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Proses inisiasi korosi pada beton bertulang akibat infiltrasi klorida dimulai Ketika klorida masuk ke dalam beton dan merusak lapisan pasif tulangan (Kolio et al., 2015).

Spalling pada penutup beton merupakan fenomena kompleks yang mempengaruhi tidak hanya keadaan batas ultimit dari komponen struktur beton, tetapi juga respon layanan dan daya tahannya (Moccia, 2021).

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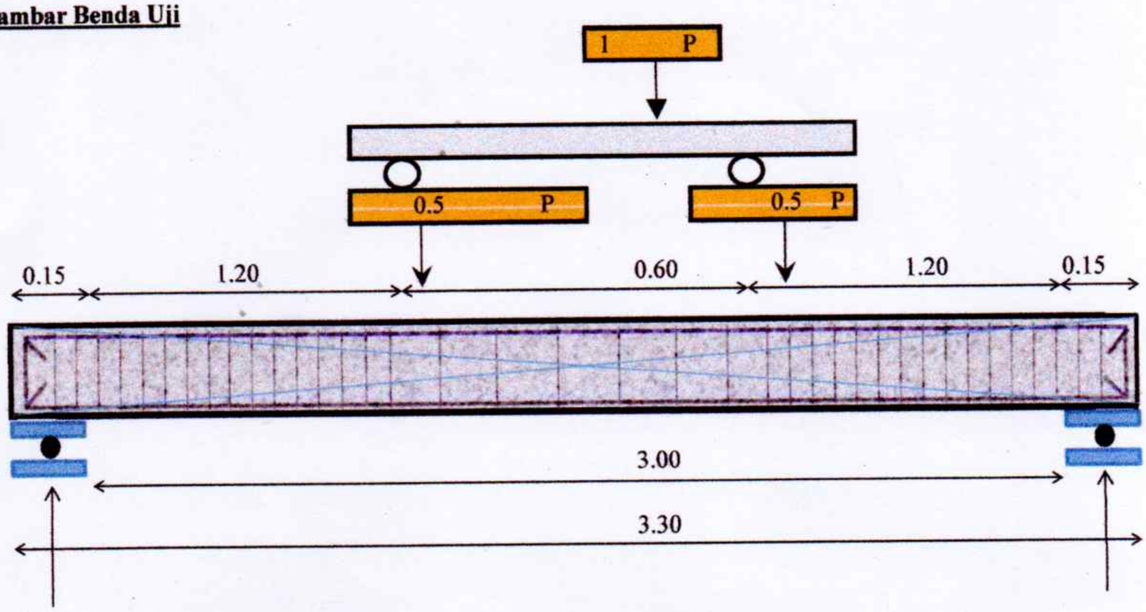
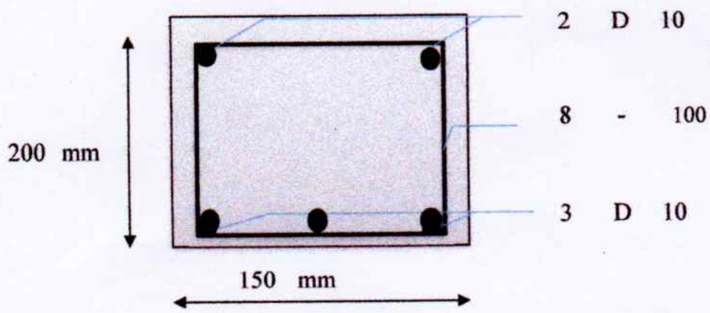
serta kerusakan konstruksi yang akan lebih banyak menimbulkan biaya

LAMPIRAN

ANALISA PENDAHULUAN

Gambar Benda Uji





Dimensi benda uji

150 mm x 200 mm x 3300 mm

$\frac{a}{d}$ = 7.64331

Menurut SK SNI - 03 - 2847 - 2002 (hal 63) , perencanaan tinggi balok minimum (h)
dengan mutu baja 400 Mpa, adalah:

- balok dengan dua tumpuang sederhana

$$h = \frac{L}{16}$$

$$= \frac{3000}{16.0}$$

$$= 188 \text{ mm} \approx 200 \text{ mm}$$

$$b = \frac{d}{1.5} = \frac{157}{1.5} = 104.667 \text{ mm} \approx 150 \text{ mm}$$

Data Penampang

Dimensi balok (B x H)				=	150	mm	x	200	mm
Tulangan tarik	3	D	10						
Tulangan tekan	2	D	10						

