

keep them out. I cut a block of wood to fit the opening in the bottom of the case, slotting this block to accommodate the parkway cable, or, if it is a trunking location, to accommodate the plain wires. Then I fill in the cracks between the block and the wires or cable, with plaster of Paris. This plaster and block can easily be taken out if it is necessary to make any changes in the wiring.

*Frank R. Schmidt*, New York Edison Company, suggests the following: "When possible, holes may be plugged with 'steel wool' or 'brass wool.' Mice do not seem to care to bite through these materials."

## Insulators

*"What are the advantages or disadvantages of using glass insulators, as compared with porcelain insulators, for signal-control open-line circuits? For a-c. power lines up to 440 volts?"*

### Brown Glass Insulators Now Available

M. K. Holmes

Chief Engineer, Hemingray Glass Co., Muncie, Ind.

In our opinion glass insulators are particularly advantageous for this use on account of their durability and economy. Brown porcelain insulators have been used for this purpose in some cases, on account of a Western Union ruling that in joint construction insulators should be used sufficiently different in appearance to distinguish the power lines from the telegraph lines.

It is now, however, possible to obtain brown glass insulators which qualify under this ruling and which make the expense of brown porcelain insulators unnecessary. Brown glass insulators are particularly adaptable to this requirement. These insulators are made of a glass which is well annealed and free from internal strain, thus giving the glass more resistance to breakage. The petticoats in this insulator are heavier and on comparative impact tests this type shows materially more strength than corresponding porcelain or glass types.

## Electric Lock on Spring Switch?

*"What are the advantages or disadvantages of using an electric lock on a spring switch?"*

### Believes That Speed Restrictions and Electric Locks Are Not Needed

Leroy Wyant

Signal Engineer, Chicago, Rock Island & Pacific, Chicago, Ill.

The disadvantages are obvious. An electric lock adds installation and maintenance expense. It will occasionally fail, causing delays to through main line trains. A lock will be an advantage on those roads where a speed restriction is imposed on main-line traffic over a spring switch and where this speed restriction would be removed by using the lock.

This brings up the question of whether a speed restriction is necessary for spring switches. It is my personal opinion that spring switches are as safe as rigid

switches, that speed restrictions are not necessary, and, therefore, that electric locks are not necessary. However, it will probably be a long time before the railroads will agree generally to eliminate the speed restrictions over high-speed main-line spring switches without an electric lock, and until that time the electric lock is a decided advantage for main-line locations where speed restrictions are a disadvantage. I believe the records show a consistent increase in the use of spring switches and this increase will be greatly accelerated as the use of electric locks is developed.

### Answer Depends Upon Safety of Spring Switch

I. A. Uhr

Signal Engineer, St. Louis-San Francisco, Springfield, Mo.

With the assumption that an electric lock is required on the spring switch for the protection of facing-point train movements only, then its necessity is determined by considering how safe a spring-switch arrangement is in comparison with the standard switch.

Some railroads evidently feel that spring switches are as safe as a standard switch, because they have no speed restriction over them, except when the point is to be moved or pushed over by a trailing train movement. If the electric lock performs no required service, then it has no advantage but is a disadvantage because it is superfluous.

## Location of Home Signals

*"Why are home signals at automatic interlocking plants usually placed 400 ft. or more from the crossing when there are numerous advantages of placing them 50 ft. to 75 ft. from the crossing?"*

### Favors Locating Signals Close to Crossing

James O'Dore

Signal Supervisor, Chicago, Milwaukee, St. Paul & Pacific, Butte, Mont.

It seems to me that locating home signals 50 ft. from the crossing would be the thing to do, especially where the angle is 90 deg. or nearly so. Where derrails are not in use I cannot see any advantage in holding a train 400 to 500 ft. from the crossing. In fact, it seems that trains stopped closer to the crossing could more readily communicate with one another in the event that the time release failed to clear one route. The saving in material would, in my opinion, warrant locating home signals close to the crossing.

### Time Interval Is a Factor

H. A. Franklin

Engineer, Iowa Board of Railroad Commissioners, Des Moines, Iowa

The Board of Railroad Commissioners of Iowa has adopted an arbitrary rule that signals at automatic interlocking plants shall not be placed closer than 250 ft. from the crossing. The reason therefor was the designating of some distance which would serve as a minimum, and that practically all plants in Iowa have no enforced time interval between the changing from a given route to an opposing route. It was the thought that the distance from the home signal to the crossing would serve the purpose

of enforcing a time interval; that is, the time consumed by a trainman in walking to the crossing.

