

LAMPIRAN

Hasil pengujian impak Material Aluminium paduan dengan suhu kamar 30° sebelum perlakuan panas T6.

1. Volume cairan 450 ml dengan durasi penekanan 60 s

$$\begin{aligned}\text{Energi Impak (EI)} &= M.g. \ell(\cos \alpha_2 - \cos \alpha_1) \\ &= 9,5 \cdot 10 \cdot 0,83 (\cos 79^\circ - \cos 88^\circ) \\ &= 78,85 (0,19 - 0,034) \\ &= 12,30 \text{ Joule}\end{aligned}$$

$$\text{Harga Impak (HI)} = \text{HI} = \frac{EI}{l \times h} = \frac{12,30}{50} = 0,24 \text{ joule/mm}^2$$

2. Volume cairan 450 ml dengan durasi penekanan 90 s

$$\begin{aligned}\text{Energi Impak (EI)} &= M.g. \ell(\cos \alpha_2 - \cos \alpha_1) \\ &= 9,5 \cdot 10 \cdot 0,83 (\cos 80^\circ - \cos 88^\circ) \\ &= 78,85 (0,17 - 0,034) \\ &= 10,72 \text{ Joule}\end{aligned}$$

$$\text{Harga Impak (HI)} = \text{HI} = \frac{EI}{l \times h} = \frac{10,72}{50} = 0,21 \text{ joule/mm}^2$$

3. Volume cairan 450 ml dengan durasi penekanan 120 s

$$\begin{aligned}\text{Energi Impak (EI)} &= M.g. \ell(\cos \alpha_2 - \cos \alpha_1) \\ &= 9,5 \cdot 10 \cdot 0,83 (\cos 83^\circ - \cos 88^\circ) \\ &= 78,85 (0,12 - 0,034) \\ &= 6,781 \text{ Joule}\end{aligned}$$

$$\text{Harga Impak (HI)} = \text{HI} = \frac{EI}{l \times h} = \frac{6,781}{50} = 0,13 \text{ joule/mm}^2$$

4. Volume cairan 500 ml dengan durasi penekanan 60 s

$$\begin{aligned}\text{Energi Impak (EI)} &= M.g. \ell(\cos \alpha_2 - \cos \alpha_1) \\ &= 9,5 \cdot 10 \cdot 0,83 (\cos 77^\circ - \cos 88^\circ) \\ &= 78,85 (0,22 - 0,034) \\ &= 14,66 \text{ Joule}\end{aligned}$$

$$\text{Harga Impak (HI)} = \text{HI} = \frac{EI}{l \times h} = \frac{14,66}{50} = 0,29 \text{ joule/mm}^2$$

5. Volume cairan 500 ml dengan durasi penekanan 90 s

$$\begin{aligned}\text{Energi Impak (EI)} &= M.g. \ell(\cos \alpha_2 - \cos \alpha_1) \\ &= 9,5 \cdot 10 \cdot 0,83 (\cos 78^\circ - \cos 88^\circ) \\ &= 78,85 (0,20 - 0,034) \\ &= 13,64 \text{ Joule}\end{aligned}$$

$$\text{Harga Impak (HI)} = \text{HI} = \frac{EI}{l \times h} = \frac{13,64}{50} = 0,27 \text{ joule/mm}^2$$

6. Volume cairan 500 ml dengan durasi penekanan 120 s
 Energi Impak (EI) = M.g. $\ell(\cos \alpha_2 - \cos \alpha_1)$
 $= 9,5 \cdot 10 \cdot 0,83 (\cos 84^\circ - \cos 88^\circ)$
 $= 78,85 (0,104 - 0,034)$
 $= 5,519 \text{ Joule}$
 Harga Impak (HI) = $\text{HI} = \frac{EI}{l \times h} = \frac{5,519}{50} = 0,11 \text{ joule/mm}^2$
7. Volume cairan 550 ml dengan durasi penekanan 60 s
 Energi Impak (EI) = M.g. $\ell(\cos \alpha_2 - \cos \alpha_1)$
 $= 9,5 \cdot 10 \cdot 0,83 (\cos 78^\circ - \cos 88^\circ)$
 $= 78,85 (0,20 - 0,034)$
 $= 13,64 \text{ Joule}$
 Harga Impak (HI) = $\text{HI} = \frac{EI}{l \times h} = \frac{13,64}{50} = 0,27 \text{ joule/mm}^2$
8. Volume cairan 550 ml dengan durasi penekanan 90 s
 Energi Impak (EI) = M.g. $\ell(\cos \alpha_2 - \cos \alpha_1)$
 $= 9,5 \cdot 10 \cdot 0,83 (\cos 79^\circ - \cos 88^\circ)$
 $= 78,85 (0,19 - 0,034)$
 $= 12,30 \text{ Joule}$
 Harga Impak (HI) = $\text{HI} = \frac{EI}{l \times h} = \frac{5,519}{50} = 0,24 \text{ joule/mm}^2$
9. Volume cairan 550 ml dengan durasi penekanan 120 s
 Energi Impak (EI) = M.g. $\ell(\cos \alpha_2 - \cos \alpha_1)$
 $= 9,5 \cdot 10 \cdot 0,83 (\cos 81^\circ - \cos 88^\circ)$
 $= 78,85 (0,15 - 0,034)$
 $= 9,146 \text{ Joule}$
 Harga Impak (HI) = $\text{HI} = \frac{EI}{l \times h} = \frac{9,620}{50} = 0,18 \text{ joule/mm}^2$

Hasil pengujian impak Material Alumunium Paduan dengan suhu panas 100 °C sebelum perlakuan panas T6.

