


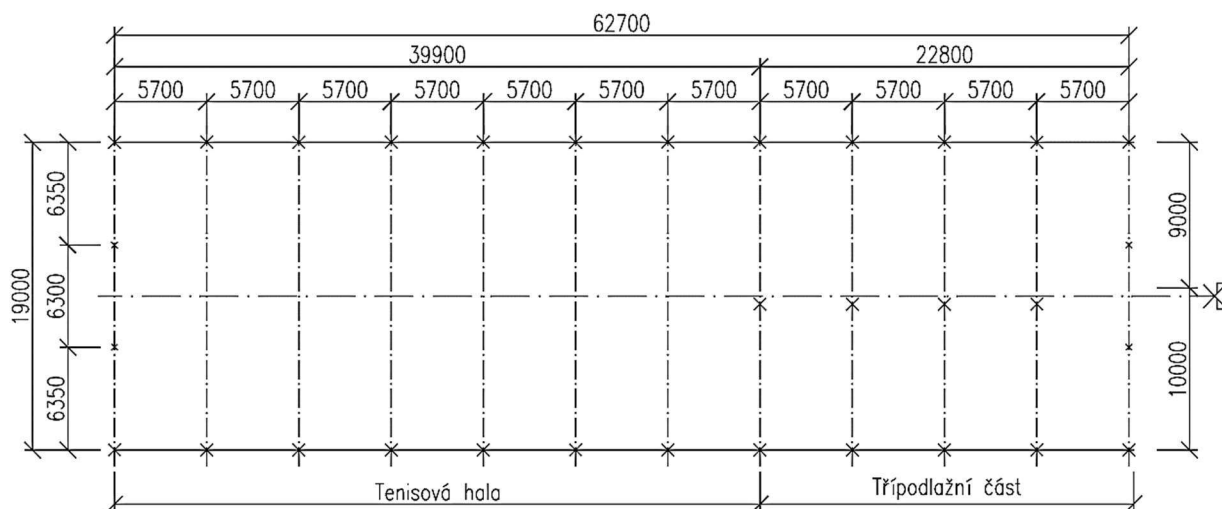
| | | | |
|--|---|--|---------|
| VYPRACOVAL: Kateřina Ježová | VEDOUcí PRÁCE: doc. Ing. Michal Jandera, Ph.D. |  ČVUT – Fakulta stavební | |
| PŘEDMĚT: 134BAP | PROJEKT: Bakalářská práce – Tenisová hala | | |
| KATEDRA: Katedra ocelových a dřevěných konstrukcí | | FORMÁT: | A4 |
| | | DATUM: | 05/2018 |
| PŘÍLOHY | | Č.: | D |

PŘÍLOHA Č.1

DISPOZIČNÍ VARIANTY

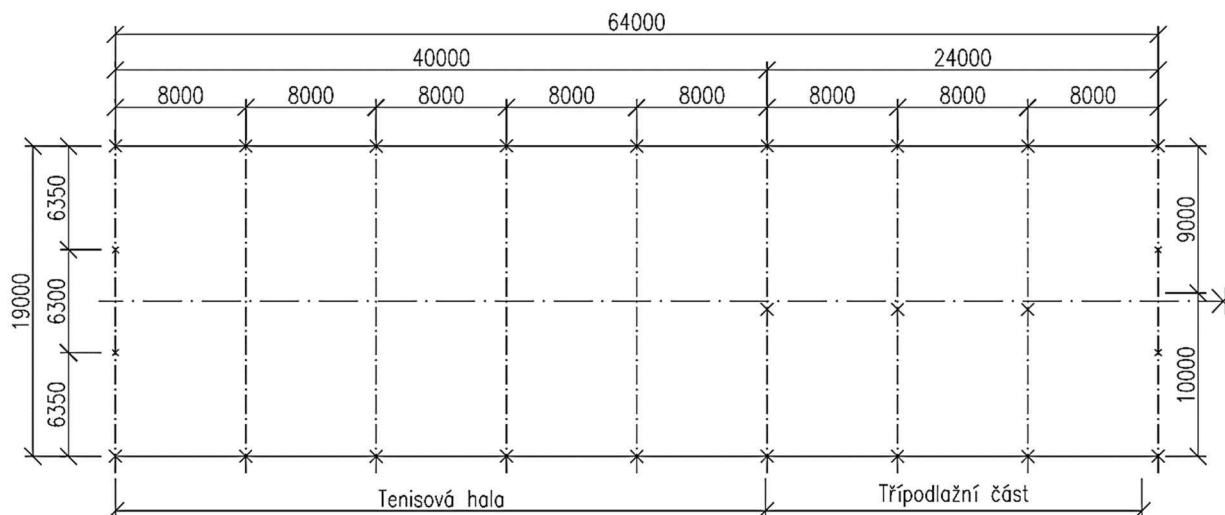
1. Varianta

Popis: Příčné rámy jsou v modulu 5,7 m. Celková délka tenisové haly 39,9 m a třípodlažní části 22,8 m. Výhodou této varianty je, že v třípodlažní části není půlka modulu. Nevýhodou je množství sloupů, které by mohly překážet pro zasklení squashových kurtů.



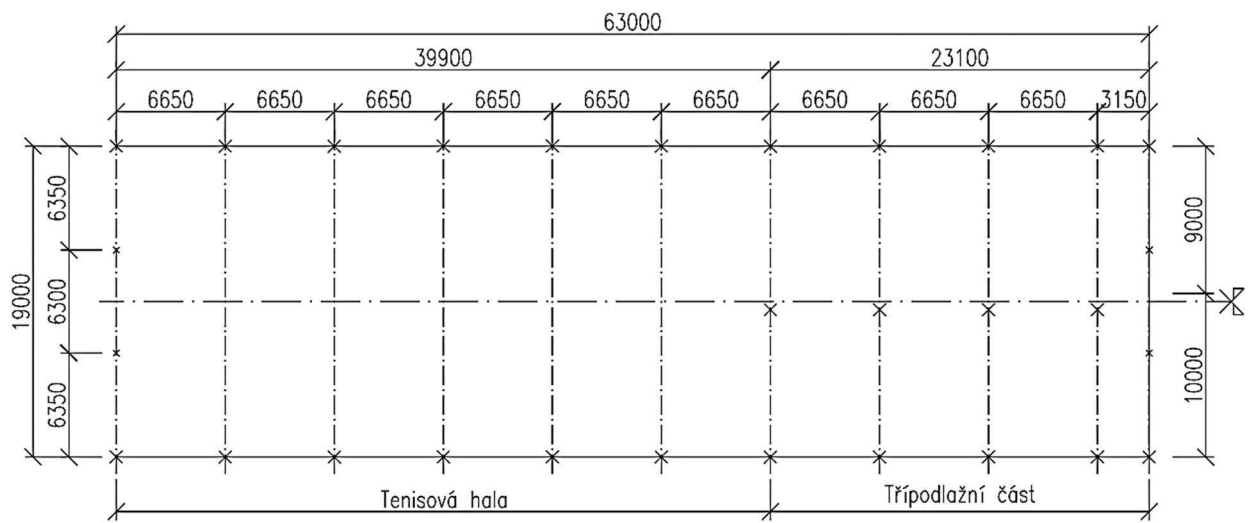
2. Varianta

Popis: Příčné rámy jsou v modulu 8 m. Celková délka tenisové haly 40,0 m a třípodlažní části 24 m. Výhodou této varianty je, že v třípodlažní části není půlka modulu. Nevýhodou je větší vzdálenost mezi příčnými vazbami a případné náročnější dispoziční umístění squashových kurtů.



3. Varianta

Popis: Příčné rámy jsou v modulu 6,65 m. Celková délka tenisové haly 39,9 m a třípodlažní části 23,1 m. Výhodou této varianty je, že v třípodlažní části jsou moduly uspořádány tak, aby se dispozičně oddělily squashové kurty. Nevýhodou je půlka modulu, která přebývá na konci třípodlažní části.

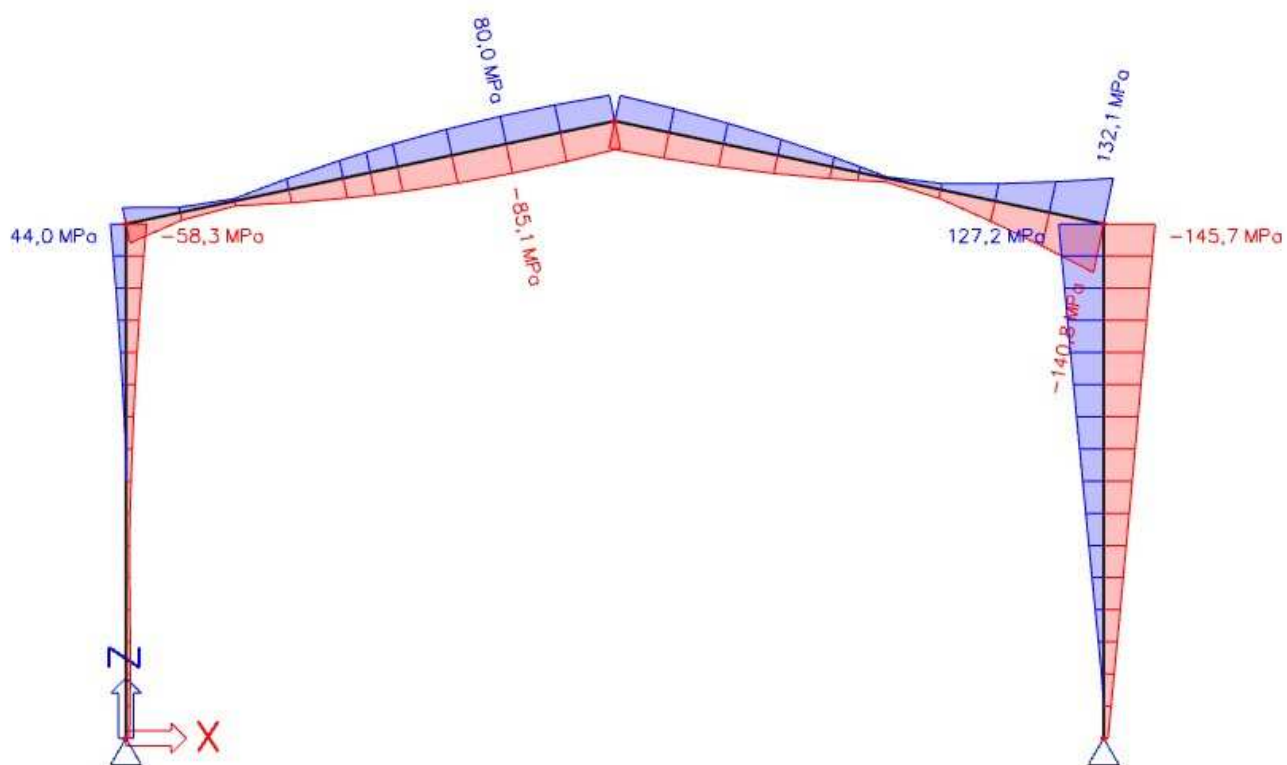


PŘÍLOHA Č.2

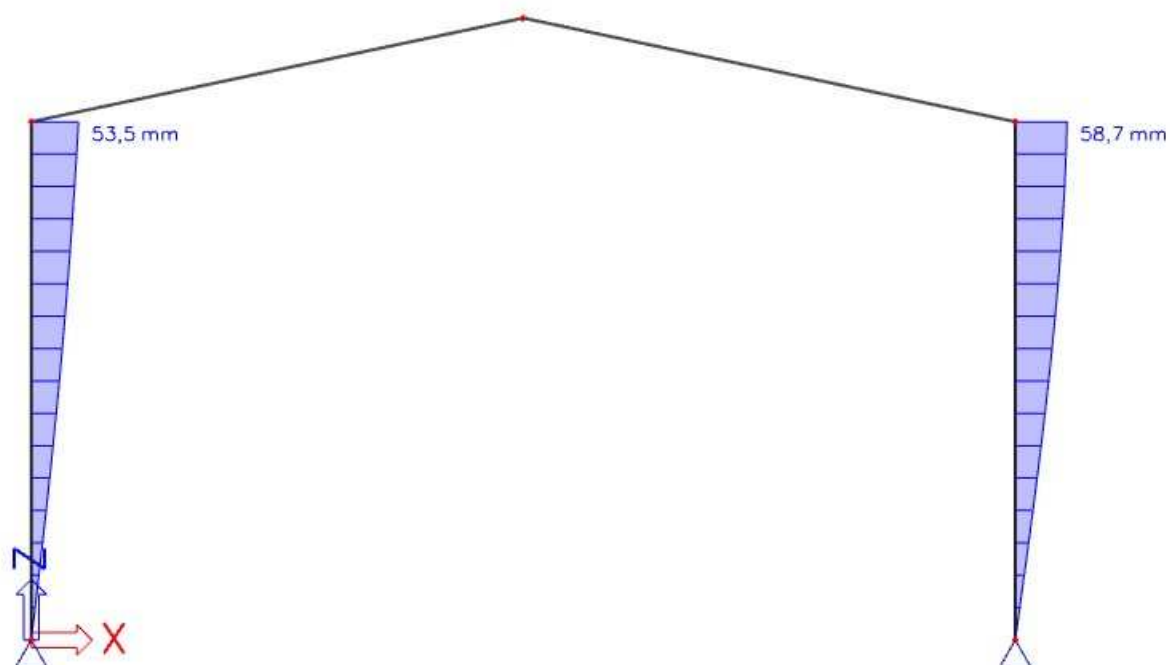
VARIANTY KONSTRUKČNÍHO ŘEŠENÍ – SCIA ENGINEER 17.1

1. Rámová konstrukce s kloubovými patkami

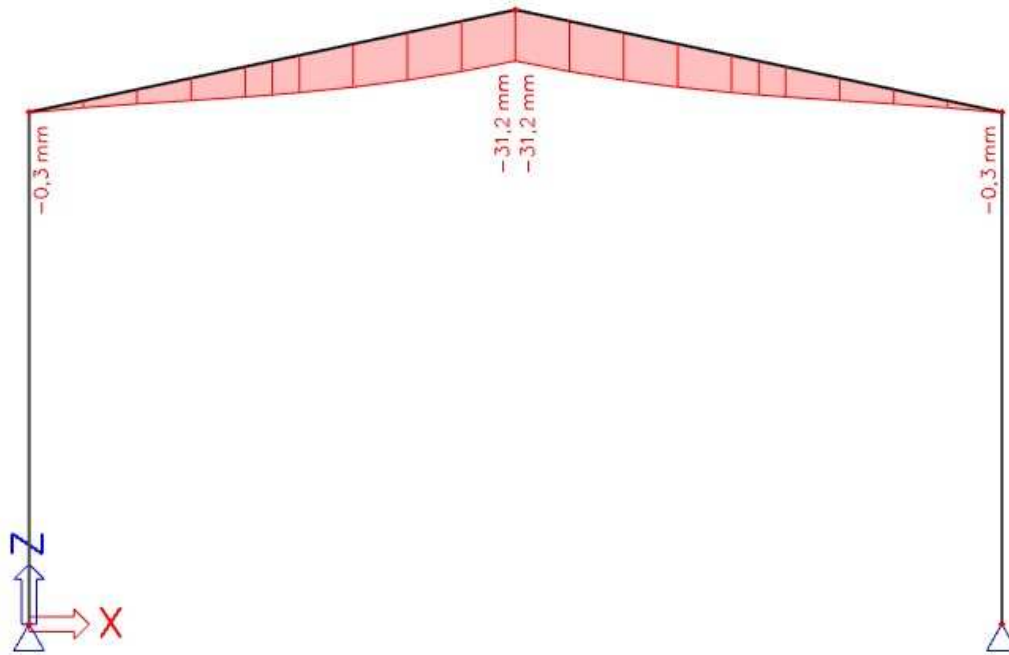
1. Maximální napětí



2. Maximální vodorovný posun

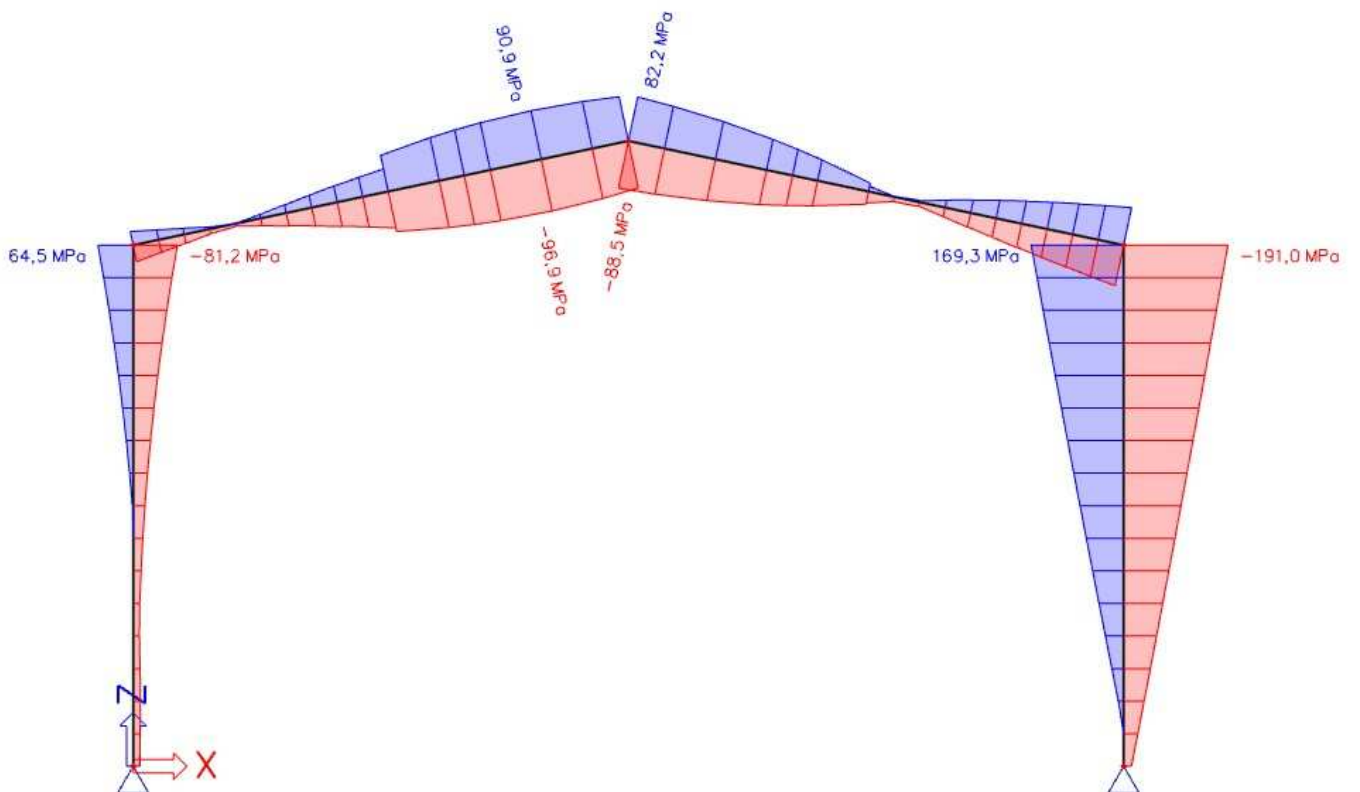


3. Maximální svislý posun

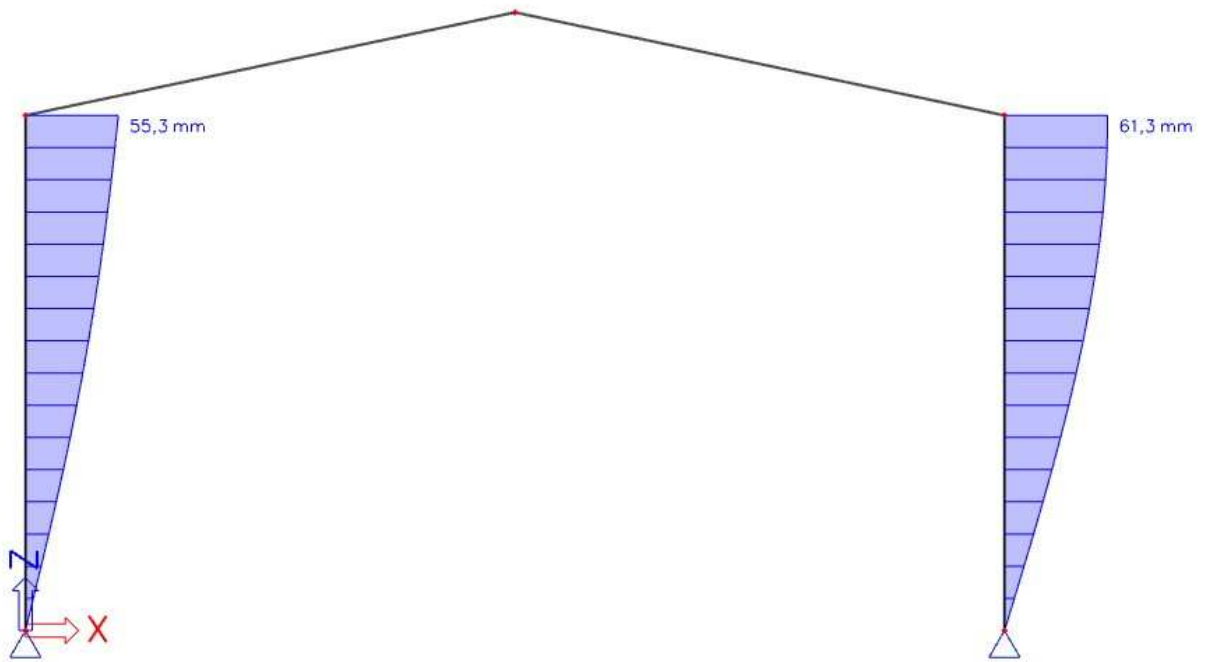


2. Rámová konstrukce s kloubovými patkami a náběhy na příčli

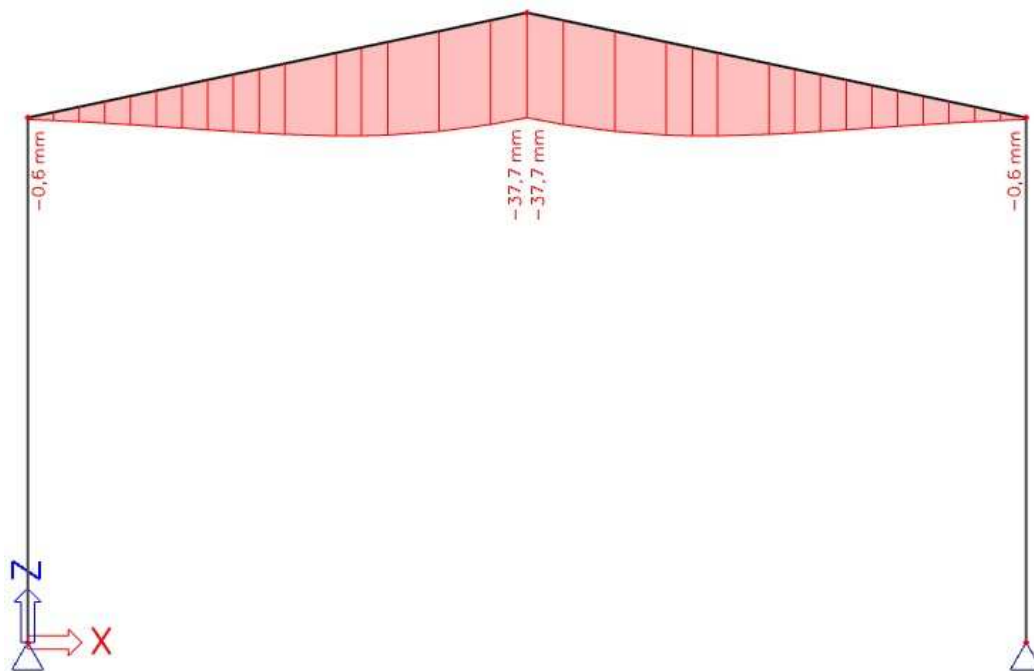
1. Maximální napětí



2. Maximální vodorovný

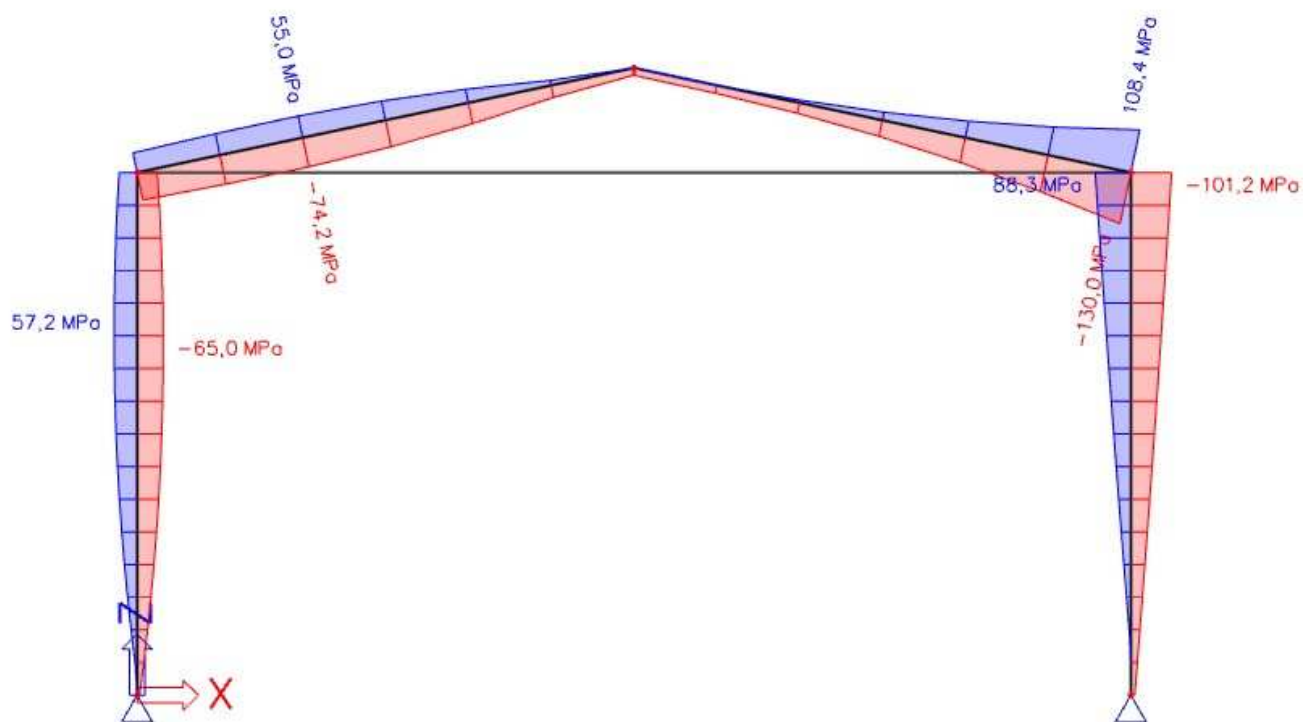


3. Maximální svislý posun

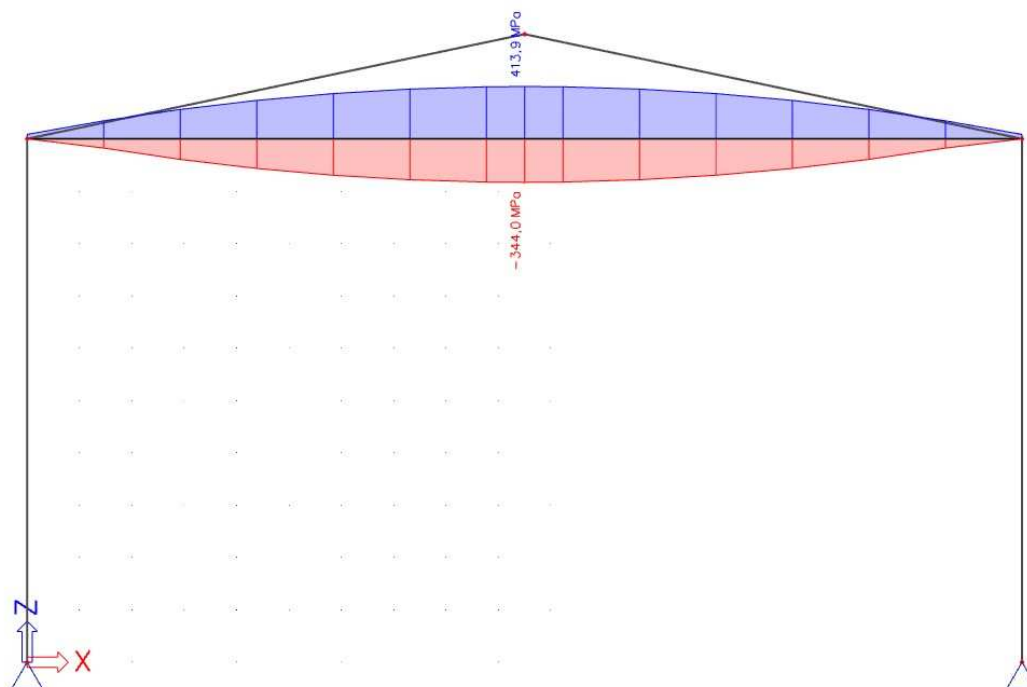


3. Rámová konstrukce s kloubovými patkami a táhlem $\varnothing 100$ mm

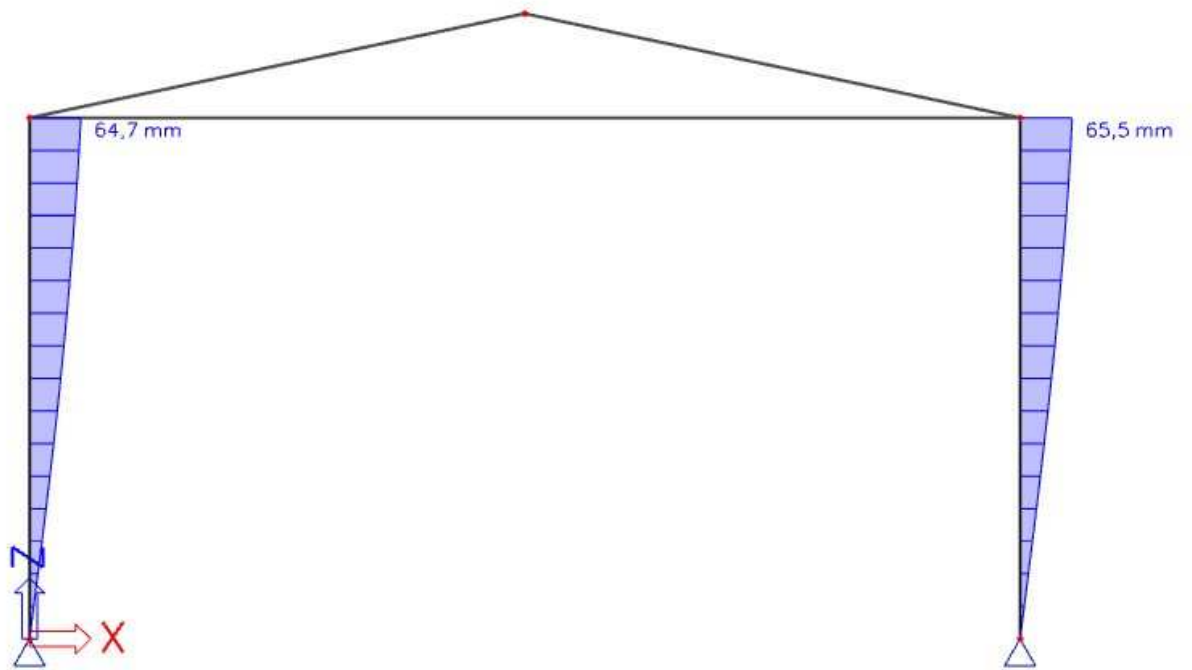
1. Maximální napětí



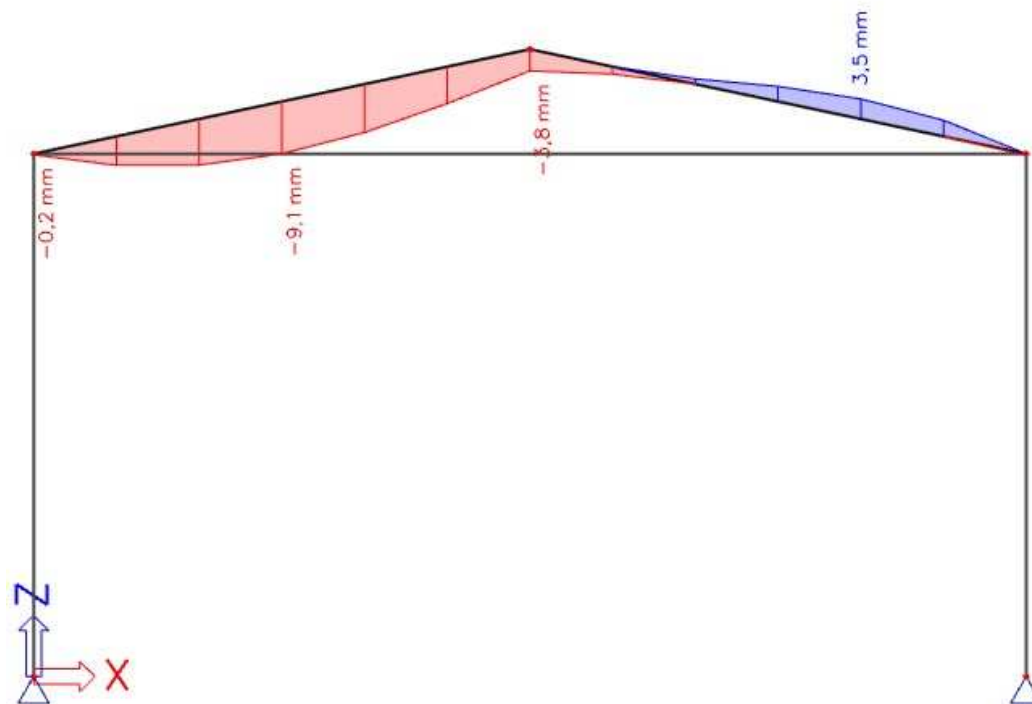
Pozn.: Pro táhlo ocel S460.



