Final Train Control Order Issued by I. C. C.

Tentative Order of January 10, Including 49 Roads, Made Permanent Without Important Change

THE Interstate Commerce Commission on June 15 made public an order, dated June 13, that the tentative order of January 10 directing the 49 railroads named therein to install automatic train stop or train control devices upon designated portions of their roads, should be entered, and that the installations prescribed should be completed by January 1, 1925. The list of railroads and, with two exceptions, the portions of road designated are the same as published in connection with the tentative order in the *Railway Signal Engineer,* January issue, page 924. The points between which the Cincinnati, New Orleans & Texas Pacific is required to make the installation have been changed to Cincinnati and Chattanooga instead of Cincinnati and Knoxville; and in the case of the St. Louis-San Francisco Springfield, Mo., and Tulsa, Okla., are substituted for St. Louis and Springfield. The railroads are those having annual gross revenues of $25,000,000 or over. It is required that the train control device be operated in connection with all road engines running on or over at least one full passenger locomotive division between the points designated.

The roads are required to submit to the Commission complete and detailed plans and specifications for the installation of the devices prior to the installation, and each installation when completed will be subject to inspection by and the approval of the commission or any division thereof to which the matter may be referred.

The date for the completion of the installation is set six months beyond that named in the tentative order; and the time within which the roads are required to furnish plans of their block signal systems and lists showing the number and types of their locomotives is extended six months, or until January 1, 1923. The roads are directed to proceed without unnecessary delay to select and install the devices, and to file with the Commission, on or before January 1, 1923, and on the first day of each month thereafter, full and complete reports of progress. However, the Pennsylvania and its controlled lines, and the Norfolk & Western, for good cause shown, are allowed until July 1, 1923. The Pennsylvania, however, will be required to file plans and reports beginning July 1, 1922, for the installation (now being made) upon its Lewistown division between Lewistown and Sunbury, Pa.

The specifications and requirements for the installation of automatic train stop or train control devices adopted by the Commission and prescribed in its order are the same as those in the tentative order, omitting the permissive feature which was in the specifications of the A. R. A. committee. The order itself is substantially in the form of the tentative order, to which the roads were given an opportunity to show cause at the hearings (in March) why it should not be put into effect.

For the benefit of systems including two or more of the roads specified the report says that those which may desire to adopt a device as standard on each of their roads may test the device on one road and during such test will not be expected to make the additional installations.

An abstract of the commission's report follows:

Report of the Commission

This is a proceeding under Section 26 of the interstate commerce act which authorizes us, after investigation, to prescribe the installation of automatic train-stop or train-control devices or other safety devices, upon the whole or any part of the railroad of any carrier by railroad subject to the act.

On January 10, 1922, we entered an order under which certain specified carriers, were given an opportunity to show cause, if any, why an order should not be entered requiring the installation of automatic train-stop or train-control devices upon designated portions of their lines. Hearings have been had at which all respondents, except nine, were represented by a general committee (C. E. Denney, chairman), and at which carriers individually presented data and arguments.

Respondents represented by the committee opposed generally the entry of an order at this time upon the grounds—First, that there has not been any automatic train-stop or train-control device developed to an extent which would justify the issuance of an order. Second, that the carriers have not had opportunity to make adequate service tests of devices which differ fundamentally in their principles of operation from those now installed and in operation under service conditions, which were referred to in our report. Third, that every reasonable effort is being made by the carriers to co-operate with the commission for the purpose of testing and developing devices which will best meet operating requirements. Fourth, that the order requires a much greater number of and more extensive installations than are warrented, in view of the present state of the art. Fifth, the costs of installation and maintenance of automatic train-stop or train-control devices are high and not within the present financial abilities of the roads. In connection with this objection it is contended that it should first be determined whether automatic train-stop or train-control devices will provide equal or greater additional safety for a specified expenditure than a like expenditure for automatic block signals, double track extensions, interlocking plants, additional steel equipment, under crossing and grade separation; most of which, it is urged, not only increase safety but increase the capacity of a railroad and produce economies in operation.

Supplementing the general objections special objections were raised by many carriers to the entry of an order requiring installations upon their respective lines. Proprietors and manufacturers of automatic train-control devices were also heard.

