BAB VII

PEMBAHASAN

VII.1. Perhitungan Dimensi dan Berat Balok

Perhitungan dimensi dan berat balok baik balok beton konvensional maupun prategang, diambil salah satu bentang yaitu pada bentang 6 m. Selanjutnya digunakan program komputer (*QUATTRO PRO*) pada bentang 8m, 10m, 12m, 14m, 16m, 18m, dan 20m, dihitung per 1 m panjang dengan mutu beton f'c = 30 Mpa, serta mutu baja fy = 400 Mpa, serta dianggap luas dan berat sengkang 5% dari luas dan berat total tulangan, luas dan berat tulangan baja serta tendon diambil dari tabel yang terdapat pada halaman 11 dan 28.

Perhitungan dimensi balok beton

Balok beton konvensional :

b = 25 cm , h = 45 cm

A = 25 x 45 = 1125 cm^2

Balok beton prategang :

b = 35 cm , h = 60 cm

A = 35 x 60 cm = 2100 cm^2

Perhitungan berat balok beton

Balok beton konvensional :

- Berat sendiri balok :

  qbs = (berat balok - jumlah tulangan)

  = (0,25(0,45)(2,4)(1))-(7(6,605)(10^{-4})(2,4)(1,05)(1))

  = 0,258349 t/m' = 258,349 kg/m'

- Berat tulangan pokok :

  A's 2 ø 29 = 5(5,190) = 10,380 kg/m'

  As 5 ø 29 = 6(5,19) = 25,950 kg/m'

- Berat keseluruhan :

  qtotal = 258,349 + (10,380 + 25,950)(1,05)

  = 296,495 kg/m'

Balok beton prategang :

- Berat sendiri balok :

  qbs = (berat balok - jumlah tulangan)

  = (0,35(0,60)(2,4)(1))-(6(98,7)(10^{-6})(2,4)(1,05)(1))

  = 0,573394 t/m' = 573,394 kg/m'

- Berat kabel :

  q = 8(0,789) = 6,312 kg/m'

-Berat keseluruhan :

  qtotal = 573,394 + 6,312(1,05)

  = 508,733 kg/m'

TABEL 7.1. - 7.2. PEMBAHASAN DIMENSI DAN BERAT BALOK BETON KONVENSIONAL

			Dimensi						BERAT BALOK				
L	fc	Fy	b	h	b x h	bj	A's	As	berat	berat	berat	berat	berat
			sebenarnya			beto	dipakai	dipakai	balok	A's	As	S	total
m	Mpa	Mpa	cm	cm	cm^2	t/m^3	cm^2	cm^2	kg/m'	kg/m'	kg/m'	kg/m'	kg/m'
6	30	400	25	45	1125	2.4	2 o 29	5 o 29	258.349	10.360	25.950	1.817	296.455
8	30	400	30	60	1800	2.4	2 o 29	6 o 32	416.510	10.360	37.860	2.413	487.162
10	30	400	35	70	2450	2.4	2 o 29	8 o 32	568.458	10.360	50.460	3.043	632.365
12	30	400	40	75	3000	2.4	3 o 29	10 o 32	694.738	15.570	63.100	3.934	777.342
14	30	400	45	85	3825	2.4	4 o 29	10 o 36	885.691	20.760	79.900	5.033	991.384
16	30	400	50	90	4500	2.4	6 o 29	12 o 36	1039.232	31.140	95.880	6.351	1172.603
18	30	400	55	100	5500	2.4	6 o 29	12 o 40	1272.017	31.140	118.440	7.475	1439.073
20	30	400	60	105	6300	2.4	6 o 36	10 o 50	1441.999	63.920	154.000	10.598	1670.515

