

## LAMPIRAN

### Lampiran 1. Analisis Sifat Mekanis Bahan Perbaikan Beton Dengan Menggunakan *Resin Catalyst* Dan Abu Tebu

#### A. Pengujian *Slump Flow*

1. Perbandingan 1:0,4

d0 : 4 cm

d1 : 17,7 cm

$$\begin{aligned} \text{Slump flow} &= \frac{d1 - d0}{d0} \times 100\% \\ &= \frac{17,7 - 4}{4} \times 100\% \\ &= 342,5 \end{aligned}$$

2. Perbandingan 1:0,53

d0 : 4 cm

d1 : 17,2 cm

$$\begin{aligned} \text{Slump flow} &= \frac{d1 - d0}{d0} \times 100\% \\ &= \frac{17,2 - 4}{4} \times 100\% \\ &= 330 \end{aligned}$$

3. Perbandingan 1:0,67

D0 : 4 cm

D1 : 17 cm

$$\begin{aligned} \text{Slump flow} &= \frac{d1 - d0}{d0} \times 100\% \\ &= \frac{17 - 4}{4} \times 100\% \\ &= 325 \end{aligned}$$

4. Perbandingan 1:0,8

D0 : 4 cm

D1 : 16,2 cm

$$\text{Slump flow} = \frac{d1 - d0}{d0} \times 100\%$$

$$= \frac{16,2 - 4}{4} \times 100\%$$

$$= 305$$

5. Perbandingan 1:1

D0 : 4 cm

D1 : 15,2 cm

$$\text{Slump flow} = \frac{d1 - d0}{d0} \times 100\%$$

$$= \frac{15,2 - 4}{4} \times 100\%$$

$$= 280$$

## B. Berat Satuan

1. Perbandingan 1:0,4

Wb : 147 gram

Vb : 103,07 cm<sup>3</sup>

$$Bs = \frac{Wb}{Vb}$$

$$= \frac{147}{103,07}$$

$$= 1,43 \text{ gram/ cm}^3$$

2. Perbandingan 1:0,53

Wb : 146 gram

Vb : 127,47 cm<sup>3</sup>

$$Bs = \frac{Wb}{Vb}$$

$$= \frac{146}{127,47}$$

$$= 1,15$$

3. Perbandaingan 1:0,67

Wb : 158 gram

Vb : 133,04

$$Bs = \frac{Wb}{Vb}$$

$$= \frac{158}{133,04}$$

$$= 1,19$$

4. Perbandingan 1:0,8

$$W_b : 156 \text{ gram}$$

$$V_b : 126,81$$

$$\begin{aligned} B_s &= \frac{W_b}{V_b} \\ &= \frac{156}{126,81} \\ &= 1,23 \end{aligned}$$

5. Perbandingan 1:1

$$W_b : 155 \text{ gram}$$

$$V_b : 128,38$$

$$\begin{aligned} B_s &= \frac{W_b}{V_b} \\ &= \frac{155}{128,38} \\ &= 1,21 \end{aligned}$$

### C. Penyerapan Air

a. Perbandingan 1:0,4

$$W : 146 \text{ gram}$$

$$W_k : 146 \text{ gram}$$

$$\begin{aligned} K &= \frac{W - W_k}{W_k} \times 100\% \\ &= \frac{146 - 146}{146} \times 100\% \\ &= 0\% \end{aligned}$$

b. Perbandingan 1:53

$$W : 147 \text{ gram}$$

$$W_k : 147 \text{ gram}$$

$$\begin{aligned} K &= \frac{W - W_k}{W_k} \times 100\% \\ &= \frac{147 - 147}{147} \times 100\% \\ &= 0\% \end{aligned}$$

c. Perbandingan 1:0,67

$$W : 141 \text{ gram}$$

$$W_k : 141 \text{ gram}$$

$$\begin{aligned} K &= \frac{W - W_k}{W_k} \times 100\% \\ &= \frac{141 - 141}{141} \times 100\% \\ &= 0\% \end{aligned}$$

d. Perbandingan 1:0,8

$$W : 145 \text{ gram}$$

$$W_k : 145 \text{ gram}$$

$$\begin{aligned} K &= \frac{W - W_k}{W_k} \times 100\% \\ &= \frac{145 - 145}{145} \times 100\% \\ &= 0\% \end{aligned}$$

e. Perbandingan 1:1

$$W : 149 \text{ gram}$$

$$W_k : 149 \text{ gram}$$

$$\begin{aligned} K &= \frac{W - W_k}{W_k} \times 100\% \\ &= \frac{149 - 149}{149} \times 100\% \\ &= 0\% \end{aligned}$$

