

## **LAMPIRAN**



## PENGUJIAN PENELITIAN TUGAS AKHIR AGREGAT HALUS

Jenis Pengujian : Pemeriksaan gradasi besar butiran agregat halus

Bahan : Pasir

Asal : Sungai Progo

Diperiksa : 10 Februari 2018

Tabel 1 Hasil pemeriksaan gradasi butiran agregat halus

Ukuran	Lubang Ayakan (mm)	Berat Tertahan (gram)	Persen Berat Tertahan (%)	Persen berat Tertahan Kumulatif (%)	Persen Berat Lolos Kumulatif (%)
No.4	4,8	0	0,000	0,000	100,000
No.8	2,4	25	2,500	2,500	97,500
No.16	1,2	91	9,100	11,600	88,400
No.30	0,6	236	23,600	35,200	64,800
No.50	0,3	155	15,500	50,700	49,300
No.100	0,15	350	35,000	85,700	5,900
Pan		143	14,300	100,000	0,000
Total		1000	100,000	285,700	

Analisis hitungan:

a. Contoh saringan no.8

Persen berat teratahan:

$$= \frac{\text{Berat Tertahan}}{\text{Total}} \times 100\%$$

$$= \frac{25}{1000} \times 100\%$$

$$= 2,5\%$$

b. Contoh saringan no.8

Persen berat tertahan kumulatif:

$$= \text{Persen berat tertahan no.4} + \text{Persen berat tertahan no.8}$$

$$= 0,00 + 2,5 = 2,5\%$$



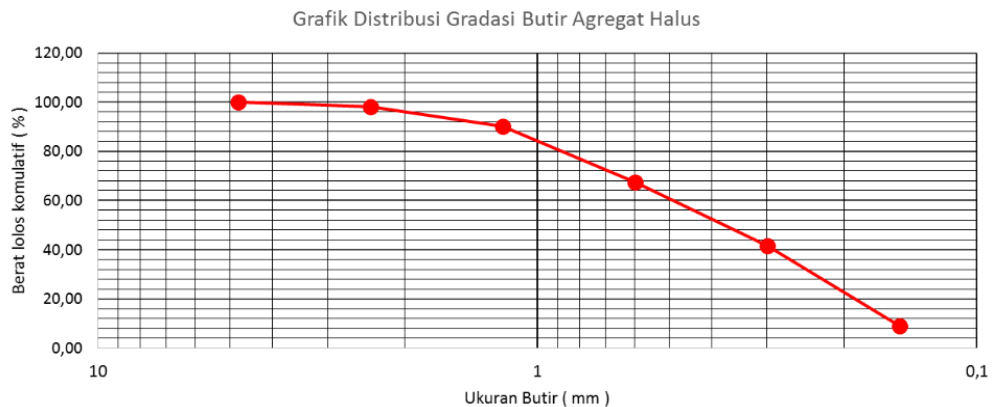
c. Komulatif contoh saringan no.8

$$\begin{aligned} &\text{Persen berat lolos komulatif:} \\ &= 100 - \text{Persen berat tertahan} \\ &= 100 - 2,5 = 97,5\% \end{aligned}$$

d. Modulus halus butir (MHB)

$$\begin{aligned} &= \text{jumlah berat tertahan komulatif} / 100 \\ &= 285,700/100 = 2,857\% \end{aligned}$$

Berdasarkan hasil pengujian gradasi pasir yang dilakukan di Laboratorium Teknik Sipil Universitas Muhammadiyah Yogyakarta didapatkan hasil berdasarkan tabel grafik kekasaran pasir masuk pada daerah 2 dengan nilai Modulus Halus Butir (MHB) adalah 2,857%.



Grafik ASTM hubungan ukuran saringan dengan persen lolos saringan



## PENGUJIAN PENELITIAN TUGAS AKHIR AGREGAT HALUS

Jenis Pengujian : Pemeriksaan kadar air agregat halus

Bahan : Pasir

Asal : Sungai Progo

Diperiksa : 08 Februari 2018 s/d 09 Februari 2018

Tabel 1 Hasil pemeriksaan kadar air agregat halus

Uraian	Benda Uji			
	Satuan	A1	A2	A3
Berat wadah (W1)	gram	130	130	125
Berat wadah + Berat isi pasir (W2)	gram	1130	1130	1125
Berat wadah + Berat isi pasir keluar oven (W3)	gram	1050	1055	1045
Berat air (W4)	gram	80	75	80
Kadar air	%	8,696	8,108	8,696
Rata-rata	%	8,500		

Analisis hitungan:

a. Berat air =  $W2 - W3$

Contoh benda uji 1 =  $1130 - 1050$   
= 80 gr

b. Kadar Air =  $\frac{W4}{W3 - W1} \times 100\%$

Contoh benda uji 1 =  $\frac{80}{1050 - 130} \times 100\%$   
= 8,696%

c. Kadar air rata-rata =  $\frac{KA1 + KA2 + KA3}{3}$

=  $\frac{8,696 + 8,108 + 8,696}{3}$   
= 8,5%

**PENGUJIAN PENELITIAN TUGAS AKHIR**  
**AGREGAT HALUS**

Jenis Pengujian : Pemeriksaan berat jenis dan penyerapan air agregat halus

Bahan : Pasir

Asal : Sungai Progo

Diperiksa : 09 Februari 2018 s/d 12 Februari 2018

Tabel 1 Data pemeriksaan berat jenis agregat halus

Uraian	Benda Uji			
	Satuan	C6	D1	C2
Berat piknometer isi pasir dan air (Bt)	gram	964,2	983	955
Berat pasir setelah kering (Bk)	gram	456,4	455,1	463,9
Berat piknometer isi air (B)	gram	662,6	687,9	653
Berat pasir keadaan jenuh kering muka (ssd)	gram	500	500	500
Berat cawan	gram	124	122	121

Tabel 2 Hasil pemeriksaan berat jenis agregat halus

Uraian	Benda Uji				Rata-rata
	Satuan	C6	D1	C2	
Berat jenis curah	gram	2,300	2,221	2,343	2,288
Berat jenis jenuh kering muka	gram	2,520	2,440	2,525	2,495
Berat jenis tampak	gram	2,948	2,844	2,865	2,886
Penyerapan air agregat halus	gram	0,096	0,099	0,078	0,091
Berat jenis kering muka rata-rata	gram	500			

Analisis hitungan:

- a. Berat jenis curah 
$$= \frac{Bk}{B+SSD-Bt}$$
  
Contoh benda uji 1 
$$= \frac{456,4}{662,6+500-964,2}$$
  
$$= 2,300 \text{ gr}$$
- b. Berat jenis jenuh kering muka 
$$= \frac{500}{B+SSD-Bt}$$



$$\begin{aligned} \text{Contoh benda uji 1} &= \frac{500}{662,6+500-964,2} \\ &= 2,520 \text{ gr} \end{aligned}$$

$$\begin{aligned} \text{c. Berat jenis tampak} &= \frac{Bk}{B+Bk-Bt} \\ \text{Contoh benda uji 1} &= \frac{456,4}{662,6+456,4-964,2} \\ &= 2,948 \text{ gr} \end{aligned}$$

$$\begin{aligned} \text{d. Penyerapan air agregat halus} &= \frac{SSD-Bk}{Bk} \times 100\% \\ \text{Contoh benda uji 1} &= \frac{500-456,4}{456,4} \times 100\% \\ &= 0,096 \text{ gr} \end{aligned}$$

$$\begin{aligned} \text{e. Berat jenis jenuh kering muka rata-rata} &= \frac{SSD_1 + SSD_2 + SSD_3}{3} \\ &= \frac{2,520+2,440+2,525}{3} \\ &= 2,495 \end{aligned}$$

**PENGUJIAN PENELITIAN TUGAS AKHIR****AGREGAT HALUS**

Jenis Pengujian : Pemeriksaan berat satuan agregat halus

Bahan : Pasir

Asal : Sungai Progo

Diperiksa : 7 Februari 2018

Tabel 1 Hasil pemeriksaan berat satuan agregat halus

Uraian	Satuan	Benda Uji		
		A	B	C
Berat bejana kosong (B1)	gr	10300	10900	11000
Berat bejana kosong + Pasir (B2)	gr	18150	19100	19150
Berat satuan (B <sub>sat</sub> )	gr/cm <sup>3</sup>	1,480	1,546	1,536
Berat satuan rata-rata	gr/cm <sup>3</sup>	1,520		

Analisis hitungan:

a. Bejan:  $d = 15 \text{ cm}$

$h = 30 \text{ cm}$

b. Volume bejana kosong  $= \frac{1}{4} \pi r^2 t$   
 $= \frac{1}{4} \pi x 15^2 x 30$   
 $= 5301 \text{ cm}^3$

c. Berat satuan ( $B_{sat}$ )  $= \frac{B_2 - B_1}{\text{Volume}}$   
Contoh benda uji 1  $= \frac{18150 - 10300}{5301}$   
 $= 1,480 \text{ gr/m}^3$

d. Berat satuan rata-rata  $= \frac{B_{1sat} + B_{2sat} + B_{3sat}}{3}$   
 $= \frac{1,480 + 1,546 + 1,536}{3}$   
 $= 1,520 \text{ gr/m}^3$



**PENGUJIAN PENELITIAN TUGAS AKHIR**  
**AGREGAT HALUS**

Jenis Pengujian : Pemeriksaan kadar lumpur agregat halus

Bahan : Pasir

Asal : Sungai Progo

Diperiksa : 07 Februari 2018 s/d 08 Februari 2018

Tabel 1 Hasil pemeriksaan kadar lumpur agregat halus

Uraian	Satuan	Benda Uji		
		D9	D2	D4
Berat wadah + Pasir setelah di oven pertama (B1)	Gr	1000	1000	1000
Berat wadah + Pasir setelah di oven kedua (B2)	Gr	960	975	976
Kandungan air (B3 = B1-B2)	Gr	40	25	24
Kadar lumpur	%	4,00	2,50	2,40
Rata-rata	%	2,97		

Analisis hitungan:

a. Kandungan air =  $B1 - B2$

Contoh benda uji 1 =  $1000 - 960$

= 40 gr

b. Kadar lumpur =  $\frac{B1-B2}{B3} \times 100\%$

Contoh benda uji 1 =  $\frac{1000-960}{40} \times 100\%$

= 4,00%

c. Rata-rata kadar lumpur =  $\frac{KL1+KL2+KL3}{3} \times 100\%$

=  $\frac{4,00+2,50+2,40}{3} \times 100\%$

= 2,97%



**PENGUJIAN PENELITIAN TUGAS AKHIR**  
**AGREGAT KASAR**

Jenis Pengujian : Pemeriksaan berat jenis dan penyerapan air agregat kasar  
Bahan : Kerikil  
Asal : Clereng  
Diperiksa : 14 Februari 2018 s/d 15 Februari 2018

Tabel 1 Hasil pemeriksaan berat jenis dan penyerapan air agregat kasar

Uraian	Satuan	Benda Uji		
		Bj1	Bj2	Bj3
Berat kerikil setelah dikeringkan (Bk)	gram	5000	5000	5000
Berat kerikil dibawah air (Ba)	gram	3071	3055	3040
Berat kerikil keadaan jenuh (Bj)	gram	5124	5103	5088

Tabel 1 Hasil pemeriksaan berat jenis dan penyerapan air agregat kasar

Uraian	Satuan	Benda Uji			Rata-rata
		Bj1	Bj2	Bj3	
Berat jenis curah	Gram	2,435	2,441	2,441	2,439
Berat jenis kering muka	Gram	2,496	2,492	2,484	2,491
Berat jenis tampak	Gram	2,592	2,571	2,551	2,571
Penyerapan air agregat kasar	%	2,48	2,06	1,76	2,1
Berat kerikil jenuh rata-rata		5105			
Penyerapan air agregat kasar		2,1			

Analisis hitungan:

$$a. \text{ Berat jenis curah} = \frac{Bk}{Bj - Ba}$$

$$\begin{aligned} \text{Contoh benda uji 1} &= \frac{5000}{5124 - 3071} \\ &= 2,435 \text{ gr} \end{aligned}$$

$$b. \text{ Berat jenis jenuh kering muka} = \frac{Bj}{Bj - Ba}$$

$$\begin{aligned} \text{Contoh benda uji 1} &= \frac{5124}{5124 - 3071} \end{aligned}$$



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$= 2,496 \text{ gr}$

c. Berat jenis tampak  $= \frac{Bk}{Bk - Ba}$

Contoh benda uji 1  $= \frac{5000}{5000 - 3071}$

$= 2,592 \text{ gr}$

d. Penyerapan air agregat kasar  $= \frac{Bj - Bk}{Bk} \times 100\%$

Contoh benda uji 1  $= \frac{5124 - 5000}{5000} \times 100\%$

$= 2,48\%$

e. Berat jenis jenuh  $= \frac{B_{\text{jenis 1}} + B_{\text{jenis 2}} + B_{\text{jenis 3}}}{3}$

Kering muka rata-rata  $= \frac{2,496 + 2,492 + 2,484}{3}$

$= 2,491$

f. Penyerpan air rata-rata AK  $= \frac{P_{\text{air AK 1}} + P_{\text{air AK 2}} + P_{\text{air AK 3}}}{3}$