2. Maximální vodorovný posun

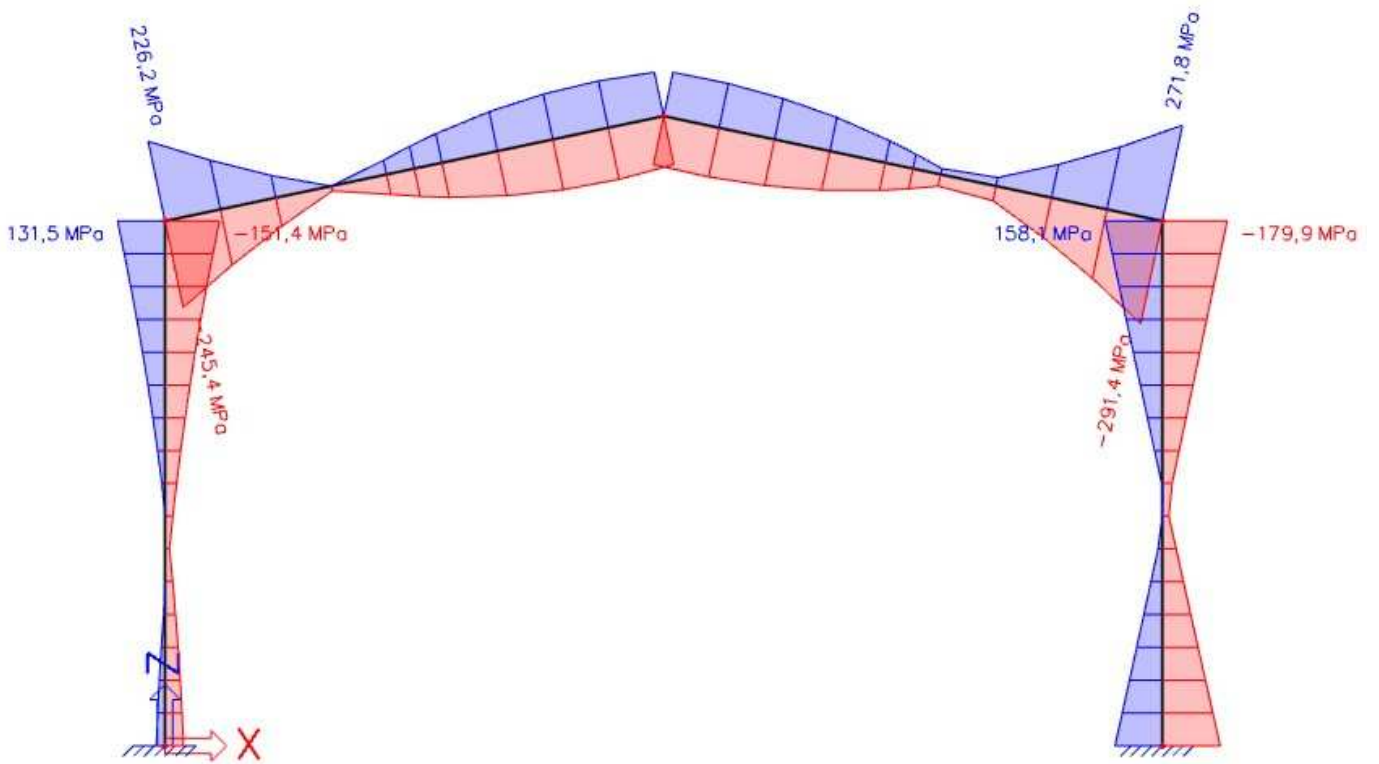


3. Maximální svislý posun

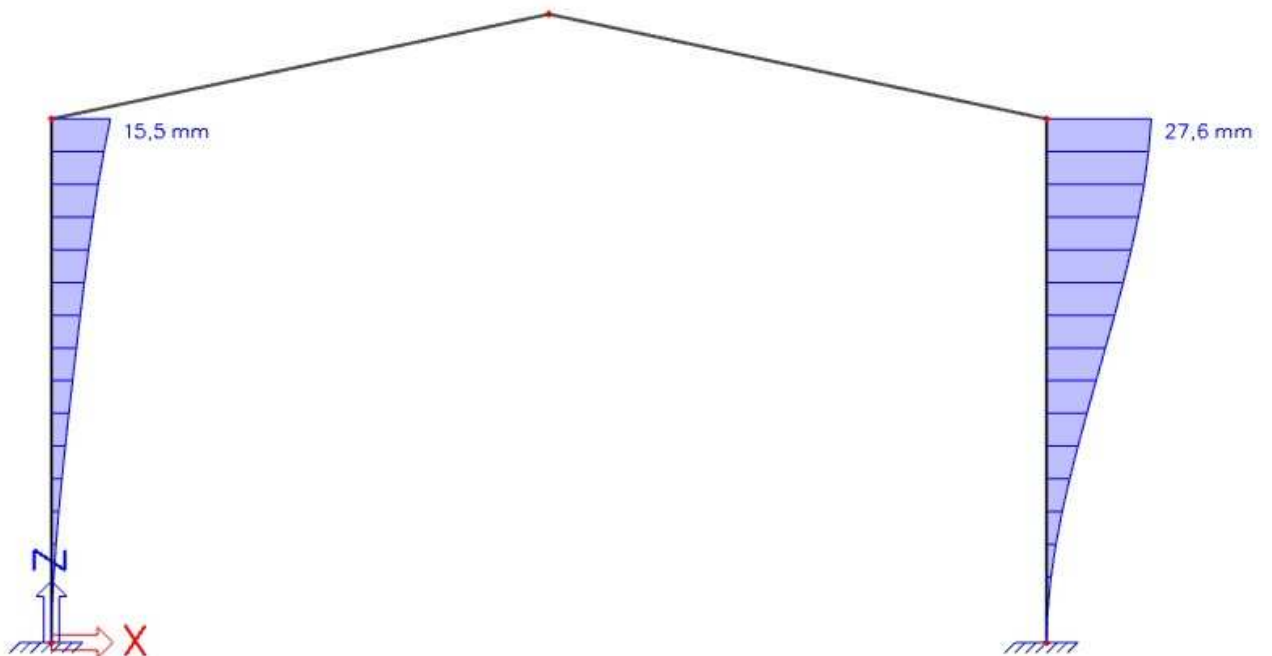


4. Rámová konstrukce s vetknutými patkami

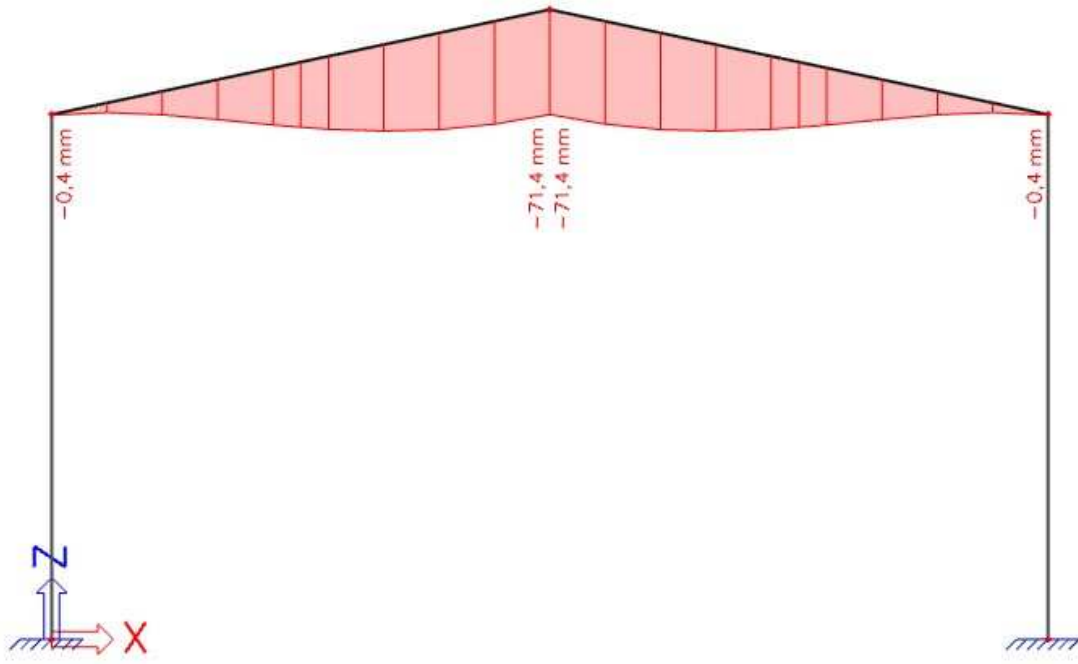
1. Maximální napětí



2. Maximální vodorovný posun

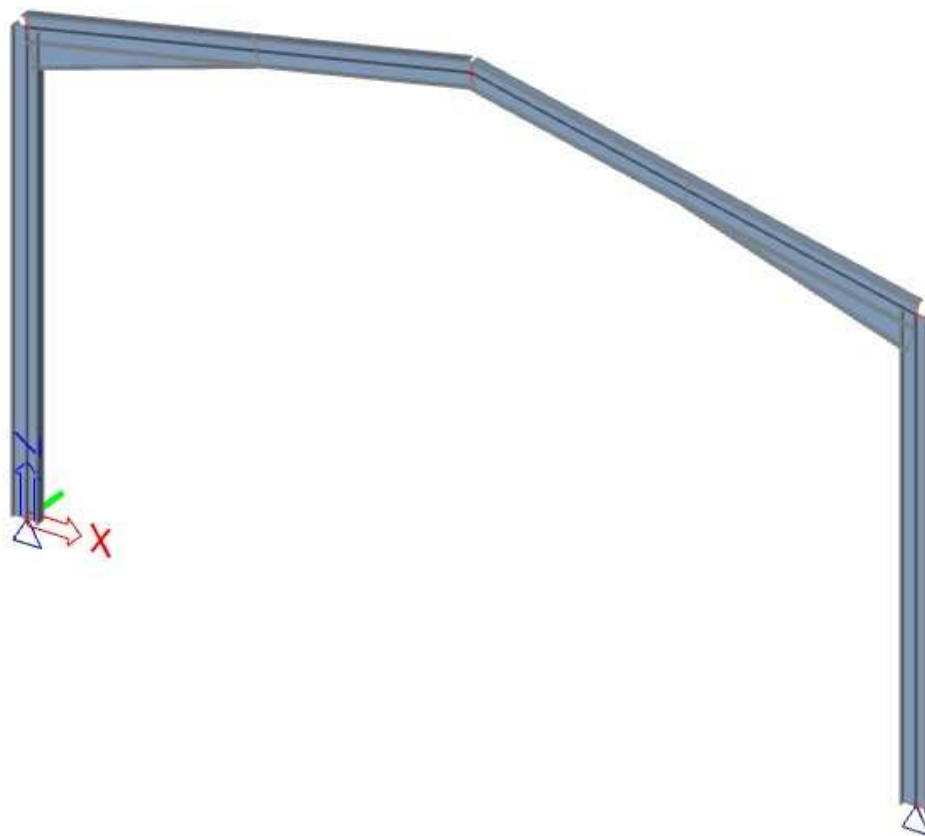


3. Maximální svislý posun



PŘÍLOHA Č.3

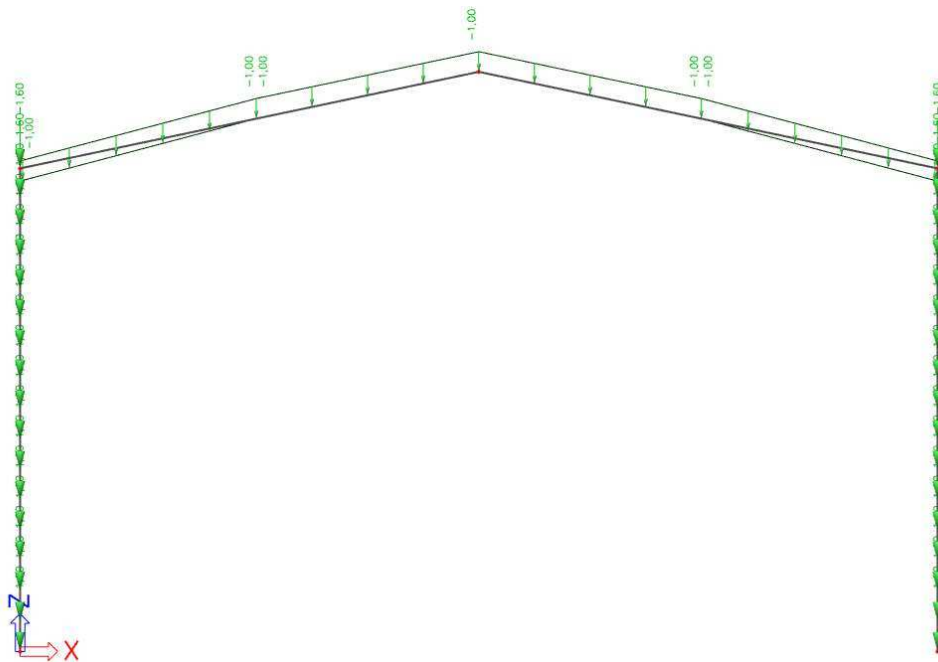
RÁMOVÁ KONSTRUKCE– SCIA ENGINEER 17.1



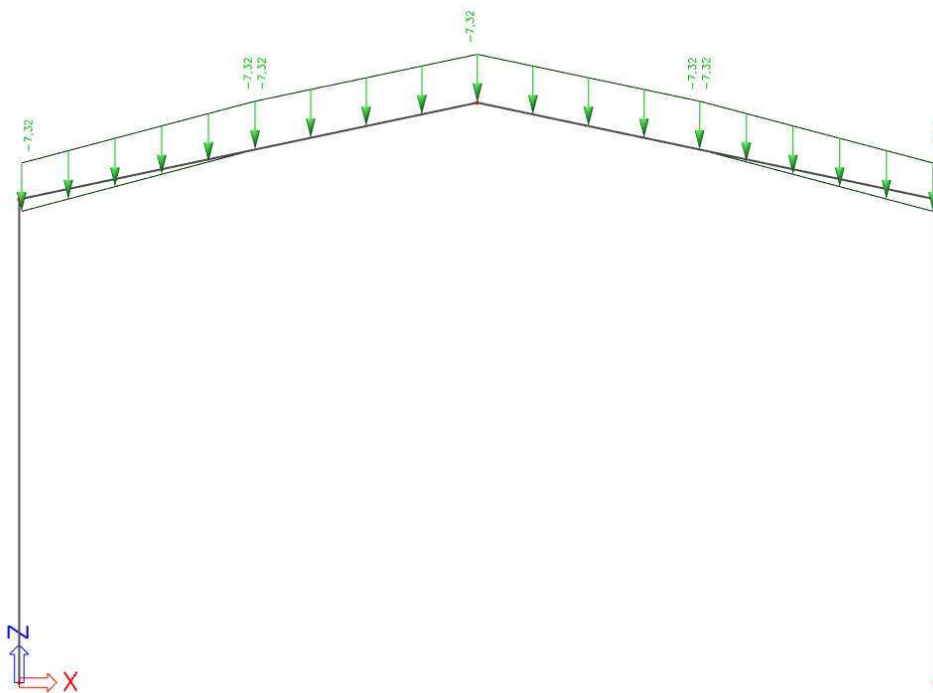
1. Zatěžovací stavy

ZS1 – vlastní tíha

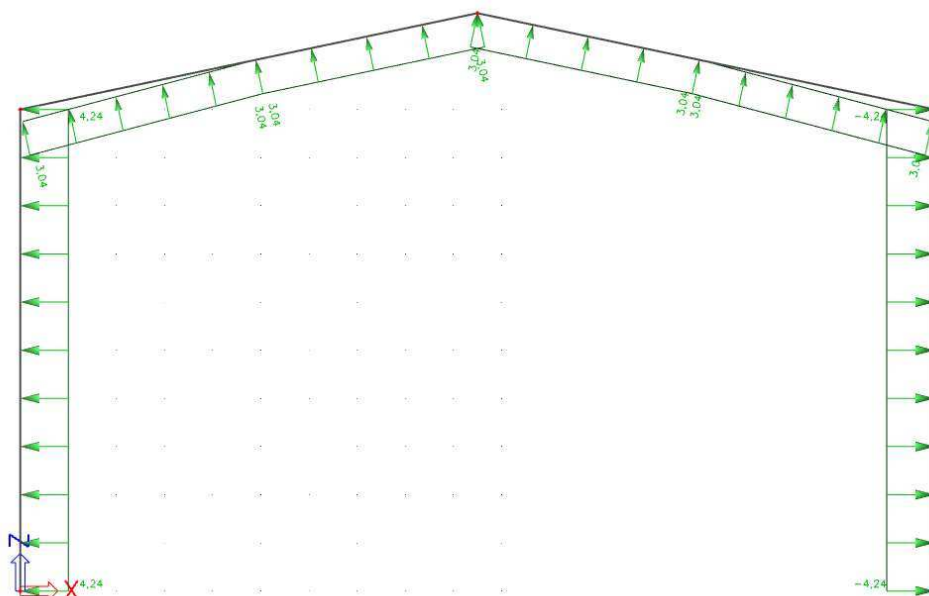
ZS2 – stálé



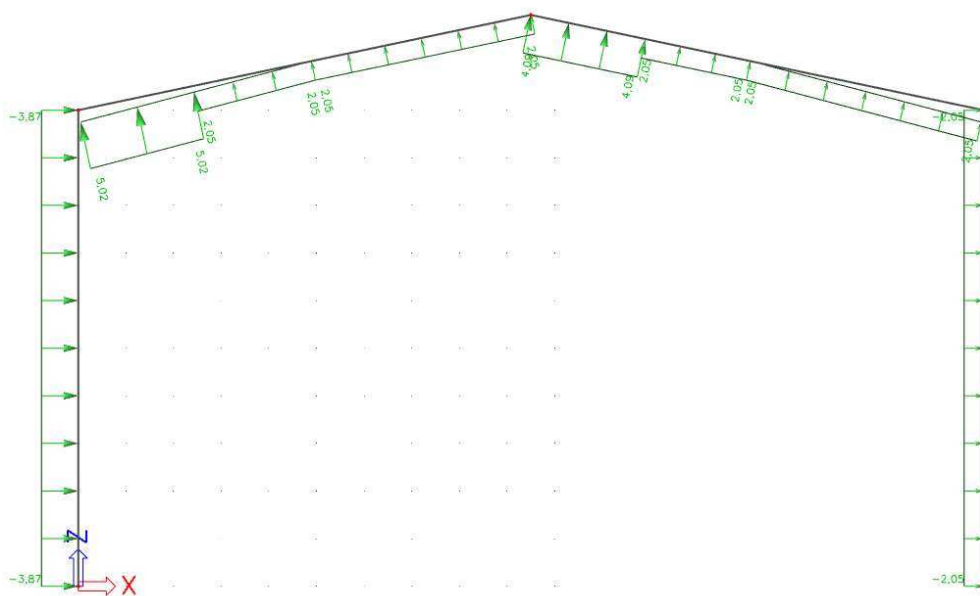
ZS3 – Snih



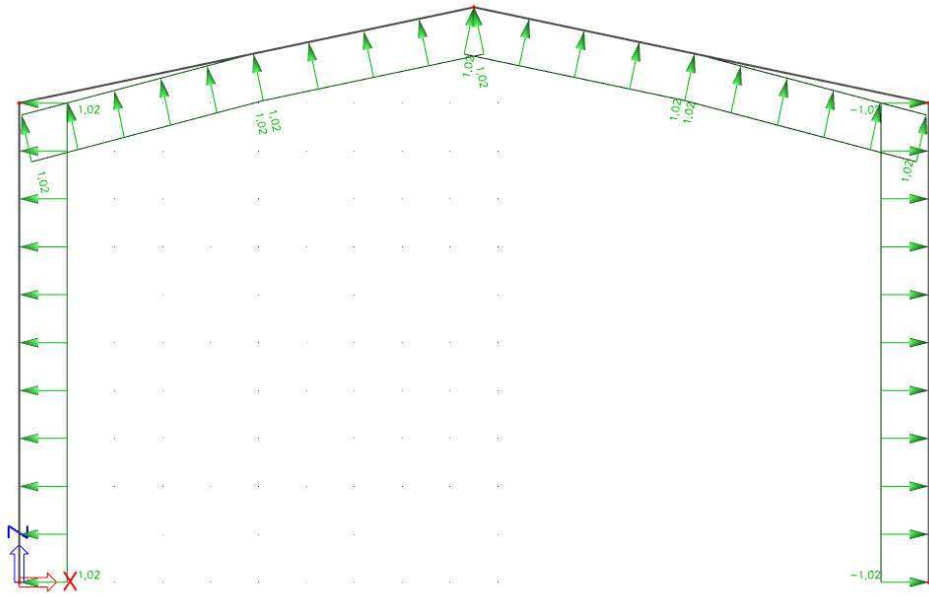
ZS4 – Podélný vítr



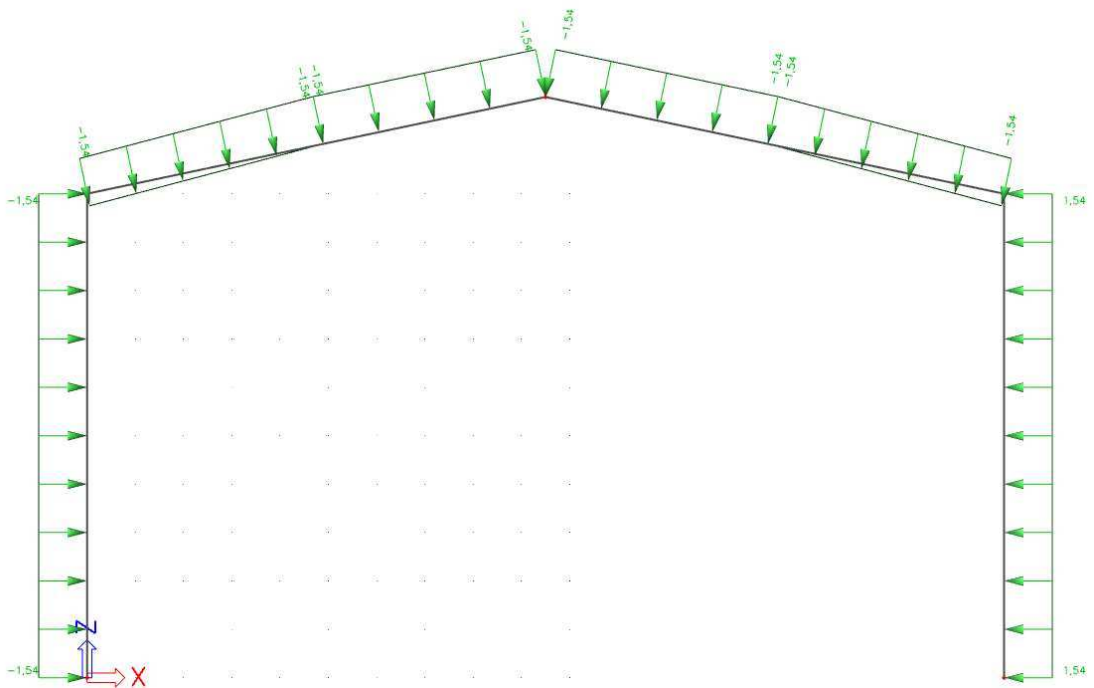
ZS5 – Příkladný vítr



ZS6 – Vnitřní tlak



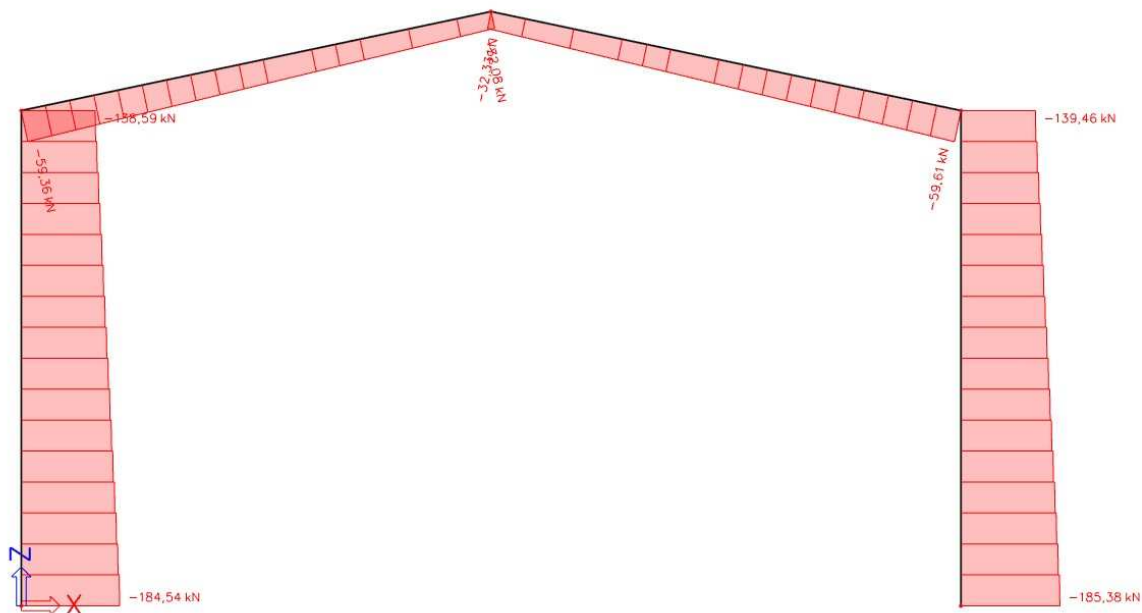
ZS7 – Vnitřní sání



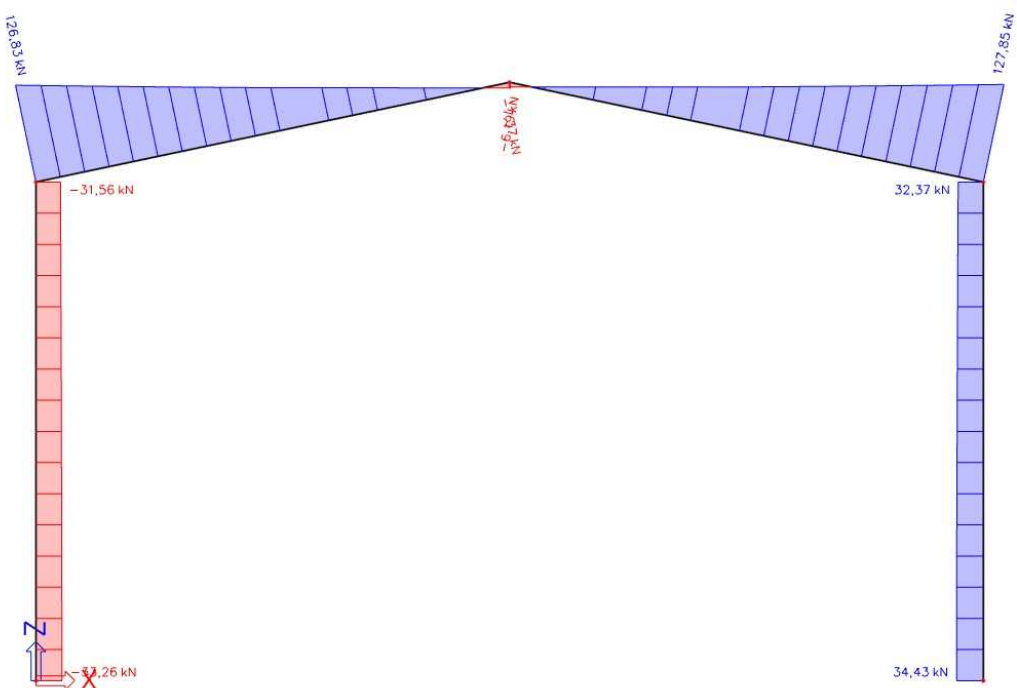
2. Vnitřní síly – nelineární kombinace

Kombinace 1

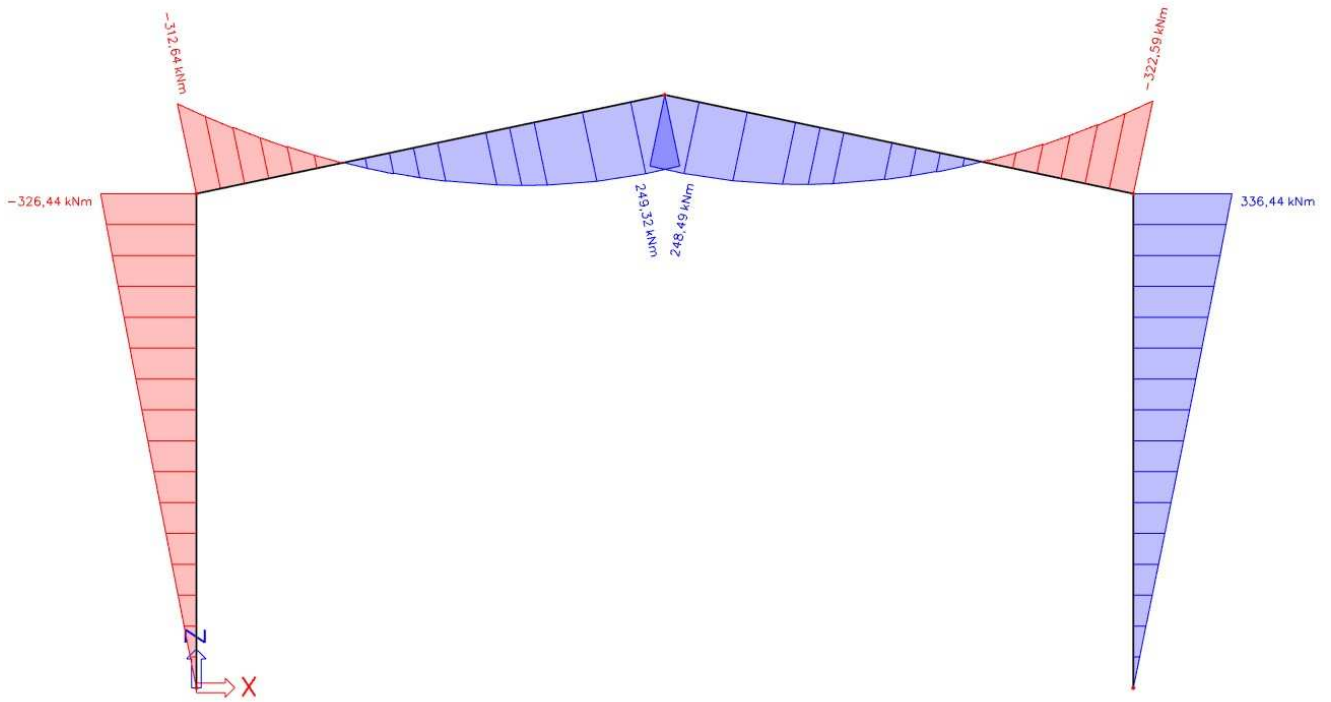
Kombinace 1 – Normálové síly N_x [kN]



Kombinace 1 – Posouvající síly V_z [kN]

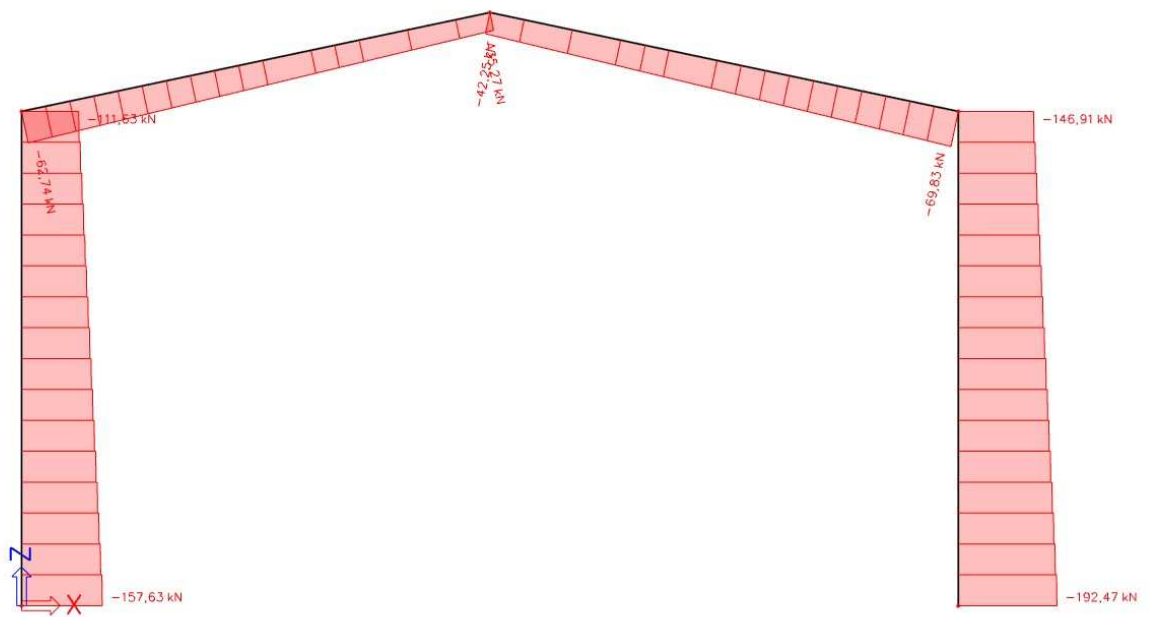


Kombinace 1 – Ohybové momenty M_y [kNm]

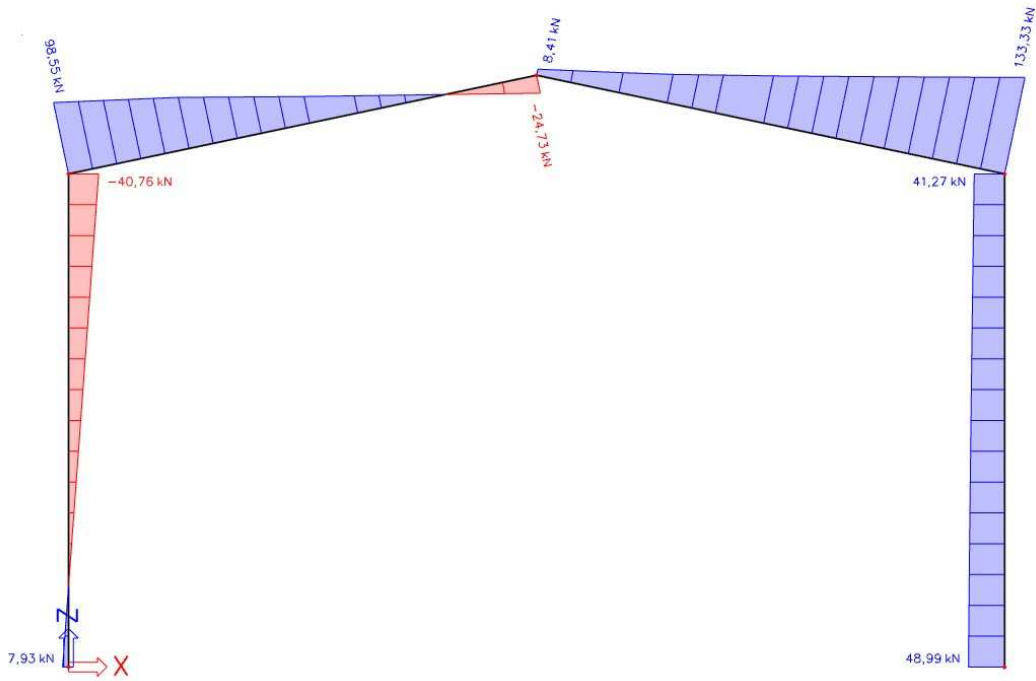


Kombinace 2

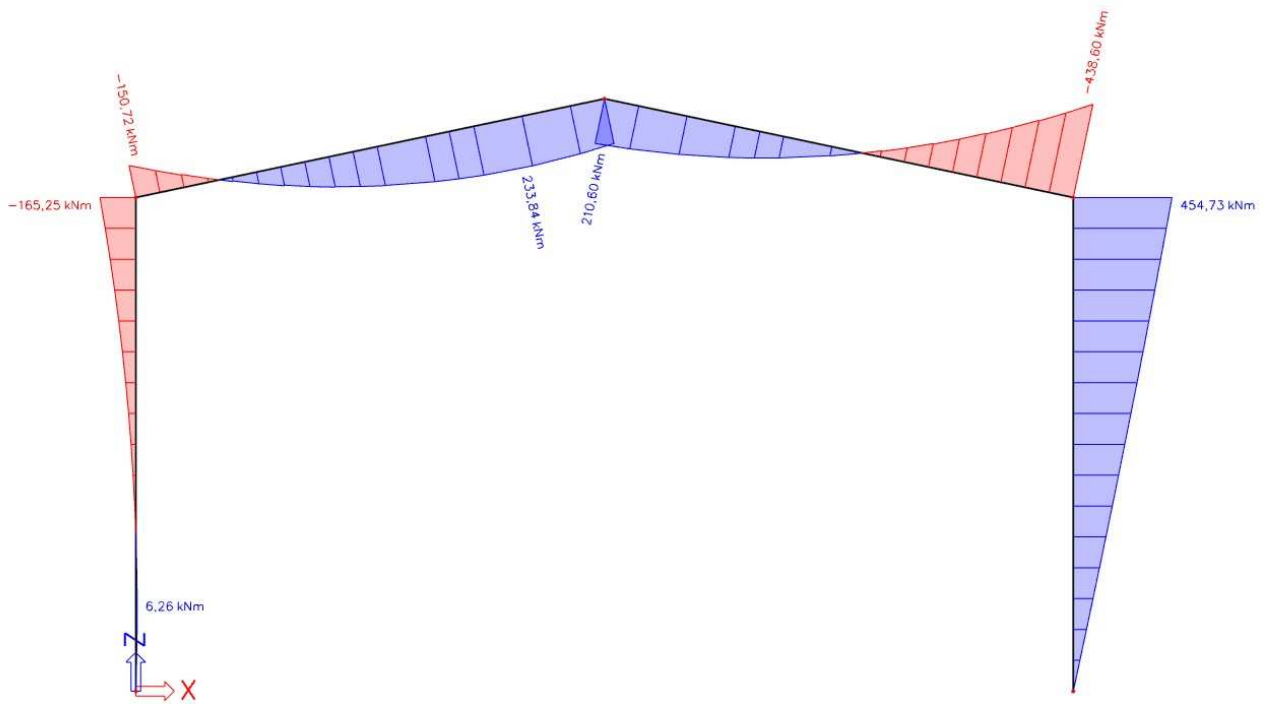
Kombinace 2 – Normálové síly N_x [kN]



