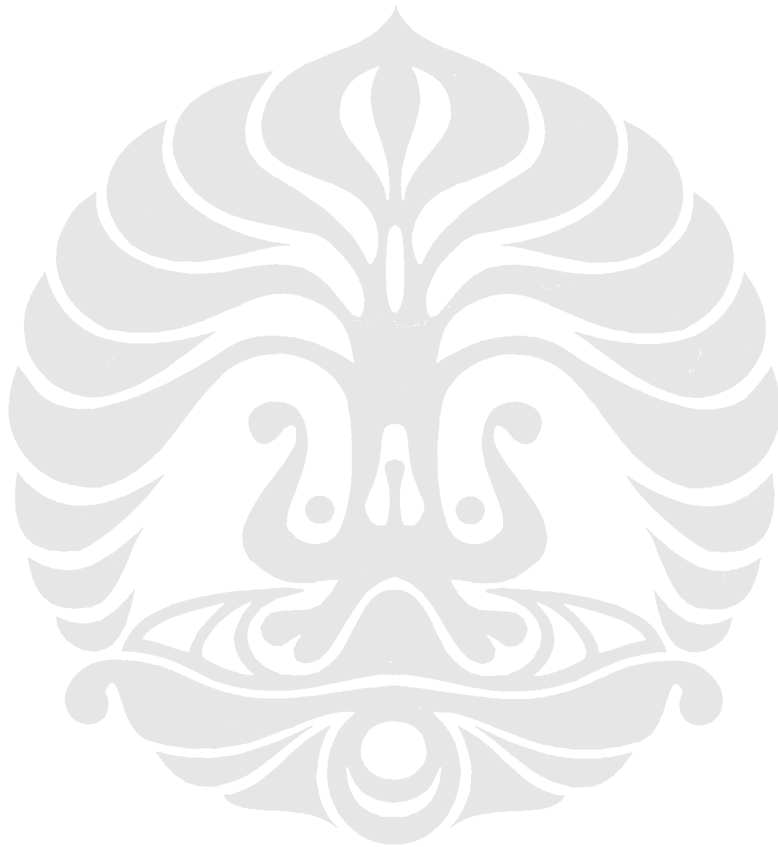
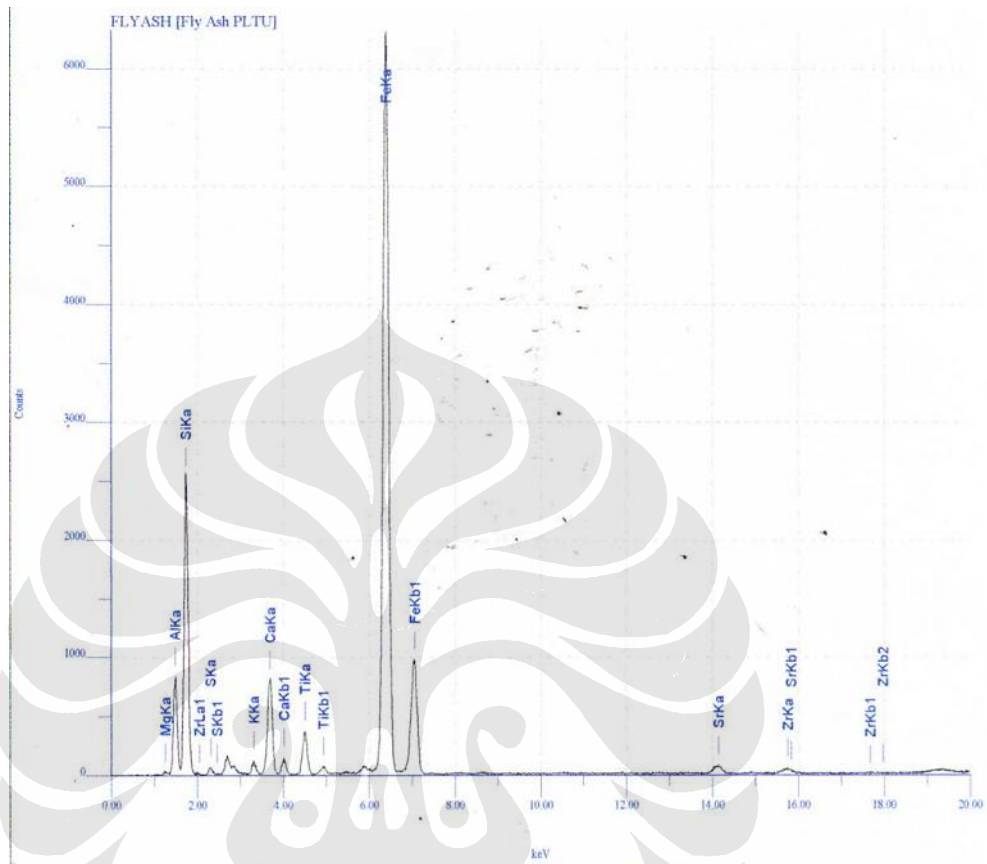


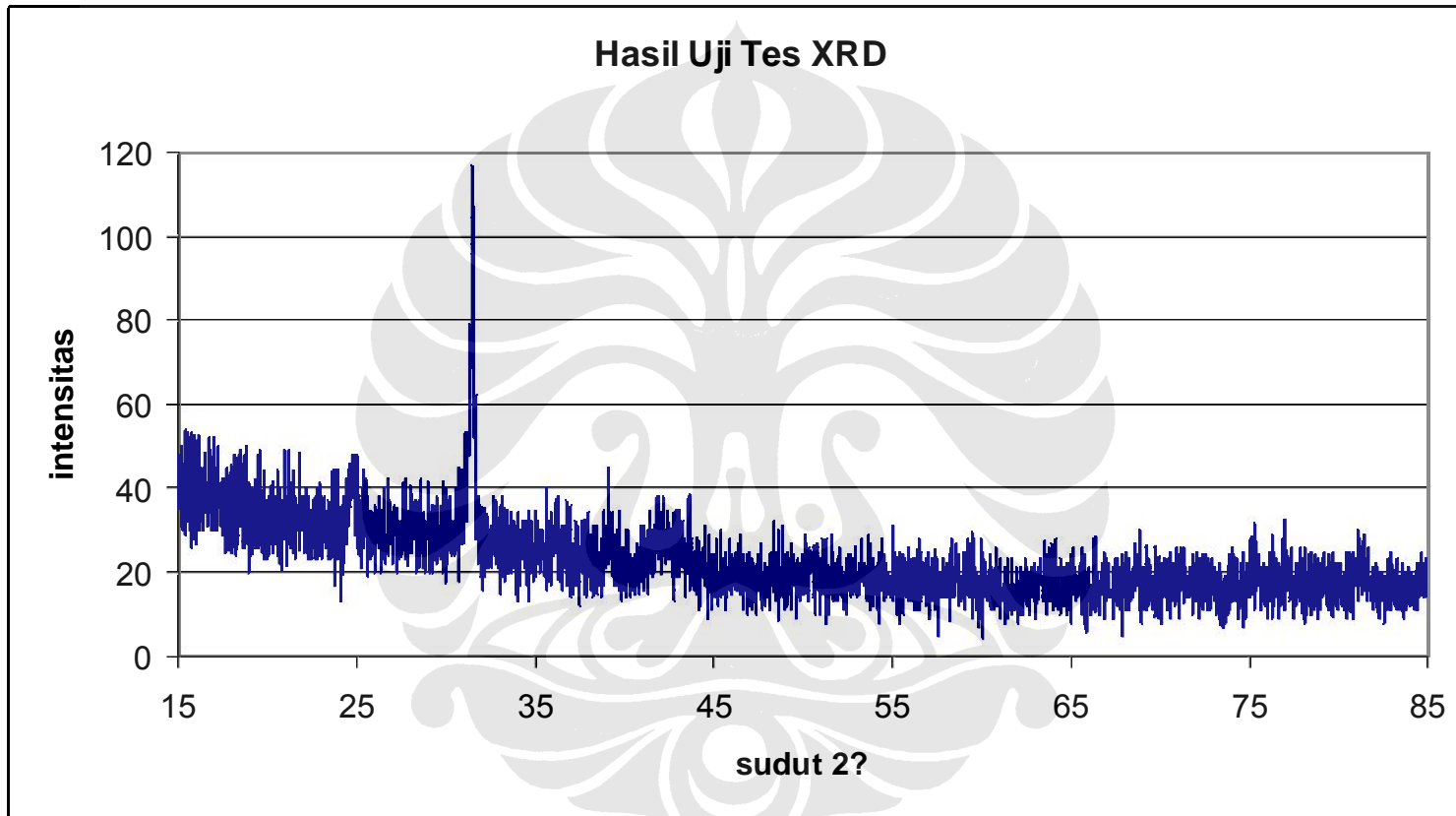
LAMPIRAN



Lampiran 1 Pengujian Fly Ash



Num	Atom/Chem.Formula	wt(%)	at/mole(%)	K-ratio	Integral Int.	Standard dev
1	12 Mg	1.6518	2.3188	0.0077083	242	0.8004
2	13 Al	19.6704	24.8813	0.0525858	8658	0.2775
3	14 Si	36.9493	44.9005	0.1410130	28495	0.1665
4	16 S	0.4895	0.5210	0.0015124	793	0.0894
5	19 K	1.3072	1.1410	0.0073793	1522	0.1334
6	20 Ca	7.1182	6.0614	0.0416753	12011	0.0990
7	22 Ti	2.3313	1.6611	0.0110570	5503	0.0780
8	26 Fe	29.9807	18.3221	0.1572605	113973	0.0586
9	38 Sr	0.3280	0.1278	0.0034374	1664	0.0909
10	40 Zr	0.1737	0.0650	0.0021534	848	0.1106