Data Material

Kuat tekan beton	f'_c	=	23.4	MPa
Kuat leleh baja	f_y	=	280	MPa

Data Analisis

Kuat tekan beton	f'_c = **23.4**	MPa
Kuat leleh tulangan tarik	f_y = **280**	MPa
Kuat leleh tulangan tekan	f_y = **280**	MPa
Kuat leleh tulangan transversal	f_y = **280**	MPa
Modulus elastisitas beton	E_c = 22711.2637	MPa
Modulus elastisitas baja	E_s = **200000**	MPa
Modulus keruntuhan	$f_r = 0.7\ f'_c{}^{0.5}$	
	= 3.38	MPa
Berat jenis beton	g_c = **2400**	kg/m^3
Lebar penampang	b = **150**	mm
Tinggi penampang	h = **200**	mm
Tinggi efektif penampang	d = 157.00	mm
Jarak tulangan tekan ke serat tekan terluar	d' = 43.00	mm
Beban berat sendiri balok	q = 0.07 t/m^1 = 0.72	kN/m^1
Berat benda uji	W = 0.24 t = 237.60	kg
Luas tulangan tarik	A_s = **3** D **10** = 235.62	mm^2
Luas tulangan tekan	A_s' = **2** D **10** = 157.08	mm^2
Luas tulangan sengkang	A_{v} = **2** D **8** = 100.53	mm^2
Angka ekivalensi beton terhadap baja	$n = \frac{E_s}{E_c} = 8.81$; $nf = \frac{E_f}{E_c} = 3.553$	

Perhitungan nilai d_s, d, d' dan d_d

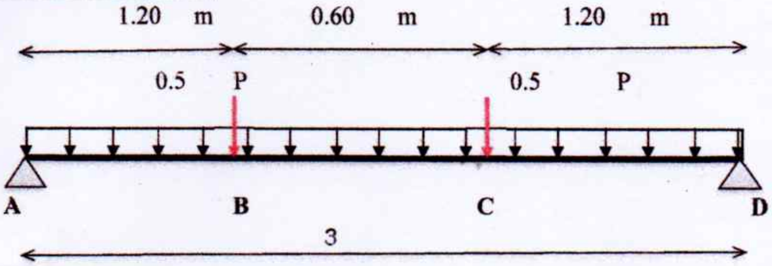
$$d_s = 30 + 8 + \frac{10}{2} \qquad \boxed{d_s = 43.0\ \text{mm}}$$

$$d = 200 - 43 \qquad \boxed{d = 157\ \text{mm}}$$

$$d' = 30 + 8 + \frac{10}{2} \qquad \boxed{d' = 43\ \text{mm}}$$

$$d_d = 200 - 30 - 8 - \frac{10}{2} \qquad \boxed{d_d = 157\ \text{mm}}$$

Statika Gaya Dalam



$q = 0.15 \quad . \quad 0.2 \quad . \quad 2.4$
$= 0.072 \quad t/m$
$= 0.72 \quad kN/m$

*gambar dalam satuan meter

$V_A = V_D = 0.5 \; P + \frac{1}{2} \; . \; 0.72 \; . \; 3$

$= 0.5 \; P + 1.08 \; kN$

$M_{maks \text{ di tengah bentang}} = - \frac{1}{2} \; . \; 0.72 \; . \; 1.5^2 + (0.5 \; P + 1.08) \; . \; 1.5 - 0.5 \; P \; . \; 0.3$

$M_{maks \text{ di tengah bentang}} = -0.81 + 0.75 \; P + 1.62 - 0.15 \; P$

$= 0.81 + 0.6 \; P \; kN.m$

$\boxed{M_{maks \text{ di tengah bentang}} = 0.81 + 0.6 \; P \; kN.m}$

Bila digunakan satuan t.m maka :

$V_A = V_D = 0.5 \; P + \frac{1}{2} \; . \; 0.072 \; . \; 3$

$= 0.5 \; P + 0.108 \; ton$

$M_{maks \text{ pada tengah bentang}} = - \frac{1}{2} \; . \; 0.072 \; . \; 1.5^2 + (0.5 \; P + 0.108) \; . \; 1.5 - 0.5 \; P \; . \; 0.3$

$= -0.081 + 0.75 \; P + 0.162 - 0.15 \; P$

$= 0.081 + 0.6 \; P \; t.m$

$\boxed{M_{maks \text{ pada tengah bentang}} = 0.081 + 0.6 \; P \; t.m}$

Geser yang terjadi

AB ($0.00 \le x \le 1.20$)

$M_x = -0.5 \; q \; x^2 + (0.5 \; P + 0.108) (x - 0.00)$

$= -0.5 \; . \; 0.072 \; x^2 + 0.5 \; P \; x - 0 \; P + 0.108 \; x - 0$

$= -0.036 \; x^2 + 0.5 \; P \; x + 0.108 \; x - 0 \; P - 0$

$M_{0.00} = 0 + 0 \; P$ t.m

$M_{1.20} = 0.07776 + 0.6 \; P$ t.m

$V_x = -0.072 \; x + 0.5 \; P + 0.108$

$V_{0.00} = 0.108 + 0.5 \; P$ ton

$V_{1.20} = 0.0216 + 0.5 \; P$ ton

BC ($1.20 \le x \le 1.80$)

