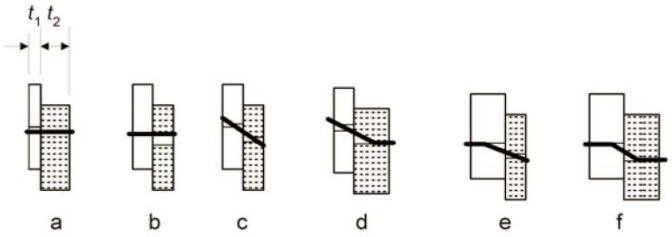
Medsraigčio laikomoji galia veikiant skersinei ir ašinei apkrovoms sykiu trumpalaikės trukmės veikimo apkrovai



Apkrovos krypties kampas medienos pluostu atzvilgiu: $\alpha := 37 \cdot deg$

Medienos storiai: $t_1 := 45 \cdot mm$

$t_2 := 65 \cdot mm$

Junges liemens skersmuo: $d := 6 \cdot mm$

Junges galvutes skersmuo: $d_h := 21 \cdot mm$

Junges sriegio ilgis elemente: $l_{ef} := 65 \cdot mm$

Junges metalo stipris pagal stiprumo ribą: $f_u := 600MPa$

Medienos ir jungės asinis istraukiamasis stipris: $f_{ax.k} := 11.4MPa$

Medienos ir jungės galvutės istraukiamasis stipris: $f_{head.k} := 12MPa$

Junges tempiamoji galia: $f_{tens.k} := 11kN$

Efektyvus jungiu skaicius su pluostu lygiagrecioje eileje: $n_{ef} := 2$

Slyties plokstumu skaicius: $n_v := 1$

Eiliu skaicius: $m_{ef} := 1$

Medienos tankis: $\rho_{k1} := 350 \frac{kg}{m^3}$

$\rho_{k2} := 350 \frac{kg}{m^3}$

Modifikacijos koeficientas: $k_{mod} := 0.9$

Koeficientas: $\gamma_M := 1.3$

$f_{h.1.k} := 0.082 \cdot d_l^{0.3} \cdot \rho_{k1l} \cdot MPa = 49.128 \cdot MPa$

$f_{h.2.k} := 0.082 \cdot d_l^{0.3} \cdot \rho_{k2l} \cdot MPa = 49.128 \cdot MPa$

$\beta := \frac{f_{h.2.k}}{f_{h.1.k}} = 1$

$M_{y.k} := 0.15 \cdot f_{u.l} \cdot d_l^{2.6} \cdot N \cdot mm = 9.494 \times 10^3 \cdot N \cdot mm$

Junges ištraukiamoji galia:

$$F_{ax.Rk} := \begin{bmatrix} \frac{n_{ef.j} \cdot f_{ax.k} \cdot d \cdot l_{ef}}{1.2 \cdot (cos(\alpha))^2 + (sin(\alpha))^2} \cdot \left(\frac{min(\rho_{k1l}, \rho_{k2l})}{350} \right)^{0.8} \\ n_{ef.j} \cdot f_{head.k} \cdot d_h^2 \cdot \left(\frac{min(\rho_{k1l}, \rho_{k2l})}{350} \right)^{0.8} \\ f_{tens.k} \end{bmatrix} = \begin{pmatrix} 788.603 \\ 1.058 \times 10^3 \\ 1.1 \times 10^3 \end{pmatrix} \cdot kg$$

