EDITORIAL COMMENT

Prepare for Construction

NUMEROUS railroads, which have had but little or no signal construction to handle during the past several years, may encounter certain difficulties in organizing forces to carry through new construction now being planned or contemplated for 1937. The first pinch, which has already been noticed on several roads, is a shortage of draftsmen, estimators, and designers. The number of men on such work was reduced to a minimum on many roads early in the depression. Some of the men were retained in the maintenance forces, but perhaps the majority drifted in to other industries. Now that the prospects are good for continued activity in signal construction work, many of the roads will be faced with the task of training men in signal drafting and circuit designing work. In certain instances, it may be that some of the maintainers have had some training in drafting or at least are anxious to apply themselves industriously in learning this type of work. Certainly their previous experience in construction or maintenance should give them knowledge of the basic principles of design work. As one method of meeting the present emergency, some roads are using various means of simplified duplication processes and other short cuts to rush the office work.

Likewise, there will undoubtedly be a shortage of good signal construction men as soon as spring programs get under way. A majority of the men employed as signal wiremen on construction work six or eight years ago are not available for this work now. Some went to other fields, some have settled on maintenance jobs and do not now want to move about in construction crews. On new jobs, where experienced wiremen are not available, the foremen in some instances will have to train new men in as wiremen as the jobs progress. In order to facilitate this work, many roads are wiring the instrument housings in a shop or at construction headquarters, while with certain types of installations, the cases or housings may be wired in the factory.

The cost of installation of concrete foundations for signals and instrument housings is one of the major items of construction costs that deserves considerable study before starting a large job. Some of the practices used extensively in the past include (1) mixing and pouring each foundation by hand locally, (2) using a portable light-weight power mixer locally at each foundation, (3) using a power mixer outfit on a work train, (4) precasting the foundations at a central point and setting them in place with a power derrick. Each method has merits under certain circumstances.

Many construction jobs will be delayed and time will be wasted by the forces unless unusually keen foresight is used in planning installations far enough ahead of time to secure delivery of materials as needed in the field. Undoubtedly, a large volume of signal equipment and accessory materials will be ordered during the next few months, and those roads that get their orders in ahead of the rush will benefit accordingly, by having materials when needed to co-ordinate the field construction work.

Improving Signaling Performance

THE prevention of failures of signal apparatus, which may cause unnecessary delays to trains, has become increasingly important in recent years especially on those roads which have inaugurated new fast trains or reduced the running time of important fast passenger and through freight trains. The signal department forces are, therefore, more than ever before, faced with the problem of constructing and maintaining their equipment so that it rarely fails; and, if a failure does occur, of correcting the trouble quickly so as to delay a minimum number of trains. This statement may seem to be trite in that it covers the whole duty of the signal department. Nevertheless, many roads are finding it necessary, when criticized by the operating officers, to approach the problems of signaling with an entirely different point of view in order to improve signal performance.

On some roads, new men being developed for maintenance positions are given a course of instructions, including the elements of electricity, basic principles of signaling, typical circuits, etc. In addition, one road devotes considerable instruction to methods for locating the causes of typical cases of incorrect operation of signaling.

Of course, many of the maintainers have been in railroad service for years and the majority have been on the same territories for extended periods, so that they have gradually acquired much valuable information concerning means of inspecting their equipment so as to prevent failures, as well as to locate trouble quickly when it occurs. Many of these men have had special cases of trouble not as yet encountered on other territories or other roads. A complete explanation of the circumstance involved would be helpful to many other signalmen, especially to those who have not been in maintenance work very long. This could be accomplished by assembling the information in the office of the supervisor or signal engineer and then preparing copies in mimeograph form for distribution to all maintenance men, to be studied and kept on file.

As an encouragement to bring out information of this type, *Railway Signaling* invites its readers and others to submit brief articles, each giving in detail an explanation of some unusual case of signaling trouble which was located and corrected. Articles of this character suitable for publication, which are received by the editor before March 1, will be paid for at the rate of $5 each.

Rehabilitating Flooded Signaling

At the time of this writing, the Ohio river and its tributaries are at record-high flood stages, inundating extensive mileages of main line railroads and terminals equipped with signal and interlocking facilities. Furthermore, if the volume of rainfall continues at the present rate throughout the spring season, further floods may be expected. Those faced with the problem of rehabilitating flooded signal apparatus might well recall that similar floods devastated numerous eastern roads in March and April last year, and that a series of articles explaining methods used to rehabilitate the signaling was published in the May and June issues. For ready reference, it might be well to summarize here some of the most effective methods developed following the 1936 floods.

