مسائل مقاومت مصالح ۲ از کتاب **Ferdinand P. Beer** ویرایش ۷

مدرس: میلاد نادری

دانشجویان محترم به نکات زیر توجه داشته باشند:

۱) حل تمرین های زیر ضروری بوده و حل کامل و دقیق آنها **۳ نمره** خواهد داشت.
۲) در ابتدای جلسه امتحان می بایست همه تمرین ها تحویل داده شود و هیچ نسخه و یا کپی از آنها نزد دانشجو نباشد.
۳) صرفا استفاده از کتاب و جزوه آزاد می باشد.
۴) حل المسائل و تلفن همراه منع استفاده دارد.
۵) ماشین حساب مهندسی در جلسه امتحان همراه داشته باشید.
۶) برای موفقیت در امتحان جزوه، مسائل حل شده در کتاب و تمرین های زیر را به دقت مطالعه کنید.

شماره تمرین‌ها از ویرایش ۷ کتاب فردیناند:

فصل ۷:

۱-۲-۵-۸-۶۱-۶۸-۹۹-۱۰۱

فصل ۹:

۴-۶-۱۳-۳۴-۳۵-۳۶-۴۸-۶۵-۶۶-۹۹-۱۰۰-۱۰۵-۱۲۹-۱۳۰-۱۴۷-۱۵۰

فصل ۱۱:

۱۰-۲۲-۶۵-۷۹-۸۰-۱۱۱-۱۱۲

7.1 through 7.4 For the given state of stress, determine the normal and shearing stresses exerted on the oblique face of the shaded triangular element shown. Use a method of analysis based on the equilibrium of that element, as was done in the derivations of Sec. 7.1A.

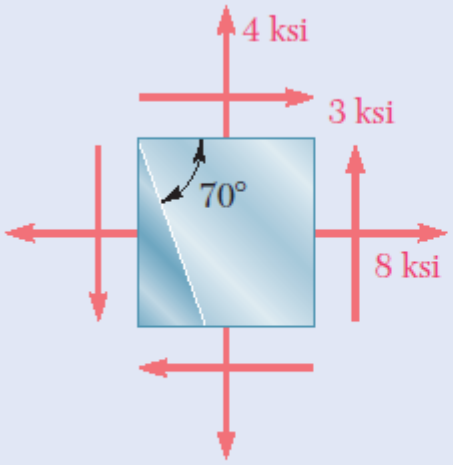


Fig. P7.1

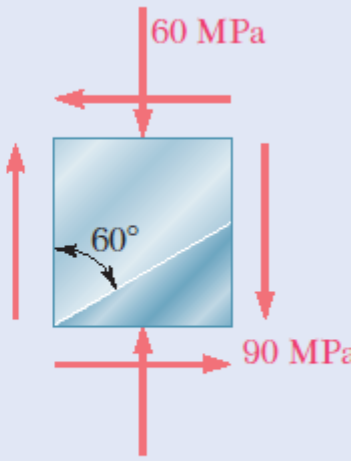


Fig. P7.2

این مسئله را هم با استفاده از فرمول ها و هم به روش ترسیم دایره مور حل کنید.

7.5 through 7.8 For the given state of stress, determine (*a*) the principal planes, (*b*) the principal stresses.

