

Effect of Partially Through Crack Size on Strength of Shell Structures

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ABSTRACT

The analysis of numerous cases of failure in shell structures has found to occur at stresses lower than the design stresses. The origins of these failures have been due to flaws or cracks. In order to determine which size of crack is admissible, one must study how the structural strength is affected by cracks.

In this paper the analysis is done using finite Element program developed by the author. The stress Intensity factor K_s of the shell structure is calculated and compared with that of theoretical one and excellent results were achieved as shown in the figures and tables of the results. The load carrying capacity of cracked shell structures were also evaluated and compared with that of the uncracked shell structures capacity to determine the crack size that is admissible. The results obtained were also compared with that of theoretical solutions and excellent results were achieved . The elements used in this program are 8-nodes shell element; 6-nodes singular triangular shell element and 8-nodes transition singular shell element, all elements with 5-degrees of freedom per node.