



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.

Signaling in Dust Storms

"What has been your experience with dust and sand storms with respect to automatic signals, interlocking, remote-control switches or C.T. C.? Are there any practical ways to reduce the damage resulting from such storms and what measures have been taken to keep the signal system functioning?"

Flashing Lights Require Cleaning

J. A. Johnson

Signal Engineer, Missouri-Kansas-Texas
Denison, Tex.

We have been handling the recent dust-storm situation with our signalmen on different parts of our railroad. Thus far we have not had many complaints resulting from dust interfering with signal apparatus. We have, however, been advised that some of our flashing-light signals, which were not tightly sealed, were partly filled with dust so that it was necessary to take the units apart for cleaning in order that proper illumination could be secured.

It has also been reported that a considerable amount of dust was deposited in some of our signal mechanism cases and relay boxes through the ventilators, but we have had no instances in which this dust caused a failure of the apparatus.

Motor Cars Damaged

P. W. Pflieger

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In the worst dust territory we have color-light signals, which are not subject to circuit-breaker trouble due to dust formation on contacts. However, where dust conditions were encountered with semaphore signals

To Be Answered in a Later Issue

(1) *On main-line automatic-block signal territory, how frequently should switch circuit controllers, connections, and the circuits affected, be tested and inspected?*

(2) *What information is available as to the use of improved types of signal glasses to provide a more satisfactory purple aspect?*

(3) *What types of practical devices are available for use in flashing a signal lamp to provide a different aspect from a steady-burning lamp of the same color?*

(4) *When enginemen complain that the light from the yellow aspect of a searchlight-type signal is blinding at night, whereas no such complaint is made regarding the green or red aspects, what arrangement can be used to reduce the voltage when the yellow aspect is being shown?*

in service we had several failures on account of dust on the contacts causing high resistance.

Section and signal maintainers' motor-car bearings were cut, and cylinders, pistons and bearings of the engines were damaged, requiring the repair of all of these cars. We did not have any interlocking plants in the dust territory, the crossing protection being automatic interlockings with color-light signals.

The damage to signals was confined to the paint being removed by the blowing sand, and to cover glasses of light signals and roundels of semaphore signals being cut by the fine sand.

We experienced delays to traffic on account of low visibility and dust covering the lenses of signal lights. Extra help was used to patrol the tracks and signals and fences were erected to prevent drifting of sand and dust over the track. Work trains with plows and ditchers were used to keep cuts and ditches from filling with dust and sand. Men were equipped with nose and mouth masks to prevent them from breathing the dust.

Visibility Greatest Problem

G. K. Thomas

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Topeka, Kan.

Dust storms are experienced every year in the Panhandle district of Texas and in parts of western Kansas, eastern Colorado and Oklahoma. The effect on signal apparatus has been the same as in previous years except to a greater extent owing to the unusual severity of the conditions this year. However, the amount of actual trouble has been surprisingly small in view of the severity of the storms and the length of time during which they have occurred.

The visibility at times was not over 50 ft., and it was necessary to hold trains until conditions improved. Lamps have been dimmed in some instances by dust accumulation. However, it has been noticed that the 3.5-watt lamp in a semaphore signal could generally be seen twice as far as a semaphore blade,

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during a dust storm in the day time. Color-light signals generally have a greater range of visibility in dust storms than semaphore signals.

In one place, sand accumulated in the track and was ground into the ball of the rail by the wheels to such an extent that the track circuits momentarily failed to become shunted for track occupancy. However, the dust did not have the same effect as sand because it was so fine that it would blow off the rail and would not insulate the circuit.

Most of the signal housings are tightly sealed and very little dirt has entered. However, in instances where housings are not tightly sealed, dust blows in, and as much as $\frac{1}{2}$ in. of fine dust has been found on shelves and relays. Cable painted last year has not been damaged, but the braid on weathered cable has been badly cut by blowing sand.

The accumulation of dry dust in the track does not cause trouble until rains occur but during some of the recent rains the formation of mud in the track has caused track-circuit failures. So far as can be determined at present, no permanent damage has been caused to any signal apparatus, but rains will cause wet track circuit failures unless the dust can be cleaned away from the rails before rains occur.

