

it is most necessary that gates be visible, yellow loses much of its effectiveness. In my opinion, the black and white stripes afford the best color combination under such conditions.

In selecting color patterns, another factor to be considered is the number of vehicle operators who are unable to distinguish between various colors. It seems to me that the contrast between black and white is greater than that between any other combination of colors, and therefore, would be more conspicuous to such persons.

Black on Yellow Would Be More Effectively Seen

By W. L. DAYTON

Signal Engineer

Grand Trunk Western, Detroit, Mich.

I FEEL that stripes of black on yellow on crossing gate arms would be more effectively seen. Yellow is used extensively by the highway departments on their signs, both in the country and in cities.

The public knows that to cross a yellow line on the center of four-lane highways, over hills, etc. is a law violation. I also feel that yellow is more outstanding and can be seen farther than white.

Black and White

By W. H. STILWELL

Signal Engineer

Louisville & Nashville, Louisville, Ky.

IN regard to color combinations most effectively seen by users of the highway on approach to crossing gates, it is my opinion that the black and white striping, as approved by the Signal Section of the A.A.R., and as shown on A.A.R. Drawing 1491D, is most effective.

All Arms Being Changed To Black on Yellow

By F. J. CORPORON

Superintendent Way & Structures
Chicago, South Shore & South Bend
Michigan City, Ind.

ALL of our crossings have been normally black on white, with the exception of three crossings which we painted red on white about 10 yr. ago. During the ensuing period, there has been no appreciable reduction in the number of accidents at these particular crossings. How-

ever, we feel that they accomplished another purpose, viz: The Baltimore & Ohio Chicago Terminal runs nearly parallel to us and only a short distance away at these locations, so that motorists approaching the crossings and seeing the gates on one railroad down, are likely to overlook the other railroad crossing at such close proximity. We believe that the red on white crossing gates draw the attention of the motorist to the fact that two independent sets of gates are in operation where the adjacent crossing is protected by black on white gate arms.

For a number of years we have felt that black on white gate arms were not plainly visible during times of fog, snow or other adverse weather conditions. Therefore, approximately six months ago we embarked upon a program to change all our crossing gate arms, both black on white and red on white, to black on yellow to increase the visibility of the gate arms and to conform to standard highway color markings on warning signs in our area of operation. We have received favorable comment on gates already completed, and we feel that perhaps black on yellow marking is an improvement over black on white or red on white. At present we are also experimenting with the application of wide-angle yel-

low Scotchlite tape stripes on black gate arms, but we have not had such arms in service for a long enough period to determine their effectiveness.

Black and Yellow Received Enthusiastic Approval

By E. N. FOX

Engineer of Signals & Telegraph
Boston & Maine, Boston, Mass.

TESTS conducted a number of years ago at selected crossings on our railroad demonstrated that highway crossing gates painted with alternate black and yellow stripes were more readily seen by highway travelers than the black and white-striped gates formerly used by us. We paint the yellow band 24 in. long and the black band 12 in., whereas the painting usually seen on black and white gates consists of alternate black bands, each 16 in. long.

The comments received from various city, state police and traffic officials at the time this color scheme was first tried out indicated a practically unanimous and enthusiastic approval of the change from white to yellow. The visibility of yellow is particularly outstanding in winter when seen against a background of white snow.

INTERLOCKING PLANT HORNS

"At towers and outlying points in interlockings, what is the most effective type of horn, you have found, for calling maintainers or for other signaling purposes—air, straight electric, etc.? What is your practice with reference to the location, installation and control of, and the power supply for such horns?"

Three Different Devices

By H. B. GARRETT

Signal Engineer

Southern Pacific, San Francisco, Cal.

WE use the following listed calling devices at interlockings for the purpose outlined in the question:

(1) Air whistles — Where compressed air is available; operated by electro-pneumatic valve; push button control

(2) Sirens — Federal Industrial Type A weatherproof for 110-volts d.c.; operated by d.c. relay; push button control.

(3) Industrial signals — Benjamin Manufacturing Company, Chicago; 220-ohm coils, .17 amp., 110 volts a.c., 60 cycles; operated by d.c. relay; push-button control.

These calling devices are being

used with very satisfactory results, and are generally mounted on the tower building at small plants. At large plants, the calling device is mounted on instrument housings at various points in the plant, in order that the maintainer will be within earshot of the device from any location in the plant.

At Two Locations

By S. W. LAW

Signal Engineer

Northern Pacific, St. Paul Minn.

