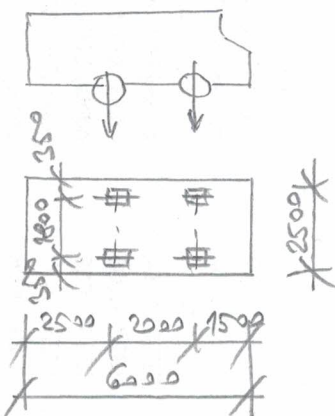
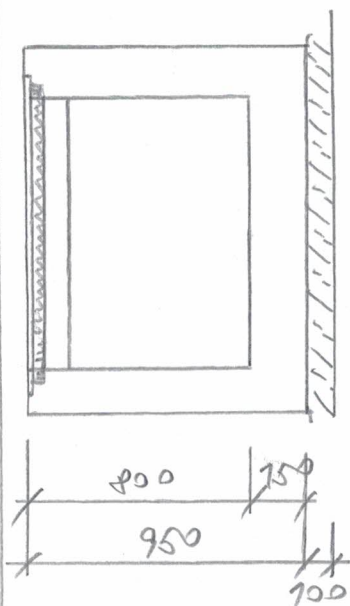
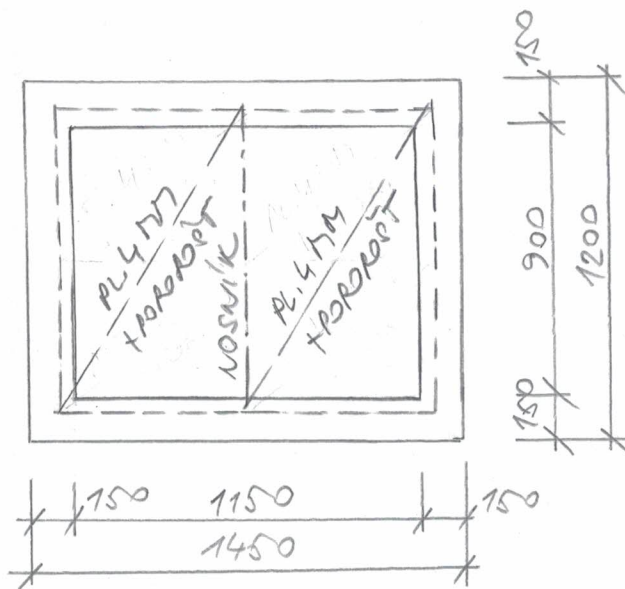


KOTORY KABELOVOU

KOTORA NN 01

## 1. SKUP KOTORY NN 01

CELKOVÁ HROTNOST  
VOZIDLA 20t

## ZATÍŽENÍ STROPU

ZATÍŽENÍ NAHODILÉ - POJEZD NA KL. AUTOMOBILEM

MAX. NA PRAVOUÉ ZATÍŽENÍ 10,0 t

JEDNO KOLA 10,0 : 2 = 5 t  $\Rightarrow$  síla  $P_m = 50 \text{ kN}$ 

ROVNĚ ZATÍŽENÍ

$$q_m = 200 \cdot \frac{1}{6 \cdot 25} = 13,30 \text{ kN/m}^2$$

SOUCÍNITELE

STATICKÝ  $\eta = 1,2$ DYNAMICKÝ  $\gamma = 1,4$  (RYCHLOST > 10 km/hod)

POTOM

$$P_m = 50 \cdot \frac{10 \cdot 1,0}{1,2 \cdot 1,4} = 84 \text{ kN}$$

$$q_m = 13,33 \cdot \frac{10 \cdot 1,0}{1,2 \cdot 1,4} = 13,33 \text{ kN/m}^2$$

VOZROVNE BRZDNE SÍLY

$$F_m = 3,5 \cdot m = 3,5 \cdot 20 = 70 \text{ kN}$$

$$F_N = m \cdot 3,5 \text{ m} = 1,2 \cdot 3,5 \cdot 20 = 84 \text{ kN}$$

NA JEDNO KOLO

$$F_{N1} = 70 \cdot \frac{1}{4} = 17,5 \text{ kN}$$

$$F_{N1} = 86 \cdot \frac{1}{4} = 21,5 \text{ kN}$$

2. ÚTĚŽNÍ SMĚŘ

$$\frac{q_n}{\text{m}^2} \quad \frac{q_n}{\text{m}^2}$$

$$\text{OCELOVÝ ŽEBR, PLOCH 4m} \quad 0,004 \cdot 80 = 0,32 \cdot 1,1 = 0,352$$

$$\text{OCELOVÝ POROKŠT SP 580-34-38-5} \quad = 1,101 \cdot 1,1 = 1,211$$

OCELKĚTI

$$1,142 \quad 1,56$$

OCELOVÝ POROKŠT SP 580-34/38-5

PRO SVĚTLÉ ROZPĚTÍ N 575mm

$$F_N = q_n = 540,82 \text{ kN/m}^2 > 13,33 + 1,142 = 14,75 \text{ kN/m}^2$$

$$F_P = 52,03 \text{ kN} > 50 \text{ kN}$$

NOSEKÁ SMĚR

1. ÚTĚŽNÍ KOLBT

$$P_N = 50 \text{ kN} \quad q_{N1} = \frac{1,15}{2} \cdot \frac{1,142}{1,56} = 0,82 \text{ kN/m}$$

$$A = \frac{25,49}{42,54} \text{ kN} \quad M = 20,97 \text{ kNm} \quad A_{max} = \frac{50,49}{84,54} \text{ kN}$$

$$g = 0,09 \text{ cm} \quad c_{gdr} = \frac{90}{400} = 0,225 \text{ cm}$$

$$\sigma = \frac{20,97 \cdot 10^3}{144 \cdot 0,16^2} = 145,7 \text{ MPa} < 210 \text{ MPa}$$

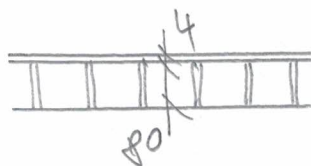
2. POSNE ÚTĚŽNÍ

$$q_{N2} = \left( \frac{1,142}{1,56} + \frac{13,33}{22,40} \right) \cdot \frac{1,15}{2} = 2,49 \text{ kN/m}$$

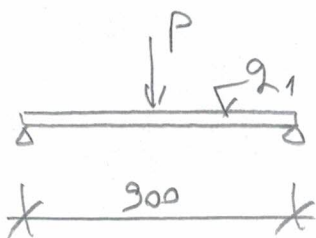
$$A = \frac{3,94}{6,33} \text{ kN} \quad M = 1,57 \text{ kNm}$$

$$g = 0,01 \text{ cm} \quad c_{gdr} = 0,225 \text{ cm}$$

$$\sigma = \frac{1,57 \cdot 10^3}{144 \cdot 0,16^2} = 11,0 \text{ MPa} < 210 \text{ MPa}$$



OCELOVÝ POROKŠT  
UYHNOUJE



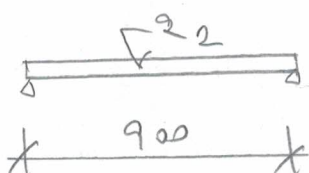
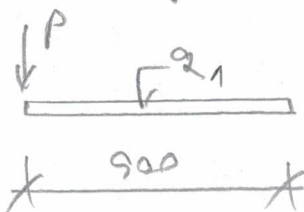
I HEB 120

$$F = 34 \text{ cm}^2$$

$$W = 144 \text{ cm}^3$$

$$J = 864 \text{ cm}^4$$

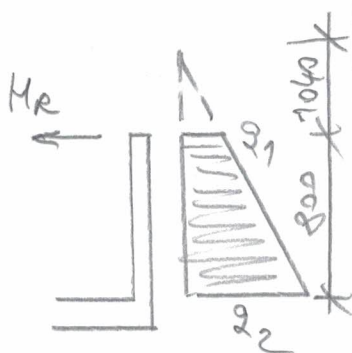
$$G = 26,7 \text{ kg/cm}$$



## 2. STĚNY KORYTY

7

SUSCE STĚNY PO ZABĚDANÍM TRUSK  
VÝKOVUŽÍ



VOZDROVNĚ

TAK ZEMINY + NAKLIDKĚ + BEZDNE SÍLY

ZEMINA  $\gamma = 18 \text{ kN/m}^3$   $m = 1,2$   $\varphi = 30^\circ$

NAKLIDKĚ  $\rho = 1333 \text{ kN/m}^2$   $m = 1,2$   $\psi = 1,4$

$$h = \frac{\rho \cdot m \cdot \psi}{\gamma \cdot m} = \frac{1333 \cdot 1,2 \cdot 1,4}{18 \cdot 1,2} = 1,04 \text{ m}$$

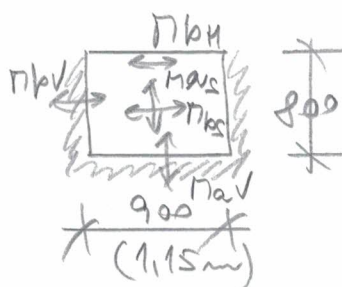
$$k = 1 - \sin \varphi_r = 1 - \sin 0,930 = 1 - \sin 27^\circ = 0,546$$

$$q_1 = h \cdot \gamma \cdot m \cdot k = 1,04 \cdot 18 \cdot 1,2 \cdot 0,546 = 12,27 \text{ kN/m}^2$$

$$q_2 = (0,8 + 1,04) \cdot 18 \cdot 1,2 \cdot 0,546 = 21,7 \text{ kN/m}^2$$

$$H = 84 \cdot \frac{1}{2} = 42 \text{ kN}$$

$$H_R = 42 \cdot \frac{1}{4} \cdot \frac{1}{0,9(1,15)} = \frac{11,67 \text{ kN}}{9,13 \text{ m}(1,15)}$$



STĚNA 0,9 m

$$H_{as} = 0,23 \text{ kNm} \quad H_{av} = 0,98 \text{ kNm}$$

$$H_{as} = 0,72 \text{ kNm} \quad H_{av} = 3,69 \text{ kNm} \quad H_{ah} = 1,72 \text{ kNm}$$

STĚNA 1,15 m

$$H_{as} = 0,45 \text{ kNm} \quad H_{av} = 1,83 \text{ kNm}$$

$$H_{as} = 1,71 \text{ kNm} \quad H_{av} = 5,49 \text{ kNm} \quad H_{ah} = 2,43 \text{ kNm}$$

VÝZTVĚ STĚN

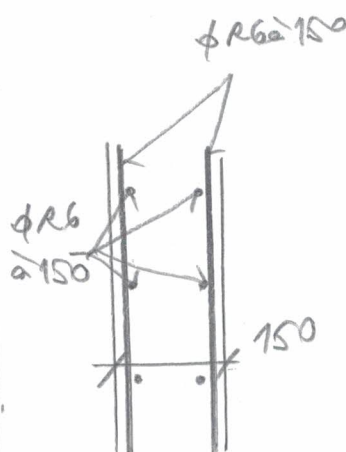
$\phi R 6 \bar{a} 150$

$$f_a = 1,88 \text{ cm}^2 \quad N_a = 84,82 \text{ kN}$$

$$\mu_k = \frac{1,88}{75} \cdot \frac{450}{200} = 0,27\% \quad \eta = 1 - \frac{1}{75} = 0,933$$

$$\sigma_p = 0,15 - 0,05 - 0,006 - 0,003 - \frac{84,82 \cdot 0,03}{2 \cdot 1 \cdot 145} = 0,028 \text{ m}$$

$$H_{a'} = 0,028 \cdot 0,933 \cdot 84,82 = 6,97 \text{ kNm} > H_{max}$$



ZATÍŽENÍ

SNĚP - PLOŠNÉ SMÁČE

$\frac{\text{W}}{\text{m}^2}$   
1,56

PLOŠNÉ NAKLONĚ

22,40

OD KOLA  $q_4 \cdot \frac{1}{1,45 \cdot 1,2}$

= 48,28

DESKA DNA

$0,15 \cdot 25 \cdot 1,1 = 4,13$

PODKL. BETON

$0,10 \cdot 23 \cdot 1,3 = 2,99$

STĚNY  $0,15 \cdot 0,08 \cdot (1,45 + 2,99) \cdot 2 \cdot 25 \cdot 1,1 = 8,92$   
 $\frac{1,45 \cdot 1,2}{1,45 \cdot 1,2}$