#### D. *Initial Rate of Suction (IRS)*

1. Perbandingan 1:0,4

$$m_1 : 140 \text{ gram}$$

$$m_2 : 140 \text{ gram}$$

$$A : 25,20 \text{ cm}^2$$

$$\begin{aligned} k &= \frac{193,55}{A} \\ &= \frac{193,55}{25,2} \\ &= 7,68 \end{aligned}$$

$$\begin{aligned} \text{IRS} &= \frac{m_2 - m_1}{k} \\ &= \frac{140 - 140}{7,68} \\ &= 0 \end{aligned}$$

2. Perbandingan 1:0,53

$$m1 : 136 \text{ gram}$$

$$m2 : 136 \text{ gram}$$

$$A : 24,8$$

$$k = \frac{193,55}{A}$$

$$= \frac{193,55}{24,8}$$

$$= 7,80$$

$$\text{IRS} = \frac{m2 - m1}{k}$$

$$= \frac{136 - 136}{7,8}$$

$$= 0$$

3. Perbandingan 1:0,67

$$m1 : 160 \text{ gram}$$

$$m2 : 160 \text{ gram}$$

$$A : 27,04$$

$$k = \frac{193,55}{A}$$

$$= \frac{193,55}{27,04}$$

$$= 7,15$$

$$\text{IRS} = \frac{m2 - m1}{k}$$

$$= \frac{160 - 160}{7,15}$$

$$= 0$$

4. Perbandingan 1:0,8

$$m1 : 142 \text{ gram}$$

$$m2 : 142 \text{ gram}$$

$$A : 26,42$$

$$k = \frac{193,55}{A}$$

$$= \frac{193,55}{26,42}$$

$$= 7,33$$

$$\begin{aligned} \text{IRS} &= \frac{m_2 - m_1}{k} \\ &= \frac{142 - 142}{7,33} \\ &= 0 \end{aligned}$$

5. Perbandingan 1:1

m1 : 147 gram

m2 : 147 gram

A : 26,47

$$\begin{aligned} k &= \frac{193,55}{A} \\ &= \frac{193,55}{26,47} \\ &= 7,31 \end{aligned}$$

$$\begin{aligned} \text{IRS} &= \frac{m_2 - m_1}{k} \\ &= \frac{147 - 147}{7,31} \\ &= 0 \end{aligned}$$

#### E. Kadar Air

1. Perbandingan 1:0,4

Wb : 151 gram

Wk : 151 gram

$$\begin{aligned} \text{Kadar air} &= \frac{W_b - W_k}{W_k} \times 100\% \\ &= \frac{151 - 151}{151} \times 100\% \\ &= 0\% \end{aligned}$$

2. Perbandingan 1:0,53

Wb : 133 gram

Wk : 133 gram

$$\begin{aligned} \text{Kadar air} &= \frac{W_b - W_k}{W_k} \times 100\% \\ &= \frac{133 - 133}{133} \times 100\% \\ &= 0\% \end{aligned}$$

3. Perbandingan 1:0,67

Wb : 158 gram

Wk : 158 gram

$$\begin{aligned} \text{Kadar air} &= \frac{W_b - W_k}{W_k} \times 100\% \\ &= \frac{158 - 158}{158} \times 100\% \\ &= 0\% \end{aligned}$$

4. Perbandingan 1:0,8

Wb : 155 gram

Wk : 155 gram

$$\begin{aligned} \text{Kadar air} &= \frac{W_b - W_k}{W_k} \times 100\% \\ &= \frac{155 - 155}{155} \times 100\% \\ &= 0\% \end{aligned}$$

