



School of Engineering

Department of Civil & Environmental Engineering

CEE 3222- Theory of Structures

Assignment No. 1 & 2 – Loads and Idealized structure

#### Description of building structure to be analyzed

The main objective of this assignment is to establish idealized models of the slabs, beams, columns and frames irregular reinforced concrete (RC) framed building located in BEng city and subjected to dead and live loads. You will combine the effect of dead and live load using the combination:  $1.35 \times (\text{Dead Load}) + 1.5 \times (\text{Live load})$ .

The total height of the building above the ground level considered for the study is 15.6 m. In the present study, ground (G)+4 storey RC residential building of  $21.5 \text{ m} \times 14.5 \text{ m}$  in plan has been considered for the comparison, as shown in Fig. 1 below (Fig 2 gives the isometric view). Consider the following occupancy types for each of the four floors:

- Floor G+1 is to be used as a light storage warehouse for books.
- Floor G+2 is to be used as a dance hall.
- Floor G+3 is to be used as a church theatre with movable seats.
- Floor G+4 is to be used as an office space.
- Roof is to be adopted as a clubhouse with intention to have a sky-bar.

The dimension of slabs, beams and columns are given in Tables 1 to 3 respectively.

**Table 1 Layout of slabs for the building**

Number of storey	Slab type	Thickness (mm)	Description of slab
G, 1-4	S1	150	Slab carrying internal walls
	S2	150	Slab for stairs

**Table 2 Layout of beams for the building**

Number of storey	Beam type	Dimensions (mm)	Type of carrying
G, 1-4	B1	500*250	Internal walls
	B2	500*250	External walls

**Table 3 Layout of columns for the building**

Number of storey	Column type	bx (mm)	by (mm)
G, 1-4	Corner column (C1)	300	400
	Exterior column (C2)	300	500
	Interior column (C3)	300	600