Kombinace 2 – Posouvající síly Vz [kN]

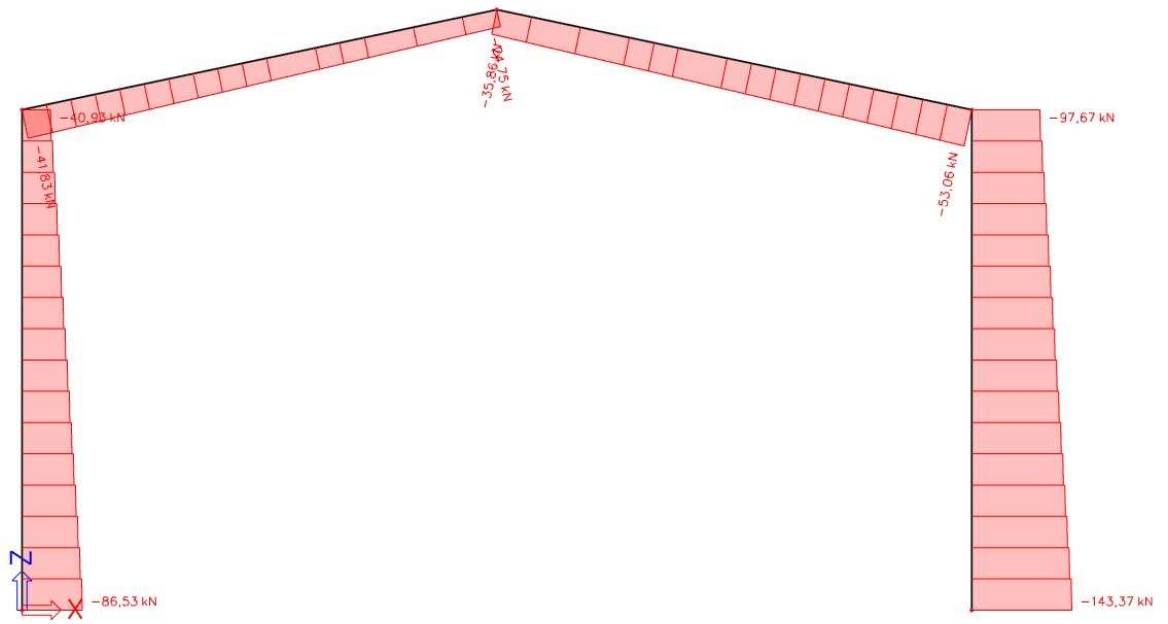


Kombinace 2 – Ohybové momenty M_y [kNm]

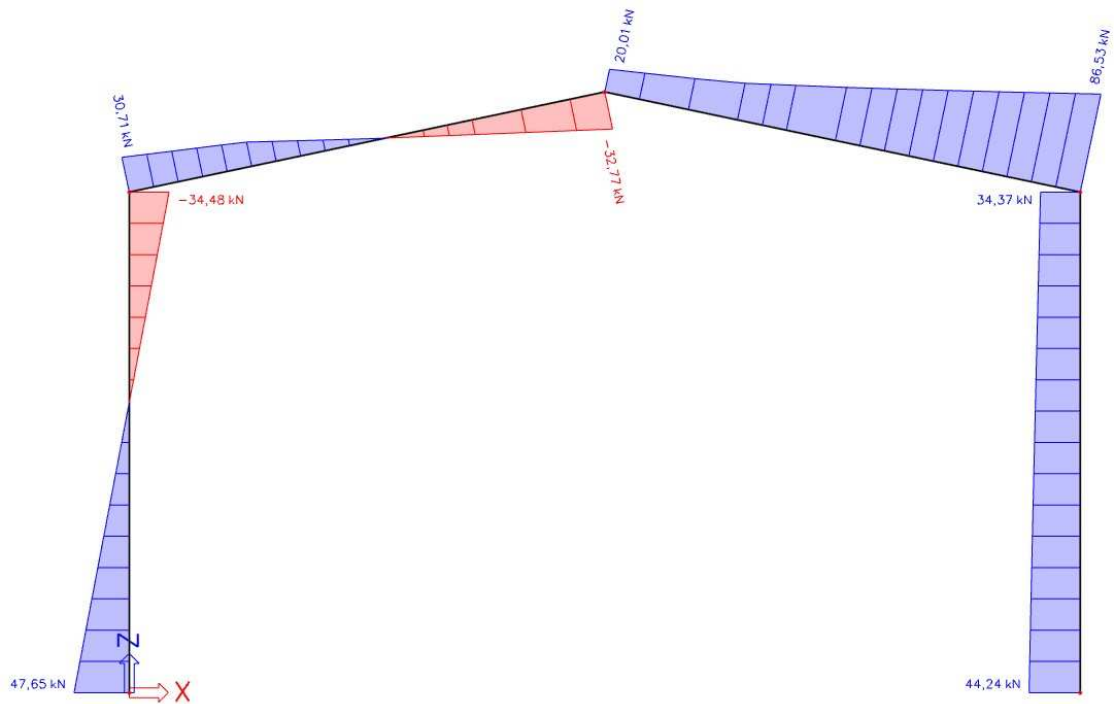


Kombinace 3

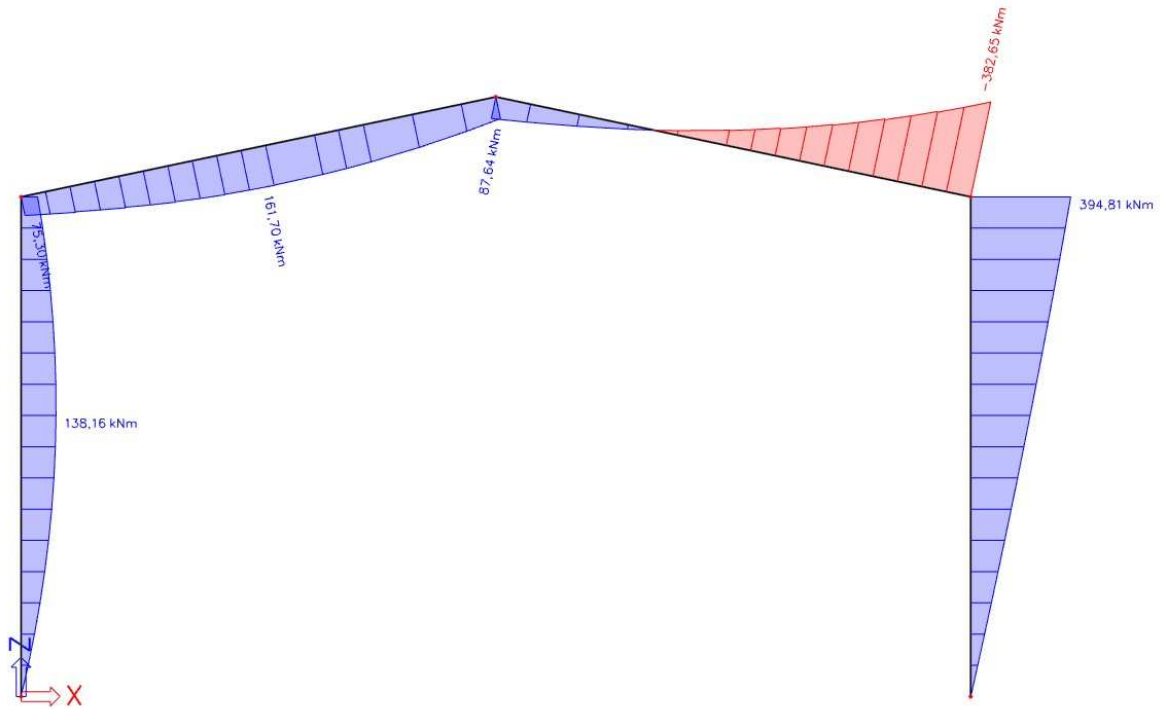
Kombinace 3 – Normálové síly N_x [kN]



Kombinace 3 – Posouvající síly V_z [kN]

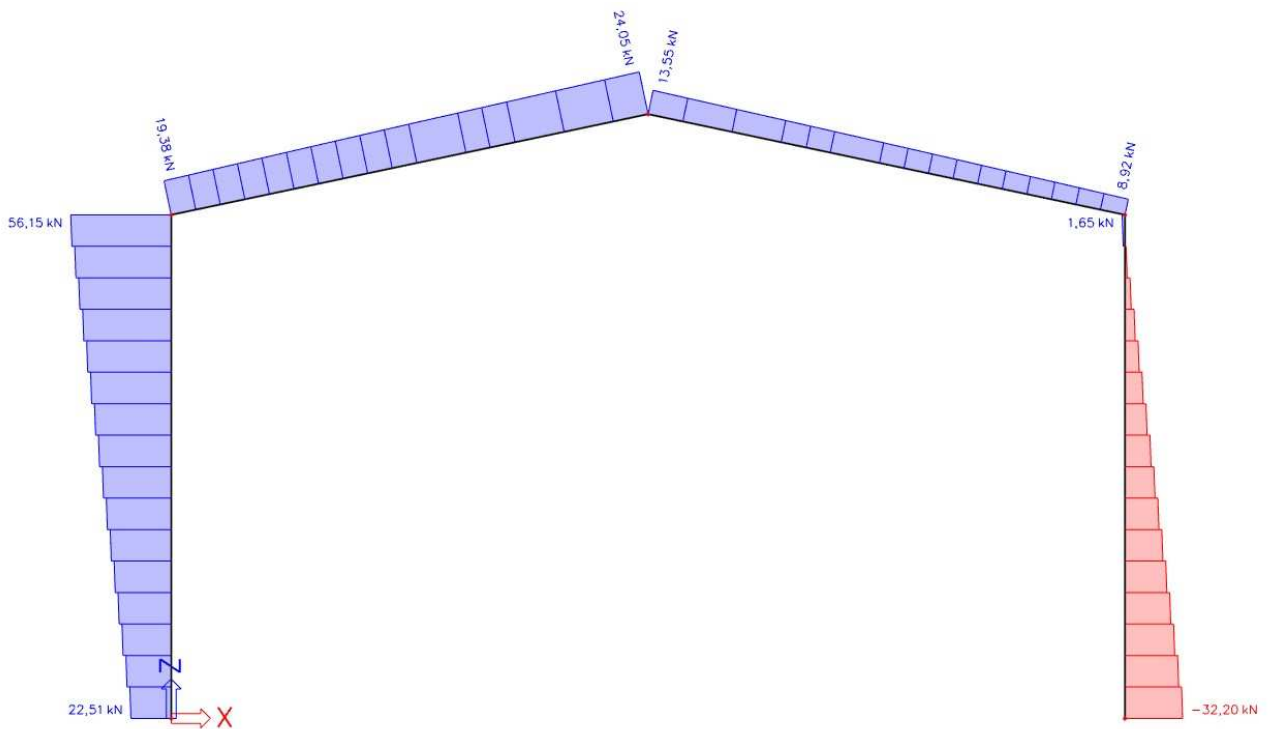


Kombinace 3 – Ohybové momenty M_y [kNm]

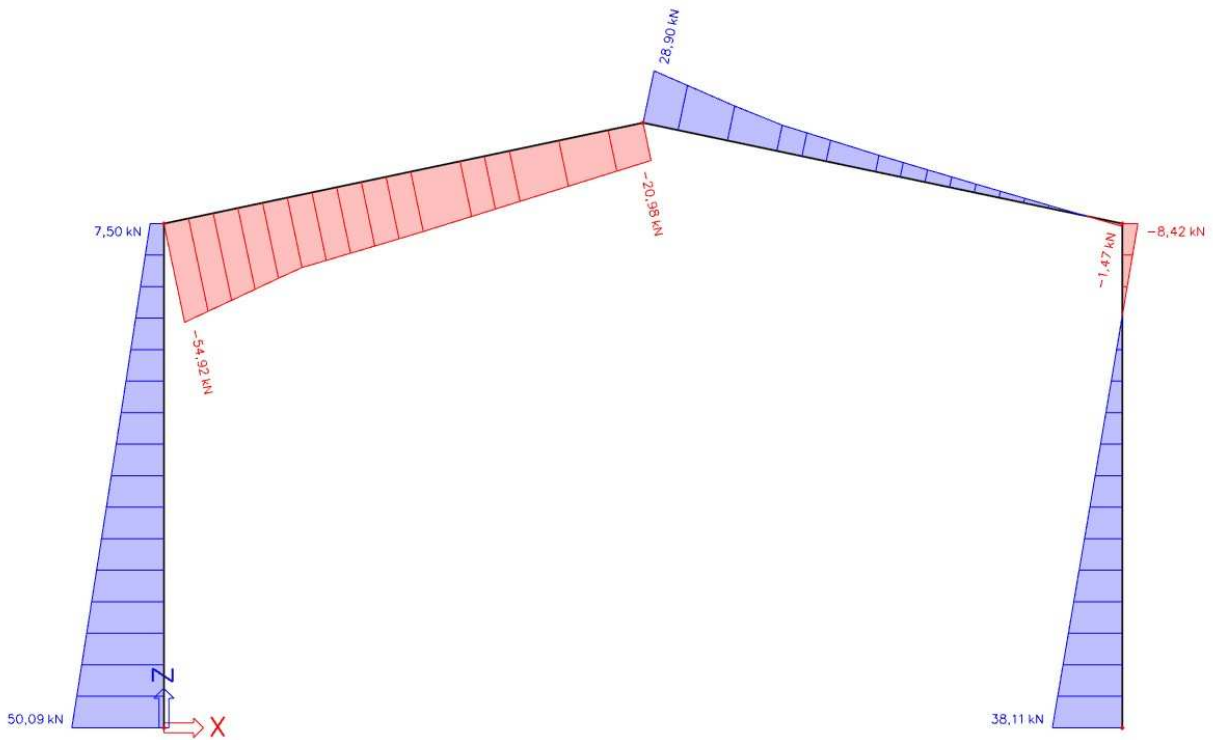


Kombinace 4

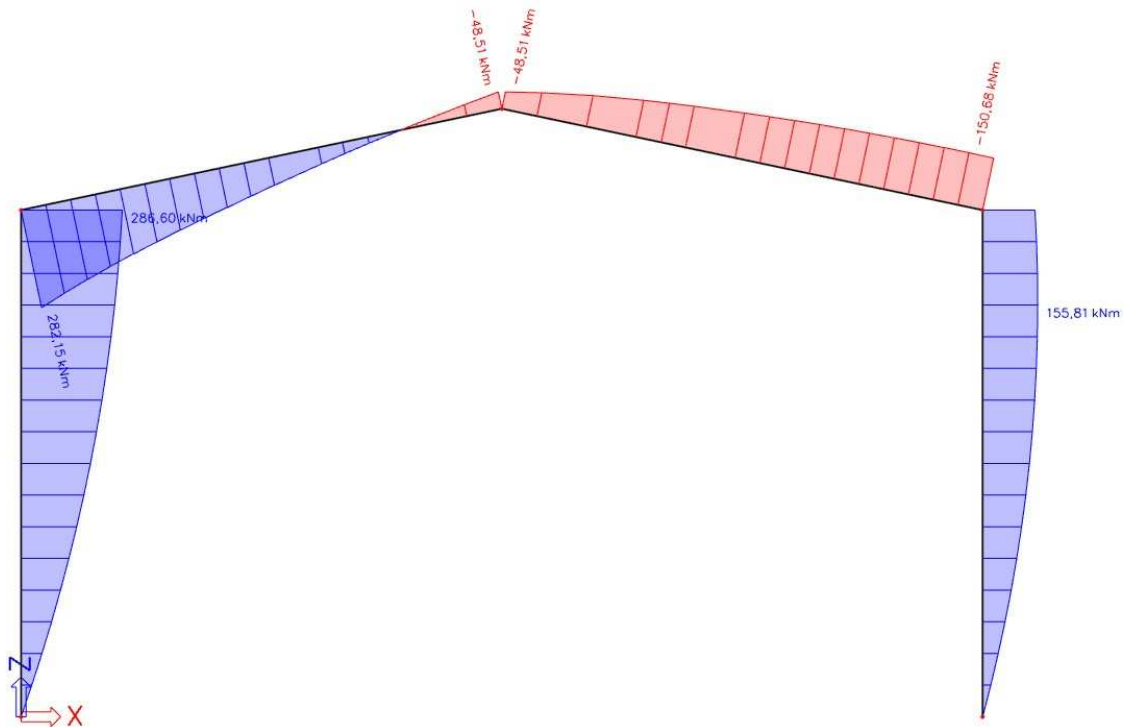
Kombinace 4 – Normálové síly N_x [kN]



Kombinace 4 – Posouvající síly Vz [kN]

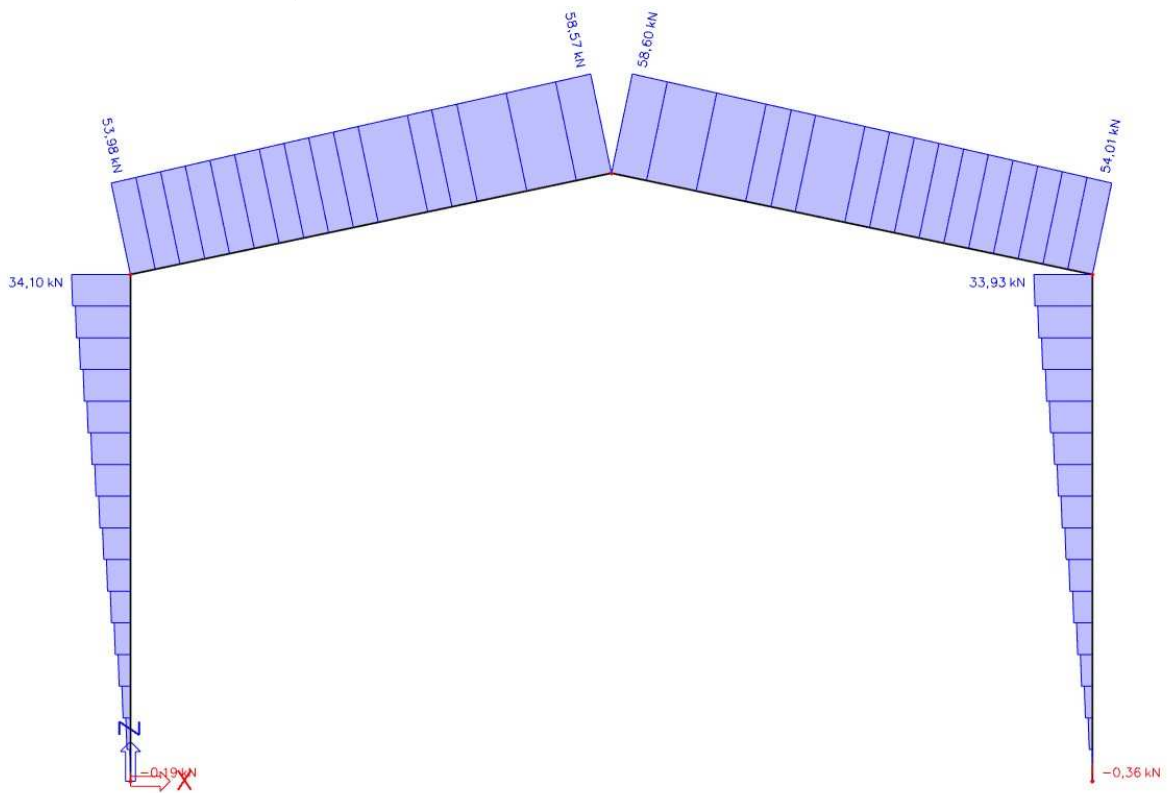


Kombinace 4 – Ohybové momenty My [kNm]

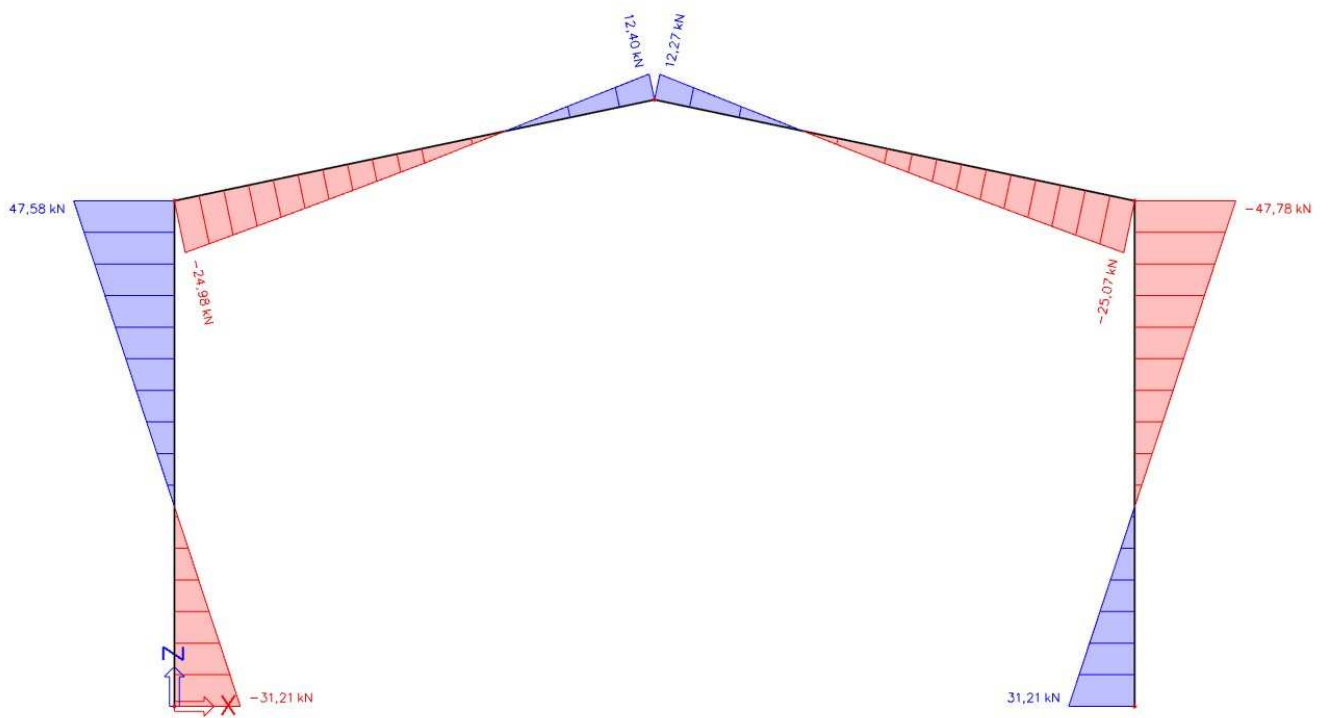


Kombinace 5

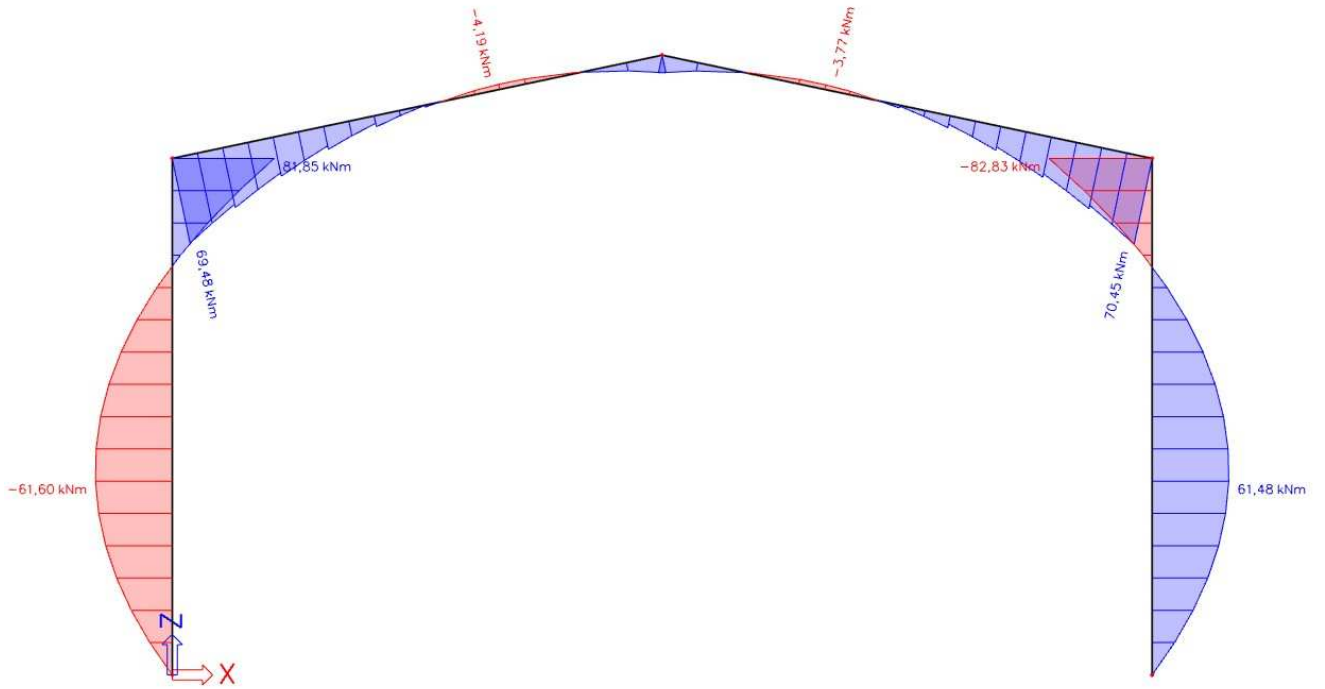
Kombinace 5 – Normálové síly N_x [kN]



Kombinace 5 – Posouvající síly V_z [kN]

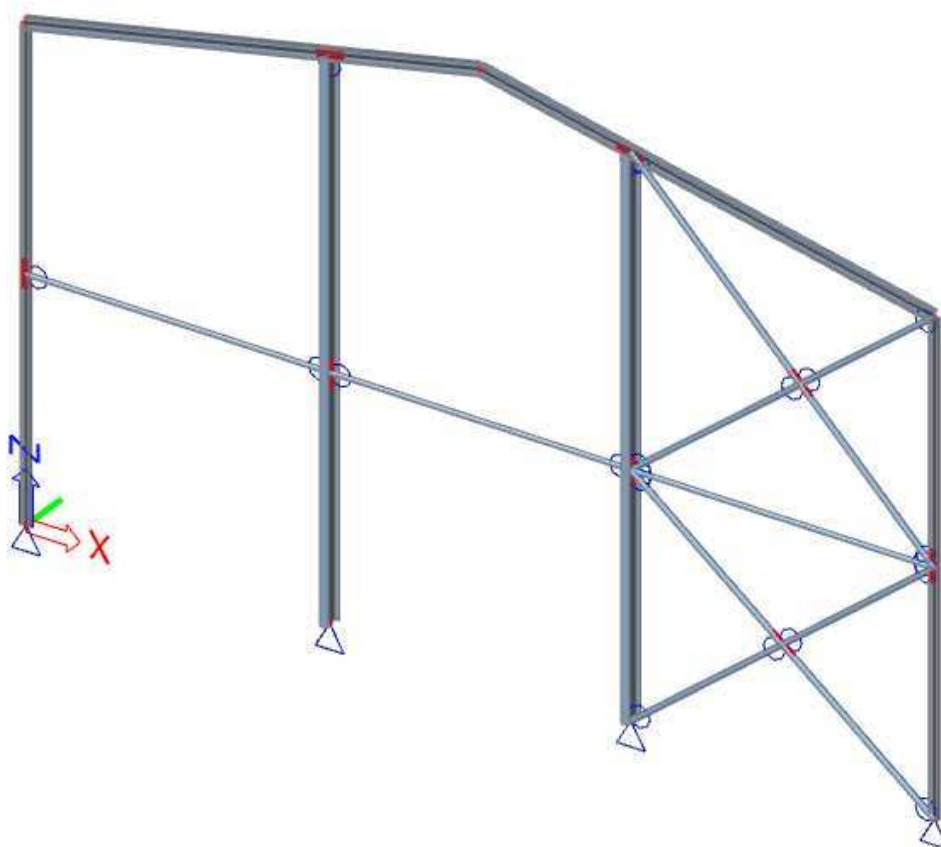


Kombinace 5 – Ohybové momenty M_y [kNm]



