

LAMPIRAN

Lampiran 1. Pemeriksaan analisis gradasi agregat halus

Bahan : Pasir Progo

Asal : Sungai Progo

Diperiksa : 5 April 2019

Tabel 1. Hasil pemeriksaan gradasi butiran agregat halus *sample 1*

Ukuran	Lubang Ayakan (mm)	Berat tertahan (gram)	Berat tertahan (%)	Berat tertahan kumulatif (%)	Berat lolos kumulatif (%)
No. 4	4,75	0	0	0	100
No. 8	2,36	105	10,5	10,5	89,5
No. 16	1,18	145	14,5	25	75
No. 30	0,6	220	22	47	53
No. 50	0,3	370	37	84	16
No. 100	0,15	120	12	96	4
Pan		40	4	100	0
Total		1000	100	362,5	

Analisis hitungan:

a. Contoh saringan no. 30

Persen berat tertahan :

$$= \frac{\text{berat tertahan}}{\text{total}} \times 100\%$$

$$= \frac{220}{1000} \times 100\%$$

$$= 22\%$$

b. Contoh saringan no. 30

Persen berat kumulatif :

$$= \frac{\text{Persen berat tertahan kumulatif no. 16} + \text{Persen berat tertahan no. 30}}{\text{total}}$$

$$= 25 + 22$$

$$= 47 \%$$

c. Kumulatif contoh saringan no. 30

Persen berat lolos kumulatif :

$$= 100 - 47$$

$$= 53$$

d. Modulus halus butir (MHB)

$$= \frac{\text{jumlah berat tertahan kumulatif}}{100}$$

$$= \frac{262,5}{100}$$

$$= 2,625 \%$$

Tabel 2. Hasil pemeriksaan gradasi butiran agregat halus *sample 2*

Ukuran	Lubang Ayakan (mm)	Berat tertahan (gram)	Berat tertahan (%)	Berat tertahan kumulatif (%)	Berat lolos kumulatif (%)
No. 4	4,75	0	0	0	100
No. 8	2,36	115	11,5	11,5	88,5
No. 16	1,18	135	13,5	25	75
No. 30	0,6	220	22	47	53
No. 50	0,3	360	36	83	17
No. 100	0,15	125	12,5	85,5	4,5
Pan		45	4,5	100	0
Total		1000	100	362	

Analisis hitungan:

- a. Contoh saringan no. 30

Persen berat tertahan :

$$= \frac{\text{berat tertahan}}{\text{total}} \times 100\%$$

$$= \frac{220}{1000} \times 100\%$$

$$= 22\%$$

- b. Contoh saringan no. 30

Persen berat kumulatif :

$$= \frac{\text{Persen berat tertahan kumulatif no. 16} + \text{Persen berat tertahan no. 30}}{\text{total}}$$

$$= 25 + 22$$

$$= 47 \%$$

- c. Kumulatif contoh saringan no. 30

Persen berat lolos kumulatif :

$$= 100 - 47$$

$$= 53$$

- d. Modulus halus butir (MHB)

$$= \frac{\text{jumlah berat tertahan kumulatif}}{100}$$

$$= \frac{262}{100}$$

$$= 2,62 \%$$

Tabel 3. Hasil pemeriksaan gradasi butiran agregat halus *sample 3*

Ukuran	Lubang Ayakan (mm)	Berat tertahan (gram)	Berat tertahan (%)	Berat tertahan kumulatif (%)	Berat lolos kumulatif (%)
No. 4	4,75	0	0	0	100
No. 8	2,36	100	10	10	90
No. 16	1,18	140	14	24	76
No. 30	0,6	225	22,5	46,5	53,5
No. 50	0,3	370	37	83,5	16,5
No. 100	0,15	125	12,5	96	4
Pan		40	4	100	0
Total		1000	100	360	

Analisis hitungan:

- a. Contoh saringan no. 30

Persen berat tertahan :

$$= \frac{\text{berat tertahan}}{\text{total}} \times 100\%$$

$$= \frac{225}{1000} \times 100\%$$

$$= 22,5\%$$

- b. Contoh saringan no. 30

Persen berat kumulatif :

$$= \frac{\text{Persen berat tertahan kumulatif no. 16} + \text{Persen berat tertahan no. 30}}{\text{total}}$$

$$= 24 + 22,5$$

$$= 46,5 \%$$

c. Kumulatif contoh saringan no. 30

Persen berat lolos kumulatif :

$$= 100 - 46,5$$

$$= 53,5$$

d. Modulus halus butir (MHB)

$$= \frac{\textit{jumlah berat tertahan kumulatif}}{100}$$

$$= \frac{260}{100}$$

$$= 2,6 \%$$

Lampiran 2. Pemeriksaan berat jenis dan penyerapan air agregat halus

Bahan : Pasir Progo
 Asal : Sungai Progo
 Diperiksa : 5 April 2019

Tabel 1. Data pemeriksaan berat jenis agregat halus

Uraian	Satuan	Benda Uji		
		1	2	3
Berat pikno berisi pasir dan air (Bt)	gram	1063	1066	1070
Berat pasir setelah kering (Bk)	gram	465	460	461
Berat pikno berisi air (B)	gram	769	770	768
Berat pasir keadaan jenuh kering muka (SSD)	gram	500	500	500

Tabel 2. Hasil pemeriksaan berat jenis agregat halus

Uraian	Satuan	Benda Uji			Rata-rata
		1	2	3	
Berat jenis curah		2,257	2,255	2,328	2,280
Berat jenis jenuh kering muka		2,427	2,451	2,525	2,468
Berat jenis tampak		2,719	2,805	2,899	2,808
Penyerapan air agregat halus	%	7,257	8,696	8,460	

Analisis Hitungan :

$$\begin{aligned}
 \text{a. Berat jenis curah} &= \frac{Bk}{B+SSD-Bt} \\
 \text{Contoh benda uji 1} &= \frac{465}{769+500-1063} \\
 &= 2,257
 \end{aligned}$$

b. Berat jenis jenuh kering muka

$$= \frac{500}{B+SSD-Bt}$$

Contoh benda uji 1

$$= \frac{Bk}{769+500-1063}$$

$$= 2,427$$

c. Berat jenis tampak

$$= \frac{Bk}{B+Bk-Bt}$$

Contoh benda uji 1

$$= \frac{465}{769+500-1063}$$

$$= 2,719$$

d. Penyerapan air agregat halus

$$= \frac{SSD-Bk}{Bk} \times 100\%$$

Contoh benda uji 1

$$= \frac{500-465}{465} \times 100\%$$

$$= 7,527$$

e. Berat jenis jenuh kering muka rata-rata

$$= \frac{SSD1+SSD2+SSD3}{3}$$

$$= \frac{2,427+2,451+2,525}{3}$$

$$= 2,468$$

Lampiran 3. Pemeriksaan kadar lumpur agregat halus

Bahan : Pasir Progo
 Asal : Sungai Progo
 Diperiksa : 6 April 2019

Tabel 1. Hasil pemeriksaan kasar lumpur agregat halus

Uraian	Satuan	Benda Uji		
		1	2	3
Berat pasir kering tungku sebelum dicuci (W1)	gr	500	500	500
Berat pasir kering tungku setelah dicuci+nampan (W2)	gr	775	770	789
Berat nampan (W3)	gr	300	300	300
Berat pasir kering tungku setelah dicuci (W4)	%	475	470	489
Kadar lumpur	%	5	6	2,2
Rata-rata	%	4,4		

Analisis hitungan:

- a. Berat pasir kering tungku setelah dicuci (W4) = $W2 - W3$
 Contoh benda uji 1 = $775 - 300$
 = 475
- b. Kadar lumpur = $\frac{W1-W4}{W1} \times 100\%$
 Contoh benda uji 1 = $\frac{500-475}{500} \times 100\%$
 = 5
- c. Rata-rata kadar lumpur = $\frac{KL1+KL2+KL3}{3} \times 100\%$
 = $\frac{5+6+2,2}{3} \times 100\%$
 = 4,4

Lampiran 4. Pemeriksaan berat jenis dan penyerapan air agregat kasar

Bahan : Kerikil Clereng

Asal : Clereng

Diperiksa : 6 April 2019

Tabel. 1 Hasil pemeriksaan berat jenis dan penyerapan air agregat kasar

Uraian	Satuan	Benda Uji		
		1	2	3
Berat kerikil setelah dikeringkan (Bk)	Gram	5000	5000	5000
Berat kerikil didalam air (Ba)	Gram	3450	3400	3410
Berat kerikil keadaan jenuh (Bj)	Gram	5150	5200	5200

Tabel 2. Hasil pemeriksaan berat jenis dan penyerapan air agregat kasar

Uraian	Satuan	Benda Uji			Rata-rata
		1	2	3	
Berat jenis curah		2,890	2,778	2,793	2,820
Berat jenis kering muka		2,977	2,889	2,905	2,924
Berat jenis tampak		3,165	3,125	3,145	3,145
Penyerapan air agregat kasar	%	3000	4000	4000	3,667
Berat kerikil jenuh rata-rata	gram	5183,333			
Penyerapan air agregat kasar	%	3,667			

Analisis hitungan :

$$\begin{aligned}
 \text{a. Berat jenis curah} &= \frac{Bk}{Bj - Ba} \\
 \text{Contoh benda uji 1} &= \frac{5000}{5150 - 3450} \\
 &= 2,890 \\
 \text{b. Berat jenis kering muka} &= \frac{Bj}{Bj - Ba} \\
 \text{Contoh benda uji 1} &= \frac{5150}{5150 - 3450} \\
 &= 2,977
 \end{aligned}$$

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

Contoh benda uji 1 $= \frac{5000}{5150 - 3420}$

$= 3,165$

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

Contoh benda uji 1 $= \frac{5150 - 5000}{5000} \times 100\%$

$= 3\%$

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

$= \frac{5150 + 5200 + 5200}{3}$

$= 5183,333$

f. Penyerapan air rata-rata AK $= \frac{Pair\ AK1 + Pair\ AK2 + Pair\ AK3}{3}$

$= \frac{3,000 + 4,000 + 4,000}{3}$

$= 3,667$

Lampiran 5. *Mix design* SNI 7656:2012

a. Data Material

Kuat tekan rencana = 35 Mpa = 356,779 kg/cm³

Jenis Kontruksi = Balok dan silinder

1. Semen

Berat jenis = 3,1

Tipe = 1

2. Agregat halus

Modulus kehalusan (MHB) = 2,625

Berat jenis (SSD) = 2,427

3. Agregat Kasar

Berat jenis (SSD) = 2,977

Berat Kering = 1540 kg/m³

Ukuran agregat (maz) = 25

Tabel 1. Densitas untuk semua material yang digunakan : $p = GS \times pw$

Material	GS (Berat Jenis)	pw	Densitas
Air	1	1000	1000
Semen	3,1	1000	3100
SSD (Agregat Halus)	2,427	1000	2477
SSD (Agregat Kasar)	2,977	1000	2977
Berat Kering (AK)			1600

b. Perhitungan

1. Margin/safety factor

Tabel 2. Nilai deviasi (kg/m^3) untuk berbagai volume pekerjaan

Volume Pekerjaan		Mutu Pelaksanaan		
Klarsifikasi	m ³	Baik Sekali	Baik	Cukup
Kecil	< 1000	$45 < s < 55$	$55 < s \leq 65$	$65 < s \leq 85$
Sedang	1000 – 3000	$35 < s \leq 45$	$45 < s \leq 55$	$55 < s \leq 75$
Besar	> 3000	$25 < s \leq 35$	$35 < s \leq 45$	$45 < s \leq 55$

$$\text{Standar deviasi (Sd)} = 60 \quad \text{kg/cm}^2$$

$$\text{Magin} = 98,400 \quad \text{kg/cm}^2$$

$$f_c''r = 356,779 + 98,400$$

$$= 455,179 \quad \text{kg/cm}^2$$

$$= 44,653 \quad \text{MPa}$$

$$2. \text{ Slump} = 75 - 100 \text{ mm}$$

$$3. \text{ Ukuran nominal (maks)} = 25 \text{ mm}$$

4. Kebutuhan Air Campuran

Tabel 3. Perkiraan kebutuhan air pencampur dan kadar udara untuk berbagai slump dan ukuran nominal

Air (kg/m³) untuk ukuran nominal agregat maksimum batu pecah								
Slump (mm)	9,5 mm	12,7 mm	19 mm	25 mm	37,5 mm	50 mm	75 mm	150 mm
Beton tanpa tambahan udara								
25-50	207	199	190	179	166	154	130	113
75-100	228	216	205	193	181	169	145	124
150-175	243	228	216	202	190	179	160	-
>175	-	-	-	-	-	-	-	-
Banyak udara dalam beton (%)	3	2,5	2	1,5	1	0,5	0,3	0,2
Beton dengan tambahan udara								
25-50	181	175	168	160	150	142	122	107
75-100	202	193	184	175	165	157	133	119
150-175	216	205	197	184	174	166	154	-
>175	-	-	-	-	-	-	-	-
Jumlah kadar udara yang disarankan untuk tingkat pemaparan : ringan (%)	4,5	4,0	3,5	3,0	2,5	2,0	1,5	1,0
Sedang (%)	6,0	5,5	5,0	4,5	4,5	3,0	3,5	3,0
Berat (%)	7,5	7,0	6,0	6,0	5,5	5,0	4,5	4,0

