

LAMPIRAN

Lampiran 1. Pengujian gradasi agregat halus

Jenis Pengujian : Pemeriksaan analisis gradasi agregat halus

Bahan : Pasir Progo

Asal : Sungai Progo, Kulon 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:

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

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

$$= 14,7\%$$

b. Contoh saringan no.16

Persen berat tertahan komulatif:

$$= \text{Persen berat tertahan no.8} + \text{Persen berat tertahan no.16}$$

$$= 2,5 + 14,7$$

$$= 17,2\%$$

c. Komulatif contoh saringan no.16

Persen berat lolos komulatif:

$$= 100 - 17,2$$

$$= 82,8\%$$

d. Modulus halus butir (MHB)

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

$$= \frac{225}{100}$$

$$= 2,25\%$$

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:

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

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

$$= 15,2\%$$

b. Contoh saringan no.16

Persen berat tertahan komulatif:

$$= \text{Persen berat tertahan no.8} + \text{Persen berat tertahan no.16}$$

$$= 3,9 + 15,2$$

$$= 19,1\%$$

c. Komulatif contoh saringan no.16

Persen berat lolos komulatif:

$$= 100 - 19,1$$

$$= 80,9\%$$

d. Modulus halus butir (MHB)

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

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

$$= 2,25\%$$

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:

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

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

$$= 11,65\%$$

b. Contoh saringan no.16

Persen berat tertahan komulatif:

$$= \text{Persen berat tertahan no.8} + \text{Persen berat tertahan no.16}$$

$$= 3,05 + 11,65$$

$$= 14,7\%$$

c. Komulatif contoh saringan no.16

Persen berat lolos komulatif:

$$= 100 - 14,7$$

$$= 85,3\%$$

d. Modulus halus butir (MHB)

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

$$= \frac{236}{100}$$

$$= 2,36\%$$

Lampiran 2. Pengujian kadar air 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		

Analisis hitungan:

- a. Berat air = $W2 - W3$
 Contoh benda uji 1 = $1126 - 1105$
 $= 21 \text{ gr}$
- b. Kadar air = $\frac{W4}{W3 - W1} \times 100\%$
 Contoh benda uji 1 = $\frac{21}{1105 - 126} \times 100\%$
 $= 2,150\%$
- c. Kadar air rata-rata = $\frac{KA1 + KA2 + KA3}{3}$
 $= \frac{2,15 + 1,94 + 1,83}{3}$
 $= 1,970\%$

Lampiran 3. Pengujian berat jenis dan penyerapan air 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 $= \frac{SSD - Bk}{Bk} \times 100\%$

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

$= 2,249\%$

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 berat satuan 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: $d = 15 \text{ cm}$

$h = 30 \text{ cm}$

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

$$\begin{aligned}
 \text{c. Berat satuan } (B_{sat}) &= \frac{B_2 - B_1}{Volume} \\
 \text{Contoh benda uji 1} &= \frac{19240 - 10160}{5301} \\
 &= 1,713 \text{ gr/cm}^3
 \end{aligned}$$

$$\begin{aligned}
 \text{d. Berat satuan rata-rata} &= \frac{B_{1sat} + B_{2sat} + B_{3sat}}{3} \\
 &= \frac{1,713 + 1,703 + 1,747}{3} \\
 &= 1,721 \text{ gr/cm}^3
 \end{aligned}$$

Lampiran 5. Pengujian kadar lumpur 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		

Analisis hitungan:

- a. Berat pasir kering tungku setelah dicuci (W4) = $W2 - W3$
 Contoh benda uji 1 = $765 - 285$
 = 480
- b. Kadar lumpur = $\frac{W1-W4}{W1} \times 100\%$
 Contoh benda uji 1 = $\frac{500-480}{500} \times 100\%$
 = 4%
- c. Rata-rata kadar lumpur = $\frac{KL1+KL2+KL3}{3} \times 100\%$
 = $\frac{4+5+3}{3} \times 100\%$
 = 4%

Lampiran 6. Pengujian berat jenis dan penyerapan air 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 $= \frac{Bj - Bk}{Bk} \times 100\%$

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

$$= 2,867\%$$

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

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

$$= 3084,667$$

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

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

$$= 2,822$$

Lampiran 7. Pengujian berat satuan 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: $d = 15 \text{ cm}$

$h = 30 \text{ cm}$

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

$$\begin{aligned} \text{c. Berat satuan } (B_{sat}) &= \frac{B_2 - B_1}{Volume} \\ \text{Contoh benda uji 1} &= \frac{18120 - 10160}{5301} \\ &= 1,502 \text{ gr/cm}^3 \end{aligned}$$

$$\begin{aligned} \text{d. Berat satuan rata-rata} &= \frac{B_{1sat} + B_{2sat} + B_{3sat}}{3} \\ &= \frac{1,502 + 1,543 + 1,547}{3} \\ &= 1,531 \text{ gr/cm}^3 \end{aligned}$$

Lampiran 8. Pengujian kadar air 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

$$\begin{aligned}
 &= \frac{B_1 - B_2}{B_1} \times 100\% \\
 &= \frac{3000 - 2889}{3000} \times 100\% \\
 &= 3,70\%
 \end{aligned}$$

b. Kadar air rata-rata

$$\begin{aligned}
 &= \frac{\text{Benda uji 1} + \text{Benda uji 2} + \text{Benda uji 3}}{3} \\
 &= \frac{3,70\% + 3,53\% + 3,90\%}{3} \\
 &= 3,71\%
 \end{aligned}$$

Lampiran 9. Pengujian kadar lumpur 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 dioven pertama (W1)	gr	5235	5230	5425
Berat wadah + Pasir setelah dioven pertama (W2)	gr	4980	4945	5185
Kandungan air (W3 = W1-W2)	gr	255	285	240
Kadar lumpur	%	4,87	5,45	4,42
Rata-rata	%	4,91		

Analisis hitungan:

- a. Kandungan air $= B1 - B2$
 Contoh benda uji 1 $= 5235 - 4980$
 $= 255$
- b. Kadar lumpur $= \frac{B1-B2}{B1} \times 100\%$
 Contoh benda uji 1 $= \frac{2535-4980}{2535} \times 100\%$
 $= 4,87\%$
- c. Rata-rata kadar lumpur $= \frac{KL1+KL2+KL3}{3} \times 100\%$
 $= \frac{4,87+5,45+4,42}{3} \times 100\%$
 $= 4,91\%$

Lampiran 10. Pengujian keausan 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:

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

$$\begin{aligned} \text{Contoh benda uji 1} &= \frac{5000-3280}{5000} \times 100\% \\ &= 34,40\% \end{aligned}$$

$$\begin{aligned} b. \text{ Keausan rata-rata} &= \frac{\text{Keausan1}+\text{Keausan2}+\text{Keausan3}}{3} \\ &= \frac{34,40+30,20+34,00}{3} \\ &= 32,87\% \end{aligned}$$

Lampiran 11. Alat pemeriksaan bahan penyusun beton



Gambar 1 Timbangan



Gambar 2 Kaliper



Gambar 3 Saringan



Gambar 4 Timbangan dalam air

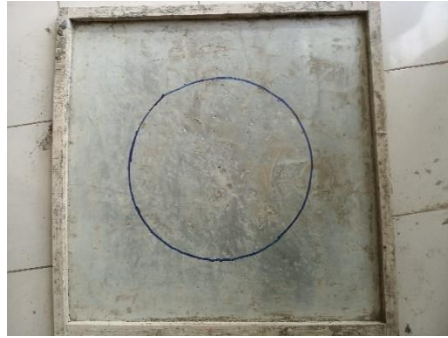


Gambar 5 Mesin *los angeles*



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 *v-funnel*



Gambar 26 Pengujian *l-box*

Lampiran 16. Proses pengujian kuat tekan



Gambar 27 Pengukuran diameter benda uji silinder



Gambar 28 Pengukuran tinggi benda uji silinder



Gambar 29 Pengujian kuat tekan beton



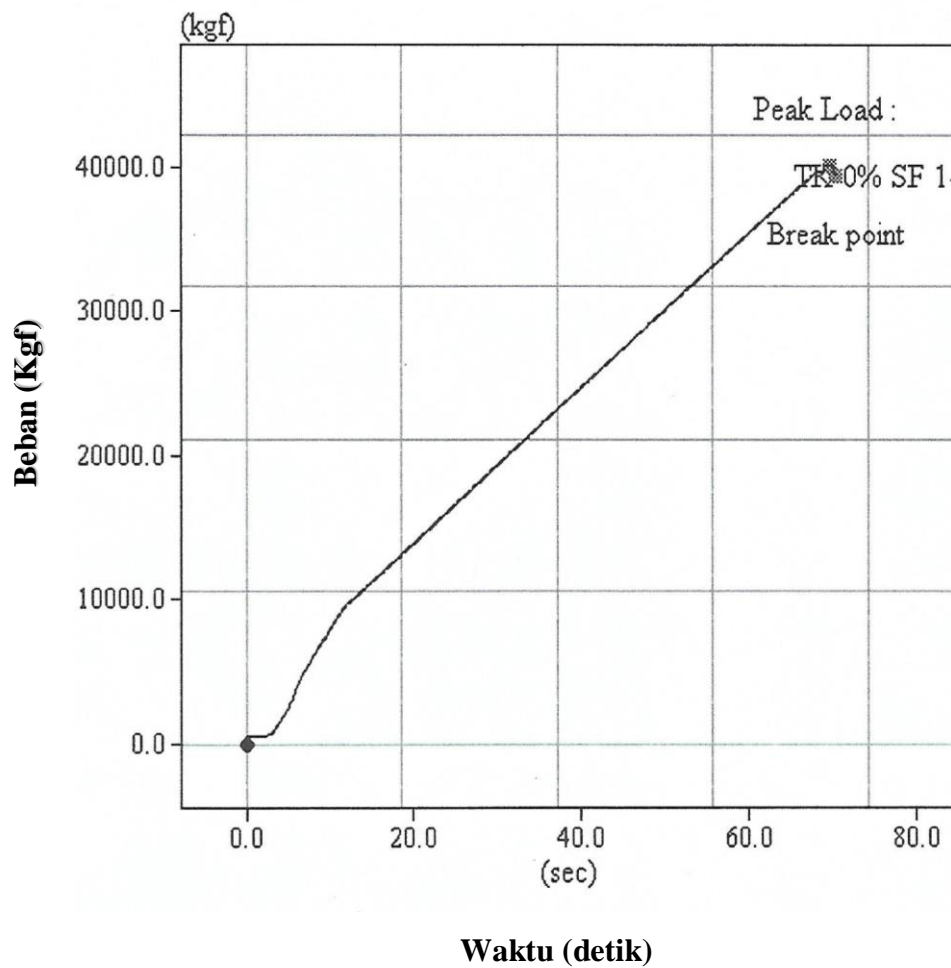
Gambar 30 Beton setelah dilakukan uji tekan

Lampiran 17. Hasil uji kuat tekan

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Universitas Muhammadiyah Yogyakarta

Concrete Testing

Construction Name		Slidr 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 (Kg/cm ²)	H/D Ratio	Design Stress	Adjust Ratio	Life	Break Style	Remark
1	177.89	40030	3200.4	226.1	2.1	300.0	1.0	7		

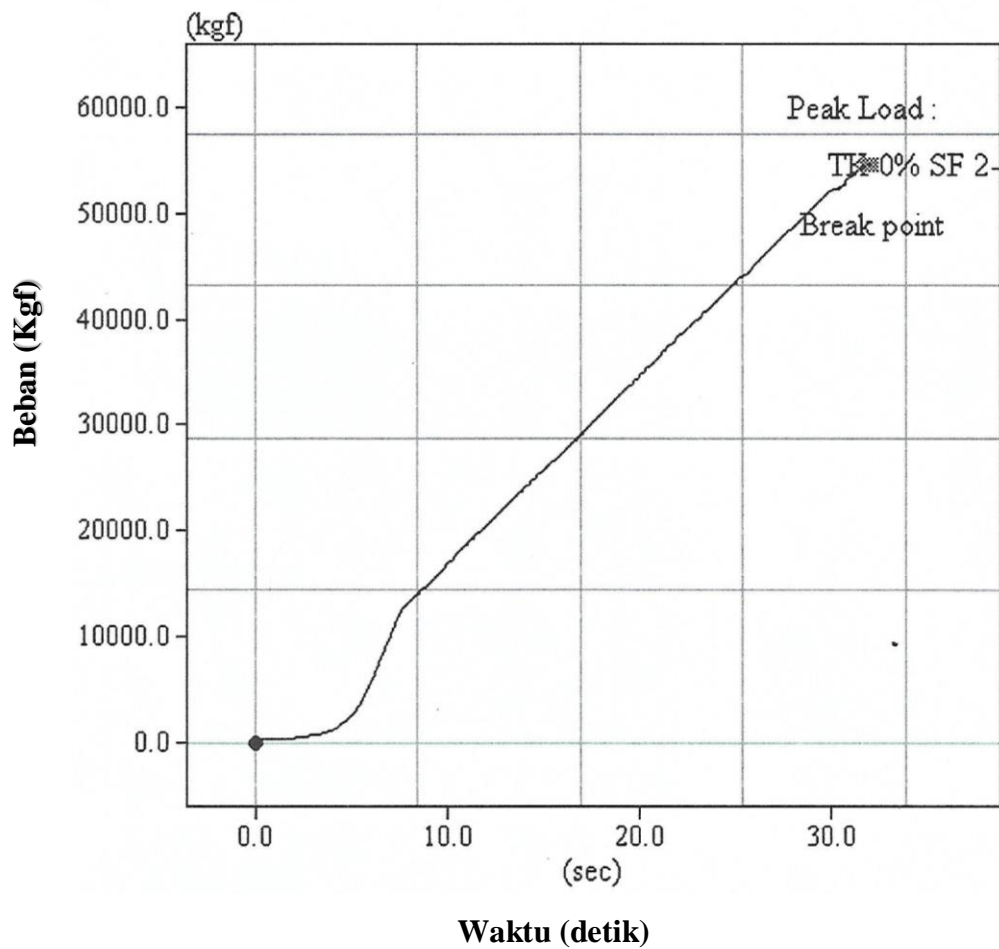


Gambar 32 Hubungan beban dan waktu benda uji TK 0% Normal 1 (7 hari)

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Universitas Muhammadiyah Yogyakarta

Concrete Testing

Construction Name		Slidr 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 (Kg/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		

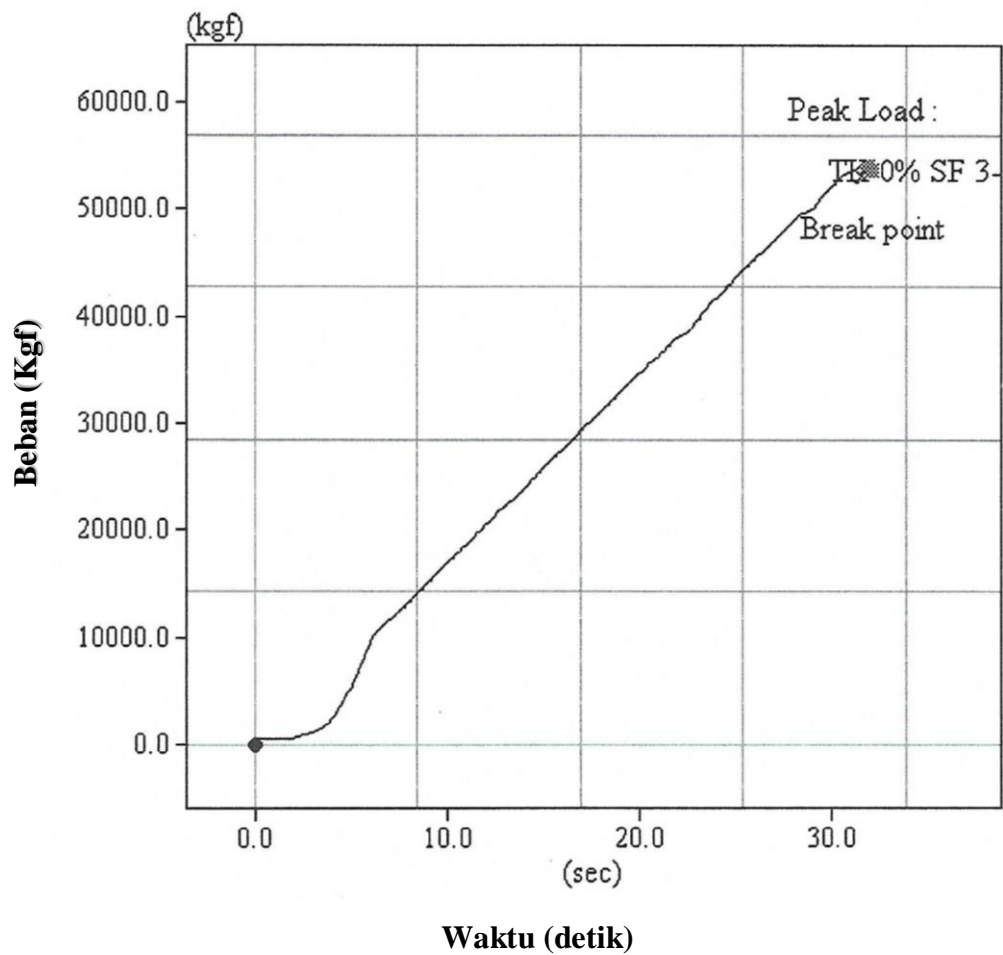


Gambar 33 Hubungan beban dan waktu benda uji TK 0% Normal 2 (7 hari)

