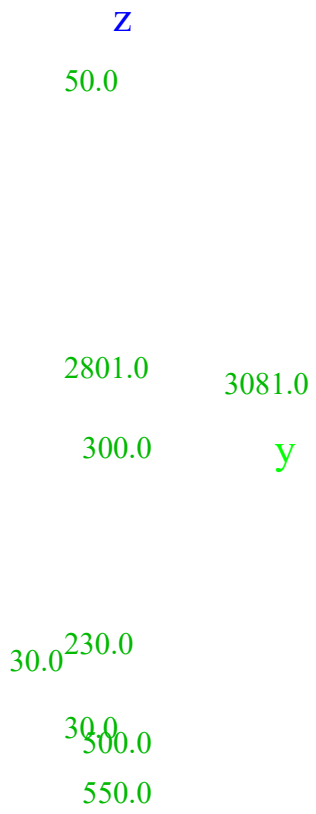
Project	IJssel Bridge
Part	Main bridge
Author	Ernst Klamer
Current date	29.01.2019
Project file name	Main Bridge v6.0.esa

Image



Main beam (500 * 30 + 550 * 30, h = 3034) 1

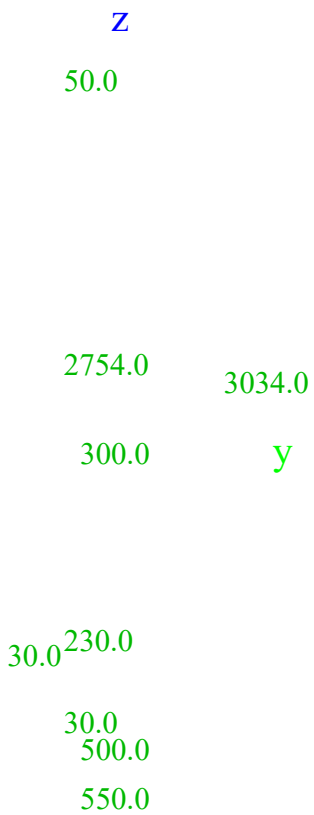
Type	Graphic cross section		
Extensive	2754.0; 30.0; 500.0; 30.0; 550.0		
Form type	Thin-walled		
Part material	LQmc 52 (eg 120%)		
Construction method	General		
Color			
Nod yy, nod zz	d	d	
A [m 2]	7.9711e-02		
A y [m 2], A z [m 2]	4.3700e-02	3.6696e-02	
A L [m 2 / m], A D [m 2 / m]	7.8330e + 00	7.8330e + 00	
c Y,UCS [mm], c Z,UCS [mm]	0.0	-2128.6	
α [deg]	0.00		
I y [m 4], I z [m 4]	1.0037e-01	8.1890e-04	
i y [mm], i z [mm]	1122.1	101.4	
W el,y [m 3], W el,z [m 3]	4.7152e-02	2,9778e-03	

$W_{pl.y}$ [m^3], $W_{pl.z}$ [m^3]	7.3480e-02	5.1544e-03
$M_{pl.y.+}$ [Nm], $M_{pl.y.-}$ [Nm]	2.57th + 07	2.57th + 07
$M_{pl.z.+}$ [Nm], $M_{pl.z.-}$ [Nm]	1.80th + 06	1.80th + 06
d_y [mm], d_z [mm]	0.0	0.0
I_t [m^4], I_w [m^6]	1.0055e-05	0.0000e + 00
β_y [mm], β_z [mm]	846.3	0.0

Page 2

Project	IJssel Bridge
Part	Main bridge
Author	Ernst Klamer
Current date	29.01.2019
Project file name	Main Bridge v6.0.esa

Image



Main beam (500 * 30 + 550 * 30, h = 2995) 1

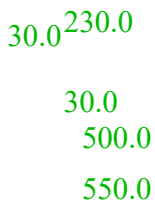
Type	Graphic cross section
Extensive	2715.0; 30.0; 500.0; 30.0; 550.0