10. Volume cairan 450 ml dengan durasi penekanan 60 s

$$\begin{aligned} \text{Energi Impak (EI)} &= M.g. \ell(\cos \alpha_2 - \cos \alpha_1) \\ &= 9,5 \cdot 10 \cdot 0,83 (\cos 77^\circ - \cos 88^\circ) \\ &= 78,85 (0,22 - 0,034) \\ &= 14,66 \text{ Joule} \end{aligned}$$

$$\text{Harga Impak (HI)} = \text{HI} = \frac{EI}{l \times h} = \frac{14,66}{50} = 0,29 \text{ joule/mm}^2$$

11. Volume cairan 450 ml dengan durasi penekanan 90 s

$$\begin{aligned} \text{Energi Impak (EI)} &= M.g. \ell(\cos \alpha_2 - \cos \alpha_1) \\ &= 9,5 \cdot 10 \cdot 0,83 (\cos 78^\circ - \cos 88^\circ) \\ &= 78,85 (0,20 - 0,034) \\ &= 13,64 \text{ Joule} \end{aligned}$$

$$\text{Harga Impak (HI)} = \text{HI} = \frac{EI}{l \times h} = \frac{13,64}{50} = 0,27 \text{ joule/mm}^2$$

12. Volume cairan 450 ml dengan durasi penekanan 120 s

$$\begin{aligned} \text{Energi Impak (EI)} &= M.g. \ell(\cos \alpha_2 - \cos \alpha_1) \\ &= 9,5 \cdot 10 \cdot 0,83 (\cos 80^\circ - \cos 88^\circ) \\ &= 78,85 (0,17 - 0,034) \\ &= 10,72 \text{ Joule} \end{aligned}$$

$$\text{Harga Impak (HI)} = \text{HI} = \frac{EI}{l \times h} = \frac{10,72}{50} = 0,21 \text{ joule/mm}^2$$

13. Volume cairan 500 ml dengan durasi penekanan 60 s

$$\begin{aligned} \text{Energi Impak (EI)} &= M.g. \ell(\cos \alpha_2 - \cos \alpha_1) \\ &= 9,5 \cdot 10 \cdot 0,83 (\cos 75^\circ - \cos 88^\circ) \\ &= 78,85 (0,25 - 0,034) \\ &= 17,03 \text{ Joule} \end{aligned}$$

$$\text{Harga Impak (HI)} = \text{HI} = \frac{EI}{l \times h} = \frac{17,03}{50} = 0,34 \text{ joule/mm}^2$$

14. Volume cairan 500 ml dengan durasi penekanan 90 s

$$\begin{aligned} \text{Energi Impak (EI)} &= M.g. \ell(\cos \alpha_2 - \cos \alpha_1) \\ &= 9,5 \cdot 10 \cdot 0,83 (\cos 75^\circ - \cos 88^\circ) \\ &= 78,85 (0,25 - 0,034) \\ &= 17,03 \text{ Joule} \end{aligned}$$

$$\text{Harga Impak (HI)} = \text{HI} = \frac{EI}{l \times h} = \frac{17,03}{50} = 0,34 \text{ joule/mm}^2$$

15. Volume cairan 500 ml dengan durasi penekanan 120 s
 Energi Impak (EI) = M.g. $\ell(\cos \alpha_2 - \cos \alpha_1)$
 $= 9,5 \cdot 10 \cdot 0,83 (\cos 82^\circ - \cos 88^\circ)$
 $= 78,85 (0,13 - 0,034)$
 $= 7,570 \text{ Joule}$
 Harga Impak (HI) = $HI = \frac{EI}{l \times h} = \frac{7,570}{50} = 0,15 \text{ joule/mm}^2$
16. Volume cairan 550 ml dengan durasi penekanan 60 s
 Energi Impak (EI) = M.g. $\ell(\cos \alpha_2 - \cos \alpha_1)$
 $= 9,5 \cdot 10 \cdot 0,83 (\cos 74^\circ - \cos 88^\circ)$
 $= 78,85 (0,23 - 0,034)$
 $= 15,45 \text{ Joule}$
 Harga Impak (HI) = $HI = \frac{EI}{l \times h} = \frac{15,45}{50} = 0,30 \text{ joule/mm}^2$
17. Volume cairan 550 ml dengan durasi penekanan 90 s
 Energi Impak (EI) = M.g. $\ell(\cos \alpha_2 - \cos \alpha_1)$
 $= 9,5 \cdot 10 \cdot 0,83 (\cos 78^\circ - \cos 88^\circ)$
 $= 78,85 (0,20 - 0,034)$
 $= 13,64 \text{ Joule}$
 Harga Impak (HI) = $HI = \frac{EI}{l \times h} = \frac{13,64}{50} = 0,27 \text{ joule/mm}^2$
18. Volume cairan 550 ml dengan durasi penekanan 120 s
 Energi Impak (EI) = M.g. $\ell(\cos \alpha_2 - \cos \alpha_1)$
 $= 9,5 \cdot 10 \cdot 0,83 (\cos 80^\circ - \cos 88^\circ)$
 $= 78,85 (0,17 - 0,034)$
 $= 10,72 \text{ Joule}$
 Harga Impak (HI) = $HI = \frac{EI}{l \times h} = \frac{10,72}{50} = 0,21 \text{ joule/mm}^2$

Hasil pengujian impact Material Aluminium paduan dengan suhu kamar 30° setelah perlakuan panas T6.

