Editorial Comment

Continuity of C.T.C. Operation

A LOCOMOTIVE engineer, with years of experience in operating trains by time-tables and train orders and more recently by centralized traffic control, has expressed an opinion to the effect that "C.T.C. is a great help in saving train stops and delays, but we will be utterly lost if the system fails." This is an important comment, which, expressed in other words, means that, when changing from time-table and train order operation to centralized traffic control, the signal department must accept, to a higher degree than ever before, the responsibility for continuity of service of the new signaling facilities.

As applying to automatic block signaling, an important consideration for many years has been to design and install the systems so that the number of failures which may stop and delay trains will be an absolute minimum. These same considerations apply with respect to the local automatic controls of signals in a C.T.C. project. A point of difference, however, is that in ordinary automatic block the failure of a local control may cause one signal to display its most restrictive aspect, and thereby delay trains at one signal, or through one station-to-station section of single track, whereas in C.T.C. territory the failure of any one of various forms of apparatus or circuits may cause trains to be held at numerous locations without any means for authorizing these trains to move by signal indication.

In the vast majority of instances, centralized traffic control has been superimposed on existing automatic block signaling, with the result that if the original signaling involved features subject to failure, the subsequent failures became much more serious with respect to train delays after C.T.C. was placed in service. These statements might apply with reference to a-c. power supply for straight a-c. signaling. On such territories, the installation of C.T.C. may justify additional connections to commercial sources of a-c. power, and the installation of more automatic switching panels to cut over from one source to another. In order to eliminate train stops at signals if the a-c. power failed, one road when installing C.T.C. replaced all a-c. relays with d-c. relays, thus changing to d-c. signaling fed from batteries which had sufficient capacity to operate the signaling throughout any reasonable outage of the a-c. power supply.

In an automatic signaling system using local line control circuits, breaks in the line wires for such circuits cause signal failures. For this reason, failures of this type must be anticipated if C.T.C. is superimposed on such an existing signal system. On the other hand, when installing C.T.C., coded track circuits can be used in certain arrangements so that no local line control circuits are required, and failures of line control wires are thereby eliminated.

To insure continuity of service of a C.T.C. installation, an important consideration is to provide line wires for the C.T.C. control code circuit that will not be broken under circumstances which can normally be anticipated. One consideration is to provide wire of sufficient strength to carry the maximum ice load on record for that territory. Weatherproof insulation on these line wires should prevent crosses and grounds, if scrap pieces of wire are thrown over the line, or when these wires are tangled with other line wires during storms.

In order to restore service as quickly as possible in the event that one of these code line wires is broken, some roads provide "plug-boards" at all open offices and switching arrangements in the instrument house at each field station, so that sections of other line circuits, such as telephone wires, can be cut in temporarily to handle the code line circuit until repairs are completed. Other arrangements for use in case a code line wire is broken, include C.T.C. levers in the instrument houses at the field stations, by means of which a man on duty at each such location can control the switches and signals locally and thus keep trains moving, under the direction of the dispatcher by telephone. This procedure is based on the assumption that the automatic control features, such as track circuits and local line circuits if any, are in service throughout the station-to-station blocks, and also that telephone circuits are in service between the dispatcher's office and the various field stations.

Another practice to be employed if the code line fails, and as being installed on one road, is to provide gang knife switches at each field station, so connected that operation of these switches changes the system from C.T.C. control to normal-clear automatic block signaling. Train movements can then be authorized by train orders. Here again, the assumption is that the code line wires are broken but the local signal line circuits, as well as telephone or telegraph line wires, are intact.

Local circumstances, of course, govern the selection of the method that will best insure that C.T.C. will render 100 per cent continuity of service, if this is possible, or, in case of failure, will provide means for moving trains as quickly as possible.