SHEAR CHECK

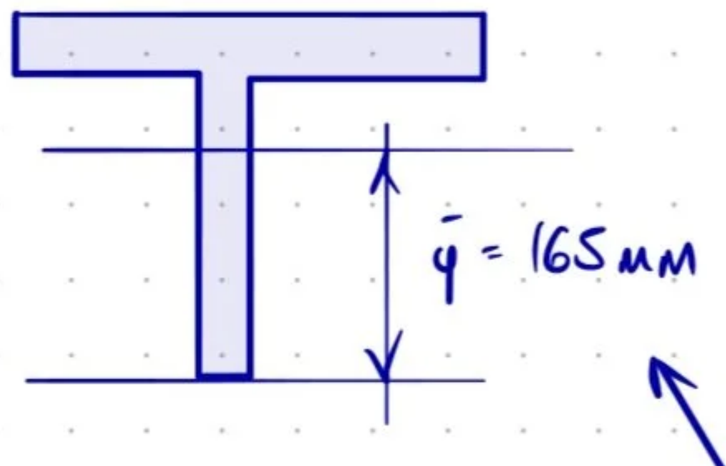
① SHEAR AREA = A_v = 13,053 mm²

$\therefore V_{pl} = \frac{13{,}053 \times 335}{\sqrt{3}} = 2525\,kN$

$V_{Ed} = 1985\,kN < 2525\,kN$ ∴ NO DIRECT SHEAR FAIL. (YET!)

CHECK SHEAR + AXIAL

Elastic shear stress $\tau_{Ed} = \frac{SA\bar{y}}{It}$



I of gross section = 147,000 mm⁴

A of ½ section = 501,00 / 2 = 25050 mm²

t = web thickness = 30.6 mm

$\bar{y}$ of ½ section : $\frac{bt_1\left(d - \frac{t_1}{2}\right) + \frac{1}{2}(d - t_1)^2 t_2}{A}$

$= \frac{(407 \times 49.2)\left(209.5 - \frac{49.2}{2}\right) + \frac{1}{2}\left(209.5 - 49.2\right)^2 \times 30.6}{25050}$

$= \frac{20024.4 \times \left(184.9\right) + \frac{1}{2}\left(160.3\right)^2 \times 30.6}{25050}$

$= \frac{20024.4 \times 184.9 + 393150}{25050} = \frac{4095662}{25050} = 165\,mm$