19. Volume cairan 450 ml dengan durasi penekanan 60 s

$$\begin{aligned} \text{Energi Impak (EI)} &= M.g. \ell(\cos \alpha_2 - \cos \alpha_1) \\ &= 9,5 \cdot 10 \cdot 0,83 (\cos 78^\circ - \cos 88^\circ) \\ &= 78,85 (0,20 - 0,034) \\ &= 13,64 \text{ Joule} \end{aligned}$$

$$\text{Harga Impak (HI)} = \text{HI} = \frac{EI}{l \times h} = \frac{13,64}{50} = 0,27 \text{ joule/mm}^2$$

20. Volume cairan 450 ml dengan durasi penekanan 90 s

$$\begin{aligned} \text{Energi Impak (EI)} &= M.g. \ell(\cos \alpha_2 - \cos \alpha_1) \\ &= 9,5 \cdot 10 \cdot 0,83 (\cos 80^\circ - \cos 88^\circ) \\ &= 78,85 (0,17 - 0,034) \\ &= 10,72 \text{ Joule} \end{aligned}$$

$$\text{Harga Impak (HI)} = \text{HI} = \frac{EI}{l \times h} = \frac{10,72}{50} = 0,21 \text{ joule/mm}^2$$

21. Volume cairan 450 ml dengan durasi penekanan 120 s

$$\begin{aligned} \text{Energi Impak (EI)} &= M.g. \ell(\cos \alpha_2 - \cos \alpha_1) \\ &= 9,5 \cdot 10 \cdot 0,83 (\cos 81^\circ - \cos 88^\circ) \\ &= 78,85 (0,15 - 0,034) \\ &= 9,146 \text{ Joule} \end{aligned}$$

$$\text{Harga Impak (HI)} = \text{HI} = \frac{EI}{l \times h} = \frac{9,416}{50} = 0,18 \text{ joule/mm}^2$$

22. Volume cairan 500 ml dengan durasi penekanan 60 s

$$\begin{aligned} \text{Energi Impak (EI)} &= M.g. \ell(\cos \alpha_2 - \cos \alpha_1) \\ &= 9,5 \cdot 10 \cdot 0,83 (\cos 76^\circ - \cos 88^\circ) \\ &= 78,85 (0,24 - 0,034) \\ &= 16,24 \text{ Joule} \end{aligned}$$

$$\text{Harga Impak (HI)} = \text{HI} = \frac{EI}{l \times h} = \frac{16,24}{50} = 0,32 \text{ joule/mm}^2$$

23. Volume cairan 500 ml dengan durasi penekanan 90 s

$$\begin{aligned} \text{Energi Impak (EI)} &= M.g. \ell(\cos \alpha_2 - \cos \alpha_1) \\ &= 9,5 \cdot 10 \cdot 0,83 (\cos 77^\circ - \cos 88^\circ) \\ &= 78,85 (0,22 - 0,034) \\ &= 14,66 \text{ Joule} \end{aligned}$$

$$\text{Harga Impak (HI)} = \text{HI} = \frac{EI}{l \times h} = \frac{14,66}{50} = 0,29 \text{ joule/mm}^2$$

24. Volume cairan 500 ml dengan durasi penekanan 120 s
 Energi Impak (EI) = M.g. $\ell(\cos \alpha_2 - \cos \alpha_1)$
 $= 9,5 \cdot 10 \cdot 0,83 (\cos 82^\circ - \cos 88^\circ)$
 $= 78,85 (0,13 - 0,034)$
 $= 7,569 \text{ Joule}$
 Harga Impak (HI) = $HI = \frac{EI}{l \times h} = \frac{5,519}{50} = 0,15 \text{ joule/mm}^2$
25. Volume cairan 550 ml dengan durasi penekanan 60 s
 Energi Impak (EI) = M.g. $\ell(\cos \alpha_2 - \cos \alpha_1)$
 $= 9,5 \cdot 10 \cdot 0,83 (\cos 76^\circ - \cos 88^\circ)$
 $= 78,85 (0,24 - 0,034)$
 $= 16,24 \text{ Joule}$
 Harga Impak (HI) = $HI = \frac{EI}{l \times h} = \frac{16,24}{50} = 0,32 \text{ joule/mm}^2$
26. Volume cairan 550 ml dengan durasi penekanan 90 s
 Energi Impak (EI) = M.g. $\ell(\cos \alpha_2 - \cos \alpha_1)$
 $= 9,5 \cdot 10 \cdot 0,83 (\cos 77^\circ - \cos 88^\circ)$
 $= 78,85 (0,22 - 0,034)$
 $= 14,66 \text{ Joule}$
 Harga Impak (HI) = $HI = \frac{EI}{l \times h} = \frac{14,66}{50} = 0,29 \text{ joule/mm}^2$
27. Volume cairan 550 ml dengan durasi penekanan 120 s
 Energi Impak (EI) = M.g. $\ell(\cos \alpha_2 - \cos \alpha_1)$
 $= 9,5 \cdot 10 \cdot 0,83 (\cos 80^\circ - \cos 88^\circ)$
 $= 78,85 (0,17 - 0,034)$
 $= 10,72 \text{ Joule}$
 Harga Impak (HI) = $HI = \frac{EI}{l \times h} = \frac{10,72}{50} = 0,21 \text{ joule/mm}^2$

