FAKULTAS TEKNIK SIPIL DAN PERENCANAAN
JL.KALIURANG KM.14,4 TELP.895042
EMAIL : FTSP.UII.AC.ID JOGJAKARTA KODE POS 55584

UNTUK MAHASISWA

FM-UII-AA-FPU-09

KARTU PESERTA TUGAS AKHIR

NO.	N A M A	NO. MHS.	BID.STUDI
1	Muslihudin	99 511 083	Teknik Sipil
2	Ibnu Hajar	99 511 376	Teknik Sipil

JUDUL TUGAS AKHIR :

Manual perencanaan struktur baja

PERIODE III : MARET - AGUSTUS
TAHUN : 2003- 2004

No.	Kegiatan	Bulan Ke :					
		Mar.	Apr.	Mei.	Jun.	Jul.	Aug.
1.	Pendaftaran						
2.	Penentuan Dosen Pembimbing						
3.	Pembuatan Proposal						
4.	Seminar Proposal						
5.	Konsultasi Penyusunan TA.						
6.	Sidang-Sidang						
7.	Pendadaran,						

DOSEN PEMBIMBING I : Much.Samsudin,Ir.H.MT
DOSEN PEMBIMBING II : Fatkhurrahman N.,Ir.MT.

Yogyakarta, 30 Maret 2004
a.n. Dekan,

(Ir.H.Munadhir,MT)

TA ini sudah lebih dari 1th.
Menurut aturan, TA ini bisa dpt perpanjang dgn syarat membayar lagi dgn dosen pembimbing & judul yg sama. 15-09-04

(Munadhir)

Catatan.

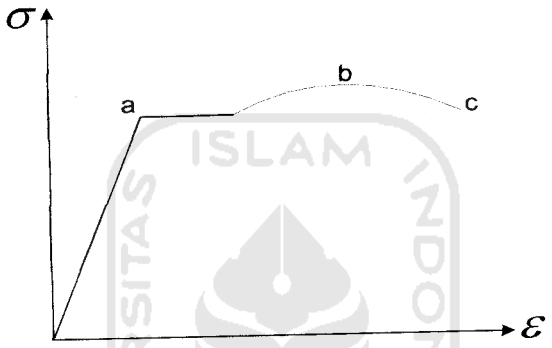
Seminar : .....
Sidang : .....
Pendadaran : .....

Setiap kali mahasiswa konsultasi dosen pembimbing diminta untuk selalu menanyakan KRS Mahasiswa yang bersangkutan yang didalamnya harus tercantum SKS TA (tugas Akhir), bila SKS TA tidak tercantum maka dosen tidak boleh melayani konsultasi mahasiswa yang bersangkutan

LAMPIRAN 2

HASIL UJI BAHAN

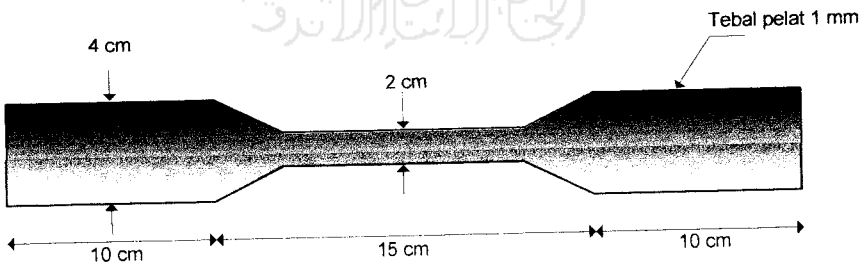
Pengujian ini merupakan uji terhadap kekuatan tarik bahan profil Lipped Channel 76x444x11 dengan tebal 1 mm yang dilakukan di laboratorium Teknik Sipil UII Yogyakarta pada tanggal 20 Desember 2004. Adapun hasil uji pendahuluan adalah sebagai berikut :



Beban Leleh (a)

Beban Maksimum (b)

Beban Patah (c)



1. Hasil pengujian kuat tarik profil Lipped Channel 76x44x11x1

a. Sampel I

Beban leleh = 1019,83 kg

Beban maksimum = 1240 kg

Perhitungan :

Lebar = 2,125 cm

Tebal = 0,1 cm

Ao = l x t = 0,2125 cm^2

Kuat Tarik (Fy) $= \frac{Py}{Ao}$

$= \frac{1019,83}{0,2125}$

$= 4799,19\ kg/cm^2$

$= 479,919$ Mpa

b. Sampel II

Beban leleh = 1195 kg

Beban maksimum = 1200 kg

Perhitungan :

