

surface or invert 2 feet lower in the middle than at the sides. On this a pitched covering of gray limestone 21 inches in depth, in regular courses of from 5 to 12 inches in thickness, is to be laid in full floating beds of hydraulic cement mortar before the centres of the arches are placed. The mortar is to be made in the manner and in the proportions subsequently described.

All the stones used for this purpose must be of the full depth (21 inches), and be picked, scabbed or otherwise dressed on all their four sides and ends, so that when in place the joints shall in no case exceed $\frac{5}{8}$ ths (five-eighths) of an inch. The upper surface of each invert must present a moderately fair surface throughout, and the sides of it are to be of a like height as the top of the upper off-set on the lower part of the masonry of the piers and abutments.

On the upper and lower sides of the Aqueduct a trench is to be excavated across the river, outside the line of the respective cut-waters, and sunk fully one foot below the bottom of the layer of concrete which form the seat of the piers. It is to be $2\frac{1}{2}$ feet in width, and in it a wall of concrete is to be carried up to a height corresponding with the surface line of the invert. This wall may be extended from time to time as the dams will permit, but every stretch of it between any two of the piers must be carried up to its full height within three days after it is commenced.

In order to protect the north west bank of the river when the current is thrown on that side by the cofferdams, a range of sheeting piles, if directed, is to be driven close, on such a line as will be likely to effect that object in the most efficient manner, and be continued until it intersects the western side of the east wall of the old lock. To enable this to be accomplished the bank will be cut down to low water line, and gauge piles driven about 10 feet apart, to which guide waling pieces are to be bolted on both sides, to ensure, as far as practicable, that the intermediate piles are driven truly.

The whole of them are to be 12 inches square, and of sufficient length when driven to stand at least 2 feet over high water mark. When they have answered the purpose contemplated part of them may be cut off to serve as bearing piles and part as sheet piling for the wing walls.

If found necessary, a series of detached piles, or a continuous range of piles are further to be driven in front of the oblique wall connecting the abutments at the south end of the aqueducts; the piles already driven there, and such others as may be directed to be driven, are to be secured by a strap of wrought iron by means of bolts that have been built into the masonry for that purpose.

In the event of the bottom material turning out different from what is indicated by the borings, it may be found necessary to drive foundation piles, and otherwise form a suitable bearing surface for the structure in the following manner:—

Bearing Piles,—if necessary for the foundation, must be of white oak timber, not less than 10 inches diameter at the small end, and of such length as may be required by the circumstances. They are to be driven in straight rows over the area to be occupied by the abutments, piers, etc., by a ram weighing not less than 2,000 pounds, falling through a space of at least 30 feet, until the pile does not drive more than an inch at a blow.

They are to be about three feet apart from centre to centre, both cross and longitudinally of the piers and abutments, or such other distance apart as may be subsequently determined.

After they are driven to the full depth required, their tops are to be accurately levelled, to receive sills or grillage timbers of white oak 12 inches square. The cross and longitudinal sills must be checked into each other where required, and are to be secured to the heads of the piles by means of white oak treenails; their upper surface must be dubbed straight and level to receive the planking, and the spaces between them as well as between the piles must be filled with concrete.

The floor under the piers and abutments will be of 4 inch oak plank secured by $1\frac{1}{2}$ -inch oak treenails, and must bear uniformly upon the sills, and a bed of fresh made cement mortar placed on the concrete.