

# I. C. C. Modifies Train Control Order

## New Roads in Second Order Exempted, Permissive Feature of Train Stop Re-inserted in Specifications

ON Saturday, July 26, the Interstate Commerce Commission issued a decision, dated July 18, regarding the train control order No. 13413. In this decision the order entered on January 14, 1924, is modified as to suspend, with respect to those roads named for the first time in said order, the effective date of the order until further action of the Commission. This decision also provides that the original report and order, 69 I. C. C. 258, be modified so as to permit the use of the permissive or manual control feature in connection with automatic train-stop devices. An abstract of the order follows:

### ORDER

It appearing; that the Commission upon consideration of the record in this proceeding and of its order entered herein on January 14, 1924, and of the petition filed March 3, 1924, by certain carriers required by orders in this proceeding to install train-control devices upon designated portions of their respective roads, entered its order dated March 21, 1924, reopening this proceeding for hearing with respect only to said order of January 14, 1924, as it affects the carriers hereinafter named;

It is further appearing; that a full investigation of the matters and things involved has been had, and that the Commission 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 the effective date of said order of January 14, 1924, be, and it is hereby, suspended until further order or orders of the Commission, so far only as it applies to the following carriers:

(Here followed the names of the roads that were mentioned for the first time in the order of January 14, 1924, with the exception of the three roads previously excused;)

Bangor & Aroostook; C. C. & O.; Central New England; C. of G.; Charleston & Western Carolina; C. & S.; D. & R. G. W.; E. P. & S. W.; F. E. C.; F. W. & D. C.; G. T. W.; G. C. & S. F.; G. M. & N.; H. V.; H. & T. C.; International-Great Northern; Kansas, Oklahoma & Gulf; Lehigh & New England; Louisiana & Arkansas; Louisiana Western; L. H. & St. L.; Maine Central; Midland Valley; M. & St. L.; M. St. P. & S. Ste M.; M. K. & T.; M. K. & T. of T.; M. & O.; N. C. & St. L.; N. O. T. & M.; Norfolk Southern; Northwestern Pacific; O. S. L.; Rutland; St. L. S. W.; S. A. L.; S. P. & S.; T. & P.; Virginian; Wabash; W. P.; Y. & M. V.

It is further ordered; that paragraph No. 1 under the heading of "Functions" in the specifications and requirements for automatic train-stop devices prescribed by the order of June 13, 1922, be, and it is hereby modified to read as follows:

#### 1. Automatic train stop:

(a) Without manual control by the engineman requiring the train to be stopped; after which the apparatus may be restored to normal condition manually and the train permitted to proceed.

(b) Under control of the engineman who may, if alert, forestall the application of the brakes by the automatic train-stop device and control his train

in the usual manner in accordance with hand signals or under limits fixed by train order or prescribed by the operating rules of the company.

It is further ordered; that in all other respects the said order of January 14, 1924, shall remain in full force and effect.

This decision by the I. C. C. is the result of the hearings on train control held before the Commission during the first two weeks of May. A report was submitted by the Commission on May 31, and the decision was given on July 18. The report itself together with the concurring and dissenting opinions of the several commissioners presents a review of the train control developments to date and gives some interesting views of these men on the question involved. An abstract of the report of the commission follows:

### REPORT OF THE COMMISSION

#### BY THE COMMISSION:

In the original report in Automatic-Train Control Devices, 69 I. C. C. 258, a proceeding under section 26 of the Interstate Commerce Act, we prescribed and adopted specifications and requirements for the installation of automatic train-stop or train-control devices and required 49 carriers to install such devices. The order was entered on June 13, 1922, and is hereinafter called the first order. The installations are to be completed by January 1, 1925. On January 14, 1924, we issued a further order, hereinafter called the second order, requiring 47 of the 49 carriers to install such devices upon an additional passenger locomotive division on or before February 1, 1926. This second order also requires 45 other roads, not included in the first order, to make installations of such devices upon designated portions of their respective roads on or before February 1, 1926.

On March 3, 1924, 88 of the carriers filed a joint petition requesting that a hearing be granted them; that the second order be vacated and set aside; that an extension of time for compliance with the first order be granted; and that certain modifications of that order be made. We exempted three roads from the provisions of the second order, namely, the B. & L. E., G. & S. I., and the N. O. G. N. On March 21, 1924, we reopened the proceedings for hearing with respect only to the second order, as it affects the remaining 42 roads, and denied in all other respects the petitions of the carriers. These 42 roads are the respondents in the present proceeding.

