

LAMPIRAN

Lampiran 1. Hasil Uji Material Dasar

BERAT JENIS PLASTIK *POLYPROPYLENE*

Sample : Cacahan Plastik *Polypropylene* yang dilelehkan
Size : 3 – 25 mm
Source : Lapak
Date Tested : 3 Maret 2008

Massa <i>Polypropylene</i>	35	Gram
Massa Wadah	155	Gram
Massa Wadah + air yang tumpah	194	Gram
Massa air yang tumpah	39	Gram
Berat Jenis Air	1	gr/cm ³
Volume Air yang tumpah	39	cm ³
Berat Jenis <i>Polypropylene</i>	0.897	gr/cm ³



**TEST OF SPECIFIC GRAVITY AND ABSORPTION OF
FINE AGGREGATE (ASTM C 128 – 04a)**

Sample : Pasir Alam
 Source : Pesing
 Date tested : 3 Maret 2008

	I	II
A) Weight of Oven-Dry Specimen in Air (gram)	477	484
B) Weight of Pycnometer Filled with Water (gram)	668	670
C) Weight of Pycnometer with Specimen and Water to Calibration Mark (gram)	970	975
Bulk Specific Gravity $= \frac{A}{B + 500 - C}$ (kg/liter)	2,409	2,482
Average of Above (kg/liter)	2,446	
Bulk Specific Gravity $= \frac{500}{B + 500 - C}$ (kg/liter) (Saturated-Surface-Dry Basis)	2,525	2,564
Average of Above (kg/liter)	2,545	
Apparent Specific Gravity $= \frac{A}{B + A - C}$ (kg/liter)	2,726	2,704
Average of Above (kg/liter)	2,715	
Absorption (%) $= \frac{500 - A}{A} \times 100\%$	4,822	3,306
Average of Above (%)	4,064	

JAKARTA, 3 Maret 2008
 KEPALA LABORATORIUM

(Dr. Ir. Elly Tjahjono, DEA)



TEST FOR UNIT WEIGHT AND VOIDS IN AGGREGATE

(ASTM C 29)

Sample : Pasir Alam
 Source : Pesing
 Date tested : 18 Juni 2008

		Shovelling	Rodding
a) Weight of Measure	(kg)	1,055	
b) Weight of Measure + Water	(kg)	3,055	
c) Weight of Measure and Sample	(kg)	3,892	4,148
d) Weight of Sample	(kg)	2,837	3,093
e) Volume of Measure	(liter)	2	
B) Unit weight of aggregate	(kg/liter)	1,419	1,547
A) Bulk Spesific Gravity of Aggregate	(kg/liter)	2,545	
W) Unit Weight of Water	(kg/liter)	0,998	
Void	(%)	44,132	39,09
$d = c - a$ $e = b - a$ $B = \frac{d}{e}$			
$\text{Void (\%)} = \frac{(A \times W) - B}{(A \times W)} \times 100\%$			

JAKARTA, 18 Juni 2008
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(Dr. Ir. Elly Tjahjono, DEA)



SIEVE ANALYSIS OF FINE AGGREGATE

(ASTM C 136 – 05)

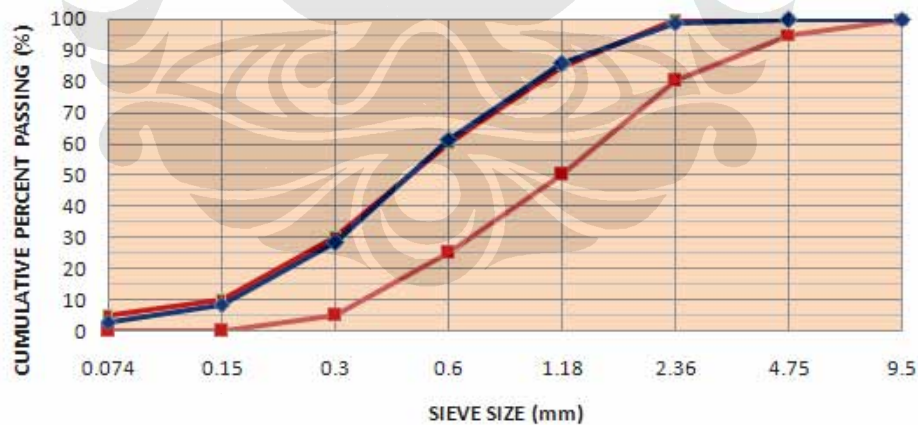
Sample : Pasir Alam

Source : Pesing

Date tested : 3 Maret 2008

SIEVE SIZE (mm)	SAMPLE No. 1			SAMPLE No. 2			AVERAGE	
	WEIGHT RET (kg)	IND % RET	CUM % RET	WEIGHT RET (kg)	IND % RET	CUM % RET	IND % RET	CUM % RET
4.75	0.002	0.397	0.397	0.002	0.407	0.407	0.402	0.402
2.36	0.004	0.794	1.190	0.005	1.018	1.426	0.906	1.308
1.18	0.065	12.897	14.087	0.065	13.238	14.664	13.068	14.376
0.6	0.119	23.611	37.698	0.121	24.644	39.308	24.127	38.503
0.3	0.167	33.135	70.833	0.165	33.605	72.912	33.370	71.873
0.15	0.105	20.833	91.667	0.092	18.737	91.650	19.785	91.658
0.074	0.028	5.556	97.222	0.027	5.499	97.149	5.527	97.185
PAN	0.014	2.778	100	0.014	2.851	100	2.815	100
TOTAL	0.504	100		0.491	100		100	
F.M.		2.155		2.200			2.177	