PŘÍLOHA Č.4

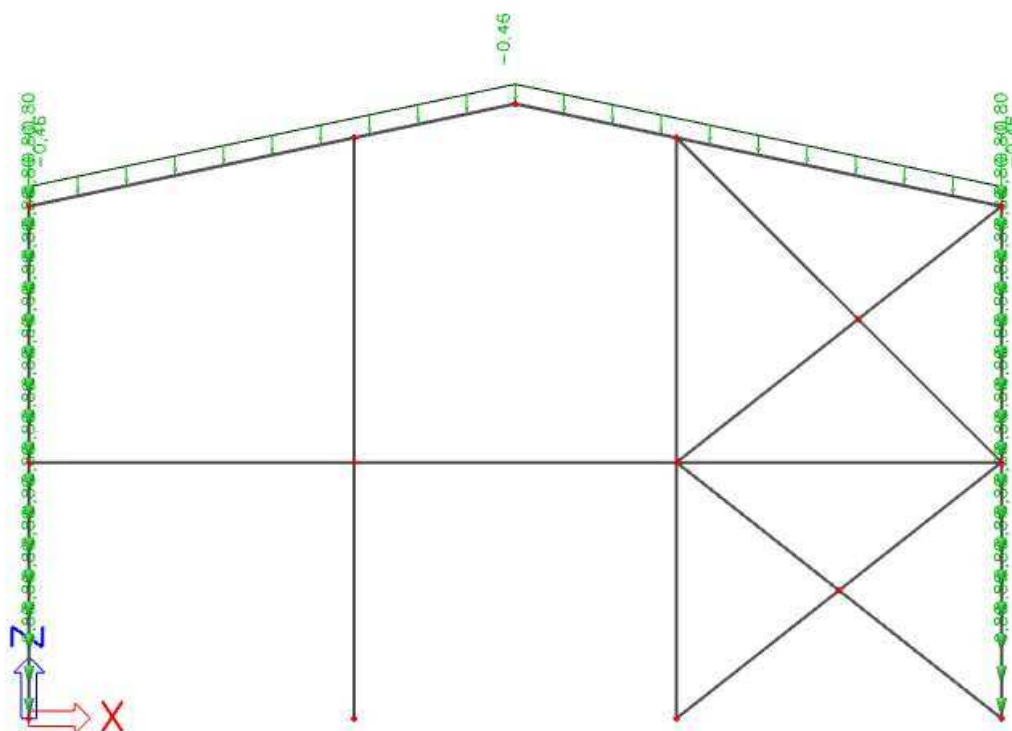
ŠTÍTOVÁ STĚNA – SCIA ENGINEER 17.1



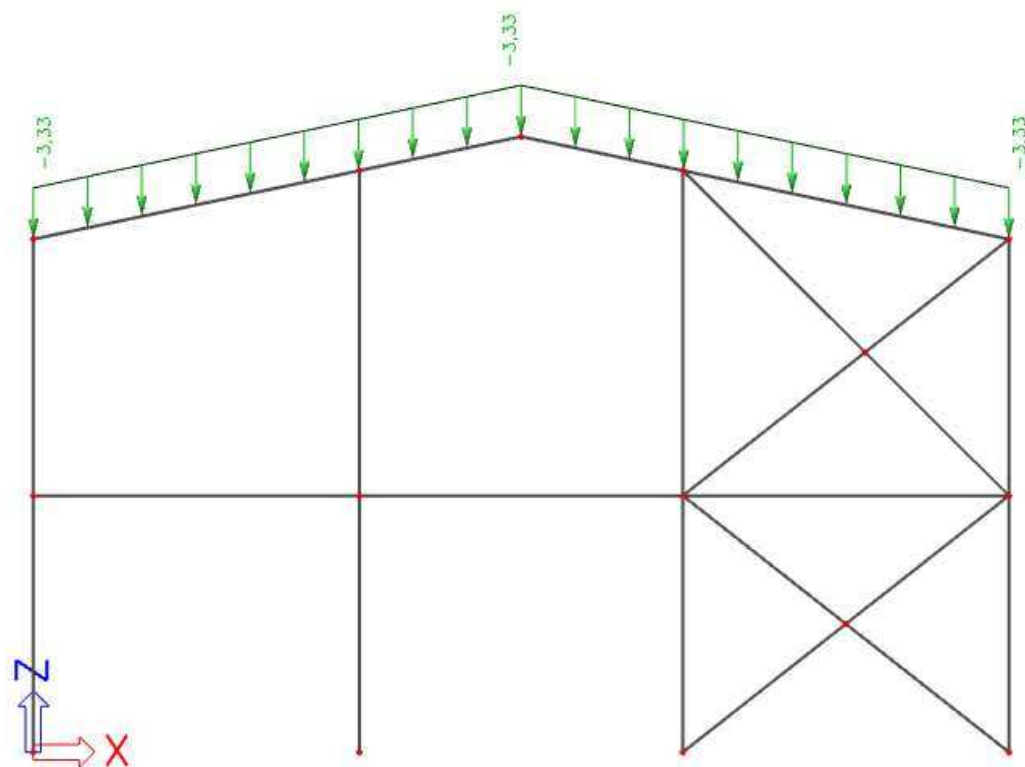
1. Zatěžovací stavy

ZS1 – vlastní tíha

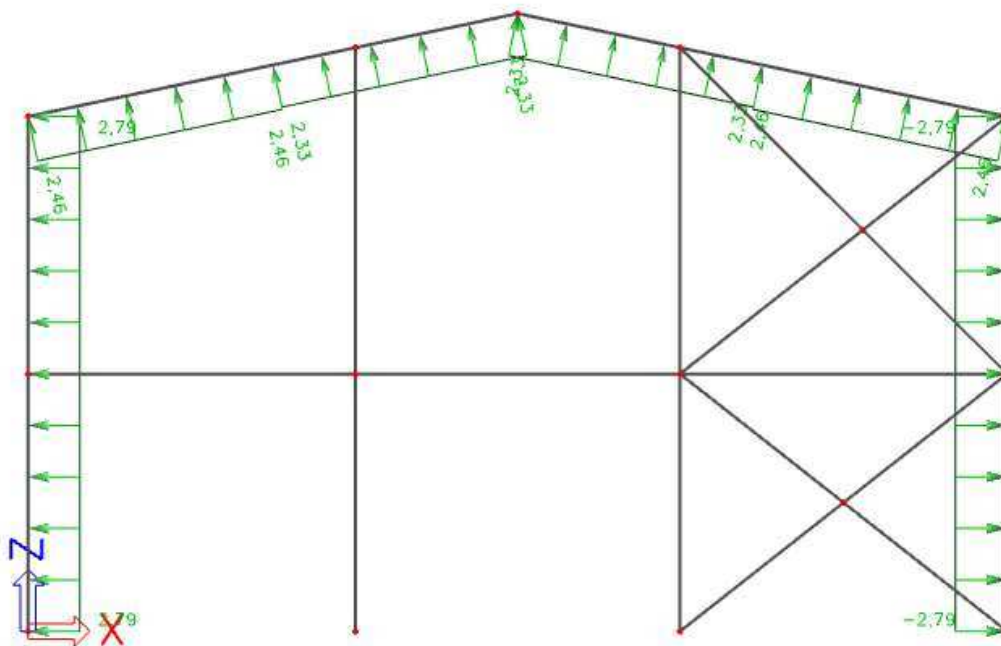
ZS2 – Stálé



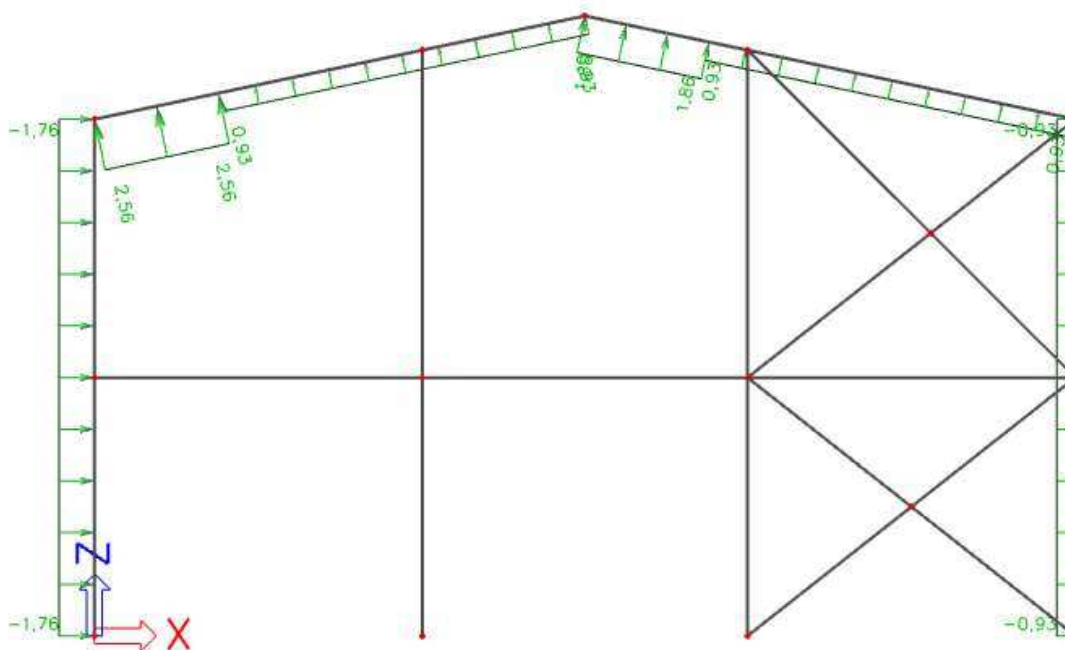
ZS3 – Sníh



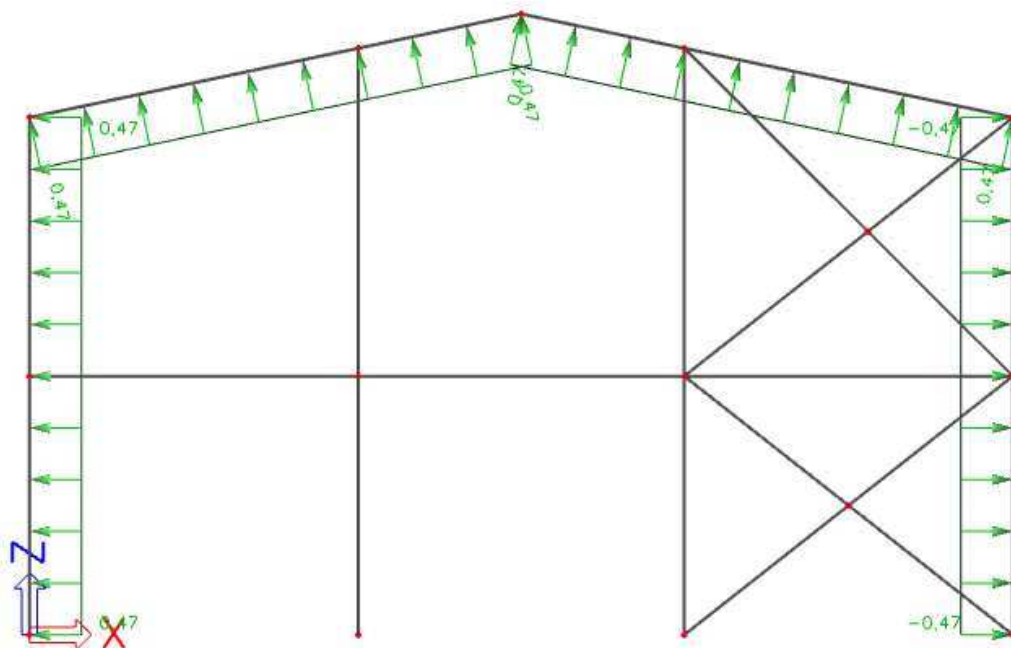
ZS4 – Podélný vítr



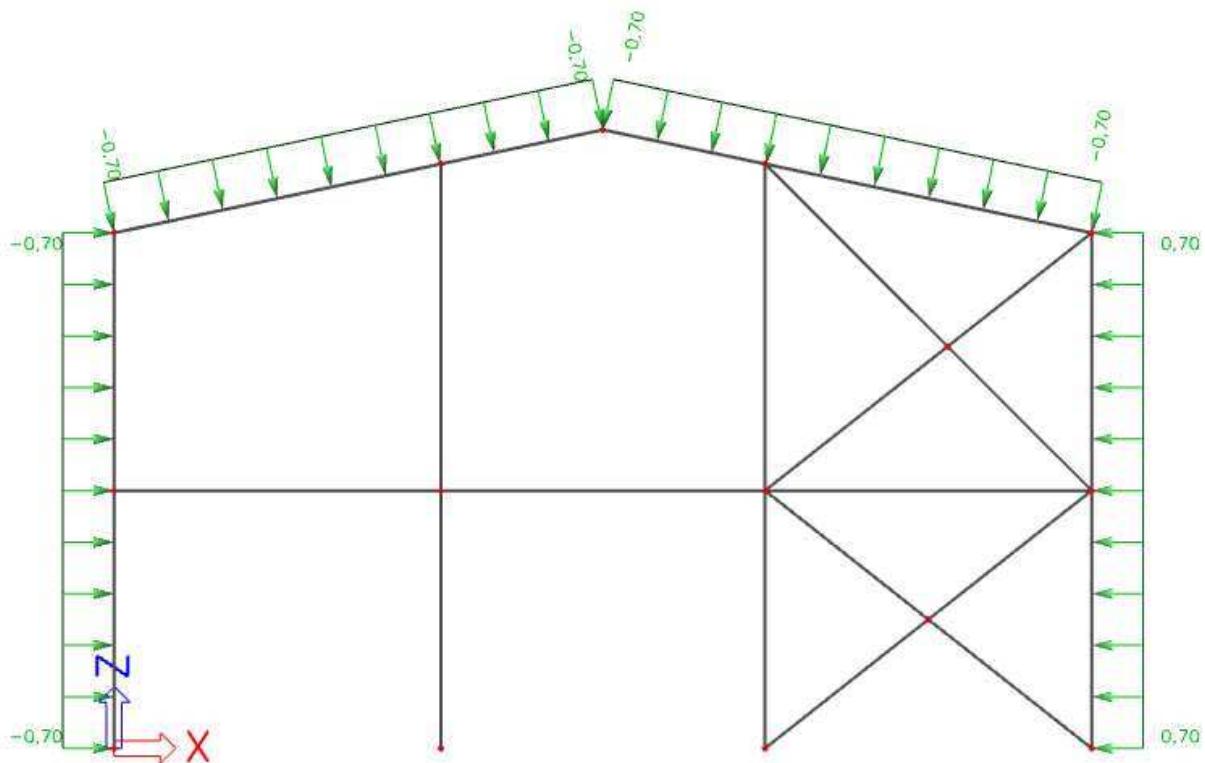
ZS5 – Příkladný vítr



ZS6 – Vnitřní tlak

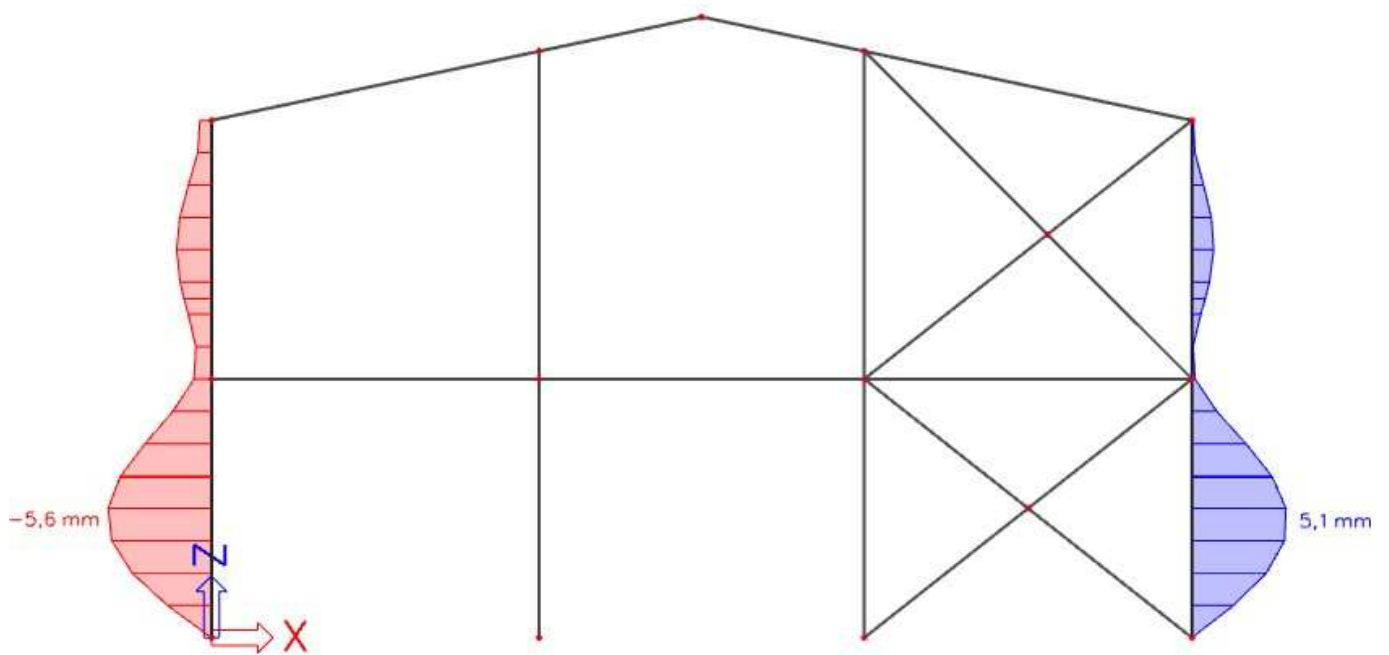


ZS7 – Vnitřní sání

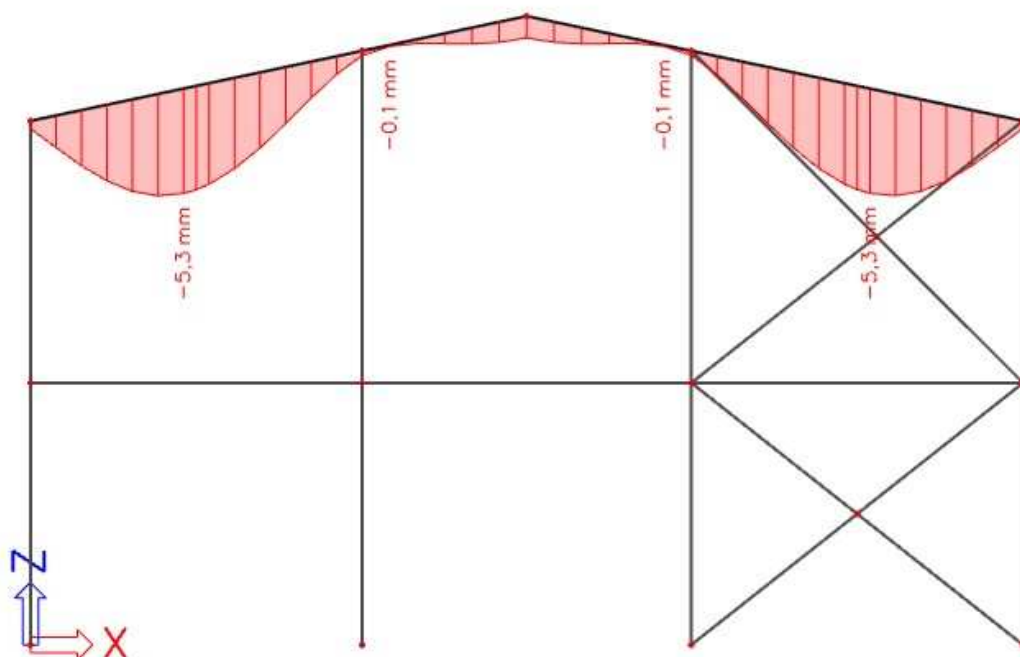


2. MSP

Kombinace 5 – Max. vodorovný posun



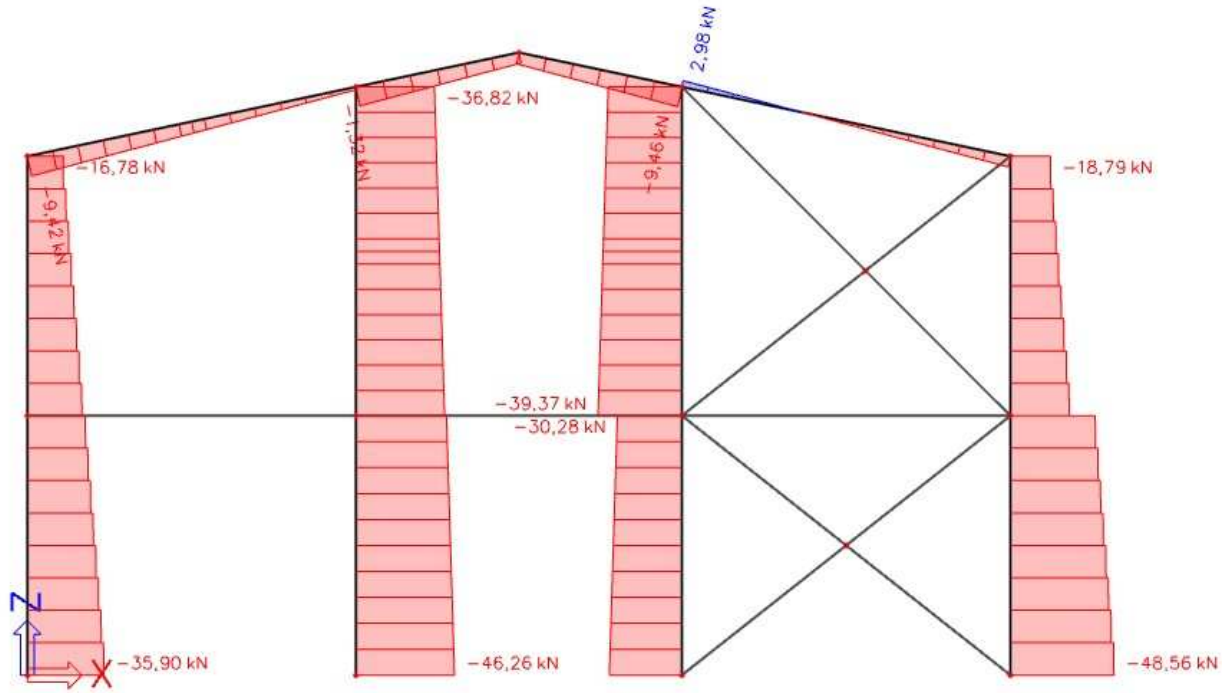
Kombinace 1 – Max. svislý posun



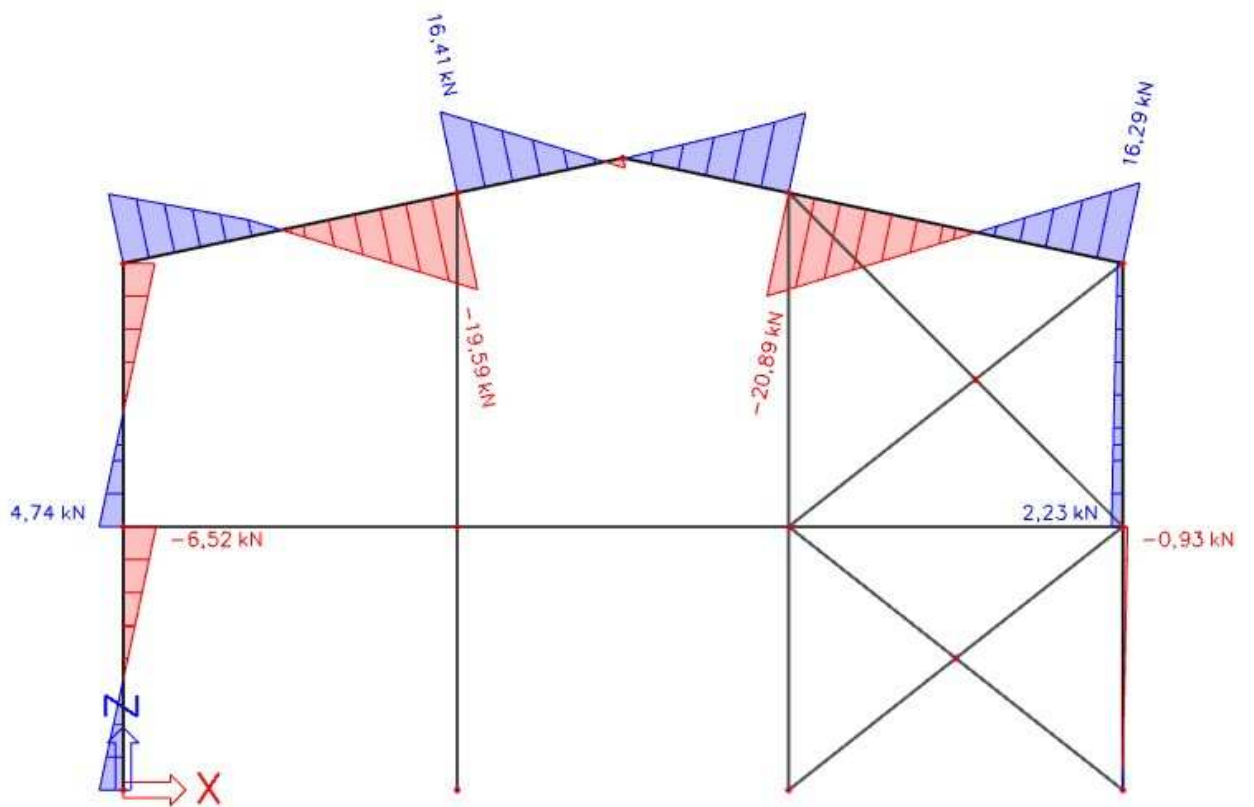
Vnitřní síly

Pozn.: Uvedena bude jen kombinace s největšími vnitřními silami

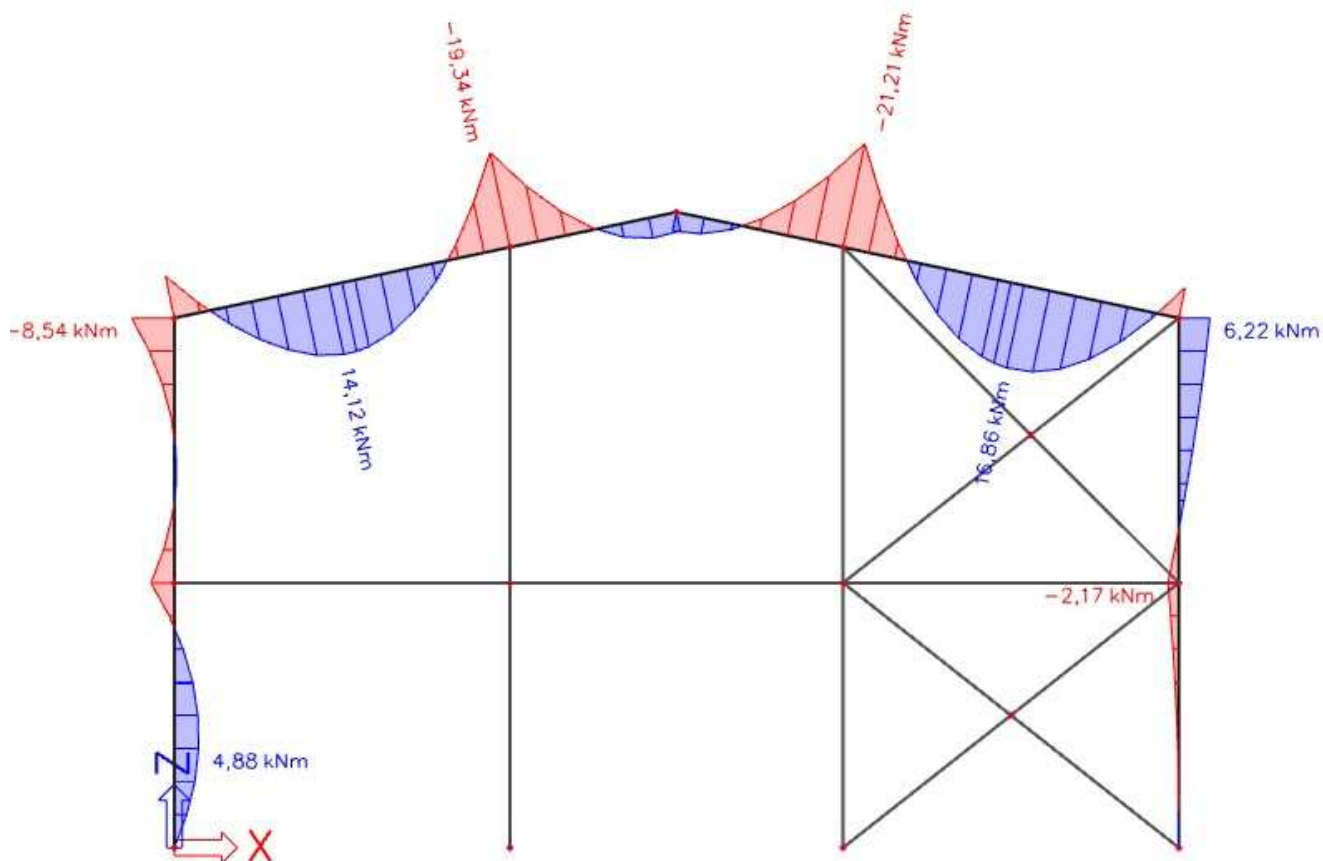
Kombinace 2 – Normálové síly N_x [kN]



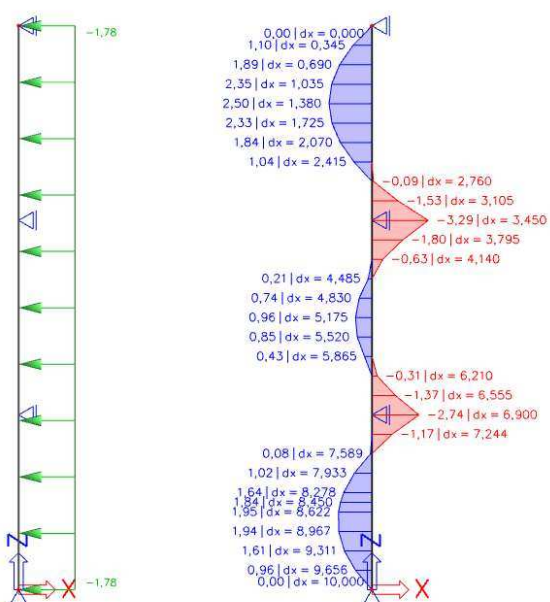
Kombinace 2 – Posouvající síly V_z [kN]



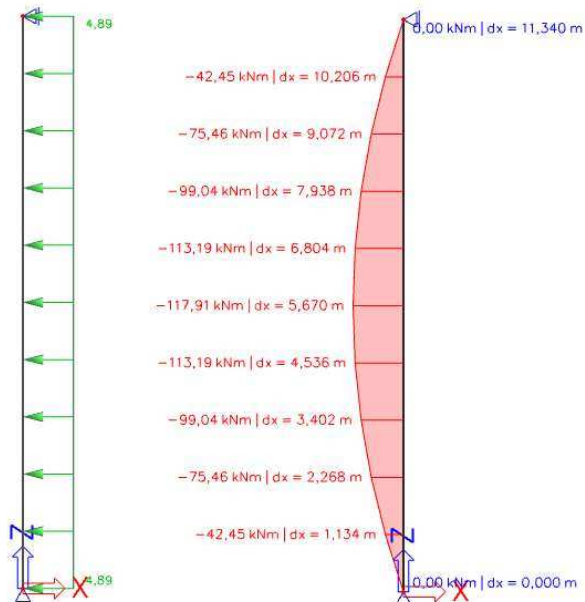
Kombinace 2 – Ohybové momenty M_y [kNm]



Zatížení – vlastní tíha + vítr příčný
Ohybový moment M_z [kNm] pro krajní sloup



Zatížení – vlastní tíha + vítr příčný
Ohybový moment M_y [kNm] pro štítový sloup

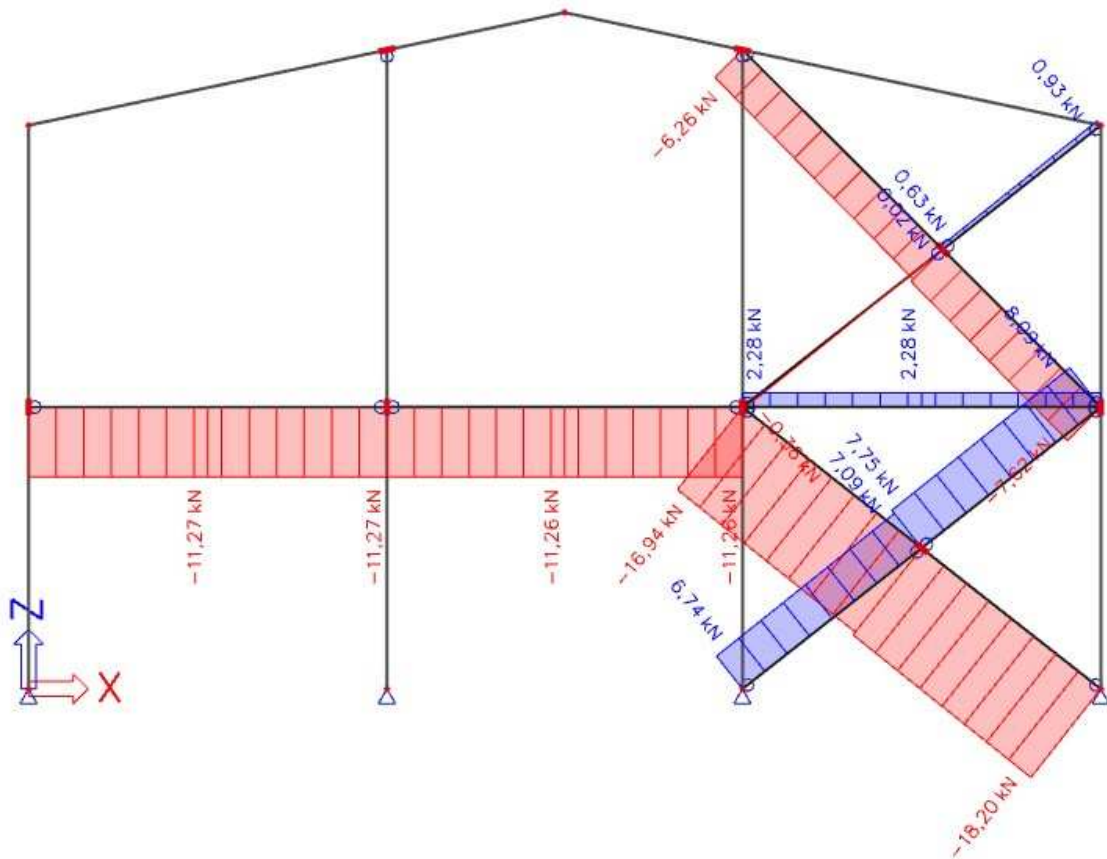


PŘÍLOHA Č.5

ZTUŽIDLA – SCIA ENGINEER 17.1

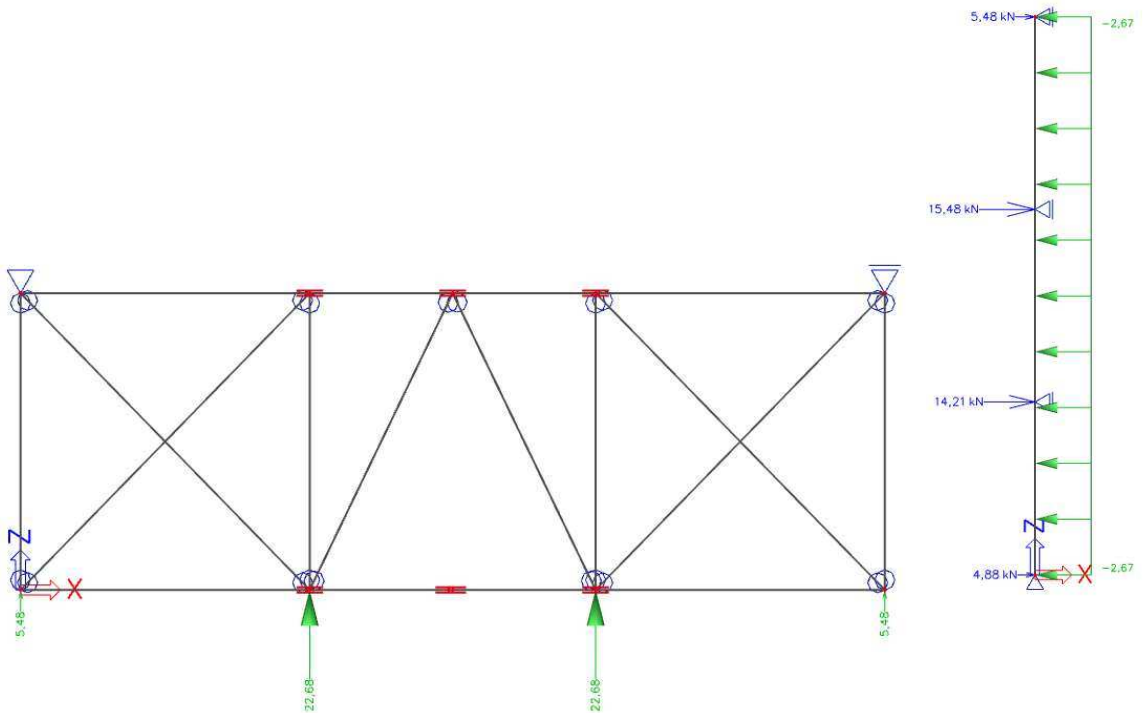
Příčná ztužidla

1. Normálové síly N_x [kN] – Příčná ztužidla

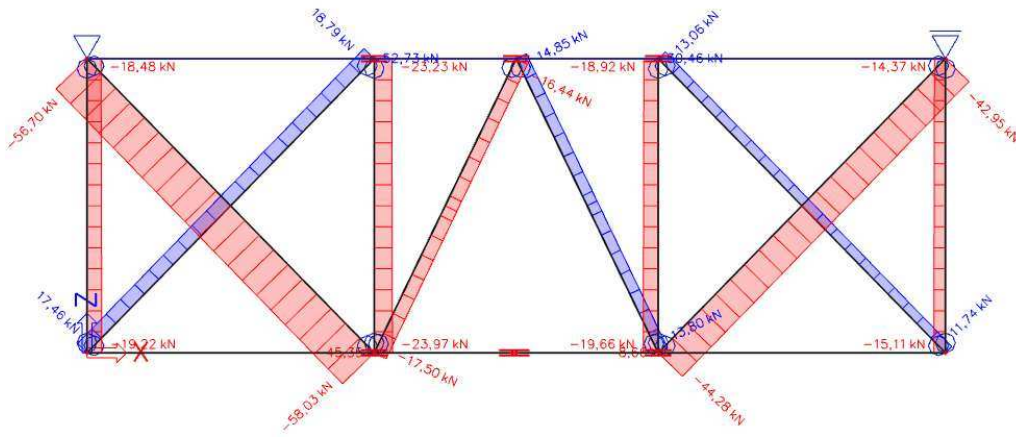


Střešní ztužidla

1. Zatížení na ztužidla (+ reakce z krajního sloupu)

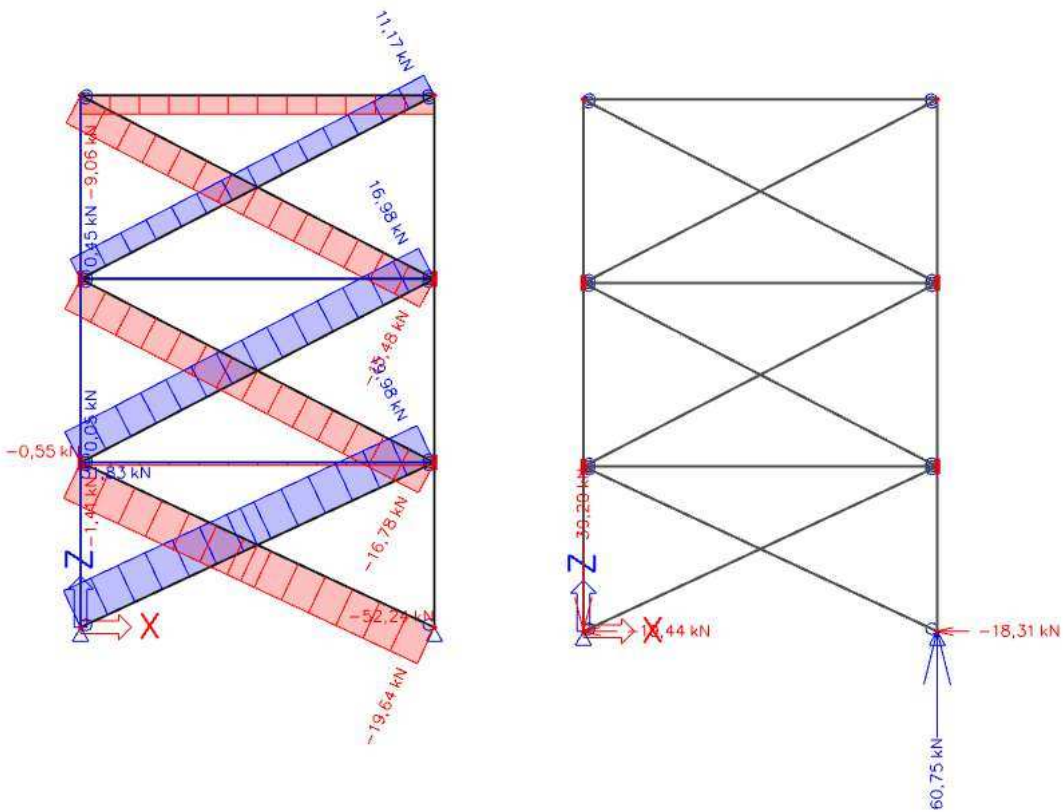


2. Normálové síly N_x [kN]



Podélná ztužidla

3. Normálové síly N_x [kN], Reakce v podporách



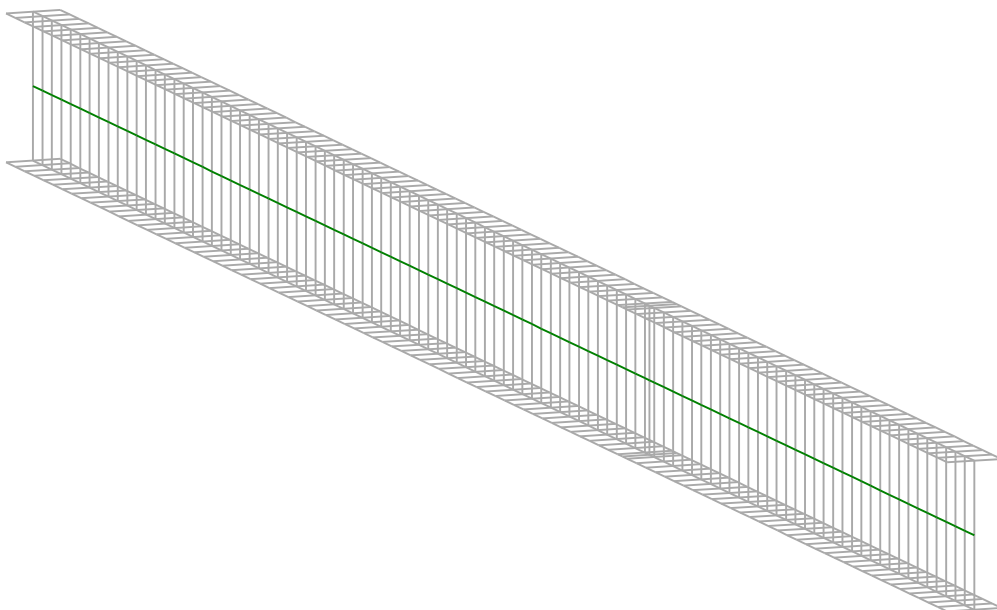
PŘÍLOHA Č.6

KRITICKÉ MOMENTY – LTBEAMN 1.0.3

LTBeamN

v 1.0.3

CALCULATION SHEET



I - PARAMETERS

I.1 - Lateral restraints

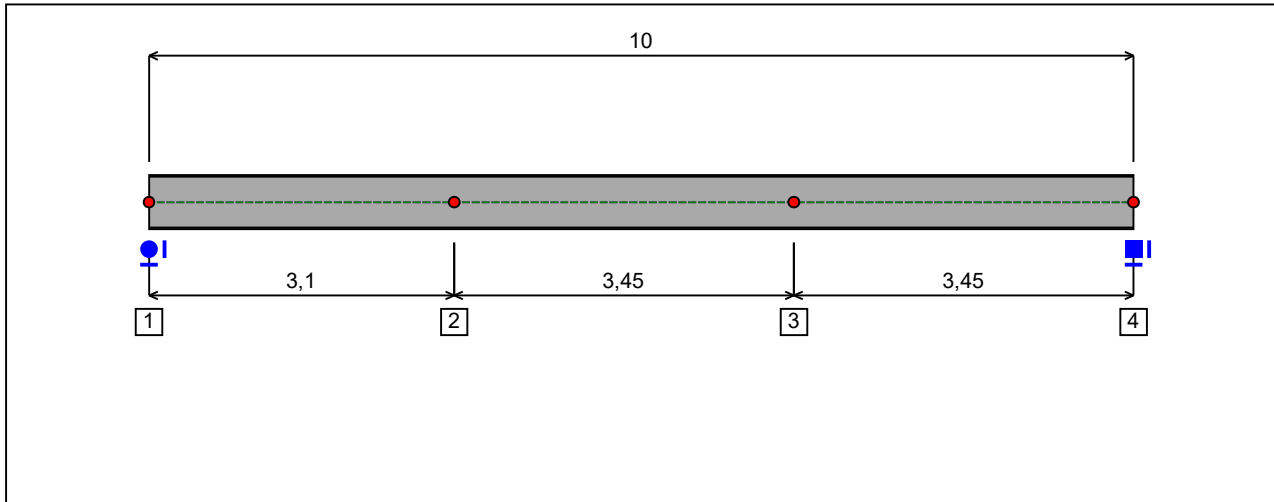


Figure 1 : Profile in long with restraint numbers.