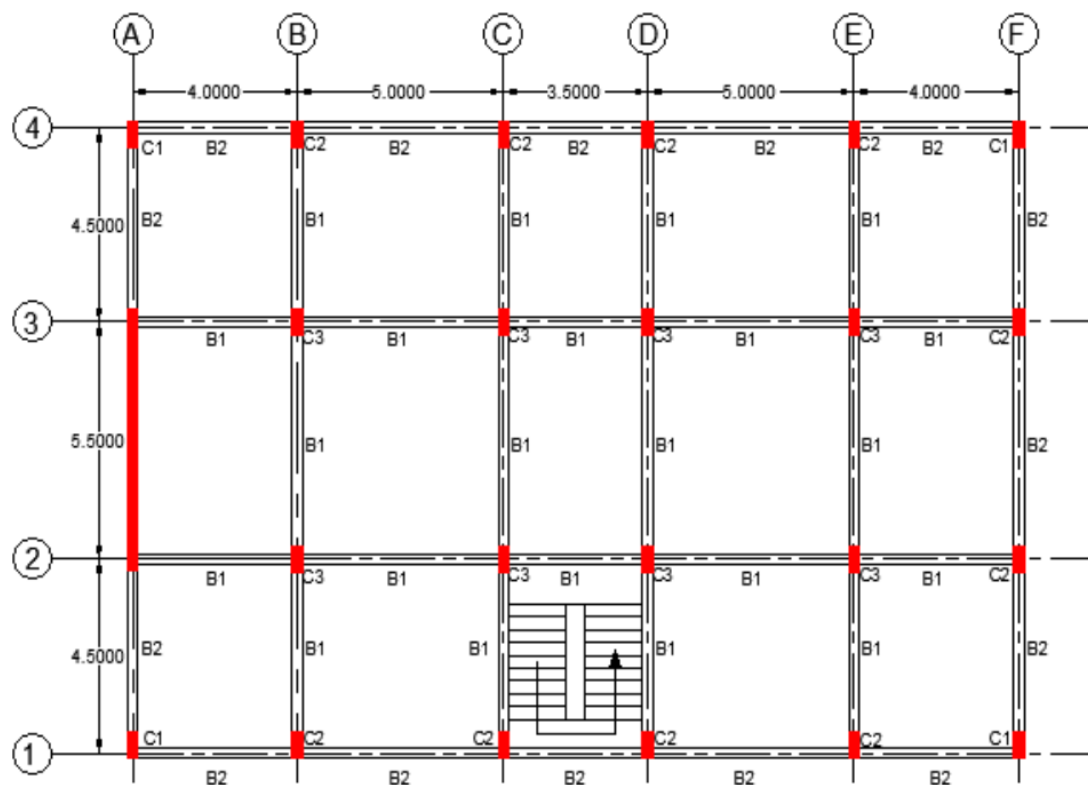


Fig. 1 Typical floor plan for the G+4 Storey building structure

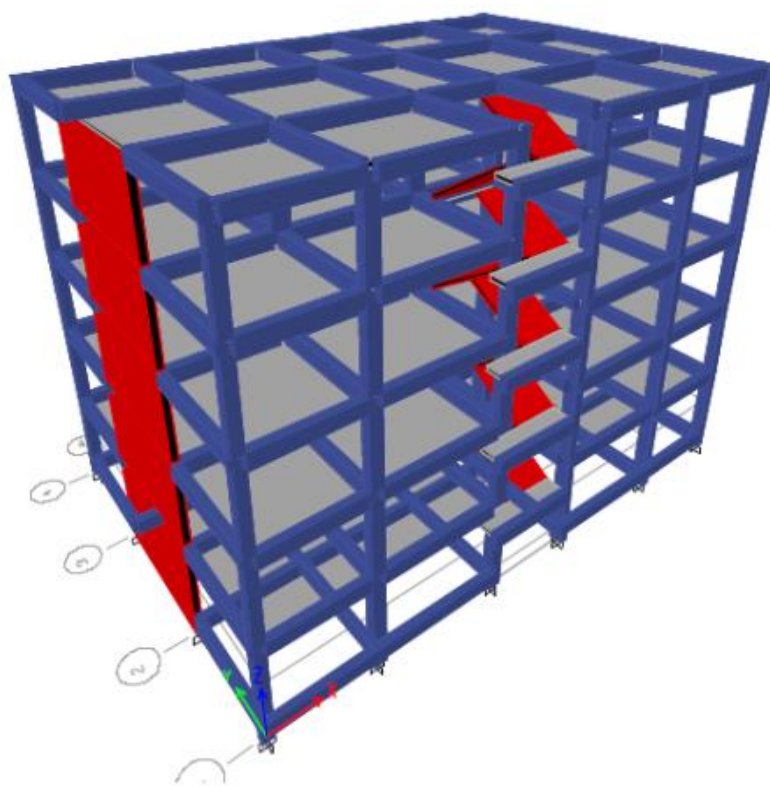


Fig. 2. Isometric view of the G+4 RC framed building structure

<b>Assignment – Due on Friday 21/07/2023</b>
<ol style="list-style-type: none"><li>1. Establish idealized framing plans for each of the floor slabs including the roof slab.</li><li>2. Establish an idealized planar frame along grid line 3 (show the estimated loadings on each floor)</li><li>3. Establish an idealized planar frame along grid line E (show the estimated loadings on each floor)</li></ol>
<b>Assignment 2 - Due on Friday 28/07/2023</b>
<ol style="list-style-type: none"><li>1. Classify each of the frames in Assignment 1 above (frame 3 and frame E) as statically determinate or indeterminate. If indeterminate, specify the degree of indeterminacy. All internal joints and supports at the base are fixed connected.</li><li>2. Model and analyze the frames 3 and E in PROKON and report (take screenshots):<ul style="list-style-type: none"><li>• The maximum deflections in X and Y directions</li><li>• The reactions at the the supports, and</li><li>• the bending moment, shear force, and axial force diagrams.</li></ul></li></ol>