EFFECT OF CARBURIZING TIME ON MECHANICAL PROPERTIES OF Fe-24Mn STEEL

MUHAMMAD AQEEL BIN RUSDI

(2014236564)

BACHELOR OF MECHANICAL ENGINEERING

(MANUFACTURING) (HONOURS)

UNIVERSITI TEKNOLOGI MARA (UiTM)

JULY 2017

"I declare that the content present in this thesis are my own work which was done at Universiti Teknologi MARA (UiTM) unless stated otherwise. The thesis has not been previously submitted for any other degree."

Sign : ……

Date : ……

Muhammad Aqeel bin Rusdi

UiTM No : 2014236564

ACKNOWLEDGEMENT

Alhamdulillah all prays for Allah S.W.T for all his blessing. First of all, I would like to express my sincere thanks and appreciations to my supervisor, Sir Rizal bin Mohamed Noor for his patience and kind guidance throughout the whole study. His understanding, encouraging and dedicated guidance have provided a good basis for my final year project.

I am also very thankful to the team of laboratory technicians, Mr Pazali and Mr Halim for their teaching and assistance in lending helping hand in the time of needs.

In additional, I wish to extend my sincere gratitude to my friend, Ahmad Amirul bin Nordin, Abdul Basir bin Mohamad and others who have provided assistance at various occasions. Last but not least I would like to thank to my parents and family for their fully support from a distance for me to strive in complete this final year project.

ABSTRACT

High Manganese steels is a type of steel that have highly desirable properties exhibiting both high strength and good ductility especially in a sheet form. This steel is widely used in industrial application especially in automotive body. Test samples were prepared from Fe-24Mn steel and will be subjected to pack carburizing process at constant temperature (930℃) and held for 1, 2 and 3 hours. After carburizing process, it was observed that the mechanical properties and microstructure of Fe-24Mn steels were found to be influenced by pack carburizing process. Carburizing for longer times (1 to 3 hours) provided improvement on mechanical properties of Fe-24Mn steel such as ductility, ultimate tensile strength and micro-hardness of the specimen even though the ultimate tensile strength value is still lower than uncarburized Fe-24Mn steel. The study also proves the carburizing process on Fe-24Mn steel results the formation of α-austenite (at surface) and ε-martensite (at core). Finally, the specimen that has been carburized for 3 hours produced best result in overall.

TABLE OF CONTENTS