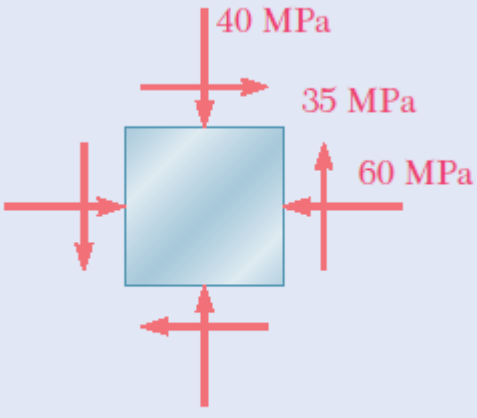


Fig. P7.5 and P7.9

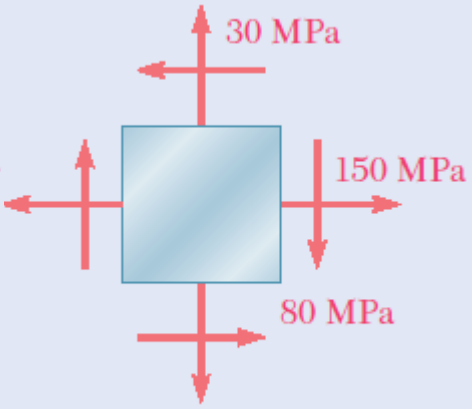


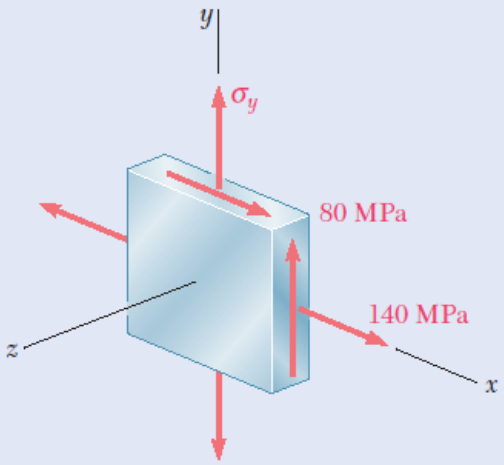
Fig. P7.7 and P7.11

این مسئله را هم با استفاده از فرمول ها و هم به روش ترسیم دایره مور حل کنید.

7.61 For the state of stress shown, determine the range of values of θ for which the normal stress $\sigma_{x'}$ is equal to or less than 50 MPa.

Fig. P7.61 and P7.62

7.68 For the state of stress shown, determine the maximum shearing stress when (*a*) $\sigma_y = 40$ MPa, (*b*) $\sigma_y = 120$ MPa. (*Hint:* Consider both in-plane and out-of-plane shearing stresses.)



7.99 A spherical gas container having an inner diameter of 5 m and a wall thickness of 24 mm is made of steel for which $E = 200$ GPa and $\nu = 0.29$. Knowing that the gage pressure in the container is increased from zero to 1.8 MPa, determine (*a*) the maximum normal stress in the container, (*b*) the corresponding increase in the diameter of the container.

7.101 A spherical pressure vessel of 750-mm outer diameter is to be fabricated from a steel having an ultimate stress $\sigma_U = 400$ MPa. Knowing that a factor of safety of 4.0 is desired and that the gage pressure can reach 4.2 MPa, determine the smallest wall thickness that should be used.

9.1 through 9.4 For the loading shown, determine (*a*) the equation of the elastic curve for the cantilever beam *AB*, (*b*) the deflection at the free end, (*c*) the slope at the free end.

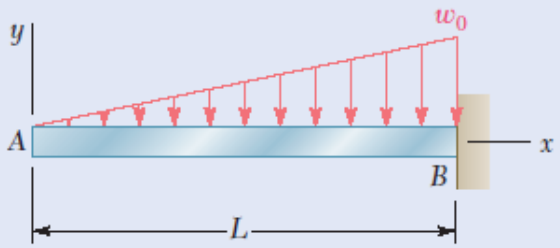


Fig. P9.4

9.6 For the cantilever beam and loading shown, determine (*a*) the equation of the elastic curve for portion *AB* of the beam, (*b*) the deflection at *B*, (*c*) the slope at *B*.

