

Automatic Gates Increase Safety

... Elimination of gatemen cuts operating expenses and helps railroad pay for new gates and flashing-light signals

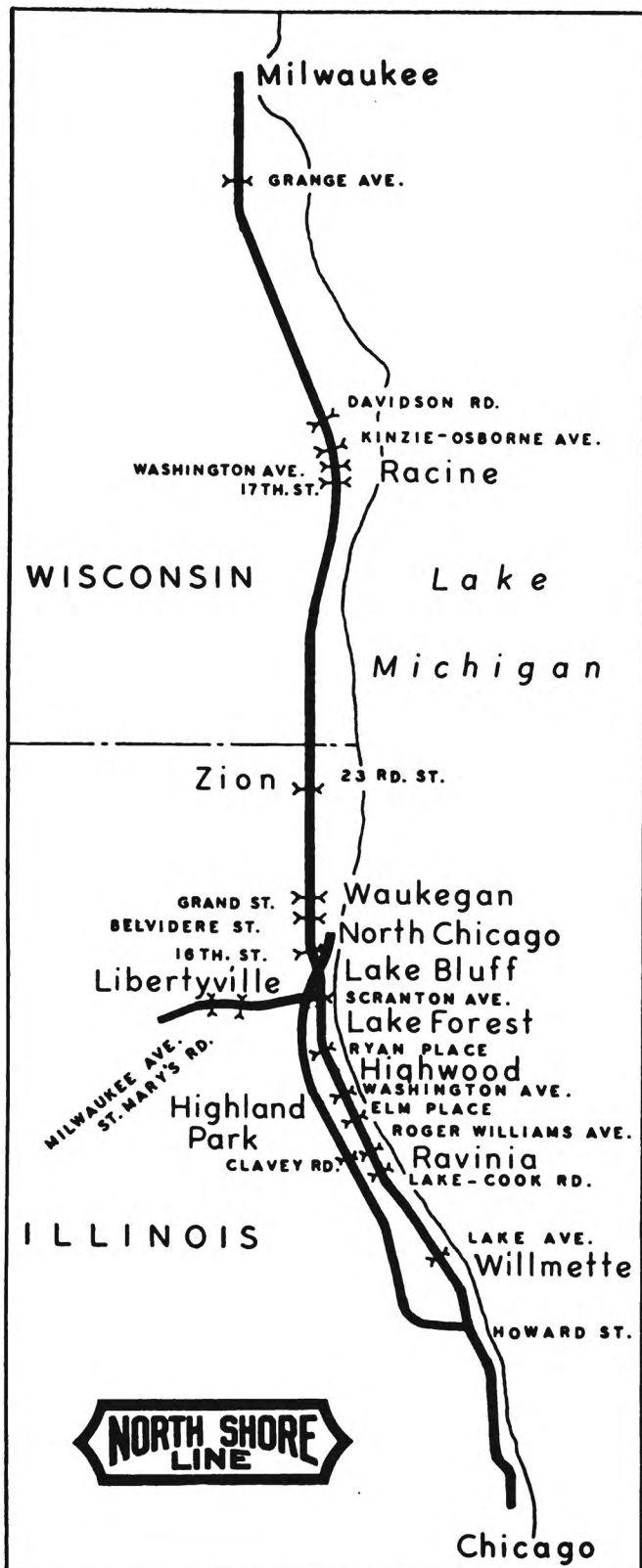
A PROGRAM, including the installation of automatically controlled electric gates, at 20 crossings, has been completed on the Chicago North Shore & Milwaukee. Many of these crossings were previously protected by mechanical gates, operated by gatemen. The installation of new automatically controlled electric gates, to replace manually operated gates requiring a man in attendance 24 hours each day, effects substantial savings in operating expenses which soon pays for the new gates. Furthermore, the new gates, supplemented by flashing-light signals, have proved to be recognized by the public as the most modern, complete and reliable form of protection, and are operated in the same uniform procedure 24 hours every day.

