

I. IDENTIFICATION DATA

Thesis title:	The Effect of Deformation on Structure and Properties of AlMgSi Alloy
Author's name:	Bc. Radek Berdnar
Type of thesis :	master
Faculty/Institute:	Faculty of Mechanical Engineering (FME)
Department:	Materials Engineering
Thesis reviewer:	Dr. Ir. Husaini Ardy
Reviewer's department:	Materials Engineering Dept., Bandung Institute of Technology, Indonesia

II. EVALUATION OF INDIVIDUAL CRITERIA

Assignment	challenging
<i>How demanding was the assigned project?</i>	
<p>The thesis project involves the study of deformation effect on structure and mechanical properties of AlMgSi alloy as a prospective automotive material, especially the forged parts. Study has been conducted on two types of semi-products, extruded and casting. Characterizations methods are tensile test, hardness test, and microstructural analysis. The main objective of this research is to study forging deformations effects of these two semi-products on their microstructures evolution and mechanical properties. The result of this study is expected to improve the forging process and obtain products with consistent quality and conform to standard specification.</p>	

Fulfilment of assignment	fulfilled
<i>How well does the thesis fulfil the assigned task? Have the primary goals been achieved? Which assigned tasks have been incompletely covered, and which parts of the thesis are overextended? Justify your answer.</i>	
<p>Student has fulfilled the research goal. Literature review on the processing method has been performed extensively. The experimental design and implementations have been conducted properly and fulfilled thesis goal.</p>	

Methodology	correct
<i>Comment on the correctness of the approach and/or the solution methods.</i>	
<p>The thesis project involves the study of deformation effect on structure and mechanical properties of AlMgSi alloy. The forging deformation effects have been verified properly by mechanical testing and microstructural analysis. The effect of initial microstructure has been verified using two type of materials, casting (HCM) and extruded (EXT). More advanced microstructural analysis by EBSD method have been applied to explain about the recrystallization phenomena in extruded samples.</p>	

Technical level	A - excellent.
<i>Is the thesis technically sound? How well did the student employ expertise in the field of his/her field of study? Does the student explain clearly what he/she has done?</i>	
<p>Thesis work has been supported by extensive literature survey and experimental methods to support the analysis. Experimental data has been presented in correct sequences to represent the basis of analysis. Since the initial material has very inhomogeneous microstructure, detail explanation of the deformation effects on mechanical properties and microstructures are still missing and need further exploration by future researcher.</p>	

Formal and language level, scope of thesis	B - very good.
<i>Are formalisms and notations used properly? Is the thesis organized in a logical way? Is the thesis sufficiently extensive? Is the thesis well-presented? Is the language clear and understandable? Is the English satisfactory?</i>	
<p>Thesis has been written in logical way, using notation properly. Literature survey and experimental data are presented extensively. The English language is satisfactory and some correction has been suggested to the Author.</p>	

Selection of sources, citation correctness**A - excellent.**

Does the thesis make adequate reference to earlier work on the topic? Was the selection of sources adequate? Is the student's original work clearly distinguished from earlier work in the field? Do the bibliographic citations meet the standards?

As a broad research project this thesis work was done by two other students and has been cited properly. Extensive literature survey related to scientific aspect of experimental work has been done by Author. Comparison between standard and experimental values has been performed correctly.

Additional commentary and evaluation (optional)

Comment on the overall quality of the thesis, its novelty and its impact on the field, its strengths and weaknesses, the utility of the solution that is presented, the theoretical/formal level, the student's skillfulness, etc.

This is a very interesting research project about hot deformation of aluminum alloys EN AW 6082, even not all metallurgical aspect of relationship between microstructure and mechanical properties can be elaborated due to variation of initial extruded samples microstructure. However, the student has gain broad knowledge about this topic, conducting experimental works properly, and reported it extensive in this thesis.

III. OVERALL EVALUATION, QUESTIONS FOR THE PRESENTATION AND DEFENSE OF THE THESIS, SUGGESTED GRADE

Summarize your opinion on the thesis and explain your final grading. Pose questions that should be answered during the presentation and defense of the student's work.

This thesis work described the differences in characteristic of cast and extruded aluminum alloys that will be used later as feeding material for the hot forging process. Experimental data will be very useful for automotive manufacturer and can be used as references during manufacturing of automotive components. Further research work is needed to get more accurate and detail data about the effect hot deformation on mechanical properties and microstructural evolution of this material.

I have two questions:

1. How do you explain that there is no definite effect of deformation on yield strength of HCM and EXT samples?
2. What do you propose for future research in continuation of your research work?

The grade that I award for the thesis is **A - excellent**.

Date: **2.2.2020**

Signature:

