**OBLICZENIA KONSTRUKCYJNE**

**Nazwa pliku: kładkaA241119.rm3** RM\_3d v. 9.2 licencja nr 16993 **Przekroje:**

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **1 - I 140** | | **2 - I 300** | | **3 - RP 80x160x6** | |
|  | |  | |  | |
| Materiał: | S 235 | Materiał: | S 235 | Materiał: | S 235 |
| A [cm2] | 18,30 | A [cm2] | 69,10 | A [cm2] | 23,76 |
| Jy [cm4] | 573,00 | Jy [cm4] | 9800,00 | Jy [cm4] | 587,04 |
| Jz [cm4] | 35,20 | Jz [cm4] | 451,00 | Jz [cm4] | 192,05 |
| Dyz [cm4] | 0,00 | Dyz [cm4] | 0,00 | Dyz [cm4] | 0,00 |
| a [Deg] | 0,00 | a [Deg] | 0,00 | a [Deg] | 0,00 |
| Iy [cm4] | 573,00 | Iy [cm4] | 9800,00 | Iy [cm4] | 587,04 |
| Iż [cm4] | 35,20 | Iz [cm4] | 451,00 | Iz [cm4] | 192,05 |
| Jt [cm4] | 4,68 | Jt [cm4] | 60,87 | Jt [cm4] | 448,46 |
| Jw [cm4] | 1524,82 | Jw [cm4] | 90575,63 | Jw [cm4] | 466,30 |
| iy [cm] | 5,60 | iy [cm] | 11,91 | iy [cm] | 4,97 |
| iz [cm] | 1,39 | iz [cm] | 2,55 | iz [cm] | 2,84 |
| is [cm] | 5,76 | is [cm] | 12,18 | is [cm] | 5,73 |
| m [kg/m] | 14,37 | m [kg/m] | 54,24 | m [kg/m] | 18,65 |
| **4 - I 120 HEB** | | **5 - R \*8x4** | |  | |
|  | |  | |  | |
| Materiał: | S 235 | Materiał: | S 235 | Materiał: |  |
| A [cm2] | 34,00 | A [cm2] | 0,50 | A [cm2] |  |
| Jy [cm4] | 864,00 | Jy [cm4] | 0,02 | Jy [cm4] |  |
| Jz [cm4] | 318,00 | Jz [cm4] | 0,02 | Jz [cm4] |  |
| Dyz [cm4] | 0,00 | Dyz [cm4] | 0,00 | Dyz [cm4] |  |
| a [Deg] | 0,00 | a [Deg] | 0,00 | a [Deg] |  |
| Iy [cm4] | 864,00 | Iy [cm4] | 0,02 | Iy [cm4] |  |
| Iż [cm4] | 318,00 | Iz [cm4] | 0,02 | Iz [cm4] |  |
| Jt [cm4] | 13,97 | Jt [cm4] | 0,02 | Jt [cm4] |  |
| Jw [cm4] | 9409,75 | Jw [cm4] | 0,00 | Jw [cm4] |  |
| iy [cm] | 5,04 | iy [cm] | 0,20 | iy [cm] |  |
| iz [cm] | 3,06 | iz [cm] | 0,20 | iz [cm] |  |
| is [cm] | 5,90 | is [cm] | 0,28 | is [cm] |  |
| m [kg/m] | 26,69 | m [kg/m] | 0,39 | m [kg/m] |  |

**Materiały:**

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Nr: | Rodzaj: | Nazwa: | E: | G: | n: | aT: | r: | Ro: |
| [GPa] | [GPa] | [-] | [1/K] | [kg/m3] | [MPa] |
| 1 | Stal 1993 | S 235 | 210 | 81 | 0,3 | 0 | 7850 | 235 |

