

# STATICKÝ VÝPOČET

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Posouzení hlavní ocelové konstrukce haly  
Výměny pro sportovní zařízení a ZOTK

|               |  |
|---------------|--|
| Investor      | Městský obvod Ostrava jih  |
| Objednatel    | Ing. Jiří Lampa, Pod Haškovicem 1553, PŘÍBOR, 742 58   |
| Název zakázky | Rekonstrukce sportovního centra Ostrava-Dubina<br>D.1.2 Stavebně konstrukční část - ocelová konstrukce |
| Zhotovitel    | <b>OCELOVÉ KONSTRUKCE - STATIKA s.r.o.</b><br>Pohraniční 504/27<br>703 00 Ostrava Vítkovice            |
| Vypracoval    | Ing. Ernest Jeżowicz   |
| HIP           | Ing. Jiří Lampa  |
| Číslo zakázky | OKST - 23007   |
| Stupeň        | TP   |
| Datum         | 24.01.23   |

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01/2023

Vypracoval: Ing. Jeżowicz

## 1. ÚVOD

Statický výpočet řeší posouzení nosné ocelové konstrukce haly Sportovního centra Ostrava-Dubina na zatížení od výsuvných basketbalových košů a výměn pro požární klapky ve střešní konstrukci haly.

## 2. PODKLADY

Podkladem pro vypracování posudku jsou :

[1] *Statický výpočet – statický výpočet - Kryté sportoviště Ostrava-Dubina. (arch.č. OK-SV-2174, OSA projekt s.r.o., 04/2004).*

[2] *Statický výpočet – Rekonstrukce sportovního centra Ostrava-Dubina. (arch.č. OK-SV-21077, OCELOVÉ KONSTRUKCE-STATIKA,s.r.o., 10/2021).*

[3] *Zatížení ZOTK (požární klapky) a konstrukce pro uchycení basketbalových košů (Ing.Jiří Lampa, 01/2023).*

Projekt je zpracován v souladu s EC1 – „Zatížení konstrukcí“ a EC3 – „Navrhování ocelových konstrukcí“.

## 3. VÝPOČET

Ve statickém výpočtu je uvažován statický model a projektovaný stav haly dle statického výpočtu [2] (viz. *Podklady*). Nové pomocné konstrukce pro vynesení požárních klap a pro uchycení výsuvných basketbalových košů jsou vloženy do původního statického modelu. Výpočet je proveden metodou konečných prvků programem SCIA ENGINEER 2022. Pro posouzení průřezů je použit nadstavbový modul "Posouzení ocelových průřezů dle EC3.

# ZATÍŽENÍ

## 1. STÁLÉ

1.1 Vlastní hmotnost konstrukce ..... generována z průřezových ploch prvků

1.2 Skladba obloukové a ploché střechy haly -viz. statický výpočet [2]

|  |   |
|--|---|
| Hydroizolace fólie (EPDM) 2 mm .....                         | 0.02  |
| Požárně dělicí izolační vrstva SG COMBI PIR, tl.160+60mm     |   |
| PIR 160 mm .....   | 0,128   |
| minerální izolace tl. 2x30mm (180kg/m <sup>3</sup> ) .....   | 0,108   |
| parozábrana mod. Asfalt 4 mm (1100 kg/m <sup>3</sup> ) ..... | 0.044   |
| trapézové plechy h=160mm .....                               | 0.16  |
|  | $q_{\text{roof\_up,k}} = 0.46 \text{ kN/m}^2$ |

Podhled

|   |   |
|---|---|
| Podkonstrukce, latě 40/60 a 400 mm..... | 0,036   |
| Prkna prkna tl=20 mm.....               | 0.152   |
|   | $q_{\text{roof\_low,k}} = 0.188 \text{ kN/m}^2$ |

Skladba obloukové střechy celkem  $q_{\text{roof,k}} = 0.648 \text{ kN/m}^2$

1.3 Skladby podélných a štítových stěn  
viz. statický výpočet [1].

1.4 Zařízení ZOTK

Požární klapy 1.5 m x 2 m  $q_{\text{ZOTK,k}} = 0.800 \text{ kN/m}^2$

1.5 Sportovní zařízení

Výsuvná konstrukce pro basketbalové koše  $q_{\text{sport,k}} = 2.800 \text{ kN}$



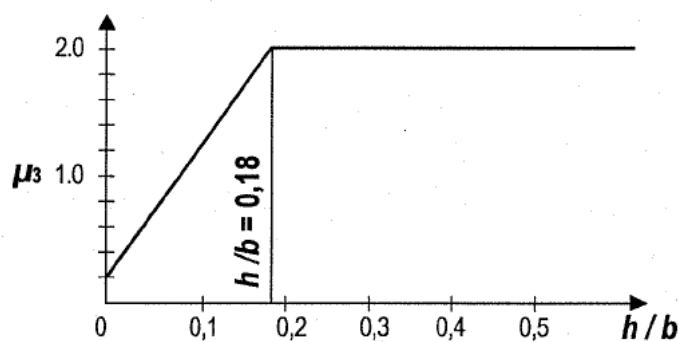
## 2. PROMĚNLIVÉ

### 2.1 Sníh

|                                    |                          |
|------------------------------------|--------------------------|
| sněhová oblast II (Ostrava)I ..... | $s_k=1.0 \text{ kN/m}^2$ |
| tepelný součinitel .....           | $C_t=1.0$                |
| součinitel expozice .....          | $C_e=1.0$                |

a) střecha haly – část bez atiky

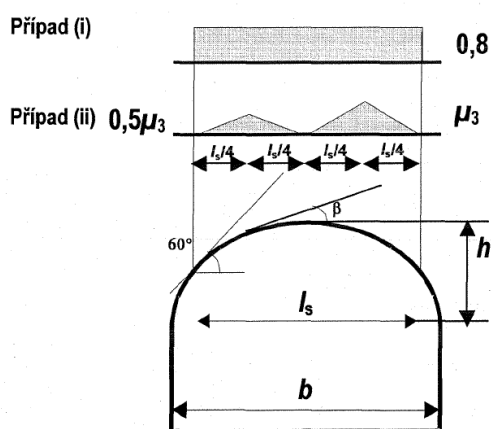
tvárový součinitel  $\mu$



$$\mu_1=0.8$$

$$\text{pro } \beta > 60^\circ \quad \mu_3=0$$

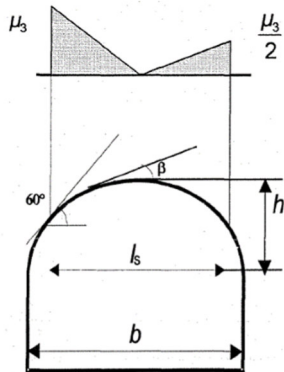
$$\text{pro } \beta \leq 60^\circ \quad \mu_3=0.2 + 10h/b = 0.2 + 10 \times 7,15/45=1.78$$



Obrázek 5.6 – Tvarové součinitele zatížení sněhem pro válcovou střechu

a) střecha haly – část s atikou

$$h/b = 7.15/45 = 0.158 \rightarrow \mu_3 = 1.78$$



|         |      |     |            |
|---------|------|-----|------------|
| $h/b$   | 1/8  | 1/6 | $\geq 1/5$ |
| $\mu_3$ | 1,45 | 1,8 | 2,0        |

$$s_{1,k} = s_k \cdot C_t \cdot C_e \cdot \mu_1 = 1.0 \cdot 1 \cdot 1 \cdot 0.8 = 0.80 \text{ kN/m}^2$$

$$s_{3,k} = s_k \cdot C_t \cdot C_e \cdot \mu_3 = 1.0 \cdot 1 \cdot 1 \cdot 1.78 = 1.78 \text{ kN/m}^2$$

$$s_{3,k(0.5)} = 0.5 \cdot s_{1,k} = s_k \cdot C_t \cdot C_e \cdot \mu_3 = 0.5 \cdot 1.0 \cdot 1 \cdot 1 \cdot 0.8 = 0.89 \text{ kN/m}^2$$

c) místní účinky - atika

$$\mu_1 = 0.8$$

$$\mu_2 = \gamma h / s_k$$

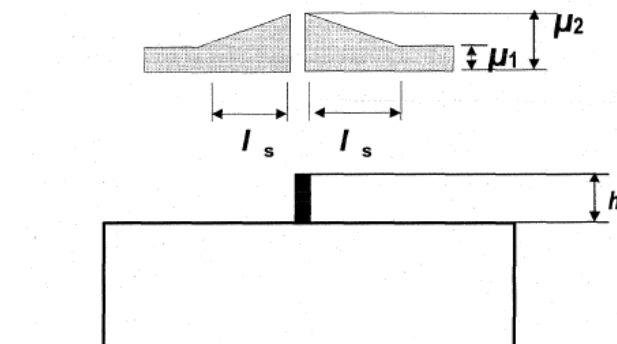
s omezením:  $0.8 \leq \mu_2 \leq 2.0$

kde  $\gamma$  je objemová tíha sněhu, kterou lze pro tento výpočet uvažovat hodnotou  $2 \text{ kN/m}^3$ ;

$$l_s = 2h$$

s omezením:  $5 \text{ m} \leq l_s \leq 15 \text{ m}$

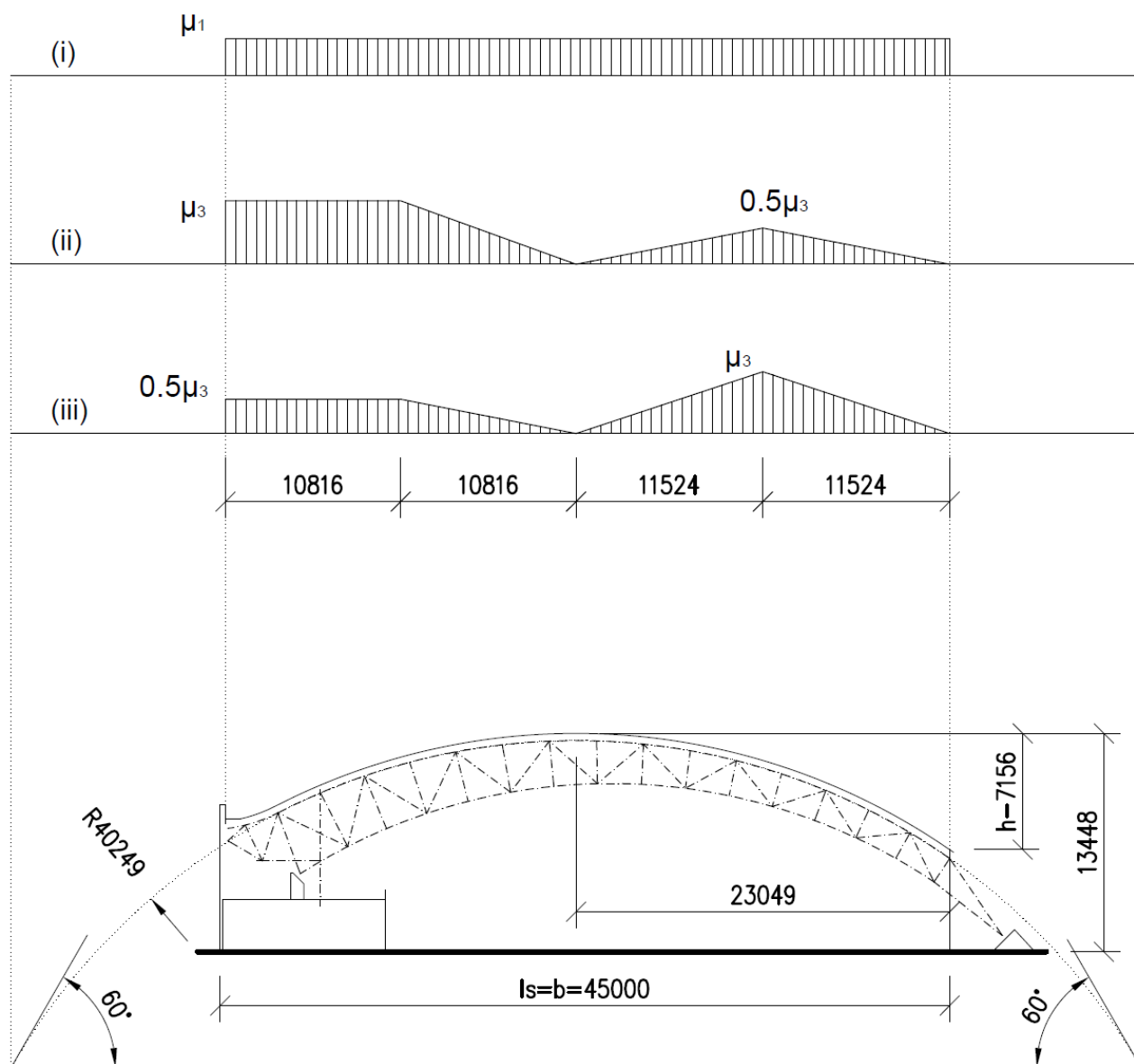
POZNÁMKA Kde to dovoluje národní příloha, lze zatížení při sněhových návějích stanovit podle přílohy B. NP22)



$$h = 0.85 \text{ m} \rightarrow l_s = 2 \cdot h = 2 \cdot 0.85 = 1.7 \text{ m}, \mu_2 = 2 \cdot 0.85 / 1 = 1.7, \text{ uvažuje se } \mu_2 = \mu_3 = 1.78$$

$$s_{2,k} = s_k \cdot C_t \cdot C_e \cdot \mu_2 = 1 \cdot 1 \cdot 1 \cdot 1.78 = 1.78 \text{ kN/m}^2$$

# VÝSLEDNÉ ZATÍŽENÍ SNĚHEM



Součinitel zatížení  $\gamma_f=1.5$

## VÝPOČET ZATÍŽENÍ VĚTREM PODLE ČTN EN 1991-1-4

### Větrová oblast

místo: Ostrava

odečteno z mapy větrových oblastí ČR

$V_{b,0} = 25$  m/s

výchozí základní rychlost větru

### Základní rychlost větru

$V_b = V_{b,0} \cdot C_{dir} \cdot C_{season} = 25$  m/s

základní rychlost větru 4.2 (4.1)

$C_{dir} = 1$

součinitel směru větru NA.2.6.

$C_{season} = 1$

součinitel ročního období NA.2.7.

### Kategorie terénu

Příloha A.1

$z_0 = 0,3$  m

tab.4.1

$z_{min} = 5,00$  m

tab.4.1

$z_{max} = 200$  m

$z_{e1} = 13,00$  m

referenční výška 7.2.2 (1)

$z_{e2} = 0$  m

### Součinitel terénu

$k_r = 0,19 \cdot (z_0/z_{0,II})^{0,07} = 0,215$

součinitel terénu 4.3.2 (4.5)

$z_{0,II} = 0,05$

kat. terénu II tab.4.1

### Součinitel drsnosti terénu

$c_r(z_{e1}) = k_r \cdot \ln(z/z_0) = 0,812$

4.3.2 (4.4)

$c_r(z_{e2}) = k_r \cdot \ln(z/z_0) =$

### Součinitel orografie

$c_0(z) = 1$

4.3.1.

### Střední rychlost větru

$v_m(z_{e1}) = c_r(z) \cdot c_0(z) \cdot v_b = 20,29$  ms<sup>-1</sup>

4.3.1 (4.3)

$v_m(z_{e2}) = c_r(z) \cdot c_0(z) \cdot v_b =$  ms<sup>-1</sup>

### Intenzita turbulence

$I_v(z_{e1}) = k_t/c_0(z) \cdot \ln(z/z_0) = 0,265$

$k_t = 1$

součinitel turbulence 4.4 (4.7)

$I_v(z_{e2}) = k_t/c_0(z) \cdot \ln(z/z_0) =$

### Maximální dynamický tlak větru

$q_p(z_{e1}) = [1+7I_v(z)] \cdot 0,5\rho \cdot v_m(z)^2 =$

736 Nm<sup>-2</sup> = 0,736 kNm<sup>-2</sup>

4.4 (4.8)

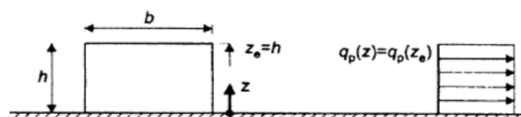
$q_p(z_{e2}) = [1+7I_v(z)] \cdot 0,5\rho \cdot v_m(z)^2 =$

Nm<sup>-2</sup> = kNm<sup>-2</sup>

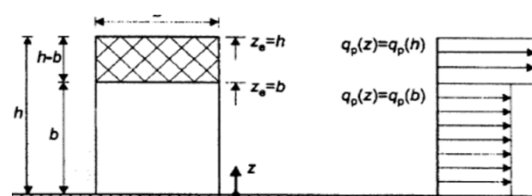
## Rozměry objektu

|         |         |                                      |
|---------|---------|--------------------------------------|
| $h =$   | 13,00 m | výška stavby                         |
| $b =$   | 40,00 m | rozměr kolmo na hřeben - délka štítu |
| $l =$   | 62,00 m | rozměr rovnoběžně s hřebenem         |
| $l_1 =$ | 6,25 m  | vzdálenost rámu                      |
| $l_2 =$ | 7,00 m  | vzdálenost štítových sloupů          |
| $l_3 =$ | 1,20 m  | vzdálenost vaznic                    |

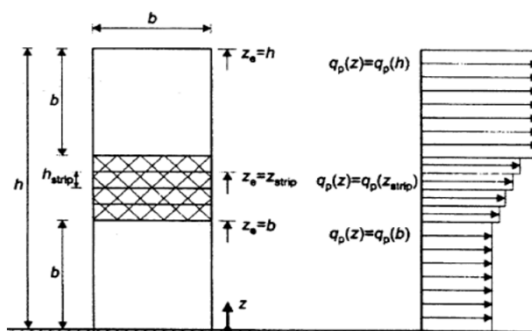
|            |      |               |         |
|------------|------|---------------|---------|
| (1)        |      | výška průběh  |         |
| $z_{e1} =$ | 13 m | 0 až h konst. | $h < b$ |



|              |      |               |              |
|--------------|------|---------------|--------------|
| (2)          |      |               |              |
| $z_{e1} = h$ | 13 m | b až h konst. | $b < h < 2b$ |
| $z_{e2} = b$ | 40 m | 0 až b konst. |              |



|              |      |                  |          |
|--------------|------|------------------|----------|
| (3)          |      |                  |          |
| $z_{e1} = h$ | 13 m | (h - b) a konst. | $h > 2b$ |
| $z_{es} = h$ | m    | b až (h · lin.)  |          |
| $z_{e2} = b$ | 40 m | 0 až b konst.    |          |



PLATÍ 1.PŘÍPAD

## Sumarizace vstupních údajů

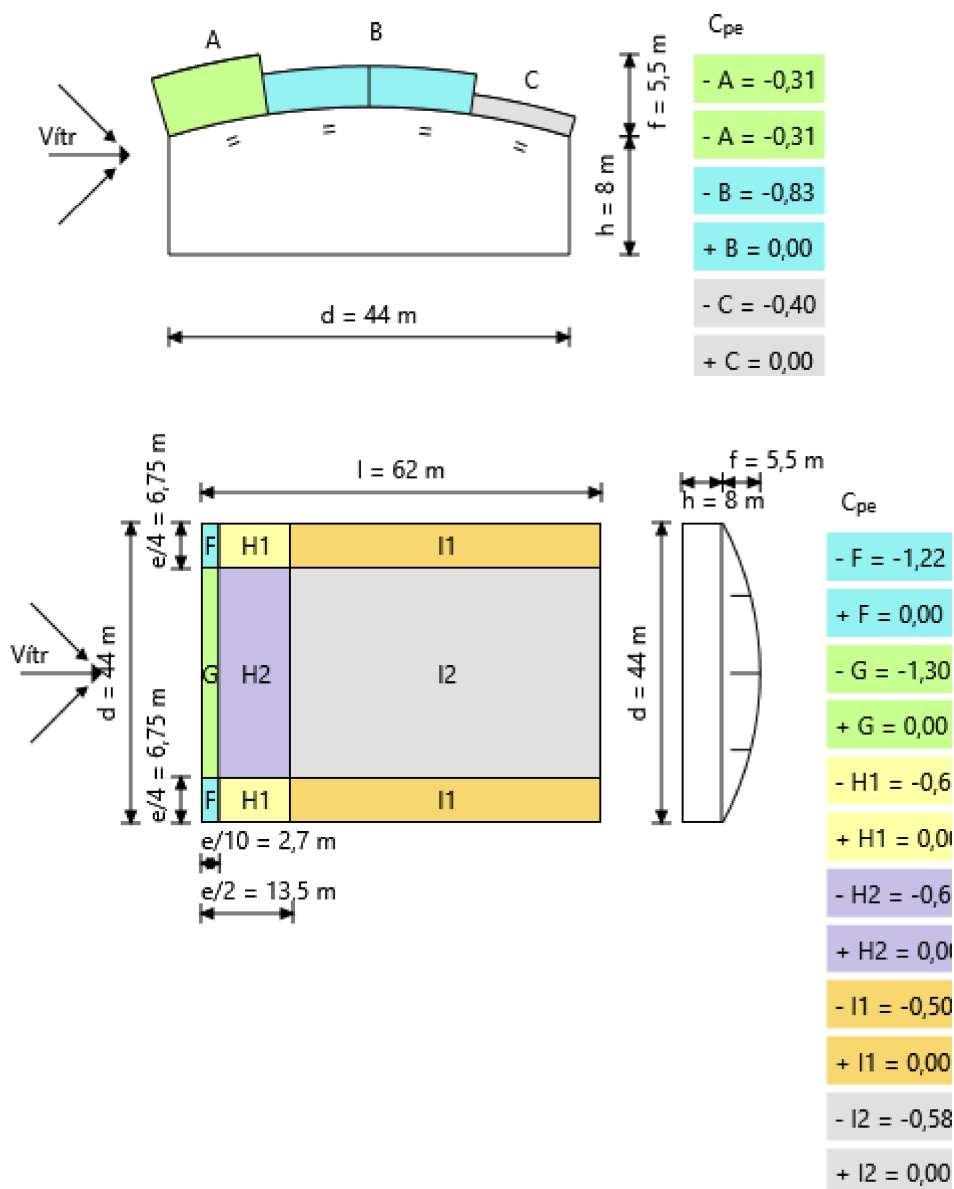
|                      |   | $z_e$ | $C_{dir}$ | $C_{season}$ | $v_{b,0}$ | $v_b$ | $C_{r(z)}$ | $C_{0(z)}$ | $k_r$ | $v_{m(z)}$ | $I_{v(z)}$ | $q_{p(z)}$ |
|----------------------|---|-------|-----------|--------------|-----------|-------|------------|------------|-------|------------|------------|------------|
| Referenční výška [m] | Střecha   | 13,5  | 1,00      | 1,00         | 25,00     | 25,00 | 0,82       | 1,00       | 0,22  | 20,50      | 0,26       | 0,745      |
|                      | Stěny   | 8     | 1,00      | 1,00         | 25,00     | 25,00 | 0,71       | 1,00       | 0,22  | 17,68      | 0,30       | 0,612      |
|                      | Štíty   | 13,5  | 1,00      | 1,00         | 25,00     | 25,00 | 0,82       | 1,00       | 0,22  | 20,50      | 0,26       | 0,745      |
| Nadmořská výška      | 250 m.n.m   |       |           |              |           |       |            |            |       |            |            |            |
| Terén                | terén III. - oblasti rovnoměrně pokryté vegetací nebo budovami (vesnice, předměstský terén, souvislý les) |       |           |              |           |       |            |            |       |            |            |            |

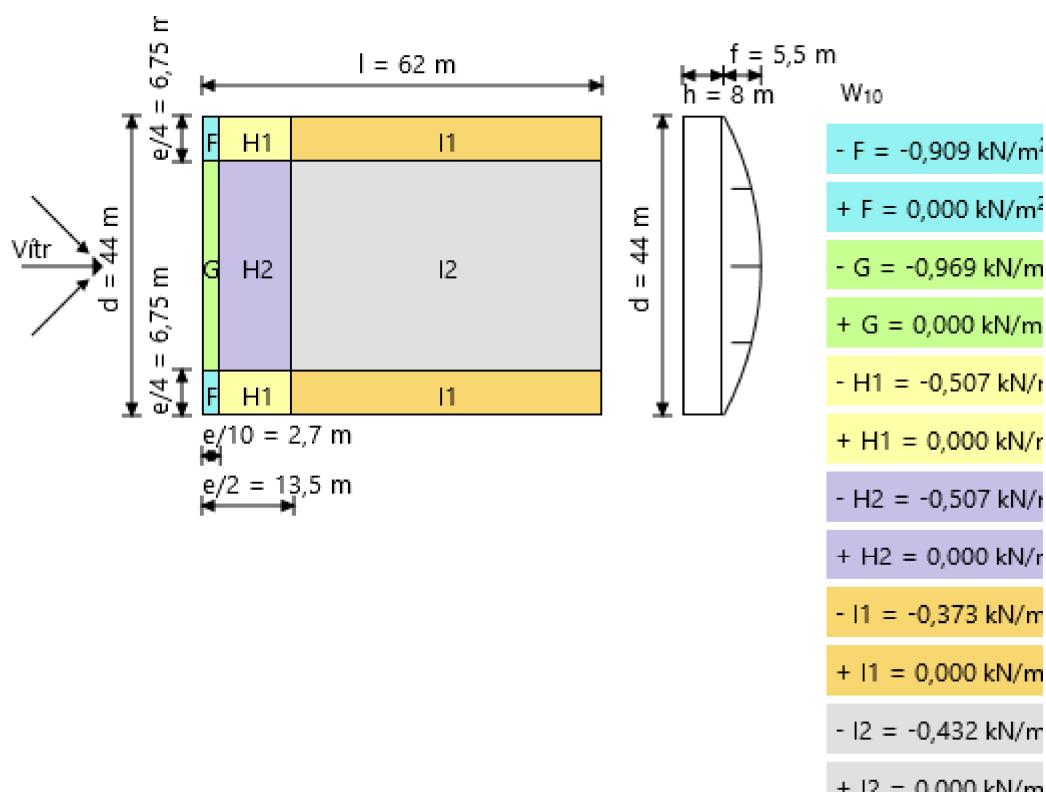
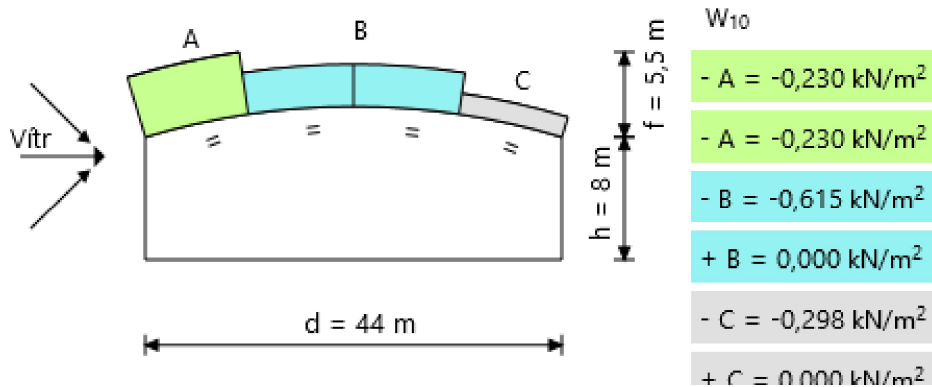
## Střecha

### Oblouková střecha

| Půdorysné rozměry objektu: |      |
|----------------------------|------|
| Šířka                      | 44 m |
| Délka                      | 62 m |
| f                          | 5,5m |

### Součinitele vnějšího tlaku $C_{pe}$ - Střecha





## Tlak větru na povrchy

$$w_e(z_e) = c_{pe} \cdot q_p(z_e)$$

$$q_{p1}(z_e) \quad 0,74 \text{ kNm}^{-2}$$

$$5.2 (5.1)$$

$$4$$

$$q_{p2}(z_e) \quad \text{není kNm}^{-2}$$

$$8$$

### Svislé stěny

$$7.2.2.$$

$$6$$

$$5,4$$

$$5,12$$

### Vítr rovnoběžně s hřebenem

$$b = 40,00 \text{ m} \quad \text{návětrná strana}$$

$$d = 62,00 \text{ m}$$

$$h = 13,00 \text{ m} \quad \text{výška}$$

$$h/d = 0,21$$

$$e = 26,00 \text{ m}$$

### Vítr kolmo na hřeben

$$b = 62,00 \text{ m} \quad \text{návětrná strana}$$

$$d = 40,00 \text{ m}$$

$$h = 13,00 \text{ m} \quad \text{výška}$$

$$h/d = 0,33$$

$$e = 26,00 \text{ m}$$

tab. 7.1 rovnoběžně s hřebenem

| oblast        | A            | B            | C            | D           | E            |
|---------------|--------------|--------------|--------------|-------------|--------------|
| h/d           | -1,2         | -0,80        | -0,5         | 0,70        | -0,30        |
| $w_{e1}(z_e)$ | <b>-0,88</b> | <b>-0,59</b> | <b>-0,37</b> | <b>0,51</b> | <b>-0,22</b> |
| $w_{e2}(z_e)$ | -            | -            | -            | -           | -            |

tab. 7.1 kolmo na hřeben

| oblast        | A            | B            | C            | D           | E            |
|---------------|--------------|--------------|--------------|-------------|--------------|
| h/d           | -1,2         | -0,86        | -0,5         | 0,71        | -0,32        |
| $w_{e1}(z_e)$ | <b>-0,88</b> | <b>-0,63</b> | <b>-0,37</b> | <b>0,52</b> | <b>-0,24</b> |
| $w_{e2}(z_e)$ | -            | -            | -            | -           | -            |

