



大圆筒结构-土-波浪相互作用的动力响应分析

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Dynamic Response Analysis of Interaction between Large Cylinder Structure, Soil and Wave

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摘要 针对新型的大圆筒薄壳结构的复杂动力特性, 建立大圆筒结构-土-波浪相互作用的三维非线性有限元模型. 通过设定无厚度的接触面单元, 来模拟薄壳圆筒-土之间的非线性接触特性; 采用土体的非线性本构模型, 并同时计入波浪等动荷载的作用对结构进行动力响应分析, 得到大圆筒上的x方向及y方向应力分布规律, 以及应力随波浪力和埋深的变化规律; 最终给出了圆筒结构的应力分布函数式及合理的壁厚尺度.

关键词: [大圆筒结构](#) [动力响应](#) [应力函数](#)

Abstract: Based on the complex dynamic characteristics of new shell structure, a 3-D nonlinear finite element model of interaction between large cylinder structure, soil and wave is established. The non-linear contact characteristics between shell structure and soil are simulated by setting contact element of zero thickness. The non-linear constitutive model of soil is used to simulate dynamic response analysis of the structure under the dynamic loads on waves. The distribution of stress in x- and y-directions, the changing law of stress with wave and buried depth are obtained. Finally the stress distribution function and reasonable size of cylinder structure are given.

Keywords: [large cylinder structure](#), [dynamic response](#), [stress function](#)

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