Create a new timber material:

All variables shown in the tables are created

Param: the index needed to use the html selector

Caratteristiche meccaniche legno C24←← ▾		
$\gamma_M = \underline{1.3}$ $k_{mod} = \underline{0.9}$		
$f_{m,k} = 24\,\mathrm{MPa}$	$f_{m,d} = 16.62\,\mathrm{MPa}$	$E_{0,mean} = 11000\,\mathrm{MPa}$
$f_{t,0,k} = 14.5\,\mathrm{MPa}$	$f_{t,0,d} = 10.04\,\mathrm{MPa}$	$E_{0,05} = 7400\,\mathrm{MPa}$
$f_{t,90,k} = 0.4\,\mathrm{MPa}$	$f_{t,90,d} = 0.277\,\mathrm{MPa}$	$E_{90,mean} = 370\,\mathrm{MPa}$
$f_{c,0,k} = 21\,\mathrm{MPa}$	$f_{c,0,d} = 14.54\,\mathrm{MPa}$	$G_{mean} = 690\,\mathrm{MPa}$
$f_{c,90,k} = 2.5\,\mathrm{MPa}$	$f_{c,90,d} = 1.73\,\mathrm{MPa}$	$r_k = 350\,\mathrm{kg/m^3}$
$f_{v,k} = 4\,\mathrm{MPa}$	$f_{v,d} = 2.77\,\mathrm{MPa}$	$r_{mean} = 420\,\mathrm{kg/m^3}$

$f_{c,0,d} = 14.54\,\mathrm{MPa}$

Overwrite the existing timber material:

It is needed to use a different index

Caratteristiche meccaniche legno GL24h←← ▾		
$\gamma_M = \underline{1.3}$ $k_{mod} = \underline{0.9}$		
$f_{m,k} = 24\,\mathrm{MPa}$	$f_{m,d} = 16.62\,\mathrm{MPa}$	$E_{0,mean} = 11500\,\mathrm{MPa}$
$f_{t,0,k} = 19.2\,\mathrm{MPa}$	$f_{t,0,d} = 13.29\,\mathrm{MPa}$	$E_{0,05} = 9600\,\mathrm{MPa}$
$f_{t,90,k} = 0.5\,\mathrm{MPa}$	$f_{t,90,d} = 0.346\,\mathrm{MPa}$	$E_{90,mean} = 300\,\mathrm{MPa}$
$f_{c,0,k} = 24\,\mathrm{MPa}$	$f_{c,0,d} = 16.62\,\mathrm{MPa}$	$G_{mean} = 650\,\mathrm{MPa}$
$f_{c,90,k} = 2.5\,\mathrm{MPa}$	$f_{c,90,d} = 1.73\,\mathrm{MPa}$	$r_k = 385\,\mathrm{kg/m^3}$
$f_{v,k} = 3.5\,\mathrm{MPa}$	$f_{v,d} = 2.42\,\mathrm{MPa}$	$r_{mean} = 420\,\mathrm{kg/m^3}$

$f_{c,0,d} = 16.62\,\mathrm{MPa}$

Add multiple timber properties with different names

This method will add a pedix for each variable. It can be a string too

Caratteristiche meccaniche legno GL24h←← ▾		
$\gamma_M = \underline{1.3}$ $k_{mod} = \underline{0.9}$		
$f_{m,k,3} = 24\,\mathrm{MPa}$	$f_{m,d,3} = 16.62\,\mathrm{MPa}$	$E_{0,mean,3} = 11500\,\mathrm{MPa}$
$f_{t,0,k,3} = 19.2\,\mathrm{MPa}$	$f_{t,0,d,3} = 13.29\,\mathrm{MPa}$	$E_{0,05,3} = 9600\,\mathrm{MPa}$
$f_{t,90,k,3} = 0.5\,\mathrm{MPa}$	$f_{t,90,d,3} = 0.346\,\mathrm{MPa}$	$E_{90,mean,3} = 300\,\mathrm{MPa}$
$f_{c,0,k,3} = 24\,\mathrm{MPa}$	$f_{c,0,d,3} = 16.62\,\mathrm{MPa}$	$G_{mean,3} = 650\,\mathrm{MPa}$
$f_{c,90,k,3} = 2.5\,\mathrm{MPa}$	$f_{c,90,d,3} = 1.73\,\mathrm{MPa}$	$r_{k,3} = 385\,\mathrm{kg/m^3}$
$f_{v,k,3} = 3.5\,\mathrm{MPa}$	$f_{v,d,3} = 2.42\,\mathrm{MPa}$	$r_{mean,3} = 420\,\mathrm{kg/m^3}$

