B. Haidar

Structural Mechanics (2)

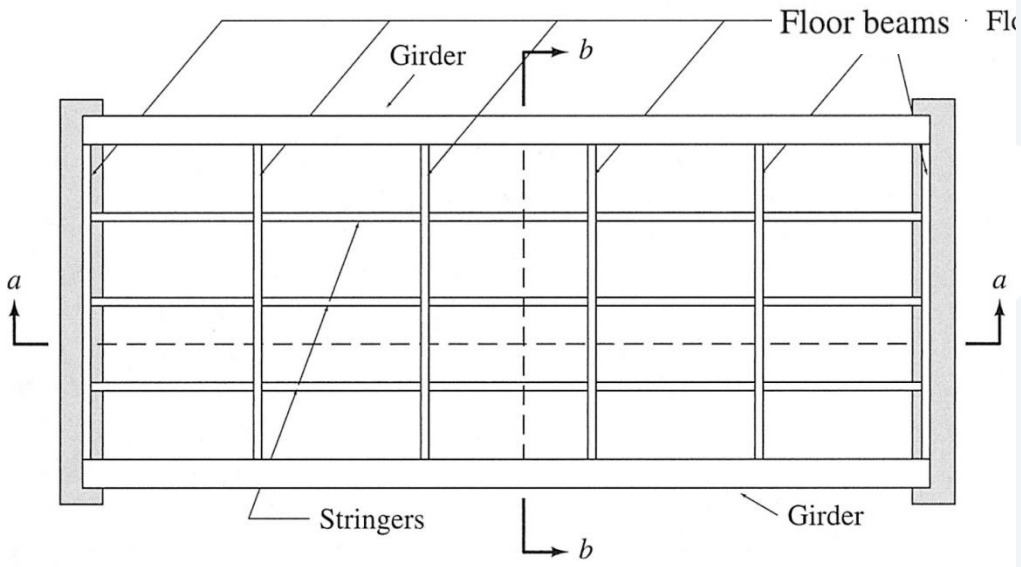
Lecture No-07

Influence Lines

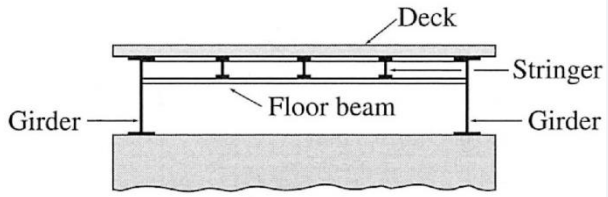
- Influence Lines for Beams & Frames by Equilibrium Method.
- **Muller-Breslau's Principle and Qualitative Influence Line.**
- **Influence Lines for Girders with Floor Systems.**
- **Influence lines for Trusses.**
- **Influence Lines for Deflections.**

Influence Lines For Girders With Floor Systems

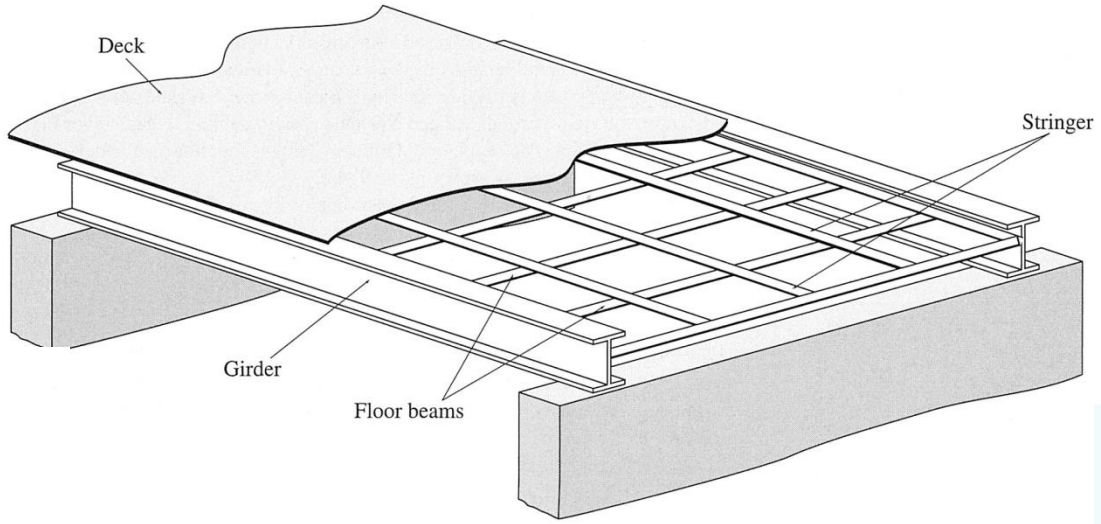
Main girders are not subjected to live loads directly but via the floor framing system.



