

DESIGN AND ANALYSIS OF AERIAL BUNDLE CABLE (ABC)
SUSPENSION BY USING ANSYS FOR JATI BERINGIN SDN
BHD

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2015

B01110292

BACHELOR OF MANUFACTURING ENGINEERING (MANUFACTURING DESIGN)

2015 UTeM



**REDESIGN AND ANALYSIS OF AERIAL BUNDLE CABLE
(ABC) SUSPENSION BY USING ANSYS AT JATI BERINGIN
SDN BHD**

This report submitted in accordance with requirement of the Universiti Teknikal
Malaysia Melaka (UTeM) for the Bachelor Degree of Manufacturing Engineering
(Manufacturing Design)

by

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FACULTY OF MANUFACTURING ENGINEERING

2015



UNIVERSITI TEKNIKAL MALAYSIA MELAKA

BORANG PENGESAHAN STATUS LAPORAN PROJEK SARJANA MUDA

TAJUK: Redesign and Analysis Of Aerial Bundle Cable (ABC) Suspension By Using Ansys at Jati Beringin Sdn Bhd.

SESI PENGAJIAN: 2014/15 Semester 2

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APPROVAL

This report is submitted to the Faculty of Manufacturing Engineering of UTeM as a partial fulfilment of the requirements for the degree of Bachelor of Manufacturing Engineering (Manufacturing Design). The member of the supervisory committee is as follow:

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ABSTRAK

Kesukaran kecacatan pada struktur produk boleh disebabkan oleh gabungan faktor-faktor yang banyak. Kaedah yang biasa digunakan dalam menganalisis reka bentuk penyangkut alumina adalah dengan menggunakan kaedah unsur terhingga. Reka bentuk penyangkut alumina sedia ada yang dicadangkan oleh syarikat amat sesuai digunakan untuk produk ABC Suspension, Voltan Tinggi. Proses yang terlibat dalam penyangkut alumina mempunyai tekanan tinggi sehingga menyebabkan kegagalan struktur yang pada penyangkut alumina. Tujuan kajian ini adalah untuk mewujudkan reka bentuk yang baru dan menentukan sama ada nilai faktor keselamatan adalah lebih besar daripada yang boleh didapati untuk memegang dan genggaman dawai keluli tergalvani standard kuat. Dengan menggunakan Analisis Struktur Statik (ANSYS), hasil daripada analisis bagi reka bentuk baru telah dibandingkan dengan reka bentuk sedia ada mengikut kepada nilai pemalar faktor keselamatan. Dari hasil analisis tersebut, nilai minimum faktor keselamatan yang diperolehi adalah tinggi dan melebihi daripada 1, ianya memberikan kekangan yang lengkap untuk penyangkut alumina. Secara ringkasnya, reka bentuk baru untuk penyangkut alumina memberi hasil pegangan yang terbaik dan menggenggam ABC Suspension bervoltan tinggi dengan kuat berbanding dengan reka bentuk sedia ada.

ABSTRACT

Defects in product structure are caused by a combination of several factors. The most common method used to analyze the current design of aluminium hanger is using finite element method. The current design of aluminium hanger is proposed by the company that is very suitable and applicable for High Voltage ABC Suspension. The process involved in the aluminium hanger is High Pressure Die Casting (HPDC) too much application for the cause of structural failure is unnecessary of aluminium hanger. The aims of this research is to create a new improved design of aluminium hanger and determine whether the value of the safety factor is larger than the existing and will hold and grip the galvanized standard messenger steel wire strongly. By using Static Structural Analysis (ANSYS), the result of the finite-element analysis for new improved design is compared with current design analysis according to the minimum value of the safety factor. From the result, minimum safety factor which is greater than 1 is chosen as an improved design for aluminium hanger. Consequently, new improved design aluminium hanger presents the best holding and gripping for High Voltage Suspension compared to the current design.

DEDICATION

For My Final Year Project Supervisor, Mr. Baharudin bin Abu Bakar, Father & Mother, Hasbullah bin Jalal & Nor Hazlin Thean bte Abdullah, and My Grandparents, Thean Inn Ngan & Lim Young Inn, thanks for everything.