5. Perbandingan 1:1

Wb : 159 gram

Wk : 159 gram

$$\begin{aligned} \text{Kadar air} &= \frac{W_b - W_k}{W_k} \times 100\% \\ &= \frac{159 - 159}{159} \times 100\% \\ &= 0\% \end{aligned}$$

## F. Porositas

1. Perbandingan 1:0,4

A : 147 gram

B : 147 gram

C : 147 gram

$$\begin{aligned} \text{Porositas} &= \frac{B - C}{B - A} \times 100\% \\ &= \frac{147 - 147}{147 - 147} \times 100\% \\ &= 0 \end{aligned}$$

## 2. Perbandingan 1:0,53

A : 137 gram

B : 137 gram

C : 137 gram

$$\begin{aligned}\text{Porositas} &= \frac{B-C}{B-A} \times 100\% \\ &= \frac{137-137}{137-137} \times 100\% \\ &= 0\end{aligned}$$

## 3. Perbandingan 1:0,67

A : 158 gram

B : 158 gram

C : 158 gram

$$\begin{aligned}\text{Porositas} &= \frac{B-C}{B-A} \times 100\% \\ &= \frac{158-158}{158-158} \times 100\% \\ &= 0\end{aligned}$$

## 4. Perbandingan 1:0,8

A : 169 gram

B : 169 gram

C : 169 gram

$$\begin{aligned}\text{Porositas} &= \frac{B-C}{B-A} \times 100\% \\ &= \frac{169-169}{169-169} \times 100\% \\ &= 0\end{aligned}$$

## 5. Perbandingan 1:1

A : 155 gram

B : 155 gram

C : 155 gram

$$\begin{aligned}\text{Porositas} &= \frac{B-C}{B-A} \times 100\% \\ &= \frac{155-155}{155-155} \times 100\% \\ &= 0\end{aligned}$$



$$= 0$$

## G. Kuat Tekan

### 1. Perbandingan 1:0,4

#### a. Umur 3 hari

##### 1) Benda uji 1

$$P_{\max} : 23160 \text{ kg}$$

$$A : 24,64 \text{ cm}$$

$$\begin{aligned} F_c &= \frac{P_{\max}}{A} \\ &= \frac{23160}{24,64} \\ &= 92,21 \text{ MPa} \end{aligned}$$

##### 2) Benda uji 2

$$P_{\max} : 27120 \text{ kg}$$

$$A : 25,2 \text{ cm}$$

$$\begin{aligned} F_c &= \frac{P_{\max}}{A} \\ &= \frac{27120}{25,2} \\ &= 105,57 \text{ MPa} \end{aligned}$$

##### 3) Benda uji 3

$$P_{\max} : 32220 \text{ kg}$$

$$A : 26,21 \text{ cm}$$

$$\begin{aligned} F_c &= \frac{P_{\max}}{A} \\ &= \frac{32220}{26,21} \\ &= 120,59 \text{ MPa} \end{aligned}$$

## b. Umur 7 hari

## 1) Benda uji 1

$$P_{\max} : 18590 \text{ kg}$$

$$A : 27,67 \text{ cm}$$

$$\begin{aligned} F_c &= \frac{P_{\max}}{A} \\ &= \frac{18590}{27,67} \\ &= 65,91 \text{ MPa} \end{aligned}$$

## 2) Benda uji 2

$$P_{\max} : 17620 \text{ kg}$$

$$A : 24,5 \text{ cm}$$

$$\begin{aligned} F_c &= \frac{P_{\max}}{A} \\ &= \frac{17620}{24,5} \\ &= 70,55 \text{ MPa} \end{aligned}$$

## 3) Benda uji 3

$$P_{\max} : 16960 \text{ kg}$$

$$A : 24,98 \text{ cm}$$

$$\begin{aligned} F_c &= \frac{P_{\max}}{A} \\ &= \frac{16960}{24,98} \\ &= 66,98 \text{ MPa} \end{aligned}$$

