Editorial Comment

Signal Lighting With Respect to Power Failures

In recent months, various signal engineers have argued either for or against approach lighting, as compared with constant lighting of the lamps in automatic signals. These discussions have applied to d.c. signaling installations using either the a.c.-floating system with storage batteries, of the a.c.-primary system with primary batteries, in which the a.c. power at 110 volts, 220 volts or 550 volts is fed by relatively short distribution lines.

In such a system, the signal lamps are fed normally from the a.c., but, in case of a power failure, they are fed from the battery. Thus the battery should have adequate capacity to feed the lamps as well as the control circuits during any ordinary outage of the commercial a.c. supply. Obviously, if the lamp in each signal is lighted only when a train is approaching, the battery would serve throughout a much longer a.c. power outage. Furthermore, as argued by many signal engineers, the lamps need be lighted only at such times as they can be seen by the enginemen of approaching trains.

Another Viewpoint

An opposing opinion is that the aspects of signals are useful also to men on motor-cars, to station agents, to engine crews of trains on sidings, and to other employees, by making it possible for them to know when trains are approaching. Although approach lighting gives a warning by lighting a signal when a train enters the approach, nevertheless, as applying to single track, the more valuable information is the constant display of aspects based on the control limits of the signal to warn men of trains in the opposite direction. To derive this benefit, the lamps must be lighted constantly, and this practice brings the discussion back to the capacity of the battery required for the duration of an outage of the commercial a.c. supply.

Some railroads endeavor to overcome this obstacle by lighting the signals constantly when a.c. is available, but when the a.c. fails, approach lighting is cut in automatically. Even this arrangement, however, was not adequate on extended sections of certain roads recently when floods, heavy sleet storms and high winds destroyed commercial power lines so that they were out of service for several days or perhaps a week or more. In these instances, as well as others which each railroad may recall as applying to its own lines, the battery did not have adequate capacity to feed the signaling throughout such long outages of a.c. power. And this was true even with approach lighting in effect.

To meet such emergencies, one road purchased several small-size light-weight portable gasoline engine-driven a.c. generators which can be hauled out quickly and placed in operation to feed the railroad distribution lines from the locations where a.c. power is normally secured from the commercial companies. When entering the market, this railroad learned that several types of these portable engine-driven a.c. generators had been developed for military service during the war, and, therefore, a wide range of capacities and weights were available. One ingenious signal supervisor determined that the small portable gasoline engine-driven a.c. generators, normally used to supply 110-volt a.c. power for electric tie tampers, could be used in an emergency to feed short sections of 110-volt a.c. signal power line, or, through a transformer, to feed a section of 220-volt or 550-volt signal line.

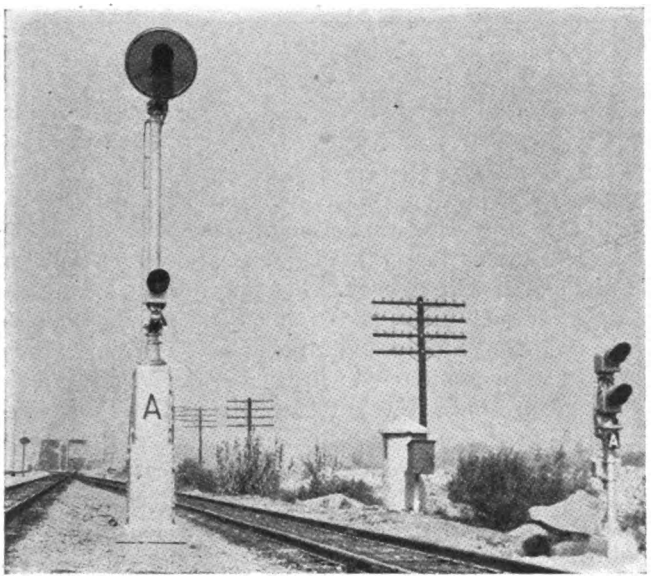
Therefore, a review of present-day factors may lead to new conclusions. First that, as applied to certain territories, constant lighting of signals may have certain advantages as compared with approach lighting. If so, the previous obstacle of adequate standby power during extraordinarily long outages of the commercial supply may be overcome by the use of portable engine-driven generators.

How Low Is a Dwarf?

A study of the history of railway signaling reveals the fact that, for half a century or more, dwarf signals conformed to their name by being mounted as close to the ground as practicable, whereas in recent years, in locations where clearance was available, several railroads have given the dwarf a "face-lifting," and thereby have improved the range as well as the distinctiveness of the aspects.

