

Crossing Protection Program Saves 59%

Power gates, controlled automatically, to replace manual gates, or wigwags, provide better protection in service round-the-clock, and reduce operating expenses in extensive project costing \$4.5 million, of which railroad pays \$3.6 million. Special working agreement with signalmen for 48-hour week, of which 8 hours is on overtime, and crews can work on or off their seniority districts.

IN 1957, the Chicago & North Western announced a special program to install new crossing protection, or to improve existing protection at a total of 330 crossings in eight states on this railroad system. This program is now well along, and is scheduled for completion in 1958. The total cost is approximately \$4.5 million, of which the railroad will pay about \$3.6 million, the remainder being

financed by city, state or federal funds.

One of the major phases of this program is to improve protection, which is accomplished in two ways: (1) better forms of protection equipment, for example, gates to replace watchmen or wigwags, and (2) automatic control to replace manual control of existing protection. For example, on the projects in Illinois, automatic gates are be-

ing installed to replace manual gates at 43 crossings; wigwags at 16 crossings; and flashing-light signals at six crossings.

A second objective of the program is to reduce operating expenses. Based on present-day wage rates, vacation expense, pension payments, etc., the railroad will save more than \$2.0 million every year in wage costs by retirement of crossing watchmen and gatemen. This is approximately 59% annually on the capital being invested by the railroad in this program.

To secure preliminary engineering information, signal supervisors or engineers from the signal engineer's office made studies in the field at each of the crossings. Sketches and pictures were made, and data was secured concerning street traffic, train movements, switching operations, station stops

and other special circumstances. Based on this information, a proposal was prepared as applying to each project, and a conference was held with the traffic engineer or the city council of the municipality in which the project was located. In such a conference, a resolution was prepared to authorize the mayor to sign a joint stipulation which is sent to the state Commerce Commission. If the commission approves, an order authorizing the project is issued.

Government Approval and Cooperation

If city authorities opposed the proposed improvement, the railroad appealed to the state commission to hold an official hearing. Then a decision and order was rendered by the commission.

In most instances the city authorities approved of the improved form of protection proposed by the railroad. Also, in most cases, they agreed that automatic control, which is on the job "round-the-clock," is better and more reliable than manual operation or manual control.

The railroad is paying 100 per cent of the cost of 39 of 58 projects in Illinois. In practically all instances where automatic gates replace manual gates the railroad pays the total cost. This change at one crossing in Kenilworth, Ill., cost \$29,375, and is providing improved protection. The wage saving is \$17,358 annually, which is 68% on the cost every year.

In projects where the form of protection was improved in character, for example, gates to replace wigwags, the local city or state funds at certain locations paid part. For instance, at DeKalb, Ill., automatic gates were installed at six crossings to replace manually-controlled wigwags, the total estimated cost being \$203,839, of which the railroad paid \$117,598. The annual wage saving is \$52,074, which is 44.5% on the railroad cost.

At one crossing in Des Plaines, Ill., the protection was improved by installing automatic gates to replace flashing-light signals, the total cost being \$12,840, of which \$11,072 was paid by government funds.

In some areas, street traffic as well as rail switching moves have been reduced and changed in nature. Although manual gates, operated part time, have been in service for 60 years or more at some crossings in industrial areas, mod-

ern flashing-light signals with automatic control in service round-the-clock are better protection now. This applied to nine crossings in one area in Chicago. This project cost \$106,652 and the annual wage saving is \$45,303.

In some instances, the city and state authorities have agreed to close some street crossings as a means of reducing overall costs, so that modern automatic protection can be provided at the remaining important crossings in a town or area of a city. At Rockford, Ill., one crossing out of five is to be closed.