- Restraint No. 1 :

Type : Ponctual

Abscissa from the left end of the beam : $x = 0$ m

Vertical position from the shear centre : $z = 0$ cm

Restraint conditions :

- v : Fixed
- θ : Fixed
- v' : Free
- θ' : Free

- Restraint No. 2 :

Type : Ponctual

Abscissa from the left end of the beam : $x = 3,1$ m

Vertical position from the shear centre : $z = 0$ cm

Restraint conditions :

- v : Fixed
- θ : Free
- v' : Free
- θ' : Free

- Restraint No. 3 :

Type : Ponctual

Abscissa from the left end of the beam : $x = 6,55$ m

Vertical position from the shear centre : $z = 0$ cm

Restraint conditions :

v : Fixed
 θ : Free
 v' : Free
 θ' : Free

- Restraint No. 4 :

Type : Ponctual

Abscissa from the left end of the beam : $x = 10$ m

Vertical position from the shear centre : $z = 0$ cm

Restraint conditions :

v : Fixed
 θ : Fixed
 v' : Free
 θ' : Free

I.2 - Supports

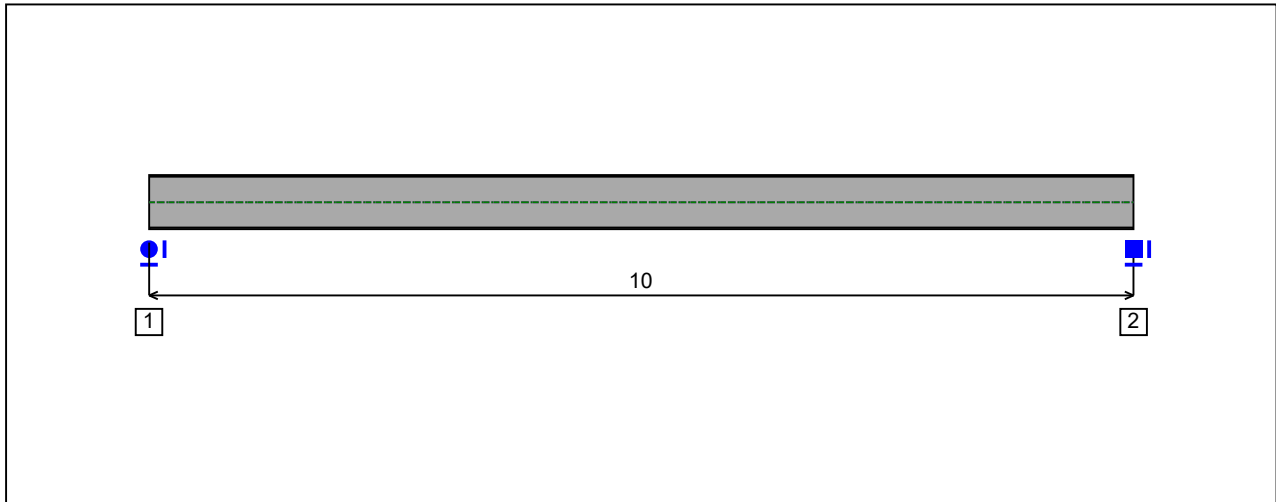


Figure 2 : Profile in long with support numbers.

- Support No. 1 :

Abscissa from the left end of the beam : $x = 0 \text{ m}$

Support conditions :

- u : Fixed
- w : Fixed
- w' : Free

- Support No. 2 :

Abscissa from the left end of the beam : $x = 10 \text{ m}$

Support conditions :

- u : Fixed
- w : Fixed
- w' : Fixed

I.3 - Loads

Type of loading :

Internal

- Moment diagram :

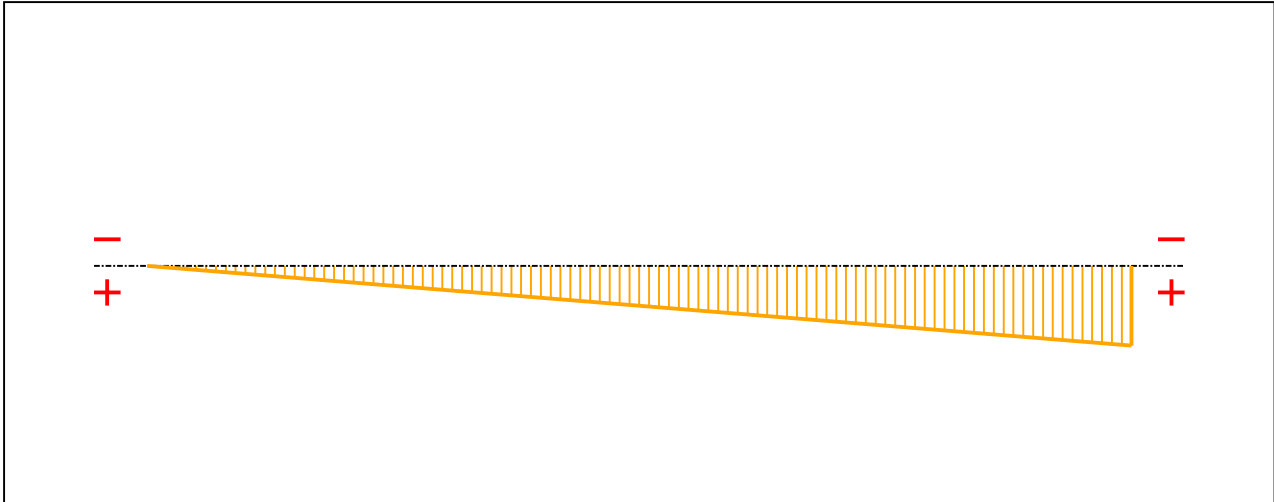


Figure 3 : Moment diagram.

Active :

Yes

Table 1 : Moment diagram.

| x(m) | M(kN.m) |
|------|---------|
| 0 | 0 |
| 10 | 454,73 |

- Axial force diagram :

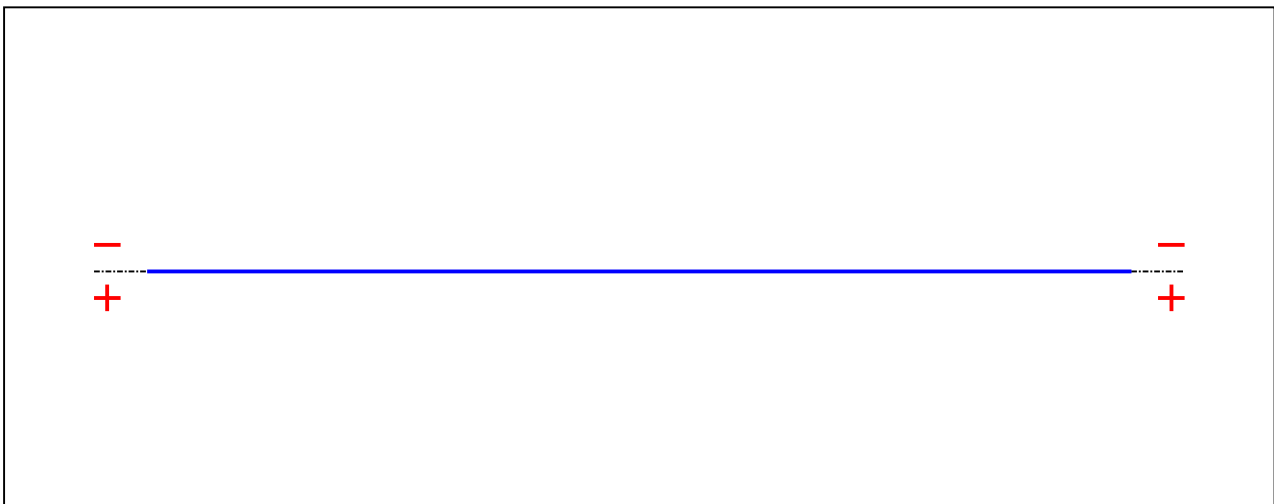


Figure 4 : Axial force diagram.

Active :

Yes

Table 2 : Axial force diagram.

| x(m) | N(kN) |
|------|-------|
| 0 | 0 |
| 10 | 0 |

- Eccentric concentrated loads :

No load has been defined.

- Eccentric distributed loads :

No load has been defined.

II - LTB CALCULATION

Requested number of modes : 1

Blocked moment diagram : No

Blocked axial force diagram : No

II.1 - LTB modes

Table 3 : LTB modes.

| Mode | μ_{cr} | $M_{max,cr}$ [kN.m] | $x(M_{max})$ [m] | $N_{max,cr}$ [kN] | $x(N_{max})$ [m] |
|------|------------|---------------------|------------------|-------------------|------------------|
| 1 | 3,929 | 1786,6 | 10 | 0 | 10 |

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| I - PARAMETERS | p.1 |
| <i>I.1 - Lateral restraints</i> | <i>p.2</i> |
| - <i>Restraint No. 1 :</i> | <i>p.2</i> |
| - <i>Restraint No. 2 :</i> | <i>p.2</i> |
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WARNING !

The following software may be used for working out technical solutions during preparatory engineering studies.

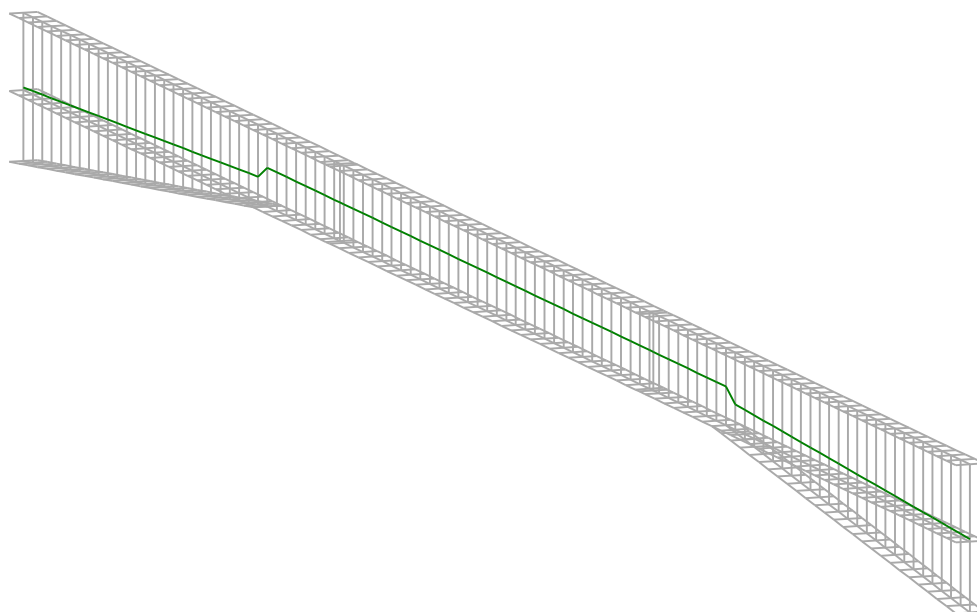
Because of the complexity of the calculations involved, the software is only for users who are able to make themselves an accurate idea of its possibilities, its limitations and adequacy to the various practical applications. The user will use it under his own responsibilities at his own risk.

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LTBeamN

v 1.0.3

CALCULATION SHEET



I - PARAMETERS

I.1 - Lateral restraints

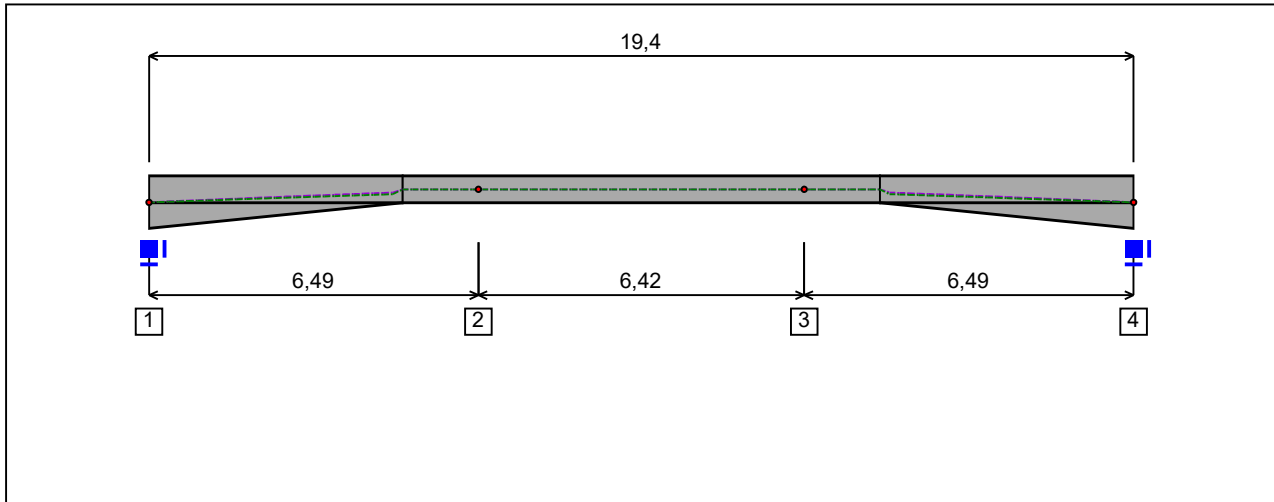


Figure 1 : Profile in long with restraint numbers.

- Restraint No. 1 :

Type : Ponctual

Abscissa from the left end of the beam : $x = 0$ m

Vertical position from the shear centre : $z = 0$ cm

Restraint conditions :

- v : Fixed
- θ : Fixed
- v' : Free
- θ' : Free

- Restraint No. 2 :

Type : Ponctual

Abscissa from the left end of the beam : $x = 6,49$ m

Vertical position from the shear centre : $z = 0$ cm

Restraint conditions :

- v : Fixed
- θ : Free
- v' : Free
- θ' : Free

- Restraint No. 3 :

Type : Ponctual

Abscissa from the left end of the beam : $x = 12,91$ m

Vertical position from the shear centre : $z = 0$ cm

Restraint conditions :

v : Fixed
 θ : Free
 v' : Free
 θ' : Free

- Restraint No. 4 :

Type : Ponctual

Abscissa from the left end of the beam : $x = 19,4$ m

Vertical position from the shear centre : $z = 0$ cm

Restraint conditions :

v : Fixed
 θ : Fixed
 v' : Free
 θ' : Free

I.2 - Supports

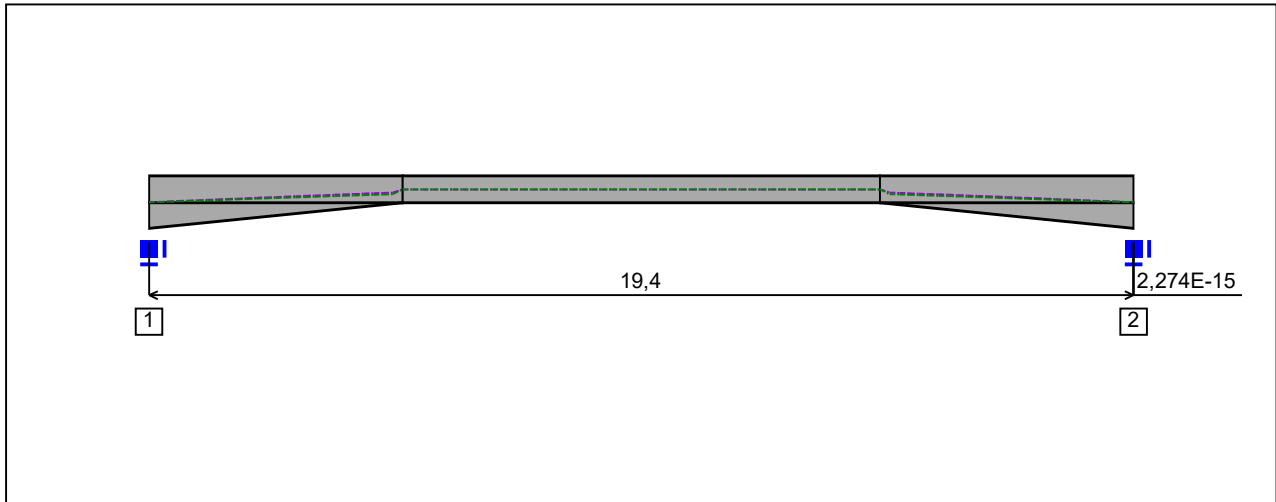


Figure 2 : Profile in long with support numbers.

- Support No. 1 :

Abscissa from the left end of the beam : $x = 0 \text{ m}$

Support conditions :

- u : Fixed
- w : Fixed
- w' : Fixed

- Support No. 2 :

Abscissa from the left end of the beam : $x = 19,4 \text{ m}$

Support conditions :

- u : Fixed
- w : Fixed
- w' : Fixed

I.3 - Loads

Type of loading :

Internal

- *Moment diagram :*

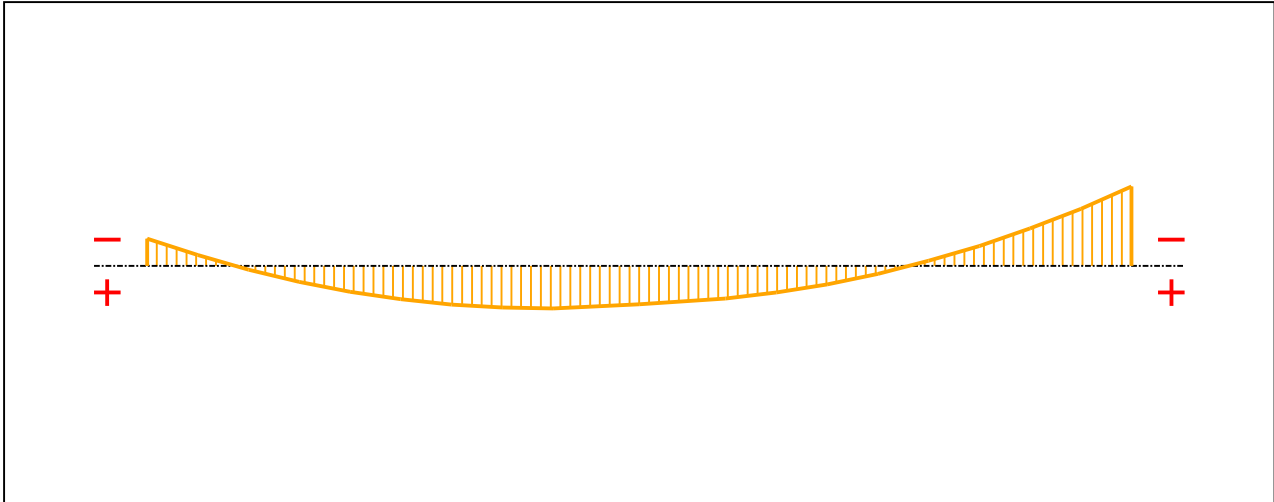


Figure 3 : Moment diagram.

Active :

Yes

Table 1 : Moment diagram.

| x(m) | M(kN.m) |
|------|---------|
| 0 | -150,72 |
| 1 | -60,8 |
| 2 | 21,06 |
| 3 | 88,52 |
| 4 | 142,78 |
| 5 | 183,65 |
| 6 | 212,62 |
| 7 | 229,76 |
| 8 | 233,84 |
| 9,7 | 210,6 |
| 11,4 | 179,92 |
| 12,4 | 146,75 |
| 13,4 | 101,06 |
| 14,4 | 43,78 |
| 15,4 | -28,12 |
| 16,4 | -110,52 |

Table 1 (Next) : Moment diagram.

| x(m) | M(kN.m) |
|------|---------|
| 17,4 | -206,33 |
| 18,4 | -315,65 |
| 19,4 | -438,6 |

- Axial force diagram :

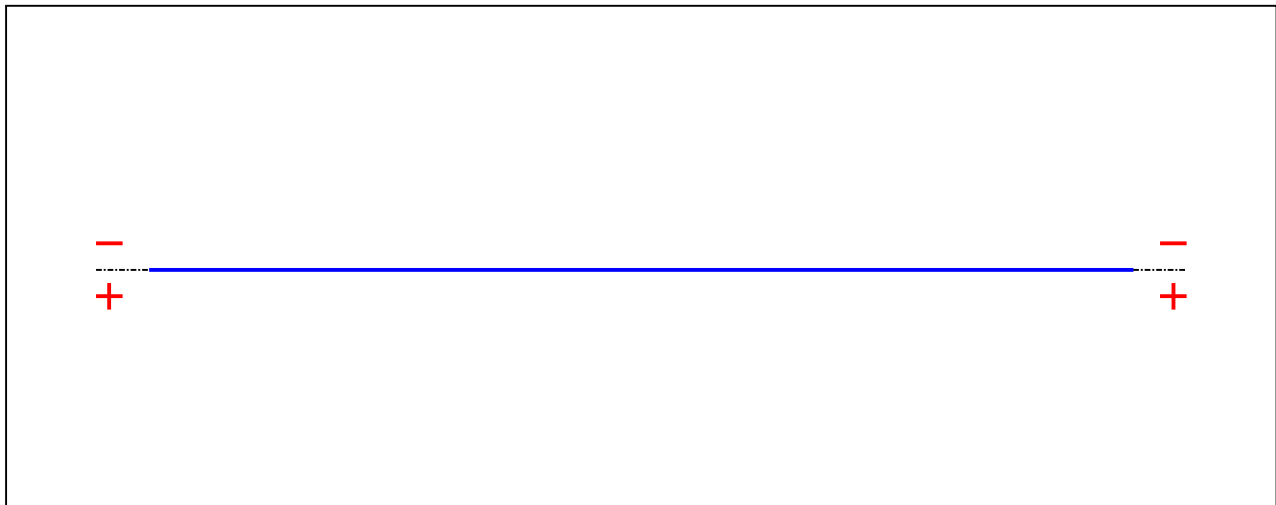


Figure 4 : Axial force diagram.

Active : Yes

Table 2 : Axial force diagram.

| x(m) | N(kN) |
|------|-------|
| 0 | 0 |
| 19,4 | 0 |

- Eccentric concentrated loads :

No load has been defined.

- Eccentric distributed loads :

No load has been defined.

II - LTB CALCULATION

Requested number of modes : 1

Blocked moment diagram : No

Blocked axial force diagram : No

The TAPER effect is taken into account

II.1 - LTB modes

Table 3 : LTB modes.

| Mode | μ_{cr} | $M_{max,cr}$ [kN.m] | $x(M_{max})$ [m] | $N_{max,cr}$ [kN] | $x(N_{max})$ [m] |
|------|------------|---------------------|------------------|-------------------|------------------|
| 1 | 2,164 | -949,22 | 19,4 | 0 | 19,4 |

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WARNING !

The following software may be used for working out technical solutions during preparatory engineering studies.

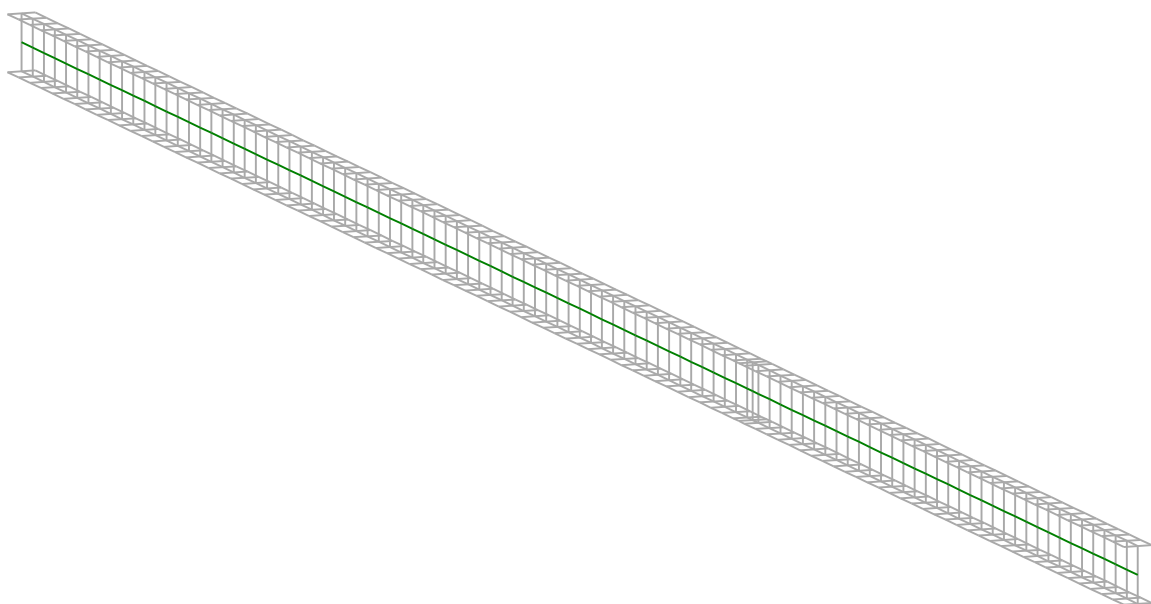
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***L*TB*eam*N**

v 1.0.3

CALCULATION SHEET



I - PARAMETERS

I.1 - Lateral restraints

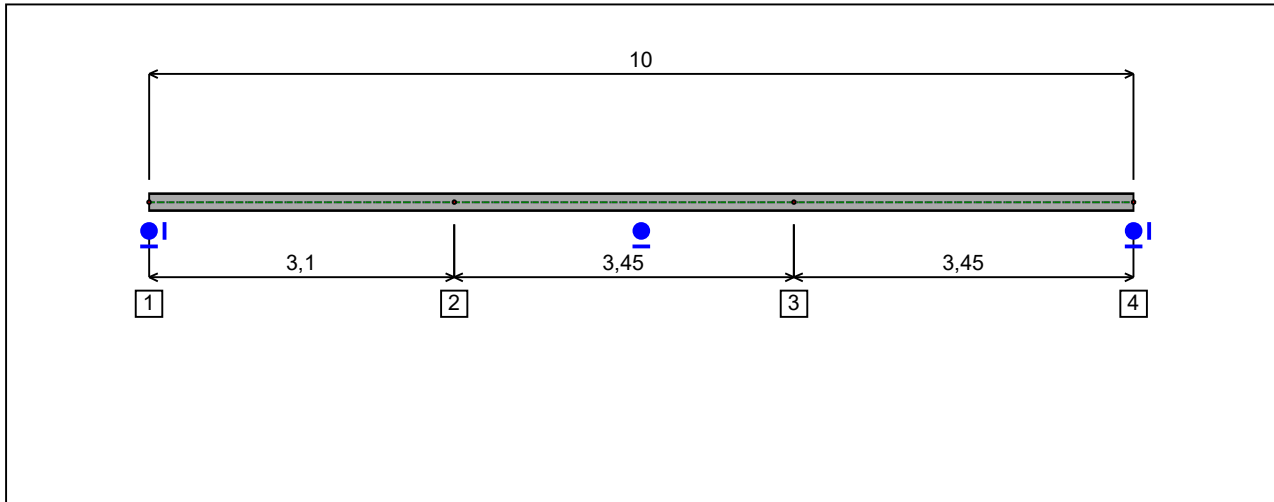


Figure 1 : Profile in long with restraint numbers.

- Restraint No. 1 :

Type : Ponctual

Abscissa from the left end of the beam : $x = 0$ m

Vertical position from the shear centre : $z = 0$ cm

Restraint conditions :

- v : Fixed
- θ : Fixed
- v' : Free
- θ' : Free

- Restraint No. 2 :

Type : Ponctual

Abscissa from the left end of the beam : $x = 3,1$ m

Vertical position from the shear centre : $z = 0$ cm

Restraint conditions :

- v : Fixed
- θ : Free
- v' : Free
- θ' : Free

- Restraint No. 3 :

Type : Ponctual

Abscissa from the left end of the beam : $x = 6,55$ m

Vertical position from the shear centre : $z = 0$ cm

Restraint conditions :

v : Fixed
 θ : Free
 v' : Free
 θ' : Free

- Restraint No. 4 :

Type : Ponctual

Abscissa from the left end of the beam : $x = 10$ m

Vertical position from the shear centre : $z = 0$ cm

Restraint conditions :

v : Fixed
 θ : Fixed
 v' : Free
 θ' : Free

I.2 - Supports

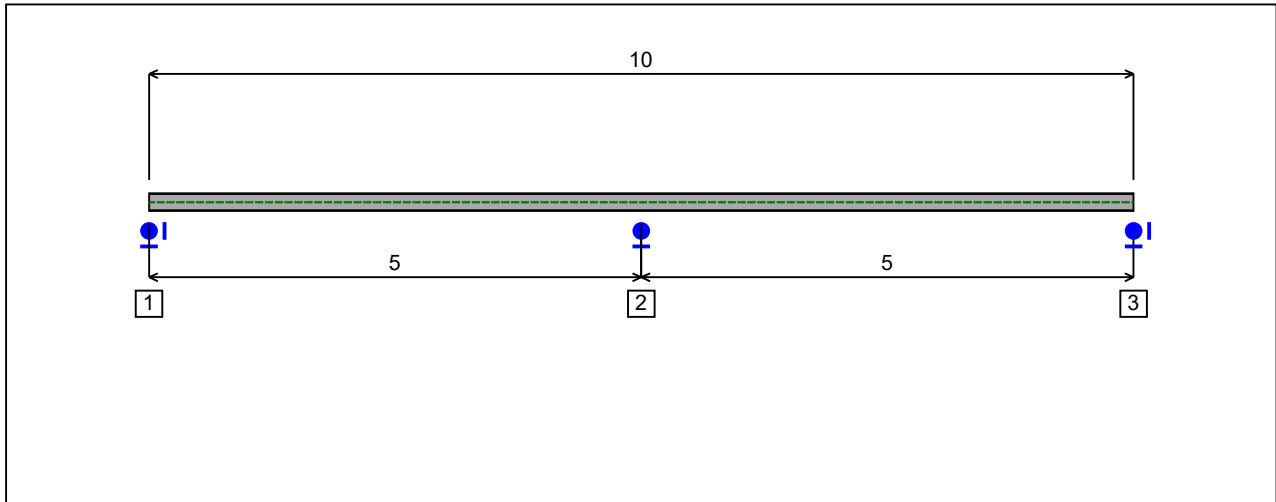


Figure 2 : Profile in long with support numbers.

- Support No. 1 :

Abscissa from the left end of the beam : $x = 0$ m

Support conditions :

- u : Fixed
- w : Fixed
- w' : Free

- Support No. 2 :

Abscissa from the left end of the beam : $x = 5$ m

Support conditions :

- u : Free
- w : Fixed
- w' : Free

- Support No. 3 :

Abscissa from the left end of the beam : $x = 10$ m

Support conditions :

- u : Fixed
- w : Fixed
- w' : Free

I.3 - Loads

Type of loading :

Internal

- Moment diagram :

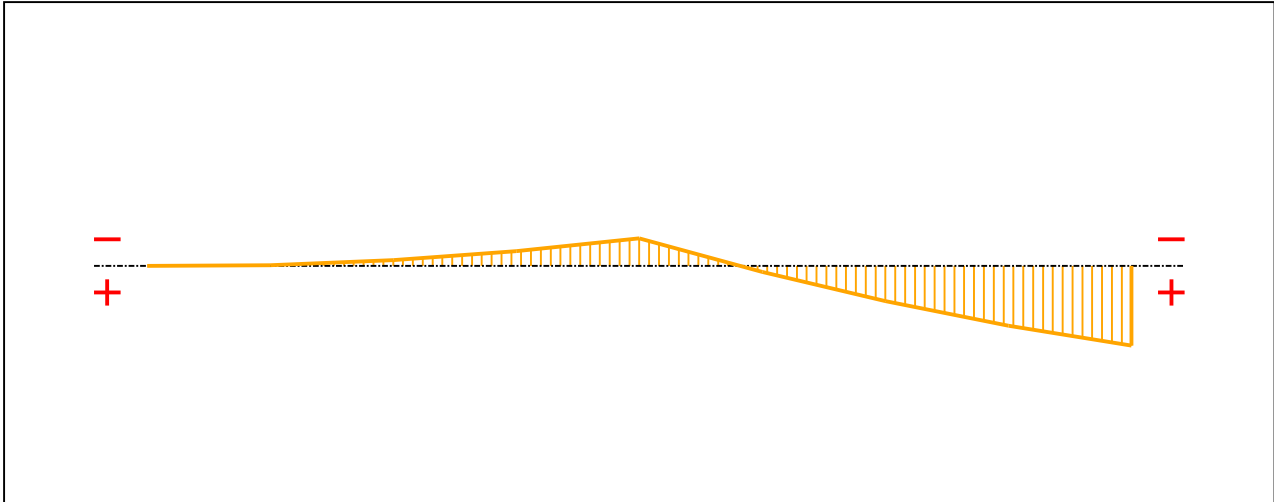


Figure 3 : Moment diagram.

