What's the Answer?

If You Have a Question That You Would Like to Have Someone Answer, Or If You Can Answer Any of the Questions Shown Below, Please Write to the Editor

Preventing Lamp Failures

"What methods are being used to prevent lamp failures in light signals? To what extent are auxiliary devices such as reserve lamps, etc., being used? What is being done to prevent shop failures without having to depend upon a rigid system of inspection and removal of lamps?"

Lamps Burned at Under-Voltage

E. S. Taylor
Signal Engineer, Canadian Pacific, Montreal, Que.

We now use, in our searchlight signals, a Canadian-made 12-16 volt 21-c.p. auto-headlight lamp which is checked for 1/64-in. precision. At interlockings where lamps burn continuously, we leave them in for 1,600 hours, with the voltage adjusted to just under 10 volts. At automatic signals and others which are approach-lighted, we calculate the burning time according to train movements and leave the lamps in service for 1,200 hours of burning, on account of these lamps burning at slightly more than 10 volts from 5 cells of lead-plate storage battery on floating charge.

We have practically no "lamps out" by following this procedure. The lamps cost us 23 cents each. At this low cost, their replacement at shorter intervals is justifiable. No checks are made on the lamps after receipt from manufacturer, except that lamps are burned for several minutes after installation and removed if they appear defective.

Advises Replacements on Basis of Accurate Records

G. E. Beck
Signal Supervisor, New York Central, Toledo, Ohio

A study of lamp life shows that of six 1,000-hour lamps three burn-outs may be expected before 1,000 hours and three after 1,000 hours of burning. In certain classes of service it is necessary to reduce burn-outs to a minimum, and this is done by burning the lamps at a reduced voltage, and removing them after they have burned a predetermined number of hours.

When a new lamp is installed, it should be burned continuously for 10 or 15 minutes, to detect bulbs which have been damaged in shipment. If, after so burning the lamp, the bulb is discolored, or if the filament loses its shiny appearance and turns black, it indicates that the life expectancy of that particular lamp is short and that the lamp should be replaced at once.

A method of recording the date each lamp is placed in service and the date of its proposed removal should be adopted. In approach-lighted territory the number hours a signal is lighted should be estimated, or a time counter should be used to determine in hours the total time a signal lamp is lighted in any given period of days.

Lamps so removed from a signal at the end of a predetermined period may be used, at a voltage further reduced, in the marker or other less important unit. For instance, an 8-volt 18-watt lamp, in an approach-lighted signal, should be burned at 7.8 volts (a-c. or d-c.) and may later be transferred to the marker unit

To be Answered in an Early Issue

(1) Approximately what should be the time setting for time-element devices used for the release of approach locking at remote-control layouts? As a general rule, do the benefits of a separate short-time device for slow-speed routes justify the installation of such a device?

(2) Can nickel or chromium plating of relay and signal parts be performed economically in the average signal shop, or is it cheaper to have such work done by some commercial plating works? If handled in the signal shop, what is the best method? Which is better—nickel plating or chromium plating?

(3) What is the distinction between speed signaling and route signaling? What are the advantages and limitations of each?

(4) What is the easiest way for one maintainer alone to make temporary and permanent repairs in open line wires and aerial cable?

(5) In terminals where three-position signaling is used, should the "D" aspect of any given signal be controlled by the signal immediately ahead, regardless of the spacing of the signals and regardless of where the signal ahead leads to?

(6) What are the most important items of maintenance work to be carried out during the spring months, on your particular district? How do you arrange your work, with a view of securing the most efficient plan of action?

and burned at 5.0 volts. Whereas, for continuously lighted signals, the operative signal unit would be burned at 7.5 volts; but, when transferred to the marker, it would be burned at 5.0 volts. Where, with the single-filament lamp, it is not possible to maintain proper voltage regulation, the reserve lamp may prove the most economical, as all that is then required is to allow the normal bright filament or reserve lamp to burn out. With the lamp showing dim enginemen will report it and renewal will be made in a short time.

We use signal-filament 8-volt 18-watt lamps in color-light signals and maintain the voltage regulation. For electrically lighted semaphore signals, we use the cut-in relay and reserve lamps.

