Example 2.2.7

A T-section cantilever beam is made of two distinct parts - one flange and one web - as shown in Figure 1. Both parts are made of the same steel with E = 200 GPa. The beam is 1 m long and subjected to a vertical tip load of 2 kN as shown. Before welding, the flange and the web are under frictionless contact as shown in Figure 1b. After welding, the beam behaves as a single solid section as shown in Figure 1c.

Plot the distributions of axial strains through the thickness of the beam at its built-in end, before and after welding.

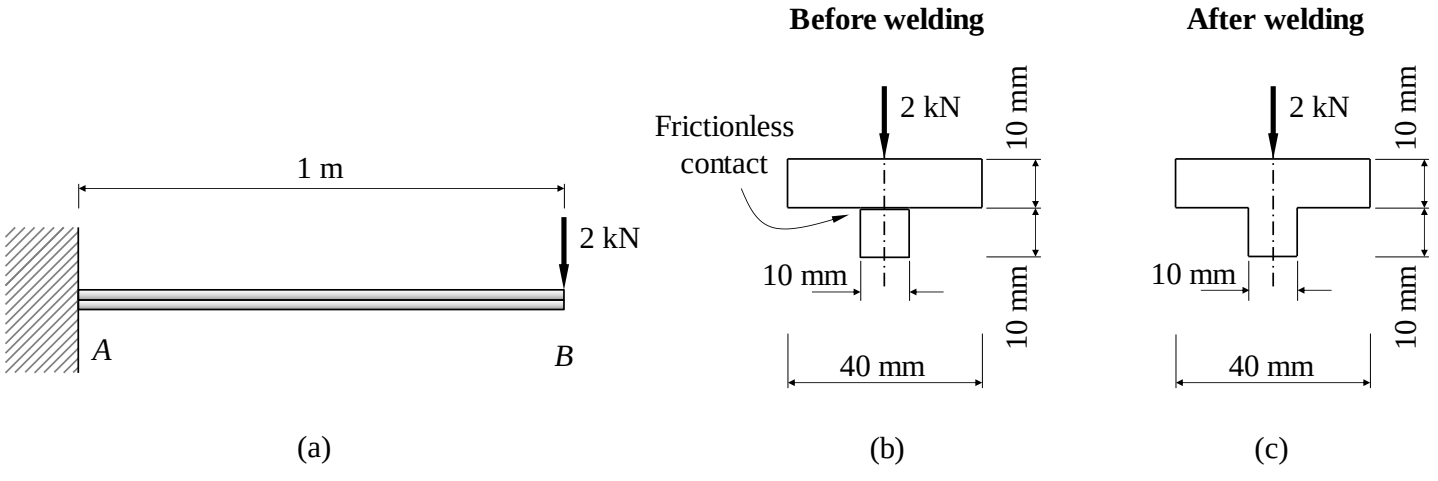

Figure 1: A T-section beam before and after welding the web on to the flange.