Form type	Thin-walled		
Part material	LQmc 52 (eg 120%)		
Construction method	General		
Color			
Nod yy, nod zz	d		d
A [m 2]		7.9243e-02	
A y [m 2], A z [m 2]		4.3695e-02	3.6327e-02
A L [m 2 / m], A D [m 2 / m]		7.7550th + 00	7.7550th + 00
c Y,UCS [mm], c Z,UCS [mm]		0.0	-2105.0
α [deg]		0.00	
I y [m 4], I z [m 4]		9.7303e-02	8.1890e-04
i y [mm], i z [mm]		1108.1	101.7
W el,y [m 3], W el,z [m 3]		4.6225e-02	2,9778e-03
W pl,y [m 3], W pl,z [m 3]		7.1930e-02	5.1530e-03
M pl,y,+ [Nm], M pl,y,- [Nm]		2.52nd + 07	2.52nd + 07
M pl,z,+ [Nm], M pl,z,- [Nm]		1.80th + 06	1.80th + 06
d y [mm], d z [mm]		0.0	0.0
I t [m 4], I w [m 6]		1.0131e-05	0.0000e + 00
β y [mm], β z [mm]		842.8	0.0

Page 3

Project	IJssel Bridge
Part	Main bridge
Author	Ernst Klamer
Current date	29.01.2019
Project file name	Main Bridge v6.0.esa

Image



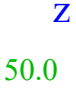
Main beam (500 * 30 + 550 * 30, h = 2955) 1

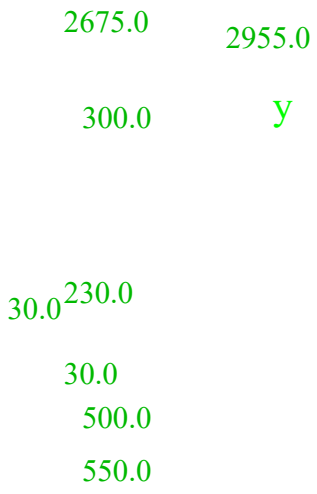
Type	Graphic cross section		
Extensive	2675.0; 30.0; 500.0; 30.0; 550.0		
Form type	Thin-walled		
Part material	LQmc 52 (eg 120%)		
Construction method	General		
Color			
Nod yy, nod zz	d	d	
A [m 2]	7.8763e-02		
A y [m 2], A z [m 2]	4.3690e-02	3,5929e-02	
A L [m 2 / m], A D [m 2 / m]	7.6750e + 00	7.6750e + 00	
c Y,UCS [mm], c Z,UCS [mm]	0.0	-2080.7	
α [deg]	0.00		
I y [m 4], I z [m 4]	9.4217e-02	8.1889e-04	
i y [mm], i z [mm]	1093.7	102.0	
W el,y [m 3], W el,z [m 3]	4,5282e-02	2,9778e-03	
W pl,y [m 3], W pl,z [m 3]	7.0350e-02	5.1515e-03	
M pl,y, + [Nm], M pl,y,- [Nm]	2.46e + 07	2.46e + 07	
M pl,z, + [Nm], M pl,z,- [Nm]	1.80th + 06	1.80th + 06	
d y [mm], d z [mm]	0.0	0.0	
I t [m 4], I w [m 6]	1.0211e-05	0.0000e + 00	
β y [mm], β z [mm]	839.1	0.0	

Page 4

Project	IJssel Bridge
Part	Main bridge
Author	Ernst Klamer
Current date	29.01.2019
Project file name	Main Bridge v6.0.esa

Image





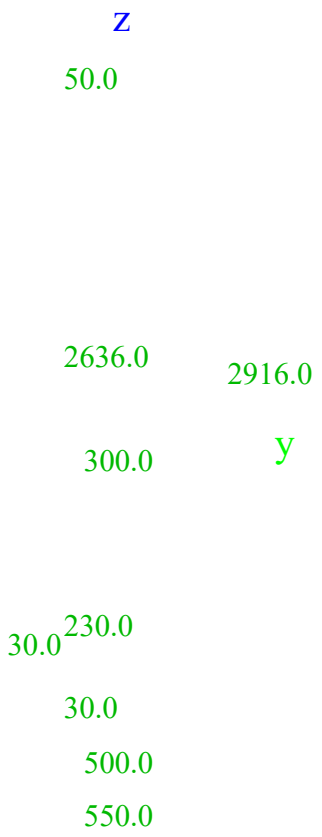
Main beam (500 * 30 + 550 * 30, h = 2916) 1