## c. Umur 14 hari

## 1) Benda uji 1

$$P_{\max} : 19840 \text{ kg}$$

$$A : 25,3 \text{ cm}$$

$$\begin{aligned} F_c &= \frac{P_{\max}}{A} \\ &= \frac{19840}{25,3} \end{aligned}$$

$$= 76,93 \text{ MPa}$$

2) Benda uji 2

$$P_{\max} : 19290 \text{ kg}$$

$$A : 24,25 \text{ cm}$$

$$\begin{aligned} F_c &= \frac{P_{\max}}{A} \\ &= \frac{19290}{24,25} \\ &= 78,04 \text{ MPa} \end{aligned}$$

3) Benda uji 3

$$P_{\max} : 20170 \text{ kg}$$

$$A : 25,3 \text{ cm}$$

$$\begin{aligned} F_c &= \frac{P_{\max}}{A} \\ &= \frac{20170}{25,3} \\ &= 78,21 \text{ MPa} \end{aligned}$$

d. Umur 28 hari

1) Benda uji 1

$$P_{\max} : 21730 \text{ kg}$$

$$A : 24,5 \text{ cm}$$

$$\begin{aligned} F_c &= \frac{P_{\max}}{A} \\ &= \frac{21730}{24,5} \\ &= 87,01 \text{ MPa} \end{aligned}$$

2) Benda uji 2

$$P_{\max} : 21960 \text{ kg}$$

$$A : 24,2 \text{ cm}$$

$$\begin{aligned} F_c &= \frac{P_{\max}}{A} \\ &= \frac{21960}{24,2} \end{aligned}$$

$$= 89,02 \text{ MPa}$$

3) Benda uji 3

$$P_{\max} : 23730 \text{ kg}$$

$$A : 25,81 \text{ cm}$$

$$F_c = \frac{P_{\max}}{A}$$

$$= \frac{23730}{25,81}$$

$$= 90,19 \text{ MPa}$$

2. Perbandingan 1:0,53

a. Umur 3 hari

1) Benda uji 1

$$P_{\max} : 13190 \text{ kg}$$

$$A : 24,55 \text{ cm}$$

$$F_c = \frac{P_{\max}}{A}$$

$$= \frac{13190}{24,55}$$

$$= 52,71 \text{ MPa}$$

2) Benda uji 2

$$P_{\max} : 10230 \text{ kg}$$

$$A : 26,31 \text{ cm}$$

$$F_c = \frac{P_{\max}}{A}$$

$$= \frac{10230}{26,31}$$

$$= 38,14 \text{ MPa}$$

3) Benda uji 3

$$P_{\max} : 7690 \text{ kg}$$

$$A : 24 \text{ cm}$$

$$F_c = \frac{P_{\max}}{A}$$

$$= \frac{7690}{24}$$

$$= 31,43 \text{ MPa}$$

b. Umur 7 hari

1) Benda uji 1

$$P_{\max} : 16710 \text{ kg}$$

$$A : 24,25 \text{ cm}$$

$$F_c = \frac{P_{\max}}{A}$$

$$= \frac{16710}{24,25}$$

$$= 67,60 \text{ MPa}$$

2) Benda uji 2

$$P_{\max} : 17700 \text{ kg}$$

$$A : 25,65 \text{ cm}$$

$$F_c = \frac{P_{\max}}{A}$$

$$= \frac{17700}{25,65}$$

$$= 67,69 \text{ MPa}$$

3) Benda uji 3

$$P_{\max} : 17020 \text{ kg}$$

$$A : 24,44 \text{ cm}$$

$$F_c = \frac{P_{\max}}{A}$$

$$= \frac{17020}{24,44}$$

$$= 68,32 \text{ MPa}$$

c. Umur 14 hari

1) Benda uji 1

$$P_{\max} : 19370 \text{ kg}$$

$$A : 24,55 \text{ cm}$$

$$\begin{aligned}
 F_c &= \frac{P_{maks}}{A} \\
 &= \frac{19370}{24,55} \\
 &= 77,56 \text{ MPa}
 \end{aligned}$$