Active :

Yes

Table 1 : Moment diagram.

| x(m) | M(kN.m) |
|------|---------|
| 0 | 0 |
| 1,25 | -0,06 |
| 2,5 | -0,45 |
| 3,75 | -1,16 |
| 5 | -2,17 |
| 6,25 | 0,46 |
| 7,5 | 2,75 |
| 8,75 | 4,68 |
| 10 | 6,22 |

- Axial force diagram :

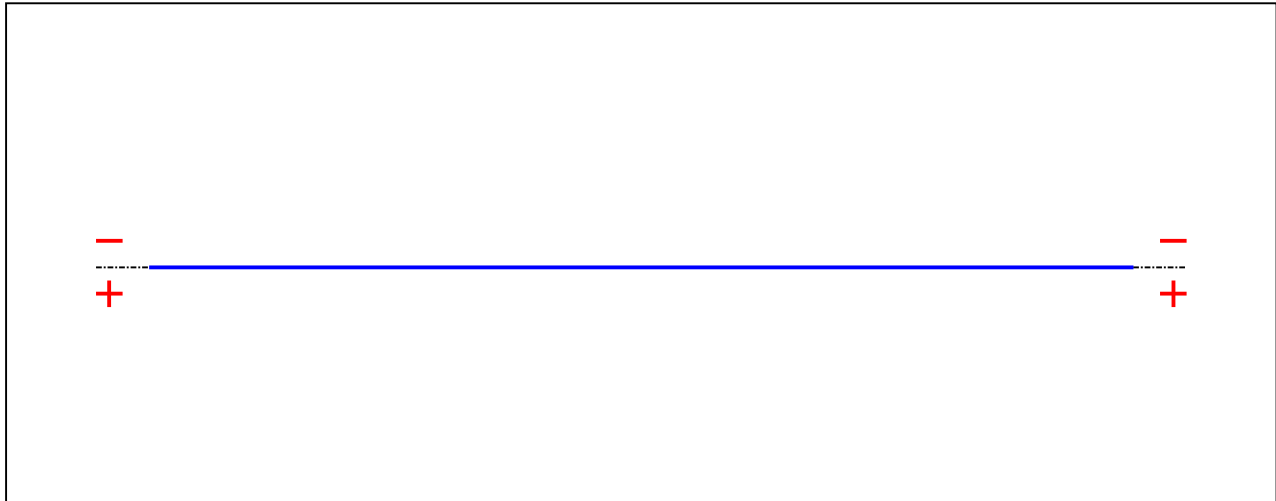


Figure 4 : Axial force diagram.

Active : Yes

Table 2 : Axial force diagram.

| x(m) | N(kN) |
|------|-------|
| 0 | 0 |
| 10 | 0 |

- Eccentric concentrated loads :

No load has been defined.

- Eccentric distributed loads :

No load has been defined.

II - LTB CALCULATION

Requested number of modes : 1

Blocked moment diagram : No

Blocked axial force diagram : No

II.1 - LTB modes

Table 3 : LTB modes.

| Mode | μ_{cr} | $M_{max,cr}$ [kN.m] | $x(M_{max})$ [m] | $N_{max,cr}$ [kN] | $x(N_{max})$ [m] |
|------|------------|---------------------|------------------|-------------------|------------------|
| 1 | 5,56 | 34,59 | 10 | 0 | 10 |

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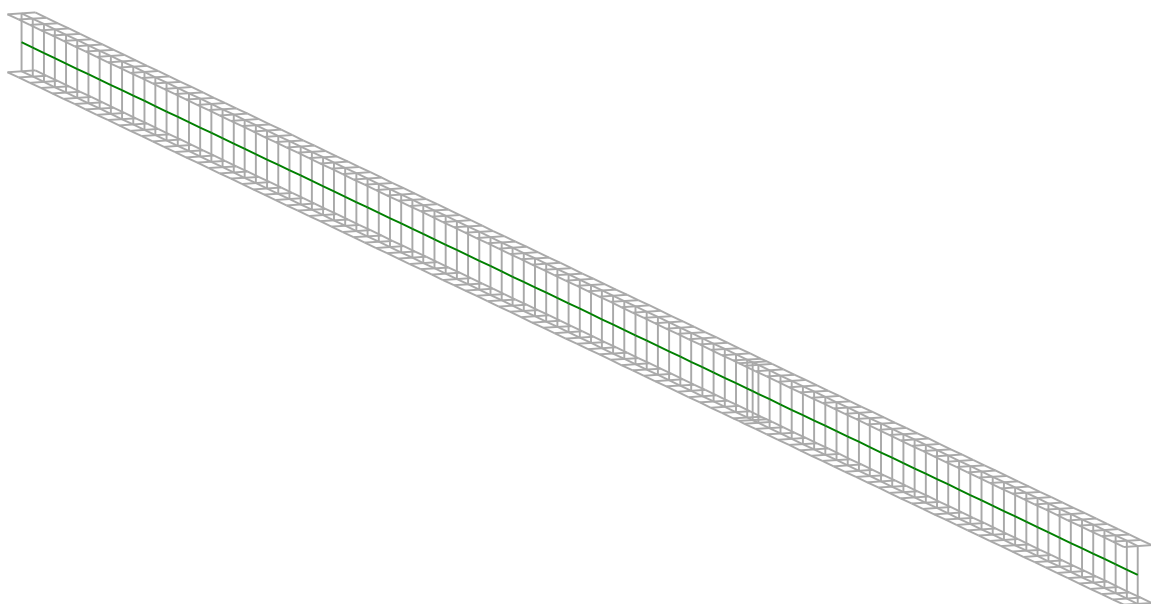
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***L*TB*eam*N**

v 1.0.3

CALCULATION SHEET



I - PARAMETERS

I.1 - Lateral restraints

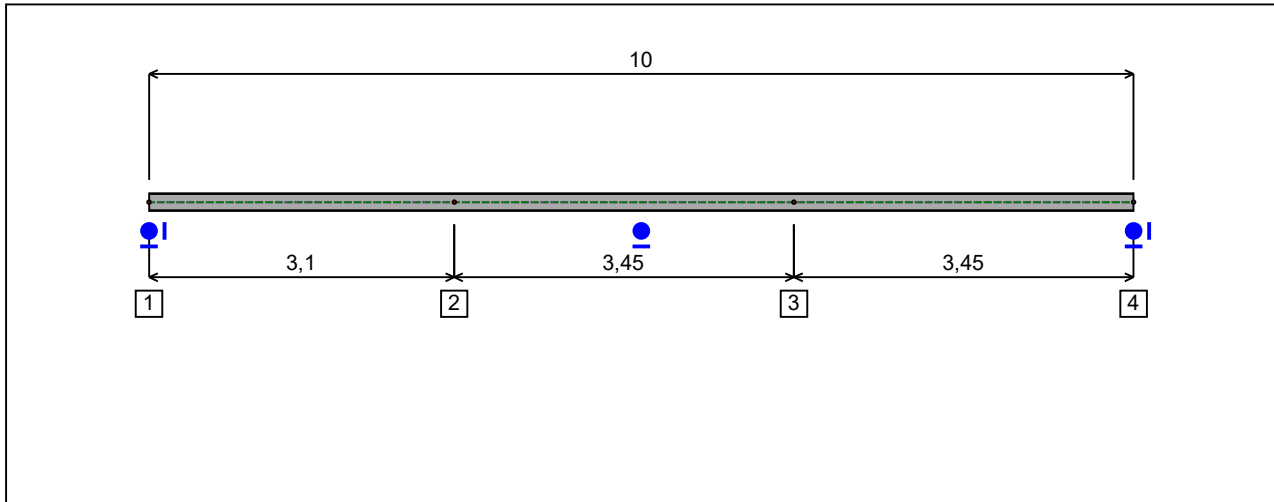


Figure 1 : Profile in long with restraint numbers.

- Restraint No. 1 :

Type : Ponctual

Abscissa from the left end of the beam : $x = 0$ m

Vertical position from the shear centre : $z = 0$ cm

Restraint conditions :

- v : Fixed
- θ : Fixed
- v' : Free
- θ' : Free

- Restraint No. 2 :

Type : Ponctual

Abscissa from the left end of the beam : $x = 3,1$ m

Vertical position from the shear centre : $z = 0$ cm

Restraint conditions :

- v : Fixed
- θ : Free
- v' : Free
- θ' : Free

- Restraint No. 3 :

Type : Ponctual

Abscissa from the left end of the beam : $x = 6,55$ m

Vertical position from the shear centre : $z = 0$ cm

Restraint conditions :

v : Fixed
 θ : Free
 v' : Free
 θ' : Free

- Restraint No. 4 :

Type : Ponctual

Abscissa from the left end of the beam : $x = 10$ m

Vertical position from the shear centre : $z = 0$ cm

Restraint conditions :

v : Fixed
 θ : Fixed
 v' : Free
 θ' : Free

I.2 - Supports

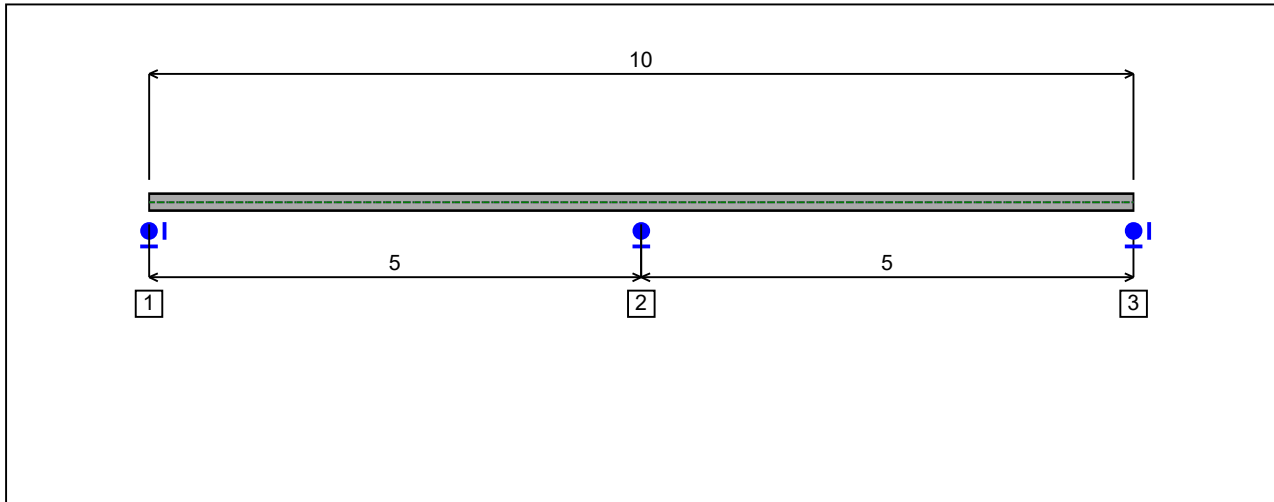


Figure 2 : Profile in long with support numbers.

- Support No. 1 :

Abscissa from the left end of the beam : $x = 0$ m

Support conditions :

- u : Fixed
- w : Fixed
- w' : Free

- Support No. 2 :

Abscissa from the left end of the beam : $x = 5$ m

Support conditions :

- u : Free
- w : Fixed
- w' : Free

- Support No. 3 :

Abscissa from the left end of the beam : $x = 10$ m

Support conditions :

- u : Fixed
- w : Fixed
- w' : Free

I.3 - Loads

Type of loading :

Internal

- Moment diagram :

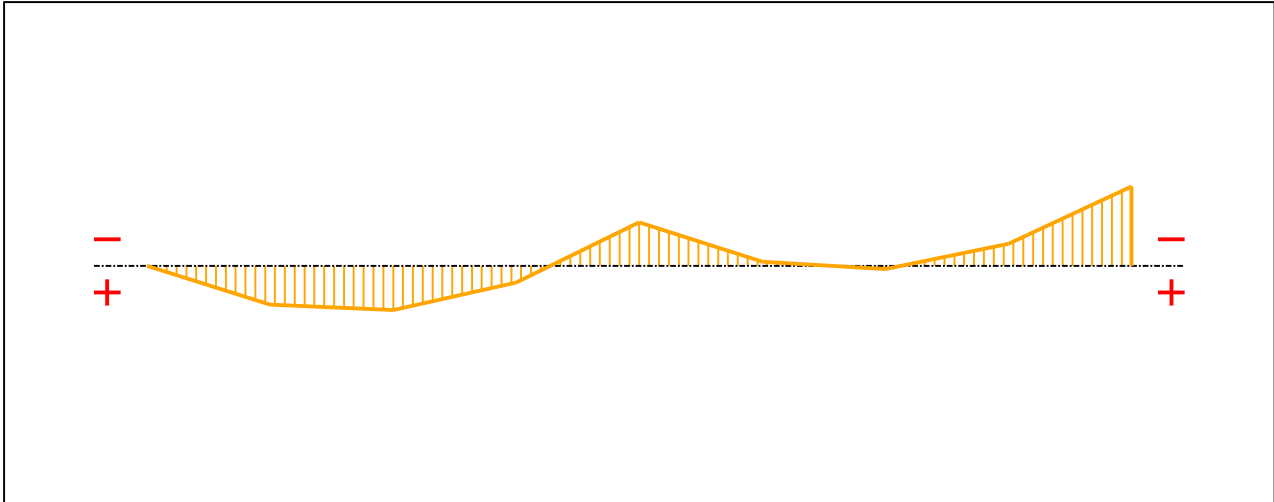


Figure 3 : Moment diagram.

Active :

Yes

Table 1 : Moment diagram.

| x(m) | M(kN.m) |
|------|---------|
| 0 | 0 |
| 1,25 | 4,14 |
| 2,5 | 4,73 |
| 3,75 | 1,78 |
| 5 | -4,67 |
| 6,25 | -0,44 |
| 7,5 | 0,32 |
| 8,75 | -2,39 |
| 10 | -8,54 |

- Axial force diagram :

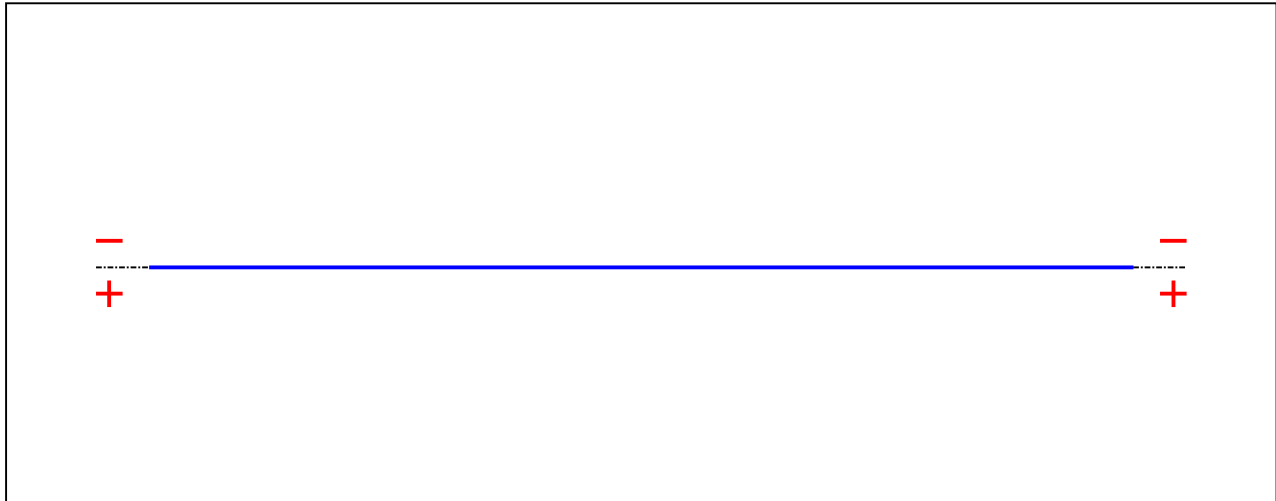


Figure 4 : Axial force diagram.

Active : Yes

Table 2 : Axial force diagram.

| x(m) | N(kN) |
|------|-------|
| 0 | 0 |
| 10 | 0 |

- Eccentric concentrated loads :

No load has been defined.

- Eccentric distributed loads :

No load has been defined.

II - LTB CALCULATION

Requested number of modes : 1

Blocked moment diagram : No

Blocked axial force diagram : No

II.1 - LTB modes

Table 3 : LTB modes.

| Mode | μ_{cr} | $M_{max,cr}$ [kN.m] | $x(M_{max})$ [m] | $N_{max,cr}$ [kN] | $x(N_{max})$ [m] |
|------|------------|---------------------|------------------|-------------------|------------------|
| 1 | 4,222 | -36,06 | 10 | 0 | 10 |

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| - <i>Moment diagram :</i> | <i>p.5</i> |
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| II - LTB CALCULATION | p.7 |
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WARNING !

The following software may be used for working out technical solutions during preparatory engineering studies.

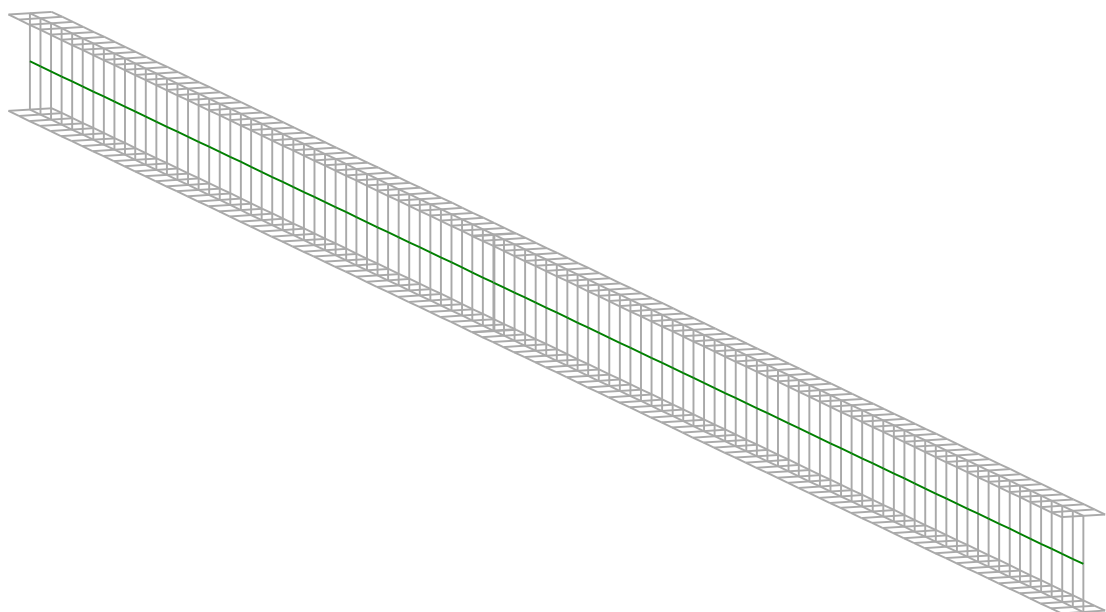
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LTBeamN

v 1.0.3

CALCULATION SHEET



I - PARAMETERS

I.1 - Lateral restraints

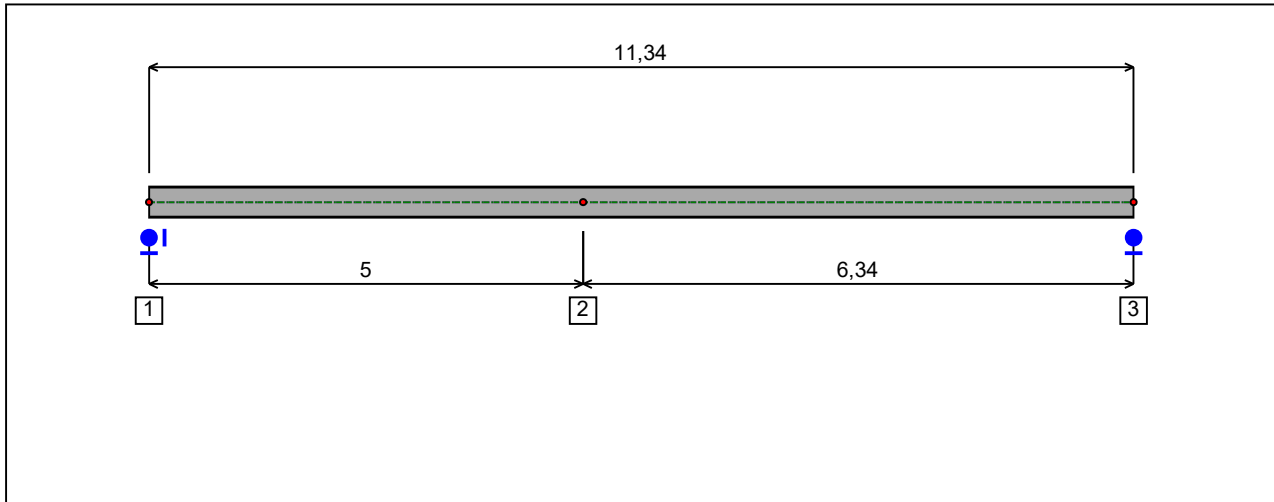


Figure 1 : Profile in long with restraint numbers.

- Restraint No. 1 :

Type : Ponctual

Abscissa from the left end of the beam : $x = 0$ m

Vertical position from the shear centre : $z = 0$ cm

Restraint conditions :

- v : Fixed
- θ : Fixed
- v' : Free
- θ' : Free

- Restraint No. 2 :

Type : Ponctual

Abscissa from the left end of the beam : $x = 5$ m

Vertical position from the shear centre : $z = 0$ cm

Restraint conditions :

- v : Fixed
- θ : Free
- v' : Free
- θ' : Free

- Restraint No. 3 :

Type : Ponctual

Abscissa from the left end of the beam : $x = 11,34$ m

Vertical position from the shear centre :

 $z = 0 \text{ cm}$

Restraint conditions :

v : Fixed
 θ : Fixed
 v' : Free
 θ' : Free

I.2 - Supports

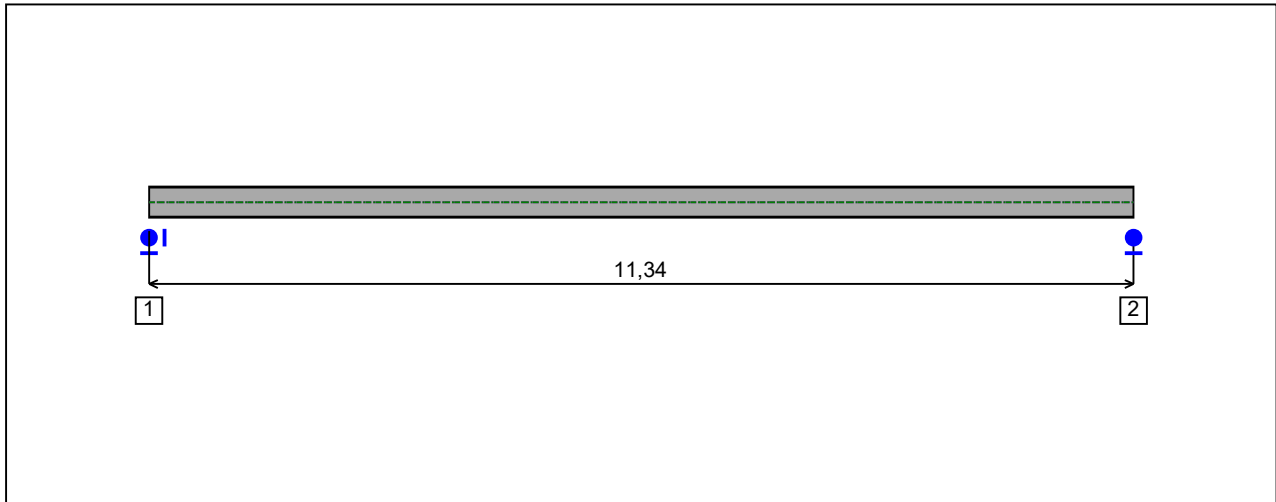


Figure 2 : Profile in long with support numbers.

- Support No. 1 :

Abscissa from the left end of the beam : $x = 0$ m

Support conditions :

u : Fixed
w : Fixed
w' : Free

- Support No. 2 :

Abscissa from the left end of the beam : $x = 11,34$ m

Support conditions :

u : Free
w : Fixed
w' : Free

I.3 - Loads

Type of loading :

Internal

- Moment diagram :

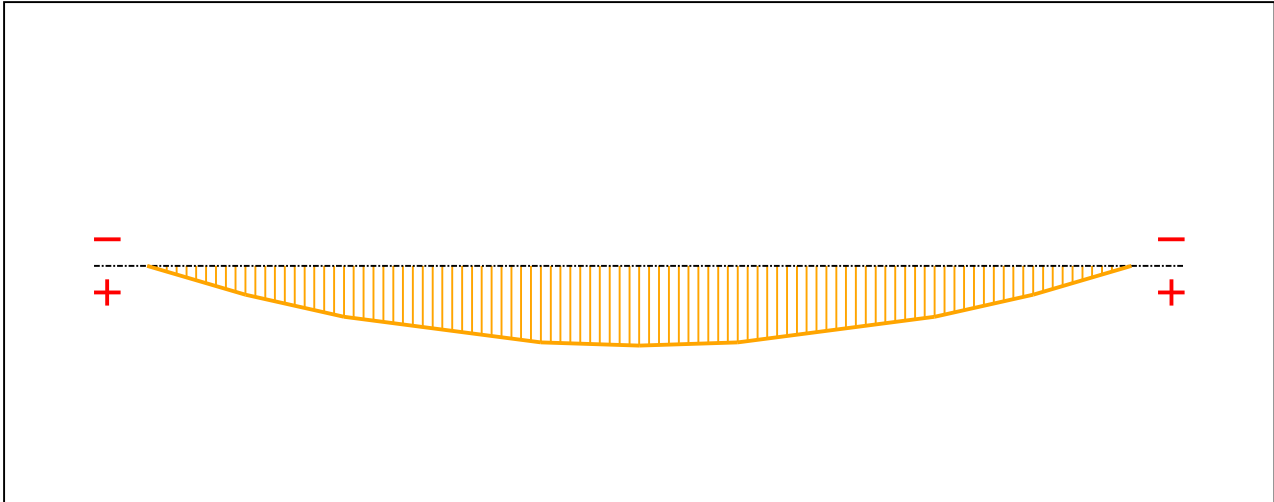


Figure 3 : Moment diagram.

Active :

Yes

Table 1 : Moment diagram.

| x(m) | M(kN.m) |
|-------|---------|
| 0 | 0 |
| 1,134 | 42,45 |
| 2,268 | 75,46 |
| 4,536 | 113,19 |
| 5,67 | 117,91 |
| 6,804 | 113,19 |
| 9,072 | 75,46 |
| 10,21 | 42,45 |
| 11,34 | 0 |

- Axial force diagram :

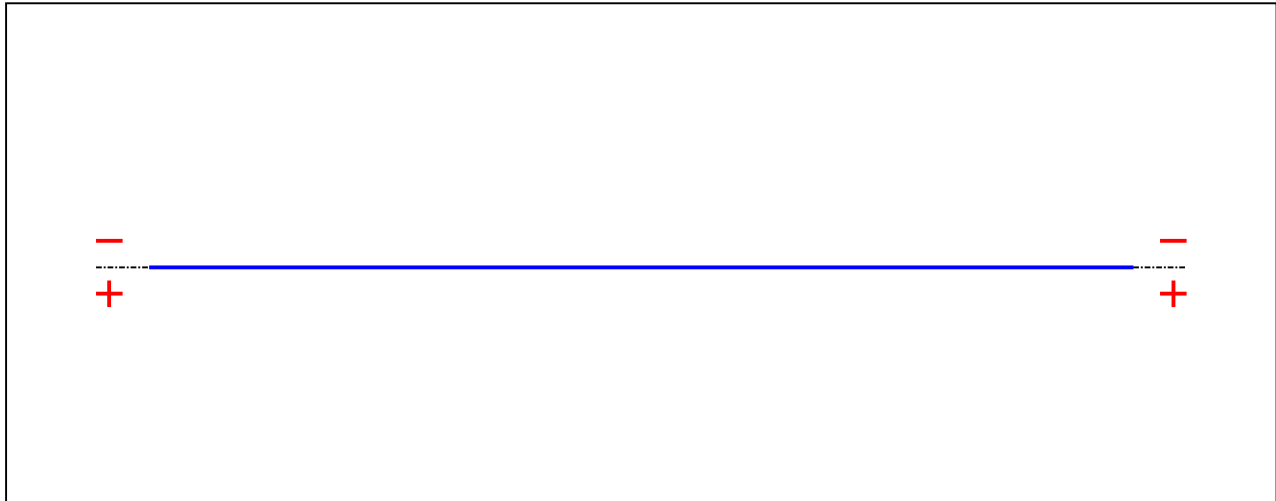


Figure 4 : Axial force diagram.

Active : Yes

Table 2 : Axial force diagram.

| x(m) | N(kN) |
|-------|-------|
| 0 | 0 |
| 11,34 | 0 |

- Eccentric concentrated loads :

No load has been defined.

- Eccentric distributed loads :

No load has been defined.

II - LTB CALCULATION

Requested number of modes : 1

Blocked moment diagram : No

Blocked axial force diagram : No

II.1 - LTB modes

Table 3 : LTB modes.

| Mode | μ_{cr} | $M_{max,cr}$ [kN.m] | $x(M_{max})$ [m] | $N_{max,cr}$ [kN] | $x(N_{max})$ [m] |
|------|------------|---------------------|------------------|-------------------|------------------|
| 1 | 2,062 | 243,15 | 5,67 | 0 | 5,67 |

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| - <i>Restraint No. 3 :</i> | <i>p.2</i> |
| <i>I.2 - Supports</i> | <i>p.4</i> |
| - <i>Support No. 1 :</i> | <i>p.4</i> |
| - <i>Support No. 2 :</i> | <i>p.4</i> |
| <i>I.3 - Loads</i> | <i>p.5</i> |
| - <i>Moment diagram :</i> | <i>p.5</i> |
| - <i>Axial force diagram :</i> | <i>p.5</i> |
| - <i>Eccentric concentrated loads :</i> | <i>p.6</i> |
| - <i>Eccentric distributed loads :</i> | <i>p.6</i> |
| II - LTB CALCULATION | p.7 |
| <i>II.1 - LTB modes</i> | <i>p.7</i> |

WARNING !

The following software may be used for working out technical solutions during preparatory engineering studies.

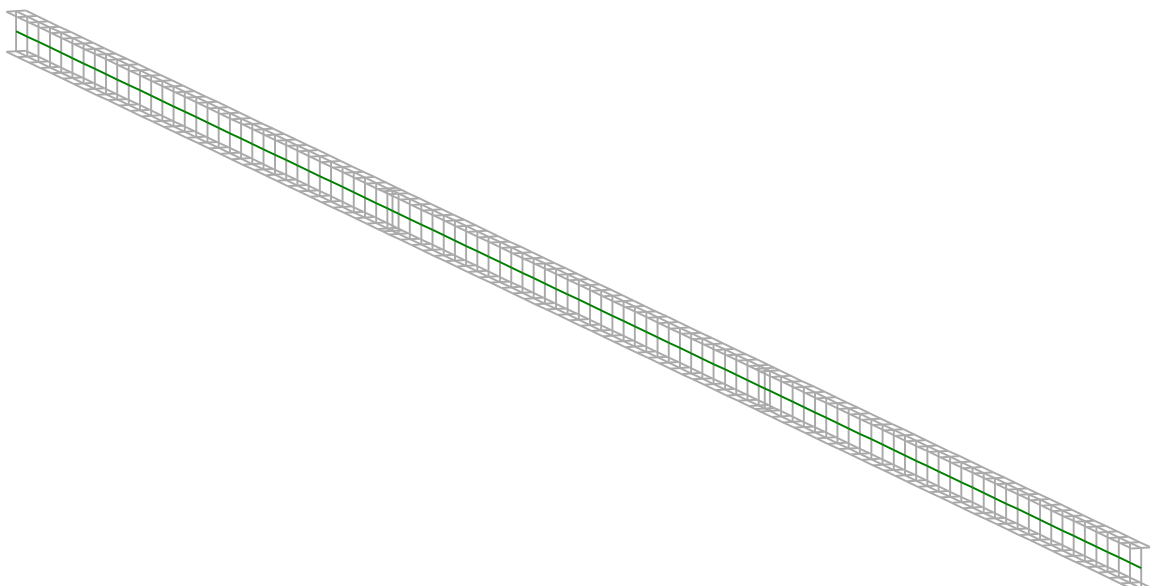
Because of the complexity of the calculations involved, the software is only for users who are able to make themselves an accurate idea of its possibilities, its limitations and adequacy to the various practical applications. The user will use it under his own responsibilities at his own risk.

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LTBeamN

v 1.0.3

CALCULATION SHEET



I - PARAMETERS

I.1 - Lateral restraints

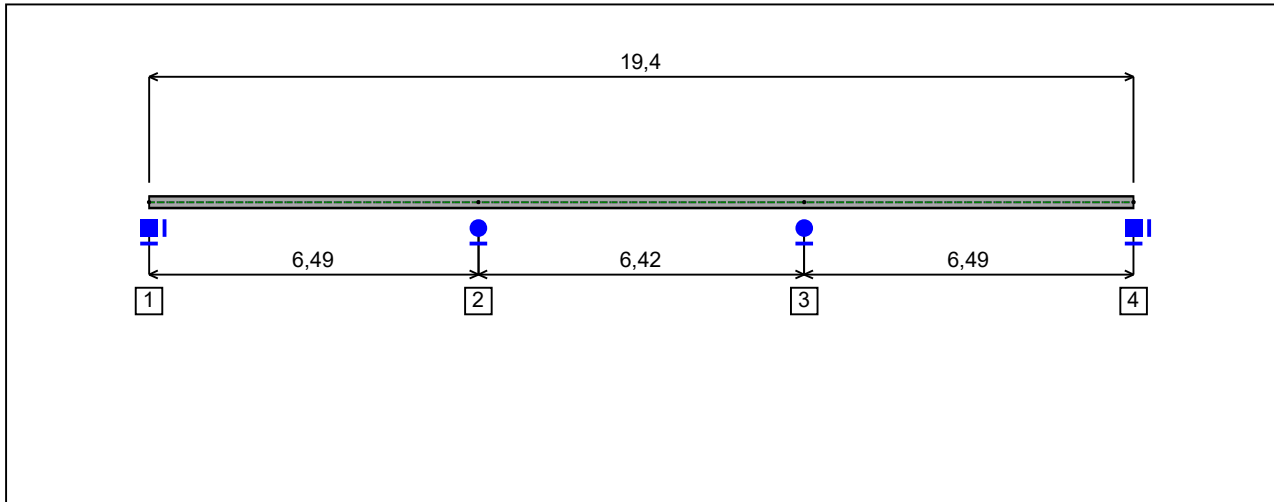


Figure 1 : Profile in long with restraint numbers.

