 | 16,138.5 | 22,489.5 | 224.8 | 4,545.0 | 4,769.8 | 15,418.0 | 42,677.3 |
| 70-79 | 11,819.3 | 15,952.6 | 27,771.9 | 287.3 | 2,957.5 | 3,244.8 | 3,168.5 | 34,185.2 |
| 80-89 | 6,377.1 | 6,829.7 | 13,206.8 | 51.7 | 346.3 | 398.0 | 857.0 | 14,461.8 |
| 90 and over | 7,262.6 | 11,184.0 | 18,446.6 | 0.0 | 0.0 | 0.0 | 106.7 | 18,553.3 |
| Under 60 | 31,810.0 | 50,104.8 | 81,914.8 | 563.8 | 7,848.8 | 8,412.6 | 19,550.2 | 109,877.6 |
| (Total all speeds) | | | | | | | | 118,052.6 |
| Freight trains: | | | | | | | | |
| 50-59 | 22,476.1 | 28,919.7 | 51,395.8 | 563.6 | 3,903.2 | 4,466.8 | 8,539.2 | 64,401.8 |
| 60 and over | 4,210.8 | 6,601.3 | 10,812.1 | 0.0 | 49.0 | 49.0 | 454.7 | 11,315.8 |
| Under 50 | 26,686.9 | 35,521.0 | 62,207.9 | 563.6 | 3,952.2 | 4,515.8 | 8,993.9 | 75,717.6 |
| (Total all speeds) | | | | | | | | 166,596.1 |
| | | | | | | | | 242,313.7 |

Interstate Commerce Commission table showing the mileages operated by Class I line-haul carriers

basic data shows numerous errors in the revised summary, particularly in the duplication by some carriers of passenger-train mileages under different speed groups. After correction of the discovered errors our analysis of the basic data is shown in the accompanying table of mileages operated by Class I line-haul carriers.

With few exceptions the 75,717.6 mi. of track over which freight trains are operated at speeds of 50 m.p.h. or more are included in the 109,877.6 mi. of track over which passenger trains are operated at speeds of 60 m.p.h. or more and, accordingly, the discussion will deal mainly with the passenger train mileage and operation. The record shows that automatic train stop or train control is in use on 14,121.4 mi. of track; automatic cab signals on 8,107.1 mi.; centralized traffic control on 8,257.2 mi.; and radio or other train communication systems on 2,079.5 mi. All of the track mileage on which automatic train stop or train control, automatic cab signals, and centralized traffic control is in use is included in the mileage under "Automatic Block."

The Operation of Passenger Trains

Passenger trains are operated at speeds of 60 m.p.h. or more over 19,550.2 mi. of track under time-table and train orders only. This represents about 18 per cent of the total mileage of track over which passenger trains are operated at such speeds. No form of block signal protection is used on these 19,550.2 mi. of track and safety of operation is dependent entirely on strict observance by the train crews of time-tables and consistent and understandable train orders properly delivered.

There are 33,015.1 mi. of track over which passenger trains are operated at speeds of 80 or more miles per hour. Automatic train stop or train control or automatic cab signals are used on 6,608.5 mi. of such track, leaving 26,406.6 mi. of track over which passenger trains are operated at speeds of 80 m.p.h. or more, and the safety of operation is dependent upon the correct observance of wayside signals and/or time-tables and train orders properly issued and delivered.

Cost of Systems

Six representative railroads† submitted estimates of the present cost of installing certain types of protection on their lines. For automatic

† Atlantic Coast Line, Missouri Pacific, New York Central, Pennsylvania, Atchison, Topeka & Santa Fe, and Southern.

block signals these estimates ranged from \$4,200 to \$8,000 per mile of track for single-track lines and from \$3,000 to \$5,850 per mile of track for multiple-track lines; for automatic block signals with intermittent inductive train control from \$400 to \$700 per mile of track in addition to the cost of the automatic block signals, plus \$2,000 to \$2,300 per locomotive; for automatic block signals with continuous cab signals, the only estimate, that of the Pennsylvania, \$5,000 per mile of track for single-track lines and \$4,000 per mile of track for multiple-track lines in addition to the cost of the automatic block signals, plus \$2,260 per locomotive; for automatic block signals on multiple tracks with continuous automatic speed control, the only estimate, that of the Atchison, Topeka & Santa Fe, \$3,000 per mile in addition to the cost of the automatic block signals, plus \$5,000 per locomotive; and centralized traffic control \$11,000 or \$12,000 per mile of track for single-track lines and \$8,750 per mile of track for multiple-track lines. The wide variations in some of the estimates of cost are undoubtedly due to the differences in the character of installations covered thereby. The averages of the estimates for automatic block signals approximate \$6,000 per mile of road for single-track lines and \$4,000 per mile of track for multiple-track lines and correspond closely to the estimates of the Pennsylvania and Atchison, Topeka & Santa Fe.