Contoh benda uji 1  $= \frac{2,48 + 2,06 + 1,76}{3}$

$= 2,1$





**PENGUJIAN PENELITIAN TUGAS AKHIR**  
**AGREGAT KASAR**

Jenis Pengujian : Pemeriksaan kadar lumpur agregat kasar

Bahan : Kerikil

Asal : Clereng

Diperiksa : 12 Februari 2018 s/d 13 Februari 2018

Tabel 1 Pemeriksaan kadar lumpur agregat kasar

Uraian	Satuan	Benda Uji		
		S1	S2	S3
Berat wadah + Pasir setelah di oven pertama (B1)	gram	5225	5220	5215
Berat wadah + Pasir setelah di oven kedua (B2)	gram	4340	4380	4550
Kandungan air (B3 = B1 – B2)	gram	885	840	665
Kadar lumpur	%	16,94	16,09	12,75
Rata-rata	%	15,260		

Analisis hitungan:

a. Kandungan air =  $B1 - B2$

Contoh benda uji 1 =  $5225 - 4340$   
= 885 gr

b. Kadar lumpur =  $\frac{B1-B2}{B1} \times 100\%$

Contoh benda uji 1 =  $\frac{5225-4340}{5225} \times 100\%$   
= 13,20 %

c. Rata-rata kadar lumpur =  $\frac{KL1+KL2+KL3}{3}$

=  $\frac{13,2+12,4+9,0}{3}$   
= 11,533%



**PENGUJIAN PENELITIAN TUGAS AKHIR**  
**AGREGAT KASAR**

Jenis Pengujian : Pemeriksaan kadar air agregat kasar

Bahan : Kerikil

Asal : Clereng

Diperiksa : 12 Februari 2018 s/d 13 Februari 2018

Tabel 1 Pemeriksaan kadar air agregat kasar

Uraian	Satuan	Benda Uji		
		B1	B2	B3
Berat wadah (W1)	gram	121,2	123,7	121,5
Berat wadah + Kerikil (W2)	gram	1130,4	1133,5	1127,7
Berat wadah + Kerikil keluar dari oven (W3)	gram	1099	1099	1093
Berat air (W4)	gram	31,9	34,5	34,7
Kadar air	%	3,111	3,416	3,449
Rata-rata	%	3,325		

Analisis hitungan:

a. Berat air =  $W2 - W3$

Contoh benda uji 1 =  $1130,4 - 1099$   
= 31,9 gr

b. Kadar air =  $\frac{W4}{W3 - W1} \times 100\%$

Contoh benda uji 1 =  $\frac{31,9}{1099 - 121,2} \times 100\%$   
= 3,11%

c. Kadar air rata-rata =  $\frac{KA1 + KA2 + KA3}{3}$

=  $\frac{3,11 + 3,41 + 3,45}{3}$   
= 3,325%



**PENGUJIAN PENELITIAN TUGAS AKHIR**  
**AGREGAT KASAR**

Jenis Pengujian : Pemeriksaan keausan agregat kasar

Bahan : Kerikil

Asal : Clereng

Diperiksa : 13 Februari 2018

Tabel 1 Pemeriksaan keausan agregat kasar

Uraian	Satuan	Benda Uji		
		1	2	3
Berat sebelum masuk mesin (B1)	gram	5000	5000	5000
Berat setelah masuk mesin (B2)	gram	3149	3138	3199
Keausan	%	36,1	37,2	36,0
Keausan rata-rata	%	26,5		

Analisis hitungan:

a. Keausan  $= \frac{B1-B2}{B1} \times 100\%$

Contoh benda uji 1  $= \frac{5000-3149}{5000} \times 100\%$   
 $= 36,1\%$

b. Keausan rata-rata  $= \frac{Keausan1+Keausan2+Keausan3}{3}$

$= \frac{36,1+37,2+36,0}{3}$   
 $= 36,43\%$

**Alat pemeriksaan bahan susun beton:**



Gambar 1 Timbangan *Ohaus*



Gambar 2 Timbangan dalam air



Gambar 3 *Kaliper*



Gambar 4 Elenmeyer



Gambar 5 Saringan ASTM



Gambar 6 Mesin Los Angeles





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**Alat pembuatan benda uji:**