- Restraint No. 1 :

Type : Ponctual

Abscissa from the left end of the beam : $x = 0 \text{ m}$

Vertical position from the shear centre : $z = 0 \text{ cm}$

Restraint conditions :

- v : Fixed
- θ : Fixed
- v' : Free
- θ' : Free

- Restraint No. 2 :

Type : Ponctual

Abscissa from the left end of the beam : $x = 6,49 \text{ m}$

Vertical position from the shear centre : $z = 0 \text{ cm}$

Restraint conditions :

- v : Fixed
- θ : Free
- v' : Free
- θ' : Free

- Restraint No. 3 :

Type : Ponctual

Abscissa from the left end of the beam : $x = 12,91 \text{ m}$

Vertical position from the shear centre : $z = 0 \text{ cm}$

Restraint conditions :

v : Fixed
 θ : Free
 v' : Free
 θ' : Free

- Restraint No. 4 :

Type : Ponctual

Abscissa from the left end of the beam : $x = 19,4 \text{ m}$

Vertical position from the shear centre : $z = 0 \text{ cm}$

Restraint conditions :

v : Fixed
 θ : Fixed
 v' : Free
 θ' : Free

I.2 - Supports

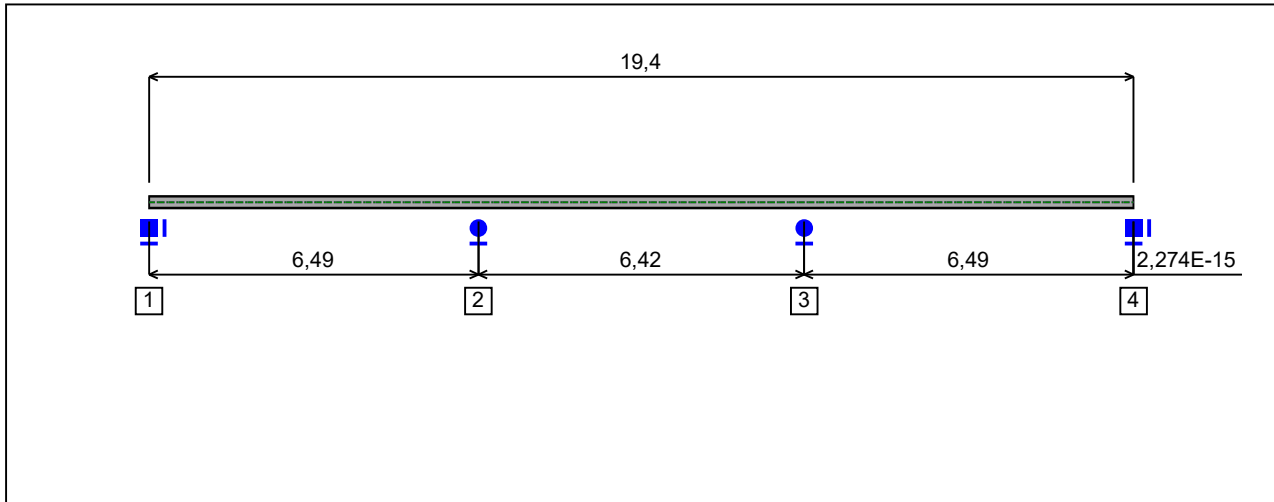


Figure 2 : Profile in long with support numbers.

- Support No. 1 :

Abscissa from the left end of the beam : $x = 0$ m

Support conditions :

- u : Fixed
- w : Fixed
- w' : Fixed

- Support No. 2 :

Abscissa from the left end of the beam : $x = 6,49$ m

Support conditions :

- u : Free
- w : Fixed
- w' : Free

- Support No. 3 :

Abscissa from the left end of the beam : $x = 12,91$ m

Support conditions :

- u : Free
- w : Fixed
- w' : Free

- Support No. 4 :

Abscissa from the left end of the beam : $x = 19,4$ m

Support conditions :

- u : Fixed
- w : Fixed

w' : Fixed

I.3 - Loads

Type of loading :

Internal

- **Moment diagram :**

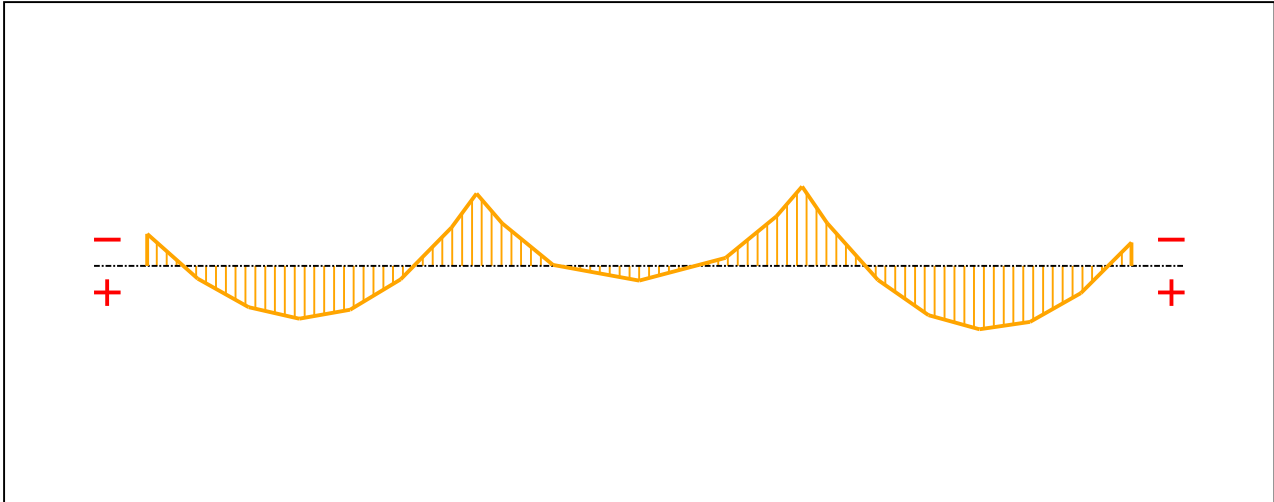


Figure 3 : Moment diagram.

Active :

Yes

Table 1 : Moment diagram.

| x(m) | M(kN.m) |
|-------|---------|
| 0 | -8,54 |
| 1 | 3,4 |
| 2 | 11 |
| 3 | 14,1 |
| 4 | 11,7 |
| 5 | 3,6 |
| 6 | -10,3 |
| 6,49 | -19,34 |
| 7 | -11,4 |
| 8 | -0,3 |
| 9,7 | 3,9 |
| 11,4 | -2,2 |
| 12,4 | -13,3 |
| 12,91 | -21,21 |
| 13,4 | -11,5 |
| 14,4 | 3,7 |

Table 1 (Next) : Moment diagram.

| x(m) | M(kN.m) |
|------|---------|
| 15,4 | 13,1 |
| 16,4 | 16,9 |
| 17,4 | 14,9 |
| 18,4 | 7,2 |
| 19,4 | -6,22 |

- Axial force diagram :

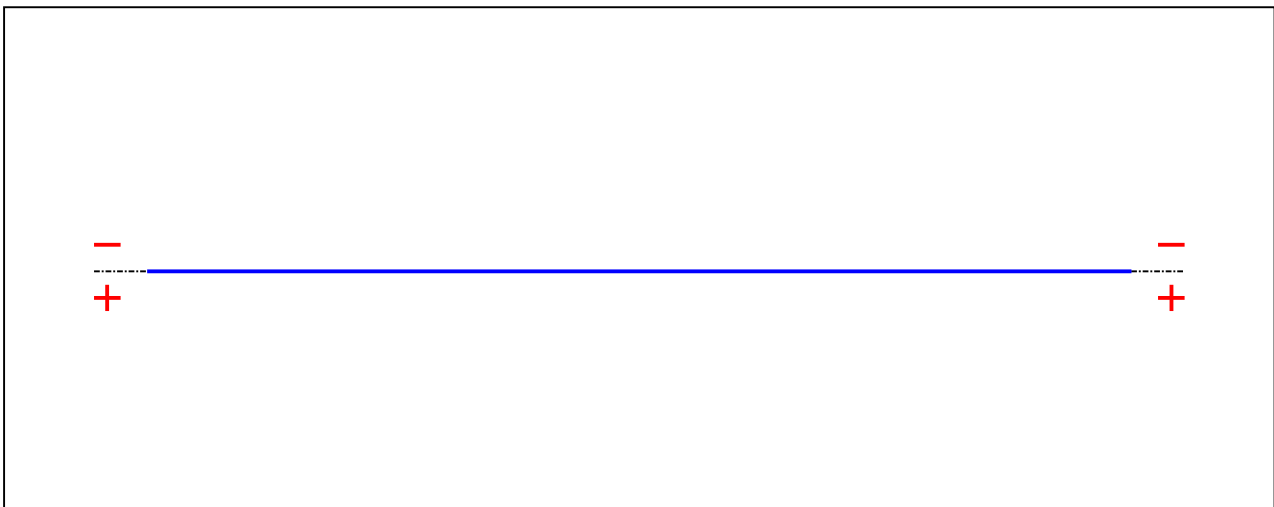


Figure 4 : Axial force diagram.

Active : Yes

Table 2 : Axial force diagram.

| x(m) | N(kN) |
|------|-------|
| 0 | 0 |
| 19,4 | 0 |

- Eccentric concentrated loads :

No load has been defined.

- Eccentric distributed loads :

No load has been defined.

II - LTB CALCULATION

Requested number of modes : 1

Blocked moment diagram : No

Blocked axial force diagram : No

II.1 - LTB modes

Table 3 : LTB modes.

| Mode | μ_{cr} | $M_{max,cr}$ [kN.m] | $x(M_{max})$ [m] | $N_{max,cr}$ [kN] | $x(N_{max})$ [m] |
|------|------------|---------------------|------------------|-------------------|------------------|
| 1 | 1,405 | -29,79 | 12,91 | 0 | 12,91 |

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WARNING !

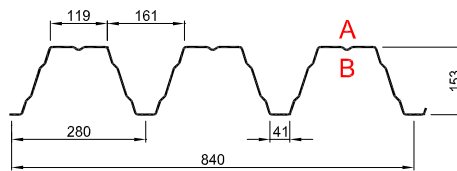
The following software may be used for working out technical solutions during preparatory engineering studies.

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| | | | |
|--|---|--|---------|
| VYPRACOVAL: Kateřina Ježová | VEDOUcí PRÁCE: doc. Ing. Michal Jandera, Ph.D. |  ČVUT – Fakulta stavební | |
| PŘEDMĚT: 134BAP | PROJEKT: Bakalářská práce – Tenisová hala | | |
| KATEDRA: Katedra ocelových a dřevěných konstrukcí | | FORMÁT: | A4 |
| | | DATUM: | 05/2018 |
| TECHNICKÉ LISTY, STATICKÉ TABULKY | | Č.: | E |

TR 150/280 pozitivní



dle ČSN EN 1993-1-3: 2010

$\gamma_{Mo} = 1,00$

Deformace = **L/200**

| | | Připustné rovnoměrné zatížení [kN/m ²] | | | | | | | | | | | | | | | | | | | | | |
|---------------|---------------------------|--|-------|-------|-------|-------|-------|-------|-------|-------|-------------|------|------|------|------|------|------|------|------|------|------|------|------|
| t_N [mm] | g [kg/m ²] | Rozpětí [m] | | | | | | | | | Rozpětí [m] | | | | | | | | | | | | |
| | | 3,50 | 3,75 | 4,00 | 4,25 | 4,50 | 4,75 | 5,00 | 5,25 | 5,50 | 5,75 | 6,00 | 6,25 | 6,50 | 6,75 | 7,00 | 7,25 | 7,50 | 7,75 | 8,00 | 8,25 | 8,50 | |
| 0,75 | 10,71 | q_{d1} | 8,01 | 6,98 | 6,13 | 5,43 | 4,85 | 4,35 | 3,93 | 3,56 | 3,24 | 2,97 | 2,73 | 2,51 | 2,32 | 2,15 | 2,00 | 1,87 | 1,74 | 1,63 | 1,53 | 1,44 | 1,36 |
| | | q_{d2} | 3,40 | 3,17 | 2,98 | 2,80 | 2,65 | 2,51 | 2,38 | 2,27 | 2,16 | 2,07 | 1,98 | 1,90 | 1,83 | 1,76 | 1,70 | 1,64 | 1,59 | 1,54 | 1,49 | 1,44 | 1,36 |
| | | q_k | 6,65 | 5,41 | 4,46 | 3,72 | 3,13 | 2,66 | 2,28 | 1,97 | 1,71 | 1,50 | 1,32 | 1,17 | 1,04 | 0,93 | 0,83 | 0,75 | 0,68 | 0,61 | 0,56 | 0,51 | 0,46 |
| 0,88 | 12,57 | q_{d1} | 9,76 | 8,50 | 7,47 | 6,62 | 5,91 | 5,30 | 4,78 | 4,34 | 3,95 | 3,62 | 3,32 | 3,06 | 2,83 | 2,62 | 2,44 | 2,27 | 2,13 | 1,99 | 1,87 | 1,76 | 1,66 |
| | | q_{d2} | 4,84 | 4,52 | 4,24 | 3,99 | 3,77 | 3,57 | 3,39 | 3,23 | 3,08 | 2,95 | 2,82 | 2,71 | 2,61 | 2,51 | 2,42 | 2,27 | 2,13 | 1,99 | 1,87 | 1,76 | 1,66 |
| | | q_k | 8,16 | 6,63 | 5,47 | 4,56 | 3,84 | 3,26 | 2,80 | 2,42 | 2,10 | 1,84 | 1,62 | 1,43 | 1,27 | 1,14 | 1,02 | 0,92 | 0,83 | 0,75 | 0,68 | 0,62 | 0,57 |
| 1,00 | 14,29 | q_{d1} | 11,41 | 9,94 | 8,73 | 7,74 | 6,90 | 6,19 | 5,59 | 5,07 | 4,62 | 4,23 | 3,88 | 3,58 | 3,31 | 3,07 | 2,85 | 2,66 | 2,48 | 2,33 | 2,18 | 2,05 | 1,93 |
| | | q_{d2} | 6,38 | 5,95 | 5,58 | 5,25 | 4,96 | 4,70 | 4,47 | 4,25 | 4,06 | 3,88 | 3,72 | 3,57 | 3,31 | 3,07 | 2,85 | 2,66 | 2,48 | 2,33 | 2,18 | 2,05 | 1,93 |
| | | q_k | 9,46 | 7,69 | 6,33 | 5,28 | 4,45 | 3,78 | 3,24 | 2,80 | 2,44 | 2,13 | 1,88 | 1,66 | 1,48 | 1,32 | 1,18 | 1,06 | 0,96 | 0,87 | 0,79 | 0,72 | 0,66 |
| 1,13 | 16,14 | q_{d1} | 13,18 | 11,48 | 10,09 | 8,94 | 7,97 | 7,16 | 6,46 | 5,86 | 5,34 | 4,88 | 4,49 | 4,13 | 3,82 | 3,54 | 3,30 | 3,07 | 2,87 | 2,69 | 2,52 | 2,37 | 2,24 |
| | | q_{d2} | 8,27 | 7,72 | 7,23 | 6,81 | 6,43 | 6,09 | 5,79 | 5,51 | 5,26 | 4,88 | 4,49 | 4,13 | 3,82 | 3,54 | 3,30 | 3,07 | 2,87 | 2,69 | 2,52 | 2,37 | 2,24 |
| | | q_k | 10,73 | 8,73 | 7,19 | 5,99 | 5,05 | 4,29 | 3,68 | 3,18 | 2,77 | 2,42 | 2,13 | 1,89 | 1,68 | 1,50 | 1,34 | 1,21 | 1,09 | 0,99 | 0,90 | 0,82 | 0,75 |
| 1,25 | 17,86 | q_{d1} | 14,74 | 12,84 | 11,28 | 9,99 | 8,91 | 8,00 | 7,22 | 6,55 | 5,97 | 5,46 | 5,01 | 4,62 | 4,27 | 3,96 | 3,68 | 3,43 | 3,21 | 3,01 | 2,82 | 2,65 | 2,50 |
| | | q_{d2} | 10,21 | 9,53 | 8,93 | 8,41 | 7,94 | 7,52 | 7,15 | 6,55 | 5,97 | 5,46 | 5,01 | 4,62 | 4,27 | 3,96 | 3,68 | 3,43 | 3,21 | 3,01 | 2,82 | 2,65 | 2,50 |
| | | q_k | 11,91 | 9,69 | 7,98 | 6,65 | 5,61 | 4,77 | 4,09 | 3,53 | 3,07 | 2,69 | 2,36 | 2,09 | 1,86 | 1,66 | 1,49 | 1,34 | 1,21 | 1,10 | 1,00 | 0,91 | 0,83 |
| 1,50 | 21,43 | q_{d1} | 17,93 | 15,62 | 13,73 | 12,16 | 10,85 | 9,73 | 8,78 | 7,97 | 7,26 | 6,64 | 6,10 | 5,62 | 5,20 | 4,82 | 4,48 | 4,18 | 3,90 | 3,66 | 3,43 | 3,23 | 3,04 |
| | | q_{d2} | 14,88 | 13,88 | 13,02 | 12,16 | 10,85 | 9,73 | 8,78 | 7,97 | 7,26 | 6,64 | 6,10 | 5,62 | 5,20 | 4,82 | 4,48 | 4,18 | 3,90 | 3,66 | 3,43 | 3,23 | 3,04 |
| | | q_k | 14,37 | 11,68 | 9,63 | 8,03 | 6,76 | 5,75 | 4,93 | 4,26 | 3,70 | 3,24 | 2,85 | 2,52 | 2,24 | 2,00 | 1,80 | 1,62 | 1,46 | 1,32 | 1,20 | 1,10 | 1,00 |
| 0,75 | 10,71 | q_{d1} | 5,10 | 4,58 | 4,13 | 3,75 | 3,42 | 3,13 | 2,88 | 2,66 | 2,46 | 2,28 | 2,13 | 1,98 | 1,86 | 1,74 | 1,64 | 1,54 | 1,45 | 1,37 | 1,30 | 1,23 | 1,17 |
| | | q_{d2} | 4,35 | 3,92 | 3,56 | 3,25 | 2,98 | 2,74 | 2,53 | 2,34 | 2,17 | 2,03 | 1,89 | 1,77 | 1,66 | 1,56 | 1,47 | 1,39 | 1,31 | 1,24 | 1,18 | 1,12 | 1,06 |
| | | q_k | 16,03 | 13,03 | 10,74 | 8,95 | 7,54 | 6,41 | 5,50 | 4,75 | 4,13 | 3,61 | 3,18 | 2,81 | 2,50 | 2,23 | 2,00 | 1,80 | 1,63 | 1,48 | 1,34 | 1,22 | 1,12 |
| 0,88 | 12,57 | q_{d1} | 6,86 | 6,15 | 5,54 | 5,03 | 4,58 | 4,19 | 3,85 | 3,55 | 3,28 | 3,05 | 2,83 | 2,64 | 2,47 | 2,32 | 2,17 | 2,05 | 1,93 | 1,82 | 1,72 | 1,63 | 1,55 |
| | | q_{d2} | 5,87 | 5,29 | 4,80 | 4,37 | 4,00 | 3,67 | 3,39 | 3,14 | 2,91 | 2,71 | 2,53 | 2,37 | 2,22 | 2,08 | 1,96 | 1,85 | 1,75 | 1,66 | 1,57 | 1,49 | 1,42 |
| | | q_k | 19,66 | 15,98 | 13,17 | 10,98 | 9,25 | 7,86 | 6,74 | 5,82 | 5,07 | 4,43 | 3,90 | 3,45 | 3,07 | 2,74 | 2,46 | 2,21 | 2,00 | 1,81 | 1,65 | 1,50 | 1,37 |
| 1,00 | 14,29 | q_{d1} | 8,54 | 7,65 | 6,89 | 6,24 | 5,68 | 5,19 | 4,76 | 4,39 | 4,05 | 3,76 | 3,49 | 3,26 | 3,04 | 2,85 | 2,67 | 2,51 | 2,37 | 2,23 | 2,11 | 2,00 | 1,90 |
| | | q_{d2} | 7,34 | 6,60 | 5,98 | 5,44 | 4,97 | 4,57 | 4,21 | 3,89 | 3,61 | 3,36 | 3,13 | 2,93 | 2,74 | 2,57 | 2,42 | 2,28 | 2,16 | 2,04 | 1,93 | 1,83 | 1,74 |
| | | q_k | 22,78 | 18,52 | 15,26 | 12,72 | 10,72 | 9,11 | 7,81 | 6,75 | 5,87 | 5,14 | 4,52 | 4,00 | 3,56 | 3,18 | 2,85 | 2,56 | 2,31 | 2,10 | 1,91 | 1,74 | 1,59 |
| 1,13 | 16,14 | q_{d1} | 10,36 | 9,26 | 8,32 | 7,52 | 6,84 | 6,24 | 5,72 | 5,26 | 4,86 | 4,50 | 4,18 | 3,89 | 3,63 | 3,40 | 3,19 | 2,99 | 2,82 | 2,66 | 2,51 | 2,36 | 2,23 |
| | | q_{d2} | 8,93 | 8,02 | 7,25 | 6,59 | 6,01 | 5,51 | 5,07 | 4,69 | 4,34 | 4,03 | 3,76 | 3,51 | 3,28 | 3,08 | 2,90 | 2,73 | 2,58 | 2,43 | 2,30 | 2,18 | 2,07 |
| | | q_k | 25,86 | 21,02 | 17,32 | 14,44 | 12,17 | 10,34 | 8,87 | 7,66 | 6,66 | 5,83 | 5,13 | 4,54 | 4,04 | 3,60 | 3,23 | 2,91 | 2,63 | 2,38 | 2,17 | 1,97 | 1,81 |
| 1,25 | 17,86 | q_{d1} | 12,08 | 10,78 | 9,68 | 8,74 | 7,93 | 7,23 | 6,62 | 6,08 | 5,61 | 5,19 | 4,82 | 4,48 | 4,18 | 3,91 | 3,66 | 3,44 | 3,22 | 3,02 | 2,83 | 2,66 | 2,51 |
| | | q_{d2} | 10,44 | 9,37 | 8,46 | 7,67 | 7,00 | 6,41 | 5,89 | 5,43 | 5,03 | 4,67 | 4,35 | 4,06 | 3,80 | 3,56 | 3,34 | 3,15 | 2,97 | 2,80 | 2,65 | 2,51 | 2,39 |
| | | q_k | 28,70 | 23,33 | 19,23 | 16,03 | 13,50 | 11,48 | 9,84 | 8,50 | 7,40 | 6,47 | 5,70 | 5,04 | 4,48 | 4,00 | 3,59 | 3,23 | 2,92 | 2,64 | 2,40 | 2,19 | 2,00 |
| 1,50 | 21,43 | q_{d1} | 15,62 | 13,89 | 12,43 | 11,20 | 10,14 | 9,22 | 8,43 | 7,73 | 7,12 | 6,57 | 6,06 | 5,59 | 5,17 | 4,80 | 4,46 | 4,16 | 3,89 | 3,64 | 3,42 | 3,22 | 3,03 |
| | | q_{d2} | 13,57 | 12,14 | 10,93 | 9,90 | 9,00 | 8,22 | 7,54 | 6,95 | 6,42 | 5,95 | 5,53 | 5,15 | 4,81 | 4,51 | 4,23 | 3,97 | 3,74 | 3,53 | 3,34 | 3,16 | 3,00 |
| | | q_k | 34,62 | 28,14 | 23,19 | 19,33 | 16,29 | 13,85 | 11,87 | 10,26 | 8,92 | 7,81 | 6,87 | 6,08 | 5,40 | 4,83 | 4,33 | 3,89 | 3,52 | 3,19 | 2,90 | 2,64 | 2,42 |

LEGENDA

Prostý nosník
 q_{d1} návrhová hodnota únosnosti : přesah TR plechu min. 230 mm za podporu
 q_{d2} návrhová hodnota únosnosti : šířka podpory min. 40 mm
 q_k charakteristická (normová) hodnota zatížení pro pružnou deformaci L/200, pro jinou mezní deformaci L/xxx přenásobte tabelizovanou hodnotou q_k koeficientem 200/xxx

Spojité nosníky
šířka vnitřní podpory min. 250 mm, šířka krajní podpory min. 125 mm
šířka vnitřní podpory min. 120 mm, šířka krajní podpory min. 40 mm

Pro zatížení osamělým břemenem (závěsem do vlny) je spolupůsobení sousedních vln minimální, bez podrobné analýzy spolupůsobení je nutné posoudit únosnost jedné samostatné vlny.

Statický návrh trapezových plechů smí provádět pouze oprávněná osoba.
Statické tabulky slouží jako pomůcka, jejich použití nesnímá z autora statického návrhu zodpovědnost za bezpečný návrh.

Tabulky platí pouze pro daný trapezový profil ze sortimentu firmy Kovové profily, spol. s r. o. z materiálu S320GD.

Pro jiné než tabelované parametry nebo pro atypické zadání kontaktujte technické oddělení firmy Kovové profily spol. s r. o.

vydání 07.2013/SZBE

Z 300-S



Únosnost dle ČSN EN 1993-1-3:

Řádek č. 1 : Únosnost bez vlivu osově síly (návrhová hodnota)

Řádek č. 2 : Únosnost s vlivem osově síly 30 kN (návrhová hodnota, osová síla v tlaku nebo tahu)

Řádek č. 3 : Únosnost pro sání bez vlivu osově síly (návrhová hodnota)

Řádek č. 4 : Únosnost pro sání s vlivem osově síly 30 kN (návrhová hodnota, osová síla v tlaku nebo tahu)

Řádek č. 5 : Maximální zatížení pro deformaci L/200 (charakteristická hodnota, únosnost dle MSÚ není zohledněna)

Řádek č. 6 : Maximální zatížení pro deformaci L/300 (charakteristická hodnota, únosnost dle MSÚ není zohledněna)

PROSTÝ NOSNÍK

| Profil G [kg/m] | | Přípustné rovnoměrné zatížení [kN/m] pro pole rozpětí L [m] | | | | | | | | | | | | | | | | |
|-----------------------------|---|---|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|
| | | 6.00 | 6.50 | 7.00 | 7.25 | 7.50 | 7.75 | 8.00 | 8.25 | 8.50 | 8.75 | 9.00 | 9.50 | 10.00 | 10.50 | 11.00 | 11.50 | 12.00 |
| Z 300/2,0 G = 7,55 kg/m | 1 | 4.09 | 3.49 | 3.01 | 2.80 | 2.62 | 2.45 | 2.30 | 2.16 | 2.04 | 1.92 | 1.82 | 1.63 | 1.47 | | | | |
| | 2 | 2.55 | 2.13 | 1.79 | 1.65 | 1.53 | 1.41 | 1.31 | 1.22 | 1.13 | 1.05 | 0.98 | 0.85 | 0.75 | | | | |
| | 3 | -1.88 | -1.58 | -1.34 | -1.24 | -1.15 | -1.07 | -1.00 | -0.93 | -0.87 | -0.81 | -0.76 | -0.67 | -0.60 | | | | |
| | 4 | -0.89 | -0.73 | -0.60 | -0.55 | -0.50 | -0.46 | -0.42 | -0.39 | -0.36 | -0.33 | -0.30 | -0.26 | -0.23 | | | | |
| | 5 | 3.65 | 2.87 | 2.30 | 2.07 | 1.87 | 1.69 | 1.54 | 1.40 | 1.28 | 1.18 | 1.08 | 0.92 | 0.79 | | | | |
| | 6 | 2.43 | 1.91 | 1.53 | 1.38 | 1.24 | 1.13 | 1.03 | 0.93 | 0.85 | 0.78 | 0.72 | 0.61 | 0.52 | | | | |
| Z 300/2,5 G = 9,44 kg/m | 1 | 5.91 | 5.04 | 4.34 | 4.05 | 3.78 | 3.54 | 3.32 | 3.13 | 2.94 | 2.78 | 2.63 | 2.36 | 2.13 | | | | |
| | 2 | 4.27 | 3.58 | 3.03 | 2.80 | 2.60 | 2.41 | 2.24 | 2.09 | 1.94 | 1.81 | 1.69 | 1.48 | 1.31 | | | | |
| | 3 | -2.69 | -2.26 | -1.92 | -1.78 | -1.65 | -1.54 | -1.43 | -1.34 | -1.25 | -1.17 | -1.10 | -0.97 | -0.86 | | | | |
| | 4 | -1.74 | -1.44 | -1.21 | -1.11 | -1.02 | -0.94 | -0.87 | -0.81 | -0.75 | -0.70 | -0.65 | -0.57 | -0.50 | | | | |
| | 5 | 4.82 | 3.80 | 3.05 | 2.75 | 2.49 | 2.26 | 2.05 | 1.87 | 1.71 | 1.56 | 1.44 | 1.22 | 1.05 | | | | |
| | 6 | 3.21 | 2.54 | 2.04 | 1.83 | 1.66 | 1.51 | 1.36 | 1.24 | 1.14 | 1.04 | 0.96 | 0.81 | 0.70 | | | | |
| Z 300/3,0 G = 11,33 kg/m | 1 | 7.72 | 6.58 | 5.67 | 5.29 | 4.94 | 4.63 | 4.34 | 4.09 | 3.85 | 3.63 | 3.43 | 3.08 | 2.78 | | | | |
| | 2 | 6.03 | 5.07 | 4.31 | 3.99 | 3.70 | 3.44 | 3.20 | 2.98 | 2.78 | 2.60 | 2.43 | 2.14 | 1.89 | | | | |
| | 3 | -3.45 | -2.90 | -2.46 | -2.28 | -2.12 | -1.97 | -1.84 | -1.71 | -1.60 | -1.50 | -1.41 | -1.25 | -1.11 | | | | |
| | 4 | -2.52 | -2.10 | -1.77 | -1.63 | -1.51 | -1.39 | -1.29 | -1.20 | -1.12 | -1.05 | -0.98 | -0.86 | -0.76 | | | | |
| | 5 | 6.08 | 4.78 | 3.83 | 3.44 | 3.11 | 2.82 | 2.56 | 2.34 | 2.14 | 1.96 | 1.80 | 1.53 | 1.31 | | | | |
| | 6 | 4.05 | 3.19 | 2.55 | 2.30 | 2.07 | 1.88 | 1.71 | 1.56 | 1.43 | 1.31 | 1.20 | 1.02 | 0.88 | | | | |

SPOJITÝ NOSNÍK O 3 NEBO 4 POLÍCH - PŘESAHY 0,6 m

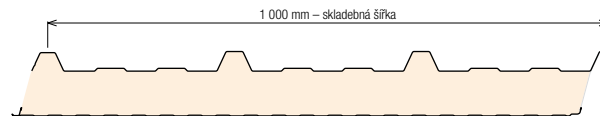
| Profil | | Přípustné rovnoměrné zatížení [kN/m] pro pole rozpětí L [m] | | | | | | | | | | | | | | | | |
|-----------|---|---|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|
| | | 6.00 | 6.50 | 7.00 | 7.25 | 7.50 | 7.75 | 8.00 | 8.25 | 8.50 | 8.75 | 9.00 | 9.50 | 10.00 | 10.50 | 11.00 | 11.50 | 12.00 |
| Z 300/2,0 | 1 | 4.67 | 3.88 | 3.26 | 2.99 | 2.76 | 2.55 | 2.36 | 2.21 | 2.07 | 1.95 | 1.83 | 1.63 | 1.45 | 1.31 | 1.18 | 1.07 | 0.98 |
| | 2 | 3.46 | 2.87 | 2.41 | 2.21 | 2.04 | 1.88 | 1.74 | 1.62 | 1.51 | 1.41 | 1.32 | 1.16 | 1.02 | 0.91 | 0.82 | 0.73 | 0.66 |
| | 3 | -3.08 | -2.59 | -2.20 | -2.04 | -1.89 | -1.76 | -1.64 | -1.53 | -1.43 | -1.34 | -1.26 | -1.12 | -1.00 | -0.89 | -0.80 | -0.73 | -0.66 |
| | 4 | -1.59 | -1.30 | -1.07 | -0.98 | -0.90 | -0.82 | -0.76 | -0.70 | -0.65 | -0.60 | -0.56 | -0.48 | -0.42 | -0.37 | -0.32 | -0.29 | -0.25 |
| | 5 | 6.90 | 5.43 | 4.34 | 3.91 | 3.53 | 3.20 | 2.91 | 2.62 | 2.37 | 2.15 | 1.95 | 1.62 | 1.42 | 1.26 | 1.12 | 1.00 | 0.86 |
| | 6 | 4.60 | 3.62 | 2.90 | 2.61 | 2.35 | 2.13 | 1.94 | 1.75 | 1.58 | 1.43 | 1.30 | 1.08 | 0.95 | 0.84 | 0.75 | 0.67 | 0.57 |
| Z 300/2,5 | 1 | 6.53 | 5.43 | 4.58 | 4.22 | 3.90 | 3.61 | 3.35 | 3.13 | 2.94 | 2.76 | 2.60 | 2.32 | 2.07 | 1.87 | 1.69 | 1.54 | 1.40 |
| | 2 | 5.77 | 4.80 | 4.04 | 3.72 | 3.43 | 3.17 | 2.94 | 2.74 | 2.56 | 2.39 | 2.24 | 1.97 | 1.74 | 1.56 | 1.40 | 1.26 | 1.14 |
| | 3 | -4.37 | -3.68 | -3.14 | -2.91 | -2.70 | -2.51 | -2.34 | -2.19 | -2.05 | -1.93 | -1.81 | -1.61 | -1.43 | -1.29 | -1.16 | -1.05 | -0.95 |
| | 4 | -2.95 | -2.45 | -2.06 | -1.89 | -1.75 | -1.61 | -1.50 | -1.39 | -1.30 | -1.21 | -1.13 | -0.99 | -0.88 | -0.78 | -0.69 | -0.62 | -0.56 |
| | 5 | 9.18 | 7.22 | 5.78 | 5.20 | 4.70 | 4.26 | 3.87 | 3.53 | 3.23 | 2.96 | 2.72 | 2.31 | 1.98 | 1.71 | 1.49 | 1.30 | 1.15 |
| | 6 | 6.12 | 4.81 | 3.85 | 3.47 | 3.13 | 2.84 | 2.58 | 2.35 | 2.15 | 1.97 | 1.81 | 1.54 | 1.32 | 1.14 | 0.99 | 0.87 | 0.76 |
| Z 300/3,0 | 1 | 8.29 | 6.91 | 5.83 | 5.38 | 4.97 | 4.61 | 4.28 | 4.01 | 3.76 | 3.54 | 3.33 | 2.97 | 2.66 | 2.40 | 2.17 | 1.98 | 1.81 |
| | 2 | 7.92 | 6.60 | 5.57 | 5.13 | 4.74 | 4.39 | 4.08 | 3.80 | 3.55 | 3.32 | 3.11 | 2.74 | 2.43 | 2.17 | 1.95 | 1.76 | 1.59 |
| | 3 | -5.58 | -4.70 | -4.01 | -3.72 | -3.45 | -3.22 | -3.00 | -2.81 | -2.63 | -2.47 | -2.32 | -2.06 | -1.84 | -1.65 | -1.48 | -1.34 | -1.22 |
| | 4 | -4.20 | -3.51 | -2.96 | -2.73 | -2.53 | -2.34 | -2.18 | -2.03 | -1.89 | -1.77 | -1.66 | -1.46 | -1.30 | -1.15 | -1.03 | -0.93 | -0.84 |
| | 5 | 11.5 | 9.05 | 7.24 | 6.52 | 5.89 | 5.34 | 4.85 | 4.43 | 4.05 | 3.71 | 3.41 | 2.90 | 2.48 | 2.15 | 1.87 | 1.63 | 1.44 |
| | 6 | 7.67 | 6.03 | 4.83 | 4.35 | 3.93 | 3.56 | 3.24 | 2.95 | 2.70 | 2.47 | 2.27 | 1.93 | 1.66 | 1.43 | 1.24 | 1.09 | 0.96 |

