

$$a := 2 \text{ m} \quad b := 4 \text{ m} \quad L := 6 \text{ m}$$

$$E_{\text{bois}} := 11 \text{ GPa} \quad E_{\text{bois}} = (11 \cdot 10^3) \frac{\text{N}}{\text{mm}^2}$$

$$E_{\text{acier}} := 210 \text{ GPa} \quad E_{\text{acier}} = (210 \cdot 10^3) \frac{\text{N}}{\text{mm}^2}$$

$$P1 := 50000 \text{ N} \quad P2 := 20000 \text{ N} \quad ft := 12 \text{ mm}$$

POUR UNE FLECHE MAXI DE L/500

$$J_{\text{bois}} := \frac{1}{384} \cdot \frac{P1 \cdot L^6 + 128 \cdot P2 \cdot a^3 \cdot b^3}{ft \cdot E_{\text{bois}} \cdot L^3} \quad J_{\text{bois}} = (332.784 \cdot 10^6) \text{ mm}^4$$

$$J_{\text{acier}} := \frac{1}{384} \cdot \frac{P1 \cdot L^6 + 128 \cdot P2 \cdot a^3 \cdot b^3}{ft \cdot E_{\text{acier}} \cdot L^3} \quad J_{\text{acier}} = (17.432 \cdot 10^6) \text{ mm}^4$$

$$bl := 180 \text{ mm} \quad hl := \sqrt[3]{\frac{12 \cdot J_{\text{bois}}}{bl}} \quad hl = 280.99 \text{ mm}$$

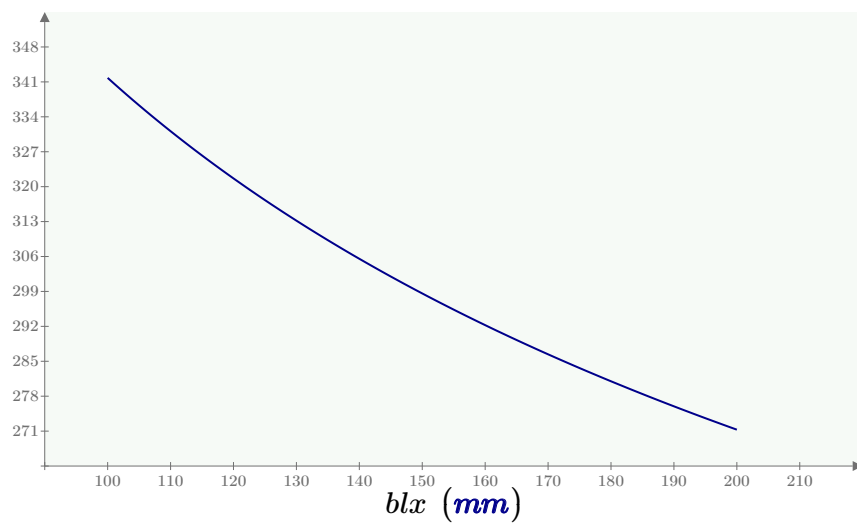
Largeur poutre bois

Hauteur poutre bois

$$blx := 100 \text{ mm}, 101 \text{ mm} \dots 200 \text{ mm}$$

$$hlx(blx) := \sqrt[3]{\frac{12 \cdot J_{\text{bois}}}{blx}}$$

hlx(blx) (mm)



$$J_{acierIPE_200} := 19.4 \cdot 10^6 \text{ mm}^4 \quad Poids := 22.4 \frac{\text{kg}}{\text{m}} \cdot L \quad Poids = 134.4 \text{ kg}$$

$$ft_{IPE_200} := \frac{1}{384} \cdot \frac{P1 \cdot L^6 + 128 \cdot P2 \cdot a^3 \cdot b^3}{J_{acierIPE_200} \cdot E_{acier} \cdot L^3} \quad ft_{IPE_200} = 10.782 \text{ mm}$$

$$J_{acierIPN_200} := 21.4 \cdot 10^6 \text{ mm}^4 \quad Poids := 26.2 \frac{\text{kg}}{\text{m}} \cdot L \quad Poids = 157.2 \text{ kg}$$

$$ft_{IPN_200} := \frac{1}{384} \cdot \frac{P1 \cdot L^6 + 128 \cdot P2 \cdot a^3 \cdot b^3}{J_{acierIPN_200} \cdot E_{acier} \cdot L^3} \quad ft_{IPN_200} = 9.775 \text{ mm}$$

$$J_{acierHEA_180} := 25.1 \cdot 10^6 \text{ mm}^4 \quad Poids := 35.5 \frac{\text{kg}}{\text{m}} \cdot L \quad Poids = 213 \text{ kg}$$

$$ft_{HEA_180} := \frac{1}{384} \cdot \frac{P1 \cdot L^6 + 128 \cdot P2 \cdot a^3 \cdot b^3}{J_{acierHEA_180} \cdot E_{acier} \cdot L^3} \quad ft_{HEA_180} = 8.334 \text{ mm}$$