Conclusions

The tendency in recent years has been greatly to increase the speeds of trains, and these increases generally has been accompanied by increases in the number of trains. Unquestionably, the higher speeds and the greater number of trains have increased the accident hazards and necessitate more and better protection for the traveling public and the train employees. While this need for better protection is more apparent in areas of high train density, it is generally required throughout the country. We are of the opinion that as a general rule when freight trains are operated at speeds of 50 or more miles per hour, or passenger trains at speeds of 60 or more miles per hour, operation by time-tables and train orders alone, with no means of maintaining a space interval between the trains and safety dependent wholly on strict observance by the train crews of time-tables and consistent and understandable train orders properly delivered, does not afford adequate protection. As here-

before shown, there are 19,550.2 mi. of track on which passenger trains are so operated at speeds of 60 or more miles per hour, on 4,132.2 mi. of which the speeds are 70 or more miles per hour. In our opinion adequate safety requires that operation at such speeds should be under an automatic or manual block signal system, preferably supplemented by time-tables and train orders.

More Protection for Over 80 M.P.H.

We are further of the opinion that trains operated at speeds of 80 or more miles per hour should have protection in addition to that afforded by a manual block signal system or an automatic block signal system with wayside signals, and that such additional protection should be either continuous cab signals, automatic train stop or train control, or both cab signals and automatic train stop or train control. We are not unmindful of the fact that speeds of trains alone do not furnish an adequate yardstick for determining what additional protection is necessary on all railroads with their varying geographical, weather, operating, and other conditions. It may be that under some circumstances the additional protection referred to above will not be sufficient, and it also may be that under other circumstances the requirements for such additional protection should be modified. Any respondent will, upon request made within 60 days after the entry of an order of general application, be given a hearing to show that it should be excepted from the order or the order modified with respect to it.

Scope of Protection

The additional protection outlined above would require the installation of automatic train stop or train control or automatic cab signals on 25,215.5 mi. of passenger track now operated by automatic block signals and without such additional protective devices, on 398 mi. of passenger track now operated by manual block signals, and on 1,542.8 mi. of passenger track now operated by time-tables and train orders only, a total of 27,156.3 mi., and the installation of manual or automatic block systems on 18,586.5 mi. of passenger track. In addition, there would be affected a relatively small additional mileage over which passenger trains are not operated at speeds of 60 or more miles per hour but freight trains are operated at speeds of 50 or more miles per hour under the time-table and train order system, on which mileage manual or automatic block signal sys-

tems would have to be installed.

While the cost to respondents for such installations would not be insignificant, any respondent subject to the order which we enter may make such order inapplicable to it by making appropriate reductions in the speeds of its trains.

Commissioner Mitchell Concurs

MITCHELL, *Commissioner*, concurring:

Fast transportation is desirable, but the safety of passengers and employees must come first. This report holds that where passenger trains operate at 60 or more miles per hour and freight trains at 50 or more miles per hour, adequate safety requires the installation of either automatic or manual block signals; and that where the speed is 80 or more miles per hour such block signals must be supplemented either by continuously-controlled cab signals or by an automatic train stop or train control system. The railroads have the choice of either installing the latest safety equipment or of lowering the speed of their trains. The report recognizes that under certain circumstances the requirements for such additional protection may have to be modified with respect to particular roads, and they are given 60 days from the entry of the accompanying order in which to petition therefor.

The requirements here laid down are rather drastic, and it may be that the effective date of the order will have to be postponed with respect to a number of the carriers affected. When the time comes for passing upon petitions with that objective, it seems to me consideration will have to be given, not only to the volume of traffic, but to the accident record and the financial condition of the respective petitioners.

The Order

At a session of the Interstate Commerce Commission, Division 3, held at its office in Washington, D.C., on the 17th day of June, A.D. 1947.