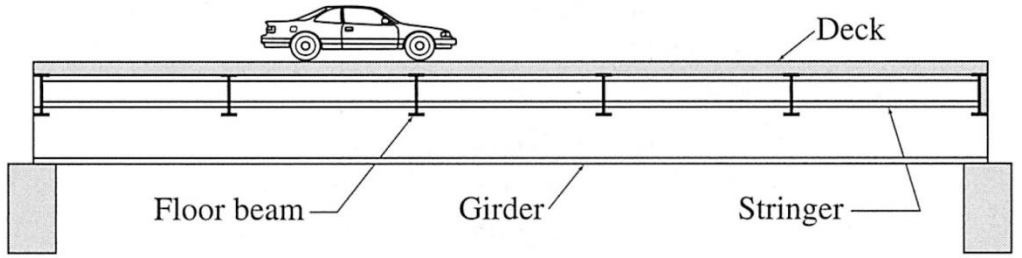
Plan (deck not shown)



Section b-b



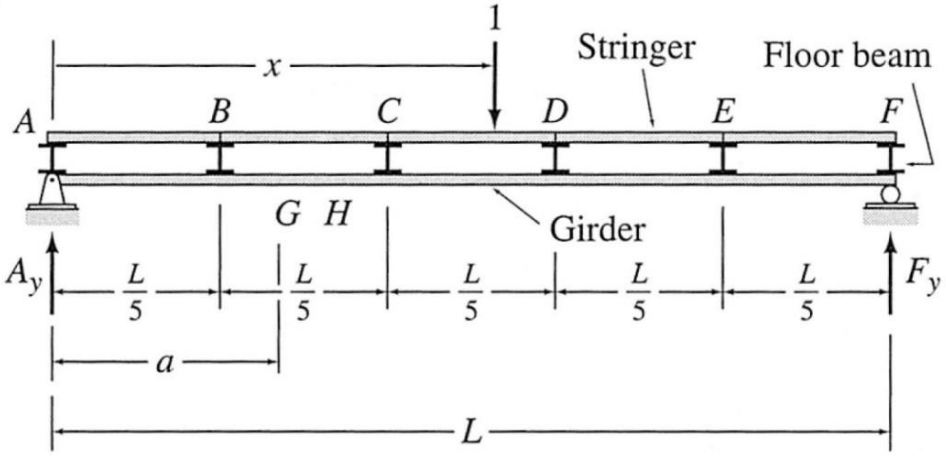
The deck rests on beams called stringers which are supported by floor beams which in turn are supported by the girders.

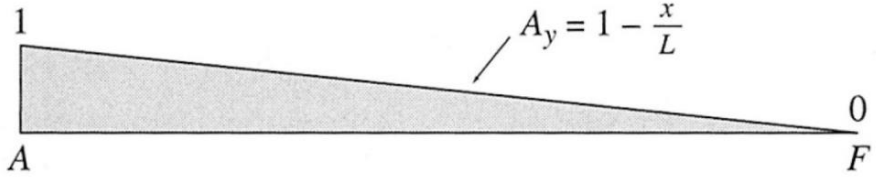


Section a-a

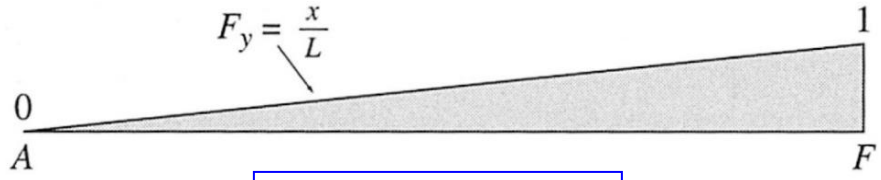
Influence Lines For Girders With Floor Systems

