

INVESTIGATE THE INFLUENCE OF NOTCHES ON STRESSES FOR MILD
STEEL AND ALUMINUM

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STUDENT'S DECLARATION

I hereby declare that the work in this project is my own except for quotations and summaries which have been duly acknowledged. The project has not been accepted for any degree and is not concurrently submitted for award of other degree.

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Dedicated to my beloved family and friends

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ABSTRACT

The diameter and type of notches has the influence to stresses any of design that has the notches. So, there is lot of research been done about the relationship of notches and stress. Many failures in engineering applications or machine components have been caused by notches at which stress was concentrated. Hence, the main objective of this study is to investigate the influence of notches on stresses for mild steel and aluminum. The investigation was based on the types and radius of notches. Both experiment and simulation were done in order to validate the result. The experiment was carried out by using tensile test to obtain maximum stress to the specimen while the simulation was analyzed by using ALGOR V22 software to obtain the stress of the specimen. The material that used in the experiment is mild steel and aluminum and for ALGOR V22 is steel ASTM-A36 and aluminum alloy 1100-H14. The experimental results and the finite element analysis results show that the maximum stress will decrease when the ratio r/d is increase. Thus, the influence of notches on the stresses has been evaluated.

ABSTRAK

Diameter dan jenis takik mempengaruhi tekanan bagi reka bentuk yang memiliki takik. Jadi, ada banyak kajian telah dilakukan mengenai hubungan antara takik dan tekanan. Banyak kegagalan dalam teknik aplikasi atau komponen mesin telah disebabkan oleh tekanan pada takik di mana ia tertumpu. Oleh kerana itu, tujuan utama dari kajian ini adalah untuk menyiasat pengaruh takik dengan tekanan untuk mild steel dan aluminium. Penyelidikan ini berdasarkan pada jenis dan radius takik. Baik eksperimen dan analisis elemen dilakukan dalam rangka untuk memvalidasi keputusan. Percubaan ini dilakukan dengan menggunakan mesin uji tarik untuk mengetahui tekanan maksimum pada spesimen sementara simulasi pula dianalisis dengan menggunakan perisian ALGOR V22 untuk mendapatkan tekanan daripada spesimen. Bahan yang digunakan dalam eksperimen ialah mild steel dan aluminium manakala bahan yang digunakan dalam perisian ALGOR V22 adalah steel ASTM-A36 dan aluminium alloy 1100-H14. Keputusan percubaan dan keputusan simulasi menunjukkan bahawa stres maksimum akan menurun ketika nisbah r / d adalah meningkat. Dengan demikian, pengaruh takik pada tekanan telah dibuktikan.

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LIST OF ABBREVIATIONS

AISI	American Iron and Steel Institute
ASTM	American Society for Testing Materials
FE	Finite Element
FEA	Finite Element Analysis
FEM	Finite Element Model

LIST OF SYMBOLS

A	Cross Sectional Area
mm	Millimetre
s	Second
t	Thickness
l	Length
w	Width
d	Characteristic length
N	Newton
P	Load
K_t	Stress concentration factor
E	Modulus of Elasticity
σ	Stress