			Dimensi						BERAT BALOK				
L	fc	Fy	b	h	b x h	bj	A's	As	berat	berat	berat	berat	berat
			sebenarnya			beto	dipakai	dipakai	balok	A's	As	S	total
m	Mpa	Mpa	cm	cm	cm^2	t/m^3	cm^2	cm^2	kg/m'	kg/m'	kg/m'	kg/m'	kg/m'
6	40	400	25	45	1125	2.4	3 o 25	6 o 29	257.866	25.240	26.730	1.812	[illegible]
8	40	400	30	55	1650	2.4	3 o 29	6 o 32	379.184	25.940	37.100	2.317	[illegible]
10	40	400	35	65	2275	2.4	5 o 29	8 o 32	524.792	31.350	50.780	3.064	[illegible]
12	40	400	40	75	3000	2.4	5 o 29	10 o 32	694.738	44.170	66.360	3.967	[illegible]
14	40	400	45	80	3600	2.4	5 o 29	10 o 36	880.027	55.980	137.325	[illegible]	[illegible]
16	40	400	50	90	4500	2.4	6 o 29	12 o 36	1039.232	47.940	157.790	10.757	[illegible]
18	40	400	55	100	5500	2.4	6 o 29	12 o 40	1272.017	63.920	217.140	11.950	[illegible]
20	40	400	60	105	6300	2.4	8 o 36	10 o 50	1436.869	71.910	236.960	15.440	[illegible]

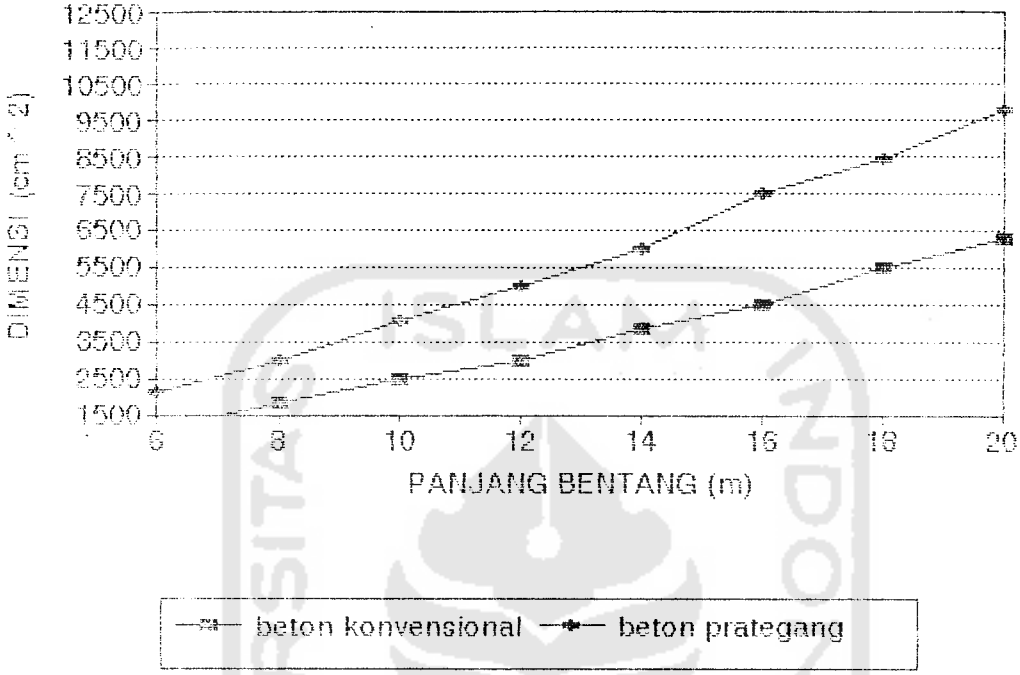
TABEL 7.3. - 7.4. PEMBAHASAN DIMENSI DAN BERAT BALOK BETON PRATEGANG

