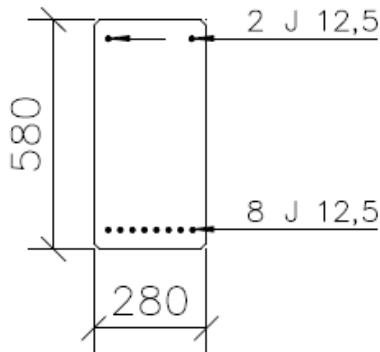


Rak 43-3111

Excercise 4

Calculate prestress loss in the **bottom** strands due to shrinkage and creep after transfer to final stage



Concrete C40/50 $E_{cm} = 35200$ MPa

Prestressed strands $A_p = 93$ mm²/strand; initial prestress 1350 MPa, $E_p = 195000$ MPa

$f_{puk} = 1860$ MPa $f_{p,o,1} = 1640$ MPa

relaxation 2,5 %/1000 h at the stress level $0,7 \cdot f_{puk}$ (class 2)

Stress just after transfer in the bottom strands $\sigma_p = 1236$ MPa and

in the top strands $\sigma_p = 1137$ MPa (see excercise 1)

Concrete stress just after transfer top fibre $\sigma_c = 0.58$ MPa

bottom fibre $\sigma_c = -14.7$ MPa

at the level of the bottom strands $\sigma_c = -13.4$ MPa

Use for final values of shrinkage $\epsilon_{cs\infty} = -0,042$ % and final creep factor $\phi_\infty = 2,3$

No additional imposed loads.

Use EC2 equation (5.46).

For the calculation of relaxation use for simplicity the stress level $\sigma_p = 1236$ MPa from the stressing of the strands to the final stage (70 years).