Hearings have been held at which a general committee representing substantially all the respondents presented evidence. Representatives of train-control equipment companies also appeared and gave testimony. At the close of the hearing the case was orally argued before us.

#### Progress Made on Tests and Installations

The record indicates that progress has been and is being made in eliminating undesirable features in operations, upon the installations in regular service and upon the test installations of various types, although this progress has not been such as might have been made if the carriers generally during the past two years had made larger installations and more extensive tests.

At the hearing held on March 20, 1922, attention was called to 32 undesirable features on the C. & O. automatic train control installation of the ramp type; 20 of these have since been corrected.

The installation of the continuous-control inductive device upon the Lewistown branch of the Pennsylvania, a distance of 54 miles, which was put in regular service on July 11, 1923, has also been further developed. Since the installation began 25 changes have been made in the device. It was testified by the signal engineer of that road that the device has passed the experimental period and is in the early development stage; that very few false clear failures have occurred; but that there were 368 other failures for the nine months' period ended March 31,

1924. It was further testified that although many of these failures were repeated failures in the same part, or parts, of the equipment, they do not indicate fundamental defects in the principle of operation but are remediable, and that the solution for most of the troubles is in sight.

Nearly two years have elapsed since we found, as a matter of fact after a long series of tests, that devices of the ramp type were practicable under actual service conditions; that they properly perform the functions for which they are designed; and that, when properly installed and maintained, they increase the safety of train operation. We also said that there was expectation of satisfactory tests and operation of the other types of train control devices. Many of the carriers, however, have decided not to install ramp type devices and have turned to other devices. Expressing the opinion that the ramp type will ultimately prove inferior, they have devoted the greater part of the last two years in testing or awaiting developments of the inductive type. The results of these tests have not in all cases been entirely satisfactory, but many of the carriers are going ahead with permanent installations of inductive devices, particularly of the continuous control type, for the reason, as they state, that such devices will demonstrate their superiority once the experimental stage, which they assert still continues, has been passed.

The extent to which the carriers named in our first order, in addition to the C. & O., the C. & E. I. and the C., R. I. & P., have progressed in making the permanent installations required by that order is as follows:

A. T. & S. F., a continuous control inductive type between Chillicothe, Ill., and Shopton, Ia., 104 miles, which is about 82 per cent completed.

D. L. & W., a continuous control inductive type between Elmira and Buffalo, N. Y., 146 miles, about 40 per cent of the roadside equipment being ready for installation.

N. & W., a continuous control inductive type between Shenandoah, Va., and Hagerstown, Md., 107 miles; wiring and signal system, 45 per cent complete, transmission line about 60 per cent complete.

Reading, a continuous control inductive type between Camden, N. J. and Atlantic City, 55.5 miles; about 30 per cent of the material for the train control installation along the right of way is on the ground and about 20 per cent of the poles for a new pole line have been erected, and certain changes in signals have been made.

C., C. O. & T. P., intermittent inductive governor cam type, between Ludlow and Somerset, Ky.; preliminary section of 35 miles, double track, from Ludlow to Williamstown is under construction and the carrier advises that it will be completed in a few months.

S. P., intermittent inductive type from Oakland to Tracy, Calif., 75 miles; about 38 per cent complete.

G., H. & S. A., intermittent inductive type from Rosenberg to Glidden, 51 miles; between 6 and 7 miles have been installed and about 60 per cent of the material has been received for the balance of the installation to Glidden. Seven locomotives are equipped. It is expected that the installation will be completed by November 1, 1924.

In addition to these installations, short test sections are installed as follows:

B., R. & P., intermittent inductive type on 15 miles of road.

C. & A., intermittent inductive type on 14 miles of road.

C. & N. W., intermittent inductive type on 16 miles of road.

D. & H., continuous control inductive type on 3 miles of road.

Erie, ramp type, 6 miles of road; continuous control inductive type 1½ miles of road.

M. P., intermittent inductive type, 14 miles of road.

N. Y., N. H. & H., continuous control inductive type, 10.5 miles.

Pennsylvania, continuous control inductive type, 54 miles.

St. L.-S. F., intermittent inductive type, 10 miles.

U. P., ramp type, intermittent inductive type and continuous control inductive type, 18 miles, one engine equipped with the 3 devices.

