

MOVEMENTS OF THE CAISSON.

The downward movement of the caisson has been under perfect control throughout the whole of the sinking. It usually occurred at low tide and was very gradual, owing principally to the wide frames and broad shoe.

While the caisson was passing through the mud, river sand, and gravel, the frames sank through the material without digging, but in the quicksand and harder material below, the whole frames had to be dug out underneath before settlement would take place.

The caisson also sank perpendicularly in its true place, no movement occurring in any direction. This result was principally owing to the facility with which it was kept level by digging.

The side friction was considerable, but difficult to estimate, because the frames and shoe were seldom entirely clear. It could not have been less than six hundred pounds per square foot of external surface, varying with the amount of air passing out under the shoe.

The total resistance offered by the side friction is, however, quite small when compared with the total bulk. At a depth of seventy-eight feet the side friction amounted to six thousand tons, whereas the weight of the whole foundation, including masonry, was fifty-three thousand tons.

At seventy-eight feet the excess of the downward pressure of the caisson over the upward pressure of the air at low tide would average from ten to twelve thousand tons, not including side friction. The air pressure has, however, frequently run so low as to give an excess of downward pressure of fifteen thousand tons. An excess of overweight is in all cases an advantage, as it saves considerable digging.

The experience with this foundation goes to show that a larger caisson is much easier to handle, is safer and under more perfect control than a smaller one. The labor question, however, becomes the most serious drawback where a considerable number of men have to be brought together under