

A Benchmark Study on Ultimate Stiffened Panel Strength

Sang Jin Kim, Dae Hyun Kim, Du Chan Kim, Jung Min Sohn, Jung Kwan Seo, Bong Ju Kim, Jeom Kee Paik and S.N. Atluri

Summary

The movement of various cargos is needed due to rise of global container traffics. Ships are ideal vehicles for transportation and have many construction types such as container ship, bulk carrier, oil tanker, and car carrier. Ships like these are serviced all over the world. Ships are subjected to various environmental loads during operation. To sustain these various loads, ships should be designed guaranteeing structural safety and economical efficiency as well.

Stiffened panels consist of plates and supporting members and are commonly used in the ship building and ocean engineering industry. Ship structures are normally exposed to uniaxial, biaxial compression and combined loads with lateral pressure.

The model used in this study was a deck panel of VLCC, The ultimate strength of stiffened panels under longitudinal uniaxial compression, transverse uniaxial compression, combined longitudinal and transverse compression and combined load with lateral pressure was analyzed with NLFEM(non-linear finite element method) and analytical method. Non-linear analysis has also been performed on varying stiffener sizes, shapes and plate thicknesses and checked to see how these parameters affect the ultimate strength of the stiffened panel.

This study will provide additional insight into the behaviour and ultimate strength of stiffened panels and provide a methodology for using NLFEM.

