

ANALISIS KOLOM M BETON BERTULANG

DENGAN DIAGRAM INTERAKSI

KODE KOLOM

K2

INPUT DATA KOLOM

Kuat tekan beton,	$f'_c =$	20	MPa
Tegangan leleh baja,	$f_y =$	390	MPa
Lebar kolom,	$b =$	250	mm
Tinggi kolom,	$h =$	250	mm
Tebal brutto selimut beton,	$d_s =$	40	mm
Jumlah tulangan,	$n =$	4	buah
Diameter tulangan,	$D =$	19	mm

PERHITUNGAN DIAGRAM INTERAKSI

Modulus elastis baja,	$E_s =$	2.E+05	MPa
$\beta_1 = 0,85$	untuk $f'_c \leq 30$ MPa		
$\beta_1 = 0,85 - 0,008 (f'_c - 30)$	untuk $f'_c > 30$ MPa		
Faktor distribusi tegangan,	$\beta_1 =$	0,85	
Luas tulangan total,	$A_s = n * \pi / 4 * D^2 =$	1134	mm ²
Jarak antara tulangan,	$x = h - 2*d_s =$	170,00	mm
Rasio tulangan,	$\rho = A_s / A_g =$	1,81%	

Faktor reduksi kekuatan,

$\phi = 0,65$ untuk $P_u \geq 0,1 * f'_c * b * h$	Untuk : $0 \leq P_u$
$\phi = 0,80$ untuk $P_u = 0$	$\phi = 0,65 + 0,15 * (P_{u0} - P_u) / P_{u0}$

No	Luas masing-masing tulangan	Jarak tulangan thd.
1	$A_{s1} = 2/4 * A_s = 567$ mm ²	$d_1 = x + d_s =$
2	$A_{s2} = 2/4 * A_s = 567$ mm ²	$d_2 = d_s =$
	$A_g = 1134$ mm ²	

Pada kondisi tekan aksial sentris ($M_{u0} = 0$) :

$$P_{u0} = 0,80 * [0,85 * f'_c * b * h + A_s * (f_y - 0,85 * f'_c)] * 10^{-3} = 1188 \text{ kN}$$

Pada kondisi balance :

$$0,1 * f'_c * b * h * 10^{-3} = 125 \text{ kN}$$

$$c = c_b = 600 / (600 + f_y) * d_1 = 127,3 \text{ mm}$$

Pada kondisi garis netral terletak pada jarak c dari sisi beton tekan t

Regangan pada masing-masing baja tulangan : $\epsilon_{si} = 0,003 * (c - d_i) / c$

Tegangan pada masing-masing baja tulangan :

Untuk $|\epsilon_{si}|$ maka $f_{si} = \epsilon_{si} * E_s$

Untuk $|\epsilon_{si}|$ maka $f_{si} = |\epsilon_{si}| / \epsilon_{si} * f_y$

$$\text{Jumlah interval jarak grs netral} = 112 \rightarrow \Delta c = 2,2321$$

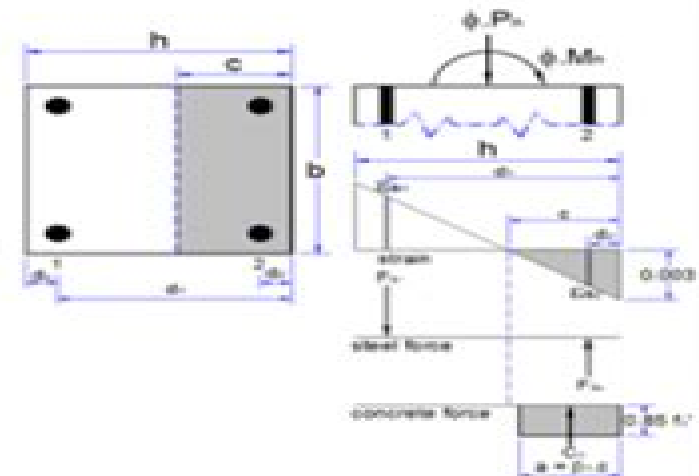
URAIAN PERHITUNGAN

Gaya-gaya internal pada masing-masing baja tulangan :

Resultan gaya internal baja tulangan :

Momen akibat gaya internal masing-masing baja tulangan :

K10 K8 K7 K6 K5 K4 K3



PERSAMAAN

$$F_{si} = A_{si} * f_{si} * 10^{-3}$$

$$C =$$

$$M =$$



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Perhitungan Diagram Interaksi Kolom Beton Bertulang

Barie Danu Hartono



Perhitungan Diagram Interaksi Kolom Beton Bertulang:

Desain Beton Bertulang Jl. 1, **Perhitungan Struktur Beton Bertulang Gedung Sekolah 7 Lantai di Kota Pontianak** Barie Danu Hartono, 2019-10-02 Buku yang membahas perhitungan struktur beton gedung sekolah dengan menggunakan standar SNI 1726 2012 SNI 2847 2013 dan SNI 1727 2013 *APLIKASI PROGRAM PENULANGAN BALOK DAN KOLOM BETON PADA SMARTPHONE* Tony Hartono Bagio, Eugene Yudhistira Baggio, 2024-10-11 Perkembangan teknologi dalam beberapa tahun terakhir tidak dapat dipungkiri berkembang sangat pesat hal ini bisa sangat membantu dalam setiap pekerjaan yang akan dilakukan Dalam pekerjaan konstruksi bangunan perhitungan balok dan kolom beton bertulang juga memanfaatkan perkembangan teknologi Perhitungan yang dilakukan pada komputer sangat membantu mempercepat dan mempermudah pekerjaan yang dilakukan serta mengurangi kesalahan akibat human error Tetapi penggunaan komputer kian lama berkurang karena pekerjaan yang dulunya hanya bisa dikerjakan pada komputer sekarang bisa dilakukan pada ponsel cerdas smartphone Penulangan balok untuk tulangan tarik As Mn dan tulangan tekan As As dimana f_y dan f_s 0 85 f_c dan M_n f_y C_c M_n f_s C_c sedang penulangan kolom tanpa menggunakan diagram interaksi M N untuk mencari A_{total} 1 A_{tot} 1% A_{gross} 2 A_{tot} 8% A_{gross} 3 A_{tot} antara 1% 8% Pada tahap 1 2 3 mencari nilai c menggunakan metode Newton Raphson sedang mencari prosentase penulangan menggunakan metode bagi dua divided by two method Pemrograman menentukan As As dan A_{total} ditulis menggunakan bahasa pemrograman Texas Instruments sehingga dapat di aplikasikan pada ponsel cerdas smartphone Hasil perhitungan balok menggunakan ponsel cerdas mendapatkan hasil dengan akurasi 99 99% untuk penulangan lentur 99 92% untuk penulangan geser dan 98 97% untuk penulangan torsi Sedang untuk perhitungan kolom akurasi smartphone terhadap manual sebesar 97 97% dibanding diagram M N dengan manual sebesar 147 78% overestimate Untuk kolom biaxial akurasi ketepatannya sebesar 92 24% **Beton Prategang Jl. 2 Ed. 3** Edward G. Nawy, 2001 Perencanaan Jembatan Girder Beton Prategang Pracetak I Nyoman Sutarja, I Nyoman Yudha Astana, I Putu Suarma, 2025-03-18 Buku ini merupakan panduan akademik yang membahas secara sistematis perencanaan jembatan girder beton prategang pracetak sesuai dengan prinsip prinsip rekayasa struktur dalam teknik sipil Disusun sebagai bahan ajar tambahan untuk mata kuliah Perilaku Struktur Beton Prategang Pracetak buku ini mengacu pada standar perencanaan dan kode teknik yang relevan serta didukung oleh berbagai literatur akademik Bab pertama memperkenalkan konsep dasar perencanaan standar yang digunakan serta kriteria desain struktur dan material Bab kedua membahas secara rinci perhitungan slab lantai kendaraan dan plat injak approach slab yang merupakan elemen penting dalam kenyamanan dan keamanan berkendara di atas jembatan Pada bab ketiga fokus utama diberikan pada perhitungan balok prategang segmental dengan bentang 40 meter mencakup aspek geometri pembebanan gaya prategang kehilangan tegangan loss of prestress hingga analisis lendutan dan kontrol kapasitas beton terhadap gaya tekan serta momen nominal Bab keempat membahas analisis pondasi tiang bor untuk abutment jembatan termasuk daya dukung aksial dan lateral

kontrol kapasitas izin serta desain pembesian tiang bor dan pile cap Bab terakhir yaitu bab kelima menjelaskan secara detail perhitungan contrafort retaining wall setinggi 10 5 meter yang mencakup analisis beban kerja pengaruh gempa kombinasi beban pada pondasi hingga perhitungan penulangan pelat dasar untuk menjamin kestabilan struktur dinding penahan tanah Buku ini diharapkan dapat menjadi referensi yang bermanfaat bagi mahasiswa dosen dan praktisi teknik sipil dalam memahami serta mengaplikasikan konsep perencanaan jembatan girder beton prategang pracetak secara lebih mendalam dan aplikatif

Struktur Beton Bertulang (Reinforced Concrete Structures) Sri Frapanti, S.T., M.T., 2025-04-16 Buku ajar ini diharapkan dapat memberikan mempelajari tentang dasar dasar perancangan suatu elemen struktur beton bertulang termasuk didalamnya adalah elemen struktur beton bertulang termasuk didalamnya adalah elemen struktur balok kolom untuk beton dasar dalam membahas metoda perancangan struktur beton dasar memakai kaidah kaidah dasar perancangan berdasarkan SNI 2847 2013

DESAIN JEMBATAN 2 Abdul Rochman, Buku Desain Jembatan Jilid 2 diuraikan tentang perencanaan jembatan rangka baja dan jembatan beton bertulang untuk jalan rel Pada bagian berikutnya diuraikan tentang perencanaan kepala jembatan abutment meliputi abutment gravitas abutment T beton bertulang abutment pondasi sumuran dan abutment pondasi tiang pile Untuk memperjelas pembahasan semuanya dilengkapi dengan contoh hitungan perencanaan sampai ke bagaimana penggambaran tulangannya

Desain Portal Beton Bertulang dengan Sistem Rangka Pemikul Momen Khusus Ir. Ali Asroni, M.T., Yunalia Muntafi, S.T., M.T., Ir. Abdul Rochman, M.T., 2020-10-19 Portal merupakan struktur rangka dari bangunan gedung bertingkat dapat didesain berdasarkan kekuatan Sistem Rangka Pemikul Beton SRPM baik secara biasa SRPMB menengah SRPMK maupun secara khusus SRPMK Desain tulangan di dalam buku ini dibuat cukup lengkap mulai dari desain balok kolom fondasi dan sloof yang dihitung berdasarkan sistem rangka pemikul momen khusus SRPMK

DESAIN PORTAL BETON BERTULANG DENGAN SISTEM RANGKA PEMIKUL MOMEN BIASA BERDASARKAN SNI 2847 - 2013 Ir. Ali Asroni, M.T., Nur Khotimah Handayani, S.T., M.Eng., Aplikasi Rekayasa Konstruksi Dengan Sap2000 ,

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