**Schemat:**



**Węzły:**

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| Nr: | X[m]: | Y[m]: | Z[m]: | Nr: | X[m]: | Y[m]: | Z[m]: |
| **Pozostałe** | | | | | | | |
| 1 | 0,000 | 0,000 | 0,000 | 14 | 2,460 | 9,470 | 0,000 |
| 2 | 2,460 | 0,000 | 0,000 | 15 | 0,000 | 1,050 | 0,000 |
| 3 | 0,000 | 9,860 | 0,000 | 16 | 2,460 | 1,050 | 0,000 |
| 4 | 2,460 | 9,860 | 0,000 | 17 | 0,000 | 1,050 | -0,690 |
| 5 | 0,000 | 1,660 | 0,000 | 18 | 2,460 | 1,050 | -0,690 |
| 6 | 2,460 | 1,660 | 0,000 | 19 | 0,300 | 0,000 | 0,000 |
| 7 | 0,000 | 3,320 | 0,000 | 20 | 0,300 | 9,860 | 0,000 |
| 8 | 2,460 | 3,320 | 0,000 | 21 | 0,920 | 0,000 | 0,000 |
| 9 | 0,000 | 5,370 | 0,000 | 22 | 0,920 | 9,860 | 0,000 |
| 10 | 2,460 | 5,370 | 0,000 | 23 | 1,540 | 0,000 | 0,000 |
| 11 | 0,000 | 7,420 | 0,000 | 24 | 1,540 | 9,860 | 0,000 |
| 12 | 2,460 | 7,420 | 0,000 | 25 | 2,160 | 0,000 | 0,000 |
| 13 | 0,000 | 9,470 | 0,000 | 26 | 2,160 | 9,860 | 0,000 |

**Podpory:**

|  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Węzeł: | Orientacja [deg] | | | Obrót | | | Przesuw | | Wymuszenia [m][deg] i podatności [m/kN] [rad/kNm] |
| a | f | y | x | y | z | x | y |
| 3 | 0,0 | 0,0 | 0,0 | + | + |  |  | + |  |
| 4 | 0,0 | 0,0 | 0,0 | + | + |  |  | + |  |
| 17 | 0,0 | 0,0 | 0,0 | + | + |  |  |  |  |
| 18 | 0,0 | 0,0 | 0,0 | + | + |  |  |  |  |



**Pręty:**

|  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Nr: | Węzły: | | Mocowania | Podatności | Mimośrody | Orient. | L[m]: | F [m]: | Przekrój: |
| A: | B: | Imperfekcje | [deg] |
| **Rygle X** | | | | | | | | | |
| 1 | 1 | 2 | P.P.: Sztywne |  |  | 0,0 | 2,460 |  | 1 I 140 |
| 2 | 3 | 4 | P.P.: Sztywne |  |  | 0,0 | 2,460 |  | 1 I 140 |
| 5 | 5 | 6 | P.P.: Sztywne |  |  | 0,0 | 2,460 |  | 1 I 140 |
| 6 | 7 | 8 | P.P.: Sztywne |  |  | 0,0 | 2,460 |  | 1 I 140 |
| 7 | 9 | 10 | P.P.: Sztywne |  |  | 0,0 | 2,460 |  | 1 I 140 |
| 8 | 11 | 12 | P.P.: Sztywne |  |  | 0,0 | 2,460 |  | 1 I 140 |
| 9 | 13 | 14 | P.P.: Sztywne |  |  | 0,0 | 2,460 |  | 1 I 140 |
| **Rygle Y** | | | | | | | | | |
| 3 | 1 | 3 | P.P.: Sztywne |  |  | 0,0 | 9,860 |  | 2 I 300 |
| 4 | 2 | 4 | P.P.: Sztywne |  |  | 0,0 | 9,860 |  | 2 I 300 |
| 12 | 19 | 20 | P.P.: Sztywne |  |  | 0,0 | 9,860 |  | 3 RP 80x160x6 |
| 13 | 21 | 22 | P.P.: Sztywne |  |  | 0,0 | 9,860 |  | 3 RP 80x160x6 |
| 14 | 23 | 24 | P.P.: Sztywne |  |  | 0,0 | 9,860 |  | 3 RP 80x160x6 |
| 15 | 25 | 26 | P.P.: Sztywne |  |  | 0,0 | 9,860 |  | 3 RP 80x160x6 |
| **Podłoga** | | | | | | | | | |
| 16 | 2 | 5 | P.P.: Brak |  | Dx:2,0 mm | 0,0 | 2,968 |  | 5 R \*8x4 |
| 17 | 5 | 8 | P.P.: Brak |  | Dx:2,0 mm | 0,0 | 2,968 |  | 5 R \*8x4 |
| 18 | 8 | 9 | P.P.: Brak |  | Dx:2,0 mm | 0,0 | 3,202 |  | 5 R \*8x4 |
| 19 | 9 | 12 | P.P.: Brak |  | Dx:2,0 mm | 0,0 | 3,202 |  | 5 R \*8x4 |
| 20 | 12 | 3 | P.P.: Brak |  | Dx:2,0 mm | 0,0 | 3,465 |  | 5 R \*8x4 |
| 21 | 1 | 6 | P.P.: Brak |  | Dx:2,0 mm | 0,0 | 2,968 |  | 5 R \*8x4 |
| 22 | 6 | 7 | P.P.: Brak |  | Dx:2,0 mm | 0,0 | 2,968 |  | 5 R \*8x4 |
| 23 | 7 | 10 | P.P.: Brak |  | Dx:2,0 mm | 0,0 | 3,202 |  | 5 R \*8x4 |
| 24 | 10 | 11 | P.P.: Brak |  | Dx:2,0 mm | 0,0 | 3,202 |  | 5 R \*8x4 |
| 25 | 11 | 4 | P.P.: Brak |  | Dx:2,0 mm | 0,0 | 3,465 |  | 5 R \*8x4 |
| **Pozycja nr 12** | | | | | | | | | |
| 10 | 16 | 18 | P.P.: Sztywne |  |  | 90,0 | 0,690 |  | 4 I 120 HEB |
| 11 | 15 | 17 | P.P.: Sztywne |  |  | 90,0 | 0,690 |  | 4 I 120 HEB |

