

## What's the Answer?

### Repeater Signals

Do you employ any type of helper or repeater signals where the main signal is obscured by a curve or other feature? What are the advantages or disadvantages in using such a signal? Where do you locate the repeater signal with respect to the main signal? If the main signal is at STOP, what indication is given by the repeater?

#### Distant Repeater Signal

WILHELM SCHMITZ, Manager of Signal Development, Standard Elektrik Lorenz Works, Stuttgart, Germany.

Where the main signal is obscured by a curve or other features, the German Federal Railroad employs a distant signal repeater. On 620 miles of main lines of the GFR, a distant signal is braking distance in approach to each main signal.

When the main signal shows red for Stop, the distant signal shows two yellow oblique lights. When the main signal shows green/yellow vertical for slow speed, the distant signal shows green/yellow oblique. Full speed on the main signal is green, and the distant signal shows green/green.

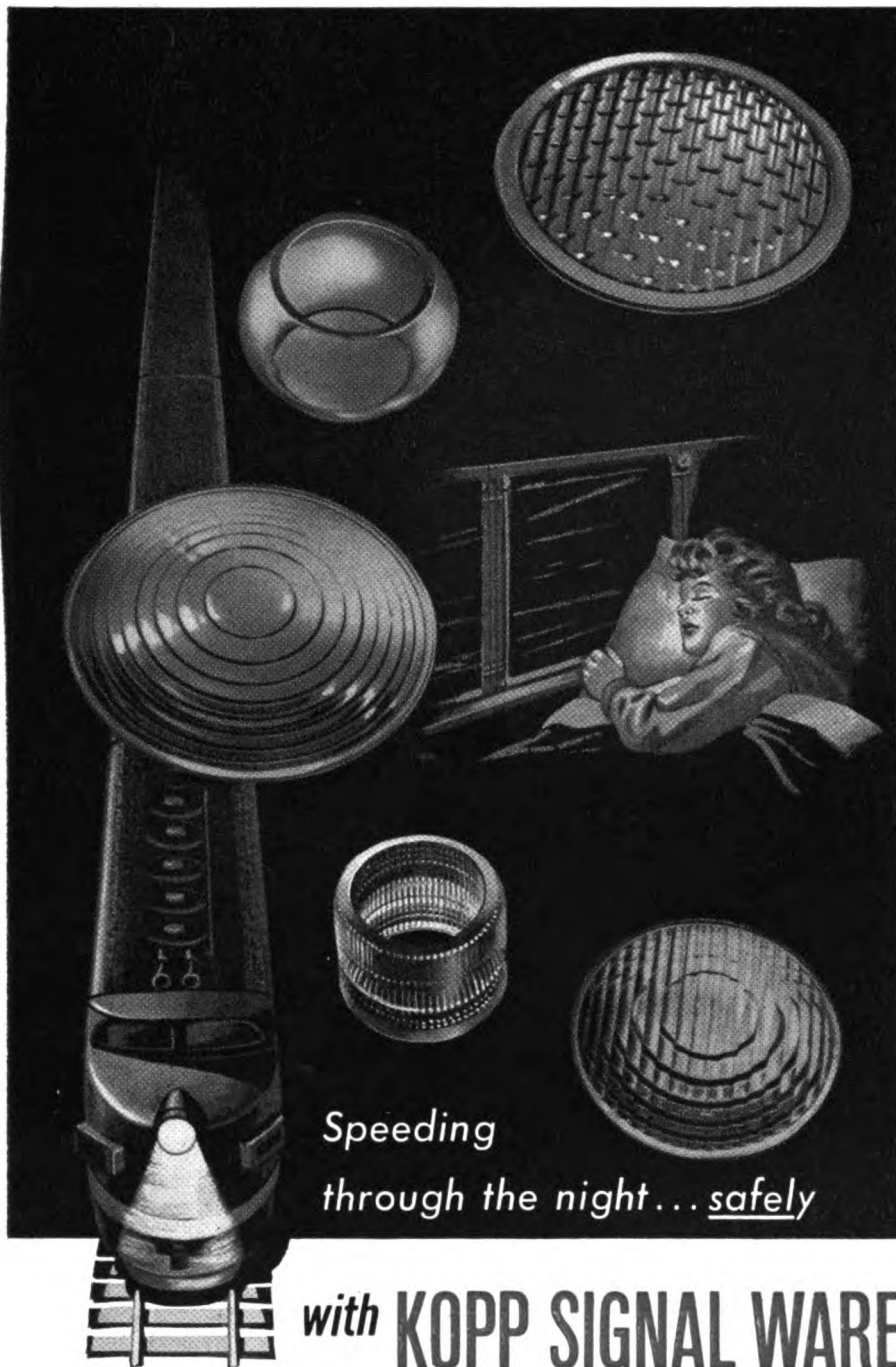
The engine driver shall be able to see the main signal on the whole way from the distant up to the main signal. If that is not possible, the distant signal is repeated one or more times. These repeater signals show the same aspects as the normal distant signal, but have an additional white light to indicate that they are repeating distant signals not having the normal braking distance.