Ex. In the main girder in Fig.(a), find the influence lines of A_y, F_y





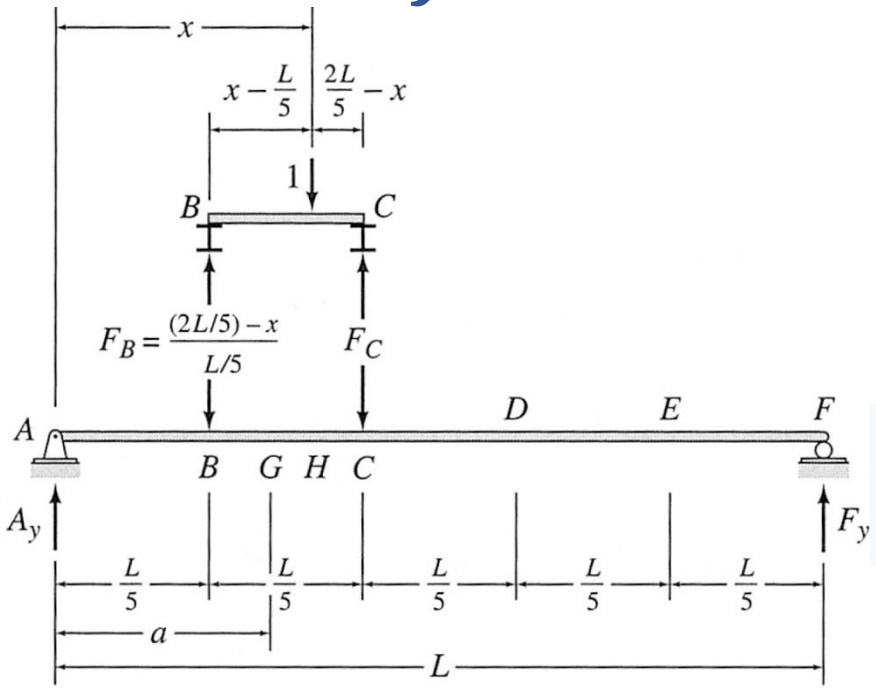
(b) Influence Line for A_y



(c) Influence Line for F_y

Influence Lines For Girders With Floor Systems

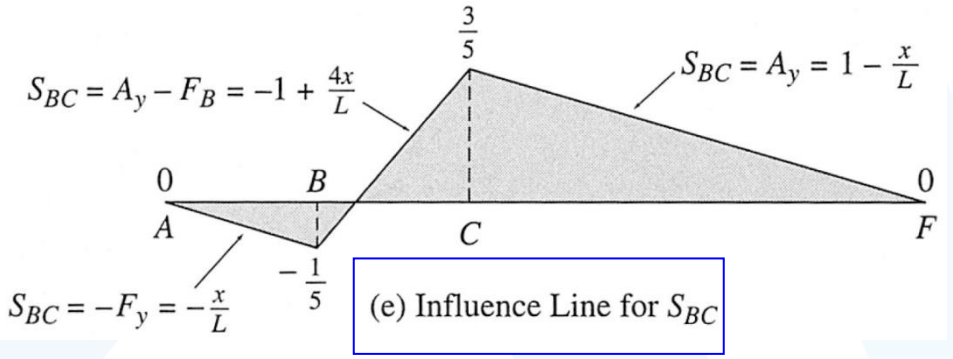
Ex. In the main girder in Fig.(a), find the influence lines of S_{BC}



if $0 \le x \le L/5$: $S_{BC} = -F_y$

if $L/5 \le x \le 2L/5$: $S_{BC} = A_y - F_B$

if $2L/5 \le x \le L$: $S_{BC} = A_y$



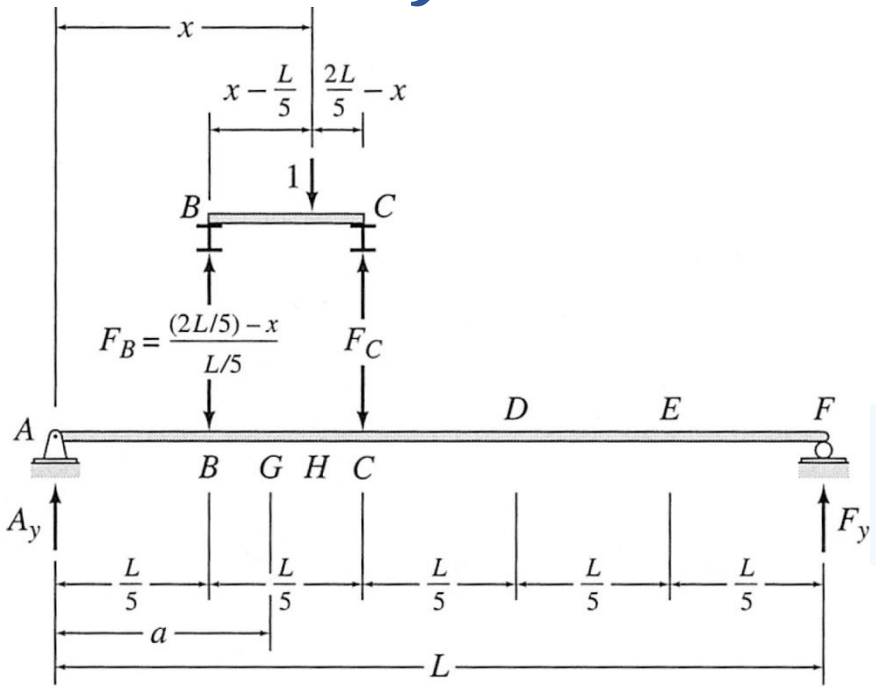
Influence Lines For Girders With Floor Systems