**Zestawienie Materiału**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Oznaczenie | Materiał | Długości [m]: | | Masa [t]: |
| I 140 | 1 - S 235 | 7x2,46 = 17,22 | | 0,247 |
| I 300 | 1 - S 235 | 2x9,86 = 19,72 | | 1,070 |
| I 120 HEB | 1 - S 235 | 2x0,69 = 1,38 | | 0,037 |
| H \*140x70x6 | 1 - S 235 | 4x9,86 = 39,44 | | 0,736 |
| R \*8x4 | 1 - S 235 | 4x2,97 + 4x3,20 + 2x3,46 = 31,61 | | 0,012 |
| Masa całkowita ustroju | | | | **2,102** |
| Materiał | | | Jednostka miary | Ilość: |
| Stal 1993: 1 - S 235 | | | t | 2,102 |



**Obciążenia:**

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Nr | Rodzaj: | Wartości char. | | Współczynniki | | Orient. | Kier.: | | Położenie | | Nazwa: |  | |
| Pręta | Pa: | Pb: | gG,sup(gQ): | gG,inf: | [deg] | [deg] | | xa: | xb: |
| **CW: Ciężar własny - Stałe gG,sup=1,4 gG,inf=1** | | | | | | | | | | | | | |
| **St: Stałe - Stałe** | | | | | | | | | | | | | |
|  | Powierzch. | 1,00 | 1,00 | 1,35 | 1,00 |  | |  |  |  | Powierzchniowe | |  |
| **A: Śnieg - Zmienne y0=0,5 y1=0,2 y2=0** | | | | | | | | | | | | | |
|  | Powierzch. | 1,00 | 1,00 | 1,50 |  |  | |  |  |  | Powierzchniowe | |  |
| **B: Użytkowe komunika 5,0kN/m2 - Zmienne y0=0,7 y1=0,7 y2=0,6** | | | | | | | | | | | | | |
|  | Powierzch. | 5,00 | 5,00 | 1,50 |  |  | |  |  |  | Powierzchniowe | |  |