The carriers claim that undesirable features exist in all the devices. In the report in *Automatic Train-Control Devices*, supra, we considered this claim and pointed out that "the discovery and elimination of undesirable features is a natural growth, inevitable in the development of the art." The development work along this line, however, has not proceeded as rapidly as we had reason to expect. As shown by the record of actual installations, many carriers included in our first order have not pursued the work of installation with due diligence or made efforts to eliminate, under service conditions, the undesirable features.

We pointed out in *Automatic Train-Control Devices*, supra, the fact that while much has been done to furnish engineers with reliable information by means of wayside signals of the conditions of the track ahead, progress has been slow in providing means automatically to compel obedience to the signal indications. We cited 80 collisions which we investigated in the period from January 1, 1911, to March 31, 1922, which occurred upon lines equipped with automatic block signals, due directly or indirectly to the failure of engineers to observe or to be governed by signal indications. The accidents caused the death of 416 persons and injury of 1,837. From March 31, 1922, to March 31, 1924, we have investigated 27 such accidents in which 85 persons were killed and 580 injured. In one of these accidents 34 persons were killed and 186 injured. From July 1, 1911, to March 31, 1924, we have investigated a total of 306 headend collisions, and 251 rear-end collisions, including the 27 just referred to. These resulted in death of 1,895 persons and injury

to 10,267. The extent to which automatic stop or train-control devices would have prevented these accidents is uncertain, but it is highly probable that they would have prevented many of them.

### Features of Ramp and Continuous Types

As has been indicated, many of the respondents express the opinion that devices of the ramp type are not the devices that will ultimately be adopted, and that, therefore, they do not desire to install them. Furthermore, many of the roads, as in the hearings in 1922, insist upon the continuous-control type over the intermittent, whether ramp or inductive, because of the possibilities of development which they claim to see in the former.

It is urged, also, that on heavy traffic lines the use of a continuous-control device will not limit the capacity of the line to handle the traffic to the same extent as an intermittent device; and that the former will immediately indicate in the locomotive cab when a condition ahead calls for restriction in speed, and likewise immediately indicate when the restriction is removed. This, they say, will enable the engineer to take prompt advantage of opportunities to increase his speed, instead of waiting for an indication at a more distant point on the line, as would be the case with an intermittent device.

In the original case the carriers offered the same objection that is made here, that automatic train-control devices had not been sufficiently developed to warrant their installation. After full investigation and argument, we found:

\* \* \* Our investigations have shown that the art of automatic train control has long since passed the experimental stage. \* \* \*

The 15 years of investigation and study and the results obtained in the actual employment of these devices over periods of years upon some of the railroads have clearly demonstrated the practicability of and the necessity for automatic train stop or train control. The time has now arrived when the carriers should be required to select and install such devices as will meet our specifications and requirements. \* \* \*

After a further exhaustive hearing of the petition now under consideration, we see no reason to change the views there expressed, except that we find that further material progress has been made in the development of many of these devices, especially where they have been permitted to be installed and operated. \* \* \*

### Permissive, or Manual, Control

In *Automatic Train-Control Devices*, supra, we said:

"The essential safety function of any automatic train stop device is to stop a train where a dangerous condition exists ahead of the train, when the engineer for any cause fails to take proper action to stop."

In that report we eliminated from our specifications the provision under which with an automatic train-stop device the engineer, if alert, would be permitted to forestall the application of the brakes by means of the automatic stop and proceed under limits fixed by train order or prescribed by the operating rules of the company, or in accordance with hand signals. At the original hearing, certain of the respondents objected to the elimination of this feature. The committee representing all the respondents now ask that it be restored for the reasons, as they contend, that without it they are compelled for operating reasons to use some form of speed control. They further contend that the introduction of this permissive feature would eliminate many of the objections that the operating officers now make to the so-called inflexibility of automatic train-stop devices. It is not necessary in all cases and at times it is even unsafe, the carriers contend, to stop long freight trains by means of the automatic application of the brakes at a stop signal, and in this contention they are supported by representatives of the employees. \* \* \*

The matter of providing for the permissive feature in automatic train-stop devices was considered in our original report. While there was testimony in that case both in favor of and against the permissive feature, it was inconclusive. At the hearing in this case the testimony was overwhelmingly in favor of the permissive feature. Operating men almost without exception favored the adoption of such a feature and expressed the opinion that it was sufficient to require the engineer to take some affirmative action to indicate that he is alert, has knowledge of the signal indication, and is operating his train in accordance with the operating rules. The committee representing the carriers were a unit in favor of the permissive feature. The chief operating officer of the Rock Island and one of the locomotive engineers from that road who appeared as witnesses for the train control companies favored the use of the permissive feature and some of the representatives of the train control companies stated that it was a desirable addition to a train-stop. Other representatives expressed a contrary view. Certain carrier officials recognize the possibility that this feature might lead to carelessness, but believe that it should be left to the judgment of the management of a road to decide whether a permissive should be employed under certain operating conditions.