Hasil pengujian impak Material Alumunium paduan dengan suhu kamar 100° setelah perlakuan panas T6.

28. Volume cairan 450 ml dengan durasi penekanan 60 s

$$\begin{aligned} \text{Energi Impak (EI)} &= M.g. \ell(\cos \alpha_2 - \cos \alpha_1) \\ &= 9,5 \cdot 10 \cdot 0,83 (\cos 76^\circ - \cos 88^\circ) \\ &= 78,85 (0,24 - 0,034) \\ &= 16,24 \text{ Joule} \end{aligned}$$

$$\text{Harga Impak (HI)} = \text{HI} = \frac{EI}{l \times h} = \frac{16,24}{50} = 0,32 \text{ joule/mm}^2$$

29. Volume cairan 450 ml dengan durasi penekanan 90 s

$$\begin{aligned} \text{Energi Impak (EI)} &= M.g. \ell(\cos \alpha_2 - \cos \alpha_1) \\ &= 9,5 \cdot 10 \cdot 0,83 (\cos 78^\circ - \cos 88^\circ) \\ &= 78,85 (0,20 - 0,034) \\ &= 13,64 \text{ Joule} \end{aligned}$$

$$\text{Harga Impak (HI)} = \text{HI} = \frac{EI}{l \times h} = \frac{13,64}{50} = 0,27 \text{ joule/mm}^2$$

30. Volume cairan 450 ml dengan durasi penekanan 120 s

$$\begin{aligned} \text{Energi Impak (EI)} &= M.g. \ell(\cos \alpha_2 - \cos \alpha_1) \\ &= 9,5 \cdot 10 \cdot 0,83 (\cos 80^\circ - \cos 88^\circ) \\ &= 78,85 (0,17 - 0,034) \\ &= 10,72 \text{ Joule} \end{aligned}$$

$$\text{Harga Impak (HI)} = \text{HI} = \frac{EI}{l \times h} = \frac{10,72}{50} = 0,21 \text{ joule/mm}^2$$

31. Volume cairan 500 ml dengan durasi penekanan 60 s

$$\begin{aligned} \text{Energi Impak (EI)} &= M.g. \ell(\cos \alpha_2 - \cos \alpha_1) \\ &= 9,5 \cdot 10 \cdot 0,83 (\cos 75^\circ - \cos 88^\circ) \\ &= 78,85 (0,25 - 0,034) \\ &= 17,03 \text{ Joule} \end{aligned}$$

$$\text{Harga Impak (HI)} = \text{HI} = \frac{EI}{l \times h} = \frac{17,03}{50} = 0,34 \text{ joule/mm}^2$$

32. Volume cairan 500 ml dengan durasi penekanan 90 s

$$\begin{aligned} \text{Energi Impak (EI)} &= M.g. \ell(\cos \alpha_2 - \cos \alpha_1) \\ &= 9,5 \cdot 10 \cdot 0,83 (\cos 76^\circ - \cos 88^\circ) \\ &= 78,85 (0,24 - 0,034) \\ &= 16,24 \text{ Joule} \end{aligned}$$

$$\text{Harga Impak (HI)} = \text{HI} = \frac{EI}{l \times h} = \frac{16,24}{50} = 0,32 \text{ joule/mm}^2$$

