

Metropolitan Railway of London

Resignaling with Modern Equipment

New installation on electric suburban line affords comparison with American signaling practice

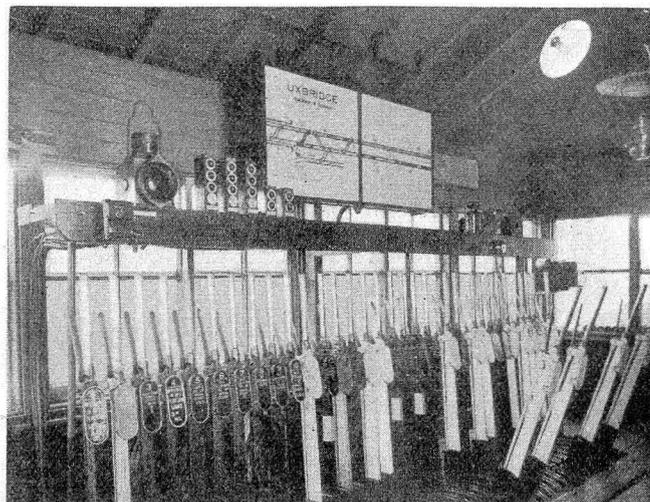
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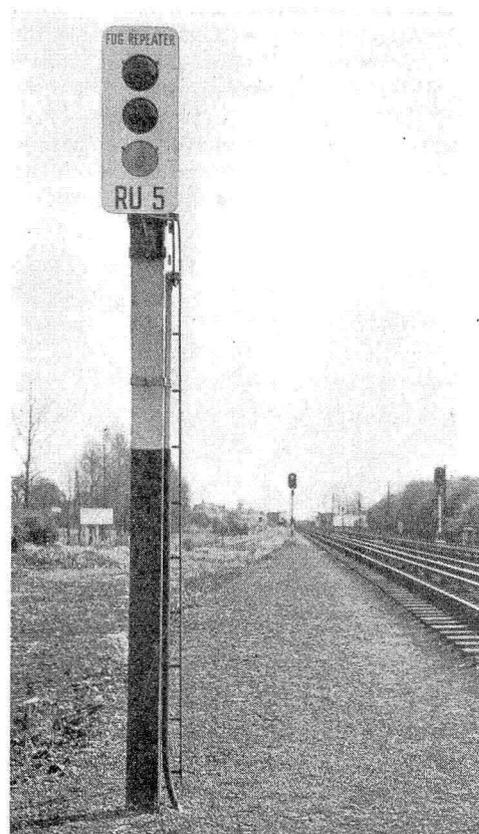
A STEP toward the modernization of certain obsolete signaling on the Metropolitan Railway of London was completed on December 9, 1930, when the Ministry of Transport inspected and passed the resignaling on the Uxbridge Branch line, which is approximately 6.5 miles long, extending from Harrow-on-the-Hill to Uxbridge.

Three-aspect (red, yellow and green) color-light signals of the long-range type, with 8-in. lenses of standard design, were chosen for this installation; they are mounted 12 ft. 6 in. from the rail level to the center of the center unit. Both 12-volt and 16-volt double-filament lamps are used. The signals are equipped with side lights, for each aspect, on the side near the track governed by the signal; the lamp for the side lights consumes 6 watts at 12 volts. Side lights, which are standard on the Metropolitan Railway, were introduced to allow drivers and motormen to drive their trains to a point directly opposite the signal, where they can utilize the station platform to the greatest possible extent without fouling signal track circuits unnecessarily. Furthermore, since the trains are operated on a one-minute headway, these side-lights are important in that they permit the station track-circuit to be kept a minimum length.

The shunting signals are of two types—light signals and disk signals—all power-operated, with the exception of a few mechanically-operated disks at Uxbridge and one at Ruislip.



Operating room of signal cabin at Uxbridge



Fog-repeater signal

Automatic train-stops have been installed in connection with all long-range signals, the mechanisms for these train-stops being operated on 110 volts alternating-current. The mechanisms are so placed that they wind to the "off" position against the normal direction of traffic. As a further safe-guard against improper train operation in inclement weather, all long-range signals have their aspects repeated, during foggy, misty or snowy weather, by means of a "fog signal" which is located 300 ft. in the approach of the signal. These fog signals are 9 ft. 6 in. above the rail level to the center of the top lens; the signal has a toric lens 6 in. in diameter and each unit is illuminated by a 110-volt 20-watt standard commercial lamp. The fog signals are manually controlled, being switched in from Ruislip and Uxbridge cabins when the weather conditions demand.