NAPEŇÍ V KVALIFIKOVANÉ SPÁŘE

65,88

$$q_2 = 65,88 \text{ W/m}^2$$

ZATÍŽENÍ PRO VÝPOČET DESKY DNA

$$q_d = 1,56 + 48,28 + 8,92 = 58,76 \text{ W/m}^2$$

$$M_{av} = 3,51 \text{ W/m} \quad M_{as} = 1,79 \text{ W/m}$$

$$M_{bv} = 2,98 \text{ W/m} \quad M_{bs} = 1,16 \text{ W/m}$$

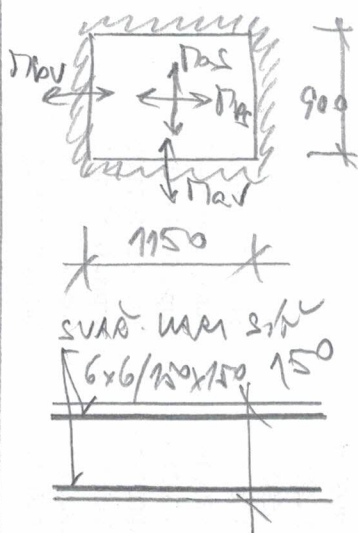
VÝSTUŽ DESKY DNA

SUM. KAM SÍŤOVINA  $6 \times 6 / 150 \times 150$   $f_a = 1,88 \text{ cm}^2$

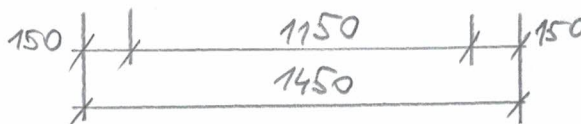
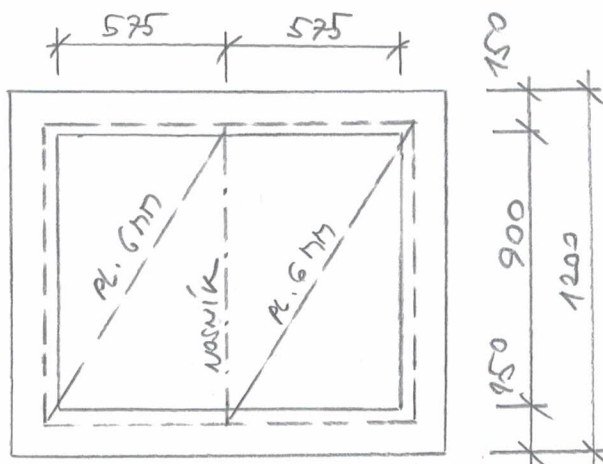
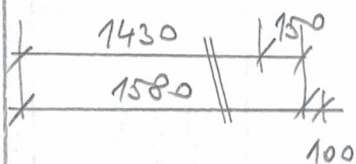
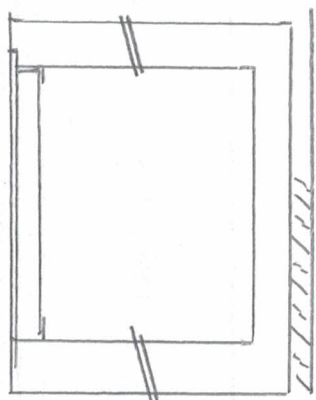
$M_a = 84,82 \text{ W}$

$$M_{max} = 3,51 \text{ W/m}$$

$$M_{a1} = 6,97 \text{ W/m} > M_{max} \text{ (V2 PŘEDLOŽÍ)}$$



## 1. STROP KATKORY NN02

ZATÍŽENÍ STROPU

ŽEBROVANÝ PLECH TL. 6 mm

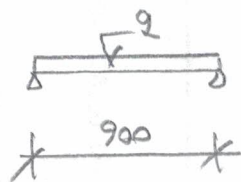
NAMODULOVÉ ZATÍŽENÍ

CELKEM

$$\begin{aligned} g_n & \text{ w/m}^2 \text{ m} & g_n & \text{ w/m}^2 \\ & = 950 \cdot 1,1 = 955 & & \\ & = 50 \cdot 1,2 = 60 & & \end{aligned}$$

5,50 6,55

PRO NORMOVÉ ZATÍŽENÍ  $q_{0w}/m^2$  A TL. PLECHU 6 mm VOLNÉ ROZDĚLENÍ MÁ JE MAX. DOVOLENÉ ROZPĚTÍ ROZDĚL 690 mm  $>$  575 mm  $\Rightarrow$  PLECH TL. 6 mm UYHODUJE

NOSNÍK STROPU

$$q_n = 515 \cdot \frac{0,575 + 0,575}{2} = 317 \text{ w/m}$$

$$A = \frac{1,46}{1,74} \text{ w} \quad \eta = 0,42 \text{ w/m}$$

$$\gamma = 0,01 \text{ cm} \quad \gamma_{\text{dov}} = \frac{90}{250} = 0,36 \text{ cm}$$

$$\sigma = \frac{0,42 \cdot 10^3}{34,2 \cdot 10^6} = 12,6 \text{ MPa} < 210 \text{ MPa}$$

I IPE100

$$F = 10,3 \text{ cm}^2$$

$$W = 34,2 \text{ cm}^3$$

$$J = 171 \text{ cm}^4$$

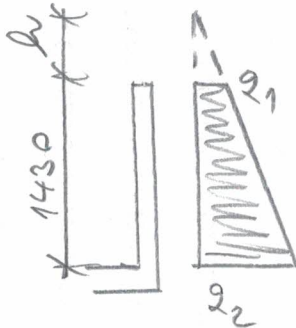
$$G = 8,1 \text{ kg/m}$$

## 2. STĚNY KOTORY

10

SVISLE STĚNY PO ZABĚTOUOVÁNÍ KAVSEK  
KABELOVOVÝ VÝKOVNÍ

### VOZROVNĚ

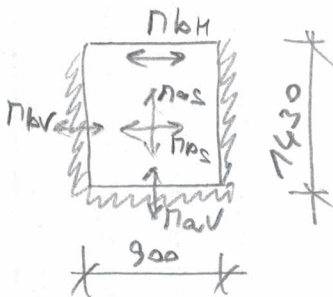


ZETINA  $\lambda = 18 \text{ W/m} \rightarrow m = 1,2 \quad \varphi = 30^\circ$   
 MAKODICE VYKOVNÍ NA KURCH  $\lambda = 5 \text{ W/m}^2 m = 1,2$   
 $h = \frac{\lambda}{\lambda} = \frac{5}{18} = 0,28 \text{ m}$   
 $k = 1 - \sin \varphi = 1 - \sin 30^\circ = 1 - 0,5 = 0,5$

$Q_1 = \lambda \cdot h \cdot m \cdot k = 18 \cdot 0,28 \cdot 1,2 \cdot 0,5 = 2,52 \text{ W/m}^2$

$Q_2 = (0,28 + 1,43) \cdot 18 \cdot 1,2 \cdot 0,5 = 20,17 \text{ W/m}^2$

### STĚNA KATŠÍ



$Q_{KV} = 0,78 \text{ W/m} \quad Q_{KS} = 0,22 \text{ W/m}$

$Q_{KV} = 0,87 \text{ W/m} \quad Q_{KS} = 0,44 \text{ W/m} \quad Q_{KH} = 0,22 \text{ W/m}$

### STĚNA ŽELŠÍ



$Q_{KV} = 1,09 \text{ W/m} \quad Q_{KS} = 0,35 \text{ W/m}$

$Q_{KV} = 1,28 \text{ W/m} \quad Q_{KS} = 0,52 \text{ W/m} \quad Q_{KH} = 0,29 \text{ W/m}$

### 3. ŽESKA DNA

MAKODICE ŽESKA - SMOOP

$\text{W/m}^2 = 6,55$

STĚNY  $\frac{0,15 \cdot (1,45 + 2,8) \cdot 2 \cdot 1,45 \cdot 25 \cdot 1,1}{1,45 \cdot 1,2} = 15,94$

ŽESKA DNA

$0,15 \cdot 25 \cdot 1,1 = 4,13$

POKRYTÍ BETON

$0,10 \cdot 23 \cdot 1,3 = 2,99$

NAPĚTÍ V ŽAKOVÉ SPÁŘE

$29,61$

$Q_2 = 29,61 \text{ W/m}^2$

MAKODICE PRO VYPOČET ŽESKA DNA

$Q_3 = 6,55 + 15,94 = 22,49 \text{ W/m}^2$

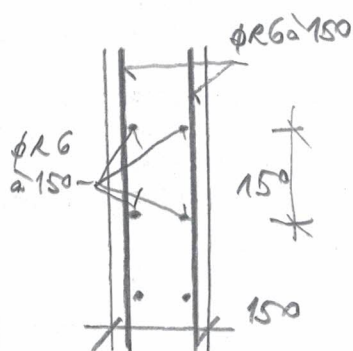
$Q_{KV} = 1,34 \text{ W/m}$

$Q_{KS} = 0,67 \text{ W/m}$

$Q_{KV} = 1,24 \text{ W/m}$

$Q_{KS} = 0,44 \text{ W/m}$

2) STĚNY



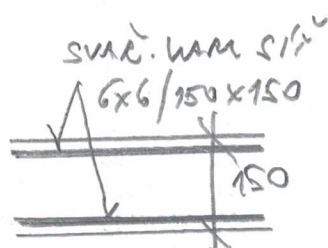
$$P_{maxS} = 0,52 \text{ W/m} \quad P_{maxV} = 1,28 \text{ W/m}$$

$$\phi R 6 a 150 \quad f_a = 1,88 \text{ cm}^2 \quad N_a = 84,82 \text{ kN}$$

$$\eta = \frac{1,88}{15} \cdot \frac{450}{20} = 0,27\% \quad \eta_g = 1 - \frac{1}{15} = 0,933$$

$$\beta_b = 0,15 - 0,05 - 0,006 - 0,003 - \frac{84,82 \cdot 10^3}{2 \cdot 1 \cdot 14,5} = 0,088$$

$$P_m' = 0,088 \cdot 0,933 \cdot 84,82 = 6,97 \text{ W/m} > P_{max}$$



3) DESKA DNA

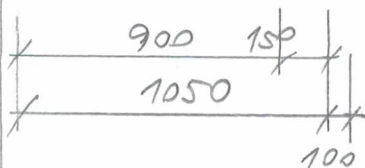
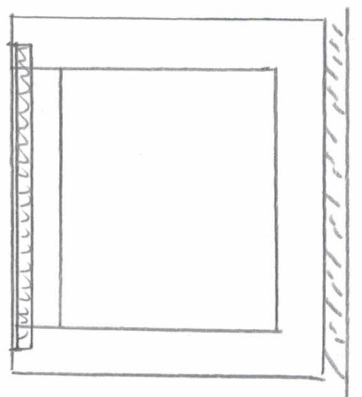
$$P_{max} = 1,31 \text{ W/m}$$

$$\text{svaz. lam sif} \quad 6x6/150x150 \quad f_a = 1,88 \text{ cm}^2$$

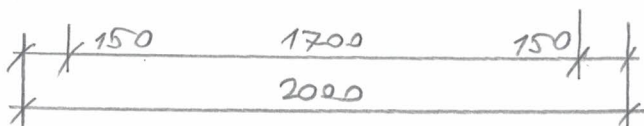
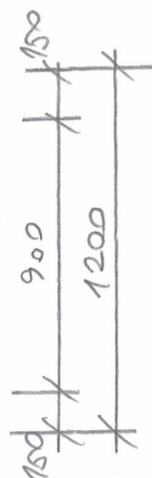
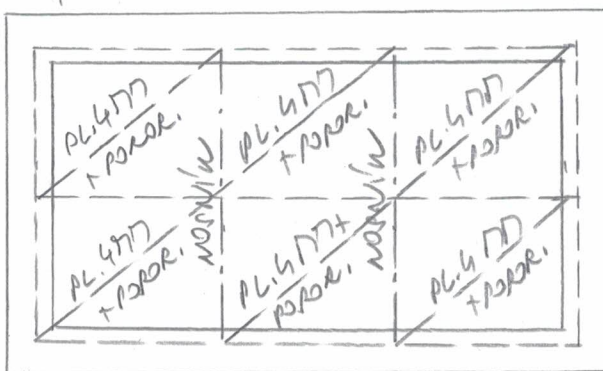
$$N_a = 84,82 \text{ kN}$$

$$P_m' = 6,97 \text{ W/m} > P_{max} \quad (\text{viz předchozí})$$

## 1. СРОП КОПОРЫ ННОЗ



566,7 566,6 566,7



## ЗАПЕЧАТКА СРОП

ВИЗ ЗАПЕЧАТКА СРОП КОПОРЫ ННОЗ

ОБЪЕМЫ РАБОТ СП 580-34/38-5

ПРО СВЕЩЕ КОПОРЫ 566,7 ПП

$$F_{\text{N}} = Q_{\text{N}} = 548,87 \text{ W/m}^2 > 1475 \text{ W/m}^2$$

$$F_{\text{P}} = 54,02 \text{ W} > 50 \text{ W}$$

## НОСНІК СРОП - КОЛО

$$P_{\text{N}} = 50 \text{ W} \quad Q_{\text{N}} = 0,5667 \cdot \frac{1,142}{1,56} = 0,81 \text{ W/m}^2$$

$$A = 42,53 \text{ W} \quad \Gamma = 20,92 \text{ W} \quad A_{\text{max}} = 50,48 \text{ W}$$

$$\gamma = 0,05 \text{ cm} \quad \gamma_{\text{max}} = \frac{90}{400} = 0,225 \text{ cm}$$

$$\nabla = \frac{20,92 \cdot 10^5}{144 \cdot 10^6} = 1457 \text{ MPa} < 20 \text{ MPa}$$