Air Pencampur = 193 kg/m³

Kadar udara = 2%

5. Rasio Air semen

Tabel 4. Hubungan antara rasio air-semen (w/c) atau rasio air-bahan bersifat semen [w/(c=p)] dan kekuatan

Kekuatan beton umur 28 hari, MPa	Rasio air-semen	
	Beton tanpa tambahan udara	Beton dengan tambahan udara
15	0,79	0,70
20	0,69	0,60
25	0,61	0,52
30	0,54	0,45
35	0,47	0,39
40	0,42	-

Ekstrapolasi

$$f_c' = 44,65 \text{ MPa}$$

$$(y - y_1) / (y_2 - y_1) = (x - x_1) / (x_2 - x_1)$$

$$(y - 0,47) / (0,42 - 0,47) = (44,65 - 35) / (40 - 35)$$

$$y = (-0,05) (9,653) / (5) + 0,47$$

$$y = 0,37347$$

$$\text{excel} = 0,3337$$

Beton tanpa tambahan udara (w/c) = 0.3337

6. Kadar Semen

$$\text{Air pencampur / Rasio air semen} = \frac{193}{0,3337}$$

$$\text{Berat semen} = 578,221 \text{ kg/m}^3$$

7. Agregat Kasar

Tabel 5. Volume agregat kasar per satuan volume

Ukuran nominal agregat maksimum (mm)	Volume agregat kasar kering			
	2,40	2,60	2,80	3,00
9,5	0,50	0,48	0,46	0,44
12,5	0,59	0,57	0,55	0,53
19,0	0,66	0,64	0,62	0,60
25,0	0,71	0,69	0,67	0,65
37,5	0,75	0,73	0,71	0,69
50,0	0,78	0,76	0,74	0,72
75,0	0,82	0,80	0,78	0,76
150,0	0,87	0,85	0,83	0,81

$$\begin{aligned} \text{Berat agregat kasar} &= 0,69 \times \text{berat kering agregat kasar} \\ &= 0,69 \times 1540 \\ &= 1062,6 \text{ kg/m}^3 \end{aligned}$$

8. Agregat halus

Tabel 6. Perkiraan awal berat beton segar

Ukuran nominal agregat maksimum (mm)	Perkiraan awal berat beton kg/m ³	
	Beton tanpa tambahan udara	Beton dengan tambahan udara
9,5	2280	2200
12,5	2310	2230
19,0	2345	2275
25,0	2380	2290
37,5	2410	2320
50,0	2445	2345
75,0	2490	2405
150,0	2530	2435

Berat awal = 2380 kg/m³

c. Perhitungan Material

Berat air = 193 kg/m³

Berat semen = 578,221 kg/m³

Berat agregat kasar = 1062,6 kg/m³

Berat total (non agregat halus) = 1833,821 kg/m³

Berat agregat halus = berat awal – berat total (non AH)

= 546,179 kg/m³

b. Berdasarkan volume absolut

$$\begin{aligned} \text{Vol air} &= \text{Air penampur} / 1000 = 193 / 1000 = 0,193 \text{ m}^3 \\ \text{Vol semen} &= \text{Berat semen} / 3150 = 578,221 / 3150 = 0,1836 \text{ m}^3 \\ \text{Vol absolut agregat kasar} &= \text{Berat agregat kasar} / \text{Densitas} \\ &= \text{AK } 1062,6 / 2977 = 0,3569 \text{ m}^3 \\ \text{Vol udara} &= 0,01 \times 1 = 0,01 \\ \hline \text{Vol total (non agregat halus)} &= 0,7435 \text{ m}^3 \\ \text{Vol agregat halus} &= 1 - \text{vol total (non AH)} = 0,2565 \text{ m}^3 \\ \text{Berat agregat halus} &= \text{Vol AH} \times \text{densitas AH} \\ &= 0,2565 \times 2427 = 622,5286 \text{ m}^3 \end{aligned}$$

c. Perbandingan dengan (c) dan (d)

Berat Material	Berat	Volume
Air	193	193
Semen	578, 221	578,221
Agregat kasar (kering)	1062,6	1062,6
Agregat halus (kering)	546,1790	622,529
Total	2380	2456,35

d. Koreksi kandungan air

$$\begin{aligned} \text{Agregat kasar} &= (1+0,02) \times (1062,6) = 1083,852 \text{ kg} \\ \text{Agregat halus} &= (1+0,06) \times (546,179) = 873,886 \text{ kg} \\ \text{Air} &= 193 - \frac{(1062,6) \times (2-0,5)}{100} - \frac{(546,179) \times (6-0,7)}{100} = 148,114 \text{ kg} \end{aligned}$$

Perkiraan berat campuran untuk 1 m³ beton menjadi

Berat Material	Berat	Satuan
Air	148,114	Kg
Semen	578,221	Kg
Agregat kasar (basah)	1083,852	Kg
Agregat halus (basah)	873,886	Kg
Total	2684,073	Kg

e. Perhitungan *mix design* untuk benda uji

1. Benda uji silinder

Ukuran silinder :

Diameter = 0,15 m

Jari-jari = 0,075 m

Tinggi = 0,3 m

$$\begin{aligned} \text{Volume} &= \pi \times 0,075 \times 0,075 \times 0,3 \\ &= 0,0053 \text{ m}^3 \end{aligned}$$

Safety factor 15%

$$= 0,0053 + (0,0053 \times 15\%)$$

$$= 0,0061$$

Semen (kg)	Air (kg)	Kerikil (kg)	Pasir (kg)	Serutan ban bekas (kg)
3,525	0,903	6,608	5,328	0
3,525	0,903	6,608	5,061	0,266
3,525	0,903	6,608	4,795	0,533
3,525	0,903	6,608	4,529	0,799
3,525	0,903	6,608	4,262	1,066

Perhitungan :

Kebutuhan material = material \times *safety factor* volume benda uji

$$\text{Contoh semen} = 578,221 \times 0,0061$$

$$= 3,525 \text{ kg}$$

2. Benda uji balok

Ukuran balok :

Panjang = 0,15 m

Lebar = 0,15 m

Tinggi = 0,6 m

$$\begin{aligned} \text{Volume} &= 0,15 \times 0,15 \times 0,6 \\ &= 0,0135 \text{ m}^3 \end{aligned}$$
Safety factor 15%
$$= 0,0135 + (0,0135 \times 15\%)$$

$$= 0,0155$$

Semen (kg)	Air (kg)	Kerikil (kg)	Pasir (kg)	Serutan ban bekas (kg)
8,977	2,299	16,827	13,567	0
3,525	0,903	6,608	12,889	0,678
3,525	0,903	6,608	12,210	1,356
3,525	0,903	6,608	11,532	2,035
3,525	0,903	6,608	10,853	2,713

Perhitungan :

Kebutuhan material = material \times *safety factor* volume benda ujiContoh semen = 578,221 \times 0,0155
$$= 8,977 \text{ kg}$$

Lampiran 6. Proses pengujian beton segar (*fresh properties*)



Gambar 1. Pengujian *slump*

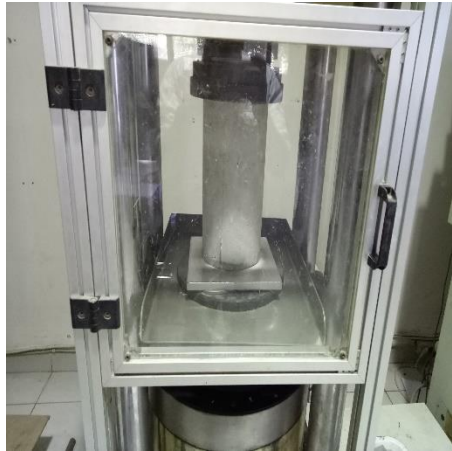
Lampiran 7. Proses pengujian kuat tekan beton



Gambar 2. Pengukuran diameter benda uji silinder



Gambar 3. Pengukuran tinggi benda uji silinder



Gambar 4. Pengujian kuat tekan beton



Gambar 5. Beton normal setelah dilakukan uji tekan



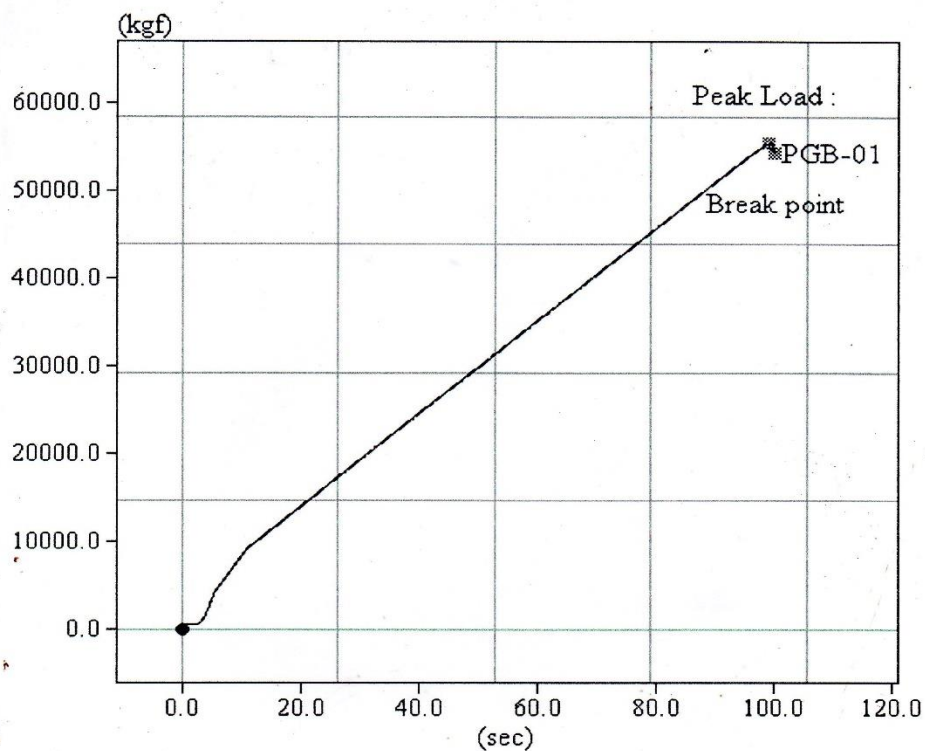
Gambar 6. Beton serutan ban bekas setelah dilakukan uji tekan

Lampiran 8. Hasil pengujian kuat tekan

Laboratorium Jurusan Teknik Sipil
Universitas Muhammadiyah Yogyakarta

Concrete Testing

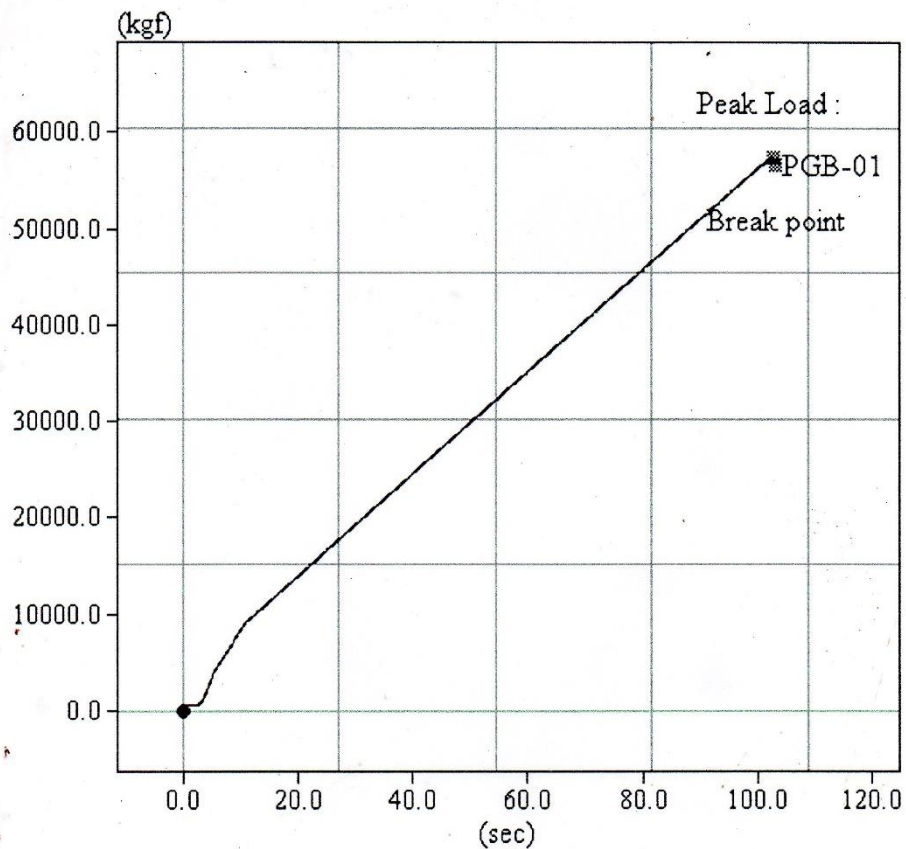
Construction Name		Sldr btm								
Manufacturer		Hungta								
Contractor		UMY								
Customer		Lab. JTS. FT.UMY								
Test Date		5/21/2019			Report No.			PGB (A)		
No.	Area (cm ²)	Peak Force (Kg)	Compression Stress (psi)	Adjust Stress (Kg/cm ²)	H/D Ratio	Design Stress	Adjust Ratio	Life	Break Style	Remark
1	176.71	55490	4466.1	314.0	2.0	300.0	1.0	28		



