

WHAT'S THE ANSWER?



Precision-Base Lamps

"Does the use of precision-base lamps in light signals altogether eliminate re-focusing the signal when replacing lamps? Is the extra cost of such lamps warranted in all cases?"

Prefers Non-Precision Lamp with Focusing Device and Adjustable Receptacle

By H. E. Brashares

Assistant Superintendent of Signals, Great Northern, St. Paul Minn.

In color-light signals, or, in fact, in any combination of lenses, it is necessary, for most efficient results, to have the source of light at the correct focal point.

Two types of color-light signals are in general use, one having practically a fixed lamp receptacle, and the other an adjustable lamp receptacle. In the first type the use of "precision-based" or "re-based" lamps is practically a necessity and does eliminate the refocusing of light signals when a bulb replacement is made. The extra cost of such lamps for such signals is warranted, especially where low-voltage lamps must be used on account of the battery being the only available energy supply, and in general to obtain the most efficient indication.

On the other hand, a non-precision lamp may be obtained at lower cost and used with an adjustable lamp receptacle, provided a simple focusing device, which may be applied quickly, is available.

From my experience with both types, I have reached the conclusion that while the fixed receptacle with the "re-based" lamp is perhaps more practicable from a maintenance standpoint, the adjustable receptacle with focusing device and a non-precision lamp is preferable.

Questions Economy of Precision Lamps

By P. M. Gault

Signal Engineer, Missouri Pacific, St. Louis, Mo.

We have been specifying precision-type bulbs for use in our signal devices where a so-called rebased lamp is not required. Judging by the experience we have been having, we believe that we are not getting any better lights than we would get from a lamp which is not selected from a lot because it happens to have the filament located (accidentally) a little closer to a prescribed point.

Where we have used lamps of the non-precision type the signalmen take a little more care in renewing lamps and refocusing signals to take care of the variation in

To Be Answered in a Later Issue

(1) What is the best method of testing relay front contacts? Back contacts? Please illustrate, and give the formulas involved in the method that you consider most suitable.

(2) Where color-light signals at interlocking and remote-control plants are lighted by alternating current with a direct-current reserve, how do you secure a back indication check? Do you consider it necessary to make this check on the distant signal at Caution, as well as on the home signal at Stop? Is it sufficient to check only the control relay, or should the red-light circuit be checked, also? If the latter, how should the check be made?

(3) When stringing open line wires for signal circuits, or messenger wires for heavy cables, what precautions can be observed to insure against later breakages due to temperature changes, and misjudgment on the part of the linemen? Have tension indicators been used successfully for this purpose?

(4) In designing signal and interlocking circuits, what provision should be made to insure facility in testing for grounds? Is any special equipment desirable in order to make possible the complete isolation of each circuit?

(5) What methods are effective in preventing trouble due to moisture and frost in or on relays, signal mechanisms, etc.?

filaments. This results in each signal giving its very best indication.

Were we able to purchase precision lamps in which the filaments were as uniformly located as in the rebased lamps we use, and for the same or less money, then I believe we would be justified in confining our purchases to this type, but, as long as "precision" does not mean any more than it does on some of the lamps we get, we will question the economy of paying a premium for such lamps.

Personally, I am willing to accept the responsibility, so far as the railroad goes, for poor indications from rebased lamps, but I do not feel so inclined toward precision-type lamps.

All Focusing Adjustments Made at Factory

By J. J. Corcoran

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We use precision-base lamps for all electrically-lighted semaphore signals and color-light signals. Our experience has been that the only place to make the proper

focusing adjustment on light units is in the laboratory where a screen, with equipment for exact photometer readings, is available. In our case this work is done at the signal company's factory where the lamp base is originally focused in the proper position for the given unit, after which it is only necessary for us to replace the lamps at regular intervals. We find that using the precision-base lamps provides a uniform and satisfactory light distribution and that the small additional expense is well warranted.

