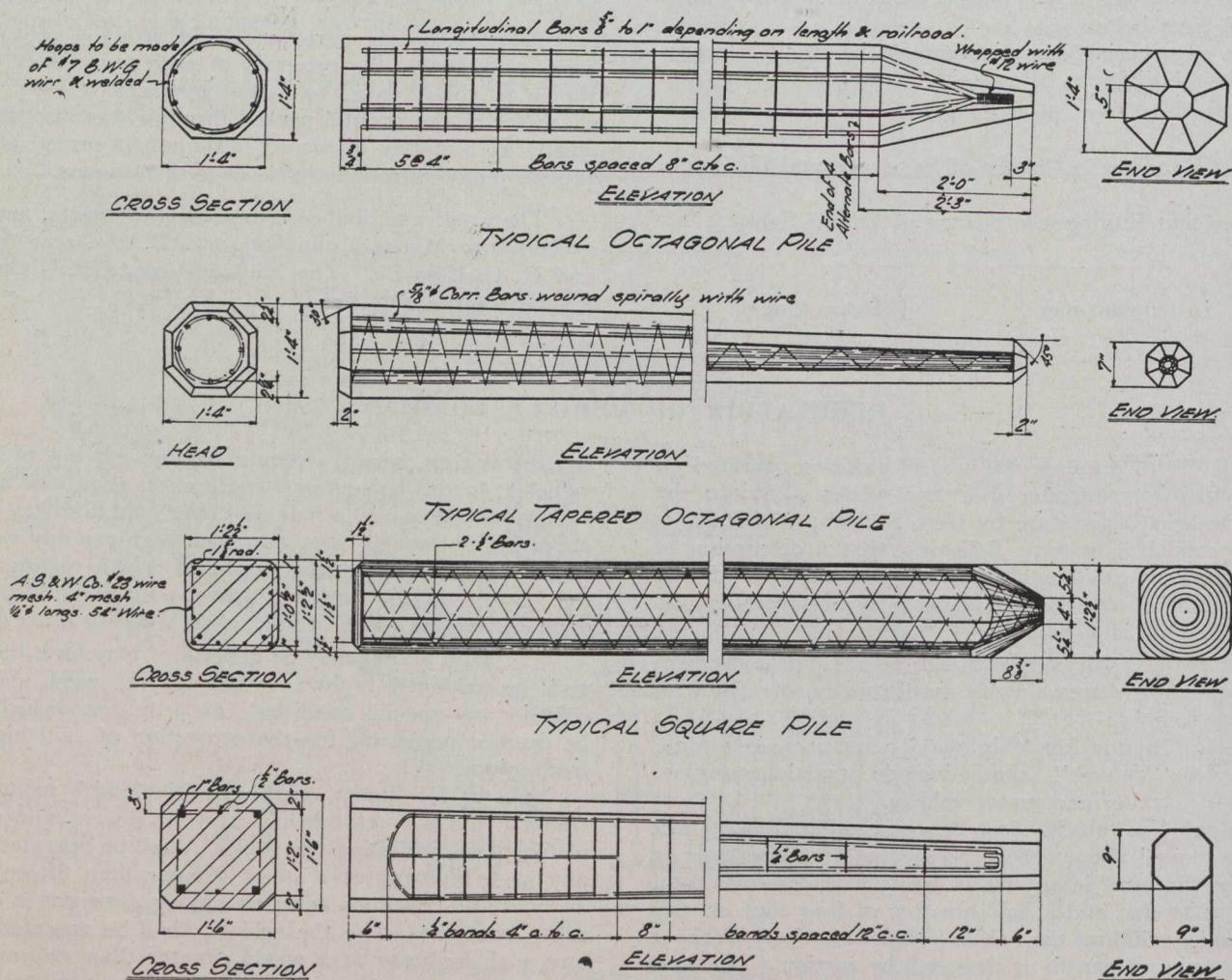


USE BY RAILROADS OF CONCRETE PILES.

THE Committee on Masonry of the American Railway Engineering Association presented a progress report at the annual meeting last month that provides some very useful data on the subject of concrete piling. Most of the information was derived from replies to circular letters, a summary of these replies appearing herewith in Tables I. and II. The following abstracts from the report will also be found of interest:—

The concrete piles generally used are of the reinforced type, though in several cases plain concrete piles have

considered a proper charge against the actual cost of the piling; the number of piles manufactured and the available plant and labor for manufacturing the piles are also factors that may influence the cost. The variation in the cost per linear foot of pile as given in the attached table is also due to the use of different quantities of steel reinforcement, some roads using a design providing considerably more steel than others. For instance, the cross-sectional area of steel used by the Burlington runs 4.25 lbs. per linear foot, Illinois Central 12.5 lbs. per linear foot, and the Milwaukee 17.5 lbs. per linear foot.



Four Piles Typical of Those Used by the Various Railroads Mentioned in This Article.

been used. They are usually of 16-in. short diameter, whether square or octagonal. The Santa Fe Railway Company vary the short diameter, using the formula $D = 7 \text{ in.} + \frac{1}{4} \text{ in.} L$, where L equals length of pile in feet. The piles are used both tapered and straight section, the latter type being more commonly used.

A large variance is shown in the amount of steel reinforcement used, both longitudinal and transverse. The greater portion of the piles have 1/4-in. rods for transverse reinforcement, whether spiralled or hooped. Steel mesh is used in a few cases and in one case additional steel reinforcement is used in the head of the pile. The Chicago, Burlington & Quincy Railroad is one of the roads that uses steel mesh for reinforcement.

The cost of the concrete piles at point of manufacture varies considerably; this is probably due in a large measure to the method of bookkeeping, or as to what is

The cost of driving the piles also varies considerably, but this should be expected, as the nature of the soil, the accessibility of the work, the traffic conditions and the number of piles driven at a given structure affect the cost of driving to a certain extent. Thirty-five cents per linear foot, however, seems to be a fair average cost under ordinary conditions. This cost includes handling costs, which vary from 10 to 12 cents per linear foot. Several of the answers indicate that it costs little more to drive concrete than wooden piling.

The general opinion seems to be that in cases where there is permanent moisture and no danger of future drying out, wooden piling is the cheaper; where the line of permanent moisture is low, concrete piling is the most economical.

No eastern railroads seem to have used concrete

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