

and expense is caused to a track department by continually having to tighten up inserts in intersections.

2. Even if insert work were renewable it is certain that after a number of years wear the rails abutting the insert will be worn down to such an extent that if a new insert is ordered from the manufacturer off the original pattern it is impossible, owing to the wear on the abutting rails, to install same without leaving an extremely rough joint where the new insert joins the rail.

3. It is also important to consider in insert work the effect of the hot iron being poured around the cold rail. It stands to reason that the cold rail must undergo severe crystalization when subjected to the extreme heat of the hot cast iron. From this cause it is only natural that the wearing qualities of the rail are reduced.

4. I think it will be generally admitted that solid manganese construction can be handled far more easily when in shipment from the manufacturer to the railway and also when being installed by the railway; this on account of the difference in weight of the material, also on account of the fact that insert work has to be handled extremely carefully to guard against breakage of the cast iron.

Having outlined some of the objections to insert work, let me now deal with the arguments generally advanced against solid manganese construction. The principal one is on the ground that manganese steel is liable to crumble, but, as previously mentioned, I can say positively that this trouble has been entirely overcome by the best and most reliable manufacturers. Like many other branches of steel manufacture the quality of manganese used for street railway purposes has improved 100 per cent. during the last three years and this fact must not be lost sight of when making comparisons. The next objection which will probably be advanced is in connection with the fish plating of manganese steel intersection work. Up to 18 months ago every leg of a solid manganese piece had to be fitted with a special fish plate, which had to be ground to conform with the inequalities of the manganese. Under such conditions it was a very serious business for a track department to renew fish plates, should they break, as it was necessary to grind each plate and this work naturally entailed carrying the particular fish plate back and forward to the shop grinder. It therefore became necessary for the manufacturer to turn his attention to overcoming this obstacle and, speaking for my own company, I am glad to say that we are now turning out solid manganese pieces 75 per cent. of which will take a standard fish plate. Naturally no manufacturer likes to absolutely guarantee that every joint will take a standard plate, as in the event of one leg of any particular piece not turning out true to section the whole piece would have to be scrapped.

Having touched upon the main points in insert and solid manganese work and having compared the two from a practical standpoint, there only remains the commercial standpoint, in other words, a comparison in prices. Generally speaking solid manganese construction costs very considerably more than insert work. Is it worth it? After careful study of the subject, I am convinced it is more than worth the additional initial cost. The cost of installing an intersection in the street is the same, whether the work is solid manganese or insert work, and the cost of installation is a very heavy item. Consequently if a solid manganese intersection will outwear two insert work intersections, as I am convinced it will, the extra initial outlay on the solid manganese type is more than offset by the difference in the cost of installing a new insert intersection twice, as against the installation of a solid manganese intersection once.

The above comparisons apply to switches, mates, and frogs, also to diamond crossings, and in connection with the latter I would like to touch on the recent desire of electric railway officials to have their solid manganese diamond crossings made in two pieces instead of four. Naturally the idea