Lebar = 2,075 cm

Tebal = 0,1 cm

Ao = l x t = 0,2075 cm^2

Kuat Tarik (Fy) $= \frac{Py}{Ao}$

$= \frac{1195}{0,2075}$

$= 5759,04\ kg/cm^2$

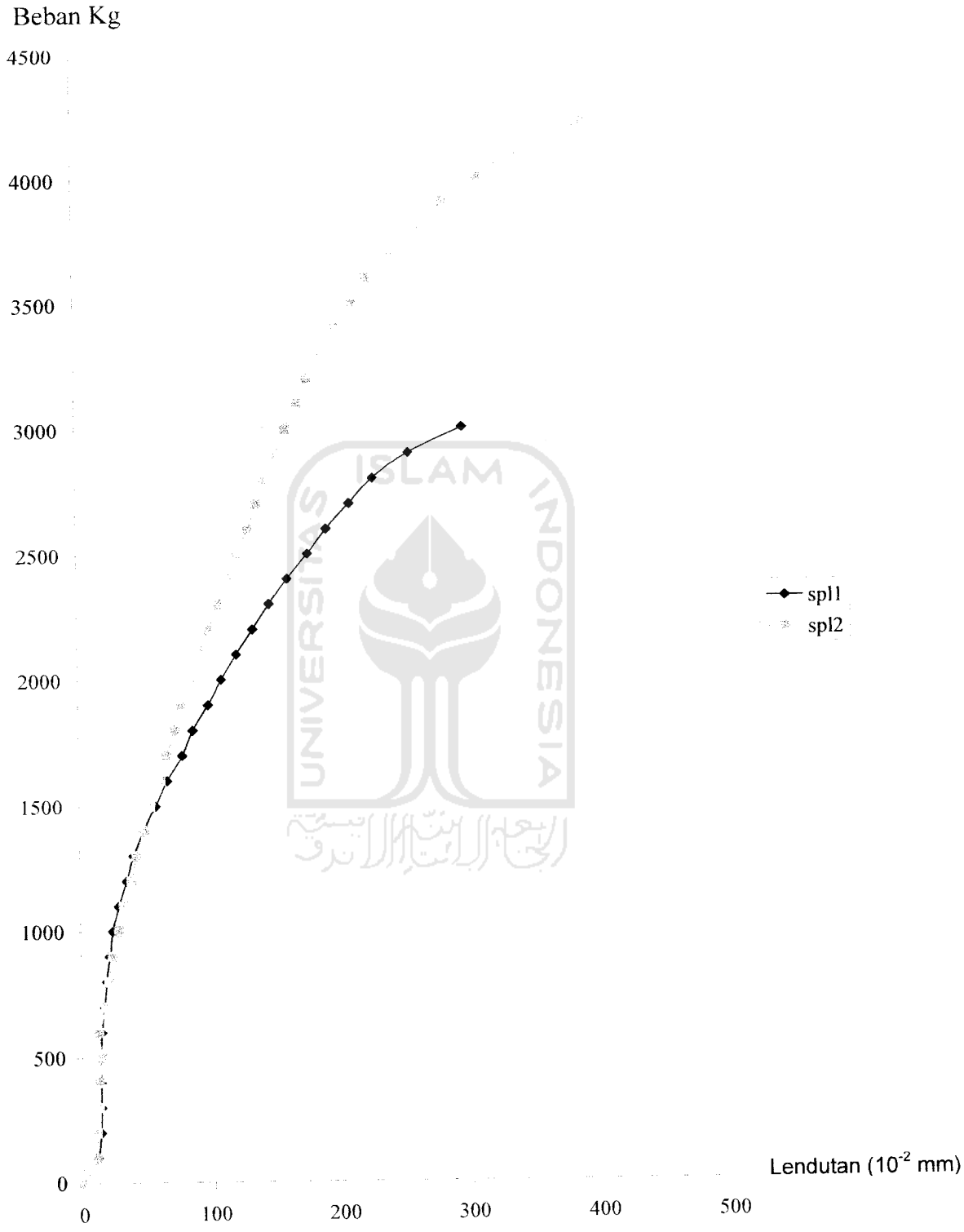
$= 575,904$ Mpa

Kuat Tarik Rata-rata ($Fy_{rata\text{-}rata}$) $= \frac{479,919+575,904}{2}$

$= 527,912$ Mpa

2. Hasil pengujian kuat tekan profil Lipped Channel 76x44x11x1

BEBAN (kg)	LENDUTAN	
	SAMPEL 1 (10^{-2} mm)	SAMPEL 2 (10^{-2} mm)
0	0	0
100	11.0	10.5
200	13.5	10.5
300	14.0	12.0
400	14.0	.0
500	14.5	15.0
600	15.0	13.0
700	17.0	18.0
800	19.0	21.0
900	22.0	24.0
1000	24.5	29.0
1100	29.0	33.0
1200	35.0	39.0
1300	41.0	43.0
1400	49.0	49.0
1500	58.0	54.0
1600	67.0	62.0
1700	79.0	67.0
1800	87.0	74.0
1900	99.0	79.0
2000	109.0	86.0
2100	121.0	92.0
2200	134.0	100.0
2300	147.0	107.0
2400	161.0	115.0
2500	177.0	122.0
2600	192.0	131.0
2700	210.0	138.0
2800	228.0	144.0
2900	256.0	152.0
3000	298.0	161.0
3100		170.0
3200		178.0
3300		190.0
3400		200.0
3500		214.0
3600		225.0
3700		244.0
3800		264.0
3900		285.0
4000		312.0
4100		342.0
4200		384.0
4220		392.0


Beban Kg
4500
4000
3500
3000
2500
2000
1500
1000
500
0
0
100
200
300
400
500
Lendutan (10^{-2} mm)
spl1
spl2

$$\text{Kuat Desak (sample 1)} = \frac{\text{beban maksimum}}{\text{luas tampang}}$$

$$= \frac{3000\,\text{kg}}{175.10^{-2}\,\text{cm}^2}$$

$$= 1714\ \text{kg/cm}^2$$

$$= 171{,}4\ \text{Mpa}$$

$$\text{Kuat Desak (sample 2)} = \frac{\text{beban maksimum}}{\text{luas tampang}}$$

$$= \frac{4220\,\text{kg}}{175.10^{-2}\,\text{cm}^2}$$

$$= 2411\ \text{kg/cm}^2$$

$$= 241{,}1\ \text{Mpa}$$

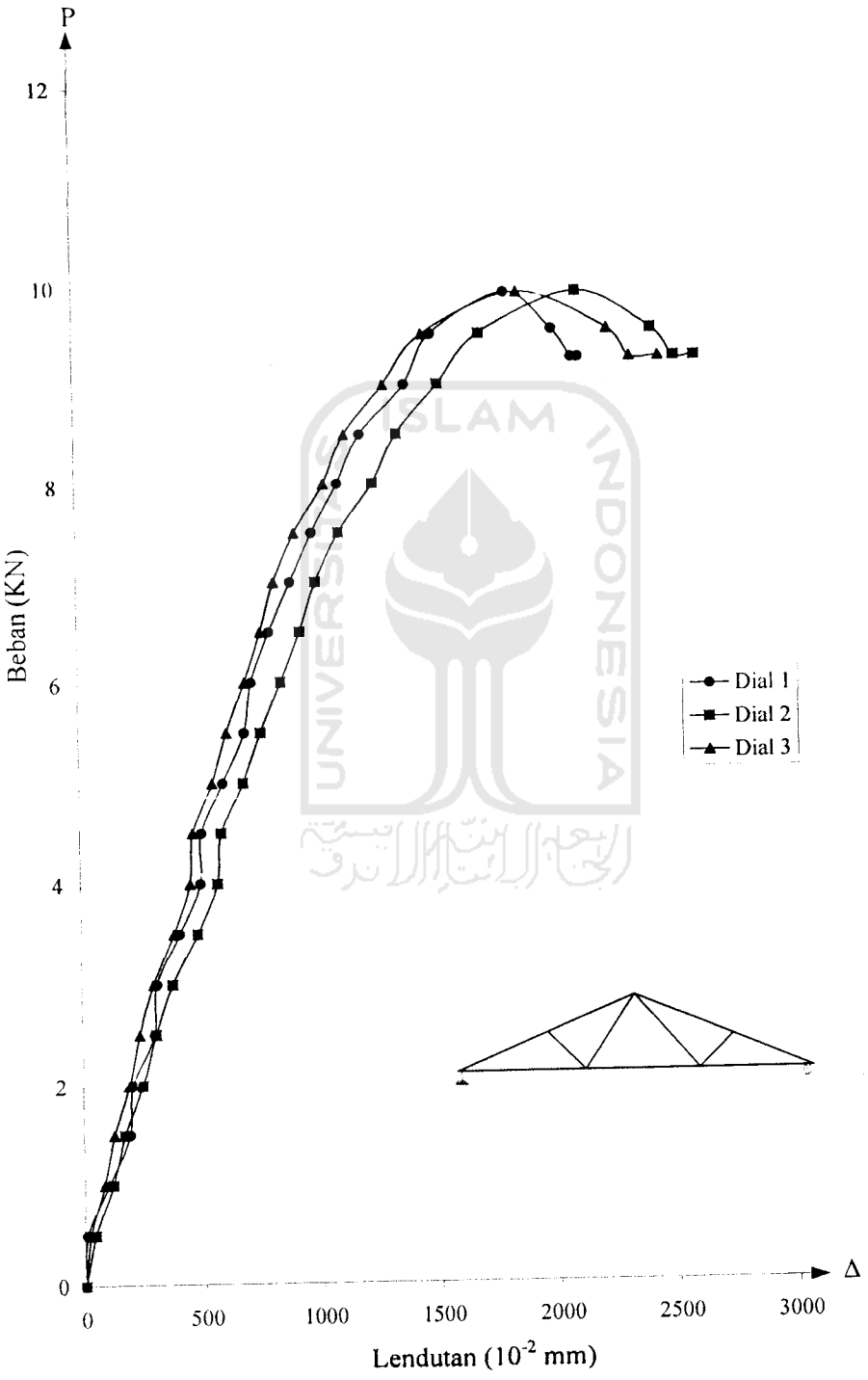
$$\text{Kuat Desak Rata-rata} = \frac{171{,}4 + 241{,}4}{2}$$