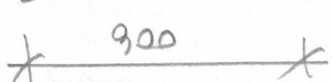
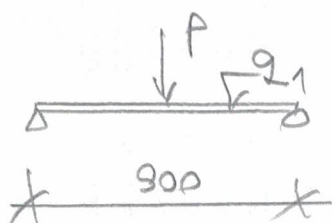
## 2. ПРОСНІК ЗАПЕЧАТКА

$$Q_{\text{N}2} = \left( \frac{1,142}{1,56} + \frac{1,33}{22,40} \right) \cdot 0,5667 = 0,36 \text{ W/m}^2$$

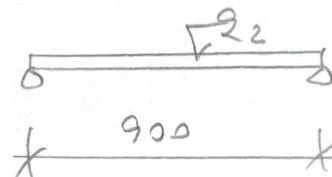
$$A = 3,88 \text{ W} \quad \Gamma = 1,54 \text{ W}$$

$$\gamma = 0,01 \text{ cm} \quad \gamma_{\text{max}} = 0,225 \text{ cm}$$

$$\nabla = \frac{1,54 \cdot 10^5}{144 \cdot 10^6} = 107 \text{ MPa} < 20 \text{ MPa}$$



НЕС 120  
ВИЗ ННОЗ

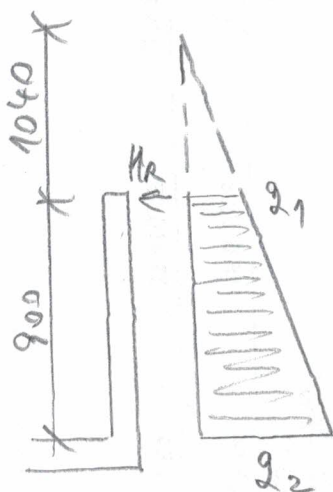


## 2. STĚNY KOTORY

13

SUSLE - STĚNY PO ZABETOVOVÁNÍ MUSÍ  
VYHOVUJÍ

VODROVNĚ - V12 NN01

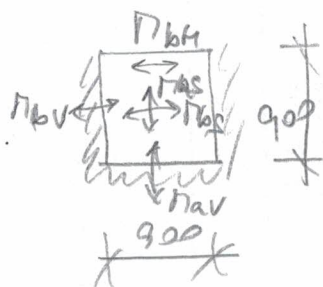


$$q_1 = 12,27 \text{ W/m}^2$$

$$q_2 = (0,9 + 1,04) \cdot 18 \cdot 1,2 \cdot 0,546 = 22,88 \text{ W/m}^2$$

$$H_R = 42 \cdot \frac{1}{4} \cdot \frac{1}{0,9(1,7)} = 11,67 \text{ W/m}^2 \begin{matrix} (0,9) \\ 6,18 \end{matrix} \begin{matrix} (1,7) \end{matrix}$$

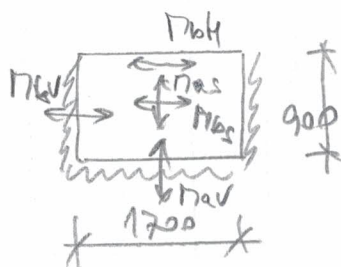
STĚNA 0,9m



$$q_{1s} = 9,23 \text{ W/m}^2 \quad q_{1v} = 1,07 \text{ W/m}^2$$

$$q_{1h} = 1,48 \text{ W/m}^2 \quad q_{2v} = 13,60 \text{ W/m}^2 \quad q_{2h} = 1,72 \text{ W/m}^2$$

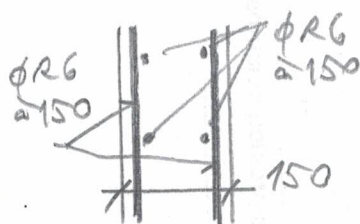
STĚNA 1,7m



$$q_{1s} = 9,55 \text{ W/m}^2 \quad q_{1v} = 3,64 \text{ W/m}^2$$

$$q_{1h} = 2,64 \text{ W/m}^2 \quad q_{2v} = 6,13 \text{ W/m}^2 \quad q_{2h} = 2,64 \text{ W/m}^2$$

VÝZVĚZ STĚN



RG 2/150

$$f_a = 1,88 \text{ cm}^2 \quad N_a = 84,82 \text{ W}$$

(V12 NN01)

$$q_{1h} = 6,97 \text{ W/m}^2 > q_{1v} = q_{2v} = 6,13 \text{ W/m}^2$$

DESKA DNA

W/m<sup>2</sup>

STROP - PLOŠNĚ STÁLE

1,56

-11- NÁMOŽNĚ

22,40

$$\text{OD KOL } 84 \cdot \frac{1}{1,2 \cdot 2} \cdot 2 = 70$$

DESKA DNA

$$0,15 \cdot 25 \cdot 1,1 = 4,13$$

$$\text{RODMĚNÍ BETON } 0,10 \cdot 23 \cdot 1,3 = 2,99$$

$$\text{STĚNY } 0,15 \cdot 28 \cdot (2 + 28) \cdot 2 \cdot 25 \cdot 1,1 \cdot \frac{1}{2 \cdot 1,2} = 2,98$$

SOUCET

87,66

14

NAPĚTÍ V KUKADOVÉ SPÁŘĚ

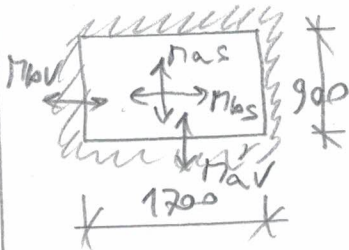
$$\underline{\underline{q_2 = 87,66 \text{ kPa}}}$$

UVEDENÍ PRO VÝPOČET DEKOVÝ DNA

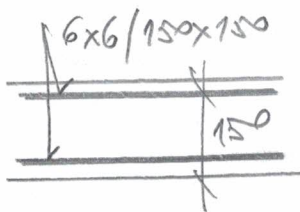
$$q_d = 1,56 + 70 + 8,98 = 80,54 \text{ kN/m}^2$$

$$p_{av} = 5,40 \text{ kN} \quad p_{as} = 3,0 \text{ kN}$$

$$p_{bv} = 3,82 \text{ kN} \quad p_{bs} = 1,10 \text{ kN/m}$$



SUMÁRNÍ SÍLY



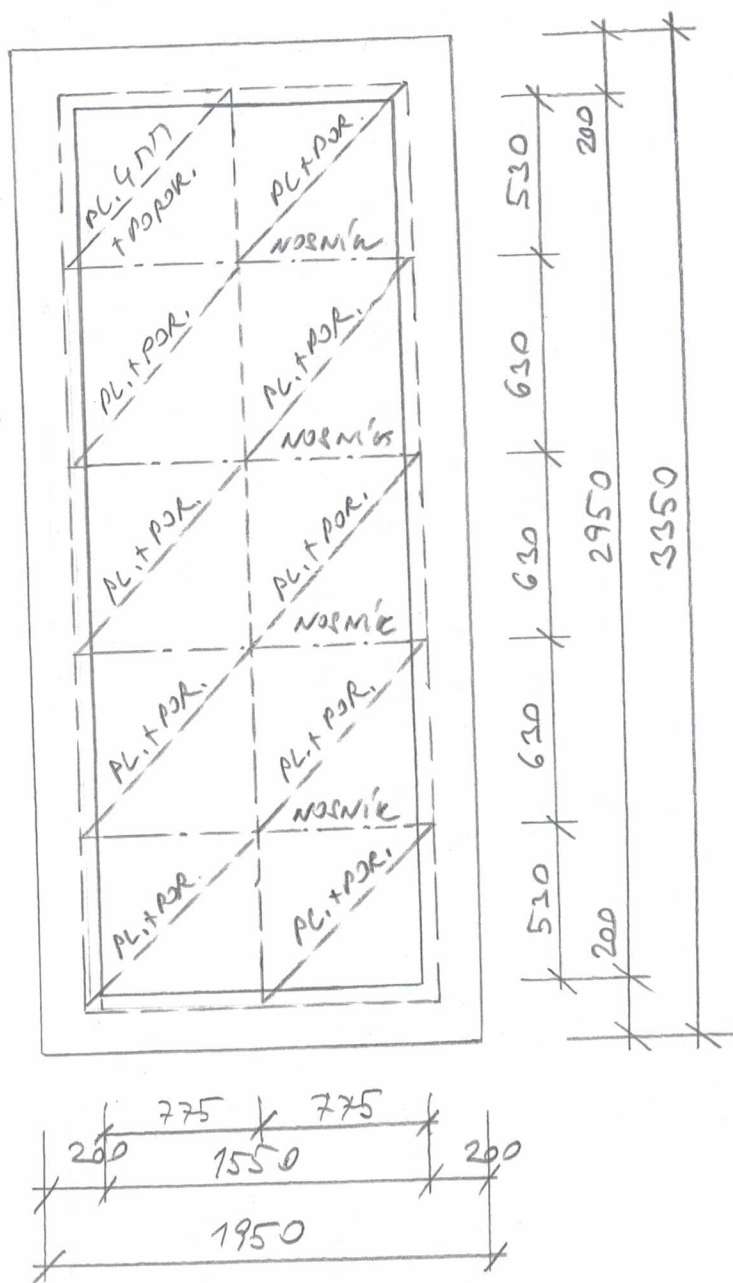
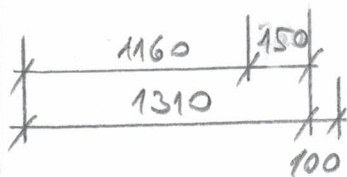
VÝSTUP DEKOVÝ DNA

$$\text{SUMÁRNÍ SÍLOVINA } 6 \times 6 / 150 \times 150 \quad f_a = 1,88 \text{ cm}^2$$

$$N_d = 84,82 \text{ kN}$$

$$p_{max} = 5,4 \text{ kN}$$

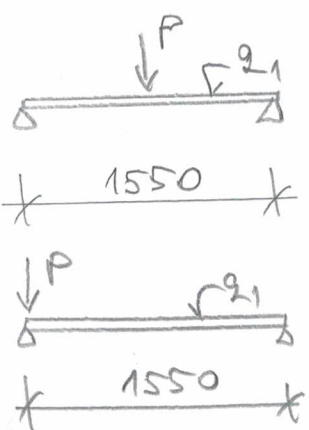
$$\underline{\underline{p_{d1} = 6,97 \text{ kN/m} > p_{max} \text{ (viz předchozí)}}}$$



ВІД НАМІСНИКА СМОВА КОЛОДЯ НН 01  
ОСОБОВИЙ ПОРЯДОК СП 580-34/38-5

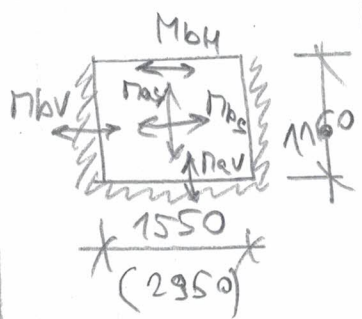
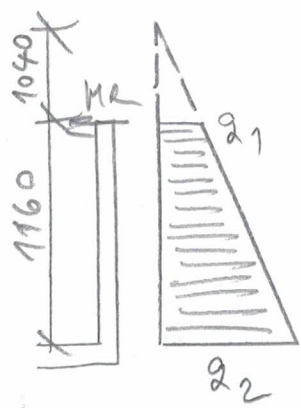
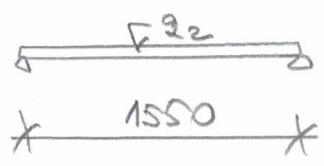
$$F_N = 2u = 508,44 \text{ kN/m}^2 > 14,75 \text{ kN/m}^2$$

$$F_p = 50 \text{ W} = 50 \text{ W}$$



**I** HEB 140

$F = 43,0 \text{ cm}^2$   
 $W < 216 \text{ cm}^3$   
 $J = 1510 \text{ cm}^4$   
 $G = 33,7 \text{ kg/m}^1$



# NOSNÍK STŘEŠNÍ - KÓLO

$$p_m = \frac{50}{84} \text{ kN} \quad q_{m1} = 0,62 \cdot \frac{1,42}{1,56} = 0,90 \text{ kN/m}^2$$

$$A = \frac{25,96}{4306} \text{ kN} \quad \Gamma = 36,34 \text{ kN/m} \quad A_{max} = \frac{52,96}{25,06} \text{ kN}$$

$$\delta = 0,125 \text{ cm} < \delta_{\text{dovr}} = \frac{155}{400} = 0,3875 \text{ cm}$$

$$\sigma = \frac{36,34 \cdot 10^3}{216 \cdot 10^6} = 168,3 \text{ MPa} < 210 \text{ MPa}$$