$min(F_{ax.Rk}) = 7.886 \cdot kN$

Vienpuses šlyties skersinės apkrovos veikiamos junges laikomoji galia

$$F_{v.Rk} := \begin{bmatrix} f_{h.1.k} \cdot t_1 \cdot d \\ f_{h.2.k} \cdot t_2 \cdot d \\ \frac{f_{h.1.k} \cdot t_1 \cdot d}{1+\beta} \cdot \left[\sqrt{\beta + 2\beta^2 \cdot \left[1 + \frac{t_2}{t_1} + \left(\frac{t_2}{t_1} \right)^2 \right] + \beta^3 \cdot \left(\frac{t_2}{t_1} \right)^2} - \beta \cdot \left(1 + \frac{t_2}{t_1} \right) \right] + \frac{min\left(F_{ax.Rk}\right)}{4} \\ 1.05 \frac{f_{h.1.k} \cdot t_1 \cdot d}{2+\beta} \cdot \left[\sqrt{2\beta \cdot (1+\beta) + \frac{4 \cdot \beta \cdot (2+\beta) \cdot M_{y.k}}{f_{h.1.k} \cdot d \cdot t_1^{\,2}}} - \beta \right] + \frac{min\left(F_{ax.Rk}\right)}{4} \\ 1.05 \frac{f_{h.1.k} \cdot t_2 \cdot d}{1+2\beta} \cdot \left[\sqrt{2\beta^2 \cdot (1+\beta) + \frac{4 \cdot \beta \cdot (1+2\beta) \cdot M_{y.k}}{f_{h.1.k} \cdot d \cdot t_2^{\,2}}} - \beta \right] + \frac{min\left(F_{ax.Rk}\right)}{4} \\ 1.15 \cdot \sqrt{\frac{2\beta}{1+\beta}} \cdot \sqrt{2M_{y.k} \cdot f_{h.1.k} \cdot d} + \frac{min\left(F_{ax.Rk}\right)}{4} \end{bmatrix} = \begin{pmatrix} 1.326 \times 10^3 \\ 1.916 \times 10^3 \\ 887.552 \\ 683.302 \\ 882.994 \\ 469.214 \end{pmatrix} kg$$

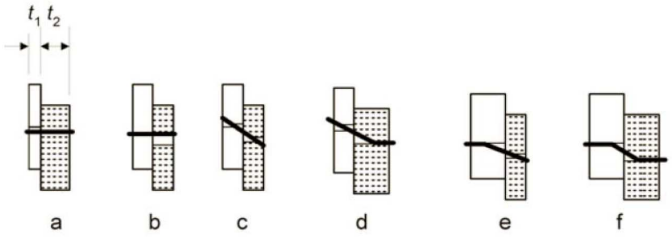
$$F_{j.Rk} := n_{ef}^{\,0.7} \cdot m_{ef} \cdot n_v \cdot min\left(F_{v.Rk}\right) = 7.622\,kN$$

Ištraukiamoji ir skersinė galia:

$$N_{t.k} := \frac{1}{\sqrt{\left(\frac{cos(\alpha)}{min\left(F_{ax.Rk}\right)} \right)^2 + \left(\frac{sin(\alpha)}{F_{j.Rk}} \right)^2}} = 7.787\,kN$$

$$N_{t.d} := \frac{N_{t.k} \cdot k_{mod}}{\gamma_M} = 5.391\,kN$$

Medsraigčio laikomoji galia veikiant skersinei ir ašinei apkrovoms sykiu momentinės trukmės veikimo apkrovai



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Junges tempiamoji galia: $f_{tens.k} := 11kN$

Efektyvus jungiu skaicius su pluostu lygiagrecioje eileje: $n_{ef} := 2$

Slyties plokstumu skaicius: $n_v := 1$

Eiliu skaicius: $m_{ef} := 1$

Medienos tankis: $\rho_{k1} := 350 \frac{kg}{m^3}$

$\rho_{k2} := 350 \frac{kg}{m^3}$

Modifikacijos koeficientas: $k_{mod} := 1.1$

Koeficientas: $\gamma_M := 1.3$

$f_{h.1.k} := 0.082 \cdot d_l^{0.3} \cdot \rho_{k1l} \cdot MPa = 49.128 \cdot MPa$

$f_{h.2.k} := 0.082 \cdot d_l^{0.3} \cdot \rho_{k2l} \cdot MPa = 49.128 \cdot MPa$

$\beta := \frac{f_{h.2.k}}{f_{h.1.k}} = 1$

$M_{y.k} := 0.15 \cdot f_{u.l} \cdot d_l^{2.6} \cdot N \cdot mm = 9.494 \times 10^3 \cdot N \cdot mm$

