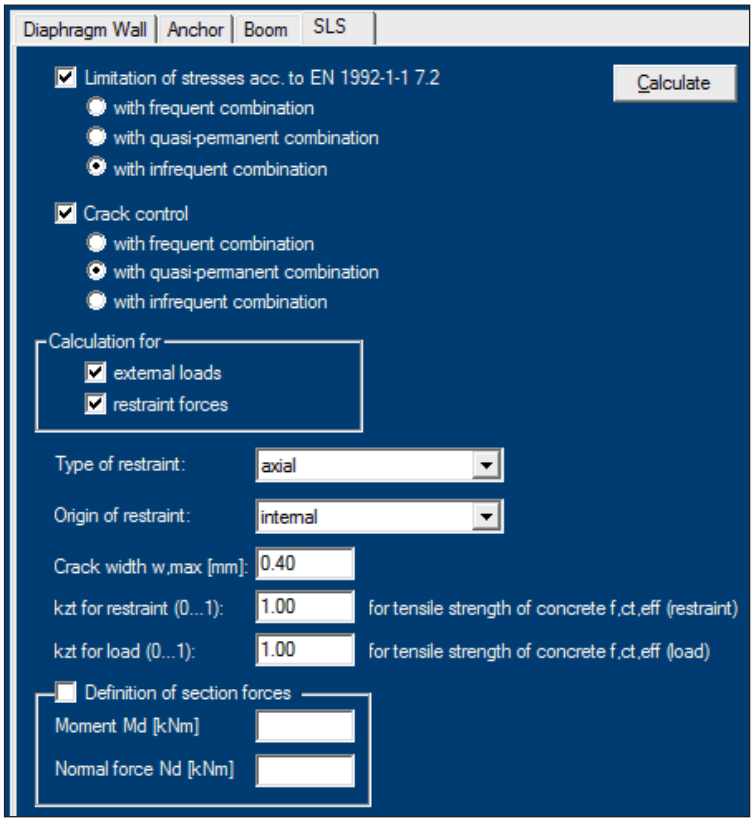
DC-NEWS

Option DC-Crack for DC-Pit

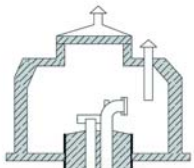
DC-SOFTWARE

Serviceability verifications / Crack width limitation



- Limitation of stresses acc. to EN 1992-1-1, 7.2
- Crack control acc. to EN 1992-1-1, 7.3
- Selection from frequent, quasi-permanent or infrequent combination
- Calculation for external load or restrained forces
- Selection of the type and origin of restrained forces
- Definition of the permitted crack width w_{max}
- Selection of the factor kzt for the concrete tensile strengh

news



- Clear verification based on the selected reinforcement
- With the section forces from the analysis or with predefined values
- In the future available for additional programs with reinforced concrete design (DC-Cantilever, DC-Footing, DC-Pile):
  buy once, use for all the programs

Serviceability Limit State (SLS)

Material parameters:
Concrete C20/25
cylinder compressive strength f_{ck} = 20.00 N/mm²
mean tensile strength f_{ctm} = 2.20 N/mm²
Steel
Strain limit f_{yk} = 500.00 N/mm²

Reinforcement selected A_s [cm²/m], ø [mm]

	A_s [cm²/m]	ø [mm]
with max. M		
exc.s.	10.05	16.0
supp.s.	10.05	16.0
with min. M		
exc.s.	10.05	16.0
supp.s.	10.05	16.0

Minimal reinforcement for crack control: EN 1992-1-1 7.3.2 (7.1)
Check for Restraint (Type: axial Origin: internal)
Maximum permissible crack width w,max = 0.40 mm
effective tensile strength $f_{ct,eff}$ = 2.20 N/mm²

	kc [-]	k [-]	A_{ct} [cm²/m]	σ_s [N/mm²]	ø* [mm]	$A_{s,min}$ [cm²/m]	Check ok
with max. M							
exc.s.	1.00	0.74	1000.00	259.39	21.1	8.48	Yes *
supp.s.	1.00	0.74	1000.00	259.39	21.1	8.48	Yes *
with min. M							
exc.s.	1.00	0.74	1000.00	259.39	21.1	8.48	Yes *
supp.s.	1.00	0.74	1000.00	259.39	21.1	8.48	Yes *

*) Eq. DIN EN 1992-1-1/NA 7.5.1 ($A_{ct} = A_{c,eff}$)

Crack Control: EN 1992-1-1 7.3.4
Check for Load - Combination of actions: quasi-permanent
Maximum permissible crack width w,max = 0.40 mm
effective tensile strength $f_{ct,eff}$ = 2.20 N/mm²

	M [kNm]	N [kN]	$A_{c,eff}$ [cm²/m]	ρ_{eff} [%]	α_e	σ_s [N/mm²]	$s_{r,max}$ [mm]	$\varepsilon_{s,m}$-$\varepsilon_{c,m}$ [‰]	$w_{k,calc.}$ [mm]	Check ok
with max. M										
exc.s.	110.61	-93.82	666.67	1.51	6.68	275.69	410.61	1.057	0.31	Yes
supp.s.	110.61	-93.82	*** No verification necessary							
with min. M										
exc.s.	-7.66	-20.11	*** No verification necessary							
supp.s.	-7.66	-20.11	*** M < M_{crack} (71.11 kNm) : No verification necessary							

Stress Control: EN 1992-1-1 7.2
Combination of actions: rare

	M [kNm]	N [kN]	$\sigma_{t,0}$ [N/mm²]	state	Concrete compressive stress σ_c [N/mm²]	0.60*f_{ck} [N/mm²]	Check ok	Steel tensile stress σ_s [N/mm²]	0.80*f_{yk} [N/mm²]	Check ok
with max. M										
exc.s.	110.61	-93.82	3.91 > f_{ctm}	II	0.00	12.00	Yes	275.69	400.00	Yes
supp.s.	110.61	-93.82	3.91 > f_{ctm}	II	11.44	12.00	Yes	0.00	400.00	Yes
with min. M										
exc.s.	-7.66	-20.11	0.24 < f_{ctm}	I	0.34	12.00	Yes	0.00	400.00	Yes
supp.s.	-7.66	-20.11	0.24 < f_{ctm}	I	0.00	12.00	Yes	1.58	400.00	Yes

state: I = uncracked / II = cracked