

UNIVERSITI TEKNOLOGI MARA

**ENHANCEMENT OF WEAR
PROPERTIES 316L STAINLESS
STEEL THROUGH SHOT BLASTING
TREATMENT AND PASTE
BORONIZING PROCESS**

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Thesis submitted in fulfilment
of the requirements for the degree of
Master of Science

Faculty of Mechanical Engineering

June 2017

ABSTRACT

Stainless steel is used widespread in various industries but it has poor wear resistance. This research was conducted to enhance wear resistance of 316L stainless steel by applying shot blasting and paste boronizing at ideal parameters. Three phases were involved in this study in which each of the phases contributes to each of the research objectives which consist of selection of ideal parameters for shot blasting, selection of ideal parameters for paste boronizing and wear resistance characterization. Data were collected and analyzed which concentrating on the samples' microstructure, X-ray Diffraction (XRD), microhardness, wear evaluation, surface roughness and density. Shot blasting improves the case depth of boride layers formed after performing paste boronizing by boosting the boron diffusion owing to the grain refinement created by shot blasting. Ideal shot blasting and paste boronizing parameters produce the greatest case depth of boride layers with highest surface hardness on 316L stainless steel which leads on improving its wear resistance. Shot blasting smoothen the metal's surface and both of the studied surface treatments slightly reduce its density. This research contributes in identifying the ideal shot blasting and paste boronizing parameters in enhancing wear resistance of 316L stainless steel. In this investigation, the ideal shot blasting parameters were obtained using 250 micron of glass beads and 6 bar of blasting pressure while the ideal paste boronizing parameters were achieved at temperature of 950°C and 8 hours of soaking time. These parameters can be used in fabricating the improved 316L stainless steel for industrial usages.

ACKNOWLEDGEMENT

In the Name of Allah, the Most Gracious, the Most Merciful.

First and foremost, all praises to Allah S.W.T as with His guidance and blessings, I managed to complete my MSc research successfully. Sholawat and salam also to our beloved prophet Muhammad S.A.W.

In this opportunity, I would like to express my gratitude to my main supervisor, Ir. Dr. Bulan Binti Abdullah and also to my co-supervisor, Dr. Muhammad Hussain Bin Ismail for sharing knowledge and time throughout the whole research process.

Besides, I would like to acknowledge Universiti Teknologi MARA and the Ministry of Higher Education for supplying the financial and facilities provision which really contribute in the research activities. Sincere thanks also to the technicians and colleagues that involved in providing the technical support and cooperation.

Last but not least, I would also like to give a high token of appreciation to my parents and siblings for the financial and valuable moral supports throughout the research period. May Allah reward all of them with peace, mercy and blessings.

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