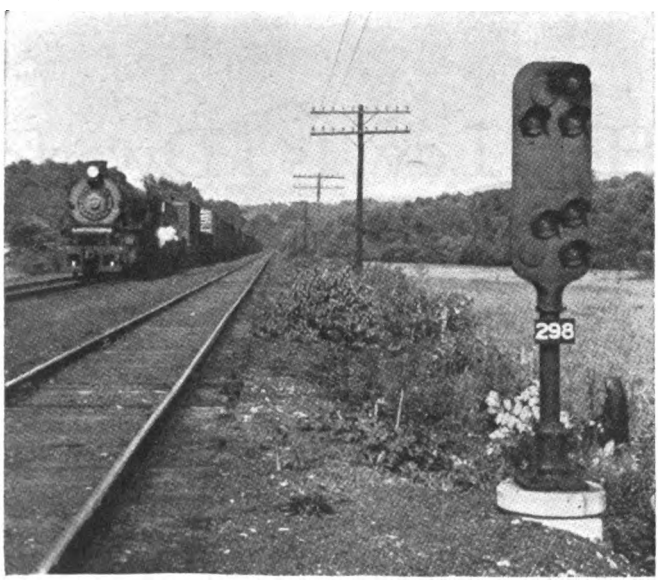
Where parallel tracks are at standard spacing so that clearance is not available for a high signal, the use of a dwarf obviates the expense for spreading the tracks. Then too, there is a conception based on high signals for high-speed main-track routes, and low signals for

back-up or low-speed routes. A dwarf signal, "flat on the ground," however, may be obstructed by various objects or materials, and perhaps by snow. Furthermore, certain types of light signals are difficult to adjust for both long range and short range views, when located so far below the horizontal line of vision from the cab of a locomotive. On account of some of these considerations, certain railroads have adopted the practice—for use where clearance is available—of placing

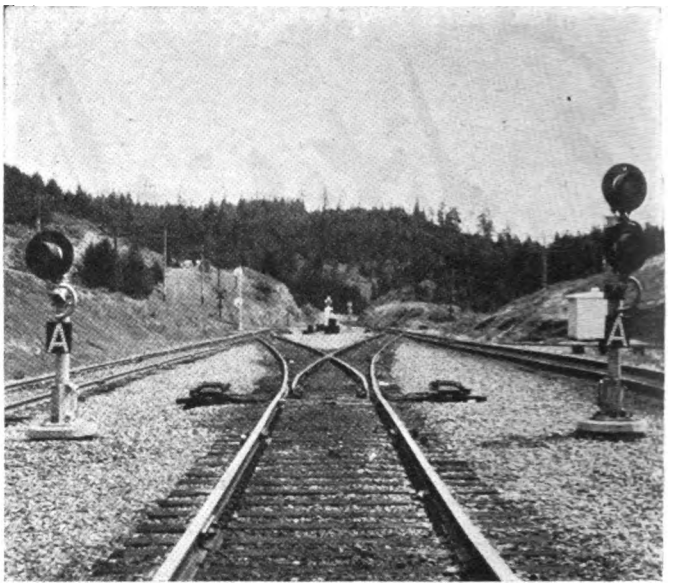


A high dwarf on the Southern Pacific

dwarfs at a higher elevation. For example, on a single-track C.T.C. installation on the Southern Pacific some of the leave-siding dwarfs are on short pipe masts to bring the center of the lens about 6 ft. above the level of the rail, as shown on page 544 of the October, 1942, issue of *Railway Signaling*. A similar practice is used on the Union Pacific and also on the Western Pacific as illustrated on page 375 of the June, 1945 issue. An equivalent practice on the Delaware & Hudson is to place a dwarf on a high concrete foundation. The use



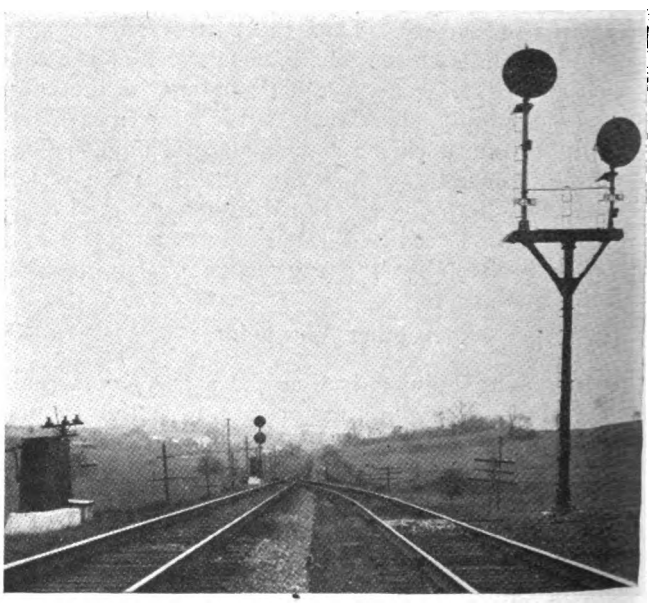
Pedestal signal on siding on the Pennsylvania



High dwarfs on the Union Pacific

of so-called pedestal mast signals on the Pennsylvania is illustrated on page 31 of the January, 1947 issue.

In none of these installation, however, are the signals so high above the level of the track that they would be easily confused with high signals in the same vicinity. Thus a difference in elevation is being maintained, but, at the same time, the range and distinctiveness of the dwarfs have been improved considerably. Probably the maximum in this respect is represented by the prac-



Main track and siding signals on Norfolk & Western

tice on the Norfolk & Western. For example, at the end of a siding in C.T.C. single-track territory on this railroad, both the main-track station-leaving signal and the leave-siding signal are the same size and type, and are mounted on the same bracket platform, the difference being that the leave-siding signal is lower, as illustrated on page 307 of the June, 1944, issue.

A conclusion, therefore, is that where clearance permits, there are various means of improving the effectiveness of the so-called dwarf signal.