LAMPIRAN

Lampiran 1. Pengujian penelitian tugas akhir agregat halus

Jenis Pengujian : Pemeriksaan analisis gradasi agregat halus

Bahan : Pasir Progo

Asal : Sungai Progo

Diperiksa : 14 Desember 2018

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

Ukuran	Lubang Ayakan (mm)	Berat tertahan (gram)	Berat tertahan (%)	Berat tertahan komulatif (%)	Berat lolos komulatif (%)
No. 4	4,75	0	0	0	100
No. 8	2,36	25	2,5	2,5	97,5
No. 16	1,18	147	14,7	17,2	82,8
No. 30	0,6	280	28,0	45,2	54,8
No. 50	0,3	246	24,6	69,8	30,2
No. 100	0,15	205	20,5	90,3	9,7
Pan		97	9,7	100	0
Total		1000	100	325	

Analisis hitungan:

a. Contoh saringan no.16

   Persen berat tertahan:

   $= \frac{Berat\ Tertahan}{Total}$ x 100%

   $= \frac{147}{1000}$ x 100%

   = 14,7%

b. Contoh saringan no.16

   Persen berat tertahan komulatif:

   = Persen berat tertahan no.8 + Persen berat tertahan no.16

   = 2,5 + 14,7

   = 17,2%

c. Komulatif contoh saringan no.16

Persen berat lolos komulatif:

= 100 - 17,2

= 82,8%

d. Modulus halus butir (MHB)

= $\frac{jumlah\ berat\ tertahan\ komulatif}{100}$

= $\frac{225}{100}$

= 2,25%

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

Ukuran	Lubang Ayakan (mm)	Berat tertahan (gram)	Berat tertahan (%)	Berat tertahan komulatif (%)	Berat lolos komulatif (%)
No. 4	4,75	0	0	0	100
No. 8	2,36	39	3.9	3.9	96.1
No. 16	1,18	152	15.2	19.1	80.9
No. 30	0,6	273	27.3	46.4	53.6
No. 50	0,3	215	21.5	67.9	32.1
No. 100	0,15	197	19.7	87.6	12.4
Pan		124	12.4	100	0
Total		1000	100	324.9	

Analisis hitungan:

a. Contoh saringan no.16

Persen berat tertahan:

= $\frac{Berat\ Tertahan}{Total}$ x 100%

= $\frac{152}{1000}$ x 100%

= 15,2%

b. Contoh saringan no.16

Persen berat tertahan komulatif:

= Persen berat tertahan no.8 + Persen berat tertahan no.16

= 3,9 + 15,2

= 19,1%

c. Komulatif contoh saringan no.16

Persen berat lolos komulatif:

= 100 – 19,1

= 80,9%

d. Modulus halus butir (MHB)

$= \frac{jumlah\ berat\ tertahan\ komulatif}{100}$

$= \frac{224,9}{100}$

= 2,25%

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

Ukuran	Lubang Ayakan (mm)	Berat tertahan (gram)	Berat tertahan (%)	Berat tertahan komulatif (%)	Berat lolos komulatif (%)
No. 4	4,75	0	0	0	100
No. 8	2,36	30.5	3.05	3.05	96.95
No. 16	1,18	116.5	11.65	14.7	85.3
No. 30	0,6	280	28	42.7	57.3
No. 50	0,3	352.5	35.25	77.95	22.05
No. 100	0,15	192.5	19.25	97.2	2.8
Pan		28	2.8	100	0
Total		1000	100	335.6	

Analisis hitungan:

a. Contoh saringan no.16

Persen berat tertahan:

$= \frac{Berat\ Tertahan}{Total}$ x 100%

$= \frac{116,5}{1000}$ x 100%

= 11,65%

b. Contoh saringan no.16

Persen berat tertahan komulatif:

= Persen berat tertahan no.8 + Persen berat tertahan no.16

= 3,05 + 11,65

= 14,7%

c. Komulatif contoh saringan no.16

Persen berat lolos komulatif:

= 100 – 14,7

= 85,3%

d. Modulus halus butir (MHB)

$= \frac{jumlah\ berat\ tertahan\ komulatif}{100}$

$= \frac{236}{100}$

= 2,36%

Lampiran 2. Pengujian penelitian tugas akhir agregat halus

Jenis Pengujian : Pemeriksaan kadar air agregat halus

Bahan : Pasir Progo

Asal : Sungai Progo

Diperiksa : 22 Februari 2019

Tabel 1. Hasil pemeriksaan kadar air agregat halus

Uraian	Benda Uji			
	Satuan	1	2	3
Berat Wadah (W1)	gram	126	299	283
Berat wadah + Berat isi pasir (W2)	gram	1126	1299	1283
Berat wadah + Berat isi pasir keluar oven (W3)	gram	1105	1280	1265
Berat Air (W4)	gram	21	19	18
kadar air	%	2.150	1.940	1.830
Rata - rata	%	1.970		

Analsisi hitungan:

a. Berat air = W2-W3

Contoh benda uji 1 = 1126 – 1105

= 21 gr

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

Contoh benda uji 1 = $\frac{21}{1105-126}$ x 100%

= 2,150%

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

= $\frac{2,15+1,94+1,83}{3}$

= 1,970%

Lampiran 3. Pengujian penelitian tugas akhir agregat halus

Jenis Pengujian : Pemeriksaan berat jenis dan penyerapan air agregat halus

Bahan : Pasir Progo

Asal : Sungai Progo

Diperiksa : 17 Desember 2018

Tabel 1. Data pemeriksaan berat jenis agregat halus

Uraian	Satuan	Benda Uji		
		1	2	3
Berat pikno berisi pasir dan air (Bt)	gram	1089	1076	1081
Berat pasir setelah kering (Bk)	gram	489	488	482
Berat pikno berisi air (B)	gram	773	767	773
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		2.658	2.555	2.510	2.797
Berat jenis jenuh kering muka		2.717	2.618	2.604	2.825
Berat jenis tampak		2.827	2.726	2.770	2.878
Penyerapan air agregat halus	%	2.249	2.459	3.734	2,814

Analisis Hitungan:

a. Berat jenis curah $= \frac{Bk}{B+SSD-Bt}$

Contoh benda uji 1 $= \frac{489}{773+500-1089}$

$= 2{,}658$

b. Berat jenis jenuh kering muka $= \frac{500}{B+SSD-Bt}$

Contoh benda uji 1 $= \frac{500}{773+500-1089}$

$= 2{,}717$

c. Berat jenis tampak $= \frac{Bk}{B+Bk-Bt}$

Contoh benda uji 1 $= \frac{489}{773+489-1089}$

$= 2{,}827$

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

Contoh benda uji 1 $= \frac{500-489}{489}$ x 100%

$= 2{,}249\%$

e. Berat jenis jenuh kering muka rata-rata $= \frac{SSD1+SSD2+SSD\#}{3}$

$= \frac{2{,}717+2{,}618+2{,}604}{3}$

$= 2{,}646$

Lampiran 4. Pengujian penelitian tugas akhir

agregat halus

Jenis Pengujian : Pemeriksaan berat satuan agregat halus

Bahan : Pasir Progo

Asal : Sungai Progo

Diperiksa : 19 Desember 2018

Tabel 1. Hasil pemeriksaan berat satuan agregat halus

Uraian	Satuan	Benda Uji		
		1	2	3
Berat bejana kosong (B1)	gr	10160	10160	10160
Berat bejana kosong +pasir	gr	19240	19185	19420
Berat satuan	gr/cm^3	1.713	1.703	1.747
Rata - rata	gr/cm^3	1.721		

Analisis hitungan:

a. Bejana: d = 15 cm

h = 30 cm

b. Volume bejana kosong $= \frac{1}{4}\pi r^2 t$

$= \frac{1}{4}\pi \ x \ 15^2 \ x \ 30$

= 5301 cm^3

c. Berat satuan (B_{sat}) $= \frac{B2-B1}{Volume}$

Contoh benda uji 1 $= \frac{19240-10160}{5301}$

= 1,713 gr/cm^3

d. Berat satuan rata-rata $= \frac{B_{1sat}+ B_{2sat}+ B_{3sat}}{3}$

$= \frac{1,713+1,703+1,747}{3}$

= 1,721 gr/cm^3

Lampiran 5. Pengujian penelitian tugas akhir agregat halus

Jenis Pengujian : Pemeriksaan kadar lumpur agregat halus

Bahan : Pasir Progo

Asal : Sungai progo

Diperiksa : 21 Desember 2018

Tabel 1. Hasil pemeriksaan kadar 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	765	602	611
Berat nampan (W3)	gr	285	127	126
Berat pasir kering tungku setelah dicuci (W4)	%	480	475	485
Kadar lumpur	%	4	5	3
Rata-rata	%	4		

Analissis hitungan:

a. Berat pasir kering tungku setelah dicuci (W4) = W2 – W3

Contoh benda uji 1 = 765 – 285

= 480

b. Kadar lumpur = $\frac{W1-W4}{W1}$ x 100%

Contoh benda uji 1 = $\frac{500-480}{500}$ x 100%

= 4%

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

= $\frac{4+5+3}{3}$ x 100%

= 4%

Lampiran 6. Pengujian penelitian tugas akhir agregat kasar

Jenis Pengujian : Pemeriksaan berat jenis dan penyerapan air agregat kasar

Bahan : Kerikil Clereng

Asal : Clereng

Diperiksa : 21 Desember 2018

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

Uraian	Satuan	Benda Uji		
		1	2	3
Berat kerikil setelah dikeringkan (Bk)	gram	3000	3000	3000
Berat kerikil didalam air (Ba)	gram	1882	1891	1891
Berat kerikil keadaan jenuh (Bj)	gram	3086	3087	3081

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

Uraian	Satuan	Benda Uji			Rata-rata
		1	2	3	
Berat jenis curah		2.492	2.508	2.521	2.507
Berat jenis kering muka		2.563	2.581	2.589	2.578
Berat jenis tampak		2.683	2.705	2.705	2.698
Penyerapan air agregat kasar	%	2.867	2.900	2.700	2.822
Berat kerikil jenuh rata-rata	gram	3084.667			
Penyerapan air agregat kasar	%	2.822			

Analisis hitungan:

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

Contoh benda uji 1 $= \frac{3000}{3086-1882}$

$= 2{,}492$

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

Contoh benda uji 1 $= \frac{3086}{3086-1882}$

$= 2{,}563$

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

Contoh benda uji 1 $= \frac{5000}{5000-1882}$

= 2,683

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

Contoh benda uji 1 $= \frac{3086-3000}{3000}$ x 100%

= 2,867%

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

$= \frac{3086+3087+3081}{3}$

= 3084,667

f. Penyerapan air rata-rata AK $= \frac{P.air\ AK\ 1+P.air\ AK\ 2+P.air\ AK\ 3}{3}$

$= \frac{2,867+2,900+2,700}{3}$

= 2,822

Lampiran 7. Pengujian penelitian tugas akhir agregat kasar

Jenis Pengujian : Pemeriksaan berat satuan agregat kasar

Bahan : Kerikil Clereng

Asal : Clereng

Diperiksa : 19 Desember 2018

Tabel 1. Hasil pemeriksaan berat satuan agregat kasar

Uraian	Satuan	Benda Uji		
		1	2	3
Berat bejana kosong (B1)	gr	10160	10160	10160
Berat bejana kosong +kerikil (B2)	gr	18120	18340	18360
Berat satuan	gr/cm^3	1.502	1.543	1.547
Rata - rata	gr/cm^3	1.531		

Analisi hitungan:

a. Bejana: d = 15 cm

h = 30 cm

b. Volume bejana kosong $= \frac{1}{4}\pi r^2 t$

$= \frac{1}{4}\pi \ x \ 15^2 \ x \ 30$

= 5301 cm^3

c. Berat satuan (B_{sat}) $= \frac{B2-B1}{Volume}$

Contoh benda uji 1 $= \frac{18120-10160}{5301}$

= 1,502 gr/cm^3

d. Berat satuan rata-rata $= \frac{B_{1sat}+ B_{2sat}+ B_{3sat}}{3}$

$= \frac{1,502+1,543+1,547}{3}$

= 1,531 gr/cm^3

Lampiran 8. Pengujian penelitian tugas akhir agregat kasar

Jenis Pengujian : Pemeriksaan kadar air agregat kasar

Bahan : Kerikil Clereng

Asal : Clereng

Diperiksa : 22 Februari 2019

Uraian	**Satuan**	**Benda Uji**		
		1	**2**	**3**
Berat pasir keadaan jenuh kering muka (B_1)	gram	3000	3000	3000
Berat pasir keadaan kering tungku (B_2)	gram	2889	2894	2883
Kadar air	%	3.70	3.53	3.90
Kadar air rata-rata	%	3.71		

Analisis Hitungan:

a. Kadar air

Contoh benda uji 1

$$= \frac{B_1 - B_2}{B_1} \times 100\%$$

$$= \frac{3000 - 2889}{3000} \times 100\%$$

$$= 3,70\%$$

b. Kadar air rata-rata

$$= \frac{\text{Benda uji } 1 + \text{Benda uji } 2 + \text{Benda uji } 3}{3}$$

$$= \frac{3,70\% + 3,53\% + 3,90\%}{3}$$

$$= 3,71\%$$

Lampiran 9. Pengujian penelitian tugas akhir agregat kasar

Jenis Pengujian : Pemeriksaan kadar lumpur agregat kasar

Bahan : Kerikil

Asal : Clereng

Diperiksa : 21 Desember 2018

Tabel 1. Hasil pemeriksaan kadar lumpur agregat halus

Uraian	Satuan	Benda Uji		
		1	2	3
Berat wadah + Pasir setelah di*oven* pertama (W1)	gr	5235	5230	5425
Berat wadah + Pasir setelah di*oven* pertama (W2)	gr	4980	4945	5185
Kandugan air (W3 = W1-W2)	gr	255	285	240
Kadar lumpur	%	4,87	5,45	4,42
Rata-rata	%	4,91		

Analissis hitungan:

a. Kandungan air = B1 – B2

Contoh benda uji 1 = 5235 – 4980

= 255

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

Contoh benda uji 1 = $\frac{2535-4980}{2535}$ x 100%

= 4,87%

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

= $\frac{4,87+5,45+4,42}{3}$ x 100%

= 4,91%

Lampiran 10. Pengujian penelitian tugas akhir agregat kasar

Jenis Pengujian : Pemeriksaan keausan (los angeles) agregat kasar

Bahan : Kerikil Clereng

Asal : Clereng

Diperiksa : 21 Desember 2018

Tabel 1. Pemeriksaan keausan agregat kasar

Uraian	Satuan	Benda Uji		
		1	2	3
Berat sebelum pengujian los angeles (B1)	gram	5000	5000	5000
Berat sesudah pengujian los angeles (B2)	gram	3280	3490	3300
Keausan	%	34,40	30,20	34,00
Keausan rata-rata	%	32,87		

Analisis Hitungan:

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

Contoh benda uji 1 $= \frac{5000-3280}{5000}$ x 100%

$= 34{,}40\%$

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

$= \frac{34{,}40+30{,}20+34{,}00}{3}$

$= 32{,}87\%$

Lampiran 11. Alat pemerikasaan bahan penyusun beton

Gambar 1 Timbangan

Gambar 2 Kaliper

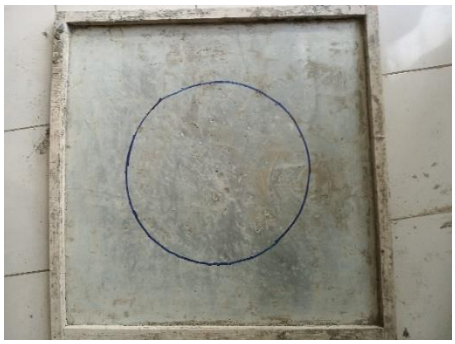
Gambar 3 Saringan

Gambar 4 Timbangan dalam air

Gambar 5 Mesin *los angeles*

Gambar 6 *Erlenmeyer*

Lampiran 12. Alat pemeriksaan sifat segar beton



Gambar 7 Meja sebar T50

Gambar 8 Alat pengujian *j-ring*

Gambar 9 Kerucut *abrams*

Gambar 10 Alat pengujian *v-funnel*

Lampiran 13. Alat pembuatan benda uji

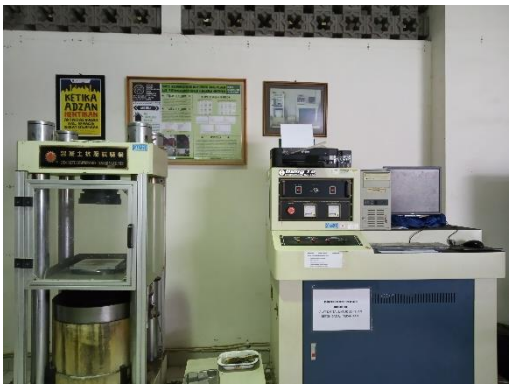
Gambar 11 *Concrete mixer*

Gambar 12 silinder

Gambar 13 cetok

Gambar 14 Gelas ukur 1000 ml

Gambar 15 Nampan



Gambar 16 *Compression machine test*

Lampiran 14. Bahan penyusun beton

Gambar 17 Semen *holcim power max*

Gambar 18 *Silica fume*

Gambar 19 Kerikil Agregat kasar (kerikil clereng)

Gambar 20 Agregat halus (pasir progo)

Gambar 21 Air

Gambar 22 *Superplasticizer (Sikament LN)*

Gambar 23 *Nylon*

Lampiran 15. Proses pengujian beton segar (*fresh properties*)