### Stěny rovnoběžně s hřebenem

#### PLATÍ

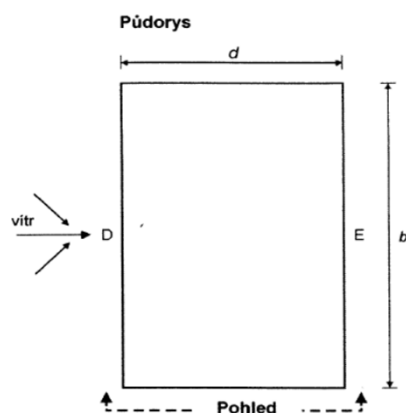
$$e/5 = 5,20 \text{ m}$$

$$4/5e = 20,8 \text{ m}$$

$$d - e = 36,00 \text{ m}$$

$$e/5 = 5,20 \text{ m}$$

$$d - e/5 = 56,80 \text{ m}$$



### Štíty

#### PLATÍ

$$e/5 = 5,20 \text{ m}$$

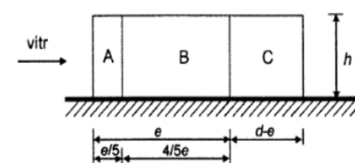
$$4/5e = 20,8 \text{ m}$$

$$d - e = 14,00 \text{ m}$$

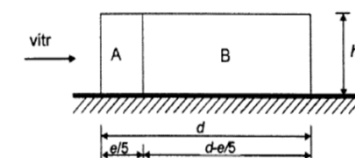
$$e/5 = 5,20 \text{ m}$$

$$d - e/5 = 34,80 \text{ m}$$

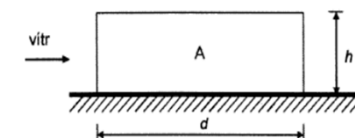
Pohled pro  $e < d$



Pohled pro  $e \geq d$



Pohled pro  $e \geq 5d$





## 2.4 TG rozvody

TG rozvody pod střechou.....  $p_{tg1,k}=0.1 \text{ kN/m}^2$

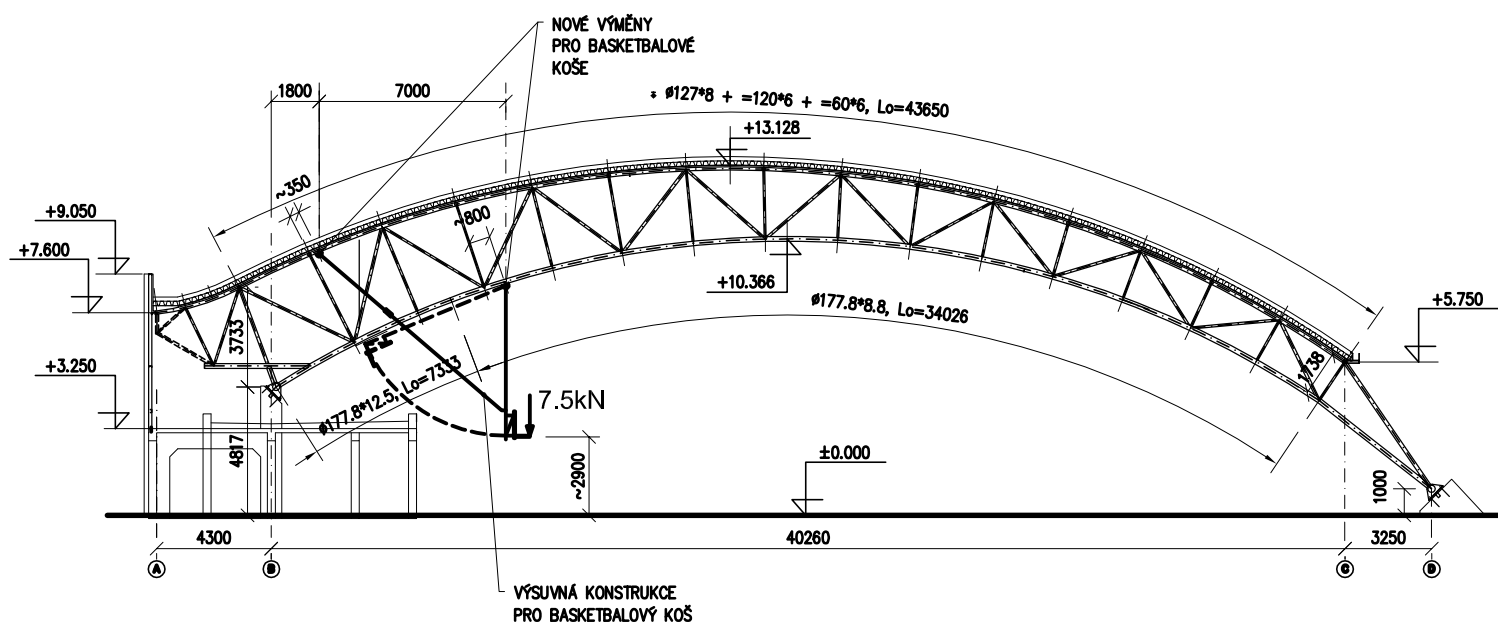
Součinitel zatížení  $\gamma_f=1.35$

## 2.5 Zatížení od basketbalové koše

$q_{sport,k}= 7.50 \text{ kN}$

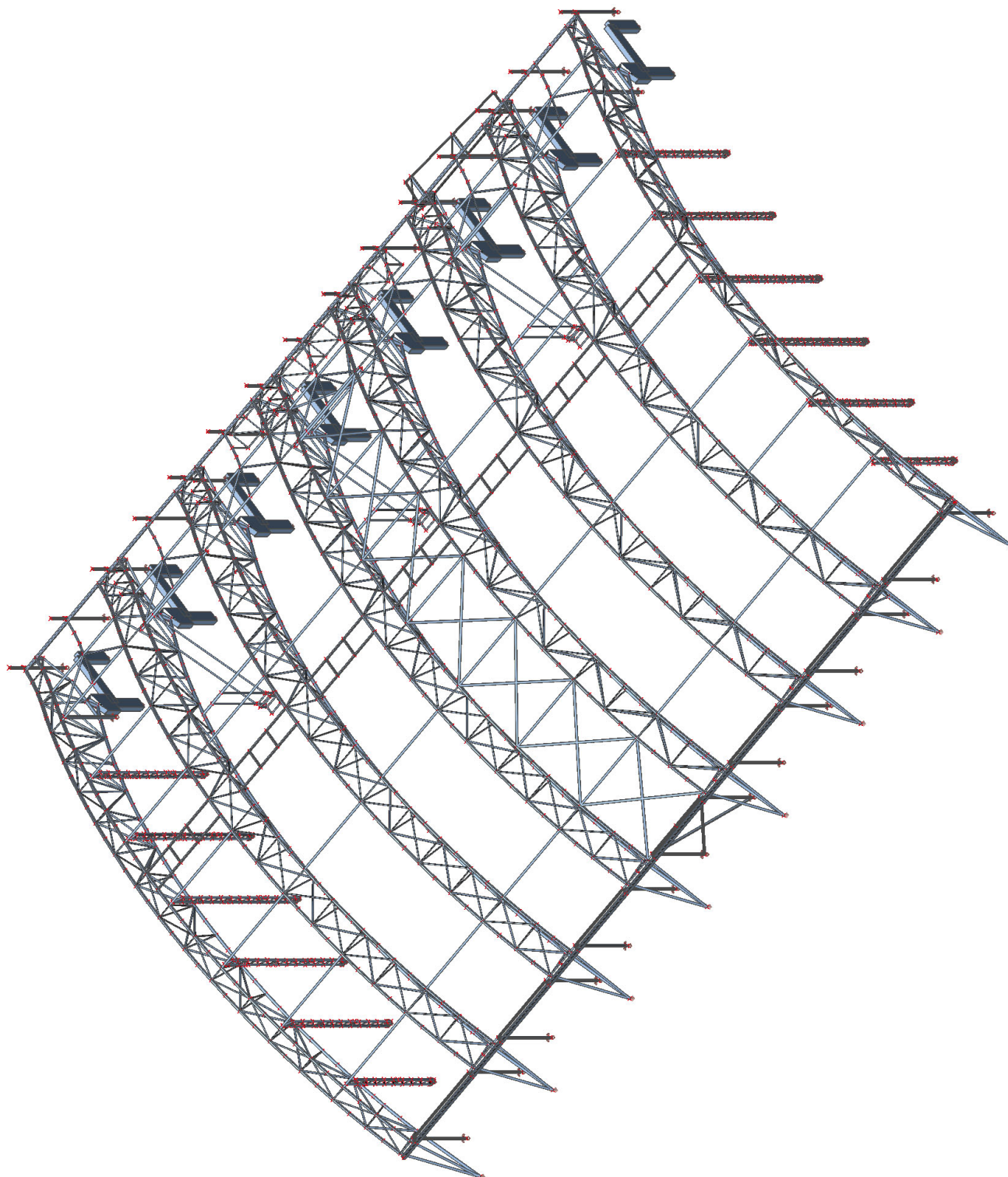
Součinitel zatížení  $\gamma_f=1.35$

# ZATÍŽENÍ - VAZNÍK

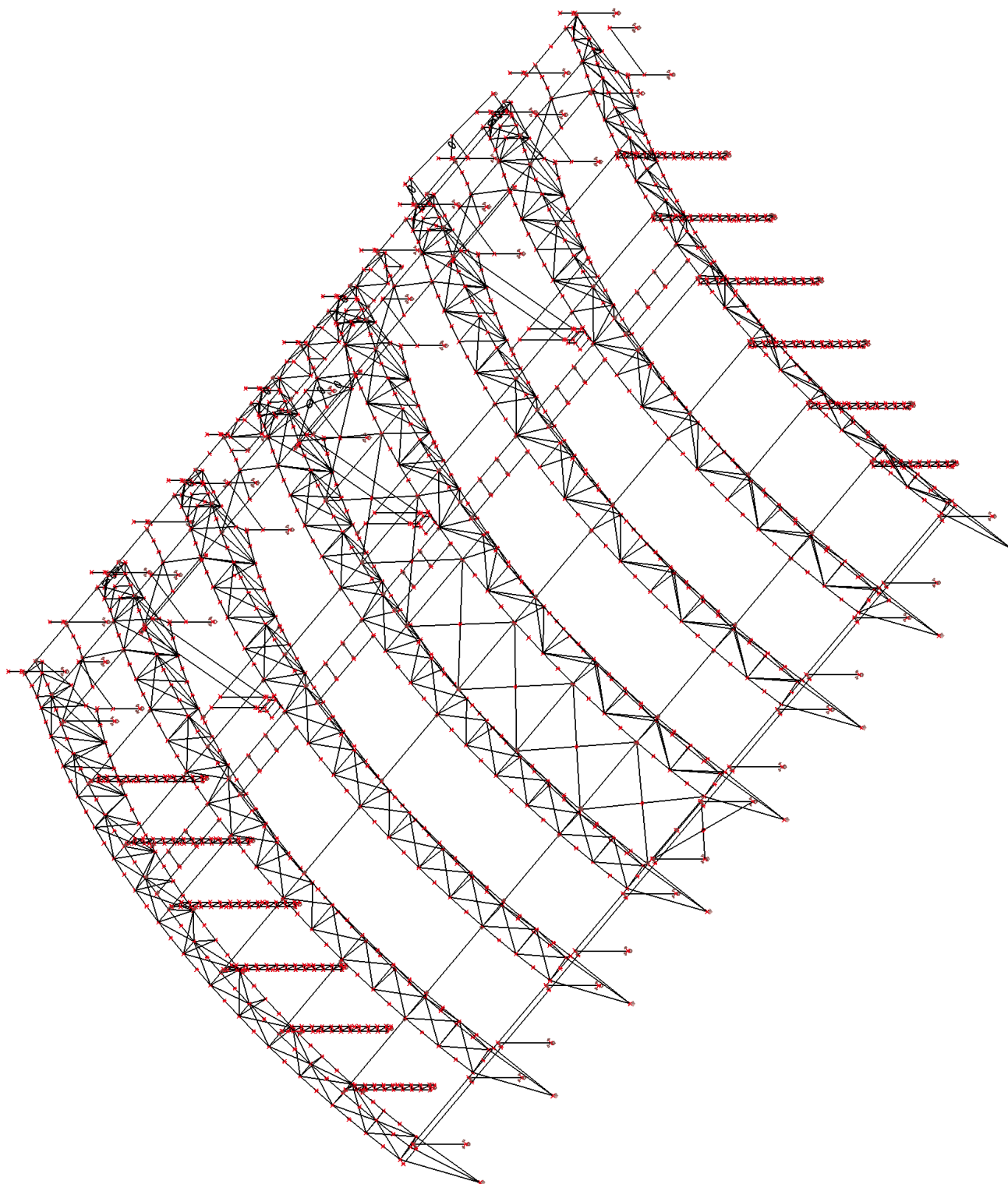


# **KONSTRUKCE SPORTOVNÍ HALY**

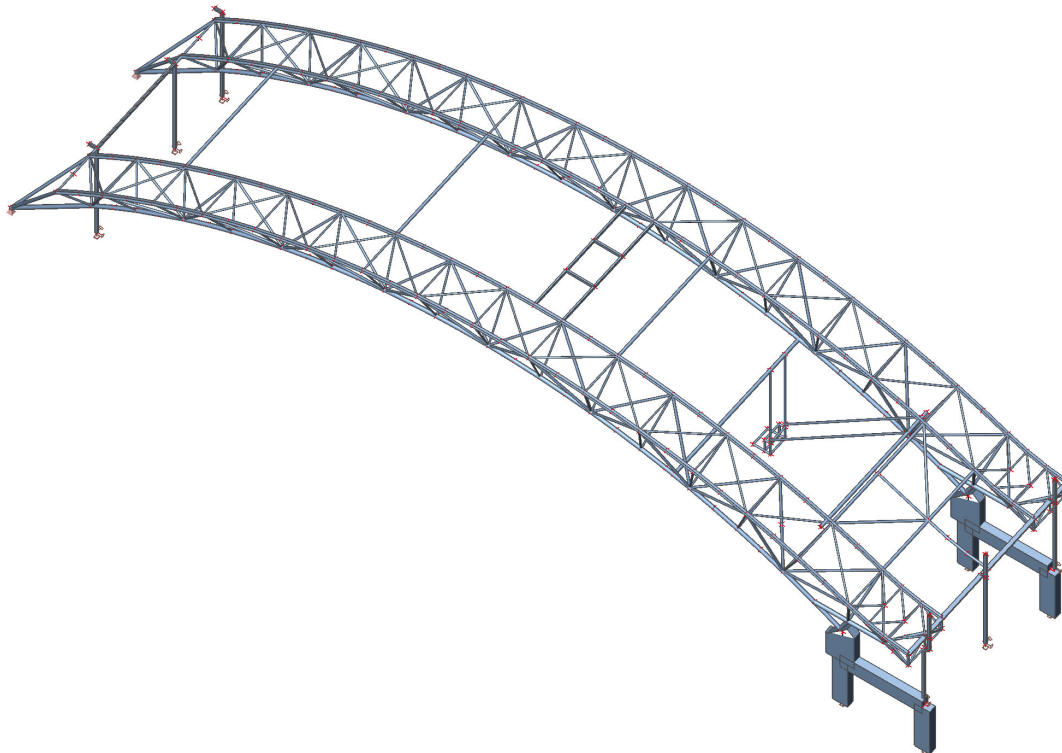
## 3D MODEL OF STRUCTURE



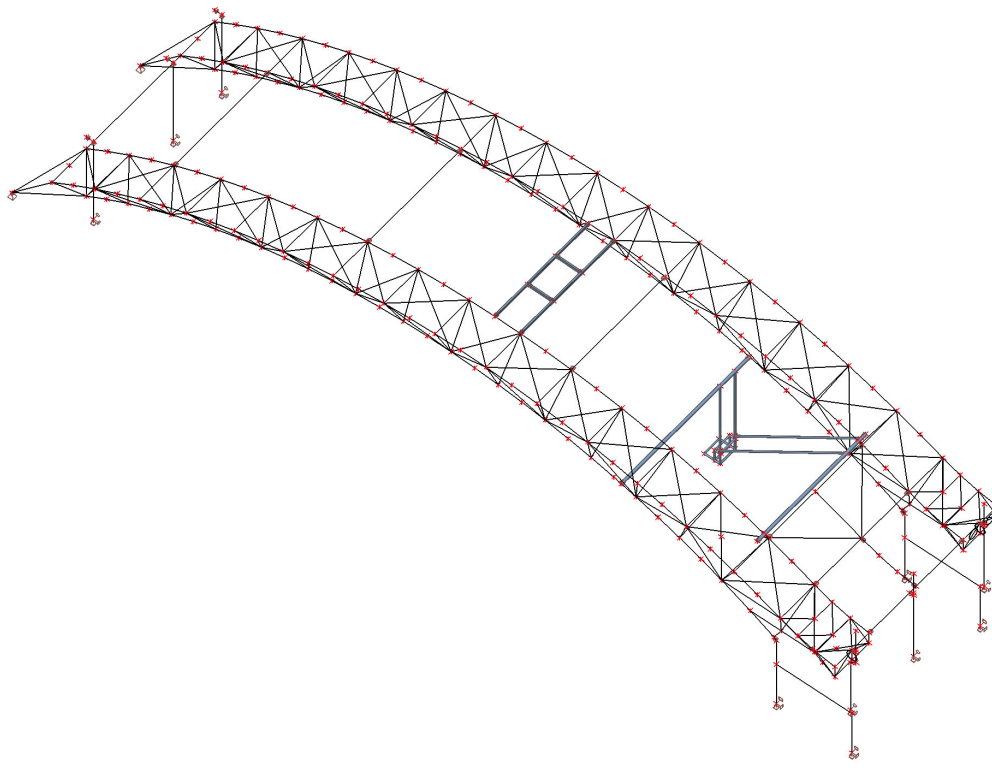
## Structural model



## 3D MODEL OF STRUCTURE



## Analysis model / Steel data



**Project**    **Rekonstrukce sportovního centra Ostrava - Dubina**

Part    Přepoččet - hlavní nosná konstrukce

Description    Ocelová konstrukce - požární klapy, sportovní zařízení (basket), leden 2023

Author    Ing. Jeřowicz

**Project**

|   |   |
|---|---|
| Version                                     | SCIA Engineer 22.0.0019   |
| Organization                                | OCELOVÉ KONSTRUKCE - STATIKA s.r.o.   |
| Project                                     | Rekonstrukce sportovního centra Ostrava - Dubina                            |
| Part  | Přepoččet - hlavní nosná konstrukce   |
| Description                                 | Ocelová konstrukce - požární klapy, sportovní zařízení (basket), leden 2023 |
| Author                                      | Ing. Jeřowicz   |
| Date  | 01/2023   |
| Structure                                   | Frame XYZ   |
| No. of nodes :                              | 1578  |
| No. of beams :                              | 1619  |
| No. of slabs :                              | 0   |
| No. of solids :                             | 0   |
| No. of used profiles :                      | 42  |
| No. of load cases :                         | 21  |
| No. of used materials :                     | 3   |
| Acceleration of gravity [m/s <sup>2</sup> ] | 10,000  |
| National code                               | EC - EN   |

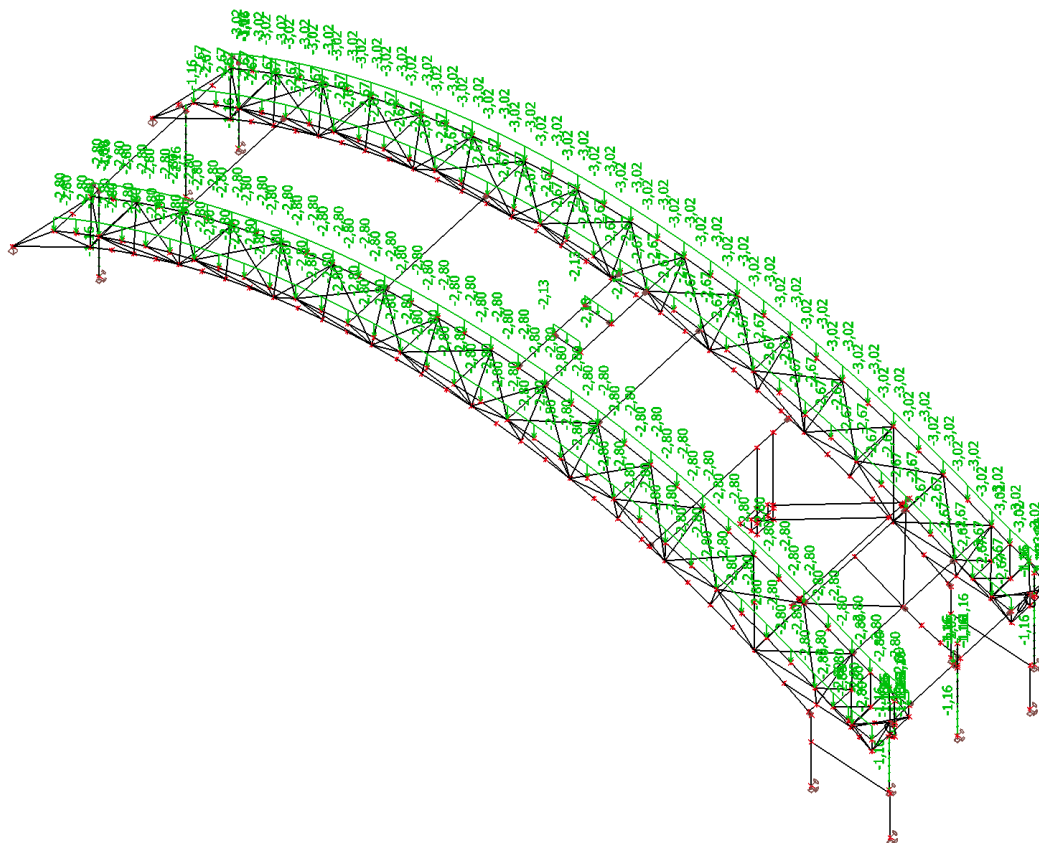
**Load cases**

| Name | Description  | Action type              | Load group | Direction | Duration | Master load case |
|------|--|--------------------------|------------|-----------|----------|------------------|
|      | Spec   | Load type                |            |           |          |                  |
| LC1  | self weight  | Permanent<br>Self weight | Group-Perm | -Z        |          |                  |
| LC2  | roofing -sidding                                   | Permanent<br>Standard    | Group-Perm |           |          |                  |
| LC3  | TG piping, lights<br>Standard                      | Variable<br>Static       | tg         |           | Long     | None             |
| LC4  | snow (i)<br>Standard                               | Variable<br>Static       | snow       |           | Short    | None             |
| LC5  | snow (ii) - north-west<br>Standard                 | Variable<br>Static       | snow       |           | Short    | None             |
| LC6  | snow (ii) - south east<br>Standard                 | Variable<br>Static       | snow       |           | Short    | None             |
| LC7  | wind +X<br>Standard                                | Variable<br>Static       | wind       |           | Short    | None             |
| LC8  | wind -X<br>Standard                                | Variable<br>Static       | wind       |           | Short    | None             |
| LC9  | wind +Y<br>Standard                                | Variable<br>Static       | wind       |           | Short    | None             |
| LC10 | wind -Y<br>Standard                                | Variable<br>Static       | wind       |           | Short    | None             |
| LC11 | thermo - winter<br>Standard                        | Variable<br>Static       | thermo     |           | Long     | None             |
| LC12 | thermo - summer<br>Standard                        | Variable<br>Static       | thermo     |           | Long     | None             |
| LC13 | Movement of<br>basements 10mm<br>Standard          | Variable<br>Static       | move       |           | Long     | None             |
| LC14 | snow 16.2.2006 - all,<br>UNIT 100kg/m2<br>Standard | Variable<br>Static       | snow       |           | Short    | None             |
| LC15 | snow 16.2.2006 -<br>nord-west UNIT<br>Standard     | Variable<br>Static       | snow       |           | Short    | None             |
| LC16 | snow 16.2.2006 -<br>south-east UNIT<br>Standard    | Variable<br>Static       | snow       |           | Short    | None             |
| LC17 | wind +X<br>Standard                                | Variable<br>Static       | wind       |           | Short    | None             |
| LC18 | wind -X<br>Standard                                | Variable<br>Static       | wind       |           | Short    | None             |
| LC19 | wind +Y<br>Standard                                | Variable<br>Static       | wind       |           | Short    | None             |



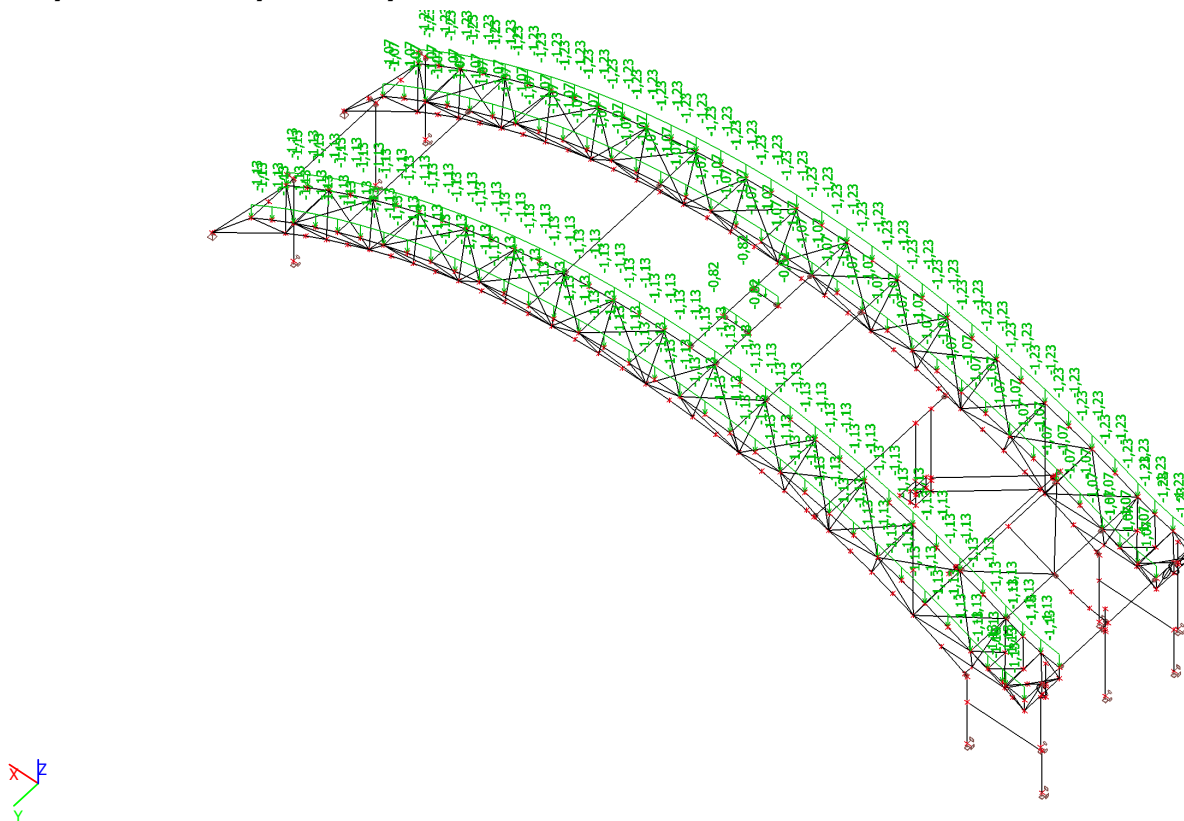
| Name | Description | Action type | Load group | Direction | Duration | Master load case |
|------|-------------|-------------|------------|-----------|----------|------------------|
|      | Spec        | Load type   |            |           |          |                  |
| LC20 | wind -Y     | Variable    | wind       |           | Short    | None             |
|      | Standard    | Static      |            |           |          |                  |
| LC21 | basket      | Variable    | basket     |           | Short    | None             |
|      | Standard    | Static      |            |           |          |                  |

## LC2 / Tot. value / Value / Steel data

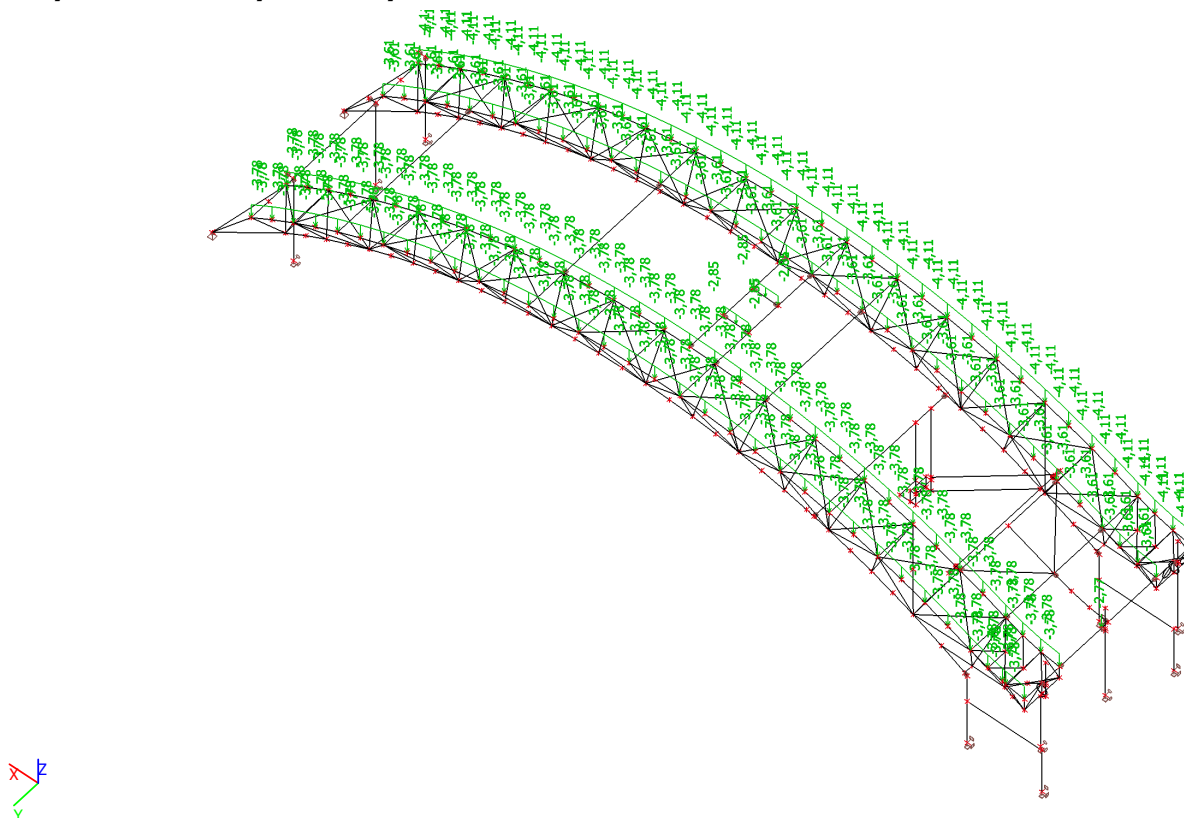




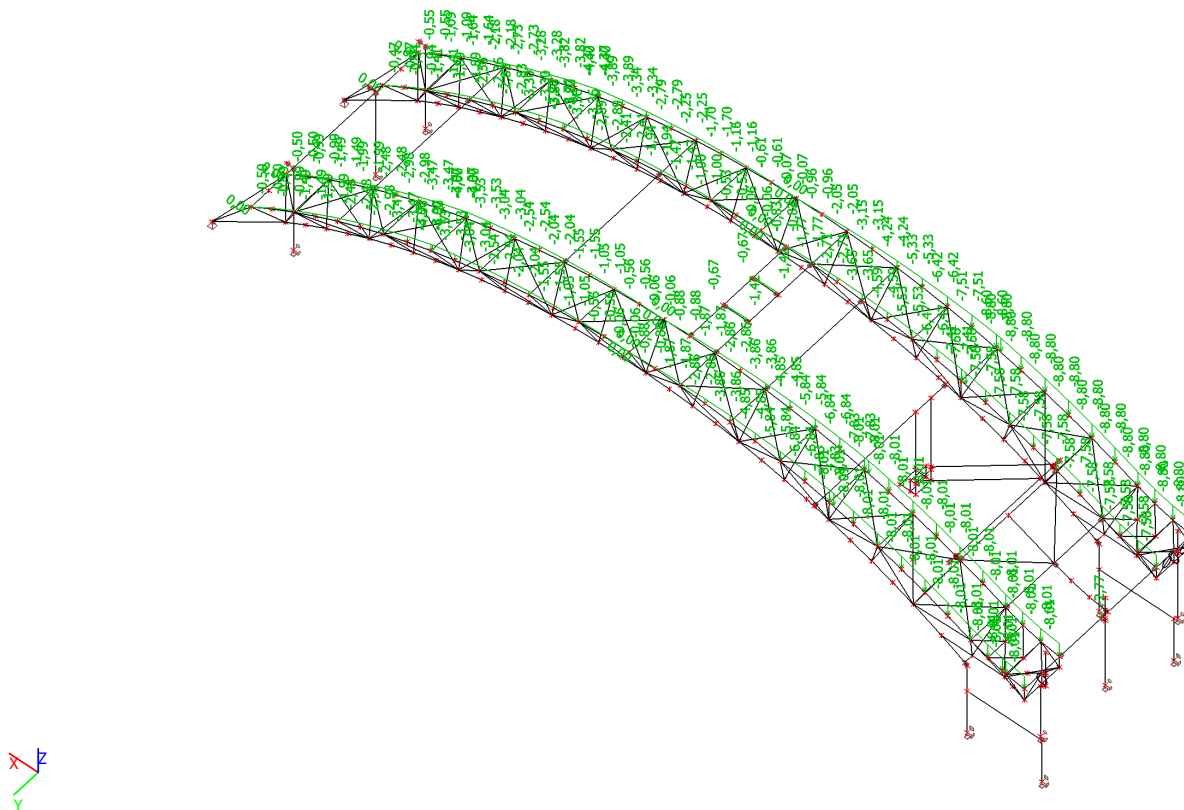
### LC3 / Tot. value / Value / Steel data



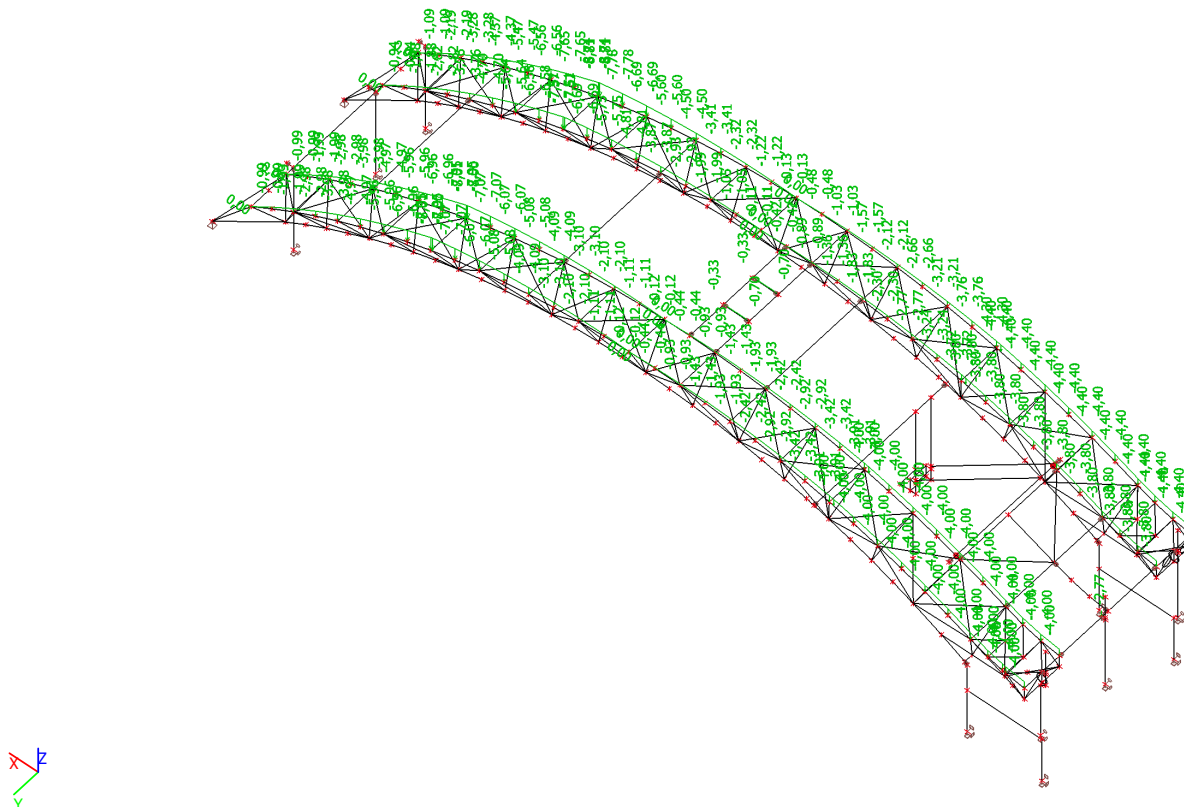
### LC4 / Tot. value / Value / Steel data