The installation on the C. & E. I., which has been in operation on a full division since 1914, and the installation on the

C. & O., which has been in operation since 1917, both use the permissive feature and no instance has developed where safety has been adversely affected thereby. Both of these companies favor its continued use for reasons above stated, which they have set forth at the hearings and in petitions which they have filed for a modification of our first order in this respect.

We are of the opinion that the evidence now before us warrants a modification of our former conclusion with respect to this permissive feature, although we shall continue to keep this matter under close observation. Paragraph No. 1 under the sub-head "Functions," of our first order will therefore be modified to read as follows:

(See order give hereinbefore.)

The above modification requires no departure from the specifications and requirements contained in our first order; it merely provides an alternative feature which may be adopted, if desired.

Other objections on the part of individual respondents to the installation of automatic train-control devices upon their particular roads are based primarily upon two grounds: (1) the alleged lack of any necessity for such devices, either from an operating or safety standpoint, and (2) the cost of installation which, they contend, is great and would have a harmful effect upon their present financial situation.

In order to obtain detailed information with respect to actual traffic conditions, number of trains operated, both passenger and freight, the number of locomotives, the alignments and grades, and other specific information, including estimated cost of installing automatic train-control devices, a questionnaire was prepared and each of the respondents was requested at the beginning of the hearing to furnish the information desired. This information has been tabulated and analyzed.

### Variations in Cost of Different Systems

The estimates of the probable cost of installing automatic train-stop or train-control devices upon respondents' lines are based, for the most part, upon information gathered by the operating and engineering forces of the several roads. The average cost per locomotive equipment installed, according to respondents' estimates, ranges from \$1,020 to \$1,360 for the ramp type devices; from \$1,300 to \$2,500 for the intermittent inductive devices; and from \$2,400 to \$3,400 for continuous inductive devices. These costs include speed control. The locomotive equipment for one device of the intermittent inductive type, for simple automatic stop without speed control, was estimated to cost \$530.

The average cost per mile of road, single track, is estimated at from \$1,120 to \$1,180 for the ramp devices; from \$1,080 to \$1,705 for intermittent inductive devices, and from \$1,160 to \$4,500 for the continuous-control inductive devices.

The total cost of installation of the ramp type device, superimposed upon a block signal system previously installed, now in regular service upon the C., R. I. & P. upon a full passenger locomotive division of 165 miles, comprising 330 miles of track and 102 locomotives, was \$235,789, or \$1,429 per mile of double track and \$714.50 per mile of single track.

The cost of installing automatic block signals where such signals are not now installed is estimated at from \$2,500 to \$4,500 per mile of road. It is estimated that where automatic train-control devices are installed at the same time as automatic block signals the cost of installing would be reduced. For an installation of an intermittent inductive device upon the M. & O., for example, upon a passenger locomotive division of 135 miles and 40 locomotives, the cost of installing automatic block signals is estimated at \$4,500 per mile; for automatic train-control about \$1,800 per mile for the roadside equipment, but \$1,600 per mile if the train-control apparatus is installed at the same time as the automatic block signals.

From the estimates that have been submitted by respondents it appears that the cost of installing upon their roads intermittent type devices is much less than the cost of installing devices of the continuous-control inductive type which many of the carriers are planning to select. Our specifications and requirements are broad and we believe can be met by much simpler devices at lower costs. On the lines of most of the respondents it would seem that these simpler and less expensive devices would be adequate for many years to come.

