



Dramix® Pro Crack Control

Crack control with Combined Reinforcement

Dramix® Steel Fibres + Traditional Reinforcement

A Serviceability Limit State Design

1. Project Info

Project: Industrial floor - warehouse

Object: Slab

Name: Vermaelen Heatings

Country: Belgium

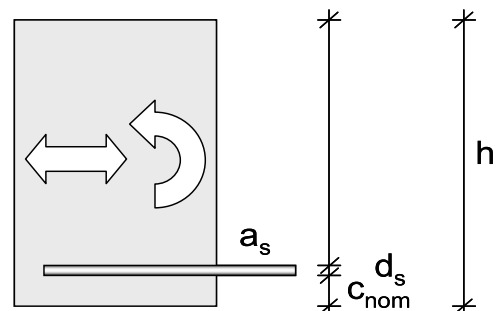
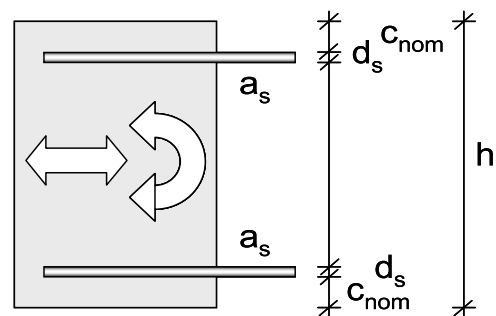
2. Input Data

a. Materials

Section	
thickness h	300 [mm]
min. concrete cover c_{min}	25 [mm]
tolerance Δc_{dev}	15 [mm]
C_{nom}	40 [mm]

Steel	
bar diameter d_s	10 [mm]
bar distance s	150 [mm]
a_s	5.24 [cm ² /m]
yield strength f_{yk}	500 [N/mm ²]
max f_y taken into account	400 [N/mm ²]
position of reinforcement	top + bottom
The effect of welded mesh was taken into account.	

Concrete	
concrete type	C25/30
f_{ctm} (28 days)	2.6 [N/mm ²]
$f_{ctR,S}$ (28 days)	1.2 [N/mm ²]



b. Loads

The calculated reinforcement is related to the serviceability limit state only. A load design, including the relevant safety factors, has to be done separately. The reinforcement for crack width design has to be placed in the relevant position(s) of the section.

Section		
F_s	150.0	[kN]
$\beta_{cc}(t)$	1.0	[-]
$f_{ct,eff}$	2.6	[N/mm ²]
$f_{ctR,S,eff}$	1.2	[N/mm ²]
α_f	0.462	[-]
$E_{cm,t}$	30500	[N/mm ²]
E_s	200000	[N/mm ²]
α_e	6.557	[-]
σ_s	286	[N/mm ²]
max $\sigma_{s,eff}$ for design	400	[N/mm ²]
X	0	[mm]
$h_{c,ef}$	113	[mm]
ρ_{eff}	0.00465	[-]
$\epsilon_{sm}^f - \epsilon_{cm}$	0.000463	[-]
$S_{r,max}$	165	[mm]
W_k	0.08	[mm]

3. Result & solution

a.

concrete	C25/30		
f_{ctm} (28days)	2.6	[N/mm ²]	
$f_{ctR,S}$ (28 days)	1.2	[N/mm ²]	
reinforcement	Ø10 - 150 mm		
position	top + bottom		
type	welded mesh		(The effect of welded mesh was taken into account.)
yield strength f_{yk}	500	[N/mm ²]	(high bond bars)
steel fibres			
Dramix® type	RC-80/60-BN		
dosage	30 kg/m³		(according to Bekaert data sheets)
fibre length	60 mm		

b.

calc. crack width w_k **0.15** **[mm]**

c. Remarks

The calculated reinforcement is related to the serviceability limit state (SLS) only. Ultimate limit state design (ULS) has to be done separately. The maximum of ULS, SLS and all other relevant design steps is governing. Therefore additional reinforcement might have to be placed locally.

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