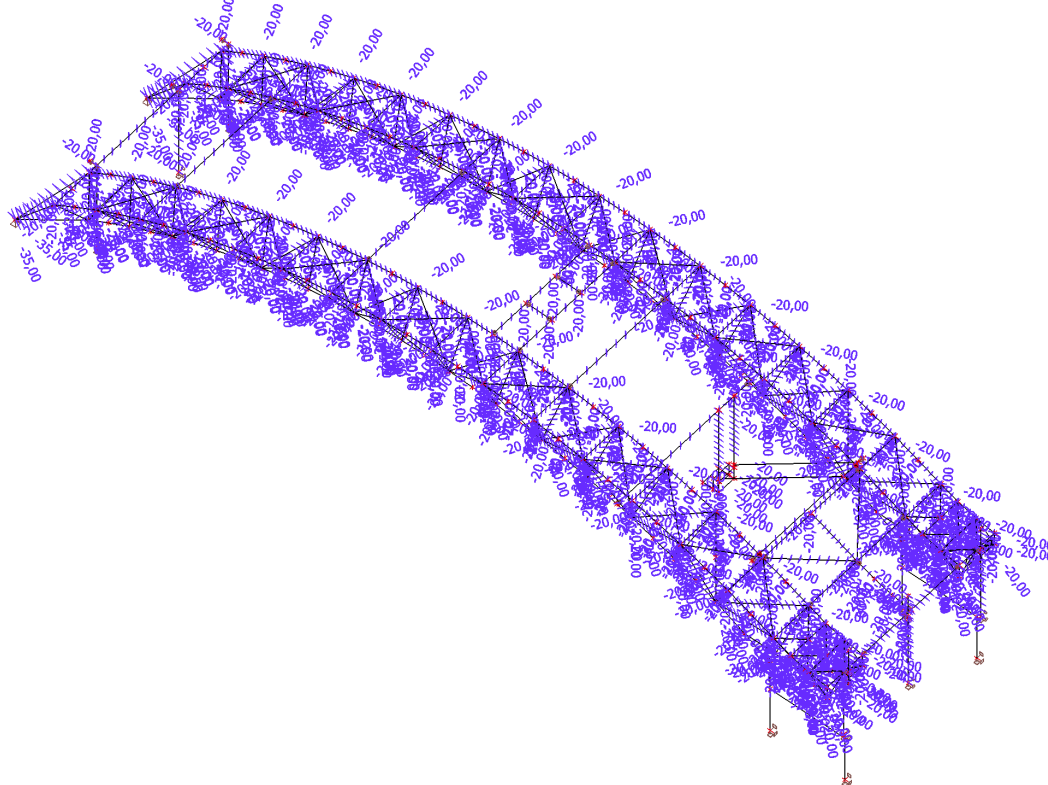
## LC5 / Tot. value / Value / Steel data



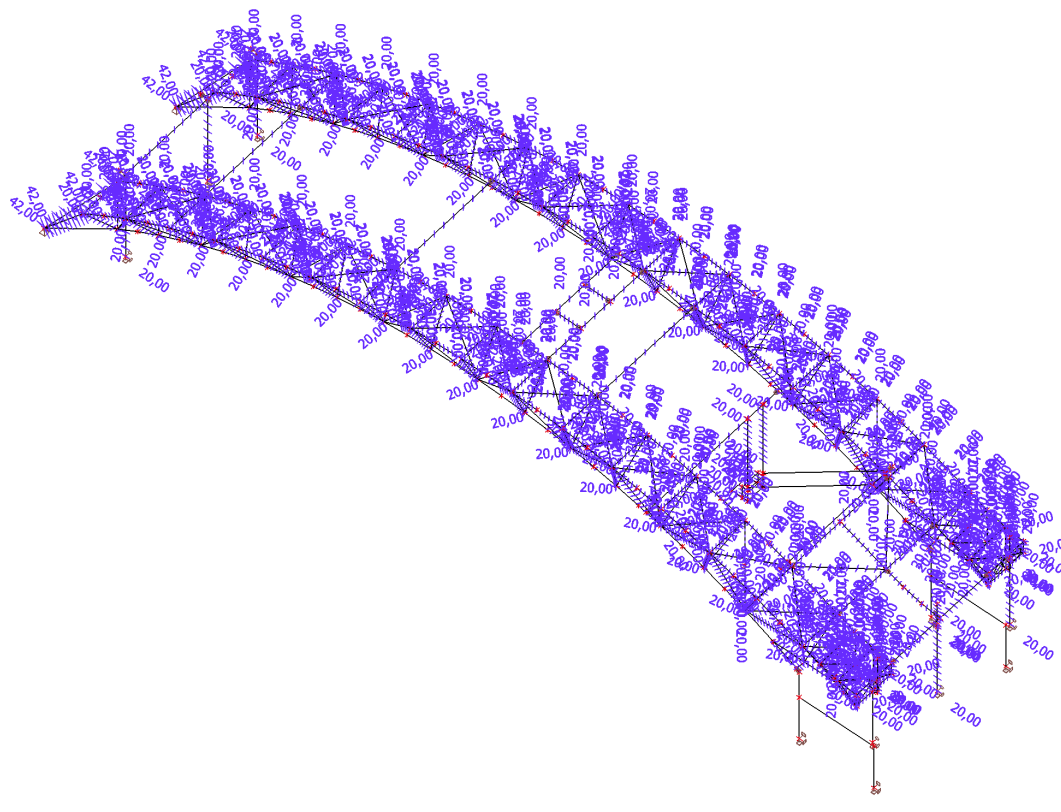
## LC6 / Tot. value / Value / Steel data



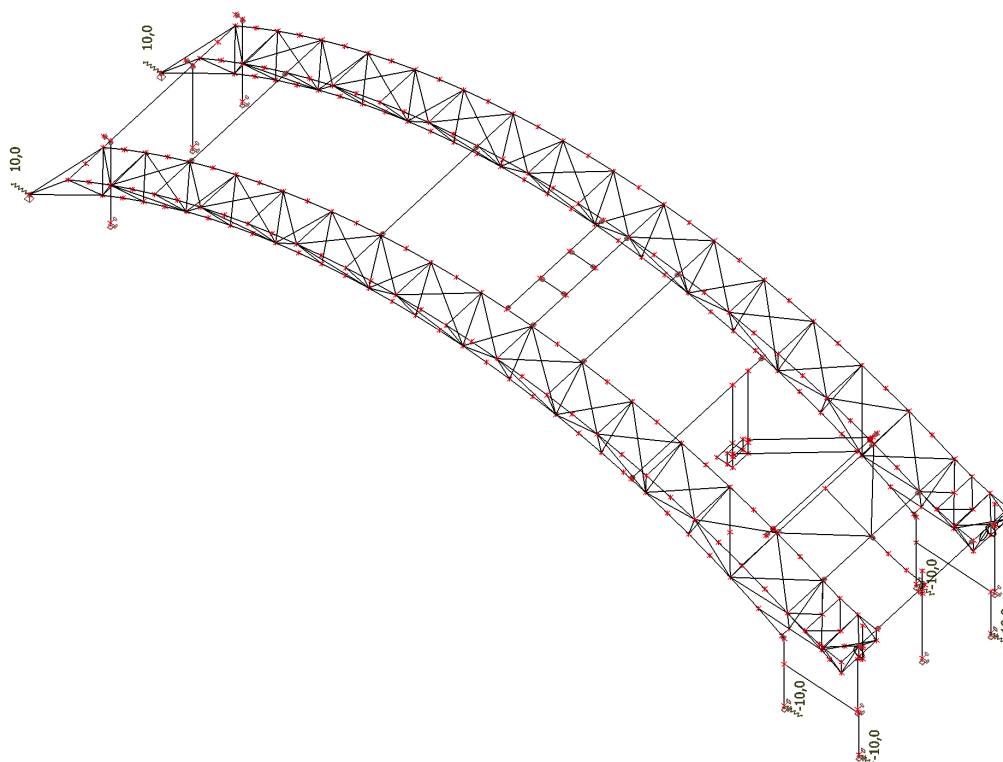
## LC11 / Tot. value / Value / Steel data



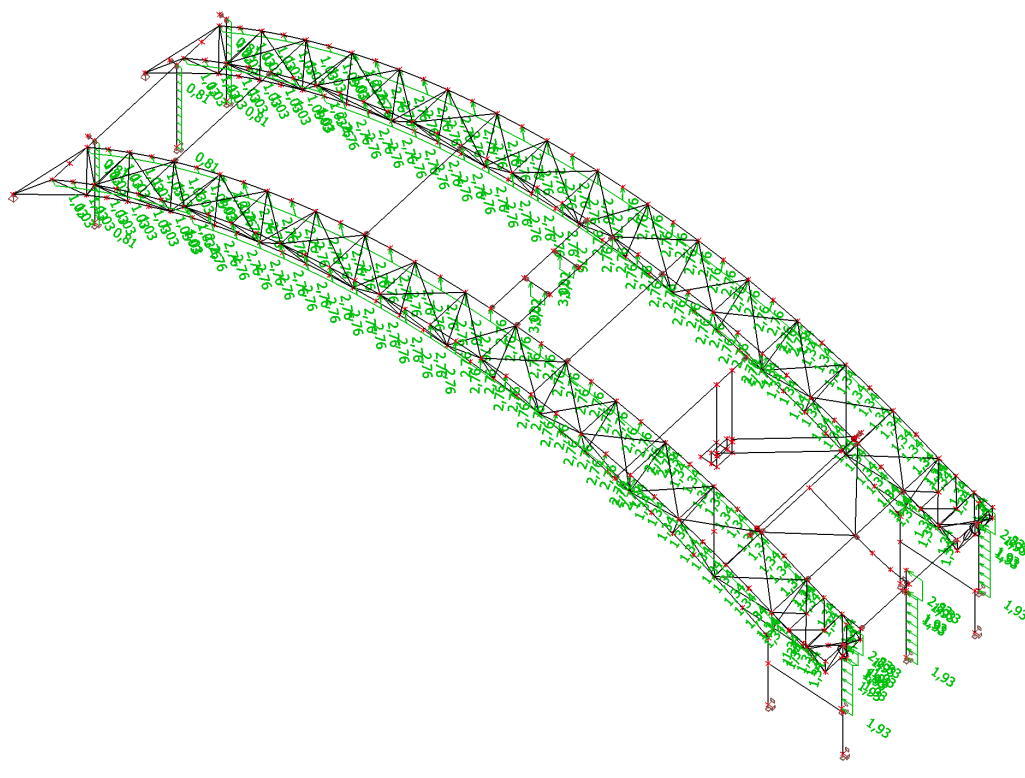
## LC12 / Tot. value / Value / Steel data



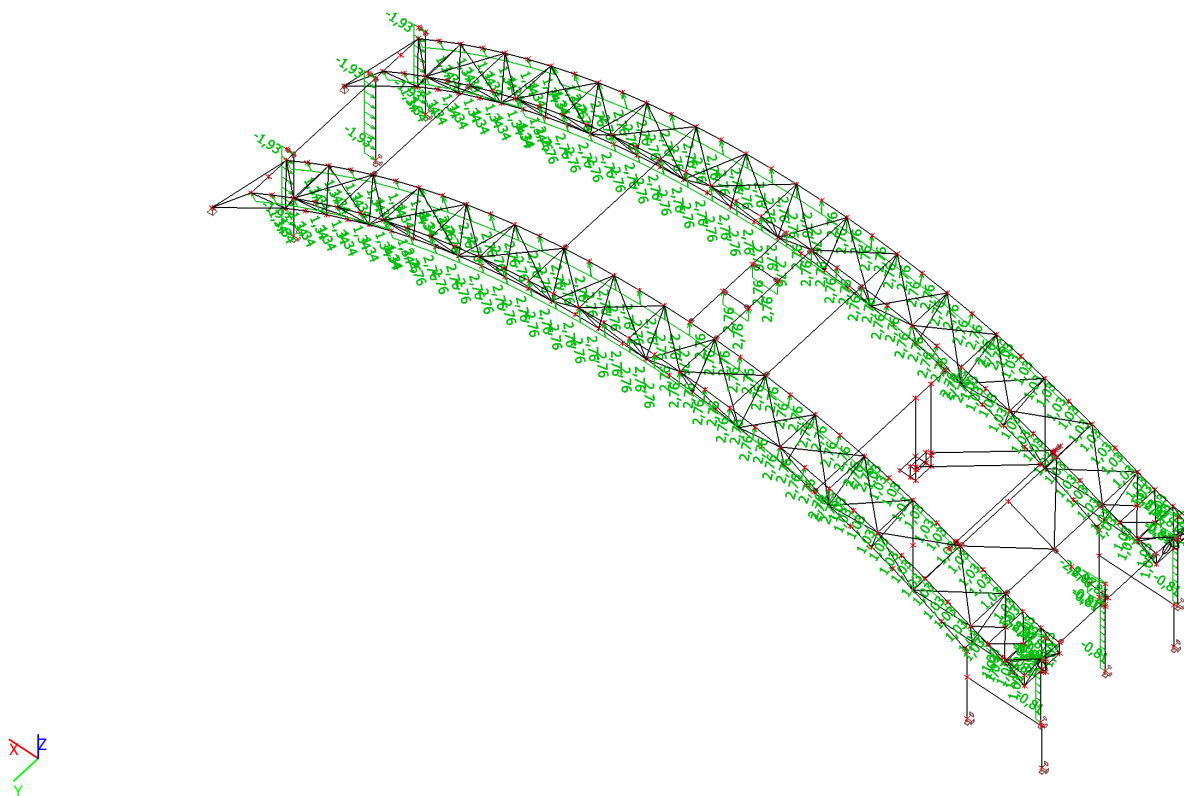
## LC13 / Tot. value / Value / Steel data



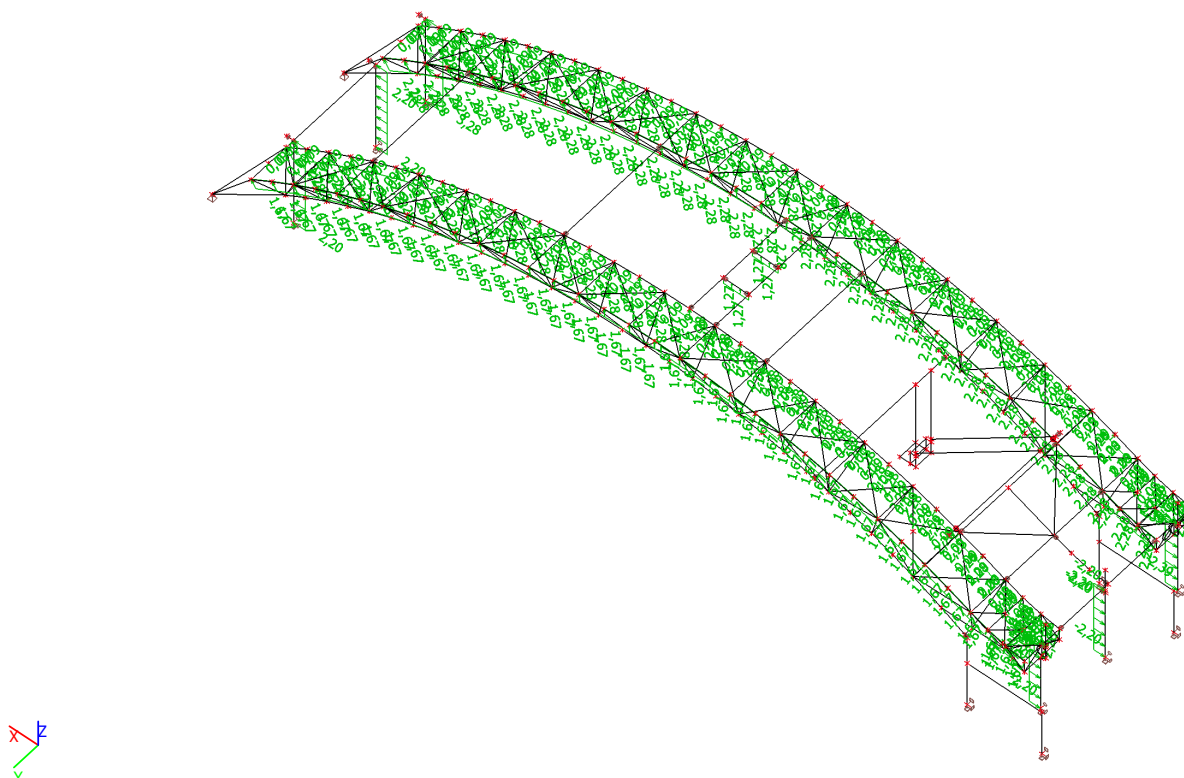
## LC17 / Tot. value / Value / Steel data



## LC18 / Tot. value / Value / Steel data

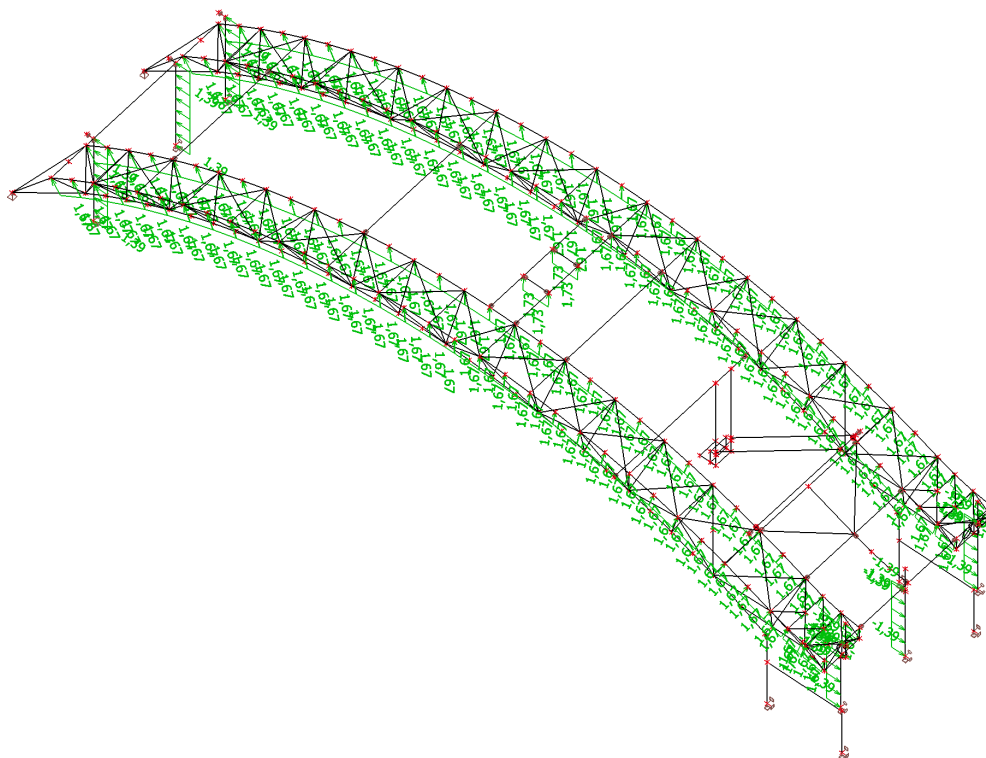


## LC19 / Tot. value / Value / Steel data

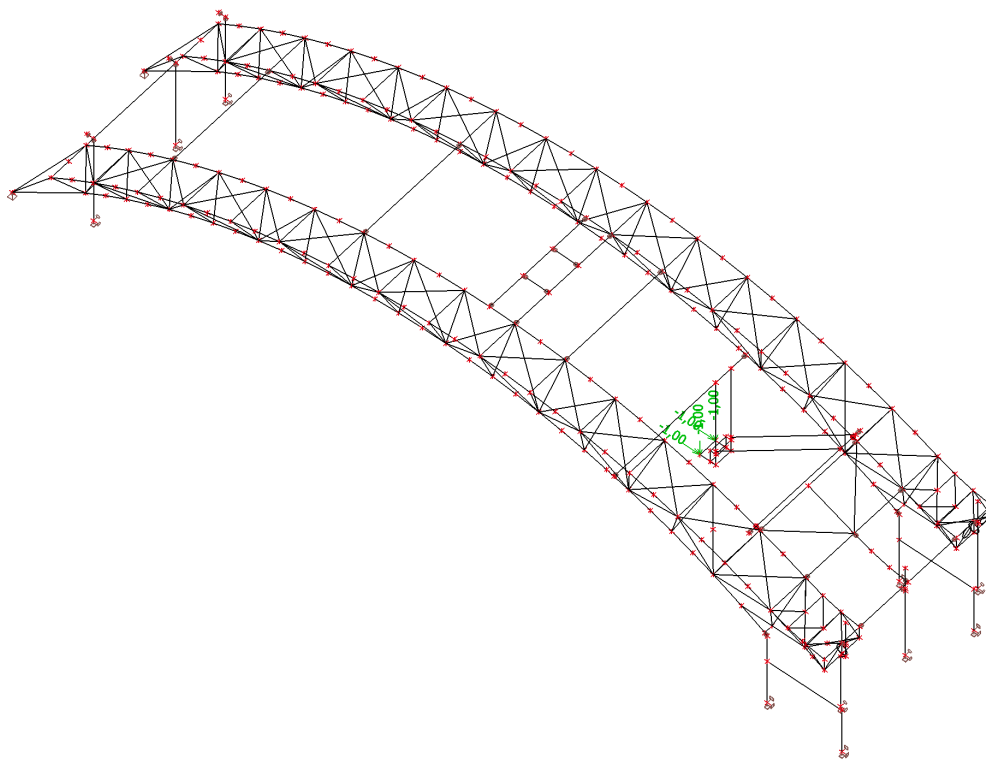




## LC20 / Tot. value / Value / Steel data



## LC21 / Tot. value / Value / Steel data



## Load groups

| Name       | Load      | Relation  | Type               |
|------------|-----------|-----------|--------------------|
| tg         | Variable  | Standard  | Cat A : Domestic   |
| snow       | Variable  | Exclusive | Snow               |
| wind       | Variable  | Exclusive | Cat A : Domestic   |
| thermo     | Variable  | Exclusive | Temperature        |
| move       | Variable  | Standard  | Construction loads |
| Group-Perm | Permanent |           |                    |
| basket     | Variable  | Standard  | Construction loads |

## Combinations

| Name | Description | Type                   | Load cases                        | Coeff. [-] |
|------|-------------|------------------------|-----------------------------------|------------|
| C01  |             | EN-ULS (STR/GEO) Set B | LC1 - self weight                 | 1,00       |
|      |             |                        | LC2 - roofing -sidding            | 1,00       |
|      |             |                        | LC3 - TG piping, lights           | 1,00       |
|      |             |                        | LC4 - snow (i)                    | 1,00       |
|      |             |                        | LC5 - snow (ii) - north-west      | 1,00       |
|      |             |                        | LC6 - snow (ii) - south east      | 1,00       |
|      |             |                        | LC11 - thermo - winter            | 1,00       |
|      |             |                        | LC12 - thermo - summer            | 1,00       |
|      |             |                        | LC13 - Movement of basements 10mm | 1,00       |
|      |             |                        | LC17 - wind +X                    | 1,00       |
|      |             |                        | LC18 - wind -X                    | 1,00       |
|      |             |                        | LC19 - wind +Y                    | 1,00       |
|      |             |                        | LC20 - wind -Y                    | 1,00       |
|      |             |                        | LC21 - basket                     | 1,00       |
| C02  |             | EN-SLS Characteristic  | LC1 - self weight                 | 1,00       |
|      |             |                        | LC2 - roofing -sidding            | 1,00       |
|      |             |                        | LC3 - TG piping, lights           | 1,00       |
|      |             |                        | LC4 - snow (i)                    | 1,00       |
|      |             |                        | LC5 - snow (ii) - north-west      | 1,00       |
|      |             |                        | LC6 - snow (ii) - south east      | 1,00       |
|      |             |                        | LC11 - thermo - winter            | 1,00       |
|      |             |                        | LC12 - thermo - summer            | 1,00       |
|      |             |                        | LC13 - Movement of basements 10mm | 1,00       |
|      |             |                        | LC17 - wind +X                    | 1,00       |
|      |             |                        | LC18 - wind -X                    | 1,00       |
|      |             |                        | LC19 - wind +Y                    | 1,00       |
|      |             |                        | LC20 - wind -Y                    | 1,00       |
|      |             |                        | LC21 - basket                     | 1,00       |
| C03  |             | EN-Accidental 1        | LC1 - self weight                 | 1,00       |
|      |             |                        | LC2 - roofing -sidding            | 1,00       |
|      |             |                        | LC3 - TG piping, lights           | 1,00       |
|      |             |                        | LC4 - snow (i)                    | 1,00       |
|      |             |                        | LC5 - snow (ii) - north-west      | 1,00       |
|      |             |                        | LC6 - snow (ii) - south east      | 1,00       |
|      |             |                        | LC11 - thermo - winter            | 1,00       |
|      |             |                        | LC12 - thermo - summer            | 1,00       |
|      |             |                        | LC13 - Movement of basements 10mm | 1,00       |
|      |             |                        | LC17 - wind +X                    | 1,00       |
|      |             |                        | LC18 - wind -X                    | 1,00       |
|      |             |                        | LC19 - wind +Y                    | 1,00       |
|      |             |                        | LC20 - wind -Y                    | 1,00       |
|      |             |                        | LC21 - basket                     | 1,00       |

## Result classes

| Name        | List  |
|-------------|---|
| All ULS     | C01 - EN-ULS (STR/GEO) Set B<br>C03 - EN-Accidental 1 |
| All SLS     | C02 - EN-SLS Characteristic                           |
| All ULS+SLS | C01 - EN-ULS (STR/GEO) Set B                          |

# **DEFORMACE**



## DEFORMATIONS

### 1D deformations; $u_y$

Values:  $u_y$

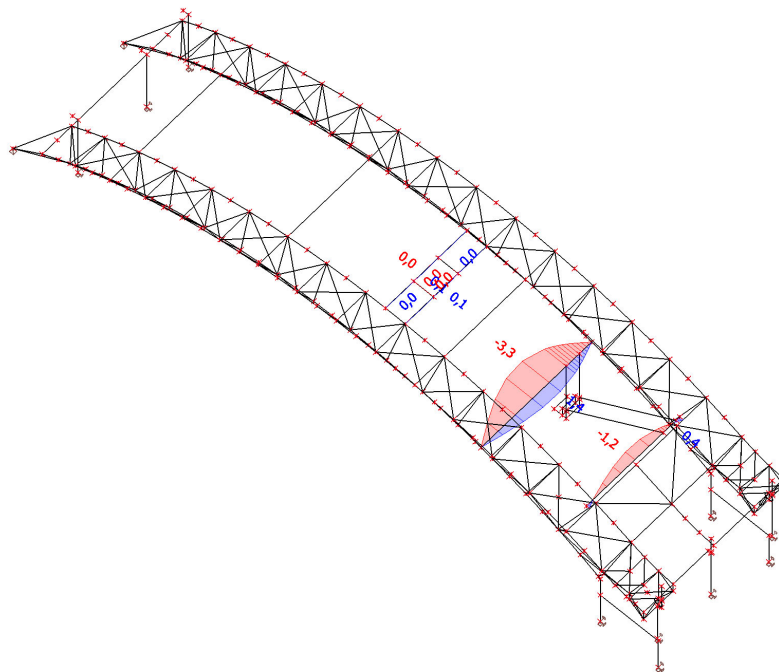
Linear calculation

Combination: C02

Coordinate system: Principal

Extreme 1D: Member

Selection: Named selection -  
def\_basket



### 1D deformations; $u_z$

Values:  $u_z$

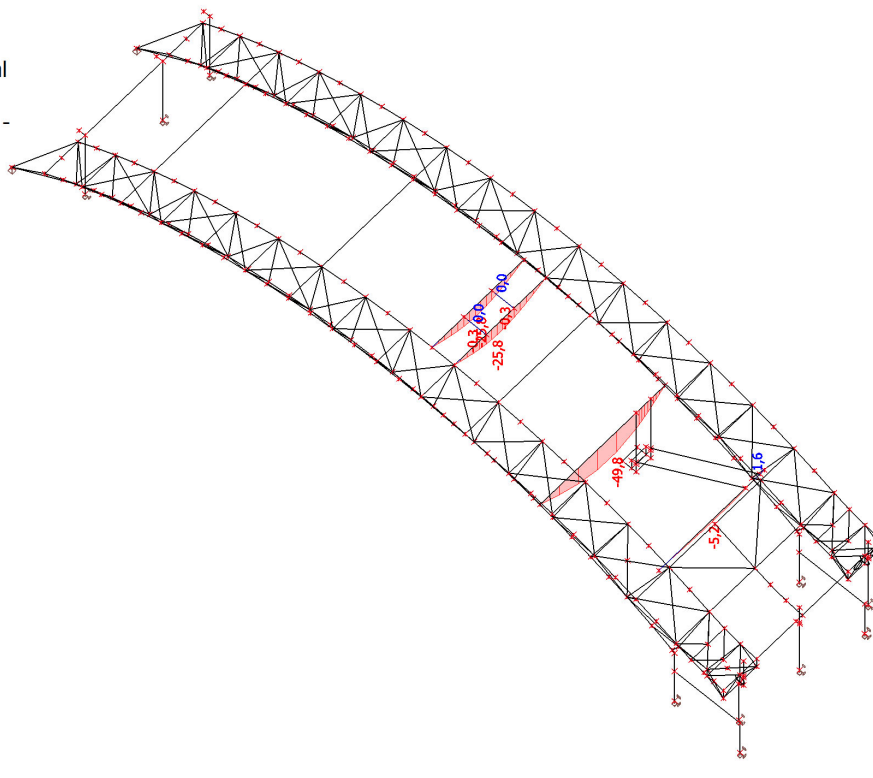
Linear calculation

Combination: C02

Coordinate system: Principal

Extreme 1D: Member

Selection: Named selection -  
def\_basket



## 1D deformations

Linear calculation

Combination: C02

Coordinate system: Principal

Extreme 1D: Global

Selection: Named selection - def\_basket

**Relative deformations**

| Name  | dx<br>[mm] | Case  | u <sub>y</sub><br>[mm] | u <sub>y,rel</sub><br>[1/xx] | u <sub>z</sub><br>[mm] | u <sub>z,rel</sub><br>[1/xx] |
|-------|------------|-------|------------------------|------------------------------|------------------------|------------------------------|
| B1848 | 3448,000-  | C02/1 | <b>1,4</b>             | 1/6640                       | -18,8                  | -1/478                       |
| B1848 | 3448,000-  | C02/2 | <b>-3,3</b>            | <b>-1/2758</b>               | -49,5                  | -1/182                       |
| B1832 | 0,000      | C02/3 | 0,4                    | <b>1/1187</b>                | 1,6                    | 1/310                        |
| B1848 | 3448,000-  | C02/4 | -3,1                   | -1/2941                      | <b>-49,8</b>           | <b>-1/181</b>                |
| B1832 | 0,000      | C02/5 | 0,4                    | 1/1215                       | <b>1,6</b>             | <b>1/307</b>                 |

| Name  | Combination key   |
|-------|---|
| C02/1 | LC1 + LC2 + 0.70*LC3 + 0.50*LC5 + LC12 + LC13 + 0.70*LC20 |
| C02/2 | LC1 + LC2 + LC11 + 0.70*LC19 + LC21                       |
| C02/3 | LC1 + LC2 + 0.50*LC5 + LC12 + 0.70*LC20 + LC21            |
| C02/4 | LC1 + LC2 + 0.70*LC3 + 0.50*LC6 + 0.60*LC12 + LC20 + LC21 |
| C02/5 | LC1 + LC2 + 0.70*LC3 + 0.50*LC5 + 0.60*LC12 + LC20 + LC21 |