## 2) Benda uji 2

$$P_{max} : 19530 \text{ kg}$$

$$A : 24,55 \text{ cm}$$

$$\begin{aligned}
 F_c &= \frac{P_{maks}}{A} \\
 &= \frac{19530}{24,55} \\
 &= 78,04 \text{ MPa}
 \end{aligned}$$

## 3) Benda uji 3

$$P_{max} : 19440 \text{ kg}$$

$$A : 24,01 \text{ cm}$$

$$\begin{aligned}
 F_c &= \frac{P_{maks}}{A} \\
 &= \frac{19440}{24,01} \\
 &= 79,43 \text{ MPa}
 \end{aligned}$$

## d. Umur 28 hari

## 1) Benda uji 1

$$P_{max} : 23300 \text{ kg}$$

$$A : 24,7 \text{ cm}$$

$$\begin{aligned}
 F_c &= \frac{P_{maks}}{A} \\
 &= \frac{23300}{24,7} \\
 &= 92,54 \text{ MPa}
 \end{aligned}$$

## 2) Benda uji 2

$$P_{max} : 22740 \text{ kg}$$

$$A : 24,65 \text{ cm}$$

$$\begin{aligned}
 F_c &= \frac{P_{maks}}{A} \\
 &= \frac{22740}{24,65} \\
 &= 90,50 \text{ MPa}
 \end{aligned}$$

### 3) Benda uji 3

$$P_{max} : 22650 \text{ kg}$$

$$A : 24,21 \text{ cm}$$

$$\begin{aligned}
 F_c &= \frac{P_{maks}}{A} \\
 &= \frac{22650}{24,21} \\
 &= 91,78 \text{ MPa}
 \end{aligned}$$

## 3. Perbandingan 1:0,67

### a. Umur 3 hari

#### 1) Benda uji 1

$$P_{max} : 14280 \text{ kg}$$

$$A : 25,32 \text{ cm}$$

$$\begin{aligned}
 F_c &= \frac{P_{maks}}{A} \\
 &= \frac{14280}{25,32} \\
 &= 54,32 \text{ MPa}
 \end{aligned}$$

#### 2) Benda uji 2

$$P_{max} : 14950 \text{ kg}$$

$$A : 27,6 \text{ cm}$$

$$\begin{aligned}
 F_c &= \frac{P_{maks}}{A} \\
 &= \frac{14950}{27,6} \\
 &= 53,14 \text{ MPa}
 \end{aligned}$$

## 3) Benda uji 3

$$P_{\max} : 13920 \text{ kg}$$

$$A : 24,28 \text{ cm}$$

$$\begin{aligned} F_c &= \frac{P_{\max}}{A} \\ &= \frac{13920}{24,28} \\ &= 56,24 \text{ MPa} \end{aligned}$$

## b. Umur 7 hari

## 1) Benda uji 1

$$P_{\max} : 17650 \text{ kg}$$

$$A : 25,25 \text{ cm}$$

$$\begin{aligned} F_c &= \frac{P_{\max}}{A} \\ &= \frac{17650}{25,25} \\ &= 68,57 \text{ MPa} \end{aligned}$$

## 2) Benda uji 2

$$P_{\max} : 17650 \text{ kg}$$

$$A : 24,69 \text{ cm}$$

$$\begin{aligned} F_c &= \frac{P_{\max}}{A} \\ &= \frac{17650}{24,69} \\ &= 70,13 \text{ MPa} \end{aligned}$$

## 3) Benda uji 3

$$P_{\max} : 19200 \text{ kg}$$

$$A : 27,35 \text{ cm}$$

$$\begin{aligned} F_c &= \frac{P_{\max}}{A} \\ &= \frac{19200}{27,35} \\ &= 68,87 \text{ MPa} \end{aligned}$$



## c. Umur 14 hari

## 1) Benda uji 1

$$P_{\max} : 21650 \text{ kg}$$

$$A : 24,63 \text{ cm}$$

$$\begin{aligned} F_c &= \frac{P_{\max}}{A} \\ &= \frac{21650}{24,63} \\ &= 86,23 \text{ MPa} \end{aligned}$$