$$= 206{,}25\ \text{Mpa}$$

Tabel Hubungan Beban dan Lendutan Fink Truss

P(kN)	Δ_1 (10^{-2} mm)	Δ_2 (10^{-2} mm)	Δ_3 (10^{-2} mm)
0.00	0	0	0
0.50	9.5	43	23
1.00	99	116	80
1.50	190	168	125
2.00	203	244	188
2.50	295	302	234
3.00	310	375	295
3.50	406	481	380
4.00	497	569	454
4.50	503	587	468
5.00	596	682	550
5.50	690	759	615
6.00	721	846	691
6.50	800	930	762
7.00	892	1000	822
7.50	985	1100	910
8.00	1099	1249	1040
8.50	1196	1352	1129
9.00	1388	1530	1298
9.50	1503	1710	1465
9.90	1815	2115	1868
9.53	2015	2430	2247
9.25	2096	2525	2340
9.25	2123	2610	2460

Dari tabel hubungan beban-lendutan diatas maka didapatkan grafik hubungan beban-lendutan.

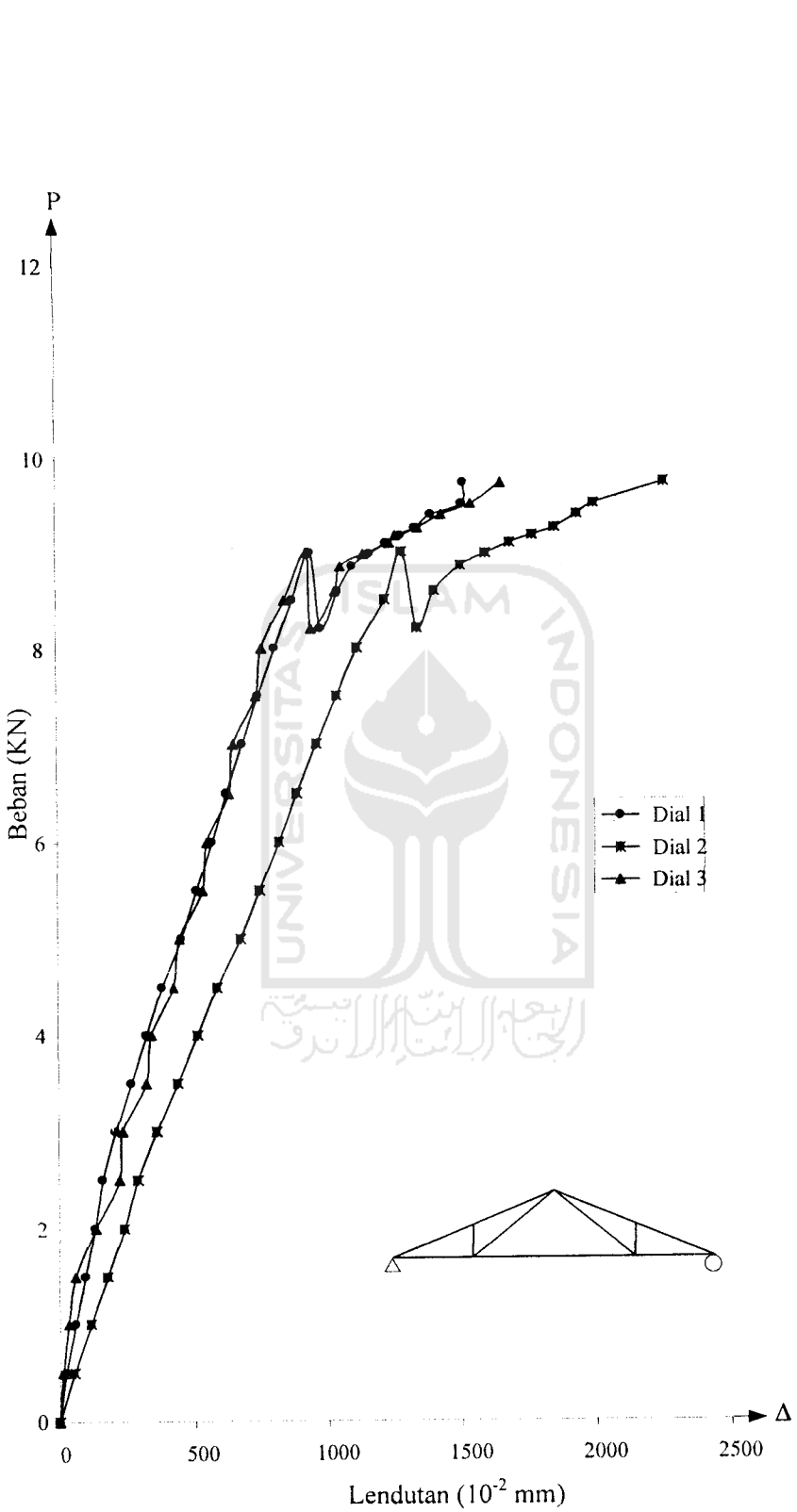


Grafik Hubungan Beban-Lendutan Fink Truss

Tabel Hubungan Beban dan Lendutan Pratt Trus

P (KN)	Dial 1 (10^{-2} mm)	Dial 2 (10^{-2} mm)	Dial 3 (10^{-2} mm)
0.00	0	0	0
0.50	24	54	12
1.00	59	115	33
1.50	96	177	60
2.00	130	237	133
2.50	161	288	221
3.00	209	360	235
3.50	266	437	320
4.00	324	513	341
4.50	381	587	422
5.00	452	675	445
5.50	512	747	534
6.00	570	820	549
6.50	625	888	634
7.00	684	963	650
7.50	743	1038	735
8.00	808	1118	759
8.50	874	1221	843
9.00	942	1287	929
8.20	981	1344	946
8.59	1045	1407	1033
8.85	1102	1506	1055
8.98	1168	1601	1143
9.09	1230	1691	1240
9.17	1285	1776	1263
9.25	1341	1858	1347
9.39	1398	1941	1436
9.50	1514	2003	1546
9.72	1518	2262	1655

Dari tabel hubungan beban-lendutan diatas maka didapatkan grafik hubungan beban-lendutan.