			Dimensi						BERAT BALOK			
L	fc	Fy	b	h	b x h	bj	dipakai	jumlah	berat	berat	berat	berat
			sebenarnya			beto	kabel	kabel	balok	tendon	S	total
							o					
m	Mpa	Mpa	cm	cm	cm^2	t/m^3	inch	buah	kg/m'	kg/m'	kg/m'	kg/m'
6	30	400	35	60	2100	2.4	0.5	8	502.105	8.512	0.818	503.435
8	30	400	40	70	3360	2.4	0.5	11	717.884	8.379	0.434	726.697
10	30	400	45	80	4080	2.4	0.5	13	968.921	10.257	0.513	979.691
12	30	400	50	100	5000	2.4	0.5	19	1196.430	14.961	0.750	1211.[illegible]
14	30	400	50	120	6000	2.4	0.5	20	1435.282	15.760	0.789	1451.831
16	30	400	55	135	7425	2.4	0.5	28	1793.387	22.092	1.105	1816.584
18	30	400	60	140	8400	2.4	0.5	31	2008.657	24.459	1.233	2034.999
20	30	400	65	150	9750	2.4	0.5	38	2331.472	28.904	1.420	2361.797

			Dimensi						BERAT BALOK			
L	fc	Fy	b	h	b x h	bj	dipakai	jumlah	berat	berat	berat	berat
			sebenarnya			beto	kabel	kabel	balok	tendon	S	total
							c					
m	Mpa	Mpa	cm	cm	cm^2	t/m^3	inch	buah	kg/m'	kg/m'	kg/m'	kg/m'
6	40	400	30	50	1500	2.4	0.5	9	429.866	7.101	0.555	437.522
8	40	400	35	60	2100	2.4	0.5	13	584.921	10.257	0.513	595.691
10	40	400	40	65	2600	2.4	0.5	17	811.973	13.419	0.671	826.057
12	40	400	45	85	3825	2.4	0.5	22	1020.789	17.358	0.868	1039.015
14	40	400	45	110	4950	2.4	0.5	25	1182.078	19.725	0.986	1202.789
16	40	400	50	110	5500	2.4	0.5	30	1432.894	25.870	1.294	1457.057
18	40	400	55	125	6875	2.4	0.5	34	1641.948	28.628	1.431	1670.113
20	40	400	60	135	8100	2.4	0.5	40	1934.525	31.560	1.578	1967.663

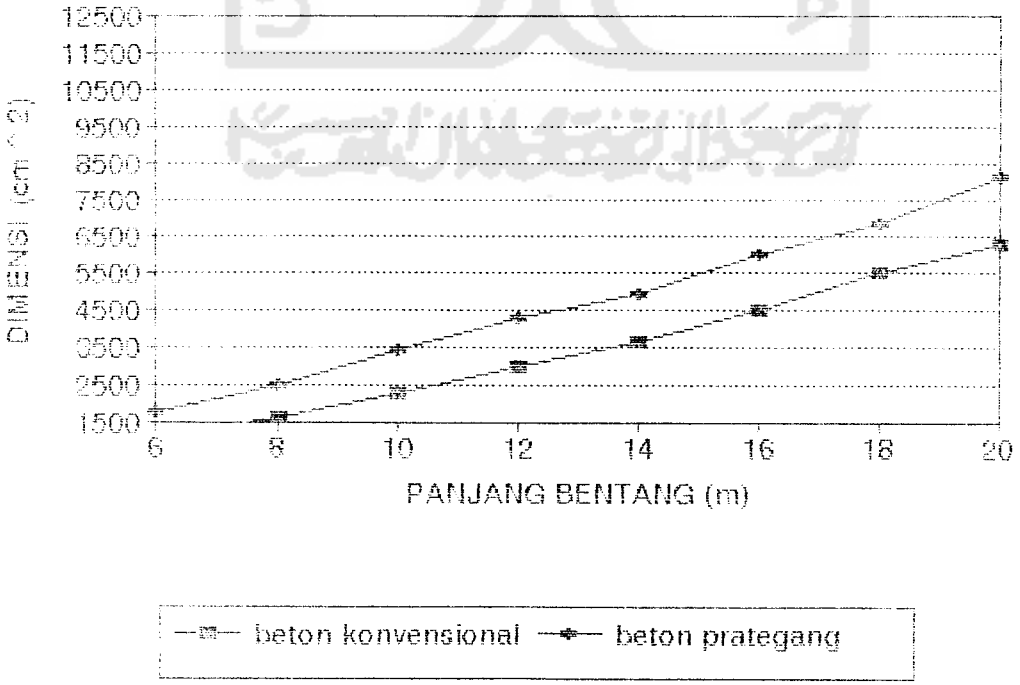
1. Perbandingan Dimensi

(f'c= 30 Mpa, fy= 40 Mpa)