## 2. PLOŠNÉ ÚPÍŽENÍ

$$q_{m2} = 0,62 \cdot \left( \frac{1,42}{1,56} + \frac{13,33}{22,40} \right) = 9,30 \text{ kN/m}^2$$

$$A = \frac{747}{11,99} \text{ kN} \quad \Gamma = 5,13 \text{ kN/m}$$

$$\delta = 0,03 \text{ cm} < \delta_{\text{dovr}} = 0,3875 \text{ cm}$$

$$\sigma = \frac{5,13 \cdot 10^3}{216 \cdot 10^6} = 23,8 \text{ MPa} < 210 \text{ MPa}$$

## 2. STĚNY KOTORY

SVISLÉ - STĚNY PO ZABEZPEČENÍ TRUBOU  
 VYKOVUJÍ

VODODROUVNĚ VIZ NN01

$$q_1 = 12,27 \text{ kN/m}^2$$

$$q_2 = (1,04 + 1,16) \cdot 18 \cdot 12 \cdot 0,546 = 25,95 \text{ kN/m}^2$$

$$M_R = 84 \cdot \frac{1}{4} \cdot \frac{1}{1,55 (2,95)} = \frac{13,55 (1,55)}{2,12 (2,95)} \text{ kN}$$

STĚNA 1,55 m

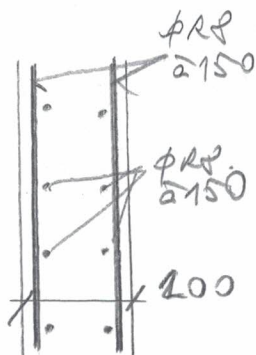
$$M_{as} = 0,51 \text{ kN} \quad M_{av} = 3,28 \text{ kN/m}$$

$$M_{bs} = 3,03 \text{ kN} \quad M_{bv} = 9,30 \text{ kN} \quad M_{bh} = 4,28 \text{ kN}$$

STĚNA 2,95 m

$$M_{as} = 2,23 \text{ kN} \quad M_{av} = 14,20 \text{ kN/m}$$

$$M_{bs} = 6,23 \text{ kN} \quad M_{bv} = 19,91 \text{ kN} \quad M_{bh} = 6,84 \text{ kN/m}$$



VÝZTUŽ STĚN

$\phi R8 @ 150$   $f_a = 3,35 \text{ cm}^2 N_a = 150,8 \text{ kN}$

$\mu = \frac{3,35}{20} \cdot \frac{450}{20} = 0,36\%$   $\mu_8 = 1 - \frac{1}{20} = 0,95$

$Z_b = 0,20 - 0,05 - 0,004 - 0,000 - \frac{150,8 \cdot 0^2}{2 \cdot 1 \cdot 14,5} = 0,1408 \text{ m}$

$\Pi_m' = 0,1408 \cdot 0,95 \cdot 150,8 = 20,17 \text{ kNm} > \Pi_{\text{max}}$

DESKA DNA

$\text{W/m}^2$

SMOP - PLOŠNÉ SMÍČE = 1,56

-u- NAMODICE = 22,40

OD KOL 84.  $\frac{1}{1,95 \cdot 2,35} \cdot 2 = 25,72$

DESKA DNA  $0,15 \cdot 25 \cdot 1,1 = 4,13$

PODKUŠNÝ BETON  $0,10 \cdot 25 \cdot 1,2 = 2,99$

STĚNY  $0,2 \cdot 1,16 \cdot \frac{(3,35 + 1,55) \cdot 2 \cdot 25 \cdot 1}{3,35 \cdot 1,95} = 9,58$

43,98

NAPĚTÍ V NÁKLADOVÉ SPÁŘCE

$Q_z = 43,98 \text{ kPa}$

ZATÍŽENÍ PRO VÝPOČET DESKY DNA

$Q_z = 1,56 + 25,72 + 9,58 = 36,86 \text{ kN/m}^2$

$\Pi_{av} = 7,39 \text{ kN} \quad \Pi_{as} = 3,82 \text{ kNm}$

$\Pi_{bv} = 5,42 \text{ kN} \quad \Pi_{bs} = 1,68 \text{ kNm}$

VÝZTUŽ DESKY DNA

SVAR. MŘ 5/12  $\phi R8 / 150 \times 150$

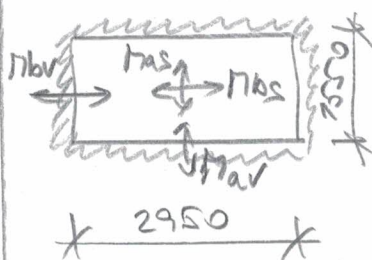
$f_a = 3,35 \text{ cm}^2$

$N_a = 150,8 \text{ kN}$

$\mu = \frac{3,35}{150} \cdot \frac{450}{20} = 0,48\%$   $\mu_8 = 1 - \frac{1}{15} = 0,933$

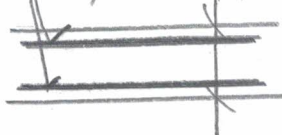
$Z_b = 0,15 - 0,05 - 0,002 - 0,004 - \frac{150,8 \cdot 0^2}{2 \cdot 1 \cdot 14,5} = 0,0828 \text{ m}$

$\Pi_m' = 0,0828 \cdot 0,933 \cdot 150,8 = 11,65 \text{ kNm} > \Pi_{\text{max}}$

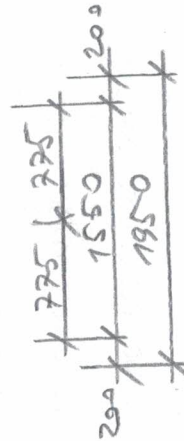
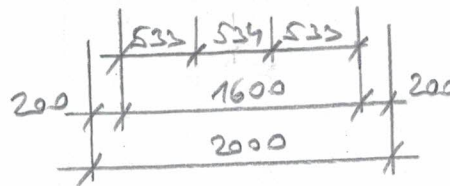
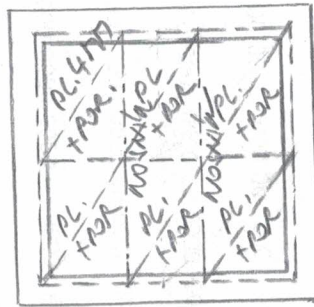
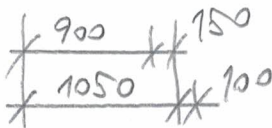
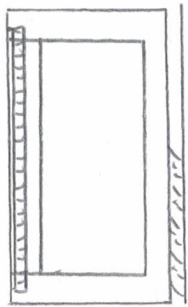


SVAR. MŘ 5/12

$\phi R8 / 150 \times 150$



# 1. STROP KOTORY NN05



## 2. STROP KOTORY NN05

VIZ STROP KOTORY NN05

OCEROVÍ KOTORY STROP - 34/38-5

PRO SVETLO KOTORY 533 mm

$$F_{\text{st}} = g_{\text{st}} = 714,68 \text{ W/m}^2 > 14,75 \text{ W/m}^2$$

$$F_{\text{p}} = 58,33 \text{ W} > 50 \text{ W}$$

MOCMÍK STROP

KOLO

$$P_{\text{st}} = 50 \text{ W} \quad g_{\text{st}} = 0,534 \cdot \frac{1,42}{1,56} = 0,76 \text{ W/m}^2$$

$$A = \frac{25,85}{42,93} \text{ W} \quad P = 36,28 \text{ W} \quad A_{\text{max}} = \text{W}$$

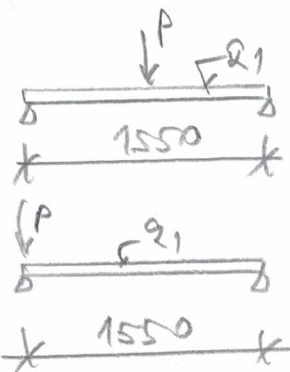
$$\gamma = 0,125 \text{ cm} \quad \gamma_{\text{dov}} = \frac{155}{400} = 0,3875 \text{ cm}$$

$$\sigma = \frac{36,28 \cdot 10^{-3}}{216 \cdot 10^6} = 168,1 \text{ MPa} < 210 \text{ MPa}$$

PROSTRE KOTORY NN05

$$g_{\text{st}} = \left( \frac{1,42 + 13,33}{1,56 + 22,40} \right) \cdot 0,534 = 7,88 \text{ W/m}^2$$

$$A = \frac{6,37}{10,21} \text{ W} \quad P = 4,37 \text{ W/m}$$



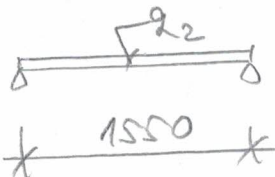
I IPE140

$$F = 43,0 \text{ cm}^2$$

$$W = 216 \text{ cm}^3$$

$$I = 1510 \text{ cm}^4$$

$$G = 33,7 \text{ kg/m}$$



$$\delta = 0,02 \text{ cm} < \delta_{\text{dov}} = 0,3875 \text{ cm}$$

$$\sqrt{\gamma} = \frac{4,37 \cdot 10^{-3}}{216 \cdot 156} = 2,4 \text{ m}^2 < 210 \text{ m}^2$$

## 2. STĚNY KOTLOU

SVISLÉ - STĚNY PO ZABEZPEČENÍ NÁVSEK  
VÝKONOVĚ

VODROVNĚ VÍZ NM03

$$q_1 = 12,27 \text{ kW/m}^2$$

$$q_2 = 22,88 \text{ kW/m}^2$$

$$H_R = 84 \cdot \frac{1}{4} \cdot \frac{1}{1,55(1,6)} = \frac{13,55(1,55)}{13,12(1,6)}$$

STĚNA 1,55 m

$$M_{as} = 0,51 \text{ kW} - M_{av} = 4,03 \text{ kW}$$

$$M_{bs} = 3,10 \text{ kW} - M_{bv} = 8,85 \text{ kW} - M_{bh} = 3,68 \text{ kW}$$

STĚNA 1,6 m

$$M_{as} = 0,55 \text{ kW} - M_{av} = 4,31 \text{ kW}$$

$$M_{bs} = 3,09 \text{ kW} - M_{bv} = 8,93 \text{ kW} - M_{bh} = 3,67 \text{ kW}$$

VÝZMĚ STĚN

$$\phi R_6 \approx 150 \quad \phi_c = 1,88 \text{ cm}^2 \quad M_a = 84,82 \text{ kW}$$

$$\eta = \frac{1,88}{20} \cdot \frac{450}{20} = 0,21 \text{ } \eta < 1 - \frac{1}{20} = 0,95$$

$$\phi = 0,20 - 0,05 - 0,006 - 0,005 - \frac{84,82 \cdot 10^{-3}}{2 \cdot 1 \cdot 14,5} = 0,1381 \text{ m}$$

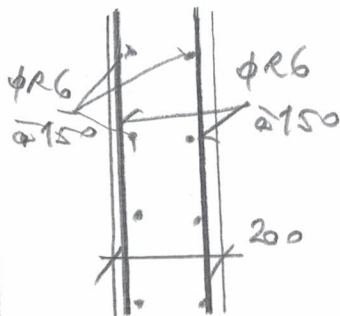
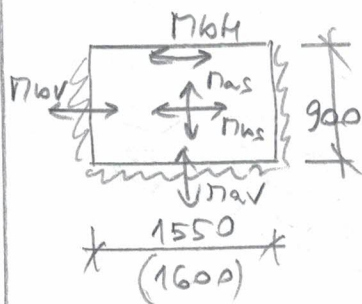
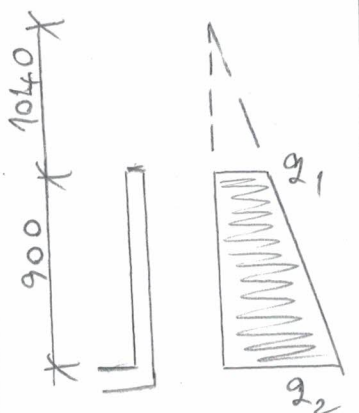
$$M_{n'} = 0,1381 \cdot 0,95 \cdot 84,82 = 11,13 \text{ kW} > M_{nol}$$

DESKA JNA

$$\text{SMOP} - \text{PLOŠNĚ} \text{ MĚŘENÍ SMĚ} = 1,56 \text{ kW/m}^2$$

$$\text{MĚŘENÍ PLOŠNĚ} = 2240$$

$$\text{OD KOL} \quad 84 \cdot \frac{1}{2 \cdot 1,95} \cdot 2 = 43,08$$



$$\begin{array}{rcl}
 \text{DESKA DNA} & 0,15 \cdot 25 \cdot 1,1 & = 4,13 \\
 \text{RODUL. BETON} & 0,10 \cdot 23 \cdot 1,3 & = 2,99 \\
 \text{STĚNA} & \frac{0,2 \cdot 29 \cdot (2+1,55) \cdot 2 \cdot 25 \cdot 1,1}{2 \cdot 1,95} & = 9,02 \\
 & & \hline
 & & 60,78
 \end{array}$$