Gambar 7 Mixer concrete



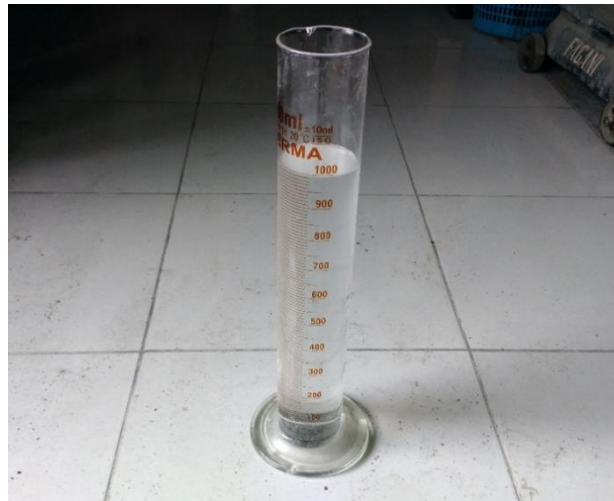
Gambar 8 Balok



Gambar 9 Cetok dan mistar



Gambar 10 Nampan



Gambar 11 Gelas ukur 1000 ml



Gambar 12 Kerucut *Abrams*



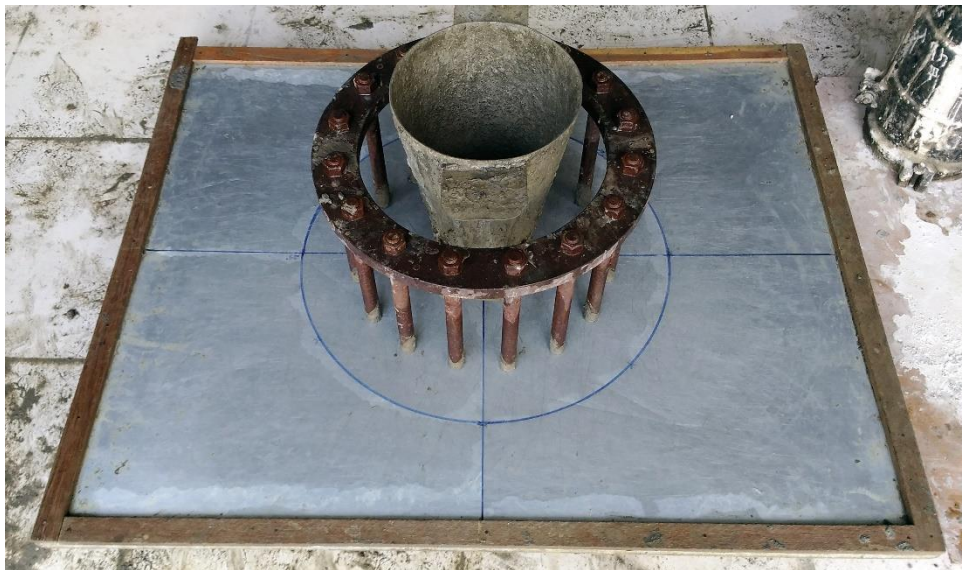
Gambar 13 Alat Pengujian T50



Gambar 14 Alat pengujian *V-Funnel*



Gambar 15 Alat pengujian *L-Box*



Gambar 16 Alat pengujian *J-Ring*



Gambar 17 *Compression Machine Test*



**Bahan susun beton:**



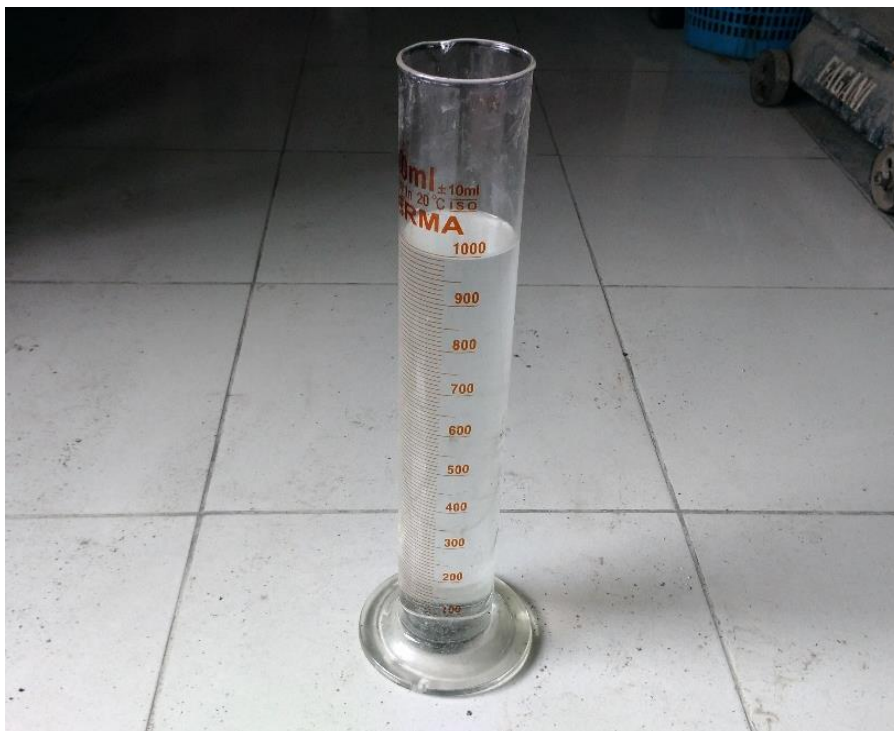
Gambar 18 Semen Gresik (PCC)



Gambar 19 Agregat halus (Pasir Progo)



Gambar 20 Agregat kasar (kerikil)

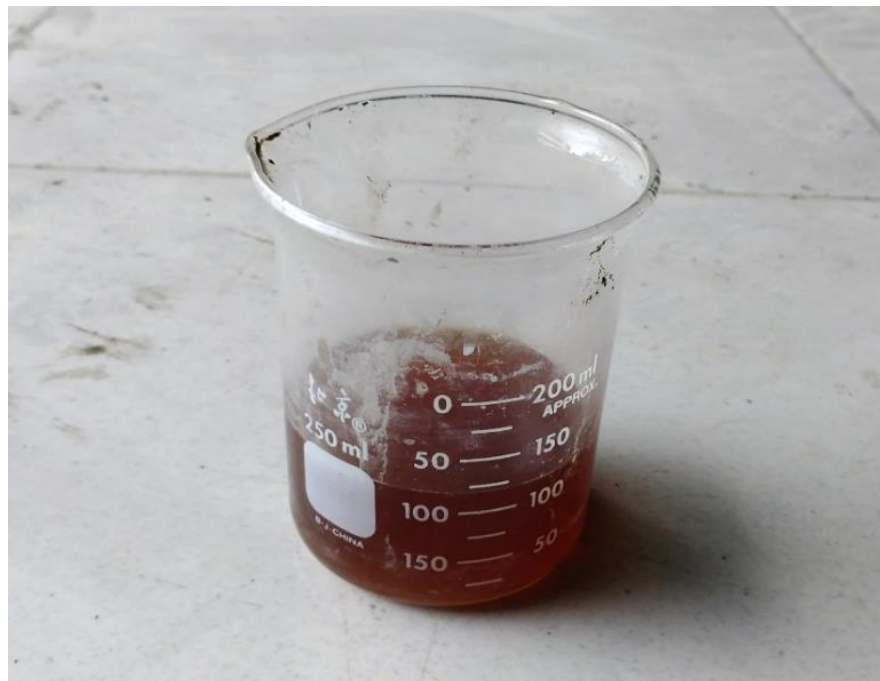


Gambar 21 Air





Gambar 22 Kaolin



Gambar 23 Superplasticizer (*Viscocrete 1003*) merk Sika

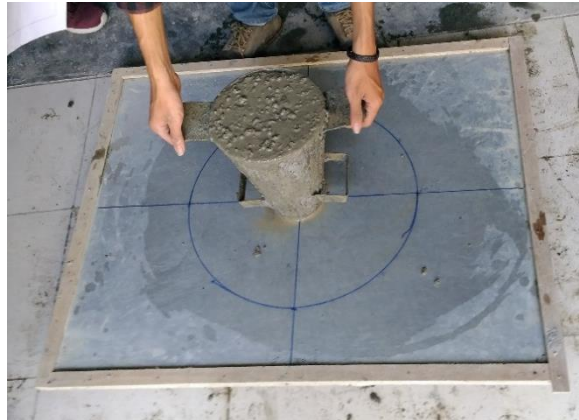


Gambar 24 Serat *Polypropylene*



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**Proses pengujian beton kondisi segar (*fresh properties*):**



Gambar 25 Pengujian Meja Sebar (T50)