Gambar 24 Pengujain meja sebar T50

Gambar 25 Pengujian *j-ring*

Gambar 26 Pengujian *v-funnel*

Gambar 27 Pengujian *l-box*

Lampiran 16. Proses pengujian kuat tekan

Gambar 28 Pengukuran diameter benda uji silinder

Gambar 29 Pengukuran tinggi benda uji silinder

Gambar 30 Pengujian kuat tekan beton

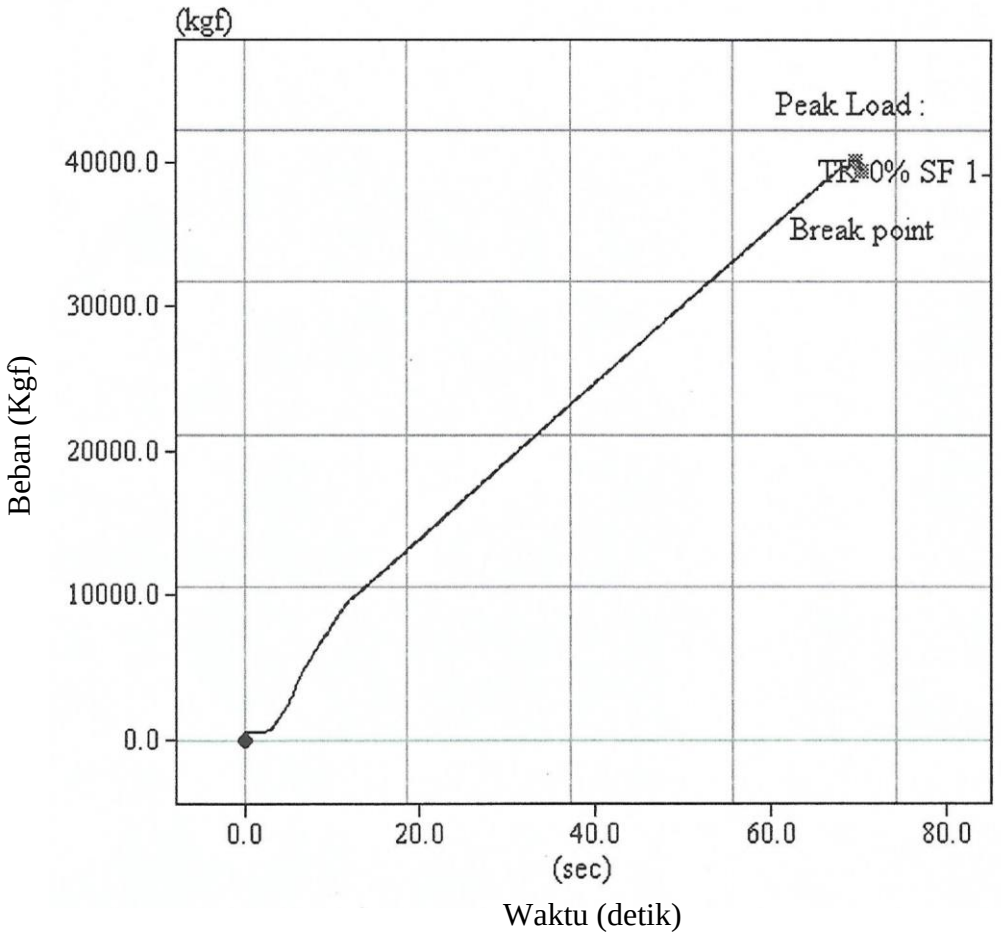
Gambar 31 Beton setelah dilakukan uji tekan

Lampiran 17. Hasil uji kuat tekan

Laboratorium Jurusan Teknik Sipil
Universitas Muhammadiyah Yogyakarta

Concrete Testing

Construstion Name	**Sldr beton**									
Manufacturer	**Hungta**									
Contractor	**UMY**									
Customer	**Lab. JTS. FT.UMY**									
Test Date	**3/2/2019**				**Report No.**			**TK 0% SF 1**		
No.	**Area (cm^2)**	**Peak Force (Kg)**	**Compression Stress (psi)**	**Adjust Stress (Kgf/cm^2)**	**H/D Ratio**	**Desiga Stress**	**Adjust Ratio**	**Life**	**Break Style**	**Remark**
1	**177.89**	**40030**	**3200.4**	**226.1**	**2.1**	**300.0**	**1.0**	**7**		

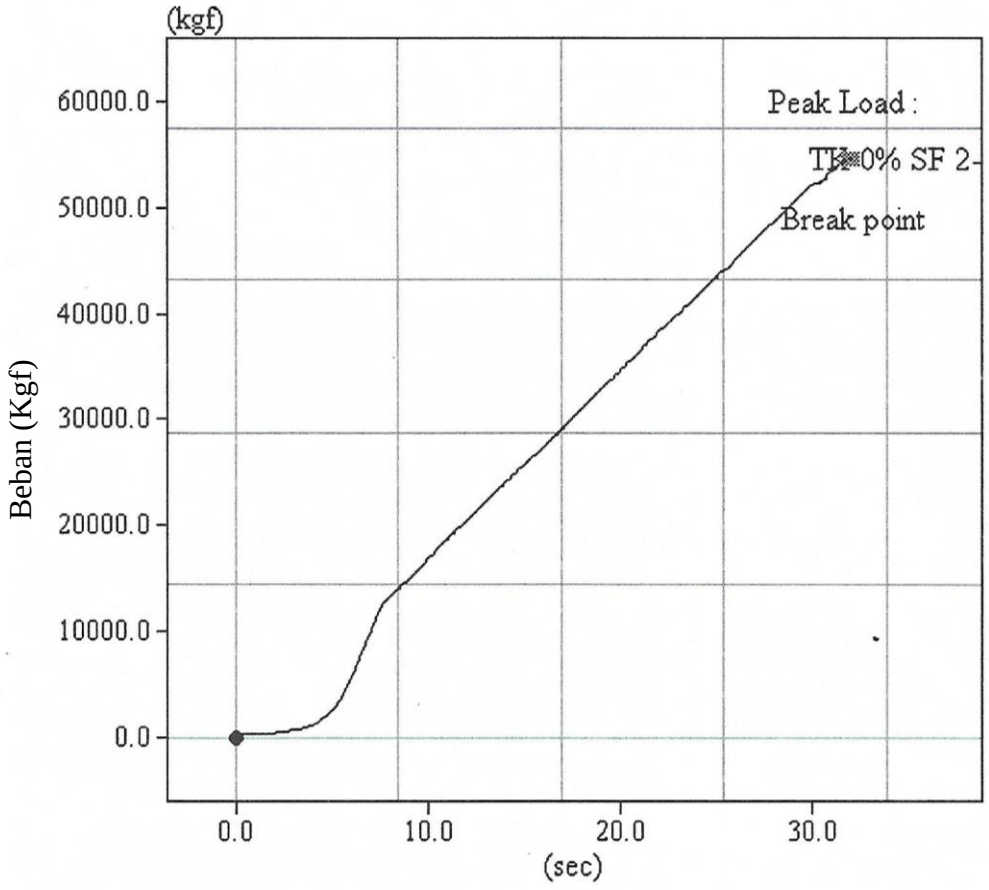


Gambar 32 Hubungan beban dan waktu

Laboratorium Jurusan Teknik Sipil
Universitas Muhammadiyah Yogyakarta

Concrete Testing

Construstion Name	**Sldr beton**									
Manufacturer	**Hungta**									
Contractor	**UMY**									
Customer	**Lab. JTS. FT.UMY**									
Test Date	**3/2/2019**				**Report No.**			**TK 0% SF 2**		
No.	**Area (cm^2)**	**Peak Force (Kg)**	**Compression Stress (psi)**	**Adjust Stress (Kgf/cm^2)**	**H/D Ratio**	**Design Stress**	**Adjust Ratio**	**Life**	**Break Style**	**Remark**
1	**176.71**	**54500**	**4386.4**	**308.1**	**2.0**	**300.0**	**1.0**	**7**		

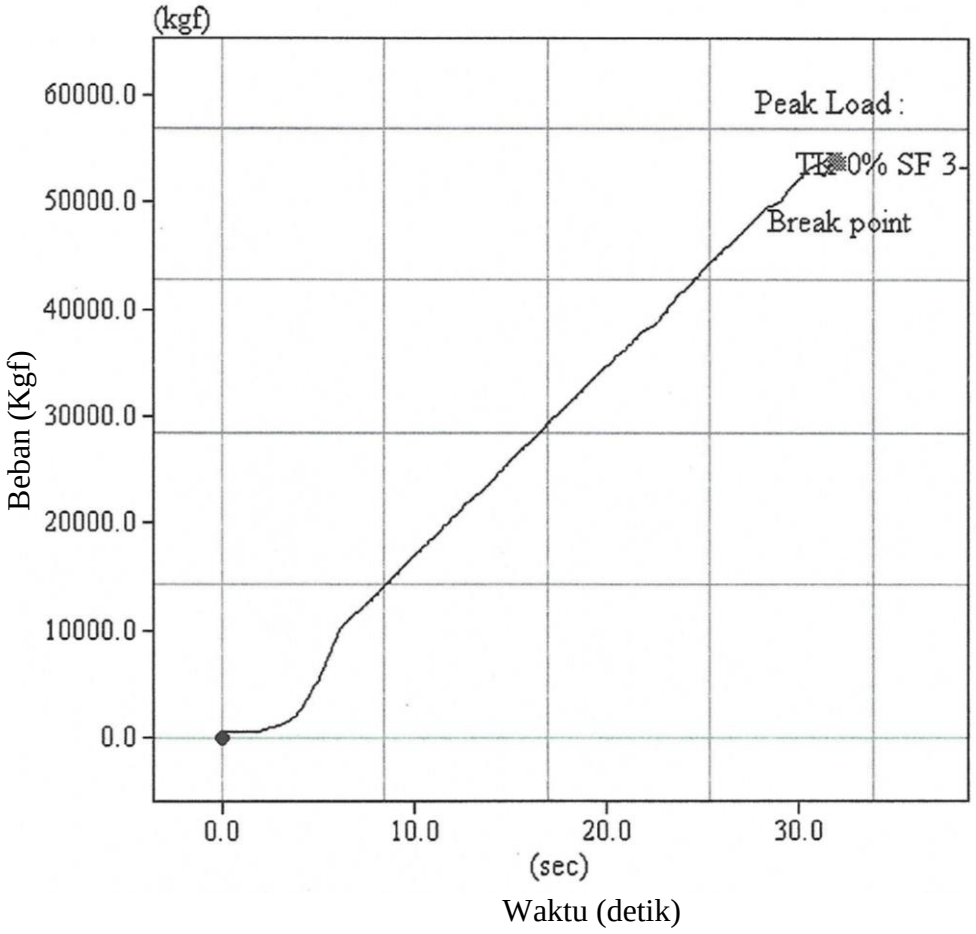


Gambar 33 Hubungan beban dan waktu

Laboratorium Jurusan Teknik Sipil
Universitas Muhammadiyah Yogyakarta

Concrete Testing

Construstion Name	**Sldr beton**									
Manufacturer	**Hungta**									
Contractor	**UMY**									
Customer	**Lab. JTS. FT.UMY**									
Test Date	**3/2/2019**			**Report No.**			**TK 0% SF 3**			
No.	**Area (cm^2)**	**Peak Force (Kg)**	**Compression Stress (psi)**	**Adjust Stress (Kgf/cm^2)**	**H/D Ratio**	**Design Stress**	**Adjust Ratio**	**Life**	**Break Style**	**Remark**
1	**177.42**	**53980**	**4327.2**	**303.3**	**2.0**	**300.0**	**1.0**	**7**		

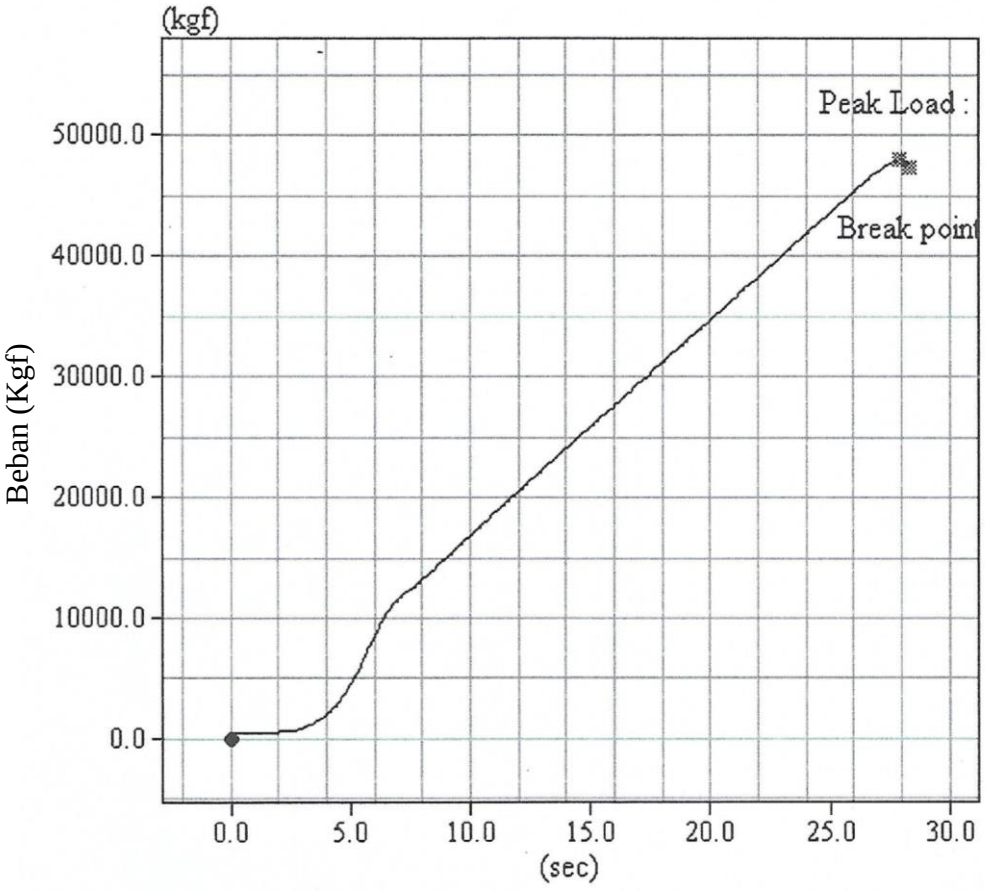


Gambar 34 Hubungan beban dan waktu

Laboratorium Jurusan Teknik Sipil
Universitas Muhammadiyah Yogyakarta

Concrete Testing

Construstion Name	**Sldr beton**									
Manufacturer	**Hungta**									
Contractor	**UMY**									
Customer	**Lab. JTS. FT.UMY**									
Test Date	**03/09/2019**			**Report No.**		**N 1**				
No.	**Area (cm^2)**	**Peak Force (Kg)**	**Compression Stress (psi)**	**Adjust Stress (Kgf/cm^2)**	**H/D Ratio**	**Design Stress**	**Adjust Ratio**	**Life**	**Break Style**	**Remark**
1	**177.89**	**47980**	**3836.0**	**268.4**	**1.9**	**300.0**	**1.0**	**14**		



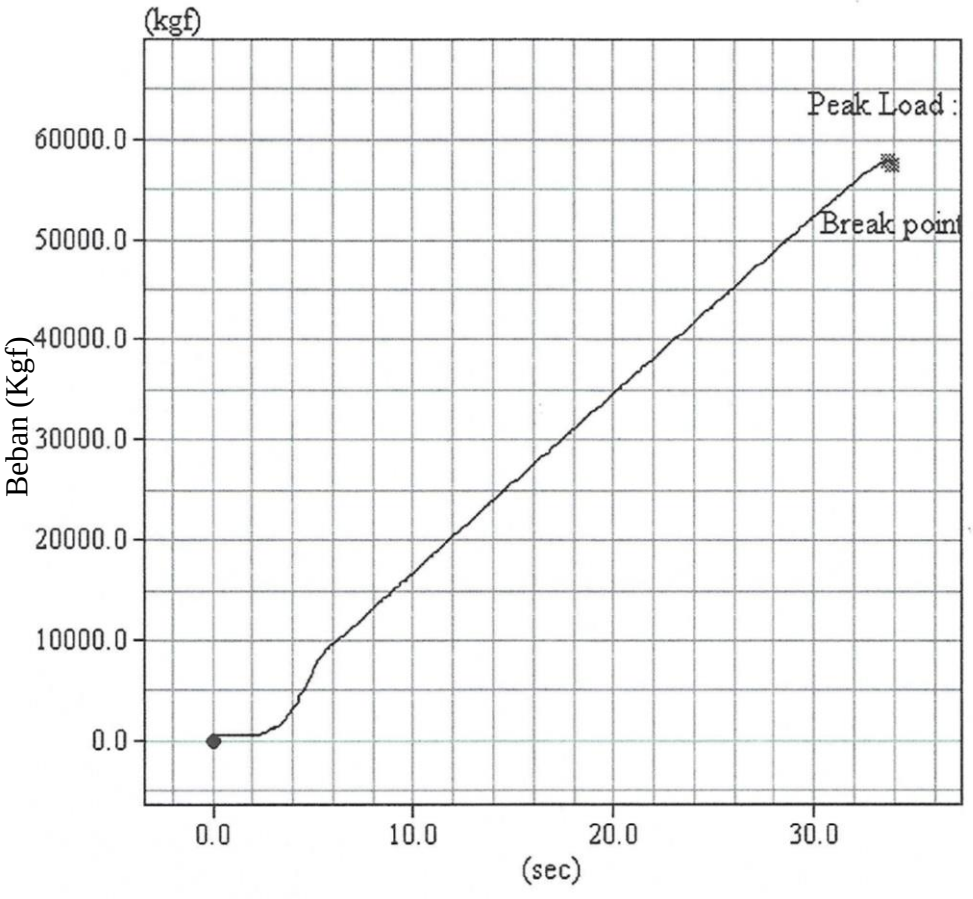
Waktu (detik)

Gambar 35 Hubungan beban dan waktu

Laboratorium Jurusan Teknik Sipil
Universitas Muhammadiyah Yogyakarta

Concrete Testing

Construstion Name			**Sldr beton**							
Manufacturer			**Hungta**							
Contractor			**UMY**							
Customer			**Lab. JTS. FT.UMY**							
Test Date			**03/09/2019**		**Report No.**			**N 2**		
No.	**Area (cm^2)**	**Peak Force (Kg)**	**Compression Stress (psi)**	**Adjust Stress (Kgf/cm^2)**	**H/D Ratio**	**Design Stress**	**Adjust Ratio**	**Life**	**Break Style**	**Remark**
1	**177.19**	**57840**	**4642.8**	**324.5**	**1.9**	**300.0**	**1.0**	**14**		

