

Influence Lines - Beams

Qu.1

Draw the influence lines for the reactions at A, B and C respectively, and the bending moment at B.

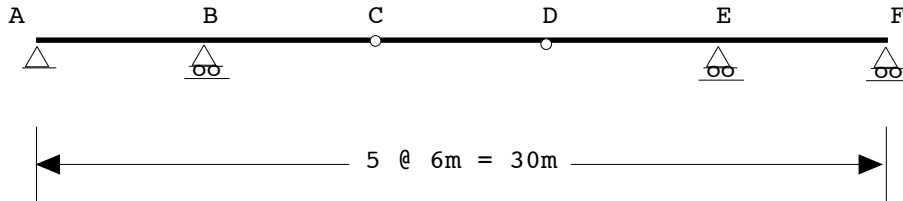
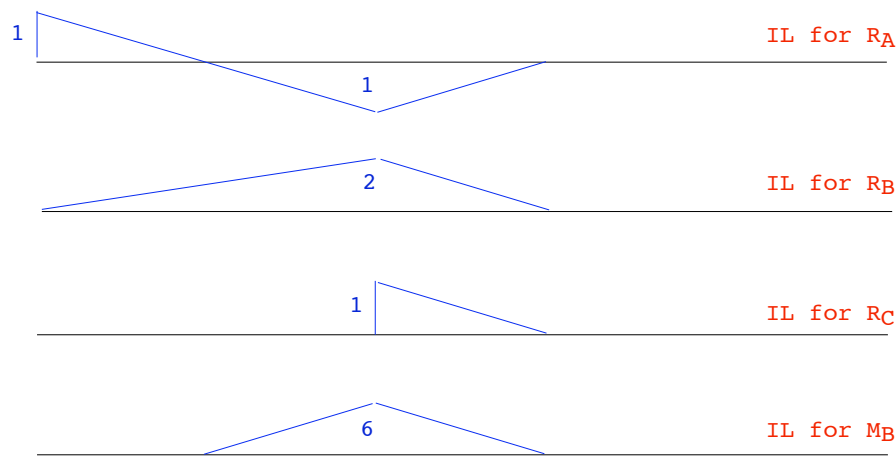


Fig.1



Qu.2

Given a compound beam such as shown in Fig.2, construct the influence lines for R_A , R_C , R_E , V_B , M_B and M_C . Calculate the maximum value for each of them due to a moving load of intensity 20kN/m.

$$R_A = 45\text{kN}, R_C = 175\text{kN}, R_E = 30\text{kN}, V_B = -55\text{kN}$$

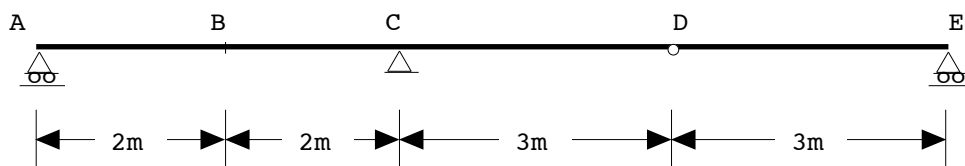


Fig.2

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Qu.3

For the compound beam and truck shown in Fig.3, find (a) the maximum reaction at C and (b) the maximum moment at D.

$R_C = 156\text{kN}$, $M_D = -111\text{kN-m}$

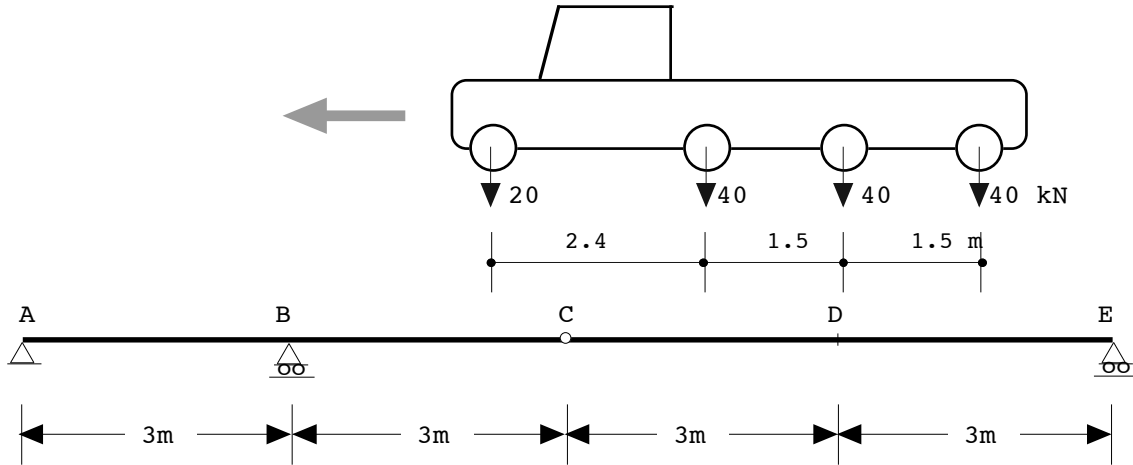


Fig.3

Qu.4

Fig.4 shows a simply supported girder of 100m span. The rolling loads shown may cross the girder in either direction. Determine the location and magnitude of the maximum bending moment. Also find the equivalent UDL covering the whole span that will produce the same maximum bending moment. What is the maximum value of the shear force at the left-hand quarter section?

$M_{\max} = 1500.8\text{kN-m}$, $q_{\text{UDL}} = 1.2\text{kN/m}$

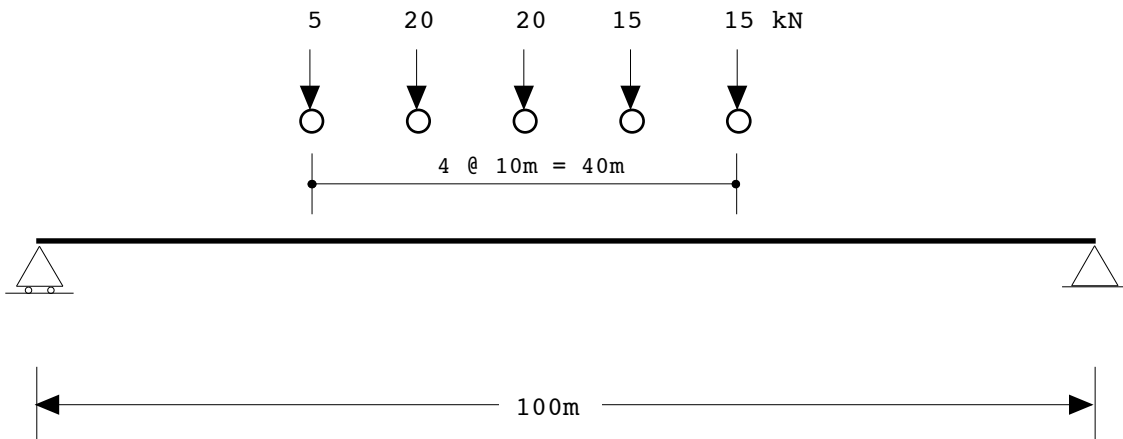


Fig.4