Numerous Train Movements

Trains on this road are operated by electric propulsion using multiple-unit cars for passenger service, and electric locomotives for freight service. Maximum train

Installation Program for Automatic Crossing Gates And Flashing-Light Signals

Street	City	Year	Prior Protection
Grand Ave.	Waukegan	1951	Automatic Gates without Flashers
Lake Ave.	Wilmette	"	Manual Gates
Lake-Cook Rd.	Highland Park	"	" "
Elm Pl.	Highland Park	"	" "
Scranton Ave.	Lake Bluff	"	" "
Roger Williams Ave.	Ravinia	"	" "
Grange Ave.	Milwaukee	"	Wigwag
Washington Ave.	Racine	1952	Manual Gates
17th Street	Racine	"	"
Ryan Pl.	Lake Forest	"	"
Washington Ave.	Highwood	"	"
Kinzie Ave.	Racine	"	"
Osborne Ave.	Racine	"	"
Belvidere St.	Waukegan	1953	Automatic Gates without Flashers
Milwaukee Ave.	Libertyville	"	" "
Clavey Rd.	Highland Park	"	Wigwags
Davidson Rd.	Racine	"	Flasher-Lights & Flagman
16th Street	No. Chicago	"	None
23rd Street	Zion	"	Bells & Lights
St. Mary's Rd.	Libertyville	"	Bells & Lights





Gates and flashers at Washington ave., Racine (left) can be controlled manually (above) when switching moves are made

speeds range from 60 to 75 m.p.h. on passenger train movements between Chicago and Milwaukee. Daily schedules include up to 194 trains daily, about 174 of which are passenger trains, ranging up to six cars each, and 20 are freight trains. Freight trains are operated to place cars at numerous industries, power stations, freight house and team tracks.

North Shore passenger trains are operated on elevated tracks of the Chicago Transit Authority for 12 mi. between Roosevelt road and Howard street, Chicago city limits. The North Shore has one route 25 mi. north from Howard street, through numerous suburban cities on the shore of Lake Michigan, to North Chicago; and a second route from Howard street west and north 26 mi. through the Skokie Valley to North Chicago. From North Chicago, the main line extends 51 mi. north to Milwaukee. Also, a branch line extends west from Lake Bluff 8 mi. to Mundelein. Much of the railroad passes through densely built residential sections, as well as, in some instances, industrial areas.

Construction of the North Shore railway began around 1900, when the principal objective was to provide passenger service through the then existing residential, well-populated areas and industrial territories. Therefore, in its early days, the North Shore was immediately faced with the problem of protection at existing street and highway crossings, on which the vehicular traffic was heavy, and which increased rapidly with

the growth of roadway motor vehicles. At many of these crossings, the railroad installed mechanical gates, operated manually by gatemen. A total of 65 crossings were so protected on this railroad as of January 1, 1928. As years passed, some of these crossings were eliminated by the construction of grade separations, and, in instances, crossings were made where new highways crossed the tracks at grade. At these new crossings, as well as some others previously existing, gates, wigwags or flashing-light signals were installed.

