Quiz 2 answer

Weldment, subjected to alternating fatigue, has throat area of

A = 0.707(6)(60 + 50 + 60) = 721 mm2

Members' endurance limit: AISI 1010 steel

Sut = 320 MPa, *S_e*= 0.5(320) = 160 MPa

ka = 272(320)−0.995 = 0.875

kb = 1 (direct shear)

kc = 0.59 (shear)

kd = 1

kf = 1/*Kf s*= 1/2.7= 0.370

Sse = 0.875(1)(0.59)(0.37)(160) = 30.56 MPa

Electrode's endurance: 6010

Sut = 62(6.89) = 427 MPa *S_e*= 0.5(427) = 213.5 MPa

ka = 272(427)−0.995 = 0.657

kb = 1 (direct shear)

kc = 0.59 (shear)

kd = 1

kf = 1/*Kf s* = 1/2.7 = 0.370

Sse = 0.657(1)(0.59)(0.37)(213.5) = 30.62 MPa .=

30.56

Thus, the members and the electrode are of equal strength. For a factor of safety of 1,

Fa = *τa A* = 30.6(721)(10−3) = 22.1 kN *Ans.*