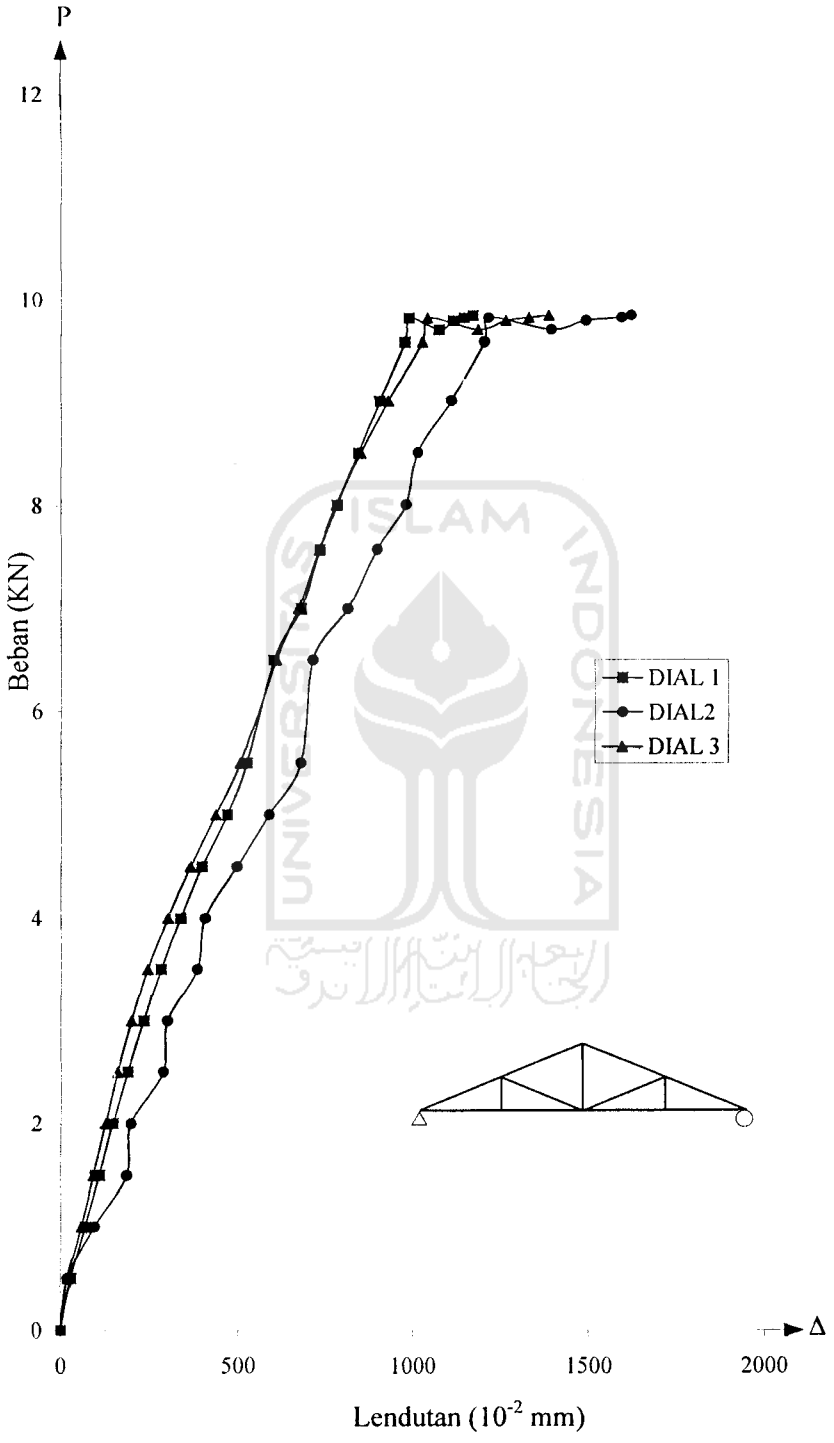


Grafik Hubungan Beban-Lendutan Pratt Truss

Tabel Hubungan Beban dan Lendutan Howe Truss

P (kN)	Dial 1 (10^{-2} mm)	Dial 2 (10^{-2} mm)	Dial 3 (10^{-2} mm)
0	0	0	0
0.50	30.0	21.0	20.0
1.00	68.5	95.0	58.0
1.50	110.0	186.0	94.0
2.00	146.0	197.0	126.0
2.50	187.5	287.0	159.0
3.00	232.5	299.0	198.0
3.50	280.0	382.0	242.0
4.00	336.0	405.0	300.0
4.50	395.5	496.0	363.0
5.00	467.0	587.0	434.0
5.50	524.5	679.0	506.0
6.00	596.5	714.0	581.0
6.50	601.5	714.0	609.0
7.00	682.0	815.0	673.0
7.57	735.0	898.0	732.0
8.00	785.5	982.0	782.0
8.50	844.0	1015.0	852.0
9.00	907.0	1111.0	931.5
9.50	979.0	1206.0	1029.0
9.80	989.0	1216.0	1042.5
9.68	1076.0	1395.0	1186.0
9.77	1115.0	1493.5	1265.0
9.80	1146.5	1594.5	1331.0
9.82	1172.0	1622.0	1388.0

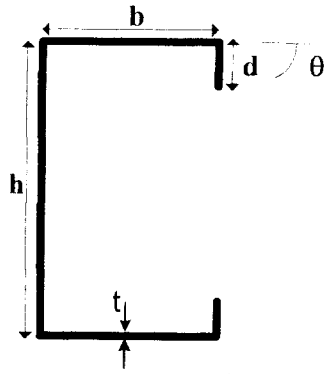
Dari tabel hubungan beban-lendutan diatas maka didapatkan grafik hubungan beban-lendutan.



Grafik Hubungan Beban- Lendutan Howe Truss

LAMPIRAN 4

PERHITUNGAN TEGANGAN KRITIS (Fcr) DARI PROFIL LIPPED CHANNEL BENTUKAN DINGAN



Gambar 3.7 Profil Lipped Chanel

h = 76 mm

b = 44 mm

d = 11 mm

t = 1 mm

Profil Lipped Channel 76 x 44 x 11 x 1

1. Menurut Salmon dan Johnson (1976)

Pada lip $\left(\frac{d}{t}\right) = \left(\frac{11}{1}\right) = 11$

$$F_{cr\_lip} = k_{lip} \cdot \frac{\pi^2 . E}{12.(1-\mu^2)} \cdot \left(\frac{t}{d}\right)^2$$, dengan nilai k pada lip = 0,425

$$F_{cr\_lip} = 0{,}425 \cdot \frac{\pi^2 . 2.10^5}{12.(1-0{,}3^2)} \cdot \left(\frac{1}{11}\right)^2$$

$$= 596{,}95 \text{ Mpa}$$

Pada sayap $\left(\frac{b}{t}\right)=\left(\frac{44}{1}\right)=44\,mm$

$$F_{cr\_sayap}=k_{sayap}.\frac{\pi^2.E}{12.(1-\mu^2)}.\left(\frac{t}{b}\right)^2$$, dengan nilai k pada sayap = 4

$$F_{cr\_sayap}=4.\frac{\pi^2.2.10^5}{12.(1-0{,}3^2)}.\left(\frac{1}{44}\right)^2$$

$$= 373{,}10 \text{ Mpa}$$

Pada badan $\left(\frac{h}{t}\right)=\left(\frac{76}{1}\right)=76\,mm$

$$F_{cr\_badan}=k_{badan}.\frac{\pi^2.E}{12.(1-\mu^2)}.\left(\frac{t}{h}\right)^2$$, dengan nilai k pada badan = 4

$$F_{cr\_badan}=4.\frac{\pi^2.2.10^5}{12.(1-0{,}3^2)}.\left(\frac{1}{76}\right)^2$$