Type	Graphic cross section		
Extensive	2636.0; 30.0; 500.0; 30.0; 550.0		
Form type	Thin-walled		
Part material	LQmc 52 (eg 120%)		
Construction method	General		
Color			
Nod yy, nod zz	d		d
A [m 2]		7.8295e-02	
A y [m 2], A z [m 2]		4.3685e-02	3,5526e-02
A L [m 2 / m], A D [m 2 / m]		7.5970e + 00	7.5970e + 00
c Y,UCS [mm], c Z,UCS [mm]		0.0	-2056.9
α [deg]		0.00	
I y [m 4], I z [m 4]		9.1267e-02	8.1888e-04
i y [mm], i z [mm]		1079.7	102.3
W el,y [m 3], W el,z [m 3]		4.4370e-02	2,9778e-03
W pl,y [m 3], W pl,z [m 3]		6.8819e-02	5.1501e-03
M pl,y, + [Nm], M pl,y,- [Nm]		2.41e + 07	2.41e + 07
M pl,z, + [Nm], M pl,z,- [Nm]		1.80th + 06	1.80th + 06
d y [mm], d z [mm]		0.0	0.0
I t [m 4], I w [m 6]		1.0293e-05	0.0000e + 00
β y [mm], β z [mm]		835.4	0.0

Page 5

Project	IJssel Bridge
Part	Main bridge
Author	Ernst Klamer
Current date	29.01.2019
Project file name	Main Bridge v6.0.esa

Image



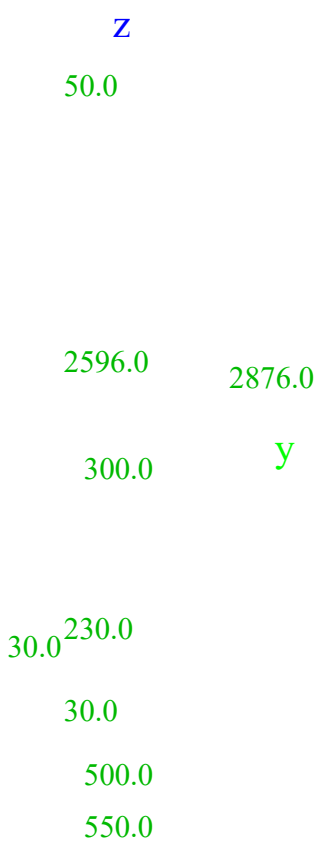
Main beam (500 * 30 + 550 * 30, h = 2876) 1

Type	Graphic cross section		
Extensive	2596.0; 30.0; 500.0; 30.0; 550.0		
Form type	Thin-walled		
Part material	LQmc 52 (eg 120%)		
Construction method	General		
Color			
Nod yy, nod zz	d	d	
A [m 2]	7.7815e-02		
A y [m 2], A z [m 2]	4.3680e-02	3,5102e-02	
A L [m 2 / m], A D [m 2 / m]	7.5170th + 00	7.5170th + 00	
c Y,UCS [mm], c Z,UCS [mm]	0.0	-2032.5	
α [deg]	0.00		
I y [m 4], I z [m 4]	8.8299e-02	8.1888e-04	
i y [mm], i z [mm]	1065.2	102.6	
W el,y [m 3], W el,z [m 3]	4.3443e-02	2,9777e-03	
W pl,y [m 3], W pl,z [m 3]	6.7258e-02	5.1487e-03	
M pl,y,+ [Nm], M pl,y,- [Nm]	2.35e + 07	2.35e + 07	
M pl,z,+ [Nm], M pl,z,- [Nm]	1.80th + 06	1.80th + 06	
d y [mm], d z [mm]	0.0	0.0	
I t [m 4], I w [m 6]	1.0381e-05	0.0000e + 00	
β y [mm], β z [mm]	831.5	0.0	

Page 6

Project	IJssel Bridge
Part	Main bridge
Author	Ernst Klamer
Current date	29.01.2019
Project file name	Main Bridge v6.0.esa