NAPĚTÍ V ŽALUZOVÉ SPÁŘĚ

$$q_2 = 60,78 \text{ kPa}$$

ZAMĚŘENÍ PRO VÝPOČET DESKY DNA

$$q_d = 1,56 + 43,08 + 9,02 = 53,66 \text{ kN/m}^2$$

$$M_{as} = 320 \text{ kN} \quad M_{av} = 711 \text{ kN}$$

$$M_{bs} = 303 \text{ kN} \quad M_{bv} = 711 \text{ kN}$$

VÝZKUM DESKY DNA

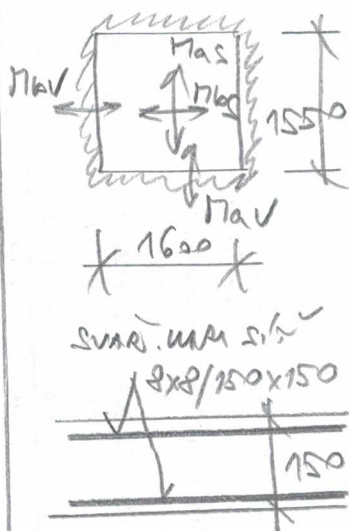
$$\text{SVAŘ. MARI SÍL} \quad 8 \times 8 / 150 \times 150$$

$$f_a = 325 \text{ cm}^2$$

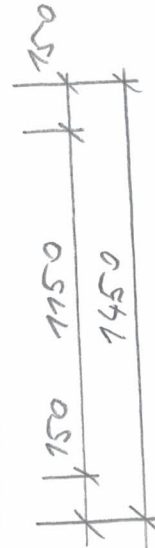
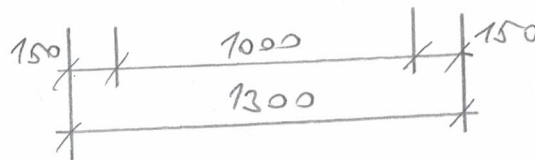
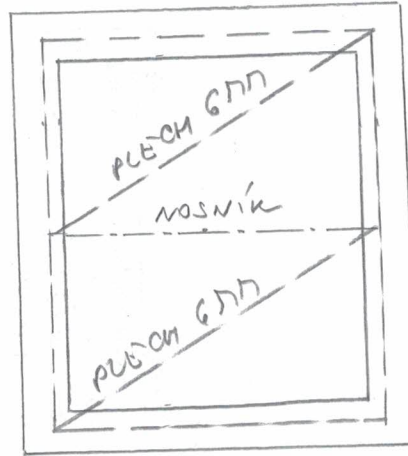
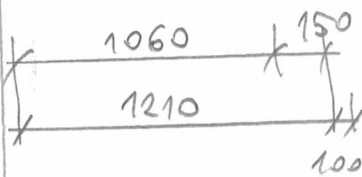
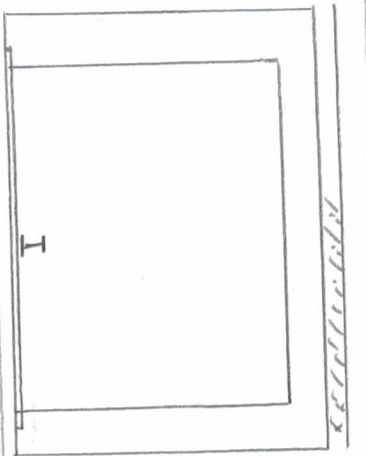
$$N_a = 189,8 \text{ kN}$$

$$M_m' = 11,65 \text{ kN} > M_{ax}$$

(V12 NN04)



1. SMOP KOTORY NNOG



ZATÍŽENÍ SMOPU

$$\begin{aligned} \text{ŠOBROVANÝ PLECH TL. 6 mm} &= 950 \cdot 1,1 = 955 \\ \text{NAKODICE UMÍSTĚNÍ} &= 510 \cdot 1,2 = 60 \end{aligned}$$

CELKOVĚ

510 955

PRO NORMOVÉ UMÍSTĚNÍ 60 W/m<sup>2</sup> A TL. PLECHU 6 mm VOLNĚ POLOŽENÉHO JE MAX. DOW-LENEŠÍ ROZPĚTÍ PODLE 690 mm > 575 mm ⇒

PLECH TL. 6 mm UYKOVUJE

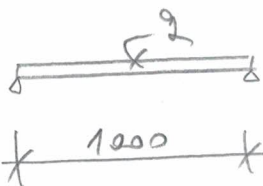
nosník SMOPU

$$q_n = \frac{510}{6,55} \cdot \frac{0,575 + 3,575}{2} = \frac{3,17}{3,77} \text{ W/m}$$

$$A = \frac{1,63}{1,93} \text{ W} \quad \Gamma = 0,53 \text{ W/m}$$

$$f = 0,012 \text{ m} \quad f_{\text{pov}} = \frac{100}{250} = 0,40 \text{ cm}$$

$$\sigma = \frac{0,53 \cdot 10^3}{34,2 \cdot 10^6} = 1515 \text{ MPa} < 20 \text{ MPa}$$



IPE 100

$$F = 193 \text{ cm}^2$$

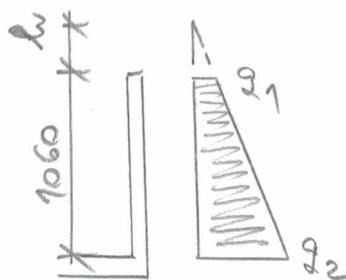
$$W = 34,2 \text{ cm}^3$$

$$I = 171 \text{ cm}^4$$

$$G = 8,1 \text{ kg/m}$$

SVISLE STĚNY PO ZABEZPEČENÍ TRUBER  
KABEZOVODŮ VYMOUVAT

VODROVNĚ



ŽETINA  $\gamma = 18 \text{ kN/m}^3$   $m = 1,2$   $\varphi = 30^\circ$   
 MĚKIDICE MĚŘENÍ NA ROVRCH  $p = 5 \text{ kN/m}^2$   $n = 1,2$

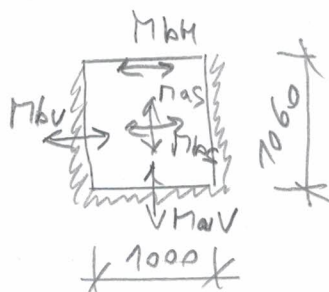
$$h = \frac{p}{\gamma} = \frac{5}{18} = 0,28 \text{ m}$$

$$k = 1 - \sin \varphi_k = 1 - \sin 30^\circ = 1 - \sin 27^\circ = 0,546$$

$$q_1 = \gamma \cdot h \cdot m \cdot k = 18 \cdot 0,28 \cdot 1,2 \cdot 0,546 = 3,31 \text{ kN/m}^2$$

$$q_2 = (0,28 + 1,06) \cdot 18 \cdot 1,2 \cdot 0,546 = 15,81 \text{ kN/m}^2$$

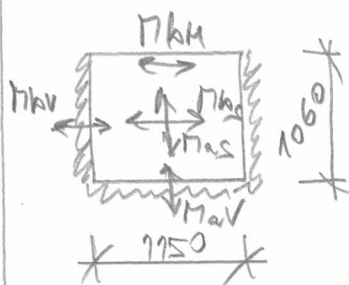
STĚNA KATĚÍ



$$M_{av} = 0,68 \text{ kNm} \quad M_{as} = 0,21 \text{ kNm}$$

$$M_{kv} = 0,68 \text{ kNm} \quad M_{ks} = 0,33 \text{ kNm} \quad M_{kh} = 0,25 \text{ kNm}$$

STĚNA DELŠÍ



$$M_{av} = 0,80 \text{ kNm} \quad M_{as} = 0,28 \text{ kNm}$$

$$M_{kv} = 0,81 \text{ kNm} \quad M_{ks} = 0,34 \text{ kNm} \quad M_{kh} = 0,26 \text{ kNm}$$

ŽELEZA ŽNA

ZMĚŘENÍ ŽELKY ŽNA - ŽMOP

$$\frac{\text{W/m}^2}{= 6,55}$$

$$\text{STĚNY } 0,15 \cdot (1,13 + 1,15) \cdot 2 \cdot 1,06 \cdot 25 \cdot 1,1 \cdot \frac{1}{1,3 \cdot 1,45} = 11,37$$

$$\text{ŽELEZA ŽNA} \quad 0,15 \cdot 25 \cdot 1,1 = 4,13$$

$$\text{RODMĚNÍ ŽELON} \quad 0,10 \cdot 25 \cdot 1,1 = 2,98$$

$$\underline{\underline{25,04}}$$

NAPĚTÍ V MĚKIDOVĚ ŽPAŽĚ

$$q_2 = 25,04 \text{ W/m}^2$$

ZMĚŘENÍ PRO VÝPOČET ŽELKY ŽNA

$$q_D = 6,55 + 11,37 = 17,92 \text{ kN/m}^2$$

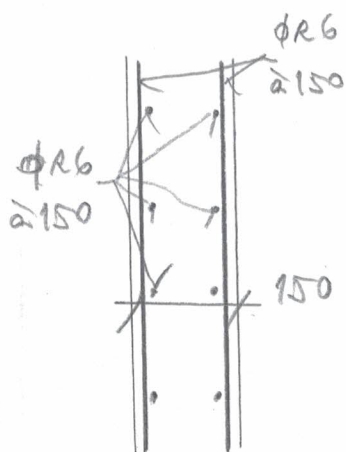
$$M_{av} = 1,14 \text{ kNm}$$

$$M_{as} = 0,44 \text{ kNm}$$

$$M_{kv} = 1,18 \text{ kNm}$$

$$M_{ks} = 0,56 \text{ kNm}$$

a) stěny



$$\Pi_{max} = 934 \text{ W} \quad \Pi_{max} = 981 \text{ W}$$

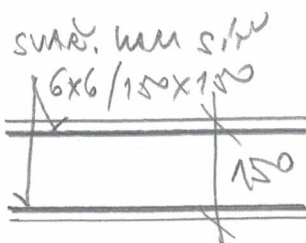
$$\phi R6 \lambda 150 \quad f_a = 1,88 \text{ cm}^2 \quad N_a = 84,82 \text{ W}$$

$$\eta = \frac{1,88 \cdot 400}{15 \cdot 20} = 0,27\% \quad \eta_g = 1 - \frac{1}{1,5} = 0,933$$

$$\beta = 0,15 - 0,05 - 0,006 - 0,003 - \frac{84,82 \cdot 0,6}{2 \cdot 1,14,5} = 0,088 \text{ W}$$

$$\Pi_{n'} = 0,088 \cdot 0,933 \cdot 84,82 = 6,97 \text{ W} > \Pi_{max}$$

b) deska DNA



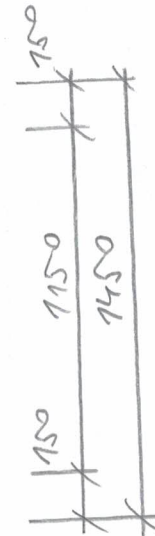
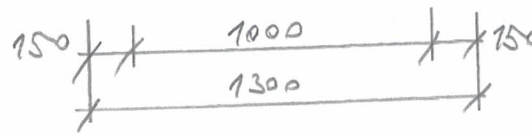
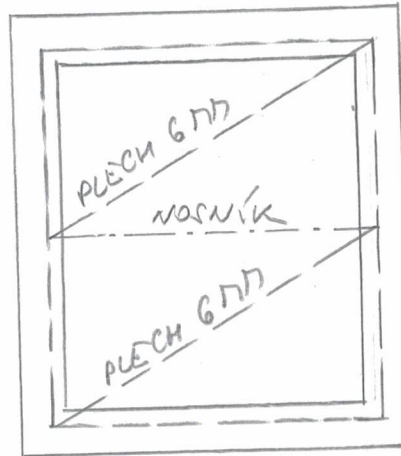
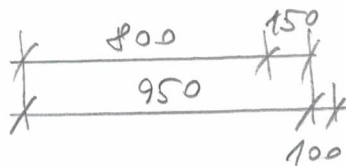
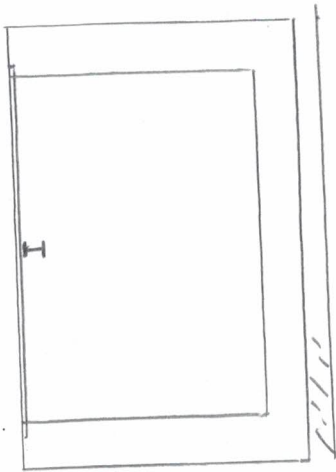
$$\Pi_{max} = 1,18 \text{ W}$$

$$\text{SVAŘ. MŘI SÍLU } 6 \times 6 / 150 \times 150 \quad f_a = 1,88 \text{ cm}^2$$

$$N_a = 84,82 \text{ W}$$

$$\Pi_{n'} = 6,97 \text{ W} > \Pi_{max} \text{ (viz předchozí)}$$

## 1. STROP KOTOR

ZATÍŽENÍ STROPU

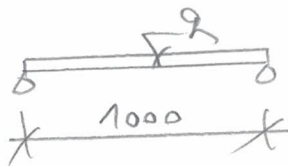
ŽÁDROVANÝ PLECH TL. 6mm  
NORMOVÉ NÁTÍŽENÍ

