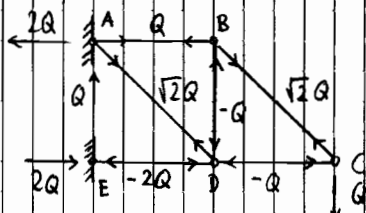


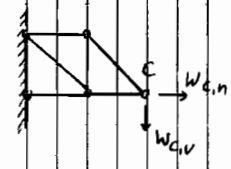
Bauwerk I+II Lösung der Fernprüfung

Sommer 08

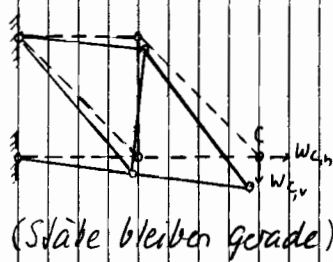
1a)



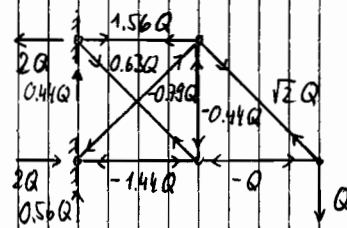
b) $w_{C,v} = (7 + 4\sqrt{2}) \frac{QL}{EA}$
 $w_{C,h} = -3 \frac{QL}{EA}$



c)



d)

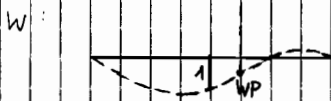


2 a) $w_1(Q_1, Q_2) = \frac{l^3}{768 EI} (16 Q_1 + 11 Q_2) = \frac{23}{6912} \frac{QL^3}{EI} = 0.003328 \cdot \frac{Q_1 l^3}{EI}$

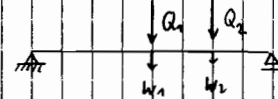
$w_2(Q_1, Q_2) = \frac{l^3}{768 EI} (41 Q_1 + 9 Q_2) = 0$



$\left[\frac{QL}{144} \right]$



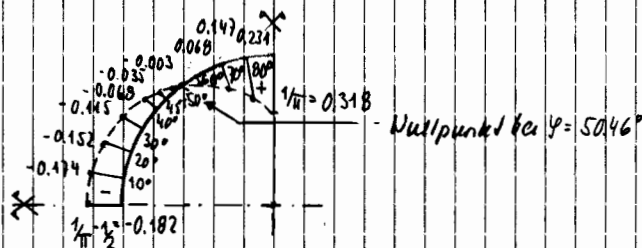
$\frac{w}{w_1}$



b) $Q_1 = -\frac{8448}{23} \frac{EI}{l^3} = -367.3 \frac{EI}{l^3}$

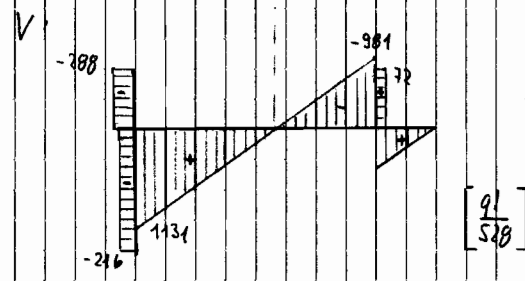
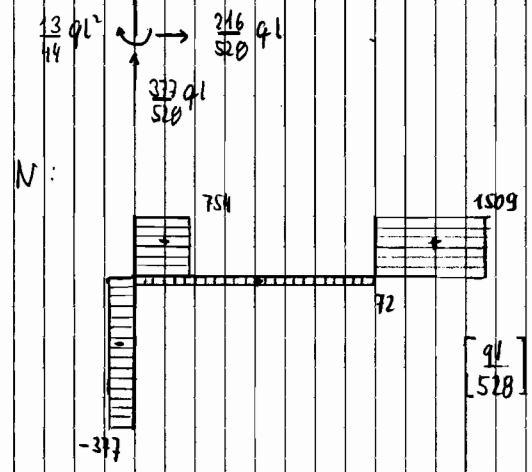
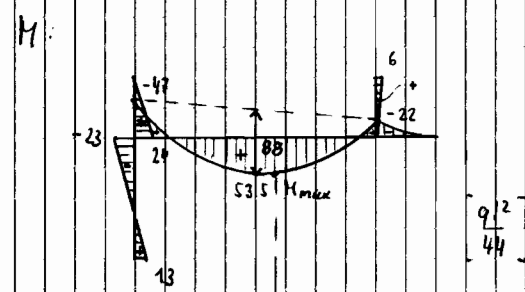
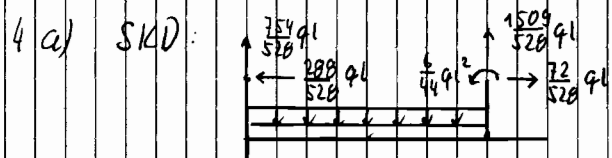
$Q_2 = \frac{12'288}{23} \frac{EI}{l^3} = 534.3 \frac{EI}{l^3}$

