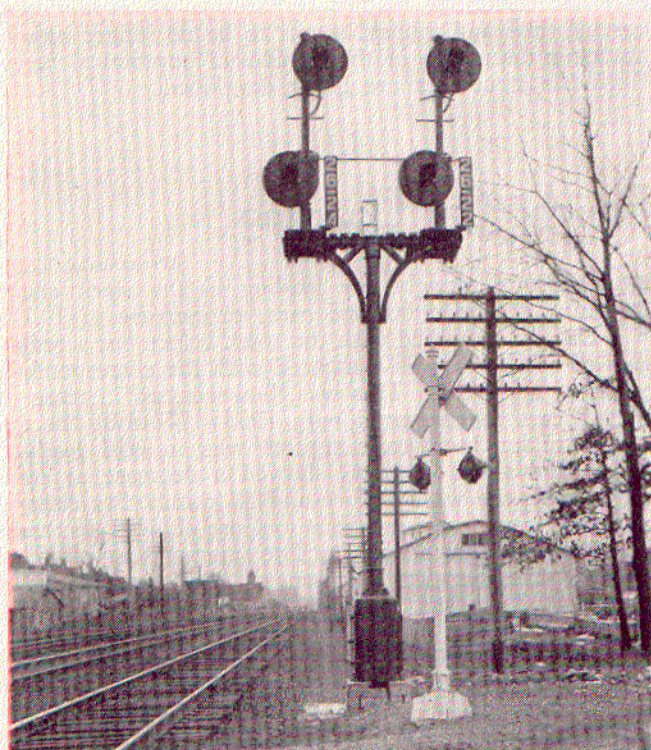


Track Capacity and Safety Increased by New Signaling on the Erie



Four-Aspect Signal on Descending Grade

by New Signaling on the Erie

Train speeds increased and delays reduced by replacing semaphores with color-light signals using two and three-block aspects

THE Erie has installed new searchlight type automatic block signals to replace two-arm lower-quadrant semaphores on 11 miles of four-track road between Ridgewood, N. J., and Suffern, this being a portion of the main-line division between Jersey City, N. J., and Port Jervis, N. Y.

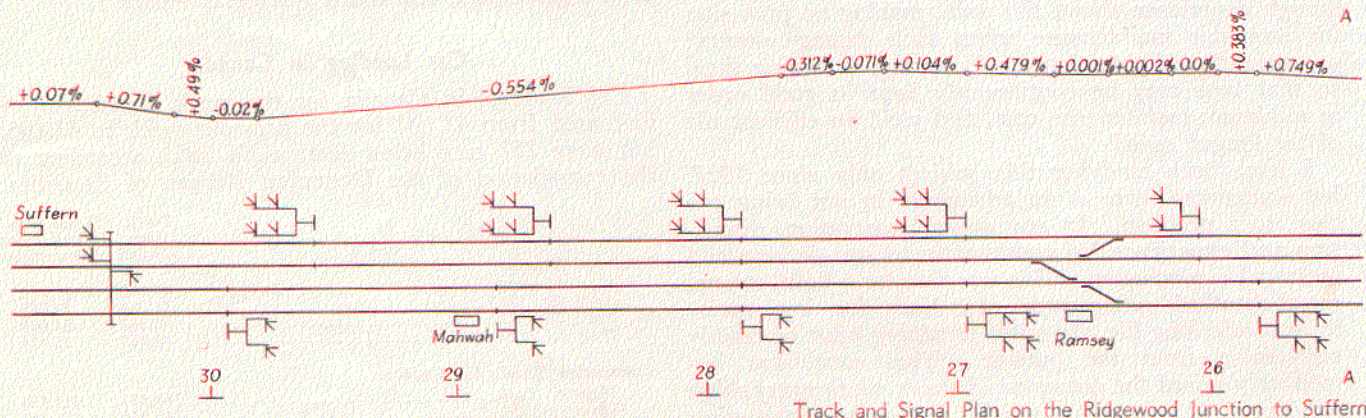
From the east end of this territory, at Ridgewood Junction, a double-track main line, used primarily by passenger trains, extends 20 miles by way of Paterson to Jersey City. A second double-track line, known as the Bergen County line, used principally for freight traffic, branches off at Ridgewood Junction and extends by way of Fairlawn and Garfield, joining the other main line at Rutherford Junction. From Ridgewood Junction west to Suffern, 11 miles, the four-track line handles both the passenger and freight traffic, freight trains running on the two inner tracks and passenger trains on the two

outside tracks, right-hand running being in effect. The daily traffic in this territory consists of 56 through passenger and 24 through freight trains, in addition to 38 suburban passenger trains.

Train Movements

The problem of getting all of the trains over this section of line without delays is complicated seriously by the fact that trains are "bunched," the preponderance of through as well as suburban trains being inbound to Jersey City in the morning and outbound in the evening. For example, between 6:30 a.m. and 8:00, the eastbound traffic includes six through passenger, 6 suburban and 2 time freight trains.

West from Ridgewood Junction, the grade ascends at a rate varying from 0.5 to 0.95 per cent for 6.5 miles, and then descends at a rate of about 0.55 per cent for



Track and Signal Plan on the Ridgewood Junction to Suffern

4.5 miles into Suffern. The old two-position lower-quadrant semaphores were spaced for blocks ranging from 2,500 ft. on ascending grade to 4,900 ft. on descending grade, the distant arm being on the same mast as the next signal in the approach. As train speeds and ton-nages increased, this signaling arrangement was not entirely satisfactory.