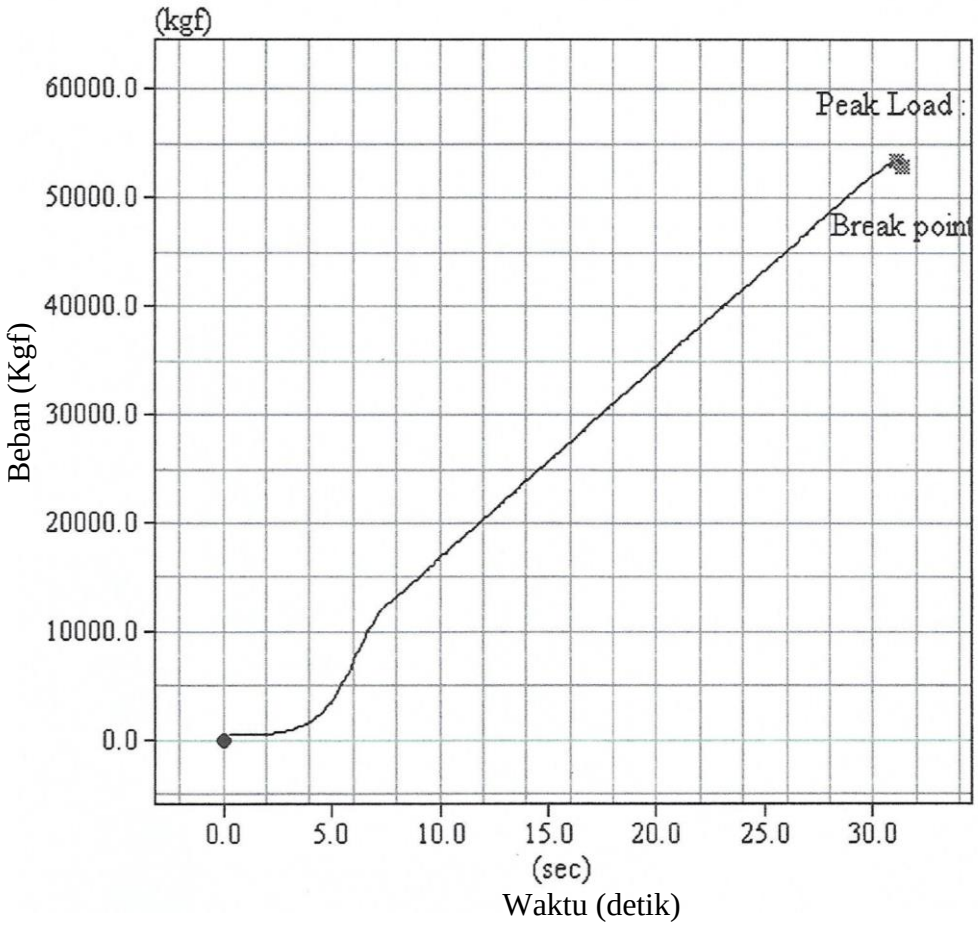


Gambar 36 Hubungan beban dan waktu

Laboratorium Jurusan Teknik Sipil
Universitas Muhammadiyah Yogyakarta

Concrete Testing

Construstion Name			**Sldr beton**							
Manufacturer			**Hungta**							
Contractor			**UMY**							
Customer			**Lab. JTS. FT.UMY**							
Test Date			**03/09/2019**		**Report No.**			**N 3**		
No.	**Area (cm^2)**	**Peak Force (Kg)**	**Compression Stress (psi)**	**Adjust Stress (Kgf/cm^2)**	**H/D Ratio**	**Design Stress**	**Adjust Ratio**	**Life**	**Break Style**	**Remark**
1	**176.71**	**53350**	**4293.8**	**301.3**	**2.0**	**300.0**	**1.0**	**14**		

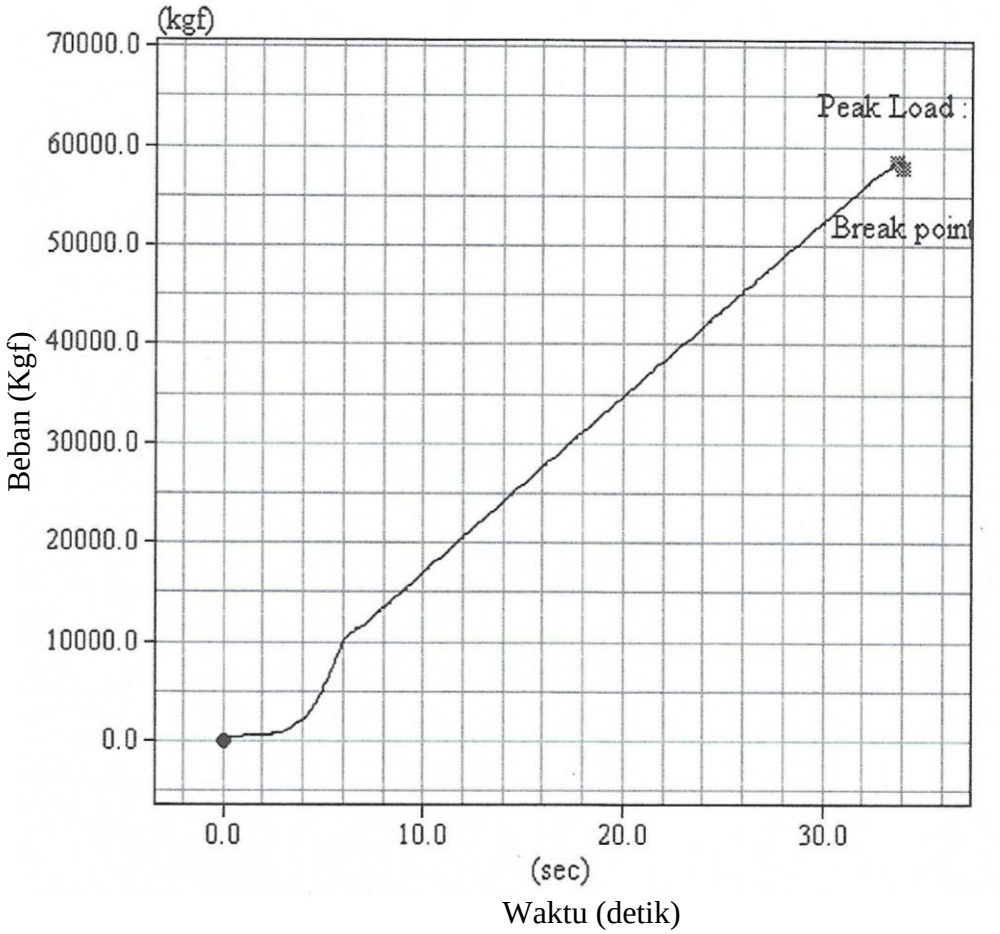


Gambar 37 Hubungan beban dan waktu

Laboratorium Jurusan Teknik Sipil
Universitas Muhammadiyah Yogyakarta

Concrete Testing

Construstion Name	**Sldr beton**									
Manufacturer	**Hungta**									
Contractor	**UMY**									
Customer	**Lab. JTS. FT.UMY**									
Test Date	**03/08/2019**				**Report No.**		**NORMAL 1**			
No.	**Area (cm^2)**	**Peak Force (Kg)**	**Compression Stress (psi)**	**Adjust Stress (Kgf/cm^2)**	**H/D Ratio**	**Design Stress**	**Adjust Ratio**	**Life**	**Break Style**	**Remark**
1	**176.71**	**58390**	**4699.5**	**329.8**	**2.0**	**300.0**	**1.0**	**28**		

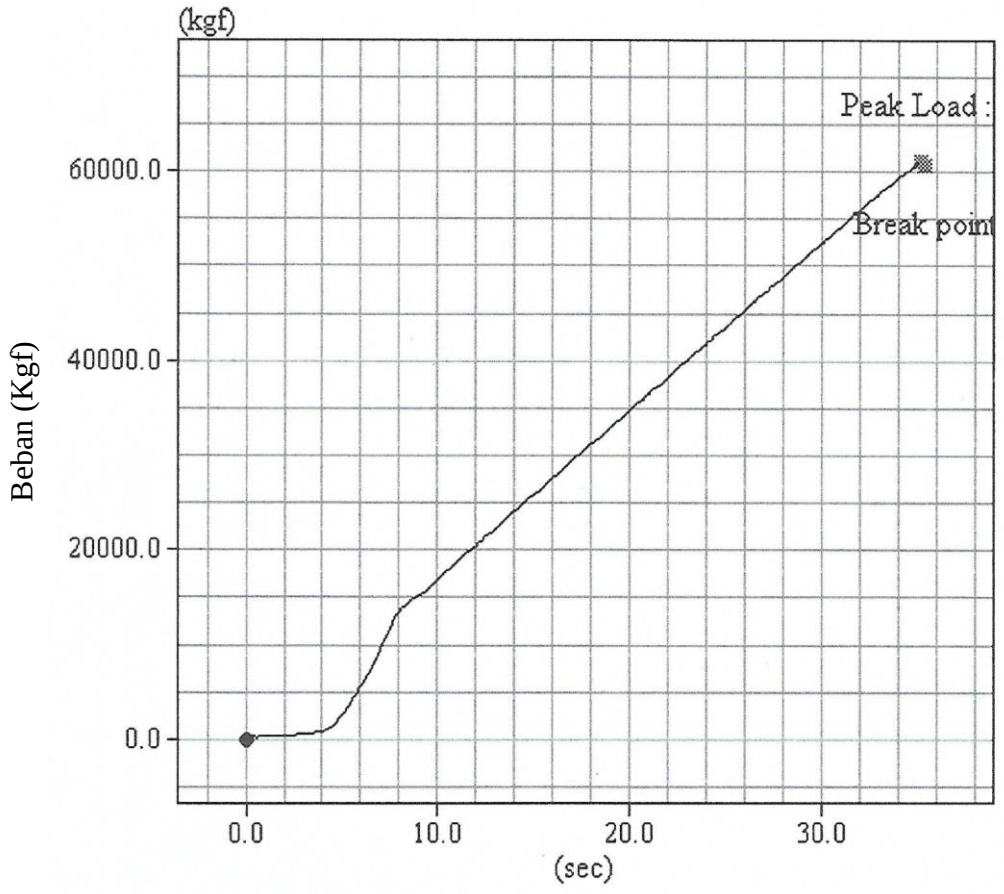


Gambar 38 Hubungan beban dan waktu

Laboratorium Jurusan Teknik Sipil
Universitas Muhammadiyah Yogyakarta

Concrete Testing

Construstion Name	**Sldr beton**									
Manufacturer	**Hungta**									
Contractor	**UMY**									
Customer	**Lab. JTS. FT.UMY**									
Test Date	**03/08/2019**			**Report No.**		**NORMAL 2**				
No.	**Area (cm^2)**	**Peak Force (Kg)**	**Compression Stress (psi)**	**Adjust Stress (Kgf/cm^2)**	**H/D Ratio**	**Design Stress**	**Adjust Ratio**	**Life**	**Break Style**	**Remark**
1	**176.71**	**61020**	**4911.1**	**345.0**	**2.0**	**300.0**	**1.0**	**28**		

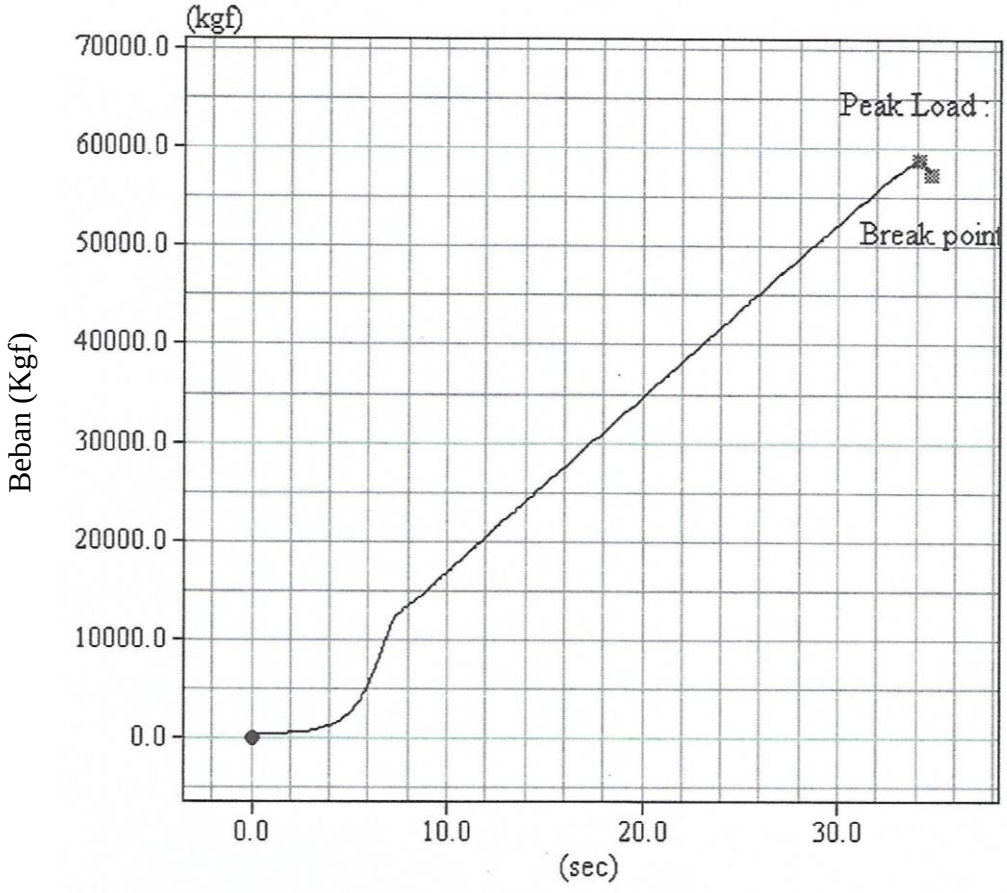


Gambar 39 Hubungan beban dan waktu

Laboratorium Jurusan Teknik Sipil
Universitas Muhammadiyah Yogyakarta

Concrete Testing

Construstion Name	**Sldr beton**									
Manufacturer	**Hungta**									
Contractor	**UMY**									
Customer	**Lab. JTS. FT.UMY**									
Test Date	**03/08/2019**			**Report No.**		**NORMAL 3**				
No.	**Area (cm^2)**	**Peak Force (Kg)**	**Compression Stress (psi)**	**Adjust Stress (Kgf/cm^2)**	**H/D Ratio**	**Design Stress**	**Adjust Ratio**	**Life**	**Break Style**	**Remark**
1	176.71	58730	4726.8	331.0	1.9	300.0	1.0	28		



Beban (Kgf)

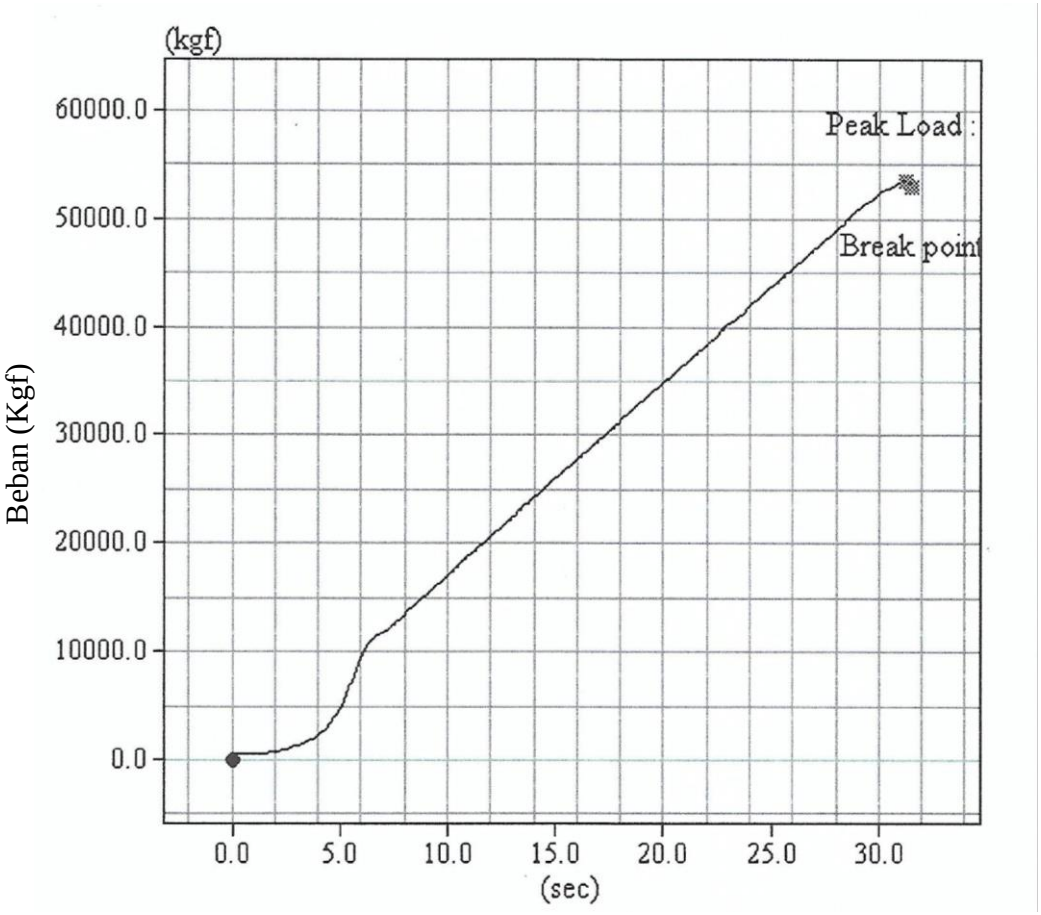
Waktu (detik)

Gambar 40 Hubungan beban dan waktu

Laboratorium Jurusan Teknik Sipil
Universitas Muhammadiyah Yogyakarta

Concrete Testing

Construstion Name	**Sldr beton**									
Manufacturer	**Hungta**									
Contractor	**UMY**									
Customer	**Lab. JTS. FT.UMY**									
Test Date	**03/06/2019**			**Report No.**			**TK 5% SF 1**			
No.	**Area (cm^2)**	**Peak Force (Kg)**	**Compression Stress (psi)**	**Adjust Stress (Kgf/cm^2)**	**H/D Ratio**	**Design Stress**	**Adjust Ratio**	**Life**	**Break Style**	**Remark**
1	**172.50**	**53140**	**4381.4**	**306.2**	**1.9**	**300.0**	**1.0**	**7**		



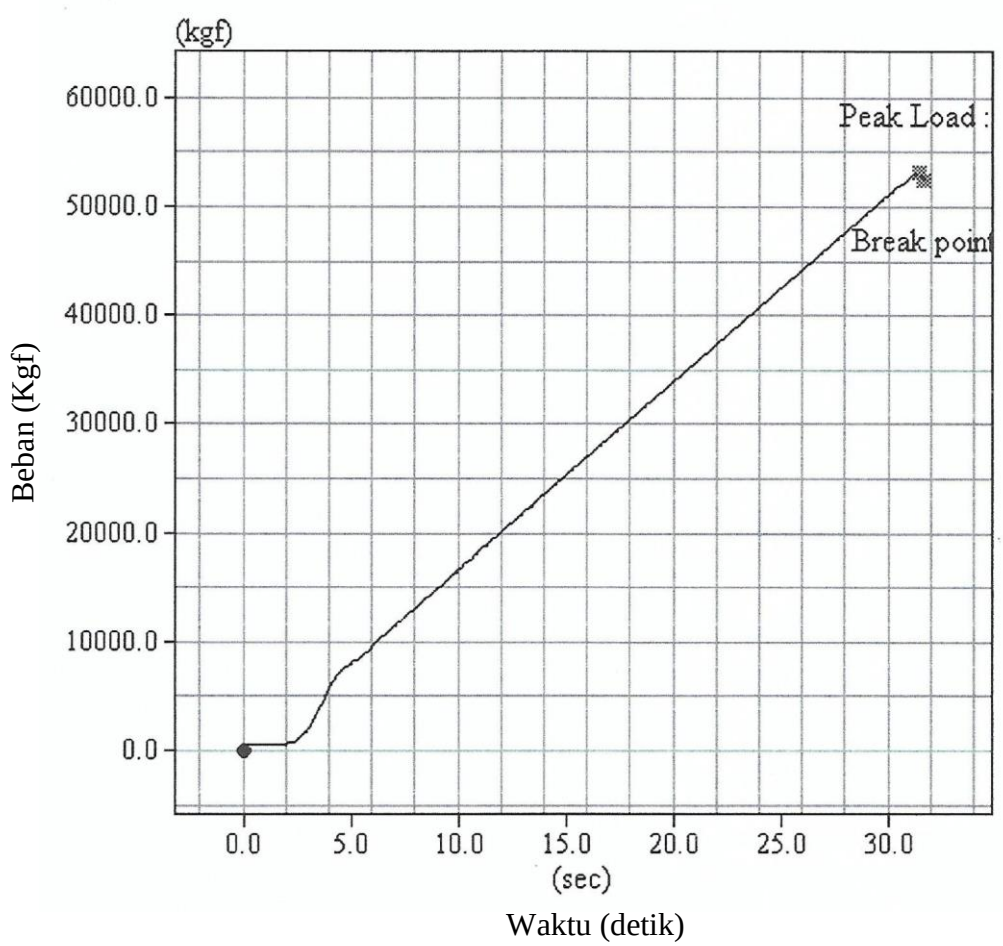
Waktu (detik)