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Concrete Testing

Construction 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 (Kg/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		

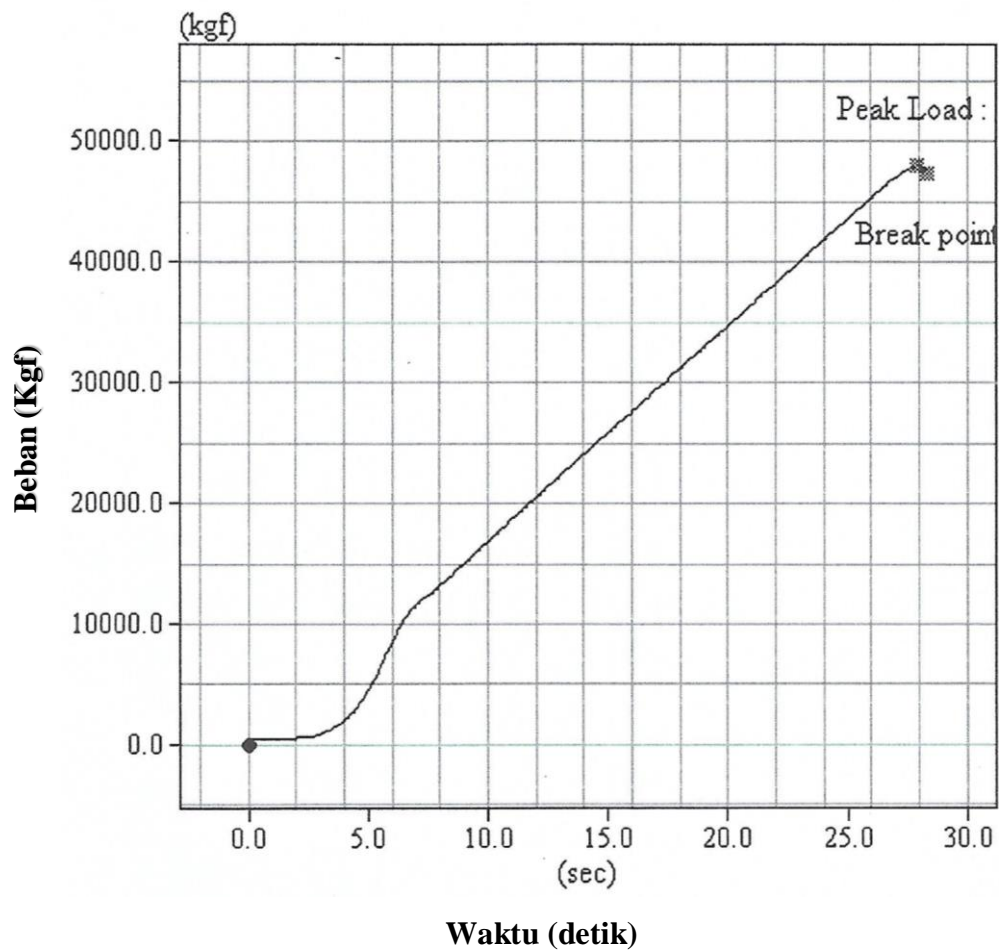


Gambar 34 Hubungan beban dan waktu benda uji TK 0% Normal 3 (7 hari)

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Concrete Testing

Constrution Name		Slidr 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 (Kg/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		

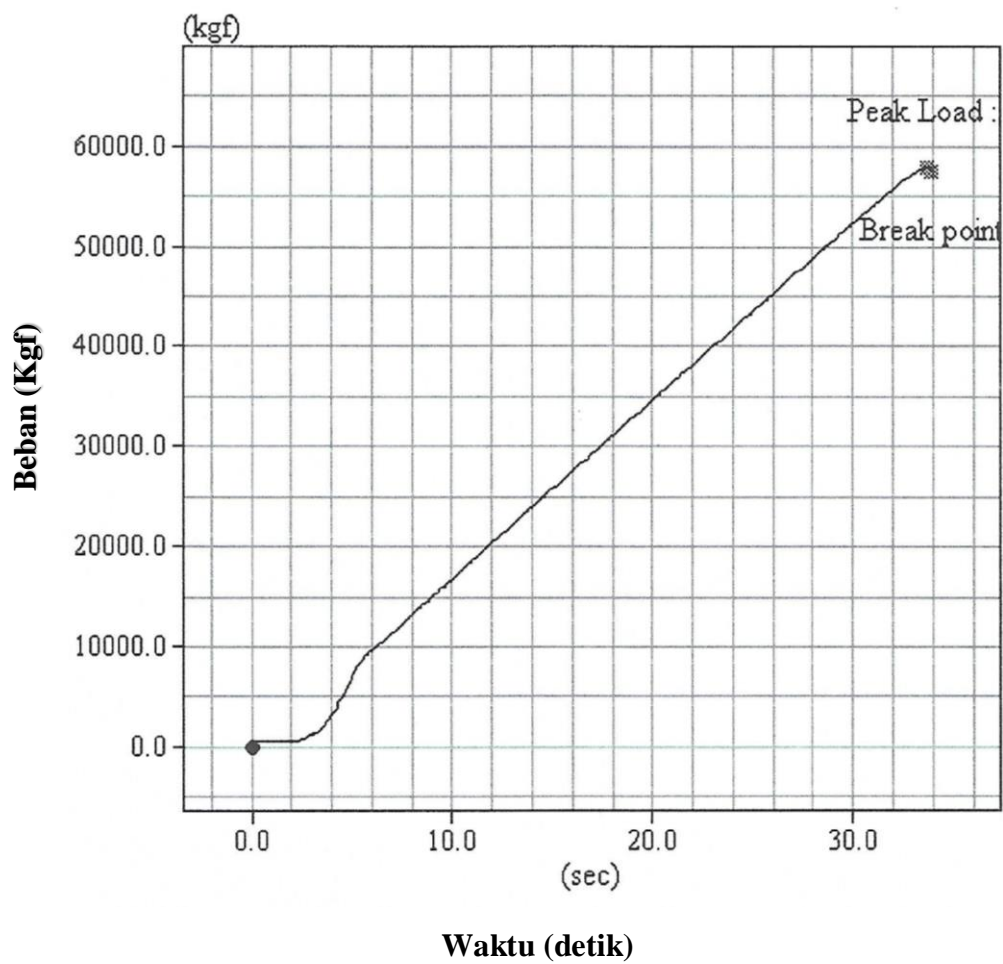


Gambar 35 Hubungan beban dan waktu benda uji TK 0% Normal 1 (14 hari)

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Concrete Testing

Construction Name		Slidr 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 (Kg/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		

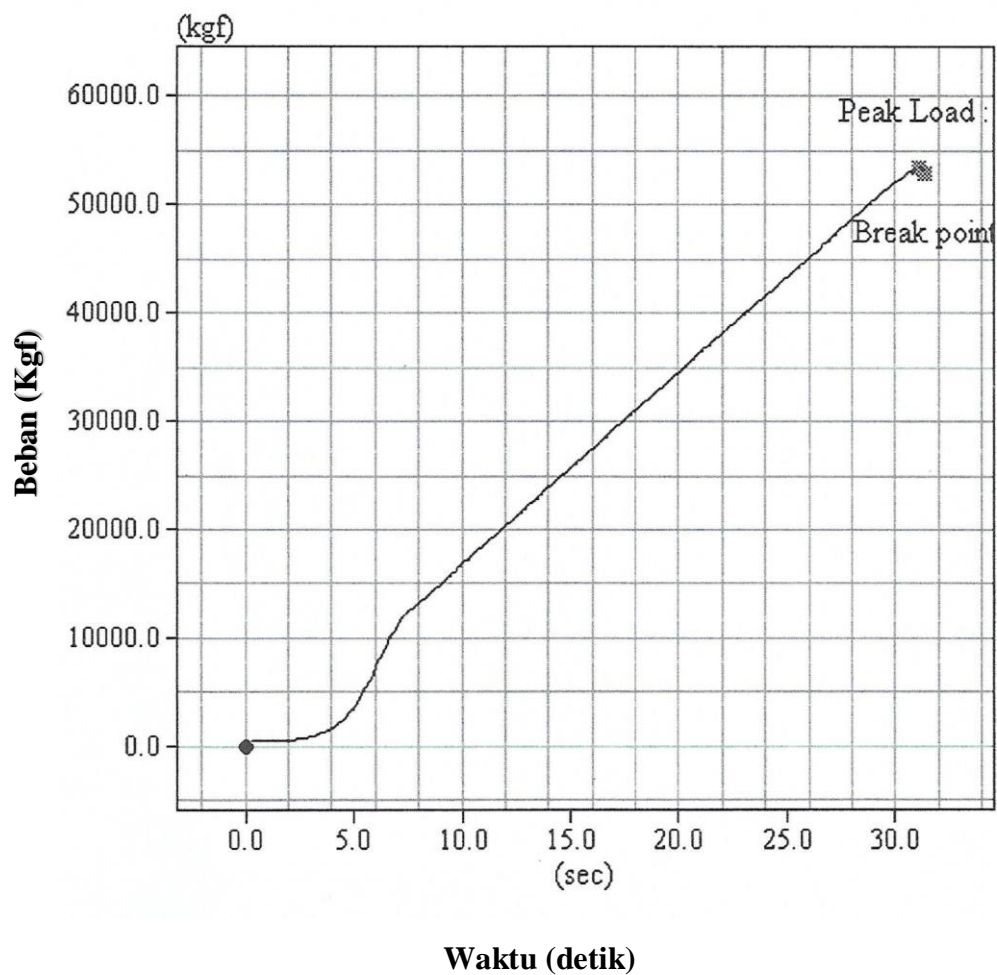


Gambar 36 Hubungan beban dan waktu benda uji TK 0% Normal 2 (14 hari)

Laboratorium Jurusan Teknik Sipil
Universitas Muhammadiyah Yogyakarta

Concrete Testing

Construction Name		Slidr 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 (Kg/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		

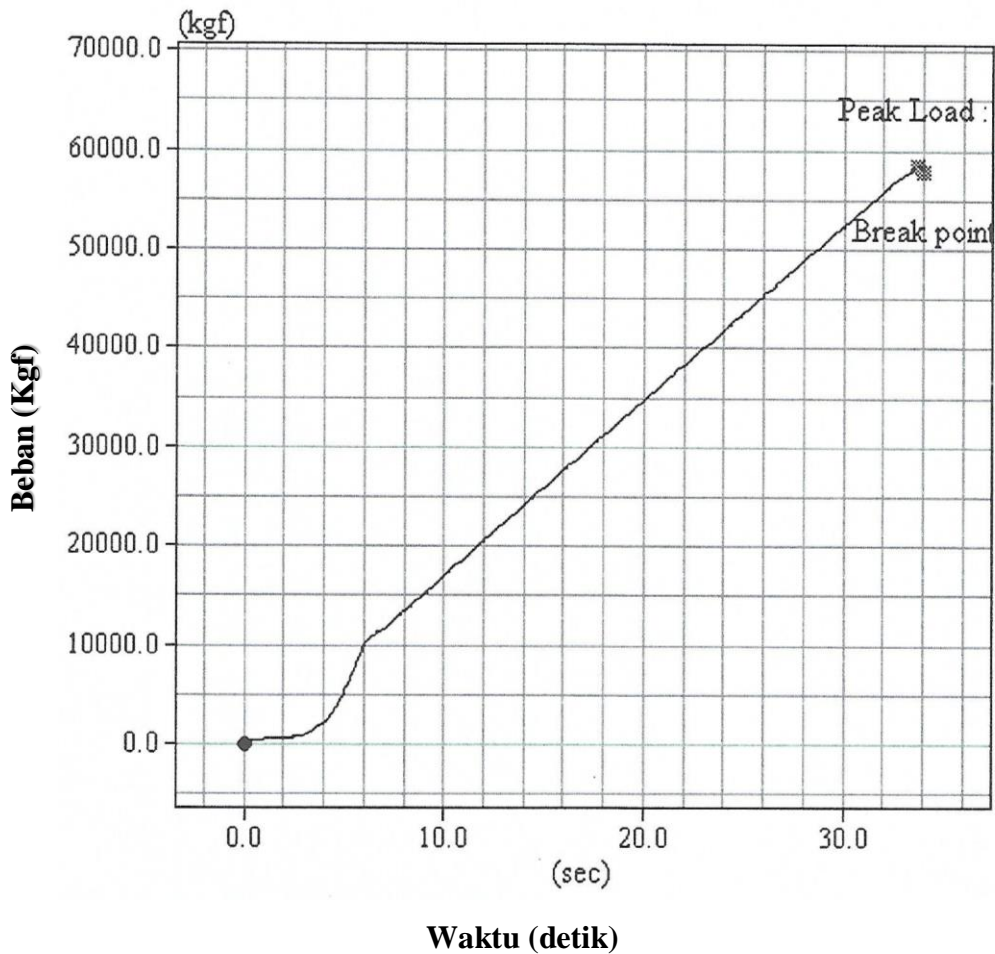


Gambar 37 Hubungan beban dan waktu benda uji TK 0% Normal 3 (14 hari)

Laboratorium Jurusan Teknik Sipil
 Universitas Muhammadiyah Yogyakarta

Concrete Testing

Construction Name		Slidr 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 (Kg/cm ²)	H/D Ratio	Design Stress	Adjust Ratio	Life	Break Style	Remark
1	176.71	58390	4699.5	329.8	2.0	360.0	1.0	28		

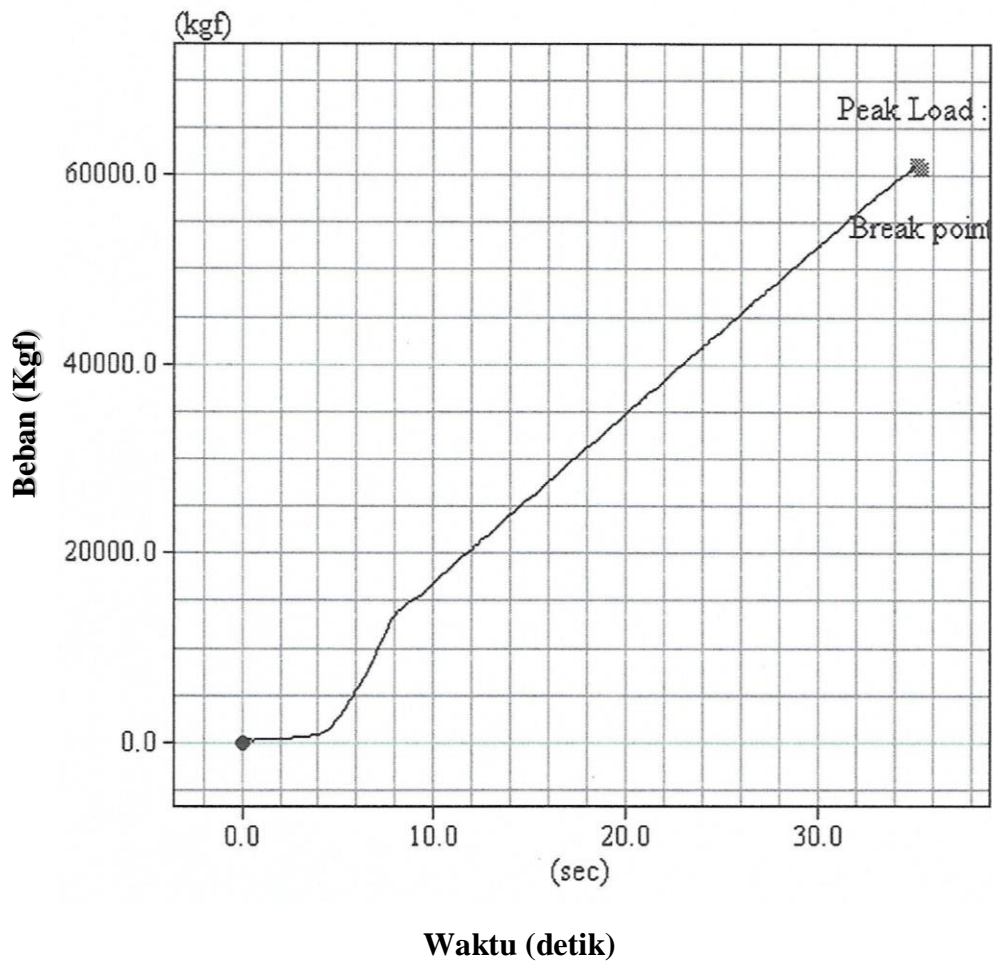


Gambar 38 Hubungan beban dan waktu benda uji TK 0% Normal 1 (28 hari)

