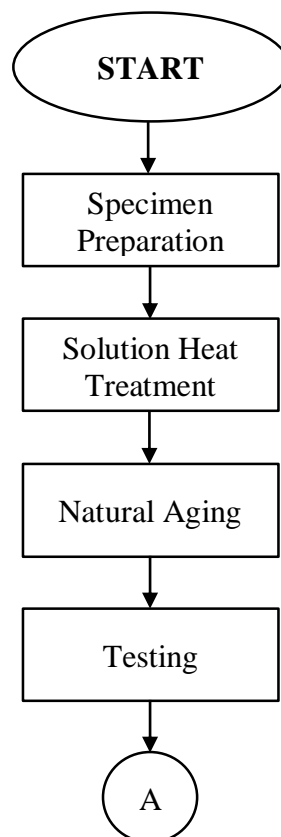


CHAPTER 3

METHODOLOGY

3.1 INTRODUCTION

This chapter briefly discusses the specimens used in this research and the heat treatment procedure as well as the tensile test and hardness procedures. Microstructural analysis using optical microscope will also be discussed. Figure 3.1 showed the process flow of this chapter.



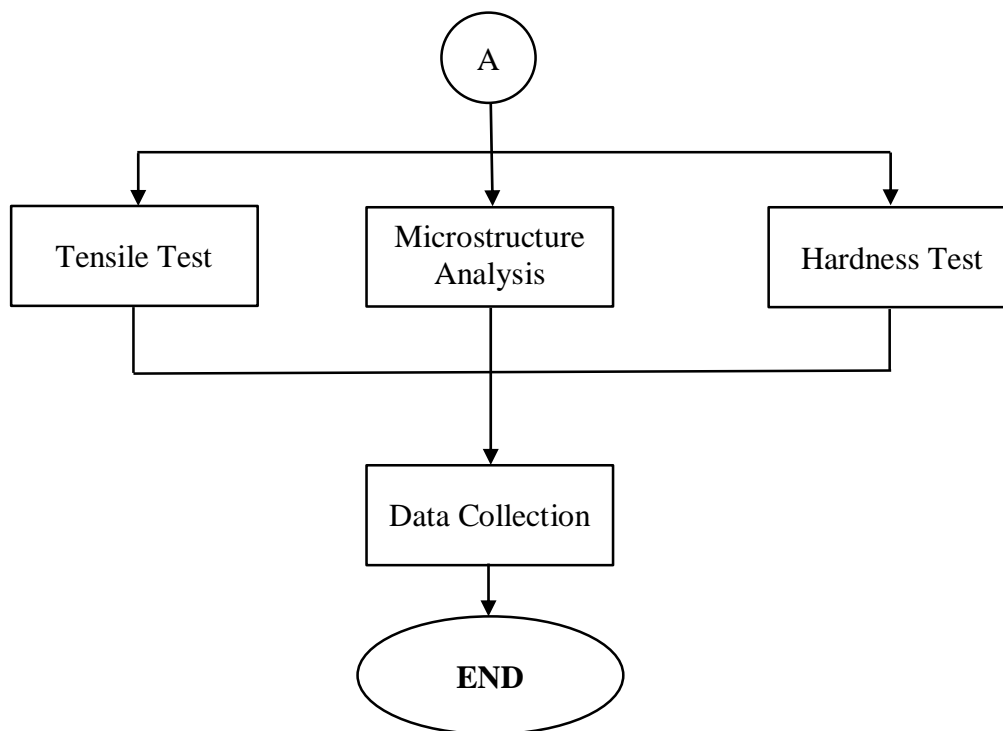


Figure 3.1: Flow chart for methodology

3.2 SPECIMEN PREPARATION

The specimen investigated in this research study was aluminum alloy 6061. The elemental compositions of the alloys AA6061 are given in Table 3.1. The specimen was received as a block which have dimension 100mm x 100mm x 58mm and then were cut into total of 9 pieces, which have dimension 75mm x 18mm x 2mm. This based on ASTM B557-06 specification which in Figure 3.2 which use for heat treatment and then for microstructure and mechanical study. The process used to cut the specimen is using horizontal bend saw and shearing machine.

Table 3.1: Elemental compositions of the alloys aluminum alloy 6061

Element	Al	Mg	Si	Fe	Cu	Zn	Ti	Mn	Cr	Other
Amount	Balance	0.8-	0.4-	Max.	0.15-	Max.	Max.	Max.	0.04-	0.05
(Wt %)		1.2	0.8	0.7	0.40	0.25	0.15	0.15	0.35	

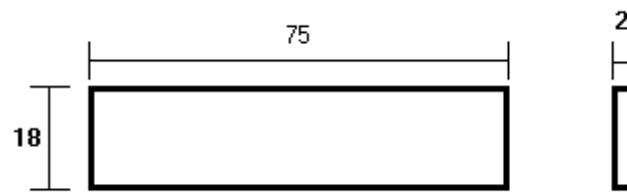


Figure 3.2: The dimensions of the specimen (in millimeters)

Each parameter of study need at least 3 specimen to make data accurate. Specimen specification for tensile testing is shown in Table 3.2.

Table 3.2: Specimen specification for tensile testing

Type (°C)	Specimen no.	Thickness (mm)	Width (mm)	Cross section area (A _o) (mm)
0°C (as received)	1	2.04	16.06	49.78
	1	2.12	17.90	50.00
550°C	2	2.20	18.28	49.98
	3	2.26	18.04	49.58
	1	2.08	17.90	49.42
575°C	2	2.28	18.00	49.40
	3	2.20	18.80	48.98
	1	2.22	18.08	49.58
600°C	2	2.06	18.06	48.44
	3	2.18	18.80	49.42

3.3 HEAT TREATMENT PROCEDURE

Aluminum alloys 6061 are heat treatable aluminum alloys. For this study, aluminum alloys 6061 were heat treated to T4 temper conditions which is solution heat treatment and natural aging. AA6061 aluminum alloy belongs to the Al-Mg-Si-Cu alloy system which is strengthened by the formation of Mg₂Si precipitate.