STANDARD GRADATION



JAKARTA, 3 Maret 2008

KEPALA LABORATORIUM

(Dr. Ir. Elly Tjahjono, DEA)



**TEST FOR MATERIALS FINER THAN NO. 200 SIEVE IN MINERAL
AGGREGATE BY WASHING (ASTM C 117 – 04)**

Sample : Pasir Alam
Source : Pesing
Date tested : 19 Juni 2008

	I
B) Original dry weight of sample (gr)	500
C) Dry weight of sample, after washing (gr)	476
A) Percentage of material finer than a No. 200 sieve, by washing (%)	4,8
$A = \frac{B - C}{B} \times 100\%$	

JAKARTA, 19 Juni 2008
KEPALA LABORATORIUM

(Dr. Ir. Elly Tjahjono, DEA)



TEST FOR ORGANIC IMPURITIES IN FINE AGGREGATE

(ASTM C 40-04)

Sample : Pasir Alam

Source : Pesing

Date tested : 19 Juni 2008

Nearest Colour of the liquid of the test sample	Organic plate Number
Lighter / Equal / Darker Colour to	1
	②
	3 (Standard)
	4
	5

Determination of Colour Value :

Lighter / Equal / Darker Colour to that the reference standard (No.3)

JAKARTA, 19 Juni 2008
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(Dr. Ir. Elly Tjahjono, DEA)



**TEST OF SPECIFIC GRAVITY AND ABSORPTION OF
COARSE AGGREGATE (ASTM C 127 – 04)**

Sample : agregat kasar (Batu Pecah)
Size : maksimum 20 mm
Source : Pesing
Date Tested : 3 Maret 2008

A) Weight of Oven-Dry Specimen in Air	(gram)	4838	4828
B) Weight SSD Specimen in Air	(gram)	5000	5000
C) Weight of Saturated Specimen in Water	(gram)	3066	3056
Bulk Specific Gravity	$= \frac{A}{B - C}$ (kg/liter)	2,502	2,484
Average of Above	(kg/liter)	2,493	
SSD Specific Gravity	$= \frac{B}{B - C}$ (kg/liter)	2,585	2,572
Average of Above	(kg/liter)	2,579	
Apparent Specific Gravity	$= \frac{A}{A - C}$ (kg/liter)	2,730	2,725
Average of Above	(kg/liter)	2,728	
Absorption (%)	$= \frac{B - A}{A} \times 100\%$	3,348	3,562
Average of Above	(%)	3,455	

JAKARTA, 3 Maret 2008
KEPALA LABORATORIUM

(Dr. Ir. Elly Tjahjono, DEA)



TEST FOR UNIT WEIGHT AND VOIDS IN AGGREGATE

(ASTM C 29)

Sample : agregat kasar (Batu Pecah)
Size : maksimum 20 mm
Source : Pesing
Date Tested : 3 Maret 2008

	Shovelling
a) Weight of Measure (kg)	5,089
b) Weight of Measure + Water (kg)	14,361
c) Weight of Measure and Sample (kg)	18,561
d) Weight of Sample (kg)	13,472
e) Volume of Measure (liter)	9,272
B) Unit weight of aggregate (kg/liter)	1,453
A) Bulk Spesific Gravity of Aggregate (kg/liter)	2,579
W) Unit Weight of Water (kg/liter)	0,998
Void (%)	40,967
$d = c - a$ $e = b - a$ $B = \frac{d}{e}$ $\text{Void (\%)} = \frac{(A \times W) - B}{(A \times W)} \times 100\%$	

JAKARTA, 18 Juni 2008

KEPALA LABORATORIUM

(Dr. Ir. Elly Tjahjono, DEA)



SIEVE ANALYSIS OF COARSE AGGREGATE (ASTM C 136 – 05)

Sample : agregat kasar (Batu Pecah)
 Size : maksimum 20 mm
 Source : Pesing
 Date Tested : 19 Juni 2008

Sieve Size (mm)	Sample No.1			Sample No.2			Average		
	Weight Ret Grams	Ind % Ret	Cum % Ret	Weight Ret Grams	Ind % Ret	Cum % Ret	Ind % Ret	Cum % Ret	Average Passing %
19,0	1143	22,887	22,887	823	16,503	16,503	19,695	19,695	80,305
12,50	2235	44,754	67,641	2295	46,020	62,523	45,387	65,082	34,918
9,5	583	11,674	79,315	655	13,134	75,657	12,404	77,486	22,514
4,75	1006	20,144	99,459	1194	23,942	99,599	22,043	99,529	0,471
PAN	27	0,541	100	20	0,401	100	0,471	100	0
TOTAL		4994			4987				



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(Dr. Ir. Elly Tjahjono, DEA)

Lampiran 2. Analisis Rancang Campur (sesuai dengan Standar U.S. Bureau of Reclamation)