Laboratorium Jurusan Teknik Sipil
Universitas Muhammadiyah Yogyakarta

Concrete Testing

Construction Name		Slidr 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 (Kg/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		

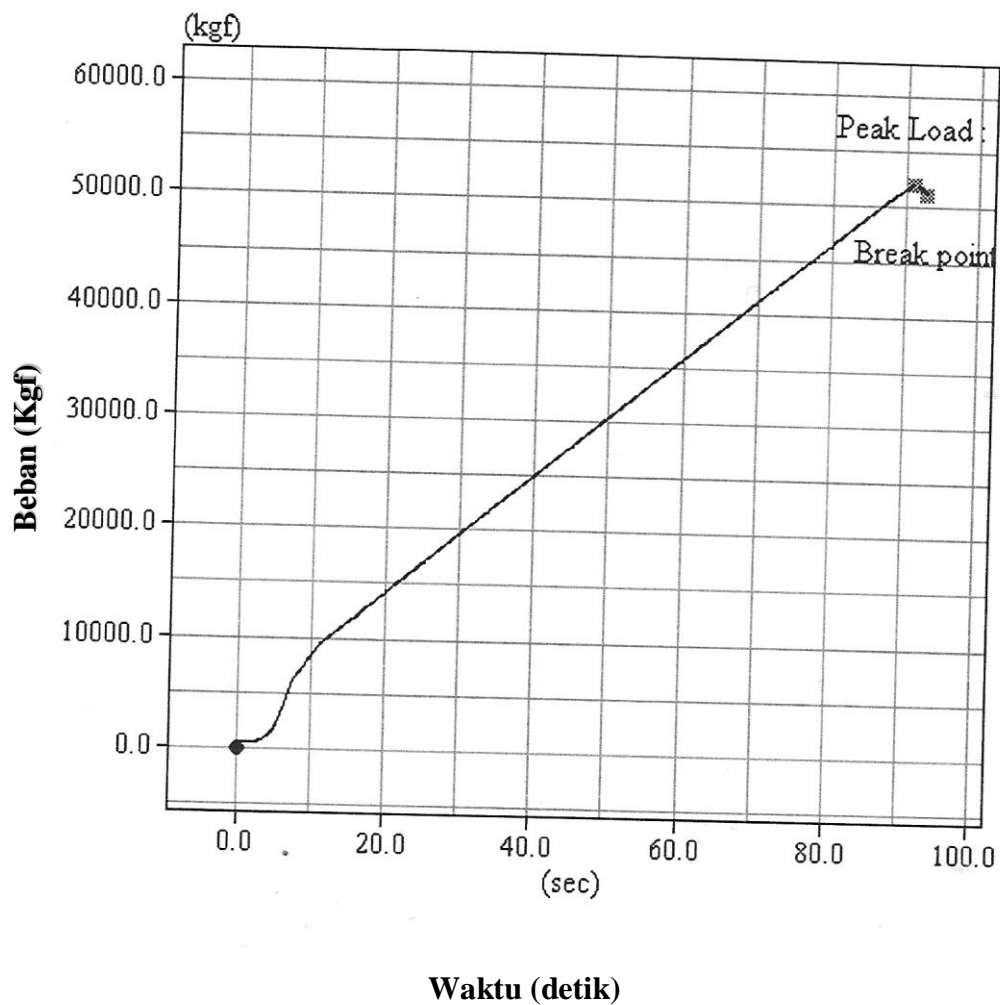


Gambar 39 Hubungan beban dan waktu benda uji TK 0% Normal 2 (28 hari)

Laboratorium Jurusan Teknik Sipil
Universitas Muhammadiyah Yogyakarta

Concrete Testing

Construction 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 (Kg/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		

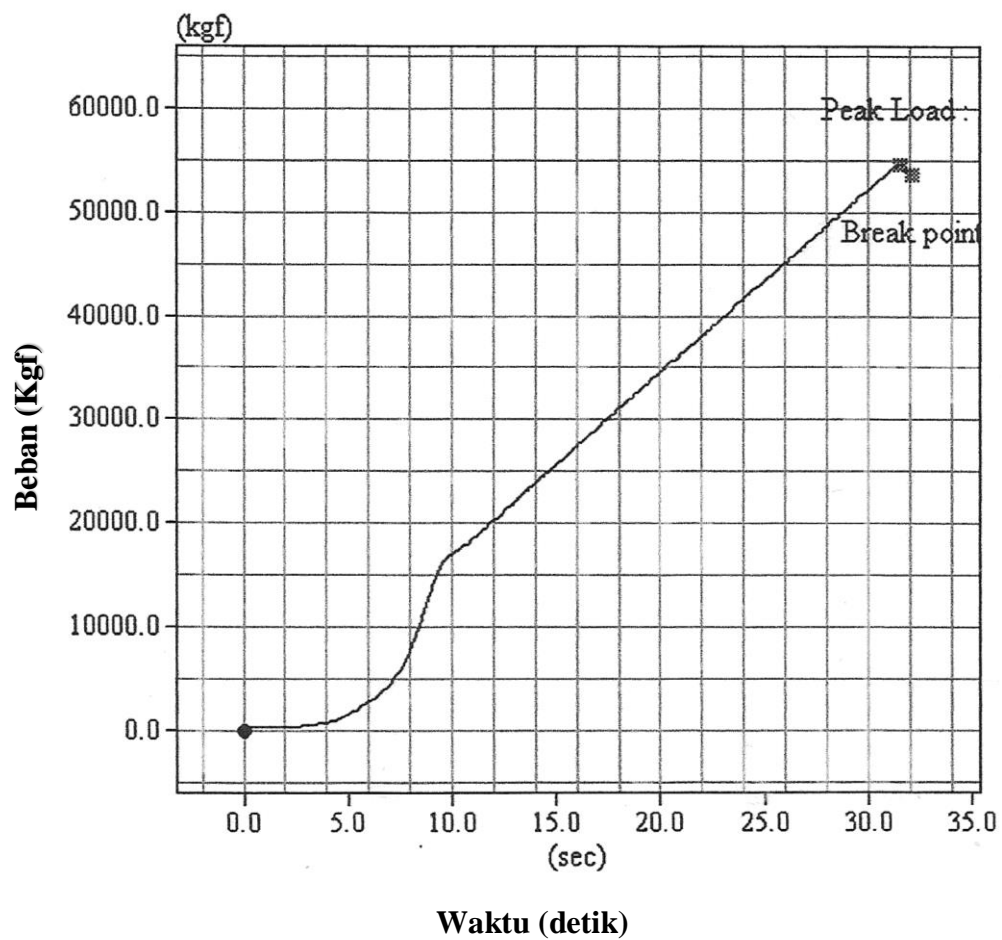


Gambar 40 Hubungan beban dan waktu benda uji TK 0% Normal 3 (28 hari)

Laboratorium Jurusan Teknik Sipil
Universitas Muhammadiyah Yogyakarta

Concrete Testing

Construction Name		Slidr Btn								
Manufacturer		Hungta								
Contractor		UMY								
Customer		Lab. JTS. FT.UMY								
Test Date		3/18/2019			Report No.			TK 5% ZT 1		
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	179.32	52040	4127.6	289.6	2.0	300.0	1.0	7		

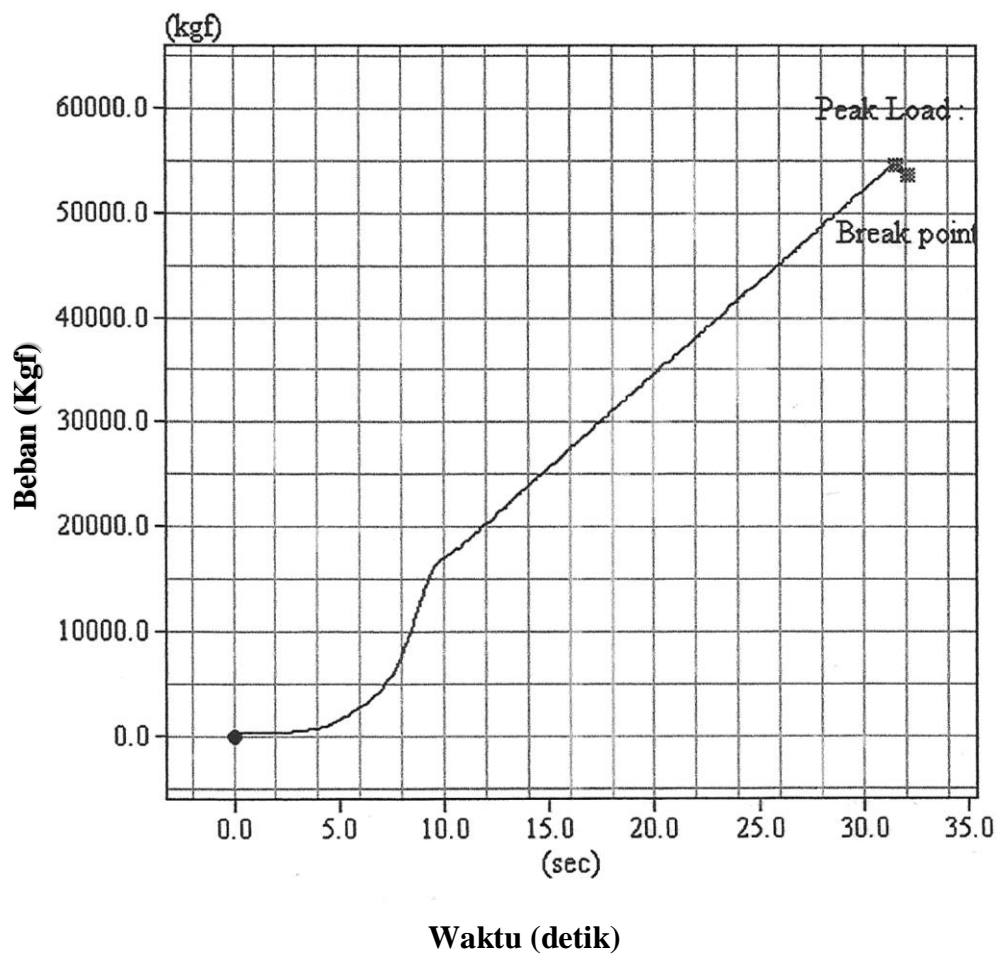


Gambar 41 Hubungan beban dan waktu benda uji TK 5% ZT 1 (7 hari)

Laboratorium Jurusan Teknik Sipil
Universitas Muhammadiyah Yogyakarta

Concrete Testing

Construction Name		Slab beton								
Manufacturer		Hungta								
Contractor		UMY								
Customer		Lab. JTS. FT.UMY								
Test Date		3/18/2019			Report No.			TK 5% ZT 2		
No.	Area (cm ²)	Peak Force (Kg)	Compression Stress (psi)	Adjust Stress (Kg/cm ²)	MO Ratio	Design Stress	Adjust Ratio	Life	Break Style	Remark
1	174.37	50730	4137.9	292.4	2.1	300.0	1.0	7		

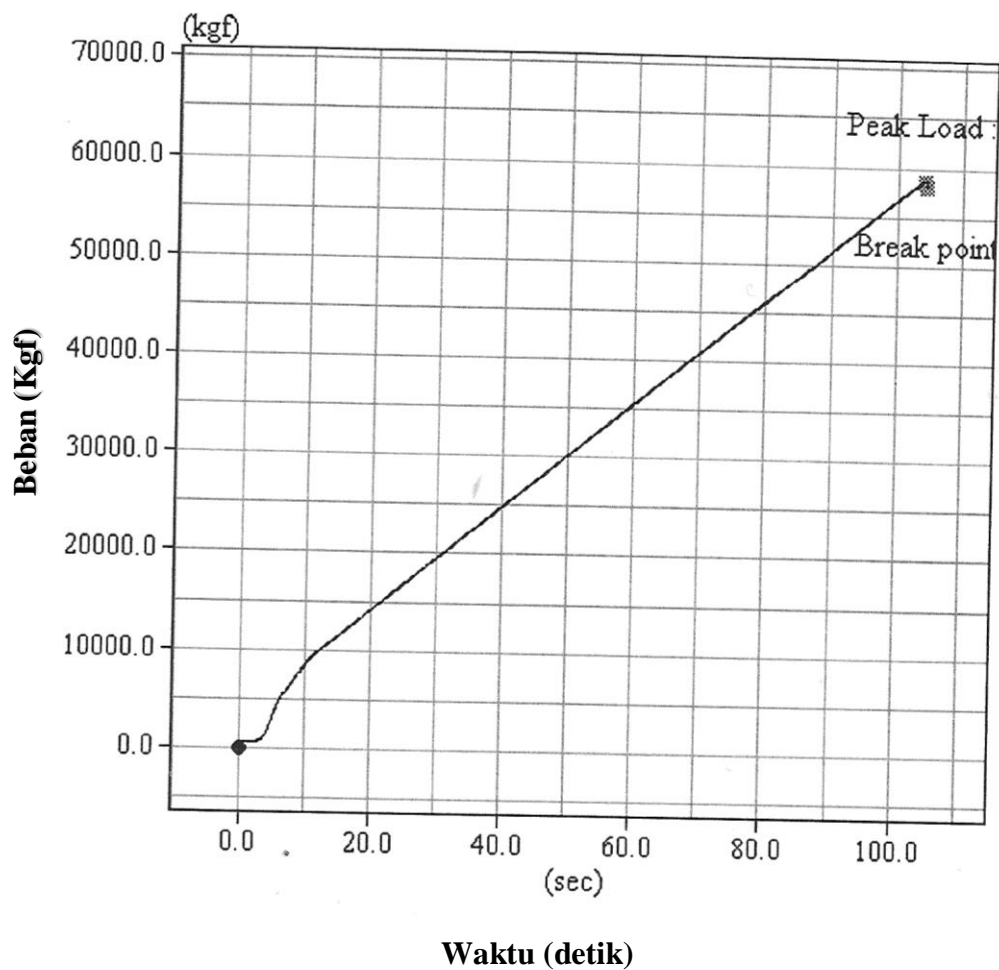


Gambar 42 Hubungan beban dan waktu benda uji TK 5% ZT 2 (7 hari)

Laboratorium Jurusan Teknik Sipil
Universitas Muhammadiyah Yogyakarta

Concrete Testing

Construction Name		Sldr Btn								
Manufacturer		Hungta								
Contractor		UMY								
Customer		Lab. JTS. FT.UMY								
Test Date		3/18/2019			Report No.			TK 5% ZT 3		
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	178.13	58590	4678.1	328.3	2.0	300.0	1.0	7		

