Chicago South Shore & South Bend Changes Signal Equipment

Union Model-R color-light signals replace upper-quadrant semaphores—High-speed spring switches installed at passing tracks

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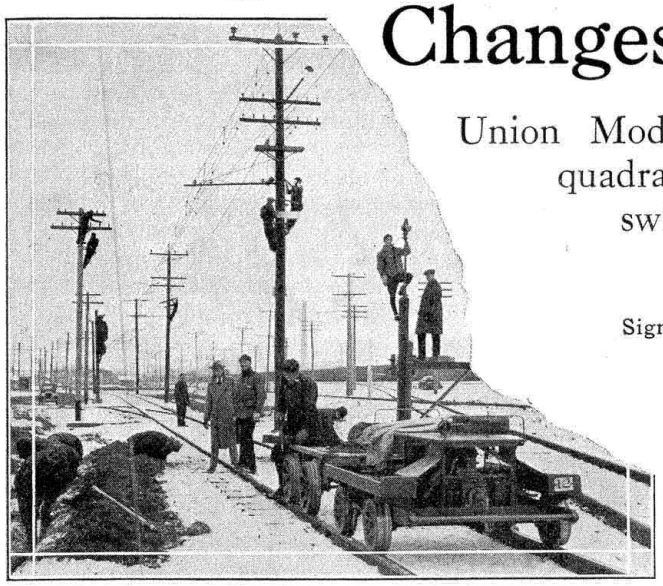


Signal gang during signal reconstruction program

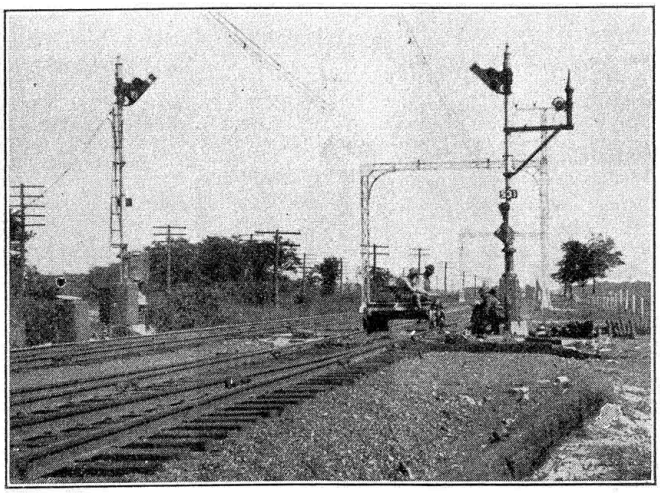
THE extensive rehabilitation program on the Chicago South Shore & South Bend is an example of the modernizing of an electric railroad that was built about 18 years ago and which had suffered so severely from bus and automobile traffic that it was necessary to appoint a receiver. The equipment and roadbed were in such shape due to deferred maintenance that the valuation of the property dropped from about $11,000,000, when built, to less than $6,500,000 when taken over by the present management. To put the road in condition to successfully compete with rival bus and trucking companies it was necessary to spend over $5,000,000 in one year.

The track was re-tied, tie-plated and ballasted with cinders and crushed stone over the entire line of 75 miles. Ten miles of new 100-lb. steel was laid and a number of new industrial spurs were put in. All sidings were extended and three were converted into high-speed passing tracks by double ending and inserting high-speed spring switches. All bridges were thoroughly examined, repaired and painted. All old corrugated iron culverts were replaced with re-inforced concrete tiles. The stations at Hammond, Gary, Michigan City and South Bend were enlarged and entirely rebuilt and new shelters were constructed at local stops.

The old overhead which was of catenary construction using an iron slipper wire was entirely replaced with new catenary using a copper slipper and a new type hanger which has relieved hard spots, provided greater flexibility and diminished wear on pantagraphs and wire. In some locations the old wooden poles have been replaced with expanded steel catenary bridges which will be the standard type of support on all future construction. Power was changed from 6,600 volts ac. to 1,500 volts dc. and nine new substations were erected. Four of these use mercury arc rectifiers while five are of the rotary converter type.

The old wooden cars were replaced with 25 large, roomy, all-steel cars of the Pullman type. Some of the features of these cars are enclosed vestibules with diaphragms on each end, baggage compartment and Pullman type smoker. Interior trim is in American walnut with light cream ceiling. A pantagraph is used for current collection instead of the conventional trolley. Lights are 32-volt supplied by storage battery and motor-generator set mounted beneath the car. Tractive effort is furnished by four 210-hp. motors. Two parlor-observation and two dining cars were placed in service the middle of February. These are of steel construction throughout and are mounted on six-wheel trucks which assure riding comfort. Contracts have been let for ten additional all-steel motors and ten all-steel trailers.