New Thinking on Automatic Controls

The desirability and practicability of changing from manual gates to power gates with automatic control have had new thinking in recent years, especially as applying to this program on the C&NW. An objection to automatic control in the past has been that, in some instances, such as during switching moves, gates are down and thus delay street traffic, when no train movement over the crossing is imminent. To meet this challenge the C&NW, in its program, utilized many of the more modern selective speed control schemes, time distance cut-outs, restarts, etc. Also several clever new schemes were developed by the C&NW. Explanations of speed selection controls as installed on the C&NW, were given in articles on page 532, August 1951, and page 27, January 1956 *Railway Signaling and Communications*.

In some instances schedules were changed so that switching by the local freights would not be done during periods of peak highway traffic. By changing locations at which suburban trains make station stops, or where cars are left overnight, automatic controls were simplified, so that men formerly required for part-time supervisory control of gates were required no more.

Changes of this nature were made at three crossings in Crystal Lake, Ill., at a cost of \$10,000, the wage saving being \$17,268 annually. At Carroll, Iowa, where automatic gates have been in service for years, at three street crossings, one reason for supervisory manual control was to clear the gates for street traffic when through freights were stopped to set out or pick up cars. By establishing rules and fixed wayside signs designating the points beyond which standing

portions of trains must be left, the automatic controls were revised so that no further manual control was required. These changes cost \$8,200 and the wage saving is \$11,512 annually.

Engineering and Drafting

As stated previously, a detailed survey was made at each crossing by a signal supervisor or an engineer from the signal engineer's office. Based on this information proposed track diagrams, operating requisites and control charts were prepared, and turned over to circuit engineers and draftsmen. Materials were ordered for delivery on definite dates.

The C&NW did not have enough engineers, circuit designers and draftsmen to handle all this work. Therefore, some of this work is being done by the General Railway Signal Company and by the Griswold Signal Company, as applying to respective projects in which each of these manufacturers is furnishing the flashing-light signals, gates, and instrument cases.

How to Get the Job Done

Close estimates indicated that a total of approximately 650,000 man-hours would be required for the signal construction work in this entire program. To complete the program on schedule, at least 175 signal construction men, working 40 hours per week, would be required. At the time the program was initiated the railroad had about 125 signal construction men, including foremen, available. Very few additional men were located by intensive searching and national advertising. To get the job done on schedule with men available, a special agreement was made between the C&NW and the Brotherhood of Railroad Signalmen of America.

One feature is that the construction crews are to be allowed to work 48 hours per week; overtime pay, at time-and-a-half, being paid after the standard 40-hour week. Some crews work four 10-hour days and one 8-hour day. Other crews work five 9-hour days, or six 8-hour days.

The agreement provides that crews may be moved from their assigned seniority districts to do construction work on other districts, if they are permitted to work 48 hours per week. Travel time is paid when moving a crew from one seniority district to another. For

week-end trips for men working off their own seniority districts, the C&NW pays car mileage at 7 cents per mile for one man's car for each five men or fraction thereof, for one round trip each week.

Most larger crews, ranging from 10 to 16 men and foreman, have outfit cars equipped with kitchen, dining and sleeping quarters. One man, on a helper's rate, is assigned as a cook. For smaller crews, which have no cook for their camp car outfit, each man is paid \$4 daily for meals expense.

A total of 14 crews, totalling 135 men and 13 foremen are now working on this crossing protection program. Three crews are in the central district, i.e., in the area near Chicago. Two crews are on the Illinois district; three on the Western district, i.e., west of Clinton, Iowa; one crew is at Milwaukee; two at Madison, two at Green Bay, and one in Minneapolis area. Some small jobs or finish-up work may be handled by a two-man crew working with a maintainer and his helper on 8 hours overtime each week.

Two Barber-Greene power ditching machines are being used effectively to save time when digging trenches for cables. Two Tractair air-compressor machines, with hammers, etc., are used for digging in hard-pan or rock, and for breaking concrete.

Most of the larger crews have a 2-ton highway truck. Also a large "stone" truck, with an overhead "I" beam and rolling crane, is available for lifting, loading and setting cases, foundations, etc.