CELKOVĚ

$$\begin{aligned} q_n &= \frac{q_n}{\text{m}^2} = \frac{q_n}{\text{m}^2} \\ &= 950 \cdot 1,1 = 0,55 \\ &= 510 \cdot 1,2 = 60 \end{aligned}$$

$$\begin{array}{r} 5,50 \\ 6,55 \end{array}$$

PRO NORMOVÉ NÁTÍŽENÍ  $6 \text{ kN/m}^2$  A TL. PLECHU  
6mm VOLNĚ ROZLOŽENÉHO JE MAX. DOVOLENÉ  
ROZPĚTNÉ PODPOR  $690 \text{ mm} > 575 \text{ mm} \Rightarrow$

PLECH TL. 6mm UTKOVUJENOSNÍK STROPU

I IPE 100

$$F = 19,3 \text{ cm}^2$$

$$W = 34,2 \text{ cm}^3$$

$$J = 171 \text{ cm}^4$$

$$G = 8,1 \text{ kg/m}$$

$$q_n = \frac{5,5 \cdot 0,575 + 6,55 \cdot 0,575}{2} = 3,17 \text{ kN/m}^2$$

$$A = \frac{1,63}{1,93} \text{ kN} \quad \sigma = 0,53 \text{ kN/mm}^2$$

$$\delta = 0,012 \text{ cm} \quad \epsilon_{\text{pdl}} = \frac{100}{200} = 0,40 \text{ cm}$$

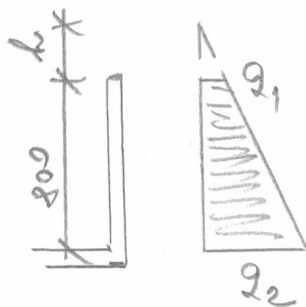
$$\sigma = \frac{0,53 \cdot 10^3}{34,2 \cdot 10^6} = 15,5 \text{ MPa} < 20 \text{ MPa}$$

## 2. STĚNY KOTOR.

25

SVISLE - STĚNY PO ZABĚTOUOVÁNÍ TRUBEC  
KABEZVOZOVÝ VÝKONNÍ

VOZROVNĚ



2. STĚNA  $\gamma = 18 \text{ kN/m}^3$   $m = 1,2$   $\varphi = 30^\circ$   
NAKLODICE ZATÍŽENÍ NA ROZECNU  $p = 5 \text{ kN/m}^2$   $m = 1,2$

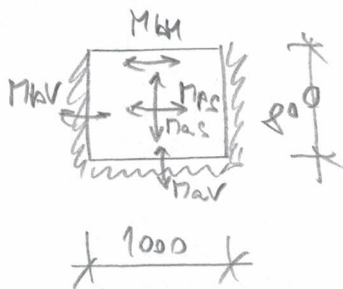
$$h = \frac{k}{\gamma} = \frac{5}{18} = 0,28 \text{ m}$$

$$k = 1 - \sin \varphi = 1 - \sin 30^\circ = 1 - 0,5 = 0,5$$

$$q_1 = \gamma \cdot h \cdot m \cdot k = 18 \cdot 0,28 \cdot 1,2 \cdot 0,5 = 3,02 \text{ kN/m}^2$$

$$q_2 = (q_1 + q_2) \cdot 18 \cdot 1,2 \cdot 0,5 = 12,74 \text{ kN/m}^2$$

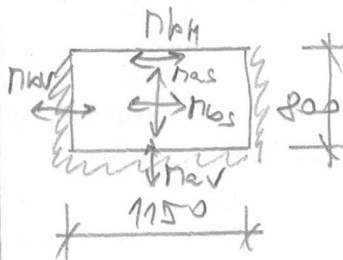
STĚNA KOTVÍ



$$M_{av} = 0,44 \text{ kN/m} \quad M_{as} = 0,16 \text{ kN/m}$$

$$M_{bv} = 0,47 \text{ kN/m} \quad M_{bs} = 0,18 \text{ kN/m} \quad M_{ah} = 0,16 \text{ kN/m}$$

STĚNA DEŠTÍ



$$M_{av} = 0,51 \text{ kN/m} \quad M_{as} = 0,19 \text{ kN/m}$$

$$M_{bv} = 0,54 \text{ kN/m} \quad M_{bs} = 0,18 \text{ kN/m} \quad M_{bh} = 0,16 \text{ kN/m}$$

## 3. DESKA DNA

$\text{W/m}^2$

ZATÍŽENÍ DESKY DNA - SROD

$$= 6,55$$

$$\text{STĚNY } 0,15 (1,3 + 1,15) \cdot 2 \cdot 0,8 \cdot 25 \cdot 1,1 \cdot \frac{1}{1,3 \cdot 1,45} = 8,58$$

DESKA DNA

$$0,15 \cdot 25 \cdot 1,1 = 4,13$$

PODKLADNÍ BETON

$$0,10 \cdot 23 \cdot 1,2 = 2,99$$

$$\underline{22,25}$$

MAJĚNÍ V KOTLOVÉ SPÁŘE

$$q_2 = 22,25 \text{ kPa}$$

ZATÍŽENÍ PRO VÝPOČET DESKY DNA

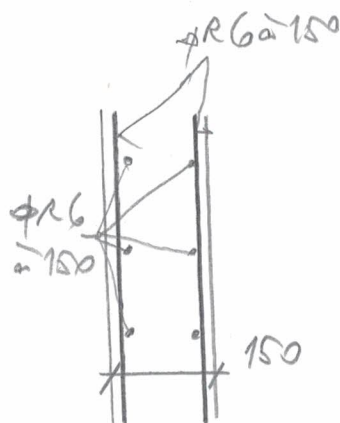
$$q_2 = 6,55 + 8,58 = 15,13 \text{ kN/m}^2$$

$$M_{av} = 0,96 \text{ kN/m}$$

$$M_{as} = 1,0 \text{ kN/m}$$

$$M_{bv} = 0,48 \text{ kN/m}$$

$$M_{bs} = 0,37 \text{ kN/m}$$

a) STĚNY

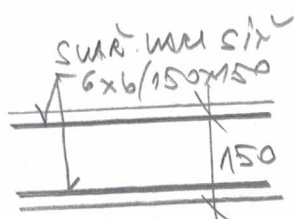
$$n_{max} = 0,19 \text{ W/m} \quad n_{maxV} = 0,54 \text{ W/m}$$

$$\phi R6 \text{ a} = 150 \quad f_r = 1,88 \text{ cm}^2 \quad N_a = 84,82 \text{ kN}$$

$$\eta_k = \frac{1,88}{15} \cdot \frac{4,15}{210} = 0,27\% \quad \sigma = 1 - \frac{1}{15} = 0,933$$

$$\eta_k = 0,15 - 0,05 - 0,006 - 0,002 - \frac{84,82 \cdot 0,5}{2 \cdot 1 \cdot 14,5} = 0,028 \text{ m}$$

$$n'_k = 0,028 \cdot 0,933 \cdot 84,82 = \underline{\underline{6,97 \text{ W/m}}} > n_{ex}$$

b) DESKA DNA

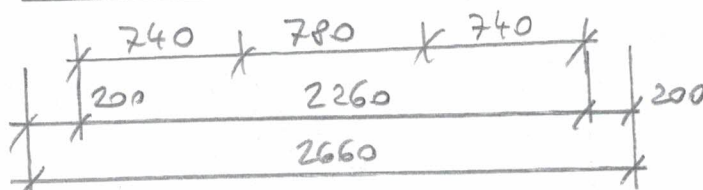
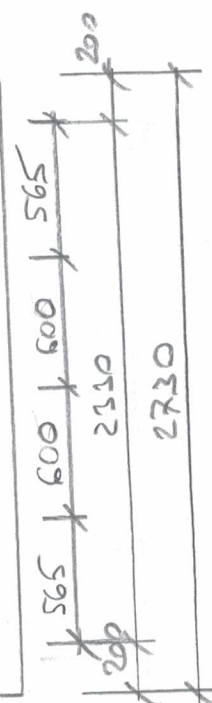
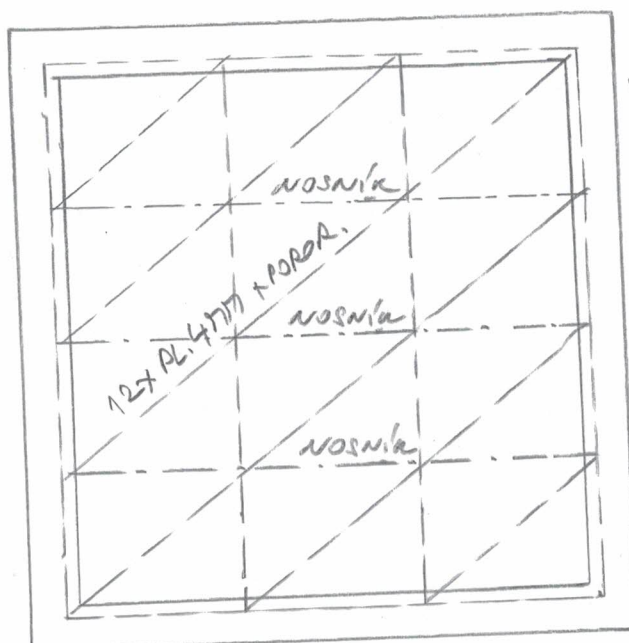
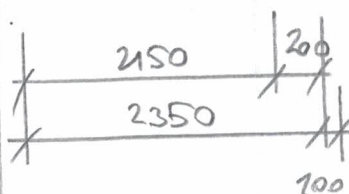
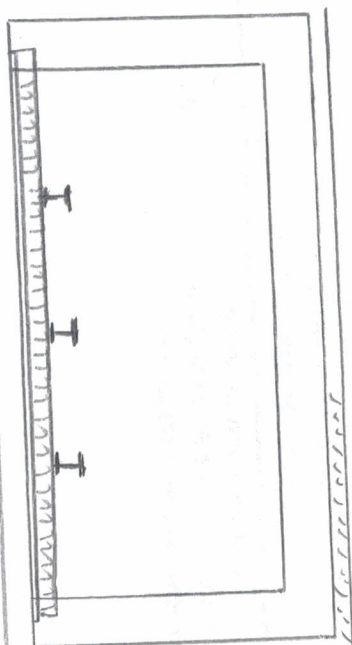
$$n_{max} = 1,0 \text{ W/m}$$

$$\text{SVAŘ. WARM SÍŤ } 6 \times 6 / 150 \times 150$$

$$f_r = 1,88 \text{ cm}^2$$

$$N_a = 84,82 \text{ kN}$$

$$n'_k = 6,97 \text{ W/m} > n_{ex} \text{ (viz předchozí)}$$



### ZATŘEŠENÍ STROPU

VIZ UVEDENÍ KOTORY VN01

OCEROVÝ ROZPOČET SA 580-34/38-5

PRO ROZPĚTÍ 600 MM

$$F_n = 2m = 795,40 \text{ W/m}^2 > 14,75 \text{ W/m}^2$$

$$F_p = 50 \text{ W} = 50 \text{ W}$$

### NOSNÍK STROPU - KOL

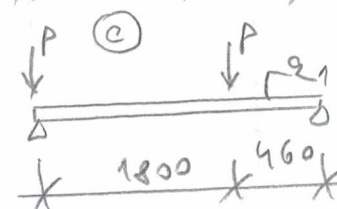
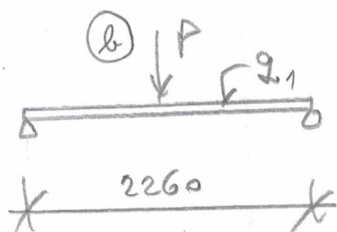
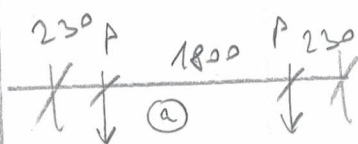
$$p_n = \frac{50}{84} \text{ W} \quad q_n = 0,6 \cdot \frac{1,42}{1,56} = 0,56 \text{ W/m}$$

$$A_a = B_a = 51,45 \text{ W} \quad M_a = 223 \text{ W}$$

$$f_a = 0,15 \text{ cm} \quad L_{f_a} = \frac{226}{400} = 0,565 \text{ cm}$$

$$A_b = B_b = 26,45 \text{ W} \quad M_b = 53,32 \text{ W}$$

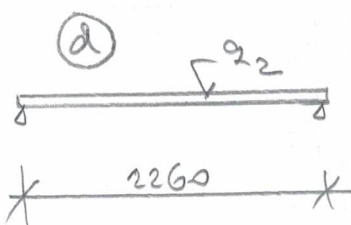
$$f_b = 0,24 \text{ cm} \quad L_{f_b} = 0,565 \text{ cm}$$



$$A_c = \frac{61,63}{102,69} \text{ W} \quad B_c = \frac{47,28}{68,49} \text{ W} \quad \Gamma_c = 34,58 \text{ W}$$