## 1D deformations; $u_z$

Values:  $u_z$

Linear calculation

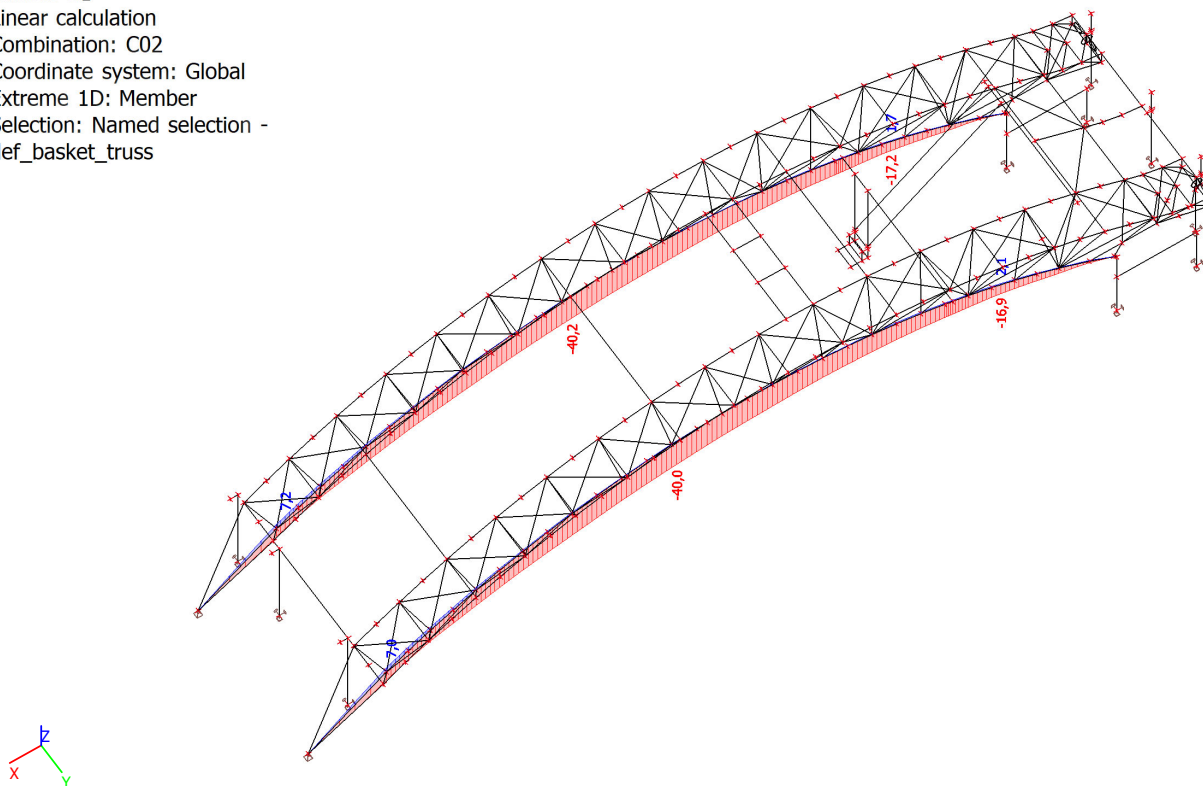
Combination: C02

Coordinate system: Global

Extreme 1D: Member

Selection: Named selection -

def\_basket\_truss



## 1D deformations

Linear calculation

Combination: C02

Coordinate system: Principal

Extreme 1D: Global

Selection: Named selection - def\_basket\_truss

### Deformations

| Name  | dx<br>[mm] | Case   | $u_x$<br>[mm] | $u_y$<br>[mm] | $u_z$<br>[mm] | $\phi_x$<br>[mrad] | $\phi_y$<br>[mrad] | $\phi_z$<br>[mrad] | $U_{total}$<br>[mm] |
|-------|------------|--------|---------------|---------------|---------------|--------------------|--------------------|--------------------|---------------------|
| B1668 | 1326,513-  | C02/1  | <b>-14,6</b>  | 1,6           | -12,0         | -0,1               | 2,1                | 0,2                | 19,0                |
| B1639 | 28485,305+ | C02/2  | <b>10,4</b>   | 2,7           | -18,3         | -0,2               | -2,2               | -0,1               | 21,2                |
| B1639 | 14771,414- | C02/3  | 0,1           | <b>-6,7</b>   | -3,1          | 1,1                | -0,1               | 0,0                | 7,4                 |
| B1639 | 13414,634- | C02/4  | -4,0          | <b>10,3</b>   | -30,0         | -1,1               | 0,3                | 0,0                | 32,0                |
| B1639 | 18315,323- | C02/5  | -2,2          | 3,7           | <b>-40,7</b>  | 0,2                | 0,0                | 0,0                | <b>41,0</b>         |
| B1639 | 34023,762+ | C02/6  | 0,9           | -0,5          | <b>9,8</b>    | 1,0                | 0,4                | 0,0                | 9,8                 |
| B1639 | 1326,513+  | C02/7  | -8,8          | 6,8           | -10,5         | <b>-1,7</b>        | 1,6                | 0,2                | 15,3                |
| B1639 | 1326,513+  | C02/8  | -2,7          | -4,4          | -3,9          | <b>1,5</b>         | 1,2                | -0,5               | 6,5                 |
| B1668 | 39382,187  | C02/9  | 7,9           | 0,0           | 6,2           | -0,4               | <b>-4,1</b>        | -0,2               | 10,0                |
| B65   | 2678,538-  | C02/2  | -12,8         | 2,4           | -0,2          | -0,4               | <b>4,6</b>         | 0,3                | 13,0                |
| B1639 | 39382,187  | C02/10 | 7,9           | 0,0           | 6,2           | -0,9               | -3,3               | <b>-0,9</b>        | 10,0                |
| B65   | 0,000      | C02/11 | -10,1         | 2,0           | 6,1           | -0,8               | 1,0                | <b>1,2</b>         | 12,0                |

# **VNITŘNÍ SÍLY A POSOUZENÍ PRŮŘEZŮ VAZNÍKŮ**

## CS8 - 1D internal forces; N

Values: **N**

Linear calculation

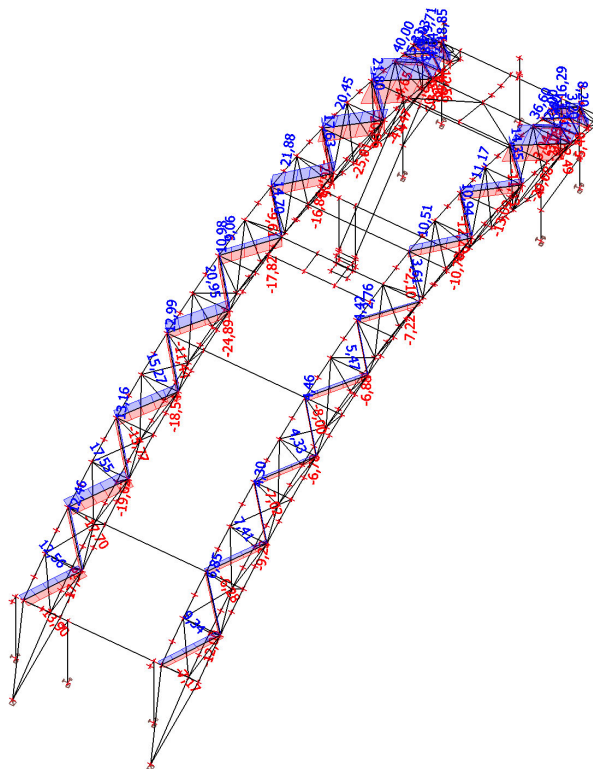
Combination: C01

Coordinate system: Principal

Extreme 1D: Member

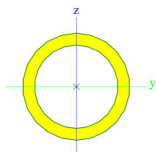
Selection: All

Filter: Cross-section = CS8 - RO57X6.3



## Cross-sections

### Cross-sections - CS8

| Name | Type                 | Item material | Fabrication | buckling y-y | buckling z-z | Picture  | Type description        |
|------|----------------------|---------------|-------------|--------------|--------------|--|-------------------------|
| CS8  | Detailed<br>RO57X6.3 | S 235         | rolled      | a            | a            |  | Circular hollow section |

### 1D internal forces

Linear calculation

Combination: C01

Coordinate system: Principal

Extreme 1D: Global

Selection: All

Filter: Cross-section = CS8 - RO57X6.3

| Name  | dx [mm]   | Case  | Cross-section  | N [kN]        | V <sub>y</sub> [kN] | V <sub>z</sub> [kN] | M <sub>x</sub> [kNm] | M <sub>y</sub> [kNm] | M <sub>z</sub> [kNm] |
|-------|-----------|-------|----------------|---------------|---------------------|---------------------|----------------------|----------------------|----------------------|
| B1520 | 0,000     | C01/1 | CS8 - RO57X6.3 | <b>-50,06</b> | 0,00                | 0,16                | -0,01                | -0,08                | 0,01                 |
| B61   | 7584,351- | C01/2 | CS8 - RO57X6.3 | <b>81,81</b>  | 0,05                | -0,08               | 0,06                 | 0,25                 | 0,09                 |
| B61   | 0,000     | C01/3 | CS8 - RO57X6.3 | -3,56         | <b>-0,26</b>        | -0,10               | 0,03                 | 0,06                 | 0,15                 |
| B654  | 1618,644- | C01/4 | CS8 - RO57X6.3 | 7,20          | -0,09               | <b>-0,77</b>        | 0,16                 | -0,79                | -0,11                |
| B749  | 4854,834+ | C01/5 | CS8 - RO57X6.3 | 15,64         | 0,00                | 0,22                | <b>-0,19</b>         | 0,10                 | -0,03                |
| B61   | 0,000     | C01/6 | CS8 - RO57X6.3 | 3,88          | 0,34                | 0,65                | <b>0,35</b>          | -0,16                | -0,14                |
| B654  | 1618,644+ | C01/7 | CS8 - RO57X6.3 | 6,25          | 0,09                | <b>0,78</b>         | -0,16                | <b>-0,79</b>         | -0,10                |

**Project**    **Rekonstrukce sportovního centra Ostrava - Dubina**

Part        Přepočít - hlavní nosná konstrukce

Description    Ocelová konstrukce - požární klapy, sportovní zařízení (basket), leden 2023

Author        Ing. Jeřowicz

| Name | dx<br>[mm] | Case  | Cross-section  | N<br>[kN] | V <sub>y</sub><br>[kN] | V <sub>z</sub><br>[kN] | M <sub>x</sub><br>[kNm] | M <sub>y</sub><br>[kNm] | M <sub>z</sub><br>[kNm] |
|------|------------|-------|----------------|-----------|------------------------|------------------------|-------------------------|-------------------------|-------------------------|
| B61  | 2818,199+  | C01/6 | CS8 - RO57X6.3 | -2,12     | -0,19                  | -0,32                  | 0,04                    | <b>0,70</b>             | 0,25                    |
| B61  | 0,000      | C01/8 | CS8 - RO57X6.3 | 6,53      | <b>0,55</b>            | 0,67                   | 0,30                    | -0,20                   | <b>-0,27</b>            |
| B61  | 1200,000-  | C01/9 | CS8 - RO57X6.3 | 5,30      | 0,53                   | 0,58                   | 0,28                    | 0,58                    | <b>0,40</b>             |

| Name  | Combination key   |
|-------|---|
| C01/1 | 1.15*LC1 + 1.15*LC2 + 1.05*LC3 + 0.75*LC5 + 0.90*LC12 + 1.50*LC13 + 1.50*LC19             |
| C01/2 | 1.15*LC1 + 1.15*LC2 + 1.05*LC3 + 1.50*LC5 + 0.90*LC12 + 1.05*LC19                         |
| C01/3 | LC1 + LC2 + 1.50*LC11 + 1.05*LC17   |
| C01/4 | 1.15*LC1 + 1.15*LC2 + 0.75*LC6 + 0.90*LC11 + 1.50*LC18 + 1.50*LC21                        |
| C01/5 | 1.15*LC1 + 1.15*LC2 + 1.05*LC3 + 1.50*LC5 + 0.90*LC12 + 1.50*LC13 + 1.05*LC19             |
| C01/6 | 1.15*LC1 + 1.15*LC2 + 1.05*LC3 + 1.50*LC5 + 0.90*LC11 + 1.05*LC19                         |
| C01/7 | 1.15*LC1 + 1.15*LC2 + 0.75*LC4 + 0.90*LC11 + 1.50*LC13 + 1.50*LC18                        |
| C01/8 | 1.15*LC1 + 1.15*LC2 + 1.05*LC3 + 1.50*LC5 + 1.50*LC13 + 1.05*LC18 + 1.50*LC21             |
| C01/9 | 1.15*LC1 + 1.15*LC2 + 1.05*LC3 + 1.50*LC5 + 0.90*LC12 + 1.50*LC13 + 1.05*LC18 + 1.50*LC21 |

**EC-EN 1993 Steel check ULS**

Linear calculation

Combination: C01

Coordinate system: Principal

Extreme 1D: Global

Selection: All

Filter: Cross-section = CS8 - RO57X6.3

**Overall Unity Check**

| Name | dx<br>[mm] | Case  | Cross-section  | Material | UC <sub>Overall</sub><br>[-] | UC <sub>Sec</sub><br>[-] | UC <sub>Stab</sub><br>[-] |
|------|------------|-------|----------------|----------|------------------------------|--------------------------|---------------------------|
| B646 | 1618,644-  | C01/1 | CS8 - RO57X6.3 | S 235    | <b>0,93</b>                  | 0,05                     | 0,93                      |

| Name  | Combination key   |
|-------|---|
| C01/1 | 1.15*LC1 + 1.15*LC2 + 1.05*LC3 + 0.75*LC6 + 0.90*LC11 + 1.50*LC13 + 1.50*LC17 |

## CS17 - 1D internal forces; N

Values: **N**

Linear calculation

Combination: C01

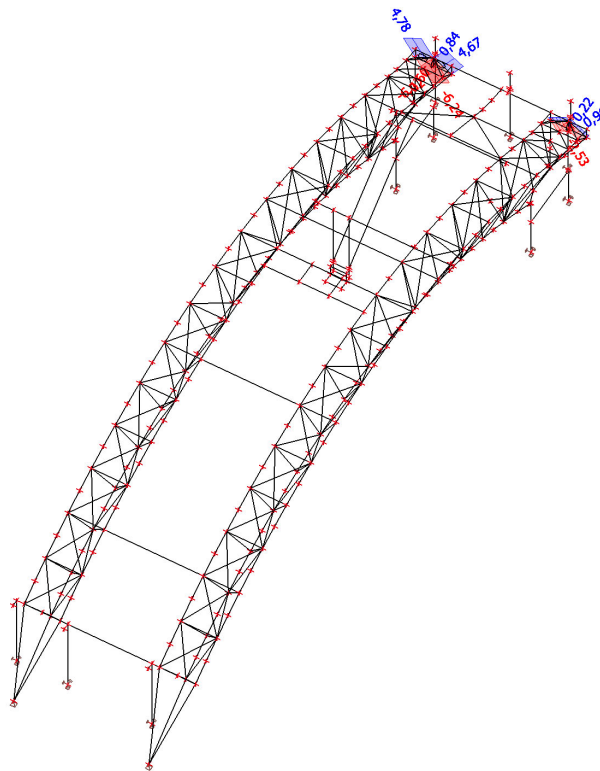
Coordinate system: Principal

Extreme 1D: Member

Selection: All

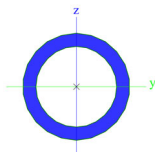
Filter: Cross-section = CS17 -

RO51X6.3



## Cross-sections

### Cross-sections - CS17

| Name | Type                        | Item material | Fabrication | buckling y-y | buckling z-z | Picture  | Type description        |
|------|-----------------------------|---------------|-------------|--------------|--------------|--|-------------------------|
| CS17 | <b>Detailed</b><br>RO51X6.3 | S 235         | rolled      | a            | a            |  | Circular hollow section |

### 1D internal forces

Linear calculation

Combination: C01

Coordinate system: Principal

Extreme 1D: Global

Selection: All

Filter: Cross-section = CS17 - RO51X6.3

| Name | dx [mm]   | Case  | Cross-section   | N [kN]        | V <sub>y</sub> [kN] | V <sub>z</sub> [kN] | M <sub>x</sub> [kNm] | M <sub>y</sub> [kNm] | M <sub>z</sub> [kNm] |
|------|-----------|-------|-----------------|---------------|---------------------|---------------------|----------------------|----------------------|----------------------|
| B546 | 3624,914  | C01/1 | CS17 - RO51X6.3 | <b>-57,45</b> | 0,00                | -0,08               | 0,04                 | -0,06                | -0,06                |
| B546 | 1812,457- | C01/2 | CS17 - RO51X6.3 | <b>49,04</b>  | 0,17                | -0,19               | 0,02                 | -0,10                | 0,18                 |
| B555 | 0,000     | C01/2 | CS17 - RO51X6.3 | 1,78          | <b>-0,83</b>        | -0,11               | -0,08                | 0,06                 | 0,31                 |
| B567 | 1415,097+ | C01/3 | CS17 -          | -7,05         | <b>0,48</b>         | 0,01                | 0,11                 | 0,00                 | -0,41                |

**Project**    **Rekonstrukce sportovního centra Ostrava - Dubina**

Part        Přepočet - hlavní nosná konstrukce

Description    Ocelová konstrukce - požární klapy, sportovní zařízení (basket), leden 2023

Author        Ing. Jeřowicz

| Name | dx<br>[mm] | Case   | Cross-section      | N<br>[kN] | V <sub>y</sub><br>[kN] | V <sub>z</sub><br>[kN] | M <sub>x</sub><br>[kNm] | M <sub>y</sub><br>[kNm] | M <sub>z</sub><br>[kNm] |
|------|------------|--------|--------------------|-----------|------------------------|------------------------|-------------------------|-------------------------|-------------------------|
|      |            |        | RO51X6.3           |           |                        |                        |                         |                         |                         |
| B551 | 1471,656   | C01/4  | CS17 -<br>RO51X6.3 | 5,09      | -0,05                  | <b>-2,11</b>           | -0,01                   | -1,30                   | -0,06                   |
| B551 | 0,000      | C01/5  | CS17 -<br>RO51X6.3 | -3,80     | 0,02                   | <b>1,46</b>            | 0,01                    | -0,55                   | -0,01                   |
| B567 | 1415,097+  | C01/6  | CS17 -<br>RO51X6.3 | -7,38     | -0,39                  | 0,00                   | <b>-0,15</b>            | 0,01                    | 0,43                    |
| B567 | 0,000      | C01/7  | CS17 -<br>RO51X6.3 | -2,79     | 0,42                   | 0,10                   | <b>0,15</b>             | -0,06                   | -0,16                   |
| B551 | 1471,656   | C01/8  | CS17 -<br>RO51X6.3 | 5,00      | -0,05                  | -2,03                  | -0,01                   | <b>-1,32</b>            | -0,06                   |
| B862 | 1745,191   | C01/9  | CS17 -<br>RO51X6.3 | 1,65      | 0,04                   | 0,60                   | 0,02                    | <b>0,57</b>             | 0,04                    |
| B567 | 1415,097+  | C01/10 | CS17 -<br>RO51X6.3 | -6,03     | 0,48                   | 0,01                   | 0,11                    | 0,00                    | <b>-0,41</b>            |
| B567 | 1415,097-  | C01/11 | CS17 -<br>RO51X6.3 | -1,12     | 0,43                   | 0,00                   | 0,15                    | 0,01                    | <b>0,44</b>             |

| Name   | Combination key  |
|--------|--|
| C01/1  | 1.15*LC1 + 1.15*LC2 + 1.05*LC3 + 0.75*LC5 +<br>1.50*LC11 + 1.50*LC13 + 1.05*LC19 + 1.50*LC21 |
| C01/2  | LC1 + LC2 + 1.05*LC3 + 0.75*LC5 + 1.50*LC11 +<br>1.50*LC13 + 1.05*LC19 + 1.50*LC21           |
| C01/3  | 1.15*LC1 + 1.15*LC2 + 0.75*LC4 + 0.90*LC11 +<br>1.50*LC13 + 1.50*LC17                        |
| C01/4  | 1.35*LC1 + 1.35*LC2 + 1.05*LC3 + 0.75*LC6 +<br>0.90*LC12 + 1.05*LC17                         |
| C01/5  | 1.15*LC1 + 1.15*LC2 + 1.50*LC11 + 1.50*LC13 +<br>1.05*LC20 + 1.50*LC21                       |
| C01/6  | 1.15*LC1 + 1.15*LC2 + 0.90*LC12 + 1.50*LC18 +<br>1.50*LC21                                   |
| C01/7  | 1.15*LC1 + 1.15*LC2 + 0.90*LC11 + 1.50*LC13 +<br>1.50*LC18                                   |
| C01/8  | 1.15*LC1 + 1.15*LC2 + 1.05*LC3 + 0.75*LC6 +<br>1.50*LC12 + 1.05*LC17                         |
| C01/9  | 1.15*LC1 + 1.15*LC2 + 1.50*LC4 + 0.90*LC11 +<br>1.50*LC13 + 1.05*LC17                        |
| C01/10 | LC1 + LC2 + 0.75*LC4 + 0.90*LC11 + 1.50*LC13 +<br>1.50*LC17                                  |
| C01/11 | 1.15*LC1 + 1.15*LC2 + 1.05*LC3 + 0.75*LC5 +<br>0.90*LC11 + 1.50*LC13 + 1.50*LC18             |

**EC-EN 1993 Steel check ULS**

Linear calculation

Combination: C01

Coordinate system: Principal

Extreme 1D: Global

Selection: All

Filter: Cross-section = CS17 - RO51X6.3

**Overall Unity Check**

| Name | dx<br>[mm] | Case  | Cross-section      | Material | UC <sub>Overall</sub><br>[-] | UC <sub>Sec</sub><br>[-] | UC <sub>Stab</sub><br>[-] |
|------|------------|-------|--------------------|----------|------------------------------|--------------------------|---------------------------|
| B568 | 0,000      | C01/1 | CS17 -<br>RO51X6.3 | S 235    | <b>0,98</b>                  | 0,14                     | 0,98                      |

| Name  | Combination key  |
|-------|--|
| C01/1 | 1.15*LC1 + 1.15*LC2 + 1.05*LC3 + 1.50*LC5 +<br>0.90*LC11 + 1.05*LC17 + 1.50*LC21 |



## CS23 - 1D internal forces; N

Values: **N**

Linear calculation

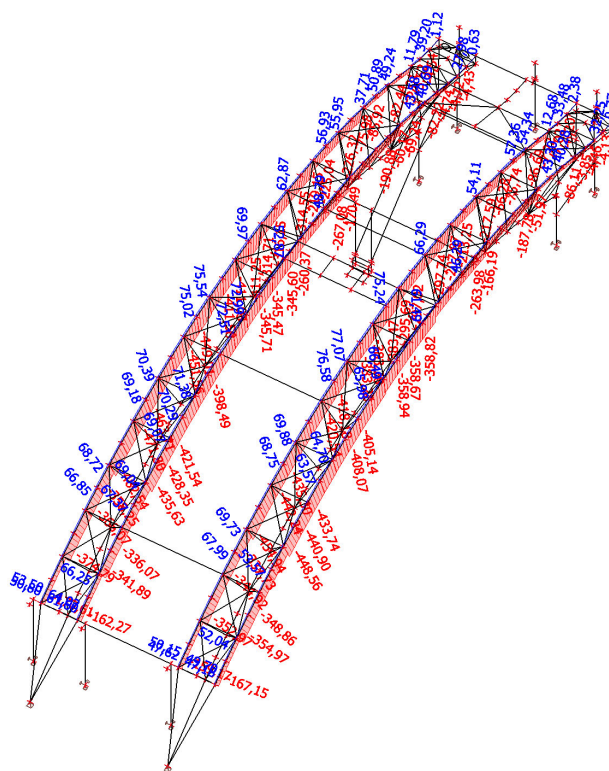
Combination: C01

Coordinate system: Principal

Extreme 1D: Local

Selection: All

Filter: Cross-section = CS23 - General  
cross-section



## CS23 - 1D internal forces; M<sub>y</sub>

Values: **M<sub>y</sub>**

Linear calculation

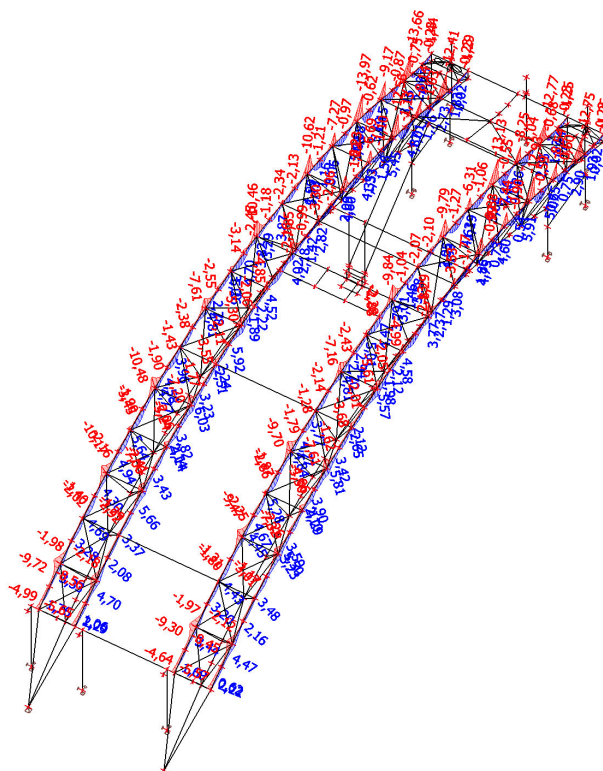
Combination: C01

Coordinate system: Principal

Extreme 1D: Local

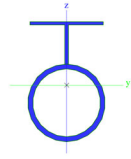
Selection: All

Filter: Cross-section = CS23 - General  
cross-section



## Cross-sections

### Cross-sections - CS23

| Name | Type                  | Item material | Fabrication | buckling y-y | buckling z-z | Picture   |
|------|-----------------------|---------------|-------------|--------------|--------------|---|
|      | Detailed              |               |             |              |              |   |
| CS23 | General cross-section | S 235         | general     | a            | a            |  |

### 1D internal forces

Linear calculation

Combination: C01

Coordinate system: Principal

Extreme 1D: Global

Selection: Named selection - basket\_sky

Filter: Cross-section = CS23 - General cross-section

| Name | dx [mm]    | Case   | Cross-section                | N [kN]         | V <sub>y</sub> [kN] | V <sub>z</sub> [kN] | M <sub>x</sub> [kNm] | M <sub>y</sub> [kNm] | M <sub>z</sub> [kNm] |
|------|------------|--------|------------------------------|----------------|---------------------|---------------------|----------------------|----------------------|----------------------|
| B87  | 38178,065- | C01/1  | CS23 - General cross-section | <b>-482,54</b> | -0,79               | -14,22              | 0,01                 | -4,80                | -1,08                |
| B149 | 26537,550+ | C01/2  | CS23 - General cross-section | <b>77,07</b>   | -0,04               | 3,31                | 0,00                 | -3,45                | 0,07                 |
| B149 | 6168,180+  | C01/3  | CS23 - General cross-section | 40,36          | <b>-7,91</b>        | 8,02                | 0,02                 | -2,64                | 1,34                 |
| B106 | 6410,206-  | C01/3  | CS23 - General cross-section | -10,54         | <b>7,41</b>         | 6,64                | -0,01                | -1,15                | 1,43                 |
| B87  | 9077,695-  | C01/4  | CS23 - General cross-section | -22,72         | -0,06               | <b>-25,87</b>       | 0,02                 | -13,55               | -0,23                |
| B87  | 9077,695+  | C01/4  | CS23 - General cross-section | -154,25        | 0,15                | <b>25,09</b>        | 0,00                 | -13,96               | -0,14                |
| B87  | 45452,186+ | C01/5  | CS23 - General cross-section | -102,80        | 0,38                | 1,30                | <b>-0,05</b>         | -2,02                | -0,08                |
| B106 | 43998,393+ | C01/6  | CS23 - General cross-section | -150,98        | 0,18                | 0,85                | <b>0,05</b>          | 1,65                 | -0,41                |
| B87  | 9077,695+  | C01/7  | CS23 - General cross-section | -175,47        | 0,07                | 24,83               | 0,00                 | <b>-13,97</b>        | -0,02                |
| B106 | 32357,905- | C01/8  | CS23 - General cross-section | -190,62        | -0,30               | 4,99                | 0,01                 | <b>6,03</b>          | -0,51                |
| B168 | 46907,729  | C01/9  | CS23 - General cross-section | -4,72          | -0,80               | -1,35               | 0,00                 | -2,33                | <b>-1,82</b>         |
| B87  | 46907,729  | C01/10 | CS23 - General cross-section | -82,86         | 1,49                | -1,73               | 0,02                 | -2,67                | <b>3,09</b>          |

| Name  | Combination key   |
|-------|---|
| C01/1 | 1.15*LC1 + 1.15*LC2 + 1.05*LC3 + 1.50*LC6 + 0.90*LC12 + 1.50*LC13 + 1.50*LC21             |
| C01/2 | LC1 + LC2 + 1.50*LC11 + 1.05*LC18   |
| C01/3 | 1.15*LC1 + 1.15*LC2 + 1.05*LC3 + 0.75*LC6 + 1.50*LC11 + 1.05*LC19                         |
| C01/4 | 1.15*LC1 + 1.15*LC2 + 1.05*LC3 + 1.50*LC5 + 0.90*LC11                                     |
| C01/5 | 1.15*LC1 + 1.15*LC2 + 1.50*LC6 + 0.90*LC11 + 1.50*LC13 + 1.05*LC18 + 1.50*LC21            |
| C01/6 | 1.15*LC1 + 1.15*LC2 + 1.05*LC3 + 1.50*LC6 + 0.90*LC12 + 1.50*LC13 + 1.05*LC18 + 1.50*LC21 |
| C01/7 | 1.15*LC1 + 1.15*LC2 + 1.05*LC3 + 1.50*LC5 + 1.50*LC21                                     |
| C01/8 | LC1 + LC2 + 1.50*LC12 + 1.50*LC13 + 1.05*LC19   |
| C01/9 | 1.15*LC1 + 1.15*LC2 + 0.75*LC5 + 1.50*LC20 + 1.50*LC21                                    |

| Name   | Combination key  |
|--------|--|
| C01/10 | 1.15*LC1 + 1.15*LC2 + 1.05*LC3 + 0.75*LC6 +<br>0.90*LC12 + 1.50*LC13 + 1.50*LC19 |

**EC-EN 1993 Steel check ULS**

Linear calculation

Combination: C01

Coordinate system: Principal

Extreme 1D: Global

Selection: Named selection - basket\_sky

Filter: Cross-section = CS23 - General cross-section

**Overall Unity Check**

| Name | dx<br>[mm] | Case  | Cross-section                   | Material | UC <sub>Overall</sub><br>[-] | UC <sub>Sec</sub><br>[-] | UC <sub>Stab</sub><br>[-] |
|------|------------|-------|---------------------------------|----------|------------------------------|--------------------------|---------------------------|
| B149 | 38178,065- | C01/1 | CS23 - General<br>cross-section | S 235    | <b>0,71</b>                  | 0,59                     | 0,71                      |

| Name  | Combination key  |
|-------|--|
| C01/1 | 1.15*LC1 + 1.15*LC2 + 1.05*LC3 + 1.50*LC6 +<br>0.90*LC12 + 1.50*LC13 + 1.50*LC21 |

## CS24 - 1D internal forces; N

Values: **N**

Linear calculation

Combination: C01

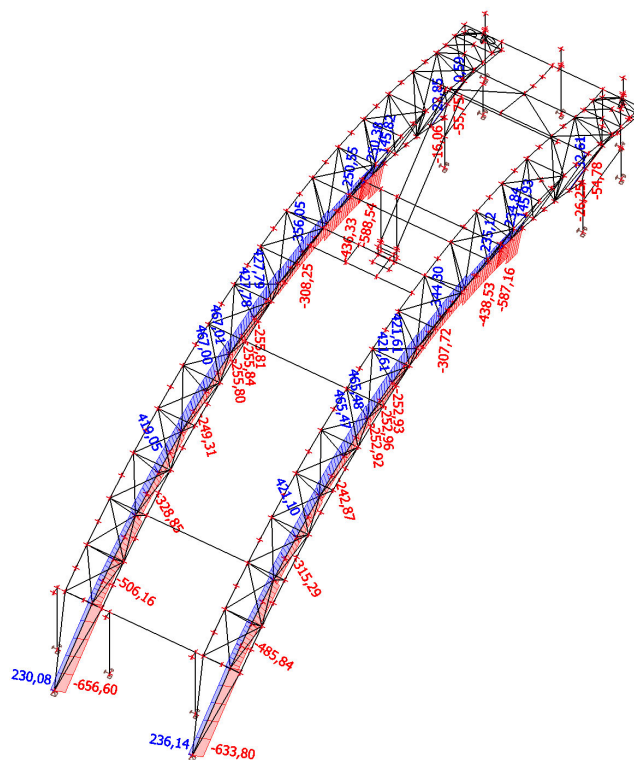
Coordinate system: Principal

Extreme 1D: Local

Selection: All

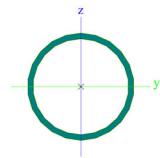
Filter: Cross-section = CS24 -

RO177.8X8.8



## Cross-sections

### Cross-sections - CS24

| Name | Type                    | Item material | Fabrication | buckling y-y | buckling z-z | Picture  | Type description        |
|------|-------------------------|---------------|-------------|--------------|--------------|--|-------------------------|
| CS24 | Detailed<br>RO177.8X8.8 | S 235         | rolled      | a            | a            |  | Circular hollow section |

### 1D internal forces

Linear calculation

Combination: C01

Coordinate system: Principal

Extreme 1D: Global

Selection: Named selection - basket\_sky

Filter: Cross-section = CS24 - RO177.8X8.8

| Name  | dx [mm]    | Case  | Cross-section      | N [kN]         | V <sub>y</sub> [kN] | V <sub>z</sub> [kN] | M <sub>x</sub> [kNm] | M <sub>y</sub> [kNm] | M <sub>z</sub> [kNm] |
|-------|------------|-------|--------------------|----------------|---------------------|---------------------|----------------------|----------------------|----------------------|
| B1639 | 39382,187  | C01/1 | CS24 - RO177.8X8.8 | <b>-656,60</b> | -0,02               | -1,42               | -0,06                | -1,01                | -0,22                |
| B1639 | 17495,119+ | C01/2 | CS24 - RO177.8X8.8 | <b>467,01</b>  | 0,02                | 11,32               | -0,16                | -7,90                | -0,09                |
| B1639 | 1326,513+  | C01/3 | CS24 - RO177.8X8.8 | 26,98          | <b>6,28</b>         | 6,02                | -0,14                | 0,09                 | -1,98                |
| B1639 | 2658,370-  | C01/4 | CS24 -             | -432,87        | -1,06               | <b>-12,33</b>       | -0,19                | -2,94                | 1,02                 |