(Here follows a history of what the commission has done in this field since 1906, concluding with the opinions formed by the Block Signal and Train Control Board and the Bureau of Safety). The conclusions reached as a result of the investigations conducted from 1906 to 1920 were that automatic control of trains is practicable; that the use of such devices is desirable as a means of increasing safety, and that the development of devices had reached a stage warranting the installation and use of such devices on a more extended scale. The results of these investigations, which had been reported by us year by year to the Congress, and the recognized need for some such device resulted in the inclusion in the Transportation Act, 1920, of a section which places upon us the duty after investigation, of ordering the carriers or any of them to install upon the whole or any part of their lines automatic train-stop or train-control devices or other safety devices, which comply with specifications and requirements prescribed by us.

Following the enactment of that section we were urged to order the installation of various automatic train-control devices. * * * In order to carry out the provisions of Section 26 in the most effective and expeditious manner, we invited the co-operation of the American Railway Associa-

tion. A joint committee on automatic train control consisting of representatives of the signal section and the operating, engineering and mechanical divisions of that association was appointed in November, 1920. * * *

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 engineman for any cause fails to take proper action to stop. Several types of apparatus have been designed to do this. Additional features have been introduced so as to afford speed control, whereby a train may be brought down automatically to a predetermined safe speed at certain fixed locations which are established with relation to the fixed signals of a block system.

In the most recent development of automatic train-control devices, continuous control is obtained whereby the engineman is not dependent upon indications received at fixed locations, but is immediately made aware of a change in condition ahead of his train and may act promptly to govern his train accordingly. * * *

The degree of control desired by a railroad will depend upon the particular operating and traffic conditions upon its road, and it is for this reason that automatic train-control devices have been further developed to provide functions in addition to the simple automatic stop. Our order recognized that fact and defined an automatic train-stop or train-control device as a system or installation so arranged that its operation will automatically result in either one or the other or both of the following conditions; first, the application of the brakes until the train has been brought to a stop, and, second, the application of the brakes, when the speed of the train exceeds a prescribed rate, until the speed has been reduced to a predetermined and prescribed rate.

(Our investigations have shown that a number of types of devices are available to meet the requirements laid down by us.)

Various Types Available

To secure the latest data pertaining to actual operations, a questionnaire was sent in December, 1920, to all carriers requesting detailed information; and replies were received from the following eleven carriers upon the lines of which such devices are installed. Chicago & Eastern Illinois; Chicago, Rock Island & Pacific; Chesapeake & Ohio; Pennsylvania; Hudson & Manhattan; San Francisco-Oakland Terminal; Washington Water Power Company; Brooklyn Rapid Transit Company; Philadelphia Rapid Transit Company; Boston Elevated Railway; and North Western Elevated Railroad.

Observations have been made by the joint (A. R. A.) committee, in connection with our Bureau of Safety, of the performances of devices of the ramp type upon portions of the Chicago & Eastern Illinois in May, June and July, 1921, and for the months of February and March 1922; upon the Chesapeake & Ohio from August 16, 1921, to March 31, 1922, and upon the Chicago, Rock Island & Pacific from May, 1921, to March 1, 1922. The joint committee has co-operated with us in making the observations and has rendered valuable aid.

Each road stated, in response to the questionnaire, that the device adequately met the operating requirements in the location where installed. As it was desired, however, to obtain more complete data, inspectors of the Bureau of Safety and of the joint committee were detailed to observe and report upon the operation of the devices. Data have been gathered upon the effect of the devices upon railroad operating conditions, upon problems of installation and maintenance upon an extended scale, upon installation and maintenance costs, and upon the revisions made or required in the devices.

The installation upon the Chicago & Eastern Illinois is upon 105.4 miles of double track from Danville to Yard Center, Ill. There are 174 signals and 175 ramps; 85 engines equipped, 47 passenger and 38 freight. The device has been in continuous service since November 1, 1914.

The installation upon the Chesapeake & Ohio is upon 21 miles of single track from Gordonsville to Charlottesville, Va. There are 67 signals, and 67 ramps; 37 engines equipped. The device was placed in service upon 7 miles of road in March, 1917, and upon 14 additional miles in June, 1919. An extension of this installation 40 miles, to Staunton, Va., is under construction and will probably be completed by August, 1922.

