

ANNEX A

MSV57 CRANE FOUNDATION

Safety Format/Material:

Design Condition:		WSD
Basic Usage Factor:	n0 =	1,00
Plate/Stiffener:		NV-NS/NV-NS
Yield stress	fyp/fys =	235/235 MPa
Youngs modulus	E =	2,10E+5 MPa

General:

Buckling length	Lk =	2588 mm
Mom fact - Field	km2 =	24,0
- Support	km1 =	12,0
Continuous stiffener		
Plate fixation parameter	kpp = 1,00	(1.0/0.5 - clamped/simply supported)

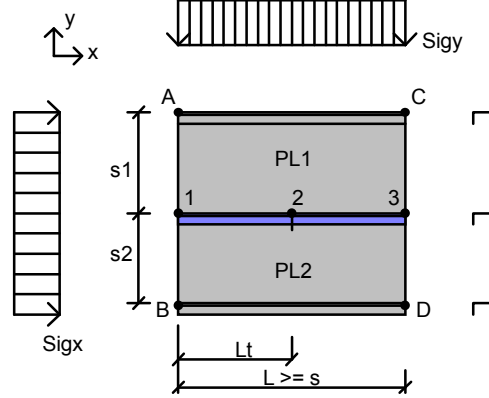
Geometry:

Stiffener span	L =	2588 mm
Length of girder	Lg =	2588 mm
Plate thickness	t =	15,0 mm
Stiffener spacing	s1 =	1000 mm
	s2 =	850 mm
Lat tors buckl length	Lt =	1000 mm

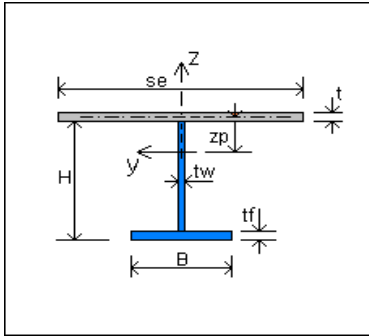
Stresses:

SigxA =	-100,0 MPa
SigxB =	-100,0 MPa
SigyA =	-80,0 MPa
SigyC =	-80,0 MPa
Tau =	0,0 MPa

Figure:



Stiffener: T 365x150x15,0x15,0



Stiffener property:

H =	365 mm
B =	150 mm
tw =	15,0 mm
tf =	15,0 mm
A =	7500 mm ²
g =	58,9 kg/m
ez =	229,8 mm
ly =	1,061E+8 mm ⁴
lz =	4,219E+6 mm ⁴

Incl. eff. plate:

se =	400,2 mm
zp =	131,8 mm
Ae =	1,350E+4 mm ²
Ie =	2,939E+8 mm ⁴
Wep =	2,230E+6 mm ³
Wes =	1,221E+6 mm ³
Flange: c = 67,5 <= 210,0	OK (Eq 9.1)
Web: hw = 350,0 <= 630,0	OK (Eq 9.2)

PLATE BUCKLING CHECK (DNV-RP-C201):

PL1: Buckling - UF = Sigy/(ksp*SigyRd) = -80,0/(1,00*80,8) =

0,99 < 1,00 (Ch 7.4)

PL2: Buckling - UF = Sigy/(ksp*SigyRd) = -80,0/(1,00*86,6) =

0,92 < 1,00 (Ch 7.4)

STIFFENER BUCKLING CHECK (DNV-RP-C201): (1 = Support, 2 = field; s = stiffener, p = plate)

se = 400,2 mm Sigxsd = -100,0 MPa Sigysd = -80,0 MPa p0 = 0,093 MPa z* = 0,0 mm

UF1s=Nsd/Nks1Rd+(M1Sd-NSd*z)/(Ms1Rd*(1-Nsd/Ne))+u = 2137,5/3173,1+(48,1-2137,5*0,000)/(286,9*(1-2137,5/90939,7))+0,000 =

0,85 < 1,00 (Eq 7.50)

UF1p=Nsd/Nkp1Rd+(M1Sd+NSd*z)/(Mp1Rd*(1-Nsd/Ne))+u = 2137,5/3173,1+(48,1+2137,5*0,000)/(524,1*(1-2137,5/90939,7))+0,000 =

0,77 < 1,00 (Eq 7.55)

UF2s=Nsd/Nks2Rd+(M2Sd-NSd*z)/(Ms2Rd*(1-Nsd/Ne))+u = 2137,5/3173,1+(24,1-2137,5*0,000)/(286,9*(1-2137,5/90939,7))+0,000 =

0,76 < 1,00 (Eq 7.56)