**Project**    **Rekonstrukce sportovního centra Ostrava - Dubina**

Part        Přepočet - hlavní nosná konstrukce

Description    Ocelová konstrukce - požární klapy, sportovní zařízení (basket), leden 2023

Author        Ing. Jeřowicz

| Name  | dx<br>[mm] | Case   | Cross-section         | N<br>[kN] | V <sub>y</sub><br>[kN] | V <sub>z</sub><br>[kN] | M <sub>x</sub><br>[kNm] | M <sub>y</sub><br>[kNm] | M <sub>z</sub><br>[kNm] |
|-------|------------|--------|-----------------------|-----------|------------------------|------------------------|-------------------------|-------------------------|-------------------------|
|       |            |        | RO177.8X8.8           |           |                        |                        |                         |                         |                         |
| B1668 | 0,000      | C01/5  | CS24 -<br>RO177.8X8.8 | -584,05   | 0,21                   | <b>12,67</b>           | -0,10                   | -8,07                   | 0,26                    |
| B66   | 1869,481+  | C01/6  | CS24 -<br>RO177.8X8.8 | 0,74      | -1,45                  | -3,27                  | <b>-1,37</b>            | 0,47                    | 2,15                    |
| B66   | 0,000      | C01/7  | CS24 -<br>RO177.8X8.8 | -47,85    | -1,27                  | 1,55                   | <b>1,12</b>             | 0,31                    | -0,14                   |
| B66   | 3634,286   | C01/8  | CS24 -<br>RO177.8X8.8 | 6,13      | -0,35                  | -7,66                  | -0,61                   | <b>-11,88</b>           | 0,13                    |
| B1668 | 1326,513-  | C01/9  | CS24 -<br>RO177.8X8.8 | -586,98   | 0,19                   | 12,07                  | -0,10                   | <b>8,44</b>             | 0,50                    |
| B1668 | 2214,418-  | C01/10 | CS24 -<br>RO177.8X8.8 | 121,82    | <b>-6,39</b>           | 2,80                   | 0,12                    | 3,31                    | <b>-3,77</b>            |
| B66   | 1869,481-  | C01/11 | CS24 -<br>RO177.8X8.8 | -22,12    | 2,25                   | 0,00                   | -0,24                   | 1,34                    | <b>3,83</b>             |

| Name   | Combination key   |
|--------|---|
| C01/1  | 1.15*LC1 + 1.15*LC2 + 1.05*LC3 + 1.50*LC4 + 0.90*LC11 + 1.50*LC21                         |
| C01/2  | 1.15*LC1 + 1.15*LC2 + 1.05*LC3 + 0.75*LC6 + 1.50*LC12 + 1.50*LC13 + 1.05*LC19             |
| C01/3  | 1.15*LC1 + 1.15*LC2 + 1.05*LC3 + 1.50*LC5 + 0.90*LC12 + 1.05*LC19 + 1.50*LC21             |
| C01/4  | 1.15*LC1 + 1.15*LC2 + 1.05*LC3 + 1.50*LC6 + 0.90*LC11 + 1.50*LC21                         |
| C01/5  | 1.15*LC1 + 1.15*LC2 + 1.05*LC3 + 1.50*LC4 + 0.90*LC11                                     |
| C01/6  | 1.15*LC1 + 1.15*LC2 + 1.05*LC3 + 0.75*LC5 + 0.90*LC11 + 1.50*LC19 + 1.50*LC21             |
| C01/7  | 1.15*LC1 + 1.15*LC2 + 1.05*LC3 + 1.50*LC5 + 0.90*LC12 + 1.50*LC13 + 1.05*LC20 + 1.50*LC21 |
| C01/8  | 1.15*LC1 + 1.15*LC2 + 1.05*LC3 + 1.50*LC5 + 0.90*LC11 + 1.50*LC13 + 1.50*LC21             |
| C01/9  | 1.15*LC1 + 1.15*LC2 + 1.05*LC3 + 1.50*LC6 + 0.90*LC11                                     |
| C01/10 | 1.15*LC1 + 1.15*LC2 + 1.05*LC3 + 1.50*LC5 + 0.90*LC12 + 1.50*LC13 + 1.05*LC19 + 1.50*LC21 |
| C01/11 | LC1 + LC2 + 1.05*LC3 + 0.75*LC5 + 0.90*LC11 + 1.50*LC19                                   |

**EC-EN 1993 Steel check ULS**

Linear calculation

Combination: C01

Coordinate system: Principal

Extreme 1D: Global

Selection: Named selection - basket\_sky

Filter: Cross-section = CS24 - RO177.8X8.8

**Overall Unity Check**

| Name  | dx<br>[mm] | Case  | Cross-section         | Material | UC <sub>Overall</sub><br>[-] | UC <sub>Sec</sub><br>[-] | UC <sub>Stab</sub><br>[-] |
|-------|------------|-------|-----------------------|----------|------------------------------|--------------------------|---------------------------|
| B1639 | 39382,187  | C01/1 | CS24 -<br>RO177.8X8.8 | S 235    | <b>0,91</b>                  | 0,60                     | 0,91                      |

| Name  | Combination key   |
|-------|---|
| C01/1 | 1.15*LC1 + 1.15*LC2 + 1.05*LC3 + 1.50*LC4 + 0.90*LC11 + 1.50*LC21 |

## CS25 - 1D internal forces; N

Values: **N**

Linear calculation

Combination: C01

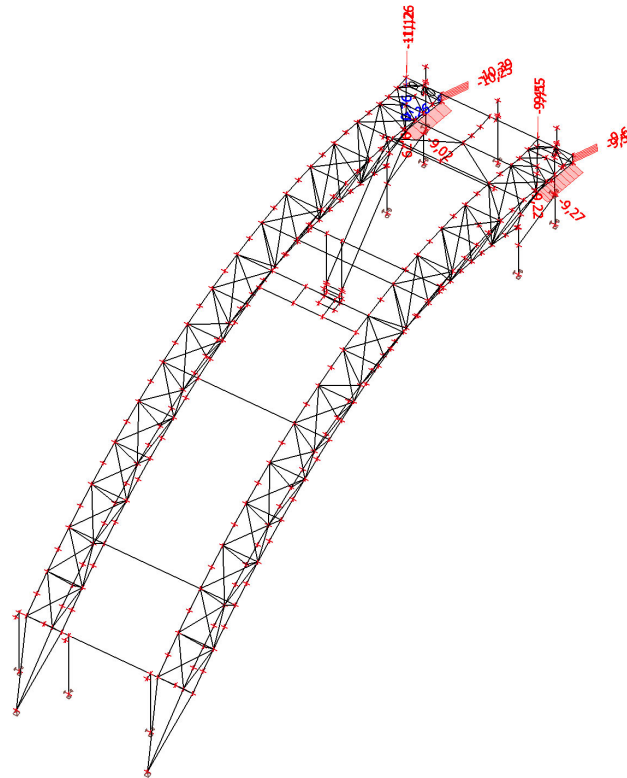
Coordinate system: Principal

Extreme 1D: Local

Selection: All

Filter: Cross-section = CS25 -

RO101.6X7.1



## Cross-sections

### Cross-sections - CS25

| Name | Type        | Item material | Fabrication | buckling y-y | buckling z-z | Picture | Type description        |
|------|-------------|---------------|-------------|--------------|--------------|---------|-------------------------|
| CS25 | RO101.6X7.1 | S 235         | rolled      | a            | a            |         | Circular hollow section |

### 1D internal forces

Linear calculation

Combination: C01

Coordinate system: Principal

Extreme 1D: Global

Selection: Named selection - basket\_sky

Filter: Cross-section = CS25 - RO101.6X7.1

| Name | dx [mm]   | Case  | Cross-section      | N [kN]        | V <sub>y</sub> [kN] | V <sub>z</sub> [kN] | M <sub>x</sub> [kNm] | M <sub>y</sub> [kNm] | M <sub>z</sub> [kNm] |
|------|-----------|-------|--------------------|---------------|---------------------|---------------------|----------------------|----------------------|----------------------|
| B528 | 2761,793+ | C01/1 | CS25 - RO101.6X7.1 | <b>-11,26</b> | -0,74               | 0,51                | 0,08                 | 0,02                 | 0,16                 |
| B529 | 3511,793  | C01/2 | CS25 - RO101.6X7.1 | <b>1,26</b>   | -1,25               | -0,38               | 0,03                 | -0,40                | -0,78                |
| B529 | 2761,793- | C01/3 | CS25 - RO101.6X7.1 | -8,44         | 0,01                | <b>-0,59</b>        | -0,01                | -0,35                | 0,05                 |
| B529 | 2761,793+ | C01/4 | CS25 -             | -7,48         | 1,19                | <b>0,87</b>         | 0,02                 | -0,11                | -0,16                |

**Project**    **Rekonstrukce sportovního centra Ostrava - Dubina**

Part        Přepočet - hlavní nosná konstrukce

Description    Ocelová konstrukce - požární klapy, sportovní zařízení (basket), leden 2023

Author        Ing. Jeřowicz

| Name | dx<br>[mm] | Case   | Cross-section         | N<br>[kN] | V <sub>y</sub><br>[kN] | V <sub>z</sub><br>[kN] | M <sub>x</sub><br>[kNm] | M <sub>y</sub><br>[kNm] | M <sub>z</sub><br>[kNm] |
|------|------------|--------|-----------------------|-----------|------------------------|------------------------|-------------------------|-------------------------|-------------------------|
|      |            |        | RO101.6X7.1           |           |                        |                        |                         |                         |                         |
| B533 | 0,000      | C01/5  | CS25 -<br>RO101.6X7.1 | -4,36     | 0,03                   | 0,17                   | <b>-0,09</b>            | 0,02                    | -0,06                   |
| B528 | 0,000      | C01/6  | CS25 -<br>RO101.6X7.1 | -8,51     | -0,09                  | 0,41                   | <b>0,16</b>             | -0,31                   | 0,20                    |
| B528 | 0,000      | C01/7  | CS25 -<br>RO101.6X7.1 | -4,17     | 0,03                   | 0,57                   | 0,11                    | <b>-0,64</b>            | -0,04                   |
| B529 | 0,000      | C01/8  | CS25 -<br>RO101.6X7.1 | -8,29     | 0,01                   | -0,15                  | -0,01                   | <b>0,63</b>             | 0,03                    |
| B528 | 3511,793   | C01/9  | CS25 -<br>RO101.6X7.1 | -4,30     | <b>-1,56</b>           | 0,54                   | 0,06                    | 0,44                    | <b>-0,89</b>            |
| B528 | 3511,793   | C01/10 | CS25 -<br>RO101.6X7.1 | -3,12     | <b>1,58</b>            | -0,12                  | 0,00                    | -0,29                   | <b>0,89</b>             |

| Name   | Combination key   |
|--------|---|
| C01/1  | 1.15*LC1 + 1.15*LC2 + 1.05*LC3 + 1.50*LC5 + 0.90*LC12 + 1.50*LC13                         |
| C01/2  | LC1 + LC2 + 1.50*LC11 + 1.05*LC19   |
| C01/3  | 1.15*LC1 + 1.15*LC2 + 1.05*LC3 + 1.50*LC5 + 0.90*LC11 + 1.50*LC13 + 1.05*LC17 + 1.50*LC21 |
| C01/4  | 1.15*LC1 + 1.15*LC2 + 1.05*LC3 + 0.75*LC5 + 1.50*LC12 + 1.50*LC13 + 1.05*LC20 + 1.50*LC21 |
| C01/5  | 1.15*LC1 + 1.15*LC2 + 1.05*LC3 + 0.75*LC5 + 0.90*LC11 + 1.50*LC13 + 1.50*LC19             |
| C01/6  | 1.15*LC1 + 1.15*LC2 + 1.05*LC3 + 1.50*LC5 + 0.90*LC12 + 1.50*LC13 + 1.05*LC20 + 1.50*LC21 |
| C01/7  | 1.15*LC1 + 1.15*LC2 + 1.05*LC3 + 0.75*LC4 + 1.50*LC12 + 1.05*LC20 + 1.50*LC21             |
| C01/8  | LC1 + LC2 + 1.05*LC3 + 1.50*LC5 + 0.90*LC11 + 1.50*LC13 + 1.05*LC17 + 1.50*LC21           |
| C01/9  | 1.15*LC1 + 1.15*LC2 + 1.50*LC12 + 1.50*LC13 + 1.05*LC17 + 1.50*LC21                       |
| C01/10 | LC1 + LC2 + 1.05*LC3 + 0.75*LC5 + 1.50*LC11 + 1.05*LC19                                   |

**EC-EN 1993 Steel check ULS**

Linear calculation

Combination: C01

Coordinate system: Principal

Extreme 1D: Global

Selection: Named selection - basket\_sky

Filter: Cross-section = CS25 - RO101.6X7.1

**Overall Unity Check**

| Name | dx<br>[mm] | Case  | Cross-section         | Material | UC <sub>Overall</sub><br>[-] | UC <sub>Sec</sub><br>[-] | UC <sub>Stab</sub><br>[-] |
|------|------------|-------|-----------------------|----------|------------------------------|--------------------------|---------------------------|
| B528 | 0,000      | C01/1 | CS25 -<br>RO101.6X7.1 | S 235    | <b>0,28</b>                  | 0,03                     | 0,28                      |

| Name  | Combination key   |
|-------|---|
| C01/1 | 1.15*LC1 + 1.15*LC2 + 1.05*LC3 + 1.50*LC5 + 0.90*LC11 + 1.50*LC13 + 1.05*LC17 |



## CS26 - 1D internal forces; N

Values: **N**

Linear calculation

Combination: C01

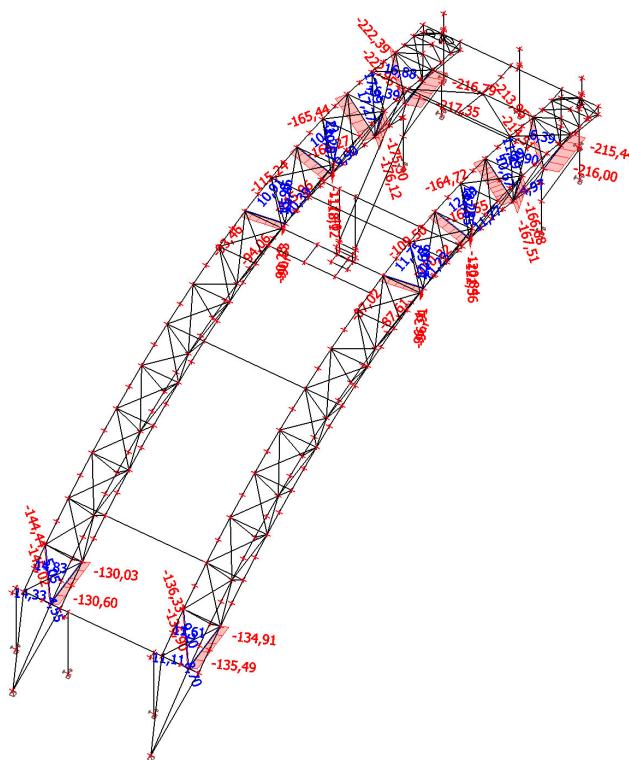
Coordinate system: Principal

Extreme 1D: Local

Selection: All

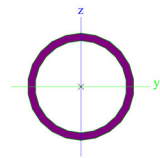
Filter: Cross-section = CS26 -

RO101.6X7.1



## Cross-sections

### Cross-sections - CS26

| Name | Type        | Item material | Fabrication | buckling y-y | buckling z-z | Picture  | Type description        |
|------|-------------|---------------|-------------|--------------|--------------|--|-------------------------|
| CS26 | RO101.6X7.1 | S 235         | rolled      | a            | a            |  | Circular hollow section |

### 1D internal forces

Linear calculation

Combination: C01

Coordinate system: Principal

Extreme 1D: Global

Selection: Named selection - basket\_sky

Filter: Cross-section = CS26 - RO101.6X7.1

| Name  | dx [mm]  | Case  | Cross-section      | N [kN]         | V <sub>y</sub> [kN] | V <sub>z</sub> [kN] | M <sub>x</sub> [kNm] | M <sub>y</sub> [kNm] | M <sub>z</sub> [kNm] |
|-------|----------|-------|--------------------|----------------|---------------------|---------------------|----------------------|----------------------|----------------------|
| B69   | 0,000    | C01/1 | CS26 - RO101.6X7.1 | <b>-222,95</b> | -0,36               | 0,36                | 0,11                 | -0,43                | 1,01                 |
| B1239 | 4359,068 | C01/2 | CS26 - RO101.6X7.1 | <b>21,20</b>   | -0,02               | -0,16               | -0,03                | -0,04                | -0,08                |
| B69   | 0,000    | C01/3 | CS26 - RO101.6X7.1 | -175,72        | <b>-0,42</b>        | 0,26                | 0,12                 | -0,24                | 1,10                 |
| B131  | 3314,807 | C01/4 | CS26 -             | -65,91         | -0,20               | <b>-0,47</b>        | 0,13                 | -0,31                | -0,26                |



**Project**    **Rekonstrukce sportovního centra Ostrava - Dubina**

Part            Přepočet - hlavní nosná konstrukce

Description   Ocelová konstrukce - požární klapy, sportovní zařízení (basket), leden 2023

Author        Ing. Jeřowicz

| Name  | dx<br>[mm] | Case  | Cross-section         | N<br>[kN] | V <sub>y</sub><br>[kN] | V <sub>z</sub><br>[kN] | M <sub>x</sub><br>[kNm] | M <sub>y</sub><br>[kNm] | M <sub>z</sub><br>[kNm] |
|-------|------------|-------|-----------------------|-----------|------------------------|------------------------|-------------------------|-------------------------|-------------------------|
|       |            |       | RO101.6X7.1           |           |                        |                        |                         |                         |                         |
| B69   | 0,000      | C01/5 | CS26 -<br>RO101.6X7.1 | -120,18   | -0,27                  | <b>0,46</b>            | 0,00                    | -0,70                   | 0,72                    |
| B1233 | 0,000      | C01/6 | CS26 -<br>RO101.6X7.1 | -109,45   | 0,00                   | 0,09                   | <b>-0,13</b>            | -0,25                   | 0,21                    |
| B69   | 0,000      | C01/7 | CS26 -<br>RO101.6X7.1 | -182,30   | -0,23                  | 0,12                   | <b>0,17</b>             | 0,13                    | 0,64                    |
| B1250 | 3571,709   | C01/8 | CS26 -<br>RO101.6X7.1 | -82,63    | -0,03                  | -0,44                  | 0,10                    | <b>-0,77</b>            | -0,30                   |
| B89   | 0,000      | C01/3 | CS26 -<br>RO101.6X7.1 | -162,56   | 0,16                   | -0,15                  | -0,10                   | <b>0,80</b>             | -0,35                   |
| B151  | 0,000      | C01/4 | CS26 -<br>RO101.6X7.1 | -45,40    | <b>0,52</b>            | 0,09                   | -0,03                   | 0,09                    | <b>-1,14</b>            |
| B69   | 0,000      | C01/9 | CS26 -<br>RO101.6X7.1 | -181,51   | -0,42                  | 0,35                   | 0,10                    | -0,43                   | <b>1,10</b>             |

| Name  | Combination key  |
|-------|--|
| C01/1 | 1.15*LC1 + 1.15*LC2 + 1.05*LC3 + 1.50*LC5 + 0.90*LC12 + 1.50*LC13 + 1.50*LC21  |
| C01/2 | LC1 + LC2 + 0.90*LC11 + 1.50*LC17  |
| C01/3 | 1.15*LC1 + 1.15*LC2 + 1.05*LC3 + 1.50*LC5 + 0.90*LC11 + 1.05*LC20 + 1.50*LC21  |
| C01/4 | 1.15*LC1 + 1.15*LC2 + 1.05*LC3 + 0.75*LC4 + 1.50*LC11 + 1.05*LC19              |
| C01/5 | 1.15*LC1 + 1.15*LC2 + 0.75*LC5 + 1.50*LC12 + 1.50*LC13 + 1.05*LC20 + 1.50*LC21 |
| C01/6 | 1.15*LC1 + 1.15*LC2 + 1.05*LC3 + 1.50*LC6 + 0.90*LC11 + 1.50*LC21              |
| C01/7 | 1.15*LC1 + 1.15*LC2 + 1.05*LC3 + 1.50*LC5 + 0.90*LC11 + 1.05*LC19 + 1.50*LC21  |
| C01/8 | 1.15*LC1 + 1.15*LC2 + 1.05*LC3 + 1.50*LC4 + 0.90*LC11 + 1.50*LC21              |
| C01/9 | 1.15*LC1 + 1.15*LC2 + 1.05*LC3 + 1.50*LC5 + 1.05*LC20 + 1.50*LC21              |

**EC-EN 1993 Steel check ULS**

Linear calculation

Combination: C01

Coordinate system: Principal

Extreme 1D: Global

Selection: Named selection - basket\_sky

Filter: Cross-section = CS26 - RO101.6X7.1

**Overall Unity Check**

| Name  | dx<br>[mm] | Case  | Cross-section         | Material | UC <sub>Overall</sub><br>[-] | UC <sub>Sec</sub><br>[-] | UC <sub>Stab</sub><br>[-] |
|-------|------------|-------|-----------------------|----------|------------------------------|--------------------------|---------------------------|
| B1254 | 0,000      | C01/1 | CS26 -<br>RO101.6X7.1 | S 235    | <b>0,95</b>                  | 0,33                     | 0,95                      |

| Name  | Combination key   |
|-------|---|
| C01/1 | 1.15*LC1 + 1.15*LC2 + 1.05*LC3 + 1.50*LC5 + 0.90*LC12 + 1.50*LC13 + 1.50*LC21 |

## CS27 - 1D internal forces; N

Values: **N**

Linear calculation

Combination: C01

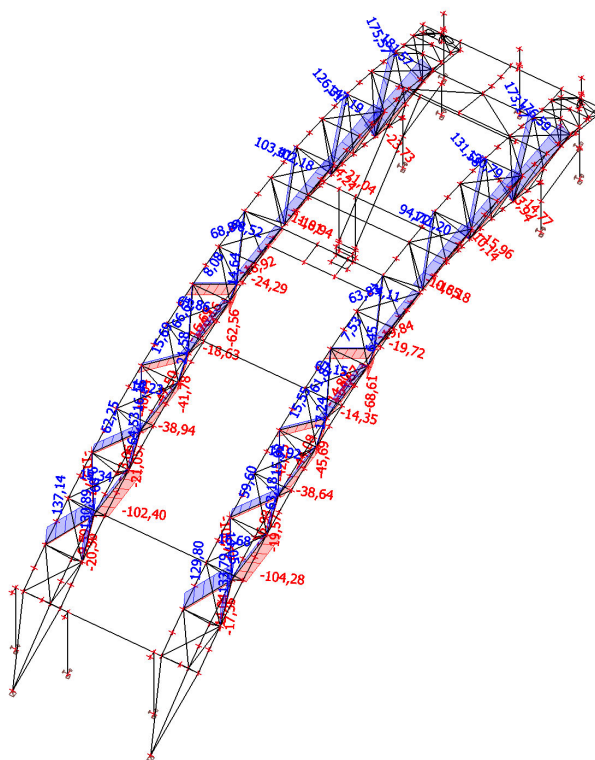
Coordinate system: Principal

Extreme 1D: Member

Selection: All

Filter: Cross-section = CS27 -

RO82.5X7.1



## Cross-sections

### Cross-sections - CS27

| Name | Type                   | Item material | Fabrication | buckling y-y | buckling z-z | Picture | Type description        |
|------|------------------------|---------------|-------------|--------------|--------------|---------|-------------------------|
| CS27 | Detailed<br>RO82.5X7.1 | S 235         | rolled      | a            | a            |         | Circular hollow section |

## 1D internal forces

Linear calculation

Combination: C01

Coordinate system: Principal

Extreme 1D: Global

Selection: Named selection - basket\_sky

Filter: Cross-section = CS27 - RO82.5X7.1

| Name  | dx [mm]  | Case  | Cross-section     | N [kN]         | V <sub>y</sub> [kN] | V <sub>z</sub> [kN] | M <sub>x</sub> [kNm] | M <sub>y</sub> [kNm] | M <sub>z</sub> [kNm] |
|-------|----------|-------|-------------------|----------------|---------------------|---------------------|----------------------|----------------------|----------------------|
| B1231 | 3656,906 | C01/1 | CS27 - RO82.5X7.1 | <b>-113,77</b> | -0,09               | -0,10               | 0,00                 | 0,12                 | -0,20                |
| B1236 | 0,000    | C01/2 | CS27 - RO82.5X7.1 | <b>181,57</b>  | -0,04               | 0,19                | 0,05                 | 0,00                 | 0,03                 |
| B1231 | 0,000    | C01/3 | CS27 - RO82.5X7.1 | -113,02        | <b>-0,09</b>        | 0,23                | 0,00                 | -0,13                | 0,12                 |
| B1219 | 4930,514 | C01/4 | CS27 -            | 128,53         | 0,00                | <b>-0,52</b>        | 0,01                 | -0,70                | -0,03                |

**Project**    **Rekonstrukce sportovního centra Ostrava - Dubina**

Part        Přepočít - hlavní nosná konstrukce

Description    Ocelová konstrukce - požární klapy, sportovní zařízení (basket), leden 2023

Author        Ing. Jeřowicz

| Name  | dx<br>[mm] | Case  | Cross-section        | N<br>[kN] | V <sub>y</sub><br>[kN] | V <sub>z</sub><br>[kN] | M <sub>x</sub><br>[kNm] | M <sub>y</sub><br>[kNm] | M <sub>z</sub><br>[kNm] |
|-------|------------|-------|----------------------|-----------|------------------------|------------------------|-------------------------|-------------------------|-------------------------|
|       |            |       | RO82.5X7.1           |           |                        |                        |                         |                         |                         |
| B1249 | 0,000      | C01/5 | CS27 -<br>RO82.5X7.1 | 41,91     | -0,03                  | <b>0,42</b>            | -0,01                   | -0,37                   | 0,03                    |
| B1253 | 0,000      | C01/6 | CS27 -<br>RO82.5X7.1 | 101,43    | 0,03                   | 0,26                   | <b>-0,04</b>            | -0,09                   | 0,00                    |
| B1219 | 4930,514   | C01/7 | CS27 -<br>RO82.5X7.1 | 175,25    | 0,00                   | -0,50                  | 0,02                    | <b>-0,78</b>            | -0,02                   |
| B1232 | 713,599    | C01/8 | CS27 -<br>RO82.5X7.1 | 48,38     | 0,00                   | 0,02                   | 0,01                    | <b>0,20</b>             | 0,03                    |
| B1236 | 4930,514   | C01/9 | CS27 -<br>RO82.5X7.1 | 176,81    | -0,05                  | -0,47                  | <b>0,06</b>             | -0,67                   | <b>-0,21</b>            |
| B1282 | 3656,906   | C01/3 | CS27 -<br>RO82.5X7.1 | -104,28   | <b>0,12</b>            | -0,14                  | -0,02                   | 0,06                    | <b>0,25</b>             |

| Name  | Combination key   |
|-------|---|
| C01/1 | 1.15*LC1 + 1.15*LC2 + 1.05*LC3 + 1.50*LC6 + 0.90*LC12 + 1.50*LC13 + 1.50*LC21             |
| C01/2 | 1.15*LC1 + 1.15*LC2 + 1.05*LC3 + 1.50*LC5 + 0.90*LC12 + 1.50*LC13                         |
| C01/3 | 1.15*LC1 + 1.15*LC2 + 1.05*LC3 + 1.50*LC6 + 0.90*LC12 + 1.50*LC13                         |
| C01/4 | 1.35*LC1 + 1.35*LC2 + 1.05*LC3 + 0.75*LC5 + 0.90*LC12 + 1.50*LC13 + 1.50*LC21             |
| C01/5 | 1.35*LC1 + 1.35*LC2 + 0.90*LC12 + 1.50*LC13 + 1.05*LC18                                   |
| C01/6 | 1.15*LC1 + 1.15*LC2 + 1.05*LC3 + 0.75*LC5 + 0.90*LC11 + 1.50*LC13 + 1.50*LC19             |
| C01/7 | 1.15*LC1 + 1.15*LC2 + 1.05*LC3 + 1.50*LC5 + 0.90*LC12 + 1.50*LC13 + 1.50*LC21             |
| C01/8 | 1.15*LC1 + 1.15*LC2 + 1.05*LC3 + 0.75*LC4 + 1.50*LC11 + 1.50*LC21                         |
| C01/9 | 1.15*LC1 + 1.15*LC2 + 1.05*LC3 + 1.50*LC5 + 0.90*LC12 + 1.50*LC13 + 1.05*LC20 + 1.50*LC21 |

**EC-EN 1993 Steel check ULS**

Linear calculation

Combination: C01

Coordinate system: Principal

Extreme 1D: Global

Selection: Named selection - basket\_sky

Filter: Cross-section = CS27 - RO82.5X7.1

**Overall Unity Check**

| Name  | dx<br>[mm] | Case  | Cross-section        | Material | UC <sub>Overall</sub><br>[-] | UC <sub>Sec</sub><br>[-] | UC <sub>Stab</sub><br>[-] |
|-------|------------|-------|----------------------|----------|------------------------------|--------------------------|---------------------------|
| B1231 | 3656,906   | C01/1 | CS27 -<br>RO82.5X7.1 | S 235    | <b>0,51</b>                  | 0,29                     | 0,51                      |

| Name  | Combination key   |
|-------|---|
| C01/1 | 1.15*LC1 + 1.15*LC2 + 1.05*LC3 + 1.50*LC6 + 0.90*LC12 + 1.50*LC13 + 1.50*LC21 |

## CS28 - 1D internal forces; N

Values: **N**

Linear calculation

Combination: C01

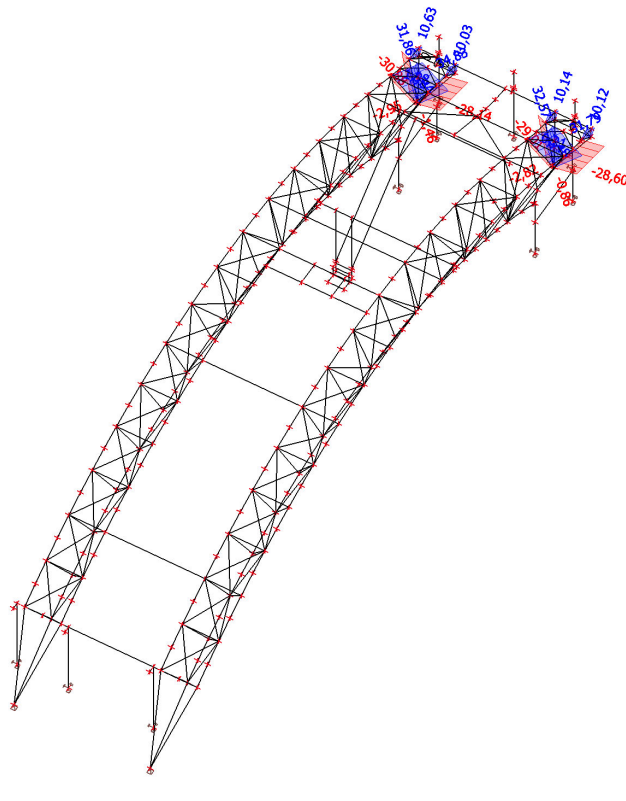
Coordinate system: Principal

Extreme 1D: Member

Selection: All

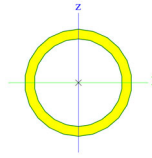
Filter: Cross-section = CS28 -

RO70X6.3



## Cross-sections

### Cross-sections - CS28

| Name | Type                 | Item material | Fabrication | buckling y-y | buckling z-z | Picture  | Type description        |
|------|----------------------|---------------|-------------|--------------|--------------|--|-------------------------|
| CS28 | Detailed<br>RO70X6.3 | S 235         | rolled      | a            | a            |  | Circular hollow section |

### 1D internal forces

Linear calculation

Combination: C01

Coordinate system: Principal

Extreme 1D: Global

Selection: Named selection - basket\_sky

Filter: Cross-section = CS28 - RO70X6.3

| Name  | dx [mm]  | Case  | Cross-section   | N [kN]        | V <sub>y</sub> [kN] | V <sub>z</sub> [kN] | M <sub>x</sub> [kNm] | M <sub>y</sub> [kNm] | M <sub>z</sub> [kNm] |
|-------|----------|-------|-----------------|---------------|---------------------|---------------------|----------------------|----------------------|----------------------|
| B1217 | 2724,371 | C01/1 | CS28 - RO70X6.3 | <b>-30,88</b> | -0,13               | -0,06               | 0,01                 | 0,02                 | -0,20                |
| B1218 | 3323,402 | C01/2 | CS28 - RO70X6.3 | <b>34,83</b>  | 0,03                | -0,06               | 0,01                 | -0,07                | 0,07                 |
| B1217 | 0,000    | C01/3 | CS28 - RO70X6.3 | -29,74        | <b>-0,14</b>        | 0,12                | 0,02                 | -0,07                | <b>0,15</b>          |
| B88   | 0,000    | C01/4 | CS28 -          | 7,70          | <b>0,14</b>         | 0,02                | 0,01                 | 0,03                 | -0,11                |

**Project**    **Rekonstrukce sportovního centra Ostrava - Dubina**

Part            Přepočet - hlavní nosná konstrukce

Description   Ocelová konstrukce - požární klapy, sportovní zařízení (basket), leden 2023

