

brake and train order instruction. Attendance at these classes forms a part of the regular duties of the men. It requires two years to cover the entire system.

### Trainmasters Conduct Classes

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The practice on the Southern in regard to instructing enginemen and

trainmen in the proper observance of signal indications is to conduct annual rule classes on each division. All enginemen and trainmen are required to attend at least one of these classes and receive a certificate for proficiency. These classes are conducted by trainmasters and a considerable portion of the class period is devoted to the discussion and the examination of employees on signal aspects and observance. It is also customary for the signal supervisor to attend these classes and assist the trainmaster in the discussion and examination on rules pertaining to signals.

### Explains Stick Relay Scheme

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The circuits for an automatic interlocking plant using the stick relay scheme of control will have at least two sets of stick relays. One set will consist of one or more relays for each crossing road and will furnish directional selection. The other set will consist of one relay for each crossing road and will furnish preference selection. Directional selection distinguishes between an approaching train and a receding train with reference to the crossing, while preference selection indicates which one of two or more trains occupying approaches on opposing roads will receive a signal to use the crossing. It requires the combined action of both sets of stick relays for the selection of routes and the proper sequence of train operation over the crossing.

The preferable method of obtaining directional selection is to energize a stick relay by the passage of a receding train from the detector or crossing track circuit onto the approach track circuit, and to maintain the stick circuit of the relay as long as the train occupies the approach section. One directional selection relay for each approach section is required for this method.

Preference selection is obtained by each crossing road having a stick relay which, when energized, checks over a back contact of the opposing road's preference relay. A train approaching the crossing will energize and stick up its own road's preference relay if the detector or crossing track circuits are clear, and the opposing road's approach sections are either clear or occupied by receding trains. The passage of a train on one road over the crossing opens the stick circuit of its own road's preference relay and sticks up the opposing road's preference relay if there is a train on the opposing road waiting to use the crossing.

Controls can be inserted into the proper branches of the pick-up and stick-up circuits of the stick relays to provide for various operating requirements, such as giving back-up signals on one road and not on the opposing road, or releasing the plant while switching moves are being made on one or more approach sections. The circuits for an automatic interlocking plant, using the stick relay scheme of control, have an adaptability which readily allows for modification to fit special conditions for a particular crossing plant.

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## Selection of Routes at Automatic Interlockings

*"For the selection of routes as between two roads at an automatic interlocking protecting a crossing, what are the advantages and disadvantages of the two schemes; (1) stick relay control, (2) polar relay control?"*

### Gives Advantages of Polar Circuits

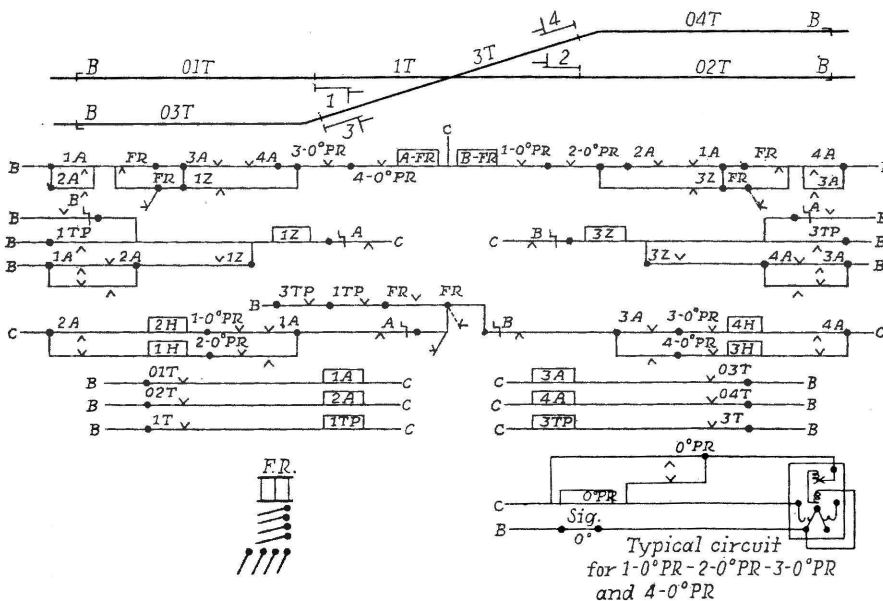
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The accompanying sketch illustrates the circuits for an automatic interlocking using a polar relay for the route controls, and the following is a brief explanation of the advantages and

accomplished by a more direct method of circuit arrangement.

The polar relay is controlled so that signals on the opposing railroads are cleared through the polar contacts in opposite positions. The approach circuits of one road energize one coil in the normal polarity while those of the other road energize the other coil in opposite polarity. While, in the stick method of selection, the first signal



Example of polar relay control for the selection of routes

operation: It can be seen that the use of such a control arrangement is simpler and accomplishes the desired result with less apparatus. Initial costs are lower due to fewer relays required for its operation. Power consumption is lower and flexibility of operation is

to clear will prevent any opposing signal from being cleared, the use of the polar relay will, when energized in one polarity, nullify all controls for the opposite polarity, thus preventing completion of circuits for signals on the opposing line.