

electric traction, it is only within the past ten or twelve years that the old horse-cars have been substituted by electricity. The system most generally in use is what is known as the overhead trolley, although in large centres of population the underground conduit has been used with satisfactory results. One of the great advantages derived from electric railways is, that cities, towns and villages are brought in close touch with one another. Owing to the economical method of construction and to the fact that the right-of-way in a majority of cases was granted free of cost, the companies have been able to operate the roads at a much lower rate of fare than steam railways, so much so that where the steam railway companies had a very large suburban business they have found it advisable altogether to abandon suburban trains, owing to the impossibility of successfully competing with electric companies. From experience we have been able to gather during the past ten or twelve years it has been advisable to use a much heavier type of rail than was originally contemplated. It has also been ascertained that owing to the heavy electric cars now in use it is advisable to have a continuous rail, which is possible by means of cast-welding. In cities the rails are now laid upon a solid bed of concrete, and steel tie bars used in place of wood. Regarding the type of rail to be used, it is the general opinion among municipal engineers that the grooved girder rail is the only suitable rail to be used in paved streets, but in country roads and where the streets are macadamized, the T rail is admissible and preferable. The railway companies, however, in every instance prefer to use the T rail if possible, but it is found very difficult to maintain a pavement next the rails where this type is adopted.

Shortly after the introduction of electric roads it was discovered that electrolytic action was taking place and that serious damage was resulting to the various underground conduits, such as water and gas pipes and telephone cables, and while this is still the case it has been largely obviated by a better system of bonding the rails.

The introduction of electric traction has to some extent increased the nuisance and danger of overhead wires. The trolley wire is not so objectionable as the large

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