The installation upon the Chicago, Rock Island & Pacific is upon 22.4 miles of double track from Blue Island to Joliet, Ill. There are 34 signals and 34 ramps; 20 engines equipped. The device has been in service since March, 1920. This installation will be extended to Rock Island, Ill., a distance of 142 miles.

Record of Three Installations

The following is a summary of the facts observed, totalled for the three installations observed (the Rock Island, the C. & E. I. and the C. & O.):

Miles of road equipped	148.8
Miles of track equipped	276.6
Total engines equipped	142
Total indication points	276
Total signals	275
Total mileage of engines in equipped zone	721,581
Total operations of train-control device (passage of equipped engine, with device in service, over an indicated point counted as one operation)	659,875
Proper operations—Clear	656,045
Caution	2,053
Stop	945
	659,043
Failures—	
False clear	15
Other causes resulting in stops to the number of...	341
Undesirable stops—	
Due to train-control device	73
Due to signal failure	418

An undesirable stop is one which occurs when there is no operating or traffic condition which requires the stop to be made. Where the train-control device causes a stop under such conditions the action is upon the side of safety. It is undesirable, however, from an operating point of view. A false clear failure on the other hand is one in which the train-control device indicates by its action or lack of action, that no danger exists, when as a matter of fact, the contrary is true. Failure in this case is a dangerous one.

These three installations which have been under close observation are of the ramp type and the record indicates that automatic train-control devices of this type are practicable under actual service conditions; that they properly perform the functions for which they are designed, and that when properly installed and maintained they unquestionably increase the safety of train operation. The record holds out expectation of satisfactory tests and operation of the other types of train-control devices.

Undesirable Features May be Corrected

The respondents called attention to many features of construction and operation of ramp type devices which they classed as undesirable and which, they urge, should be eliminated before the devices may reasonably be said to operate to a degree of efficiency warranting the issuance of an order requiring their installation as safety measures. From the close and detailed observations which have been made we are convinced that the features claimed to be undesirable are not such as cannot be corrected, as the systems are utilized extensively; in fact, some of them have already been corrected. The discovery and the elimination of undesirable features is a natural growth, inevitable in the development of the art, such has been the history of the development of the automatic block signals, of the air brake and of the automatic coupler.

Carriers who have stressed the difficulties of the ramp type urge that more time should be allowed in which to test induction devices. Two devices of the magnetic induction type are now installed for test purposes, one upon the Southern Pacific (the National) and the other upon the New York Central (the Sprague). Arrangements have been completed for a test installation of another device of the induction type upon the Delaware, Lackawanna & Western (the Finnigan). One device of the continuous control induction type is now being installed upon the Pennsylvania (the Union) upon 52 miles of track between Lewistown and Sunbury, Pa., and arrangements have been made by the Pere Marquette Railway for a test installation of another continuous control device of the induction type (Clark's).

Effect on Track Capacity

Respondents, through their committee, state that the installation of automatic train control devices upon lines handling heavy traffic will tend to slow up train movements, decrease track capacity, and, therefore, may require the addition of more running tracks to accommodate the same volume of traffic. * * * It is obvious that this difficulty arises only upon roads and portions of roads now operating to full capacity, or nearly so. The problem is one not generally confronting all the respondent carriers. * * * In some locations a simple automatic stop will be adequate, in others speed control may be necessary or desirable or automatic stops on part of the line and speed control on other parts where traffic is heavy may be needed. * * *

Cost of Installation

The cost per mile of road and per mile of track can not be stated generally. The cost for locomotive apparatus and

for roadside or track apparatus will therefore be given together with the cost of the installations which have been under observation.