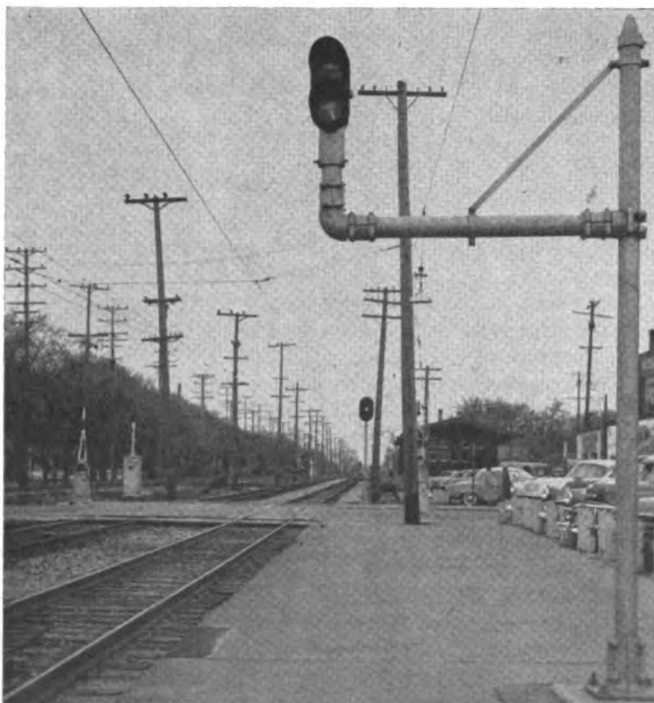
Through the years, the vehicular traffic on the streets and highways continued to increase. For example, the street traffic over Belvidere street in Waukegan averaged 9,322 vehicles daily for five days in February; and 10,420 vehicles daily on Washington Avenue in Racine for three days in April. The wages involved in operating manual gates increased rapidly. Therefore, in 1950, the North Shore made a survey, with the objective of increasing the effectiveness of crossing protection, in service 24 hours every day, and at the same time to reduce operating costs for this protection. During the year 1951, automatically controlled electric gates, with flashing-light signals were installed, to replace manual gates at seven crossings. These projects, as well as those completed each year up to now, are listed in the table.

Thus, within the last four years, the North Shore has made rapid progress in the installation of modern crossing protection, so that as of July 1, this year, 14 short arm, 28 short arm with sidewalk arm, and 26 sidewalk modern electric gates are now in service at 20 crossings, and furthermore, all of these gates are controlled automatically by the approach of trains on track circuits. Manual gates are still in service at only seven crossings, and these are to be replaced as soon as possible.

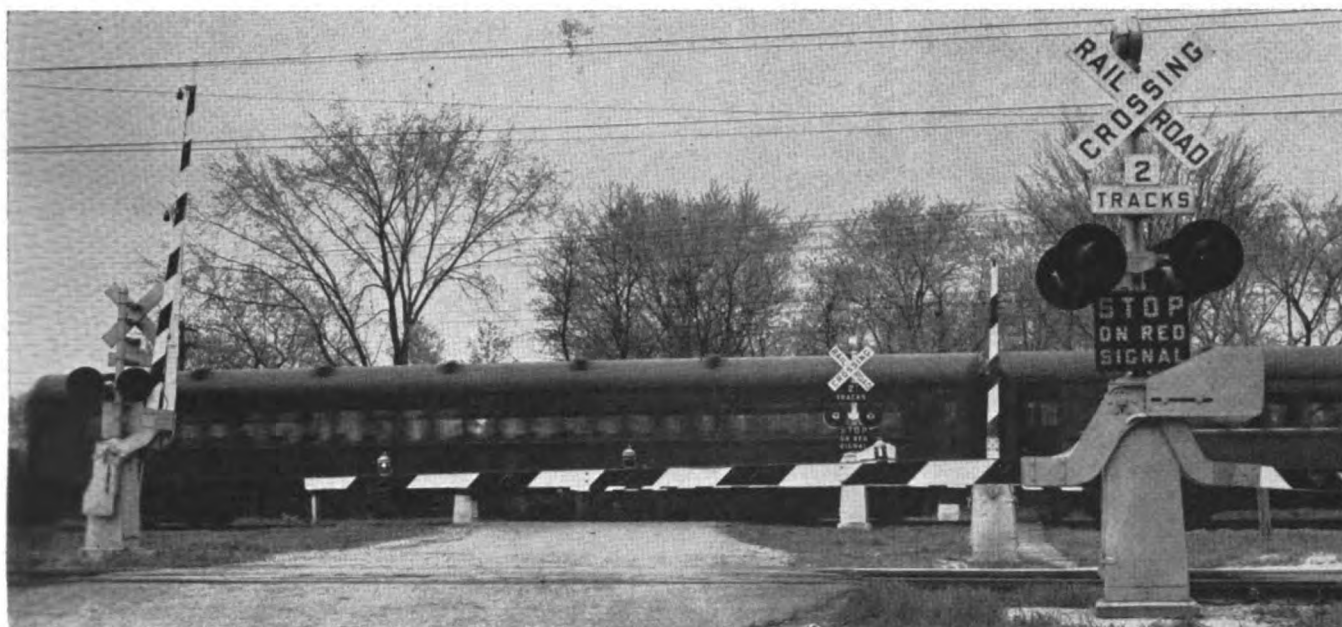
Public Recognizes Standard Protection And Sequences of Operations

