The Effect of D/t ratio on Buckling Strength Analysis of Fixed Offshore Platform

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Abstract

A jacket, or template, structures are still the most common offshore structures used for drilling and production. Fixed jacket structures consist of tubular members interconnected to form a threedimensional space frame. Hence, the jacket structure can be categorized into a column structure. The D/t ratio of a typical member on the jacket structure has significant influence to buckling strength. Although only the axial load acts on the jacket legs, the local and global deformation of the structural member due to this load must be taken into account. This paper discusses the effect of D/t ratio on fixed jacket platform in the buckling strength analysis. A kind of fixed jacket offshore structure namely tripod is taken as the object of the analysis. Only the axial load is considered and it is applied to all jacket legs. The material and dimension of the structure are taken based on the structural member. Crack and corrosion are not considered in the analysis. To assess the buckling strength of the structure due to the effect of D/t ratio, the Finite Element Method (FEM) is performed. As a fundamental case, the buckling strength analysis is conducted on the structure by taking two dimensional planes (2D) into consideration to obtain the critical buckling load due to the effect of D/t ratio for two dimensional plane. The result obtained by FEA is compared with the analytical solution.

Keywords: Buckling strength; fixed jacket structure; D/t ratio; Finite Element Method