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Wave forces on wind turbine substructures at moderate water depths

The wave forces acting on the substructure depends on several parameters such as depth at which it is located, wave climate and current intensity etc. The offshore wind turbine structures are slender and wave loads act on the lower part of the tower. Near to the free surface zone, the wave forces may obtain their maximum values. The hydrodynamic issues pertaining to offshore wind turbine substructures are to be investigated, such as the variation of the wave forces due to the local modifications of free surface and the impact load on the substructure. The objective of the present work is to investigate the wave forces with emphasis on the free surface zone on the offshore wind turbine substructures. The scope of the work includes the study of variation of wave forces due to local modification of the free surface and also the impact force on substructures due to steep and breaking waves. The substructure considered for this study is Monopile or Jacket structure in moderate water depth ranging from 10m to 50m. The outcome of this study can be an improved characterization of the free surface effects of the wave forces on offshore wind turbine substructures.