ACKNOWLEDGEMENTS

In the name of Allah S.W.T, the most gracious and the most merciful, thanks a lot for giving me this strength and opportunity to complete this report. In pursuing this research, I would like to thank several people who have contributed to this endeavour. The following individuals provided valuable comments on earlier drafts of the work: En. Baharudin bin Abu Bakar as my official supervisor, Dr Shajahan bin Mydin and Prof Hambali bin Ariff@arep as my second reader and others lectures who have significantly helped, whether directly or not. Special thanks to my friend, Mr Hafizudin bin Hashim for the tutor during my research. A very hue appreciation also would like to be given to all staff of Jati Beringin Sdn. Bhd, especially to the top management's staff and also from the Faculty of Manufacturing Engineering (FKP) for their courage and support.

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LIST OF ABBREVIATIONS

JBSB	-	Jati Beringin Sdn.Bhd.
TNB	-	Tenaga Nasional Berhad
TMB	-	Telekom Malaysia Berhad
FEA	-	Finite Element Analysis
2D	-	Two Dimensional
3D	-	Third Dimensional
AISI	-	American Iron and Steel Institute
UTS	-	Ultimate Tensile Strength
ABC	-	Aerial Bundle Cable
HV	-	High Voltage
PSM 1	-	“Projek Sarjana Muda 1”
PSM 2	-	“Projek Sarjana Muda 2”
HPDC	-	High Pressure Die Casting
PMS	-	Permanent Mold Modeling
KG	-	Kilogram
KN	-	Kilo Newton
M/S	-	Meter/Second
SPH	-	Smooth Particle Hydrodynamic
ALCOA	-	Aluminium Company of America
UTS	-	Ultimate Tensile Strength
YS	-	Yield Strength
EF	-	Elongation Factor
CAD	-	Computer Added Design
CSG	-	Constructive Solid Geometry
GUI	-	Graphical User Interface

ABSTRAK

Kesukaran kecacatan pada struktur produk boleh disebabkan oleh gabungan faktor-faktor yang banyak. Kaedah yang biasa digunakan dalam menganalisis reka bentuk penyangkut alumina adalah dengan menggunakan kaedah unsur terhingga. Reka bentuk penyangkut alumina sedia ada yang dicadangkan oleh syarikat amat sesuai digunakan untuk produk ABC Suspension, Voltan Tinggi. Proses yang terlibat dalam penyangkut alumina mempunyai tekanan tinggi sehingga menyebabkan kegagalan struktur yang pada penyangkut alumina. Tujuan kajian ini adalah untuk mewujudkan reka bentuk yang baru dan menentukan sama ada nilai faktor keselamatan adalah lebih besar daripada yang boleh didapati untuk memegang dan genggaman dawai keluli tergalvani standard kuat. Dengan menggunakan Analisis Struktur Statik (ANSYS), hasil daripada analisis bagi reka bentuk baru telah dibandingkan dengan reka bentuk sedia ada mengikut kepada nilai pemalar faktor keselamatan. Dari hasil analisis tersebut, nilai minimum faktor keselamatan yang diperolehi adalah tinggi dan melebihi daripada 1, ianya memberikan kekangan yang lengkap untuk penyangkut alumina. Secara ringkasnya, reka bentuk baru untuk penyangkut alumina memberi hasil pegangan yang terbaik dan menggenggam ABC Suspension bervoltan tinggi dengan kuat berbanding dengan reka bentuk sedia ada.

ABSTRACT

Defects in product structure are caused by a combination of several factors. The most common method used to analyze the current design of aluminium hanger is using finite element method. The current design of aluminium hanger is proposed by the company that is very suitable and applicable for High Voltage ABC Suspension. The process involved in the aluminium hanger is High Pressure Die Casting (HPDC) too much application for the cause of structural failure is unnecessary of aluminium hanger. The aims of this research is to create a new improved design of aluminium hanger and determine whether the value of the safety factor is larger than the existing and will hold and grip the galvanized standard messenger steel wire strongly. By using Static Structural Analysis (ANSYS), the result of the finite-element analysis for new improved design is compared with current design analysis according to the minimum value of the safety factor. From the result, minimum safety factor which is greater than 1 is chosen as an improved design for aluminium hanger. Consequently, new improved design aluminium hanger presents the best holding and gripping for High Voltage Suspension compared to the current design.