Gambar 26 Pengujian L-Box



Gambar 27 Pengujian *V-Funnel*



Gambar 28 Pengujian *J-Ring*

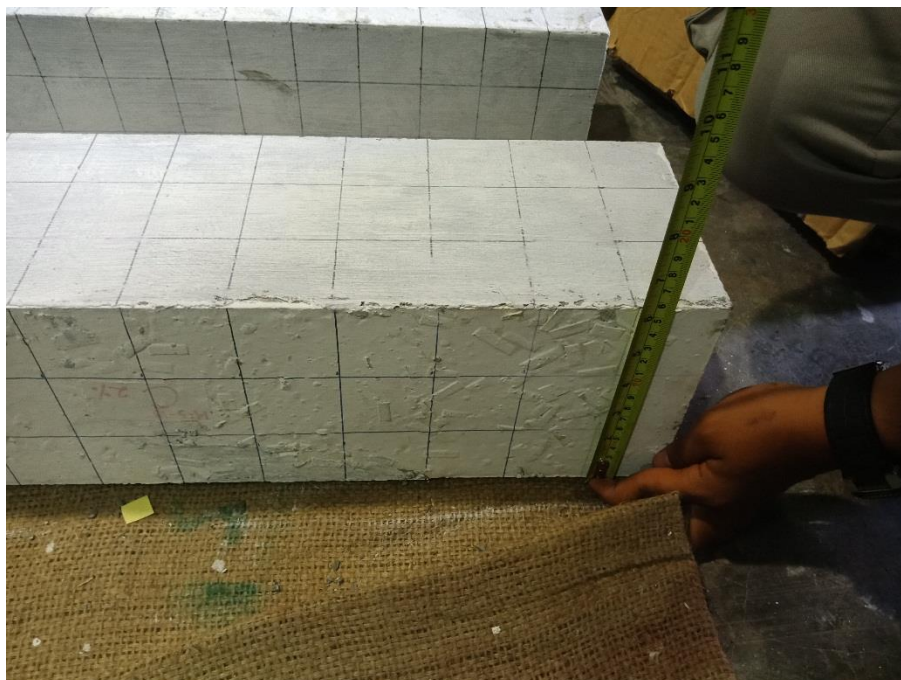


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**Proses pengujian kuat lentur :**



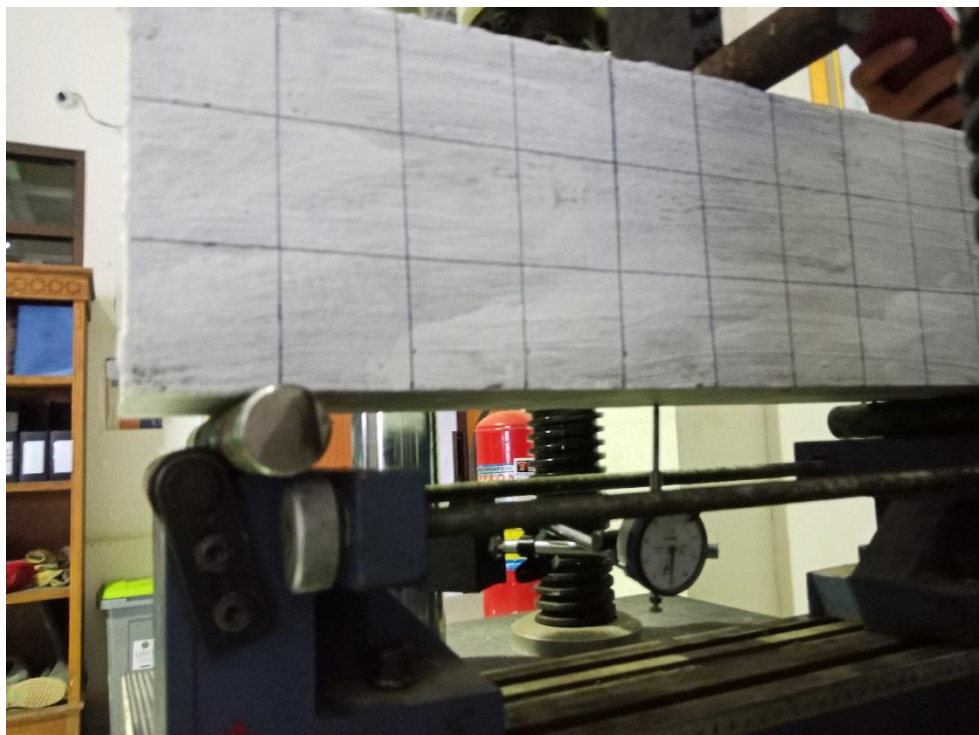
Gambar 29 Pengukuran panjang benda uji balok



Gambar 30 pengukuran tinggi benda uji balok



Gambar 31 pengukuran lebar benda uji balok



Gambar 32 pengujian kuat lentur





Gambar 33 beton setelah dilakukan uji tekan



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**Proses pengujian kuat tarik baja :**



Gambar 34 Sebelum melakukan pengujian



Gambar 35 setelah melakukan pengujian





**Hasil uji kuat lentur :**

(A<sub>1</sub>)  
1%

```
===== UNIVERSAL TESTING DATA REPORT =====
DATE          : 4 -20-2018
MAX CAPACITY  : 30000.0 KG      TEMPERATURE   : 30 °C
LOADING MODE  : COMPRESS      TEST SPEED    :      MM/min
LENGTH       : 150.000 MM     CROSS AREA    : 90000.0 MM2

              FORCE      STRESS      ELONG.      STRAIN
              (KG)      (KG/MM2)   (MM)        (%)
PEAK POINT   : 2615.85   0.02907     1.68000     1.12000
BREAK POINT  : 2509.80   0.02789     1.72000     1.14667

LOT NUMBER   : 1
TEST NUMBER  : 0.              MAX TEST GAIN: G10

              FORCE      STRESS      ELONG.      STRAIN
              (KG)      (KG/MM2)   (MM)        (%)
PEAK POINT   : 2615.85   0.02907     1.68000     1.12000
BREAK POINT  : 2509.80   0.02789     1.72000     1.14667
-----
```

Gambar 35 Hasil pengujian balok A 1% (1)

(A<sub>2</sub>)  
1%

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===== UNIVERSAL TESTING DATA REPORT =====
DATE          : 4 -20-2018
MAX CAPACITY  : 30000.0 KG      TEMPERATURE   : 30 °C
LOADING MODE  : COMPRESS      TEST SPEED    :      MM/min
LENGTH       : 150.000 MM     CROSS AREA    : 90000.0 MM2

              FORCE      STRESS      ELONG.      STRAIN
              (KG)      (KG/MM2)   (MM)        (%)
PEAK POINT   : 2960.55   0.03290     2.04000     1.36000
BREAK POINT  : 2835.90   0.03151     2.04000     1.36000

LOT NUMBER   : 2
TEST NUMBER  : 0.              MAX TEST GAIN: G10

              FORCE      STRESS      ELONG.      STRAIN
              (KG)      (KG/MM2)   (MM)        (%)
PEAK POINT   : 2960.55   0.03290     2.04000     1.36000
BREAK POINT  : 2835.90   0.03151     2.04000     1.36000
-----
```

Gambar 36 Hasil pengujian balok A 1% (2)





(A<sub>3</sub>)  
1%

```
===== UNIVERSAL TESTING DATA REPORT =====
DATE          : 4 -20-2018
MAX CAPACITY  : 30000.0 KG      TEMPERATURE   : 30  "C
LOADING MODE  : COMPRESS      TEST SPEED    :      MM/min
LENGTH       : 150.000 MM     CROSS AREA    : 90000.0 MM2

              FORCE      STRESS      ELONG.      STRAIN
              (KG)      (KG/MM2)   (MM)        (%)
PEAK POINT   : 3690.60   0.04101    2.96000    1.97333
BREAK POINT  : 3559.20   0.03955    3.04000    2.02667

LOT NUMBER   : 3
TEST NUMBER  : 0.              MAX TEST GAIN: G5.

