

Features of
Design of Rectangular Reinforced Concrete Columns to BS8110

Rect-Column

by

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Rec-Column is an Excel Template for the design of rectangular reinforced concrete columns. The bending due to axial load can be uni-axial or bi-axial. It incorporates a data base facility so that all columns on a project can be batch-analysed and their data stored in a single excel file. Its various features are listed below

- ◆ The columns can be braced or un-braced in the X and Y direction. By clicking a relevant radio button, the column can be described as being braced or un-braced.
- ◆ The bending of columns can be in Uni-axial or Bi-axial.
- ◆ The applied axial load can be Compression or Tension.
- ◆ Up to six loading cases can be considered in each column design.
- ◆ The design data for all columns is stored in the "Rect-Column" file itself. It can be recalled and updated at a later date.
- ◆ Each "Rect-Column" file can hold design information for as many columns as required, e.g. over 30,000 by inserting and or deleting the data rows in its "Store" worksheet.
- ◆ Command buttons at top of the screen allow the storage and or recall of the column data. This permits re-display and re-design of each column with ease and rapidity at a later stage.

- ◆ Auto analysis option analyses all columns by the click of a command button. If so desired, the results for each column can also be printed by the Auto analysis.
- ◆ When there is a failure, a Check-codes for all failing load cases are shown in red colour cells. The change of cell colour to red makes the failing columns apparent at a glance.
- ◆ The Check-codes are also included in the "Store" worksheet, after the Auto analysis of all columns in a batch.
- ◆ When designing un-braced columns, floor sway displacement can be differing values for each load case and or each column. This displacement is used for calculating the deflection induced moment in the column design.
- ◆ By the click of a radio button, the end connection for each column can be specified as being Rigid, Semi-rigid or Pinned. For un-braced columns, the top connection can also be a Free connection.

- ◆ Column end fixities at two ends and in two directions can be Rigid, Semi-rigid, Pinned & Free. They represent end connections type 1, 2, 3 and 4 respectively as described in BS8110 and are used to calculate effective height of the columns.
- ◆ The display and output of "Rect-Column" is a one-page document. Its layout is so arranged that both the user and the checking person can grasp and check results by hand calculations.

- ◆ The program employs an iterative procedure to calculate maximum moment capacities corresponding to the balanced failure and the applied axial loads in each of its six loading cases.

- ◆ The column section and all reinforcing bars are plotted in two separate diagrams. One diagram is for bending about the X-axis and the other for the Y-axis. In both diagram, the position of neutral axis is also shown.
- ◆ Rect-Column incorporates the use of default values for new columns. The user can change these to any desired values. They are f_{cu} , γ_{mc} , γ_{ms} , section width, section depth, cover to the centroid of steel, height in X-direction, height in Y-direction and the area of each reinforcement bar.