Color-Light Signals Advantageous

E. M. Kempe

Signal Supervisor, Missouri Pacific
Dodson, Mo.

On a recent inspection trip from Pueblo, Colo., to Hoisington, Kan., I found that our relays are in good condition and are not in any way damaged by dust. The signal-heads have some dust that has worked in through the doors but this has been of no particular harm. Considerable dust accumulates on battery tops, however, without material damage.

Switch circuit controllers are the source of most of the trouble resulting from dust. After each storm, the men are obliged to clean out the switch boxes and contacts. Color-light signals have been of great advantage in the operation of trains as their indication penetrates through a cloud of dust much better than the indication of a semaphore signal.

As an illustration of the damage done by the dust storms, a wig-wag signal at one point becomes inoperative after every storm, as a result of dust working into the mechanism. It is, therefore, necessary to clean this mechanism before the wig-wag

will operate properly. Such difficulty may be compared with the small amount of trouble experienced with flashing-light signals at three other locations.

Another trouble resulting from the dust storms involves difficulty with switch mechanisms owing to dust

clogging the gears. Train-order signals, where the pipe line passes under a track, become inoperative owing to dust working into the conduit pipes and packing so tightly that the operating pipe cannot be moved without great difficulty. Switch lamps have been known to be full of dust.



Re-Use of Plug-Type Bond Wires

"Is it good practice to re-install a cable-type bond after it has been removed from service, when new rail is laid?"

Questionable Practice

C. F. Grundy

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Kansas City, Mo.

Six years ago we re-installed a small number of the plug-type bonds. Although not noticeable at the time they were installed, the plugs did not seal the holes, and corrosion set in, so that all of the bonds failed in about 18 months. These plugs, however, were somewhat rough due to tool or die marks made during their manufacture, and the plugs did not seem to taper quite as much as the ones we get now.

The present-day bonds, with a smooth galvanized or tinned-finish plug, tapered in accordance with A.A.R. specifications, might give better results, but I would hesitate to re-install any great number of them on new rail, without further experiments, especially if the plugs were well "driven home" the first time.

Bonds Carefully Selected For Re-Use

B. F. Dickinson

Engineer Telegraph & Signals, Pennsylvania
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A hard and fast rule covering the re-use of plug-type bonds can hardly be made, as there are a number of conditions to be considered. If bonds have been in service for several years and have been subject to brine drippings, they will be corroded to a greater or lesser degree, strands may be broken, etc., which would make it inadvisable to use them again on new rail, which will remain in service for many years.

When a bond is first applied, the terminal plug, when being driven, is shaped or seated in the drilled hole in the rail, and as all holes are not exactly the same due to differences in

bits, the manner in which they are drilled, etc., the pin shapes itself to the hole and when removed it retains this shape. When it is applied the second time, the plug may not fit properly and this results in the possibility of moisture entering and later causing a failure.

The general practice we follow is to sort the bonds when they are removed from service on account of rail renewals; the plugs of those that are fit for further service are dipped in oil or other preservative compound and again applied, preferably the same day they are removed. If it is not practicable to apply them on the same day, they are bundled and placed where they will be protected from cinders and corrosion until they can be used.



Night Intensity of Signal Lamps

"Is it desirable to reduce the voltage on color-light signals at night in order to secure a strong indication in daylight and not too brilliant an indication at night? How can this be accomplished economically?"

Line Voltage Reduced

By E. P. Weatherby

Signal Engineer, Texas & Pacific
Dallas, Tex.

On some sections of our automatic block territory where color-light signals with 8-volt 18-watt lamps are used, we have provided an arrangement to reduce the voltage on the signal lamps from 8 volts in daylight to 6 volts at night, thus reducing the glare during the hours of darkness.

The power for the signal system is supplied to us at 2,300 volts, and we provide a 2,300-550 volt transformer to reduce the voltage to 550 volts for distribution over the territory. At each location where we buy power, an Edison sun relay is used to control an auxiliary relay through con-

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