Lampiran 2 Sodium Silikat Na_2SiO_3



Lab. Afiliasi
& Keselamatan Kimia

LABORATORY TEST RESULTS				
Job. Number : 034/II/008		Date : 03 - 03 - 2008		
Customer : Ria		Attention :		
Sample Code : Water Glass Date Received : 18 - 02 - 2008 Sample Matrix : Liquid				
No.	Parameter Analysis	Result	Units	Method
1.	Kadar Air	22.84	%	Gravimetri
2.	Na_2O	0.11	%	AAS
3.	SiO_2	42.23	%	Gravimetri

Mengetahui,

Drs. Sunardi M.Si
Direktur

Laboratorium Afiliasi UI
Departemen Kimia, FMIPA UI, Kampus UI Depok 16424
Telp. 021-7872720, Faks 021-7863432

Lampiran 3 *Mix Design*

Design Strength	= Beton K-400
Agregat maksimum	= 40 mm
Slump	= 10 cm
SG Cemen t	= 3,15
SG Sand	= 2,6
SG Coarse Agregat	= 2,65
FM Sand	= 2,6

1. Menentukan Target Strength

$$T_{ts} = \frac{T_{ds}}{1-t.V} = \frac{400}{1-(0,883.0,15)} = 461,06853 = 461$$

keterangan :

t : Konstanta yang besarnya ditentukan berdasarkan perkiraan % benda uji oleh karena 80 % yang mau lolos, maka $t = 0,883$

V : Koefisien variasi, didapat dari penelitian sebelumnya = 0,15

2. Menentukan W/C dengan metode JSCE berdasarkan *Compressive Strength*

Berdasarkan rumus dari Japan Cement Association

$$T_{28} = -113 + 214 C/W$$

$$461 = -113 + 214 C/W$$

$$C/W = 2,66355$$

$$W/C = 0,37278 = 0,373$$

3. Menentukan S/A, jumlah air adukan (W), dan kandungan udara (A) dari tabel

4.3 diperoleh :

$$W = 165 \text{ kg}$$

$$S/A = 36 \%$$

$$A = 1,2 \%$$

Harga diatas berlaku untuk beton yang menggunakan pasir alam FM = 2,8 dan slump = 80 mm. Oleh karena itu, untuk menyesuaikan dengan harga

sebenarnya dihitung menggunakan tabel 4.4, dimana perhitungannya adalah sebagai berikut :

No.	Change in material or proportion	Correction on S/A and W	
		S/A (%)	W (kg)
1.	FM = 2.6	$36 + \left(\left(\frac{2,6 - 2,8}{0,1} \right) 0,5 \right) = 35\%$	No correction
2.	Slump = 10 cm	No correction	$165 + \left(\frac{1,2}{100} (10 - 8) 165 \right) = 168,96$
3.	Using crushed CA	35 + 4 = 39 %	168,96 + 12 = 180,96
4.	Increase in S/A	39 %	180,96 + ((39 - 35)1,5) = 186,96

Jadi setelah disesuaikan dengan keadaan sebenarnya didapatkan harga-harga :

$$S/A = 39,00 \%$$

$$W = 186,96 \text{ kg}$$

4. Dari $W/C = 0.373$ dan $W = 186.96 \text{ kg}$ dapat dihitung berat semen yang dibutuhkan :

$$C = \frac{W}{W/C} = \frac{186,96}{0,373} = 501,532 \text{ kg}$$

5. Menghitung volume total agregat (Ag) :

$$Ag = Ag = 1 - \frac{W}{1000} - \frac{C}{SG_{cement}} - A = 1 - \frac{186,96}{1000} - \frac{501,532}{3150} - \frac{1,2}{100} = 0,6418$$

6. $S/A = 39 \%$, maka dapat dihitung volume pasir dan agregat kasar, yaitu :

$$\text{Volume S} = 39 \% \times 0,6418 \text{ m}^3 = 0,2503 \text{ m}^3$$

$$S = 0,2503 \text{ m}^3 \times 2600 \text{ kg/m}^3 = 650,809 \text{ kg}$$

$$\text{Volume CA} = Ag - S = 0,6418 \text{ m}^3 - 0,2503 \text{ m}^3 = 0,3915 \text{ m}^3$$

$$CA = 0,3915 \text{ m}^3 \times 2650 \text{ Kg/m}^3 = 1037,508 \text{ kg}$$

Dari hasil perhitungan ini, untuk per m^3 beton dapat campuran sebagai berikut :

$$\text{Semen (C)} = 501,532 \text{ kg}$$

$$\text{Air (W)} = 186,960 \text{ kg}$$

$$\text{Pasir (S)} = 650,809 \text{ kg}$$

$$\text{Agregat kasar (CA)} = 1037,508 \text{ kg}$$

Lampiran 4 Hasil Analisa Numerik Balok Pengujian

Gaya Dalam

kurvatur	Letak Garis Netral (mm)	Gaya Tarik Baja (N)	Gaya Tekan Baja (N)	Gaya Tekan Beton (N)
0	0	0	0	0
0.000001	44.06165	741.9996	43.0862	776.5697
0.000002	44.0618	1483.998278	86.17340204	1553.139
0.000003	44.06202	2225.995228	129.2622922	2329.703
0.000004	44.06233	2967.989548	172.3538116	3106.262
0.000005	44.06273	3.71E+03	2.15E+02	3.88E+03
0.000006	44.06322	4451.966801	258.5482391	4659.354
0.000007	44.06379	5193.947981	301.6528991	5435.883
0.000008	44.06446	5.94E+03	344.7637	6.21E+03
0.000009	44.06521	6677.891069	387.8814912	6988.9
0.00001	44.06605	7419.851225	431.0071751	7765.382
0.000011	44.06698	8161.802616	4.74E+02	8541.846
0.000012	44.068	8.90E+03	517.2857	9.32E+03
0.000013	44.0691	9645.67563	560.4402901	10094.71
0.000014	44.0703	10387.59546	603.6062966	10871.1
0.000015	44.07158	1.11E+04	646.7845	1.16E+04
0.000016	44.07296	11871.3975	689.9759412	12423.8
0.000017	44.07442	12613.27793	733.1813503	13200.11
0.000018	44.07597	13355.14346	776.4016606	13976.38
0.000019	44.0776	1.41E+04	819.6377	1.48E+04
0.00002	44.07933	14838.82631	862.8904945	15528.82
0.000021	44.08115	15580.64187	906.1607728	16304.98
0.000022	44.08305	1.63E+04	949.4495	1.71E+04
0.000025	44.08929	1.85E+04	1.08E+03	1.94E+04
0.000028	44.09633	2.08E+04	1.21E+03	2.17E+04
0.000031	44.10417	2.30E+04	1.34E+03	2.41E+04
0.000033	44.10984	24480.74201	1427.090707	25615.17
0.000034	44.11281	25222.24981	1470.668752	26390.65
0.000035	44.11587	2.60E+04	1.51E+03	2.72E+04
0.000038	44.12557	2.82E+04	1.65E+03	2.95E+04
0.000041	44.13607	3.04E+04	1.78E+03	3.18E+04
0.000044	44.14737	3.26E+04	1.91E+03	3.41E+04
0.000045	44.15132	33376.67355	1952.189248	34916.09
0.000046	44.15535	34117.76534	1996.183298	35690.65
0.000047	44.15947	3.49E+04	2.04E+03	3.65E+04
0.000048	44.16368	35599.82676	2084.293558	37239.48
0.000049	44.16799	36340.7947	2128.411461	38013.76
0.00005	44.17237	37081.71964	2172.572359	38787.94
0.000051	44.17685	3.78E+04	2.22E+03	3.96E+04
0.000052	43.80865	3.79E+04	2.20E+03	3.97E+04
0.000053	43.4135	3.79E+04	2.17E+03	3.97E+04
0.000054	43.02989	37896.65682	2142.869082	39726.43
0.000055	42.6573	37898.28282	2114.953782	39759.25
0.000056	42.29523	3.79E+04	2.09E+03	3.98E+04

0.0000057	41.9432	37901.53789	2057.59182	39826.61
0.0000058	41.60077	37903.16689	2028.176219	39861.1
0.0000059	41.26754	3.79E+04	2.00E+03	3.99E+04
0.000006	40.94311	37906.42769	1967.948229	39931.64
0.0000062	40.31921	3.79E+04	1.91E+03	4.00E+04
0.0000063	40.01906	37911.32548	1874.313056	40041.13
0.0000065	39.44084	3.79E+04	1.81E+03	4.01E+04
0.0000068	38.62453	3.79E+04	1.71E+03	4.02E+04
0.0000071	37.86354	3.79E+04	1.61E+03	4.04E+04
0.0000073	37.38408	3.79E+04	1.54E+03	4.04E+04
0.0000076	36.70293	3.79E+04	1.43E+03	4.06E+04
0.0000078	36.27224	3.79E+04	1.36E+03	4.06E+04
0.0000079	36.06347	3.79E+04	1.32E+03	4.07E+04
0.0000081	35.65838	3.79E+04	1.24E+03	4.08E+04
0.0000083	35.26902	3.79E+04	1.17E+03	4.09E+04
0.0000085	34.89447	3.79E+04	1.09E+03	4.10E+04
0.0000087	34.53384	3.80E+04	1.01E+03	4.10E+04
0.0000089	34.18633	3.80E+04	935.4504	4.11E+04
0.0000091	33.8512	3.80E+04	855.8739	4.12E+04
0.0000093	33.52778	3.80E+04	775.465	4.13E+04
0.0000094	33.37026	37962.27951	734.9589671	41363.69
0.0000095	33.21542	3.80E+04	694.2572	4.14E+04
0.0000096	33.06321	37965.58304	653.3637073	41458.02
0.0000097	32.91355	3.80E+04	612.2822	4.15E+04
0.0000098	32.76637	37968.88808	571.0163445	41553.19
0.0000099	32.62162	3.80E+04	529.5698	4.16E+04
0.00001	32.47922	3.80E+04	487.946	4.16E+04
0.0000107	31.54367	3.80E+04	191.8922	4.20E+04
0.000011	31.17271	3.80E+04	62.6671	4.21E+04