New Signaling

The solution was to provide four-aspect, three-block signaling on the descending grade to permit higher train speeds and closer spacing of trains, with entire safety with reference to braking distances. In contrast, on the ascending grades proper braking distance and train spacing was provided by the use of three-aspect, two-block signaling.

Except in a few special instances, the signal locations were not moved, the block lengths remaining practically as they were. However, on the descending grades where the three-block signaling is used, the engineman can control the speed of his train to much better advantage since he gets an approach-restricting indication at the second signal in the approach to one indicating "stop," and an approach indication at the first signal in advance of the signal indication "stop." A train can thus be kept moving at the highest possible speed consistent with safety, thereby reducing delays and eliminating the necessity for heavy brake applications to make short stops. The new signaling also increases the track capacity because trains can now be spaced on the basis of braking distances on the ascending grade, and when they pass over the crest of the hill and accelerate while going down the grade, proper spacing is provided by the three block indications.

Signal Mounting and Aspects

New searchlight-type color-light signals were installed on the existing double-pole bracket masts formerly used for the semaphores. Each mast is located to the right of the two tracks governed, the signal on the field side being for the passenger track and the other signal being for the freight track, the two signals on the bracket being 7 ft. apart. Where the three-aspect, two-block signaling is used, one searchlight unit giving three aspects, red, yellow and green, is mounted on the left side of a short stub on the bracket, to bring the center of the lenses 25 ft. above the level of the rail. Where the four-aspect, three-block signaling is in effect, a pole 9 ft. 8 in. high is used on the bracket and the top signal unit is mounted at the right of the pole 6 ft. above the lower one, which is to the left of the pole. The aspects for the three-block territory comply with the standard code, being red over red, staggered for "stop and proceed," yellow over red for "approach," yellow over green for

"approach medium," and green over red for "clear." This system of aspects not only allows adequate stopping distance with minimum spacing between following trains, but affords the engineman of a freight train adequate warning to control the speed of his train in conformance with the conditions ahead, so that he can keep his train moving with safety and yet eliminate unnecessary stops.

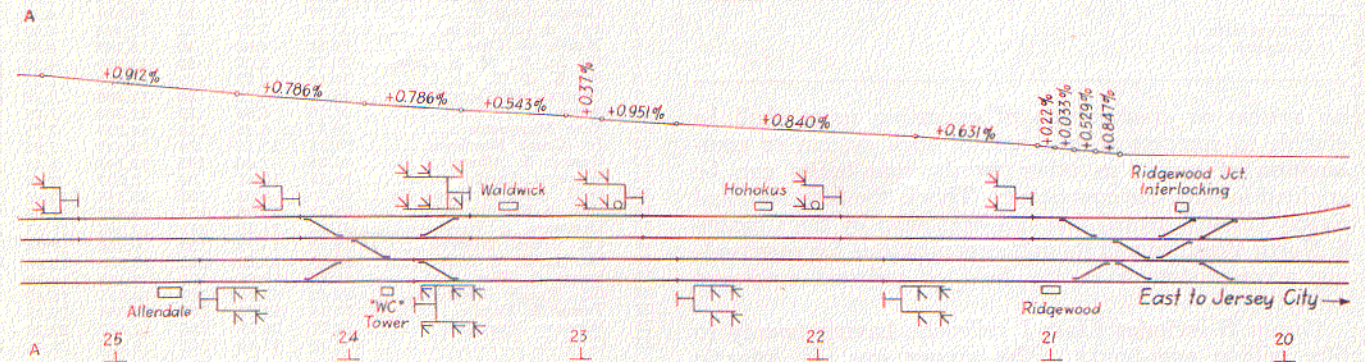
Check on Lamp Failures

Each signal is equipped with an 8-volt lamp which has two filaments, one rated at 13 watts and the other at 3.5 watts. The lamps are normally fed at 7.2 volts in order to lengthen the life. The signal lamps are on approach control, the lamp being lighted when a train is approaching, as well as during the time the block governed by the signal is occupied. The foreman of maintainers makes a check of the traffic to determine the average number of burning hours for each signal and establishes the date of replacement of the lamp to give about 2,000 burning hours. With this procedure, the lamps are, with rare exception, replaced before the main filament burns out, but even if the main filament does burn out the secondary filament gives an indication strong enough to permit an engineman to pick up the indication.

Another important feature of this installation is the fact that if both filaments in the top unit of a double-unit signal should burn out, a normally-energized relay, in series with this filament, will be released and, by means of circuits controlled by this relay, the lower unit will display red. Therefore, if the lamp burns out, there is no chance that the signal will display a less restrictive indication. For example, if the aspect is yellow over green, and the lamp in the upper unit burns out, this would leave a single green in the lower unit, except for the fact that the light-out relay operation would change the lower unit to the red aspect.

The design and construction of this signal and interlocking program were handled by the signal department forces of the Erie, the signals, relays, etc., being furnished by the Union Switch & Signal Company.

THE PENNSYLVANIA has presented to Edsel Ford the passenger transport airplane which for the past 4½ years has comprised the aeronautical exhibit in Pennsylvania station, New York. Known as "Old No. 1," it was the first passenger transport plane to cross the Rocky mountains and it will henceforth be on exhibition at the Ford Museum at Dearborn, Mich. It is a trimotored Ford plane which was placed in service in September, 1927, between Los Angeles, Cal., and Santiago by the Maddux Air Line in California, afterwards consolidated with Transcontinental Air Transport, now Transcontinental & Western Air. The plane remained in regular service until September, 1930, since which time it has been in Pennsylvania station.



Section Using Four-Aspect Automatic Signals on Descending Grades