Gambar 41 Hubungan beban dan waktu

Laboratorium Jurusan Teknik Sipil
Universitas Muhammadiyah Yogyakarta

Concrete Testing

Construstion Name	**Sldr beton**									
Manufacturer	**Hungta**									
Contractor	**UMY**									
Customer	**Lab. JTS. FT.UMY**									
Test Date	**03/06/2019**			**Report No.**			**TK 5% SF 2**			
No.	**Area (cm^2)**	**Peak Force (Kg)**	**Compression Stress (psi)**	**Adjust Stress (Kgf/cm^2)**	**H/D Ratio**	**Design Stress**	**Adjust Ratio**	**Life**	**Break Style**	**Remark**
1	**177.66**	**53510**	**4283.8**	**299.1**	**1.9**	**300.0**	**1.0**	**7**		



Beban (Kgf)

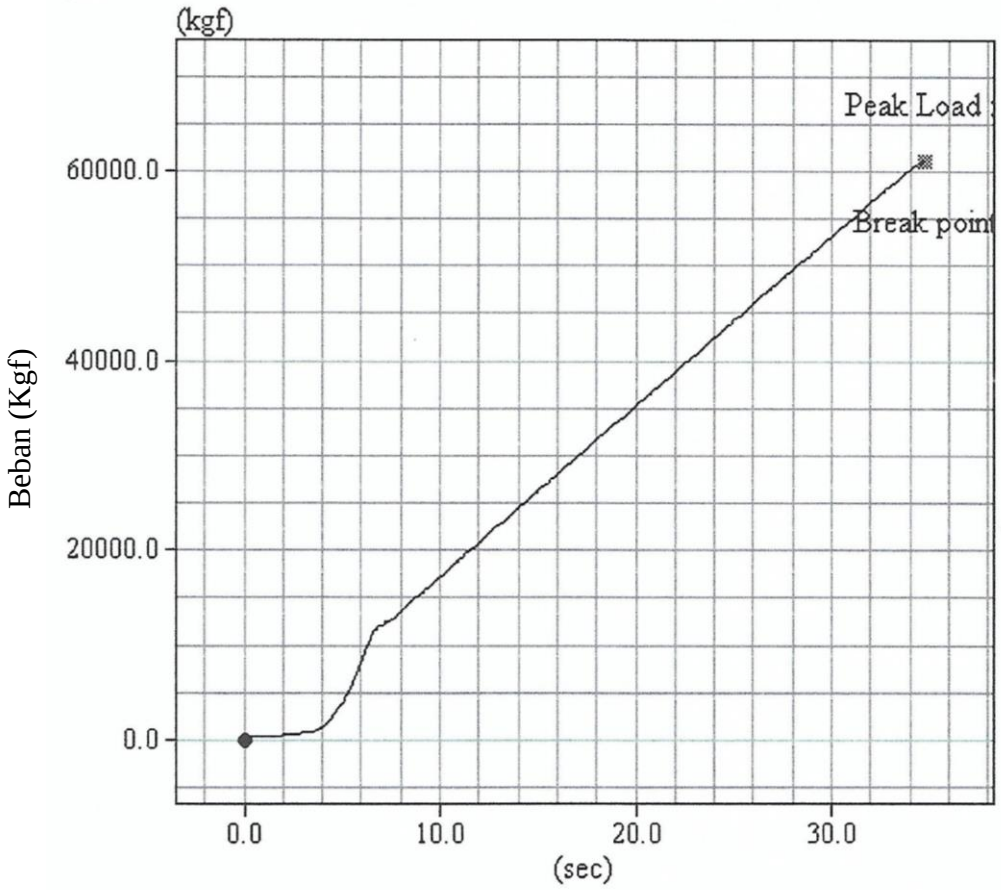
Waktu (detik)

Gambar 42 Hubungan beban dan waktu

Laboratorium Jurusan Teknik Sipil
Universitas Muhammadiyah Yogyakarta

Concrete Testing

Construstion Name	**Sldr beton**									
Manufacturer	**Hungta**									
Contractor	**UMY**									
Customer	**Lab. JTS. FT.UMY**									
Test Date	**03/06/2019**			**Report No.**			**TK 5% SF 3**			
No.	**Area (cm^2)**	**Peak Force (Kg)**	**Compression Stress (psi)**	**Adjust Stress (Kgf/cm^2)**	**H/D Ratio**	**Design Stress**	**Adjust Ratio**	**Life**	**Break Style**	**Remark**
1	**179.32**	**60980**	**4836.7**	**339.7**	**2.0**	**300.0**	**1.0**	**7**		

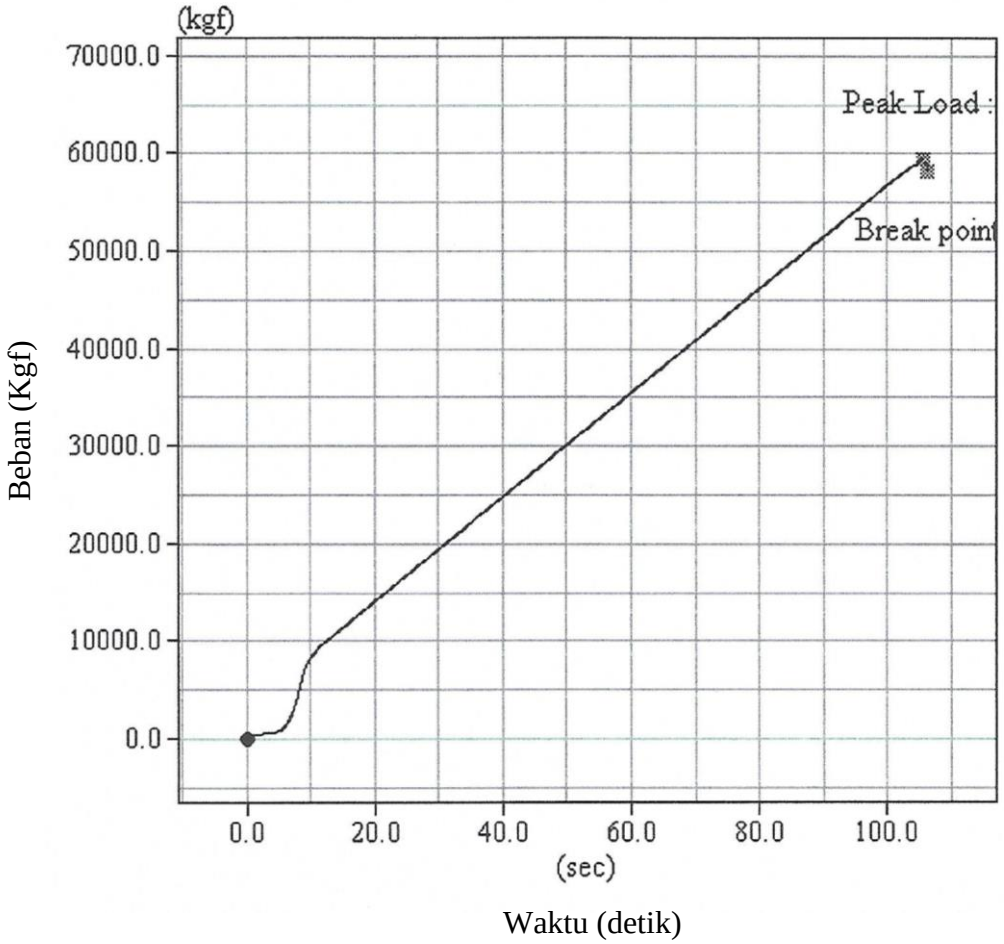


Gambar 43 Hubungan beban dan waktu

Laboratorium Jurusan Teknik Sipil
Universitas Muhammadiyah Yogyakarta

Concrete Testing

Construstion Name			**Sldr Btn**							
Manufacturer			**Hungta**							
Contractor			**UMY**							
Customer			**Lab. JTS. FT.UMY**							
Test Date			**03/18/2019**		**Report No.**			**TK 5% SF. 1**		
No.	Area (cm^2)	Peak Force (Kg)	Compression Stress (psi)	Adjust Stress (Kgf/cm^2)	H/D Ratio	Design Stress	Adjust Ratio	Life	Break Style	Remark
1	178.13	59380	4741.1	333.0	2.0	300.0	1.0	14		

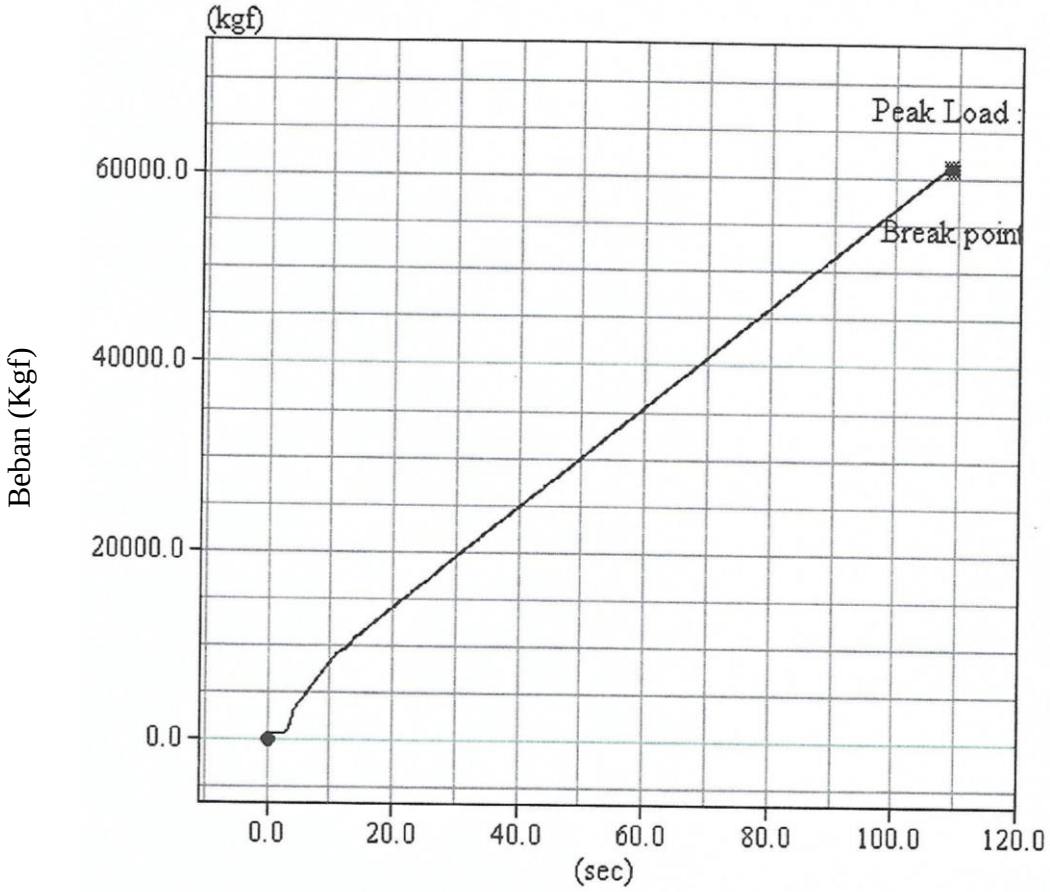


Gambar 44 Hubungan beban dan waktu

Laboratorium Jurusan Teknik Sipil
Universitas Muhammadiyah Yogyakarta

Concrete Testing

Construstion Name	**Sldr Btn**									
Manufacturer	**Hungta**									
Contractor	**UMY**									
Customer	**Lab. JTS. FT.UMY**									
Test Date	**3/18/2019**			**Report No.**			**TK 5% SF. 2.**			
No.	**Area (cm^2)**	**Peak Force (Kg)**	**Compression Stress (psi)**	**Adjust Stress (Kgf/cm^2)**	**H/D Ratio**	**Design Stress**	**Adjust Ratio**	**Life**	**Break Style**	**Remark**
1	**178.13**	**61280**	**4892.8**	**343.7**	**2.0**	**300.0**	**1.0**	**14**		



Beban (Kgf)

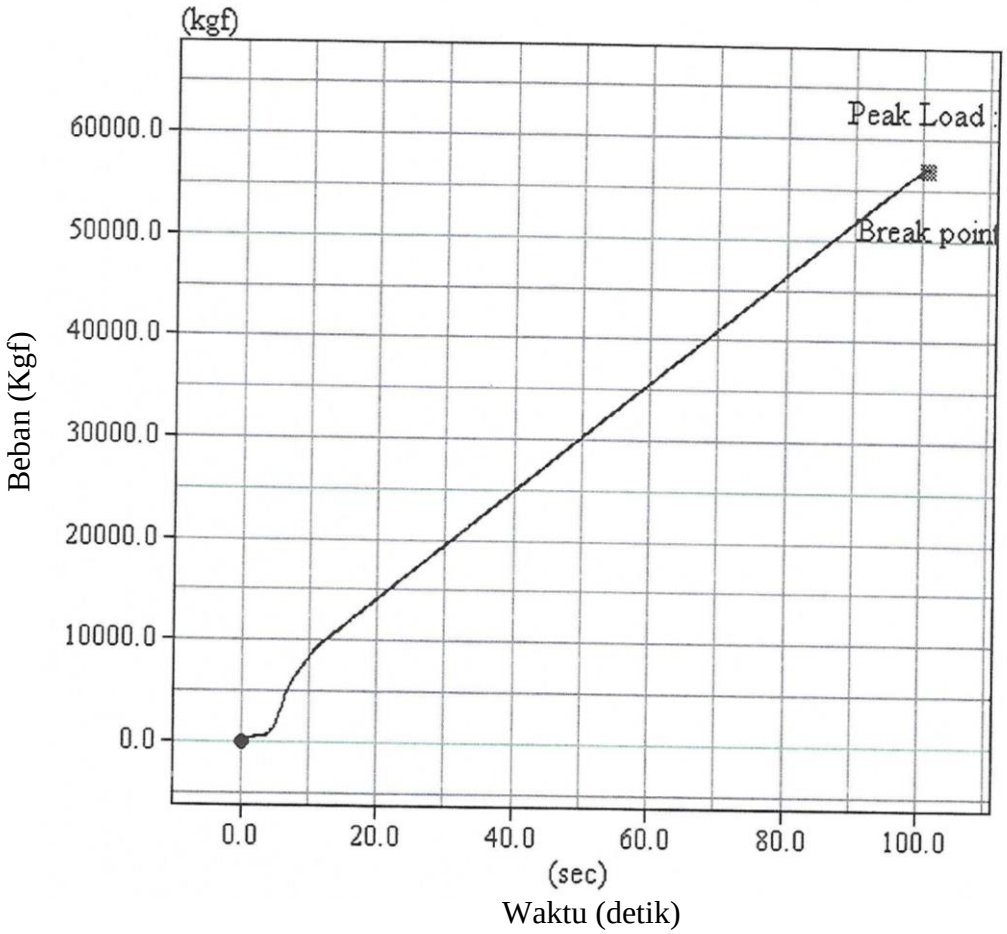
Waktu (detik)

Gambar 45 Hubungan beban dan waktu

Laboratorium Jurusan Teknik Sipil
Universitas Muhammadiyah Yogyakarta

Concrete Testing

Construstion Name			**Sldr Btn**							
Manufacturer			**Hungta**							
Contractor			**UMY**							
Customer			**Lab. JTS. FT.UMY**							
Test Date			**3/18/2019**		**Report No.**			**TK 5% SF. 3**		
No.	**Area (cm^2)**	**Peak Force (Kg)**	**Compression Stress (psi)**	**Adjust Stress (Kgf/cm^2)**	**H/D Ratio**	**Design Stress**	**Adjust Ratio**	**Life**	**Break Style**	**Remark**
1	**178.84**	**56950**	**4529.1**	**318.1**	**2.0**	**300.0**	**1.0**	**14**		



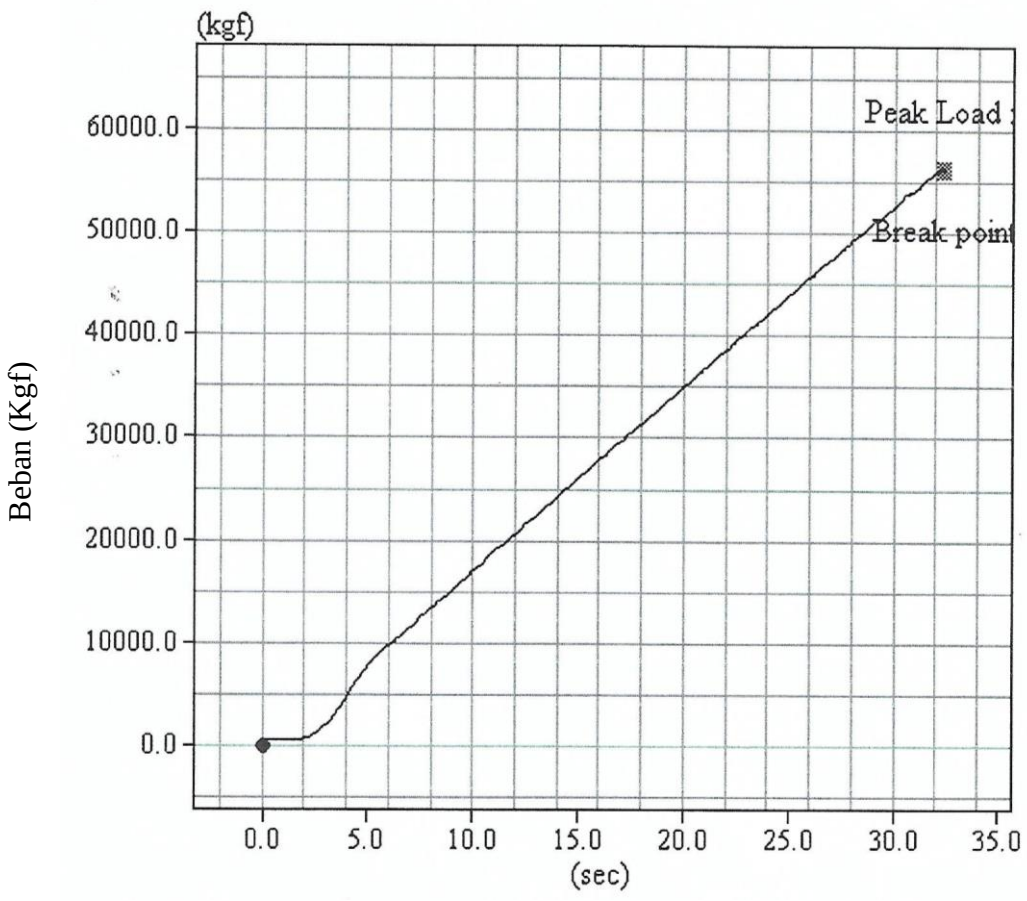
Gambar 46 Hubungan beban dan waktu

Laboratorium Jurusan Teknik Sipil
Universitas Muhammadiyah Yogyakarta

Concrete Testing

Construstion Name	Sldr btn
Manufacturer	Hungta
Contractor	UMY
Customer	Lab. JTS. FT.UMY
Test Date	2/9/2019
Report No.	SF5-1