Interlockings

There are a few small mechanical interlocking installations in this section. The first is at Eastcote, where there are four working and four spare levers. At Ruislip, the frame consists of 13 working and 11 spare levers, and at Hillingdon there are four working levers. At Uxbridge, the terminus, the interlocking machine has 20 working levers and 15 spares. It will be observed that at some cabins there is a large number of spare levers. This is accounted for by the fact that originally the system of signaling was of the lock-and-block type, with manually-operated distant, home and starting signals.

At those points where there are interlocking towers, the signals are semi-automatic or automatic, depending upon whether the cabin is open or closed, respectively.

The cabins are open only when switching movements are being made. At such times the station signals become stop-and-stay signals; when the cabins are closed, the signals are treated as purely automatic. In England, automatic signals are designated by the letter, "A," which may or may not be illuminated. This letter is displayed just under the signal head and forms part of the signal number plate, as, for example, "A.80." For semi-automatic signals, there is also affixed to the mast a letter "A" which can be illuminated by a lamp with a five-inch lens, through the operation of a lever in the cabin frame; when thus illuminated, this letter, "A," announces to drivers that these signals are to be regarded as Stop-and-Proceed signals; and when not illuminated, the signals are regarded as Stop-and-Stay signals.



Starting signal U3 and shunting signal U6 at Ruislip

Each cabin has an illuminated diagram, with 12- to 14-volt 3.6-watt lamps repeating the track circuits and signals. Approach- and back-locking is standard. The switch points are locked through the track circuits and are electrically detected. Power is transmitted at 440 volts, 33 $\frac{1}{4}$ cycles, which is standard for signaling purposes on this railway. Booster transformers are used to insure that the drop in the line voltage will not exceed 2 $\frac{1}{2}$ per cent at the extreme ends, these transformers having several taps for the purpose of making the necessary adjustments to meet various line-voltage requirements at different points. The company's substation at Ickenham supplies the power through a special switchboard.

Since, as stated, the original signaling was of the lock-and-block type, it was desirable in planning the new installation to make use of the old block wires and the old telephone pole-line on which they were strung. No disruption of the telephone service has resulted from the installation of the power and control circuits on the telephone pole line, nor has it been necessary to transpose any of the telephone wires.

Stamped fiber tags make it easy to locate and trace any desired circuit. Field telephones are fixed to certain specified semi-automatic signals in order that trainmen, when detained longer than ordinarily necessary at any danger signal, may communicate with the signal cabinet concerned.

The installation was carried out by the Westinghouse Brake and Saxby Signal Company of London, from specifications and plans prepared by the signal and telegraph department of the Metropolitan Railway.

New Books

Interlocking, Chapter XVI of the book, "American Railway Signaling Principles and Practices," official publication of the Signal Section, A.R.A. This 6 in. by 9 in. pamphlet can be secured from the secretary of the Signal Section at 30 Vesey street, New York, if the order is accompanied by the amount listed in the table below.

This is the thirteenth chapter of the book on signaling that is being prepared by Committee V of the Signal Section, A.R.A. Each chapter of the book is printed and bound separately as soon as it is completed, in order to make it available as soon as possible.

The following chapters of "American Railway Signaling Principles and Practices" are now on sale. The prices shown include the postage. Orders should be addressed to R. H. C. Balliet, secretary of the Signal Section, A.R.A., 30 Vesey street, New York. A binder which will accommodate thirteen chapters is also on sale, at \$1.00.

CHAPTER:	Members Non-Members and Railroad Not Railroad Employees Employees	
	Per Copy	Per Copy
II—Symbols, Aspects and Indications....	20c.	30c.
V—Batteries	20c.	30c.
VI—Direct Current Relays.....	15c.	25c.
VII—Direct Current Track Circuits.....	15c.	25c.
VIII—Transformers	15c.	25c.
IX—Rectifiers (including fundamental theory of alternating currents)....	25c.	35c.
X—Alternating Current Relays	15c.	25c.
XI—Alternating Current Track Circuits..	25c.	35c.
XII—Semaphore Signals	25c.	35c.
XIII—Light Signals	25c.	35c.
XVI—Interlocking	25c.	35c.
XVIII—Electro-Pneumatic Interlocking	25c.	35c.
XXIII—Highway Crossing Protection.....	10c.	20c.

Chapter XVI, Interlocking traces the development of the various types of interlocking, and the text is well illustrated with educational diagrams showing modern types of equipment. The subject is comprehensively covered and the pamphlet constitutes a very important chapter of the book.



Tower A—On the Michigan Central Car Retarder Installation in Detroit