Caratteristiche meccaniche legno GL24h←← ▾		
$\gamma_M = \underline{1.3}$ $k_{mod} = \underline{0.9}$		
$f_{m,k,4} = 24\,\mathrm{MPa}$	$f_{m,d,4} = 16.62\,\mathrm{MPa}$	$E_{0,mean,4} = 11500\,\mathrm{MPa}$
$f_{t,0,k,4} = 19.2\,\mathrm{MPa}$	$f_{t,0,d,4} = 13.29\,\mathrm{MPa}$	$E_{0,05,4} = 9600\,\mathrm{MPa}$
$f_{t,90,k,4} = 0.5\,\mathrm{MPa}$	$f_{t,90,d,4} = 0.346\,\mathrm{MPa}$	$E_{90,mean,4} = 300\,\mathrm{MPa}$
$f_{c,0,k,4} = 24\,\mathrm{MPa}$	$f_{c,0,d,4} = 16.62\,\mathrm{MPa}$	$G_{mean,4} = 650\,\mathrm{MPa}$
$f_{c,90,k,4} = 2.5\,\mathrm{MPa}$	$f_{c,90,d,4} = 1.73\,\mathrm{MPa}$	$r_{k,4} = 385\,\mathrm{kg/m^3}$

Caratteristiche meccaniche legno GL24h←← ▽		
$\gamma_M = \underline{1.3}$ $k_{mod} = \underline{0.9}$		
$f_{v,k,4} = 3.5\,\text{MPa}$	$f_{v,d,4} = 2.42\,\text{MPa}$	$r_{mean,4} = 420\,\text{kg/m}^3$

Caratteristiche meccaniche legno C24←← ▽		
$\gamma_M = \underline{1.3}$ $k_{mod} = \underline{0.9}$		
$f_{m,k,beam} = 24\,\text{MPa}$	$f_{m,d,beam} = 16.62\,\text{MPa}$	$E_{0,mean,beam} = 11000\,\text{MPa}$
$f_{t,0,k,beam} = 14.5\,\text{MPa}$	$f_{t,0,d,beam} = 10.04\,\text{MPa}$	$E_{0,05,beam} = 7400\,\text{MPa}$
$f_{t,90,k,beam} = 0.4\,\text{MPa}$	$f_{t,90,d,beam} = 0.277\,\text{MPa}$	$E_{90,mean,beam} = 370\,\text{MPa}$
$f_{c,0,k,beam} = 21\,\text{MPa}$	$f_{c,0,d,beam} = 14.54\,\text{MPa}$	$G_{mean,beam} = 690\,\text{MPa}$
$f_{c,90,k,beam} = 2.5\,\text{MPa}$	$f_{c,90,d,beam} = 1.73\,\text{MPa}$	$r_{k,beam} = 350\,\text{kg/m}^3$
$f_{v,k,beam} = 4\,\text{MPa}$	$f_{v,d,beam} = 2.77\,\text{MPa}$	$r_{mean,beam} = 420\,\text{kg/m}^3$

Caratteristiche meccaniche legno C24←← ▽		
$\gamma_M = \underline{1.3}$ $k_{mod} = \underline{0.9}$		
$f_{m,k,purlin} = 24\,\text{MPa}$	$f_{m,d,purlin} = 16.62\,\text{MPa}$	$E_{0,mean,purlin} = 11000\,\text{MPa}$
$f_{t,0,k,purlin} = 14.5\,\text{MPa}$	$f_{t,0,d,purlin} = 10.04\,\text{MPa}$	$E_{0,05,purlin} = 7400\,\text{MPa}$
$f_{t,90,k,purlin} = 0.4\,\text{MPa}$	$f_{t,90,d,purlin} = 0.277\,\text{MPa}$	$E_{90,mean,purlin} = 370\,\text{MPa}$
$f_{c,0,k,purlin} = 21\,\text{MPa}$	$f_{c,0,d,purlin} = 14.54\,\text{MPa}$	$G_{mean,purlin} = 690\,\text{MPa}$
$f_{c,90,k,purlin} = 2.5\,\text{MPa}$	$f_{c,90,d,purlin} = 1.73\,\text{MPa}$	$r_{k,purlin} = 350\,\text{kg/m}^3$
$f_{v,k,purlin} = 4\,\text{MPa}$	$f_{v,d,purlin} = 2.77\,\text{MPa}$	$r_{mean,purlin} = 420\,\text{kg/m}^3$