Momen

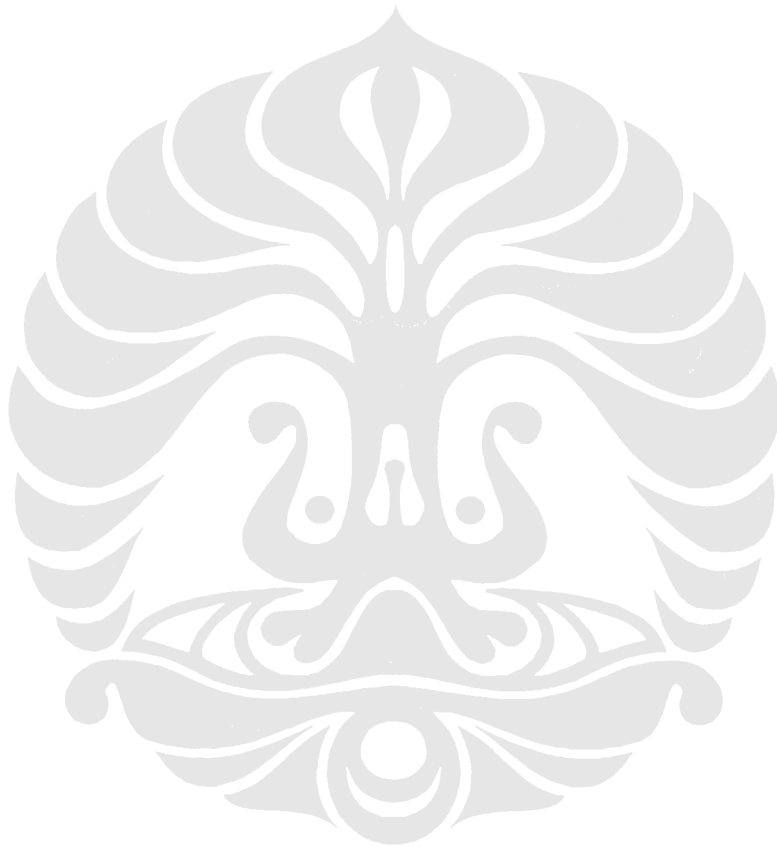
kurvatur	Momen (Nmm)	Momen Beton (Nmm)	Momen Baja Tarik (Nmm)	Momen Baja Tekan (Nmm)
0	0	0	0	0
0.0000001	192560	22811	166900	562.7769
0.0000002	385120	45622.66116	333807.9003	1125.579811
0.0000003	577680	68434.02601	500710.8656	1688.426904
0.0000004	770230	91245.43306	667612.648	2251.342687
0.0000005	962790	114060	834517.2717	2814.349503
0.0000006	1155300	136868.4277	1001411.089	3377.471794
0.0000007	1347900	159680.0428	1168306.96	3940.730904
0.0000008	1540400	182490	1335194.902	4504.149844
0.0000009	1733000	205303.5776	1502090.032	5067.75273
0.000001	1925500	228115.5246	1668976.445	5631.561262
0.0000011	2118100	250927.6122	1835858.915	6195.5989
0.0000012	2310600	273740	2002727.066	6759.888493
0.0000013	2503100	296552.2482	2169610.463	7324.452364
0.0000014	2695700	319364.8417	2336478.737	7889.315061
0.0000015	2888200	342180	2503453.281	8454.497275
0.0000016	3080700	364990.602	2670198.355	9020.024667
0.0000017	3273200	387803.8046	2837048.904	9585.918012
0.0000018	3465700	410617.244	3003892.749	10152.20126
0.0000019	3658200	433430	3170731.031	10718.89644
0.000002	3850700	456244.8889	3337558.753	11286.02965
0.0000021	4043200	479059.122	3504380.121	11853.6209
0.0000022	4235700	501870	3671094.458	12421.69528
0.0000025	4813100	570320	4171643.805	14128.58222
0.0000028	5390400	638770	4671923.854	15841.32561
0.0000031	5967600	707220	5172154.252	17559.59048
0.0000033	6352300	752856.3273	5505477.944	18708.93341
0.0000034	6544700	775675.3815	5672160.885	19284.59992
0.0000035	6737000	798490	5838891.655	19861.35588
0.0000038	7314000	866960	6338760.489	21595.49703
0.0000041	7890800	935420	6838561.839	23337.54196
0.0000044	8467600	1003900	7338290.4	25087.81334
0.0000045	8659800	1026718.446	7504701.125	25673.85769
0.0000046	8852000	1049543.928	7671197.007	26260.48995
0.0000047	9044100	1072400	7837715.931	26847.95681
0.0000048	9236300	1095196.802	8004133.899	27436.98177
0.0000049	9428400	1118024.185	8170574.099	28026.89019
0.000005	9620600	1140900	8336994.989	28617.936
0.0000051	9812700	1163700	8503485.889	29210.44773
0.0000052	9834000	1156900	8533175.826	28141.88492
0.0000053	9837600	1147300	8548600.569	26941.01037
0.0000054	9841200	1138087.626	8563511.672	25778.48149
0.0000055	9844700	1129135.894	8577999.621	24654.65283
0.0000056	9848200	1120500	8592110.973	23567.48696
0.0000057	9851600	1112056.227	8605802.059	22516.63057
0.0000058	9854900	1103903.761	8619150.89	21500.23367
0.0000059	9858300	1096000	8632198.896	20517.62518

0.000006	9861500	1088317.699	8644822.01	19567.52571
0.0000062	9868000	1073600	8669288.863	17761.47662
0.0000063	9871100	1066587.206	8680970.868	16904.54566
0.0000065	9877300	1053100	8703735.551	15276.23223
0.0000068	9886400	1034200	8735837.993	13040.22596
0.0000071	9895200	1016800	8765619.071	11033.14216
0.0000073	9900900	1005900	8784728.545	9814.248951
0.0000076	9909300	990500	8811724.745	8153.47945
0.0000078	9914900	980880	8828760.117	7151.800207
0.0000079	9917600	976240	8837145.988	6681.251687
0.0000081	9923000	967280	8853214.579	5798.27986
0.0000083	9928300	958720	8868688.169	4989.634784
0.0000085	9933600	950560	8883602.63	4252.758838
0.0000087	9938800	942750	8898225.36	3584.017283
0.0000089	9943900	935280	8912118.088	2980.65227
0.0000091	9949000	928130	8925542.869	2440.270659
0.0000093	9954100	921290	8938760.989	1960.203987
0.0000094	9956600	917972.9042	8945042.24	1742.040167
0.0000095	9959000	914730	8951325.693	1538.073161
0.0000096	9961500	911548.1967	8957477.77	1348.026927
0.0000097	9964000	908440	8963494.27	1171.632236
0.0000098	9966500	905385.6745	8969528.167	1008.627511
0.0000099	9968900	902400	8975523.649	858.7584371
0.00001	9971400	899470	8981167.21	721.7775303
0.0000107	9988200	880550	9019541.334	104.3255526
0.000011	9995300	873210	9034821.079	10.82297164

Lendutan sepanjang balok

L (mm)	Kurvatur	Rotasi (rad)	Lendutan (mm)
0	0	0	0
25	0.0000002	0.0000025	0.00003125
50	0.0000004	0.00001	0.0001875
75	0.0000006	0.0000225	0.00059375
100	0.0000008	0.00004	0.001375
125	0.000001	0.0000625	0.00265625
150	0.0000012	0.00009	0.0045625
175	0.0000014	0.0001225	0.00721875
200	0.0000016	0.00016	0.01075
225	0.0000018	0.0002025	0.01528125
250	0.000002	0.00025	0.0209375
275	0.0000022	0.0003025	0.02784375
300	0.0000024	0.00036	0.036125
325	0.0000026	0.0004225	0.04590625
350	0.0000028	0.00049	0.0573125
375	0.000003	0.0005625	0.07046875
400	0.0000032	0.00064	0.0855
425	0.0000034	0.0007225	0.10253125
450	0.0000036	0.00081	0.1216875
475	0.0000038	0.0009025	0.14309375
500	0.000004	0.001	0.166875
525	0.0000042	0.0011025	0.19315625
550	0.0000044	0.00121	0.2220625
575	0.0000046	0.0013225	0.25371875
600	0.0000048	0.00144	0.28825
625	0.000005	0.0015625	0.32578125
645	0.00000787	0.0016912	0.35831825
650	0.00001093	0.0017382	0.36689175
655	0.0000067	0.0016795	0.3582012
675	0.0000050	0.0015625	0.3257812
700	0.0000048	0.00144	0.2882500
725	0.0000046	0.0013225	0.2537187
750	0.0000044	0.00121	0.2220625
775	0.0000042	0.0011025	0.1931562
800	0.0000040	0.001	0.1668750
825	0.0000038	0.0009025	0.1430937
850	0.0000036	0.00081	0.1216875
875	0.0000034	0.0007225	0.1025312
900	0.0000032	0.00064	0.0855000
925	0.0000030	0.0005625	0.0704687
950	0.0000028	0.00049	0.0573125
975	0.0000026	0.0004225	0.0459062
1000	0.0000024	0.00036	0.0361250
1025	0.0000022	0.0003025	0.0278437
1050	0.0000020	0.00025	0.0209375
1075	0.0000018	0.0002025	0.0152812
1100	0.0000016	0.00016	0.0107500