#### At an Interlocking

R. E. TESTERMAN, Superintendent Signals, St. Louis-San Francisco, Springfield, Mo.

At an automatic interlocking recently installed in non-block territory, we installed a two-aspect repeater signal because of a sharp curve immediately in approach to one of the home signals. This signal is located about 1,000 ft from the home signal and displays green when the home signal is clear and yellow when the home signal is at stop. A fixed approach signal is located braking distance from the home signal.

We believe the advantage of this arrangement is that a heavy freight train



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does not have to slow down and be prepared to stop at the home signal on every move, because of the short view which would be the case with no advance indication. The cost is considerably less than for a standard approach signal.

### In CTC Territory

B. W. MOLIS, Superintendent of Signals and Communications, Denver & Rio Grande Western, Denver Colo.

The rules and regulations of the operating department of the Rio Grande define a repeater signal as: "A repeater

signal, designated by the letter "R" (reflectorized) may be located in advance and indicates the aspect of the next ABS. When no color indication is displayed on a repeater signal the next ABS displays a Stop indication. Note: Repeater signal indications are for information only."

There are approximately a dozen signals in service on the Rio Grande. In all cases they are used to repeat the indication of a positive signal, the range of which is very short due to a sharp curve around a hill or through a tunnel, immediately in the approach to the positive signal.

Where color-light signals are used, a

three-position signal is repeated with a two-position signal, and a two-position is repeated by a single unit. There is no red aspect on a repeater signal. Where searchlight type of signal units are used, the light energy for the repeater signal is broken through the green and yellow contacts in the mechanism to prevent displaying a red aspect.

The green and yellow aspects on the positive ABS are repeated in kind and the red aspect is repeated as a dark aspect, i.e., if the positive ABS displays green over red, the repeater displays green over dark, or, if the repeated signal is cleared for a diverging route red over yellow, the repeater would display dark over yellow.

To insure that the repeater will not display an improper indication with a "light-out" condition at the positive ABS, "hot-check" light-out relays are inserted in the lighting circuit of the positive signal, and the repeater signal controls are broken through an energized contact of the respective relays. A track circuit is installed between the two signals and the repeater controls are taken through energized contacts of this relay to prevent displaying a repeater indication if an unsafe condition occurs between these signals.

This type of signal is in use in CTC territory only and it has proved to be of considerable value in reducing train delays on train meets where a train has passed a yellow distant signal.

At one siding used for passenger train service, where the departure signals are obscured by curves, repeater signals are used. Passenger trains do not leave the depot until a clear or approach indication is displayed on this signal.

In another case, the siding departure signal is repeated at a heavily traveled road crossing near the end of a long siding at which, due to a curve, the departure signal is obscured. Trains which will clear the main track in the approach to the repeater signal do not cross the highway until conditions permit re-entry to maintrack. This practically eliminated the delay to trains due to the necessity of "cutting" for highway traffic.

### Used in Subways

L. M. BELLINGER, Superintendent Signals, New York City Transit Authority, Brooklyn, N.Y.

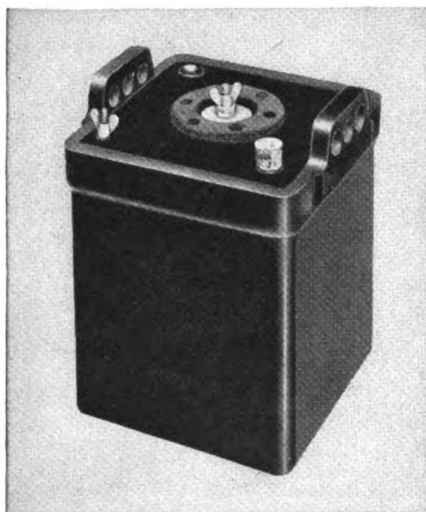
The New York City Transit Authority makes wide use of repeater signals. They are employed mostly in the subway or tunnel portions of the railroad where curves obstruct the view of the principal signal in its traditional location on the right-hand or motorman's

*Continued on page 44*



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## WHAT'S THE ANSWER?