## 2) Benda uji 2

$$P_{\max} : 21190 \text{ kg}$$

$$A : 25,4 \text{ cm}$$

$$\begin{aligned} F_c &= \frac{P_{\max}}{A} \\ &= \frac{21190}{25,4} \\ &= 81,84 \text{ MPa} \end{aligned}$$

## 3) Benda uji 3

$$P_{\max} : 20730 \text{ kg}$$

$$A : 24,25 \text{ cm}$$

$$\begin{aligned} F_c &= \frac{P_{\max}}{A} \\ &= \frac{20730}{24,25} \\ &= 83,86 \text{ MPa} \end{aligned}$$

## d. Umur 28 hari

## 1) Benda uji 1

$$P_{\max} : 25370 \text{ kg}$$

$$A : 27,5 \text{ cm}$$

$$\begin{aligned} F_c &= \frac{P_{\max}}{A} \\ &= \frac{23160}{27,5} \end{aligned}$$

$$= 90,50 \text{ MPa}$$

2) Benda uji 2

$$P_{\max} : 25660 \text{ kg}$$

$$A : 26,83 \text{ cm}$$

$$\begin{aligned} F_c &= \frac{P_{\max}}{A} \\ &= \frac{25660}{26,83} \\ &= 93,82 \text{ MPa} \end{aligned}$$

3) Benda uji 3

$$P_{\max} : 23700 \text{ kg}$$

$$A : 24,4 \text{ cm}$$

$$\begin{aligned} F_c &= \frac{P_{\max}}{A} \\ &= \frac{23700}{24,4} \\ &= 95,29 \text{ MPa} \end{aligned}$$

4. Perbandingan 1:0,8

a. Umur 3 hari

1) Benda uji 1

$$P_{\max} : 15490 \text{ kg}$$

$$A : 24,55 \text{ cm}$$

$$\begin{aligned} F_c &= \frac{P_{\max}}{A} \\ &= \frac{15490}{24,55} \\ &= 61,90 \text{ MPa} \end{aligned}$$