UF2p=Nsd/Nkp2Rd+(M2Sd+NSd*z)/(Mp2Rd*(1-Nsd/Ne))+u = 2137,5/3173,1+(24,1+2137,5*0,000)/(524,1*(1-2137,5/90939,7))+0,000 =

0,72 < 1,00 (Eq 7.53)

PLATE YIELD CHECK (Points A-D):

Yield, max in point: A: UF = Sigj/fy = 91,7/235,0 =

0,39 < 1,00

STIFFENER YIELD CHECK: (check at points 1-3, plate(p) and stiffener(s)). Effective width se = 925,0

Point 1p: UF = Sigj/fy = 91,7/235,0 =

0,39 < 1,00

Point 1s: UF = Sigx/fy = 100,0/235,0 =

0,43 < 1,00

DNV R P S	Project: P168-MAURIC		Page: 1/1
	Version 1.9 Plate/Stiff Check based on DNV-RP-C201/OS-C201 Copyright (C) 2004-2010 StruProg AB		Identification: Girder Panel 2
File: \\vnsvr01\prod\p168 - mauric - msv75 crane foundation\04 results\stipla\girder2\girder2.drps		Date: 06-05-2016	Time: 11:22

Safety Format/Material:

Design Condition:		WSD
Basic Usage Factor:	n0 =	1,00
Plate/Stiffener:		NV-NS/NV-NS
Yield stress	fyp/fys =	235/235 MPa
Youngs modulus	E =	2,10E+5 MPa

General:

Buckling length	Lk =	2035 mm
Mom fact - Field	km2 =	24,0
- Support	km1 =	12,0
Continuous stiffener		
Plate fixation parameter	kpp = 1,00	(1.0/0.5 - clamped/simply supported)

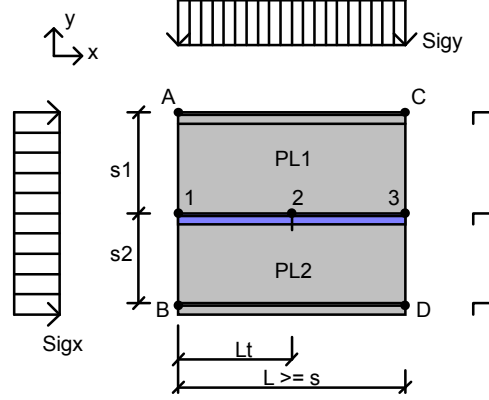
Geometry:

Stiffener span	L =	2035 mm
Length of girder	Lg =	2035 mm
Plate thickness	t =	15,0 mm
Stiffener spacing	s1 =	1000 mm
	s2 =	850 mm
Lat tors buckl length	Lt =	1000 mm

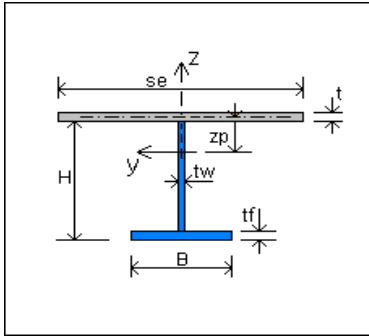
Stresses:

SigxA =	-90,0 MPa
SigxB =	-90,0 MPa
SigyA =	-90,0 MPa
SigyC =	-90,0 MPa
Tau =	0,0 MPa

Figure:



Stiffener: T 365x150x15,0x15,0



Stiffener property:

H =	365 mm
B =	150 mm
tw =	15,0 mm
tf =	15,0 mm
A =	7500 mm ²
g =	58,9 kg/m
ez =	229,8 mm
ly =	1,061E+8 mm ⁴
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Incl. eff. plate:

se =	400,2 mm
zp =	131,8 mm
Ae =	1,350E+4 mm ²
le =	2,939E+8 mm ⁴
Wep =	2,230E+6 mm ³
Wes =	1,221E+6 mm ³
Flange: c = 67,5	<= 210,0 OK (Eq 9.1)
Web: hw = 350,0	<= 630,0 OK (Eq 9.2)

PLATE BUCKLING CHECK (DNV-RP-C201):

PL1: Buckling - UF = Sigy/(ksp*SigyRd) = -90,0/(1,00*93,0) =

0,97 < 1,00 (Ch 7.4)

PL2: Buckling - UF = Sigy/(ksp*SigyRd) = -90,0/(1,00*98,3) =

0,92 < 1,00 (Ch 7.4)

STIFFENER BUCKLING CHECK (DNV-RP-C201): (1 = Support, 2 = field; s = stiffener, p = plate)

se = 400,2 mm Sigxsd = -90,0 MPa Sigysd = -90,0 MPa p0 = 0,105 MPa z* = 0,0 mm

UF1s=Nsd/Nks1Rd+(M1Sd-NSd*z)/(Ms1Rd*(1-Nsd/Ne))+u = 1923,8/3173,3+(33,5-1923,8*0,000)/(286,9*(1-1923,8/147086,3))+0,000 =