Laboratorium Jurusan Teknik Sipil
Universitas Muhammadiyah Yogyakarta

Concrete Testing

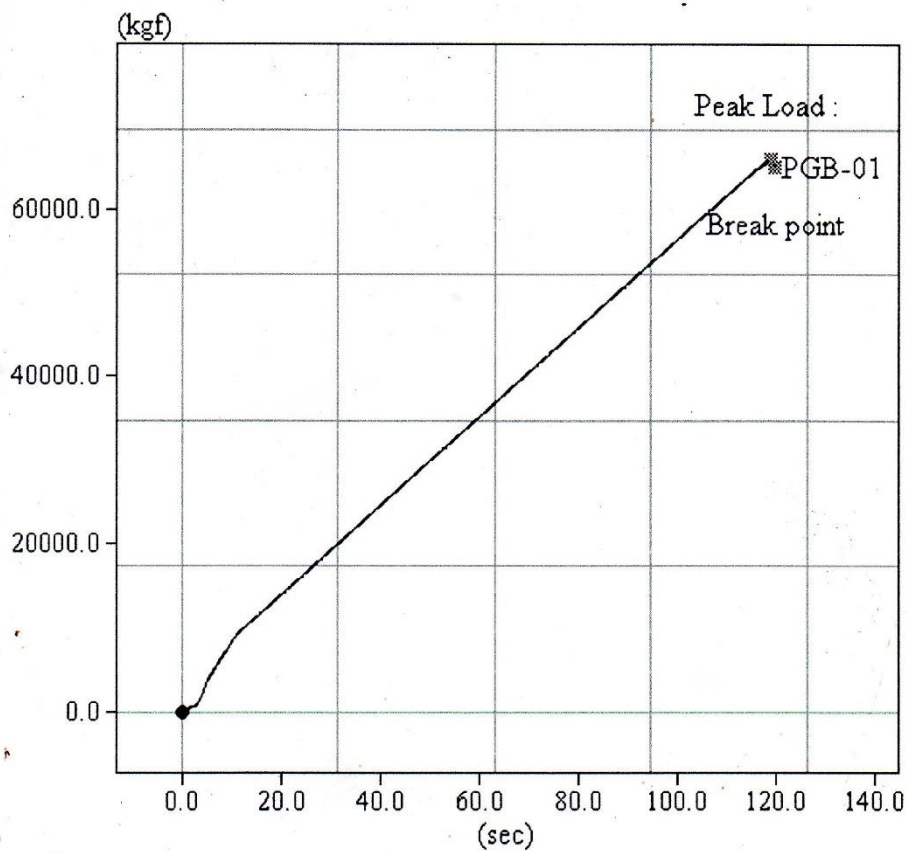
Construction Name		Sldr btn								
Manufacturer		Hungta								
Contractor		UMY								
Customer		Lab. JTS. FT.UMY								
Test Date		5/21/2019			Report No.			PGB 207		
No.	Area (cm ²)	Peak Force (Kg)	Compression Stress (psi)	Adjust Stress (Kg/cm ²)	H/D Ratio	Design Stress	Adjust Ratio	Life	Break Style	Remark
1	176.71	57340	4615.0	324.5	2.0	300.0	1.0	28		



Laboratorium Jurusan Teknik Sipil
Universitas Muhammadiyah Yogyakarta

Concrete Testing

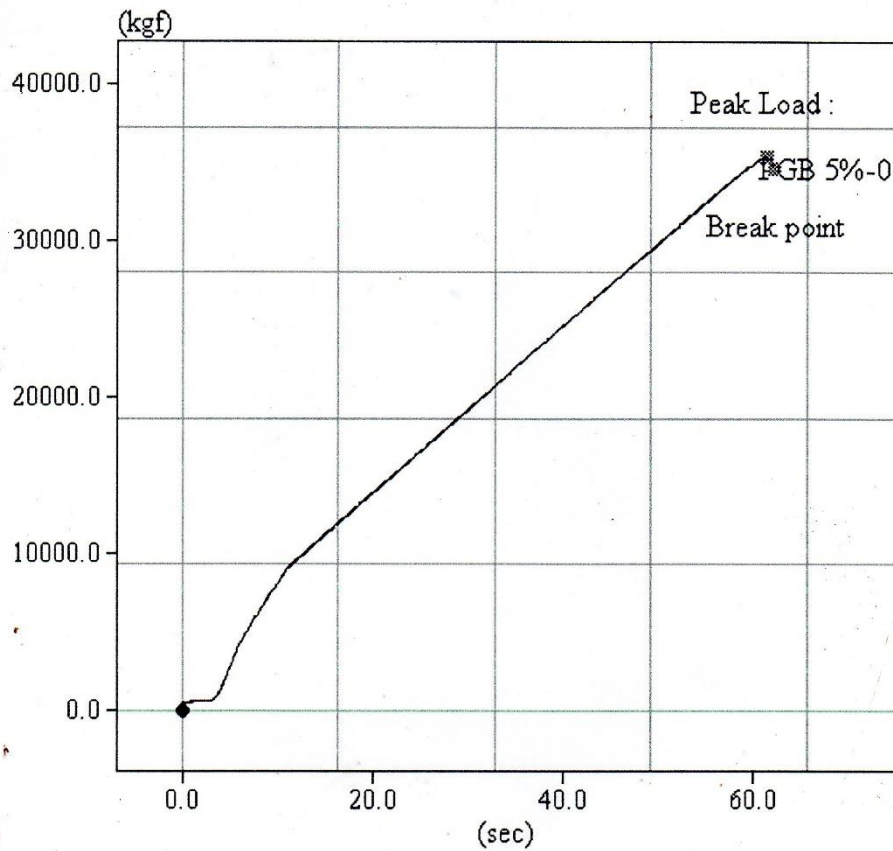
Construction Name		Sldr btm								
Manufacturer		Hungta								
Contractor		UMY								
Customer		Lab. JTS. FT.UMY								
Test Date		05/21/2019			Report No.			PGB (C)		
No.	Area (cm ²)	Peak Force (Kg)	Compression Stress (psi)	Adjust Stress (Kg/cm ²)	H/D Ratio	Design Stress	Adjust Ratio	Life	Break Style	Remark
1	176.71	65880	5302.3	372.8	2.0	300.0	1.0	28		



Laboratorium Jurusan Teknik Sipil
Universitas Muhammadiyah Yogyakarta

Concrete Testing

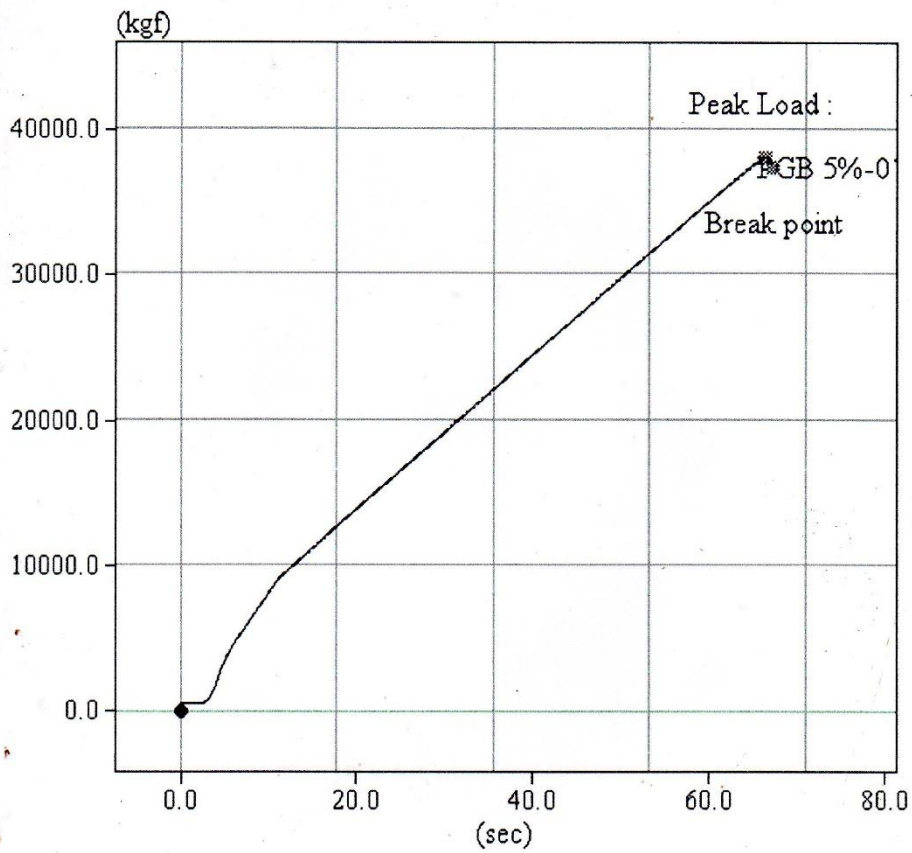
Construction Name		Sldr btn								
Manufacturer		Hungta								
Contractor		UMY								
Customer		Lab. JTS. FT.UMY								
Test Date		5/21/2019			Report No.			PGB 5% (A)		
No.	Area (cm ²)	Peak Force (Kg)	Compression Stress (psi)	Adjust Stress (Kg/cm ²)	H/D Ratio	Design Stress	Adjust Ratio	Life	Break Style	Remark
1	176.71	35340	2844.3	200.0	2.0	300.0	1.0	28		



Laboratorium Jurusan Teknik Sipil
Universitas Muhammadiyah Yogyakarta

Concrete Testing

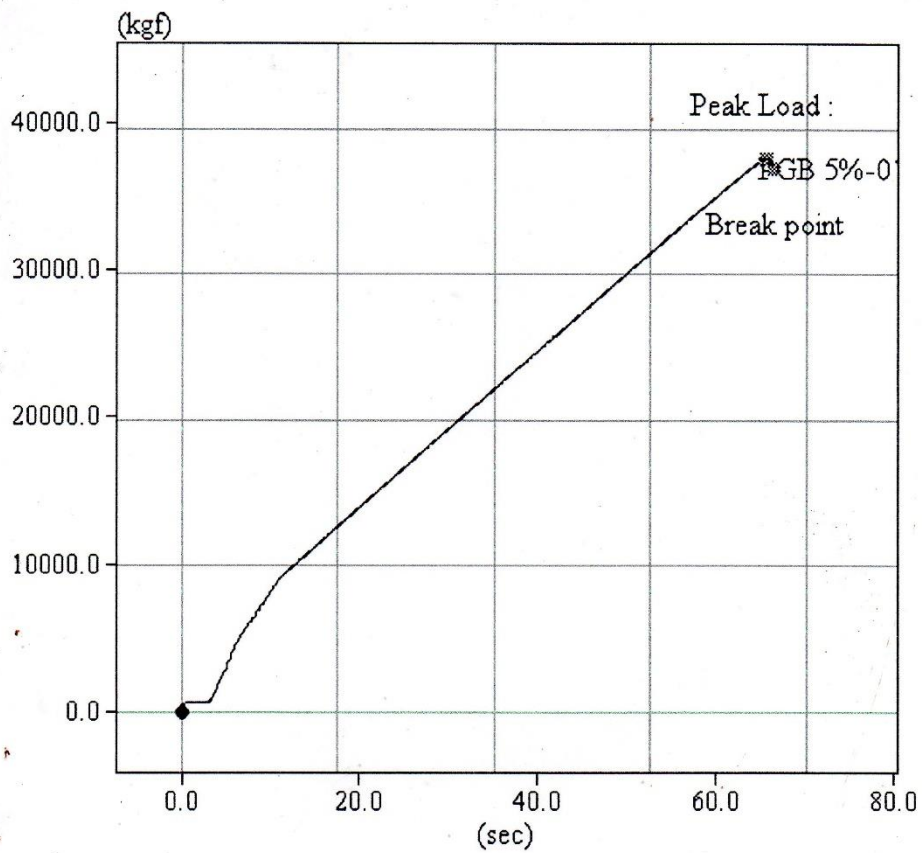
Construction Name		Sldr btn								
Manufacturer		Hungta								
Contractor		UMY								
Customer		Lab. JTS. FT.UMY								
Test Date		5/21/2019			Report No.			PGB 5% (B)		
No.	Area (cm ²)	Peak Force (Kg)	Compression Stress (psi)	Adjust Stress (Kg/cm ²)	H/D Ratio	Design Stress	Adjust Ratio	Life	Break Style	Remark
1	176.71	38080	3064.8	215.5	2.0	300.0	1.0	28		