From the various figures submitted by respondents and by proprietors and manufacturers, it appears that the cost of locomotive apparatus for an intermittent control device of the ramp type ranges from $400 to $1,000: for an intermittent control device of the induction type, from $375 to $2,100, and for a continuous control device, induction type, from $1,000 to $3,000. Assuming one indication point per block the cost of track equipment of the ramp type is from $200 to $550 per block; of the induction type, intermittent control, from $400 to $2,000 per block, and the induction type, continuous control, from $300 to $1,000 per block. These prices cover installation costs and are stated to be the maximum prices for each unit of the particular device. They may be reduced when the apparatus is manufactured and installed upon a large scale. * * *

Maintenance Costs

Maintenance costs have been ascertained in connection with the installations that have been under observation as follows:

On the Chicago & Eastern Illinois installation the average maintenance cost per locomotive, per month, over a three months' period was $13.02; per ramp, per month, over same period, $2.74; per mile of track, per month, $2.27. On the Chesapeake & Ohio installation the average per locomotive per month over a six months' period was $12.23; per ramp per month over same period $5.68; per mile of track per month, $18.12. On the Rock Island installation average per locomotive per month over a nine months' period was $110.33; per ramp per month, $12.43; per mile of track per month, $9.44.

The above figures were compiled from monthly statements furnished to the joint inspectors by the railroad companies and the train-control companies. The maintenance figures for the Rock Island installation represent much higher maintenance costs than would be required under normal operating conditions, because of the nature and extent of the tests conducted during the observation period. The proprietors of this device state that, based upon their experience, the average annual cost of maintenance per mile of track on a double-track division, consisting of 165 miles of road with 120 equipped engines and 273 ramps, will be $54.69, or a total cost per annum of $18,047.88.

Many of the respondents have filed estimates of the cost of installation upon selected portions of their roads, comprising passenger locomotive divisions, which show a much higher cost than those indicated in the foregoing figures. The estimated figures show a wide variation both for engine equipment and roadway equipment. The differences are due in part to the type of device selected and the measure of control to be secured and in part to the varying number of locomotives to be equipped and the number of indication points upon the road.

With these figures as bases, they urge that a greater degree of safety might be secured by spending the money to eliminate grade crossings, to extend their automatic block signal systems, and interlocking plants, and to construct additional tracks. All of these are unquestionably desirable. Automatic train control, however, will still be a necessary safety measure when all of these things shall have been completed. The compensation from a financial standpoint which will result from securing added safety should not be overlooked, however, when costs are being considered.

Cost of Collisions

The accident reports made by the railroads to us show that from January 1, 1906, to December 31, 1921, there were 26,297 head-on and rear-end collisions. These resulted in death to 4,326 persons and injury to 60,682. The damage to railway property alone amounted to $40,969,663. The annual average of these collisions amounted to 1,643, the average number killed, 270, and the average number injured, 3,792. The average damage to railroad property amounted to $2,560,603 per year. Losses due to damage to lading are not included in these figures but they are no doubt considerable. If to the large property losses there be added the death losses and the damages paid for persons injured, the total amount will be very great. As an indication of what these latter losses are, a number of carriers have furnished us with the death and personal injury claims paid by them as a result of a number of accidents.

New York, New Haven & Hartford, for example, paid $412,210 upon death and injury claims as a result of a collision at North Haven, Conn., on September 2, 1913, in which 21 persons were killed and 42 injured; $131,543 for like claims from a collision at Milford, Conn., on February 22, 1916, in which 10 persons were killed and 152 injured; and $29,580 for like claims from a collision at Norwood Junction, Mass., on March 17, 1921, in which 4 were killed and 11 injured. The total claims paid for these three accidents amount to $573,335.

The Delaware, Lackawanna & Western as a result of a collision at Corning, N. Y., in 1912, which caused the death of 39 persons and injury to many others, paid out in death and injury claims $326,133; for a similar accident at Ackerman, Pa., in 1919, in which 3 persons were killed and 2 injured, it paid for death and injury claims $10,469. In ten years from 1912 to 1922 it paid for death and injury losses a total of $367,360, for 12 collisions, including the two mentioned. These, it is admitted, might have been prevented by an automatic train control device.

The New York Central paid death and personal injury claims in the amount of $226,616 as a result of a collision at Amherst, Ohio, in March, 1916, in which 23 persons were killed and 125 injured; $356,478 for like claims from a collision at South Byron, N. Y., in January, 1919, in which 22 persons were killed and 183 persons were injured; $201,119 as a result of a collision at Schenectady, N. Y., in June, 1920, in which 15 were killed and 47 injured. As a result of a collision at Porter, Ind., in February, 1921, in which 37 were killed and 124 injured, the cost for death and personal injury claims is estimated at $175,000. Thus in these four accidents such payments amounted to $959,214.

