

Scour Around Marine Naked Pipeline Under Wave Action

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ABSTRACT

When nearshore and landing pipelines are exposed on sea bed the vortex area is formed around the naked pipeline under wave action. There is an erosive hole in vortex area. In this paper, it is given to calculating formulas for the depth and length of the erosive hole from analysis of vortex intensity and demonstrating physical meaning of formulas. A simple calculation method is provided for engineering practice with the formulas.

KEY WORDS: Scour, marine naked pipeline, wave action

BACKGROUND

If there is oil-gasfield in the nearshore i.e. shallow water region, the marine pipelines are subjected to action of wave and tidal-current. The wave action plays an important role in nearshore. The erosion will appear around marine pipeline exposed on sea bed, specially lee of pipes and will endanger the safe of pipes. One of the possibles is displacement of pipe in horizontal direction, another possible is settlement of pipe because there is tunnel under pipe. Whether the

displacement in horizontal, vertical direction, or in both of them appears it will cause danger that the pipe subjected to force is broken down. So that oil-gas is leaked to pollute sea. The parameters around pipeline such as scour limit, erosive hole stable form and so on should be understood in design process. It is necessary that engineering measures could be adopted. So that the safety of pipeline in the operation process can be ensured.

Condition of pipeline subjected to forces under wave action was studied more than erosive around pipeline. The scour around marine pipeline is observed in the flume experiment.

EXPERIMENTAL DESIGN AND INSTRUMENT

The erosive depth and limit are measured for various water depth, wave parameters, pipe diameter, sand size. See following tables.