Laboratorium Jurusan Teknik Sipil
Universitas Muhammadiyah Yogyakarta

Concrete Testing

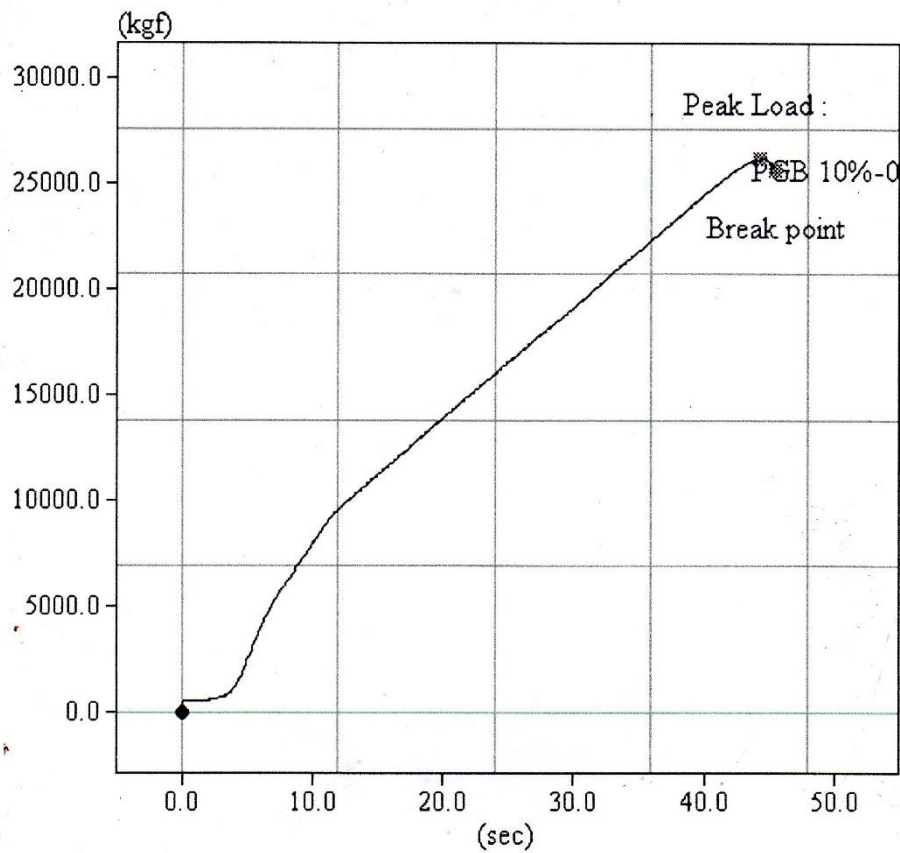
Construction Name		Sldr btn								
Manufacturer		Hungta								
Contractor		UMY								
Customer		Lab. JTS. FT.UMY								
Test Date		5/21/2019			Report No.			PGB 5% (<>)		
No.	Area (cm ²)	Peak Force (Kg)	Compression Stress (psi)	Adjust Stress (Kg/cm ²)	H/D Ratio	Design Stress	Adjust Ratio	Life	Break Style	Remark
1	176.71	37540	3021.4	212.4	2.0	300.0	1.0	28		



Laboratorium Jurusan Teknik Sipil
Universitas Muhammadiyah Yogyakarta

Concrete Testing

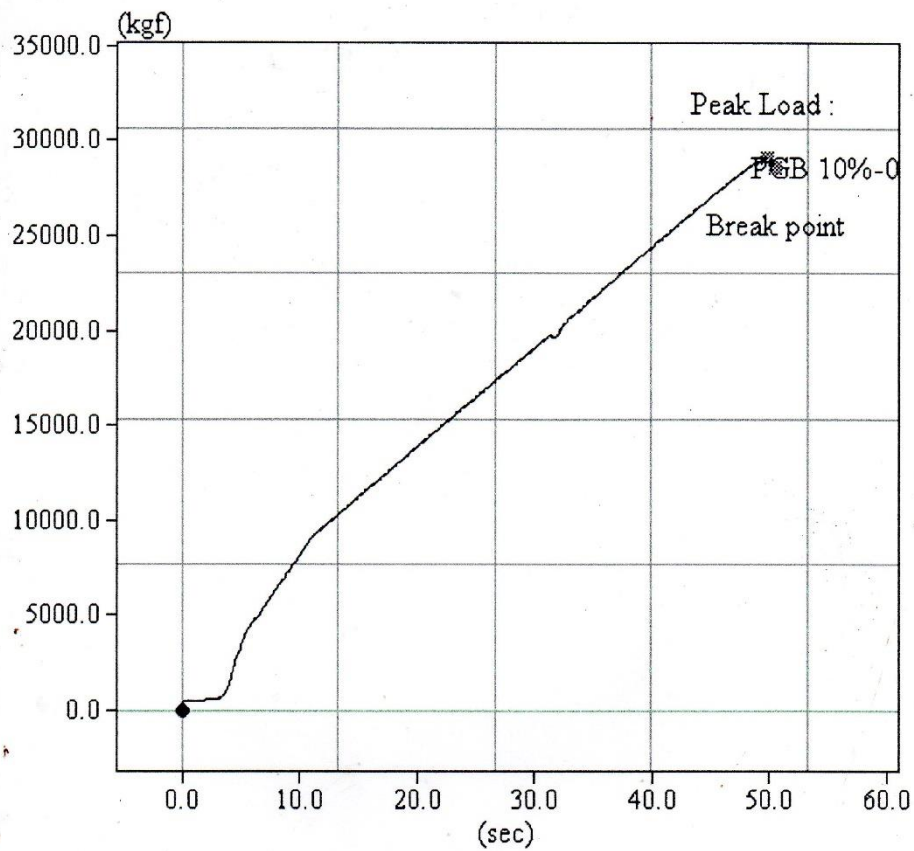
Construction Name		Sldr btn								
Manufacturer		Hungta								
Contractor		UMY								
Customer		Lab. JTS. FT.UMY								
Test Date		5/21/2019			Report No.			PGB 10% (A)		
No.	Area (cm ²)	Peak Force (Kg)	Compression Stress (psi)	Adjust Stress (Kg/cm ²)	H/D Ratio	Design Stress	Adjust Ratio	Life	Break Style	Remark
1	176.71	26190	2107.9	148.2	2.0	300.0	1.0	28		



Laboratorium Jurusan Teknik Sipil
Universitas Muhammadiyah Yogyakarta

Concrete Testing

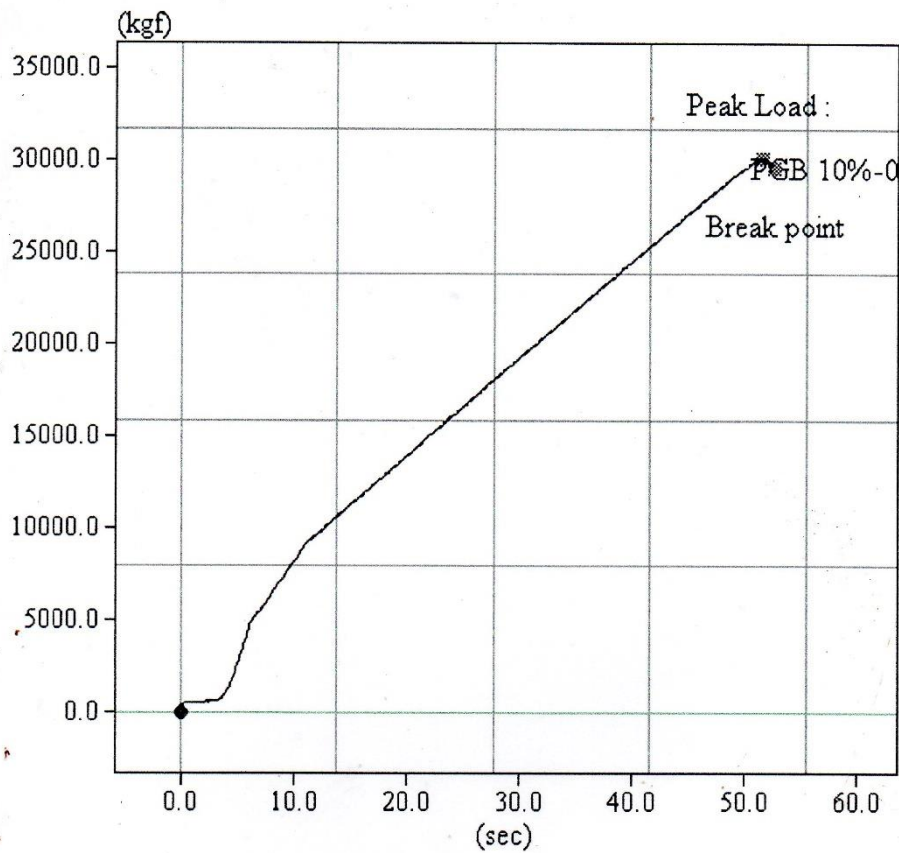
Construction Name		Slidr btn								
Manufacturer		Hungta								
Contractor		UMY								
Customer		Lab. JTS. FT.UMY								
Test Date		5/21/2019			Report No.			PGB 10% (B)		
No.	Area (cm ²)	Peak Force (Kg)	Compression Stress (psi)	Adjust Stress (Kg/cm ²)	H/D Ratio	Design Stress	Adjust Ratio	Life	Break Style	Remark
1	176.71	29080	2340.5	164.6	2.0	300.0	1.0	28		



Laboratorium Jurusan Teknik Sipil
Universitas Muhammadiyah Yogyakarta

Concrete Testing

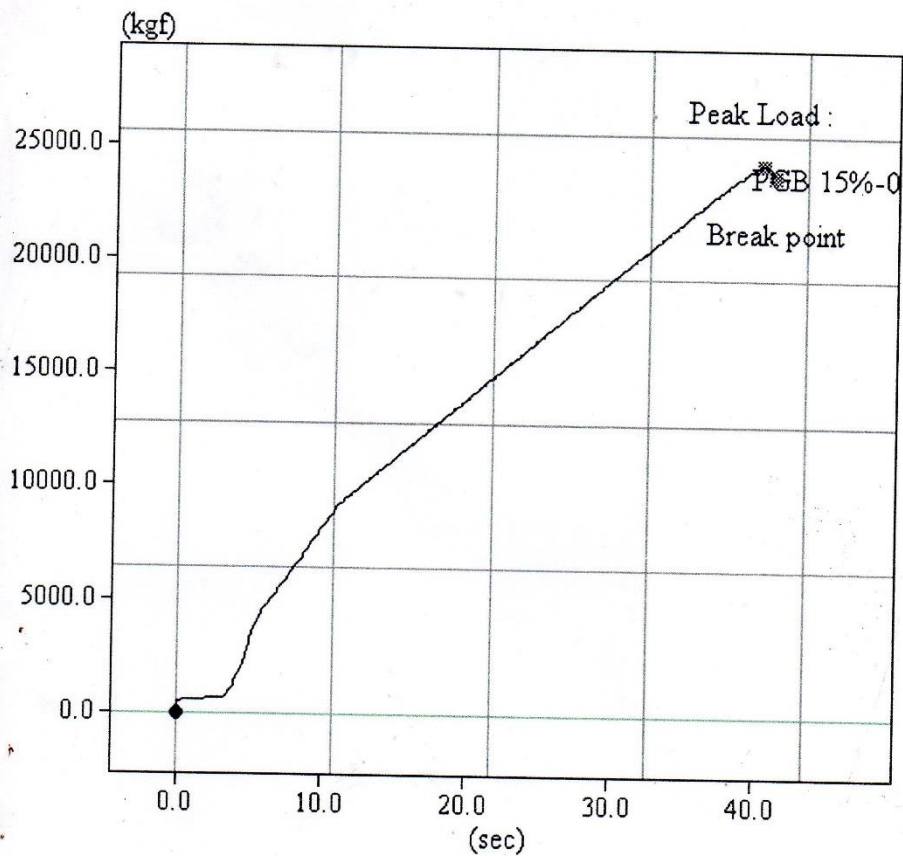
Construction Name		Slidr btn								
Manufacturer		Hungta								
Contractor		UMY								
Customer		Lab. JTS. FT.UMY								
Test Date		5/21/2019			Report No.			PGB 10% (C)		
No.	Area (cm ²)	Peak Force (Kg)	Compression Stress (psi)	Adjust Stress (Kg/cm ²)	H/D Ratio	Design Stress	Adjust Ratio	Life	Break Style	Remark
1	176.71	30110	2423.4	170.4	2.0	300.0	1.0	28		