$M_x = -0.036 \; x^2 + 0.5 \; P \; x + 0.108 \; x - 0 \; P - 0$

$- 0.5 \; P (x - 1.20)$

$= -0.036 \; x^2 + 0 \; P \; x + 0.108 \; x - -0.6 \; P - 0$

$M_{1.20} = 0.07776 + 0.6 \; P$ t.m

$M_{1.80} = 0.07776 + 0.6 \; P$ t.m

max ; $-0.072 \; x + 0 \; P + 0.108 = 0$

$x = 1.5$ m

$M_{1.50} = 0.081 + 0.6 \; P$ t.m

$V_x = -0.072 \; x + 0 \; P + 0.108$

$V_{1.20} = 0.0216 + 0 \; P$ ton

$V_{1.80} = -0.0216 + 0 \; P$ ton

CD ($1.80 \le x \le 3.00$)

$M_x = -0.036 \; x^2 + 0 \; P \; x + 0.108 \; x - -0.6 \; P - 0$

$- 0.5 \; P (x - 1.80)$

$= -0.036 \; x^2 + -0.5 \; P \; x + 0.108 \; x - -1.5 \; P - 0$

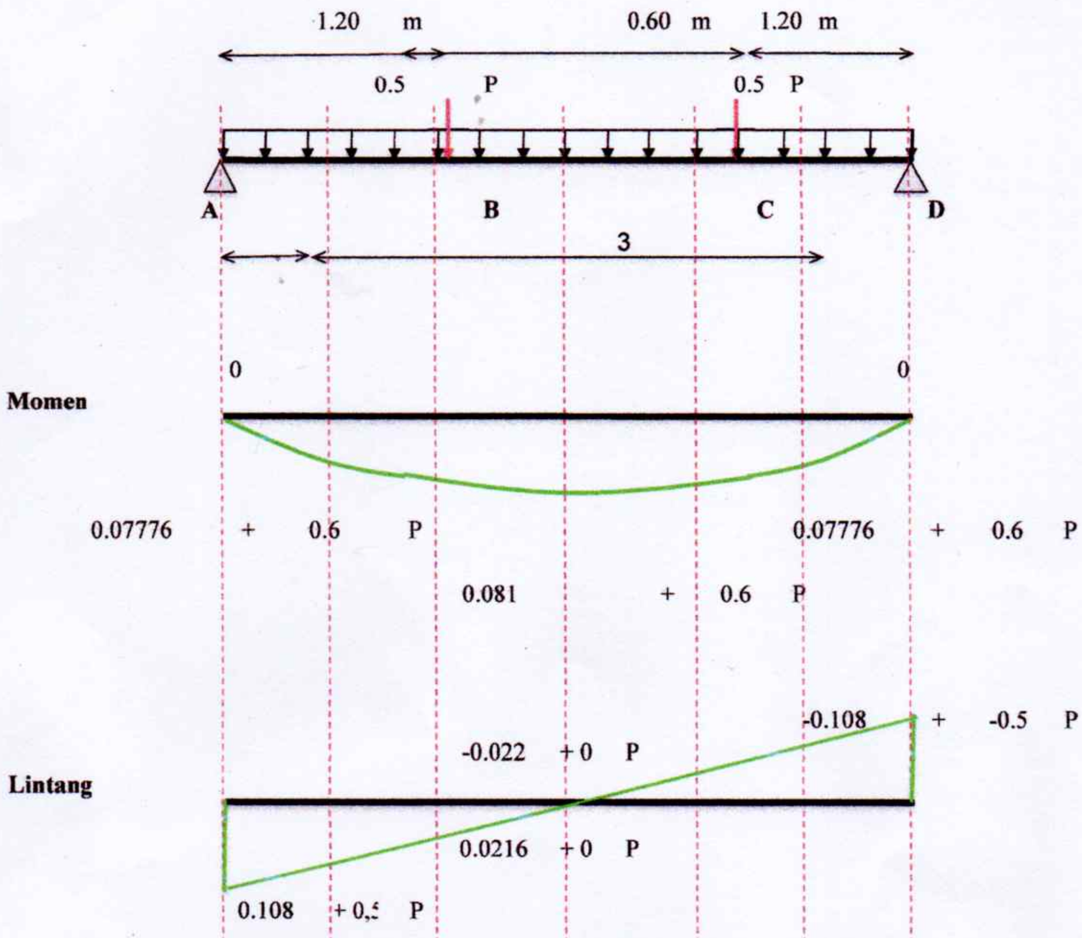
$M_{1.80} = 0.07776 + 0.6 \; P$ t.m

$M_{3.00} = 0 + 0 \; P$ t.m

$V_x = -0.072 \; x + -0.5 \; P + 0.108$

$V_{1.80} = -0.0216 + -0.5 \; P$ ton

$V_{3.00} = -0.108 + -0.5 \; P$ ton


1.20 m
0.60 m
1.20 m
0.5 P
0.5 P
A
B
C
D
3
Momen
0
0
0.07776 + 0.6 P
0.07776 + 0.6 P
0.081 + 0.6 P
Lintang
-0.108 + -0.5 P
-0.022 + 0 P
0.0216 + 0 P
0.108 + 0,5 P