1125	0.0000014	0.0001225	0.0072187
1150	0.0000012	0.0000900	0.0045625
1175	0.0000010	0.0000625	0.0026562
1200	0.0000008	0.0000400	0.0013750
1225	0.0000006	0.0000225	0.0005937
1250	0.0000004	0.0000100	0.0001875
1275	0.0000002	0.0000025	0.0000312
1300	0.0000000	0.0000000	0



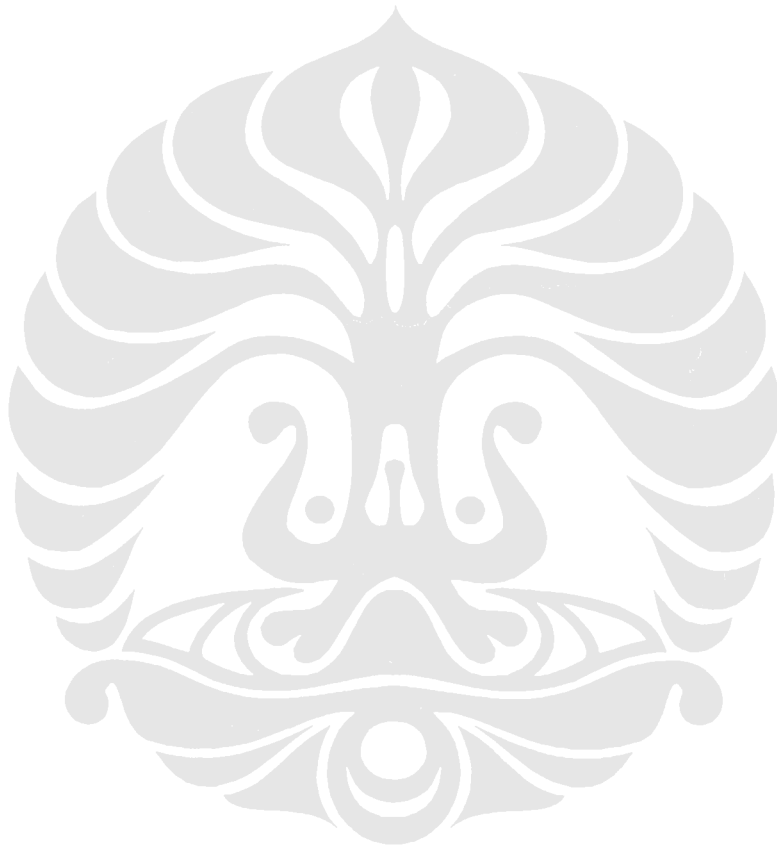
Lampiran 5 Hasil Analisa Numerik Balok Pembanding 1

Gaya Dalam

Kurvatur	Letak Garis Netral (mm)	Gaya Tarik Baja (N)	Gaya Tekan Baja (N)	Gaya Tekan Beton (N)
0	0	0	0	0
0.0000001	45.20974	738.2125	2.4027	817.5661
0.0000002	45.2099	1476.4	4.8055	1635.1
0.0000003	45.21016	2214.6	7.2083	2452.7
0.0000004	45.21053	2952.8	9.6113	3270.3
0.0000005	45.211	3691	12.0145	4087.8
0.0000006	45.21157	4429.2	14.4178	4905.4
0.0000007	45.21225	5167.4	16.8214	5722.9
0.0000008	45.21304	5905.6	19.2253	6540.4
0.0000009	45.21392	6643.8	21.6295	7358
0.000001	45.21492	7382	24.0341	8175.5
0.0000011	45.216015	8120.1	26.4391	8993
0.0000012	45.217217	8858.3	28.8445	9810.5
0.0000013	45.218524	9596.4	31.2505	10628
0.0000014	45.219935	10335	33.657	11445
0.0000015	45.22145	11073	36.064	12263
0.0000016	45.22307	11811	38.4717	13080
0.0000017	45.224796	12549	40.8801	13898
0.0000018	45.226625	13287	43.2891	14715
0.0000019	45.22856	14025	45.6989	15532
0.000002	45.230598	14763	48.1095	16350
0.0000021	45.23274	15501	50.5209	17167
0.0000022	45.23499	16239	52.9332	17984
0.0000023	45.237342	16977	55.3464	18802
0.0000024	45.2398	17715	57.7606	19619
0.0000025	45.242362	18453	60.1757	20436
0.0000026	45.245029	19190	62.5919	21253
0.0000027	45.247801	19928	65.0091	22070
0.0000028	45.250677	20666	67.4275	22887
0.0000029	45.253658	21404	69.8471	23705
0.000003	45.256745	22142	72.2678	24522
0.0000031	45.259936	22879	74.6898	25339
0.0000032	45.263232	23617	77.113	26156
0.0000033	45.266633	24355	79.5376	26973
0.0000034	45.270139	25092	81.9636	27789
0.0000035	45.27375	25830	84.391	28606
0.0000036	45.277466	26568	86.8198	29423
0.0000037	45.281287	27305	89.2501	30240
0.0000038	45.285213	28043	91.6819	31057
0.0000039	45.289244	28780	94.1154	31873
0.000004	45.293381	29517	96.5504	32690
0.0000041	45.297622	30255	98.9871	33506
0.0000042	45.301969	30992	101.4255	34323
0.0000043	45.306421	31729	103.8657	35140
0.0000044	45.310979	32467	106.3076	35956

0.0000045	45.315641	33204	108.7514	36772
0.0000046	45.320409	33941	111.197	37589
0.0000047	45.325283	34678	113.6446	38405
0.0000048	45.330262	35415	116.0941	39221
0.0000049	45.335346	36152	118.5456	40037
0.000005	45.340536	36889	120.9991	40853
0.0000051	45.345832	37626	123.4547	41669
0.0000052	45.071004	37893	123.9898	41966
0.0000053	44.648024	37895	123.4162	41968
0.0000054	44.236905	37896	122.8155	41970
0.0000055	43.837106	37898	122.1885	41973
0.0000056	43.448119	37899	121.5359	41975
0.0000057	43.069465	37901	120.8583	41978
0.0000058	42.700699	37903	120.1565	41981
0.0000059	42.341398	37904	119.431	41983
0.000006	41.991166	37906	118.6825	41986
0.0000061	41.64963	37908	117.9116	41989
0.0000062	41.316437	37909	117.1189	41991
0.0000063	40.991254	37911	116.3047	41994
0.0000064	40.673767	37913	115.4698	41997
0.0000065	40.363678	37914	114.6145	42000
0.0000066	40.060707	37916	113.7394	42002
0.0000067	39.764585	37917	112.8448	42005
0.0000068	39.4750597	37919	111.9313	42008
0.0000069	39.191891	37921	110.9993	42011
0.000007	38.9148516	37922	110.0492	42014
0.0000071	38.643724	37924	109.0813	42017
0.0000072	38.378301	37926	108.0961	42020
0.0000073	38.118388	37927	107.0939	42023
0.0000074	37.863797	37929	106.0751	42025
0.0000075	37.614349	37931	105.04	42028
0.0000076	37.369876	37932	103.989	42031
0.0000077	37.130215	37934	102.9223	42034
0.0000078	36.89521	37936	101.8403	42038
0.0000079	36.664715	37937	100.7433	42041
0.000008	36.438586	37939	99.6316	42044
0.0000081	36.2166895	37941	98.5054	42047
0.0000082	35.998895	37942	97.3651	42050
0.0000083	35.7850791	37944	96.2108	42053
0.0000084	35.575122	37946	95.0429	42056
0.0000085	35.36891	37947	93.8616	42059
0.0000086	35.166335	37949	93.7447	42062
0.0000087	34.96729	37950	91.4598	42066
0.0000088	34.771675	37952	90.2397	42069
0.0000089	34.579394	37954	89.0071	42072
0.000009	34.390353	37955	87.7623	42075
0.0000091	34.204464	37957	86.5054	42078
0.0000092	34.021639	37959	85.2367	42082
0.0000093	33.841797	37960	83.9563	42085
0.0000094	33.664857	37962	82.6645	42088

0.0000095	33.490743	37964	81.3614	42092
0.0000096	33.319381	37965	80.0472	42095
0.0000097	33.1507005	37967	78.7221	42098
0.0000098	32.984632	37969	77.3862	42102
0.0000099	32.821109	37970	76.0398	42105
0.00001	32.660068	37972	74.683	42108
0.0000107	31.597351	37984	64.907	42132
0.000011	31.173577	37989	60.5761	42142