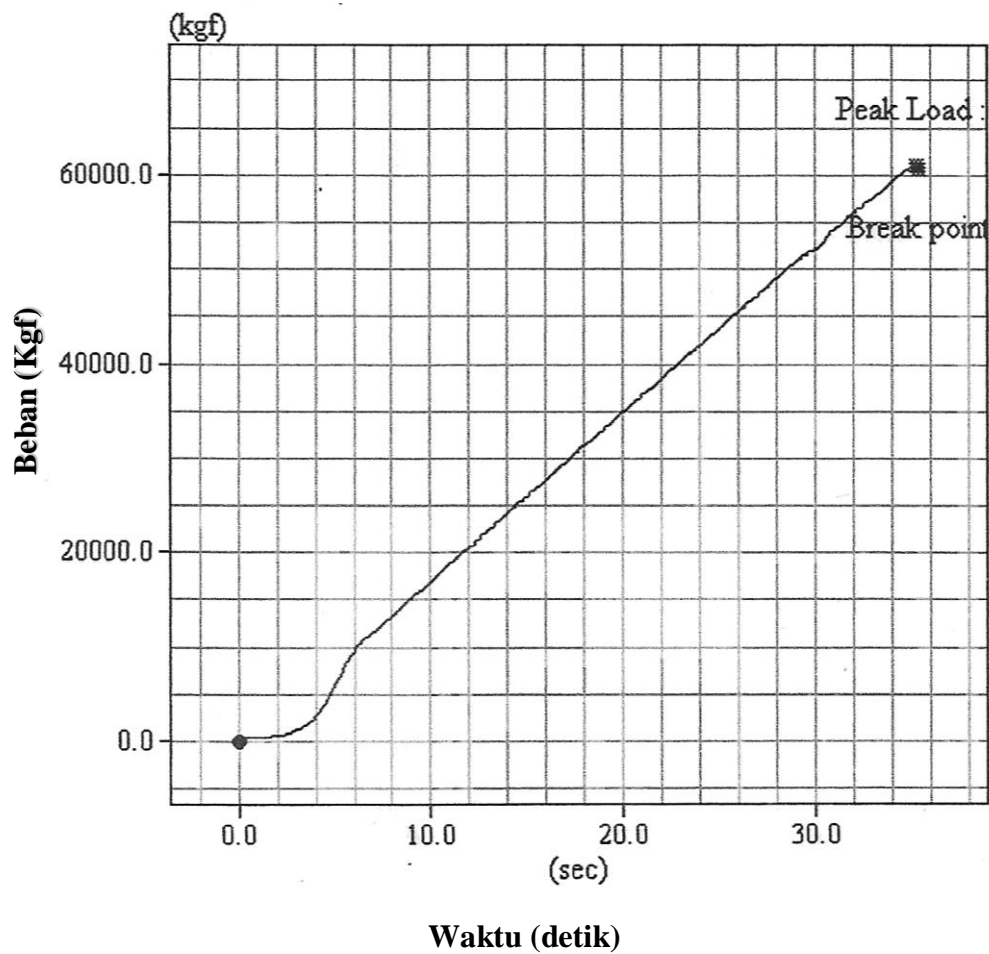


Gambar 43 Hubungan beban dan waktu benda uji TK 5% ZT 3 (7 hari)

**Laboratorium Jurusan Teknik Sipil
Universitas Muhammadiyah Yogyakarta**

Concrete Testing

Construction Name		Sldr btn								
Manufacturer		Hungta								
Contractor		UMY								
Customer		Lab. JTS. FT.UMY								
Test Date		03/06/2019			Report No.			TK 5% ZT 1		
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	177.66	60970	4881.0	343.2	2.0	300.0	1.0	14		

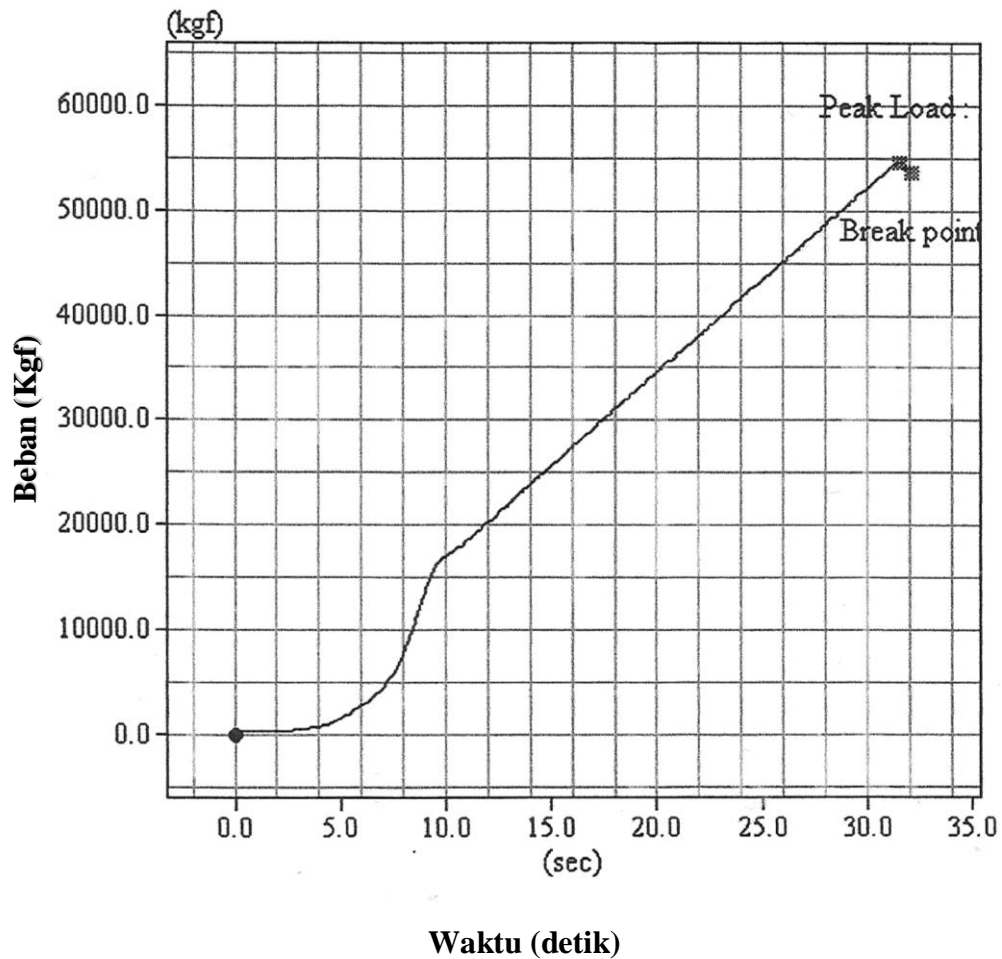


Gambar 44 Hubungan beban dan waktu benda uji TK 5% ZT 1 (14 hari)

Laboratorium Jurusan Teknik Sipil
Universitas Muhammadiyah Yogyakarta

Concrete Testing

Construction Name		Slidr btn								
Manufacturer		Hungta								
Contractor		UMY								
Customer		Lab. JTS. FT.UMY								
Test Date		03/06/2019			Report No.			TK 5% ZT 2		
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	176.24	54510	4328.9	309.3	2.0	300.0	1.0	14		

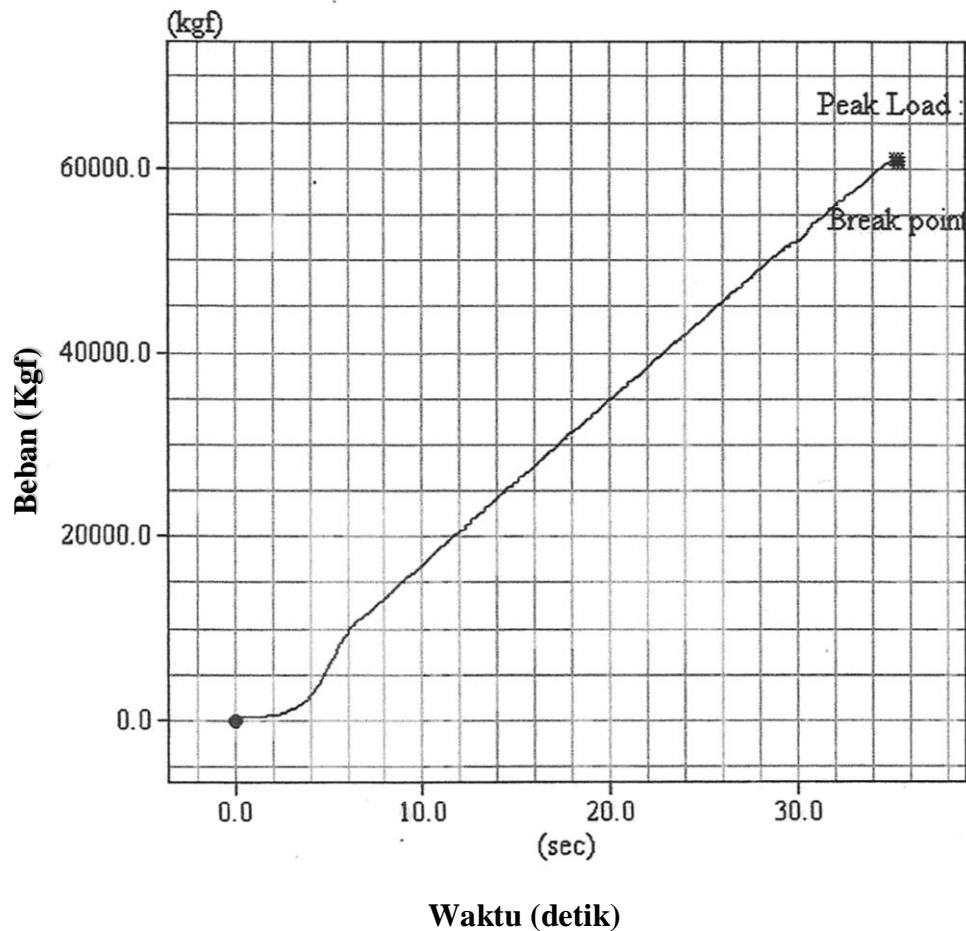


Gambar 45 Hubungan beban dan waktu benda uji TK 5% ZT 2 (14 hari)

**Laboratorium Jurusan Teknik Sipil
Universitas Muhammadiyah Yogyakarta**

Concrete Testing

Construction Name		Slidr btm								
Manufacturer		Hungta								
Contractor		UMY								
Customer		Lab. JTS. FT.UMY								
Test Date		03/06/2019			Report No.			TK 5% ZT 3		
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	176.24	54510	4398.9	309.3	2.0	300.0	1.0	14		
2	172.27	61320	5062.7	356.7	2.0	300.0	1.0	14		

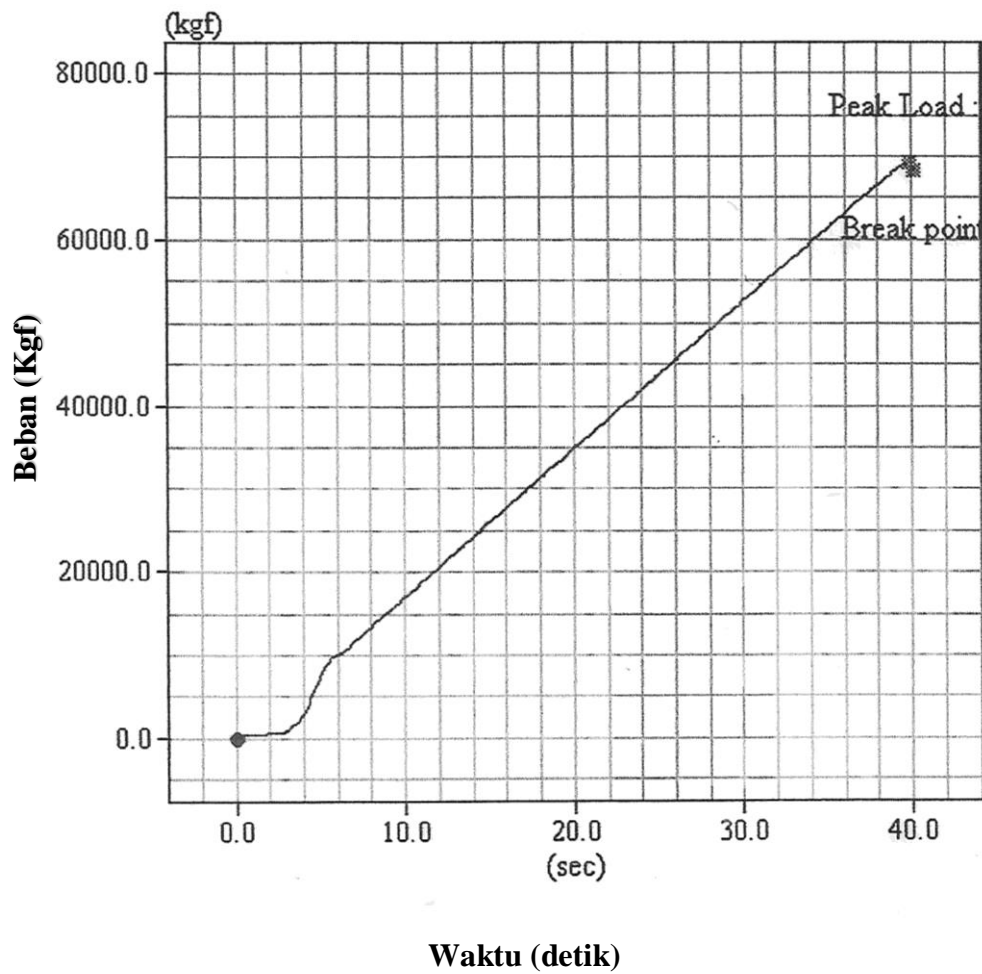


Gambar 46 Hubungan beban dan waktu benda uji TK 5% ZT 3 (14 hari)

Laboratorium Jurusan Teknik Sipil
Universitas Muhammadiyah Yogyakarta

Concrete Testing

Construction Name		Slidr beton								
Manufacturer		Hungta								
Contractor		UMY								
Customer		Lab. JTS. FT.UMY								
Test Date		03/06/2019			Report No.			TK 5% ZT 1		
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	177.19	69200	5554.7	386.3	1.9	300.0	1.0	28		

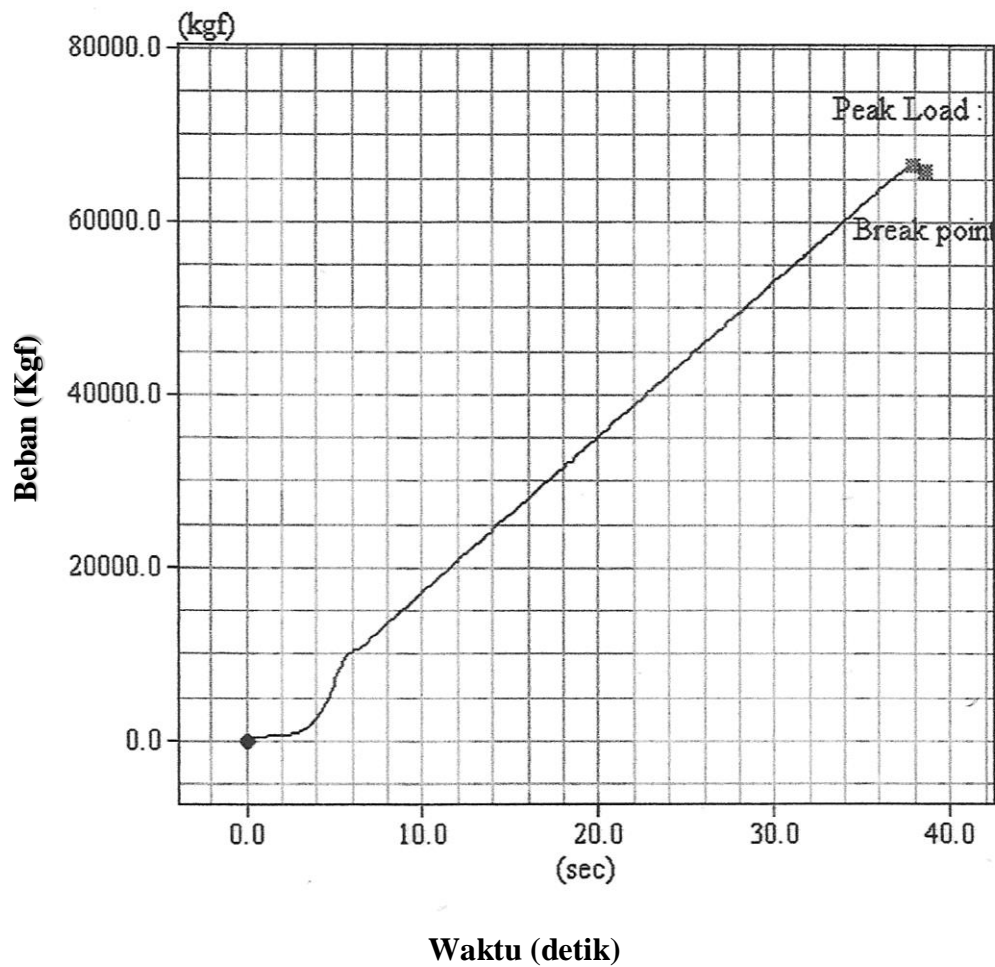


Gambar 47 Hubungan beban dan waktu benda uji TK 5% ZT 1 (28 hari)

Laboratorium Jurusan Teknik Sipil
Universitas Muhammadiyah Yogyakarta

Concrete Testing

Constrution Name		Slidr beton								
Manufacturer		Hungta								
Contractor		UMY								
Customer		Lab. JTS. FT.UMY								
Test Date		03/06/2019			Report No.			TK 5% ZT 2		
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	178.60	66450	5291.6	372.8	2.0	300.0	1.0	28		