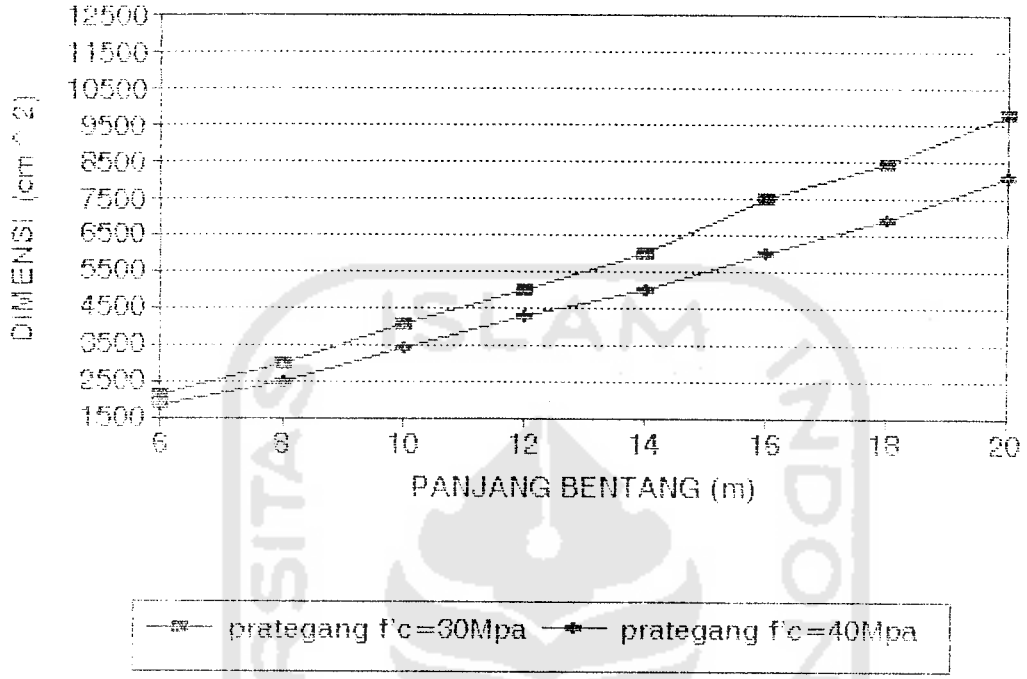
2. Perbandingan Dimensi

(f'c= 40 Mpa, fy= 40 Mpa)



