REINFORCED CONCRETE DESIGN 1

Assessment 1

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Question 1: Analysis of section

Figure 1 shows the cross section of a 'box' reinforced concrete element. The element has the compression zone depth, *x*.

Prove that the balanced moment for the section,

$$M_{bal} = 0.1086\, f_{ck} b^3$$

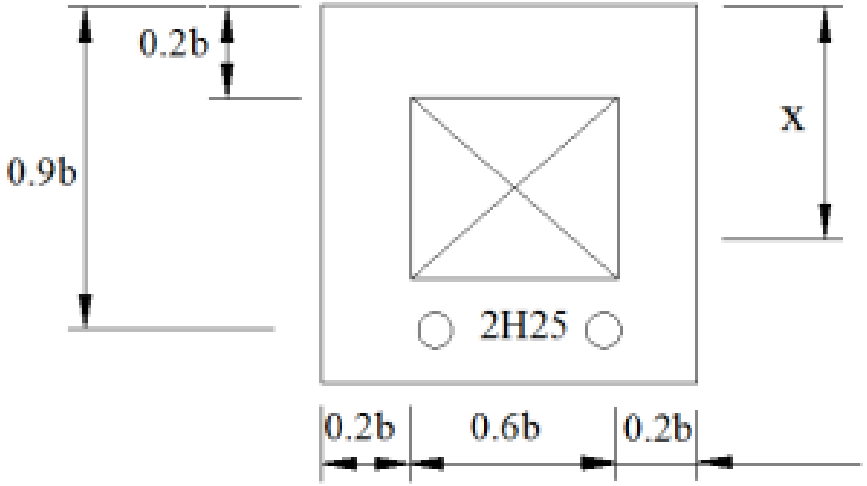


Figure 1

Question 2: Design of Beam

Figure 2(a) shows part of the floor plan of a reinforced concrete office building. During construction, slabs and beams are cast together. **Figure 2(b)** is the cross-section of Beam 1/A-D using the previous design for office building. This office building was later changed to become a retail shops which cause all slab panels to carry a larger variable action. Design data related to the action and construction material are as follows:

Variable action for retail shop = 4.0 kN/m^2
Floor finishes, ceiling and building services = 1.5 kN/m^2
Characteristics cylinder strength of concrete, f_{ck} = 30 N/mm^2
Nominal cover, c_{nom} = 30 mm

Determine whether beam 1/A-D can withstand the new variable action for retail shop. This beam also carries a 3 m high brickwall with a weight of 2.6 kN/m^2.

Question 2: Design of Beam (Figure 2(a))

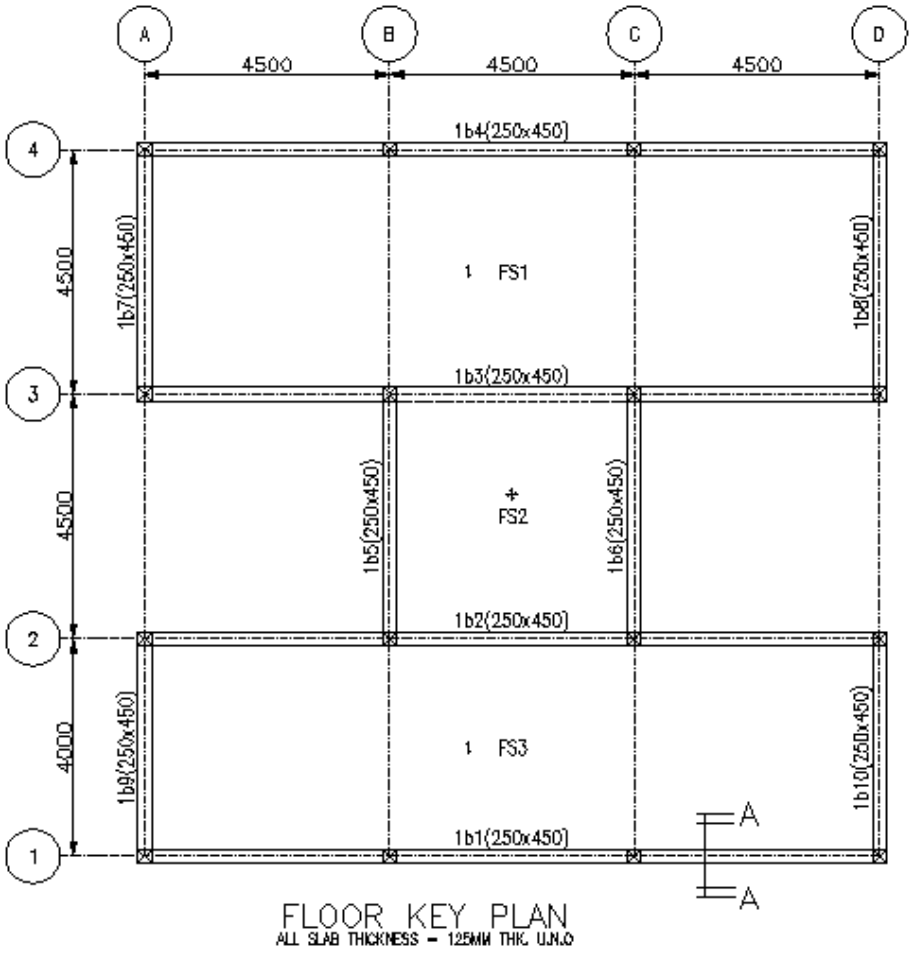
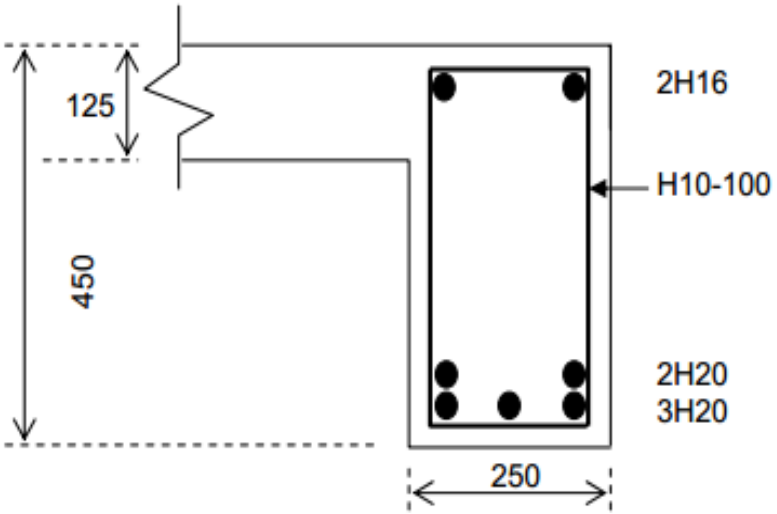


Figure 2(a)

Question 2: Design of Beam (Figure 2(b))



(All dimensions are in mm unless otherwise stated)

Figure 2(b)

End of Assessment