How the Great Northern Reduces . . .

Accidents at Highway Crossings

Railroad installs modern, uniform crossing protection equipment on a continuing program, averaging one installation being placed in service every two weeks

NUMBER OF INSTALLATIONS BY TYPE OF EQUIPMENT			
YEAR	SHORT-ARM GATES WITH FLASHING-LIGHT SIGNALS	FLASHING-LIGHT SIGNALS WITH ROTATING STOP DISC	FLASHING-LIGHT SIGNALS
1951	2	23	—
1952	10	9	3
1953	7	8	2
1954	8	16	—
TOTAL	27	56	5

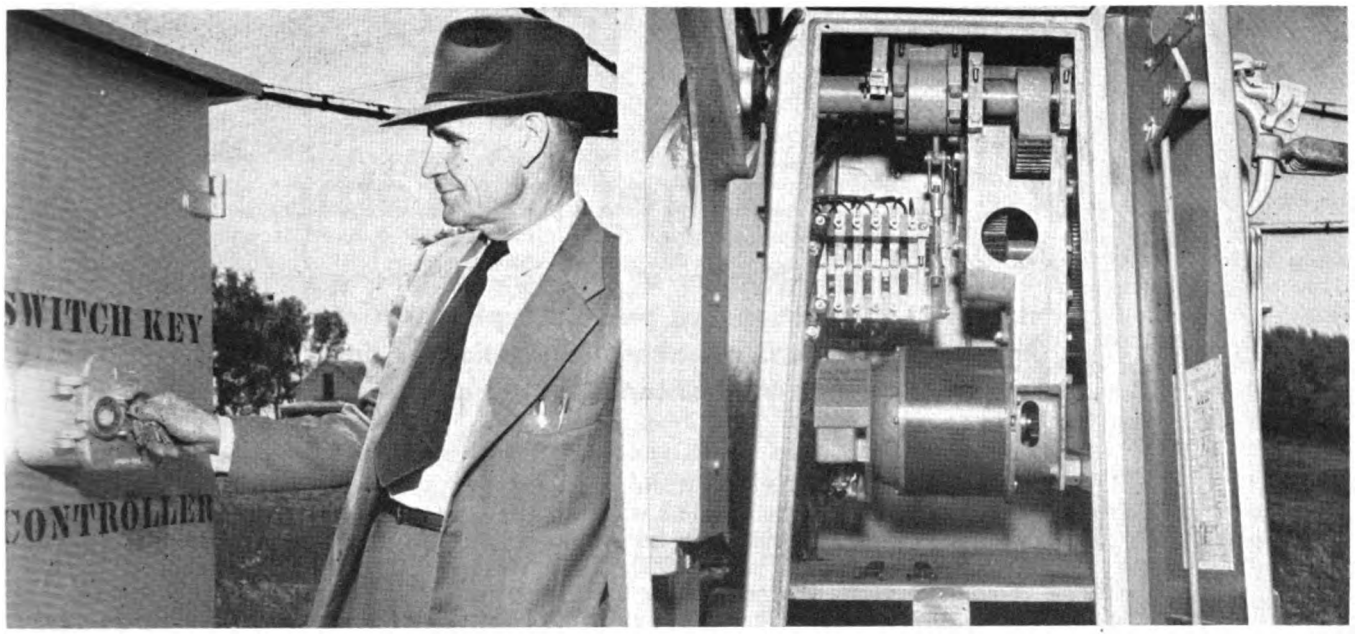
REDUCING ACCIDENTS at highway crossings has resulted from the Great Northern's program of installing modern crossing protection equipment. Over a four-year program, the railroad has placed new equipment in service at 88 crossings. Short-arm gates with flashing-light signals were installed at 27 crossings, flashing-light signals with rotating stop discs were installed at 56 crossings and flashing-light signals only, were installed at five crossings.