3 a) $M(\varphi) = Q_1 r \cdot \left(\frac{1}{\pi} - \frac{\cos \varphi}{2} \right)$



3 b) $\Delta D_{AA} = \frac{Qr^3}{EI} \left(\frac{\pi}{4} - \frac{2}{\pi} \right) = 0.149 \frac{Qr^3}{EI} \rightarrow$ Verkürzung

c) $\Delta D_{BB} = \frac{Qr^3}{2EI} \left(1 - \frac{4}{\pi} \right) = -0.137 \frac{Qr^3}{EI} \rightarrow$ Verlängerung

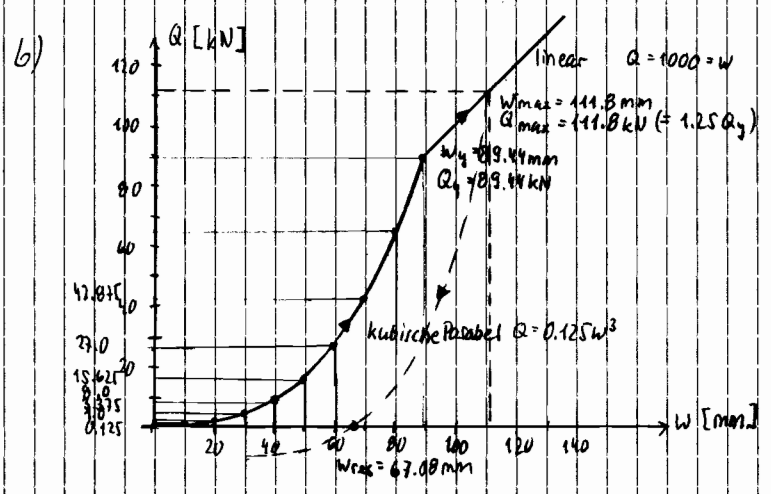


b) $\delta_{Dh} = \psi_{\neq 0} l = -\frac{2}{11} \frac{ql^4}{EI}$ (nach links)

$\delta_{N,V} = 0$ (Verformungen inf. N, V vernachlässigbar)

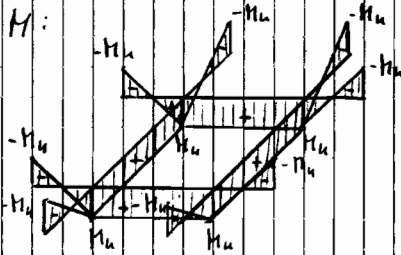
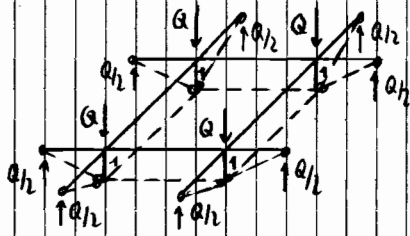
c) $\varphi_F = -\frac{37}{33} \cdot \frac{ql^3}{EI}$ (im Gegenuhrzeigersinn)

