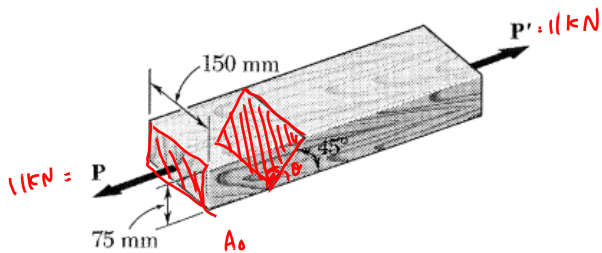Q1:Two wooden members of uniform rectangular cross section are joined by the simple glues scarf splice shown.



$\theta = 45°$

$\theta' = 90° - 45° = 45°$

$P = 11kN = 11000\,N$

$A_0 = 75^{mm} \times 150^{mm} = 11\,250\,mm^2$

Knowing that P=11kN, please determine

$$\sigma = \frac{P}{A}$$

(1) The normal stress (in kPa) in the glued splice and

(2) The shearing stress (in kPa) in the glued splice

(1) $\sigma = \dfrac{P\cos^2\theta}{A_0} = \dfrac{11000 \cdot (\cos 45°)^2}{11250} = 0.4889\ \frac{N/mm^2}{N/mm^2} = 488.9\ kPa \overset{OK}{\;} = 489.0\ kPa$

System

(2) Shearing stress $\mathcal{J} = \dfrac{P}{A}$    $\mathcal{J} = \dfrac{P}{A_0}\cos\theta \cdot \sin\theta$

$= \dfrac{11000\ N}{11250\ mm^2} \cdot \cos 45° \cdot \sin 45° = 488.9\ kPa = 489.0\ kPa$

MPa