1. Kriteria Desain :

- f_c' = 25MPa
- *Slump* = 12 cm
- MSA = 20 mm
- *Sand* (Agregat Halus)
 - *Specific Gravity* = $2,545 \text{ kg/dm}^3$
 - *Fineness Modulus* = 2,177
- *Coarse Aggregate* (Agregat Kasar)
 - *Specific Gravity* = $2,579 \text{ kg/dm}^3$
- Semen
 - *Specific Gravity* = $3,150 \text{ kg/dm}^3$

2. Menentukan *target strength* (δ_{ts})

$$\delta_{ts} = \frac{\delta_{ds}}{1-t.v} = \frac{250}{1-(0,883)(0,15)} = 288,168 \text{ kg/cm}^2$$

Di mana :

δ_{ts} = *target strength*

δ_{ds} = *standard design strength*

t = konstanta

v = *coefficient of variation*

3. Berdasarkan ukuran agregat maksimum, dapat ditentukan berat satuan air (W) dan presentase pasir terhadap agregat (S/A).

Entrapped Air (A) = 2 %.

S/A = 45 %.

W = 185 kg

Perhitungan S/A dan W dengan Penyesuaian

Penyesuaian	S/A = 45%	W = 185kg
FM = 2.177175	$45 - \left\{ \frac{(2,8 - 2,177175)}{0,1} \right\} (0,5) = 44,2215$	No correction
Slump = 12cm	No correction	$185 + \{(12 - 8)(1,2\%)(185)\} = 193,88$
Crushstone	$44,2215 + 4\% = 48,2215\%$	$193,88 + 12 = 205,88$
S/A	No correction	$205,88 + (48,2215 - 45)(1,5) = 210,71225$

4. Menentukan berat satuan semen (C) dari berat satuan air (W) dan *water-cement ratio* (W/C).

Dengan interpolasi, diperoleh W/C = 0,50229

Maka nilai C dapat ditentukan :

$$C = \frac{W}{0,50229} = \frac{210,71225 \text{ kg}}{0,50229} = 419,5 \text{ kg}$$

5. Menentukan volume total agregat

$$V_{\text{agregat}} = 1 - \left(\frac{C}{SG_C} + \frac{W}{1000} + A \right)$$

$$V_{\text{agregat}} = 1 - \left(\frac{419,5}{3150} + \frac{210,71225}{1000} + \frac{2}{100} \right) = 0,636112 \text{ m}^3$$

6. Menentukan jumlah agregat halus dan agregat kasar

$$S / A = 48,2215\%$$

$$S = (S / A)(V_{\text{agregat}})(SG_S)$$

$$= \left(\frac{48,2215}{100} \right) (0,636112) (2545)$$

$$= 780,660 \text{ kg}$$

$$CA = (100 - S / A)(V_{\text{agregat}})(SG_{CA})$$

$$= \left(\frac{100 - 48,2215}{100} \right) (0,636112) (2579)$$

$$= 849,443 \text{ kg}$$

7. Kesimpulan

Untuk 1m^3 beton dibutuhkan:

- Agregat halus (S) = 780,660 kg
- Agregat kasar (CA) = 849,443 kg
- Semen (C) = 419,5 kg
- Air (W) = 210,712 kg

8. Jumlah benda uji

- Silinder $\phi 15 \times 30$ cm = 54 silinder
- Balok ($15 \times 15 \times 55$ cm³) = 21 silinder

Volume benda uji yang dibutuhkan

- Silinder $\phi 15 \times 30$ cm = $54 \times \frac{1}{4} \times \pi \times 0,15^2 \times 0,3$ = $0,286\text{m}^3$
- Balok ($15 \times 15 \times 55$ cm³) = $21 \times 0,15 \times 0,15 \times 0,55$ = $0,260\text{m}^3$ +
- Total = $0,546\text{m}^3$

9. Jumlah bahan dan material yang diperlukan

Agar campuran tidak kurang atau terlalu pas ketika dimasukkan ke dalam *mold* maka kebutuhan bahan campuran ditambah sebesar 5%

- Agregat halus
S = $105\% \times 780,660 \text{ kg} \times 0,546$ = 447,552 kg.
- Agregat kasar
Ca = $105\% \times 849,443 \text{ kg} \times 0,546$ = 486,948 kg.
- Semen
C = $115\% \times 419,5 \text{ kg} \times 0,546$ = 240,499 kg.
- Air
W = $115\% \times 210,712 \text{ kg} \times 0,546$ = 120,801 kg.



LABORATORIUM STRUKTUR DAN MATERIAL

Departemen Sipil – Fakultas Teknik

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Lampiran 3. Hasil Uji Tarik Belah