Author        Ing. Jeřowicz

| Name  | dx<br>[mm] | Case  | Cross-section      | N<br>[kN] | V <sub>y</sub><br>[kN] | V <sub>z</sub><br>[kN] | M <sub>x</sub><br>[kNm] | M <sub>y</sub><br>[kNm] | M <sub>z</sub><br>[kNm] |
|-------|------------|-------|--------------------|-----------|------------------------|------------------------|-------------------------|-------------------------|-------------------------|
|       |            |       | RO70X6.3           |           |                        |                        |                         |                         |                         |
| B1234 | 0,000      | C01/5 | CS28 -<br>RO70X6.3 | -24,09    | 0,06                   | <b>0,20</b>            | 0,00                    | -0,13                   | -0,08                   |
| B1235 | 0,000      | C01/6 | CS28 -<br>RO70X6.3 | 25,28     | 0,02                   | 0,06                   | <b>-0,03</b>            | 0,00                    | -0,09                   |
| B1217 | 0,000      | C01/7 | CS28 -<br>RO70X6.3 | -26,38    | -0,10                  | 0,01                   | <b>0,03</b>             | 0,06                    | 0,10                    |
| B1217 | 2724,371   | C01/8 | CS28 -<br>RO70X6.3 | -10,21    | -0,03                  | <b>-0,22</b>           | 0,02                    | <b>-0,23</b>            | -0,04                   |
| B1234 | 2724,371   | C01/9 | CS28 -<br>RO70X6.3 | -23,48    | 0,05                   | 0,03                   | 0,00                    | <b>0,17</b>             | 0,06                    |
| B1217 | 2724,371   | C01/3 | CS28 -<br>RO70X6.3 | -29,99    | -0,14                  | -0,06                  | 0,02                    | 0,01                    | <b>-0,23</b>            |

| Name  | Combination key   |
|-------|---|
| C01/1 | 1.15*LC1 + 1.15*LC2 + 1.05*LC3 + 1.50*LC5 + 0.90*LC11 + 1.50*LC13                         |
| C01/2 | 1.15*LC1 + 1.15*LC2 + 1.05*LC3 + 1.50*LC5 + 0.90*LC12 + 1.50*LC13                         |
| C01/3 | 1.15*LC1 + 1.15*LC2 + 1.05*LC3 + 1.50*LC5 + 0.90*LC11 + 1.50*LC13 + 1.05*LC17 + 1.50*LC21 |
| C01/4 | 1.15*LC1 + 1.15*LC2 + 1.05*LC3 + 0.75*LC5 + 1.50*LC11 + 1.50*LC13 + 1.05*LC17 + 1.50*LC21 |
| C01/5 | 1.15*LC1 + 1.15*LC2 + 1.05*LC3 + 1.50*LC5 + 0.90*LC11 + 1.50*LC13 + 1.05*LC20 + 1.50*LC21 |
| C01/6 | 1.15*LC1 + 1.15*LC2 + 1.05*LC3 + 1.50*LC5 + 0.90*LC12 + 1.50*LC13 + 1.05*LC18 + 1.50*LC21 |
| C01/7 | 1.15*LC1 + 1.15*LC2 + 1.05*LC3 + 1.50*LC5 + 0.90*LC12 + 1.50*LC13 + 1.05*LC20 + 1.50*LC21 |
| C01/8 | 1.15*LC1 + 1.15*LC2 + 1.05*LC3 + 0.75*LC6 + 1.50*LC12 + 1.05*LC20 + 1.50*LC21             |
| C01/9 | LC1 + LC2 + 1.05*LC3 + 1.50*LC5 + 0.90*LC11 + 1.50*LC13 + 1.05*LC20 + 1.50*LC21           |

**EC-EN 1993 Steel check ULS**

Linear calculation

Combination: C01

Coordinate system: Principal

Extreme 1D: Global

Selection: Named selection - basket\_sky

Filter: Cross-section = CS28 - RO70X6.3

**Overall Unity Check**

| Name  | dx<br>[mm] | Case  | Cross-section      | Material | UC <sub>Overall</sub><br>[-] | UC <sub>Sec</sub><br>[-] | UC <sub>Stab</sub><br>[-] |
|-------|------------|-------|--------------------|----------|------------------------------|--------------------------|---------------------------|
| B1217 | 2724,371   | C01/1 | CS28 -<br>RO70X6.3 | S 235    | <b>0,18</b>                  | 0,10                     | 0,18                      |

| Name  | Combination key   |
|-------|---|
| C01/1 | 1.15*LC1 + 1.15*LC2 + 1.05*LC3 + 1.50*LC5 + 0.90*LC12 + 1.50*LC13 + 1.50*LC21 |

## CS29 - 1D internal forces; N

Values: **N**

Linear calculation

Combination: C01

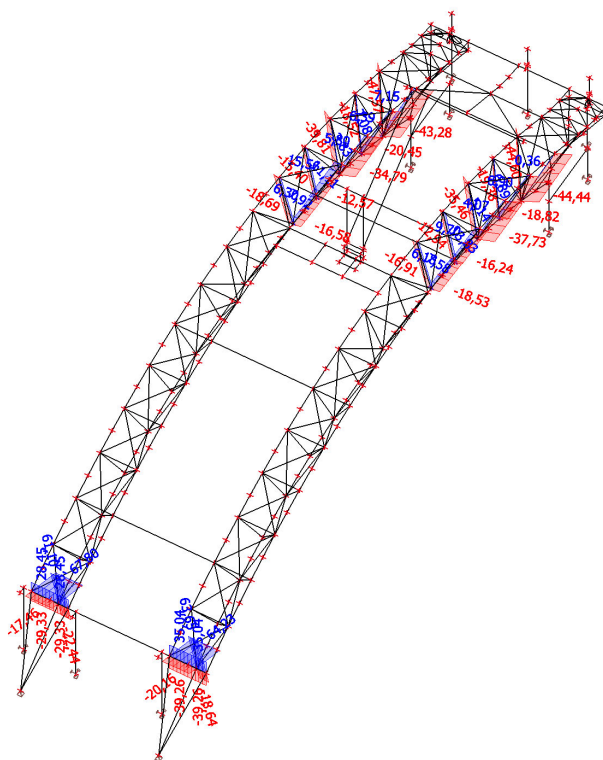
Coordinate system: Principal

Extreme 1D: Member

Selection: All

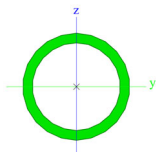
Filter: Cross-section = CS29 -

RO70X6.3



## Cross-sections

### Cross-sections - CS29

| Name | Type                 | Item material | Fabrication | buckling y-y | buckling z-z | Picture  | Type description        |
|------|----------------------|---------------|-------------|--------------|--------------|--|-------------------------|
| CS29 | Detailed<br>RO70X6.3 | S 235         | rolled      | a            | a            |  | Circular hollow section |

### 1D internal forces

Linear calculation

Combination: C01

Coordinate system: Principal

Extreme 1D: Global

Selection: Named selection - basket\_sky

Filter: Cross-section = CS29 - RO70X6.3

| Name | dx [mm]  | Case  | Cross-section   | N [kN]        | V <sub>y</sub> [kN] | V <sub>z</sub> [kN] | M <sub>x</sub> [kNm] | M <sub>y</sub> [kNm] | M <sub>z</sub> [kNm] |
|------|----------|-------|-----------------|---------------|---------------------|---------------------|----------------------|----------------------|----------------------|
| B70  | 3894,707 | C01/1 | CS29 - RO70X6.3 | <b>-47,57</b> | 0,13                | -0,21               | -0,01                | -0,33                | 0,23                 |
| B81  | 0,000    | C01/2 | CS29 - RO70X6.3 | <b>67,80</b>  | -0,26               | 0,39                | -0,04                | -0,43                | 0,37                 |
| B81  | 0,000    | C01/3 | CS29 - RO70X6.3 | 30,72         | <b>-0,56</b>        | 0,71                | -0,03                | -0,86                | <b>0,84</b>          |
| B100 | 0,000    | C01/4 | CS29 -          | 53,68         | <b>0,69</b>         | 0,52                | 0,01                 | -0,66                | -0,92                |

**Project**    **Rekonstrukce sportovního centra Ostrava - Dubina**

Part        Přepočet - hlavní nosná konstrukce

Description    Ocelová konstrukce - požární klapy, sportovní zařízení (basket), leden 2023

Author        Ing. Jeřowicz

| Name  | dx<br>[mm] | Case   | Cross-section      | N<br>[kN] | V <sub>y</sub><br>[kN] | V <sub>z</sub><br>[kN] | M <sub>x</sub><br>[kNm] | M <sub>y</sub><br>[kNm] | M <sub>z</sub><br>[kNm] |
|-------|------------|--------|--------------------|-----------|------------------------|------------------------|-------------------------|-------------------------|-------------------------|
|       |            |        | RO70X6.3           |           |                        |                        |                         |                         |                         |
| B1453 | 1200,000   | C01/5  | CS29 -<br>RO70X6.3 | -16,61    | 0,16                   | <b>-0,51</b>           | -0,01                   | -0,65                   | 0,19                    |
| B81   | 0,000      | C01/6  | CS29 -<br>RO70X6.3 | 9,72      | -0,05                  | 0,67                   | <b>-0,11</b>            | -0,75                   | 0,18                    |
| B162  | 0,000      | C01/7  | CS29 -<br>RO70X6.3 | 6,38      | -0,01                  | 0,52                   | <b>0,09</b>             | -0,52                   | -0,08                   |
| B81   | 0,000      | C01/8  | CS29 -<br>RO70X6.3 | -3,17     | -0,38                  | <b>0,87</b>            | -0,01                   | <b>-1,04</b>            | 0,63                    |
| B81   | 2111,924   | C01/9  | CS29 -<br>RO70X6.3 | 0,01      | -0,39                  | 0,69                   | -0,02                   | <b>0,62</b>             | -0,18                   |
| B100  | 0,000      | C01/10 | CS29 -<br>RO70X6.3 | 48,48     | 0,67                   | 0,63                   | 0,02                    | -0,77                   | <b>-0,93</b>            |

| Name   | Combination key   |
|--------|---|
| C01/1  | 1.15*LC1 + 1.15*LC2 + 1.05*LC3 + 1.50*LC5 + 0.90*LC11                                     |
| C01/2  | 1.15*LC1 + 1.15*LC2 + 1.05*LC3 + 1.50*LC6 + 0.90*LC12 + 1.50*LC13                         |
| C01/3  | 1.15*LC1 + 1.15*LC2 + 1.05*LC3 + 1.50*LC4 + 0.90*LC11 + 1.50*LC13 + 1.05*LC18 + 1.50*LC21 |
| C01/4  | 1.15*LC1 + 1.15*LC2 + 1.05*LC3 + 0.75*LC4 + 1.50*LC12 + 1.50*LC13 + 1.05*LC18             |
| C01/5  | 1.15*LC1 + 1.15*LC2 + 1.05*LC3 + 0.75*LC6 + 1.50*LC12 + 1.05*LC20                         |
| C01/6  | 1.15*LC1 + 1.15*LC2 + 1.05*LC3 + 1.50*LC4 + 0.90*LC11 + 1.05*LC19 + 1.50*LC21             |
| C01/7  | 1.15*LC1 + 1.15*LC2 + 1.05*LC3 + 1.50*LC4 + 0.90*LC11 + 1.05*LC20 + 1.50*LC21             |
| C01/8  | 1.15*LC1 + 1.15*LC2 + 1.50*LC5 + 0.90*LC11 + 1.05*LC18 + 1.50*LC21                        |
| C01/9  | 1.15*LC1 + 1.15*LC2 + 1.05*LC3 + 1.50*LC5 + 0.90*LC11 + 1.05*LC18 + 1.50*LC21             |
| C01/10 | 1.15*LC1 + 1.15*LC2 + 1.05*LC3 + 1.50*LC4 + 0.90*LC12 + 1.50*LC13 + 1.05*LC18             |

**EC-EN 1993 Steel check ULS**

Linear calculation

Combination: C01

Coordinate system: Principal

Extreme 1D: Global

Selection: Named selection - basket\_sky

Filter: Cross-section = CS29 - RO70X6.3

**Overall Unity Check**

| Name | dx<br>[mm] | Case  | Cross-section      | Material | UC <sub>Overall</sub><br>[-] | UC <sub>Sec</sub><br>[-] | UC <sub>Stab</sub><br>[-] |
|------|------------|-------|--------------------|----------|------------------------------|--------------------------|---------------------------|
| B153 | 3194,238   | C01/1 | CS29 -<br>RO70X6.3 | S 235    | <b>0,76</b>                  | 0,06                     | 0,76                      |

| Name  | Combination key   |
|-------|---|
| C01/1 | 1.15*LC1 + 1.15*LC2 + 1.05*LC3 + 1.50*LC5 + 0.90*LC11 + 1.50*LC21 |

## CS30 - 1D internal forces; N

Values: **N**

Linear calculation

Combination: C01

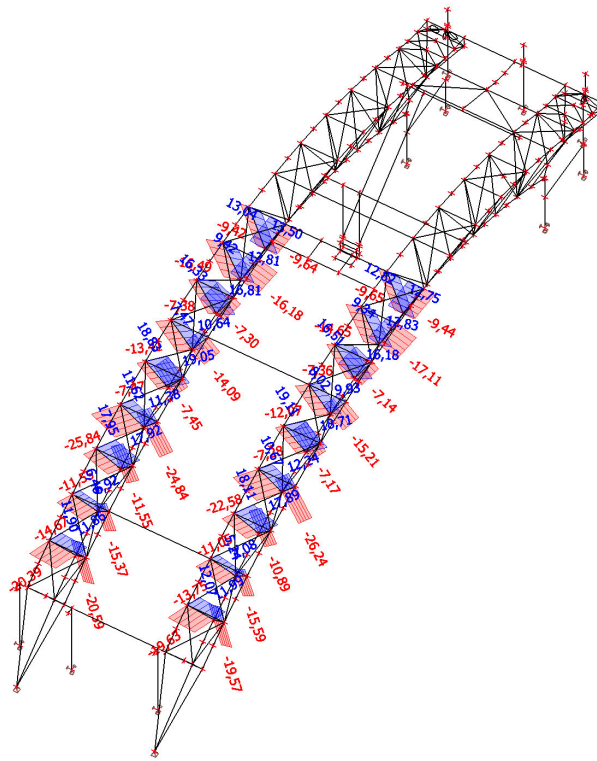
Coordinate system: Principal

Extreme 1D: Member

Selection: All

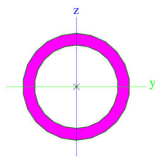
Filter: Cross-section = CS30 -

RO57X6.3



## Cross-sections

### Cross-sections - CS30

| Name | Type                 | Item material | Fabrication | buckling y-y | buckling z-z | Picture  | Type description        |
|------|----------------------|---------------|-------------|--------------|--------------|--|-------------------------|
| CS30 | Detailed<br>RO57X6.3 | S 235         | rolled      | a            | a            |  | Circular hollow section |

## 1D internal forces

Linear calculation

Combination: C01

Coordinate system: Principal

Extreme 1D: Global

Selection: Named selection - basket\_sky

Filter: Cross-section = CS30 - RO57X6.3

| Name | dx [mm]  | Case  | Cross-section   | N [kN]        | V <sub>y</sub> [kN] | V <sub>z</sub> [kN] | M <sub>x</sub> [kNm] | M <sub>y</sub> [kNm] | M <sub>z</sub> [kNm] |
|------|----------|-------|-----------------|---------------|---------------------|---------------------|----------------------|----------------------|----------------------|
| B164 | 2402,341 | C01/1 | CS30 - RO57X6.3 | <b>-26,24</b> | 0,01                | -0,10               | 0,00                 | -0,05                | 0,03                 |
| B165 | 0,000    | C01/2 | CS30 - RO57X6.3 | <b>19,11</b>  | -0,02               | 0,04                | 0,00                 | 0,01                 | 0,02                 |
| B161 | 2165,933 | C01/1 | CS30 - RO57X6.3 | -17,27        | 0,10                | <b>-0,24</b>        | -0,02                | -0,23                | 0,13                 |
| B142 | 0,000    | C01/3 | CS30 -          | 11,24         | 0,02                | <b>0,08</b>         | -0,01                | -0,02                | -0,02                |



**Project**    **Rekonstrukce sportovního centra Ostrava - Dubina**

Part        Přepočít - hlavní nosná konstrukce

Description    Ocelová konstrukce - požární klapy, sportovní zařízení (basket), leden 2023

Author        Ing. Jeřowicz

| Name | dx<br>[mm] | Case  | Cross-section      | N<br>[kN] | V <sub>y</sub><br>[kN] | V <sub>z</sub><br>[kN] | M <sub>x</sub><br>[kNm] | M <sub>y</sub><br>[kNm] | M <sub>z</sub><br>[kNm] |
|------|------------|-------|--------------------|-----------|------------------------|------------------------|-------------------------|-------------------------|-------------------------|
|      |            |       | RO57X6.3           |           |                        |                        |                         |                         |                         |
| B99  | 0,000      | C01/4 | CS30 -<br>RO57X6.3 | -20,45    | 0,08                   | -0,09                  | <b>-0,03</b>            | 0,13                    | -0,06                   |
| B142 | 0,000      | C01/5 | CS30 -<br>RO57X6.3 | -17,54    | -0,09                  | -0,08                  | <b>0,02</b>             | 0,12                    | 0,07                    |
| B99  | 2165,933   | C01/1 | CS30 -<br>RO57X6.3 | -18,29    | 0,09                   | -0,24                  | -0,02                   | <b>-0,23</b>            | 0,12                    |
| B86  | 0,000      | C01/6 | CS30 -<br>RO57X6.3 | -2,85     | -0,09                  | -0,11                  | 0,00                    | <b>0,17</b>             | 0,09                    |
| B80  | 2165,933   | C01/1 | CS30 -<br>RO57X6.3 | -18,06    | <b>-0,12</b>           | -0,24                  | 0,01                    | -0,22                   | <b>-0,16</b>            |
| B105 | 2231,787   | C01/7 | CS30 -<br>RO57X6.3 | -2,73     | <b>0,12</b>            | -0,17                  | 0,00                    | -0,13                   | <b>0,17</b>             |

| Name  | Combination key   |
|-------|---|
| C01/1 | 1.15*LC1 + 1.15*LC2 + 1.05*LC3 + 1.50*LC6 + 0.90*LC11 + 1.50*LC21             |
| C01/2 | 1.15*LC1 + 1.15*LC2 + 1.05*LC3 + 0.75*LC6 + 1.50*LC12 + 1.50*LC13 + 1.05*LC19 |
| C01/3 | 1.15*LC1 + 1.15*LC2 + 0.90*LC12 + 1.50*LC13 + 1.50*LC18                       |
| C01/4 | 1.15*LC1 + 1.15*LC2 + 1.05*LC3 + 1.50*LC4 + 0.90*LC11 + 1.50*LC21             |
| C01/5 | 1.15*LC1 + 1.15*LC2 + 1.05*LC3 + 1.50*LC4 + 0.90*LC11 + 1.05*LC19             |
| C01/6 | 1.15*LC1 + 1.15*LC2 + 1.05*LC3 + 1.50*LC6 + 0.90*LC12 + 1.50*LC13 + 1.50*LC21 |
| C01/7 | 1.15*LC1 + 1.15*LC2 + 1.05*LC3 + 1.50*LC6 + 0.90*LC12 + 1.50*LC13 + 1.05*LC19 |

**EC-EN 1993 Steel check ULS**

Linear calculation

Combination: C01

Coordinate system: Principal

Extreme 1D: Global

Selection: Named selection - basket\_sky

Filter: Cross-section = CS30 - RO57X6.3

**Overall Unity Check**

| Name | dx<br>[mm] | Case  | Cross-section      | Material | UC <sub>Overall</sub><br>[-] | UC <sub>Sec</sub><br>[-] | UC <sub>Stab</sub><br>[-] |
|------|------------|-------|--------------------|----------|------------------------------|--------------------------|---------------------------|
| B83  | 2402,341   | C01/1 | CS30 -<br>RO57X6.3 | S 235    | <b>0,31</b>                  | 0,11                     | 0,31                      |

| Name  | Combination key                                       |
|-------|---|
| C01/1 | 1.15*LC1 + 1.15*LC2 + 1.05*LC3 + 1.50*LC6 + 0.90*LC11 |

## CS31 - 1D internal forces; N

Values: **N**

Linear calculation

Combination: C01

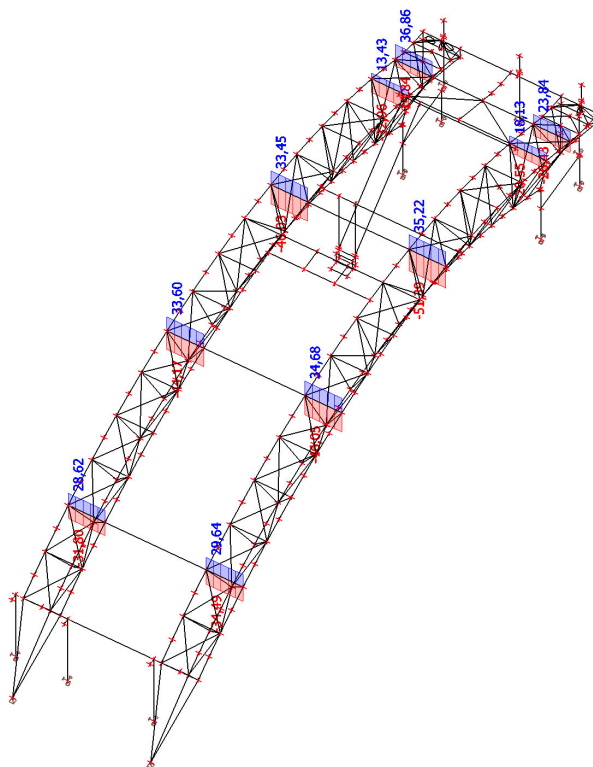
Coordinate system: Principal

Extreme 1D: Member

Selection: All

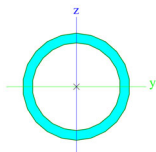
Filter: Cross-section = CS31 -

RO70X6.3



## Cross-sections

### Cross-sections - CS31

| Name | Type                 | Item material | Fabrication | buckling y-y | buckling z-z | Picture  | Type description        |
|------|----------------------|---------------|-------------|--------------|--------------|--|-------------------------|
| CS31 | Detailed<br>RO70X6.3 | S 235         | rolled      | a            | a            |  | Circular hollow section |

### 1D internal forces

Linear calculation

Combination: C01

Coordinate system: Principal

Extreme 1D: Global

Selection: Named selection - basket\_sky

Filter: Cross-section = CS31 - RO70X6.3

| Name | dx [mm]  | Case  | Cross-section   | N [kN]        | V <sub>y</sub> [kN] | V <sub>z</sub> [kN] | M <sub>x</sub> [kNm] | M <sub>y</sub> [kNm] | M <sub>z</sub> [kNm] |
|------|----------|-------|-----------------|---------------|---------------------|---------------------|----------------------|----------------------|----------------------|
| B174 | 0,000    | C01/1 | CS31 - RO70X6.3 | <b>-51,39</b> | 0,00                | 0,12                | 0,00                 | 0,01                 | 0,01                 |
| B464 | 0,000    | C01/2 | CS31 - RO70X6.3 | <b>36,86</b>  | 0,03                | 0,20                | 0,01                 | -0,12                | -0,02                |
| B466 | 0,000    | C01/3 | CS31 - RO70X6.3 | -15,75        | <b>-0,08</b>        | 0,06                | 0,01                 | 0,06                 | 0,11                 |
| B170 | 2400,000 | C01/4 | CS31 -          | 0,35          | -0,04               | <b>-0,41</b>        | -0,01                | -0,48                | -0,09                |

**Project**    **Rekonstrukce sportovního centra Ostrava - Dubina**

Part        Přepočet - hlavní nosná konstrukce

Description    Ocelová konstrukce - požární klapy, sportovní zařízení (basket), leden 2023

Author        Ing. Jeřowicz

| Name | dx<br>[mm] | Case   | Cross-section      | N<br>[kN] | V <sub>y</sub><br>[kN] | V <sub>z</sub><br>[kN] | M <sub>x</sub><br>[kNm] | M <sub>y</sub><br>[kNm] | M <sub>z</sub><br>[kNm] |
|------|------------|--------|--------------------|-----------|------------------------|------------------------|-------------------------|-------------------------|-------------------------|
|      |            |        | RO70X6.3           |           |                        |                        |                         |                         |                         |
| B108 | 0,000      | C01/5  | CS31 -<br>RO70X6.3 | -24,56    | -0,03                  | <b>0,40</b>            | 0,02                    | -0,41                   | 0,00                    |
| B108 | 0,000      | C01/6  | CS31 -<br>RO70X6.3 | 9,45      | 0,01                   | -0,10                  | <b>-0,02</b>            | 0,12                    | -0,06                   |
| B108 | 0,000      | C01/7  | CS31 -<br>RO70X6.3 | -25,60    | -0,03                  | 0,37                   | <b>0,02</b>             | -0,38                   | 0,01                    |
| B108 | 2400,000   | C01/8  | CS31 -<br>RO70X6.3 | 2,60      | 0,01                   | -0,39                  | -0,02                   | <b>-0,49</b>            | -0,04                   |
| B108 | 2400,000   | C01/9  | CS31 -<br>RO70X6.3 | -24,45    | -0,03                  | 0,15                   | 0,02                    | <b>0,25</b>             | -0,06                   |
| B108 | 0,000      | C01/10 | CS31 -<br>RO70X6.3 | 9,13      | 0,04                   | 0,11                   | 0,00                    | -0,23                   | <b>-0,14</b>            |
| B464 | 2400,000   | C01/11 | CS31 -<br>RO70X6.3 | 19,07     | <b>0,09</b>            | -0,04                  | -0,01                   | 0,07                    | <b>0,12</b>             |

| Name   | Combination key   |
|--------|---|
| C01/1  | LC1 + LC2 + 1.05*LC3 + 0.75*LC6 + 0.90*LC11 + 1.50*LC13 + 1.50*LC19 + 1.50*LC21           |
| C01/2  | 1.15*LC1 + 1.15*LC2 + 1.05*LC3 + 1.50*LC5 + 0.90*LC11 + 1.50*LC13 + 1.05*LC17 + 1.50*LC21 |
| C01/3  | LC1 + LC2 + 0.90*LC11 + 1.50*LC19   |
| C01/4  | 1.15*LC1 + 1.15*LC2 + 1.05*LC3 + 0.75*LC6 + 0.90*LC12 + 1.50*LC20 + 1.50*LC21             |
| C01/5  | 1.15*LC1 + 1.15*LC2 + 0.90*LC11 + 1.50*LC13 + 1.50*LC19                                   |
| C01/6  | 1.15*LC1 + 1.15*LC2 + 1.05*LC3 + 0.75*LC5 + 0.90*LC12 + 1.50*LC13 + 1.50*LC20             |
| C01/7  | LC1 + LC2 + 0.90*LC11 + 1.50*LC19 + 1.50*LC21   |
| C01/8  | 1.15*LC1 + 1.15*LC2 + 1.05*LC3 + 0.75*LC5 + 1.50*LC12 + 1.05*LC20 + 1.50*LC21             |
| C01/9  | LC1 + LC2 + 0.90*LC11 + 1.50*LC13 + 1.50*LC19   |
| C01/10 | 1.15*LC1 + 1.15*LC2 + 1.05*LC3 + 0.75*LC5 + 1.50*LC13 + 1.50*LC17                         |
| C01/11 | 1.15*LC1 + 1.15*LC2 + 1.05*LC3 + 0.75*LC5 + 0.90*LC12 + 1.50*LC13 + 1.50*LC20 + 1.50*LC21 |

**EC-EN 1993 Steel check ULS**

Linear calculation

Combination: C01

Coordinate system: Principal

Extreme 1D: Global

Selection: Named selection - basket\_sky

Filter: Cross-section = CS31 - RO70X6.3

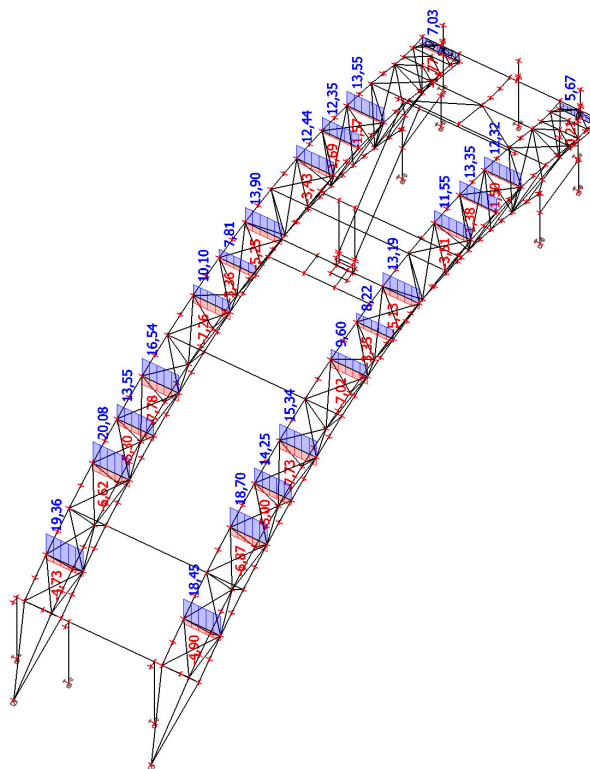
**Overall Unity Check**

| Name | dx<br>[mm] | Case  | Cross-section      | Material | UC <sub>Overall</sub><br>[-] | UC <sub>Sec</sub><br>[-] | UC <sub>Stab</sub><br>[-] |
|------|------------|-------|--------------------|----------|------------------------------|--------------------------|---------------------------|
| B466 | 0,000      | C01/1 | CS31 -<br>RO70X6.3 | S 235    | <b>0,81</b>                  | 0,09                     | 0,81                      |

| Name  | Combination key                   |
|-------|-----------------------------------|
| C01/1 | LC1 + LC2 + 0.90*LC12 + 1.50*LC19 |

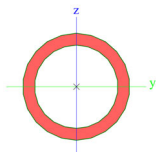
## CS32 - 1D internal forces; N

Values: **N**  
 Linear calculation  
 Combination: C01  
 Coordinate system: Principal  
 Extreme 1D: Member  
 Selection: All  
 Filter: Cross-section = CS32 - RO57X6.3



## Cross-sections

### Cross-sections - CS32

| Name | Type                 | Item material | Fabrication | buckling y-y | buckling z-z | Picture  | Type description        |
|------|----------------------|---------------|-------------|--------------|--------------|--|-------------------------|
| CS32 | Detailed<br>RO57X6.3 | S 235         | rolled      | a            | a            |  | Circular hollow section |

### 1D internal forces

Linear calculation  
 Combination: C01  
 Coordinate system: Principal  
 Extreme 1D: Global  
 Selection: Named selection - basket\_sky  
 Filter: Cross-section = CS32 - RO57X6.3

| Name | dx [mm] | Case  | Cross-section   | N [kN]       | V <sub>y</sub> [kN] | V <sub>z</sub> [kN] | M <sub>x</sub> [kNm] | M <sub>y</sub> [kNm] | M <sub>z</sub> [kNm] |
|------|---------|-------|-----------------|--------------|---------------------|---------------------|----------------------|----------------------|----------------------|
| B117 | 0,000   | C01/1 | CS32 - RO57X6.3 | <b>-7,78</b> | -0,02               | 0,09                | 0,01                 | -0,02                | 0,02                 |
| B119 | 0,000   | C01/2 | CS32 - RO57X6.3 | <b>20,08</b> | 0,01                | 0,13                | 0,00                 | -0,04                | -0,02                |
| B111 | 0,000   | C01/3 | CS32 - RO57X6.3 | 3,31         | <b>-0,05</b>        | 0,11                | 0,01                 | -0,02                | 0,07                 |
| B109 | 0,000   | C01/4 | CS32 -          | 3,21         | <b>0,04</b>         | 0,09                | -0,01                | -0,02                | -0,04                |

**Project**    **Rekonstrukce sportovního centra Ostrava - Dubina**

Part        Přepočet - hlavní nosná konstrukce

Description    Ocelová konstrukce - požární klapy, sportovní zařízení (basket), leden 2023

