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Thesis Title : Analysis of Drilling Technique to Reduce Stress Concentration Factor by Finite Element Method.

Major Field : Mechanical Engineering

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Academic Year : 1993

Abstract

In designing or analysing engineering components, the problems that mechanical engineer always encounter are the stress concentration resulting from geometrical discontinuities in the engineering components such as, a groove, a notch or a hole. The study of techniques for reduction of stress concentration factor are very important in design. In Thailand the study of the techniques for reducing stress concentration factor by experiment was not extensive because of the lacks of equipments and fund to support the research. But ,nowadays the developments of personal computers and the finite element programs are growing rapidly. Thus the analysis of stress concentration factor problems by using finite element method with the personal computer is more appropriate.

This research is a study on drilling techniques to reduce stress concentration factor of the thin plate with a single hole in the centre under the uniform distribution tensile forces at both edges . The study was performed by using the finite element program . The results of this research show that the drilling technique called " defense hole " can reduce the stress concentration factor. This technique will be suitable for the ratio of hole diameter(a) to width of plate(w) has less value. The value of stress concentration factor will be reduced by 12.49% when the value of a/w is 0.05 and 5.735% as it is 0.275. Moreover, the result can be used as basic information for comparing with the same type of research using other methods. The knowledge gained from this research can be applied in the actual designing problems.