THERE are only two locations on the Northern Pacific where horns are used at interlockings—one at Garrison, Mont., where a 120-volt a.c. klaxon horn is used to call the maintainer's attention in case of

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trouble, and two at the Duluth (Minn.) drawbridges, where an air-operated horn is used when the bridge operator wishes to call the maintainer.

Air Signal

By W. C. MILLER
Supervisor Telegraph & Signals
Pennsylvania, Harrington, Del.

THE Clark Cooper Company's Model EP-D two-way Electro-Phonic air signal is being used by the Pennsylvania as an emergency horn at outlying C.T.C. houses, drawbridges, etc., for calling maintainers, track foreman and others, signaling boats at bridges and for signaling train and engine crews to make departure brake tests in large

freight yards. The air signal is electrically operated, produces its own compressed air, and has two horns facing in opposite directions. With it, we use a relay with heavy-duty contacts near the horn, as the compressor motor pulls around 10 amp. (torque), immediately dropping back to 4 amp.

The same duplex horns, but without the compressor, are used where air is already available, our standard valve body and 400-ohm magnet being used in lieu of the motor. I have been using these horns since 1938 on all big signal construction jobs on our Philadelphia, Maryland and Delmarva divisions after trying every other type of klaxon horn and air whistle. The blasts are instantaneous with or without the motor compressor.

is likely to occur, and a pole line is available, we would install aerial cable.

If it is necessary to rebuild and strengthen the pole line to support heavy cables and messenger wire, and earth conditions are favorable, we would install underground cable on runs of moderate lengths. It has not been a common practice with us to install long stretches of underground cable if a pole line is available. In some instances, where overhead clearances are insufficient, or the pole line is not properly located, we have found it advisable to construct an independent cable line by suspending the messenger and cable from concrete cable posts.

It is true that aerial cables involve some maintenance costs. To offset this expense, they can usually be salvaged and rearranged when it is necessary to relocate or retire controlled equipment, due to track changes or other revisions. While it has been our experience that expense of salvaging underground cable can seldom be justified, it has been my observation that we have less trouble with grounded circuits in aerial cable than in underground cable, and when we do have trouble in aerial cable it is easier to locate the trouble and simpler to make repairs.

We have found that when it is feasible to locate all relays, batteries and charging facilities in a tower or centrally-located bungalow, and run underground cables from the centrally-located housing directly to the controlled facilities, and rail connections, this not only makes a neat appearance with economic advantages but also affords shelter, permitting inspection and repairs of relays and associated appliances under adverse weather conditions. In our opinion, the question of whether aerial or underground cables shall be used must be decided for each installation individually, and no set policy can be adopted.

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DIFFERENTIATION BETWEEN SIGNALS^x

"From the standpoint of simplicity and least expense, what is the best way you have found to differentiate between absolute and permissive signals of the light type?"

Light Units Vertical or Staggered on Mast

By B. J. SCHWENDT
Assistant Signal Engineer
New York Central System
Cincinnati, Ohio

FROM the standpoint of simplicity and least expense on the New York Central System, we distinguish between absolute and permissive signals by using a vertical configuration of lights for absolute signals, and a diagonal configuration of lights for permissive signals. This, of course, requires a minimum of two color-light units per mast.

This means of distinguishing between absolute and permissive signals is the simplest and least expensive for us, where we are already committed to a minimum of two light units per mast. On roads using only one unit per mast, they may be able to find a cheaper way in the sense of first cost, but it might not be cheaper in the long run everything considered. With two light units, we gain increased protection against light outage that would not exist if we used only one unit. We also get increased visibility, as compared with using one light unit and a number plate or special painting or marking.

BURIED OR AERIAL CABLE?^{*}

"Within interlocking limits, where signal cable is to be used in runs of 300 ft. or more, and where space is available for a pole line, do you install buried or aerial cable? What are the advantages of both types of construction?"

Set Policy Unpractical

By H. A. MAYNARD
Assistant Engineer Signals
Baltimore & Ohio, Cincinnati, Ohio

IT has been our experience that a set policy is not practical, but each project must be studied on the

site to determine whether aerial or underground cable should be used. If the track layout is on a new fill containing considerable large stones where underground cable would be subjected to damage by the stones settling or shifting, or if the installation is to be made on an embankment where slippage

If you have a question, answer or Kink you think would be of interest and help to others in the field, please write. Your comments will be welcomed—
Editor.

^x Other answers on this subject were published on page 112 of the February issue—Editor.

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