Some roads when investigating the damage done by the 1936 floods realized at once that it would not be economical to rehabilitate certain types of the old relays or signals, and, therefore, several hundred new relays and numerous signals were secured on rush orders, thus not only restoring the signaling to service much quicker but also securing modern equipment which would pay for itself by effecting safer and more economical operation.

Aside from the actual loss of apparatus washed away, perhaps the most serious handicap, in returning signaling to service after it has been flooded, is the work required in cleaning the mud and water out of such instruments as relays, circuit controllers, switch machines and rectifiers. The consensus of the men engaged in the rehabilitation work during the spring of 1936 was that an instrument which had been under water for hours or days will not be harmed further by washing out the mud with water. Therefore, the majority of the roads used buckets, streams from a hose and even hot water from a locomotive, to wash mud out of instruments, relay cases, switch fittings and switch machines.

The next problem is to remove the remaining moisture. Air pressure, where available, is effective in this effort. Warm air, as delivered from an ordinary electric hair dryer, acts quickly in drying moisture, and such devices were used extensively, especially on the Eastern Region of the Pennsylvania. In instances where relays are damp but no mud is present, these dryers can be used in the field. The use of alcohol to wash out a relay will remove moisture, this method being used as a temporary measure on one road.

Of course, if a layer of mud has been deposited inside a relay, the only logical procedure is to dismantle it and clean all the parts thoroughly. Following the floods of 1936, several roads set up temporary relay shops in which the relays were given thorough overhauling, insofar as mechanical operation was concerned, on a very fast schedule. Different methods of drying parts and coils were used on the various railroads. The use of ordinary portable sheet-metal cook-stove ovens, especially for baking the coils, seems to have advantages over the use of racks around stoves, for in an oven, the entire coil is subjected to a uniform temperature whereas when hung near a stove, the side toward the stove may get too much heat, which may cause damage. The New Haven, which had a number of car-retarder motors as well as relays to dry out, installed extra steam radiators in a room 11 ft. by 20 ft. so that the temperature in this drying room could be maintained at 190 deg. F. With forced ventilation that cleared evaporated moisture from the room, the relays could be so thoroughly dried that they rang clear in 48 hrs.

Batteries that have been flooded, but not subject to the force of a stream current, can usually be brought back to service readily. On the Western Maryland and on the Lackawanna, primary battery cells were flooded at numerous locations in 1936, but these cells were returned to service when the water was pumped out of the wells or boxes. In some instances, the excess water at the top of the jars was dumped off and new oil applied. Storage batteries, especially the types with sealed glass covers and vent plugs, seemed to go through the flood with but little damage. Any excess water that may get in on top of the electrolyte can be dumped off. Of course, if mud gets into the cells, the entire assembly must be taken apart and cleaned, using new electrolyte.

In spite of the fact that the equipment may have been given the most thorough cleaning possible in the time available, and seems to be operating satisfactorily when re-installed, it may be that some moisture is still present or some slight defects have been overlooked. Consequently, it will be well to watch all of this apparatus very closely. As a safety measure, it might be well to send every flooded relay through the regular repair shops in order that special emphasis may be given to the electrical tests.

Electrical Engineers' Handbook—Electric Power. *Harold Pender, Editor, and William A. Del Mar, associate editor, and 49 contributors. John Wiley & Sons, Inc., New York, 1936. 1300 pages, 709 illustrations; 5⅝ in. by 8⅝ in.; flexible binding; $6.00.*

The Pender-Del Mar handbook on electric power covers the entire field of electrical engineering, with the exception of communication and electronics. These subjects have been removed to a separate volume and are available in a separate book edited by Harold Pender and Knox McIlwain, which sells for $5.00.

The encyclopedic arrangement used in the early editions of this handbook has been abandoned. The material in the new edition is arranged in a sequence more convenient for purpose of study and of gaining a perspective of the field. The change in arrangement and format has necessitated practically a complete revision of all the material. The subjects covered in the electric power handbook include: mathematics, units and symbols; properties of materials; electric circuits and electric lines; resistors, reactors, magnets, measurements and measuring apparatus; principles of electro-chemistry; batteries; direct-current machines; alternating-current machines; transformers; converters and rectifiers; switching, control and protection; power stations and substations; power transmission and distribution; lighting and heating.