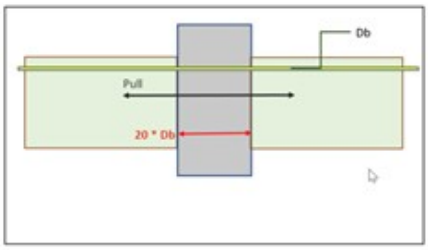
IS 13920 & ACI 318 : Beam Rebar Diameter as per column Size

IS 13920 & ACI 318 : Beam rebar Diameter to be restricted as per column size for Ductile detailing

Longitudinal Reinforcement -

- Diameter < Column Size / 20

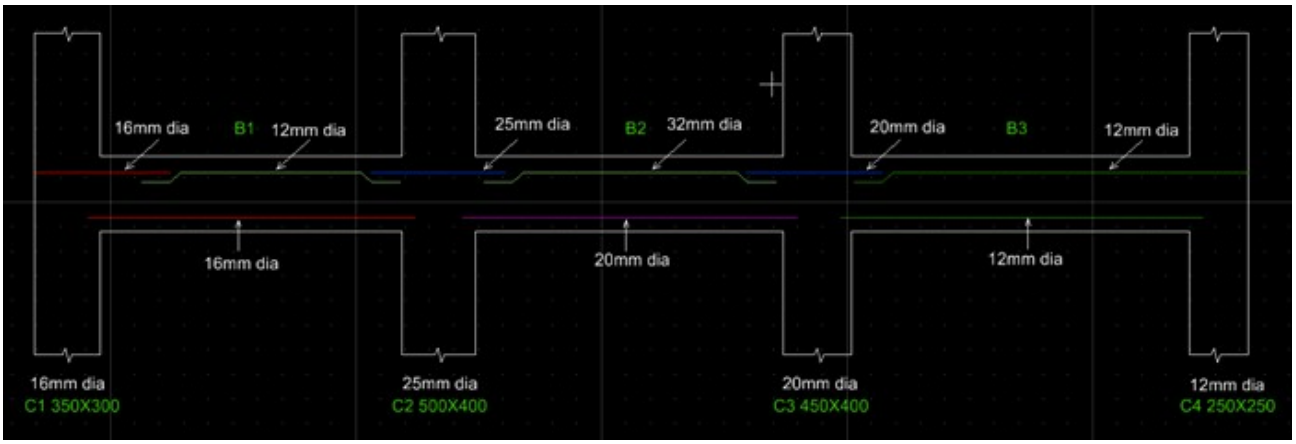


Column size proportional to beam reinforcement passing through column

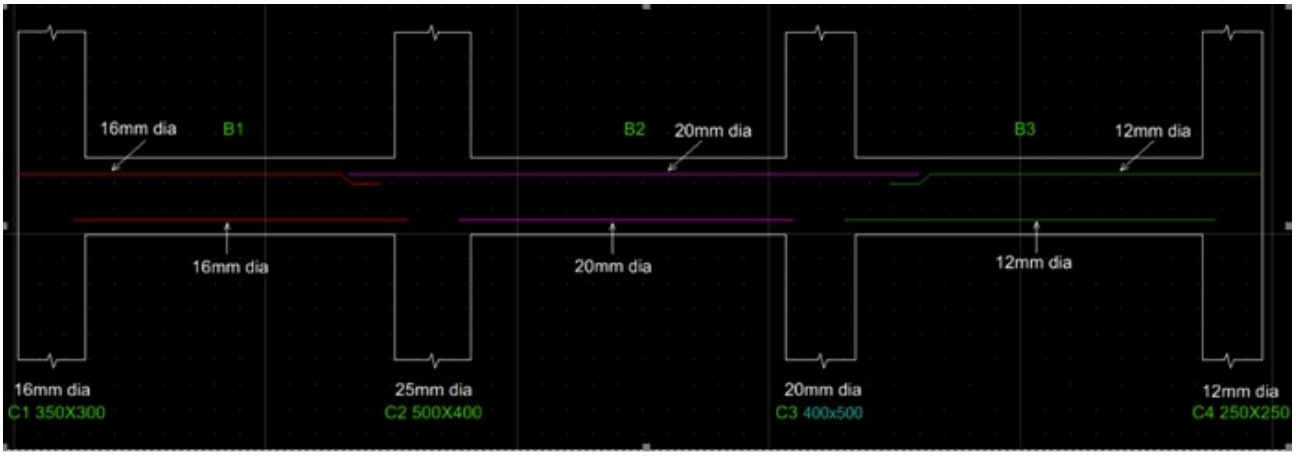
As per clause of 7.1.1 and 21.2.7.3 of IS 13920-2016 and ACI 318M-2011 (and similar clauses of ACI 318-2014, ACI 318-2011, ACI 318M-2014) respectively, longitudinal beam reinforcement extends through a beam-column joint. The column dimension parallel to the beam reinforcement shall not be less than 20 times the diameter of the largest longitudinal beam bar. The analysis model is prepared by the user in various analysis software. It is presumed that the user has checked all the requirements before proceeding to design in RCDC. Hence, in RCDC we consider that column sizes available from analysis files are final. In order to comply with the clauses mentioned earlier, for beam detailing, RCDC will restrict the rebar to be provided in beam at column-junction as per column size. This is applicable to top and Bottom reinforcement of beam along with SFR (Skin reinforcement).