Other than the above, there are no apparent technical or theoretical reasons why the location of a signal should not be as effective at a distance of 50 ft. from the crossing as at 500 ft. However, it would seem advisable to provide a reasonable distance for misjudgment in handling a train, or to take care of a slight over-run of the signal. Some conservative distance should be established as a standard and variations allowed where conditions justify.

### Prevailing Practice Is Satisfactory

C. A. Dunham

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

The general practice of locating home signals for all interlocking plants at from 400 ft. to 600 ft. or more from the crossing is a practice well established throughout the country. In the beginning of railway signaling in this country, derrails came into use and usually such derrails were placed about 300 ft. from the crossing or fouling point and the signal was usually located about 50 ft. from the derailed. The prevailing practice, I should say, is very satisfactory. If four or more home signals were located at a point 50 ft. to 75 ft. from a crossing, a condition would be set up which undoubtedly would be confusing to enginemen even at right-angle crossings, and would be much more so at a crossing of an angle of 30 deg. My conclusion is that the prevailing practice is satisfactory, and there is no good reason for considering a change such as the question suggests.

*Thos. S. Stevens*, signal engineer system, Santa Fe, states that "the only essential consideration seems to be that the signal shall be placed a sufficient distance from the crossing so that the detector section cannot be spanned by equipment with the longest distance between wheel bases."

### What Safety Factor is 500 Ft.?

Leroy Wyant

Signal Engineer, Chicago, Rock Island & Pacific, Chicago

In so far as the Rock Island is concerned, the reason for locating home signals 400 ft. or more from the crossing is that at manual plants they have been so located in the past to conform with state laws and, when first introducing automatic interlocking it was considered advisable to conform with existing practices wherever possible.

The records of our installations will show, I believe, that the Rock Island was among the pioneers in the installation of the present type of simplified automatic plant and, from the start, where there were advantages in locating the signals closer to the crossing, which we could use as talking points, we endeavored to obtain, and usually did obtain, the necessary approval of the State Commission, and the other railroad involved, to do so.

We have plants with all home signals as close as 50 ft. to the crossing and others where one or more of the signals are very close to the crossing in order to be ahead of passing track, house track, or other switches. Personally I would locate all such signals between 50 and 75 ft. from the crossing, except where the angle is so small that there might be confusion on the part of an engineman as to signals for the separate roads.

When signals are located near the crossing all control apparatus can be placed in a central housing, using underground cable to the individual signals. This method

materially reduces installation and maintenance costs and also facilitates maintenance, inspection, operation, and testing. In fact, the time saved to a maintainer in making complete working tests, where color-light signals are used, is a very important point in these times when our forces are reduced.

I would like to see a consistent effort on the part of all railroads to establish the practice of locating home signals at all plants, manual and automatic, approximately 50 to 75 ft. from the crossing. What safety factor is 500 ft. if an engineman overlooks or disregards the distant and home signals?

## Inventory System

*"What material ordering and inventory system for signal maintenance materials is best from the standpoint of avoiding waste?"*

### System Is in Effect a Monthly Inventory

B. J. Schwendt

Assistant Signal Engineer, New York Central, Cleveland, Ohio

The best system is one which requires a monthly book record made by each maintainer, showing each item of material under the following classifications: Ordering description of each item; on hand at the end of the previous month; received during the month; total at the end of month; used during the month; material on hand at the end of the month.

With these items, side notes may be made as reminders as to amounts to be ordered on requisitions, also as to amounts used and where, upon which to base any necessary reports. In addition to the foregoing, the material on hand must be kept in an orderly way at headquarters or on location as may be necessary to serve the purpose best. With this arrangement in effect and the work systematized, it is very little trouble for the maintainer to keep the matter straight so that he will always know the amounts necessary to order, amounts on hand, and where and when parts were used. Without such a record, men must necessarily guess more or less when making requisitions or charge-outs, with the result that duplications are made in ordering or charging out, and this causes waste.

The system also has the advantage of being a perpetual inventory correct within a month, and if properly followed may be used as a substitute for the annual inventory with the attendant additional savings. This arrangement was put into effect on one of our lines as a result of large inventory off-balances. I have observed its working during the past 20 years and note that the inventory off-balances are practically eliminated. I would recommend it as the best scheme I know for avoiding waste in ordering and inventory.

### Proper Handling Eliminates Wastage

I. A. Uhr

Signal Engineer, St. Louis-San Francisco, Springfield, Mo.

Signal maintainers are required to keep a record of their handling of materials through a material report which they must render the first of each month. This report shows the material on hand, received during the month, used during the month, any transferred, that on hand the last of the month, the amount they have on order, and that required or desired to be ordered. This report is checked by the signal supervisor for errors, any items which are excessive in amount being reduced and those not required cut off.