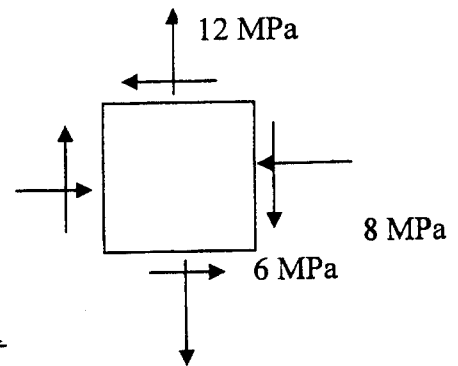
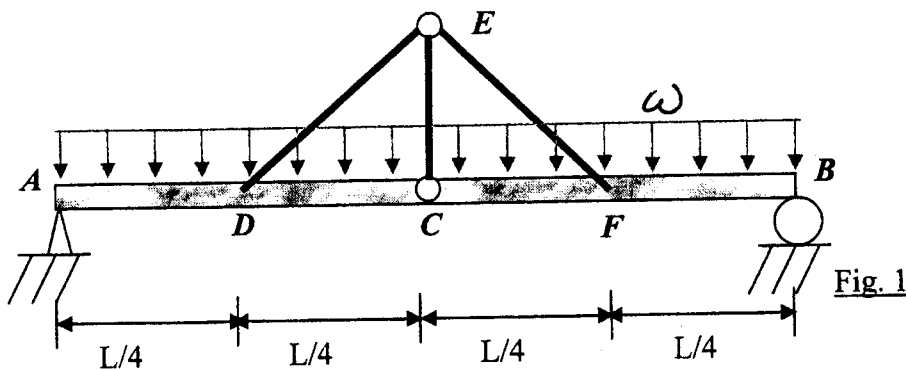


編號: 303 系所: 建築學系丁組

科目: 建築結構學

本試題是否可以使用計算機:  可使用,  不可使用 (請命題老師勾選)

1. A simply supported concrete beam AB, shown in Fig. 1, is found to suffer moment cracks and serious bottom steel corrosion at the middle of the span, joint C. It is considered that joint C is becoming a hinge, only capable of transferring axial force and shear. A simple truss, composed of three members DE, CE and EF, is proposed to increase the load bearing capacity of beam AB. (40%)
- Analyze the force pattern (compression or tension) of the three truss members to explain if this scheme will work.
  - Which portion of the beam AB will experience axial force in this case?
  - If the  $E_c I$  of beam AB and the  $E_s A$  of the truss members are known, calculate the deformation at mid point C due to a uniformly distributed load  $\omega$ .



2. The state of plane stress at a point is shown on the stress element in Fig. 2. Represent this state of stress on an element oriented  $45^\circ$  counter-clockwise from the current position. Must use Mohr Circle method to solve this problem. (20%)
3. Describe the meaning of the following terms each in less than 200 Chinese words: (15%) (Answer in Chinese is acceptable.)
- "slenderness ratio" in buckling analysis
  - "Whitney's Block" in RC design
  - "Stress Ratio" in steel design
4. Design a **folded plate roof system** for a two-story school classroom building with plan dimension of 50 m  $\times$  12 m. The floor height is 3.5 m each and the roof height is presumed to be 1 m. Show your roof design in plan and section. Also explain the load path of the system for vertical loads. (25%)