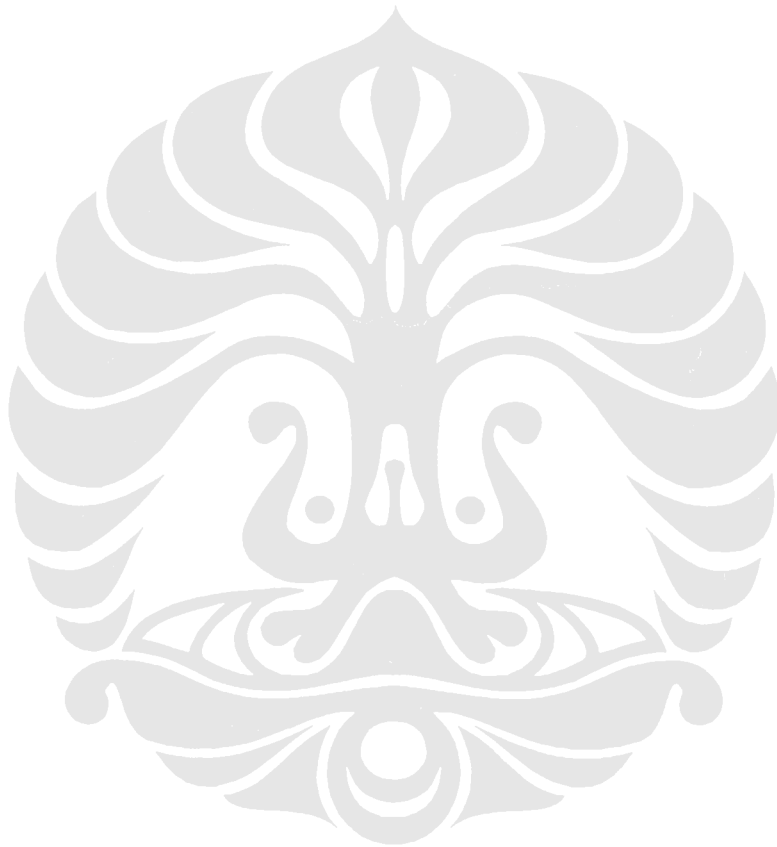


Momen

Kurvatur	Momen Tekan Beton (Nmm)	Momen Tarik Baja (Nmm)	Momen Tekan Baja (Nmm)	Momen Total (Nmm)
0	0	0	0	0
0.0000001	24641	165200	43.753	192348.853
0.0000002	49283	330410	87.5075	384708.8075
0.0000003	73924	495610	131.265	577057.665
0.0000004	98566	660810	175.0271	769407.6271
0.0000005	123210	826010	218.7952	961759.7952
0.0000006	147850	991210	262.5707	1154107.571
0.0000007	172490	1156400	306.3553	1346445.355
0.0000008	197140	1321600	350.1507	1538804.151
0.0000009	221780	1486800	393.9576	1731151.958
0.000001	246420	1652000	437.7788	1923499.779
0.0000011	271070	1817200	481.6146	2115858.615
0.0000012	295710	1982300	525.467	2308106.467
0.0000013	320360	2147500	569.3377	2500465.338
0.0000014	345010	2312700	613.2278	2692824.228
0.0000015	369650	2477800	657.1391	2885072.139
0.0000016	394300	2643000	701.073	3077431.073
0.0000017	418950	2808100	745.0312	3269690.031
0.0000018	443600	2973200	789.0149	3461949.015
0.0000019	468250	3138400	833.0259	3654308.026
0.000002	492910	3303500	877.0655	3846578.066
0.0000021	517560	3468600	921.1351	4038837.135
0.0000022	542210	3633700	965.2369	4231096.237
0.0000023	566870	3798800	1009.4	4423366.4
0.0000024	591530	3963800	1053.5	4615536.5
0.0000025	616190	4128900	1097.7	4807806.7
0.0000026	640850	4294000	1142	5000077
0.0000027	665510	4459000	1186.3	5192247.3
0.0000028	690170	4624000	1230.6	5384417.6
0.0000029	714840	4789100	1275	5576699
0.000003	739510	4954100	1319.4	5768880.4
0.0000031	764170	5119100	1363.8	5961050.8
0.0000032	788850	5284000	1408.3	6153143.3
0.0000033	813520	5449000	1452.9	6345324.9
0.0000034	838190	5613900	1497.5	6537406.5
0.0000035	862870	5778900	1542.1	6729599.1
0.0000036	887550	5943800	1586.8	6921691.8
0.0000037	912230	6108700	1631.6	7113784.6
0.0000038	936910	6273500	1676.4	7305777.4
0.0000039	961600	6438400	1721.3	7497881.3
0.000004	986280	6603300	1766.2	7689974.2
0.0000041	1011000	6768100	1811.2	7882011.2
0.0000042	1035700	6932900	1856.3	8074026.3
0.0000043	1060400	7097700	1901.4	8266041.4
0.0000044	1085100	7262400	1946.6	8457956.6
0.0000045	1109800	7427200	1991.9	8649971.9
0.0000046	1134500	7591900	2037.2	8841887.2

0.000047	1159200	7756600	2082.6	9033802.6
0.000048	1183900	7921300	2128	9225718
0.000049	1208600	8085900	2173.6	9417533.6
0.00005	1233300	8250600	2219.2	9609449.2
0.000051	1258000	8415200	2264.9	9801264.9
0.000052	1259200	8485300	2240.6	9872660.6
0.000053	1247500	8501700	2178.1	9876128.1
0.000054	1236000	8517700	2117	9879417
0.000055	1224900	8533200	2057.3	9882647.3
0.000056	1214100	8548300	1999	9885809
0.000057	1203500	8563000	1942.1	9888792.1
0.000058	1193200	8577400	1886.5	9891806.5
0.000059	1183300	8591400	1832.2	9894862.2
0.00006	1173500	8605000	1779.2	9897629.2
0.000061	1164000	8618300	1727.4	9900427.4
0.000062	1154700	8631300	1676.7	9903146.7
0.000063	1145700	8644000	1627.2	9905897.2
0.000064	1136900	8656400	1578.9	9908568.9
0.000065	1128200	8668600	1531.7	9911151.7
0.000066	1119800	8680400	1485.5	9913665.5
0.000067	1111600	8692000	1440.4	9916200.4
0.000068	1103500	8703400	1396.4	9918646.4
0.000069	1095700	8714500	1353.3	9921123.3
0.00007	1088000	8725400	1311.2	9923511.2
0.000071	1095300	8736000	1270.1	9942100.1
0.000072	1073100	8746500	1230	9928140
0.000073	1065800	8756700	1190.7	9930270.7
0.000074	1058800	8766800	1152.4	9932632.4
0.000075	1051800	8776600	1114.9	9934694.9
0.000076	1045000	8786300	1078.4	9936878.4
0.000077	1038400	8795700	1042.6	9938982.6
0.000078	1031900	8805000	1007.7	9941097.7
0.000079	1025500	8814200	973.6556	9943223.656
0.00008	1019200	8823100	940.3814	9945160.381
0.000081	1013000	8831900	907.8939	9947107.894
0.000082	1007000	8840600	876.1781	9949176.178
0.000083	1001100	8849100	845.2197	9951155.22
0.000084	995230	8857400	815.0046	9952968.005
0.000085	989510	8865600	785.5194	9954846.519
0.000086	983890	8873700	756.751	9956735.751
0.000087	978370	8881700	728.6864	9958635.686
0.000088	972940	8889500	701.3134	9960435.313
0.000089	967610	8897200	674.6199	9962245.62
0.00009	962370	8904700	648.5942	9963955.594
0.000091	957220	8912200	623.2251	9965765.225
0.000092	952150	8919500	598.5012	9967463.501
0.000093	947160	8926700	574.412	9969150.412
0.000094	942260	8933800	550.9468	9970836.947
0.000095	937430	8940800	528.0957	9972501.096
0.000096	932690	8947700	505.8485	9974164.849

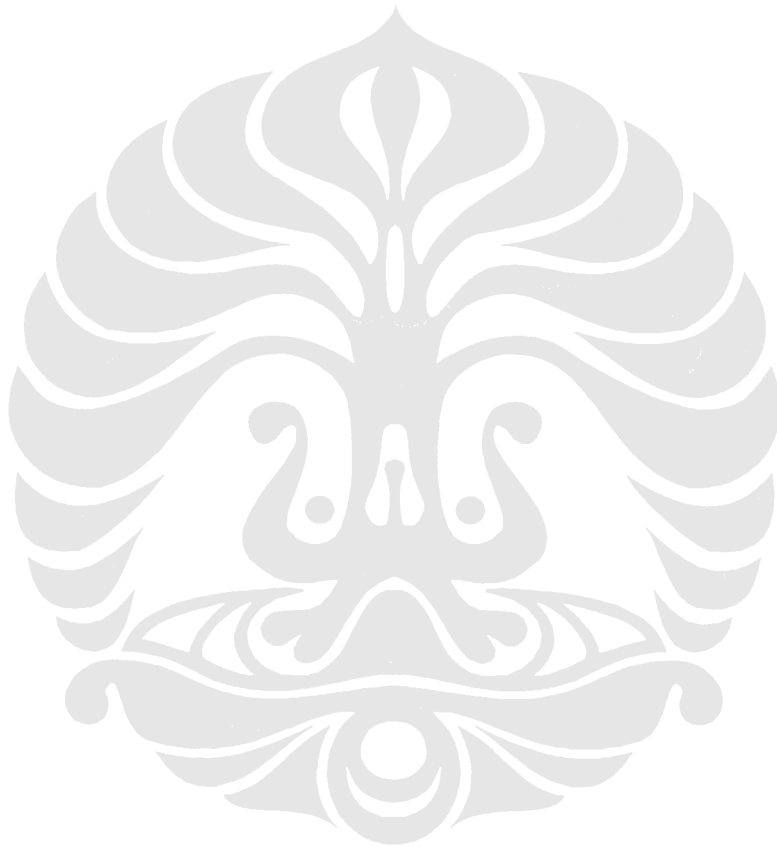
0.0000097	928010	8954500	484.1959	9975795.196
0.0000098	923410	8961200	463.1281	9977414.128
0.0000099	918880	8967800	442.6361	9979010.636
0.00001	914420	8974300	422.7109	9980584.711
0.0000107	885000	9017400	298.4003	9991198.4
0.000011	873280	9034700	252.819	9995560.819