Author        Ing. Jeřowicz

| Name | dx<br>[mm] | Case   | Cross-section      | N<br>[kN] | V <sub>y</sub><br>[kN] | V <sub>z</sub><br>[kN] | M <sub>x</sub><br>[kNm] | M <sub>y</sub><br>[kNm] | M <sub>z</sub><br>[kNm] |
|------|------------|--------|--------------------|-----------|------------------------|------------------------|-------------------------|-------------------------|-------------------------|
|      |            |        | RO57X6.3           |           |                        |                        |                         |                         |                         |
| B531 | 2400,000   | C01/5  | CS32 -<br>RO57X6.3 | 1,79      | 0,01                   | <b>-0,40</b>           | 0,00                    | -0,23                   | 0,02                    |
| B531 | 0,000      | C01/5  | CS32 -<br>RO57X6.3 | 1,79      | 0,01                   | <b>0,40</b>            | 0,00                    | -0,23                   | 0,00                    |
| B121 | 0,000      | C01/6  | CS32 -<br>RO57X6.3 | 11,26     | 0,03                   | 0,12                   | <b>-0,01</b>            | -0,04                   | -0,04                   |
| B531 | 2400,000   | C01/7  | CS32 -<br>RO57X6.3 | 1,79      | 0,01                   | -0,40                  | 0,00                    | <b>-0,23</b>            | 0,02                    |
| B531 | 2400,000   | C01/8  | CS32 -<br>RO57X6.3 | 3,77      | 0,00                   | 0,29                   | 0,00                    | <b>0,20</b>             | 0,00                    |
| B115 | 2400,000   | C01/9  | CS32 -<br>RO57X6.3 | -4,18     | -0,05                  | -0,11                  | <b>0,01</b>             | -0,02                   | <b>-0,07</b>            |
| B111 | 0,000      | C01/10 | CS32 -<br>RO57X6.3 | 5,99      | -0,05                  | 0,11                   | 0,01                    | -0,02                   | <b>0,07</b>             |

| Name   | Combination key   |
|--------|---|
| C01/1  | LC1 + LC2 + 1.50*LC12 + 1.50*LC13 + 1.05*LC17 + 1.50*LC21                     |
| C01/2  | 1.15*LC1 + 1.15*LC2 + 1.05*LC3 + 1.50*LC6 + 0.90*LC11 + 1.50*LC21             |
| C01/3  | 1.15*LC1 + 1.15*LC2 + 1.05*LC3 + 0.75*LC4 + 0.90*LC11 + 1.50*LC13 + 1.50*LC19 |
| C01/4  | LC1 + LC2 + 1.05*LC3 + 0.75*LC6 + 0.90*LC12 + 1.50*LC19 + 1.50*LC21           |
| C01/5  | 1.15*LC1 + 1.15*LC2 + 1.05*LC3 + 0.75*LC6 + 1.50*LC12 + 1.05*LC17 + 1.50*LC21 |
| C01/6  | 1.15*LC1 + 1.15*LC2 + 1.05*LC3 + 1.50*LC6 + 0.90*LC11 + 1.50*LC13 + 1.50*LC21 |
| C01/7  | 1.15*LC1 + 1.15*LC2 + 1.05*LC3 + 0.75*LC6 + 1.50*LC12 + 1.05*LC17             |
| C01/8  | LC1 + LC2 + 0.75*LC5 + 1.50*LC11 + 1.50*LC13 + 1.05*LC19 + 1.50*LC21          |
| C01/9  | 1.15*LC1 + 1.15*LC2 + 1.05*LC3 + 0.75*LC6 + 0.90*LC12 + 1.50*LC13 + 1.50*LC19 |
| C01/10 | 1.15*LC1 + 1.15*LC2 + 1.05*LC3 + 1.50*LC4 + 0.90*LC11 + 1.50*LC13 + 1.05*LC19 |

**EC-EN 1993 Steel check ULS**

Linear calculation

Combination: C01

Coordinate system: Principal

Extreme 1D: Global

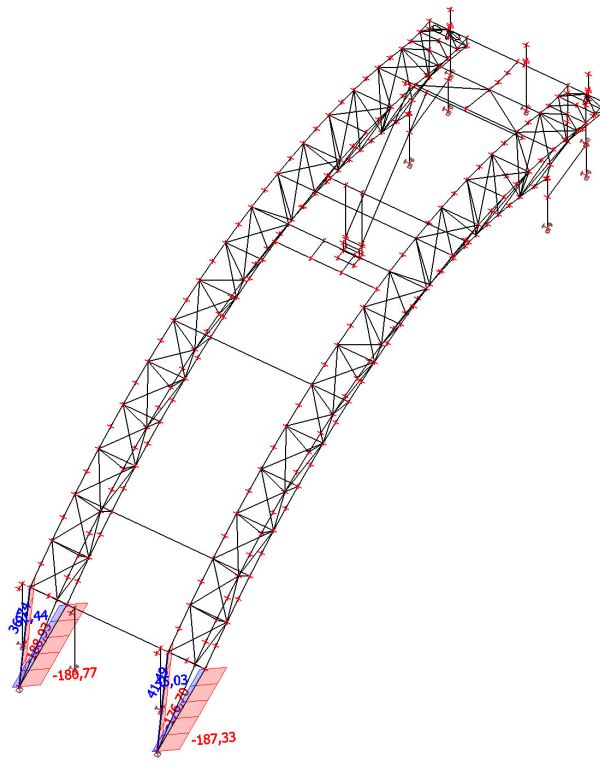
Selection: Named selection - basket\_sky

Filter: Cross-section = CS32 - RO57X6.3

**Overall Unity Check**

| Name | dx<br>[mm] | Case  | Cross-section      | Material | UC <sub>Overall</sub><br>[-] | UC <sub>Sec</sub><br>[-] | UC <sub>Stab</sub><br>[-] |
|------|------------|-------|--------------------|----------|------------------------------|--------------------------|---------------------------|
| B531 | 2400,000   | C01/1 | CS32 -<br>RO57X6.3 | S 235    | <b>0,45</b>                  | 0,05                     | 0,45                      |

| Name  | Combination key                               |
|-------|---|
| C01/1 | LC1 + LC2 + 1.50*LC12 + 1.05*LC18 + 1.50*LC21 |



**Project**    **Rekonstrukce sportovního centra Ostrava - Dubina**

Part        Přepočet - hlavní nosná konstrukce

Description    Ocelová konstrukce - požární klapy, sportovní zařízení (basket), leden 2023

Author        Ing. Jeřowicz

| Name | dx<br>[mm] | Case   | Cross-section  | N<br>[kN] | V <sub>y</sub><br>[kN] | V <sub>z</sub><br>[kN] | M <sub>x</sub><br>[kNm] | M <sub>y</sub><br>[kNm] | M <sub>z</sub><br>[kNm] |
|------|------------|--------|----------------|-----------|------------------------|------------------------|-------------------------|-------------------------|-------------------------|
| B98  | 5879,201   | C01/8  | CS33 - RO127X8 | -138,23   | -0,17                  | -1,07                  | -0,21                   | <b>-3,14</b>            | -0,58                   |
| B98  | 3527,520   | C01/9  | CS33 - RO127X8 | 22,07     | -0,01                  | 0,05                   | 0,12                    | <b>0,88</b>             | -0,11                   |
| B98  | 5879,201   | C01/10 | CS33 - RO127X8 | -149,98   | -0,32                  | -0,85                  | -0,26                   | -2,01                   | <b>-1,28</b>            |
| B79  | 5879,201   | C01/11 | CS33 - RO127X8 | -44,16    | <b>0,41</b>            | -0,62                  | 0,30                    | -0,74                   | <b>1,79</b>             |

| Name   | Combination key  |
|--------|--|
| C01/1  | 1.15*LC1 + 1.15*LC2 + 1.05*LC3 + 1.50*LC6 + 0.90*LC12 + 1.50*LC13              |
| C01/2  | LC1 + LC2 + 1.50*LC11 + 1.05*LC19 + 1.50*LC21                                  |
| C01/3  | 1.15*LC1 + 1.15*LC2 + 1.50*LC5 + 0.90*LC12 + 1.50*LC13 + 1.05*LC20             |
| C01/4  | 1.35*LC1 + 1.35*LC2 + 1.05*LC3 + 0.75*LC4 + 0.90*LC12 + 1.50*LC21              |
| C01/5  | 1.15*LC1 + 1.15*LC2 + 1.50*LC11 + 1.50*LC13 + 1.05*LC18                        |
| C01/6  | 1.15*LC1 + 1.15*LC2 + 1.50*LC6 + 0.90*LC12 + 1.50*LC13 + 1.05*LC18 + 1.50*LC21 |
| C01/7  | 1.15*LC1 + 1.15*LC2 + 1.50*LC5 + 0.90*LC11 + 1.50*LC13 + 1.05*LC18 + 1.50*LC21 |
| C01/8  | 1.15*LC1 + 1.15*LC2 + 1.05*LC3 + 0.75*LC4 + 1.50*LC12 + 1.50*LC21              |
| C01/9  | LC1 + LC2 + 1.50*LC11 + 1.50*LC13 + 1.05*LC19                                  |
| C01/10 | 1.15*LC1 + 1.15*LC2 + 1.50*LC6 + 0.90*LC12 + 1.50*LC13 + 1.05*LC20             |
| C01/11 | 1.15*LC1 + 1.15*LC2 + 1.50*LC5 + 0.90*LC11 + 1.50*LC13 + 1.05*LC19             |

**EC-EN 1993 Steel check ULS**

Linear calculation

Combination: C01

Coordinate system: Principal

Extreme 1D: Global

Selection: Named selection - basket\_sky

Filter: Cross-section = CS33 - RO127X8

**Overall Unity Check**

| Name | dx<br>[mm] | Case  | Cross-section  | Material | UC <sub>Overall</sub><br>[-] | UC <sub>Sec</sub><br>[-] | UC <sub>Stab</sub><br>[-] |
|------|------------|-------|----------------|----------|------------------------------|--------------------------|---------------------------|
| B160 | 0,000      | C01/1 | CS33 - RO127X8 | S 235    | <b>0,85</b>                  | 0,26                     | 0,85                      |

| Name  | Combination key   |
|-------|---|
| C01/1 | 1.15*LC1 + 1.15*LC2 + 1.05*LC3 + 1.50*LC4 + 0.90*LC12 + 1.50*LC13 |

## CS34 - 1D internal forces; N

Values: **N**

Linear calculation

Combination: C01

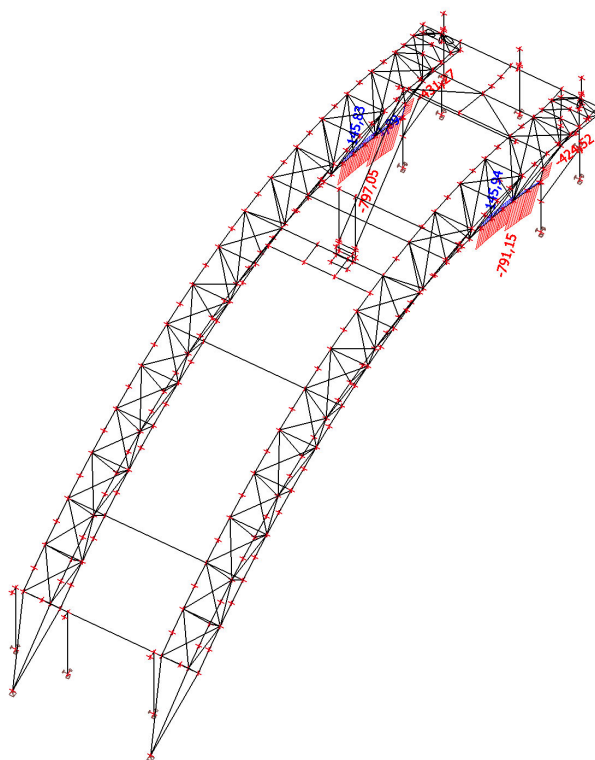
Coordinate system: Principal

Extreme 1D: Member

Selection: All

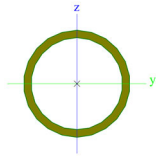
Filter: Cross-section = CS34 -

RO177.8X12.5



## Cross-sections

### Cross-sections - CS34

| Name | Type         | Item material | Fabrication | buckling y-y | buckling z-z | Picture  | Type description        |
|------|--------------|---------------|-------------|--------------|--------------|--|-------------------------|
| CS34 | RO177.8X12.5 | S 235         | rolled      | a            | a            |  | Circular hollow section |

### 1D internal forces

Linear calculation

Combination: C01

Coordinate system: Principal

Extreme 1D: Global

Selection: Named selection - basket\_sky

Filter: Cross-section = CS34 - RO177.8X12.5

| Name | dx [mm]   | Case  | Cross-section       | N [kN]         | V <sub>y</sub> [kN] | V <sub>z</sub> [kN] | M <sub>x</sub> [kNm] | M <sub>y</sub> [kNm] | M <sub>z</sub> [kNm] |
|------|-----------|-------|---------------------|----------------|---------------------|---------------------|----------------------|----------------------|----------------------|
| B65  | 1567,747+ | C01/1 | CS34 - RO177.8X12.5 | <b>-797,05</b> | 0,05                | 20,54               | -0,21                | -20,62               | -0,54                |
| B127 | 7382,174  | C01/2 | CS34 - RO177.8X12.5 | <b>145,94</b>  | 0,07                | 2,43                | 0,00                 | 1,54                 | 0,10                 |
| B62  | 0,000     | C01/3 | CS34 - RO177.8X12.5 | -112,78        | <b>-12,79</b>       | -1,33               | -1,60                | 1,38                 | <b>12,90</b>         |
| B65  | 4738,002- | C01/4 | CS34 -              | -584,26        | 0,12                | <b>-14,86</b>       | -0,14                | -5,03                | 0,00                 |



**Project**    **Rekonstrukce sportovního centra Ostrava - Dubina**

Part        Přepočet - hlavní nosná konstrukce

Description    Ocelová konstrukce - požární klapy, sportovní zařízení (basket), leden 2023

Author        Ing. Jeřowicz

| Name | dx<br>[mm] | Case  | Cross-section          | N<br>[kN] | V <sub>y</sub><br>[kN] | V <sub>z</sub><br>[kN] | M <sub>x</sub><br>[kNm] | M <sub>y</sub><br>[kNm] | M <sub>z</sub><br>[kNm] |
|------|------------|-------|------------------------|-----------|------------------------|------------------------|-------------------------|-------------------------|-------------------------|
|      |            |       | RO177.8X12.5           |           |                        |                        |                         |                         |                         |
| B65  | 0,000      | C01/5 | CS34 -<br>RO177.8X12.5 | -383,61   | -2,14                  | -6,62                  | <b>-1,62</b>            | 0,41                    | 2,62                    |
| B127 | 1567,747+  | C01/6 | CS34 -<br>RO177.8X12.5 | -662,72   | -0,22                  | <b>25,16</b>           | -0,40                   | <b>-27,17</b>           | 0,00                    |
| B65  | 3419,065-  | C01/7 | CS34 -<br>RO177.8X12.5 | -729,88   | 0,07                   | 23,09                  | -0,33                   | <b>18,68</b>            | -0,52                   |
| B62  | 0,000      | C01/8 | CS34 -<br>RO177.8X12.5 | -166,29   | <b>18,07</b>           | 4,87                   | <b>2,19</b>             | -2,23                   | <b>-16,74</b>           |

| Name  | Combination key  |
|-------|--|
| C01/1 | 1.15*LC1 + 1.15*LC2 + 1.05*LC3 + 1.50*LC4 +<br>0.90*LC11 + 1.50*LC21                         |
| C01/2 | LC1 + LC2 + 0.90*LC12 + 1.50*LC13 + 1.50*LC17 +<br>1.50*LC21                                 |
| C01/3 | LC1 + LC2 + 1.50*LC12 + 1.50*LC13 + 1.05*LC20  |
| C01/4 | 1.15*LC1 + 1.15*LC2 + 1.05*LC3 + 1.50*LC4 +<br>0.90*LC11                                     |
| C01/5 | 1.15*LC1 + 1.15*LC2 + 1.05*LC3 + 0.75*LC5 +<br>1.50*LC12 + 1.50*LC13 + 1.05*LC20 + 1.50*LC21 |
| C01/6 | 1.15*LC1 + 1.15*LC2 + 1.05*LC3 + 1.50*LC5 +<br>0.90*LC12 + 1.50*LC13 + 1.50*LC21             |
| C01/7 | 1.15*LC1 + 1.15*LC2 + 1.05*LC3 + 1.50*LC5 +<br>0.90*LC11 + 1.50*LC13                         |
| C01/8 | 1.15*LC1 + 1.15*LC2 + 1.05*LC3 + 0.75*LC5 +<br>0.90*LC11 + 1.50*LC19 + 1.50*LC21             |

**EC-EN 1993 Steel check ULS**

Linear calculation

Combination: C01

Coordinate system: Principal

Extreme 1D: Global

Selection: Named selection - basket\_sky

Filter: Cross-section = CS34 - RO177.8X12.5

**Overall Unity Check**

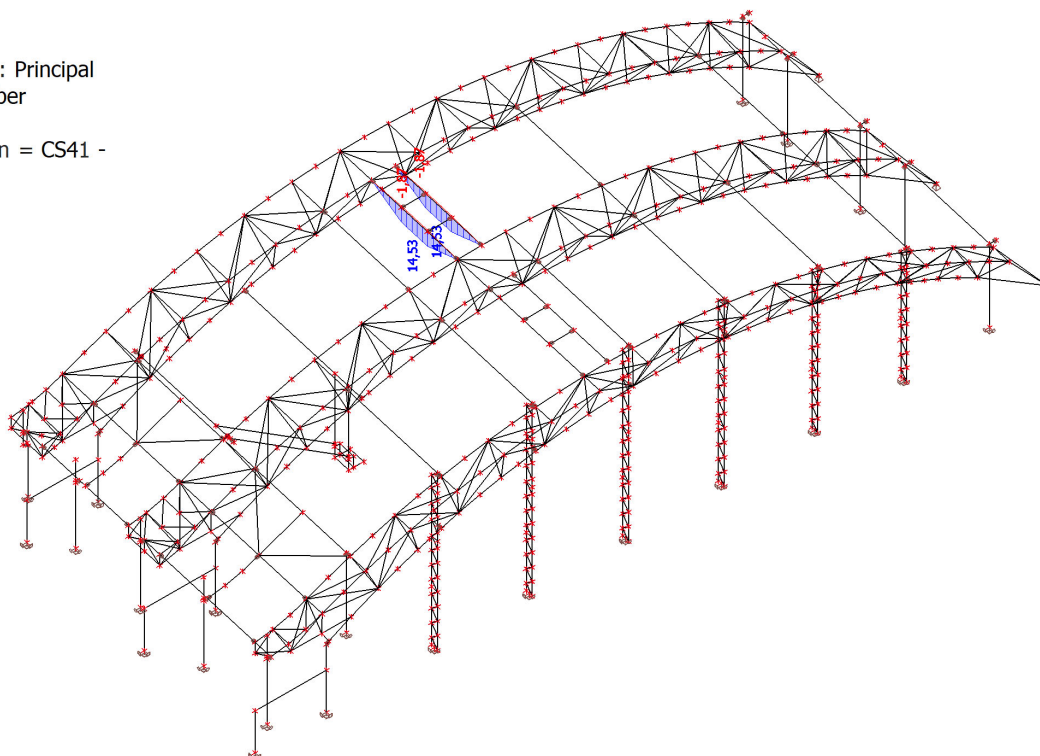
| Name | dx<br>[mm] | Case  | Cross-section          | Material | UC <sub>Overall</sub><br>[-] | UC <sub>Sec</sub><br>[-] | UC <sub>Stab</sub><br>[-] |
|------|------------|-------|------------------------|----------|------------------------------|--------------------------|---------------------------|
| B65  | 0,000      | C01/1 | CS34 -<br>RO177.8X12.5 | S 235    | <b>0,85</b>                  | 0,51                     | 0,85                      |

| Name  | Combination key  |
|-------|--|
| C01/1 | 1.15*LC1 + 1.15*LC2 + 1.05*LC3 + 1.50*LC5 +<br>0.90*LC11 + 1.50*LC21 |

# **VNITŘNÍ SÍLY A POSOUZENÍ PRŮŘEZŮ VÝMĚN PRO ZOTK**

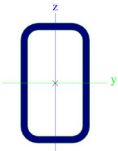
## CS41 - 1D internal forces; M<sub>y</sub>

Values: **M<sub>y</sub>**  
 Linear calculation  
 Combination: C01  
 Coordinate system: Principal  
 Extreme 1D: Member  
 Selection: All  
 Filter: Cross-section = CS41 -  
 VHP150/100x7.0



## Cross-sections

### Cross-sections - CS41

| Name | Type                             | Item material | Fabrication | buckling y-y | buckling z-z | Picture   | Type description           |
|------|----------------------------------|---------------|-------------|--------------|--------------|---|----------------------------|
| CS41 | <b>Detailed</b><br>VHP140/80x8.0 | S 235         | cold formed | c            | c            |  | Rectangular hollow section |

### 1D internal forces

Linear calculation  
 Combination: C01  
 Coordinate system: Principal  
 Extreme 1D: Global  
 Selection: All  
 Filter: Cross-section = CS41 - VHP140/80x8.0

| Name  | dx [mm]   | Case  | Cross-section        | N [kN]      | V <sub>y</sub> [kN] | V <sub>z</sub> [kN] | M <sub>x</sub> [kNm] | M <sub>y</sub> [kNm] | M <sub>z</sub> [kNm] |
|-------|-----------|-------|----------------------|-------------|---------------------|---------------------|----------------------|----------------------|----------------------|
| B1794 | 4300,000+ | C01/1 | CS41 - VHP140/80x8.0 | <b>0,00</b> | 0,04                | -0,86               | -0,01                | 2,71                 | -0,08                |
| B1785 | 2650,000+ | C01/2 | CS41 - VHP140/80x8.0 | <b>0,00</b> | 0,00                | 0,27                | 0,00                 | 3,08                 | -0,08                |
| B1794 | 0,000     | C01/3 | CS41 - VHP140/80x8.0 | 0,00        | <b>-0,08</b>        | 1,99                | 0,00                 | 0,00                 | 0,00                 |
| B1812 | 4300,000+ | C01/3 | CS41 -               | 0,00        | <b>0,08</b>         | -1,36               | -0,01                | 3,85                 | -0,18                |

**Project**    **Rekonstrukce sportovního centra Ostrava - Dubina**

Part        Přepočet - hlavní nosná konstrukce

Description    Ocelová konstrukce - požární klapy, sportovní zařízení (basket), leden 2023

Author        Ing. Jeřowicz

| Name  | dx<br>[mm] | Case  | Cross-section           | N<br>[kN] | V <sub>y</sub><br>[kN] | V <sub>z</sub><br>[kN] | M <sub>x</sub><br>[kNm] | M <sub>y</sub><br>[kNm] | M <sub>z</sub><br>[kNm] |
|-------|------------|-------|-------------------------|-----------|------------------------|------------------------|-------------------------|-------------------------|-------------------------|
|       |            |       | VHP140/80x8.0           |           |                        |                        |                         |                         |                         |
| B1785 | 7300,000   | C01/4 | CS41 -<br>VHP140/80x8.0 | 0,00      | 0,02                   | <b>-6,98</b>           | -0,02                   | 0,00                    | 0,00                    |
| B1790 | 0,000      | C01/4 | CS41 -<br>VHP140/80x8.0 | 0,00      | -0,02                  | <b>6,98</b>            | 0,02                    | 0,00                    | 0,00                    |
| B1787 | 0,000      | C01/5 | CS41 -<br>VHP140/80x8.0 | 0,00      | 0,01                   | 3,81                   | <b>-0,08</b>            | 0,00                    | 0,00                    |
| B1791 | 0,000      | C01/5 | CS41 -<br>VHP140/80x8.0 | 0,00      | 0,00                   | 3,81                   | <b>0,08</b>             | 0,00                    | 0,00                    |
| B1791 | 4650,000-  | C01/6 | CS41 -<br>VHP140/80x8.0 | 0,00      | 0,01                   | -0,24                  | 0,03                    | <b>-2,09</b>            | -0,16                   |
| B1785 | 3850,000-  | C01/7 | CS41 -<br>VHP140/80x8.0 | 0,00      | -0,01                  | -0,05                  | -0,02                   | <b>17,66</b>            | -0,04                   |
| B1790 | 4650,000+  | C01/8 | CS41 -<br>VHP140/80x8.0 | 0,00      | 0,08                   | -1,56                  | 0,01                    | 5,09                    | <b>-0,21</b>            |
| B1810 | 4300,000-  | C01/7 | CS41 -<br>VHP140/80x8.0 | 0,00      | 0,00                   | -0,27                  | -0,04                   | 14,35                   | <b>0,05</b>             |

**EC-EN 1993 Steel check ULS**

Linear calculation

Combination: C01

Coordinate system: Principal

Extreme 1D: Global

Selection: All

Filter: Cross-section = CS41 - VHP140/80x8.0

**Overall Unity Check**

| Name  | dx<br>[mm] | Case  | Cross-section           | Material | UC <sub>Overall</sub><br>[-] | UC <sub>Sec</sub><br>[-] | UC <sub>Stab</sub><br>[-] |
|-------|------------|-------|-------------------------|----------|------------------------------|--------------------------|---------------------------|
| B1785 | 3850,000-  | C01/1 | CS41 -<br>VHP140/80x8.0 | S 235    | <b>0,58</b>                  | 0,58                     | 0,52                      |

| Name  | Combination key  |
|-------|--|
| C01/1 | 1.15*LC1 + 1.15*LC2 + 1.05*LC3 + 1.50*LC4 +<br>0.90*LC12 + 1.50*LC13 + 1.50*LC21 |

**EC-EN 1993 Steel check fire resistance**

Linear calculation

Combination: C03

Coordinate system: Principal

Extreme 1D: Global

Selection: All

Filter: Cross-section = CS41 - VHP140/80x8.0

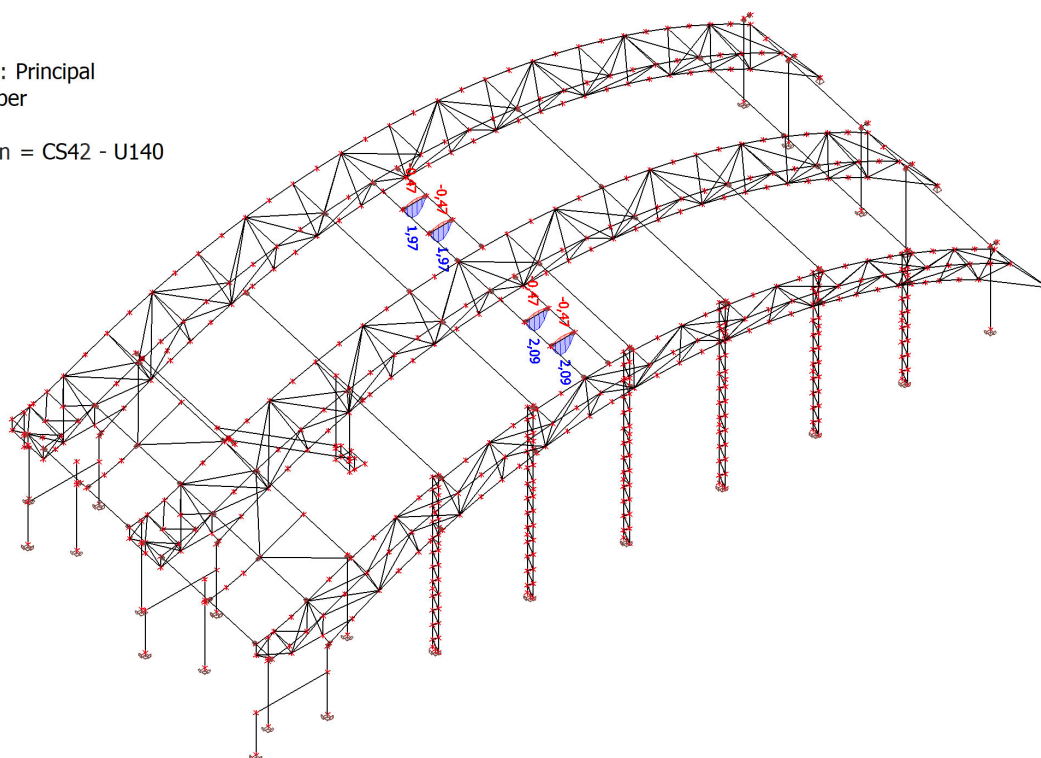
**Overall Unity Check**

| Name  | dx<br>[mm] | Case  | Cross-section           | Material | UC <sub>Overall</sub><br>[-] | UC <sub>Temperature</sub><br>[-] | UC <sub>Sec</sub><br>[-] | UC <sub>Stab</sub><br>[-] |
|-------|------------|-------|-------------------------|----------|------------------------------|----------------------------------|--------------------------|---------------------------|
| B1790 | 3450,000-  | C03/1 | CS41 -<br>VHP140/80x8.0 | S 235    | <b>0,79</b>                  | 0,00                             | 0,79                     | 0,79                      |

| Name  | Combination key                             |
|-------|---|
| C03/1 | LC1 + LC2 + 0.30*LC3 + 0.20*LC4 + 0.20*LC13 |

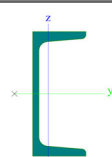
## CS42 - 1D internal forces; M<sub>y</sub>

Values: **M<sub>y</sub>**  
 Linear calculation  
 Combination: C01  
 Coordinate system: Principal  
 Extreme 1D: Member  
 Selection: All  
 Filter: Cross-section = CS42 - U140



## Cross-sections

### Cross-sections - CS42

| Name | Type                    | Item material | Fabrication | buckling y-y | buckling z-z | Picture  | Type description          |
|------|-------------------------|---------------|-------------|--------------|--------------|--|---------------------------|
| CS42 | <b>Detailed</b><br>U140 | S 235         | rolled      | c            | c            |  | European standard channel |

### 1D internal forces

Linear calculation  
 Combination: C01  
 Coordinate system: Principal  
 Extreme 1D: Global  
 Selection: All  
 Filter: Cross-section = CS42 - U140

| Name  | dx [mm]  | Case  | Cross-section | N [kN]       | V <sub>y</sub> [kN] | V <sub>z</sub> [kN] | M <sub>x</sub> [kNm] | M <sub>y</sub> [kNm] | M <sub>z</sub> [kNm] |
|-------|----------|-------|---------------|--------------|---------------------|---------------------|----------------------|----------------------|----------------------|
| B1789 | 0,000    | C01/1 | CS42 - U140   | <b>-0,16</b> | 0,00                | <b>5,98</b>         | 0,00                 | 0,00                 | 0,00                 |
| B1788 | 0,000    | C01/2 | CS42 - U140   | <b>0,15</b>  | <b>0,00</b>         | 5,01                | 0,00                 | 0,00                 | <b>0,00</b>          |
| B1788 | 1454,374 | C01/3 | CS42 - U140   | -0,14        | 0,00                | <b>-5,98</b>        | 0,00                 | 0,00                 | 0,00                 |
| B1799 | 0,000    | C01/4 | CS42 - U140   | -0,14        | 0,00                | 4,44                | <b>0,00</b>          | 0,00                 | 0,00                 |
| B1788 | 0,000    | C01/5 | CS42 - U140   | 0,04         | 0,00                | 0,62                | <b>0,00</b>          | 0,00                 | 0,00                 |
| B1788 | 581,750- | C01/6 | CS42 - U140   | 0,01         | 0,00                | -0,27               | 0,00                 | <b>-0,47</b>         | 0,00                 |
| B1788 | 872,625- | C01/3 | CS42 - U140   | -0,03        | 0,00                | -1,20               | 0,00                 | <b>2,09</b>          | 0,00                 |

| Name  | Combination key   |
|-------|---|
| C01/1 | 1.15*LC1 + 1.15*LC2 + 1.05*LC3 + 1.50*LC4 + 0.90*LC12 + 1.50*LC13 + 1.50*LC21             |
| C01/2 | 1.15*LC1 + 1.15*LC2 + 1.05*LC3 + 1.50*LC4 + 0.90*LC12 + 1.05*LC19 + 1.50*LC21             |
| C01/3 | 1.15*LC1 + 1.15*LC2 + 1.05*LC3 + 1.50*LC4   |
| C01/4 | 1.15*LC1 + 1.15*LC2 + 1.05*LC3 + 1.50*LC4 + 0.90*LC11 + 1.50*LC13 + 1.05*LC17 + 1.50*LC21 |
| C01/5 | 1.15*LC1 + 1.15*LC2 + 1.50*LC6 + 0.90*LC11 + 1.05*LC17                                    |
| C01/6 | LC1 + LC2 + 1.50*LC18   |

### EC-EN 1993 Steel check ULS

Linear calculation

Combination: C01

Coordinate system: Principal

Extreme 1D: Global

Selection: All

Filter: Cross-section = CS42 - U140

#### Overall Unity Check

| Name  | dx<br>[mm] | Case  | Cross-section | Material | UC <sub>Overall</sub><br>[-] | UC <sub>Sec</sub><br>[-] | UC <sub>Stab</sub><br>[-] |
|-------|------------|-------|---------------|----------|------------------------------|--------------------------|---------------------------|
| B1789 | 0,000      | C01/1 | CS42 - U140   | S 235    | <b>0,09</b>                  | 0,04                     | 0,09                      |

| Name  | Combination key   |
|-------|---|
| C01/1 | 1.15*LC1 + 1.15*LC2 + 1.05*LC3 + 1.50*LC4 + 0.90*LC12 + 1.50*LC13 + 1.50*LC21 |