No.	Area (cm^2)	Peak Force (Kg)	Compression Stress (psi)	Adjust Stress (Kgf/cm^2)	H/D Ratio	Design Stress	Adjust Ratio	Life	Break Style	Remark
1	178.60	56350	4487.3	314.9	2.0	300.0	1.0	28		



Beban (Kgf)

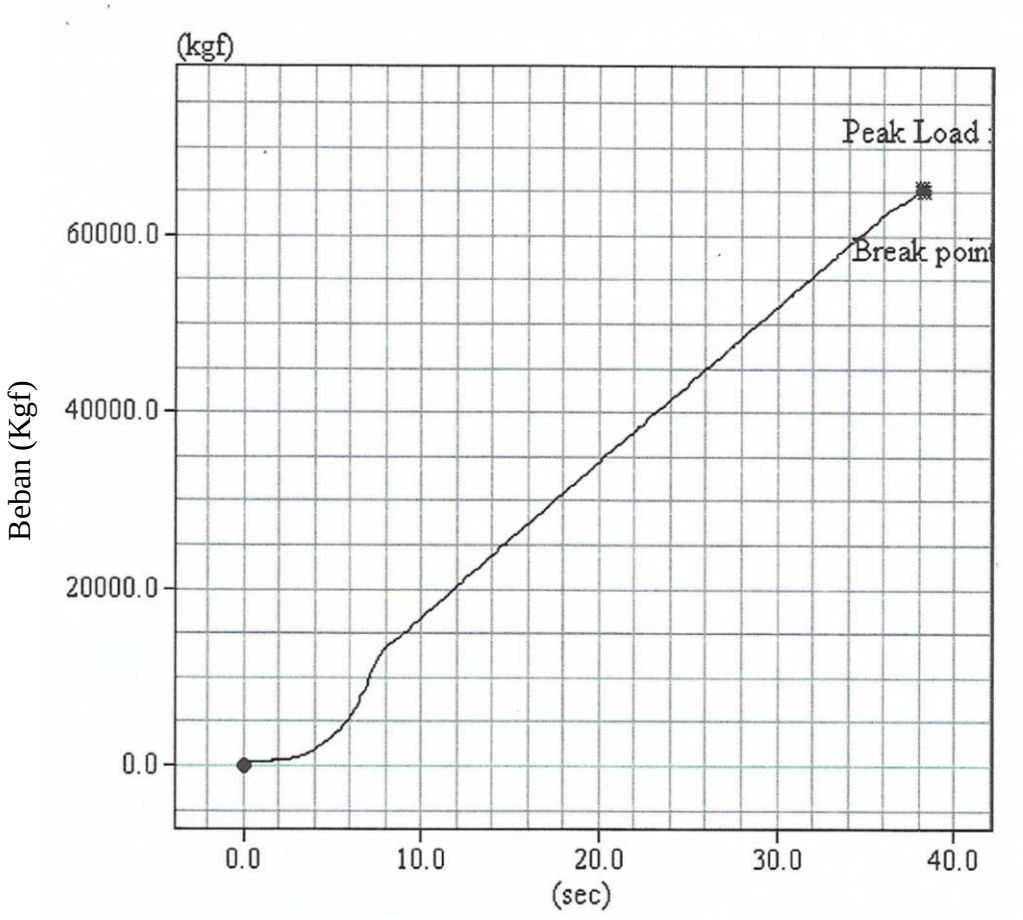
Waktu (detik)

Gambar 47 Hubungan beban dan waktu

Laboratorium Jurusan Teknik Sipil
Universitas Muhammadiyah Yogyakarta

Concrete Testing

Construstion Name	**Sldr btn**									
Manufacturer	**Hungta**									
Contractor	**UMY**									
Customer	**Lab. JTS. FT.UMY**									
Test Date	**2/9/2019**			**Report No.**		**SF5-2**				
No.	**Area (cm^2)**	**Peak Force (Kg)**	**Compression Stress (psi)**	**Adjust Stress (Kgf/cm^2)**	**H/D Ratio**	**Design Stress**	**Adjust Ratio**	**Life**	**Break Style**	**Remark**
1	**175.07**	**65460**	**5318.0**	**374.3**	**2.0**	**300.0**	**1.0**	**28**		



Beban (Kgf)

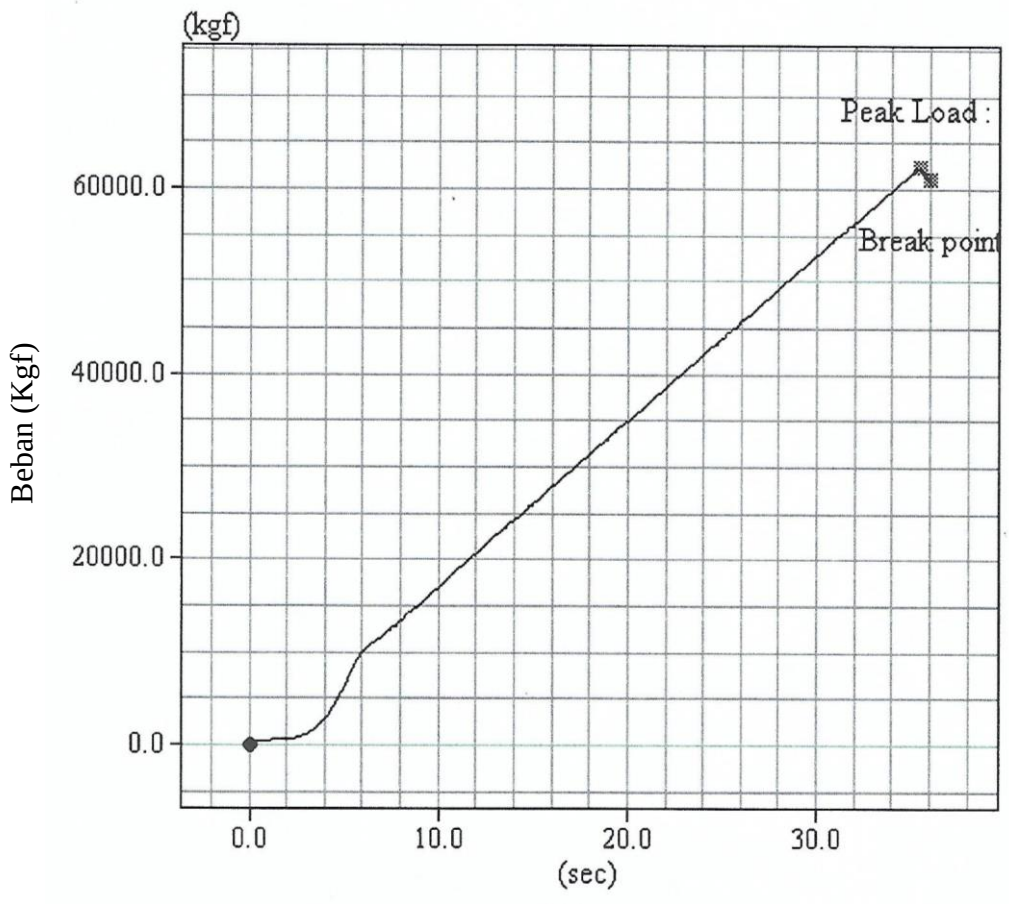
Waktu (detik)

Gambar 48 Hubungan beban dan waktu

Laboratorium Jurusan Teknik Sipil
Universitas Muhammadiyah Yogyakarta

Concrete Testing

Construstion Name			**Sldr btn**							
Manufacturer			**Hungta**							
Contractor			**UMY**							
Customer			**Lab. JTS. FT.UMY**							
Test Date			**2/9/2019**		**Report No.**		**SF5-3**			
No.	**Area (cm^2)**	**Peak Force (Kg)**	**Compression Stress (psi)**	**Adjust Stress (Kgf/cm^2)**	**H/D Ratio**	**Design Stress**	**Adjust Ratio**	**Life**	**Break Style**	**Remark**
1	**178.37**	**62380**	**4974.1**	**349.4**	**2.0**	**300.0**	**1.0**	**28**		



Beban (Kgf)

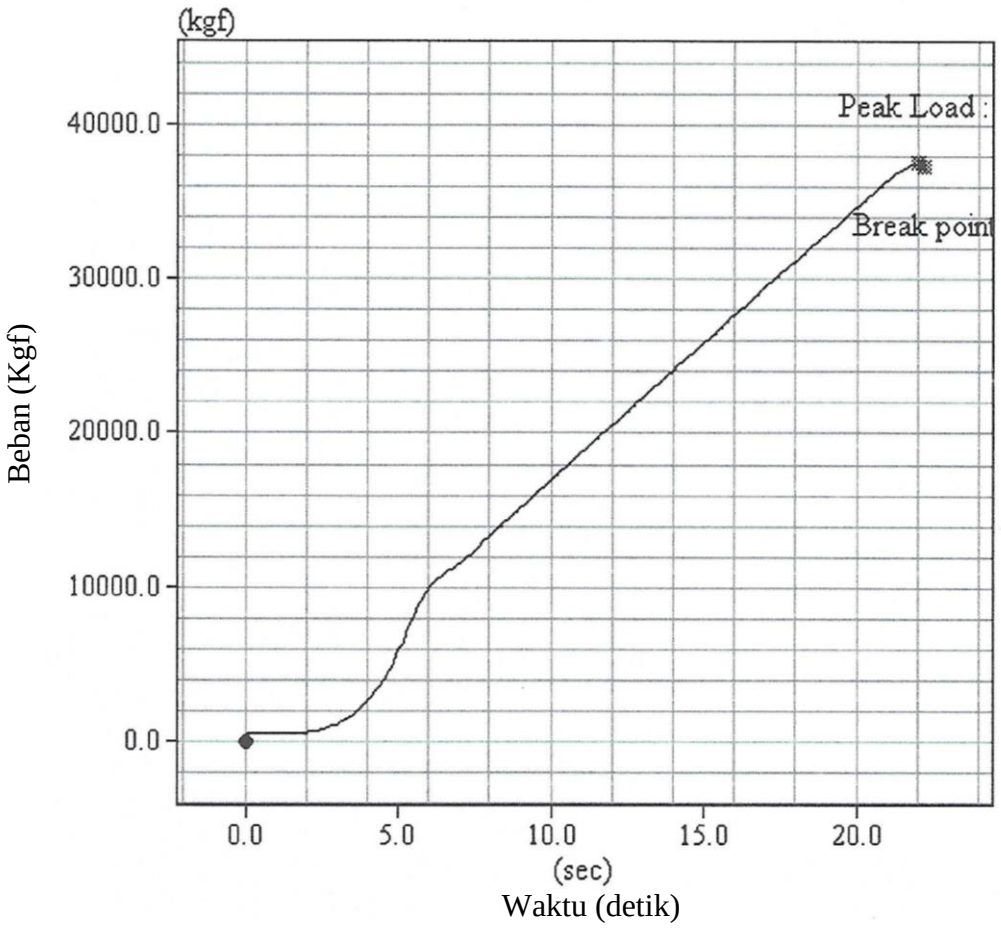
Waktu (detik)

Gambar 49 Hubungan beban dan waktu

Laboratorium Jurusan Teknik Sipil
Universitas Muhammadiyah Yogyakarta

Concrete Testing

Construstion Name	**Sldr beton**									
Manufacturer	**Hungta**									
Contractor	**UMY**									
Customer	**Lab. JTS. FT.UMY**									
Test Date	**03/08/2019**			**Report No.**		**TK 10% SF 1**				
No.	**Area (cm^2)**	**Peak Force (Kg)**	**Compression Stress (psi)**	**Adjust Stress (Kgf/cm^2)**	**H/D Ratio**	**Design Stress**	**Adjust Ratio**	**Life**	**Break Style**	**Remark**
1	**177.42**	**37570**	**3011.7**	**211.5**	**2.0**	**300.0**	**1.0**	**7**		

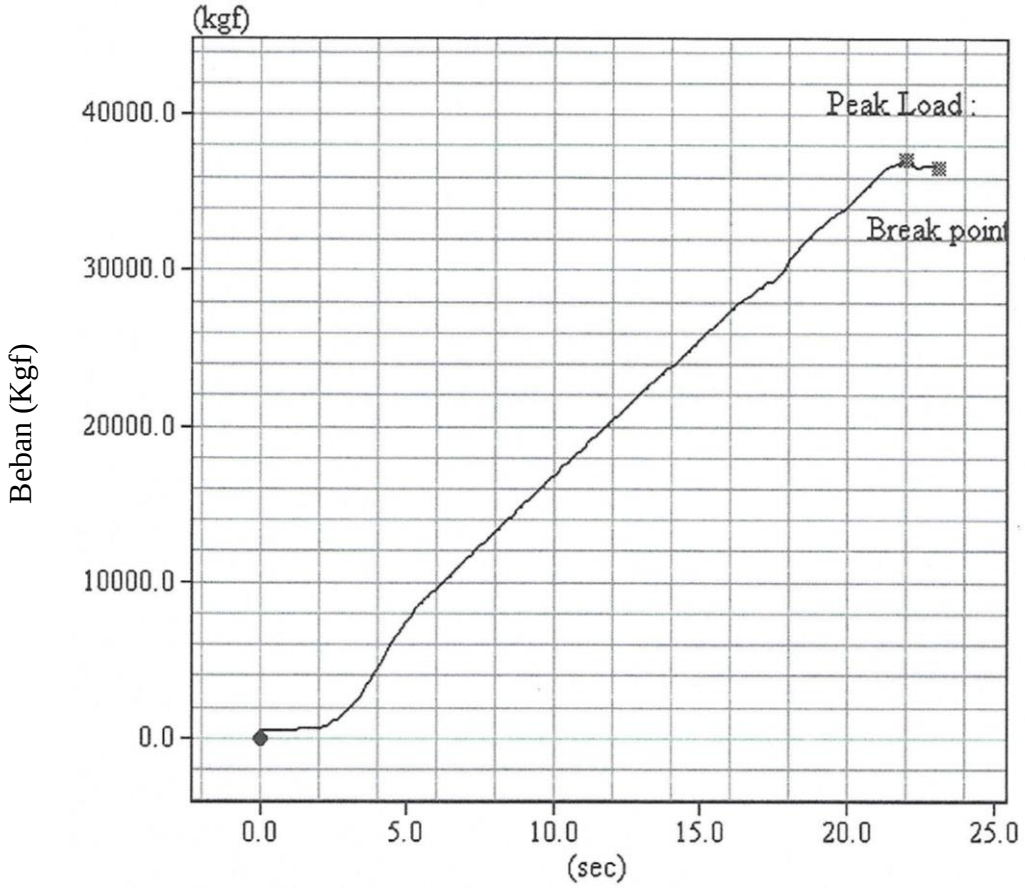


Gambar 50 Hubungan beban dan waktu

Laboratorium Jurusan Teknik Sipil
Universitas Muhammadiyah Yogyakarta

Concrete Testing

Construstion Name	**Sldr beton**									
Manufacturer	**Hungta**									
Contractor	**UMY**									
Customer	**Lab. JTS. FT.UMY**									
Test Date	**03/08/2019**			**Report No.**		**TK 10% SF 2**				
No.	**Area (cm^2)**	**Peak Force (Kg)**	**Compression Stress (psi)**	**Adjust Stress (Kgf/cm^2)**	**H/D Ratio**	**Design Stress**	**Adjust Ratio**	**Life**	**Break Style**	**Remark**
1	**176.95**	**37090**	**2981.2**	**209.6**	**2.0**	**300.0**	**1.0**	**7**		



Beban (Kgf)

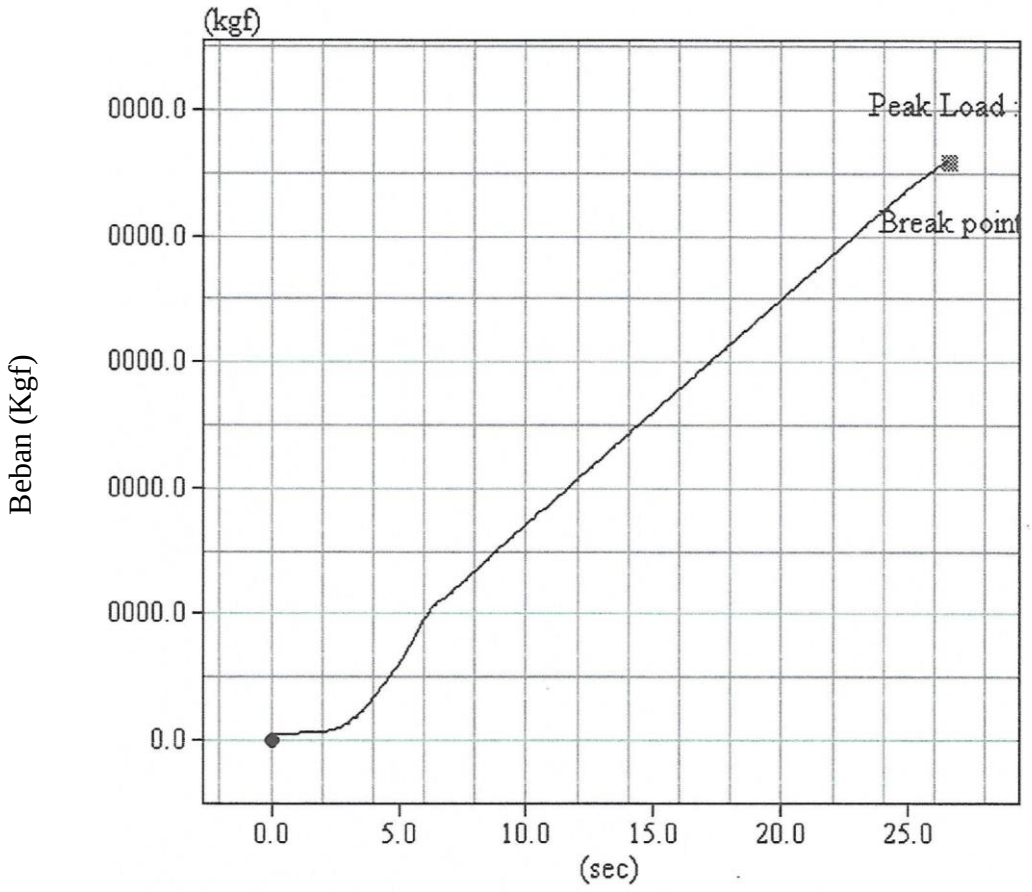
Waktu (detik)