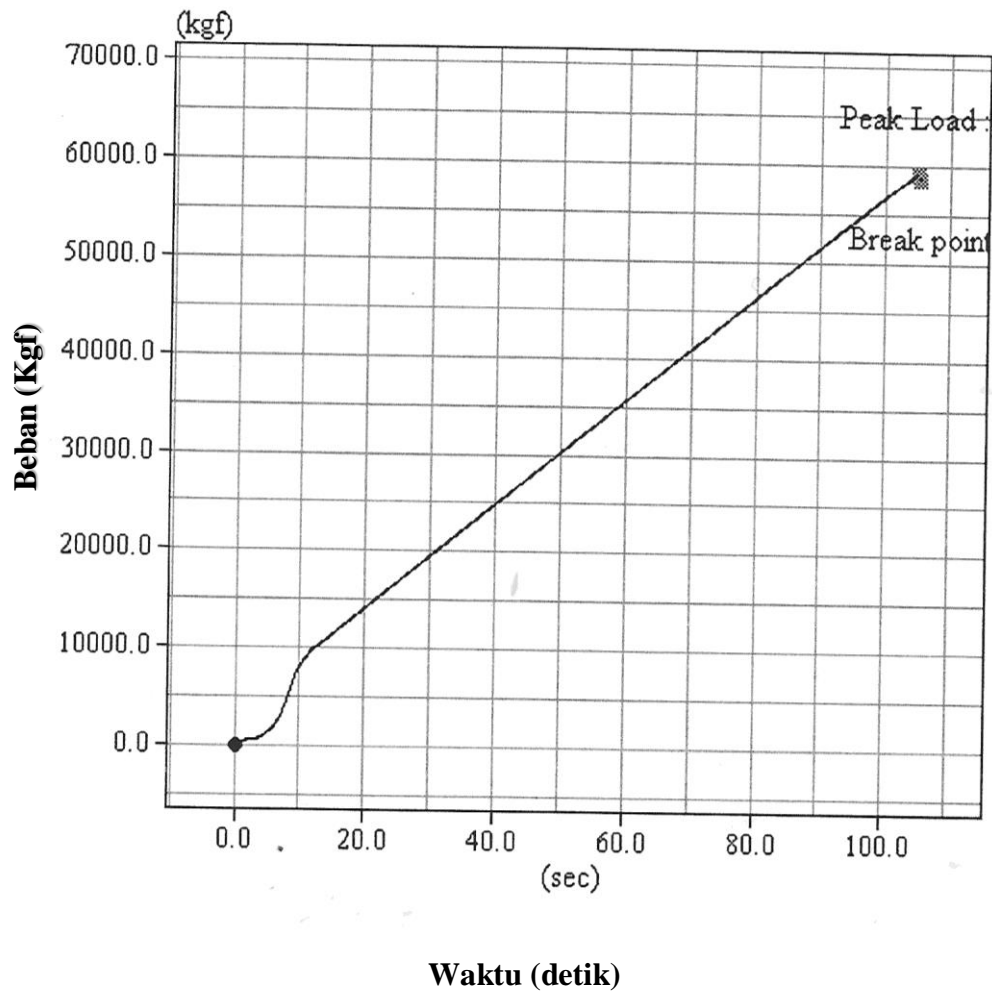


Gambar 48 Hubungan beban dan waktu benda uji TK 5% ZT 2 (28 hari)

**Laboratorium Jurusan Teknik Sipil
Universitas Muhammadiyah Yogyakarta**

Concrete Testing

Construction Name		Slidr Btm								
Manufacturer		Hungta								
Contractor		UMY								
Customer		Lab. JTS. FT.UMY								
Test Date		03/06/2019			Report No.			TK 5% ZT 3		
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	178.13	59140	4722.0	332.0	2.0	300.0	1.0	28		

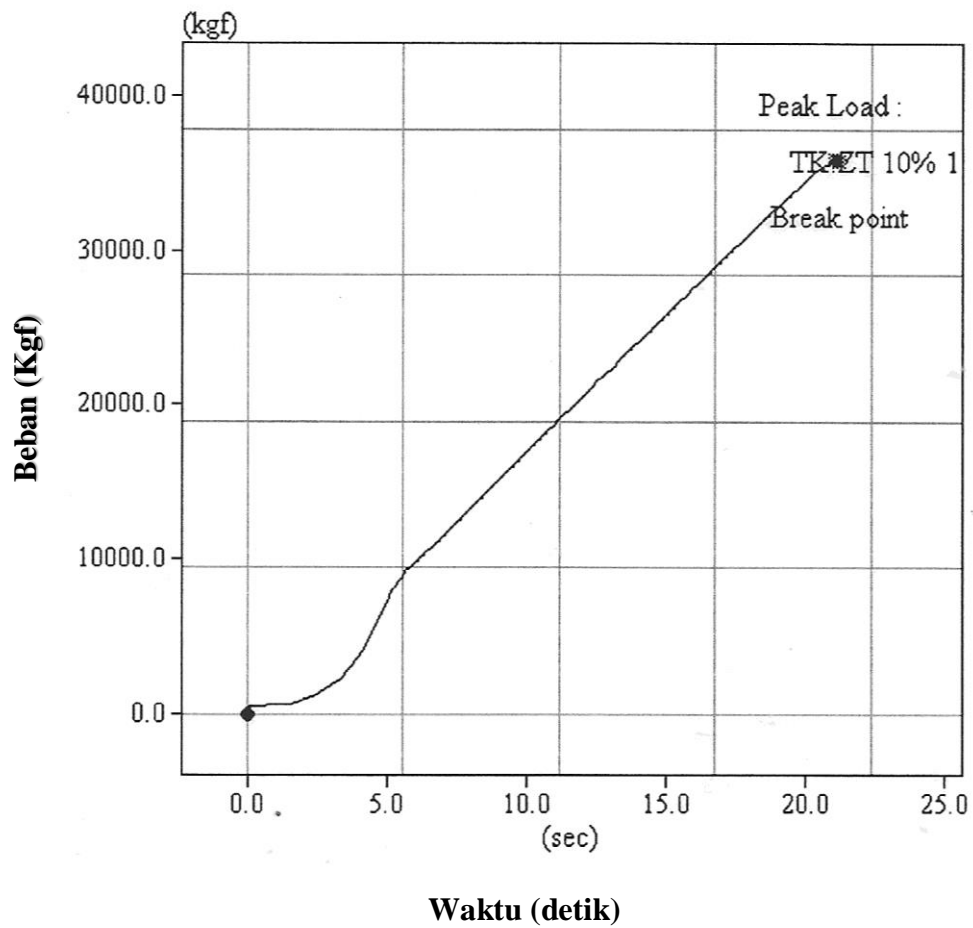


Gambar 49 Hubungan beban dan waktu benda uji TK 5% ZT 3 (28 hari)

Laboratorium Jurusan Teknik Sipil
Universitas Muhammadiyah Yogyakarta

Concrete Testing

Construction Name		Slidr Btn								
Manufacturer		Hungta								
Contractor		UMY								
Customer		Lab. JTS. FT.UMY								
Test Date		3/13/2019			Report No.			TK.ZT 10% 1		
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	177.89	35860	2867.0	201.2	2.0	300.0	1.0	7		

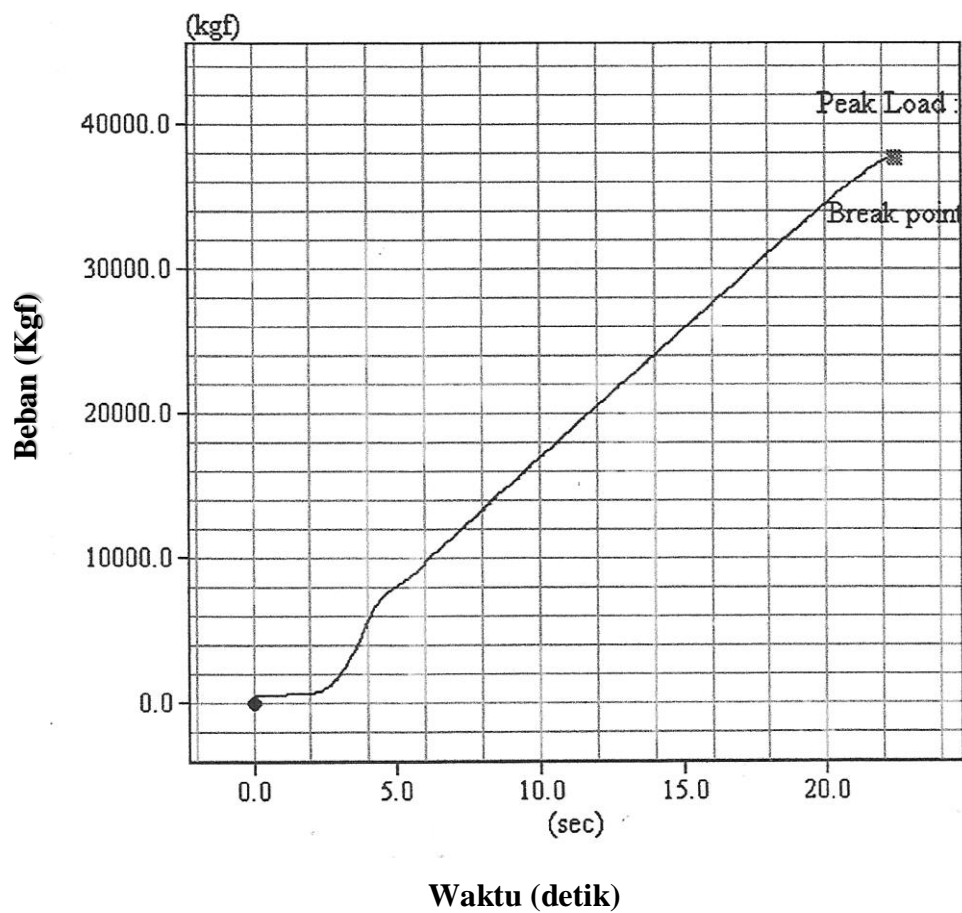


Gambar 50 Hubungan beban dan waktu benda uji TK 10% ZT 1 (7 hari)

Laboratorium Jurusan Teknik Sipil
Universitas Muhammadiyah Yogyakarta

Concrete Testing

Construction Name		Slidr beton								
Manufacturer		Hungta								
Contractor		UMY								
Customer		Lab. JTS. FT.UMY								
Test Date		3/13/2019			Report No.			TK.ZT 10% 2		
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	176.95	37640	3025.4	212.7	2.0	300.0	1.0	7		

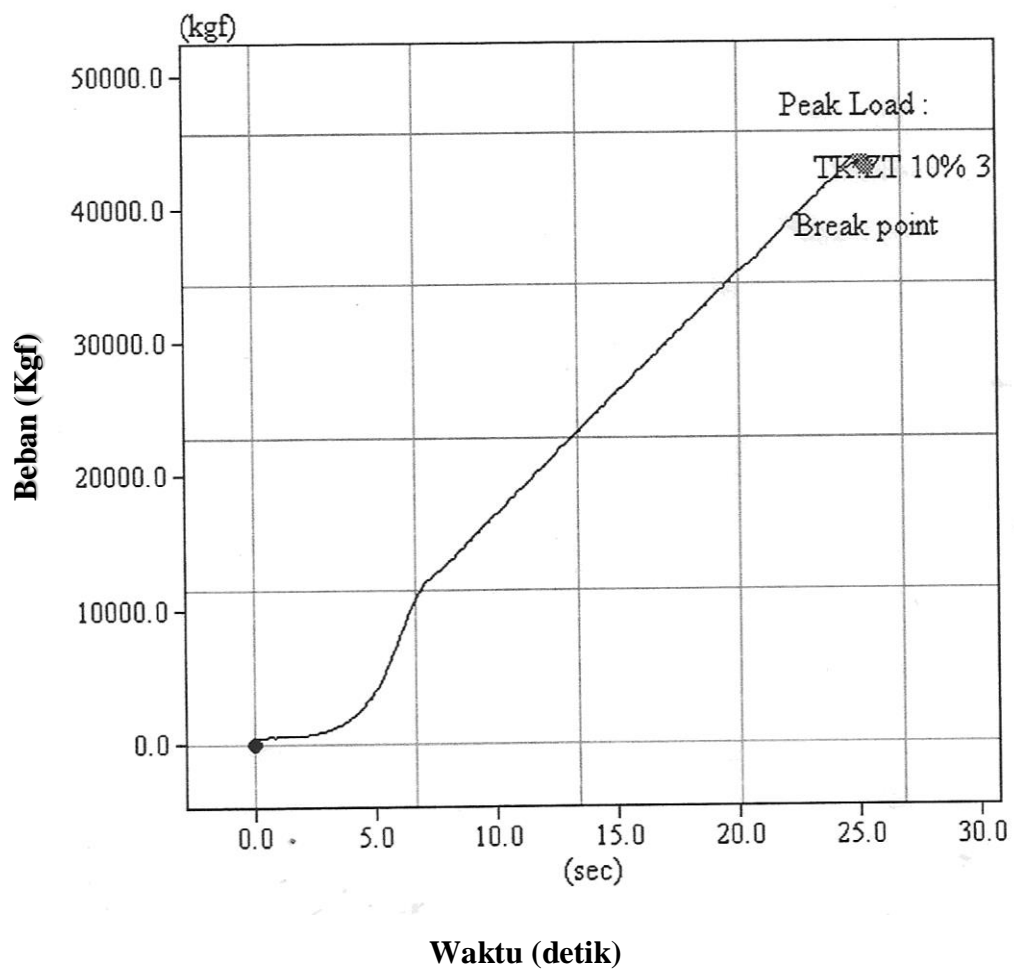


Gambar 51 Hubungan beban dan waktu benda uji TK 10% ZT 2 (7 hari)

Laboratorium Jurusan Teknik Sipil
Universitas Muhammadiyah Yogyakarta

Concrete Testing

Construction Name		Slidr Btn								
Manufacturer		Hungta								
Contractor		UMY								
Customer		Lab. JTS. FT.UMY								
Test Date		3/13/2019			Report No.			TK.ZT 10% 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	179.79	43310	3426.1	240.4	2.0	300.0	1.0	7		

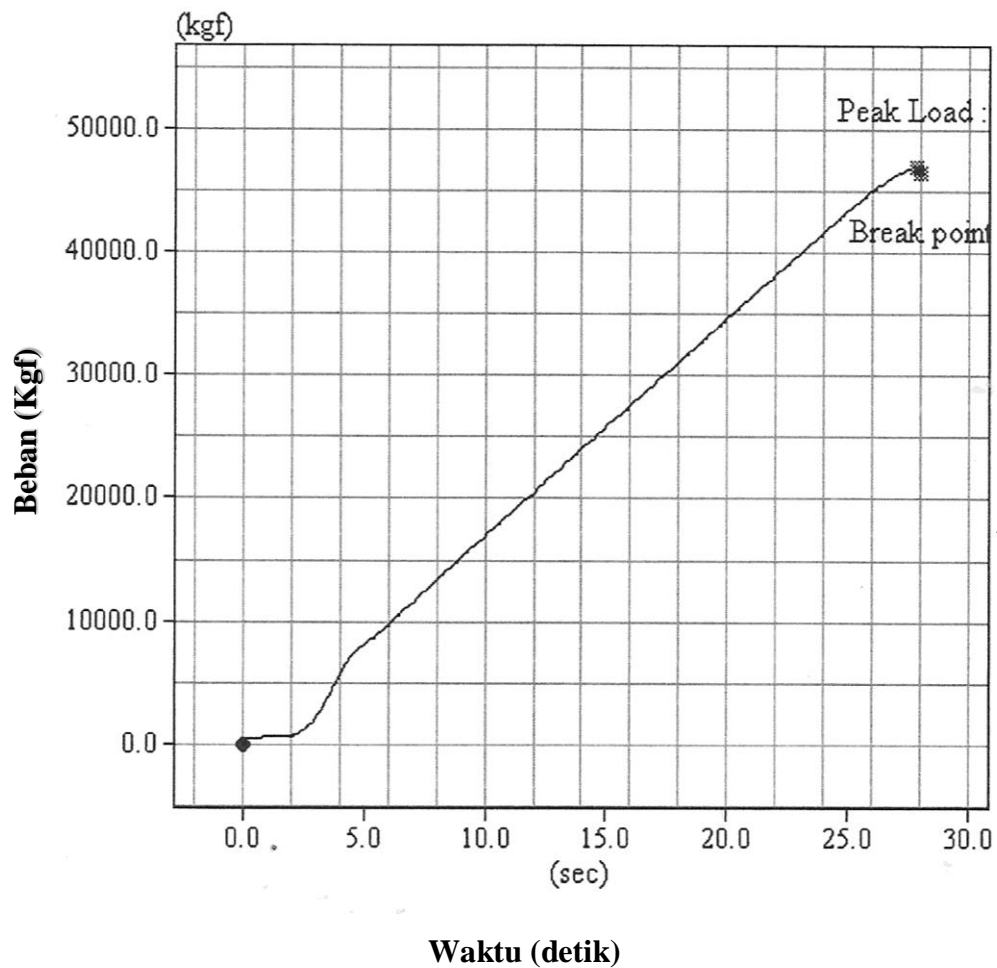


Gambar 52 Hubungan beban dan waktu benda uji TK 10% ZT 3 (7 hari)