33. Volume cairan 500 ml dengan durasi penekanan 120 s
 Energi Impak (EI) = M.g. $\ell(\cos \alpha_2 - \cos \alpha_1)$
 $= 9,5 \cdot 10 \cdot 0,83 (\cos 81^\circ - \cos 88^\circ)$
 $= 78,85 (0,15 - 0,034)$
 $= 9,146 \text{ Joule}$
 Harga Impak (HI) = $HI = \frac{EI}{l \times h} = \frac{9,146}{50} = 0,18 \text{ joule/mm}^2$
34. Volume cairan 550 ml dengan durasi penekanan 60 s
 Energi Impak (EI) = M.g. $\ell(\cos \alpha_2 - \cos \alpha_1)$
 $= 9,5 \cdot 10 \cdot 0,83 (\cos 74^\circ - \cos 88^\circ)$
 $= 78,85 (0,27 - 0,034)$
 $= 18,60 \text{ Joule}$
 Harga Impak (HI) = $HI = \frac{EI}{l \times h} = \frac{18,60}{50} = 0,37 \text{ joule/mm}^2$
35. Volume cairan 550 ml dengan durasi penekanan 90 s
 Energi Impak (EI) = M.g. $\ell(\cos \alpha_2 - \cos \alpha_1)$
 $= 9,5 \cdot 10 \cdot 0,83 (\cos 75^\circ - \cos 88^\circ)$
 $= 78,85 (0,25 - 0,034)$
 $= 17,03 \text{ Joule}$
 Harga Impak (HI) = $HI = \frac{EI}{l \times h} = \frac{17,03}{50} = 0,34 \text{ joule/mm}^2$
36. Volume cairan 550 ml dengan durasi penekanan 120 s
 Energi Impak (EI) = M.g. $\ell(\cos \alpha_2 - \cos \alpha_1)$
 $= 9,5 \cdot 10 \cdot 0,83 (\cos 79^\circ - \cos 88^\circ)$
 $= 78,85 (0,19 - 0,034)$
 $= 12,30 \text{ Joule}$
 Harga Impak (HI) = $HI = \frac{EI}{l \times h} = \frac{12,30}{50} = 0,24 \text{ joule/mm}^2$

1. Proses Squeeze Casting

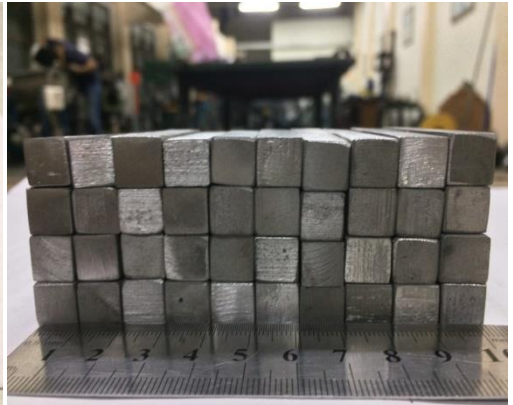
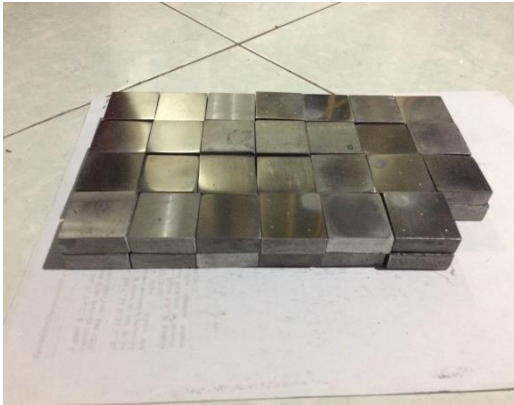






2. Pembentukan spesimen uji



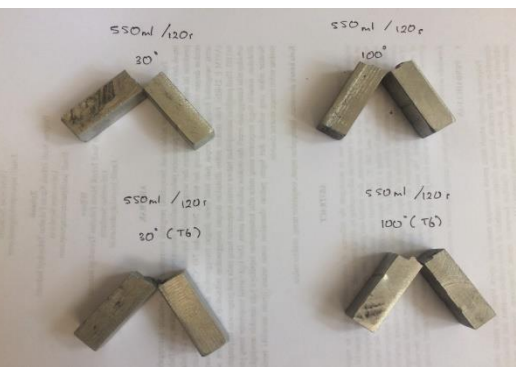
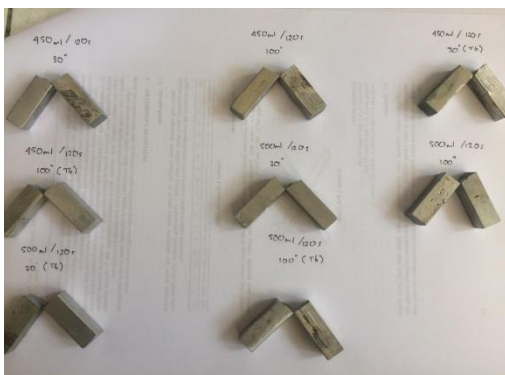
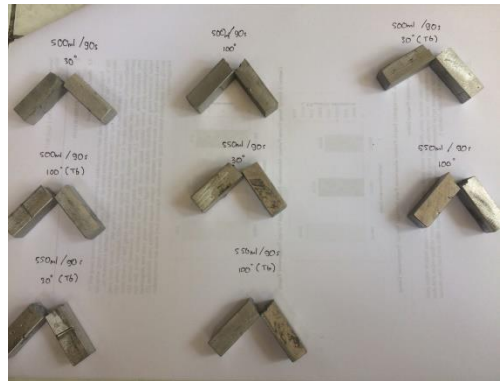
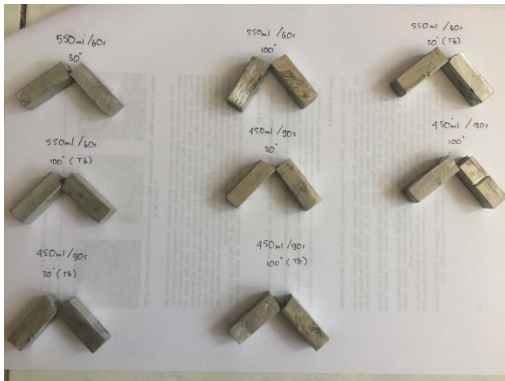
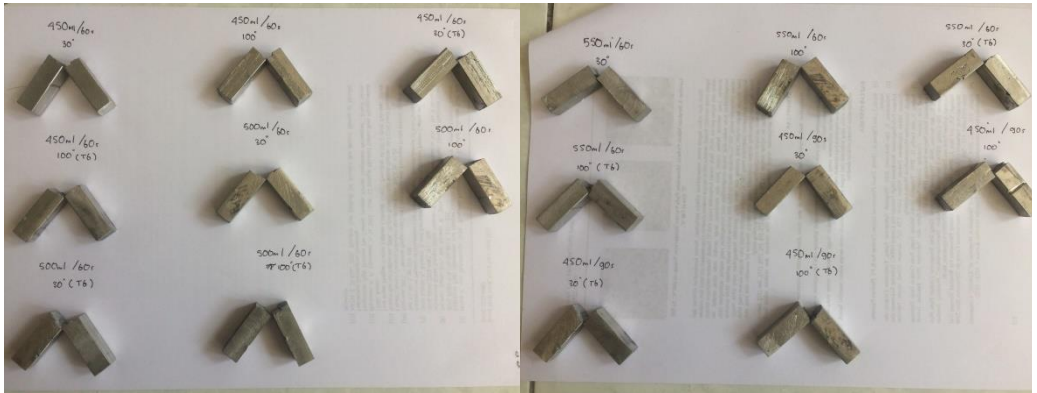