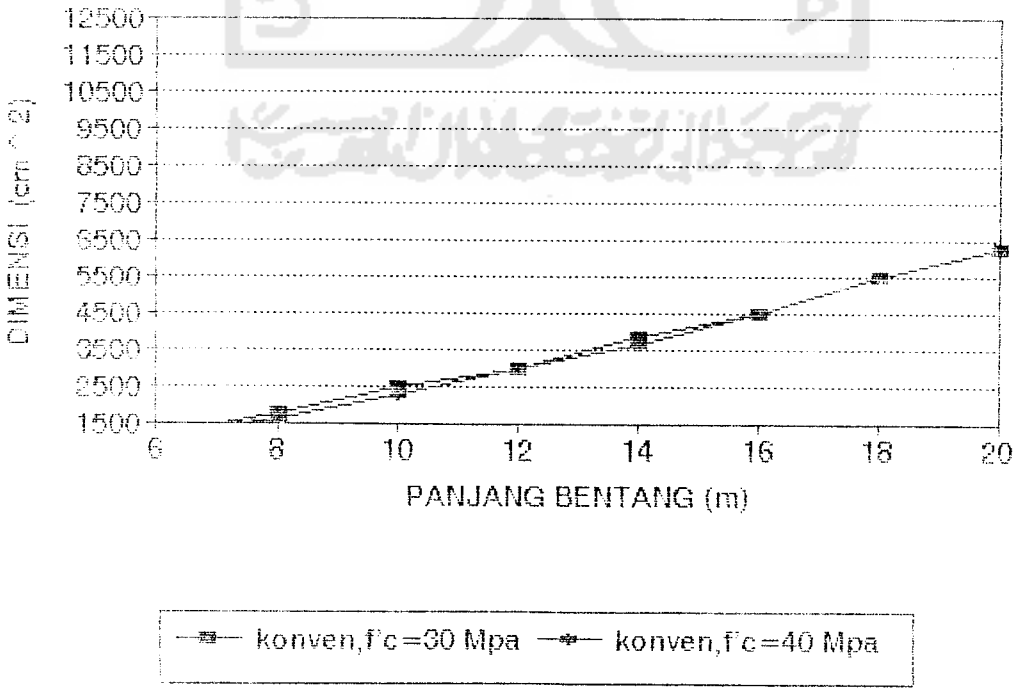
3. Perbandingan Dimensi

(f'c= 30 Mpa, f'c= 40 Mpa)



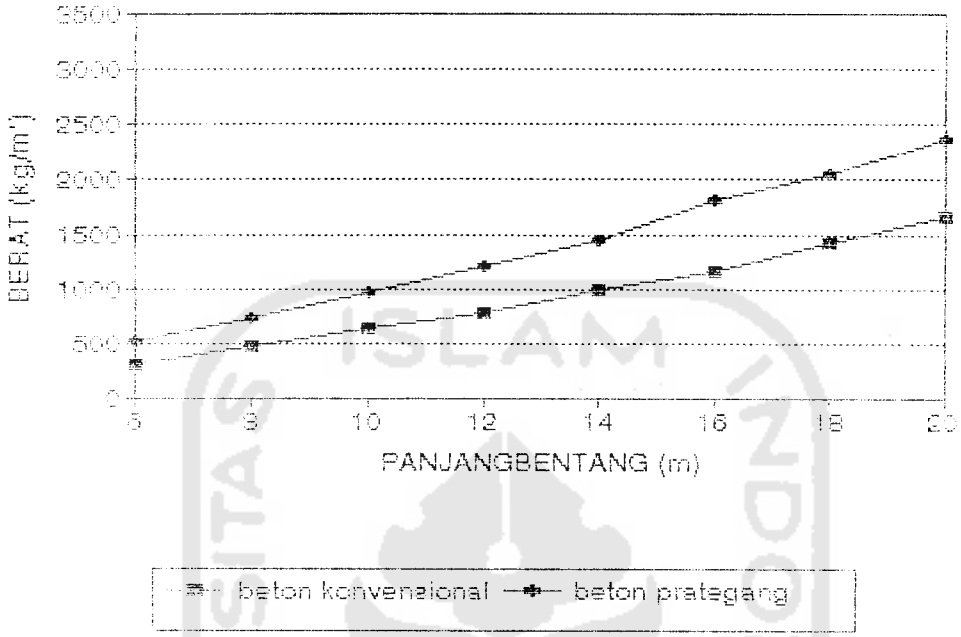
4. Perbandingan Dimensi

(f'c= 30 Mpa, f'c= 40 Mpa)