Lendutan Sepanjang Balok

L (mm)	Momen (Nmm)	Kurvatur	Rotasi (rad)	Lendutan (mm)
0	0	0	0	0
25	384375	0.000002	0.000025	0.00003125
50	768750	0.000004	0.00001	0.0001875
75	1153125	0.000006	0.0000225	0.00059375
100	1537500	0.000008	0.00004	0.001375
125	1921875	0.00001	0.0000625	0.00265625
150	2306250	0.000012	0.00009	0.0045625
175	2690625	0.000014	0.0001225	0.00721875
200	3075000	0.000016	0.00016	0.01075
225	3459375	0.000018	0.0002025	0.01528125
250	3843750	0.00002	0.00025	0.0209375
275	4228125	0.000022	0.0003025	0.02784375
300	4612500	0.000024	0.00036	0.036125
325	4996875	0.000026	0.0004225	0.04590625
350	5381250	0.000028	0.00049	0.0573125
375	5765625	0.00003	0.0005625	0.07046875
400	6150000	0.000032	0.00064	0.0855
425	6534375	0.000034	0.0007225	0.10253125
450	6918750	0.000036	0.00081	0.1216875
475	7303125	0.000038	0.0009025	0.14309375
500	7687500	0.00004	0.001	0.166875
525	8071875	0.000042	0.0011025	0.19315625
550	8456250	0.000044	0.00121	0.2220625
575	8840625	0.000046	0.0013225	0.25371875
600	9225000	0.000048	0.00144	0.28825
625	9609375	0.00005	0.0015625	0.32578125
645	9916875	0.000067	0.0016795	0.35820125
650	9993750	0.0001087	0.001723425	0.366708563
655	9916875	0.000067	0.0016795	0.3582012
675	9609375	0.000050	0.0015625	0.3257812
700	9225000	0.000048	0.00144	0.2882500
725	8840625	0.000046	0.0013225	0.2537187
750	8456250	0.000044	0.00121	0.2220625
775	8071875	0.000042	0.0011025	0.1931562
800	7687500	0.000040	0.001	0.1668750
825	7303125	0.000038	0.0009025	0.1430937
850	6918750	0.000036	0.00081	0.1216875
875	6534375	0.000034	0.0007225	0.1025312
900	6150000	0.000032	0.00064	0.0855000
925	5765625	0.000030	0.0005625	0.0704687
950	5381250	0.000028	0.00049	0.0573125
975	4996875	0.000026	0.0004225	0.0459062
1000	4612500	0.000024	0.00036	0.0361250
1025	4228125	0.000022	0.0003025	0.0278437
1050	3843750	0.000020	0.00025	0.0209375
1075	3459375	0.000018	0.0002025	0.0152812
1100	3075000	0.000016	0.00016	0.0107500
1125	2690625	0.000014	0.0001225	0.0072187

1150	2306250	0.0000012	0.0000900	0.0045625
1175	1921875	0.0000010	0.0000625	0.0026562
1200	1537500	0.0000008	0.0000400	0.0013750
1225	1153125	0.0000006	0.0000225	0.0005937
1250	768750	0.0000004	0.0000100	0.0001875
1275	384375	0.0000002	0.0000025	0.0000312
1300	0	0.0000000	0.0000000	0



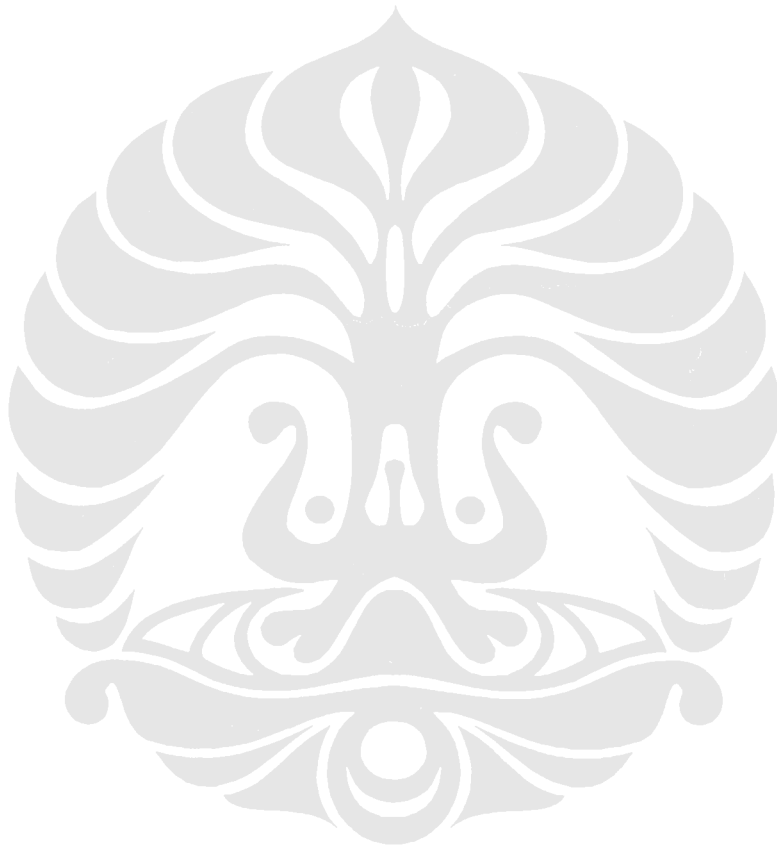
Lampiran 6 Hasil Analisa Numerik Balok Pembanding 2

Gaya Dalam

Kurvatur	Letak Garis Netral (mm)	Gaya Tarik Baja (N)	Gaya Tekan Baja (N)	Gaya Tekan Beton (N)
0.0000001	61.46566	684.5893505	4.547576	755.6020985
0.0000002	61.46604	1369.176266	9.095249	1511.200937
0.0000003	61.46667	2053.75817	13.64312	2266.794304
0.0000004	61.46755	2738.332603	18.1913	3022.379127
0.0000005	61.46868	3422.897036	22.73987	3777.952838
0.0000006	61.47007	4107.449074	27.28894	4533.511871
0.0000007	61.4717	4791.986263	31.8386	5289.053099
0.0000008	61.47358	5476.505899	36.38896	6044.575268
0.0000009	61.47572	6161.005716	40.94012	6800.073836
0.000001	61.4781	6845.483259	45.49217	7555.545669
0.0000011	61.48075	7529.935731	50.04522	8310.990203
0.0000012	61.48364	8214.360959	54.59936	9066.402186
0.0000013	61.48678	8898.756362	59.1547	9821.779418
0.0000014	61.49017	9583.119293	63.71133	10577.1202
0.0000015	61.49382	10267.44744	68.26935	11332.42031
0.0000016	61.49771	10951.73826	72.82887	12087.67723
0.0000017	61.50186	11635.98926	77.38998	12842.88805
0.0000018	61.50626	12320.19789	81.95278	13598.05038
0.0000019	61.51092	13004.36179	86.51738	14353.16028
0.000002	61.51582	13688.47834	91.08386	15108.2159
0.0000021	61.52098	14372.54502	95.65235	15863.21439
0.0000022	61.52638	15056.55951	100.2229	16618.1516
0.0000023	61.53204	15740.51915	104.7957	17373.02583
0.0000024	61.53796	16424.42144	109.3707	18127.83421
0.0000025	61.54412	17108.26398	113.9482	18882.57311
0.0000026	61.55054	17792.04418	118.5281	19637.24032
0.0000027	61.55721	18475.75964	123.1107	20391.83214
0.0000028	61.56413	19159.40776	127.6959	21146.34637
0.0000029	61.5713	19842.98605	132.2839	21900.78009
0.000003	61.57873	20526.49199	136.8748	22655.13036
0.0000031	61.58641	21209.9231	141.4687	23409.39422
0.0000032	61.59434	21893.27699	146.0657	24163.56777
0.0000033	61.60252	22576.55091	150.6659	24917.64987
0.0000034	61.61096	23259.74249	155.2694	25671.63662
0.0000035	61.61965	23942.84923	159.8763	26425.52502
0.0000036	61.6286	24625.86848	164.4866	27179.31309
0.0000037	61.63779	25308.79788	169.1006	27932.99681
0.0000038	61.64724	25991.63478	173.7183	28686.57422
0.0000039	61.65695	26674.37681	178.3398	29440.04123
0.000004	61.66691	27357.02132	182.9651	30193.3959
0.0000041	61.67712	28039.56579	187.5945	30946.63523
0.0000042	61.68758	28722.00788	192.228	31699.75497
0.0000043	61.6983	29404.34475	196.8656	32452.75448
0.0000044	61.70927	30086.57405	201.5076	33205.62952

0.000045	61.7205	30768.69326	206.154	33958.37699
0.000046	61.73198	31450.69987	210.8049	34710.99382
0.000047	61.74372	32132.59119	215.4604	35463.47822
0.000048	61.75571	32814.36469	220.1206	36215.82717
0.000049	61.76795	33496.01803	224.7856	36968.03617
0.00005	61.78045	34177.54851	229.4555	37720.10349
0.000051	61.79321	34858.95361	234.1305	38472.02602
0.000052	61.80622	35540.2308	238.8105	39223.80065
0.000053	61.81949	36221.37755	243.4958	39975.42421
0.000054	61.83301	36902.39134	248.1864	40726.89354
0.000055	61.84678	37583.26942	252.8824	41478.20703
0.000056	61.55538	37892.79415	255.3271	41819.40838
0.000057	61.02189	37894.36336	255.8742	41820.54339
0.000058	60.50236	37895.93426	256.3874	41821.71936
0.000059	59.9962	37897.50681	256.8675	41822.9324
0.00006	59.50285	37899.08097	257.3155	41824.18352
0.000061	59.02178	37900.6567	257.7322	41825.47158
0.000062	58.5525	37902.23396	258.1183	41826.79485
0.000063	58.09453	37903.8127	258.4746	41828.1532
0.000064	57.64744	37905.3929	258.8019	41829.5454
0.000065	57.21079	37906.97452	259.1007	41830.97083
0.000066	56.78419	37908.55752	259.3719	41832.4284
0.000067	56.36726	37910.14187	259.6161	41833.91791
0.000068	55.95966	37911.72755	259.8338	41835.43767
0.000069	55.56103	37913.31451	260.0256	41836.98728
0.00007	55.17105	37914.90274	260.1923	41838.56762
0.000071	54.78942	37916.49221	260.3342	41840.17537
0.000072	54.78942	37916.49221	260.3342	41840.17537
0.000073	54.41586	37918.08288	260.4519	41841.81247
0.000074	53.69179	37921.26775	260.617	41845.16723
0.000075	53.34078	37922.8619	260.6653	41846.8853
0.000076	52.99679	37924.45715	260.6914	41848.62864
0.000077	52.6596	37926.0535	260.6957	41850.39721
0.000078	52.32899	37927.65091	260.6788	41852.19165
0.000079	52.00474	37929.24936	260.6409	41854.00949
0.00008	51.68665	37930.84884	260.5826	41855.85164
0.000081	51.37454	37932.44932	260.5042	41857.7166
0.000082	51.06823	37934.05078	260.4061	41859.60504
0.000083	50.76753	37935.65322	260.2887	41861.51572
0.000084	50.47227	37937.2566	260.1523	41863.44905
0.000085	50.18231	37938.86091	259.9974	41865.40387
0.000086	49.89748	37940.46613	259.8241	41867.37992
0.000087	49.61764	37942.07225	259.6329	41869.37752
0.000088	49.34263	37943.67925	259.4241	41871.39509
0.000089	49.07234	37945.28712	259.198	41873.4326
0.00009	48.80661	37946.89584	258.9548	41875.49008
0.000091	48.54534	37948.50539	258.695	41877.56709
0.000092	48.28839	37950.11577	258.4187	41879.66307
0.000093	48.03566	37951.72695	258.1263	41881.77881
0.000094	47.78702	37953.33892	257.818	41883.91174