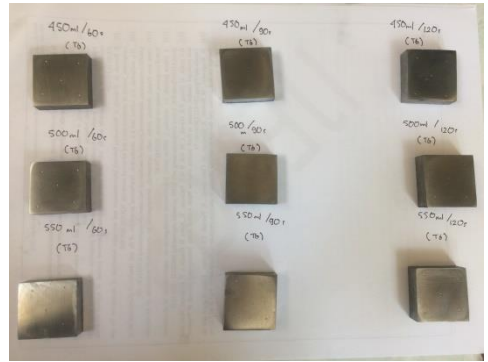
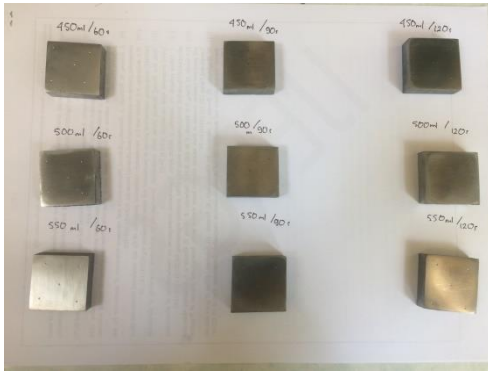
3. Proses perlakuan panas T6




4. Pengujian kekerasan dan Uji impak







5. Data pengujian kekerasan



Laboratorium Material Teknik
Teknik Industri UNTAG- Surabaya
LEMBAR DATA UJI KEKERASAN / METODE ROCKWELL

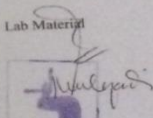

Nama : Muhammad Subesto
NBI : 1421404574
Tanggal pengujian : 8 - 6 - 18

Data Hasil Pengujian Kekerasan

No	Benda Uji	Beban (Kg)	Indentor	Warna Skala	Skala Beban	Kekerasan (HRF)	Rata-rata kekerasan
1	S 50 ml 120 r	60Kg	1/16"	Merah	49	63,5	66,8
2					49,5	63,5	
3					51	69,5	
4					53,5	72	
5					45	54,5	

No	Benda Uji	Beban (Kg)	Indentor	Warna Skala	Skala Beban	Kekerasan (HRF)	Rata-rata kekerasan
1	S 50 ml 120 r (T6)	60Kg	1/16"	Merah	49,5	72,5	71,4
2					52	72	
3					52	72	
4					49	69,5	
5					52	72	

Lab Material

LAB. LOGAM
UNTAG 45
SURABAYA



Laboratorium Material Teknik

Teknik Industri UNTAG- Surabaya

LEMBAR DATA UJI KEKERASAN / METODE ROCKWELL

Nama : Muhammad Subesto

NBI : 1421404574

Tanggal pengujian : 2 - 6 - 18

Data Hasil Pengujian Kekerasan

No	Benda Uji	Beban (Kg)	Indentor	Warna Skala	Skala Beban	Kekerasan (HRF)	Rata-rata kekerasan
1	SS0ml 60r	60Kg	1/16"	Merah	52	71	60,8
2					47	62	
3					38	57,5	
4					35,5	51,5	
5					41	59	

No	Benda Uji	Beban (Kg)	Indentor	Warna Skala	Skala Beban	Kekerasan (HRF)	Rata-rata kekerasan
1	SS0ml 60r (T6)	60Kg	1/16"	Merah	51,5	70	69
2					51	69,5	
3					52,5	70,5	
4					49	68	
5					48	67	