**HASIL TEST TARIK SILINDER BETON
CONCRETE SPLITTING TENSILE STRENGTH TEST**

No	TANGGAL		UMUR (HARI)	KODE	Berat (g)	Kadar PP (%)	P _{max} (kg)	Tegangan (kg/cm ²)	f _i (MPa)	f _{avg} (MPa)	Kenaikan (%)
	DICOR	DITEST									
1	5-Mar-08	12-Mar-08	7	TB-7-0-1	12054	0	16000	22.626	2.217	2.102	0
2	5-Mar-08	12-Mar-08	7	TB-7-0-2	11880		15000	21.212	2.079		
3	5-Mar-08	12-Mar-08	7	TB-7-0-3	11991		14500	20.505	2.009		
4	12-Mar-08	19-Mar-08	7	TB-7-0,1-1	11971	0.1	16750	23.687	2.321	2.160	2.747
5	12-Mar-08	19-Mar-08	7	TB-7-0,1-2	11956		12500	17.677	1.732		
6	12-Mar-08	19-Mar-08	7	TB-7-0,1-3	12003		17500	24.747	2.425		
7	3-Apr-08	10-Apr-08	7	TB-7-0,2-1	11935	0.2	15500	21.919	2.148	2.183	3.846
8	3-Apr-08	10-Apr-08	7	TB-7-0,2-2	11916		15750	22.273	2.183		
9	3-Apr-08	10-Apr-08	7	TB-7-0,2-3	12067		16000	22.626	2.217		
10	3-Apr-08	10-Apr-08	7	TB-7-0,3-1	12095	0.3	15500	21.919	2.148	2.333	10.989
11	3-Apr-08	10-Apr-08	7	TB-7-0,3-2	11938		18750	26.515	2.598		
12	3-Apr-08	10-Apr-08	7	TB-7-0,3-3	12031		16250	22.980	2.252		

13	16-Apr-08	23-Apr-08	7	TB-7-0,5-1	11964	0.5	14000	19.798	1.940	2.056	-2.198
14	16-Apr-08	23-Apr-08	7	TB-7-0,5-2	11954		9750	13.788	1.351		
15	16-Apr-08	23-Apr-08	7	TB-7-0,5-3	12151		20750	29.343	2.876		
16	22-Apr-08	29-Apr-08	7	TB-7-0,7-1	11843	0.7	15000	21.212	2.079	2.194	4.396
17	23-Apr-08	30-Apr-08	7	TB-7-0,7-2	12007		17000	24.040	2.356		
18	23-Apr-08	30-Apr-08	7	TB-7-0,7-3	11966		15500	21.919	2.148		
19	21-Apr-08	28-Apr-08	7	TB-7-1-1	11982	1	15750	22.273	2.183	2.206	4.945
20	21-Apr-08	28-Apr-08	7	TB-7-1-2	11969		16250	22.980	2.252		
21	21-Apr-08	28-Apr-08	7	TB-7-1-3	11775		15750	22.273	2.183		
22	15-May-08	22-May-08	7	TB-7-2-1	11719	2	10250	14.495	1.421	2.160	2.747
23	15-May-08	22-May-08	7	TB-7-2-2	11991		18000	25.455	2.495		
24	15-May-08	22-May-08	7	TB-7-2-3	11964		18500	26.162	2.564		
25	22-May-08	29-May-08	7	TB-7-3-1	11813	3	15500	21.919	2.148	2.113	0.549
26	22-May-08	29-May-08	7	TB-7-3-2	11845		15000	21.212	2.079		
27	22-May-08	29-May-08	7	TB-7-3-3	11621		15250	21.566	2.113		

Benda Uji : Silinder

Diameter : 15 cm

Tinggi : 30 cm



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HASIL TEST TARIK SILINDER BETON
CONCRETE SPLITTING TENSILE STRENGTH TEST

No	TANGGAL		UMUR (HARI)	KODE	Berat (g)	Kadar PP (%)	P _{max} (kg)	Tegangan (kg/cm ²)	f _t (Mpa)	f _{ravg} (Mpa)	Kenaikan (%)
	DICOR	DITEST									
1	10-Mar-08	7-Apr-08	28	TB-28-0-1	12205	0	24250	34.293	3.361	3.014	0.000
2	10-Mar-08	7-Apr-08	28	TB-28-0-2	12056		19000	26.869	2.633		
3	10-Mar-08	7-Apr-08	28	TB-28-0-3	12092		22000	31.111	3.049		
4	12-Mar-08	9-Apr-08	28	TB-28-0,1-1	12076	0.1	14750	20.859	2.044	2.264	-24.904
5	12-Mar-08	9-Apr-08	28	TB-28-0,1-2	12113		19750	27.929	2.737		
6	12-Mar-08	9-Apr-08	28	TB-28-0,1-3	12041		14500	20.505	2.009		
7	26-Mar-08	23-Apr-08	28	TB-28-0,2-1	12115	0.2	24500	34.646	3.395	3.187	5.747
8	26-Mar-08	23-Apr-08	28	TB-28-0,2-2	12086		24500	34.646	3.395		
9	26-Mar-08	23-Apr-08	28	TB-28-0,2-3	11999		20000	28.283	2.772		
10	27-Mar-08	24-Apr-08	28	TB-28-0,3-1	12102	0.3	19250	27.222	2.668	2.622	-13.027
11	27-Mar-08	24-Apr-08	28	TB-28-0,3-2	12069		20000	28.283	2.772		
12	27-Mar-08	24-Apr-08	28	TB-28-0,3-3	12127		17500	24.747	2.425		