$$= 125{,}05 \text{ Mpa}$$

$$Pcr = Fcr \,.\, A$$

$$= 2.(Fcr_{lip}.A_{lip}) + 2.(Fcr_{syp}\,A_{syp}) + (Fcr_{bdn}.A_{bdn})$$

$$= 2.(596{,}95 \,.\, 11) + 2.(373{,}10 \,.\, 44) + (125{,}05 \,.\, 76)$$

$$= 55{,}4695 \text{ kN}$$

2. Menurut Schafer (1997)

Pada sayap tepi/lip $\left(\frac{d}{t}\right)=\left(\frac{11}{1}\right)=11$

$$F_{cr\_lip}=k_{lip}.\frac{\pi^2.E}{12.(1-\mu^2)}.\left(\frac{t}{d}\right)^2$$, dengan nilai k, yaitu

$$k_{lip}=-11{,}07\left(\frac{d}{b}\right)^2+3{,}95\left(\frac{d}{b}\right)+4$$

$$= -11,07\left(\frac{11}{44}\right)^2 + 3,95\left(\frac{11}{44}\right) + 4$$

$$= 4,2956$$

Sehingga

$$F_{cr\_lip} = 4,2956.\frac{\pi^2.2.10^5}{12.\left(1-0,3^2\right)}.\left(\frac{1}{11}\right)^2$$

$$= 6410,069 \text{ Mpa}$$

Pada sayap dan badan

$$F_{cr\_sayap\_badan} = k_{sayap\_badan}.\frac{\pi^2.E}{12.\left(1-\nu^2\right)}.\left(\frac{t}{b}\right)^2 \text{ dengan nilai k, yaitu :}$$

$$k_{sayap\_badan} = \left[\left[2-\left(\frac{b}{h}\right)^{0.4}\right].4.\left(\frac{b}{h}\right)^2\right] \quad \text{jika } \frac{h}{b} \geq 1$$

$$\left[\left[2-\left(\frac{b}{h}\right)^{0.2}\right].4\right] \quad \text{jika } \frac{h}{b} < 1$$

$\frac{h}{b} = \frac{76}{44} = 1,727 > 1$, sehingga nilai $k_{sayap\_badan} = \left[\left[2-\left(\frac{b}{h}\right)^{0.4}\right].4.\left(\frac{b}{h}\right)^2\right]$

$$k_{sayap\_badan} = \left[\left[2-\left(\frac{b}{h}\right)^{0.4}\right].4.\left(\frac{b}{h}\right)^2\right]$$

$$= \left[\left[2-\left(\frac{44}{76}\right)^{0.4}\right].4.\left(\frac{44}{76}\right)^2\right]$$

$$= 1,60$$

$$F_{cr\_sayap} = k_{sayap}.\frac{\pi^2.E}{12.\left(1-\nu^2\right)}.\left(\frac{t}{b}\right)^2$$

$$= 1{,}60.\frac{\pi^2.2.10^5}{12.\left(1-0{,}3^2\right)}.\left(\frac{1}{44}\right)^2$$

$$= 149{,}24 \text{ Mpa}$$

$$F_{cr\_badan} = k_{badan}.\frac{\pi^2.E}{12.\left(1-\nu^2\right)}.\left(\frac{t}{h}\right)^2$$

$$= 1{,}60.\frac{\pi^2.2.10^5}{12.\left(1-0{,}3^2\right)}.\left(\frac{1}{76}\right)^2$$

$$= 50{,}02 \text{ Mpa}$$

$$Pcr = Fcr \,.\, A$$

$$= 2.(Fcr_{lip} \,.\, A_{lip}) + 2.(Fcr_{syp} \,.\, A_{syp}) + (Fcr_{bdn} \,.\, A_{bdn})$$

$$= 2.(6410{,}069 \,.\, 11) + 2.(149{,}24 \,.\, 44) + (50{,}02 \,.\, 76)$$

$$= 157{,}96 \text{ kN}$$

3. Menurut AISC

Besar tegangan kritis menurut AISC dapat ditentukan dengan menggunakan persamaan tegangan kritis kolom, yaitu :

$$Fcr = QFy\left[1-\frac{(KL/r)^2}{2Cc^2}\right]$$

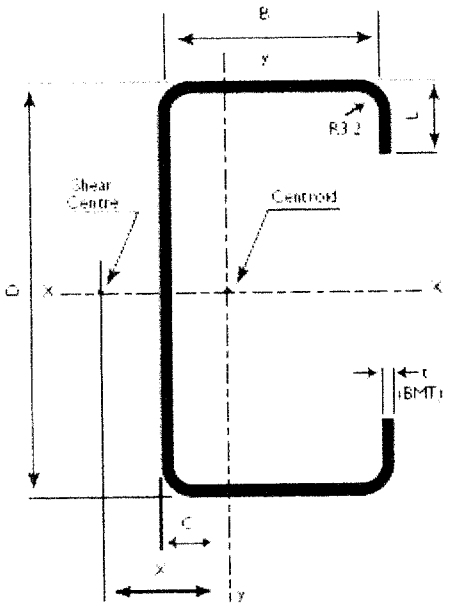
Apabila

$$Cc = \sqrt{\frac{2\pi^2 E}{QFy}}$$, dengan Q = 0,838 (diambil dari tabel lipped channel)

$$= \sqrt{\frac{2\pi^2 2.10^5}{0{,}838.527{,}912}}$$

$$= 94{,}47$$

Lipped Channels



Method of Cataloguing

Lipped Channels are denoted by the letters "LL". In the number following these letters, the first three digits indicate the nominal web dimension of the channel in millimetres. The last two digits indicate the thickness of material in tenths of a millimetre, e.g.

LL 06425 – Lipped Channel
364 mm x 2.5 mm

LC 20330 – Lipped Channel
203 mm x 3.0 mm

Tolerances

Web: ±1 mm for LL 05116 to LL 10230
+ 2mm –1 mm for LL 12725 to LL 25430

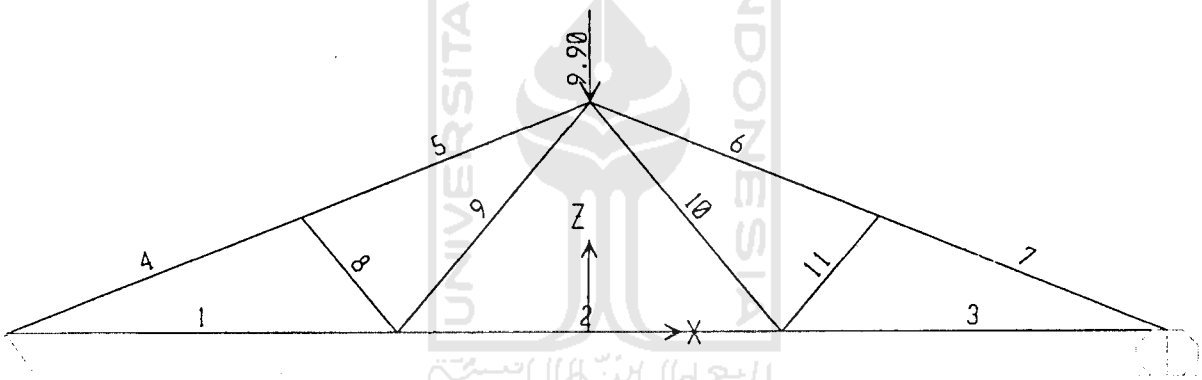
Flange: ± 1 mm for LL 05116 to LL 10230 (within 1 mm each side) +2 mm -1 mm for LL 12725 to LL 25430 (within 1 mm each side)

