(Continued from page 46)

tips of staples holding track jumpers; bolts on bridges shorting through steel girders or through spikes and guard rails, or metal sheeting on caps and stringers; insulated joints with the rail lipped on the sides to touch the joint bar or over the end posts; bent bolts in insulated gauge plates and rods.

Hidden and intermittent shorts can sometimes be pin-pointed by watching an ammeter at the battery end as a train passes, or as a helper strikes the insulated track material with a maul.

Often stubborn cases of track circuit trouble will be revealed by comparing values recorded in making the current and voltage readings that are normally taken to determine ballast and rail resistances. That is, voltage across battery, voltage on the track side of the resistance unit, voltage across rails at the battery end, current flowing to the rails, voltage midway of the track circuit, voltage across rails (relay end), voltage across relay terminals and current flow through relay coils. If the readings themselves do not show a discrepancy, they quite often will cause you to stumble on the trouble by moving a wire or piece of apparatus that is defective.

Checking Half-Wave Circuits

GLENN C. FITE, Los Angeles, Calif.

The assumption in this case is that the circuit is definitely shorted and not partially open. In general, we use the so-called type C circuit, which is fed with low voltage alternating current supplying a half-wave rectifier at its outer end, and picking up a 1-ohm dc relay at the control end. There is a 1-ohm resistor, placed between the ac source (commonly a transformer secondary) and the track, and a shorted track circuit generally evidences itself by excessive heating of the resistor. Your question indicates that the voltage at the relay has dropped below its minimum pick-up value. As a usual procedure in a case of this kind, we place a low reading dc voltmeter across the coil terminals of the relay, having someone standing by to observe the meter reading, and then send a man out on the track with a spike maul to tap such things as insulated gauge rods, gauge plates, switch tie rods and the insulated joints in the closure rail of turnouts, as well as any other items which might, if broken down, indicate a shorted condition. Generally, whenever an item has broken down, it will reveal its condition when struck by a spike maul, by a change or fluctuation in the reading of the voltmeter at the relay.

Atomic Lamps

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.

Use In Semaphore Signal

MILES L. HLAVIN, Assistant Engineer, Illinois Central, Chicago, Ill.

Our experience on the Illinois Central with atomic lamps has been limited to one installation where we employ a Krypton 85 activated lamp as an inoperative semaphore approach signal. This signal was placed in service on October 17, 1958. The aspect of this lamp at night has a satisfactory visibility for this purpose at this installation. During the daylight hours, the indication of the signal is conveyed by the semaphore blade.

The Krypton 85 lamp was purchased from the United States Radium Corp. and adapted to a wooden pole by a special mounting bracket designed at our signal repair shop. Our shop also built a special background and lense hood for this lamp.

The only maintenance required at this installation during the 10-year estimated life of the Krypton 85 lamp would be an occasional cleaning of the lens, plus periodic painting of the background and lens hood.

Our decision to utilize an atomic lamp as an inoperative semaphore approach signal rather than as a switch lamp was based on (1) the lower initial cost, since only one activated bulb is necessary; and (2) the lamp presents less of a temptation to vandals as an approach signal than as a switch lamp. Vandalism is considered very important as a maintenance factor, for damage to the activated bulb would necessitate returning the lamp to the manufacturer for a bulb replacement and proper sealing.

Hopes for Brighter Light

J. I. KIRSCH, Retired System Engineer-Communications and Signals, Pennsylvania, Philadelphia, Pa.

The Pennsylvania has made one test installation of a nuclear-powered switch lamp. The self-contained lamp measures about a foot square, weighs about 44 lb, and was welded to a switch stand. The lamp has two red and two green lenses similar to the conventional switch lamp. Behind the lenses is a small glass bulb, about ¾ in. in diameter, which contains radioactive Krypton 85 gas, an isotope which is constantly giving off beta particles. The bulb is coated inside with a zinc sulphide phosphor and this glows as the beta particles strike it.

The lamp is being tested primarily to determine the adequacy of its light intensity, which is less than that of electric and kerosene switch lamps now in use. The lamp is visible at night at a distance of 500 yards. It is hoped future developments will provide a brighter lamp of this type.

Barring accident and except for an occasional cleaning to remove dust from the lenses, the unit should provide illumination for 10 years without further attention. The lamp will lose its intensity gradually over the years as the beta particles in the Krypton are dissipated, but it should be about 10 years before an appreciable difference takes place.

Painting

How often do you paint signal equipment, such as switch machines, relay cases, masts, cantilever supports and signal bridges? Do you use a primer coat? How many coats do you put on, and how is the paint applied—by brush or by spray equipment? What colors and kinds of paint do you use, and why?

Every Two Years

C. E. R. HAIGHT, Chief Engineer, Delaware & Hudson, Albany, N. Y.

Signal equipment, such as switch machines, relay cases, masts, cantilever supports and signal bridges, is painted every two years, but occasionally for economic reasons, painting is postponed another year. A priming coat is seldom applied because painting is done before rust starts. One coat only of lead base paint is applied, by brush or by spray. The latter accounts for about 90 per cent.

Black is used on all equipment except crossing signal equipment, where black and white are used. Black is used because it shows the least discoloration and a minimum of reflectorization.

Paint Once Each Year

GLENN C. FITE, Los Angeles, Calif.

We generally paint our signal equipment an average of once each year. Certain items such as switch circuit controllers, terminal boxes, etc., that are near the rails and subject to drenching with salt brine from refrigerator cars, are painted oftener. We use a primer coat of Rust-Oleum and then aluminum is hand-brushed on top of this. Concrete foundations and low points of pipe posts and the like are generally painted black.

(Continued on page 51)