Studies of rail and highway traffic were made at each crossing in order to determine the type of equipment and controls which would provide adequate protection for vehicular traffic, yet would not unnecessarily delay such traffic. These studies have resulted in better coordination of highway and rail traffic, thereby effecting a minimum of interference and delay to vehicular traffic with a maximum of protection. Three types of controls are used: (1) straight track circuit control; (2) track circuit control with timing and approach circuits; and (3) manual control.

Over the past four years, the majority of protection equipment installed has consisted of flashing-light signals with rotating Stop discs at highway crossings with the main line of the railroad, employing track circuit control with timing and approach circuits. These installations have been on single and double track lines where maximum permissible passenger train speed is 79 m.p.h., and maximum permissible freight train speed is 50 m.p.h. Many of the crossings are on state highways and in small towns where highway traffic is relatively light, but near stations or industries where local trains make switching moves. Where highway traffic is more dense at main line crossings, short-arm gates with flashing-light signals were installed with timing and approach circuits. At these installations, two approach circuits and a timing circuit are used. The critical speed relative to the timing circuit is 50 m.p.h. Trains traveling above 50 m.p.h. actuate the protection equipment when they hit the long approach circuit, and trains traveling below that speed put the equipment into operation when they hit the short approach circuit.

Long and Short Approach Circuits at Kerkhoven

A typical installation employing short-arm gates with flashing-light signals with track circuit controls, using timing and approach circuits is at Kerkhoven, Minn., at a street crossing on single-track main line. Maximum permissible passenger train speed through Kerkhoven is 79 m.p.h. and maximum permissible freight train speed is 50 m.p.h. The timing circuit for westbound trains is 3,225 ft. Trains traveling over 50 m.p.h. will set the crossing protection equipment into operation when they enter the long approach circuit, 2,360 ft. in approach to the crossing. Trains traveling less than 50 m.p.h. do not actuate the protection equipment until they pass the short approach point, 1,480 ft. in approach to the crossing. For eastward trains, the timing circuit is 1,560 ft. long; with a 2,340 ft. long approach circuit and a 1,420 ft. short approach circuit.



Near Long Lake, Minn. short-arm gates with flashing-light signals were installed at the crossing of a state highway and the double-track main line. At this crossing, the timing circuits are 650 ft. and 2,650 ft. for westbound and eastbound trains, respectively; with 2,600 ft. long approach circuits and 1,550 ft. short approach circuits for each direction of operation. The lengths of the timing and approach circuits varies because of the track layout at or near each crossing. Automatic block signals, turnouts, sidings or other highway crossings may require that the lengths of circuits be adjusted to meet the particular requirements of each installation. At every highway crossing, a short track circuit extends across the street, which if occupied by a locomotive or car will set the crossing protection equipment into operation, irrespective of the type of other track circuit control in service.

One Approach Circuit Only

At highway crossings on secondary lines, branch lines and on sections of the main line where there is no great differential between train speeds, straight track circuit control is used with one approach circuit on each side of the crossing. Most of these installations are on sngle-track lines where maximum permissible speed for all trains is 50 m.p.h.

In a heavy industrial district of Minneapolis, Minn., manually controlled pneumatic gates were replaced by electric short-arm gates with flashing-light signals. The manual control was retained because of the numerous switching movements made in the area over the multiple-track crossings. All other installations made in the last years have employed some form of track circuit control.

Manual Control for Switching Moves

At most of the crossings in or near towns where sidings and spur tracks are located, over which numerous switching movements are made, switch key controls are provided for manual control of the crossing protection equipment. Thus trainmen can cut out the operation of the equipment when switching moves are made on approach circuits, but the train or engine does not enter upon the crossing. Manual control during these switching movements reduces delays to highway traffic. If however, the engine or train does enter the absolute control circuit which extends across the highway, the protection equipment will operate regardless of the position of the manual controller.

The crossing protection program, including engineering and installation work was done by the railroad's signal department. The crossing protection equipment was furnished by the Griswold Signal Company.