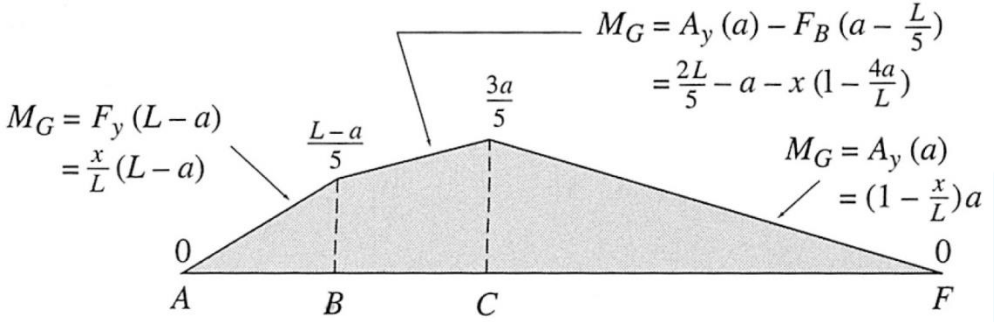
Ex. In the main girder in Fig.(a), find the influence lines of M_G

if $0 \le x \le L/5$: $M_G = \ldots$

if $L/5 \le x \le 2L/5$: $M_G = \ldots$

if $2L/5 \le x \le L$: $M_G = \ldots$





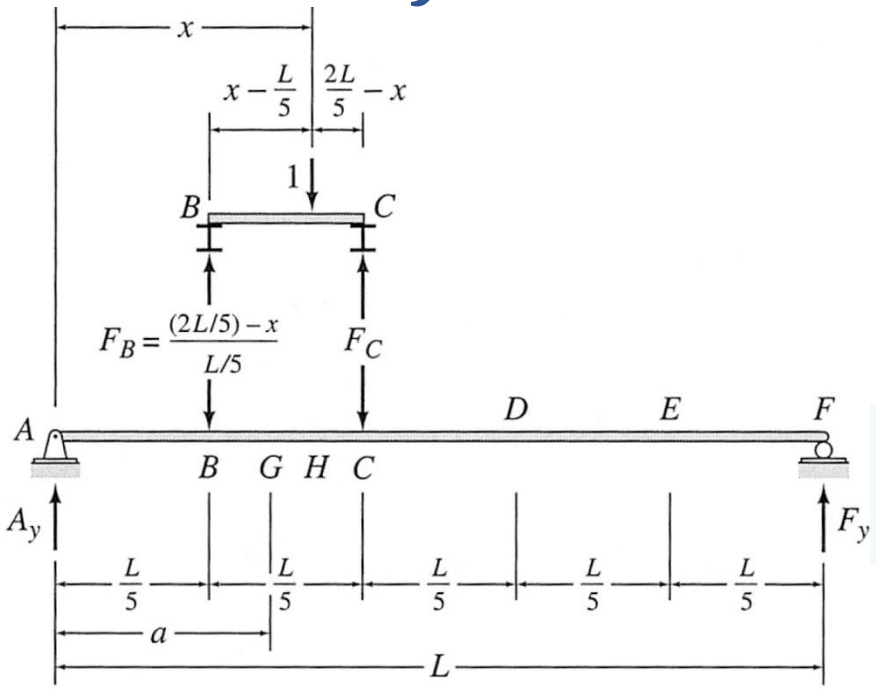
(f) Influence Line for M_G

Influence Lines For Girders With Floor Systems

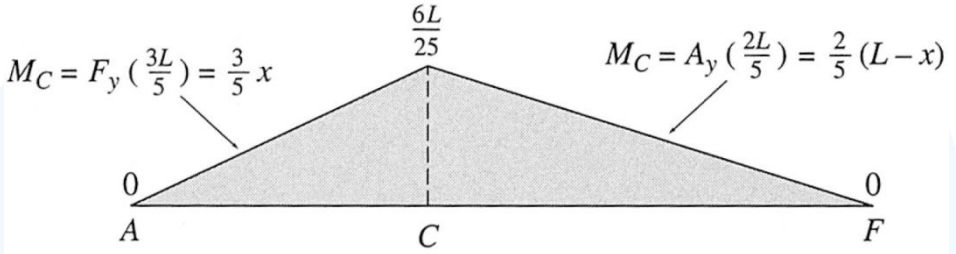
Ex. In the main girder in Fig.(a), find the influence lines of M_C

if $0 \le x \le 2L/5$: $M_C = \ldots$

if $2L/5 \le x \le L$: $M_C = \ldots$



(d)



(g) Influence Line for M_C