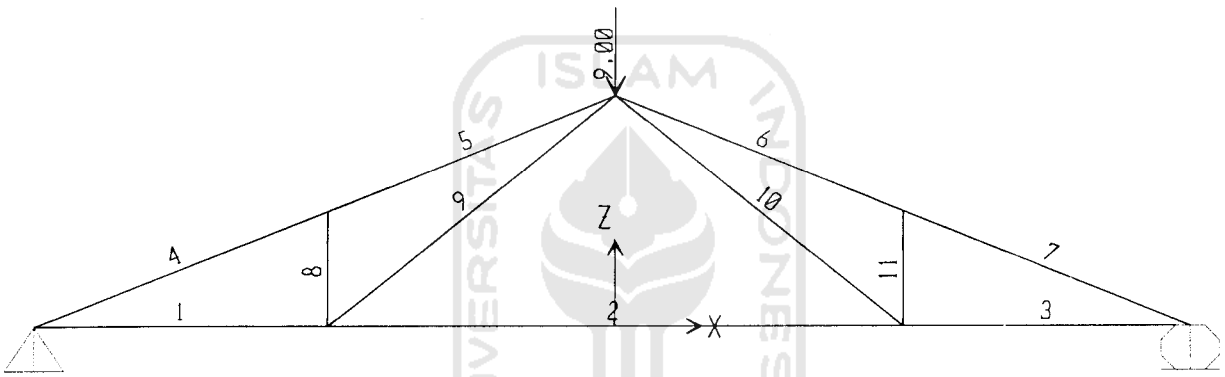
Length: + 15 mm –0

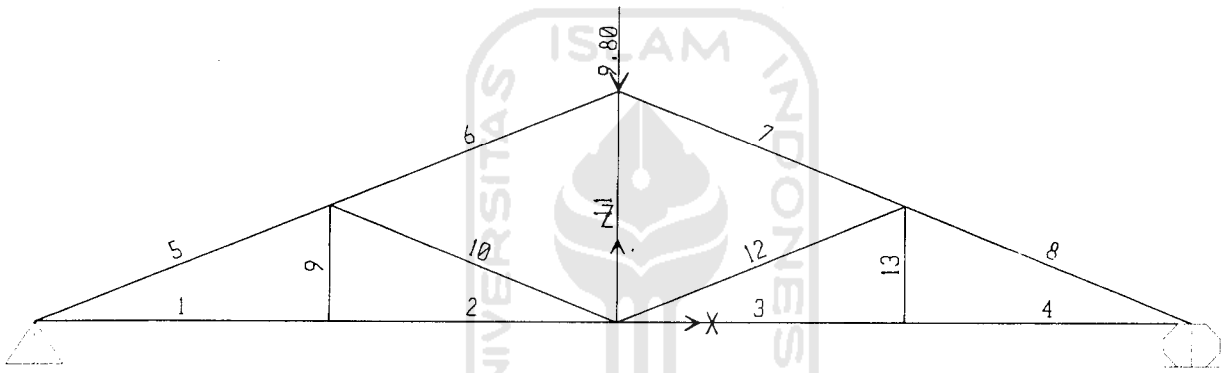
Lipped Channels - Dimensions and Properties of Full Unreduced Sections

Catalogue No.	Nominal Dimensions				Section Area	Mass		Second Moment of Area		Centroid	Section Modulus			Radius of Gyration		
	D	B	L	t		Galv.	Black	I_x	I_y	c	Z_x	Z_y	Z_y red	r_x	r_y	Q
	mm				mm^2	kg/m		$10^6 mm^4$		mm	$10^3 mm^3$			mm		-
LL05116	51	35	12	1.6	208	1.68	1.63	0.0864	0.0352	13.9	3.39	1.67	1.67	20.4	13.0	1.0000
LL06425	64	38	13	2.5	363	2.90	2.85	0.2280	0.0680	14.2	7.11	2.86	2.86	25.1	13.7	1.0000
LL07610	76	44	11	1.0	175	1.43	1.37	0.1682	0.0464	15.3	4.43	1.62	1.41	31.0	16.3	0.8380
LL07625	76	44	16	2.5	438	3.49	3.44	0.3920	0.1156	16.7	10.30	4.23	4.23	29.9	16.3	1.0000
LL10225	102	51	18	2.5	550	4.39	4.32	0.8870	0.1980	18.2	17.40	6.05	6.05	40.2	19.0	0.9830
LL10230	102	51	19	3.0	660	5.25	5.18	1.0450	0.2370	18.6	20.50	7.32	7.32	39.8	18.9	1.0000
LL12725	127	51	18	2.5	612	4.89	4.81	1.4870	0.2140	16.5	23.40	6.22	6.22	49.3	18.7	0.9150
LL12730	127	51	19	3.0	735	5.85	5.77	1.7600	0.2570	16.9	27.70	7.53	7.53	48.9	18.7	0.9670
LL15230	152	64	21	3.0	900	7.16	7.07	3.1800	0.4980	20.9	41.80	11.50	11.50	59.4	23.5	0.9150
LL20330	203	76	24	3.0	1140	9.07	8.95	1.7750	0.8750	23.1	70.10	16.54	16.54	39.9	27.7	0.8230

LAMPIRAN 5


9.90
5
6
4
8
9
10
11
7
1
2
3
Z
X


2.00
5
6
9
10
4
8
11
7
Z
1
2
3
X


9.80
6
7
5
9
10
12
13
8
1
2
3
4
X

Tabel. Deformasi Analisa SAP

FINK						
Batang	**Panjang (L)** mm	**Beban (P)** N	**Luas (A)** mm^2	**Tegangan** F=P/A (Mpa)	**E** Mpa	**Δ=PL/AE** (mm)
1	2000	10703	175	61.16	200000	0.61160
2	2000	10910	175	62.34	200000	0.62343
3	2000	10700	175	61.14	200000	0.61143
4	1617.79	11723	175	66.99	200000	- 0.54187
5	1617.79	11227	175	64.15	200000	- 0.51894
6	1617.79	11230	175	64.17	200000	- 0.51908
7	1617.79	11720	175	66.97	200000	- 0.54173
8	790.00	186	175	1.06	200000	0.00420
9	1571.29	892	175	5.10	200000	- 0.04005
10	1571.29	892	175	5.10	200000	- 0.04005
11	790.00	190	175	1.09	200000	0.00429

PRATT						
Batang	**Panjang (L)** mm	**Beban (P)** N	**Luas (A)** mm^2	**Tegangan** F=P/A (Mpa)	**E** Mpa	**Δ=PL/AE** (mm)
1	1500	9280	175	53.03	200000	0.39771
2	3000	9630	175	55.03	200000	0.82543
3	1500	9280	175	53.03	200000	0.39771
4	1617.79	10159	175	58.05	200000	- 0.46958
5	1617.79	9016	175	51.52	200000	- 0.41674
6	1617.79	9016	175	51.52	200000	- 0.41674
7	1617.79	10159	175	58.05	200000	- 0.46958
8	606	690	175	3.94	200000	0.01195
9	1928.46	1698	175	9.70	200000	- 0.09356
10	1928.46	1700	175	9.71	200000	- 0.09367
11	606	690	175	3.94	200000	0.01195