13	16-Apr-08	14-May-08	28	TB-28-0,5-1	12168	0.5	22000	31.111	3.049	2.564	-14.943
14	16-Apr-08	14-May-08	28	TB-28-0,5-2	12138		18000	25.455	2.495		
15	16-Apr-08	14-May-08	28	TB-28-0,5-3	12116		15500	21.919	2.148		
16	24-Apr-08	22-May-08	28	TB-28-0,7-1	12041	0.7	17000	24.040	2.356	2.287	-24.138
17	24-Apr-08	22-May-08	28	TB-28-0,7-2	11999		15500	21.919	2.148		
18	24-Apr-08	22-May-08	28	TB-28-0,7-3	12138		17000	24.040	2.356		
19	21-Apr-08	19-May-08	28	TB-28-1-1	11881	1	17500	24.747	2.425	2.622	-13.027
20	21-Apr-08	19-May-08	28	TB-28-1-2	11934		19500	27.576	2.702		
21	21-Apr-08	19-May-08	28	TB-28-1-3	11826		19750	27.929	2.737		
22	15-May-08	12-Jun-08	28	TB-28-2-1	12057	2	17500	24.747	2.425	2.679	-11.111
23	15-May-08	12-Jun-08	28	TB-28-2-2	12007		20500	28.990	2.841		
24	15-May-08	12-Jun-08	28	TB-28-2-3	11823		20000	28.283	2.772		
25	22-May-08	19-Jun-08	28	TB-28-3-1	12028	3	17500	24.747	2.425	2.587	-14.176
26	22-May-08	19-Jun-08	28	TB-28-3-2	11894		20000	28.283	2.772		
27	22-May-08	19-Jun-08	28	TB-28-3-3	11760		18500	26.162	2.564		

Benda Uji : Silinder

Diameter : 15 cm

Tinggi : 30 cm



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Lampiran 4. Hasil Uji Lentur

HASIL TEST LENTUR BALOK BETON CONCRETE FLEXURAL STRENGTH TEST

No	TANGGAL		UMUR (HARI)	KODE	Beban (P) (kg)	W $1/6.b.h^2$ (CM ³)	Momen Lentur $M=1/6.P.L$ (kg.cm)	Tegangan Lentur (M/W) (kg/cm ²)	Tegangan Lentur (MPa)
	DICOR	DITEST							
1	12-Mar-08	9-Apr-08	28	TL-28-0-1	3109.072	562.5	23318.043	41.454	4.063
2	12-Mar-08	9-Apr-08	28	TL-28-0-2	3363.914	562.5	25229.358	44.852	4.396
3	12-Mar-08	9-Apr-08	28	TL-28-0-3	3363.914	562.5	25229.358	44.852	4.396
4	26-Mar-08	23-Apr-08	28	TL-28-0,1-1	3058.104	562.5	22935.780	40.775	3.996
5	26-Mar-08	23-Apr-08	28	TL-28-0,1-2	3414.883	562.5	25611.621	45.532	4.462
6	26-Mar-08	23-Apr-08	28	TL-28-0,1-3	3109.072	562.5	23318.043	41.454	4.063
7	9-Apr-08	7-May-08	28	TL-28-0,2-1	3261.978	562.5	24464.832	43.493	4.262
8	9-Apr-08	7-May-08	28	TL-28-0,2-2	3211.009	562.5	24082.569	42.813	4.196
9	9-Apr-08	7-May-08	28	TL-28-0,2-3	3261.978	562.5	24464.832	43.493	4.262

10	23-Apr-08	21-May-08	28	TL-28-0,3-1	3414.883	562.5	25611.621	45.532	4.462
11	23-Mar-08	20-Apr-08	28	TL-28-0,3-2	2905.199	562.5	21788.991	38.736	3.796
12	23-Apr-08	21-May-08	28	TL-28-0,3-3	3211.009	562.5	24082.569	42.813	4.196
13	29-Apr-08	27-May-08	28	TL-28-0,5-1	3363.914	562.5	25229.358	44.852	4.396
14	29-Apr-08	27-May-08	28	TL-28-0,5-2	3873.598	562.5	29051.988	51.648	5.062
15	29-Apr-08	27-May-08	28	TL-28-0,5-3	3363.914	562.5	25229.358	44.852	4.396
16	28-Apr-08	26-May-08	28	TL-28-0,7-1	4383.282	562.5	32874.618	58.444	5.727
17	28-Apr-08	26-May-08	28	TL-28-0,7-2	3822.63	562.5	28669.725	50.968	4.995
18	28-Apr-08	26-May-08	28	TL-28-0,7-3	3312.946	562.5	24847.095	44.173	4.329
19	28-Apr-08	26-May-08	28	TL-28-1-1	3771.662	562.5	28287.462	50.289	4.928
20	28-Apr-08	26-May-08	28	TL-28-1-2	3720.693	562.5	27905.199	49.609	4.862
21	28-Apr-08	26-May-08	28	TL-28-1-3	3618.756	562.5	27140.673	48.250	4.729