Calculate the geometric properties for a rectangle

Same behavior as before. This time the index is not needed

Caratteristiche sezione rettangolare	
$b = \underline{120}\,\text{mm}$ $h = \underline{240}\,\text{mm}$ $\gamma = \underline{5}\,\dfrac{\text{kN}}{\text{m}^3}$	
$A = 288\,\text{cm}^2$	$g_{1,k} = 0.144\,\text{kN/m}$
$I_y = 13824\,\text{cm}^4$	$I_z = 3456\,\text{cm}^4$
$W_y = 1152\,\text{cm}^3$	$W_z = 576\,\text{cm}^3$
$i_y = 6.93\,\text{cm}$	$i_z = 3.46\,\text{cm}$

Caratteristiche sezione rettangolare	
$b_1 = \underline{120}\,\text{mm}$ $h_1 = \underline{240}\,\text{mm}$ $\gamma = \underline{5}\,\dfrac{\text{kN}}{\text{m}^3}$	
$A_1 = 288\,\text{cm}^2$	$g_{1,k,1} = 0.144\,\text{kN/m}$
$I_{y,1} = 13824\,\text{cm}^4$	$I_{z,1} = 3456\,\text{cm}^4$
$W_{y,1} = 1152\,\text{cm}^3$	$W_{z,1} = 576\,\text{cm}^3$
$i_{y,1} = 6.93\,\text{cm}$	$i_{z,1} = 3.46\,\text{cm}$

Caratteristiche sezione rettangolare	
$b_2 = \underline{140}\,\text{mm}$ $h_2 = \underline{240}\,\text{mm}$ $\gamma = \underline{5}\,\dfrac{\text{kN}}{\text{m}^3}$	
$A_2 = 336\,\text{cm}^2$	$g_{1,k,2} = 0.168\,\text{kN/m}$
$I_{y,2} = 16128\,\text{cm}^4$	$I_{z,2} = 5488\,\text{cm}^4$
$W_{y,2} = 1344\,\text{cm}^3$	$W_{z,2} = 784\,\text{cm}^3$
$i_{y,2} = 6.93\,\text{cm}$	$i_{z,2} = 4.04\,\text{cm}$

<table>
<tr><td colspan="2" align="center">Caratteristiche sezione rettangolare
$b_{beam} = \underline{240}$ mm $h_{beam} = \underline{2400}$ mm $\gamma = \underline{5}\,\dfrac{kN}{m^3}$</td></tr>
</table>

$A_{beam} = 5760\,cm^2$	$g_{1,k,beam} = 2.88\,kN/m$
$I_{y,beam} = 27648000\,cm^4$	$I_{z,beam} = 276480\,cm^4$
$W_{y,beam} = 230400\,cm^3$	$W_{z,beam} = 23040\,cm^3$
$i_{y,beam} = 69.28\,cm$	$i_{z,beam} = 6.93\,cm$

<table>
<tr><td colspan="2" align="center">Caratteristiche sezione rettangolare
$b_{purlin} = \underline{160}$ mm $h_{purlin} = \underline{200}$ mm $\gamma = \underline{5}\,\dfrac{kN}{m^3}$</td></tr>
</table>

$A_{purlin} = 320\,cm^2$	$g_{1,k,purlin} = 0.16\,kN/m$
$I_{y,purlin} = 10666.7\,cm^4$	$I_{z,purlin} = 6826.67\,cm^4$
$W_{y,purlin} = 1066.67\,cm^3$	$W_{z,purlin} = 853.33\,cm^3$
$i_{y,purlin} = 5.77\,cm$	$i_{z,purlin} = 4.62\,cm$

Verification

$\sigma = 2\,MPa$

$f = 3\,MPa$

Verifica soddisfatta: $\sigma = 2\,MPa \leq f = 3\,MPa$ ✓

Verifica soddisfatta: $\dfrac{\sigma}{f} = \dfrac{2\,MPa}{3\,MPa} = 66.67\,\%$ ✓

$\sigma = 2\,MPa \leq f = 3\,MPa$ Ok ✓

$\dfrac{\sigma}{f} = \dfrac{2\,MPa}{3\,MPa} = 66.67\,\%$ Ok ✓

$\sigma = 3.1\,MPa$

$f = 3\,MPa$

Verifica non soddisfatta: $\sigma = 3.1\,MPa > f = 3\,MPa$ ✖

Verifica non soddisfatta: $\dfrac{\sigma}{f} = \dfrac{3.1\,MPa}{3\,MPa} = 103.33\,\%$ ✖

$\sigma = 3.1\,MPa > f = 3\,MPa$ NO ✖

$\dfrac{\sigma}{f} = \dfrac{3.1\,MPa}{3\,MPa} = 103.33\,\%$ NO ✖

Circle area

$$\frac{2\cdot\pi\cdot(8\,mm)^2}{4} = \frac{2\cdot 3.14\cdot(8\,mm)^2}{4} = 100.53\,mm^2$$