0,72 < 1,00 (Eq 7.50)

UF1p=Nsd/Nkp1Rd+(M1Sd+NSd*z)/(Mp1Rd*(1-Nsd/Ne))+u = 1923,8/3173,3+(33,5+1923,8*0,000)/(524,1*(1-1923,8/147086,3))+0,000 =

0,67 < 1,00 (Eq 7.55)

UF2s=Nsd/Nks2Rd+(M2Sd-NSd*z)/(Ms2Rd*(1-Nsd/Ne))+u = 1923,8/3173,3+(16,7-1923,8*0,000)/(286,9*(1-1923,8/147086,3))+0,000 =

0,67 < 1,00 (Eq 7.56)

UF2p=Nsd/Nkp2Rd+(M2Sd+NSd*z)/(Mp2Rd*(1-Nsd/Ne))+u = 1923,8/3173,3+(16,7+1923,8*0,000)/(524,1*(1-1923,8/147086,3))+0,000 =

0,64 < 1,00 (Eq 7.53)

PLATE YIELD CHECK (Points A-D):

Yield, max in point: A: UF = Sigj/fy = 90,0/235,0 =

0,38 < 1,00

STIFFENER YIELD CHECK: (check at points 1-3, plate(p) and stiffener(s)). Effective width se = 925,0

Point 1p: UF = Sigj/fy = 90,0/235,0 =

0,38 < 1,00

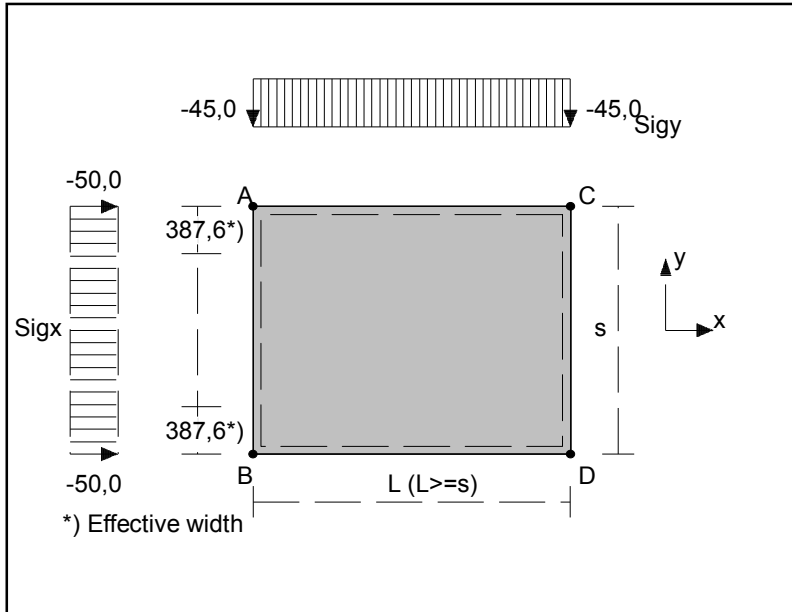
Point 1s: UF = Sigx/fy = 90,0/235,0 =

0,38 < 1,00

Material/Safety Format:

Material: NV-NS Allowable Usage Factor: UF = 1,00
 fyk = 235 MPa gm = 1,15
 E = 2,100E+5 MPa

Geometry/Loading:



L	=	2615	mm	SigxA	=	-50,0	MPa
s	=	2033	mm	SigxB	=	-50,0	MPa
t	=	15,0	mm	SigyA	=	-45,0	MPa
				SigyC	=	-45,0	MPa
				Tau	=	0,0	MPa

STRESS CONTROLL: (max of the four corners and mid of the plate)

$UF = \text{Sig}_i / \text{Sig}_{Rd} = 47,7 / 204,3 = 0,23 < 1,00$ (Point A)

BUCKLING CONTROL:

$UF = (\text{Sig}_x / \text{Sig}_{xRd})^2 + (\text{Sig}_y / \text{Sig}_{yRd})^2 - c_i (\text{Sig}_x / \text{Sig}_{xRd}) (\text{Sig}_y / \text{Sig}_{yRd}) + (\text{Tau} / \text{Tau}_{Rd})^2 =$
 $= (50,0 / 77,9)^2 + (45,0 / 59,9)^2 - 0,00 (50,0 / 77,9) (45,0 / 59,9) + (0,0 / 70,4)^2 = 0,98 < 1,00$ (Ch 6.5)