



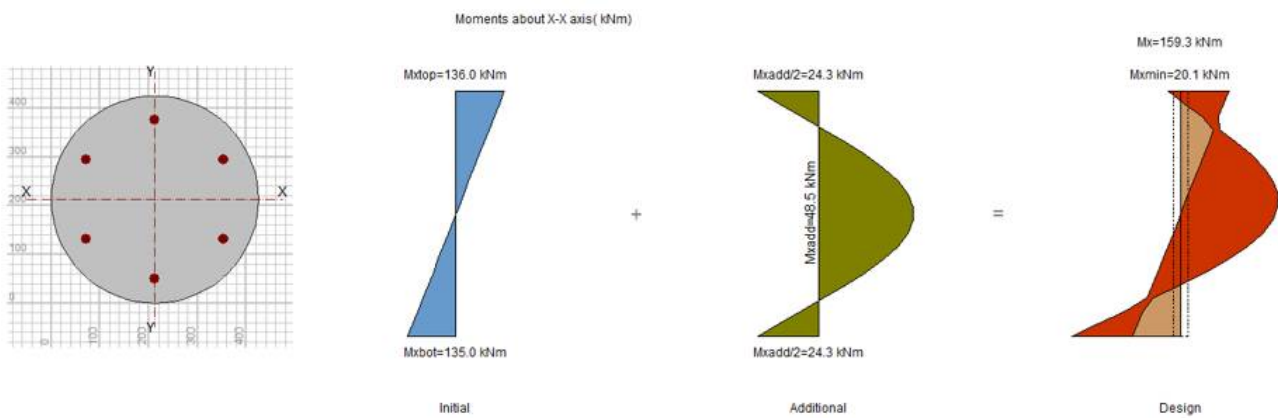
# CIRCULAR COLUMN

DESIGN OF CIRCULAR REINFORCED CONCRETE COLUMNS  
DESIGN | DETAILING | C12

## Summary

**Circular Column** designs solid circular concrete columns subject to axial forces and bi-axial bending moments. The simplified design approach set out in most codes is used for the design.

The module can be used independently, or as a Design Link from **Sumo**. The Design Links automate data entry by linking analysis results and geometry with the design module.



Load Case	Description	ULS Design Loads				
		P (kN)	Mx Top (kNm)	My Top (kNm)	Mx Bottom (kNm)	My Bottom (kNm)
1	DL	1008	20	25	20	-25
2	DL	900	35	5	17.5	2.5
	LL	854	35	5	17.5	2.5
3	DL	650	90	10	45	5
	LL	234	12	10	45	5
	WL	123	34	10	45	5

## What makes this module special?

- Automated bending schedule
- Axial forces and bi-axial bending are considered for the design
- Groups of columns analysed in **Sumo** can be linked into these modules for rapid design and detailing



# CIRCULAR COLUMN

DESIGN OF CIRCULAR REINFORCED CONCRETE COLUMNS  
DESIGN | DETAILING | C12

## Minimum Moments for Design:

Check for minimum eccentricity:

For bi-axial bending, it is only necessary to ensure that the eccentricity exceeds the minimum about one axis at a time.

For the worst effect, apply the minimum eccentricity about the minor axis:

$$e_{min} = 0.05 \cdot d$$

$$= 0.05 \times 3$$

$$= 0.0150 \text{ m}$$

$$M_{min} = e_{min} \cdot N$$

$$= .015 \times 1754$$

$$= 26.310 \text{ kNm}$$

Check if the column is slender:

$$\lambda_x = 21.3 > 15$$

$$\lambda_y = 21.3 > 15$$

Thus: The column is slender.

Check slenderness limit:

$$L_o = 8.000 \text{ m} < 60 \cdot dia' = 18.000 \text{ m}$$

Thus: Slenderness limit not exceeded.

MEMBER	No OF	BARS PER MEMBER	DIA	LENGTH	TOTAL NO. OF BARS	MARK	S.C	BENDING						
								A	B	C	D	Er		
	1	8	Y20	8100	8	A	34	7850	240	300	7850			
		1	R10	20800	1	B	88							

	8	10	12	16	20	25	32	40	TOT	Dist
R		13							13	Dist by
Y					180				180	Dist by
TOT		13			180				180	Dist by

**PROKON**  
Software Consultants PVT. LTD.  
http://www.prokon.com

Revision	
Schedule No	
Code	

## Detailed Description

Design and detail solid circular concrete columns. Columns can be short or slender in one or both directions, and different fixity conditions at the bottom and top. You can enter multiple load cases comprising of axial loads and moments about one or both axes at the bottom or top of the column. The module compiles column design charts and provides complete design calculation sheets. Generating reinforcement bending schedules is easy; the main bars and the stirrups can be customised. You can open the bending schedules in **Padds** or **Probar 2D** for final editing and printing.

## Theory used in this module

- The design codes give simplified procedures for designing columns of which the ratio of the larger to the smaller dimension does not exceed 1:4.
- The procedure used for the design of rectangular columns is applied to the design of circular columns.
- The reinforcement layout is assumed to be symmetrical.

## Workflow

Columns and their applied loading and properties can either be defined in the module or imported from **Sumo**.



# CIRCULAR COLUMN

DESIGN OF CIRCULAR REINFORCED CONCRETE  
COLUMNS  
DESIGN | DETAILING | C12

## Comments

For columns of general shapes see **General Column**.

## Supported Design Codes

### Design Codes

- ACI 318 - 1999
- ACI 318 - 2005
- ACI 318 - 2011
- ACI 318 - 2014
- ACI 318 - 2019
- AS 3600 - 2001
- AS 3600 - 2009
- AS3600 - 2018
- BS 8110 - 1985
- BS 8110 - 1997
- CP 65 - 1999
- CSA A23.3-04 - 2010
- CSA-A23.3:2019
- Eurocode 2 - 2004
- HK Concrete - 2004
- HK Concrete - 2013
- IS:456 - 2000
- NZ 3101 - 2006
- SABS 0100 - 2000
- SP 63.13330.2018