Bentuk dan Luas Penampang : Balok Beton 15x15x55 cm³

Bentang (L) : 45 cm

Dimensi **b** : 15 cm

h : 15 cm

Lampiran 5. Hasil Uji Modulus Elastisitas dan Rasio Poisson

1. Deskripsi Uji

- a. Sampel : T-28-0,7-3
- b. Beban Max : 50000kg
- c. 40% Beban Max : 20000kg

2. Pembacaan Dial

a. Vertikal

P (kg)	Siklus 1		Siklus 2		Siklus 3	
	Naik	Turun	Naik	Turun	Naik	Turun
	(0,01 mm)	(0,01 mm)	(0,01 mm)	(0,01 mm)	(0,01 mm)	(0,01 mm)
0	0	1.5	1.5	2	2	2
2500	1	6	3	5	2.5	6
5000	2.5	10	4	10	4	10
7500	4	14	5.5	13	6	14
10000	6	15.5	8	15	8	17
12500	8	15.5	9	17	10	17
15000	10	16	12	17.5	12	17.5
17500	12	16	14	17.5	14	17.5
20000	16	16	17.5	17.5	17.5	17.5

b. Horisontal

P (kg)	Siklus 1		Siklus 2		Siklus 3	
	Naik	Turun	Naik	Turun	Naik	Turun
	(0,01 mm)	(0,01 mm)	(0,01 mm)	(0,01 mm)	(0,01 mm)	(0,01 mm)
0	0	1	1	1	1	1
2500	0.5	1.5	1	1	1	1.5
5000	0.5	2.5	1	1	1	2.5
7500	1	3.5	1.5	1.5	1.5	3.5
10000	1.5	4	2	2	2	4
12500	2	4	2.5	2.5	2.5	4.5
15000	2.5	4	3	3	3	4.5
17500	3	4	3.5	3.5	3.5	4.5
20000	4	4	4.5	4.5	4.5	4.5

3. Pengukuran Nilai Regangan

a. Vertikal

$$L = 200 \text{ mm}$$

$$\text{Koreksi} = 285 \text{ mm} \quad 140 \text{ mm(As)}$$

Tegangan (kg/cm ²)	Siklus 1		Siklus 2		Siklus 3	
	Naik	Turun	Naik	Turun	Naik	Turun
0	0	3.684E-05	3.684E-05	4.912E-05	4.912E-05	4.912E-05
14.141414	2.456E-05	0.0001474	7.368E-05	0.0001228	6.14E-05	0.0001474
28.282828	6.14E-05	0.0002456	9.825E-05	0.0002456	9.825E-05	0.0002456
42.424242	9.825E-05	0.0003439	0.0001351	0.0003193	0.0001474	0.0003439
56.565657	0.0001474	0.0003807	0.0001965	0.0003684	0.0001965	0.0004175
70.707071	0.0001965	0.0003807	0.0002211	0.0004175	0.0002456	0.0004175
84.848485	0.0002456	0.000393	0.0002947	0.0004298	0.0002947	0.0004298
98.989899	0.0002947	0.000393	0.0003439	0.0004298	0.0003439	0.0004298
113.13131	0.000393	0.000393	0.0004298	0.0004298	0.0004298	0.0004298

b. Horisontal

$$d = 150 \text{ mm}$$

$$\text{Koreksi} = 280 \text{ mm} \quad 95 \text{ mm(As)}$$

Tegangan (kg/cm ²)	Siklus 1		Siklus 2		Siklus 3	
	Naik	Turun	Naik	Turun	Naik	Turun
0	0	2.262E-05	2.262E-05	2.262E-05	2.262E-05	2.262E-05
14.141414	1.131E-05	3.393E-05	2.262E-05	2.262E-05	2.262E-05	3.393E-05
28.282828	1.131E-05	5.655E-05	2.262E-05	2.262E-05	2.262E-05	5.655E-05
42.424242	2.262E-05	7.917E-05	3.393E-05	3.393E-05	3.393E-05	7.917E-05
56.565657	3.393E-05	9.048E-05	4.524E-05	4.524E-05	4.524E-05	9.048E-05
70.707071	4.524E-05	9.048E-05	5.655E-05	5.655E-05	5.655E-05	0.0001018
84.848485	5.655E-05	9.048E-05	6.786E-05	6.786E-05	6.786E-05	0.0001018
98.989899	6.786E-05	9.048E-05	7.917E-05	7.917E-05	7.917E-05	0.0001018
113.13131	9.048E-05	9.048E-05	0.0001018	0.0001018	0.0001018	0.0001018

4. Menghitung Modulus Elastisitas dan Rasio Poisson

Luas Penampang = 176,786 cm²

Lihat Tabel Regangan Vertikal dan Horizontal, dari Interpolasi didapat:

Siklus	P _{max} (kg)	40%P _{max} (kg)	S ₂ (kg/cm ²)	ε ₂	ε ₁	S ₁ (kg/cm ²)	ε ₁₂
1	50000	20000	113.13131	0.000393	0.00005	23.962	9.048E-05
2	50000	20000	113.13131	0.0004298	0.00005	4.9684595	0.0001018
3	50000	20000	113.13131	0.0004298	0.00005	15.3195	0.0001018

Dari Interpolasi didapat

1		2		3	
teg	ε ₁₁	teg	ε ₁₁	teg	ε ₁₁
14.141414	1.131E-05	2.262E-05	0	14.141414	2.262E-05
23.962	1.131E-05	4.968	8.08E-06	15.3195	2.262E-05
28.282828	1.131E-05	14.141414	2.262E-05	28.282828	0.000023

Maka Nilai Modulus Elastisitas dan Rasio Poisson-nya

Siklus	Modulus Elastisitas (MPa)	Rasio Poisson
1	25504.24799	0.230818414
2	27935.9921	0.246707006
3	25262.55499	0.208429561
Rata - rata	26234.26503	0.228651661