0.0000095	47.54237	37954.95168	257.4941	41886.06438
0.0000096	47.3016	37956.56521	257.1549	41888.23351
0.0000097	47.06462	37958.17948	256.8005	41890.42066
0.0000098	46.83132	37959.79451	256.4313	41892.6253
0.0000099	46.60162	37961.41026	256.0474	41894.84711
0.00001	46.37542	37963.02673	255.6492	41897.08631
0.0000107	44.88317	37974.36128	252.4768	41913.20545
0.000011	44.28834	37979.2287	250.9222	41920.34051



Momen

Kurvatur	Momen Tekan Beton (Nmm)	Momen Tarik Baja (Nmm)	Momen Tekan Baja (Nmm)	Momen Total (Nmm)
0	0	0	0	0
0.000001	61924.74785	142075.7968	156.7352232	210349.7546
0.000002	123849.6377	284150.5765	313.4772029	420698.6551
0.000003	185774.8996	426223.2793	470.2329788	631045.9019
0.000004	247700.6903	568292.881	627.0093562	841390.6497
0.000005	309627.2205	710358.3322	783.8133081	1051732.088
0.000006	371554.5783	852418.6388	940.6514399	1262069.326
0.000007	433482.9057	994472.7825	1097.530521	1472401.509
0.000008	495412.5748	1136519.64	1254.458017	1682727.931
0.000009	557343.5538	1278558.273	1411.440178	1893047.622
0.00001	619275.9835	1420587.661	1568.483781	2103359.727
0.000011	681210.3212	1562606.644	1725.596556	2313663.593
0.000012	743146.4474	1704614.32	1882.784501	2523958.196
0.000013	805084.6183	1846609.618	2040.054751	2734242.753
0.000014	867025.1506	1988591.44	2197.414628	2944516.521
0.000015	928968.0527	2130558.827	2354.870531	3154778.556
0.000016	990913.5409	2272510.725	2512.429489	3365028.049
0.000017	1052861.784	2414446.101	2670.098395	3575264.161
0.000018	1114813.014	2556363.893	2827.884343	3785486.093
0.000019	1176767.273	2698263.127	2985.793854	3995692.922
0.00002	1238724.86	2840142.711	3143.834235	4205883.891
0.000021	1300685.95	2982001.606	3302.01243	4416058.163
0.000022	1362650.56	3123838.849	3460.33491	4626214.8
0.000023	1424619.008	3265653.337	3618.809062	4836353.054
0.000024	1486591.465	3407444.034	3777.441846	5046472.087
0.000025	1548568.014	3549209.944	3936.239956	5256570.999
0.000026	1610548.907	3690949.994	4095.210611	5466649.002
0.000027	1672534.215	3832663.191	4254.360497	5676705.189
0.000028	1734524.197	3974348.46	4413.696868	5886738.773
0.000029	1796519.016	4116004.763	4573.226715	6096748.908
0.00003	1858518.839	4257631.067	4732.957037	6306734.747
0.000031	1920523.828	4399226.335	4892.894837	6516695.441
0.000032	1982534.029	4540789.584	5053.046782	6726630.063
0.000033	2044549.829	4682319.677	5213.420576	6936537.909
0.000034	2106571.273	4823815.63	5374.02291	7146418.053
0.000035	2168598.518	4965276.408	5534.860823	7356269.638
0.000036	2230631.847	5106700.918	5695.941751	7566091.891
0.000037	2292671.292	5248088.181	5857.272377	7775883.874
0.000038	2354717.139	5389437.101	6018.860181	7985644.814
0.000039	2416769.408	5530746.704	6180.711843	8195373.765
0.00004	2478828.389	5672015.891	6342.83488	8405069.954
0.000041	2540894.237	5813243.624	6505.236418	8614732.522
0.000042	2602966.957	5954428.934	6667.923134	8824360.51
0.000043	2665046.995	6095570.647	6830.903081	9033953.244
0.000044	2727134.354	6236667.794	6994.182966	9243509.766
0.000045	2789229.181	6377719.337	7157.769957	9453029.206
0.000046	2851331.621	6518724.239	7321.671233	9662510.694

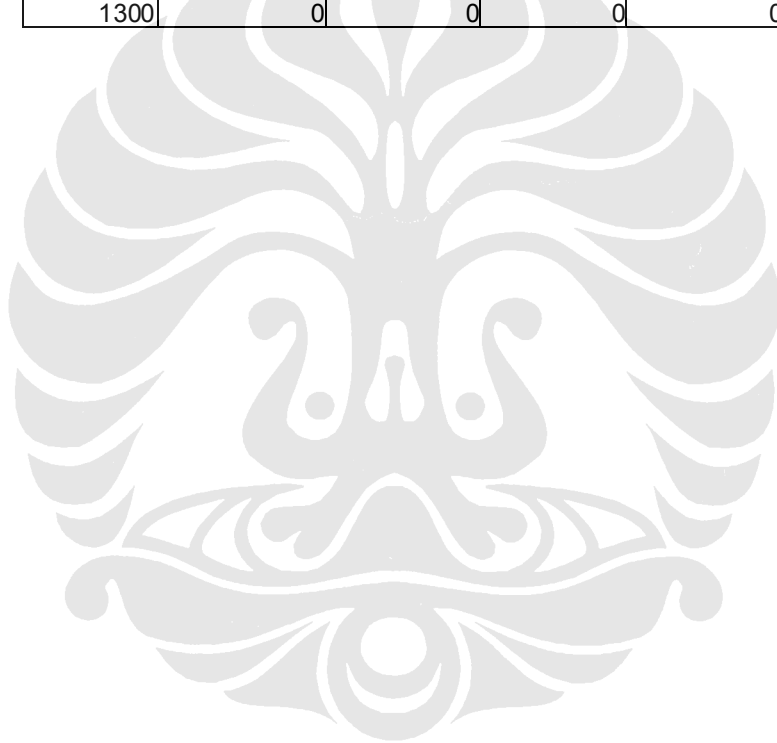
0.0000047	2913441.984	6659681.388	7485.894497	9871953.465
0.0000048	2975560.42	6800589.743	7650.446985	10081356.65
0.0000049	3037686.902	6941448.342	7815.335407	10290719.27
0.000005	3099821.743	7082256.069	7980.567536	10500040.55
0.0000051	3161965.088	7223011.884	8146.150645	10709319.63
0.0000052	3224117.075	7363714.746	8312.092017	10918555.62
0.0000053	3286277.843	7504363.617	8478.398951	11127747.64
0.0000054	3348447.528	7644957.457	8645.078757	11336894.82
0.0000055	3410626.457	7785495.138	8812.139362	11545996.38
0.0000056	3422219.786	7860656.229	8822.926791	11633920.92
0.0000057	3392473.152	7881198.204	8705.323292	11621623.99
0.0000058	3363507.729	7901212.931	8589.581652	11609661.01
0.0000059	3335289.866	7920722.972	8475.651807	11598017.48
0.000006	3307788.45	7939749.433	8363.48759	11586680.22
0.0000061	3280973.913	7958312.265	8253.04397	11575636.61
0.0000062	3254818.288	7976430.301	8144.277531	11564874.7
0.0000063	3229295.352	7994121.282	8037.147168	11554383.32
0.0000064	3204380.19	8011402.003	7931.613006	11544151.82
0.0000065	3180049.303	8028288.336	7827.636932	11534170.21
0.0000066	3156280.389	8044795.321	7725.182125	11524428.93
0.0000067	3133052.408	8060937.185	7624.213456	11514919.05
0.0000068	3110345.244	8076727.458	7524.696588	11505631.92
0.0000069	3088139.944	8092178.949	7426.598878	11496559.49
0.000007	3066418.644	8107303.793	7329.88931	11487694.19
0.0000071	3045163.908	8122113.627	7234.536516	11479028.46
0.0000072	3045163.908	8122113.627	7234.536516	11479028.46
0.0000073	3024359.712	8136619.391	7140.512035	11470555.59
0.0000074	2984041.05	8164760.243	6956.333865	11454161.73
0.0000075	2964497.88	8178414.778	6866.126907	11446228.57
0.0000076	2945347.231	8191804.32	6777.139949	11438463.41
0.0000077	2926576.333	8204937.513	6689.348449	11430860.83
0.0000078	2908173.059	8217822.595	6602.728877	11423415.69
0.0000079	2890125.503	8230467.51	6517.257438	11416122.82
0.000008	2872422.621	8242879.776	6432.912182	11408977.57
0.0000081	2855053.609	8255066.64	6349.671071	11401975.28
0.0000082	2838008.337	8267034.99	6267.513434	11395111.67
0.0000083	2821276.916	8278791.464	6186.418623	11388382.49
0.0000084	2804850.031	8290342.387	6106.367132	11381783.79
0.0000085	2788718.596	8301693.858	6027.339531	11375311.65
0.0000086	2772873.986	8312851.705	5949.317255	11368962.41
0.0000087	2757307.979	8323821.509	5872.282449	11362732.57
0.0000088	2742012.492	8334608.672	5796.21718	11356618.63
0.0000089	2726979.915	8345218.347	5721.104501	11350617.36
0.000009	2712202.938	8355655.484	5646.927965	11344725.64
0.0000091	2697674.485	8365924.854	5573.671424	11338940.46
0.0000092	2683387.743	8376031.047	5501.319152	11333258.88
0.0000093	2669336.281	8385978.452	5429.856246	11327678.22
0.0000094	2655513.588	8395771.366	5359.267193	11322195.58
0.0000095	2641913.877	8405413.817	5289.538418	11316808.62
0.0000096	2628531.03	8414909.81	5220.654994	11311514.6