As a means of accomplishing the maximum in improved safety, the North Shore adopted the practice that each new installation should include a complete and uniform arrangement of electric gates with flashing-light signals, and that this protection should, in all instances, be operated by a standardized sequence of controls.

The gate arm on each side of the track extends across the right-hand lane of the highway approaching the track. This leaves the other lane unobstructed, thus allowing vehicles, on the tracks, an open way to depart. On each roadway gate mast there is a standard flashing-light crossing signal which, when in operation, flashes 30 to 45 times per minute. On this mast is a standard "Stop on Red Signal" sign and "No. of Tracks" sign. Where sidewalks are included in the crossing, separate pedestrian gate arms extend across these sidewalks. At each crossing there is a bell to warn pedestrians.



Green aspect on two-unit signal indicates gates are down



Train on C&NW also actuates near gate, thus preventing motorists from stopping on North Shore track in foreground

When a train enters its first control track circuit, approaching a crossing, the lamps on the gate arms and in the flashing-light signals are operated for 5 seconds, as a prewarning. This allows time for automobiles, closely approaching, to pass beyond the crossing, and for vehicles approaching at a greater distance to have time to stop short of the gate. At the end of this 5 seconds prewarning, the gates are released and are operated to their position across the highway in about 10 seconds. This operation is completed at least 10 seconds before the train arrives at the crossing. After the rear of the train passes the crossing, the gates are raised in 7 seconds. This sequence of operations is practically the same as used on many other railroads, and has been stated in detail above to emphasize the fact that the North Shore, by adopting and adhering to this sequence, has accomplished effective protection. Test observations at many crossings show that automobile and truck drivers react according to the warnings. They do not try to "beat the gate down" or to "beat the train to the crossing."

The effectiveness of the prewarning has been proved by comparison. A gate installation at Crawford avenue included no flashing-light signals with a 5 second prewarning time when installed. At this crossing, one or both of the gate arms was broken by highway vehicles, on an average of once each month. Flashing-light signals with a 5 second prewarning were added in 1950, and only five gate arms were broken at this crossing in 3 years 6 months since the flashing-light signals were added.

Special Control Saves Drivers' Time

In gate installations where trains stop in approach control sections, the North Shore installs special controls to raise the gates, thus allowing highway traffic to proceed over the crossing until the train is ready to go. For example, at Racine, Wis., Washington avenue crosses the tracks at the south end of the station platforms. When a southbound train approaches, the gates go down in the usual manner, and the train stops short of a special two-aspect color-light gate-indicating signal located 100 ft. north of the street. Just north of this

gate-indicating signal, there is a short track circuit 380 ft. long, and a time relay measures the time from when the front wheels enter this circuit. If 25 seconds expire before the front wheels reach the leaving end, this checks that the train has stopped at the station, or that it is proceeding at less than 10 m.p.h. If the train should proceed past this signal, the gates will remain down. After the expiration of this 25 seconds, the flashing-light signals are cut out, and the gates are raised so that the highway traffic can proceed.

