

Adapting Lift-slab Technology to Construct Submerged Pile Caps

Abstract:

Many techniques are used in practice to construct underwater foundation, including caissons and piled foundations. The main challenge of underwater construction is cutting off water seepage so as to always provide dry working conditions. Water seepage can be eliminated by continually pressurizing inside caissons and dewatering the intercepted space of sheet-pile cofferdams. Although these methods alleviate water seepage, they have negative aspects, including unhygienic working conditions and elevated costs. This paper presents a method to partly construct the submerged pile caps above water, sink to place, and complete work in totally dry working conditions. This method adapts the lift-slab technology to lower the pile cap to the underwater permanent position. Only activities necessary to make the pile cap monolithic with the pile group are achieved after the cap is lowered in secured dry working conditions. This method was used successfully in many bridges on the Nile River in Egypt during the last decade. The method is illustrated in this paper along with the problems encountered during construction. Finally, the method is evaluated and compared with other methods.