$$J_{acierHEB_160} := 24.9 \cdot 10^6 \text{ mm}^4 \quad Poids := 42.6 \frac{\text{kg}}{\text{m}} \cdot L \quad Poids = 255.6 \text{ kg}$$

$$ft_{HEB_160} := \frac{1}{384} \cdot \frac{P1 \cdot L^6 + 128 \cdot P2 \cdot a^3 \cdot b^3}{J_{acierHEB_160} \cdot E_{acier} \cdot L^3} \quad ft_{HEB_160} = 8.401 \text{ mm}$$

$$BB := 180 \text{ mm} \quad HH := 300 \text{ mm} \quad J_{Bois} := \frac{BB \cdot HH^3}{12} \quad J_{Bois} = (405 \cdot 10^6) \text{ mm}^4$$

$$ft_{Bois} := \frac{1}{384} \cdot \frac{P1 \cdot L^6 + 128 \cdot P2 \cdot a^3 \cdot b^3}{J_{Bois} \cdot E_{bois} \cdot L^3} \quad ft_{Bois} = 9.86 \text{ mm}$$

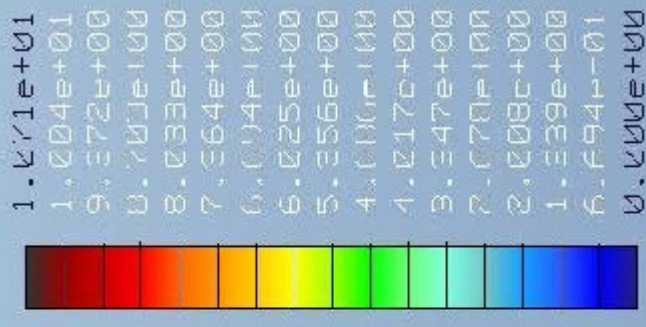
Displacement Mag (wds)
(mm)

Deformed

Max Disp +1.0711E+01

Scale 6.2552E+01

Loadset:LoadSet1 ; POUTRE_280_180_300



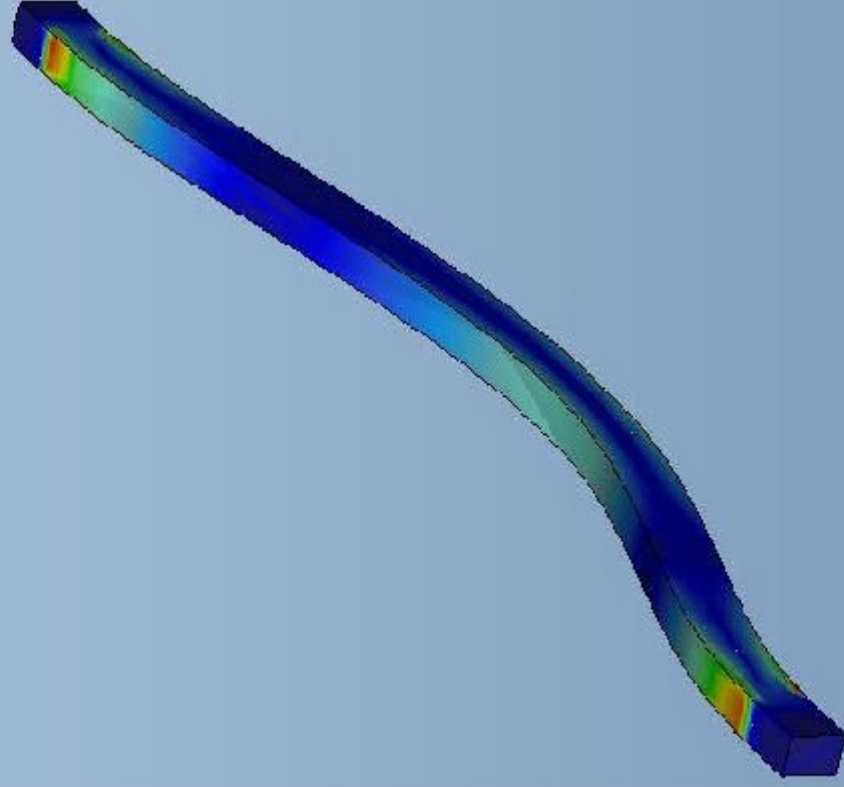
"Window1" POUTRE_180_300_2CHARGE5 POUTRE_180_300_2CHARGE5

Stress von Mises (WCS)
(MPa)

Deformed

Scale 6.2852E+01

Loadset:LoadSet1 : POUTRE_280_180_6700



2.711e+01
2.612e+00
2.438e+01
2.264e+01
2.090e+01
1.916e+01
1.742e+01
1.568e+01
1.394e+01
1.220e+01
1.046e+01
8.721e+00
6.981e+00
5.245e+00
3.505e+00
1.766e+00
2.611E-02

"Window?" POUTRE_180_300 PCHARGES POUTRE_180_300 PCHARGES