              FORCE      STRESS      ELONG.      STRAIN
              (KG)      (KG/MM2)   (MM)        (%)
PEAK POINT   : 3690.60   0.04101    2.96000    1.97333
BREAK POINT  : 3559.20   0.03955    3.04000    2.02667
-----
```

Gambar 37 Hasil pengujian balok A 1% (3)

(B<sub>1</sub>)  
1,5%

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===== UNIVERSAL TESTING DATA REPORT =====
DATE          : 4 -20-2018
MAX CAPACITY  : 30000.0 KG      TEMPERATURE   : 30  "C
LOADING MODE  : COMPRESS      TEST SPEED    :      MM/min
LENGTH       : 150.000 MM     CROSS AREA    : 90000.0 MM2

              FORCE      STRESS      ELONG.      STRAIN
              (KG)      (KG/MM2)   (MM)        (%)
PEAK POINT   : 5059.20   0.05621    9.64000    6.42667
BREAK POINT  : 4907.10   0.05452    9.40000    6.26667

LOT NUMBER   : 4
TEST NUMBER  : 0.              MAX TEST GAIN: G5.

              FORCE      STRESS      ELONG.      STRAIN
              (KG)      (KG/MM2)   (MM)        (%)
PEAK POINT   : 5059.20   0.05621    9.64000    6.42667
BREAK POINT  : 4907.10   0.05452    9.40000    6.26667
-----
```

Gambar 38 Hasil pengujian balok B 1,5% (1)





(B<sub>2</sub>)  
1,5%

```
===== UNIVERSAL TESTING DATA REPORT =====
DATE           : 4 -20-2018
MAX CAPACITY   : 30000.0 KG      TEMPERATURE    : 30    °C
LOADING MODE   : COMPRESS      TEST SPEED     :      MM/min
LENGTH        : 150.000 MM     CROSS AREA     : 90000.0 MM2

              FORCE      STRESS   ELONG.   STRAIN
              (KG)     (KG/MM2) (MM)     (%)
PEAK POINT   : 4767.00   0.05297   6.20000  4.13333
BREAK POINT  : 4565.40   0.05073   6.24000  4.16000

LOT NUMBER    : 5.
TEST NUMBER   : 0.                MAX TEST GAIN: G5.

              FORCE      STRESS   ELONG.   STRAIN
              (KG)     (KG/MM2) (MM)     (%)
PEAK POINT   : 4767.00   0.05297   6.20000  4.13333
BREAK POINT  : 4565.40   0.05073   6.24000  4.16000
-----
```

Gambar 39 Hasil pengujian balok B 1,5% (2)

(B<sub>3</sub>)  
1,5%

```
===== UNIVERSAL TESTING DATA REPORT =====
DATE           : 4 -20-2018
MAX CAPACITY   : 30000.0 KG      TEMPERATURE    : 30    °C
LOADING MODE   : COMPRESS      TEST SPEED     :      MM/min
LENGTH        : 150.000 MM     CROSS AREA     : 90000.0 MM2

              FORCE      STRESS   ELONG.   STRAIN
              (KG)     (KG/MM2) (MM)     (%)
PEAK POINT   : 5211.60   0.05791   8.32000  5.54667
BREAK POINT  : 4992.30   0.05547   8.36000  5.57333

LOT NUMBER    : 6
TEST NUMBER   : 0.                MAX TEST GAIN: G5.

              FORCE      STRESS   ELONG.   STRAIN
              (KG)     (KG/MM2) (MM)     (%)
PEAK POINT   : 5211.60   0.05791   8.32000  5.54667
BREAK POINT  : 4992.30   0.05547   8.36000  5.57333
-----
```

Gambar 40 Hasil pengujian balok B 1,5% (3)





C<sub>1</sub>  
2%

```
===== UNIVERSAL TESTING DATA REPORT =====
DATE          : 4 -24-2018
MAX CAPACITY  : 30000.0 KG      TEMPERATURE   : 30    °C
LOADING MODE  : COMPRESS      TEST SPEED    :      MM/min
LENGTH       : 150.000 MM     CROSS AREA    : 90000.0 MM2

          FORCE      STRESS      ELONG.      STRAIN
          (KG)      (KG/MM2)   (MM)        (%)
PEAK POINT : 6461.25  0.07179    13.3600    8.90667
BREAK POINT : 6184.50  0.06872    13.4000    8.93333

LOT NUMBER   : 1
TEST NUMBER  : 0.              MAX TEST GAIN: G2.

          FORCE      STRESS      ELONG.      STRAIN
          (KG)      (KG/MM2)   (MM)        (%)
PEAK POINT : 6461.25  0.07179    13.3600    8.90667
BREAK POINT : 6184.50  0.06872    13.4000    8.93333
```

Gambar 41 Hasil pengujian balok C 2% (1)