We are convinced that the carriers can, if they are determined to do so, readily install upon their roads devices which will meet the requirements of safety and which at the same time will not unduly interfere with operating requirements. Had the railroads taken prompt action when the Block Signal and Train Control Board pointed the way in 1911, the art would have been far advanced today. Many of the operating problems, such as interchangeability, effect on track capacity, and others which respondents have stressed in this proceeding, would have been solved. The development of the automatic block signal system to its present state of efficiency is evidence of what can be accomplished.

It is evident from the record that automatic block signals were primarily installed as a means of increasing the capacity of existing lines. This very fact, however, increases the possibility of accidents. Much has been done to furnish the engineman with reliable information, by means of wayside signals, of the conditions of the track ahead, but progress has been slow in providing means to automatically compel obedience to the signal indications. The fact remains that the correct operation of trains in compliance with the signals still depends entirely upon the knowledge, alertness and skill of the engine crew. The danger is ever present that the engineman may fail to observe, correctly interpret and obey the signals. * * *

Experimental Stage Passed

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-stops or train-control. The time has now arrived when the carriers should be required to select and install such device or devices as will meet our specifications and requirements.

Time for Compliance

* * * The fixing of a time limit should be based upon a consideration of the time which has already run since the passage of the act and the progress and present state of the art. There should be considered also the time reasonably required to enable the carriers to select suitable devices from among those available, to develop them to meet their operating conditions and requirements in the designated locations and to provide for the manufacture and installation of the apparatus.

Some of the respondents contend that devices of the ramp type are unsuited to their needs and hence undesirable. They state that devices employing the induction principle will better meet their requirements and therefore desire more time in which to test such devices. This is necessary, they believe, because there has been relatively less development of the induction type as compared with the ramp type. Proprietors and manufacturers of devices of the induction type support, in some measure, this request, because they are of the opinion that unless more time is allowed, re-

spondents will perforce be limited to the employment of devices of the ramp type. The request for additional time was made by respondents in their answers and at the hearing. Although the proposed order was issued on January 10 of this year, it appeared at the close of the hearings on April 15 that only a few of the respondents had made arrangements or were contemplating making arrangements to make the tests which they consider to be necessary.

We do not desire to force any carrier to adopt a particular type which it believes is not entirely suitable to its peculiar needs, if there are others available which, within a reasonable time, may be shown to be more suitable. In view, however, of the investigations which have already been made and the time which has elapsed, we are of the opinion that a six months' period will give sufficient time for any road to decide upon the device it should select. Within this time, provided a sufficient installation is made and intensive tests of the device are conducted, it can be determined whether or not the device will be suitable.

Respondents will be required to make monthly reports to us, during the six months' period beginning July 1, 1922, of their arrangements for such tests and of the progress made. Railroad systems composed of two or more of the roads specified in our order, which may desire to adopt a device for use as standard equipment on each of the roads constituting the system, may test such device on one of the roads of the system, and during the time of such test will not be expected to make test installations on any other road of the system.

Requirements and Specifications

The definitions, functions, requirements and specifications which we have adopted are set forth in the appendix. They are based upon the facts developed in our investigations and upon the requisites laid down by the Block Signal and Train Control Board in its report in 1910, the requisites of the Railway Signal Association reported in 1914, the requisites of the American Railway Association adopted in 1914, and of the automatic train control committee of the United States Railroad Adminstration adopted in 1919, together with those adopted by the joint committee on automatic train-control of the American Railway Association in March, 1921.

Permissive Feature Eliminated

We have eliminated the provision in the specifications of the joint committee under which the engineman would be permitted, if alert, to forestall the automatic brake application and proceed. Some of the respondents object to the elimination of this provision. They contend that, in many instances, it is proper for a train to pass an automatic block signal in the stop position, and that there are so many such conditions that the elimination of the manual control provision practically eliminates the simple automatic stop from consideration. * * * Where the device is made subject to the manual control of the engineman so that he may prevent the automatic brake application according to his own judgment of the conditions, the automatic safety feature of the device is, to that extent, nullified. It is assumed by the proponents of manual control that no engineman, if alert to a dangerous situation, will deliberately cut out the automatic stop device. The proper use of the manual control would depend, therefore, upon the judgment of the engineman. His judgment would be the determining factor in situations of known or unknown danger. This factor of human judgment is the factor which an automatic train-stop device is designed to eliminate. The manual control feature is, in our opinion, a dangerous one which will permit the judgment of the engineman to intervene and thus may prevent the essential function of the train-stop device, namely, its automatic operation in cases of emergency.