Laboratorium Jurusan Teknik Sipil
Universitas Muhammadiyah Yogyakarta

Concrete Testing

Construction Name		Sldr beton								
Manufacturer		Hungta								
Contractor		UMY								
Customer		Lab. JTS. FT.UMY								
Test Date		03/08/2019			Report No.			TK 10% ZF 1		
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	176.95	46910	3770.5	265.1	2.0	300.0	1.0	14		

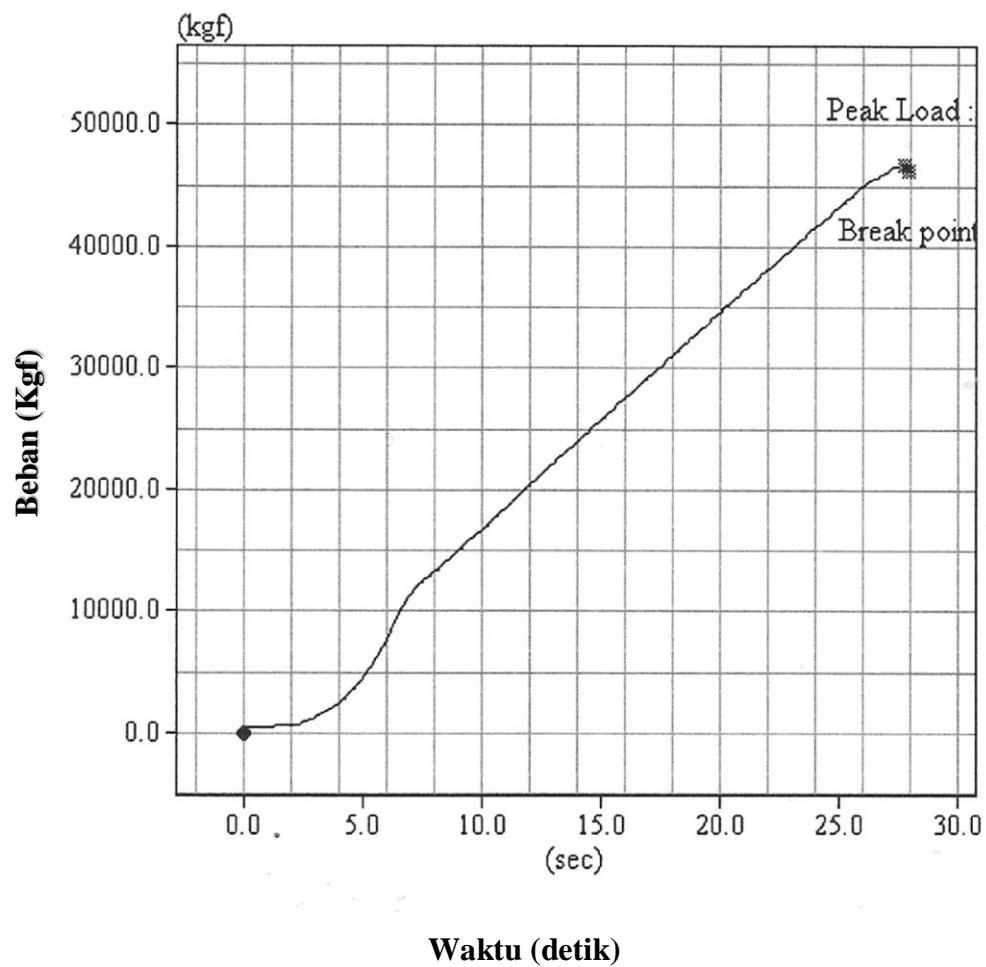


Gambar 53 Hubungan beban dan waktu benda uji TK 10% ZT 1 (14 hari)

Laboratorium Jurusan Teknik Sipil
Universitas Muhammadiyah Yogyakarta

Concrete Testing

Construction Name		Slidr beton								
Manufacturer		Hungta								
Contractor		UMY								
Customer		Lab. JTS. FT.UMY								
Test Date		03/08/2019			Report No.			TK 10% ZF 2		
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	46710	3759.4	264.1	2.0	300.0	1.0	14		

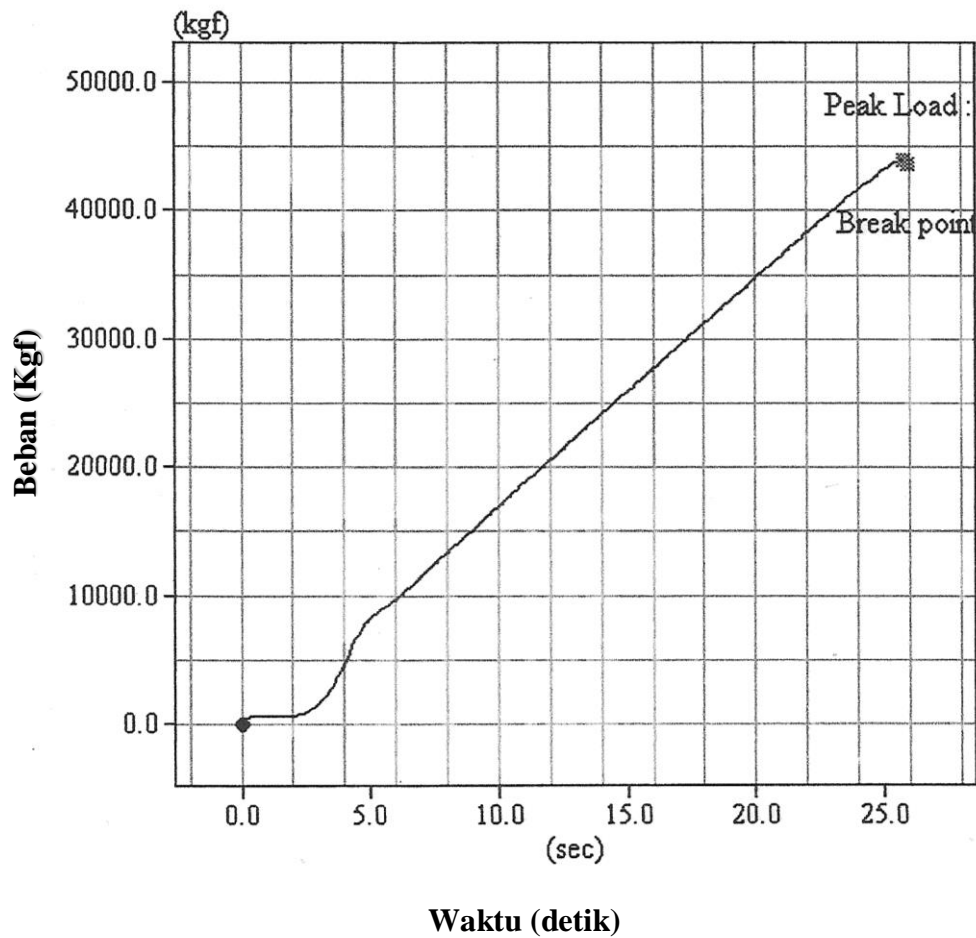


Gambar 54 Hubungan beban dan waktu benda uji TK 10% ZT 2 (14 hari)

Laboratorium Jurusan Teknik Sipil
Universitas Muhammadiyah Yogyakarta

Concrete Testing

Construction Name		Slidr beton								
Manufacturer		Hungta								
Contractor		UMY								
Customer		Lab. JTS. FT.UMY								
Test Date		03/08/2019			Report No.			TK 10% ZF 3		
No.	Area (cm ²)	Peak Force (Kgf)	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	14		

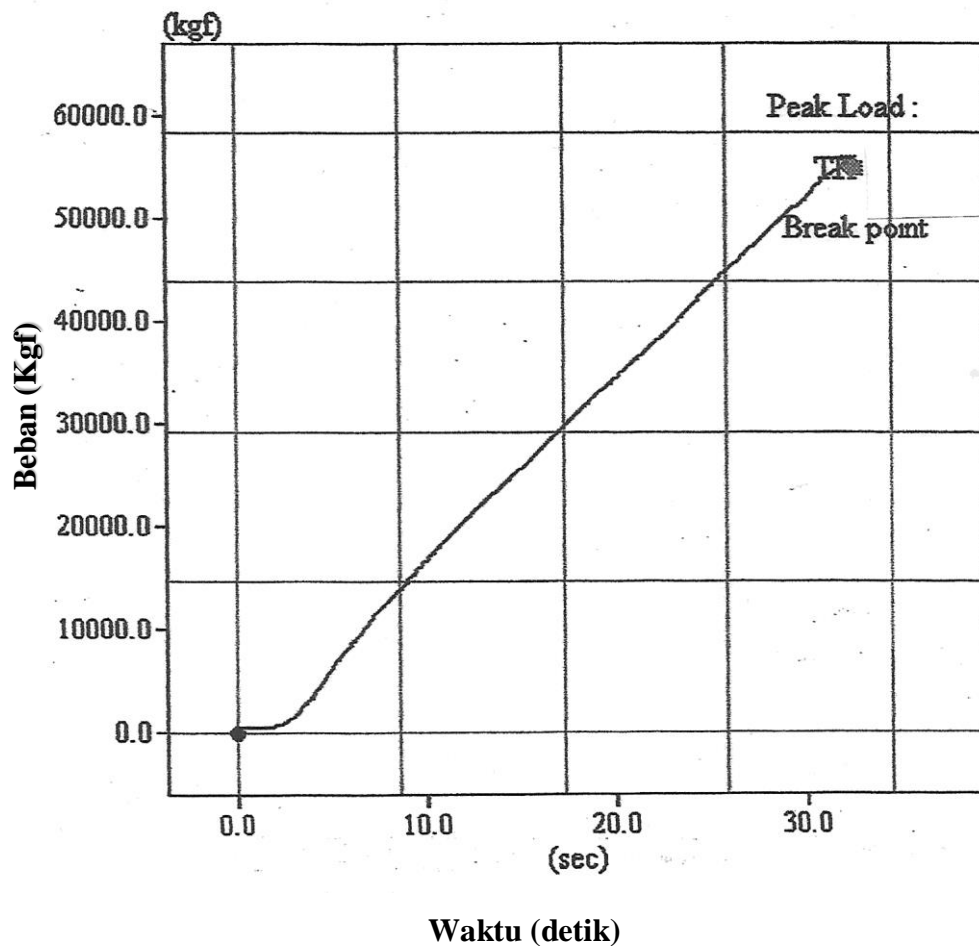


Gambar 55 Hubungan beban dan waktu benda uji TK 10% ZT 3 (14 hari)

Laboratorium Jurusan Teknik Sipil
Universitas Muhammadiyah Yogyakarta

Concrete Testing

Construction Name		Slidr btn								
Manufacturer		Hungta								
Contractor		UMY								
Customer		Lab. JTS. FT.UMY								
Test Date		3/1/2019			Report No.			ZT 10% 2		
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	313.7	2.0	300.0	1.0	28		

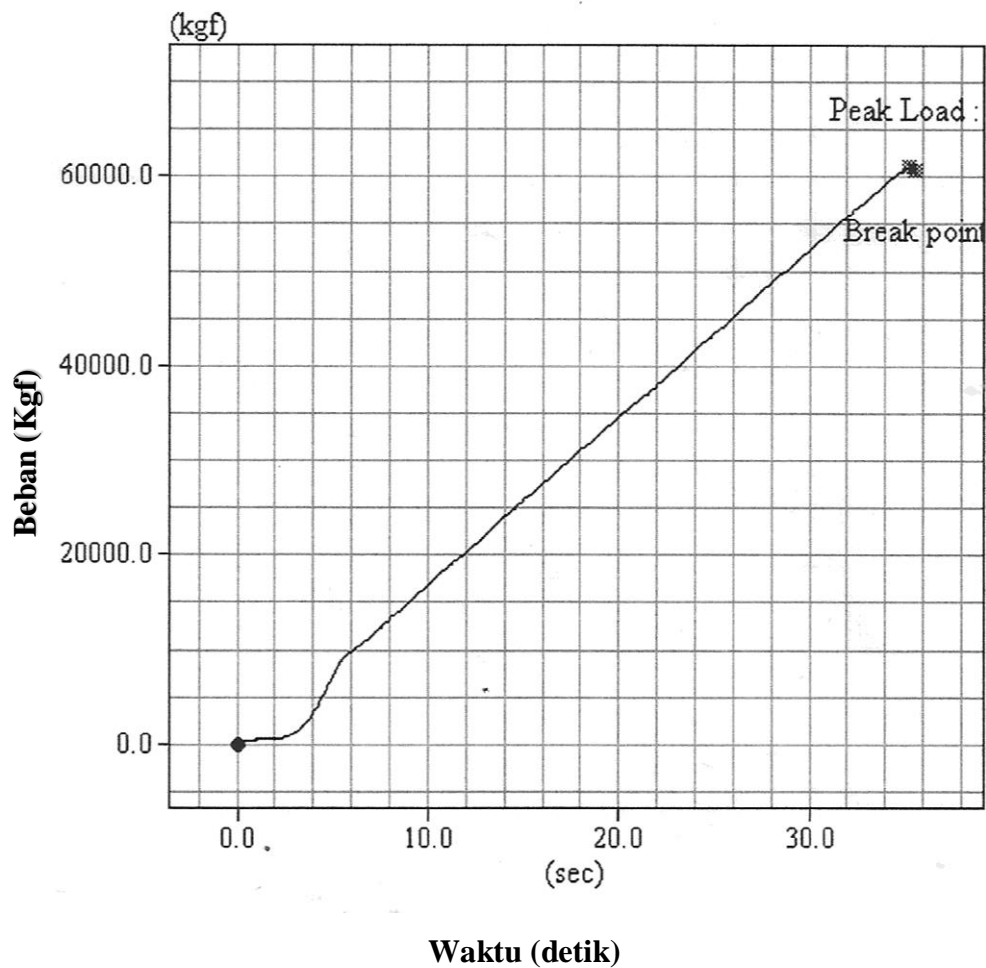


Gambar 56 Hubungan beban dan waktu benda uji TK 10% ZT 1 (28 hari)

Laboratorium Jurusan Teknik Sipil
Universitas Muhammadiyah Yogyakarta

Concrete Testing

Construction Name		Slidr beton								
Manufacturer		Hungta								
Contractor		UMY								
Customer		Lab. JTS. FT.UMY								
Test Date		3/1/2019			Report No.			ZT 10% 2		
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	61060	4914.4	345.9	2.0	300.0	1.0	28		