5 a) $w_y = l \sqrt{\frac{F_y}{2E}} = 89.44 \text{ mm}; \quad Q_y = 4 \frac{w_y}{l} \cdot A F_y = 4 A F_y \cdot \frac{\sqrt{F_y}}{\sqrt{2E}} = 89.44 \text{ kN}$

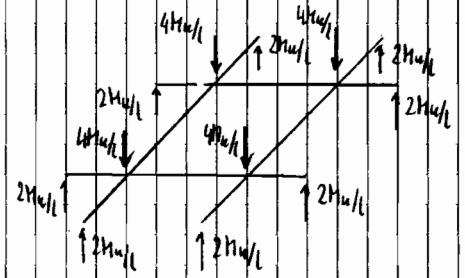


c) $w_{res} = \frac{3l}{4} \sqrt{\frac{F_y}{2E}} = 67.08 \text{ mm}$

6a)



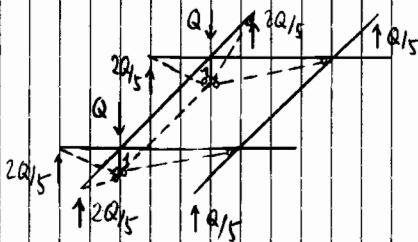
$$Q_u \leq \frac{4M_u}{l}$$



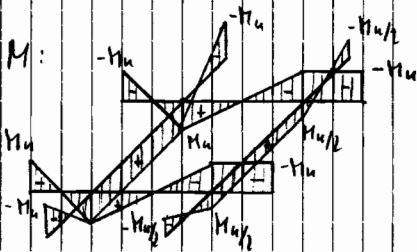
T: keine Torsionsmomente

$$Q_u = \frac{4M_u}{l}$$

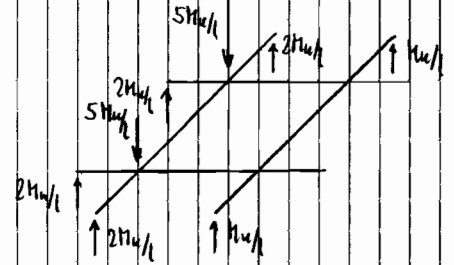
b)



Plastizitätskontrolle:



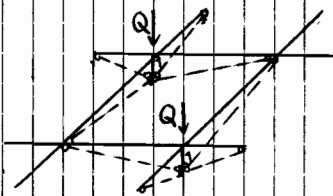
$$Q_u \leq \frac{5M_u}{l}$$



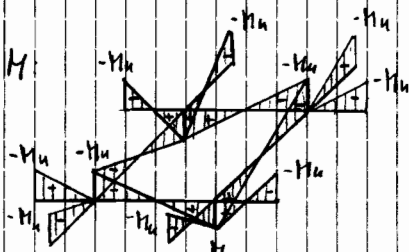
T: keine Torsionsmomente

$$Q_u = \frac{5M_u}{l}$$

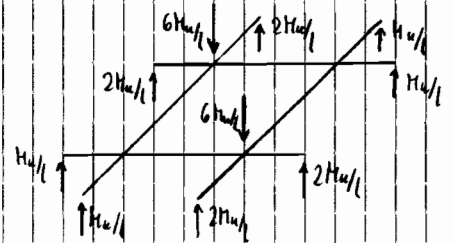
c)



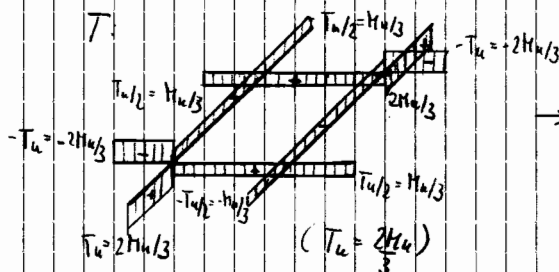
Plastizitätskontrolle



$$Q_u \leq \frac{6M_u}{l}$$



(Eine von mehreren zulässigen Lösungen!)



$$Q_u = \frac{6M_u}{l}$$