In order to keep pace with the rapidly growing freight business four 80-ton Baldwin-Westinghouse freight locomotives have been placed in service. With this equipment it is possible to deliver freight loaded in Chicago in the afternoon at South Bend before 6 o'clock the next morning.



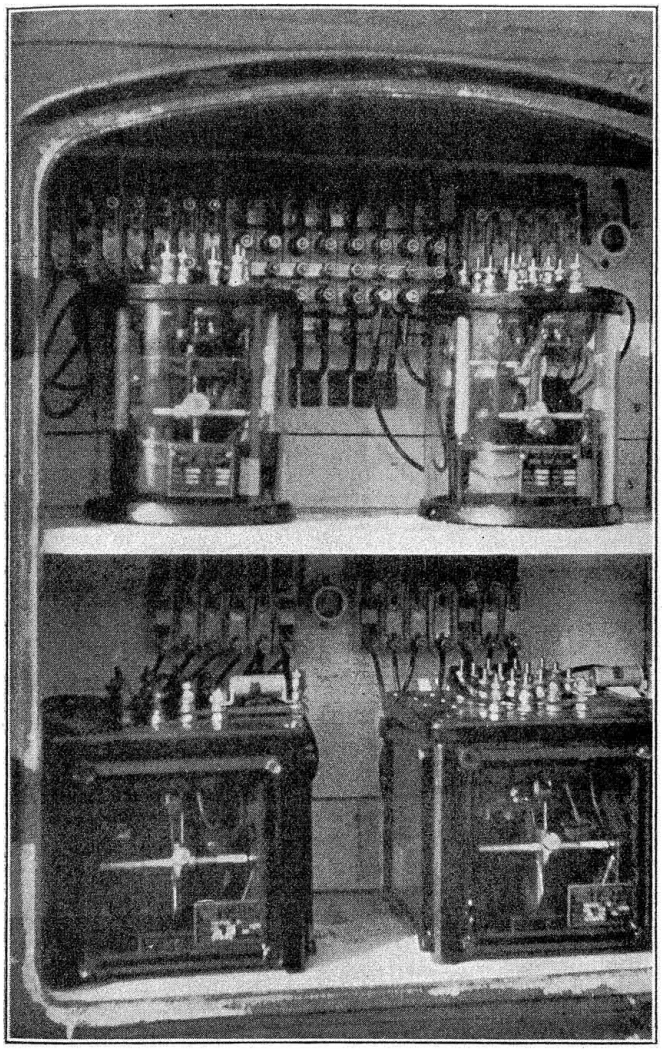
A pair of 60 degree two-position, upper-quadrant signals which were converted to color-light type

Extensive Signal Reconstruction Program Carried Out

The first signal system installed on the road was unique, being known as the positive selector system. To operate these signals, which were located at passing tracks, the dispatcher located at Michigan City, Ind., would plug in on the selector for the siding wanted and drop the block. If the block set properly he received an indication on a tape that worked in conjunction with the selector. As the dispatcher had no way of clearing the blocks they had to be cleared by the conductor of the train after receiving his orders. The system was finally aban-

doned and Union Style-B, 60 deg., two-position, upper-quadrant signals were installed. These functioned satisfactorily until allowed to deteriorate through lack of maintenance. When the road was taken over by the new management there were from 10 to 50 signals out of service each day and in some locations signals were not working at all.

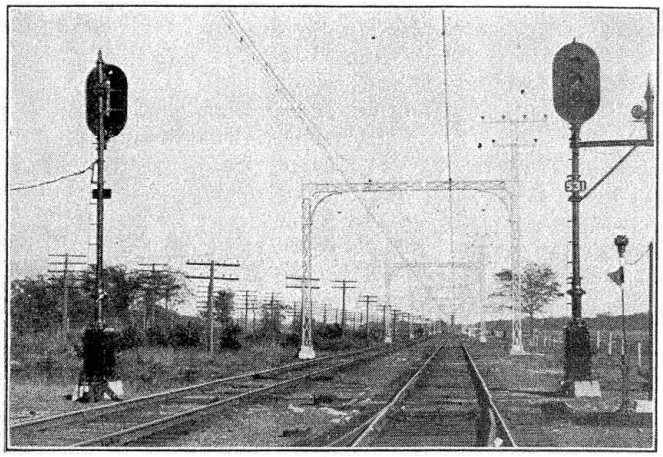
These signals were put in operating condition even though they were considered inadequate for the faster and more frequent service contemplated. All mechanisms were completely overhauled and worn parts replaced. Cable and trunking was re-



