

CE 462 – Analysis and Design of Building Structures

1st Semester 1428-1429 H

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CASE # 5

Design Drawings

The attached drawings show partial designs and details of a **two-story** residential villa.

Design Assumption and Loads Data

Assume same dimensions for the ground beams, floor beams, and roof beams if they are in the same frame.

Superimposed D.L.(not including self weight) : 2.0 kN/m^2 for roof, floor, and stairs.

All walls D.L.: 3.0 kN/m^2 (Story wall height = 3.0 m, Parapet = 1.2 m).

L.L. is: 2 kN/m^2 for the floor and the roof, 3 kN/m^2 for stairs.

The allowable soil pressure: 200 kN/m^2 , $\gamma_s = 18 \text{ kN/m}^3$.

$f'_c = 25 \text{ MPa}$, $f_y = 420 \text{ MPa}$.

Required

- (A) Investigate the adequacy of the given design and details for the following members: (state if it is unsafe, adequate, or over design).
1. Beam 1-3 (B-4) of the first story floor (roof of the ground floor) for shear and mid-span moments.
 2. Slab S1 for the following cases:
 - (i) the slab is continuous on one side.
 - (ii) the slab is simply supported on all sides.
 3. Slab S2 for the following cases:
 - (i) the slab is continuous on two sides.
 - (ii) the slab is simply supported on all sides.