It appearing, that the Commission under date of May 20, 1946, instituted, on its own motion, an investigation to determine whether it is necessary in the public interest to require any respondent to install block signal system, interlocking, automatic train stop, train control and/or cab signal devices, and/or other similar appliances, methods, and systems intended to promote the safety of railroad operation upon the whole or any part of its railroad on which any train is operated at a speed of 50 or more miles per hour, and whether the Rules,

Standards and Instructions prescribed by the Commission's order of April 13, 1939 (49 CFR, Cum. Supp., 136), pursuant to the provisions of section 26 (now section 25) of the Interstate Commerce Act (49 U.S.C. 25) should be amended to include a revised definition of the term "medium speed" and a definition of the term "low (restricted) speed."

It further appearing, that all Class I and all switching and terminal railroads subject to the Interstate Commerce Act were made respondents to such investigation, and

It further appearing, that a full investigation of the matters and things involved has been made and that said division, on the date hereof, has made and filed a report containing its findings of fact and conclusions thereon, which said report is hereby referred to and made a part hereof:

It is ordered, that each respondent be, and it is hereby notified and required to install on that part or parts of its lines over which any passenger train is operated at a speed of 60 or more miles per hour, or any freight train is operated at a speed of 50 or more miles per hour an automatic block signal system which shall conform to the rules, standards and instructions prescribed by the order of the Commission of April 13, 1939 (49 CFR, Cum. Supp., 136), as herein amended, or a manual block system which shall conform to the following conditions:

A passenger train will not be admitted to the block when occupied by another train, except under flag protection; no train will be admitted to the block when occupied by an opposing train or by a passenger train, except under flag protection; and a train other than a passenger train will not be permitted to follow a train other than a passenger train into the block except when authorized by a train order, permissive signal or prescribed form, and when such movement is so authorized the following train must proceed prepared to stop short of a train or obstruction, but not to exceed 15 m.p.h.

It is further ordered, that the installations required by the next preceding paragraph shall be made as follows:

When such installations are to be made on 100 or less miles of track, they shall be made on or before December 31, 1948.

When such installations are to be made on more than 100 mi. of track, they shall be made on not less than 25 per cent of the miles of track, with a minimum of 100 mi., on or before December 31, 1948; on not less than 50 per cent of the miles of track, with a minimum of 200 mi. or the total

miles if less than 200, on or before December 31, 1949; on not less than 75 per cent of the miles of track, with a minimum of 300 mi. or the total miles if less than 300, on or before December 31, 1950, and on all miles of track on or before December 31, 1951.

It is further ordered, that each respondent be, and it is hereby notified and required to install on that part or parts of its lines over which any passenger or freight train is operated at a speed of 80 or more miles per hour an automatic train stop or train control system or automatic continuously controlled cab signal system which shall conform to the rules, standards and instructions prescribed by the order of the Commission of April 13, 1939, as herein amended.

It is further ordered, that the installations required by the next preceding paragraph shall be made as follows:

When such installations are to be made on 100 or less miles of track, they shall be made on or before December 31, 1948.

When such installations are to be made on more than 100 mi. of track they shall be made on 25 per cent of the miles of track, or 800 mi., whichever is less, with a minimum of 100 mi., on or before December 31, 1948; on 50 per cent of the miles of track, or 1,600 mi., whichever is less, with a minimum of 200 mi., or the total miles, whichever is less, on or before December 31, 1949; on 75 per cent of the miles of track, or 2,400 mi., whichever is less, with a minimum of 300 mi. or the total miles, whichever is less, on or before December 31, 1950; on 100 per cent of the miles of track, or 3,200 mi., whichever is less, on or before December 31, 1951, and on all remaining miles of track on or before December 31, 1952.

It is further ordered, that the definition of "Medium Speed" in the rules, standards and instructions for the installation, inspection, maintenance and repair of systems, devices and appliances intended to promote the safety of railroad operation in accordance with section 26 (now section 25) of the Interstate Commerce Act, prescribed by the order of the Commission of April 13, 1939, be, and it is hereby, amended to read as follows:

S 136.11 *Definitions.* * * *

(q) *Speed.* (1) *Medium.* A speed not exceeding one-half authorized speed, but not exceeding 30 m.p.h.

(2) *Low (Restricted) Speed.* A speed that will permit stopping short of another train or an obstruction, but not exceeding 15 m.p.h.

By the Commission, Division 3.
W. P. BARTEL, Secretary.