Lampiran 6. Dokumentasi

6.1. Alat - Alat



Timbangan



Timbangan Digital



Timbangan Jenuh



Alat Sieve Analysis



Wadah Berat Isi Agregat Halus



Wadah Berat Isi Agregat Kasar



Piknometer



Labu Erlenmeyer



Alat Slump



Bak Curing



Mixer



Alat Pencacah Plastik



Mold Silinder



Mold Balok



Kompor



Oven



Metal Sand Cone Mold



Alat Penunjang Lain



Alat Uji Tarik Belah dan Elastisitas



Alat Uji Lentur

6.2. Prosedural

Proses Pencacahan Limbah Gelas Plastik



Mencari Berat Jenis Plastik *Polypropylene*



Pengujian Berat Isi

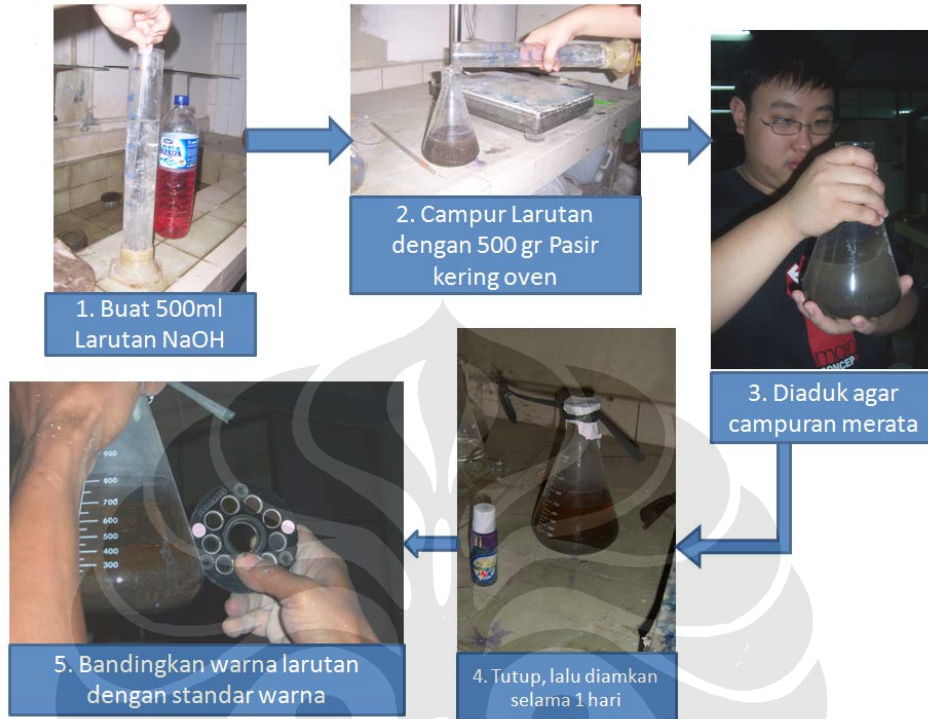
a. Kasar

			
1. Masukkan Batu yang sudah dioven selama 1 hari	2. Cara pemadatan, Batu dimasukkan dalam 3 lapisan, dimana setiap lapisan dilakukan pemadatan sebanyak 25 kali	3. Wadah Diratakan	4. Timbang Berat Batu

b. Halus

			
1. Pasir Dioven selama 1 hari	2a. Cara Langsung, Pasir langsung diisi dengan sekop sampai wadah penuh 2b. Cara pemadatan, Pasir dimasukkan dalam 3 lapisan, dimana setiap lapisan dilakukan pemadatan sebanyak 25 kali	3. Wadah Diratakan	4. Timbang Berat Pasir