Continued from page 40

cab side of the track. For operation around curves, turning to the right, the repeater would be located on the left-hand side of the track, a sufficient distance in the approach to the principal signal to provide the motorman with proper information on conditions ahead. Without this repeater indication, the view of a signal could be limited in some cases to less than 25 ft. Since automatic train stops are provided at all signals, this lack of information would create very low operating speeds. On left-hand curves, a repeater signal would be installed in the approach to the principal signal on the right-hand side of the track, but this is seldom required as the motorman's field of vision is usually ample.

In all cases, the repeater gives the same indication as the main signal, although it has no separate track circuit control or automatic stop installation. The light circuits are taken in multiple off the main signal controls.

The disadvantages of the signal are, of course, its cost and the possibility of a motorman on an adjacent track being influenced by a repeater indication which does not apply to him. Proper light shielding should prevent this latter possibility.

## Battery Water

How do you supply signal maintainers with water suitable for use in nickel-iron or lead-type storage batteries?

### Use Distilled Water

H. L. WALLACE, Signal Supervisor, Delaware & Hudson, Oneonta, N. Y.

When a supply of approved water is not available at the signal maintainer's headquarters, distilled water is furnished from our divisional signal shop. The distilled water is obtained from a Barnstead water still, which has an output of one gallon per hour. The distilled water is forwarded to the required location in 10-gallon wooden barrels, which are returned when empty and refilled. The actual transportation of the barrels from the shop to the field is handled by baggage or the stores department.

### Tested Tap Water

E. L. HARLAN, Assistant Chief Signal Inspector, Baltimore & Ohio, Baltimore, Md.

The tap water at all signal maintainer headquarters has been tested and a list of approved water sources has been posted. Maintainers without approved taps are supplied with water from approved sources.

### Use Laboratory Test

H. C. SAMPSON, Superintendent Signals, Gulf, Mobile & Ohio, Bloomington, Ill.

In various sections along the GM&O we have established through laboratory test whether or not water is suitable for our storage-battery service. In general, we have found that at locations where the water is supplied from lakes, rivers or reservoirs, it is reasonably free of detrimental impurities; whereas water obtained from deep wells is not. Maintainers are instructed accordingly.

Suitable water (not distilled) is shipped in carboys of 10-gal capacity from a district storeroom to maintainers in territories devoid of a satisfactory supply.

### Maintainer Has Filter

E. A. THOMPSON, Assistant to Signal Engineer, Western Pacific, San Francisco, Calif.

To eliminate the problem of handling and shipping distilled water from one or two central points on the railroad, we have supplied each signal

## Can You Answer These Questions?

1) What are your procedures or instructions for train crews and towermen when a hot box is indicated by a hot box detector? Do you always stop the train for inspection by the crew?

2) Of what value is the use of dry spot insulators? Do you use them? Please explain why or why not.

3) What experience have you had with atomic lamps? (They use Krypton 85 gas or some other atomic material.) What use are you making of these lamps? Please explain giving distances visible, maintenance and operating considerations, etc.

4) How can capacitors be applied to correct the power factor in ac power distribution circuits for signaling installations?

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maintainer with a Hydrion battery water unit. Ordinary tap water is filtered through the unit which removes minerals and other impurities, making the water suitable for use in storage batteries.

We have been processing our battery water in this manner for the past eight or nine years with satisfactory results.

## Packset Batteries

What procedures do you follow to assure that walkie-talkies used in road train service always have fresh batteries?

### Test Every 5 Weeks

T. C. LUKE, Superintendent of Communications, Boston & Maine, Boston, Mass.

A small plastic holder has been devised which is mounted on the side of the battery case. When batteries are replaced a card is inserted under this holder, with an advance of five weeks as the next date for battery changeout. Actually the battery life (Motorola heavy duty NU-126 battery pack) in most instances will exceed this period. The battery which is removed is tested under load, and re-used if found to be adequate.

The dry battery packs are exchanged at terminal points by communications department personnel. Where it may be impractical to service the units at outlying locations, fibre cases have been supplied to ship the complete units.

Continued on page 50

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