
PROBLEM S6-1 QUESTION

Application of the ASME Code Rules

Consider a PWR pressure vessel that operates at 15 MPa and 320°C. The vessel is made of carbon steel, and has a diameter of 4.5 m and a thickness of 200 mm. If due to a seismic event the vessel is also subjected temporarily to an external compressive axial force F_s , as shown in Figure 1, what is the maximum allowable value of F_s , so that the ASME limit for the primary general membrane stresses is not violated? ($S_m = 180$ MPa for carbon steel at 320°C)

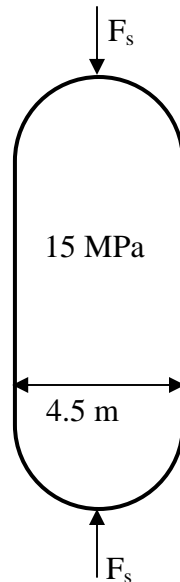


Fig. 1. (not to scale)

Assumptions

- 1) Use a thin-shell approach to calculate the principal stresses.
- 2) Neglect the external pressure.