C<sub>2</sub> 2%

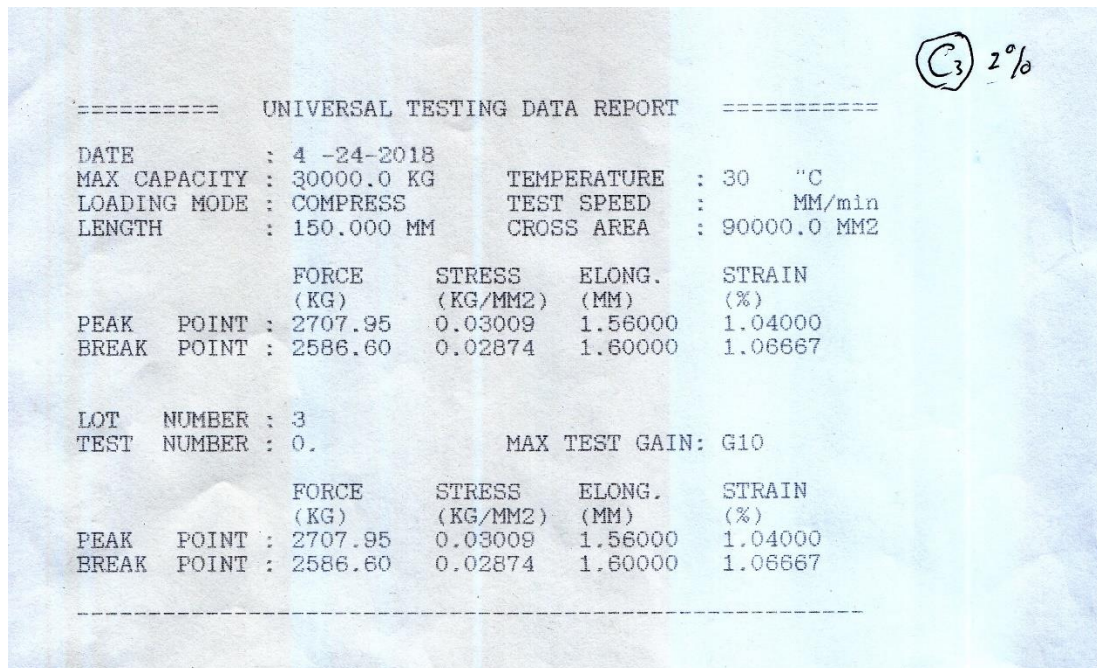
```
===== UNIVERSAL TESTING DATA REPORT =====
DATE          : 4 -24-2018
MAX CAPACITY  : 30000.0 KG      TEMPERATURE   : 30    °C
LOADING MODE  : COMPRESS      TEST SPEED    :      MM/min
LENGTH       : 150.000 MM     CROSS AREA    : 90000.0 MM2

          FORCE      STRESS      ELONG.      STRAIN
          (KG)      (KG/MM2)   (MM)        (%)
PEAK POINT : 3482.10  0.03869    2.44000    1.62667
BREAK POINT : 3340.50  0.03712    2.48000    1.65333

LOT NUMBER   : 2.
TEST NUMBER  : 0.              MAX TEST GAIN: G5.

          FORCE      STRESS      ELONG.      STRAIN
          (KG)      (KG/MM2)   (MM)        (%)
PEAK POINT : 3482.10  0.03869    2.44000    1.62667
BREAK POINT : 3340.50  0.03712    2.48000    1.65333
```

Gambar 42 Hasil pengujian balok C 2% (2)

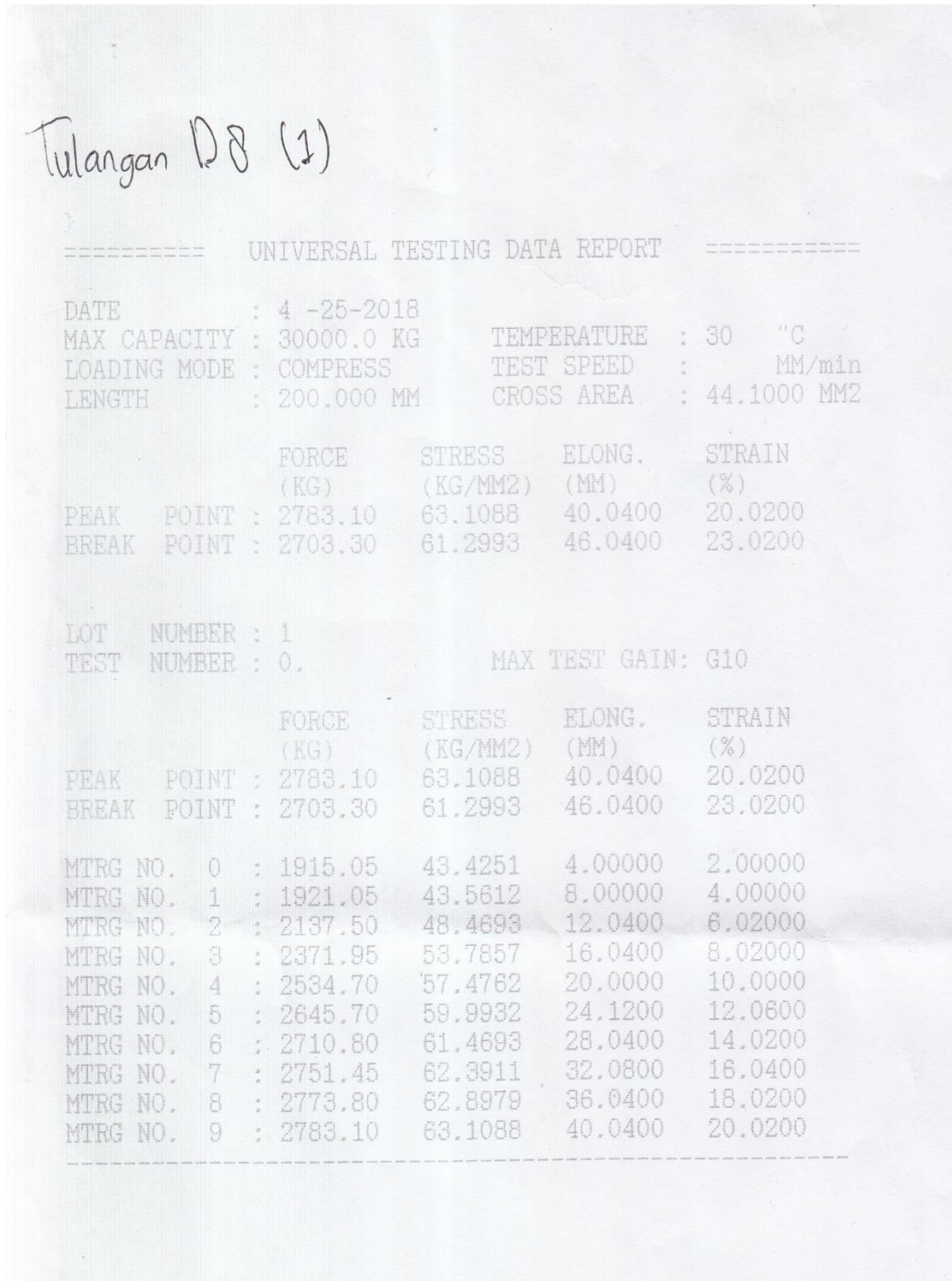


Gambar 43 Hasil pengujian balok C 2% (3)





**Hasil uji kuat tarik baja :**



Gambar 44 Hasil pengujian kuat tarik D8 (1)



Tulangan D8 (2)

===== UNIVERSAL TESTING DATA REPORT =====

DATE : 5 -2 -2018  
MAX CAPACITY : 30000.0 KG TEMPERATURE : 30 °C  
LOADING MODE : TENSION TEST SPEED : MM/min  
LENGTH : 200.000 MM CROSS AREA : 50.2400 MM2

	FORCE (KG)	STRESS (KG/MM2)	ELONG. (MM)	STRAIN (%)
PEAK POINT :	2743.80	54.6138	36.3600	18.1800
BREAK POINT :	2656.65	52.8791	40.4000	20.2000

LOT NUMBER : 1  
TEST NUMBER : 0. MAX TEST GAIN: G10

	FORCE (KG)	STRESS (KG/MM2)	ELONG. (MM)	STRAIN (%)
PEAK POINT :	2743.80	54.6138	36.3600	18.1800
BREAK POINT :	2656.65	52.8791	40.4000	20.2000

