

Fatigue Life Analysis of Container Deck Using Finite Element Method

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ABSTRACT

Container ship is a ship specially built to transport standard sized containers. On a container ship there is a part of the deck which is a vulnerable structure because it is used to support container loads. This study aims to determine the value of fatigue life on the container deck and determine the most vulnerable areas on the container deck. The value of fatigue analysis is taken from the largest stress value and the shortest cycle is taken for each load variation under conditions of non-undulating, sagging and hogging loads. The method used is the finite element method (FEM) with the help of finite element-based software. The maximum stress results obtained at 100% load sagging conditions of 235.51 MPa and the lowest at 25% uncorrugated load of 46.531 MPa. The highest value of fatigue life was obtained at 25% non-undulating loads of 3836.05 years with cycles totaling 28700000 times, while the lowest fatigue life was obtained at 100% load sagging conditions of 10.61 years with cycles totaling 235000 times. The most vulnerable point occurs on the upper wing tank when the Sagging condition is 100% loaded with a voltage of 235.51 MPa.

Keyword:

Container Ship, Fatigue life, Finite Element Method, Hogging, Sagging