Laboratorium Jurusan Teknik Sipil
Universitas Muhammadiyah Yogyakarta

Concrete Testing

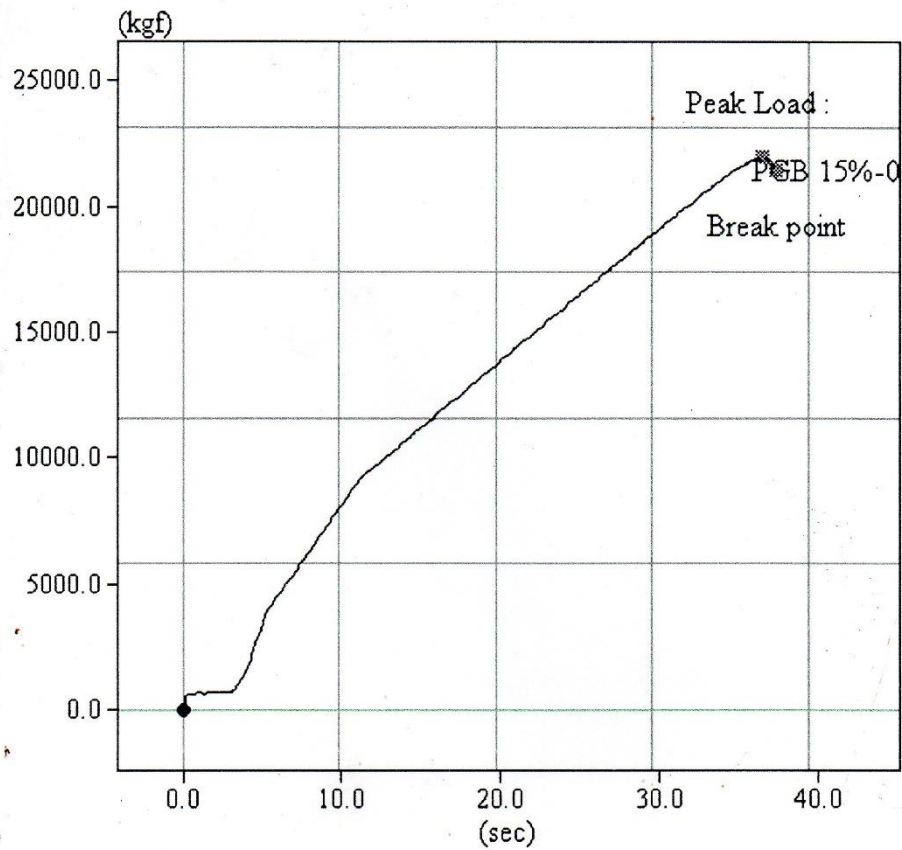
Construction Name		Sldr btn								
Manufacturer		Hungta								
Contractor		UMY								
Customer		Lab. JTS. FT.UMY								
Test Date		05/27/2019			Report No.			PGB 15%		
No.	Area (cm ²)	Peak Force (Kg)	Compression Stress (psi)	Adjust Stress (Kg/cm ²)	H/D Ratio	Design Stress	Adjust Ratio	Life	Break Style	Remark
1	176.71	24260	1952.5	137.3	2.0	300.0	1.0	28		



Laboratorium Jurusan Teknik Sipil
Universitas Muhammadiyah Yogyakarta

Concrete Testing

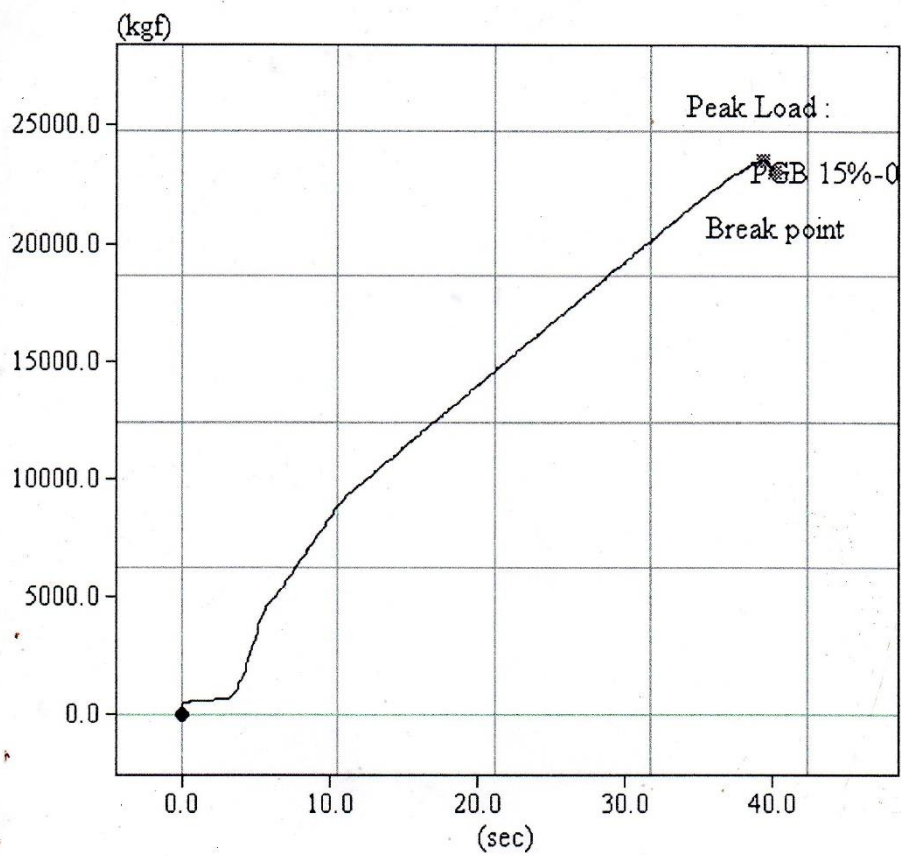
Construction Name		Sldr bm								
Manufacturer		Hungta								
Contractor		UMY								
Customer		Lab. JTS. FT.UMY								
Test Date		05/27/2019			Report No.			PGB 15%		
No.	Area (cm ²)	Peak Force (Kg)	Compression Stress (psi)	Adjust Stress (Kg/cm ²)	H/D Ratio	Design Stress	Adjust Ratio	Life	Break Style	Remark
1	176.71	21970	1768.2	124.3	2.0	300.0	1.0	28		



Laboratorium Jurusan Teknik Sipil
Universitas Muhammadiyah Yogyakarta

Concrete Testing

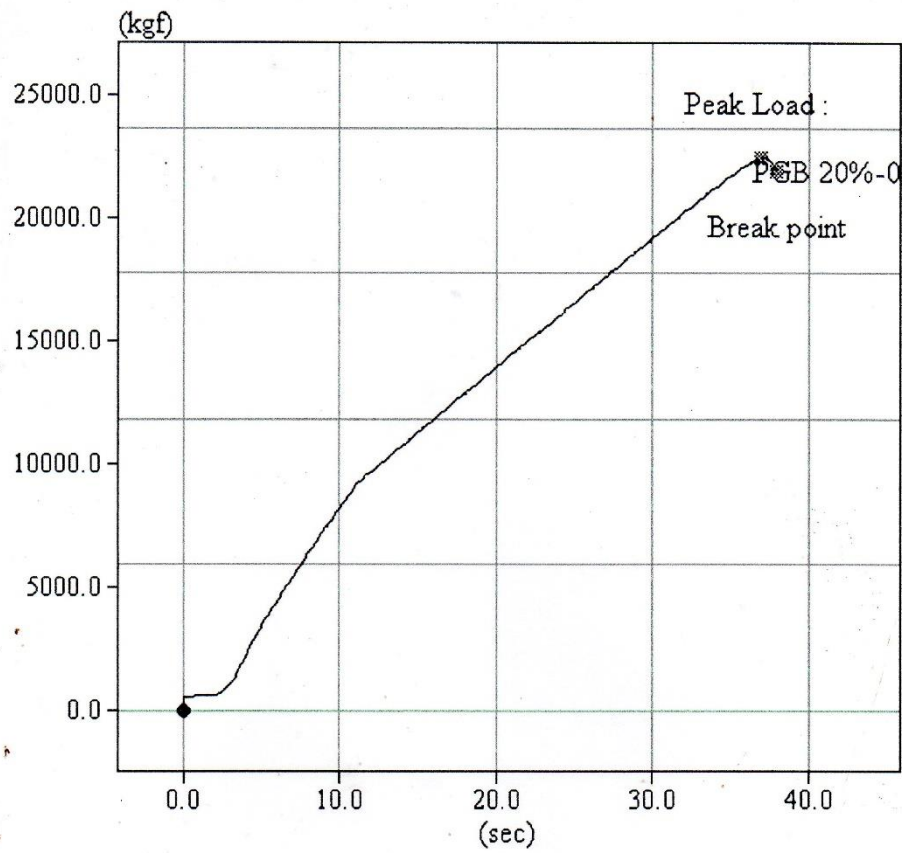
Construction Name		Sldr btn								
Manufacturer		Hungta								
Contractor		UMY								
Customer		Lab. JTS. FT.UMY								
Test Date		05/27/2019			Report No.			PGB 15%		
No.	Area (cm ²)	Peak Force (Kg)	Compression Stress (psi)	Adjust Stress (Kg/cm ²)	H/D Ratio	Design Stress	Adjust Ratio	Life	Break Style	Remark
1	176.71	23510	1892.2	133.0	2.0	300.0	1.0	28		



Laboratorium Jurusan Teknik Sipil
Universitas Muhammadiyah Yogyakarta

Concrete Testing

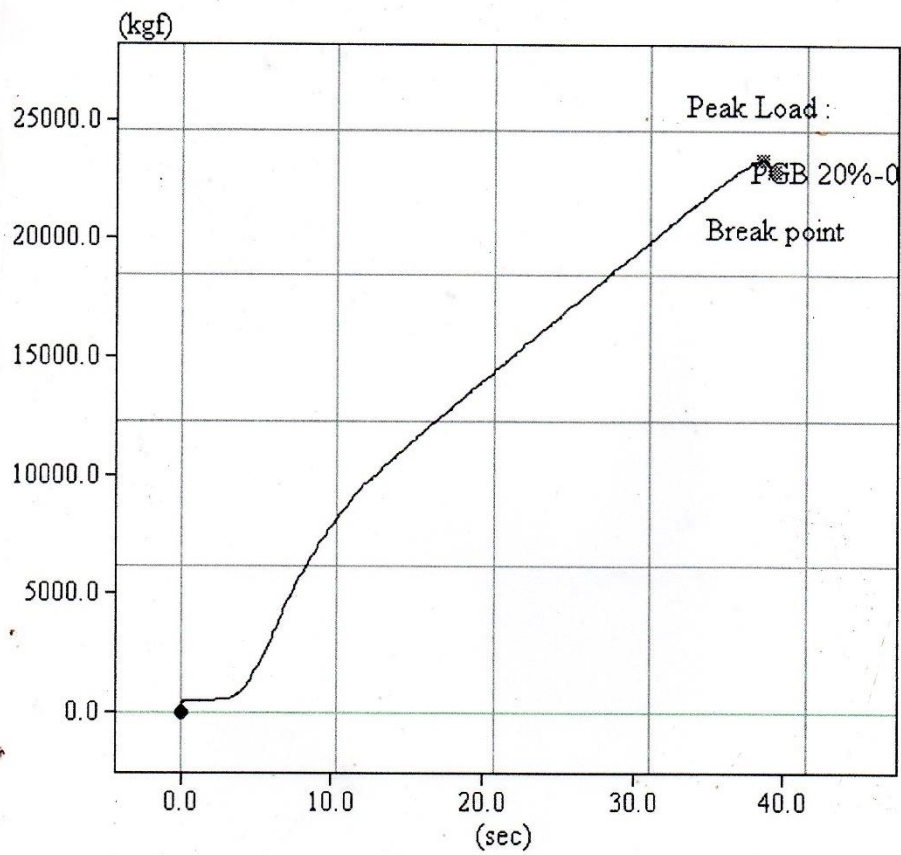
Construction Name		Sldr btm								
Manufacturer		Hungta								
Contractor		UMY								
Customer		Lab. JTS. FT.UMY								
Test Date		05/27/2019			Report No.			PGB 20%		
No.	Area (cm ²)	Peak Force (Kg)	Compression Stress (psi)	Adjust Stress (Kg/cm ²)	H/D Ratio	Design Stress	Adjust Ratio	Life	Break Style	Remark
1	176.71	22450	1806.9	127.0	2.0	300.0	1.0	28		



