

## Experimental Study of Pile Group Scour due to Waves

○Samaneh GHAZANFARI HASHEMI, Tetsuya HIRAISHI

Supports of marine structures are commonly being constructed on groups of piles. As scouring is a threat to such structures, the scouring depth around pile groups should be considered well in safe designs. Though most of structures are constructed in form of groups, most of studies were concentrated on predictions of scouring around single piles. Wave-induced scour around a single pile depends on several parameters such as the characteristics of the wave and the sediment properties and geometry of the pile. Compared to single piles, the arrangement of the piles and the spaces between them in arrangements as well as their geometry, sediment and wave characteristics should be considered to study the scour depth around them. Regarding the lack of enough in depth experimental group pile scouring data and the effect of arrangements in formation of vortices and the sediment transport phenomena around them, and the complexity of modeling the scouring phenomena around piles, a comprehensive experimental study of wave induced scour of pile groups seem necessary. This paper aims to present the results of experimental study carried out about various arrangements of pile groups.

Experimental studies were conducted in the wave basin of Ujigawa Open Laboratory; 45 meter in length, 30 meter in width and 1 meter in depth.

Various arrangements of 9, 6, 4, 2, 1 pile(s) were studied where the diameters are 10 cm in all sets with

the gap equals to 10 cm consequently. In all sets, the grain size of the bed is 0.3 mm. In the experimental studies, various arrangements of piles were exposed to regular waves the height of which were  $H=12\text{cm}$  for wave periods of  $T=1.2\text{s}$  and  $T=1.5\text{s}$  in water depth of  $h=35\text{cm}$ .

Based on the experimental results it can be concluded that, the amount of scour holes recorded are dependent on the configuration factors of pile groups: whereas the number of piles increases, the scour depth may increase; moreover, maximum scour holes occur around corner piles front to the wave direction.