Emergency Yellow Unit

J. A. Johnson
Signal Engineer, Missouri-Kansas-Texas, Denison, Tex.

We burn our lamps slightly under the rated voltage. On our color-light signals we apply an emergency yellow-light unit, which is located slightly below the regular unit. An ANL-2 relay is in series with the feed circuit for the green unit and the regular yellow unit. If a green, or Proceed, indication is to be displayed and the light bulb has burned out, the ANL-2 relay switches the current on to the emergency yellow unit, displaying an emergency caution indication to approaching trains. If the yellow or caution indication is to be displayed and the lamp filament is burned out, the ANL-2 relay will switch on the emergency unit displaying an emergency caution indication for approaching trains. The rules require that trains receiving an emergency yellow indication report same at the first open office, so that the dispatcher will be in a position to notify the signal maintainer. We do not make a practice of calling the maintainers out after their regular assigned hours for replacing burned-out lamps, except when the lamp in the red unit is burned out. The maintainers are merely notified, so that they will be in a position to make lamp replacements promptly during their regular assigned hours.

Since we adopted this emergency unit we have not followed the practice of keeping a record of each lamp, as was formerly done in order to change the lamps at the end of their rated service life. In checking over the lamp renewals for the last two and a half years on 18 of our signals, we find that the life of the lamps will average 7,000 hours or better.

The use of the emergency yellow unit saves the expense of calling maintainers to make lamp replacements, eliminates stopping of trains, and gives us considerably more than the rated service life of our lamps.

One-Hour Burning Test at Rated Voltage

C. A. Taylor
Superintendent of Telegraph and Signals, Chesapeake & Ohio, Richmond, Va.

The present standard lamp for use in light signals on the Chesapeake & Ohio is a rebased lamp with a PS-16 clear bulb, a medium bayonet base, and two filaments. The lamps are purchased without collars and are rebased at a central shop before being distributed to the signal maintenance forces. In order to prevent failures during the early part of the lamp service life and to take care of the normal sagging of the filament the lamps are given a rigid inspection at the shop and a one-hour burning test at rated voltage before being rebased. The period of one hour for burning test was established after several years of experience, using longer burning periods, ranging up to 48 hours. The one-hour period has proved entirely adequate.

Standard instructions covering requirements for recording the life of lamps, and for inspecting, testing and renewing the lamps, are furnished to all signal maintenance forces. The strict observance of these instructions has resulted in uniformity of practice and satisfactory performance. These instructions embody the following features:

1. Lamps are burned at approximately 90 per cent of their rated voltage.
2. They are renewed on a regular schedule which permits a total period in service equivalent to a maximum of 3,000 burning hours. The supervisor of signals furnishes each maintainer with a renewal schedule showing the actual number of days the lamp is to remain in service on each light unit.
3. Light-signal inspections are conducted at least weekly and oftener under certain local conditions.
4. To detect burnouts of either filament, a burning test is conducted weekly, using 2 volts (for a 10-volt lamp). By observation of the dull red glow, the maintainer can definitely determine the continuity of both filaments.
5. Lamps are immediately renewed when one filament fails.
6. Voltage tests at the lamp are conducted semi-annually to insure lamp voltages within minimum and maximum requirements. These include tests of the d-c. stand-by, as well as of the normal a-c. power source.

A complete service record of all lamps is maintained by each maintainer on a special form prepared for that purpose. Burned-out and defective lamps are accumulated for observation and study and each one failing in service is checked against the service record. No auxiliary devices, such as reserve lamps, are being used.

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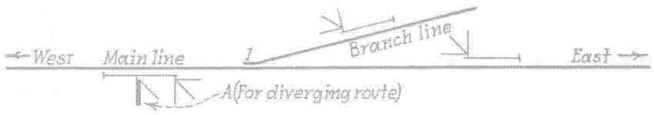
Automatic Operation

"It is desired to install automatic interlocking at the junction of two single-track lines (illustrated). Can switch 1 and signal A be controlled automatically for an



eastward train movement from the main line to the branch line? Would it be feasible to install a preliminary track circuit and time-element device so arranged that the route lined up would depend upon the speed at which the approaching train passes over this preliminary track circuit?"

Part-Automatic Control

P. G. Seaholm
Office Engineer, Great Northern, St. Paul, Minn.

To operate switch *1* and signal *A* automatically for movements from the main line to the branch line, by means of a short preliminary track circuit and time-element device, would, in my opinion, not prove satisfactory. Although such an arrangement could be worked out, it would be difficult to regulate the speed of all trains to such an extent that both main-line and branch-line movements would not be delayed.