Gambar 51 Hubungan beban dan waktu

Laboratorium Jurusan Teknik Sipil
Universitas Muhammadiyah Yogyakarta

Concrete Testing

Construstion Name	**Sldr beton**									
Manufacturer	**Hungta**									
Contractor	**UMY**									
Customer	**Lab. JTS. FT.UMY**									
Test Date	**03/08/2019**			**Report No.**			**TK 10% SF 3**			
No.	**Area (cm^2)**	**Peak Force (Kg)**	**Compression Stress (psi)**	**Adjust Stress (Kgf/cm^2)**	**H/D Ratio**	**Design Stress**	**Adjust Ratio**	**Life**	**Break Style**	**Remark**
1	**178.60**	**45910**	**3655.9**	**256.8**	**2.0**	**300.0**	**1.0**	**7**		



Beban (Kgf)

Waktu (detik)

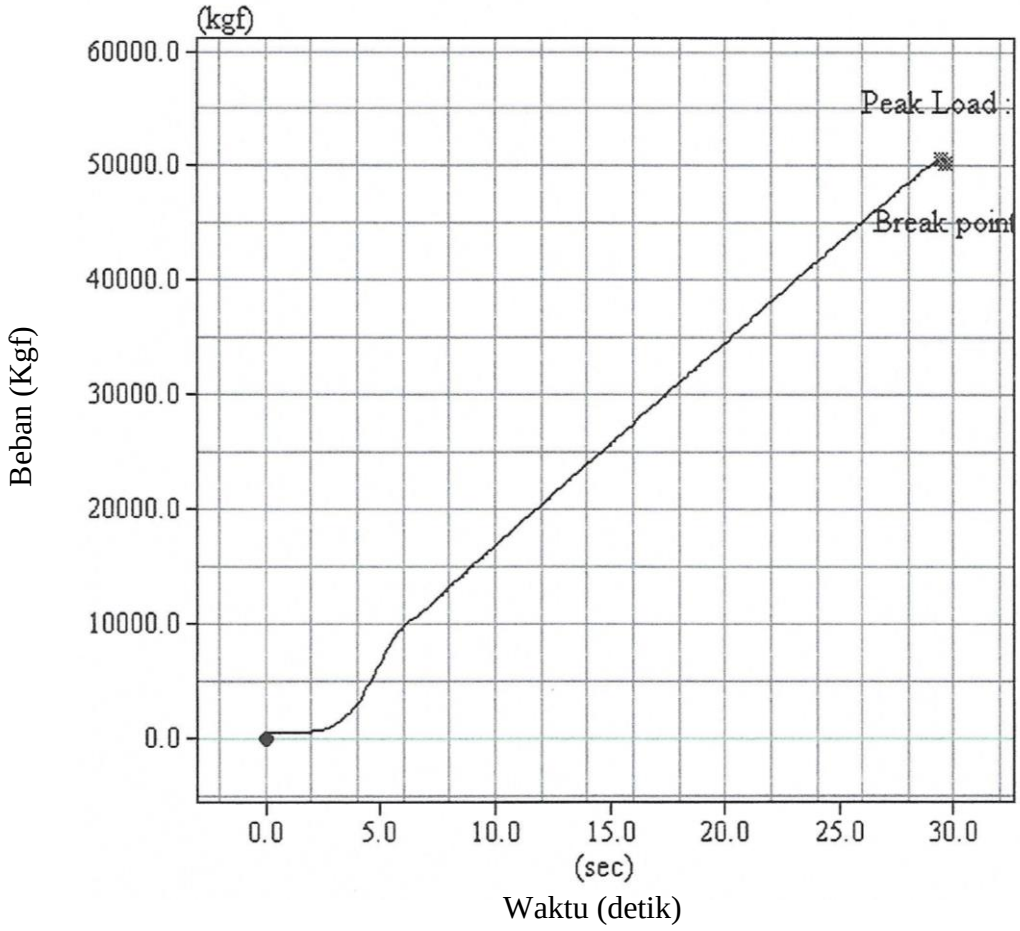
Gambar 52 Hubungan beban dan waktu

Laboratorium Jurusan Teknik Sipil
Universitas Muhammadiyah Yogyakarta

Concrete Testing

Construstion Name	**Sldr Btn**
Manufacturer	**Hungta**
Contractor	**UMY**
Customer	**Lab. JTS. FT.UMY**
Test Date	**3/13/2019**
Report No.	**TK.10% SF 1**

No.	Area (cm^2)	Peak Force (Kg)	Compression Stress (psi)	Adjust Stress (Kgf/cm^2)	H/D Ratio	Design Stress	Adjust Ratio	Life	Break Style	Rema
1	176.71	50550	4068.5	286.1	2.0	300.0	1.0	14		

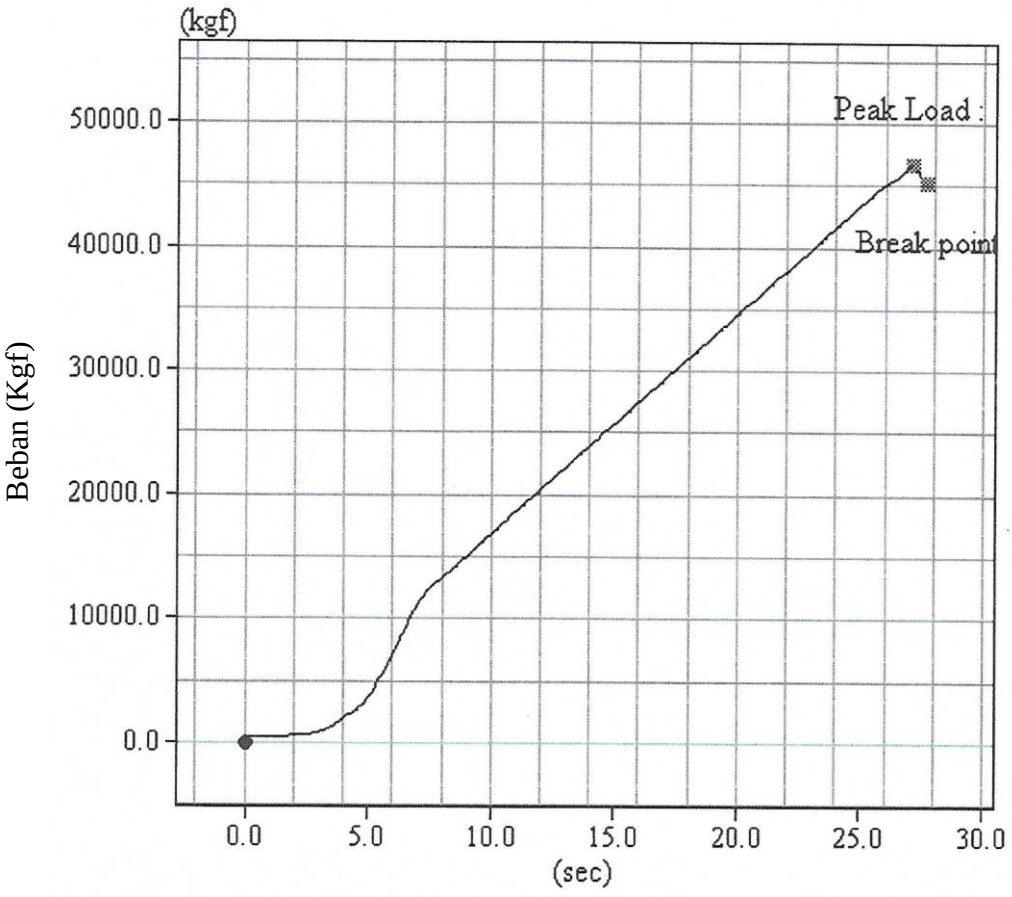


Gambar 53 Hubungan beban dan waktu

Laboratorium Jurusan Teknik Sipil
Universitas Muhammadiyah Yogyakarta

Concrete Testing

Construstion Name	**Sldr Btn**									
Manufacturer	**Hungta**									
Contractor	**UMY**									
Customer	**Lab. JTS. FT.UMY**									
Test Date	**3/13/2019**				**Report No.**		**TK.10% SF 2**			
No.	**Area (cm^2)**	**Peak Force (Kg)**	**Compression Stress (psi)**	**Adjust Stress (Kgf/cm^2)**	**H/D Ratio**	**Design Stress**	**Adjust Ratio**	**Life**	**Break Style**	**Remark**
1	176.71	46640	3753.8	263.9	2.0	300.0	1.0	14		

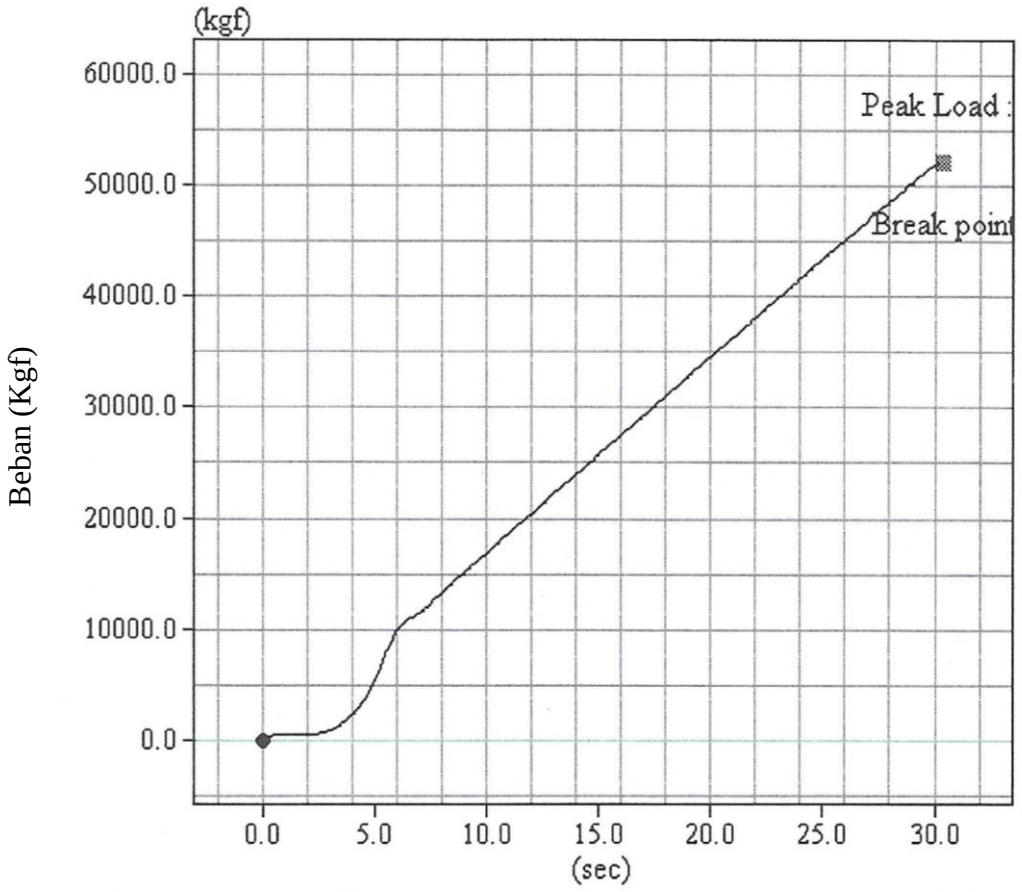


Gambar 54 Hubungan beban dan waktu

Laboratorium Jurusan Teknik Sipil
Universitas Muhammadiyah Yogyakarta

Concrete Testing

Construstion Name	**Sldr Btn**									
Manufacturer	**Hungta**									
Contractor	**UMY**									
Customer	**Lab. JTS. FT.UMY**									
Test Date	**3/13/2019**				**Report No.**			**TK.10% SF 3**		
No.	**Area (cm^2)**	**Peak Force (Kg)**	**Compression Stress (psi)**	**Adjust Stress (Kgf/cm^2)**	**H/D Ratio**	**Design Stress**	**Adjust Ratio**	**Life**	**Break Style**	**Rema**
1	176.71	52160	4198.0	295.2	2.0	300.0	1.0	14		



Beban (Kgf)

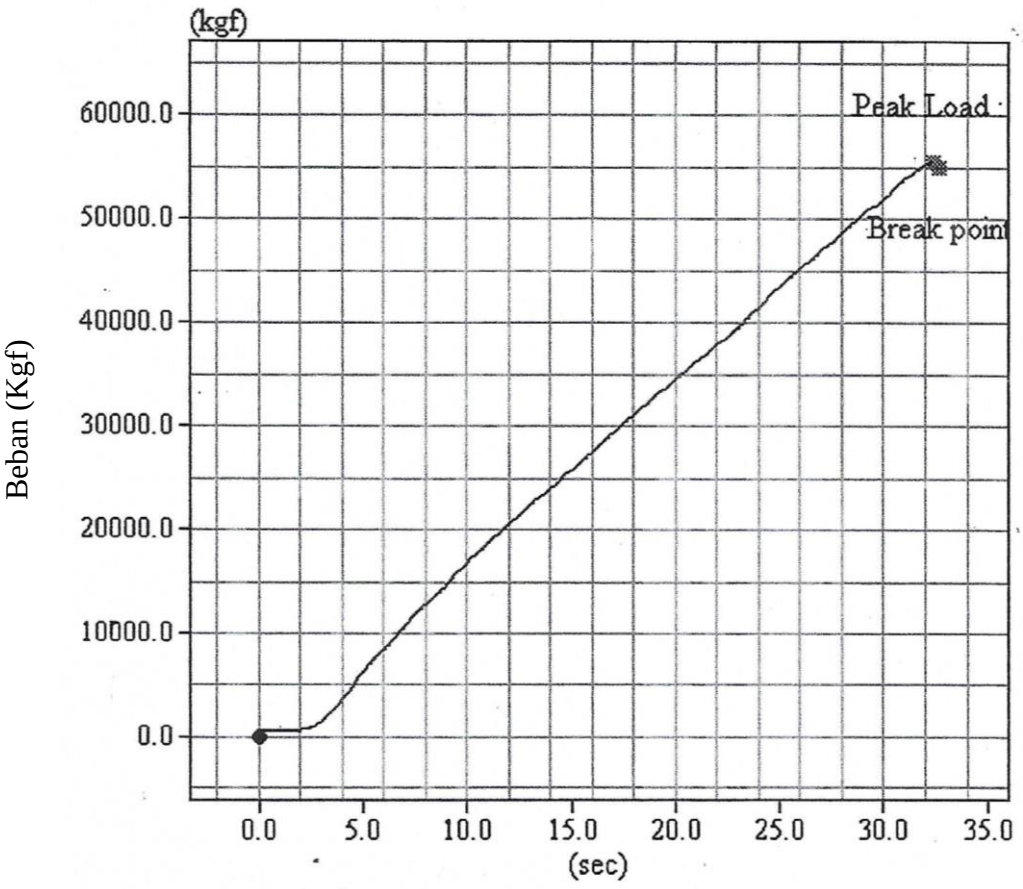
Waktu (detik)

Gambar 55 Hubungan beban dan waktu

Laboratorium Jurusan Teknik Sipil
Universitas Muhammadiyah Yogyakarta

Concrete Testing

Construstion Name			**Sldr btn**							
Manufacturer			**Hungta**							
Contractor			**UMY**							
Customer			**Lab. JTS. FT.UMY**							
Test Date			**2/15/2019**		**Report No.**			**TK 10% SF**		
No.	**Area (cm^2)**	**Peak Force (Kg)**	**Compression Stress (psi)**	**Adjust Stress (Kgf/cm^2)**	**H/D Ratio**	**Design Stress**	**Adjust Ratio**	**Life**	**Break Style**	**Remark**
1	**176.71**	**52250**	**4205.3**	**295.4**	**2.0**	**300.0**	**1.0**	**28**		



Beban (Kgf)

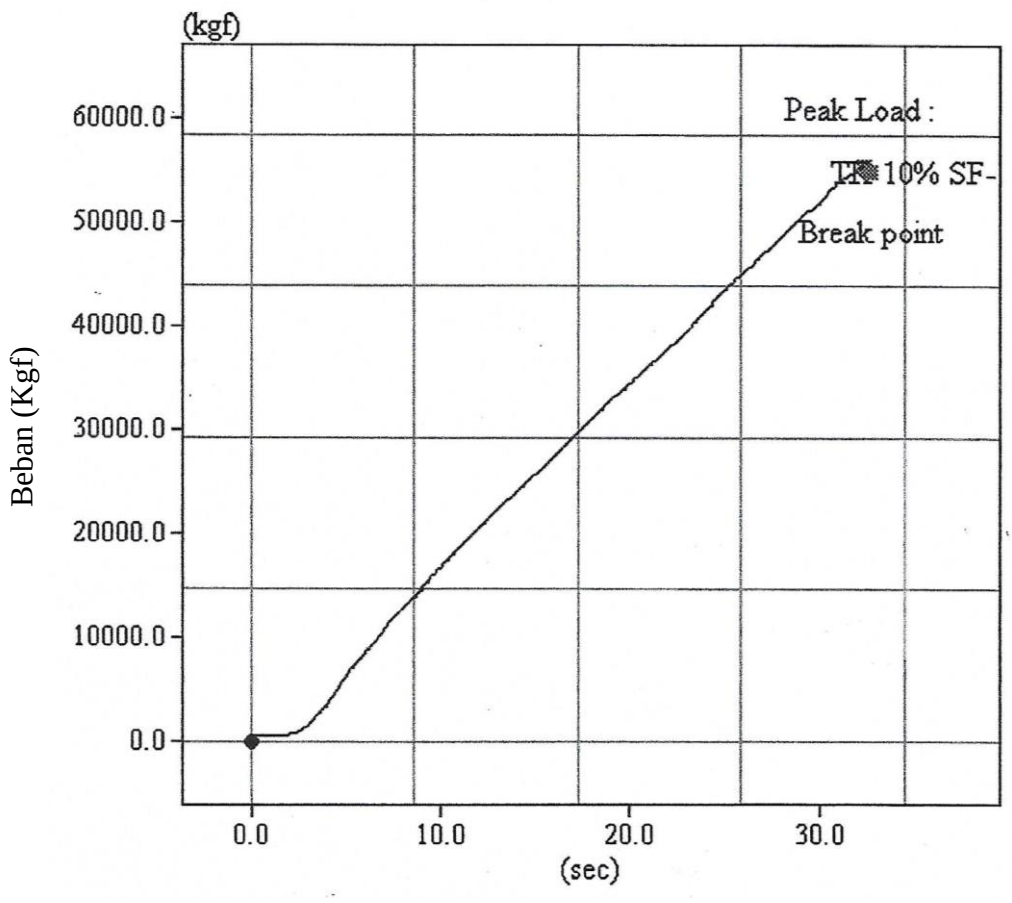
Waktu (detik)