Junges ištraukiamoji galia:

$$F_{ax.Rk} := \begin{bmatrix} \frac{n_{ef.j} \cdot f_{ax.k} \cdot d \cdot l_{ef}}{1.2 \cdot (cos(\alpha))^2 + (sin(\alpha))^2} \cdot \left(\frac{min(\rho_{k1l}, \rho_{k2l})}{350} \right)^{0.8} \\ n_{ef.j} \cdot f_{head.k} \cdot d_h^2 \cdot \left(\frac{min(\rho_{k1l}, \rho_{k2l})}{350} \right)^{0.8} \\ f_{tens.k} \end{bmatrix} = \begin{pmatrix} 788.603 \\ 1.058 \times 10^3 \\ 1.1 \times 10^3 \end{pmatrix} \cdot kg$$

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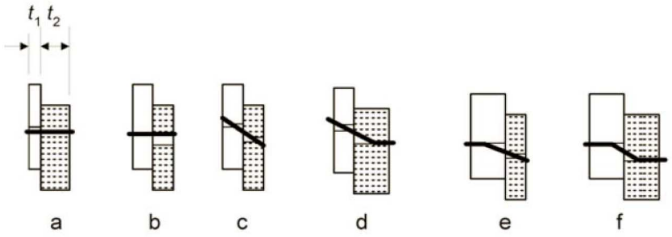
$$F_{j.Rk} := n_{ef}^{\,0.7} \cdot m_{ef} \cdot n_v \cdot min\left(F_{v.Rk}\right) = 7.622\,kN$$

Ištraukiamoji ir skersinė galia:

$$N_{t.k} := \frac{1}{\sqrt{\left(\frac{cos(\alpha)}{min\left(F_{ax.Rk}\right)} \right)^2 + \left(\frac{sin(\alpha)}{F_{j.Rk}} \right)^2}} = 7.787\,kN$$

$$N_{t.d} := \frac{N_{t.k} \cdot k_{mod}}{\gamma_M} = 6.589\,kN$$

Medsraigčio laikomoji galia veikiant skersinei trupalaikės trukmės veikimo apkrovai



Apkrovos krypties kampas medienos pluostu atzvilgiu: $\alpha := 42.4 \cdot deg$

Medienos storiai: $t_1 := 95 \cdot mm$

$t_2 := 53 \cdot mm$

Junges liemens skersmuo: $d := 6 \cdot mm$

Junges galvutes skersmuo: $d_h := 21 \cdot mm$

Junges sriegio ilgis elemente: $l_{ef} := \min\left(65 \cdot mm, t_2\right) = 53 \cdot mm$

Junges metalo stipris pagal stiprumo ribą: $f_u := 600MPa$

Medienos ir jungės asinis istraukiamasis stipris: $f_{ax.k} := 11.4MPa$

Medienos ir jungės galvutės istraukiamasis stipris: $f_{head.k} := 12MPa$

Junges tempiamoji galia: $f_{tens.k} := 11kN$

Efektyvus jungiu skaicius su pluostu lygiagrecioje eileje: $n_{ef} := 2$

Slyties plokstumu skaicius: $n_v := 1$

Eiliu skaicius: $m_{ef} := 1$

Medienos tankis: $\rho_{k1} := 350 \frac{kg}{m^3}$

$\rho_{k2} := 350 \frac{kg}{m^3}$

Modifikacijos koeficientas: $k_{mod} := 0.9$

Koeficientas: $\gamma_M := 1.3$

$f_{h.1.k} := 0.082 \cdot d_l^{0.3} \cdot \rho_{k1l} \cdot MPa = 49.128 \cdot MPa$

$f_{h.2.k} := 0.082 \cdot d_l^{0.3} \cdot \rho_{k2l} \cdot MPa = 49.128 \cdot MPa$

$\beta := \frac{f_{h.2.k}}{f_{h.1.k}} = 1$

$M_{y.k} := 0.15 \cdot f_{u.l} \cdot d_l^{2.6} \cdot N \cdot mm = 9.494 \times 10^3 \cdot N \cdot mm$