2) Benda uji 2

$$P_{\max} : 16090 \text{ kg}$$

$$A : 24,75 \text{ cm}$$

$$F_c = \frac{P_{\max}}{A}$$

$$= \frac{16090}{24,75}$$

$$= 63,77 \text{ MPa}$$

## 3) Benda uji 3

$$P_{\max} : 16110 \text{ kg}$$

$$A : 24,7 \text{ cm}$$

$$F_c = \frac{P_{\max}}{A}$$

$$= \frac{16110}{24,7}$$

$$= 63,98 \text{ MPa}$$

## b. Umur 7 hari

## 1) Benda uji 1

$$P_{\max} : 21550 \text{ kg}$$

$$A : 28,62 \text{ cm}$$

$$F_c = \frac{P_{\max}}{A}$$

$$= \frac{21550}{28,62}$$

$$= 73,87 \text{ MPa}$$

## 2) Benda uji 2

$$P_{\max} : 18150 \text{ kg}$$

$$A : 25,3 \text{ cm}$$

$$F_c = \frac{P_{\max}}{A}$$

$$= \frac{18150}{25,3}$$

$$= 70,38 \text{ MPa}$$

## 3) Benda uji 3

$$P_{\max} : 17890 \text{ kg}$$

$$A : 24,79 \text{ cm}$$

$$F_c = \frac{P_{\max}}{A}$$

$$= \frac{17890}{24,79}$$

$$= 70,80 \text{ MPa}$$

c. Umur 14 hari

1) Benda uji 1

$$P_{\max} : 21140 \text{ kg}$$

$$A : 24,49 \text{ cm}$$

$$F_c = \frac{P_{\max}}{A}$$

$$= \frac{21140}{24,49}$$

$$= 84,68 \text{ MPa}$$

2) Benda uji 2

$$P_{\max} : 20170 \text{ kg}$$

$$A : 24,6 \text{ cm}$$

$$F_c = \frac{P_{\max}}{A}$$

$$= \frac{20170}{24,6}$$

$$= 80,43 \text{ MPa}$$

3) Benda uji 3

$$P_{\max} : 21560 \text{ kg}$$

$$A : 24,4 \text{ cm}$$

$$F_c = \frac{P_{\max}}{A}$$

$$= \frac{21560}{24,4}$$

$$= 86,68 \text{ MPa}$$

d. Umur 28 hari

1) Benda uji 1

$$P_{\max} : 24000 \text{ kg}$$

$$A : 24,5 \text{ cm}$$

$$\begin{aligned}
 F_c &= \frac{P_{maks}}{A} \\
 &= \frac{24000}{24,5} \\
 &= 96,10 \text{ MPa}
 \end{aligned}$$

## 2) Benda uji 2

$$P_{max} : 15930 \text{ kg}$$

$$A : 26,32 \text{ cm}$$

$$\begin{aligned}
 F_c &= \frac{P_{maks}}{A} \\
 &= \frac{15930}{26,32} \\
 &= 59,37 \text{ MPa}
 \end{aligned}$$

## 3) Benda uji 3

$$P_{max} : 21000 \text{ kg}$$

$$A : 25,1 \text{ cm}$$

$$\begin{aligned}
 F_c &= \frac{P_{maks}}{A} \\
 &= \frac{21000}{25,1} \\
 &= 82,08 \text{ MPa}
 \end{aligned}$$

## 5. Perbandingan 1:1

## a. Umur 3 hari

## 1) Benda uji 1

$$P_{max} : 16460 \text{ kg}$$

$$A : 25 \text{ cm}$$

$$\begin{aligned}
 F_c &= \frac{P_{maks}}{A} \\
 &= \frac{16460}{25} \\
 &= 64,59 \text{ MPa}
 \end{aligned}$$

## 2) Benda uji 2

$$P_{\max} : 16540 \text{ kg}$$

$$A : 24,8 \text{ cm}$$

$$\begin{aligned} F_c &= \frac{P_{\max}}{A} \\ &= \frac{16540}{24,8} \\ &= 65,43 \text{ MPa} \end{aligned}$$

## 3) Benda uji 3

$$P_{\max} : 17310 \text{ kg}$$

$$A : 26 \text{ cm}$$

$$\begin{aligned} F_c &= \frac{P_{\max}}{A} \\ &= \frac{17310}{26} \\ &= 65,31 \text{ MPa} \end{aligned}$$

## b. Umur 7 hari

## 1) Benda uji 1

$$P_{\max} : 20300 \text{ kg}$$

$$A : 27,56 \text{ cm}$$

$$\begin{aligned} F_c &= \frac{P_{\max}}{A} \\ &= \frac{20300}{27,56} \\ &= 72,26 \text{ MPa} \end{aligned}$$

## 2) Benda uji 2

$$P_{\max} : 19310 \text{ kg}$$

$$A : 24,65 \text{ cm}$$

$$\begin{aligned} F_c &= \frac{P_{\max}}{A} \\ &= \frac{19310}{24,65} \\ &= 76,85 \text{ MPa} \end{aligned}$$

## 3) Benda uji 3

$$P_{\max} : 19560 \text{ kg}$$

$$A : 26,26 \text{ cm}$$

$$\begin{aligned} F_c &= \frac{P_{\max}}{A} \\ &= \frac{19560}{26,26} \\ &= 73,07 \text{ MPa} \end{aligned}$$

## c. Umur 14 hari

## 1) Benda uji 1

$$P_{\max} : 24960 \text{ kg}$$

$$A : 27,72 \text{ cm}$$

$$\begin{aligned} F_c &= \frac{P_{\max}}{A} \\ &= \frac{24960}{27,72} \\ &= 88,33 \text{ MPa} \end{aligned}$$

## 2) Benda uji 2

$$P_{\max} : 22600 \text{ kg}$$

$$A : 25,05 \text{ cm}$$

$$\begin{aligned} F_c &= \frac{P_{\max}}{A} \\ &= \frac{22600}{25,05} \\ &= 88,51 \text{ MPa} \end{aligned}$$