0.0000097	2615359.595	8424263.103	5152.603786	11306311.26
0.0000098	2602394.123	8433477.362	5085.371389	11301196.27
0.0000099	2589629.377	8442556.121	5018.944806	11296167.38
0.00001	2577060.354	8451502.777	4953.311518	11291222.48
0.0000107	2494166.453	8510693.524	4515.085598	11258791.71
0.000011	2461136.858	8534375.688	4338.027769	11245964.26

Lendutan Sepanjang Balok

L (mm)	Momen (Nmm)	Kurvatur	Rotasi (rad)	Lendutan (mm)
0	0	0	0	0
25	437500	0.000000208	2.6E-06	0.0000325
50	875000	0.000000416	1.04E-05	0.000195
75	1312500	0.000000625	2.34E-05	0.000617656
100	1750000	0.000000833	4.16E-05	0.001430313
125	2187500	0.000001042	6.5E-05	0.0027625
150	2625000	0.000001250	9.36E-05	0.004744688
175	3062500	0.000001458	0.000127	0.007508125
200	3500000	0.000001667	0.000167	0.011184063
225	3937500	0.000001875	0.000211	0.015902188
250	4375000	0.000002083	0.00026	0.021790625
275	4812500	0.000002292	0.000315	0.028979063
300	5250000	0.000002500	0.000375	0.03759875
325	5687500	0.000002708	0.00044	0.047780938
350	6125000	0.000002917	0.00051	0.059655313
375	6562500	0.000003125	0.000585	0.073346875
400	7000000	0.000003333	0.000666	0.088982188
425	7437500	0.000003542	0.000751	0.106695625
450	7875000	0.000003750	0.000843	0.126621563
475	8312500	0.000003958	0.000939	0.14889125
500	8750000	0.000004167	0.00104	0.173634375
525	9187500	0.000004375	0.001147	0.200979063
550	9625000	0.000004583	0.001259	0.231055
575	10062500	0.000004792	0.001376	0.263993438
600	10500000	0.000005000	0.001498	0.299925625
625	10937500	0.000005208	0.001626	0.338982813
645	11287500	0.000005375	0.001732	0.372562813
650	11375000	0.00000542	0.001759	0.38128975
655	11287500	0.00000537	0.001732	0.3725628
675	10937500	0.00000521	0.001626	0.3389828
700	10500000	0.00000500	0.001498	0.2999256
725	10062500	0.00000479	0.001376	0.2639934
750	9625000	0.00000458	0.001259	0.2310550
775	9187500	0.00000437	0.001147	0.2009791
800	8750000	0.00000416	0.00104	0.1736344
825	8312500	0.00000396	0.000939	0.1488913
850	7875000	0.00000375	0.000843	0.1266216
875	7437500	0.00000354	0.000751	0.1066956
900	7000000	0.00000333	0.000666	0.0889822

925	6562500	0.0000031	0.000585	0.0733469
950	6125000	0.00000291	0.00051	0.0596553
975	5687500	0.00000271	0.00044	0.0477809
1000	5250000	0.0000025	0.000375	0.0375988
1025	4812500	0.00000229	0.000315	0.0289791
1050	4375000	0.00000208	0.00026	0.0217906
1075	3937500	0.00000187	0.000211	0.0159022
1100	3500000	0.00000167	0.000167	0.0111841
1125	3062500	0.00000146	0.0001275	0.0075081
1150	2625000	0.00000125	0.0000936	0.0047447
1175	2187500	0.00000104	6.498E-05	0.0027625
1200	1750000	0.00000083	0.0000416	0.0014303
1225	1312500	0.000000625	2.341E-05	0.0006177
1250	875000	0.000000416	0.0000104	0.0001950
1275	437500	0.000000208	0.0000026	0.0000325
1300	0	0	0	0



Lampiran 7 Bahasa Numerik

Regangan beton

```
function [strain]= fungsi (c0,b0)
[strain]=(c0)*(b0);
end
```

Regangan baja tarik

```
function [strain]= baja (c0,b0)
d=269;
[strain]=c0*(d-(b0));
end
```

Regangan baja tekan

```
function [strain]= baja (c0,b0)
d1=27;
[strain]=c0*(b0-d1);
end
```

Tegangan beton

```
function [fc]=beton (c0,b0)
%E= modulus elastisitas (Mpa)
E=20000;
e0=0.002;
ec=strainC(c0,b0);
[fc]=(E*ec)./(1+((ec).^2)/e0^2));
end
```

Tegangan baja tarik

```
function [fst]= baja (c0,b0)
%eyt=regangan leleh baja
%Et=modulus elastisitas
%Esht=modulus strain hardening baja
et=est(c0,b0);
Et=210000;
Esht=420;
eyt=0.0011487;
eut=0.29;
if et>=0 & et<=eyt
fst=(Et*et);
elseif et>=eyt & et<=eut
fst=((Et-Esht)*eyt)+(Esht*et));
elseif et>eut
fst=0;
end
end
```

Tegangan baja tekan

```
function [fsc]=baja (c0,b0)
%eyc = regangan leleh baja
%Et=modulus elastisitas
```

```

%Esht=modulus strain hardening baja
ec=esc(c0,b0);
Ec=210000;
Eshc=420;
eyc=0.0011487;
euc=0.29;

if ec>=0 & ec<=eyc
    fsc=Ec*ec;
elseif ec>=eyc & ec<=euc
    fsc=((Ec-Eshc)*eyc)+((ec).*Eshc);
elseif ec>euc
    fsc=0;
end

```

Gaya tekan beton

```

function [luasan]=trapzdl(a,b,n,c0)
%n= pembagian segmen
h=(b-a)/n;
x=a+h;
jum=0;
L=200;
for j=1 : n-1
    jum=jum + tekanC(c0,x);
    x=x+h;
end
luasan=(h.*((tekanC(c0,a))+(2*jum)+tekanC(c0,(b)))/2)*L;
end

```

Gaya tarik tulangan

```

function [nst]=baja (asT,c0,b0)
%asT=luas tulangan tarik
ft=tarikB (c0,b0);

nst=asT*ft;

end

```

Gaya tekan tulangan

```

function [nsc]=baja (asC,c0,b0)
%asC=luas tulangan tekan
fC = tekanB (c0,b0);

nsc=fC*asC;

end

```

Momen beton

```

function [mc]=beton (c0,b0)

```

```

%E= modulus elastisitas (Mpa)
E=40000;
e0=0.002;
ec=strainC(c0,b0);
[mc]=(b0)*((E*ec)./(1+((ec).^2)/e0^2));
end

function [luasanm]=trapzd2(a,b,n,c0)
%n= pembagian segmen
h=(b-a)/n;
x=a+h;
jum=0;
L=200;
for j=1 : n-1
    jum=jum + Mc(c0,x);
    x=x+h;
end
luasanm=(h*(Mc(c0,a)+(2*jum)+ Mc(c0,b))/2)*L;
end

```

Momen tulangan tarik

```

function [Mst]=baja(asT,c0,b0)
%d=jarak tulangan tarik ke serat atas
d=269;
Mst=(FtarikB(asT,c0,b0))*(d-(b0));
end

```

Momen tulangan tekan

```

function [Msc]=baja(asC,c0,b0)
%d1=jarak tulangan tekan ke serat atas
d1=27;
Msc=(FtekanB(asC,c0,b0))*(b0-d1);
end

```

Keseimbangan gaya dan momen total

```

function [gaya]=total(a,b,n,c0)
%asT = luas tulangan tarik yang digunakan
%asC = luas tulangan tekan yang digunakan
asT=157.08;
asC=6.2831;
k=FtarikB(asT,c0,b);
l=FtekanB(asC,c0,b);
m=trapzd1(a,b,n,c0);
o=trapzd2(a,b,n,c0);
p=MtarikB(asT,c0,b);
q=MtekanB(asC,c0,b);
s=(0.1)*o;
Momen = o + p + q + s
gaya=l-k+m-(0.1*m);
end

```

Mencari akar persamaan

```

function [akar] = bisection (c0)
a = 0;
n = 1000;
xl=31;
xu=269;
es=0.00001;
maxit = 1000;

%bisection
iter = 0;
xr = xl;
while (1)
    xrold = xr;
    xr = (xl + xu)/2;
    iter = iter + 1;
    if xr~=0,ea = abs ((xr - xrold)/xr)* 1000; end
    fl=sigmaF (a, xl, n, c0);
    fr=sigmaF (a, xr, n, c0);
    test = (fl).* (fr);
    if test < 0
        xu = xr;
    elseif test > 0
        xl = xr;
    else ea = 0;
    end
    if ea <= es
        iter >= maxit; break, end
end
sigmagaya = sigmaF(a, xr, n, c0);
akar = xr;
end

```