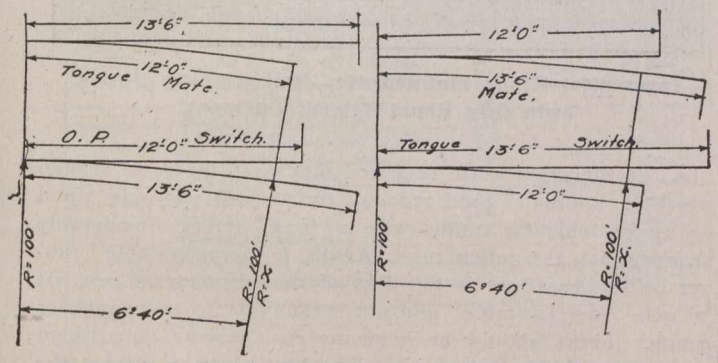
Shops.

Only the largest roads require special shops for the track department, except a smithing shop to take care of the tools, make temporary plates, bend rail, and the like. Other work, such as making split switches and frogs, may be taken care of by the mechanical department, an arrangement that is fairly satisfactory if there is proper co-operation. For urban properties, the large use of manganese for specials has minimized the local shop work to a large degree. Some companies bend a large proportion of their own track curves. An hydraulic rail-bender is a fair substitute for a power bender.

Standards.

The adoption of standards to meet particular conditions is strongly recommended because of the importance not only of keeping the stores and stocks down to a minimum, but of increasing the general efficiency of the work executed. Laborers, skilled or unskilled, after handling the same type of rail, special work and accessories naturally become more proficient in making repairs, and not only is the work done better and more quickly, and, therefore, more cheaply, but also without requiring the strict supervision and inspection that would otherwise be necessary. Moreover, there is a material saving to be effected by being able to make proper repairs promptly.



Economical Track Maintenance—100-ft. Inside Radius Switch Pieces with Broken Joints.

It might be well to briefly consider special work. The maintenance of track and roadway for urban roads amounts to as much as $600 per mile per year. One hundred and fifty dollars, or 25 per cent. of this, would be a fair average for special work, including the installation and paving. Hence the importance of a close study of this item. Guard-rails should be standard to fish with the regular rail section, without compromise joints. Little may be accomplished in getting standard frogs, except for cross-overs or turnouts, but it is well to have standard switch pieces, standard at least as to lengths and radii. It would not be very practicable to standardize the details of design. A standard switch makes it convenient in replacement for any location. The switches may be shifted around without cutting in and out the straight rail. Also, with a few switches in stock, renewals may be made at any time, which is no small item when special work exists with switches of varying lengths and radii. It appears that a 100-ft. radius switch is satisfactory for many urban roads and its possibilities are illustrated by one lay-out, in which, under many conditions, 186 standard switches and mates were utilized.

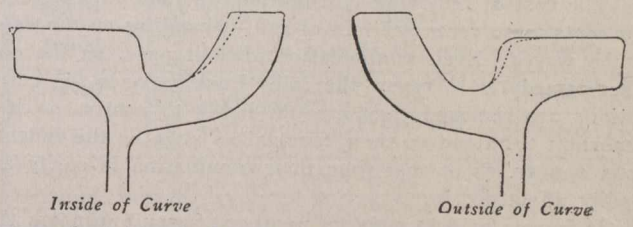
Accompanying sketches show 100-ft. inside radius switch pieces with joints broken, and a table gives dimensions of the proposed standard switches of different radii that were recommended by the special work manufacturers, consisting of the Wharton Steel Company, Lorain Steel Company, Pennsylvania Steel Company, New York Switch and Crossing Company, Cleveland Frog and Crossing Company, Buda Company, and Barbour-Stockwell Company. Another table, on the following page, gives a list of proposed standard frogs, designating the frogs by numbers, following steam road practice, which is to be commended.

One illustration shows a 100-ft. radius switch applied to make up a standard cross-over. In the cross-over for a distance between tracks of more than 4 ft. 10 in. two jump frogs may be used; otherwise one jump frog. Open-point switches, or switches on the outside curve, should be utilized where the cross-over is seldom used, as in this case the mate will last longer than the switch in the main line track.

It was interesting to note that from the records of one of the large manufacturers it was shown that over half of all the switches ordered were of 100-ft. radius; also that very few data sheets showed that any of the street railway companies favored spiral switches.

The use of solid manganese for switches, mates, frogs and curves is steadily increasing. There is no doubt that in the case of any curve of 75-ft. radius or less for permanent street work money is eventually saved by using the solid manganese rail.

Illustrations show cast manganese steel guard-rails that have been in service since February, 1908. The old curve was Bessemer, and if renewed with same material it would now be ready for replacement for the second time. From



Economical Track Maintenance—Cross Sections of Cast Manganese Guard-rails Showing Wear.

the experience of the Interborough Rapid Transit Company, of New York, there seems little doubt that the open-hearth rail of 0.75 per cent. carbon is very superior to the present market Bessemer steel.

For city traffic the solid manganese switch is gaining favor. It means an additional cost of probably one-third to one-half, yet the advantage of a one-piece casting, with manganese arms, as well as other wearing parts, appeals to the ordinary engineer, as the switch pieces of the hardened centre type often batter down and fail at the arms if the joints are not first class. Another point in favor of solid work is that those who have used the special work speak favorably of it, and are still ordering. This is not true, however, for the solid manganese frogs. Undoubtedly, since the frog wears away at the point, it seems rather extravagant to scrap the whole piece of material whose first cost is ten times as much as it is worth in scrap. Therefore, the solid frog is not recommended at this time in preference to the hardened centre one. Of course, the frogs referred to above are understood to be those found in turn-outs and branch-offs rather than crossing frogs with the larger angles. For crossing frogs at intersection of two trolley roads, in case of severe traffic, solid manganese construction is preferable.

Corrugations.

Few maintenance troubles have attracted so much attention and study as corrugations in rails. We are having more corrugations than ever before, and the problem is to get rid of what we have in the large quantity of rail that