Gambar 56 Hubungan beban dan waktu

Laboratorium Jurusan Teknik Sipil
Universitas Muhammadiyah Yogyakarta

Concrete Testing

Construstion Name	**Sldr btn**									
Manufacturer	**Hungta**									
Contractor	**UMY**									
Customer	**Lab. JTS. FT.UMY**									
Test Date	**2/15/2019**				**Report No.**		**TK 10% SF**			
No.	Area (cm^2)	Peak Force (Kg)	Compression Stress (psi)	Adjust Stress (Kgf/cm^2)	H/D Ratio	Design Stress	Adjust Ratio	Life	Break Style	Remark
1	176.71	55490	4466.1	313.7	2.0	300.0	1.0	28		

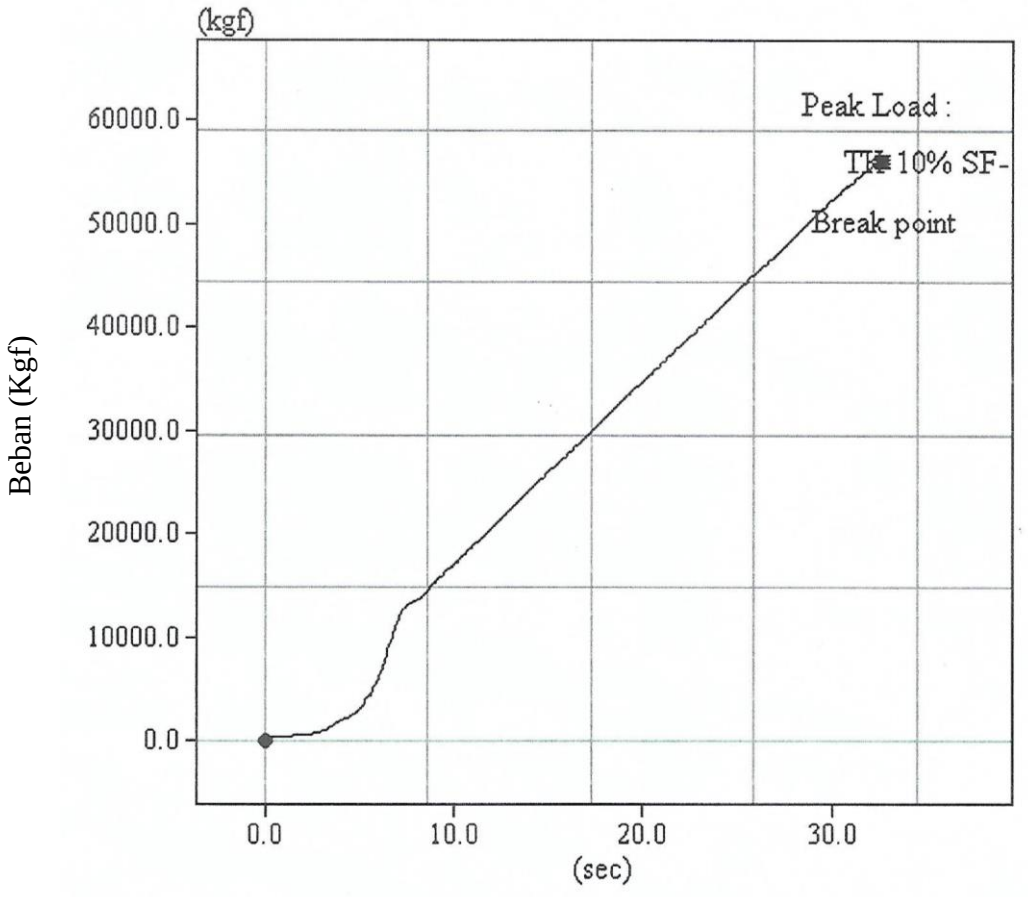


Gambar 57 Hubungan beban dan waktu

Laboratorium Jurusan Teknik Sipil
Universitas Muhammadiyah Yogyakarta

Concrete Testing

Construstion Name	**Sldr btn**									
Manufacturer	**Hungta**									
Contractor	**UMY**									
Customer	**Lab. JTS. FT.UMY**									
Test Date	**2/15/2019**				**Report No.**			**TK 10% SF**		
No.	**Area (cm^2)**	**Peak Force (Kg)**	**Compression Stress (psi)**	**Adjust Stress (Kgf/cm^2)**	**H/D Ratio**	**Design Stress**	**Adjust Ratio**	**Life**	**Break Style**	**Remark**
1	**176.71**	**56050**	**4511.1**	**317.2**	**2.0**	**300.0**	**1.0**	**28**		



Beban (Kgf)

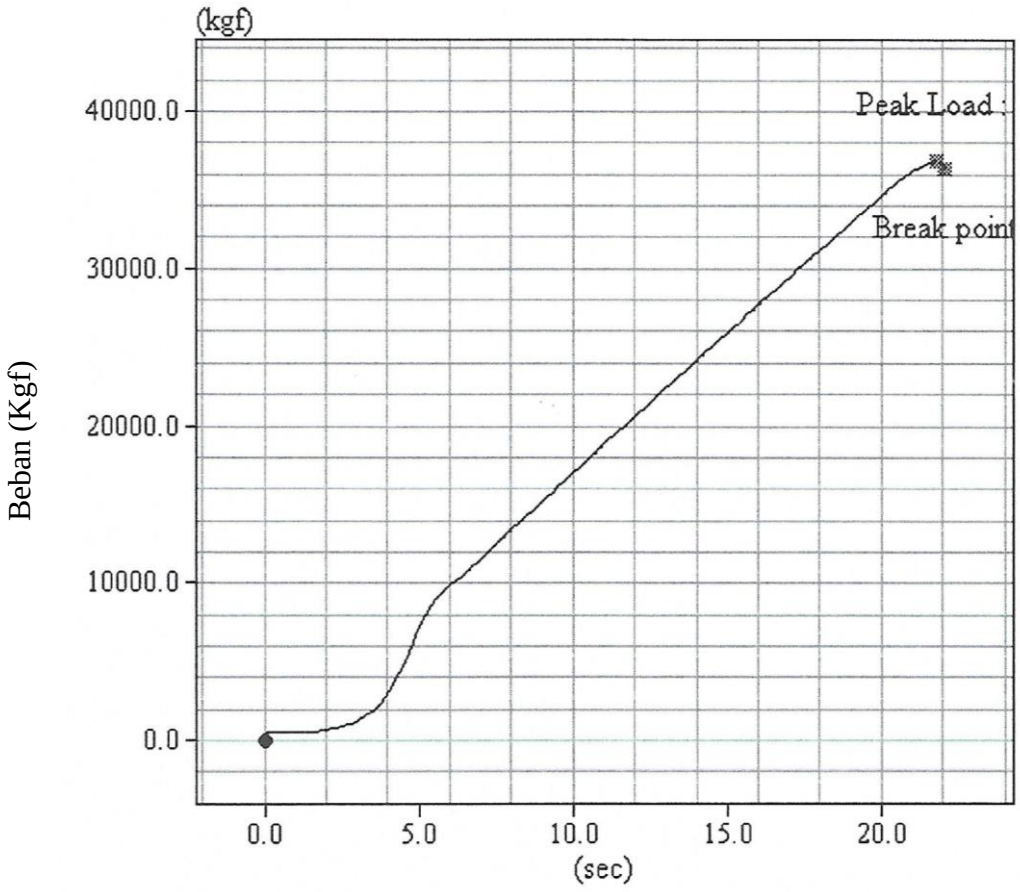
Waktu (detik)

Gambar 58 Hubungan beban dan waktu

Laboratorium Jurusan Teknik Sipil
Universitas Muhammadiyah Yogyakarta

Concrete Testing

Construstion Name			**Sldr beton**							
Manufacturer			**Hungta**							
Contractor			**UMY**							
Customer			**Lab. JTS. FT.UMY**							
Test Date			**03/09/2019**		**Report No.**			**TK 15% SF 1**		
No.	**Area (cm^2)**	**Peak Force (Kg)**	**Compression Stress (psi)**	**Adjust Stress (Kgf/cm^2)**	**H/D Ratio**	**Design Stress**	**Adjust Ratio**	**Life**	**Break Style**	**Remark**
1	**178.37**	**36840**	**2937.6**	**206.3**	**2.0**	**300.0**	**1.0**	**7**		



Beban (Kgf)

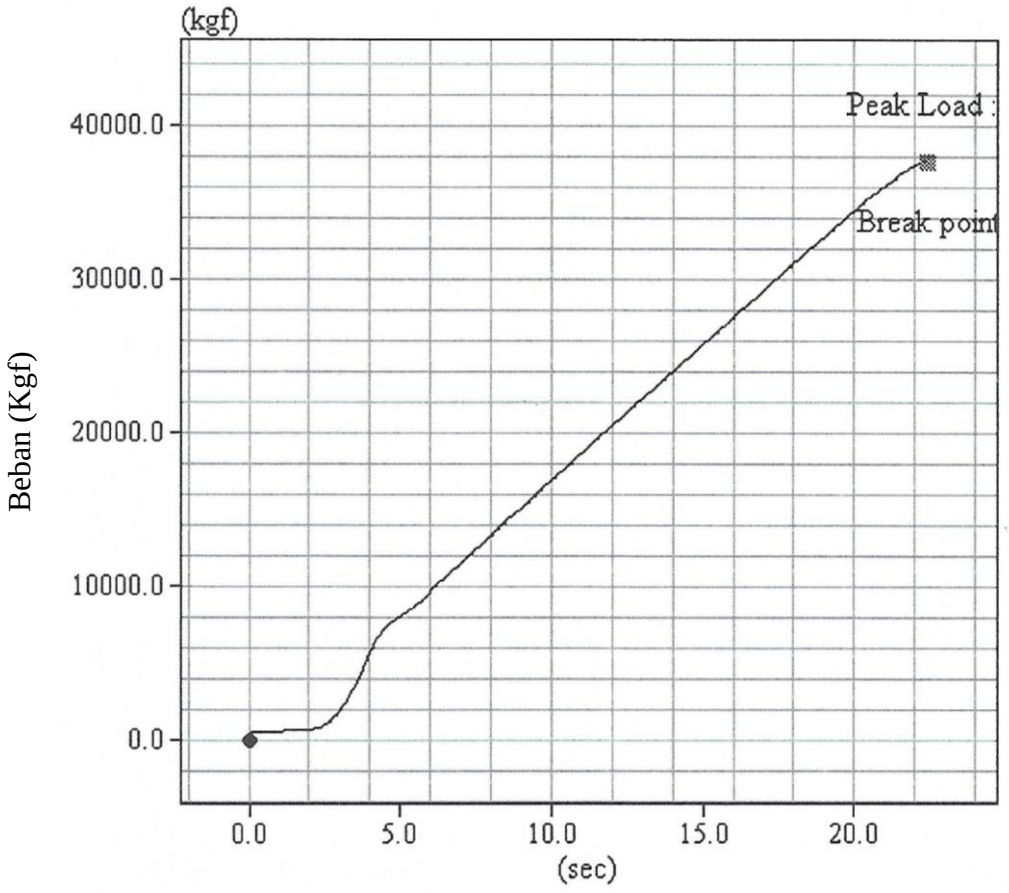
Waktu (detik)

Gambar 59 Hubungan beban dan waktu

Laboratorium Jurusan Teknik Sipil
Universitas Muhammadiyah Yogyakarta

Concrete Testing

Construstion Name			**Sldr beton**							
Manufacturer			**Hungta**							
Contractor			**UMY**							
Customer			**Lab. JTS. FT.UMY**							
Test Date			**03/09/2019**		**Report No.**			**TK 15% SF 2**		
No.	**Area (cm^2)**	**Peak Force (Kg)**	**Compression Stress (psi)**	**Adjust Stress (Kgf/cm^2)**	**H/D Ratio**	**Design Stress**	**Adjust Ratio**	**Life**	**Break Style**	**Remark**
1	**176.95**	**37640**	**3025.4**	**212.7**	**2.0**	**300.0**	**1.0**	**7**		



Beban (Kgf)

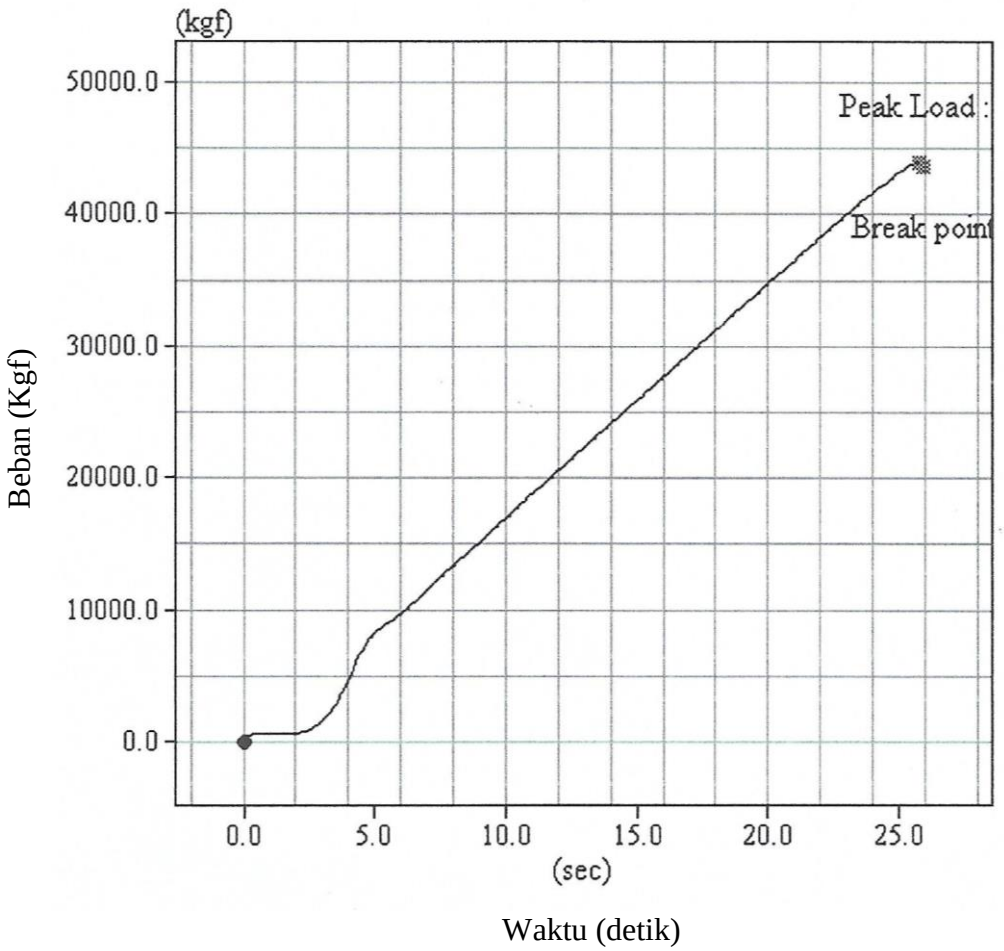
Waktu (detik)

Gambar 60 Hubungan beban dan waktu

Laboratorium Jurusan Teknik Sipil
Universitas Muhammadiyah Yogyakarta

Concrete Testing

Construstion Name	**Sidr beton**									
Manufacturer	**Hungta**									
Contractor	**UMY**									
Customer	**Lab. JTS. FT.UMY**									
Test Date	**03/09/2019**			**Report No.**		**TK 15% SF 3**				
No.	**Area (cm^2)**	**Peak Force (Kg)**	**Compression Stress (psi)**	**Adjust Stress (Kgf/cm^2)**	**H/D Ratio**	**Design Stress**	**Adjust Ratio**	**Life**	**Break Style**	**Remark**
1	**177.89**	**43900**	**3509.8**	**246.5**	**2.0**	**300.0**	**1.0**	**7**		

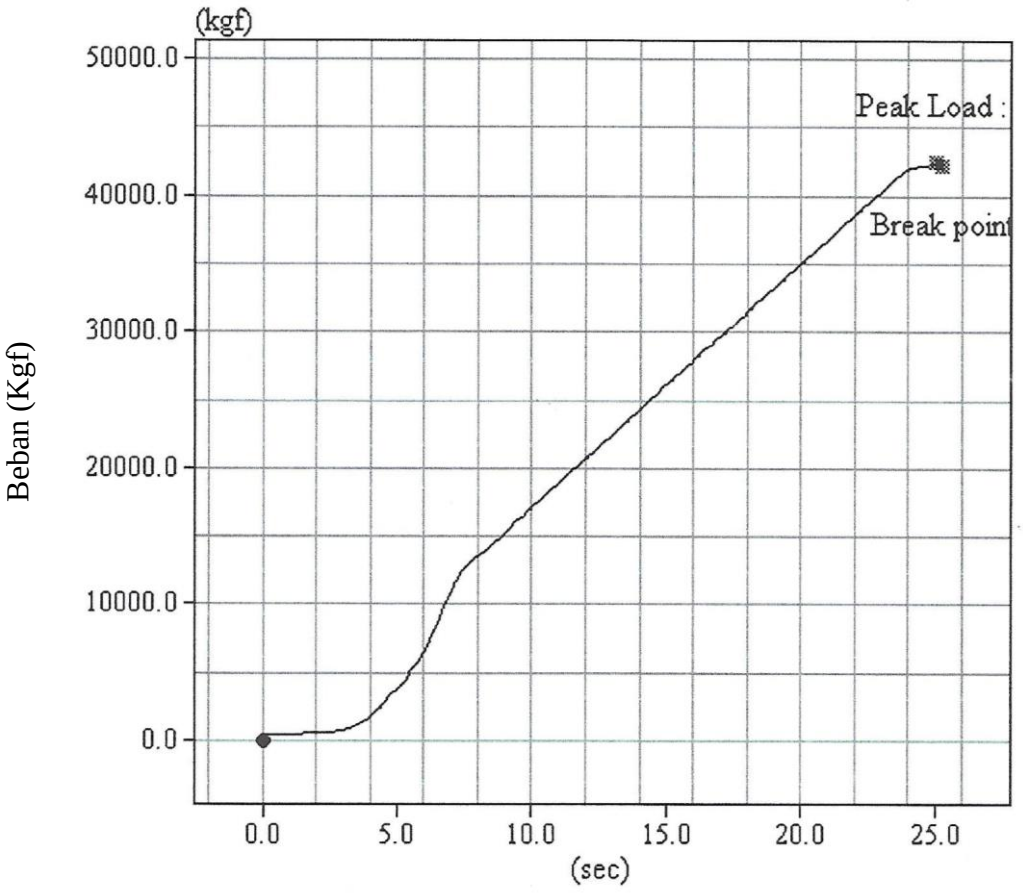


Gambar 61 Hubungan beban dan waktu

Laboratorium Jurusan Teknik Sipil
Universitas Muhammadiyah Yogyakarta

Concrete Testing

Construstion Name	**Sldr beton**									
Manufacturer	**Hungta**									
Contractor	**UMY**									
Customer	**Lab. JTS. FT.UMY**									
Test Date	**2/22/2019**			**Report No.**		**TK 15% SF**				
No.	**Area (cm^2)**	**Peak Force (Kg)**	**Compression Stress (psi)**	**Adjust Stress (Kgf/cm^2)**	**H/D Ratio**	**Design Stress**	**Adjust Ratio**	**Life**	**Break Style**	**Remark**
1	**178.60**	**42460**	**3381.2**	**236.8**	**2.0**	**300.0**	**1.0**	**14**		