In the meantime, the yellow aspect is displayed on the gate-indicating signal ahead of the train and north of the crossing. When the train is ready to go, the conductor pushes a button in a box on the station platform. This starts operation of the crossing protection and the gates are lowered. Then the yellow aspect of the gate-indicating signal changes to green, assuring the motorman that all the gates are down so that the train can proceed over the crossing.

For Switching Moves

When placing or picking up cars at coal yards, freight houses or industries, the local freight may occupy approach control track circuits for some time. In such instances, the conductor or a trainman goes to the crossing to raise the gates to permit highway traffic to proceed, and to lower the gates again when the train is ready to go toward the crossing. This control is accomplished by push buttons in a box at the crossing. To raise the gates he pushes the "up" button for the track which is occupied by his train. To lower the gates, he pushes the "down" button for his track. A separate set of buttons is installed for each main track. If the gates are up because of this manual control, they will go down if a train approaches on the other track. If no train is occupying the approach circuit, the operation of the push buttons will have no effect.

Special Layout Problems

For 9 mi. south of Lake Forest, the North Shore tracks are parallel and about 80 ft. east of the Chicago & North Western tracks. In this territory, as for example
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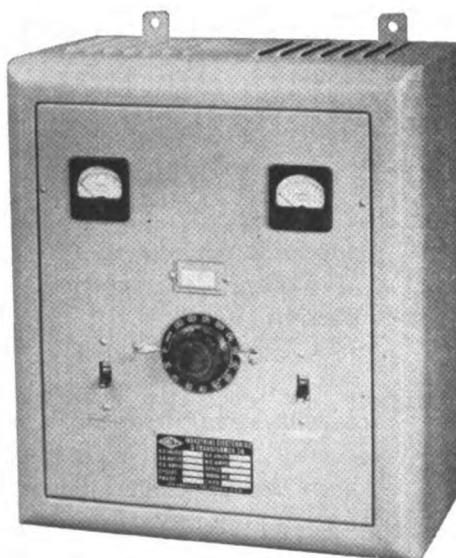
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CNS&M Installs Automatic Gates

(Continued from page 31)

at Ryan place crossing, the North Shore has two gates and the North Western has two gates, in the conventional arrangement.

If the gates on each railroad were controlled only by trains on that road, a situation might arise in which a string of automobiles were stopped by the westward C&NW gate, for example, thus some of these automobiles would be standing on the North Shore tracks. This would be hazardous if a North Shore train approached.

To prevent this hazard, the controls are so arranged that when a C&NW train approaches, both gates on the C&NW, and the westbound gate on the North Shore, go down. Thus westbound automobiles are held off the North Shore tracks. In a similar manner, when a North Shore train approaches, the two North Shore gates and the eastbound C&NW gates go down.

At some crossings, the tracks of the North Shore and the C&NW are closer, as, for example, at Lake-Cook road crossing in Braeside the distance between center lines of the nearest tracks is only 56 ft., therefore the crossing as a whole is protected by one eastbound and one westbound gate, and an extra sidewalk gate. A train on the track of either railroad will operate all the gates.

Train propulsion current on the North Shore is 600 volts d.c. returned through the rails. Therefore a.c. track circuits must be used. The gate motors are rated at 12 volts d.c. Where only two gates are located at a crossing, the motors are fed from a set of seven Exide 120-a.h. storage cells. At a crossing with four gates the battery includes seven Exide 240-a.h. storage cells. The gate lamps and flashing-light lamps are normally fed from a.c., but are cut over to the battery if the a.c. fails.

This program of crossing protection installed in the past four years on the North Shore was planned and constructed by railroad forces, under the supervision of R. N. Pickens, engineer, communication and signals. The crossing gates and flashing-light signals installed in the past four years on this road were furnished by the Griswold Signal Company; the relays by the Union Switch & Signal; the rectifiers by Fansteel; the batteries by Exide and the cable by Kerite.