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## COMBINED SLAB-PILE FOUNDATION

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**Summary.** Solid reinforced concrete slab foundations are commonly employed in the construction of multi-story frame and panel buildings on natural grounds, as well as in industrial structures such as silos, elevators, chimneys, steel reactors, and more. One significant advantage of monolithic foundations is their ability to be used on weak and uneven ground bases. These foundations can distribute uneven loads over a considerable area, redistributing

them to equalize the inevitable differential settlements of individual foundations. On soft and uneven soils, slab foundations are not only used to mitigate deformations but also to protect against high groundwater, creating what is known as a "floating" foundation.

It has been demonstrated that the combined slab-pile foundation (CSPF) is an effective development in the field of foundation construction. CSPF constitutes a foundation system comprising a "pile field – slab grillage – soil base," where piles bear a portion of the building load, and the slab grillage functions as a foundation slab. CSPF can be interpreted as a monolithic slab supported by piles of various types arranged in the form of a pile field, strips, clusters, or individual piles. Various types of piles, including "barrette" piles, can be used for CSPF foundations.

Considering the soil resistance beneath the slab grillage in the deformation calculations and load-bearing capacity of combined slab-pile foundations provides a reserve for enhancing their economic efficiency. This includes reducing the number of piles, lowering the consumption of steel reinforcement, and decreasing the thickness of the grillage. However, the implementation of CSPF in construction is hindered by the limited theoretical research, necessary regulatory framework, and design experience for such structures.

The determination of design parameters for CSPF is carried out using the method of successive approximations. By specifying the area of the slab grillage and defining the pile length and spacing, the number of piles in the foundation, the settlement of an individual pile, and the design load on the pile are calculated (initially assuming that all piles bear 70-80% of the total load).

**Keywords.** Slab-pile foundation; grillage; pile field; soil base; settlement; reinforcement; application experience

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