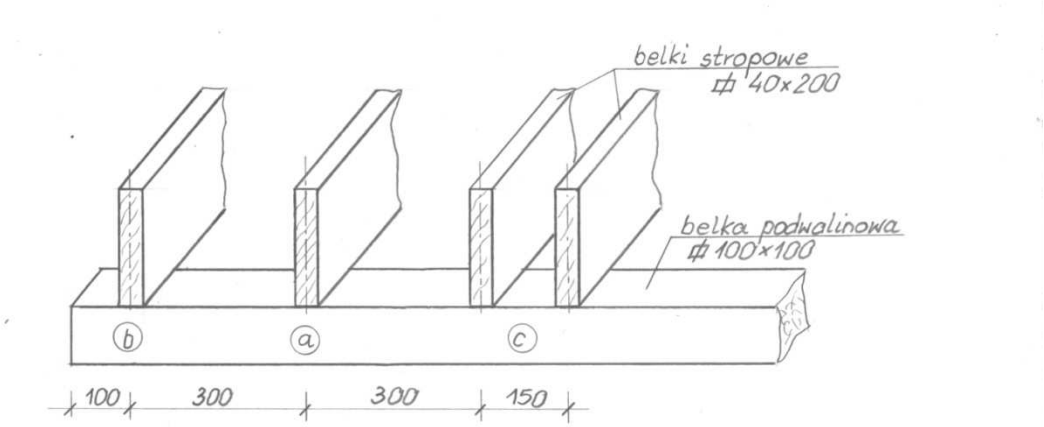
ZADANIE 3

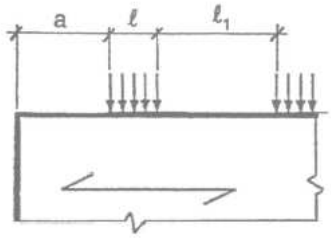
Docisk prostopadły do włókien.

Reakcja podporowa R = 15kN.

Drewno klasy C24; $f_{c,90,k}$ = 5,3MPa =5,3 N/mm ^{2}; k_{mod} = 0,6; γ_M = 1,3

$f_{c,90,d} = f_{c,90,k} \times k_{mod} / \gamma_M$ = 5,3 x 0,6 / 1,3 = 2,45 MPa =2,45 N/mm ^{2}





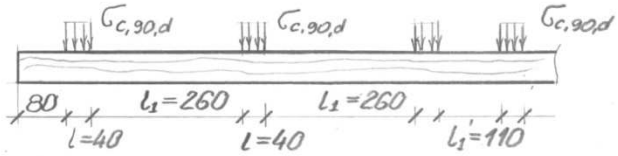
Rysunek 4.1.4.1 – Ściskanie prostopadłe do włókien

Tablica 4.1.4 – Wartości współczynnika $k_{c,90}$

	$l_1 \leq 150$ mm	$l_1 > 150$ mm	
		$a \geq 100$ mm	$a < 100$ mm
$l \geq 150$ mm	1	1	1
150 mm > $l \geq$ 15 mm	1	1 +(150 – l) / 170	1 + a(150 – l) / 17000
$l <$ 15 mm	1	1,8	1 +a / 125

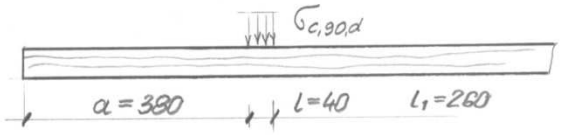
$$\sigma_{c,90,d} \leq k_{c,90} f_{c,90,d}$$

Sprawdzenie wytrzymałości belki podwalinowej na docisk prostopadły do włókien



$\sigma_{c,90,d}$ = 15 x 10^3 /(100 x 40) = 3,75 N/mm^2

a)



l_1 = 260mm > 150mm

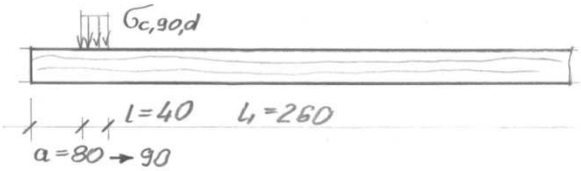
a = 380mm > 100mm

l = 40

$k_{c,90}$ = 1 + (150 – l)/170 = 1 + (150-40)/170 =1,647

$\sigma_{c,90,d}$ = 3,75 N/mm^2 < $k_{c,90}$ $f_{c,90,d}$ = 1,647 x 2,45 = 4,03 N/mm^2

b)



l_1 = 260mm > 150mm

a = 80mm < 100mm

l = 40

$k_{c,90}$ = 1 + a(150 – l)/17000 = 1 + 80 x (150-40)/17000 =1,518

$\sigma_{c,90,d}$ = 3,75 N/mm^2 > $k_{c,90}$ $f_{c,90,d}$ = 1,518 x 2,45 = 3,72 N/mm^2

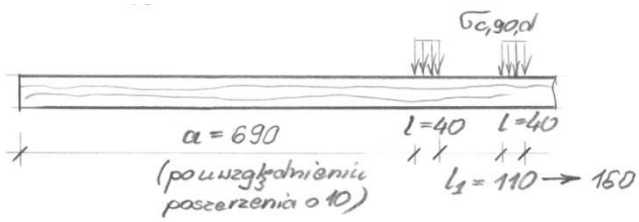
Powiększono odcinek a do 90 mm

l_1 = 260mm > 150mm
a = 90mm < 100mm
l = 40

$k_{c,90} = 1 + a(150 - l)/17000 = 1 + 90 \times (150-40)/17000 = 1{,}582$

$\sigma_{c,90,d} = 3{,}75\ N/mm^2 < k_{c,90} f_{c,90,d} = 1{,}582 \times 2{,}45 = 3{,}88\ N/mm^2$

c)



l_1 = 110mm < 150mm
a = 690mm > 100mm
l = 40

$k_{c,90} = 1$

$\sigma_{c,90,d} = 3{,}75\ N/mm^2 > k_{c,90} f_{c,90,d} = 1 \times 2{,}45 = 2{,}45\ N/mm^2$

Należy rozsunąć belki, tak aby między nimi była odległość 160mm.

l_1 = 160mm > 150mm
a = 690mm > 100mm
l = 40

$k_{c,90} = 1 + (150 - l)/170 = 1 + (150-40)/170 = 1{,}347$

$\sigma_{c,90,d} = 3{,}75\ N/mm^2 < k_{c,90} f_{c,90,d} = 1{,}647 \times 2{,}45 = 4{,}03\ N/mm^2$

Sprawdzenie wytrzymałości belki stropowej na docisk prostopadły do włókien

l_1 = rozp. między ścianami >> 150mm

a = 0mm < 100mm

15mm < l = 100 < 150

$k_{c,90} = 1 + (150 - l)/170 = 1 + (150\text{-}100)/170 = 1{,}29$

$\sigma_{c,90,d} = 3{,}75\ N/mm^2 > k_{c,90}\, f_{c,90,d} = 1{,}29 \times 2{,}45 = 3{,}16\ N/mm^2$

Należy zwiększyć szerokość podwaliny do 160mm

$\sigma_{c,90,d} = 15 \times 10^3 / (160 \times 40) = 2{,}34\ N/mm^2$

l_1 = rozp. między ścianami >> 150mm

a = 0mm < 100mm

l = 160 > 150

$k_{c,90} = 1$

$\sigma_{c,90,d} = 2{,}34\ N/mm^2 < k_{c,90}\, f_{c,90,d} = 1 \times 2{,}45 = 2{,}45\ N/mm^2$