### May Institute Large Tests

At the hearing and upon oral argument, it was suggested, on behalf of all the carriers now required to install train control devices, that a joint committee of representatives of this commission and of the carriers be appointed to decide upon and select such train-stop and train-control devices for test purposes as the joint committee may deem to be substantially within our specifications and requirements and worthy of a practical test. \* \* \*

The carriers suggest, that, pending these tests our second order should be vacated and set aside; that the time fixed for the completion of installation under our first order, namely, January 1, 1925, should be extended to January 1, 1926; that the installation already made, or to be made, under the latter order be subject to inspection and approval by the joint committee when an installation of ten miles of road and ten locomotives has been made; and that complete installation thereof be dependent upon the report of the committee and this commission. \* \* \*

We have given consideration to the particular circumstances and conditions affecting the installation of automatic train-stop or train-control devices upon the lines of the respondents herein and in view of the action which we have already taken with respect to installation of such devices upon the lines of the larger carriers and the extent thereof, we have concluded that, with respect to the 42 carriers now before us, our second order should not be vacated and set aside as prayed by said respondents, but that the effective date thereof should be suspended until our further order or orders herein.

### Opposing Opinions of Commissioners

The report of the Commission as given above was not approved unanimously by all the members of the Commission nor was the order announced herewith issued without considerable differences in opinion. Commissioner Esch rendered a dissenting opinion in which Commissioners McChord and Cox concurred. Commissioner McManamy rendered a concurring opinion giving the reasons of the majority for the action taken. Abstracts of these two opinions follow:

#### Dissenting Opinion

ESCH, Commissioner, dissenting.

I dissent from the finding which changes paragraph No. 1, under the sub-head "functions," of our first order. I dissent also from the finding that this commission should cooperate with a committee of the carriers in selecting and testing devices, because the time for that is past and we so found in our report adopted over two years ago. There is not now, has not been, and will not be in the future, any obstacle in the way of the carriers testing any device; for this they need no license from us; they may do so without our or any one's permission, and they know this.

Manual control of an automatic train-stop device permits an engineman to forestall an automatic brake application at a danger point and proceed according to his own judgment. It, therefore, nullifies the essential purpose of the automatic device. It permits an engineman to run by stop signals, which is a practice frequently indulged in, as our accident reports show, and a practice that is the cause of many train collisions. We refused to permit its use under our first order upon the ground that it is dangerous. The reasons for its use that are given in the present proceeding are the same as those of two years ago, and in them I can find no reason to justify the majority in reversing the unanimous judgment by which this commission condemned it.

The present record, on the contrary, affords ample reason to sustain that judgment, because the witnesses for the carriers who claim that manual control is desirable consider only the operating features and not the safety features. One of their chief witnesses stated that while it was desirable for operating reasons it was not desirable from a safety standpoint. Witnesses for certain ramp type devices, who were at first in favor of using a manual control with their devices, stated at the hearing that such a feature is not desirable.

I am opposed also to the majority approval of the plan of the carriers for experimentation and tests of devices by a joint committee in cooperation with this commission. We found over two years ago that these devices are past the experimental stage and that the carriers should be required to install them. Our order was based upon that finding and under it some progress has been made in permanent installations of devices. This progress will be halted until the committee is through with its experiments.

No period of time is specified for the completion of the work of the committee. Our former experience with joint committees convinces me that a long time will elapse before any conclusions or recommendations are made by this committee. \* \*

Intermittent type devices have been greatly improved during the past few years. With the exception of three roads that have installed devices of the ramp type the carriers generally have definitely stated to us that they will not install this latter type. Thus they discard the successful results of years of effort

to develop a practicable automatic train-control device, which upon final test we have found meets all our requirements. In view of the expressed attitude of the carriers the commission's decision and conclusions appear to have but little weight. In view also of this decision of the carriers—if they are to be permitted to adhere to it—any further expenditure of either time or money experimenting with this type of device would simply be wasted, notwithstanding the fact that it has been found by us to meet every requirement, and that we have approved its installation. This would be true even though a joint committee should supervise such experimentation.

The majority report, furthermore, does not sufficiently emphasize the fact that many carriers are going far beyond the necessary requirements of our orders when they plan, as the record shows, to adopt highly complicated and expensive continuous-control devices instead of less expensive ones. Such continuous-control devices have not yet been perfected and as to their ultimate practicability carriers' experts even expressed doubt. Many carriers have selected the continuous-control type although the testimony shows that this kind of control is primarily intended for use on heavy congested lines and that it is necessary only on such lines if necessary at all. This clearly appears from the testimony of carriers that are foremost in advocating this type. No general necessity for installing such a device has been shown, nor anything to indicate that the great majority of the carriers named in our orders, and they constitute the largest roads in the country, must install it as they would have us believe.