HOWE						
Batang	**Panjang (L)** mm	**Beban (P)** N	**Luas (A)** mm^2	**Tegangan** F=P/A (Mpa)	**E** Mpa	**Δ=PL/AE** (mm)
1	1500	10120	175	57.83	200000	0.43371
2	1500	9120	175	52.111	200000	0.39086
3	1500	9120	175	52.111	200000	0.39086
4	1500	10120	175	57.83	200000	0.43371
5	1617.79	11080	175	63.31	200000	- 0.51215
6	1617.79	11220	175	64.11	200000	- 0.51862
7	1617.79	11220	175	64.11	200000	- 0.51862
8	1617.79	11080	175	63.31	200000	- 0.51215
9	606.00	370	175	2.11	200000	- 0.00641
10	1617.79	1380	175	7.89	200000	0.06379
11	1212.00	1320	175	7.54	200000	- 0.04571
12	1617.79	1380	175	7.89	200000	0.06379
13	606.00	370	175	2.11	200000	- 0.00641

Tabel 1. Beban – Lendutan Analisis SAP dan Hasil Pengujian Rangka Fink

SAP (10^{-2} mm)				Hasil Pengujian (10^{-2} mm)			
P(kN)	Δ_1	Δ_2	Δ_3	P(kN)	Δ_1	Δ_2	Δ_3
0	0	0	0	0	0	0	0
0.50	24.60	24.60	24.60	0.50	9.5	43	23
1.00	49.20	49.20	49.20	1.00	99	116	80
1.50	73.90	73.90	73.90	1.50	190	168	125
2.00	98.50	98.50	98.50	2.00	203	244	188
2.50	123.13	123.13	123.13	2.50	295	302	234
3.00	147.76	147.76	147.76	3.00	310	375	295
3.50	172.39	172.39	172.39	3.50	406	481	380
4.00	197.02	197.02	197.02	4.00	497	569	454
4.50	221.65	221.65	221.65	4.50	503	587	468
5.00	246.28	246.28	246.28	5.00	596	682	550
5.50	270.91	270.91	270.91	5.50	690	759	615
6.00	295.54	295.54	295.54	6.00	721	846	691
6.50	320.17	320.17	320.17	6.50	800	930	762
7.00	344.80	344.80	344.80	7.00	892	1000	822
7.50	369.43	369.43	369.43	7.50	985	1100	910
8.00	394.06	394.06	394.06	8.00	1099	1249	1040
8.50	418.69	418.69	418.69	8.50	1196	1352	1129
9.00	443.32	443.32	443.32	9.00	1388	1530	1298
9.50	467.95	467.95	467.95	9.50	1503	1710	1465
9.90	487.50	487.50	487.50	9.90	1815	2115	1868
9.53	469.20	469.20	469.20	9.53	2015	2430	2247
9.25	455.50	455.50	455.50	9.25	2096	2525	2340
9.25	455.50	455.50	455.50	9.25	2123	2610	2460

Tabel 2. Beban – Lendutan Analisis SAP dan Hasil Pengujian Rangka Pratt

SAP (10^{-2} mm)				Hasil Pengujian (10^{-2} mm)			
P(kN)	Δ_1	Δ_2	Δ_3	P(kN)	Δ_1	Δ_2	Δ_3
0	0	0	0	0	0	0	0
0.50	20.80	20.80	20.80	0.50	24	54	12
1.00	41.60	41.60	41.60	1.00	59	115	33
1.50	62.40	62.40	62.40	1.50	96	177	60
2.00	83.20	83.20	83.20	2.00	130	237	133
2.50	104.00	104.00	104.00	2.50	161	288	221
3.00	124.80	124.80	124.80	3.00	209	360	235
3.50	145.60	145.60	145.60	3.50	266	437	320
4.00	166.40	166.40	166.40	4.00	324	513	341
4.50	187.20	187.20	187.20	4.50	381	587	422
5.00	208.00	208.00	208.00	5.00	452	675	445

Tabel 2. Lanjutan

SAP (10^{-2} mm)				Hasil Pengujian (10^{-2} mm)			
P(kN)	Δ_1	Δ_2	Δ_3	P(kN)	Δ_1	Δ_2	Δ_3
5.50	228.80	228.80	228.80	5.50	512	747	534
6.00	249.60	249.60	249.60	6.00	570	820	549
6.50	270.40	270.40	270.40	6.50	625	888	634
7.00	291.20	291.20	291.20	7.00	684	963	650
7.50	312.00	312.00	312.00	7.50	743	1038	735
8.00	332.80	332.80	332.80	8.00	808	1118	759
8.50	353.60	353.60	353.60	8.50	874	1221	843
9.00	374.40	374.40	374.40	9.00	942	1287	929
8.20	341.30	341.30	341.30	8.20	981	1344	946
8.59	357.50	357.50	357.50	8.59	1045	1407	1033
8.85	368.30	368.30	368.30	8.85	1102	1506	1055
8.98	373.70	373.70	373.70	8.98	1168	1601	1143
9.09	378.30	378.30	378.30	9.09	1230	1691	1240
9.17	381.70	381.70	381.70	9.17	1285	1776	1263
9.25	385.00	385.00	385.00	9.25	1341	1858	1347
9.39	390.80	390.80	390.80	9.39	1398	1941	1436
9.50	395.20	395.20	395.20	9.50	1514	2003	1546
9.72	404.50	404.50	404.50	9.72	1518	2262	1655

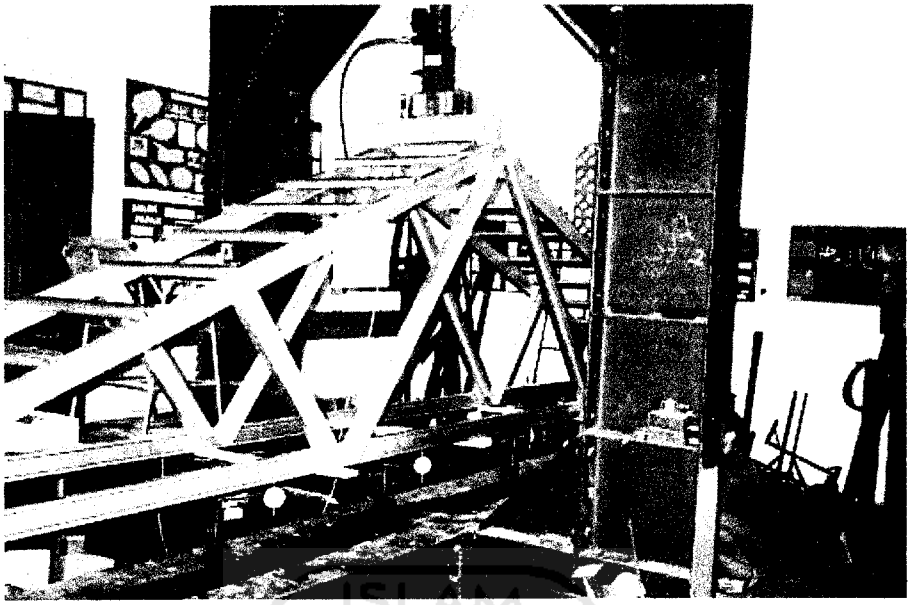
Tabel 3. Beban – Lendutan Analisis SAP dan Hasil Pengujian Rangka Howe