Lab Material





Laboratorium Material Teknik

Teknik Industri UNTAG- Surabaya

LEMBAR DATA UJI KEKERASAN / METODE ROCKWELL

Nama : Muhammad Subesto

NBI : 1421404574

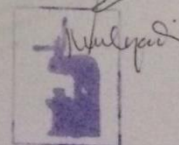
Tanggal pengujian : 8 / 6 - 18

Data Hasil Pengujian Kekerasan

No	Benda Uji	Beban (Kg)	Indentor	Warna Skala	Skala Beban	Kekerasan (HRF)	Rata-rata kekerasan
1	550ml 90s	60Kg	1/16"	Merah	40,5	66	64,6
2					45	64,5	
3					48,5	67	
4					58,5	67,5	
5					49,5	64	

No	Benda Uji	Beban (Kg)	Indentor	Warna Skala	Skala Beban	Kekerasan (HRF)	Rata-rata kekerasan
1	550ml 90s (T6)	60Kg	1/16"	Merah	52	71,5	70,8
2					50,5	70	
3					52	72	
4					51	70,5	
5					50	70	

Lab Material



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Nama : Muhammad Subesto

NBI : 1421404574

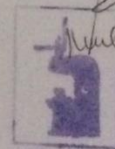
Tanggal pengujian : 8-6-18

Data Hasil Pengujian Kekerasan

No	Benda Uji	Beban (Kg)	Indentor	Warna Skala	Skala Beban	Kekerasan (HRF)	Rata-rata kekerasan
1	450 ml 120 s	60Kg	1/16"	Merah	49	67,5	67,6
2					50,5	68,5	
3					48,	66,5	
4					48	67	
5					50	68,5	

No	Benda Uji	Beban (Kg)	Indentor	Warna Skala	Skala Beban	Kekerasan (HRF)	Rata-rata kekerasan
1	450 ml 120 r (T6)	60Kg	1/16"	Merah	52,5	72,5	74
2					56	75	
3					55,5	75	
4					54,5	73,5	
5					55	74	

Lab Material



LAB. LOGAM
UNTAG 45
SURABAYA



Laboratorium Material Teknik

Teknik Industri UNTAG- Surabaya

LEMBAR DATA UJI KEKERASAN / METODE ROCKWELL

Nama : Muhammad Subesto

NBI : 1421404574

Tanggal pengujian : 3 - 6 - 13

Data Hasil Pengujian Kekerasan

No	Benda Uji	Beban (Kg)	Indentor	Warna Skala	Skala Beban	Kekerasan (HRF)	Rata-rata kekerasan
1	Volume cairan 500ml Durosi penetrasi 60 detik.	60Kg	1/16"	Merah	43	62,5	63
2					45	64,5	
3					43	61	
4					41	60	
5					47	67	

No	Benda Uji	Beban (Kg)	Indentor	Warna Skala	Skala Beban	Kekerasan (HRF)	Rata-rata kekerasan
1	500ml 60 detik (Tb)	60Kg	1/16"	Merah	52	69,5	70
2					53	71,5	
3					50	68	
4					51,5	70	
5					53	71	

Lab Material



LAB. LOGAM
UNTAG 45
SURABAYA



Laboratorium Material Teknik

Teknik Industri UNTAG- Surabaya

LEMBAR DATA UJI KEKERASAN / METODE ROCKWELL

Nama : Muhammad Subesto

NBI : 1421404574

Tanggal pengujian : 8 - 6 - 18

Data Hasil Pengujian Kekerasan

No	Benda Uji	Beban (Kg)	Indentor	Warna Skala	Skala Beban	Kekerasan (HRF)	Rata-rata kekerasan
1	500ml 90s	60Kg	1/16"	Merah	46	65	65,7
2					46	65	
3					47,5	66	
4					46	69,5	
5					49	60	

No	Benda Uji	Beban (Kg)	Indentor	Warna Skala	Skala Beban	Kekerasan (HRF)	Rata-rata kekerasan
1	500ml 90s (T6)	60Kg	1/16"	Merah	50,5	66,5	70,9
2					51,5	70,5	
3					50	69	
4					53	73,5	
5					53,5	73	

Lab Material



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UNTAG 45
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Teknik Industri UNTAG- Surabaya

LEMBAR DATA UJI KEKERASAN / METODE ROCKWELL

Nama : Muhammad Subesto

NBI : 1421404574

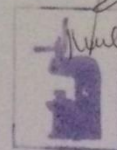
Tanggal pengujian : 8-6-18

Data Hasil Pengujian Kekerasan

No	Benda Uji	Beban (Kg)	Indentor	Warna Skala	Skala Beban	Kekerasan (HRF)	Rata-rata kekerasan
1	500 ^{ml} 120 ^s	60Kg	1/16"	Merah	47	67,5	68,9
2					52,5	71,5	
3					51	70,5	
4					46	66,5	
5					48,5	68,5	

No	Benda Uji	Beban (Kg)	Indentor	Warna Skala	Skala Beban	Kekerasan (HRF)	Rata-rata kekerasan
1	500 ^{ml} / 120 ^s (T6)	60Kg	1/16"	Merah	56,5	69,5	71,9
2					57	77,5	
3					59	79	
4					53	73,5	
5					55,5	75	

