servation and periodic tests should offer no difficulty. The inherent weakness of this type of circuiting would seem to be the strongest argument against the practice of preconditioning. The gain in time is negligible when weighed against the potential danger it might cause.

Proper instruction of the control machine operator will also lessen the possibility of any undesired condition being set up. An experienced, capable operator, upon receipt of an OS indication, will not attempt to operate a switch until his indication lights indicate that the train has cleared the approach and detector sections and is in the advance section. This, of course, would not apply where pre-conditioning of switches is provided.

## Aligning Searchlight Signal

*What methods do you use for properly aligning searchlight signals?*

### Use a Target

By O. W. DeWitt
Superintendent of Construction
General Railway Signal Company
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One of the most successful methods we have used in territory signaled with SA compound lens, 5-watt lamp searchlight signals, is aligning the signal by means of a target. This target should consist of a 2-ft. diameter disk of ¼" plywood painted white on one side. A black cross is then painted on the white background, consisting of a 2-in. vertical stripe and a 2-in. horizontal stripe intersecting at the center of the disk and running from edge to edge.

The target is then mounted on a ¾" by 2" staff, long enough to place the target at a level of the locomotive engineer's eyes as he rides in the locomotive. The bottom end of the staff would rest on a cross-tie.

To use this target, a man would be stationed at a location at which it had been previously determined the engineer should be able to see the signal. He would hold the target upright, cross side facing toward the signal to be aligned. Through the use of the sighting device built into the signal case, locate the hair line cross exactly on the cross of the target. Set and securely fasten the adjusting screws and after this has been done, take a final look through the sighting device to make sure tightening the adjustment screws has not changed the alignment. A target of this type can be seen several thousand feet under normal weather conditions.

## Training Program

*Do you have a training program for signal department employees?*

### On a Voluntary Basis

By V. O. Smeltzer
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Training programs in the Santa Fe signal department are on a voluntary basis. The men are encouraged to improve their position and knowledge through study of correspondence school courses and through classes conducted by signal department personnel. Such classes are organized on construction gangs when the men express a desire for such training. Classes are conducted after working hours usually one night each week. Attendance is not compulsory, however, a surprising number of men avail themselves of these opportunities.

Usually the foreman of the gang is directly in charge of the classes under the guidance and with the

assistance of the division supervisory forces. On occasion, particularly when new systems or procedures are involved, a member of the signal engineer's force acts as instructor. An example being the first installation of CTC on a division. All signal department personnel are invited to attend classes.

No set course is prescribed for these classes, it being left up to the instructor and the men to decide on what is to be studied. Usually there are enough new men to warrant some discussion of signaling fundamentals such as track circuits. Blue print reading becomes a part of each class. Symbols and wire nomenclature are explained to the men as the instruction progresses. Visual instruction is employed by showing relays, batterie, etc., at classes as these items are discussed. The men are assumed to have some knowledge of basic electricity, and are shown how to apply simple formulae such as Ohm's law and track circuit calculations.

The Santa Fe has prepared letter size drawings of wiring for various pieces of apparatus such as semaphore or light signals, switch motors, etc. These are bound in book form. Included in the book are pages showing symbols used on drawings together with an explanation of wire nomenclature. Other books cover construction and maintenance standards. Each signalman has a copy of these books, and the foreman has copies available for loan to any of the men. AAR Chapters on "Railway Signaling Principles and Practices" are available on most gangs for the men to study. Classes are intended to be practical rather than theoretical, and generally cover the type of work being performed at the time.

## Radio Antennas

*How often do you inspect wayside radio station antennas?*

### Measure Standing Wave Ratio

By C. J. Nelson

Assistant Superintendent
Communications, Engineering
Chicago, Rock Island & Pacific
Chicago, Ill.

Our communications maintainers are provided with voltage standing wave ratio meters, and normally use this instrument whenever maintenance work is done at the various base stations. The maintainers keep their record of the readings obtained at each station and therefore can determine whenever antenna trouble exists.