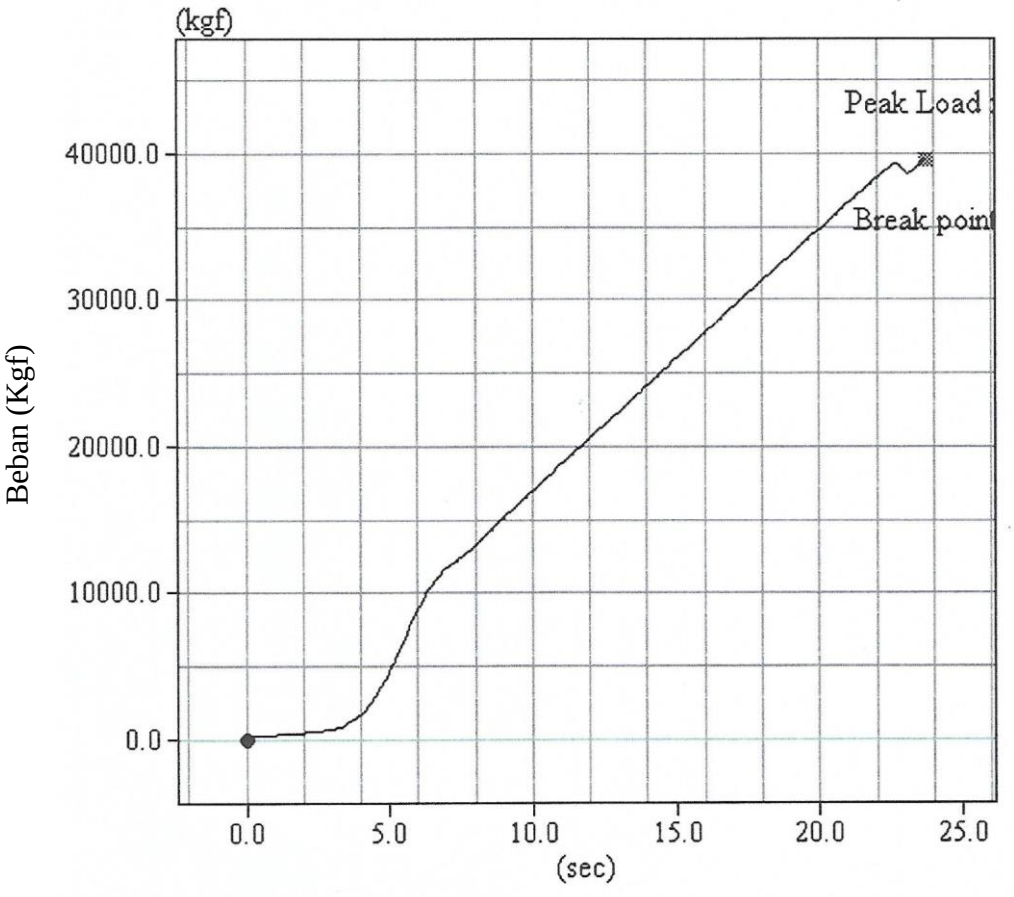


Gambar 62 Hubungan beban dan waktu

Laboratorium Jurusan Teknik Sipil
Universitas Muhammadiyah Yogyakarta

Concrete Testing

Construstion Name	**Sldr Btn**									
Manufacturer	**Hungta**									
Contractor	**UMY**									
Customer	**Lab. JTS. FT.UMY**									
Test Date	**2/22/2019**				**Report No.**		**TK.15% SF 1**			
No.	Area (cm^2)	Peak Force (Kg)	Compression Stress (psi)	Adjust Stress (Kgf/cm^2)	H/D Ratio	Design Stress	Adjust Ratio	Life	Break Style	Remark
1	177.89	39500	3158.0	221.8	2.0	300.0	1.0	14		

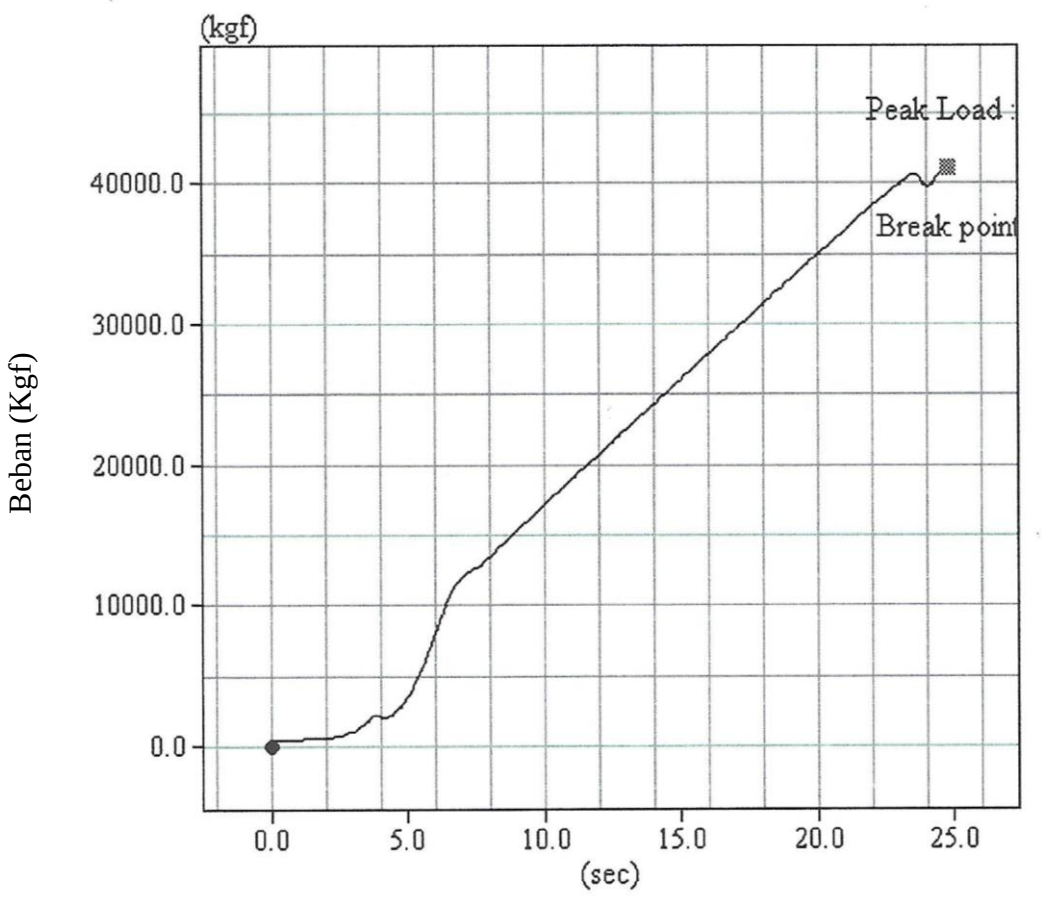


Gambar 63 Hubungan beban dan waktu

Laboratorium Jurusan Teknik Sipil
Universitas Muhammadiyah Yogyakarta

Concrete Testing

Construstion Name			**Sldr beton**							
Manufacturer			**Hungta**							
Contractor			**UMY**							
Customer			**Lab. JTS. FT.UMY**							
Test Date			**2/22/2019**		**Report No.**			**TK 15% SF.3**		
No.	Area (cm^2)	Peak Force (Kg)	Compression Stress (psi)	Adjust Stress (Kgf/cm^2)	H/D Ratio	Design Stress	Adjust Ratio	Life	Break Style	Remark
1	177.66	41160	3295.1	231.0	2.0	300.0	1.0	14		



Beban (Kgf)

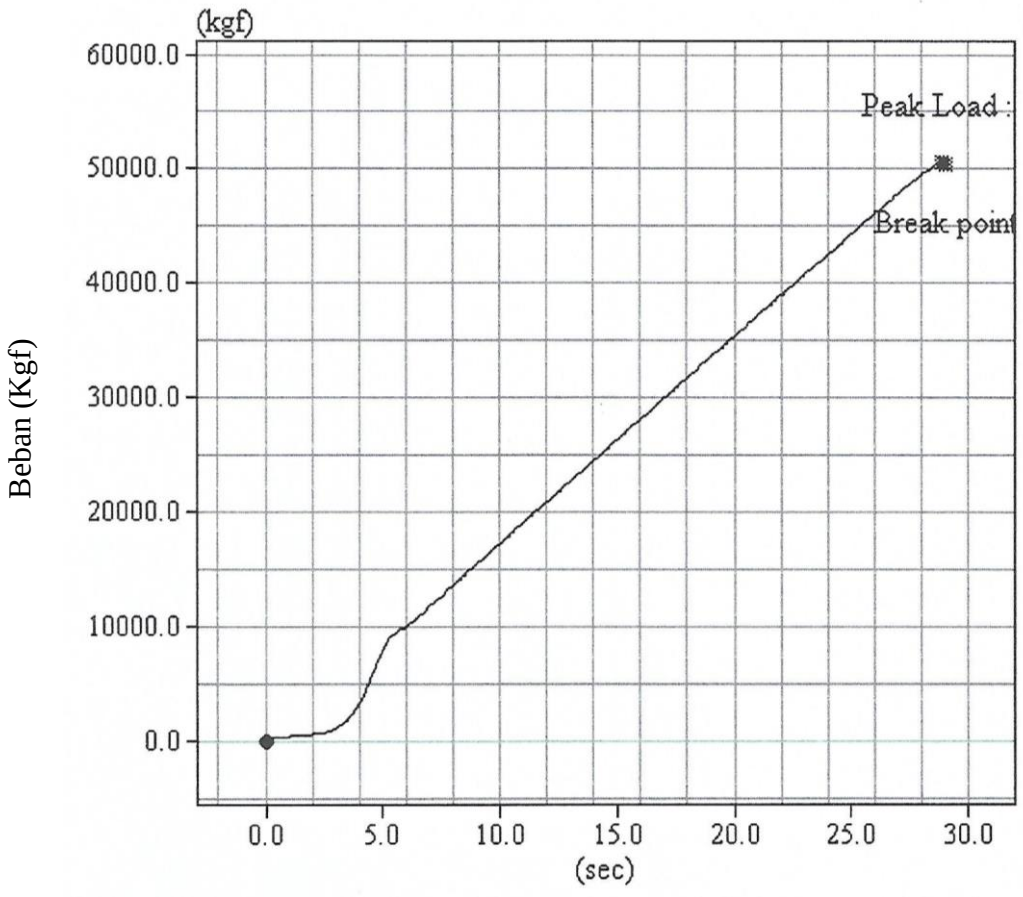
Waktu (detik)

Gambar 64 Hubungan beban dan waktu

Laboratorium Jurusan Teknik Sipil
Universitas Muhammadiyah Yogyakarta

Concrete Testing

Construstion Name	**Sldr Btn**									
Manufacturer	**Hungta**									
Contractor	**UMY**									
Customer	**Lab. JTS. FT.UMY**									
Test Date	**3/13/2019**			**Report No.**			**TK.15% SF 1**			
No.	**Area (cm^2)**	**Peak Force (Kg)**	**Compression Stress (psi)**	**Adjust Stress (Kgf/cm^2)**	**H/D Ratio**	**Design Stress**	**Adjust Ratio**	**Life**	**Break Style**	**Remark**
1	**180.50**	**50550**	**3983.0**	**279.5**	**2.0**	**300.0**	**1.0**	**28**		



Beban (Kgf)

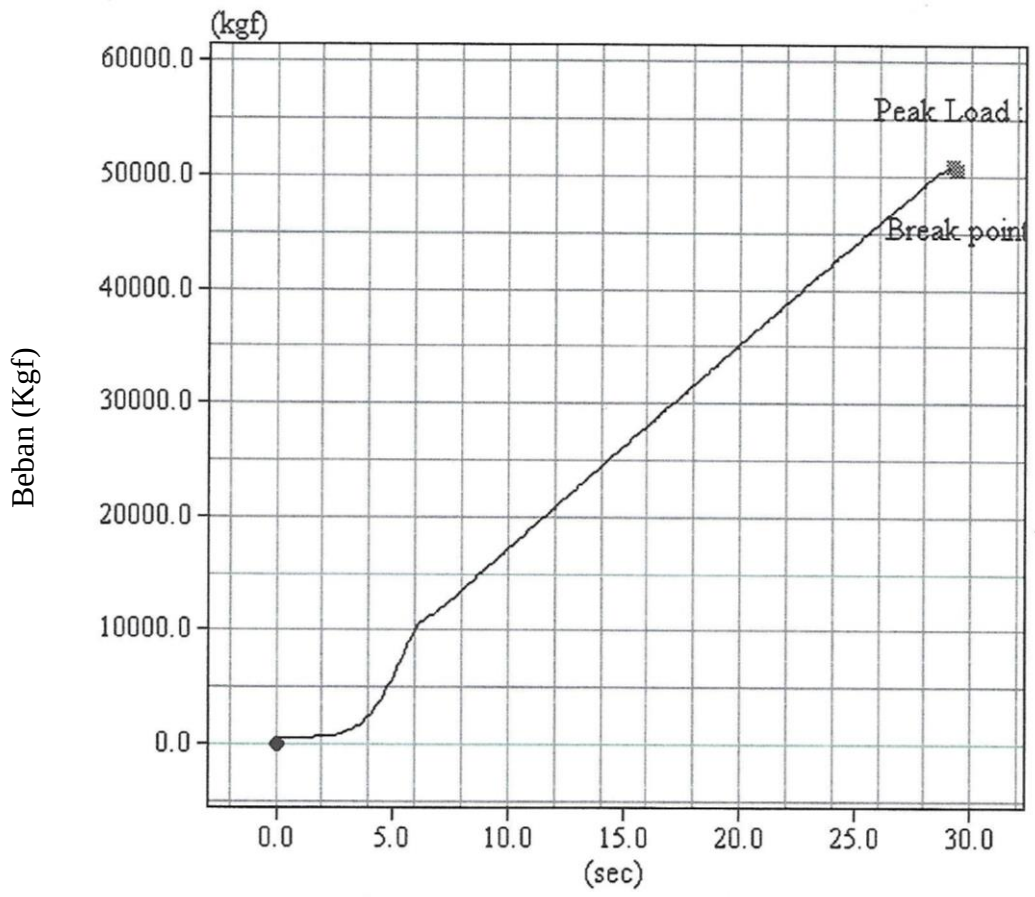
Waktu (detik)

Gambar 65 Hubungan beban dan waktu

Laboratorium Jurusan Teknik Sipil
Universitas Muhammadiyah Yogyakarta

Concrete Testing

Construstion Name			**Sldr beton**							
Manufacturer			**Hungta**							
Contractor			**UMY**							
Customer			**Lab. JTS. FT.UMY**							
Test Date			**3/13/2019**		**Report No.**			**TK 15% SF.2**		
No.	Area (cm^2)	Peak Force (Kg)	Compression Stress (psi)	Adjust Stress (Kgf/cm^2)	H/D Ratio	Design Stress	Adjust Ratio	Life	Break Style	Remark
1	178.60	50820	4046.9	283.7	2.0	300.0	1.0	28		



Beban (Kgf)

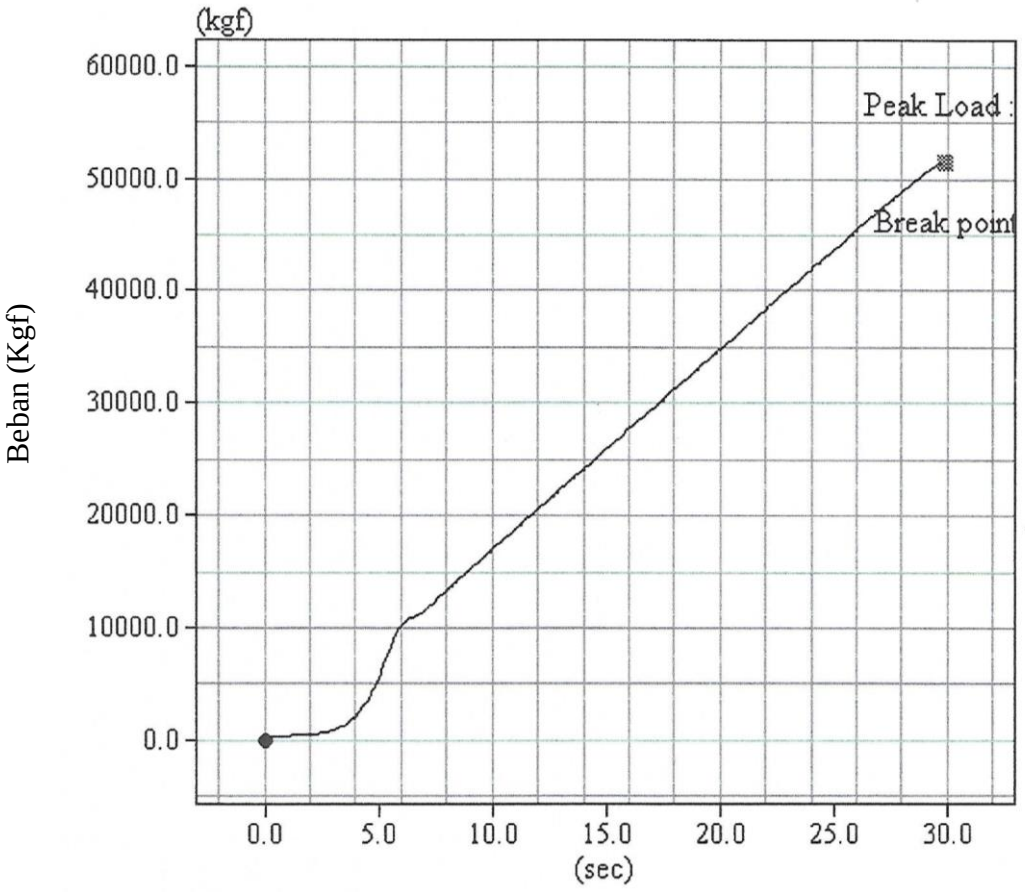
Waktu (detik)

Gambar 66 Hubungan beban dan waktu

Laboratorium Jurusan Teknik Sipil
Universitas Muhammadiyah Yogyakarta

Concrete Testing

Construstion Name	**Sldr Btn**									
Manufacturer	**Hungta**									
Contractor	**UMY**									
Customer	**Lab. JTS. FT.UMY**									
Test Date	**3/13/2019**				**Report No.**			**TK.15% SF 3**		
No.	**Area (cm^2)**	**Peak Force (Kg)**	**Compression Stress (psi)**	**Adjust Stress (Kgf/cm^2)**	**H/D Ratio**	**Design Stress**	**Adjust Ratio**	**Life**	**Break Style**	**Remark**
1	**177.89**	**51500**	**4117.4**	**289.5**	**2.0**	**300.0**	**1.0**	**28**		



Beban (Kgf)

Waktu (detik)

Gambar 67 Hubungan beban dan waktu