Image



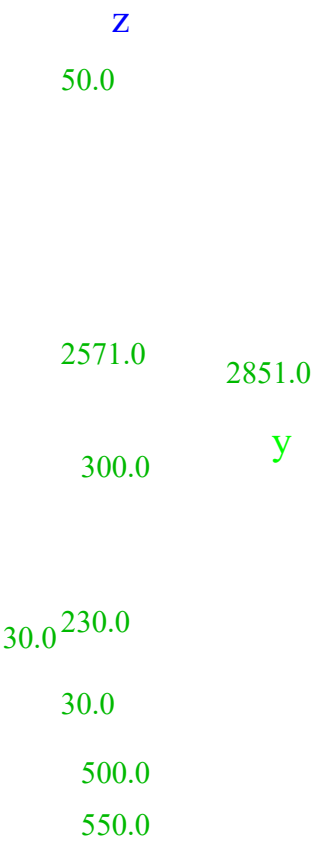
Main beam (500 * 30 + 550 * 30, h = 2851) 1

Type	Graphic cross section		
Extensive	2571.0; 30.0; 500.0; 30.0; 550.0		
Form type	Thin-walled		
Part material	LQmc 52 (eg 120%)		
Construction method	General		
Color			
Nod yy, nod zz	d	d	
A [m 2]	7.7515e-02		
A y [m 2], A z [m 2]	4.3676e-02	3.4832e-02	
A L [m 2 / m], A D [m 2 / m]	7.4670e + 00	7.4670e + 00	
c Y,UCS [mm], c Z,UCS [mm]	0.0	-2017.3	
α [deg]	0.00		
I y [m 4], I z [m 4]	8.6475e-02	8.1887e-04	
i y [mm], i z [mm]	1056.2	102.8	
W el,y [m 3], W el,z [m 3]	4.2867e-02	2,9777e-03	
W pl,y [m 3], W pl,z [m 3]	6.6287e-02	5.1478e-03	
M pl,y, + [Nm], M pl,y,- [Nm]	2.32nd + 07	2.32nd + 07	
M pl,z, + [Nm], M pl,z,- [Nm]	1.80th + 06	1.80th + 06	
d y [mm], d z [mm]	0.0	0.0	
I t [m 4], I w [m 6]	1.0437e-05	0.0000e + 00	
β y [mm], β z [mm]	829.0	0.0	

Page 7

Project	IJssel Bridge
Part	Main bridge
Author	Ernst Klamer
Current date	29.01.2019
Project file name	Main Bridge v6.0.esa

Image



Main beam (500 * 30 + 550 * 30, h = 2838) 1

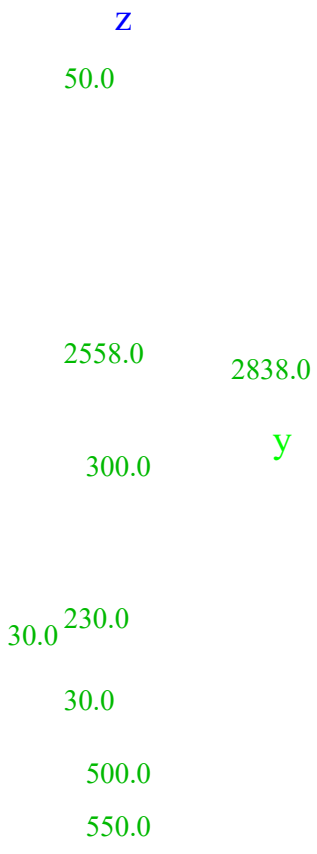
Type	Graphic cross section		
Extensive	2558.0; 30.0; 500.0; 30.0; 550.0		
Form type	Thin-walled		
Part material	LQmc 52 (eg 120%)		
Construction method	General		
Color			
Nod yy, nod zz	d	d	
A [m 2]	7.7359e-02		
A y [m 2], A z [m 2]	4.3675e-02	3,4691e-02	
A L [m 2 / m], A D [m 2 / m]	7.4410e + 00	7.4410e + 00	
c Y,UCS [mm], c Z,UCS [mm]	0.0	-2009.3	

α [deg]	0.00	
I_y [m^4], I_z [m^4]	8.5535e-02	8.1887e-04
i_y [mm], i_z [mm]	1051.5	102.9
$W_{el.y}$ [m^3], $W_{el.z}$ [m^3]	4.2569e-02	2,9777e-03
$W_{pl.y}$ [m^3], $W_{pl.z}$ [m^3]	6,5784e-02	5.1473e-03
$M_{pl.y.+}$ [Nm], $M_{pl.y.-}$ [Nm]	2.30th + 07	2.30th + 07
$M_{pl.z.+}$ [Nm], $M_{pl.z.-}$ [Nm]	1.80th + 06	1.80th + 06
d_y [mm], d_z [mm]	0.0	0.0
I_t [m^4], I_w [m^6]	1.0467e-05	0.0000e + 00
β_y [mm], β_z [mm]	827.7	0.0