Laboratorium Jurusan Teknik Sipil
Universitas Muhammadiyah Yogyakarta

Concrete Testing

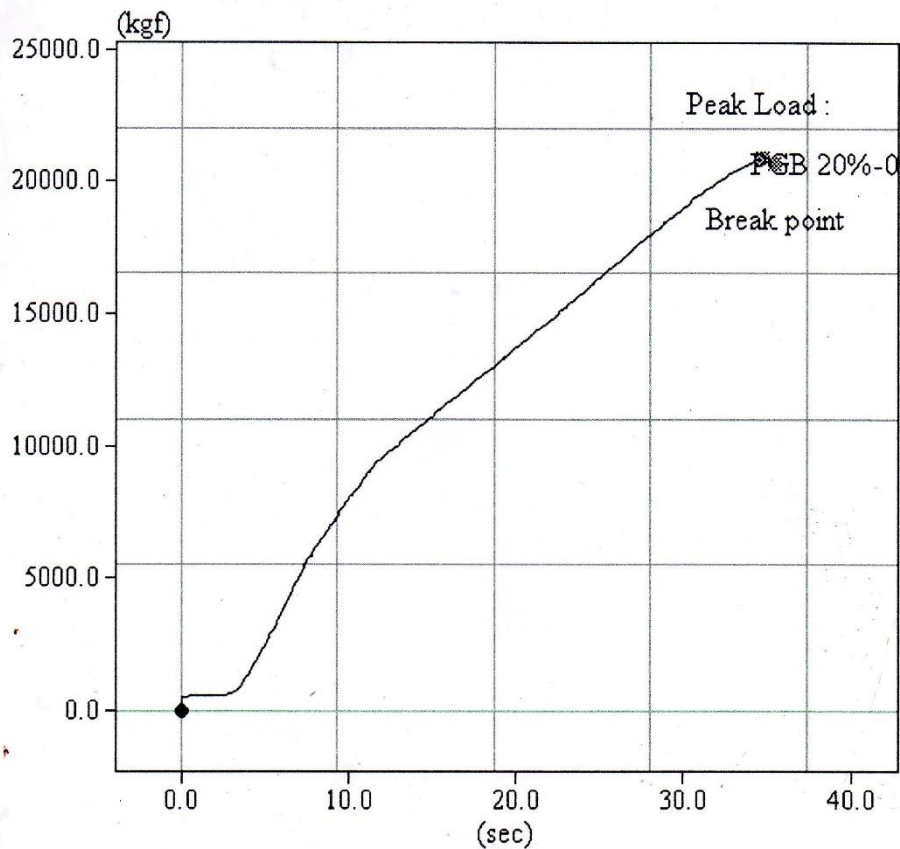
Construction Name		Sldr btm								
Manufacturer		Hungta								
Contractor		UMY								
Customer		Lab. JTS. FT.UMY								
Test Date		05/27/2019			Report No.			PGB 20%		
No.	Area (cm ²)	Peak Force (Kg)	Compression Stress (psi)	Adjust Stress (Kg/cm ²)	H/D Ratio	Design Stress	Adjust Ratio	Life	Break Style	Remark
1	176.71	23290	1874.5	131.8	2.0	300.0	1.0	28		









Laboratorium Jurusan Teknik Sipil
Universitas Muhammadiyah Yogyakarta





Concrete Testing

Construction Name		Sldr btm								
Manufacturer		Hungta								
Contractor		UMY								
Customer		Lab. JTS. FT.UMY								
Test Date		05/27/2019			Report No.			PGB 20%		
No.	Area (cm ²)	Peak Force (Kg)	Compression Stress (psi)	Adjust Stress (Kg/cm ²)	H/D Ratio	Design Stress	Adjust Ratio	Life	Break Style	Remark
1	176.71	20890	1681.3	118.2	2.0	300.0	1.0	28		

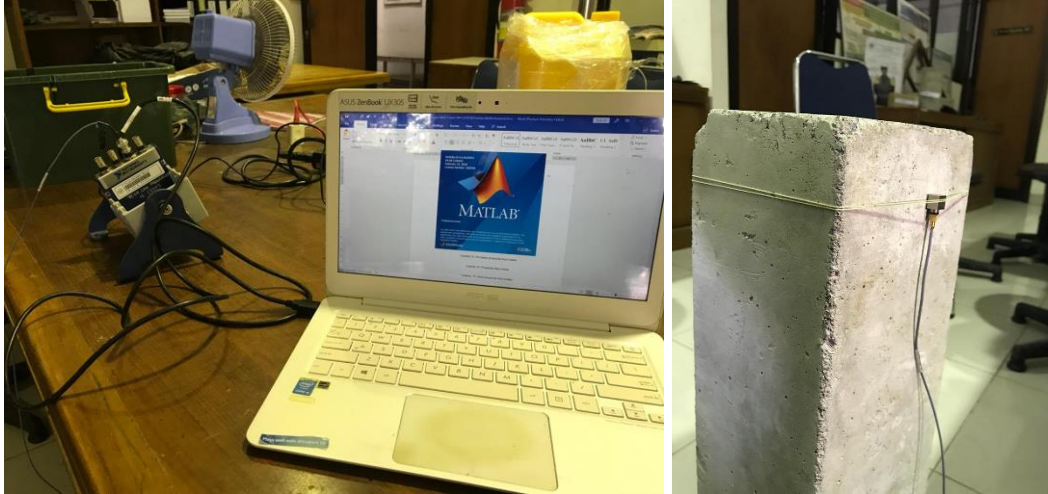


Lampiran 9. Perbandingan benda uji silinder

Variasi	Sebelum diuji	Sesudah diuji	Keterangan
0%			Benda uji mengalami keretakan pada bagian atas dan samping
5%			Benda uji mengalami keretakan pada bagian atas dan samping
10%			Benda uji mengalami keretakan pada bagian samping

Variasi	Sebelum diuji	Sesudah diuji	Keterangan
15%			Benda uji mengalami keretakan pada bagian atas samping
20%			Benda uji mengalami keretakan pada bagian atas dan samping