I wish to call attention to the situation which may arise in connection with the enforcement of existing orders, by amending the requirements to permit the use of a manual control feature. Section 26 of the Interstate Commerce Act, provides that our order requiring a carrier to install automatic train-stop or train-control devices, which comply with specifications and requirements prescribed by us, shall be issued and published at least two years before the date specified for its fulfillment. Many of the carriers have taken the stand that our refusal to permit the use of manual control in connection with train-stop devices in our order of June 13, 1922, has prevented them from using the plain automatic stop and forced them to use some form of speed control. The change in the requirements now made removes this obstacle to the use of an automatic stop. The question then arises as to whether the carriers can, under the law, require us to give them a further two-year period within which to install an automatic train-stop in accordance with the new order and specifications. Thus an opportunity for more procrastination and delay.

In its original report in this case, June 13, 1922, this commission gave the history of what had been done by Congress and the commission with respect to automatic train-control. As there stated, Congress and this commission has been at work for more than 18 years in an endeavor to persuade and require the carriers to install automatic train-control, with scant results. I feel that the action taken by the majority will be a backward step, very greatly retarding the work that has already been begun.

We had concluded prior to our first report, (1) that the need for automatic train control devices had been clearly shown; and (2) that devices had been developed and used under actual service conditions that met this need in a practical manner. These conclusions were and still are, the bases for our orders in this case. They are the results of over 15 years of study culminating in many months of tests and observations under actual service conditions. The facts are too well known to need further discussion.

The general tone of the concurring opinion conveys the thought that the commission has gone too far with respect to the installations it has ordered. When the first order was before us for consideration in the latter part of 1921, the matter was very fully considered and discussed. It was decided then that the so-called \$25,000,000 roads should be required to make installations. These roads were selected because of their traffic density and the risk of accidents from train collisions. I do not see what good will result from a discussion of this policy now in connection with the present order. The requirements of the first and second orders as they concern the original 49 roads are clearly not in issue. They ought not, therefore, be brought into this case even by inference. The matter of ordering installations of automatic block signals is not in issue and is outside of the record. We have relieved the 42 respondents, the only ones before us, from any present obligation under the order and the question of further installations is in abeyance.

I think the concurring opinion in part is an expression of dissent from the policy of the commission adopted in the first and second orders. That is the effect, at any rate, and I doubt the propriety of it.

Commissioner McManamy compares the time allowed for compliance with our first order with the time allowed for the installations of safety appliances other than automatic train con-

trol. The application of safety appliances was required upon all roads, therefore a longer period for compliance was necessary. The first train control order allowed two and one-half years for the installation of devices upon 49 passenger engine divisions, a relatively small part of the mileage of the country.

There is a reference to the permissive feature on the C. & O. It is stated that the permissive feature has been found essential in order to avoid the stopping of trains in tunnels, bridges, etc., where such stops are undesirable. As far as such undesirable stops are concerned when a plain stop device without the permissive feature is used the engine apparatus may be cut out of service, without the necessity for the engineman to get down and manually release or reset the device, by the breaking of a seal in the cab. Such undesirable stops are due to some failure of the device; the reset feature would not in such cases restore the device and therefore the action necessary in order to proceed would be to cut out the device in the cab.

Reference is made to the fact that the human element is not eliminated from the devices. The specifications under design and construction have guarded against the failure of the human element as far as possible by providing as one of the essential requirements, as follows:

3. The apparatus shall be so constructed that it will, so far as possible, perform its intended function if an essential part fails or is removed, or a break, cross, or ground occurs in electric circuits, or in case of a failure of energy.

This requirement means that if any part of the device fails it must be so designed as to cause a stop.

I am authorized to say that Commissioners McChord and Cox concur in this expression of dissent.

### Concurring Opinion

McMANAMY, Commissioner, concurring:

While I am in accord with the majority report, I desire to correct any possible misapprehension that may result from the dissenting interpretation of that report, and also to direct attention to certain matters upon which more emphasis might well be laid. I was not a member of the Commission at the time the first order was approved. At the second hearing much testimony was introduced relative to the development, cost, value, advantages, or disadvantages arising from the use of train control and a more complete record made than on the original hearing. It is, therefore, proper for me at this time to express my individual views on the entire subject. \* \* \*

\* \* \* On January 1, 1924, there were 41,537.1 miles of road equipped with automatic block signals and 64,364.5 miles equipped with non-automatic block signals, or a total of 105,901.6 miles of track protected by block signals. This is approximately 50 per cent of the miles of road over which passenger trains are operated. \* \* \*

In confining our order to train-stop and train-control devices, we have given no consideration to the need for extension of automatic block signal systems, disregarding the fact that section 26 of the Transportation Act applies with equal force to that device. \* \* \*

Clearly Congress contemplated that each case should be investigated and that the particular safety device which we order installed would be the one needed to furnish adequate protection under the operating conditions existing on that particular road or division.