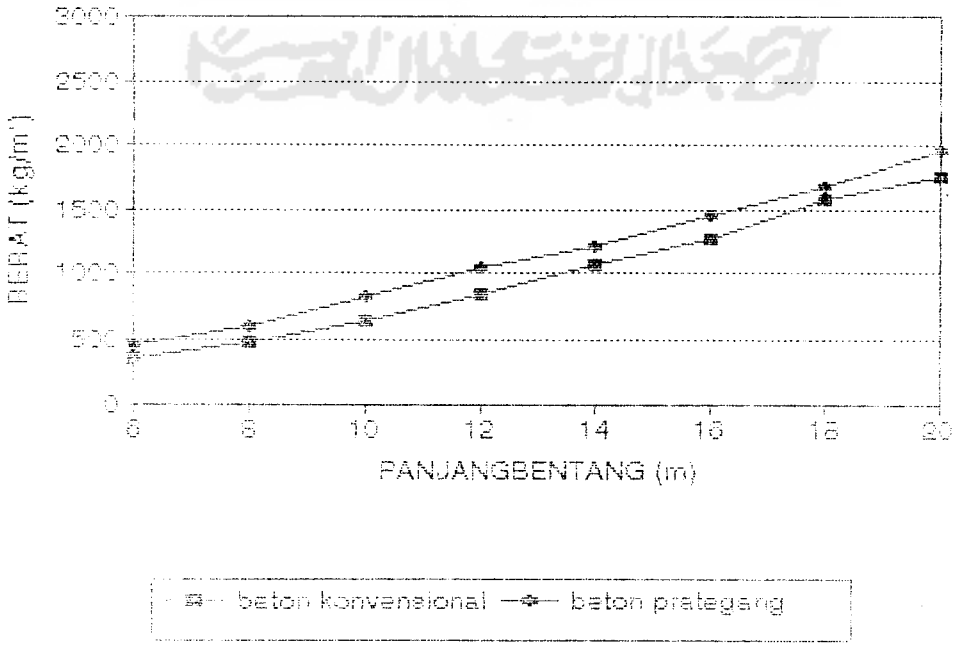
5. Perbandingan Berat

(f'c= 30 Mpa, fy= 40 Mpa)



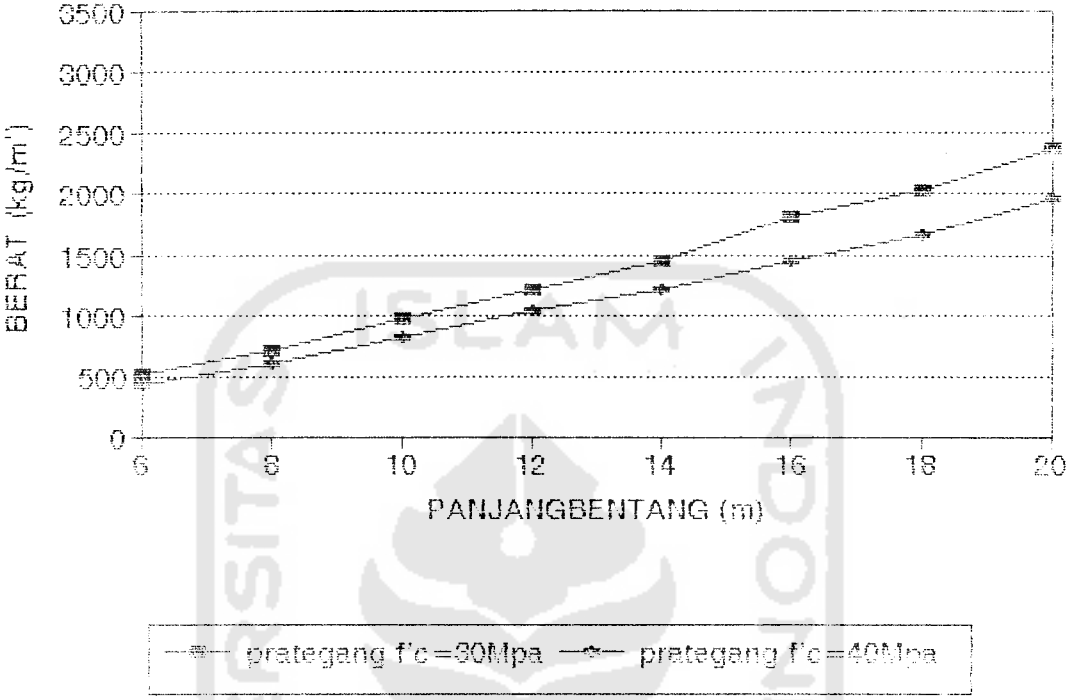
6. Perbandingan Berat

(f'c= 40 Mpa, fy= 40 Mpa)



7. Perbandingan Berat

(f'c= 30 Mpa, f'c= 40 Mpa)



8. Perbandingan Berat

(f'c= 30 Mpa, f'c= 40 Mpa)