Lampiran 10. Proses pengujian daya redam



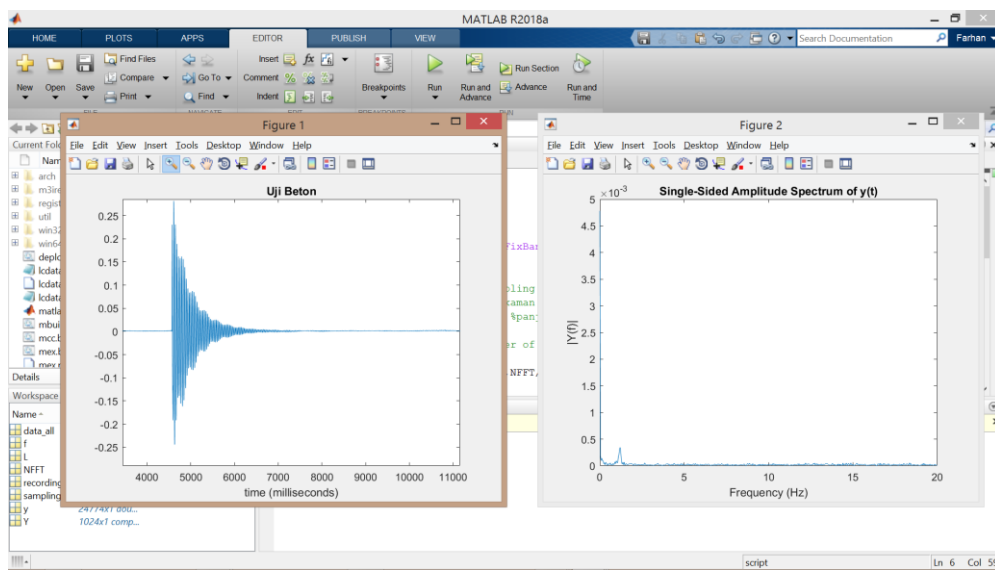
Gambar 7. Setting alat pengujian



Gambar 8. Persiapan pengujian daya redam

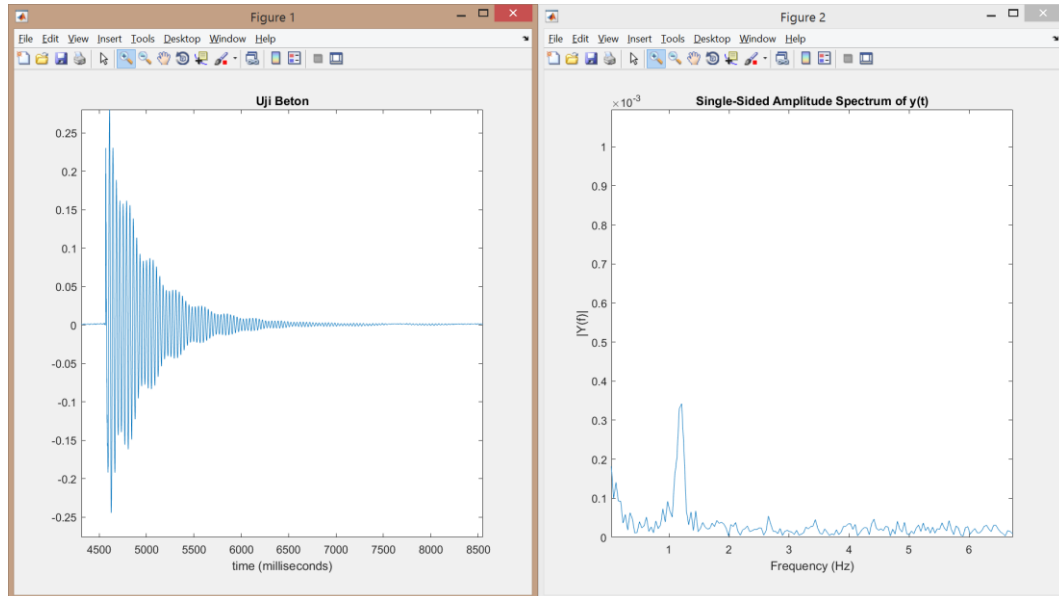


Gambar 9. Pengujian daya redam

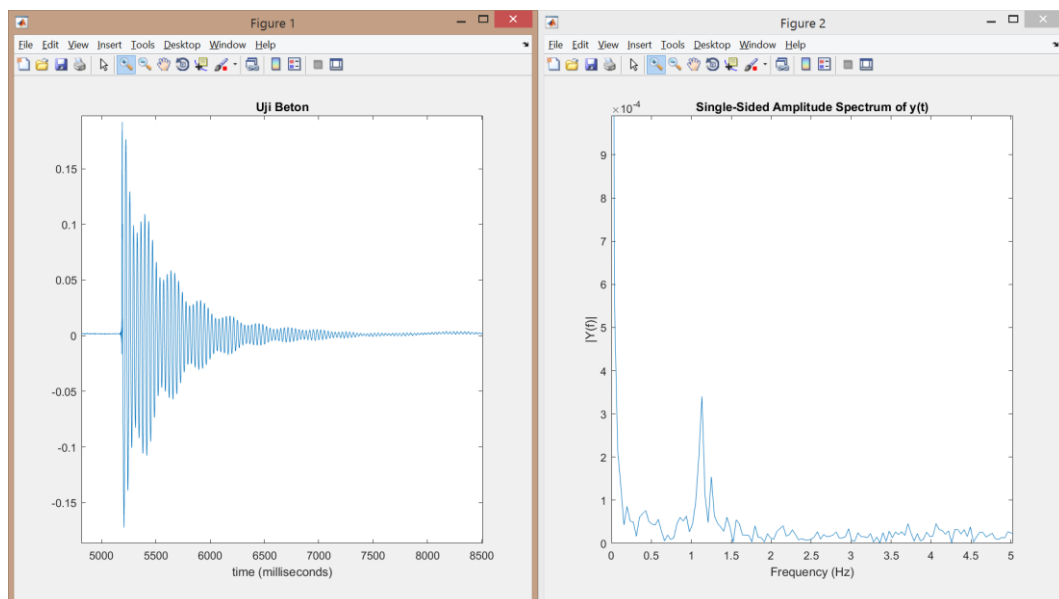


Gambar. 10. Hasil pengujian daya redam

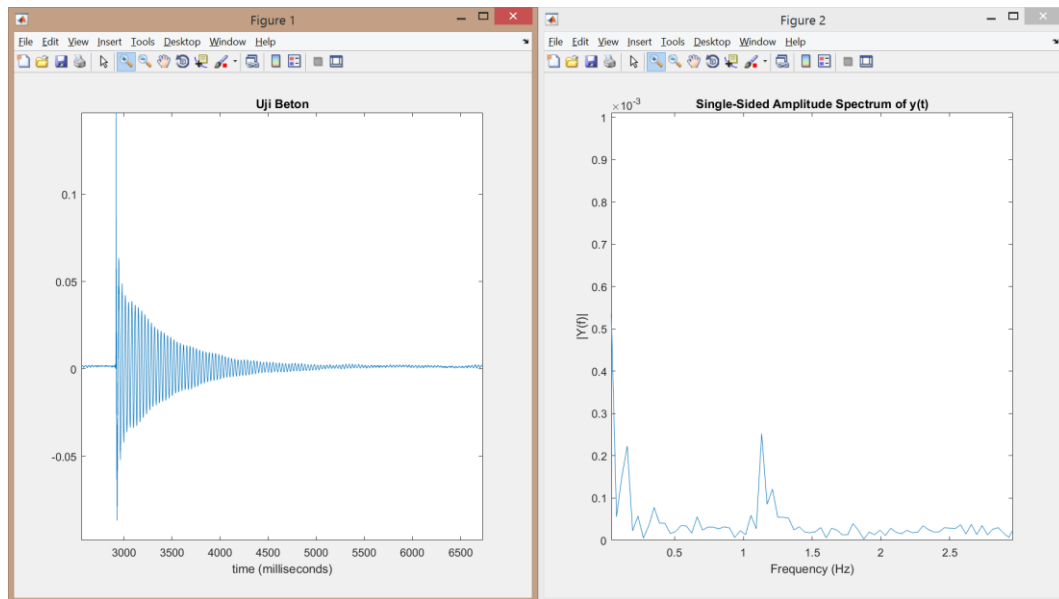
Lampiran 11. Hasil pengujian daya redam



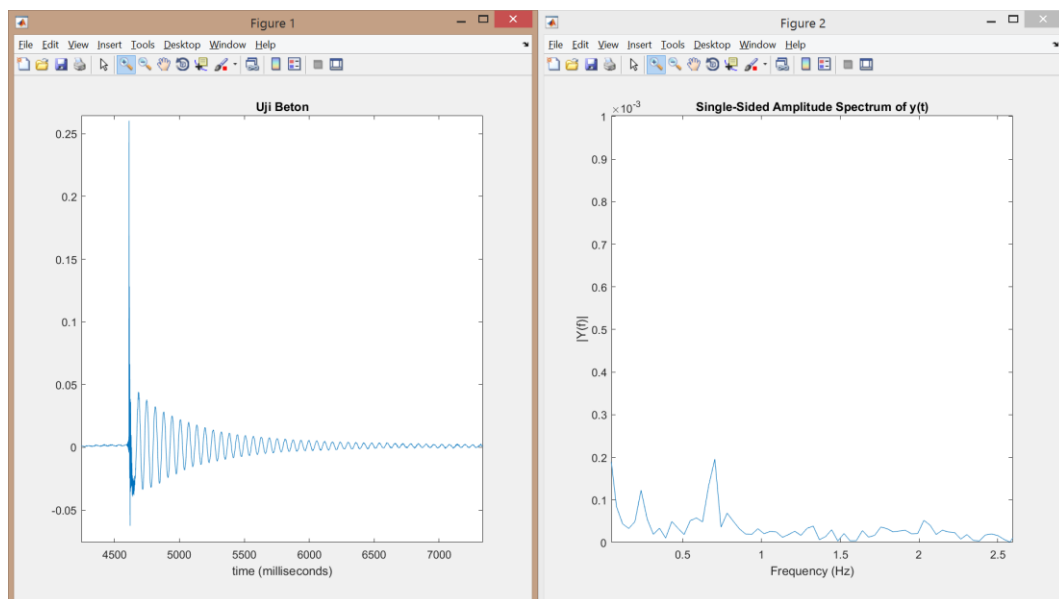
Gambar 11. Gelombang getaran dan frekuensi variasi campuran 0% pengujian 1



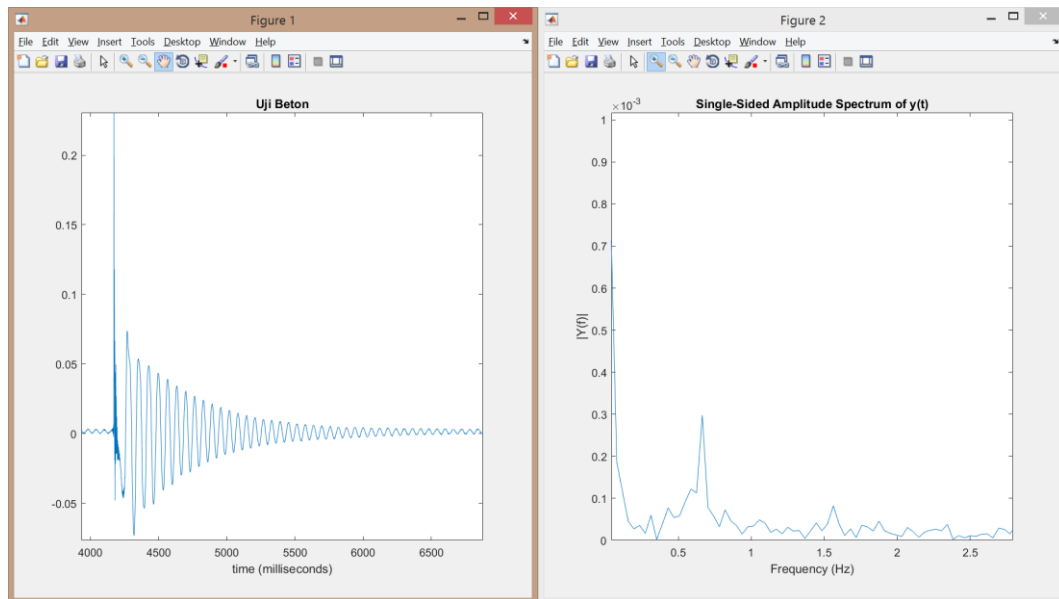
Gambar 12. Gelombang getaran dan frekuensi variasi campuran 0% pengujian 2



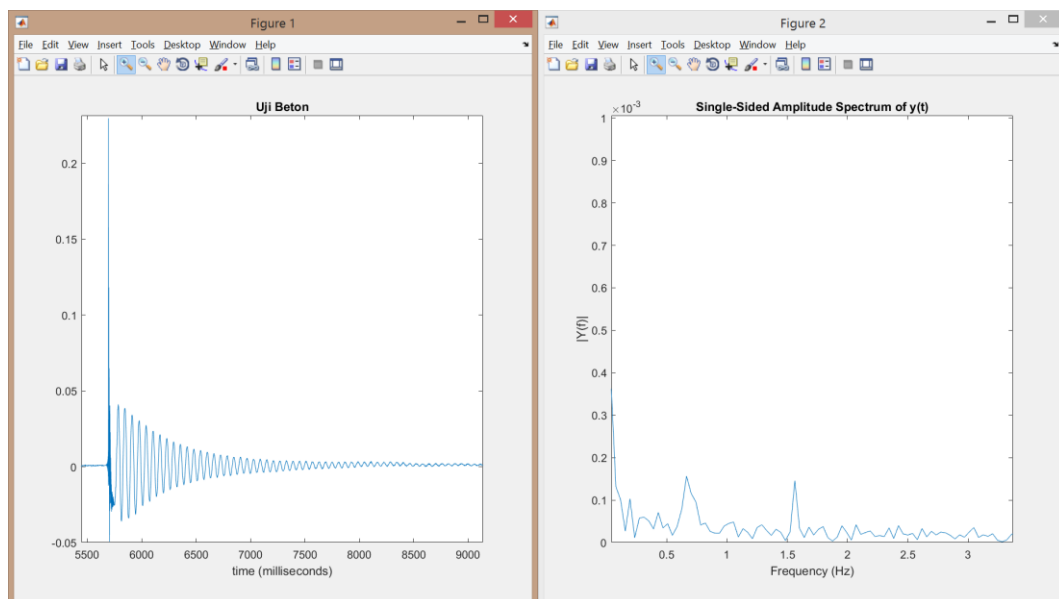
Gambar 13. Gelombang getaran dan frekuensi variasi campuran 0% pengujian 3



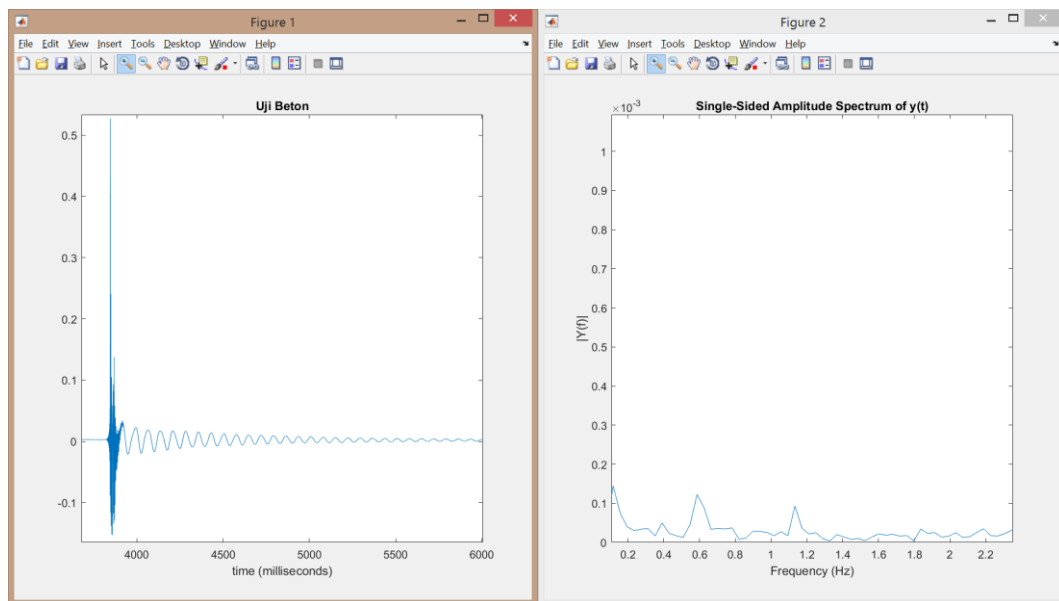
Gambar 14. Gelombang getaran dan frekuensi variasi campuran 5% pengujian 1



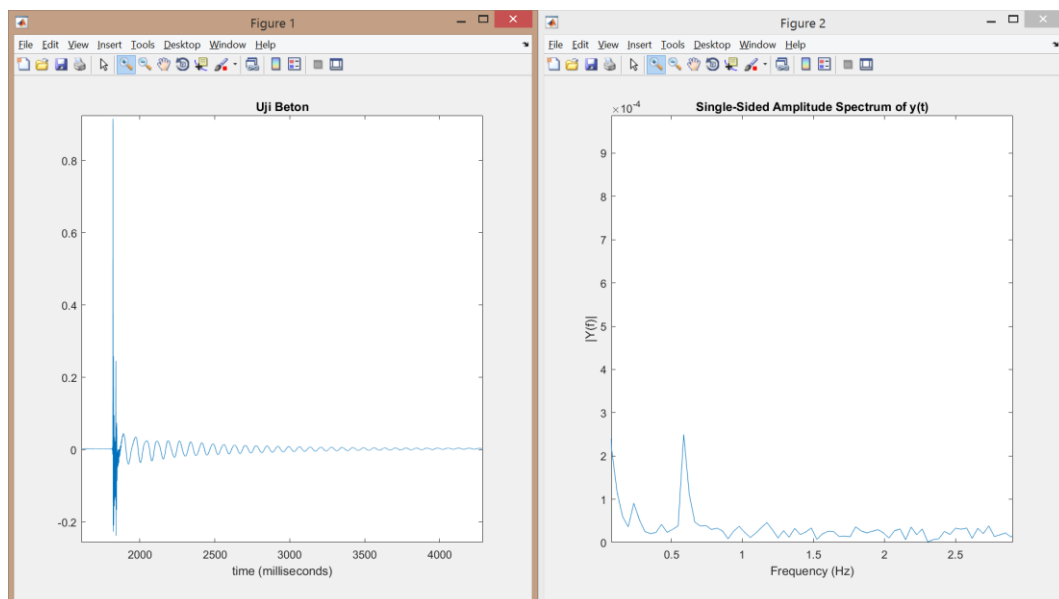
Gambar 15. Gelombang getaran dan frekuensi variasi campuran 5% pengujian 2



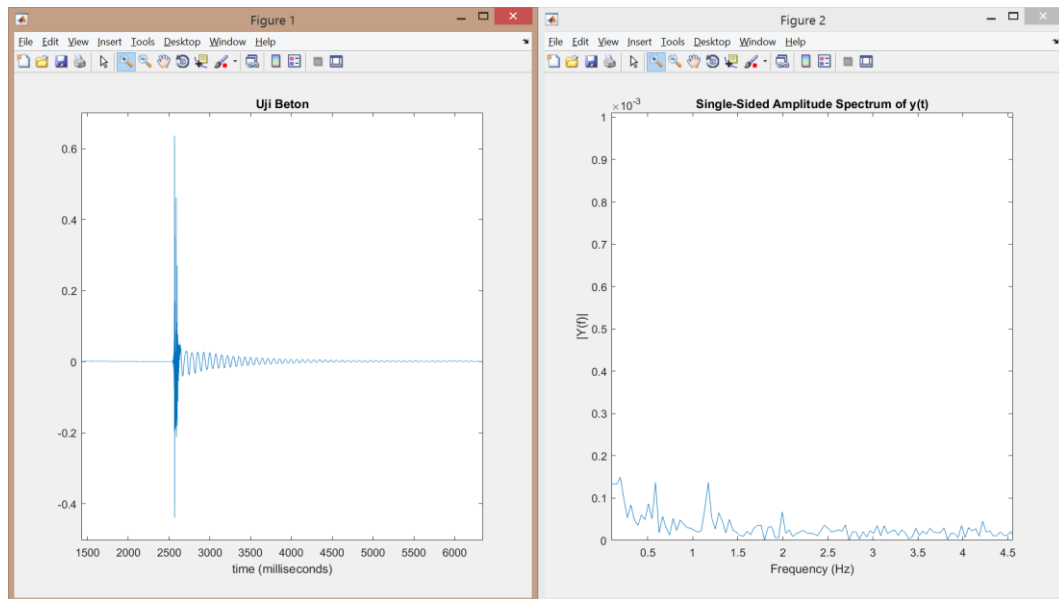
Gambar 16. Gelombang getaran dan frekuensi variasi campuran 5% pengujian 3