This is applicable for Ductile design of IS code and Special frame of ACI design codes. This is not applicable to intermediate frame of ACI design codes.
RCDC allows user to detail the beam reinforcement as per best fit, maximum diameter and minimum diameter options. Below are some snaps showing the effect of the above clauses in all three detailing options,

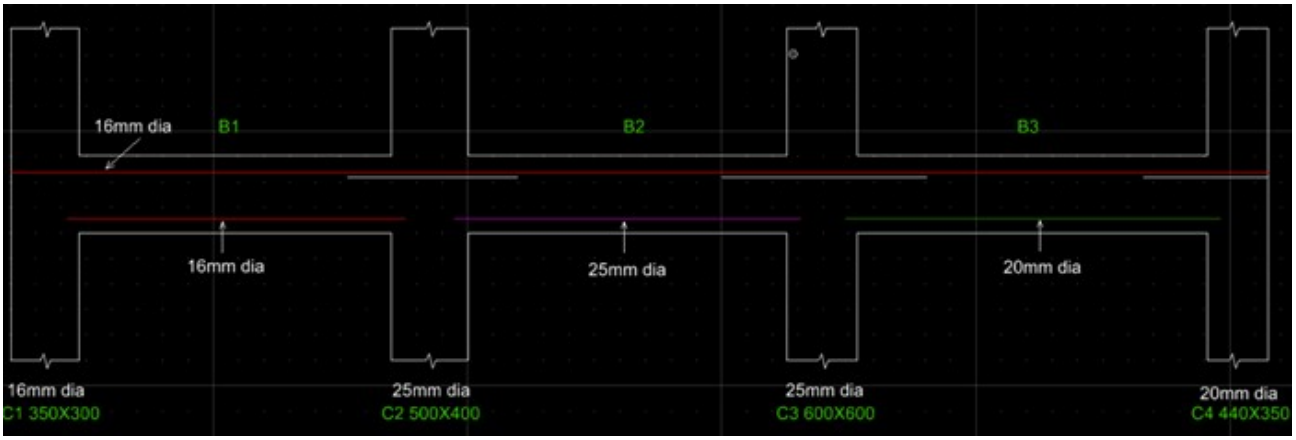
Detailing Option: Best Fit



Detailing Option: Max Diameter



Detailing Option: Min Diameter



For various options of redesign and re-detailing, the list of rebar that would be available would be as per restrictions of the adjacent column size.
If any beam fails due to permissible diameter as per column size, it would be recorded as a “Detailing failure” in RCDC.
Note:
1. If user performs the grouping of beams at same level, the permissible rebar size in the beam would be calculated as per the column size available in first beam group.

2. If user performs the grouping of levels, the permissible rebar size in the beams would be calculated as per the column size available in lowest level.

3. The restriction of rebar diameter in beam as per column size is not considred if beam is design with Axial + Biaxial forces.