Signal Indications More Uniform If Precision Lamps are Used

By A. W. Fisher

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All manufacturers of light signal equipment find that very accurate focusing of the light source is necessary to get the best result, and there is no doubt that all railroads using light signals recognize the same necessity. It has been found by repeated laboratory tests that light sources which are displaced more than $1/64$ in. from the focal point, at which location the best results are produced, will throw the beam out of alinement or out of focus to such an extent that the necessity for readjustment is obvious.

Sighting devices on light signal cases are adjusted to give the proper alinement to the light signal beam, only when the beam is focused along the axis of the lens system. This adjustment is obtained with a lamp of proper design having its light source located at the point determined by the proper dimensions for light center length and axial alinement.

Obviously, if replacement lamps are used which have their bases applied with relation to the proper location of the filament within an error of $1/64$ in., or if special rebased lamps giving the same $1/64$ in. precision are used, there will be no departure from the original alinement of the signal beams, assuming this to have been properly made, and therefore the need for refocusing the signal when replacing lamps is eliminated.

Signals built for $1/64$ in. precision lamps have the lamp receptacles permanently located in their correct position before they leave the factory. The alternative is the use of an adjustable lamp receptacle, to which can be applied, for lamp renewals, lamps with ordinary commercial tolerances of plus or minus $3/64$ in. or $1/8$ in. for light center length and axial alinement. Such lamps are slightly cheaper than the $1/64$ in. precision lamps, but in all cases of renewal, it will be necessary for the maintainer to adjust or refocus the receptacle. Lamps can be brought into proper focus by this means to obtain results equally as good as with a $1/64$ in. precision lamp, but these results depend entirely on the individual maintainer. Experience has shown in a great many cases that the maintainers often fail to get the proper adjustment, or, due to lack of time when replacing a lamp, postpone the adjustment to another day and often overlook it entirely. Conditions vary on different roads and with different maintainers, the natural result being some good signal indications and some poor signal indications.

The $1/64$ in. precision lamps in accurately located and permanently fixed receptacles provide uniformity in signal indications and eliminate the labor of readjustment and irregularities in indication due to refocusing with adjustable receptacles.

The slight extra cost of the $1/64$ in. precision lamps

as compared to lamps based with commercial tolerances is an item which must not be compared alone to the labor expense of adjusting receptacles in the field, but must be considered also in connection with the insurance it provides for uniformly good indications and the elimination of the human element.

C. J. Kelloway, superintendent of signals, Atlantic Coast Line: It depends entirely upon the type of signals as to whether it is necessary to re-focus the signal when replacing lamps. It appears to me that this is a question to be decided by each railroad for its particular type of signal.

Call-on Route Control

"What control features can be incorporated to insure that a call-on signal will clear for only a specified route? Under what operating conditions should call-on signals be used?"

Security of Operation Depends Upon Strict Enforcement of Rules

By D. W. Richards

Signal Engineer, Norfolk & Western, Roanoke, Va.

I do not know of any control features that could be added to or incorporated in the circuits of an electrically-operated calling-on signal so that it will clear for only a specific route and at the same time convey to engineers what route is set up, unless it is a one-route signal. When it is installed as a restrictive speed signal governing movements into one or more occupied tracks, in order to insure that an engineman knows where he is going, it would be necessary to go back to the old route-indicator signals, using illuminated numbered disks selected by the route lined up, the proper disk being displayed to show the number of the track or route for which the switches have been lined up.

With the use of the present type of restrictive-speed signals governing movements into occupied blocks, the only security which can be obtained is in the strict observance and enforcement of the rules governing the use of this type of signal.

Favors Exclusive Use of Route-Controlled Signals

By W. F. Zane

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Until about four years ago, a few call-on signals were in use at interlocking plants under my jurisdiction. At that time I removed them from service, as I do not believe it is safe practice to use any signal in an interlocking plant that is not 100 per cent route-signal controlled through the routes over which it governs. Since discontinuing the use of these call-on signals, I have found that they were not of as much value as they had previously been considered to be.

My personal opinion is that the regular route signal, controlled through the track circuits and through the proper lever on the machine, and with the proper selection through the switches, is an efficient signal, and will answer all the purposes that an interlocking plant is designed for. At the same time, it will handle the traffic as quickly as if a call-on signal were displayed. I feel sure that the regular route signal is much safer.