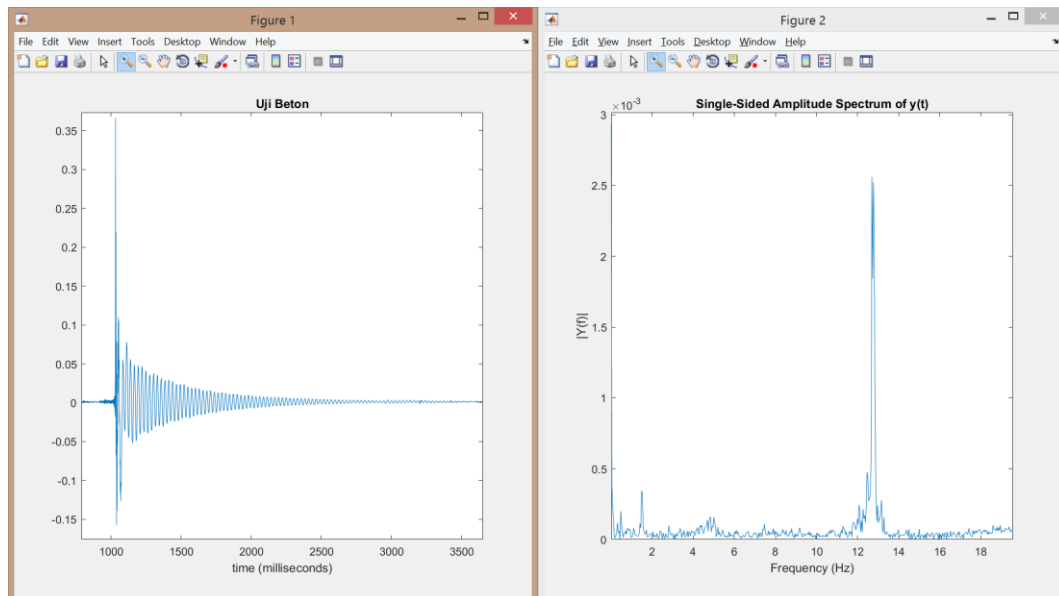
Gambar 17. Gelombang getaran dan frekuensi variasi campuran 10% pengujian 1



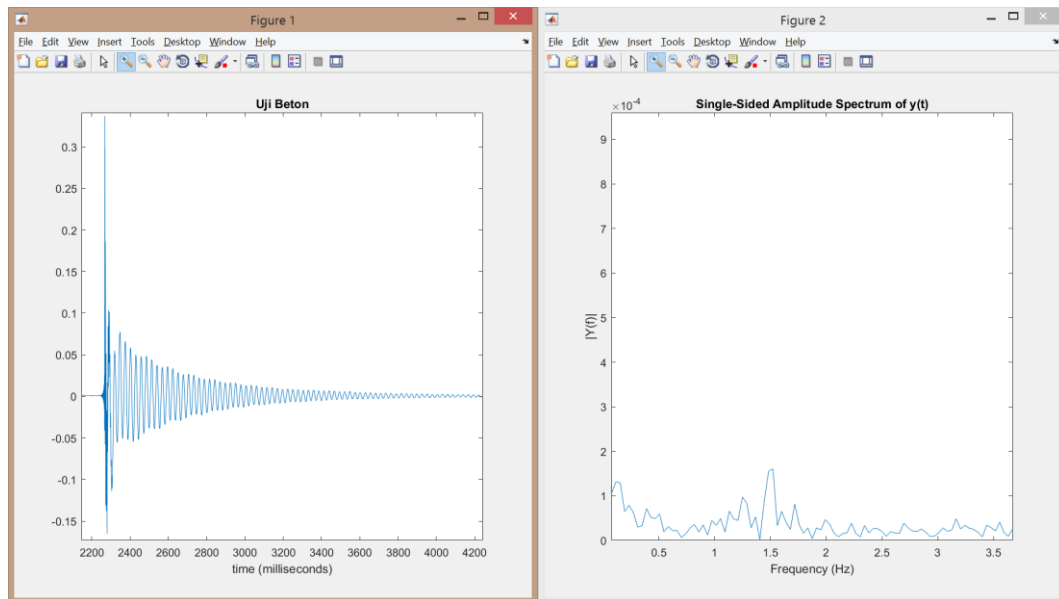
Gambar 18. Gelombang getaran dan frekuensi variasi campuran 10% pengujian 2



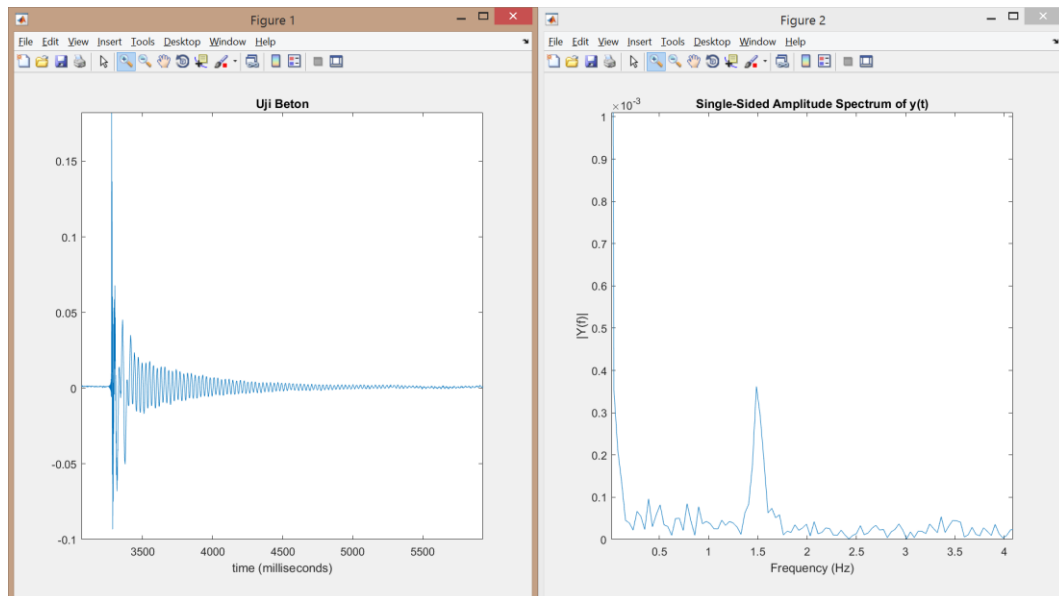
Gambar 19. Gelombang getaran dan frekuensi variasi campuran 10% pengujian 3



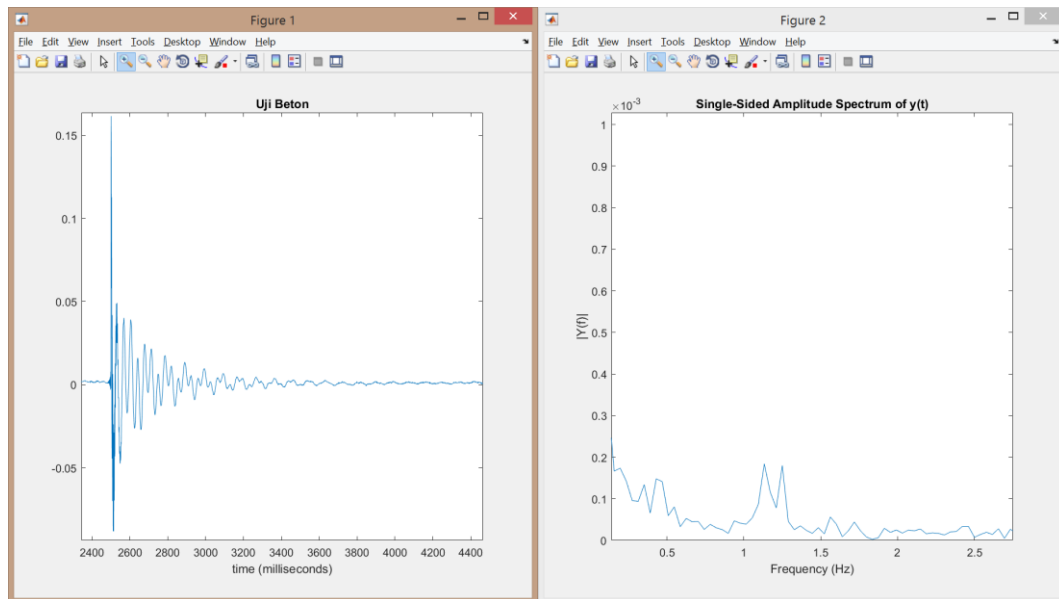
Gambar 20. Gelombang getaran dan frekuensi variasi campuran 15% pengujian 1



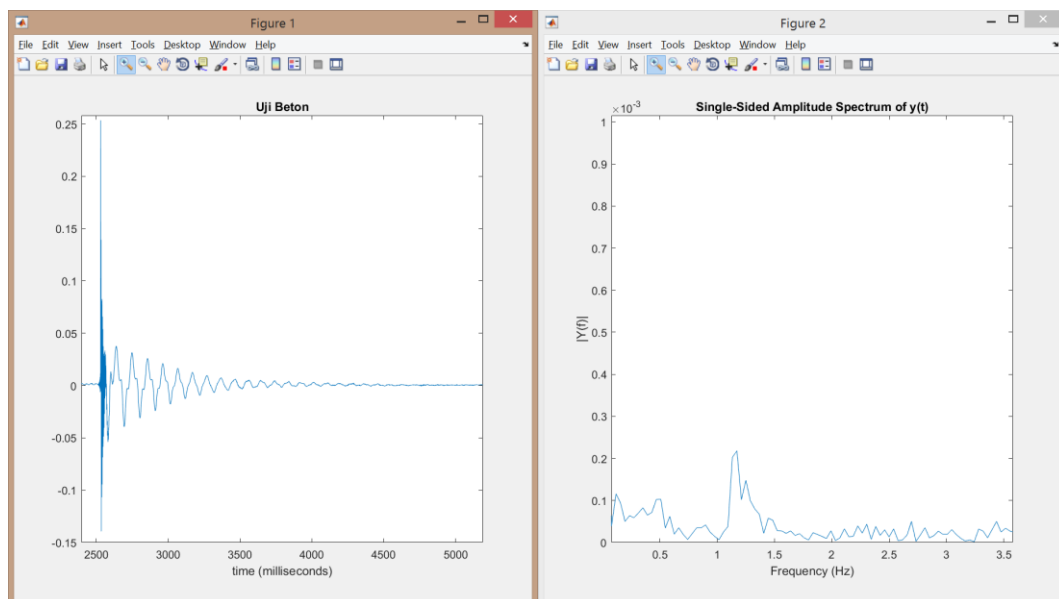
Gambar 21. Gelombang getaran dan frekuensi variasi campuran 15% pengujian 2



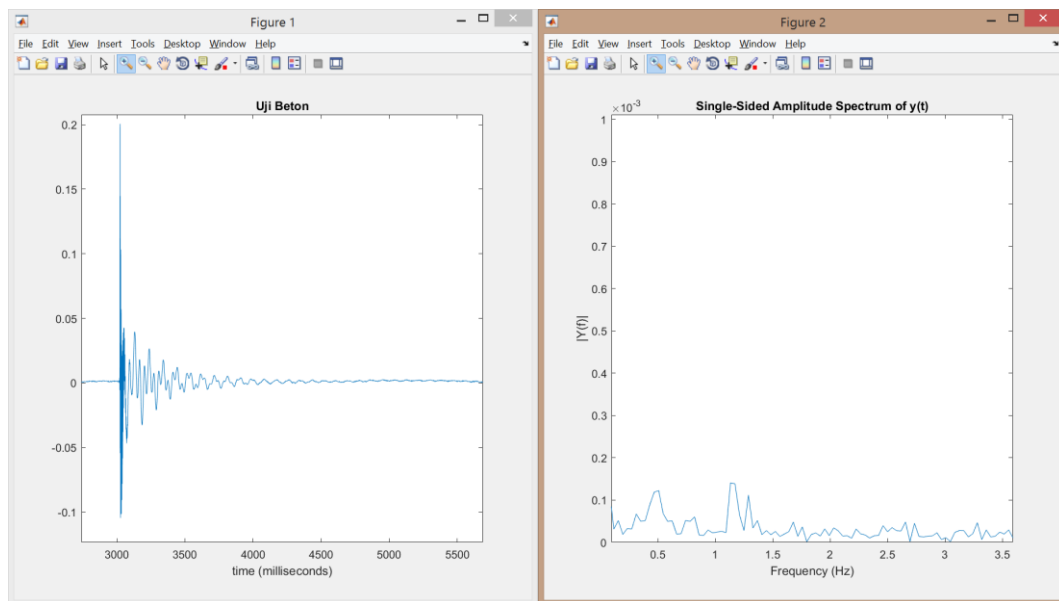
Gambar 22. Gelombang getaran dan frekuensi variasi campuran 15% pengujian 3



Gambar 23. Gelombang getaran dan frekuensi variasi campuran 20% pengujian 1



Gambar 24. Gelombang getaran dan frekuensi variasi campuran 20% pengujian 2



Gambar 25. Gelombang getaran dan frekuensi variasi campuran 20% pengujian 3