The respondents, required to install upon designated portions of their respective roads, automatic train-control devices in accordance with our specifications and requirements, have been selected with regard to the measure of the risk of accident in connection with traffic conditions thereon. Some of the respondents called attention to their records of operation to show that there have been relatively few accidents of the character which automatic train-control devices are intended to prevent, and that the possibility of such accidents is relatively remote. These respondents therefore request that they be excluded from the provisions of our order. The reasons advanced do not, however, appear to be sufficient justification for such action.

We have decided not to limit by our order the installation of automatic train-control devices to roads or portions of roads already equipped with automatic block signals, because we have no desire to discourage efforts to automatically control trains without the aid of fixed wayside signals. The statement, therefore, of the primary function of automatic train-stop or train-control devices recognizes the possibility of installing such a device without the use of automatic block signals.

Order

At a General Session of the Interstate Commerce Commission, held at its office in Washington, D. C., on the 13th day of June, A. D. 1922.

No. 13413.

In the Matter of Automatic Train Control Devices

This case having been initiated under the provisions of Section 26 of the Interstate Commerce Act; and full investigation of the matters and things involved having been had and the case having been duly heard and submitted, and the commission having, on the date hereof, 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 following specifications and requirements for the installation of automatic train-stop or train-control devices upon the herein designated portion or portions of the lines of respondents, be, and they are hereby, adopted and prescribed:

See page 26, January, 1922, *Railway Signal Engineer.*

It is further ordered, That the following carriers by railroad subject to the Interstate Commerce Act be, and each of them is hereby, required to install on or before the first day of January, A. D., 1925, an automatic train-stop or train-control device or devices, applicable to or operated in connection with all road engines running on or over at least one full passenger locomotive division included in the part of each of such company's main line between points hereinafter designated:

See page 26, January, 1922, *Railway Signal Engineer.*

It is further ordered, That each of the said carriers shall submit to the Commission complete and detailed plans and specifications for the installation of the aforesaid devices prior to the installation thereof.

It is further ordered, That each of the said carriers shall file with the Commission, on or before January 1, 1923, complete plans of the signal systems in use on the designated portion or portions of line, and report of the number and type of locomotives assigned to or engaged in road service thereon; each carrier shall proceed without unnecessary delay to select and install the devices as specified herein; and each carrier shall file with the Commission, on or before January 1, 1923, and on the first day of every month thereafter, full and complete reports of the progress made with reference to the preparation for and installation of such device or devices, except that the The Pennsylvania Railroad Company, The Pittsburgh, Cincinnati, Chicago & St. Louis Railroad Company, West Jersey and Seashore Railroad Company, The Long Island Railroad Company, and Norfolk & Western Railway Company, for good cause shown, will not be required to file the plans and reports herein specified until July 1, 1923, but The Pennsylvania Railroad Company will be required to file such plans and reports beginning July 1, 1922, for the installation of the automatic train-control device upon its Lewistown division between Lewistown and Sunbury, Pa.

And it is further ordered, That each installation made pursuant to this order shall, when completed, be subject to inspection by and the approval of the Commission or any division thereof to which the matter may be referred.

And it is further ordered, That a copy of this order be served upon the above named carriers.

By the Commission: GEORGE B. McGINTY, Secretary.

A movement was begun in New York City recently by the American Engineering Standards Committee to standardize colors for traffic signals, under a plan, which includes considerations of signalling in railway and steamship operations. The avowed purpose in this movement is that of establishing codes of signaling so different one from the other that no confusion will arise in identifying one system from the other. In presenting unofficially the case of the railroads, A. H. Rudd, chief signal engineer of the Pennsylvania, contended that the committee should adopt red as a stop signal in all cases unless qualified by a more favorable indication, should adopt the use of yellow for tail lights of automobiles or for any other purposes where caution only is required, and should adopt the use of green lights for fire escapes, for proceed signals at street intersections or to indicate a clear way.