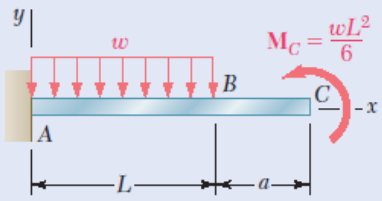


Fig. P9.6

9.13 For the beam and loading shown, determine the deflection at point *C*. Use $E = 29 \times 10^6$ psi.

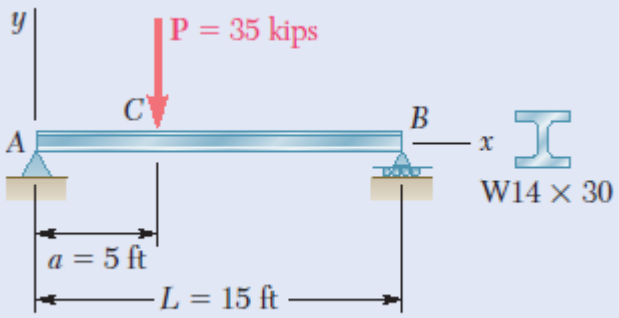


Fig. P9.13

مسائل مقاومت مصالح ۲ از کتاب **Ferdinand P. Beer** ویرایش ۷

مدرس: میلاد نادری

9.34 Determine the reaction at A and draw the bending moment diagram for the beam and loading shown.

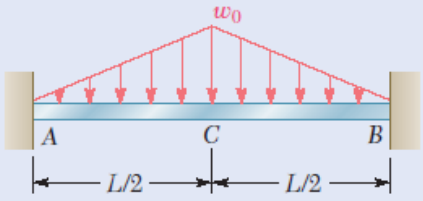


Fig. P9.34

9.35 and 9.36 For the beam and loading shown, determine (a) the equation of the elastic curve, (b) the slope at end A, (c) the deflection at point C.

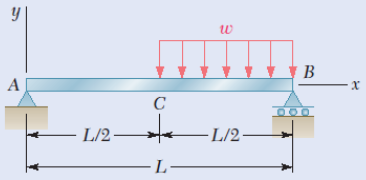


Fig. P9.35

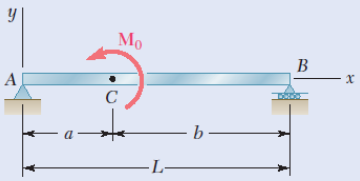


Fig. P9.36

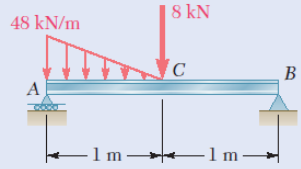


Fig. P9.48

S130 × 15

9.48 For the beam and loading shown, determine (a) the slope at end A, (b) the deflection at the midpoint C. Use $E = 200$ GPa.

9.65 through 9.68 For the cantilever beam and loading shown, determine the slope and deflection at the free end.

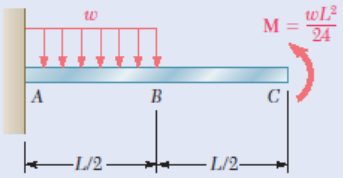


Fig. P9. 65

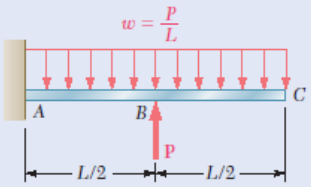


Fig. P9. 66

9.99 and 9.100 For the uniform cantilever beam and loading shown, determine the slope and deflection at (a) point B, (b) point C.

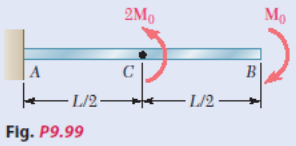


Fig. *P9.99*

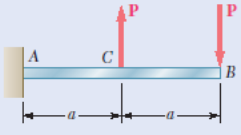


Fig. *P9.100*

مسائل مقاومت مصالح ۲ از کتاب **Ferdinand P. Beer** ویرایش ۷

مدرس: میلاد نادری

9.105 For the cantilever beam and loading shown, determine (*a*) the slope at point *A*, (*b*) the deflection at point *A*.

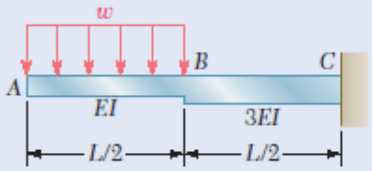


Fig. P9.105

9.129 and 9.130 For the beam and loading shown, determine (*a*) the slope at end *A*, (*b*) the deflection at point *D*. Use $E = 200$ GPa.

