Pitch-pine pile, 12½ × 11½ = 143·75 sq. ins., 37 ft. long = 36.8 cu. ft., at, say, 50 lbs. per cu. ft. = 1,840 lbs. Weight of ram = 12 cwt. = 2,016 lbs.

Driven in peaty ground a distance of 36.1 ft., going 2¼ ins. to four 8-ft. blows when driving was stopped.

Loaded with rolled joists balanced on head.

Load 10	tons	No sinking	Remained	thus	24	hours
" 20	"	1/16 in.	"	"	48	"
" 30	"	1/16 in.	"	"	0	"
" 37·5	"	3/16 in.	"	"	7	days
" 56.9	"	¼ in.	"	"	4	weeks

No further sinking. Load being removed, pile rose 3/16 in.

The rising of the head of pile when the load was removed showed the amount of temporary compression in the timber, and the missing 1/16 in. may have been further compression held back for a time by the friction of the earth, at the sides, and possibly reappearing some time later, a sort of *hysteresis*. The result of the test shows that the pile was practically safe with a load of 60 tons, but, like other tests that stop short of completion, it did not show that it would have failed with double the load or more.

The sort of test that is required to prove the accuracy of any formula is to measure the distance moved by the head and by the point during, say, the last four blows, and take the average for each. Cut off a foot from the top of the pile to receive the load on a good surface. Carefully level through from a fixed bench mark to find the level of the top of unloaded piles. Calculate the safe load on the pile and load it up until the head of the pile has sunk to the amount to which it was previously compressed (*i.e.*, previous average movement of head—average movement of point); note this load. Then continue loading, and note level of pile at each ton addition until the head of the pile has sunk, say, double the previous compression—*i.e.*, previous average movement of head, minus average movement of point. Then leave it loaded for twenty-four hours, and note whether it has sunk further and how much. Remove the load and note the result.

The difficulties in the way are: (*a*) Finding enough load; (*b*) supporting the load on the pile without friction; (*c*) measuring the results accurately; (*d*) avoiding personal danger throughout the test.

Reinforced Concrete Piles.—The advantages of reinforced concrete piles are so manifest that they need no express recommendation here. The chief physical differences from timber piles, as regards driving and their supporting power, are due to their extra weight and their friable nature. They should be made with slow-setting cement six weeks before driving, but if made with quick-setting cement they must be left eight weeks, because in the latter case the outside hardens first and leaves the interior soft. They should be driven by steam or drop hammer with a 3-ton ram, having a fall of 3 ft., with a steel helmet filled with sawdust, and preferably without a dolly.

In America the use of a water jet is found to greatly facilitate the sinking of concrete piles.

Hollow cylindrical reinforced concrete piles have been used at Southampton, Newcastle-on-Tyne, and Liverpool. They are lighter and cheaper than solid piles and more effective. Those at Brockelbank Dock, Liverpool, were 20-in. diameter. Reinforced concrete piles of circular section are easier to drive than square piles, and as they have no sharp angles are less liable to be damaged by coming into contact with boulders, etc.

As reinforced concrete piles are made horizontally, care must be taken in lifting them; the points of attachment for lifting should not be less than half the length apart, and if lifted with one end on the ground the attachment should be one-third the length from the other end.

The reinforced rods (about 2½ per cent.) should preferably be hooked at the top and electrically welded together at the bottom. They should be bound helically by, say, ¼-in. wire, 4-in. pitch, carefully secured at the top.

REPORT OF COMMITTEE ON RECOMMENDED PRACTICE FOR STANDARDIZATION OF FILTERS.

SOME years ago (May 12th, 1913) the American Society of Mechanical Engineers upon the suggestion of Mr. P. N. Engel appointed a committee to investigate and report on how to rate the capacity of mechanical filters.

This committee, of which Geo. W. Fuller, of New York, was chairman, has now presented its report and this, together with some discussion on it, is printed herewith:—

Your committee, appointed to make recommendations as to how to rate the capacity of mechanical filters, desires to submit the following report:—

Municipal vs. Industrial Field.—(2) The field of mechanical filtration may be arbitrarily yet definitely divided into two parts: One, the purification of drinking water or water for domestic supply, and the other the purification of water for other purposes, such as industrial uses.

Municipal Practice Substantially Uniform.—(3) On account of its importance and the large expenditure involved, especially in connection with municipal plants, much time and study have been given to all features of the filtration of water for domestic use. A large amount of data gathered through laboratory tests, and experience covering long periods in the practical operation of municipal plants, have brought into quite uniform adoption by all engineers engaged in such work the use of a rate of filtration of 2 gal. per min. per sq. ft. of filtering area for domestic supply.

Departures from Normal Municipal Rate Permissible.—(4) While stating as a matter of information that such a rate is applicable in the great majority of such cases, your committee does not feel warranted in setting forth this rate as one to be adopted for all cases. As a matter of fact, the installation of a municipal filtration plant usually is done, and always should be done, under the advice and supervision of a competent filtration engineer engaged for the purpose, and the rate of filtration as well as other points of construction and operation should be left to his judgment, based upon the local conditions that may exist. For this reason, your committee feels that it is advisable and in accordance with the spirit and intent of your instructions to refer herein chiefly to the filtration of water for other than municipal purposes.

Various Views Canvassed.—(5) Your committee in considering this subject has sought information and assistance from many sources, and we desire herewith to express our appreciation of the many courtesies extended to us by those thus called upon for data or comment.

Gravity vs. Pressure Filters.—(6) It may be well here, in view of the misunderstanding that seems to exist