Lab Material



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UNTAG 45
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Laboratorium Material Teknik

Teknik Industri UNTAG- Surabaya

LEMBAR DATA UJI KEKERASAN / METODE ROCKWELL

Nama	: Muhammad Subesto
NBI	: 1421404574
Tanggal pengujian	: 8-6-18

Data Hasil Pengujian Kekerasan

No	Benda Uji	Beban (Kg)	Indentor	Warna Skala	Skala Beban	Kekerasan (HRF)	Rata-rata kekerasan
1	Volume Caran 450ml Durasi penetrasi 60 detik	60Kg	1/16"	Merah	41	60	63,4
2					42	59,5	
3					43	61,5	
4					49	68	
5					48,5	68	

No	Benda Uji	Beban (Kg)	Indentor	Warna Skala	Skala Beban	Kekerasan (HRF)	Rata-rata kekerasan
1	450ml 60 detik (T6)	60Kg	1/16"	Merah	45	65,5	70
2					52	71,5	
3					52	71	
4					54,5	73	
5					49,5	69	

Lab Material



LAB. LOGAM
UNTAG 48
SURABAYA



Laboratorium Material Teknik

Teknik Industri UNTAG- Surabaya

LEMBAR DATA UJI KEKERASAN / METODE ROCKWELL

Nama : Muhammad Subesto

NBI : 1421404574

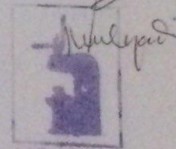
Tanggal pengujian : 03-06-18

Data Hasil Pengujian Kekerasan

No	Benda Uji	Beban (Kg)	Indentor	Warna Skala	Skala Beban	Kekerasan (HRF)	Rata-rata kekerasan
1	450ml 90s	60Kg	1/16"	Merah	47	67	67
2					49,5	69	
3					40,5	61	
4					49,5	68	
5					51	70	

No	Benda Uji	Beban (Kg)	Indentor	Warna Skala	Skala Beban	Kekerasan (HRF)	Rata-rata kekerasan
1	450ml 90s (T6)	60Kg	1/16"	Merah	50	70	72
2					53	72,5	
3					51,5	72	
4					48	77,5	
5					49	73	

Lab Material



LAB. LOGAM
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SURABAYA

6. Data pengujian ketangguhan impact

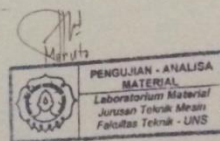
Data hasil pengujian impact setelah perlakuan panas T6

No	Bahan	Volume cairan	Durasi penekanan	p(mm)	l(mm)	t(mm)	h(mm)	T°C	Luas(mm ²)	β_1	β_2
1	Komposit	450 ml	60 s	60	10	10	5	30	50	76°	88°
2		450 ml	90 s							80°	
3		450 ml	120 s							81°	
4		500 ml	60 s							76°	
5		500 ml	90 s							77°	
6		500 ml	120 s							82°	
7		550 ml	60 s							76°	
8		550 ml	90 s							77°	
9		550 ml	120 s							80°	

No	Bahan	Volume cairan	Durasi penekanan	p(mm)	l(mm)	t(mm)	h(mm)	T°C	Luas(mm ²)	β_1	β_2
1	Komposit	450 ml	60 s	60	10	10	5	100	50	76°	88°
2		450 ml	90 s							78°	
3		450 ml	120 s							80°	
4		500 ml	60 s							75°	
5		500 ml	90 s							76°	
6		500 ml	120 s							81°	
7		550 ml	60 s							74°	
8		550 ml	90 s							75°	
9		550 ml	120 s							79°	

Tabel pengujian impact

Keterangan :
 panjang lengan bandul (ℓ) = 0,83 m
 Massa bandul (W) = 9,5 kg



Data Hasil Pengujian Impak

No	Bahan	Volume cairan	Durasi penekanan	p(mm)	l(mm)	t(mm)	h(mm)	T°C	Luas(mm ²)	g ₁	g ₂
1	Komposit	450 ml	60 s	60	10	10	5	30	50	88 ^o	79 ^o
2		450 ml	90 s								80 ^o
3		450 ml	120 s								83 ^o
4		500 ml	60 s								77 ^o
5		500 ml	90 s								78 ^o
6		500 ml	120 s								84 ^o
7		550 ml	60 s								78 ^o
8		550 ml	90 s								79 ^o
9		550 ml	120 s								81 ^o

No	Bahan	Volume cairan	Durasi penekanan	p(mm)	l(mm)	t(mm)	h(mm)	T°C	Luas(mm ²)	g ₁	g ₂
1	Komposit	450 ml	60 s	60	10	10	5	100 ^o	50	88 ^o	77 ^o
2		450 ml	90 s								76 ^o
3		450 ml	120 s								80 ^o
4		500 ml	60 s								75 ^o
5		500 ml	90 s								75 ^o
6		500 ml	120 s								82 ^o
7		550 ml	60 s								74 ^o
8		550 ml	90 s								76 ^o
9		550 ml	120 s								80 ^o