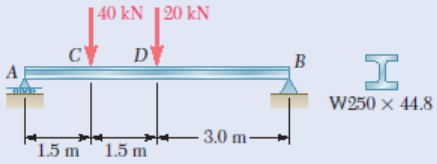


Fig. P9.129

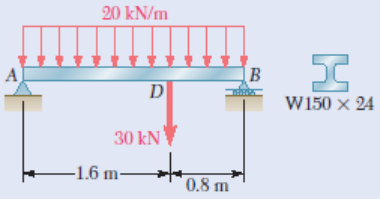


Fig. P9.130

9.147 through 9.150 For the beam and loading shown, determine the reaction at the roller support.

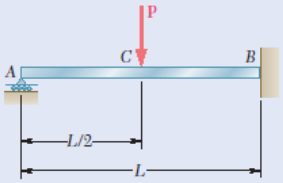


Fig. P9.147

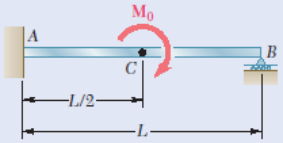


Fig. P9.148

11.10 Using $E = 200$ GPa, determine (*a*) the strain energy of the steel rod *ABC* when $P = 25$ kN, (*b*) the corresponding strain-energy density in portions *AB* and *BC* of the rod.

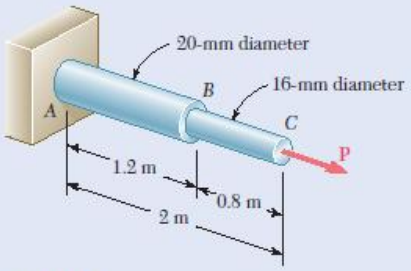


Fig. P11.10

مسائل مقاومت مصالح ۲ از کتاب **Ferdinand P. Beer** ویرایش ۷

مدرس: میلاد نادری

11.22 Each member of the truss shown is made of aluminum and has the cross-sectional area shown. Using $E = 72$ GPa, determine the strain energy of the truss for the loading shown.

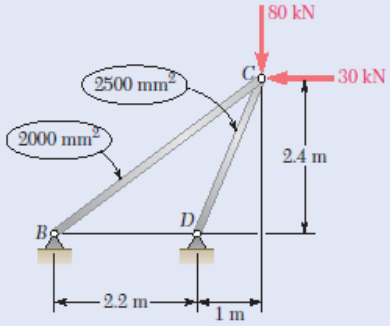


Fig. *P11.22*

11.65 Using the method of work and energy, determine the slope at point D caused by the couple $\mathbf{M}_0$.

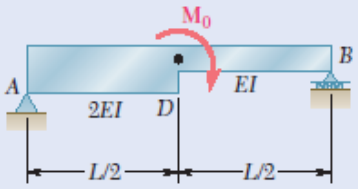


Fig. P11.65

11.79 through 11.82 For the beam and loading shown, (*a*) compute the work of the loads as they are applied successively to the beam, using the information provided in Appendix D, (*b*) compute the strain energy of the beam by the method of Sec. 11.2A and show that it is equal to the work obtained in part *a*.

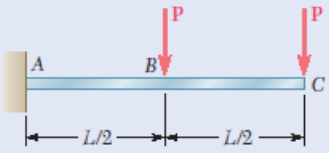


Fig. *P11.79*

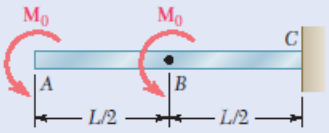


Fig. P11.80

11.111 through 11.115 Determine the reaction at the roller support and draw the bending-moment diagram for the beam and loading shown.

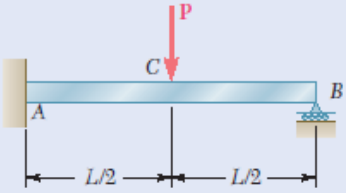


Fig. P11.111

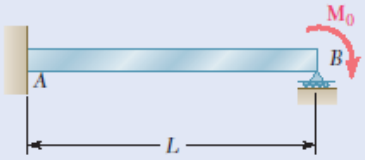


Fig. P11.112