New relays were installed in the old mechanism cases

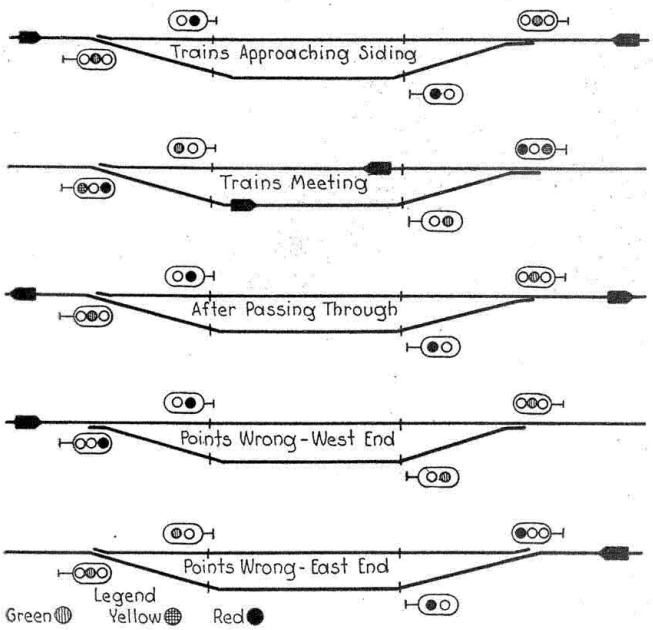
newed, cases were rewired, and relays repaired. All poles were re-painted and broken roundels replaced.

When the new signals were installed the old 200-amp. bonds were replaced with bonds of 600-amp. capacity. Centrifugal relays were replaced with Union Switch & Signal Company two-position, two-element, Model-15 vane relays and Union Model SLV-13 vane line relays were installed at all intermediate signals. All track circuits were changed from center-fed to end-fed. The new light heads, which are Union Model-R two-position, were mounted on the old poles and cases at the home locations. Each case contains one Model-15 relay, one Model-SLV 13 relay, terminals, fuses, lightning arresters and a porcelain receptacle to provide the maintainer with light for night work. The intermediate light heads are mounted on poles only, the relays and accessories for these signals being located at the track feed locations and housed in standard signal cases which were reclaimed from the old intermediate signals. These cases each contain four Model-SLV 13 relays, one 110-volt double secondary track transformer, two reactors, fuses, lightning arresters, terminals and a maintainers' light receptacle. Chang-



Union Model-R two-position color-light signals were mounted on the old poles

ing this equipment was a difficult task as the old signals had to remain in service. The signals were energized from a 2,200-volt line fed from Michigan City which is the center of the automatic territory. This, however, was found inadequate for the new layout so it was sectionalized at four points and fed from the substations. Signal indications are the same conventional red and green as before except



Signal indication diagram illustrating train movements through high-speed sidings and conditions existing when switches are not in proper position

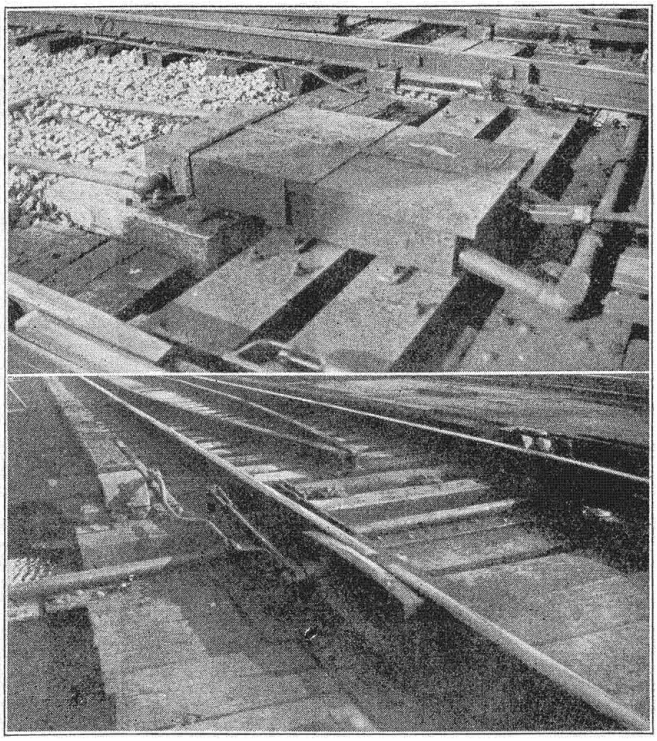
that the intermediates employ approach lighting while the home signals burn continuously.

Spring Switches Employed with Automatic Signal Protection at High-Speed Passing Tracks

One feature of this installation is the protection of the high-speed passing tracks, which employ a Morden high-speed spring switch protected by a three-position

home signal located 150 ft. in advance of the switch points on either end. Indications for these signals corresponding to the two positions of the switches are shown in the accompanying diagram. A special relay known as the Union light out Type-ANL is wired in series with the light to obtain these indications.