SAP (10^{-2} mm)				Hasil Pengujian (10^{-2} mm)			
P(kN)	Δ_1	Δ_2	Δ_3	P(kN)	Δ_1	Δ_2	Δ_3
0	0	0	0	0	0	0	0
0.50	20.50	24.50	20.50	0.50	30.0	21.0	20.0
1.00	41.10	49.00	41.10	1.00	68.5	95.0	58.0
1.50	61.60	73.60	61.60	1.50	110.0	186.0	94.0
2.00	82.15	98.10	82.15	2.00	146.0	197.0	126.0
2.50	102.69	122.63	102.69	2.50	187.5	287.0	159.0
3.00	123.23	147.16	123.23	3.00	232.5	299.0	198.0
3.50	143.77	171.69	143.77	3.50	280.0	382.0	242.0
4.00	164.31	196.22	164.31	4.00	336.0	405.0	300.0
4.50	184.85	220.75	184.85	4.50	395.5	496.0	363.0
5.00	205.39	245.28	205.39	5.00	467.0	587.0	434.0
5.50	225.93	269.81	225.93	5.50	524.5	679.0	506.0
6.00	246.47	294.34	246.47	6.00	596.5	714.0	581.0
6.50	267.01	318.87	267.01	6.50	601.5	714.0	609.0
7.00	287.55	343.40	287.55	7.00	682.0	815.0	673.0
7.57	308.09	367.93	308.09	7.57	735.0	898.0	732.0
8.00	328.63	392.46	328.63	8.00	785.5	982.0	782.0
8.50	349.17	416.99	349.17	8.50	844.0	1015.0	852.0
9.00	369.71	441.52	369.71	9.00	907.0	1111.0	931.5

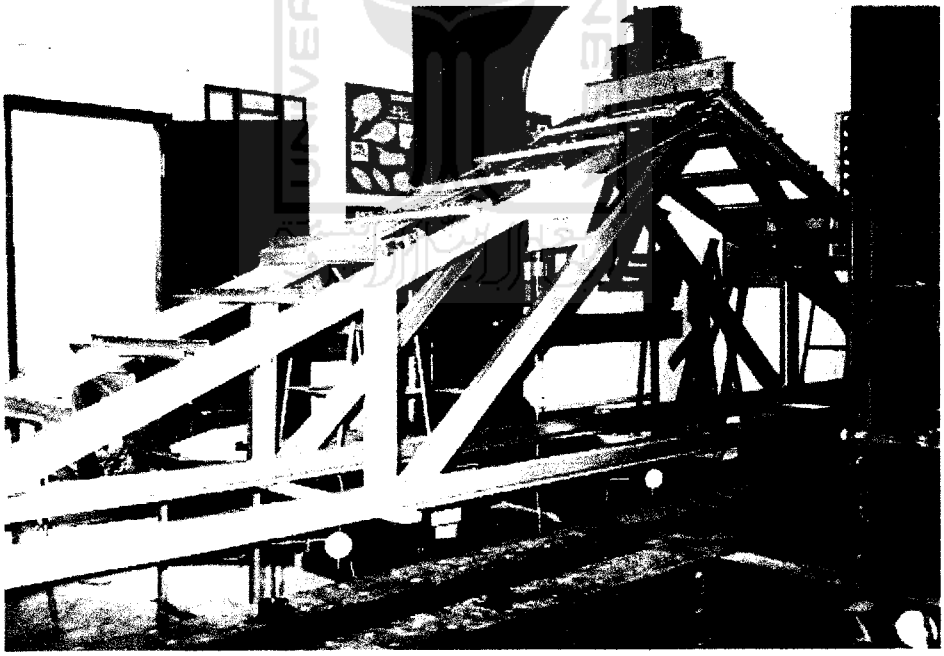
Tabel 3. Lanjutan

SAP (10^{-2} mm)				Hasil Pengujian (10^{-2} mm)			
P(kN)	Δ_1	Δ_2	Δ_3	P(kN)	Δ_1	Δ_2	Δ_3
9.50	390.25	466.05	390.25	9.50	979.0	1206.0	1029.0
9.80	402.80	480.60	402.80	9.80	989.0	1216.0	1042.5
9.68	397.80	474.70	397.80	9.68	1076.0	1395.0	1186.0
9.77	401.50	479.10	401.50	9.77	1115.0	1493.5	1265.0
9.80	402.80	480.60	402.80	9.80	1146.5	1594.5	1331.0
9.82	403.60	481.60	403.60	9.82	1172.0	1622.0	1388.0

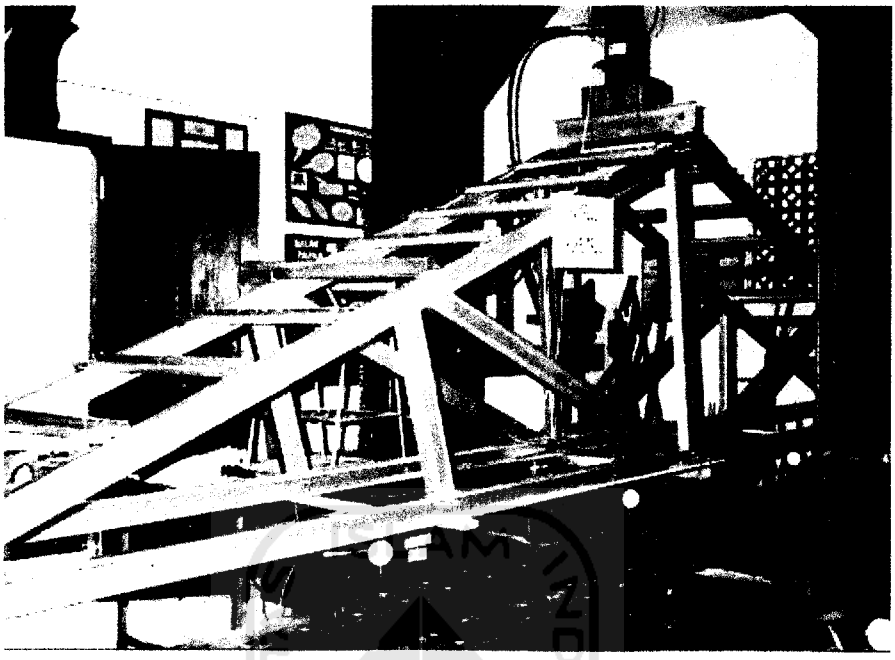
LAMPIRAN 6



Sampel 1. Fink Truss



Sampel 2. Pratt Truss



Sampel 3. Howe Truss

Sampel 1. Fink Truss setelah diuji

Sampel 2. Pratt Truss setelah diuji

Sampel 3. Howe Truss setelah diuji