A Numerical Study of Heavyweight Shipboard Equipment Shock Resistant Using Floating Shock Platform

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ABSTRACT

The Navy ’ s shock test standard MIL-STD-901D requires that heavyweight equipment above a designated weight must be tested on a floating shock platform(FSP) barge, but the shock test is time-consuming, laborious and spend money. And the finite element modeling and simulation can provide a viable, cost effective alternative to shock tests. Underwater explosion shock response analysis of a MIL-STD-901D standard floating shock platform(SFSP) was performed using nonlinear finite element software accuracy of analysis results was examined with the existing test results in this paper at first. The objective of this study was to examine the response of different weight in different equipment and difference from the explosion at the depth of explosives, when subjected to an underwater explosion, utilizing the ABAQUS software. Three heavyweight equipments 9000lbs, 18400lbs, and 35800lbs are studied in the five stand off of explosive points: 20ft, 30ft, 40ft, 60ft, and 80ft, and two explosive depths: 20ft, and 30ft. And then compared with the U.S.H.I. TEST laboratory ’ s test data and Kwon ’ s LS-DYNA/USA simulations to demonstrate the feasibility of the ABAQUS/USA. Finally, when the heavyweight equipments are setted NavySeamountTM250 shock mount, the numerical results showed that the shock effect of vertical direction can be reduced 15%, the transverse direction can be reduced 5% to 10%, but there was only 5% reduction at fore and aft the bow to the stern while no apparent effect. This paper established the floating shock platform finite element model and showed the benefits that installed shock mounts on heavy weight equipments. These results can provide a reference for correlative organizations to analize the shock effect.

Keywords : MIL-STD-901D ; ABAQUS ; shock mounts

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