28

$$f_c = 0,15 \text{ cm} \quad L_{\text{pav}} = 0,565 \text{ cm}$$



$$F = 54,30 \text{ cm}^2$$

$$W = 311 \text{ cm}^3$$

$$J = 2490 \text{ cm}^4$$

$$G = 42,60 \text{ kg/h}$$

POŠNE NÁČERNÍ

$$q_{n2} = \left( \frac{1,42 + 13,33}{1,56 + 23,70} \right) \cdot 0,6 = \frac{8,85}{14,38} \text{ W}$$

$$A_d = B_d = \frac{19,48}{16,78} \text{ W} \quad \Gamma_d = 19,46 \text{ W}$$

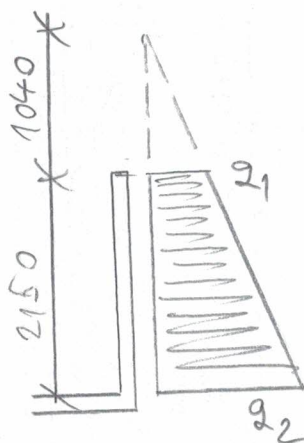
$$f_d = 0,06 \text{ cm} \quad L_{\text{pav}} = 0,565 \text{ cm}$$

$$\tau_{\text{max}} = \frac{M_{\text{e}}}{W} = \frac{5332 \cdot 10^3}{311 \cdot 19,6} = 177,5 \text{ Pa} \text{ (NOVA)}$$

STĚNY KOTORY

SVISLÉ - STĚNY PO NABÝTOUVAŇÍ MUSEK  
VYHOVUJÍ

VODROVNÉ - NÁČERNÍ VÍČ ANO



$$q_1 = 12,27 \text{ W/m}^2$$

$$q_2 = (1,04 + 2,15) \cdot 12,12 \cdot 0,546 = 37,63 \text{ W/m}^2$$

$$M_R = 2,84 \cdot \frac{1}{4} \cdot \frac{1}{2,26(333)} = \frac{12,58 \text{ W}(2,26)}{12,25 \text{ W}(333)}$$

STĚNA 226 mm

$$M_{as} = 2,11 \text{ W} \quad M_{av} = 8,02 \text{ W}$$

$$M_{bs} = 7,08 \text{ W} \quad M_{bv} = 12,61 \text{ W} \quad M_{bh} = 9,97 \text{ W}$$

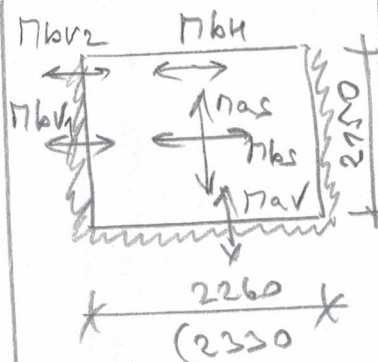
$$M_{w2} = 22,41 \text{ W}$$

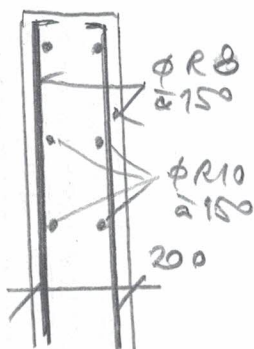
STĚNA 2133 mm

$$M_{as} = 2,23 \text{ W} \quad M_{av} = 8,53 \text{ W}$$

$$M_{bs} = 6,56 \text{ W} \quad M_{bv} = 12,93 \text{ W} \quad M_{bh} = 12,33 \text{ W}$$

$$M_{w2} = 22,99 \text{ W}$$





$$\phi R 10 \text{ a } 150 \quad f_a = 5,124 \text{ cm}^2 \quad N_a = 235,62 \text{ kN}$$

$$\mu = \frac{5,124}{20} \cdot \frac{410}{20} = 0,56\% \quad \mu_g = 1 - \frac{1}{20} = 0,95$$

$$\beta_p = 0,20 - 0,05 - 0,01 - 0,005 - \frac{235,62 \cdot 0,5}{2 \cdot 1 \cdot 14,5} = 0,1269 \text{ m}$$

$$\mu_{a1} = 0,1269 \cdot 0,95 \cdot 235,62 = 28,4 \text{ kNm} > \mu_{max1} = 22,99 \text{ kNm}$$

$$\phi R 8 \text{ a } 150 \quad f_a = 335 \text{ cm}^2 \quad N_a = 150,8 \text{ kN}$$

$$\mu = \frac{335}{20} \cdot \frac{410}{20} = 0,36\% \quad \mu_g = 1 - \frac{1}{20} = 0,95$$

$$\beta_p = 0,20 - 0,05 - 0,008 - 0,004 - \frac{150,8 \cdot 0,5}{2 \cdot 1 \cdot 14,5} = 0,1328 \text{ m}$$

$$\mu_{a1} = 0,1328 \cdot 0,95 \cdot 150,8 = 19,02 \text{ kNm} > \mu_{max2} = 12,93 \text{ kNm}$$

## DESKA DNA

W/m<sup>2</sup>

STROP - PLOŠNĚ

= 1,56

-u- NÁMOČNĚ

= 2240

$$0,2 \text{ kol } \phi 4 \cdot 2 \cdot \frac{1}{266 \cdot 273} \cdot 2 = 46,27$$

$$\text{DESKA DNA} \quad 0,2 \cdot 25 \cdot 1,1 = 5,50$$

$$\text{PODHL. BETON} \quad 0,1 \cdot 25 \cdot 1,2 = 2,99$$

$$\text{STĚNY} \quad 0,2 \cdot (266 + 232) \cdot \frac{2 \cdot 215 \cdot 25 \cdot 1,1}{266 \cdot 273} = 16,26$$

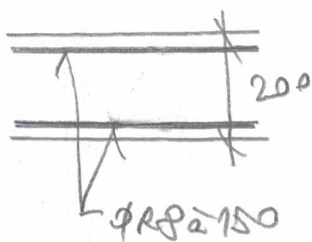
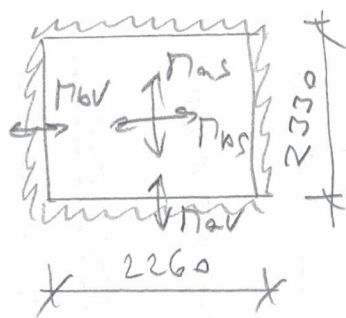
72,58

## NAPEŤÍ V NÁMOČNĚ SPRÁVĚ

$$\sigma_2 = 72,58 \text{ kPa}$$

ZAHŘENÍ PRO VÝPOČET DEŠKY DNA

$$Q_D = 1,56 + 46,27 + 16,26 = 64,09 \text{ W/m}^2$$



$$\pi_{as} = 723 \text{ kN} \quad \pi_{av} = 1696 \text{ kN}$$

$$\pi_{bs} = 762 \text{ kN} \quad \pi_{bv} = 1745 \text{ kN}$$

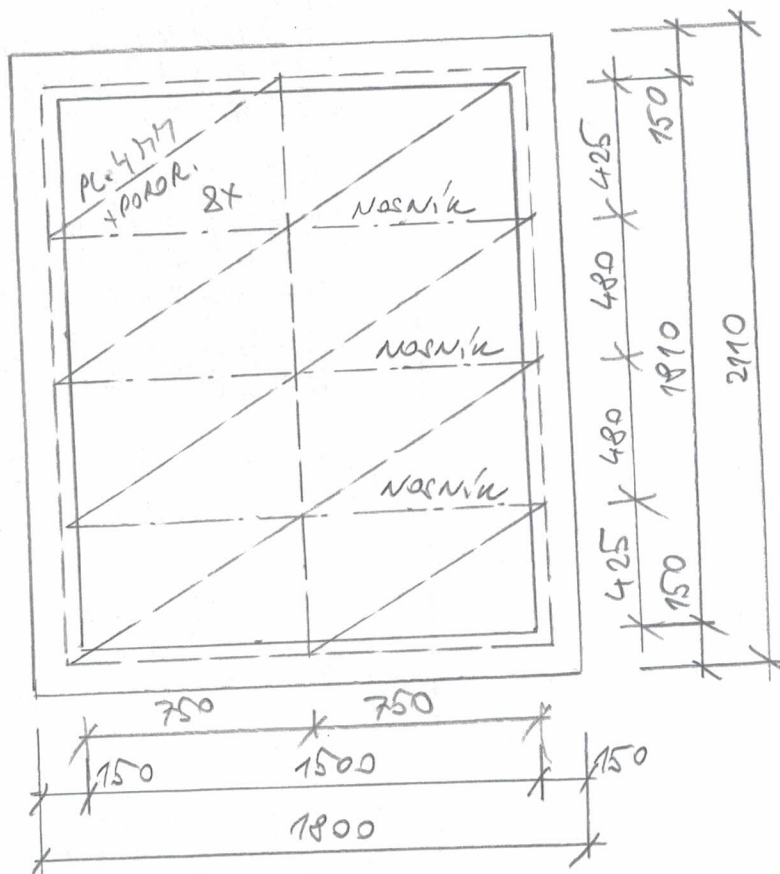
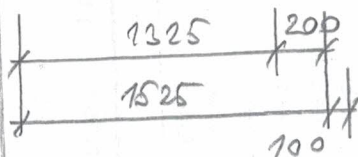
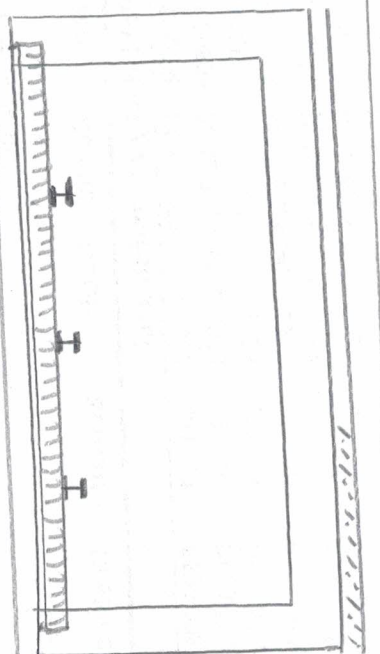
визначити деформ. DNA

$$\phi R \rho \approx 150$$

$$k_e = 3,35 \text{ cm}^2/\text{N} \quad N_e = 150,8 \text{ kN}$$

$$\pi_{a1} = 19,02 \text{ kN} > \pi_{av} \quad (\text{визначено})$$

SROD ŠACHTY S 1P



ZATÍŽENÍ SROPU

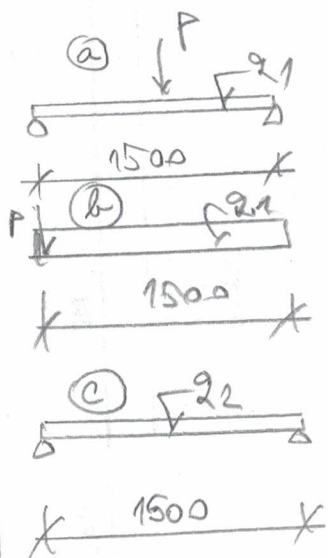
VIZ ZATÍŽENÍ SROPU KOTORY NN01  
OCEŤOVÍ ROZPOČET SP 580 - 34/28-5

PRO ROZPĚTÍ 480 mm

$$F_{\text{min}} = q_{\text{min}} = 795,40 \text{ W/m}^2 > q = 14,75 \text{ W/m}^2$$

$$F_p = 625 \text{ W} > 50 \text{ W} = P_{\text{max}}$$

NOSENÍ SROPU

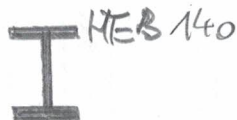


(a) Kolo

$$P_{\text{min}} = 50 \text{ W} \quad q_{\text{min}} = 0,48 \cdot \frac{1,42}{1,56} = 0,69 \text{ W/m}$$

$$A = B = 2577 \text{ W} \quad \Pi = 3508 \text{ W}$$

$$\delta = 0,12 \text{ cm} \quad c_{\text{dov}} = \frac{150}{400} = 0,375 \text{ cm}$$