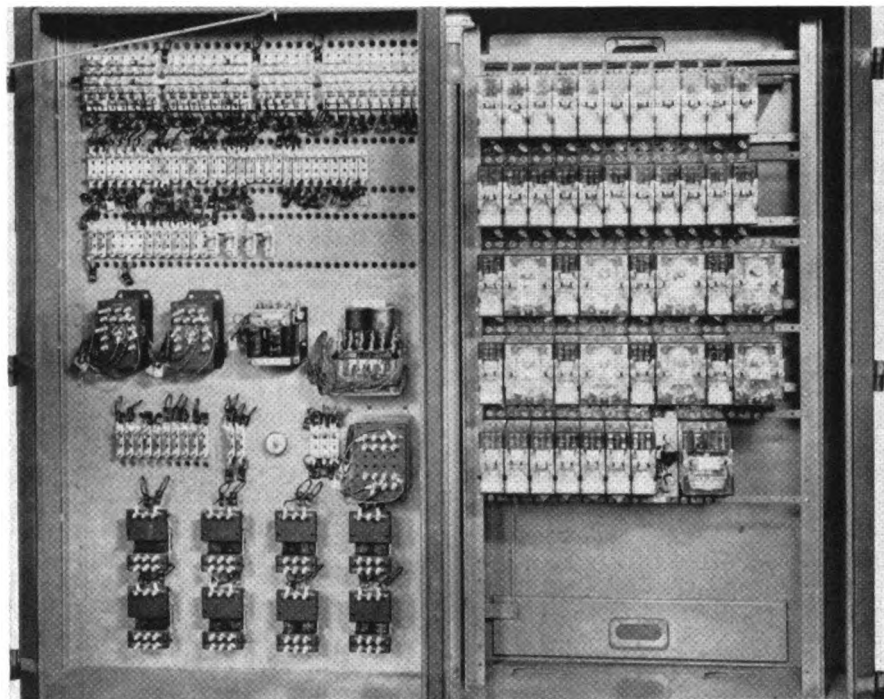
While this special agreement is in effect, all crossing protection apparatus in this program is to be installed by C&NW signal forces, and no signal maintenance territories are to be abolished or consolidated. Signal forces, for maintenance and for construction are not to be arbitrarily reduced, below that existing at the time the project started in April 1957.

With the thought that men may not be available to wire all the equipment cases, the agreement provides that the railroad can purchase factory-wired cases, for the larger sizes, i.e., cases including 20 or more relays, rectifiers, etc. All of the smaller cases, and some of the larger ones, are being wired in the C&NW shop at Proviso near Chicago, or by field crews at the various locations.

A total of 18 men are employed in this shop, where all kinds of signal equipment is repaired in a



Typical crossing protection installation at Racine, Wis.



Majority of relays are the plug-in type and housed in instrument cases

normal program, in addition to a normal volume of case wiring. To provide extra time for the additional case wiring, caused by the crossing protection program, some of the men rotate so that six work each Saturday.

In this shop a crane, on an overhead "I" beam, is used to move cases and load them on railroad cars or in highway trucks used by the crews.

The work of mounting the terminals, arresters, relays and rectifiers, as well as running the wires, making tags, etc., is well organized, so that cases are wired complete with equipment in place, on a highly efficient basis.

Vernon S. Mitchell, Signal En-

gineer, C&NW, has charge of this crossing protection program, which was started by H. T. Fleisher, former Assistant Chief Engineer Signals and Communications, who died in February, 1957.

The flashing-light signals, electric gates and instrument cases are being furnished by the Griswold Signal Company, the General Railway Signal Company, and Western Railroad Supply Company. The relays are from the General Railway Signal Company and the rectifiers are Fansteel. Storage batteries are the lead type from Exide or Gould, and the primary cells used on some track circuits are Edison or Eveready National Carbon.