### EC-EN 1993 Steel check fire resistance

Linear calculation

Combination: C03

Coordinate system: Principal

Extreme 1D: Global

Selection: All

Filter: Cross-section = CS42 - U140

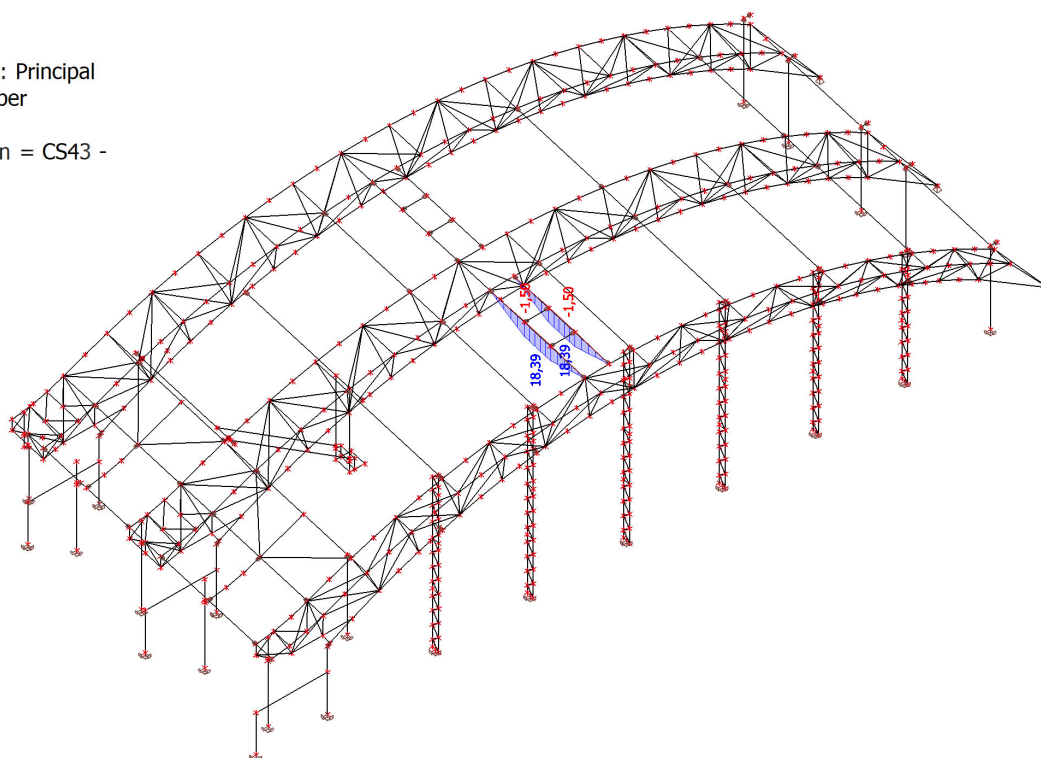
#### Overall Unity Check

| Name  | dx<br>[mm] | Case  | Cross-section | Material | UC <sub>Overall</sub><br>[-] | UC <sub>Temperature</sub><br>[-] | UC <sub>Sec</sub><br>[-] | UC <sub>Stab</sub><br>[-] |
|-------|------------|-------|---------------|----------|------------------------------|----------------------------------|--------------------------|---------------------------|
| B1789 | 581,750-   | C03/1 | CS42 - U140   | S 235    | <b>0,21</b>                  | 0,00                             | 0,12                     | 0,21                      |

| Name  | Combination key                             |
|-------|---|
| C03/1 | LC1 + LC2 + 0.30*LC3 + 0.20*LC4 + 0.20*LC13 |

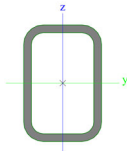
## CS43 - 1D internal forces; M<sub>y</sub>

Values: **M<sub>y</sub>**  
 Linear calculation  
 Combination: C01  
 Coordinate system: Principal  
 Extreme 1D: Member  
 Selection: All  
 Filter: Cross-section = CS43 -  
 VHP150/100x10.0



## Cross-sections

### Cross-sections - CS43

| Name | Type                        | Item material | Fabrication | buckling y-y | buckling z-z | Picture   | Type description           |
|------|-----------------------------|---------------|-------------|--------------|--------------|---|----------------------------|
| CS43 | Detailed<br>VHP150/100x10.0 | S 235         | cold formed | c            | c            |  | Rectangular hollow section |

### 1D internal forces

Linear calculation  
 Combination: C01  
 Coordinate system: Principal  
 Extreme 1D: Global  
 Selection: All  
 Filter: Cross-section = CS43 - VHP150/100x10.0

| Name  | dx [mm]   | Case  | Cross-section          | N [kN]      | V <sub>y</sub> [kN] | V <sub>z</sub> [kN] | M <sub>x</sub> [kNm] | M <sub>y</sub> [kNm] | M <sub>z</sub> [kNm] |
|-------|-----------|-------|------------------------|-------------|---------------------|---------------------|----------------------|----------------------|----------------------|
| B1787 | 4650,000+ | C01/1 | CS43 - VHP150/100x10.0 | <b>0,00</b> | 0,03                | -0,91               | -0,01                | 3,76                 | -0,07                |
| B1785 | 4650,000+ | C01/2 | CS43 - VHP150/100x10.0 | <b>0,00</b> | <b>0,09</b>         | -1,67               | -0,02                | 5,77                 | -0,24                |
| B1785 | 7300,000  | C01/3 | CS43 - VHP150/100x10.0 | 0,00        | 0,04                | <b>-7,38</b>        | -0,03                | 0,00                 | 0,00                 |
| B1785 | 0,000     | C01/4 | CS43 -                 | 0,00        | -0,03               | <b>7,38</b>         | -0,01                | 0,00                 | 0,00                 |

**Project**    **Rekonstrukce sportovního centra Ostrava - Dubina**

Part    Přepočít - hlavní nosná konstrukce

Description    Ocelová konstrukce - požární klapy, sportovní zařízení (basket), leden 2023

Author    Ing. Jeřowicz

| Name  | dx<br>[mm] | Case  | Cross-section             | N<br>[kN] | V <sub>y</sub><br>[kN] | V <sub>z</sub><br>[kN] | M <sub>x</sub><br>[kNm] | M <sub>y</sub><br>[kNm] | M <sub>z</sub><br>[kNm] |
|-------|------------|-------|---------------------------|-----------|------------------------|------------------------|-------------------------|-------------------------|-------------------------|
|       |            |       | VHP150/100x10.0           |           |                        |                        |                         |                         |                         |
| B1787 | 0,000      | C01/5 | CS43 -<br>VHP150/100x10.0 | 0,00      | 0,02                   | 4,21                   | <b>-0,16</b>            | 0,00                    | 0,00                    |
| B1787 | 0,000      | C01/6 | CS43 -<br>VHP150/100x10.0 | 0,00      | -0,03                  | 1,57                   | <b>0,13</b>             | 0,00                    | 0,00                    |
| B1787 | 2650,000+  | C01/7 | CS43 -<br>VHP150/100x10.0 | 0,00      | -0,02                  | 0,34                   | -0,06                   | <b>-1,50</b>            | -0,14                   |
| B1785 | 3850,000-  | C01/3 | CS43 -<br>VHP150/100x10.0 | 0,00      | -0,02                  | -0,08                  | -0,03                   | <b>18,39</b>            | -0,08                   |
| B1785 | 2650,000-  | C01/8 | CS43 -<br>VHP150/100x10.0 | 0,00      | <b>-0,09</b>           | 1,67                   | -0,01                   | 5,77                    | <b>-0,24</b>            |
| B1787 | 4650,000+  | C01/3 | CS43 -<br>VHP150/100x10.0 | 0,00      | -0,04                  | -6,36                  | 0,03                    | 18,20                   | <b>0,10</b>             |

**EC-EN 1993 Steel check ULS**

Linear calculation

Combination: C01

Coordinate system: Principal

Extreme 1D: Global

Selection: All

Filter: Cross-section = CS43 - VHP150/100x10.0

**Overall Unity Check**

| Name  | dx<br>[mm] | Case  | Cross-section             | Material | UC <sub>Overall</sub><br>[-] | UC <sub>Sec</sub><br>[-] | UC <sub>Stab</sub><br>[-] |
|-------|------------|-------|---------------------------|----------|------------------------------|--------------------------|---------------------------|
| B1785 | 3850,000-  | C01/1 | CS43 -<br>VHP150/100x10.0 | S 235    | <b>0,40</b>                  | 0,40                     | 0,36                      |

| Name  | Combination key  |
|-------|--|
| C01/1 | 1.15*LC1 + 1.15*LC2 + 1.05*LC3 + 1.50*LC4 +<br>0.90*LC12 + 1.50*LC13 + 1.50*LC21 |

**EC-EN 1993 Steel check fire resistance**

Linear calculation

Combination: C03

Coordinate system: Principal

Extreme 1D: Global

Selection: All

Filter: Cross-section = CS43 - VHP150/100x10.0

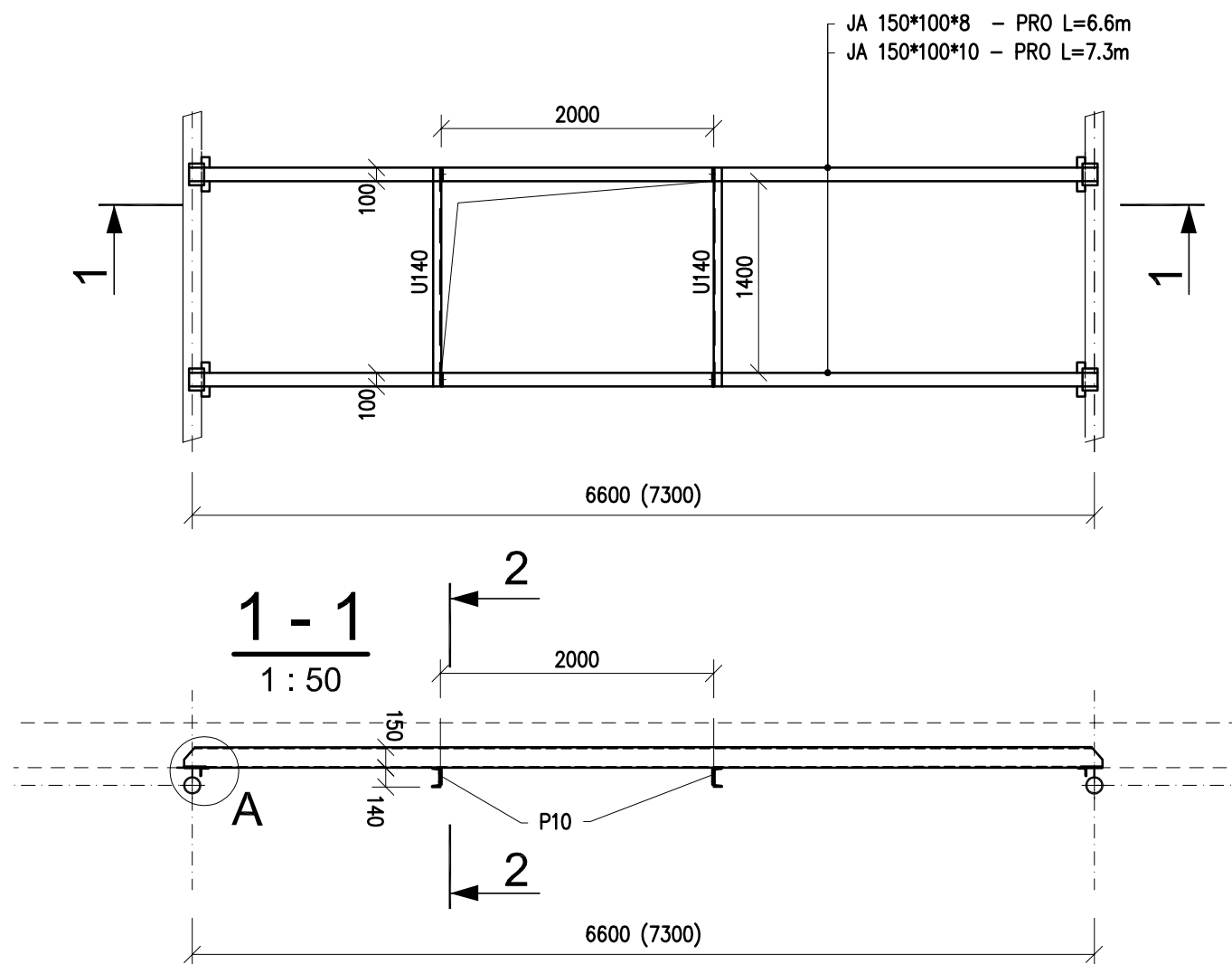
**Overall Unity Check**

| Name  | dx<br>[mm] | Case  | Cross-section             | Material | UC <sub>Overall</sub><br>[-] | UC <sub>Temperature</sub><br>[-] | UC <sub>Sec</sub><br>[-] | UC <sub>Stab</sub><br>[-] |
|-------|------------|-------|---------------------------|----------|------------------------------|----------------------------------|--------------------------|---------------------------|
| B1785 | 3850,000-  | C03/1 | CS43 -<br>VHP150/100x10.0 | S 235    | <b>0,42</b>                  | 0,00                             | 0,42                     | 0,42                      |

| Name  | Combination key                             |
|-------|---|
| C03/1 | LC1 + LC2 + 0.30*LC3 + 0.20*LC4 + 0.20*LC13 |

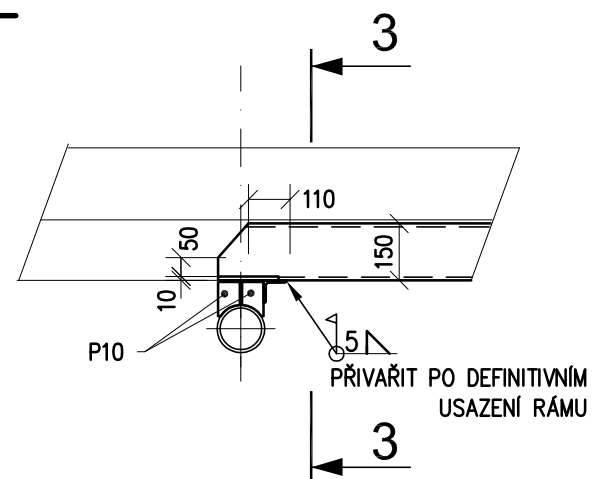


## VÝMĚNY ZOTK



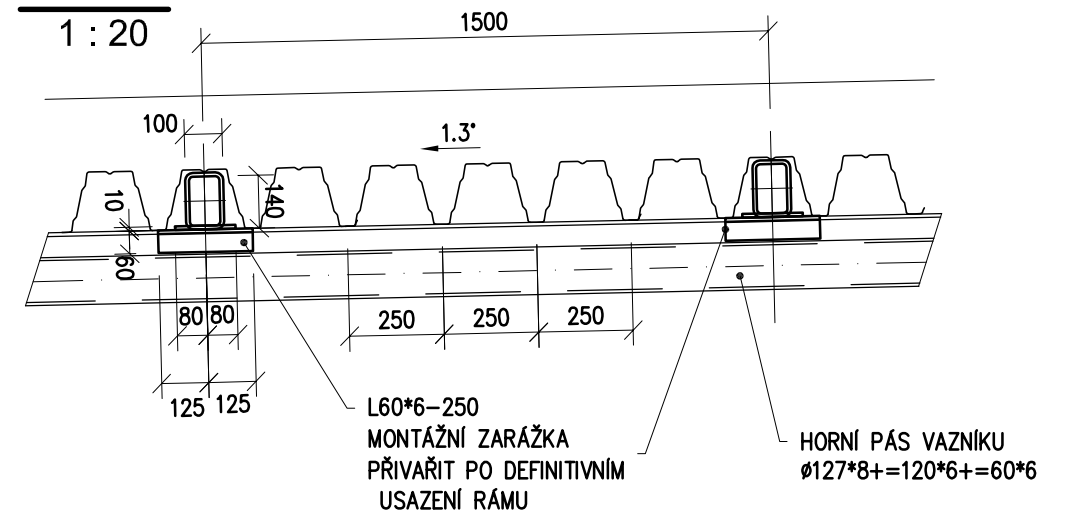
## DETAIL A

1 : 20



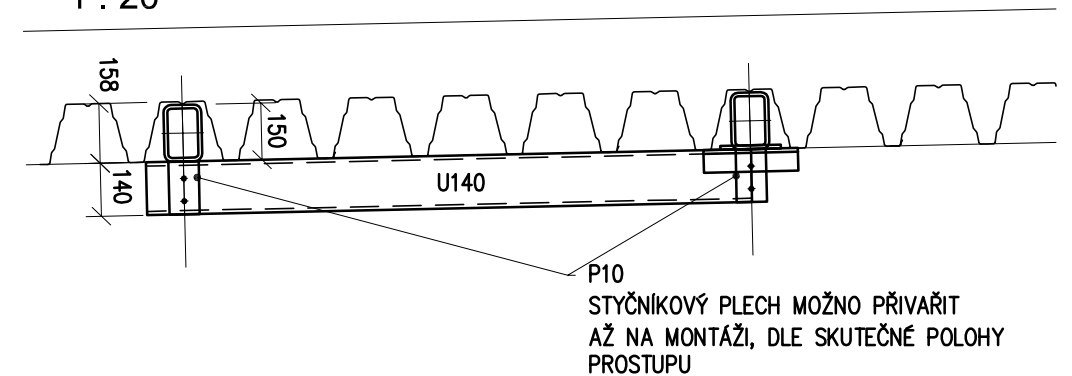
3 - 3

1 : 20



2 - 2

1 : 20



# **VNITŘNÍ SÍLY A POSOUZENÍ PRŮŘEZŮ PRO BASKETBALOVÉ KOŠE**

## CS47 - 1D internal forces; $M_y$

Values:  $M_y$

Linear calculation

Combination: C01

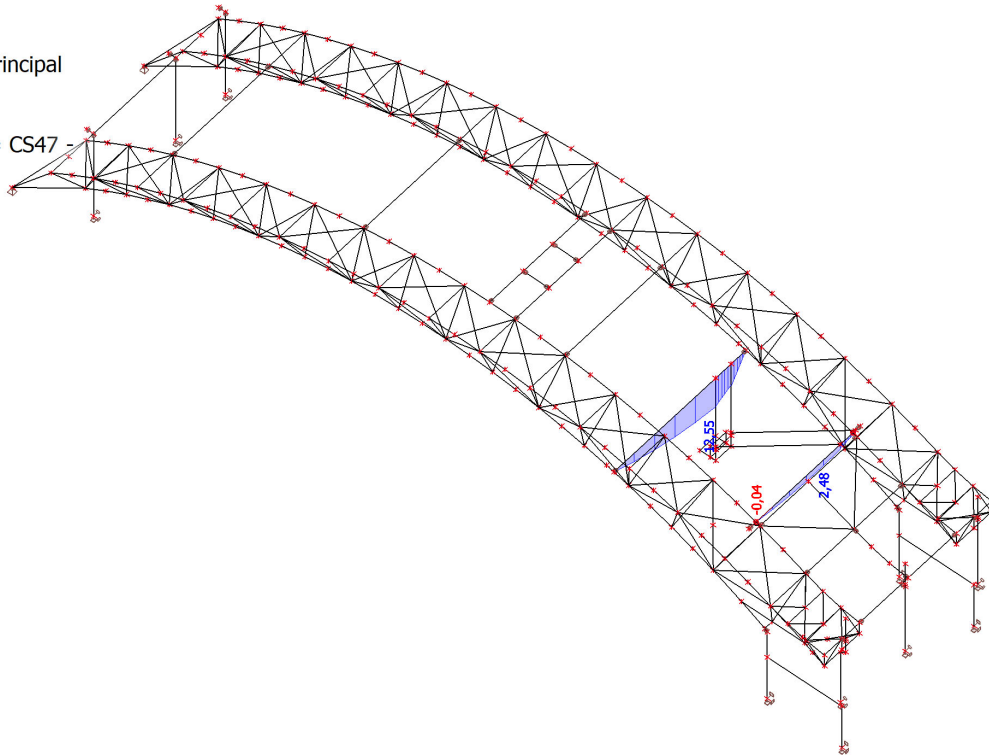
Coordinate system: Principal

Extreme 1D: Member

Selection: All

Filter: Cross-section = CS47 -

RO152.4X6.3



## Cross-sections

### Cross-sections - CS47

| Name | Type                   | Item material | Fabrication | buckling y-y | buckling z-z | Picture | Type description        |
|------|------------------------|---------------|-------------|--------------|--------------|---------|-------------------------|
| CS47 | Detailed<br>RO152.4X10 | S 235         | rolled      | a            | a            |         | Circular hollow section |

## 1D internal forces

Linear calculation

Combination: C01

Coordinate system: Principal

Extreme 1D: Global

Selection: All

Filter: Cross-section = CS47 - RO152.4X10

| Name  | dx [mm]   | Case  | Cross-section     | N [kN]        | $V_y$ [kN]   | $V_z$ [kN] | $M_x$ [kNm] | $M_y$ [kNm] | $M_z$ [kNm] |
|-------|-----------|-------|-------------------|---------------|--------------|------------|-------------|-------------|-------------|
| B1849 | 500,000+  | C01/1 | CS47 - RO152.4X10 | <b>-10,98</b> | 0,37         | 1,96       | -0,03       | -0,03       | 0,02        |
| B1849 | 1360,000+ | C01/2 | CS47 - RO152.4X10 | <b>7,21</b>   | -0,17        | 0,60       | 0,00        | 2,28        | 0,96        |
| B1849 | 500,000+  | C01/3 | CS47 - RO152.4X10 | -8,56         | <b>-0,89</b> | 0,39       | -0,11       | 1,21        | 1,12        |
| B1832 | 310,000+  | C01/4 | CS47 -            | 0,16          | <b>4,75</b>  | 3,71       | -0,13       | 0,68        | 0,41        |

**Project**    **Rekonstrukce sportovního centra Ostrava - Dubina**

Part        Přepočet - hlavní nosná konstrukce

Description    Ocelová konstrukce - požární klapy, sportovní zařízení (basket), leden 2023

Author        Ing. Jeřowicz

| Name  | dx<br>[mm] | Case  | Cross-section        | N<br>[kN] | V <sub>y</sub><br>[kN] | V <sub>z</sub><br>[kN] | M <sub>x</sub><br>[kNm] | M <sub>y</sub><br>[kNm] | M <sub>z</sub><br>[kNm] |
|-------|------------|-------|----------------------|-----------|------------------------|------------------------|-------------------------|-------------------------|-------------------------|
|       |            |       | RO152.4X10           |           |                        |                        |                         |                         |                         |
| B1865 | 9000,000   | C01/5 | CS47 -<br>RO152.4X10 | -4,33     | -0,26                  | <b>-5,20</b>           | -0,27                   | 0,00                    | 0,00                    |
| B1848 | 0,000      | C01/6 | CS47 -<br>RO152.4X10 | -4,23     | 1,84                   | <b>18,87</b>           | 2,06                    | 0,00                    | 0,00                    |
| B1848 | 0,000      | C01/7 | CS47 -<br>RO152.4X10 | -3,97     | -0,41                  | 4,98                   | <b>-0,89</b>            | 0,00                    | 0,00                    |
| B1848 | 0,000      | C01/8 | CS47 -<br>RO152.4X10 | -3,54     | 1,95                   | 17,58                  | <b>2,31</b>             | 0,00                    | 0,00                    |
| B1832 | 500,000-   | C01/9 | CS47 -<br>RO152.4X10 | 0,00      | -0,05                  | -0,53                  | -0,02                   | <b>-0,06</b>            | -0,03                   |
| B1865 | 2060,000+  | C01/5 | CS47 -<br>RO152.4X10 | -4,33     | -0,26                  | -1,91                  | -0,27                   | <b>24,69</b>            | 1,82                    |
| B1848 | 2060,000+  | C01/7 | CS47 -<br>RO152.4X10 | -4,00     | 0,10                   | 0,63                   | 0,23                    | 7,04                    | <b>-0,69</b>            |
| B1848 | 2060,000-  | C01/8 | CS47 -<br>RO152.4X10 | -3,84     | 0,69                   | 5,37                   | 0,63                    | 22,54                   | <b>2,36</b>             |

| Name  | Combination key  |
|-------|--|
| C01/1 | 1.15*LC1 + 1.15*LC2 + 1.05*LC3 + 0.75*LC6 +<br>1.50*LC11 + 1.50*LC13 + 1.05*LC20 |
| C01/2 | LC1 + LC2 + 1.50*LC12 + 1.05*LC17 + 1.50*LC21                                    |
| C01/3 | LC1 + LC2 + 1.50*LC11 + 1.05*LC20 + 1.50*LC21                                    |
| C01/4 | 1.15*LC1 + 1.15*LC2 + 0.90*LC11 + 1.50*LC19 +<br>1.50*LC21                       |
| C01/5 | 1.35*LC1 + 1.35*LC2 + 0.90*LC11 + 1.05*LC20 +<br>1.50*LC21                       |
| C01/6 | 1.35*LC1 + 1.35*LC2 + 0.90*LC11 + 1.05*LC19 +<br>1.50*LC21                       |
| C01/7 | 1.35*LC1 + 1.35*LC2 + 1.05*LC3 + 0.75*LC5 +<br>0.90*LC12 + 1.50*LC13 + 1.05*LC20 |
| C01/8 | LC1 + LC2 + 1.50*LC11 + 1.05*LC19 + 1.50*LC21                                    |
| C01/9 | LC1 + LC2 + 1.05*LC3 + 0.75*LC5 + 1.50*LC12 +<br>1.50*LC13 + 1.05*LC20           |

**EC-EN 1993 Steel check ULS**

Linear calculation

Combination: C01

Coordinate system: Principal

Extreme 1D: Global

Selection: All

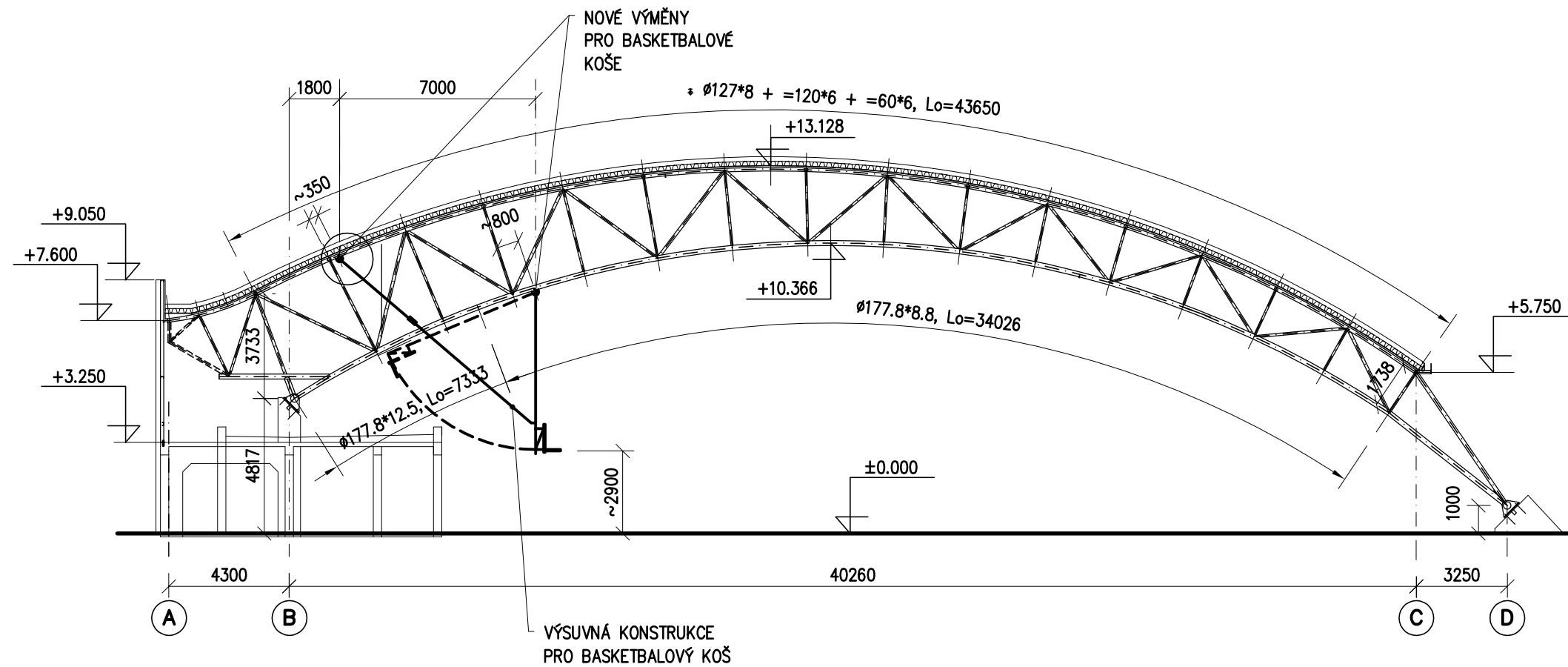
Filter: Cross-section = CS47 - RO152.4X10

**Overall Unity Check**

| Name  | dx<br>[mm] | Case  | Cross-section        | Material | UC <sub>Overall</sub><br>[-] | UC <sub>Sec</sub><br>[-] | UC <sub>Stab</sub><br>[-] |
|-------|------------|-------|----------------------|----------|------------------------------|--------------------------|---------------------------|
| B1865 | 2060,000+  | C01/1 | CS47 -<br>RO152.4X10 | S 235    | <b>0,52</b>                  | 0,52                     | 0,49                      |

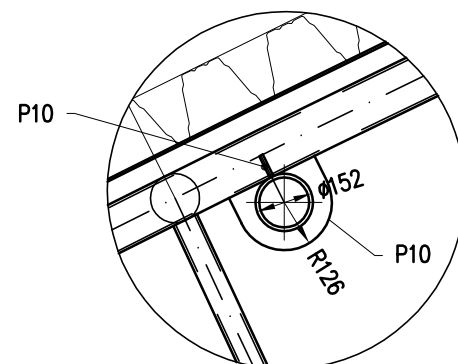
| Name  | Combination key  |
|-------|--|
| C01/1 | 1.35*LC1 + 1.35*LC2 + 0.90*LC11 + 1.05*LC20 +<br>1.50*LC21 |

# VÝMĚNY PRO BASKETBALOVÉ KOŠE - UCHYCENÍ

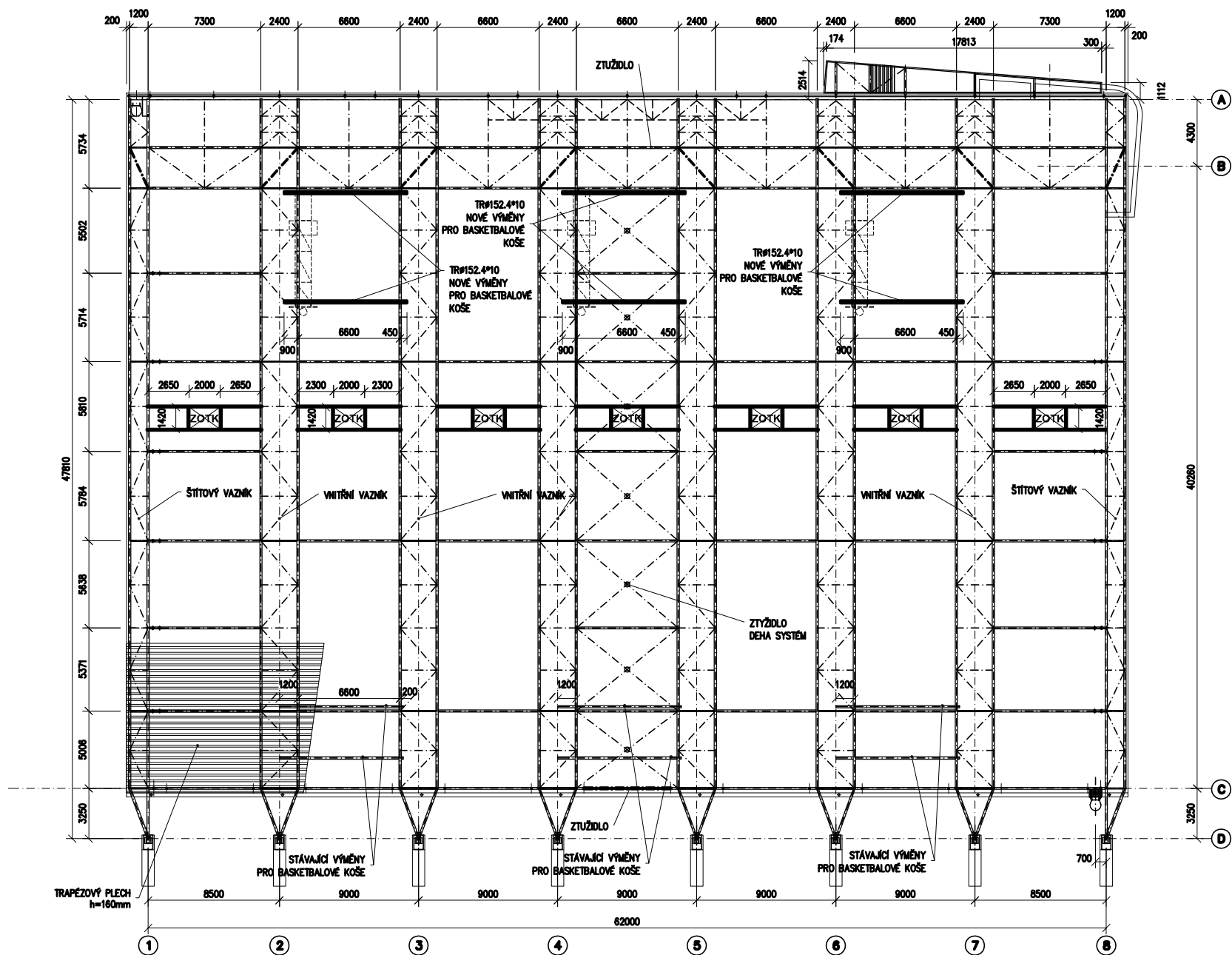


## DETAIL A

1 : 20



# PŮDORYS STŘECHY



## ZÁVĚR

Statický výpočet prokázal, že nosná ocelová konstrukce sportovní haly včetně nově instalovaných výměn pro ZOTK a basketbalové koše **vyhovuje**, a to jak na **mezní stav pevnosti tak i na mezní stav použitelnosti dle ČSN EN 1993-1-1**. Výměny pro ZOTK vyhovují také na **požární odolnost R15 dle ČSN EN 1993-1-2**.