

TABLE OF CONTENTS

HALAMAN PENGESAHAN	i
HALAMAN PENGESAHAN DOSEN PENGUJI	ii
PERNYATAAN BEBAS PLAGIASI	iii
NASKAH SOAL TUGAS AKHIR	iv
ACKNOWLEDGMENT	v
TABLE OF CONTENT	vii
LIST OF FIGURES	x
LIST OF TABLES	xi
LIST OF APPENDIXES	xii
NOTATIONS AND ABBREVIATIONS	xiii
ABSTRACT	xv
INTISARI	xvi
CHAPTER 1	
INTRODUCTION	1
1.1 Background	2
1.2 Problem Definition	3
1.3 Limitation of Study	3
1.4 Objective of Research	3
1.5 Goals of Research	3
CHAPTER II	
LITERATURE REVIEW	4
2.1. Spin Welding on Solid and 3D Printed ABS	4
2.2. Parameters Influence of ABS Printing	8
2.3. Forging Phase on Rotary Friction Welding	8
CHAPTER III	
BASIC THEORY	11

3.1. Tensile Strength Test	11
3.1.1 Tensile Testing Principles	11
3.2. Fused Deposition Modelling	14
3.3. Acrylonitrile Butadiene Styrene	15
3.4. Rotary Friction Welding	17
3.5. Glass Transition Temperature	22
3.6. Heat Affected Zone	22
CHAPTER IV	
RESEARCH METHODOLOGY	24
4.1. Research Locations	25
4.2. Research Tools	26
4.2.1. Hardware	27
4.2.2. Software	28
4.3. Research Materials	29
4.4. One-Factor-at-a-Time (OFAT)	30
4.5 Variabel Penelitian	33
4.5.1 Controlled Variable	33
4.5.2 Independent Variable	33
4.5.3 Dependent Variable	33
CHAPTER V	
RESULTS AND DISCUSSION	34
5.1 Results	34
5.1.1 Ultimate Tensile Strength	34
5.1.2 One-way ANOVA	38
5.1.3 Cross-section Analysis	39
5.2 Discussion	41
CHAPTER VI	

CONCLUSION AND SUGGESTIONS	44
6.1 Conclusions	44
6.2 Suggestions	44
BIBLIOGRAPHY	46
APPENDIX	49
Appendix 1. UTS bar diagram for standard and RFW specimens	49
Appendix 2. ASTM E8/E8M – 24	51
Appendix 3. G-Code for forge time of 15 seconds	52
Appendix 4. G-Code for forge time of 20 seconds	53
Appendix 5. G-Code for forge time of 25 seconds	54
Appendix 6. G-Code for forge time of 30 seconds	55
Appendix 7. Stress-strain graphs	56