SPOJITÝ NOSNÍK O 5 A VÍCE POLÍCH - PŘESAHY 0,6 m + 0,9 m

| Profil | | Přípustné rovnoměrné zatížení [kN/m] pro pole rozpětí L [m] | | | | | | | | | | | | | | | | |
|---|---|---|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|
| | | 6.00 | 6.50 | 7.00 | 7.25 | 7.50 | 7.75 | 8.00 | 8.25 | 8.50 | 8.75 | 9.00 | 9.50 | 10.00 | 10.50 | 11.00 | 11.50 | 12.00 |
| krajní : Z 300/2,5 vnitřní : Z 300/2,0 | 1 | 6.23 | 5.21 | 4.40 | 4.06 | 3.76 | 3.49 | 3.24 | 3.01 | 2.80 | 2.61 | 2.43 | 2.13 | 1.87 | 1.67 | 1.49 | 1.34 | 1.21 |
| | 2 | 5.21 | 4.52 | 3.96 | 3.73 | 3.51 | 3.32 | 3.14 | 2.92 | 2.72 | 2.54 | 2.38 | 2.09 | 1.85 | 1.65 | 1.48 | 1.33 | 1.20 |
| | 3 | -4.44 | -3.73 | -3.18 | -2.95 | -2.74 | -2.55 | -2.38 | -2.22 | -2.08 | -1.95 | -1.84 | -1.63 | -1.45 | -1.30 | -1.17 | -1.06 | -0.96 |
| | 4 | -2.99 | -2.48 | -2.09 | -1.92 | -1.77 | -1.64 | -1.52 | -1.41 | -1.31 | -1.23 | -1.15 | -1.01 | -0.89 | -0.79 | -0.70 | -0.63 | -0.56 |
| | 5 | 9.36 | 7.36 | 5.90 | 5.31 | 4.79 | 4.35 | 3.95 | 3.60 | 3.29 | 3.02 | 2.77 | 2.36 | 2.02 | 1.75 | 1.52 | 1.33 | 1.17 |
| | 6 | 6.24 | 4.91 | 3.93 | 3.54 | 3.20 | 2.90 | 2.63 | 2.40 | 2.20 | 2.01 | 1.85 | 1.57 | 1.35 | 1.16 | 1.01 | 0.89 | 0.78 |
| krajní : Z 300/3,0 vnitřní : Z 300/2,5 | 1 | 8.30 | 7.04 | 6.04 | 5.62 | 5.24 | 4.90 | 4.58 | 4.26 | 3.96 | 3.69 | 3.44 | 3.01 | 2.65 | 2.36 | 2.11 | 1.90 | 1.71 |
| | 2 | 7.37 | 6.34 | 5.52 | 5.17 | 4.85 | 4.57 | 4.31 | 4.01 | 3.74 | 3.50 | 3.27 | 2.88 | 2.55 | 2.28 | 2.04 | 1.84 | 1.67 |
| | 3 | -5.68 | -4.78 | -4.08 | -3.78 | -3.51 | -3.27 | -3.05 | -2.86 | -2.67 | -2.51 | -2.36 | -2.09 | -1.87 | -1.68 | -1.51 | -1.37 | -1.24 |
| | 4 | -4.28 | -3.57 | -3.02 | -2.78 | -2.57 | -2.39 | -2.22 | -2.07 | -1.93 | -1.80 | -1.69 | -1.49 | -1.32 | -1.17 | -1.05 | -0.94 | -0.85 |
| | 5 | 11.8 | 9.28 | 7.43 | 6.69 | 6.04 | 5.48 | 4.98 | 4.54 | 4.15 | 3.80 | 3.50 | 2.97 | 2.55 | 2.20 | 1.92 | 1.68 | 1.48 |
| | 6 | 7.87 | 6.19 | 4.95 | 4.46 | 4.03 | 3.65 | 3.32 | 3.03 | 2.77 | 2.54 | 2.33 | 1.98 | 1.70 | 1.47 | 1.28 | 1.12 | 0.98 |

Střešní panel KS1000 RW 120

plech vnější/vnitřní 0,5 / 0,4 mm S280GD podle ČSN EN 14509



hodnota
zatížení

| Systém | Skupina barev | charakteristické proměnné zatížení sněhem [kN/m ²] | | | | | | | | | | | | | | | | | | | |
|----------------------------------|----------------|--|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|
| | | 0,25 | 0,50 | 0,75 | 1,00 | 1,25 | 1,50 | 1,75 | 2,00 | 2,25 | 2,50 | 2,75 | 3,00 | 3,25 | 3,50 | 3,75 | 4,00 | 4,25 | 4,50 | 4,75 | 5,00 |
| Prostý nosník | I, II, III (f) | 40 | 40 | 40 | 40 | 42 | 42 | 42 | 42 | 41 | 40 | 40 | 40 | 40 | 40 | 40 | 40 | 40 | 40 | 40 | 40 |
| | | 7,51 | 6,40 | 5,52 | 4,59 | 3,89 | 3,33 | 2,88 | 2,50 | 2,18 | 1,93 | 1,73 | 1,56 | 1,43 | 1,32 | 1,24 | 1,16 | 1,10 | 1,04 | 1,00 | 0,96 |
| Spojitý nosník o 2 polích | I (f) | 40 | 40 | 40 | 40 | 40 | 40 | 40 | 40 | 40 | 40 | 40 | 40 | 40 | 40 | 40 | 40 | 40 | 40 | 40 | 40 |
| | | 6,33 | 4,46 | 3,53 | 2,97 | 2,59 | 2,31 | 2,10 | 1,94 | 1,80 | 1,69 | 1,60 | 1,52 | 1,43 | 1,32 | 1,24 | 1,16 | 1,10 | 1,04 | 1,00 | 0,96 |
| | 60 | 60 | 60 | 60 | 60 | 60 | 60 | 62 | 64 | 67 | 69 | 72 | 74 | 76 | 75 | 75 | 75 | 76 | 76 | 77 | 77 |
| | 40 | 40 | 40 | 40 | 40 | 40 | 40 | 40 | 40 | 40 | 40 | 40 | 40 | 40 | 40 | 40 | 40 | 40 | 40 | 40 | 40 |
| | 6,33 | 4,46 | 3,53 | 2,97 | 2,59 | 2,31 | 2,10 | 1,94 | 1,80 | 1,69 | 1,60 | 1,52 | 1,43 | 1,32 | 1,24 | 1,16 | 1,10 | 1,04 | 1,00 | 0,96 | |
| | 60 | 60 | 60 | 60 | 60 | 60 | 60 | 62 | 64 | 67 | 69 | 72 | 74 | 76 | 75 | 75 | 75 | 76 | 76 | 77 | 77 |
| III (f) | 40 | 40 | 40 | 40 | 40 | 40 | 40 | 40 | 40 | 40 | 40 | 40 | 40 | 40 | 40 | 40 | 40 | 40 | 40 | 40 | 40 |
| | 6,33 | 4,46 | 3,53 | 2,97 | 2,59 | 2,31 | 2,10 | 1,94 | 1,80 | 1,69 | 1,60 | 1,52 | 1,43 | 1,32 | 1,24 | 1,16 | 1,10 | 1,04 | 1,00 | 0,96 | |
| 60 | 60 | 60 | 60 | 60 | 60 | 60 | 62 | 64 | 67 | 69 | 72 | 74 | 76 | 75 | 75 | 75 | 76 | 76 | 77 | 77 | |
| Spojitý nosník o 3 a více polích | I (f) | 40 | 40 | 40 | 40 | 40 | 40 | 40 | 40 | 40 | 40 | 40 | 40 | 40 | 40 | 40 | 40 | 40 | 40 | 40 | 40 |
| | | 7,18 | 5,02 | 3,94 | 3,30 | 2,86 | 2,55 | 2,32 | 2,13 | 1,98 | 1,86 | 1,73 | 1,56 | 1,43 | 1,32 | 1,24 | 1,16 | 1,10 | 1,04 | 1,00 | 0,96 |
| | 60 | 60 | 60 | 60 | 61 | 65 | 68 | 71 | 74 | 76 | 78 | 76 | 76 | 76 | 75 | 75 | 75 | 76 | 76 | 77 | 77 |
| | 40 | 40 | 40 | 40 | 40 | 40 | 40 | 40 | 40 | 40 | 40 | 40 | 40 | 40 | 40 | 40 | 40 | 40 | 40 | 40 | 40 |
| | 7,18 | 5,02 | 3,94 | 3,30 | 2,86 | 2,55 | 2,32 | 2,13 | 1,98 | 1,86 | 1,73 | 1,56 | 1,43 | 1,32 | 1,24 | 1,16 | 1,10 | 1,04 | 1,00 | 0,96 | |
| | 60 | 60 | 60 | 60 | 61 | 65 | 68 | 71 | 74 | 76 | 78 | 76 | 76 | 76 | 75 | 75 | 75 | 76 | 76 | 77 | 77 |
| III (f) | 40 | 40 | 40 | 40 | 40 | 40 | 40 | 40 | 40 | 40 | 40 | 40 | 40 | 40 | 40 | 40 | 40 | 40 | 40 | 40 | 40 |
| | 7,18 | 5,02 | 3,94 | 3,30 | 2,86 | 2,55 | 2,32 | 2,13 | 1,98 | 1,86 | 1,73 | 1,56 | 1,43 | 1,32 | 1,24 | 1,16 | 1,10 | 1,04 | 1,00 | 0,96 | |
| 60 | 60 | 60 | 60 | 60 | 61 | 65 | 68 | 71 | 74 | 76 | 78 | 76 | 76 | 75 | 75 | 75 | 76 | 76 | 77 | 77 | |

barevná skupina (zařídění dle odstínu v RAL)
(f) – přípustná deformace pro krátkodobé zatížení L/200,
pro dlouhodobě L/100, kde L je rozpětí mezi podporami

AA – min. šířka krajní podpory
X,XX – max. rozpon
BB – min. šířka střední podpory

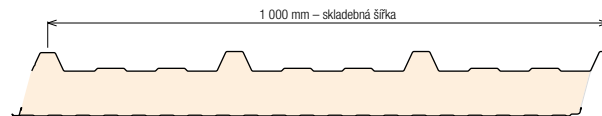
Tabulky únosnosti

KS1000 RW

Tabulka platí pro běžná proměnná klimatická zatížení. Při jiných požadavcích (dlouhodobá zatížení, teplotní zatížení v chladírnách apod.) je třeba provést zvláštní výpočet. Výpočty jsou provedeny v souladu s ČSN EN 14509. Hodnoty mezních zatížení uvedené v tabulkách porovnávejte s charakteristickými hodnotami zatížení. Výpočty berou v úvahu vlastní hmotnost panelů. Možné chyby a opomenutí vyhrazeny. Mějte prosím na paměti, že tato tabulka nenahrazuje statický výpočet.

Střešní panel KS1000 RW 120

plech vnější/vnitřní 0,5 / 0,4 mm S280GD podle ČSN EN 14509



hodnota
zatížení

| Systém | Skupina barev | charakteristické proměnné zatížení, SÁNÍ větru [kN/m ²] | | | | | | | | | | | | | | | | | | | |
|----------------------------------|----------------|---|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|
| | | 0,25 | 0,50 | 0,75 | 1,00 | 1,25 | 1,50 | 1,75 | 2,00 | 2,25 | 2,50 | 2,75 | 3,00 | 3,25 | 3,50 | 3,75 | 4,00 | 4,25 | 4,50 | 4,75 | 5,00 |
| Prostý nosník | I, II, III (f) | 7,76 | 6,63 | 5,90 | 5,37 | 4,90 | 4,54 | 4,25 | 4,00 | 3,80 | 3,61 | 3,44 | 3,28 | 3,13 | 2,99 | 2,87 | 2,76 | 2,66 | 2,53 | 2,40 | 2,29 |
| Spojité nosník o 2 polích | I (f) | 10,62 | 7,11 | 4,89 | 3,83 | 3,20 | 2,78 | 2,48 | 2,24 | 2,06 | 1,91 | 1,78 | 1,67 | 1,58 | 1,50 | 1,43 | 1,37 | 1,31 | 1,26 | 1,22 | 1,17 |
| | II (f) | 10,62 | 6,64 | 4,56 | 3,58 | 3,00 | 2,62 | 2,34 | 2,13 | 1,96 | 1,82 | 1,70 | 1,61 | 1,52 | 1,45 | 1,38 | 1,32 | 1,27 | 1,22 | 1,18 | 1,14 |
| | III (f) | 10,62 | 5,90 | 4,05 | 3,21 | 2,72 | 2,39 | 2,15 | 1,97 | 1,82 | 1,70 | 1,60 | 1,52 | 1,44 | 1,37 | 1,32 | 1,26 | 1,22 | 1,17 | 1,13 | 1,10 |
| Spojité nosník o 3 a více polích | I (f) | 12,01 | 8,37 | 5,71 | 4,41 | 3,64 | 3,12 | 2,75 | 2,47 | 2,25 | 2,08 | 1,93 | 1,81 | 1,71 | 1,62 | 1,54 | 1,47 | 1,41 | 1,36 | 1,31 | 1,26 |
| | II (f) | 12,01 | 8,04 | 5,47 | 4,22 | 3,48 | 2,98 | 2,63 | 2,37 | 2,16 | 2,00 | 1,86 | 1,75 | 1,65 | 1,57 | 1,49 | 1,43 | 1,37 | 1,32 | 1,28 | 1,23 |
| | III (f) | 12,01 | 7,54 | 5,09 | 3,92 | 3,23 | 2,78 | 2,46 | 2,22 | 2,03 | 1,88 | 1,76 | 1,66 | 1,57 | 1,49 | 1,43 | 1,37 | 1,32 | 1,27 | 1,23 | 1,19 |

Minimální šířka krajní podpory je 40 mm, minimální šířka střední podpory je 60 mm, nevyplývá-li z tabulek pro zatížení v tlaku šířka větší.

barevná skupina (zatřídění dle odstínu v RAL)
(f) – přípustná deformace pro krátkodobé zatížení L/200,
pro dlouhodobě L/100, kde L je rozpětí mezi podporami

max. rozpon

Tabulky únosnosti

KS1000 RW

C 140-S

Únosnost dle ČSN EN 1993-1-3:

Řádek č. 1 : Únosnost bez vlivu osově síly (návrhová hodnota)

Řádek č. 2 : Únosnost s vlivem osově síly 15 kN (návrhová hodnota, osová síla v tlaku nebo tahu)

Řádek č. 3 : Únosnost pro sání bez vlivu osově síly (návrhová hodnota)

Řádek č. 4 : Únosnost pro sání s vlivem osově síly 15 kN (návrhová hodnota, osová síla v tlaku nebo tahu)

Řádek č. 5 : Maximální zatížení pro deformaci L/200 (charakteristická hodnota, únosnost dle MSÚ není zohledněna)

Řádek č. 6 : Maximální zatížení pro deformaci L/300 (charakteristická hodnota, únosnost dle MSÚ není zohledněna)

PROSTÝ NOSNÍK

| Profil G [kg/m] | | Přípustné rovnoměrné zatížení [kN/m] pro pole rozpětí L [m] | | | | | | | | | | | | | | | | |
|-----------------------------------|---|---|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|
| | | 2.50 | 2.75 | 3.00 | 3.25 | 3.50 | 3.75 | 4.00 | 4.25 | 4.50 | 4.75 | 5.00 | 5.25 | 5.50 | 5.75 | 6.00 | 6.25 | 6.50 |
| C 140/1,5 G = 3,47 kg/m | 1 | 7.06 | 5.83 | 4.90 | 4.18 | 3.60 | 3.14 | 2.76 | 2.44 | 2.18 | 1.96 | 1.77 | 1.60 | 1.46 | 1.33 | 1.23 | 1.13 | 1.04 |
| | 2 | 4.97 | 4.02 | 3.31 | 2.76 | 2.33 | 1.99 | 1.71 | 1.46 | 1.25 | 1.08 | 0.93 | 0.81 | 0.71 | 0.62 | 0.55 | 0.49 | 0.43 |
| | 3 | -2.43 | -2.13 | -1.90 | -1.72 | -1.57 | -1.46 | -1.36 | -1.24 | -1.13 | -1.04 | -0.96 | -0.90 | -0.84 | -0.79 | -0.74 | -0.69 | -0.63 |
| | 4 | -1.85 | -1.61 | -1.43 | -1.29 | -1.17 | -1.07 | -1.00 | -0.90 | -0.82 | -0.75 | -0.70 | -0.65 | -0.60 | -0.56 | -0.53 | -0.47 | -0.42 |
| | 5 | 6.51 | 4.89 | 3.77 | 2.96 | 2.37 | 1.93 | 1.59 | 1.32 | 1.12 | 0.95 | 0.81 | 0.70 | 0.61 | 0.53 | 0.47 | 0.42 | 0.37 |
| | 6 | 4.34 | 3.26 | 2.51 | 1.97 | 1.58 | 1.29 | 1.06 | 0.88 | 0.74 | 0.63 | 0.54 | 0.47 | 0.41 | 0.36 | 0.31 | 0.28 | 0.25 |
| C 140/2,0 G = 4,63 kg/m | 1 | 10.89 | 9.00 | 7.56 | 6.44 | 5.55 | 4.84 | 4.25 | 3.77 | 3.36 | 3.02 | 2.72 | 2.47 | 2.25 | 2.06 | 1.89 | 1.74 | 1.61 |
| | 2 | 8.69 | 7.07 | 5.84 | 4.90 | 4.16 | 3.57 | 3.09 | 2.65 | 2.28 | 1.98 | 1.73 | 1.52 | 1.34 | 1.19 | 1.06 | 0.94 | 0.84 |
| | 3 | -3.47 | -3.07 | -2.76 | -2.52 | -2.32 | -2.16 | -2.04 | -1.86 | -1.71 | -1.58 | -1.47 | -1.37 | -1.28 | -1.21 | -1.14 | -1.06 | -0.98 |
| | 4 | -2.96 | -2.61 | -2.34 | -2.13 | -1.95 | -1.81 | -1.70 | -1.55 | -1.42 | -1.31 | -1.21 | -1.13 | -1.06 | -1.00 | -0.94 | -0.85 | -0.77 |
| | 5 | 8.90 | 6.68 | 5.15 | 4.05 | 3.24 | 2.63 | 2.17 | 1.81 | 1.53 | 1.30 | 1.11 | 0.96 | 0.84 | 0.73 | 0.64 | 0.57 | 0.51 |
| | 6 | 5.93 | 4.46 | 3.43 | 2.70 | 2.16 | 1.76 | 1.45 | 1.21 | 1.02 | 0.86 | 0.74 | 0.64 | 0.56 | 0.49 | 0.43 | 0.38 | 0.34 |

SPOJITÝ NOSNÍK O 2 POLÍCH

| Profil G [kg/m] | | Přípustné rovnoměrné zatížení [kN/m] pro pole rozpětí L [m] | | | | | | | | | | | | | | | | |
|-----------------------------------|---|---|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|
| | | 2.50 | 2.75 | 3.00 | 3.25 | 3.50 | 3.75 | 4.00 | 4.25 | 4.50 | 4.75 | 5.00 | 5.25 | 5.50 | 5.75 | 6.00 | 6.25 | 6.50 |
| C 140/1,5 G = 3,47 kg/m | 1 | 3.36 | 2.88 | 2.50 | 2.20 | 1.97 | 1.77 | 1.61 | 1.46 | 1.34 | 1.23 | 1.14 | 1.06 | 1.00 | 0.93 | 0.88 | 0.82 | 0.76 |
| | 2 | 2.66 | 2.27 | 1.97 | 1.73 | 1.54 | 1.39 | 1.26 | 1.13 | 1.01 | 0.92 | 0.83 | 0.76 | 0.70 | 0.65 | 0.60 | 0.52 | 0.46 |
| | 3 | -4.02 | -3.46 | -3.03 | -2.69 | -2.42 | -2.19 | -2.01 | -1.85 | -1.72 | -1.60 | -1.51 | -1.42 | -1.35 | -1.28 | -1.23 | -1.13 | -1.04 |
| | 4 | -3.13 | -2.68 | -2.33 | -2.05 | -1.83 | -1.65 | -1.50 | -1.31 | -1.15 | -1.02 | -0.91 | -0.81 | -0.73 | -0.66 | -0.60 | -0.52 | -0.46 |
| | 5 | 15.6 | 11.8 | 9.05 | 7.12 | 5.71 | 4.64 | 3.82 | 3.18 | 2.68 | 2.28 | 1.96 | 1.69 | 1.47 | 1.29 | 1.13 | 1.00 | 0.89 |
| | 6 | 10.4 | 7.83 | 6.04 | 4.75 | 3.80 | 3.09 | 2.55 | 2.12 | 1.79 | 1.52 | 1.30 | 1.13 | 0.98 | 0.86 | 0.75 | 0.67 | 0.59 |
| C 140/2,0 G = 4,63 kg/m | 1 | 4.83 | 4.15 | 3.62 | 3.20 | 2.86 | 2.59 | 2.36 | 2.15 | 1.98 | 1.82 | 1.70 | 1.58 | 1.48 | 1.40 | 1.32 | 1.23 | 1.15 |
| | 2 | 4.20 | 3.60 | 3.14 | 2.78 | 2.48 | 2.24 | 2.04 | 1.86 | 1.71 | 1.57 | 1.46 | 1.36 | 1.28 | 1.20 | 1.13 | 1.00 | 0.88 |
| | 3 | -5.69 | -4.92 | -4.33 | -3.87 | -3.49 | -3.19 | -2.94 | -2.73 | -2.55 | -2.39 | -2.26 | -2.15 | -2.05 | -1.97 | -1.89 | -1.74 | -1.61 |
| | 4 | -4.91 | -4.23 | -3.71 | -3.30 | -2.97 | -2.70 | -2.48 | -2.20 | -1.97 | -1.78 | -1.61 | -1.46 | -1.34 | -1.23 | -1.13 | -1.00 | -0.88 |
| | 5 | 21.4 | 16.1 | 12.4 | 9.73 | 7.79 | 6.34 | 5.22 | 4.35 | 3.67 | 3.12 | 2.67 | 2.31 | 2.01 | 1.76 | 1.55 | 1.37 | 1.22 |
| | 6 | 14.3 | 10.7 | 8.25 | 6.49 | 5.20 | 4.22 | 3.48 | 2.90 | 2.44 | 2.08 | 1.78 | 1.54 | 1.34 | 1.17 | 1.03 | 0.91 | 0.81 |

SPOJITÝ NOSNÍK O 3 POLÍCH

| Profil G [kg/m] | | Přípustné rovnoměrné zatížení [kN/m] pro pole rozpětí L [m] | | | | | | | | | | | | | | | | |
|-----------------------------------|---|---|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|------|------|------|------|------|
| | | 2.50 | 2.75 | 3.00 | 3.25 | 3.50 | 3.75 | 4.00 | 4.25 | 4.50 | 4.75 | 5.00 | 5.25 | 5.50 | 5.75 | 6.00 | 6.25 | 6.50 |
| C 140/1,5 G = 3,47 kg/m | 1 | 4.05 | 3.45 | 2.98 | 2.62 | 2.33 | 2.09 | 1.89 | 1.72 | 1.58 | 1.46 | 1.35 | 1.26 | | | | | |
| | 2 | 3.20 | 2.72 | 2.35 | 2.06 | 1.83 | 1.64 | 1.48 | 1.33 | 1.20 | 1.10 | 1.00 | 0.92 | | | | | |
| | 3 | -3.52 | -3.03 | -2.65 | -2.35 | -2.11 | -1.91 | -1.75 | -1.62 | -1.50 | -1.41 | -1.33 | -1.25 | | | | | |
| | 4 | -2.72 | -2.33 | -2.02 | -1.78 | -1.59 | -1.43 | -1.30 | -1.19 | -1.09 | -1.01 | -0.94 | -0.88 | | | | | |
| | 5 | 12.3 | 9.24 | 7.12 | 5.60 | 4.48 | 3.65 | 3.00 | 2.50 | 2.11 | 1.79 | 1.54 | 1.33 | | | | | |
| | 6 | 8.20 | 6.16 | 4.75 | 3.73 | 2.99 | 2.43 | 2.00 | 1.67 | 1.41 | 1.20 | 1.03 | 0.89 | | | | | |
| C 140/2,0 G = 4,63 kg/m | 1 | 5.80 | 4.95 | 4.30 | 3.78 | 3.37 | 3.03 | 2.75 | 2.52 | 2.31 | 2.14 | 2.00 | 1.87 | | | | | |
| | 2 | 5.04 | 4.30 | 3.73 | 3.28 | 2.92 | 2.63 | 2.38 | 2.18 | 2.00 | 1.86 | 1.73 | 1.62 | | | | | |
| | 3 | -4.97 | -4.30 | -3.79 | -3.38 | -3.05 | -2.79 | -2.56 | -2.38 | -2.23 | -2.09 | -1.98 | -1.88 | | | | | |
| | 4 | -4.28 | -3.69 | -3.24 | -2.88 | -2.59 | -2.35 | -2.16 | -2.00 | -1.87 | -1.75 | -1.65 | -1.57 | | | | | |
| | 5 | 16.8 | 12.6 | 9.74 | 7.66 | 6.13 | 4.99 | 4.11 | 3.42 | 2.89 | 2.45 | 2.10 | 1.82 | | | | | |
| | 6 | 11.2 | 8.43 | 6.49 | 5.11 | 4.09 | 3.33 | 2.74 | 2.28 | 1.92 | 1.64 | 1.40 | 1.21 | | | | | |

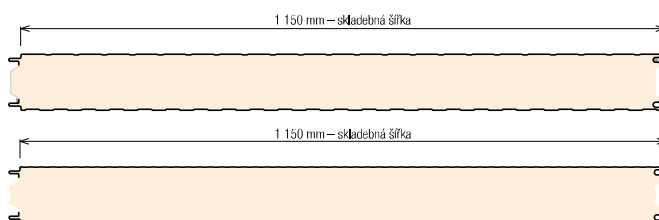
Tabulky únosnosti

KS1150 NF/TL

Stěnový panel KS1150 NF/TL 120

plech vnější/vnitřní 0,6/0,5 mm, profilace M/D, S280GD podle ČSN EN 14509

nestandardní tloušťka vnitřního plechu a profilace D



| TLAK | | | | | | | | | | |
|----------------------------------|-----------------|------------------------------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|--|
| systém | barevná skupina | charakteristické proměnné zatížení | | | | | | | | |
| | | 0,25 | 0,50 | 0,75 | 1,00 | 1,25 | 1,50 | 1,75 | 2,00 | [kN/m ²] |
| prostý nosník | I., II., III. | 40 | 40 | 53 | 65 | 76 | 85 | 94 | 102 | Význam hodnot v tabulce: AA min. šířka krajní podpory [mm] X,XX max. rozpon [m] BB min. šířka střední podpory [mm] Příklady začlenění odstínu do skupiny: I. barevná skupina RAL 1015, 7035, 9002, 9010 II. barevná skupina RAL 9006, 9007 III. barevná skupina RAL 8004, 3009, 5010, 6020, 7016, 3000 Přípustná deformace: – pro krátkodobé zatížení L/200 – pro dlouhodobá zatížení L/100 kde L je vzdálenost mezi podporami |
| | | 11,77 | 9,43 | 7,70 | 6,67 | 5,97 | 5,45 | 5,05 | 4,72 | |
| spojitý nosník o 2 polích | I. | 40 | 40 | 52 | 65 | 76 | 85 | 94 | 102 | |
| | | 12,63 | 9,15 | 7,63 | 6,67 | 5,97 | 5,45 | 5,05 | 4,72 | |
| | II. | 60 | 73 | 104 | 130 | 151 | 170 | 188 | 204 | |
| | | 12,63 | 9,15 | 7,63 | 6,67 | 5,97 | 5,45 | 5,05 | 4,72 | |
| | III. | 40 | 40 | 52 | 65 | 76 | 85 | 94 | 102 | |
| | | 60 | 73 | 104 | 130 | 151 | 170 | 188 | 204 | |
| spojitý nosník o 3 polích | I. | 40 | 40 | 53 | 65 | 76 | 85 | 94 | 102 | |
| | | 13,34 | 9,43 | 7,70 | 6,67 | 5,97 | 5,45 | 5,05 | 4,72 | |
| | II. | 60 | 77 | 106 | 130 | 151 | 170 | 188 | 204 | |
| | | 13,34 | 9,43 | 7,70 | 6,67 | 5,97 | 5,45 | 5,05 | 4,72 | |
| | III. | 40 | 40 | 53 | 65 | 76 | 85 | 94 | 102 | |
| | | 60 | 77 | 106 | 130 | 151 | 170 | 188 | 204 | |
| SÁNÍ | | | | | | | | | | |
| systém | barevná skupina | charakteristické proměnné zatížení | | | | | | | | |
| | | 0,25 | 0,50 | 0,75 | 1,00 | 1,25 | 1,50 | 1,75 | 2,00 | [kN/m ²] |
| prostý nosník | I. | 12,27 | 9,23 | 7,54 | 6,53 | 5,84 | 5,33 | 4,93 | 4,62 | Význam hodnot v tabulce: X,XX max. rozpon [m] Příklady začlenění odstínu do skupiny: I. barevná skupina RAL 1015, 7035, 9002, 9010 II. barevná skupina RAL 9006, 9007 III. barevná skupina RAL 8004, 3009, 5010, 6020, 7016, 3000 Přípustná deformace: – pro krátkodobé zatížení L/200 – pro dlouhodobá zatížení L/100 kde L je vzdálenost mezi podporami |
| | II. | 11,77 | 9,23 | 7,54 | 6,53 | 5,84 | 5,33 | 4,93 | 4,62 | |
| | III. | 10,40 | 8,99 | 7,54 | 6,53 | 5,84 | 5,33 | 4,93 | 4,62 | |
| spojitý nosník o 2 polích | I. | 12,66 | 9,16 | 7,54 | 6,53 | 5,84 | 5,33 | 4,93 | 4,62 | |
| | II. | 11,86 | 8,63 | 7,22 | 6,39 | 5,82 | 5,33 | 4,93 | 4,62 | |
| | III. | 8,45 | 6,68 | 5,87 | 5,37 | 5,03 | 4,76 | 4,55 | 4,38 | |
| spojitý nosník o 3 polích | I. | 13,05 | 9,23 | 7,54 | 6,53 | 5,84 | 5,33 | 4,93 | 4,62 | |
| | II. | 13,05 | 9,23 | 7,54 | 6,53 | 5,84 | 5,33 | 4,93 | 4,62 | |
| | III. | 11,76 | 8,53 | 7,12 | 6,28 | 5,72 | 5,31 | 4,93 | 4,62 | |

Minimální šířka krajní podpory je 40 mm, minimální šířka střední podpory je 60 mm, nevyplývá-li z tabulek pro zatížení v tlaku šířka větší.

Pozn.: Uvedené rozpory jsou vypočteny pro případ upevnění panelu ve skrytém spoji pomocí 2 šroubů s roznášecí podložkou Z15 a v místě každé podpory.

Tabulka platí pro běžná proměnná klimatická zatížení (typicky zatížení větrem dle ČSN EN 1991-1-4). Pro jiné typy profilací, jiné tloušťky povrchových plechů a pro jiné požadavky zatížení (dlouhodobá zatížení, zatížení stálým teplotním gradientem v chladárnách apod.) kontaktujte technické oddělení pro konkrétní statické posouzení. Výpočty jsou provedeny v souladu s ČSN EN 14509. Hodnoty mezních zatížení uvedené v tabulkách porovnávejte s charakteristickými hodnotami zatížení. Výpočty berou v úvahu vlastní hmotnost panelů. Možné chyby a opomenutí vyhrazeny. Mějte prosím na paměti, že tato tabulka nenahrazuje statický výpočet.

CETRIS® BASIC je cementotřísková deska s hladkým přírodním cementově šedým povrchem. Vyrábí se lisováním směsi dřevěných třísek (63% obj.), portlandského cementu (25% obj.), vody (10% obj.) a hydratačních přísad (2% obj.) standardně v tloušťkách 8, 10, 12, 14, 16, 18, 20, 22, 24, 26, 28, 30, 32 mm. Po dohodě lze dodat i desky tloušťky 34, 36, 38 a 40 mm. Základní rozměr desky je 3 350 x 1 250 mm. Desky je možné dodat řezané na zákazníkem požadovaný rozměr, se zaoblenou nebo sraženou hranou pod úhlem 45°, frézované od tl. desky 12 mm s polodrážkou, od tl. desky 16 mm s perem a drážkou. Do desek lze rovněž předvrtat otvory. Cementotřískové desky jsou určeny především jako konstrukční materiál v případech, kde je požadována současně odolnost proti vlhkosti, pevnost, nehořlavost, ekologická a hygienická nezávadnost. Desky CETRIS® neobsahují azbest ani formaldehydy, jsou odolné vůči hmyzu a působení plísní. Jsou nehořlavé a zvukově izolační. Opracování desek je možné běžnými dřevoobráběcími nástroji.

Technická specifikace:

| | |
|---------------------------------|---|
| základní formát: | 3 350 x 1 250 mm |
| tloušťky desek: | 8-10-12-14-16-18-20-22-24-26-28-30-32, po dohodě 34-36-38-40 mm |
| objemová hmotnost: | 1 150 - 1 450 kg/m ³ |
| služba: dle požadavků zákazníka | řezání, vrtání otvorů, srážení a frézování hran |
| povrch: | hladký |
| povrchová úprava: | bez povrchové úpravy |

| Tabulka základních fyzikálně mechanických vlastností cementotřískových desek CETRIS®: | Mezní hodnoty dle normy | Průměrné hodnoty - skutečné |
|---|---|---|
| Objemová hmotnost dle ČSN EN 323: | min. 1 000 kg/m ³ | 1 350 kg/m ³ |
| Pevnost v tahu za ohybu dle ČSN EN 310 | min. 9,0 N/mm ² | min. 11,5 N/mm ² |
| Modul pružnosti dle ČSN EN 310 | min. 4 500 N/mm ² | min. 6 800 N/mm ² |
| Pevnost v tahu kolmo na rovinu desky dle ČSN EN 319 | min. 0,5 N/mm ² | min. 0,63 N/mm ² |
| Rozlupčivost po cyklování ve vlhkém prostředí dle ČSN EN 321 | min. 0,3 N/mm ² | min. 0,41 N/mm ² |
| Reakce na oheň dle EN 13 501-1 | | A2-s1,d0 |
| Index šíření plamene po povrchu dle ČSN 73 0863 | | i = 0 mm/min |
| Tloušťkové bobtnání při uložení ve vodě po dobu 24 hodin | max. 1,5 % | max. 0,28 % |
| Tloušťkové bobtnání po cyklování ve vlhkém prostředí ČSN EN 321 | dle max. 1,5 % | max. 0,31 % |
| Lineární roztažnost při změně vlhkosti vzduchu z 35% na 85% 23 °C dle ČSN EN 13 009 | při | max. 0,122 % |
| Nasákavost desky při uložení ve vodě po dobu 24 hodin | | max. 16 % |
| Součinitel tepelné roztažnosti dle ČSN EN 13 471 | | 10 × 10 ⁻⁶ K ⁻¹ |
| Součinitel tepelné vodivosti dle ČSN EN 12 664, tl.8 - 40mm | | 0,200 - 0,287W/mK |
| Vzduchová neprůzvučnost dle ČSN 73 0513, tl.8 - 40mm | | 30 dB – 35 dB |
| Faktor difuzního odporu dle ČSN EN ISO 12 572, tl.8 - 40 | | 52,8 – 69,2 |
| Mrazuvzdornost při 100 cyklech dle ČSN EN 1328 | R _L > 0,7 | R _L = 0,97 |
| pH desky | | 12,5 |
| Hmotnostní aktivita Ra 226 | 150 Bq/kg | 22 Bq/kg |
| Index hmotnostní aktivity | I = 0,5 | I = 0,21 |
| Odolnosti povrchu proti působení vody a chemických rozmrazovacích látek ČSN 73 1326 | Odpad po 100 cyklech max. 800 g/m ² (metoda A) | Odpad po 100 cyklech max.20,4 g/m ² (metoda A) |
| | Odpad po 75 cyklech max. 800 g/m ² (metoda C) | Odpad po 100 cyklech max.47,8 g/m ² (metoda C) |
| Odolnost vůči obloukovému výboji vysokého napětí dle EN 61 621 | | tl. 10mm, min.143 sec |
| Součinitel smykového tření ČSN 74 4507 | | statický μ _s = 0,73 |
| | | dynamický μ _d = 0,76 |
| Hmotnostní rovnovážná vlhkost při 20° a relativní vlhkosti 50 % EN 634-1 | dle 9 ±3 % | 9,50% |