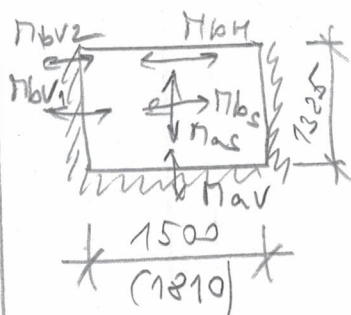
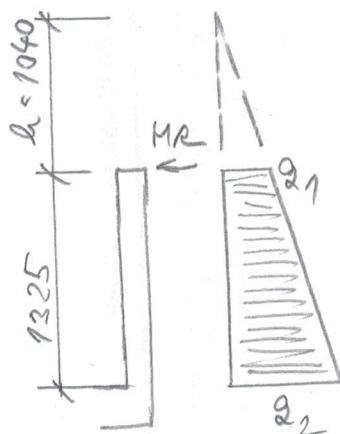


$$F = 43 \text{ cm}^2$$

$$W = 216 \text{ cm}^3$$

$$I = 1510 \text{ cm}^4$$

$$G = 33.7 \text{ kg}$$



⑥ КОЛО

$A = \frac{5077}{84,84} \text{ W}$   $B = \frac{977}{9,84} \text{ W}$   $\gamma = 0,26 \text{ W}$

c)  $g_{2,2} = \left( \frac{1,42}{1,56} + \frac{13,13}{22,40} \right) \cdot 0,48 = \frac{7,08}{11,50} \text{ (W/m)}$

$$A = B = \frac{5156}{290} \text{ W} \quad \eta = 3.69 \text{ W}$$

$$d = 0,02 \text{ cm} \quad r_{\text{gas}} = 0,375 \text{ cm}$$

$$\underline{V_{max} = \frac{35,08 \cdot 10^3}{216 \cdot 10^6} = 162,417 \text{ Pa} < 200 \text{ Pa}}$$

STENY SACHTY

SUIČE - STĚNY PO ZABETOVNĚNÍ TRUSK  
VYKOVUJÍ

VODOROVEN - V12 NNO1

$$q_1 = 12,27 \text{ kW/m}^2$$

$$q_2 = (1,04 + 1,325) \cdot 18 \cdot 12 \cdot 0,546 = 27,90 \text{ kJ/m}^2$$

$$HR = 84 \cdot \frac{1}{2} \cdot \frac{1}{1.5(1.81)} = \frac{28.0}{23.2} \frac{(1.5)}{(1.81)} \text{ W/m}^2$$

STENA 1,5 m

$$M_{a2} = 1,12 \text{ Wm} \quad M_{aV} = 4,65 \text{ Wm}$$

$P_{as} = 1,12 \text{ W}$   $P_{av} = 4,05 \text{ W}$   
 $P_{os} = 4,73 \text{ W}$   $P_{ov_1} = 8,45 \text{ W}$   $P_{av} = 7,2 \text{ W}$   
 $P_{ov_2} = 16,90 \text{ W}$

$$M_{KVR_2} = 16,90 \text{ kN}$$

STENA 1,81m

$M_{a2} = 1.21 \text{ W} - M_{aV} = 5.18 \text{ W}$

$\eta_{12} = \eta_1 = 1$   
 $M_{ps} = 4,87 \text{ kNm}$      $\eta_{6V_1} = 9,45 \text{ kNm}$      $\eta_{6V_2} = 8,13 \text{ kNm}$   
 $\eta_{6V_2} = 13,91 \text{ kNm}$

$$P_{bV_2} = 18,91 \text{ W}$$

VYTVRŽ STĚN

Q R R 150

$$f_e = 3,35 \text{ cm}^2 \quad N_e = 150,8 \text{ W}$$

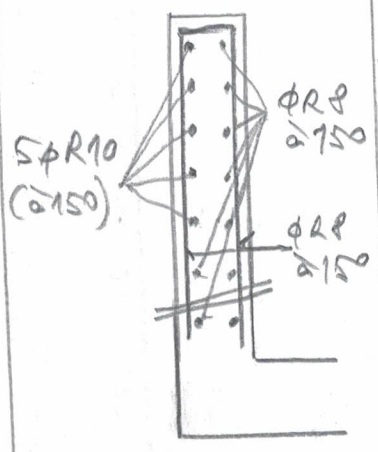
$$P_n = \frac{3,35}{75} \cdot \frac{400}{20} = 0,48\% \quad n_2 = 1 - \frac{1}{15} = 0,933$$

$$Z_p = 0,15 - 0,05 - 0,008 - 0,004 - \frac{150,8 \cdot 10^3}{2 \cdot 1 \cdot 14,5} = 0,0222 \text{ mm}$$

$$\pi_m' = 90828 \cdot 0933 \cdot 1508 = 11,65 \text{ W/m} >$$

$$> \pi_{max1} = 9,45 \text{ W/m}$$

$$\phi R_{10} \approx 150 \quad f_a = 5,23 \text{ cm}^2 \quad N_a = 235,62 \text{ kN}$$



$$\eta = \frac{5,23}{15} \cdot \frac{410}{20} = 0,75\% \quad \sim 8 = 0,933$$

$$\eta_k = 0,15 - 0,05 - 0,005 - \frac{235,62 \cdot 6^{1,2}}{2 \cdot 1 \cdot 14,5} = 0,0869 \text{ m}$$

$$\pi_m' = 90868 \cdot 0,933 \cdot 235,62 = 19,1 \text{ W/m} >$$

$$> \pi_{max2} = 18,91 \text{ W/m}$$

### DESKA DNA

UPOVĚDNÍ	W/m <sup>2</sup>
SNOP - PLOŠNÉ SMĚLE	= 1,56
— " — NAKOVILE	= 22,40
OD KOL $\phi 4 \cdot 2 \cdot \frac{1}{1,8 \cdot 2,11}$	= 44,24
DESKA DNA $0,20 \cdot 25 \cdot 1,1$	= 5,50
PODKL. BETON $0,10 \cdot 23 \cdot 1,3$	= 2,99
STĚNY $25 \cdot 1,1 \cdot 0,15 \cdot \frac{1,325(1,8+1,8)}{1,8 \cdot 2,11} \cdot 2$	= 10,39
	<u>64,68</u>

### NAPEŤ V NÁKROVÉ SPÁŘE

$$q_2 = 64,68 \text{ W/m}$$

### UPOVĚDNÍ PRO VÝPOČET DESKY DNA

$$q_D = 1,56 + 44,24 + 10,39 = 56,19 \text{ W/m}^2$$

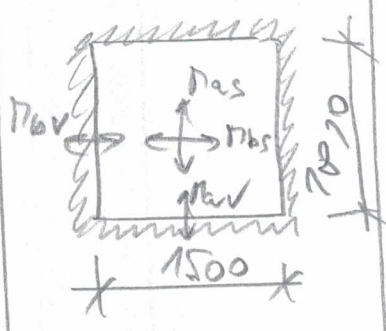
$$\pi_{av} = 7,05 \text{ W/m} \quad \pi_{as} = 2,79 \text{ W/m}$$

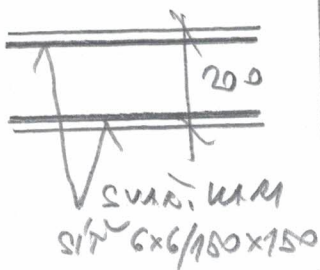
$$\pi_{bv} = 8,13 \text{ W/m} \quad \pi_{bs} = 3,87 \text{ W/m}$$

### VÝPOČET DESKY DNA

SVAR. VARI SÍŤ  $6 \times 6 / 150 \times 150 \quad f_a = 1,88 \text{ cm}^2$   
 $N_a = 84,82 \text{ kN}$

$$\eta = \frac{1,88}{20} \cdot \frac{410}{20} = 0,21\% \quad \sim 8 = 1 - \frac{1}{20} = 0,95$$





$$z_b = 220 - 905 - 0,006 - 9003 - \frac{84,82 \cdot 10^3}{2 \cdot 1 \cdot 14,5} = 0,1381 \text{ m}$$

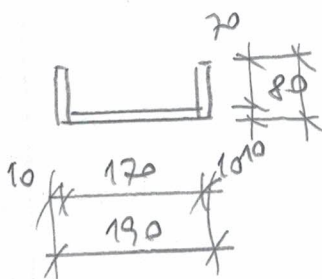
$$\Pi_m = 0,1381 \cdot 995 \cdot 84,82 = 11,12 \text{ W/m} > \Pi_{\text{max}}$$

DETAILY KOTVENÍ NOSNÍKŮ V POVĚŘENĚ

NYČN KOTOR

MAXIMÁLNÍ UPEVNĚNÍ KOTVÍCÍ P<sub>max</sub> = 102,68 kN

$$\Pi = 102,68 \cdot 0,05 = 5,14 \text{ W/m}$$



$$F = 8 \cdot 1 \cdot 2 + 17 \cdot 1 = 33 \text{ cm}^2$$

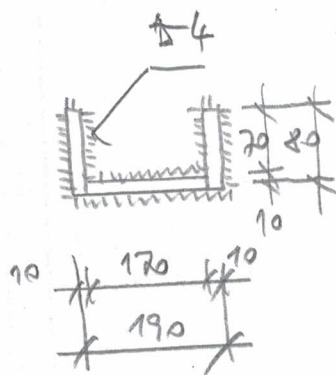
$$x = \frac{1 \cdot 8 \cdot 2 \cdot 4 + 17 \cdot 1 \cdot 95}{33} = \frac{735}{33} = 2,197 \text{ cm}$$

$$J_x = \frac{1}{12} \cdot 1 \cdot 8^3 \cdot 2 + \frac{1}{12} \cdot 17 \cdot 1^3 + 8 \cdot 1 \cdot 2 \cdot (4 - 2,197)^2 + 17 \cdot 1 \cdot (2,197 - 95)^2 = 187,72 \text{ cm}^4$$

$$W_1 = \frac{187,72}{2,197} = 85,44 \text{ cm}^3$$

$$W_2 = \frac{187,72}{8 - 2,197} = 32,35 \text{ cm}^3$$

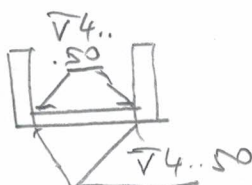
$$\sigma_{\text{max}} = \frac{5,14 \cdot 10^3}{32,35 \cdot 10^6} = 158,9 \text{ Pa} < 200 \text{ Pa}$$



SVARY KOTVÍCÍ K U PROFILU OZÁŘENÉHO  
VE STĚNĚ KOTVÍ

$$N_m' = 2 \cdot (907 + 908) \cdot 0,7 \cdot 0,004 \cdot 1,15 \cdot 0,65 \cdot 20 \cdot 10^3 + (917 + 918 + 901 \cdot 2) \cdot 0,7 \cdot 0,004 \cdot 0,75 \cdot 1,15 \cdot 120 \cdot 10^3 = 324,58 \text{ W} > P_{\text{max}}$$

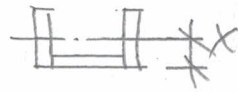
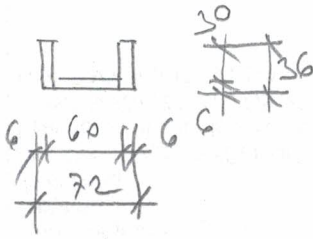
SVARY MEZI STĚNAMI A DESKOU



## KONOR

MAX. ZAMĚNÍ KONZOLKY  $P_{max} = 1,93 \text{ kN}$

$$P_{max} = 1,93 \cdot 205 = 0,40 \text{ kNm}$$



$$F = 0,6 \cdot 3,6 \cdot 2 + 6 \cdot 26 = 791 \text{ cm}^2$$

$$x = \frac{0,6 \cdot 3,6 \cdot 2 \cdot 1,8 + 6 \cdot 26 \cdot 9,3}{791} = 1,118 \text{ cm}$$

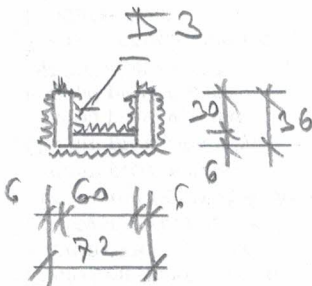
$$I_x = \frac{1}{12} 0,6 \cdot 3,6^3 + \frac{1}{12} 6 \cdot 26^3 + 0,6 \cdot 3,6 \cdot 2 \cdot (1,8 - 1,118)^2 + 6 \cdot 26 \cdot (1,118 - 9,3)^2 = 919 \text{ cm}^4$$

$$w_1 = \frac{919}{1118} = 0,822 \text{ cm}^2$$

$$w_2 = \frac{919}{36 - 1,118} = 37 \text{ cm}^2$$

$$\sigma_{max} = \frac{0,40 \cdot 10^3}{37} = 27,1 \text{ MPa} < \sigma_{adm}$$

## SVAZY KONZOLKY KE STĚNĚ



$$N_{st} = (0,036 + 0,03) \cdot 2 \cdot 97 \cdot 9003 \cdot 1,15 \cdot 0,65 \cdot 20 \cdot 10^3 + (0,06 + 0,072 + 0,006 \cdot 2) \cdot 97 \cdot 9003 \cdot 0,75 \cdot 1,15 \cdot 20 \cdot 10^3 = 98,3 \text{ kN} > P_{max}$$

## SVAZY MEZI STĚNAMI A SPODNÍ DESKOU

$$N_{st} = 0,05 \cdot 4 \cdot 0,7 \cdot 9003 \cdot 0,75 \cdot 1,15 \cdot 20 \cdot 10^3 = 76 \text{ kN}$$

## B. KAPROVODY

- KONSERVATIVNÍ VÝPOČET SVAZOVANÉ KAM LIŠTOVINY

RODŘICE, KVĚTEN 2024

Jan Eliáš