

INVESTIGATION OF STRESSED-STRAINED STATE OF REINFORCED
CONCRETE PILES UNDER HORIZONTAL LOADS OF THE
SEISMIC TYPE

by
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Presently pile foundations are spread over in practice of earthquake engineering. At the same time carrying power of pile foundations are not often used to the full extent for a variety of reasons. It leads to the increase of pile number and cost of work.

The paper presents the problems of behaviour of pile foundations under horizontal loads of the seismic type taking into account the process of fracturing. Investigations of stressed-strained state of horizontally loaded reinforced concrete piles with allowance for plastic deformations of ground and for change of rigidity of pile stocks after formation and opening of fractures in concrete.

The main aim of the investigation was perfection of procedure of field investigations and calculations of individual reinforced concrete piles under horizontal loads. The experiments were carried out on piles (cross-section is 35x35 cm and lengths are 11 and 16 m). The piles are made of usual heavy concrete (D 300) and submerged into strongly and middle compressible macroporous loams of high plastic consistency.

The results of investigations show that arised non-linearity of the dependence of load-displacement is connected with the process of fracturing in pile concrete. This process is characterized by the increase of stresses in stretched steel frame work from 40 to 80-100MPa. While refining the design diagram of interaction between pile and surrounding ground the coefficient of pile flexibility can be used. The coefficient values are calculated for each stage of stressed-strained state of stock. The design diagram is determined by the relation between rigidities in the system pile-ground. In presented ground conditions distributions of bending moments in the upper part of pile stocks are enough smooth functions with maximum values in sections at the distances 1.8-2.5 m from the ground surface. While approximation function of distribution of bending moments in the upper pile part the dependences for calculation of the values of reactive resistance of ground along the stock are determined. The calculations carried out with the help of digital computer allow the distribution of reactive resistance and coefficients of elastic ground compression along the pile height under different horizontal loads to be obtained.

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