During the years 1921, 1922, and 1923, 172 collisions were investigated by our Bureau of Safety. Of these, 69 were in block-signal territory, and 103 in territory not protected by block signals. Block signals are usually on lines of heavy traffic density, while the roads not protected by block signals are those of light traffic density, including branch lines, where but two or three passenger trains each way are operated. In spite of the greater traffic density, there were but 69 collisions in block-signal territory as against 103 in territory not so protected. Our safety reports show that only 34 out of the total of 172 collisions were due to failure to observe signals. Surely on this showing we are not justified in wholly disregarding the lack of block signals on 50 per cent of the mileage of the country, and confining our attention entirely to train-control or train-stop devices.

Installations should be required in such a way as to suit the needs of the particular carrier. Installation of train-control might be proper in one case and unreasonable in another because of differences in speed of trains, the density of traffic, financial condition, etc. \* \* \*

\* \* \* While from a mechanical standpoint train-control may operate satisfactorily, it still must be adapted to meet varied operating conditions and requirements. I do not mean that safety should be disregarded, or that essential safety devices should not be required. But we must not overlook the fact that the ultimate cost of train-control installations will be very great, and that it will all represent a capital charge on which under section 15a, standard return must be paid, and this represents a burden on

the transportation of the country which should not be required unless it can be fully justified. \* \* \*

When we consider the tremendous expenditure involved and the development work yet to be done, the time provided in the original order is to my mind clearly inadequate and is out of line with our action in similar cases. For these reasons I favor a more liberal policy in the matter of time to meet our requirements.

The dissenting opinion objects to the conclusions of the majority, if I interpret it correctly, in three principal respects:

- (1) That we erred in authorizing the use of the permissive or manual control in connection with train-stop devices;
- (2) That we should not give approval to the carriers' plan for further tests in cooperation with us; and
- (3) That we should criticize the carriers for not selecting simpler devices already approved by us instead of further experimenting with more complicated ones.

Taking up these points, one by one, a review of the events leading up to the adoption of our original order and a study of the record of the first hearing convinces me that the elimination of the permissive feature in connection with train-stop devices was not justified. Clearly the testimony at the second hearing, abundantly supports the use of the permissive feature and amply warrants the reversal of our former finding in that respect.

Prior to the first hearing, our Bureau of Safety, under our direction, had been intensively studying the question of automatic train-stop for 18 years. I favored the permissive feature. During Federal control, the committee representing the Railroad Administration, after exhaustive study, also favored the use of the permissive feature. At the first hearing, representatives of the railroads favored the use of the permissive feature, while certain representatives of train-control devices opposed it. The train-control people, however, were not unanimous either at the first or second hearing against it. At the time of the first hearing the installations on the C. & E. I. and C. & O. both included the permissive feature.

I am unable to accept the statement in the dissenting opinion that:

It therefore nullifies the essential purpose of the automatic device. It permits the engineman to run by stop signals, which is a practice freely indulged in as our accident reports show, and is a practice that is the cause of many train collisions.

A check of all our accident investigation reports will not show a single case where the use of the permissive feature has caused a train collision. The first actual service installation of automatic train-stop was on the C. & E. I. in 1914, where it has been in use continuously since that time. This device has the permissive feature and not a single accident of any kind has been attributed to its use. On the C. & O. a train-stop device, including the permissive feature, has been in service since 1917. The permissive feature has been found essential in order to avoid the stopping of trains in tunnels, cuts, on bridges, or other places, where it would be dangerous, if not impossible, for the engineman to get down and manually release the device. On the C. R. I. & P. a train-control device has been in service since 1920. Our reports do not indicate any better results in the way of safety from this installation than from the others.

Generally speaking, accidents on roads equipped with block signals are due to one of three causes: (1) The failure of signals to act; (2) the failure of employees to observe and understand the signals; and (3) failure of employees to obey the signals when understood and observed. The failure of signals to perform their functions is infrequent and the possibility of accidents from this cause is remote. The failure to obey signal indications that are seen and understood is also rare. Failure to see or understand signals may be due to diversion of attention, physical incapacity, smoke, fog, snow, etc. The permissive feature would not interfere with the performance of train-stops when the engineman fails to observe or understand the signals. It would still enforce the stopping for unknown dangers. It would only permit him to forestall the stop and use his judgment in proceeding under the rules when he has been warned of an existing danger.