## 3) Benda uji 3

$$P_{\max} : 21500 \text{ kg}$$

$$A : 24,3 \text{ cm}$$

$$\begin{aligned} F_c &= \frac{P_{\max}}{A} \\ &= \frac{21500}{24,3} \\ &= 86,80 \text{ MPa} \end{aligned}$$

d. Umur 28 hari

1) Benda uji 1

Pmax : 24510 kg

A : 25 cm

$$\begin{aligned} F_c &= \frac{P_{maks}}{A} \\ &= \frac{24510}{25} \\ &= 96,18 \text{ MPa} \end{aligned}$$

2) Benda uji 2

Pmax : 24600 kg

A : 27,67 cm

$$\begin{aligned} F_c &= \frac{P_{maks}}{A} \\ &= \frac{24600}{27,67} \\ &= 87,22 \text{ MPa} \end{aligned}$$

3) Benda uji 3

Pmax : 27320 kg

A : 28,3 cm

$$\begin{aligned} F_c &= \frac{P_{maks}}{A} \\ &= \frac{27320}{28,3} \\ &= 94,70 \text{ MPa} \end{aligned}$$



## Lampiran 2. Gambar Hasil Pengujian

### A. Foto-foto Benda Uji Hasil Penelitian



Gambar 1. Benda uji sebelum diuji tekan



Gambar 2. Benda uji saat diuji tekan



Gambar 3. Benda uji setelah diuji tekan



Gambar 4. Benda uji yang diuji mekanik

### Lampiran 3. Hasil Uji Tekan Benda Uji

Tabel 1. Hasil kuat tekan

No.	Perbandingan Volume	Umur (hari)	Beban max (Kg)	Luas (cm <sup>2</sup> )	Kuat tekan (Mpa)
1			23160	24,64	92,21
2		3	27120	25,2	105,57
3			32220	26,21	120,59
4			18590	27,67	65,91
5		7	17620	24,5	70,55
6	1 : 0,4		16960	24,48	66,98
7			19840	25,3	76,93
8		14	19290	24,25	78,04
9			20170	25,3	78,21
10			21730	24,5	87,01
11		28	21960	24,2	89,02
12			23720	25,81	90,19
13			13190	24,55	52,71
14		3	10230	26,31	38,14
15			7690	24	31,43
16			16710	24,25	67,6
17		7	17700	25,65	67,69
18	1 : 0,53		17020	24,44	68,32
19			19370	24,5	77,56
20		14	19530	24,55	78,04
21			19440	24,01	79,43
22			23300	24,7	92,54
23		28	22740	24,65	90,5
24			22650	24,21	91,78
25			14280	25,79	4,32
26		3	14950	27,6	53,14
27	1 : 0,67		13920	24,28	56,24
28			17650	25,25	68,57
29		7	17650	24,69	70,13

Tabel 1. Hasil uji tekan (Lanjutan)

30		19200	27,35	68,87
31		21650	24,63	86,23
32	14	21190	25,4	81,84
33		20730	24,25	83,86
34		25370	27,5	90,5
35	28	25660	26,83	93,82
36		23700	24,4	95,29
37		15490	24,55	61,9
38	3	16090	24,75	63,77
39		16110	24,7	63,98
40		21550	28,62	73,87
41	7	18150	25,3	70,38
42	1 : 0,8	17890	24,79	70,8
43		21140	24,49	84,68
44		20170	24,6	80,43
45		21560	24,4	86,68
46		24000	24,5	96,1
47	28	15930	26,32	59,37
48		21000	25,1	82,08
49		16460	25	64,59
50	3	16540	24,8	65,43
51		17310	26	65,31
52		20300	27,56	72,26
53	7	19310	24,65	76,85
54	1 : 1	19560	26,26	73,07
55		24960	27,72	88,33
56		22600	25,05	88,51
57		21500	24,3	86,8
58		24510	25	96,18
59	28	24600	27,67	87,22
60		27320	28,3	94,7