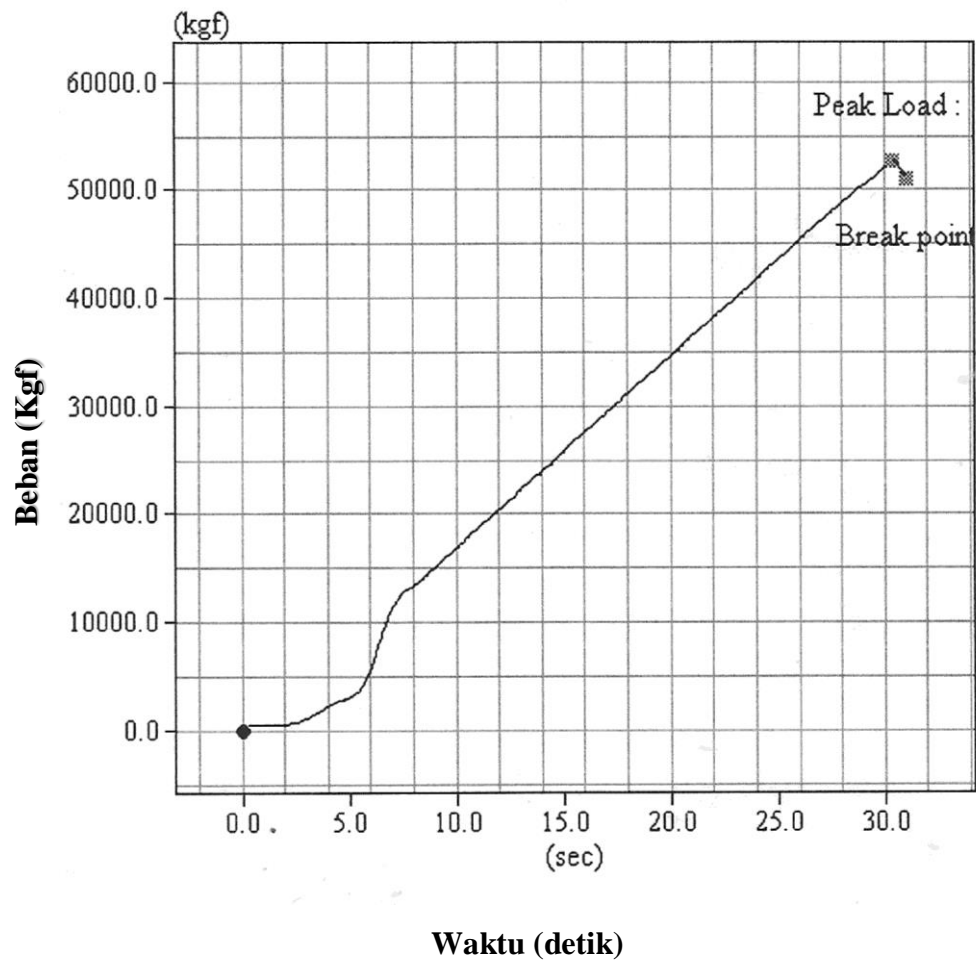


Gambar 57 Hubungan beban dan waktu benda uji TK 10% ZT 2 (28 hari)

Laboratorium Jurusan Teknik Sipil
Universitas Muhammadiyah Yogyakarta

Concrete Testing

Construction Name		Sldr beton								
Manufacturer		Hungta								
Contractor		UMY								
Customer		Lab. JTS. FT.UMY								
Test Date		3/1/2019			Report No.			ZT 10% 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	52610	4234.3	298.3	2.0	300.0	1.0	28		

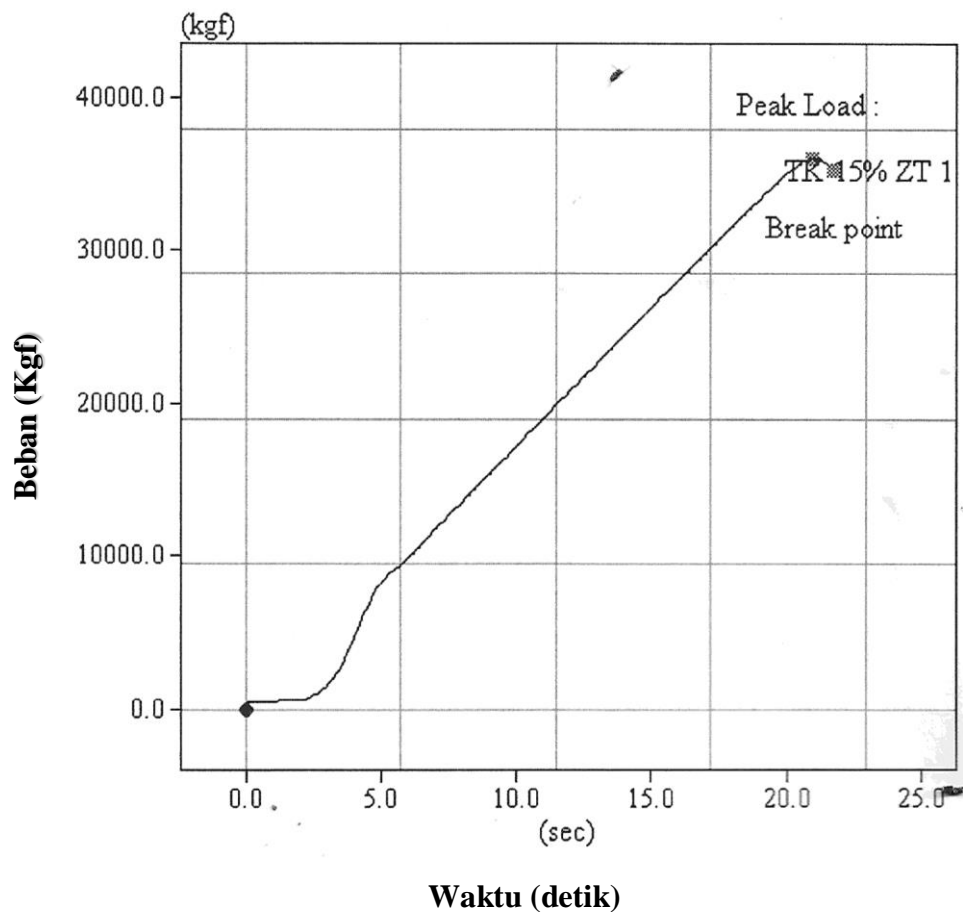


Gambar 58 Hubungan beban dan waktu benda uji TK 10% ZT 3 (28 hari)

Laboratorium Jurusan Teknik Sipil
Universitas Muhammadiyah Yogyakarta

Concrete Testing

Construction Name		Sldr beton								
Manufacturer		Hungta								
Contractor		UMY								
Customer		Lab. JTS. FT.UMY								
Test Date		3/11/2019			Report No.			TK 15% ZT 1		
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	180.27	36000	2840.3	199.3	2.0	300.0	1.0	7		

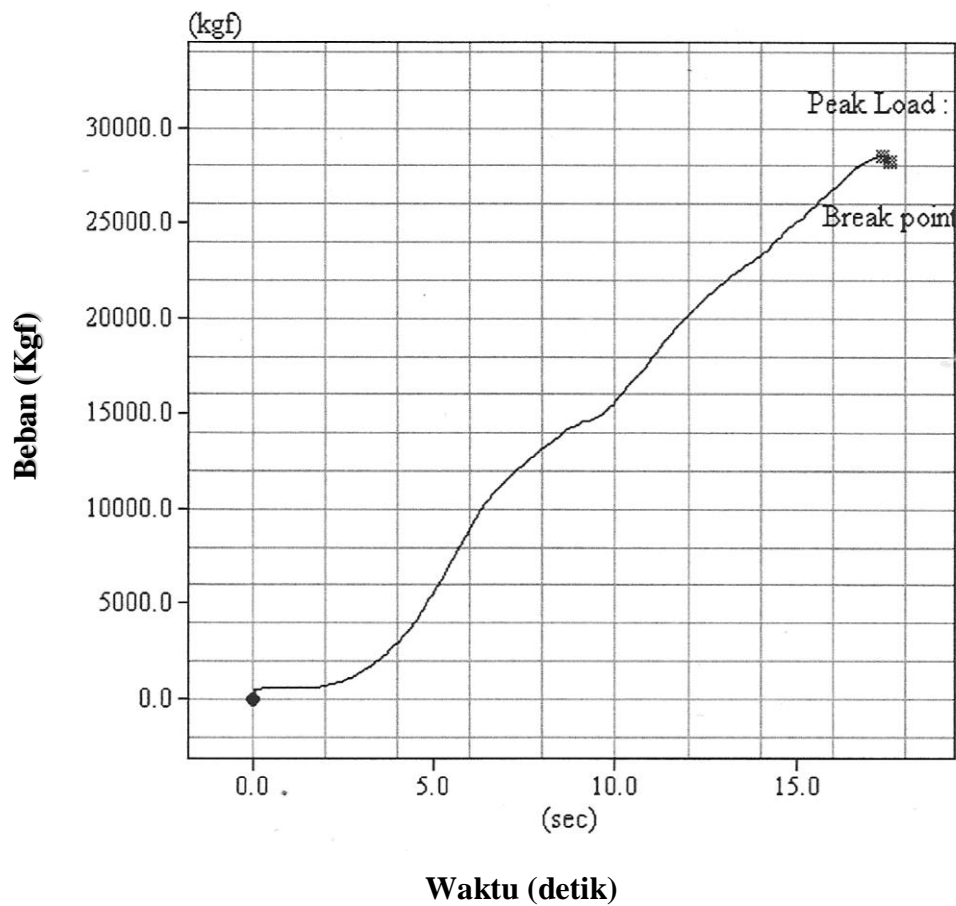


Gambar 59 Hubungan beban dan waktu benda uji TK 15% ZT 1 (7 hari)

Laboratorium Jurusan Teknik Sipil
Universitas Muhammadiyah Yogyakarta

Concrete Testing

Constrution Name		Slidr beton								
Manufacturer		Hungta								
Contractor		UMY								
Customer		Lab. JTS. FT.UMY								
Test Date		3/11/2019			Report No.			TK 15% ZT 2		
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	178.37	28510	2273.3	159.5	2.0	300.0	1.0	7		

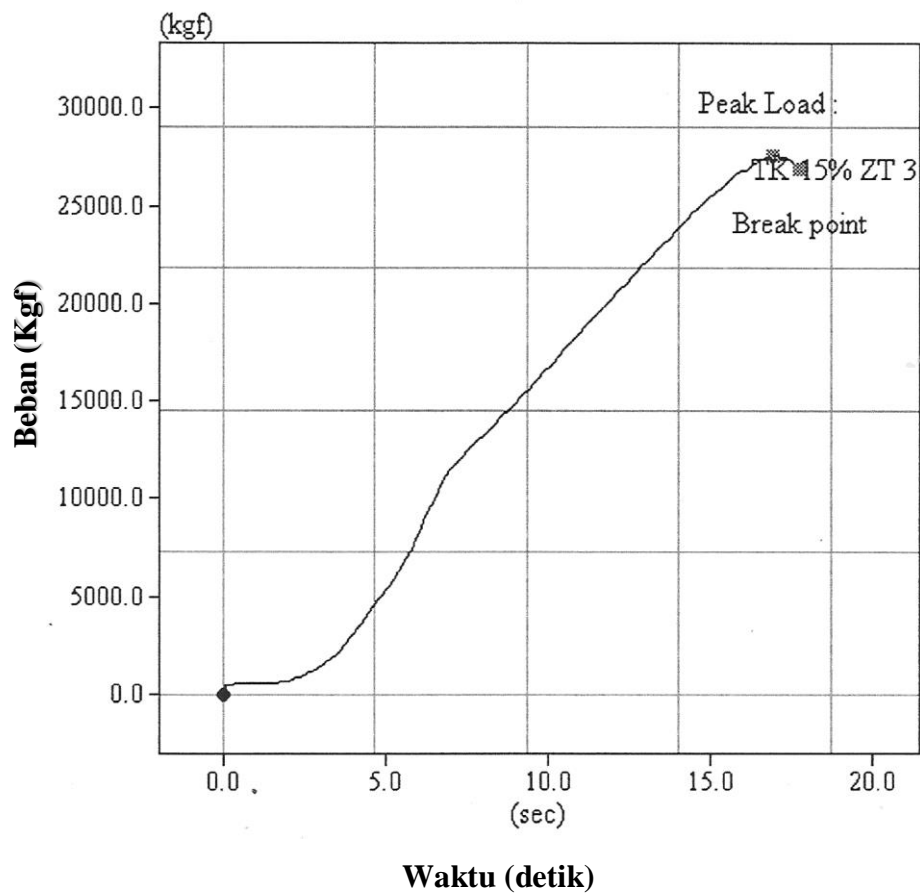


Gambar 60 Hubungan beban dan waktu benda uji TK 15% ZT 2 (7 hari)

Laboratorium Jurusan Teknik Sipil
Universitas Muhammadiyah Yogyakarta

Concrete Testing

Construction Name		Slidr beton								
Manufacturer		Hungta								
Contractor		UMY								
Customer		Lab. JTS. FT.UMY								
Test Date		3/11/2019			Report No.			TK 15% ZT 3		
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	177.42	27560	2209.3	155.3	2.0	300.0	1.0	7		

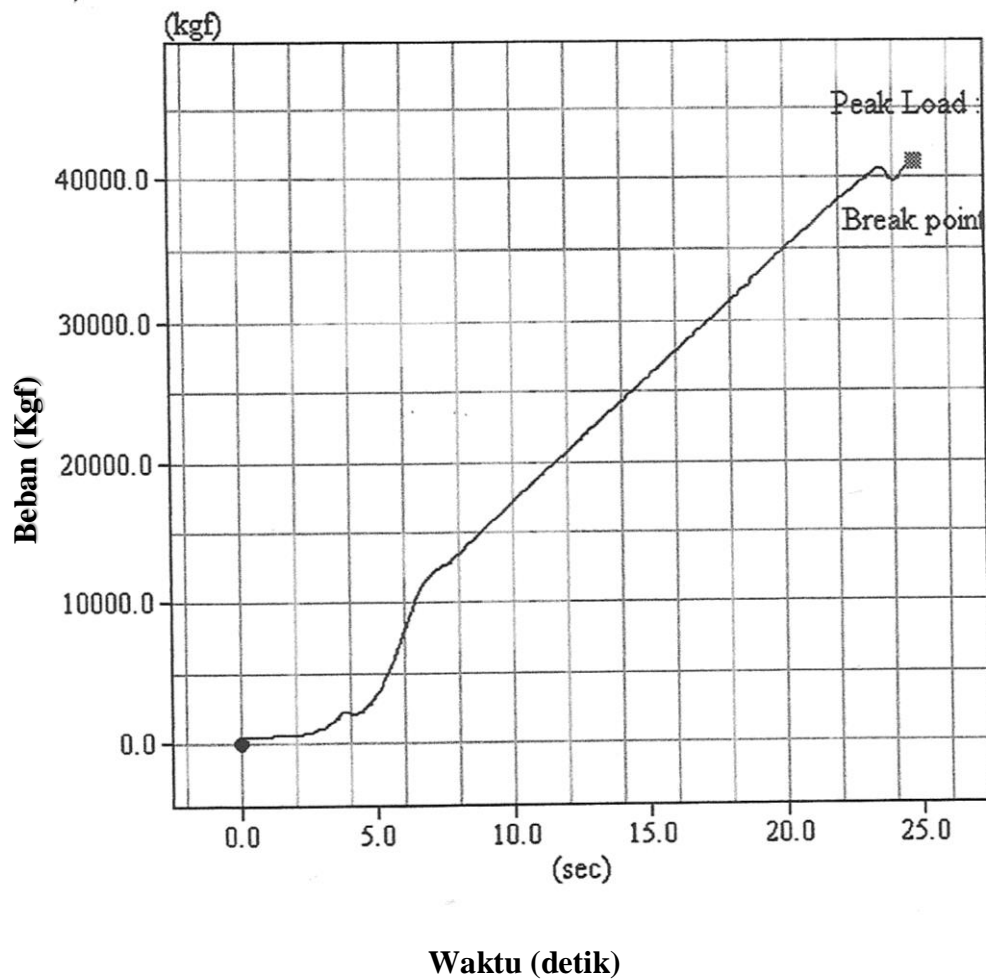


Gambar 61 Hubungan beban dan waktu benda uji TK 15% ZT 3 (7 hari)

Laboratorium Jurusan Teknik Sipil
Universitas Muhammadiyah Yogyakarta

Concrete Testing

Construction Name		Slab beton								
Manufacturer		Hongta								
Contractor		UMY								
Customer		Lab. JTS. FT.UMY								
Test Date		3/13/2019			Report No.			TK.ZT 15% 1		
No.	Area (cm ²)	Peak Force (Kg)	Compression Stress (psi)	Adjust Stress (Kgf/cm ²)	MO Ratio	Design Stress	Adjust Ratio	Life	Break Style	Remark
1	177.66	41160	3295.1	231.0	2.0	380.0	1.0	14		