There is abundant evidence that the train-stop system without the permissive feature is unsafe to control trains on grades, particularly freight trains, and that even a train-control device of the most improved type may prove to be unsafe, due to the fact that the control of heavy trains on grades is an extremely difficult task, requiring the utmost skill. \* \* \* Any attempt at such dual control of heavy freight trains on grades invites disaster.

Both at the original and at the recent hearing, the testimony of all operating officials of the railroads was uniformly to the effect that the train-stop should be equipped with a permissive feature to enable enginemen to observe operating rules and hand signals, which often conflict with and are superior to the indications of any automatic device. They all stated that without such a permissive feature the train-stop becomes impracticable. The argument against the permissive feature is that it permits

to enter into the device the human element which the train-control was designed to prevent. But the human element is not eliminated. These devices are made by men, cared for by men, and operated by men, therefore the human element still remains. If experience shows that the permissive feature does not fulfill its purpose we can at any time require its elimination.

The dissenting opinion states that our offer to cooperate with the carriers in further tests will result in procrastination and delay in the installation of train-control and train-stop devices. This statement is founded on a misapprehension of the majority report. The majority report simply states that we are willing to cooperate, to the extent of our ability, with the carriers in any series of tests that they may desire, realizing that safety devices have not yet reached their fullest stage of development, and that it is our duty to continue to aid in investigation and research for the further development of the art, and in the interest of the desirable standardization of devices. We specifically state that this offer will not be permitted "to serve as an excuse for delay in the installations required by our orders." Surely it is not improper to cooperate and assist in such investigation and research work as may be necessary to promote the art of train control, particularly when every installation must be made in accordance with our specifications and requirements, and subject to our approval. In the interest of economy, if for no other reason, the carriers should be kept informed at all times as to what devices would, or would not, meet with our approval so that unnecessary expenditure would not be made in installing devices that might be finally disapproved.

The belief is expressed in the dissent that the modification of the order as to permissive control may automatically give the carriers two years additional time. As pointed out in the majority report, the order makes no additional requirements, but only offers an alternative which relaxes our former requirements in one respect. In my opinion, there is no legal basis for an extension of time because of this modification.

The dissenting opinion would have us criticize the carriers for not proceeding to install the simpler types of devices which we have approved instead of experimenting further with more complicated and more costly types. As stated, the difficult question yet to be solved is to install the train-control systems in such a manner that adequate protection will be provided without interfering with the normal operation of trains. Interference with operation by decreasing track capacity on congested railroads is a serious matter. Almost all the carriers claim that the intermittent contact type of device is not correct in principle and that other types, which function by non-contact, will receive greater development in the future. Their greatest objection to the contact type of device is that the impact shocks between the train and roadside apparatus, with the trains moving at high speed, are severe; and that due to oscillation of the train the operation of the device is liable to be interfered with. The carriers object to obstructions along the right-of-way and the possibility of damage to the roadside apparatus by brake beams or other parts of the train that may be dragging, or damage to train apparatus by obstructions along the right-of-way or on the roadbed. The continuous devices are designed to give an immediate indication on the train of any change in operating conditions so that the engineman will not have to wait until he approaches the end of the block to accelerate his speed. This, the carriers contend, will go far towards the elimination of the objection that the devices now reduce track capacity in congested areas.

Under such conditions we should not even by inference criticize the carriers for their failure to install a particular type of device. The device should be selected on its merits with due regard for the conditions under which it must function, and the responsibility for its selection, installation and performance should rest initially with the carriers. Our interest should be concentrated upon results.

### Signal Section—Fall Meeting

The Signal Section of the American Railway Association will hold its fifteenth meeting at the New Ocean House, Swampscott, Mass., on Tuesday, Wednesday and Thursday, September 23, 24 and 25, the sessions to begin each day at 9 a. m. summer time. The secretary suggests that all members should reach Swampscott on the evening of the 22nd. He announces that Wednesday, September 24, is set aside for the general discussion of automatic train control. Rates at the hotel, on the American plan, range from \$8 to \$10 a day. Swampscott is 13 miles north of Boston, on the Boston & Maine. Baggage should be checked to Lynn, Mass., but omnibuses or taxicabs may be had at both Lynn and Swampscott stations.