throwing them on full load for ten minutes or more once each month while completing a general inspection of the remaining signal equipment at the location. This latter method is being carried out successfully in many parts of the world and under all climatic conditions.

Uses 10-Minute Short Circuit

W. Abell
Signal Maintainer, Canadian Pacific
Golden, B.C., Canada

On my territory, signal batteries are housed in concrete wells and 9-ft. cast-iron battery chutes. Although extremely low temperatures prevail during the winter months, we experience no trouble from sluggishness of primary battery that is on a closed circuit most of the time. However, signal operating batteries are inclined to get sluggish, and I find that "shorting" them for a period of about 10 minutes will restore them to their original activity. It is seldom necessary to short-circuit a battery more than once during the winter. Shorting for a period in excess of 10 minutes should be avoided as the battery would be unnecessarily exhausted, and also, there is the possibility of the zinc element "flaking" and setting up an internal short circuit.

In making the short, one must make sure that there are no relay contacts included in the temporary circuit, as they might be damaged by the excessive current. If there is any uncertainty as to where to place the jumper, it should be placed directly across the positive and negative terminals of the battery.

One means of detecting a sluggish operating battery is to observe the clearing time (semaphore signals). However, where a signal takes longer than the usual time to clear, it is best to make sure that excessive friction, due to a tight or dry bearing, is not responsible. This can be done by dropping the signal arm part way with the dynamic snub cut out, and observing the freedom and rapidity with which it falls. Care must be taken to arrest the movement before the spectacle casting strikes the bottom stop, or breakage may occur.

Another test can be made by placing an ammeter in the operating circuit and observing the current flowing while the signal clears; if a sustained current of 2.5 or 3 amp. is flowing, the signal should clear in from 8 to 10 seconds. If a longer time is required, there is excessive friction, the cause of which should be determined and corrected. If the current flowing drops below 2.5 amp., it is almost certain that the battery is sluggish or that abnormally high resistance exists in a relay contact or motor spring.

A definite check of the battery condition can be made by shorting the battery through an ammeter, using the 30-amp. scale; if the battery will sustain an output of 10 amp. for a reasonable period of time, sluggishness is not the trouble. Should the reading gradually diminish until it drops to 5 or even 7 amp.—the battery being tested may be at fault.

Upon first thought it may appear that a signal which clears slowly on account of a sluggish battery, is wasting a great deal of energy and that any shortening of the clearing time will result in a proportionate saving in battery energy. This is, however, to a large extent erroneous, as it is only the increase in current output, due to the higher sustained voltage of the "enlivened" battery, that causes the signal to clear more rapidly.

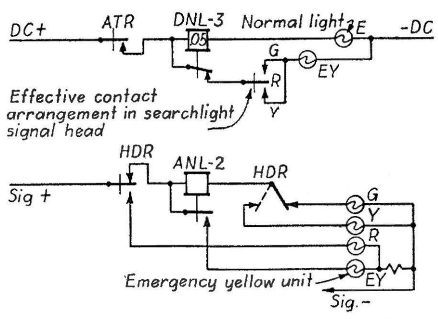
Avoiding Light-Out Signal Failures

"What methods are used to safeguard light-out failures in color-light signals, caused by a broken filament in the normal-burning light? Please answer for searchlight type signals having but one lamp and for multiple-unit color-light signals."

Emergency Yellow Aspect Provided

J. A. Johnson
Superintendent of Telegraph & Signals
Missouri-Kansas-Texas
Denison, Tex.

To guard against light-out failures with color-light signals, we have installed an emergency yellow light unit which is lighted in the event of a lamp failure in the yellow or green aspect of the signal. The additional unit is mounted on the mast of each of our



color-light signals, a short distance below the regular color-light unit.

The circuit that supplies the current to the lamps in the green and yellow units is connected through the coils of an ANL relay which is thus energized when either the green or the yellow unit is lighted. Therefore, a burn-out in either of these units de-energizes the ANL relay, which switches the current on to the emergency yellow unit through a back contact, as may be seen in the accompanying circuit plan. The lower diagram is that commonly used with our Style-R signals which are operated on alternating current with primary-battery stand-by.

The circuit for the control of the emergency yellow unit on our searchlight signals is shown in the upper diagram. With these signals also, only the green and yellow aspects are repeated by the emergency yellow unit in the event of a lamp burnout. The normal light is fed through a DNL relay, which, if de-energized by a lamp burn-out, completes the circuit for the extra yellow unit, provided however, the signal contact mechanism is not in the "red" position. In this circuit the light is operated on direct current from a rectifier.

New Lamps Closely Inspected

J. J. Corcoran
Assistant Signal Engineer, New York Central, Albany, N.Y.

In order to minimize signal failures chargeable to broken lamp filaments in color-light signals, our lamps are purchased under a specification which insures the receipt of lamps of the best quality obtainable. Before using the lamps they are carefully inspected, and any lamp which may be found not physically perfect is rejected. When a lamp is installed it is closely watched for some time, as experience has shown that a lamp which does not burn out in a short time will usually burn its full expected life.

Lamps are burned at a voltage reduced as low as possible and yet provide sufficient beam intensity to insure that a satisfactory indication is displayed. Where practicable, voltage is further reduced for night operation. This practice results in reliable performance and longer lamp life. By following this procedure closely, very few light-out failures are experienced.