MTRG NO. 0 :	1885.80	37.5358	4.00000	2.00000
MTRG NO. 1 :	1944.75	38.7092	8.04000	4.02000
MTRG NO. 2 :	2220.90	44.2058	12.0000	6.00000
MTRG NO. 3 :	2433.44	48.4365	16.0800	8.04000
MTRG NO. 4 :	2575.95	51.2728	20.0400	10.0200
MTRG NO. 5 :	2663.40	53.0135	24.1200	12.0600
MTRG NO. 6 :	2710.94	53.9599	28.0400	14.0200
MTRG NO. 7 :	2736.00	54.4586	32.0800	16.0400
MTRG NO. 8 :	2743.65	54.6108	36.0000	18.0000
MTRG NO. 9 :	2656.65	52.8791	40.0000	20.0000

Gambar 45 Hasil pengujian kuat tarik D8 (2)





Tulangan D6 (1)

===== UNIVERSAL TESTING DATA REPORT =====

DATE : 4 -28-2018  
MAX CAPACITY : 30000.0 KG      TEMPERATURE : 30 °C  
LOADING MODE : TENSION      TEST SPEED :      MM/min  
LENGTH : 200.000 MM      CROSS AREA : 28.2600 MM2

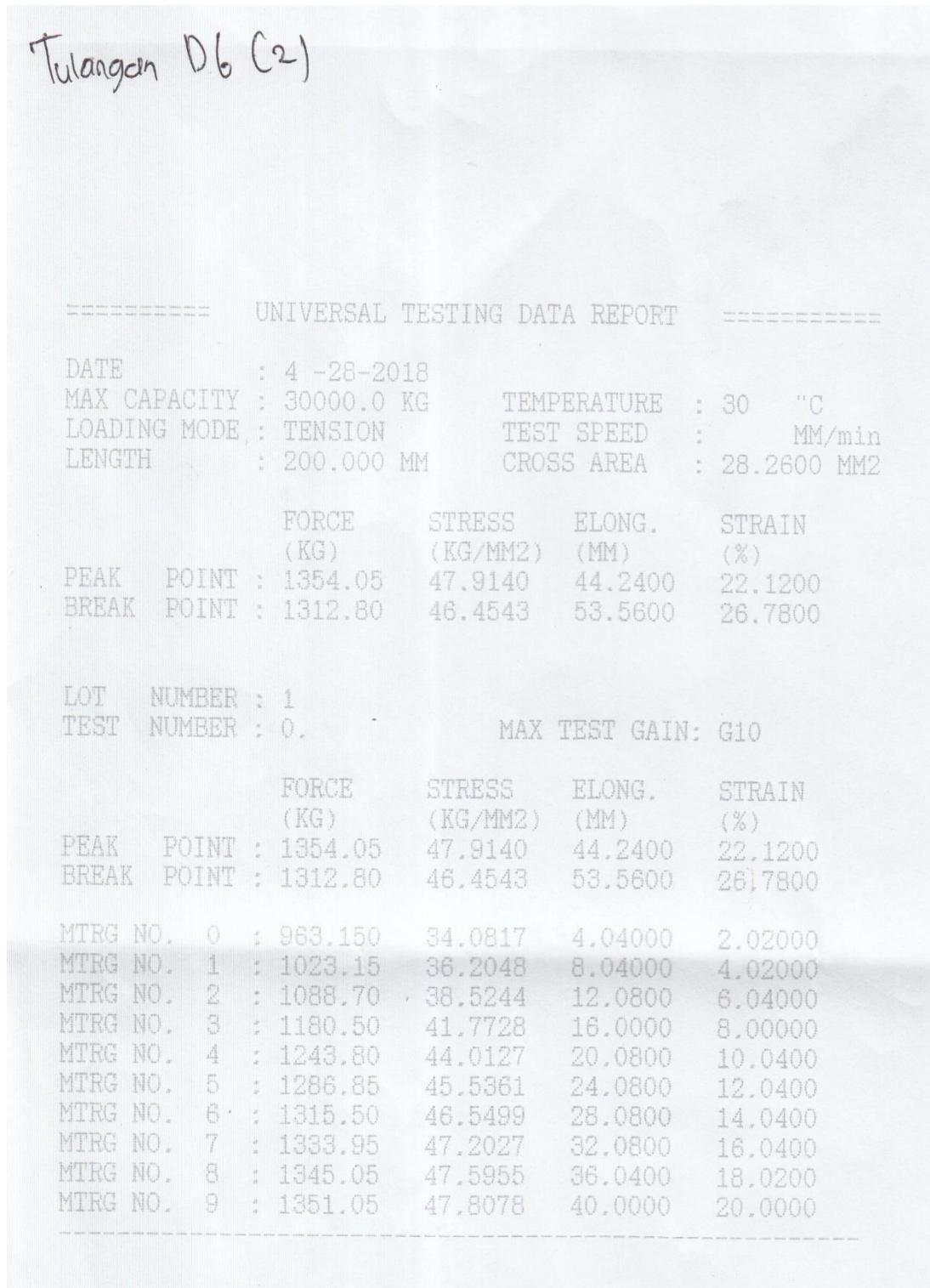
	FORCE (KG)	STRESS (KG/MM2)	ELONG. (MM)	STRAIN (%)
PEAK POINT :	1102.20	39.0021	47.6800	23.8400
BREAK POINT :	1069.65	37.8503	58.4800	29.2400

LOT NUMBER : 2.  
TEST NUMBER : 0.      MAX TEST GAIN: G10

	FORCE (KG)	STRESS (KG/MM2)	ELONG. (MM)	STRAIN (%)
PEAK POINT :	1102.20	39.0021	47.6800	23.8400
BREAK POINT :	1069.65	37.8503	58.4800	29.2400

MTRG NO. 0 :	769.050	27.2133	4.08000	2.04000
MTRG NO. 1 :	913.500	32.3248	8.08000	4.04000
MTRG NO. 2 :	922.200	32.6327	12.0400	6.02000
MTRG NO. 3 :	922.200	32.6327	16.0400	8.02000
MTRG NO. 4 :	993.000	35.1380	20.0800	10.0400
MTRG NO. 5 :	1031.10	36.4862	24.0000	12.0000
MTRG NO. 6 :	1056.75	37.3938	28.0800	14.0400
MTRG NO. 7 :	1072.95	37.9670	32.1200	16.0600
MTRG NO. 8 :	1086.15	38.4341	36.0800	18.0400
MTRG NO. 9 :	1094.40	38.7261	39.9600	19.9800

Gambar 46 Hasil pengujian kuat tarik D6 (1)



Gambar 47 Hasil pengujian kuat tarik D6 (2)