Junges ištraukiamoji galia:

$$F_{ax.Rk} := \begin{bmatrix} \frac{n_{ef.j} \cdot f_{ax.k} \cdot d \cdot l_{ef}}{1.2 \cdot (\cos(\alpha))^2 + (\sin(\alpha))^2} \cdot \left(\frac{\min\left(\rho_{k1l}, \rho_{k2l}\right)}{350}\right)^{0.8} \\ n_{ef.j} \cdot f_{head.k} \cdot d_h^2 \cdot \left(\frac{\min\left(\rho_{k1l}, \rho_{k2l}\right)}{350}\right)^{0.8} \\ f_{tens.k} \end{bmatrix} = \begin{pmatrix} 653.741 \\ 1.058 \times 10^3 \\ 1.1 \times 10^3 \end{pmatrix} \cdot kg$$

$\min\left(F_{ax.Rk}\right) = 6.537 \cdot kN$

Vienpuses šlyties skersinės apkrovos veikiamos junges laikomoji galia

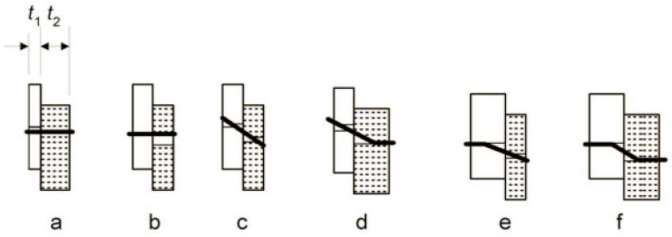
$$F_{v.Rk} := \begin{bmatrix} f_{h.1.k} \cdot t_1 \cdot d \\ f_{h.2.k} \cdot t_2 \cdot d \\ \frac{f_{h.1.k} \cdot t_1 \cdot d}{1+\beta} \cdot \left[\sqrt{\beta + 2\beta^2 \cdot \left[1 + \frac{t_2}{t_1} + \left(\frac{t_2}{t_1} \right)^2 \right] + \beta^3 \cdot \left(\frac{t_2}{t_1} \right)^2} - \beta \cdot \left(1 + \frac{t_2}{t_1} \right) \right] + \frac{min\left(F_{ax.Rk}\right)}{4} \\ 1.05 \frac{f_{h.1.k} \cdot t_1 \cdot d}{2+\beta} \cdot \left[\sqrt{2\beta \cdot (1+\beta) + \frac{4 \cdot \beta \cdot (2+\beta) \cdot M_{y.k}}{f_{h.1.k} \cdot d \cdot t_1^{\,2}}} - \beta \right] + \frac{min\left(F_{ax.Rk}\right)}{4} \\ 1.05 \frac{f_{h.1.k} \cdot t_2 \cdot d}{1+2\beta} \cdot \left[\sqrt{2\beta^2 \cdot (1+\beta) + \frac{4 \cdot \beta \cdot (1+2\beta) \cdot M_{y.k}}{f_{h.1.k} \cdot d \cdot t_2^{\,2}}} - \beta \right] + \frac{min\left(F_{ax.Rk}\right)}{4} \\ 1.15 \cdot \sqrt{\frac{2\beta}{1+\beta}} \cdot \sqrt{2M_{y.k} \cdot f_{h.1.k} \cdot d} + \frac{min\left(F_{ax.Rk}\right)}{4} \end{bmatrix} = \begin{pmatrix} 2.8 \times 10^3 \\ 1.562 \times 10^3 \\ 1.128 \times 10^3 \\ 1.154 \times 10^3 \\ 728.877 \\ 435.499 \end{pmatrix} kg$$

$$F_{j.Rk} := n_{ef}^{\,0.7} \cdot m_{ef} \cdot n_v \cdot min\left(F_{v.Rk}\right) = 7.075 \cdot kN$$

Skersinė galia:

$$F_{v.d} := \frac{F_{j.Rk} \cdot k_{mod}}{\gamma_M} = 4.898 \cdot kN$$

Medsraigčio laikomoji galia veikiant skersinei vidutinei trukmės veikimo apkrovai



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$\rho_{k2} := 350 \frac{kg}{m^3}$

Modifikacijos koeficientas: $k_{mod} := 0.8$

Koeficientas: $\gamma_M := 1.3$

$f_{h.1.k} := 0.082 \cdot d_l^{0.3} \cdot \rho_{k1l} \cdot MPa = 49.128 \cdot MPa$

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