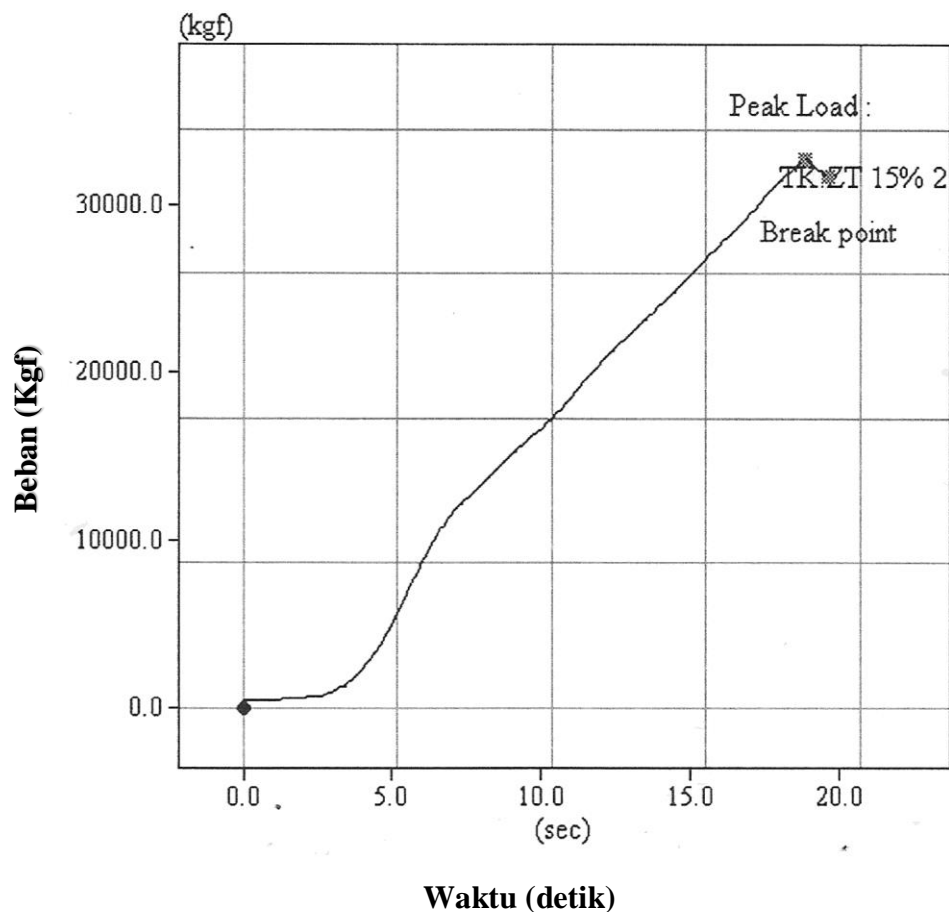


Gambar 62 Hubungan beban dan waktu benda uji TK 15% ZT 1 (14 hari)

Laboratorium Jurusan Teknik Sipil
Universitas Muhammadiyah Yogyakarta

Concrete Testing

Construction Name		Slidr Btn								
Manufacturer		Hungta								
Contractor		UMY								
Customer		Lab. JTS. FT.UMY								
Test Date		3/13/2019			Report No.			TK.ZT 15% 2		
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	180.74	32720	2574.7	179.8	1.9	300.0	1.0	14		

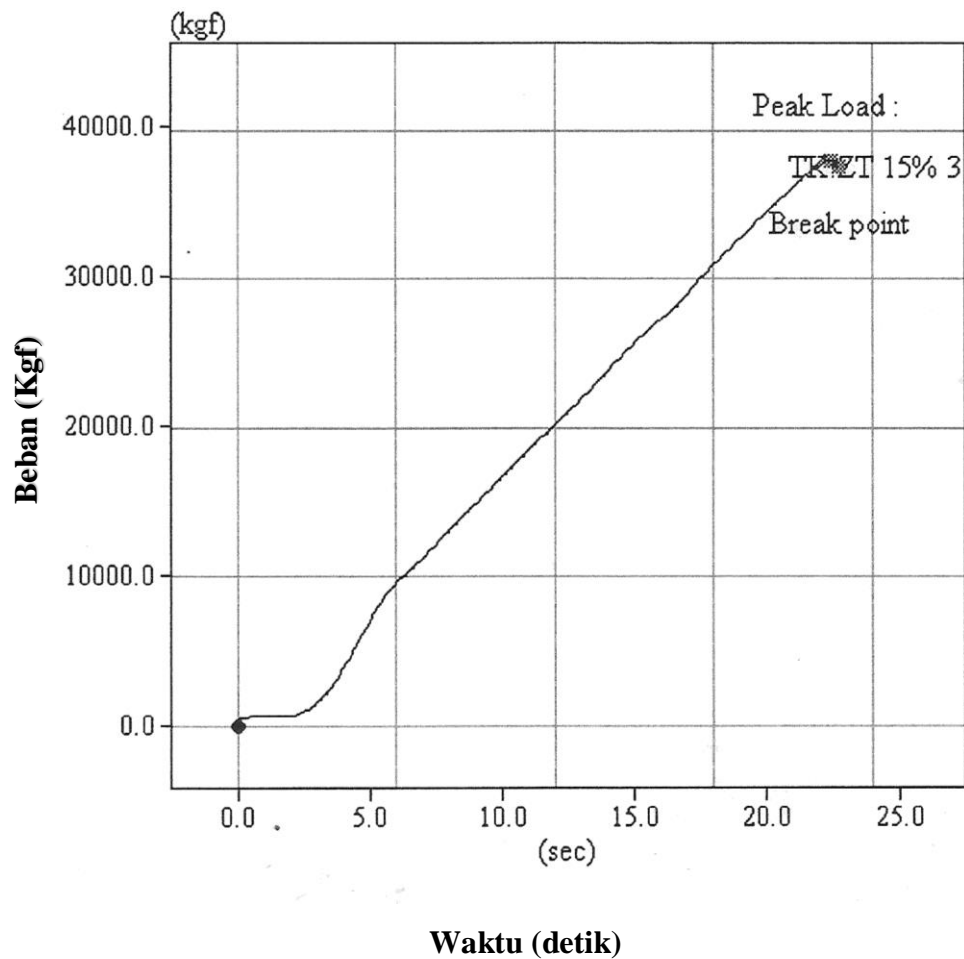


Gambar 63 Hubungan beban dan waktu benda uji TK 15% ZT 2 (14 hari)

Laboratorium Jurusan Teknik Sipil
Universitas Muhammadiyah Yogyakarta

Concrete Testing

Construction Name		Slidr Btn								
Manufacturer		Hungta								
Contractor		UMY								
Customer		Lab. JTS. FT.UMY								
Test Date		3/13/2019			Report No.			TK.ZT 15% 3		
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	37710	3035.1	213.2	2.0	300.0	1.0	14		

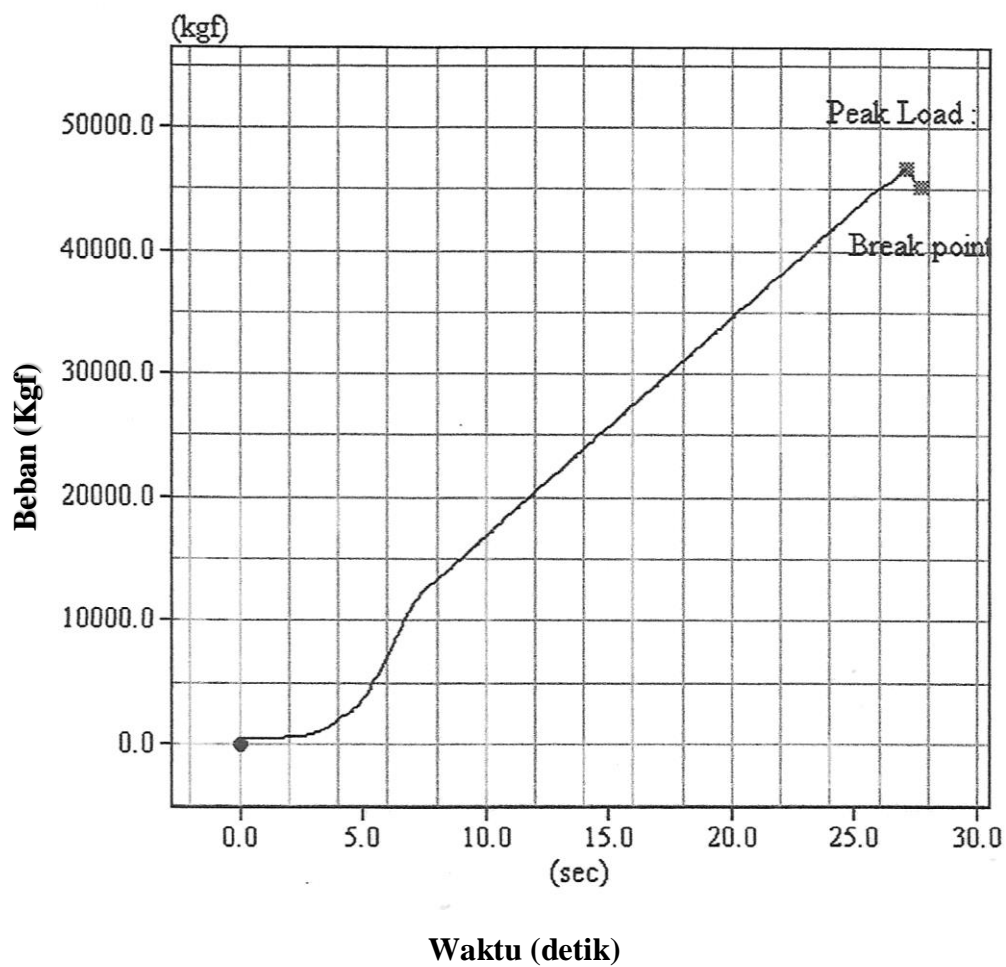


Gambar 64 Hubungan beban dan waktu benda uji TK 15% ZT 3 (14 hari)

Laboratorium Jurusan Teknik Sipil
Universitas Muhammadiyah Yogyakarta

Concrete Testing

Construction Name		Sldr Btn								
Manufacturer		Hungta								
Contractor		UMY								
Customer		Lab. JTS. FT.UMY								
Test Date		03/01/2019			Report No.			ZT 15% 1		
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	46640	3753.8	263.9	2.0	300.0	1.0	28		

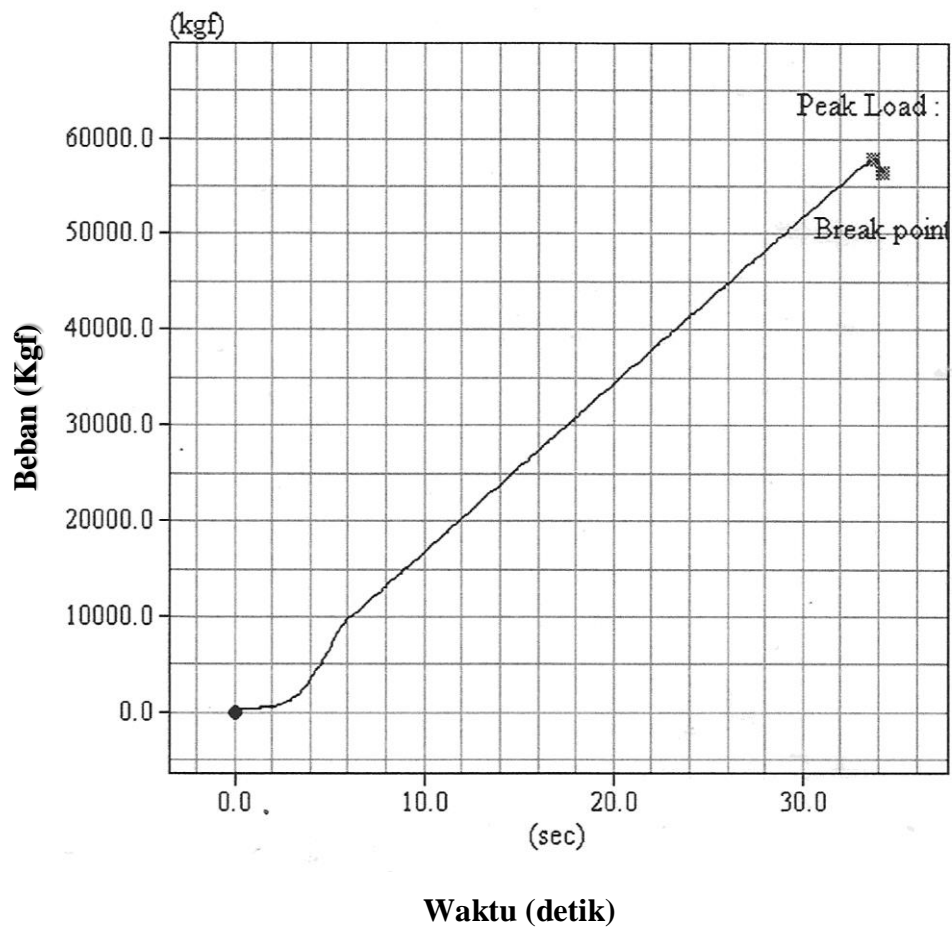


Gambar 65 Hubungan beban dan waktu benda uji TK 15% ZT 1 (28 hari)

Laboratorium Jurusan Teknik Sipil
Universitas Muhammadiyah Yogyakarta

Concrete Testing

Construction Name		Slidr beton								
Manufacturer		Hungta								
Contractor		UMY								
Customer		Lab. JTS. FT.UMY								
Test Date		3/1/2019			Report No.			ZT 15% 2		
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	51510	4145.7	291.8	2.0	300.0	1.0	28		

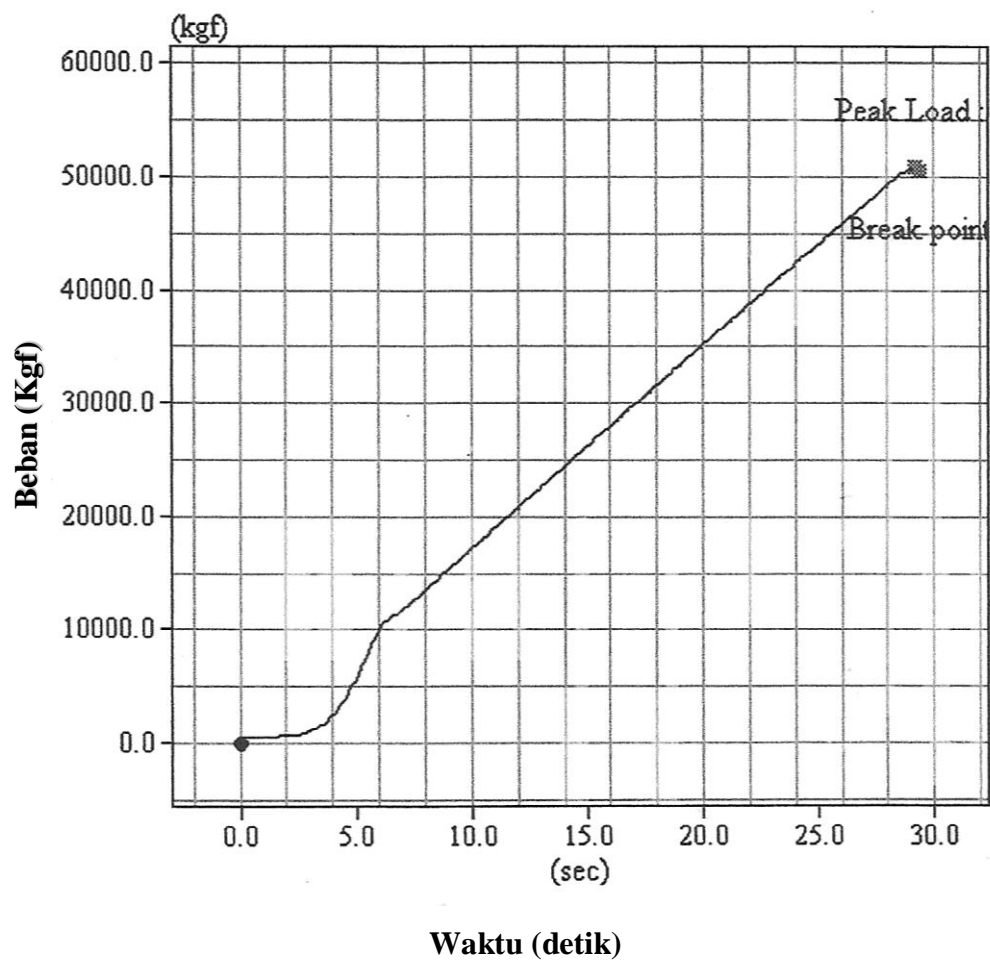


Gambar 66 Hubungan beban dan waktu benda uji TK 15% ZT 2 (28 hari)

**Laboratorium Jurusan Teknik Sipil
Universitas Muhammadiyah Yogyakarta**

Concrete Testing

Construction Name		Slidr beton								
Manufacturer		Hungta								
Contractor		UMY								
Customer		Lab. JTS. FT.UMY								
Test Date		3/1/2019			Report No.			ZT 15% 3		
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	178.60	50820	4046.9	283.7	2.0	300.0	1.0	28		



Gambar 67 Hubungan beban dan waktu benda uji TK 15% ZT 3 (28 hari)