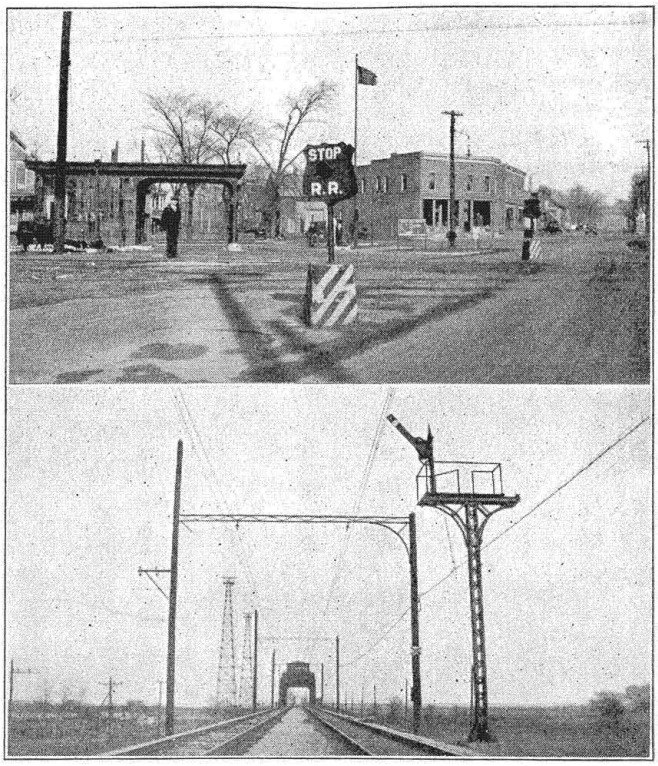
The 28-lever mechanical plant at Shearson, Ind., was completely rebuilt. All old wooden pipe carrier bases were replaced and new Kenley tops and Universal carriers installed. New foundations for cranks and compensators were laid and all old pipe renewed. The electric plant at the Calumet river bridge was entirely rebuilt. The old signals were replaced with General Railway Signal Model-2A, 60-deg., upper-quadrant signals. A new G-R-S switch machine was installed and the old split point derails were replaced with Morden lift type. New Morden rail locks of solid cast steel were installed. These locks, which slide back and forth across the rail ends, were built with risers



Top—Bridge circuit controller at Calumet river interlocker. Below—Close-up of power rail locks

on the outside, thus giving the car wheels a continuous unbroken passage across the 4-in. rail break in the bridge which has been left for expansion and swing. This also relieves a great deal of noise and jar which would otherwise be felt in the car when passing over the break. Rail locks are connected with G-R-S Model-5 switch circuit controllers adjusted to set signals with ¼-in. movement of the rail locks. The bridge circuit controllers are of the latest type furnished by the T. Geo. Stiles Company. The bridge box is mounted on two 8-in. by 6-ft. channel irons and the shore box is embedded in solid concrete making movement of these parts impossible. The interlocking machine was rebuilt and new polar relays were mounted on the back of the board. All open control wires are placed in an aerial cable which terminates at junction boxes mounted on poles at either end of the bridge. All wire is carried from junction boxes to circuit controllers and from circuit controllers to machines in conduit. The interlocking plant is powered by a 110-volt battery while the bridge is supplied from a 250-volt battery.

Two automatic flagmen with flashing lights have been installed. Five sets of electric gates are in oper-



Top—Flashing light signals at grade crossing Below—Approach to Calumet river interlocker

ation at crossings where traffic is heavy and a complete survey of all crossings has been made.

Much work is contemplated for the coming summer. This includes the installation of flashing highway signals and illuminated signs.

A Splendid Maintenance Record

JAMES SHEEHAN, signal maintainer on the Chicago, Milwaukee & St. Paul at Aberdeen, S. D., has an enviable record. Until last fall he maintained, alone, 15 miles of double-track d-c. automatic signals; a 100-mile territory of train order signals; one crossing bell and two wigwags, the crossing protection being outside of automatic signal territory. He still has this territory and in addition three automatic interlockers, but with an assistant to help him.

From January, 1916, to December, 1926, inclusive the interruptions on this section are classified as follows:

Twelve interruptions due to broken bond wires (including those in road crossings), corroded wires, mice gnawing wires, etc. In other words, failures which might have been avoided but were not classified as faulty maintenance.

Seven interruptions due to dragging equipment and wrecks.

Thirty interruptions due to line trouble, such as sleet storms, crossed line wires, etc. This line always gives trouble on account of heavy winds and sleet storms. Every year sections of this pole line are down.

Seventeen interruptions on account of apparatus burned out by lightning.

Sixteen interruptions on account of wet track and zinc treated ties.

Five interruptions on account of defective battery.

According to A. F. Alexander, signal supervisor, Mr. Sheehan's entire section is always in first-class condition.