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Foundations of Bridge Piers across the Volga and Buzan Rivers

Fondations des piles de ponts sur la Volga et la Bouzan

Gründung der Strompfeiler von Brücken über die Wolga und den Bouzan

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In construction of foundations of bed piers under the complex engineering and geological conditions of the lower reaches of large rivers featuring considerable depths, low location of hard bedrock, weak drifts of substantial thickness, intensive navigation, etc., a demand arose in the elaboration of new structural and technological concepts whereby a sufficient operational reliability is combined with industrial method of work performance, lowering of material and labour ex penditure.

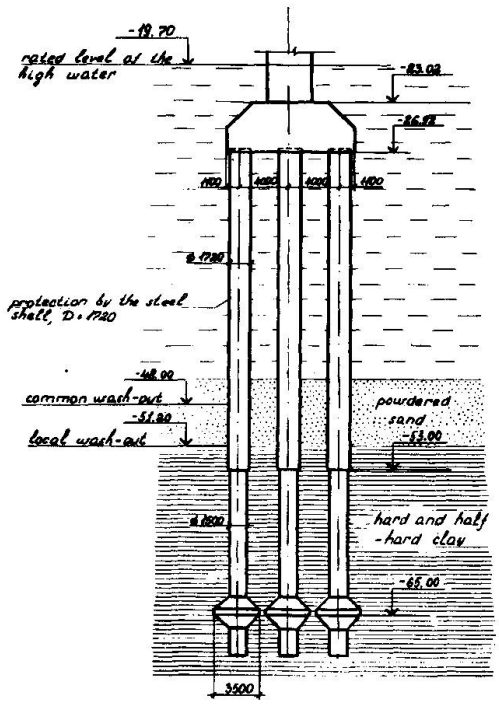

Fig. 1 Pier diagram.

For the first time in country's practice while erecting a city bridge across the Volga river in the town of Astrakhan and motor transport bridge across the Buzan river new solutions specified below (Fig.1) were run in. The two passages feature natural depths up to 28 m, flow rates up to 2.5 m/s, arrangement of the ground roofing facilitating reliable funding (of hard and semi-hard clays) at the depths up to 30 below bottom elevation.

The elaborated technology makes it possible to construct the drill columns of up to 2.0 m in diameter having the 3.5 m broadening at the bottom at depths up to 30 m below the bottom elevation.

Column pressing statical test with application of load up to 2000 kn were performed.

The pier foundations were built from islands having the sheet piling at depths up to 8-10 m, at larger depths selflifting platforms using travelling wharfs ПМК-67 were employed.

The column construction started with immersion of the plan manufactured diameter 1720 or 2020 mm steel pipes until the clay roofing.

Upon removal of sand from the pipe cavities by a grab or airlift, the Japanese machines Kato-30TH or Kato-50TH were used for drilling dia. 1500 or 1700 mm wells to the design elevations. For making broadenings, use was made of the ШИС universal reamers, or the reamers from the Kato-TH-50 mashine set.

Reinforcing cages were lowered into the wells and by a method of the vertically moving pipe, filling of wells with concrete was achieved. All works were done at the not less than 4 m excessive pressure of water.

In concreting the grid foundations use was made of the suspended inventory lintels.
The applied technology is highly effective ensuring considerable reduction, as compared with other probable versions, of material expenditure, labour input and construction costs, which determined its wide application in designing and construction of bridges under similar conditions.