**Wyniki wymiarowania stali wg PN-EN 1993** (Stal1993\_3d v. 1.105 licencja nr 16993) **Teoria II-go rzędu**

Nazwa pliku: kładkaA241119.rm3 a

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| Nr pręta: | Grupa: | Przekrój: | Warunek decydujący: | Nośność: | | Kombinacja obc. | |
| 7 | Podłoga / Rygle X | 1 - I 140 | Zginanie | 0,599 |  | | 1,35·0,85·(CW+St)+1,5·(0,5·A+**B**) (b) |
| 8 | Podłoga / Rygle X | 1 - I 140 | Zginanie | 0,576 |  | | 1,35·0,85·(CW+St)+1,5·(0,5·A+**B**) (b) |
| 6 | Podłoga / Rygle X | 1 - I 140 | Zginanie | 0,567 |  | | 1,35·0,85·(CW+St)+1,5·(0,5·A+**B**) (b) |
| 5 | Podłoga / Rygle X | 1 - I 140 | Zginanie | 0,546 |  | | 1,35·0,85·(CW+St)+1,5·(0,5·A+**B**) (b) |
| 9 | Podłoga / Rygle X | 1 - I 140 | Zginanie | 0,333 |  | | 1,35·0,85·(CW+St)+1,5·(0,5·A+**B**) (b) |
| 1 | Podłoga / Rygle X | 1 - I 140 | Zginanie | 0,326 |  | | 1,35·0,85·(CW+St)+1,5·(0,5·A+**B**) (b) |
| 2 | Podłoga / Rygle X | 1 - I 140 | Zginanie | 0,257 |  | | 1,35·0,85·(CW+St)+1,5·(0,5·A+**B**) (b) |
| 3 | Podłoga / Rygle Y | 2 - I 300 | SGU | 0,838 |  | | CW+St+0,5·A+**B** |
| 4 | Podłoga / Rygle Y | 2 - I 300 | SGU | 0,838 |  | | CW+St+0,5·A+**B** |
| 13 | Podłoga / Rygle Y | 3 - RP 80x160x6 | SGU | 0,939 |  | | CW+St+0,5·A+**B** |
| 14 | Podłoga / Rygle Y | 3 - RP 80x160x6 | SGU | 0,939 |  | | CW+St+0,5·A+**B** |
| 15 | Podłoga / Rygle Y | 3 - RP 80x160x6 | SGU | 0,903 |  | | CW+St+0,5·A+**B** |
| 12 | Podłoga / Rygle Y | 3 - RP 80x160x6 | SGU | 0,902 |  | | CW+St+0,5·A+**B** |
| 10 | Pozycja nr 12 | 4 - I 120 HEB | Zginanie i ściskanie (Stateczność) | 0,138 |  | | 1,35·0,85·(CW+St)+1,5·(0,5·A+**B**) (b) |
| 11 | Pozycja nr 12 | 4 - I 120 HEB | Zginanie i ściskanie (Stateczność) | 0,138 |  | | 1,35·0,85·(CW+St)+1,5·(0,5·A+**B**) (b) |
| 16 | Podłoga | 5 - R \*8x4 | Zginanie | 0,840 |  | | CW+1,35·0,85·St+1,5·**A** (b) |
| 21 | Podłoga | 5 - R \*8x4 | Zginanie | 0,840 |  | | CW+1,35·0,85·St+1,5·(0,5·A+**B**) (b) |
| 17 | Podłoga | 5 - R \*8x4 | Zginanie | 0,834 |  | | CW+1,35·0,85·St+1,5·(0,5·A+**B**) (b) |
| 22 | Podłoga | 5 - R \*8x4 | Zginanie | 0,833 |  | | CW+1,35·0,85·St+1,5·(0,5·A+**B**) (b) |
| 19 | Podłoga | 5 - R \*8x4 | Zginanie | 0,777 |  | | CW+1,35·0,85·St+1,5·(0,5·A+**B**) (b) |
| 23 | Podłoga | 5 - R \*8x4 | Zginanie | 0,776 |  | | CW+1,35·0,85·St+1,5·(0,5·A+**B**) (b) |
| 18 | Podłoga | 5 - R \*8x4 | Zginanie | 0,775 |  | | CW+1,35·0,85·St+1,5·(0,5·A+**B**) (b) |
| 24 | Podłoga | 5 - R \*8x4 | Zginanie | 0,775 |  | | CW+1,35·0,85·St+1,5·(0,5·A+**B**) (b) |
| 25 | Podłoga | 5 - R \*8x4 | Zginanie | 0,734 |  | | CW+1,35·0,85·St+1,5·**B** (b) |
| 20 | Podłoga | 5 - R \*8x4 | Zginanie | 0,732 |  | | CW+1,35·0,85·St+1,5·(0,5·A+**B**) (b) |