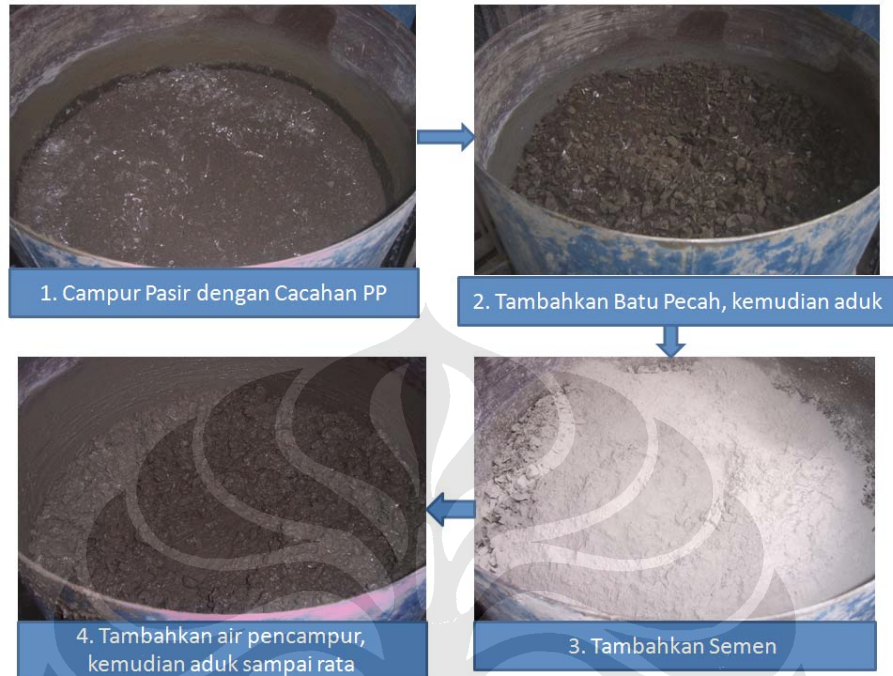
Uji Kandungan Organik



Uji Sieve Analysis



Proses Pencampuran Material Beton



Uji *Slump* Beton Segar



Proses Pencetakan sampai *Curing*



1. Siapkan *mold* yang sudah diminyaki



2. Ambil Beton dari Mesin Pencampur



4. Beton didiamkan selama 1 hari, kemudian direndam dalam bak *curing*



3. Masukkan beton ke dalam *mold* dalam 3 lapisan, setiap lapisan dilakukan pemadatan 25 kali

Proses *Capping* Beton



1. Lelekan Mortar Belerang



2. Siapkan Alat Pencetak



3. Masukkan Lelehan Belerang ke alat pencetak



6. Hasil Akhir



5. Tambahkan Mortar Belerang, kemudian dinginkan

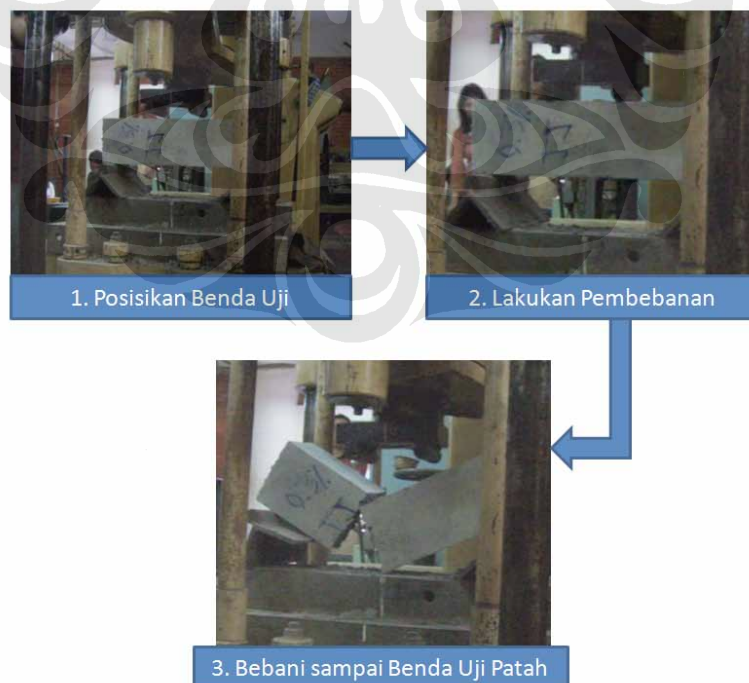


4. Segera Taruh Benda Uji ke cetakan

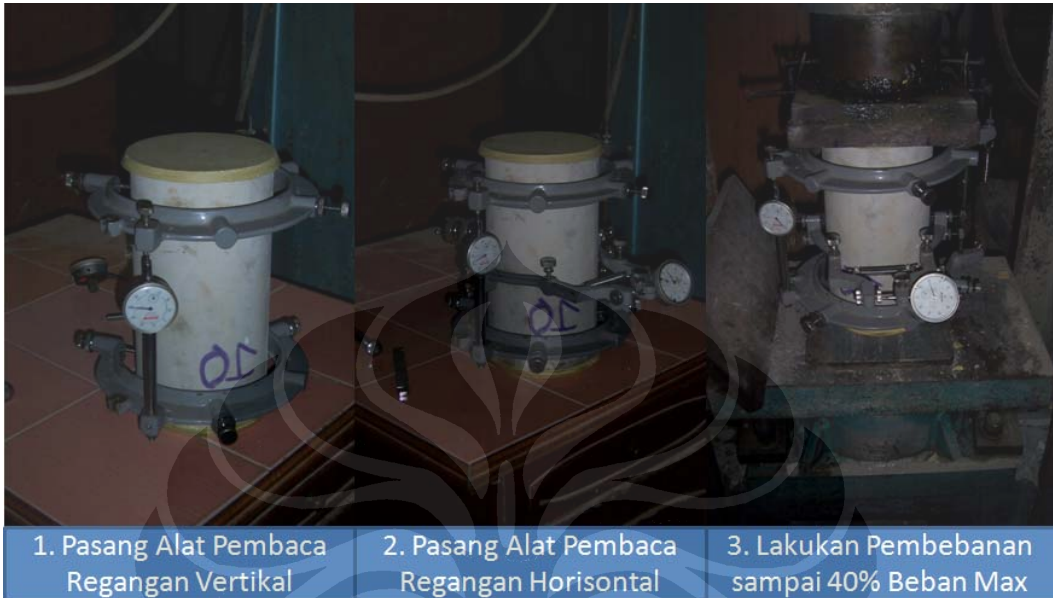
Uji Kuat Tarik Belah



Uji Kuat Tarik Lentur



Uji Modulus Elastisitas dan Rasio Poisson



6.3. Variasi *Slump* untuk tiap Kadar Cacahan *Polypropylene*