Page 8

Project	IJssel Bridge
Part	Main bridge
Author	Ernst Klamer
Current date	29.01.2019
Project file name	Main Bridge v6.0.esa

Image



Main beam (500 * 30 + 550 * 30, h = 2825) 1

Type	Graphic cross section		
Extensive	2545.0; 30.0; 500.0; 30.0; 550.0		
Form type	Thin-walled		
Part material	LQmc 52 (eg 120%)		
Construction method	General		
Color			
Nod yy, nod zz	d		d
A [m 2]		7.7203e-02	
A y [m 2], A z [m 2]		4.3673e-02	3.4548e-02
A L [m 2 / m], A D [m 2 / m]		7.4150th + 00	7.4150th + 00
c Y.UCS [mm], c Z.UCS [mm]		0.0	-2001.4
α [deg]		0.00	
I y [m 4], I z [m 4]		8.4602e-02	8.1887e-04
i y [mm], i z [mm]		1046.8	103.0
W el.y [m 3], W el.z [m 3]		4.2272e-02	2,9777e-03
W pl.y [m 3], W pl.z [m 3]		6,5281e-02	5.1469e-03
M pl.y. + [Nm], M pl.y.- [Nm]		2.28th + 07	2.28th + 07
M pl.z. + [Nm], M pl.z.- [Nm]		1.80th + 06	1.80th + 06
d y [mm], d z [mm]		0.0	0.0
I t [m 4], I w [m 6]		1.0497e-05	0.0000e + 00
β y [mm], β z [mm]		826.4	0.0

Page 9

Project	IJssel Bridge
Part	Main bridge
Author	Ernst Klamer
Current date	29.01.2019
Project file name	Main Bridge v6.0.esa

Image

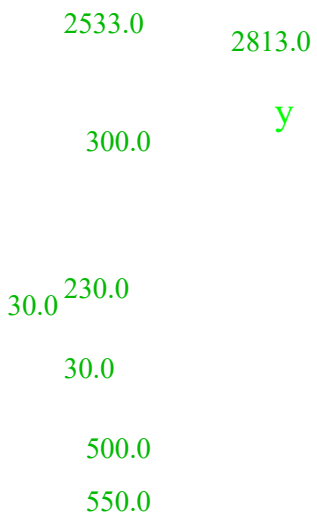
Main beam (500 * 30 + 550 * 30, h = 2813) 1

Type	Graphic cross section		
Extensive	2533.0; 30.0; 500.0; 30.0; 550.0		
Form type	Thin-walled		
Part material	LQmc 52 (eg 120%)		
Construction method	General		
Color			
Nod yy, nod zz	d		d
A [m 2]		7.7059e-02	
A y [m 2], A z [m 2]		4.3671e-02	3.4417e-02
A L [m 2 / m], A D [m 2 / m]		7.3910e + 00	7.3910e + 00
c Y,UCS [mm], c Z,UCS [mm]		0.0	-1994.0
α [deg]		0.00	
I y [m 4], I z [m 4]		8.3745e-02	8.1887e-04
i y [mm], i z [mm]		1042.5	103.1
W el,y [m 3], W el,z [m 3]		4.1999e-02	2,9777e-03
W pl,y [m 3], W pl,z [m 3]		6.4819e-02	5.1464e-03
M pl,y, + [Nm], M pl,y,- [Nm]		2.27th + 07	2.27th + 07
M pl,z, + [Nm], M pl,z,- [Nm]		1.80th + 06	1.80th + 06
d y [mm], d z [mm]		0.0	0.0
I t [m 4], I w [m 6]		1.0526e-05	0.0000e + 00
β y [mm], β z [mm]		825.2	0.0

Page 10

Project	IJssel Bridge
Part	Main bridge
Author	Ernst Klamer
Current date	29.01.2019
Project file name	Main Bridge v6.0.esa

Image



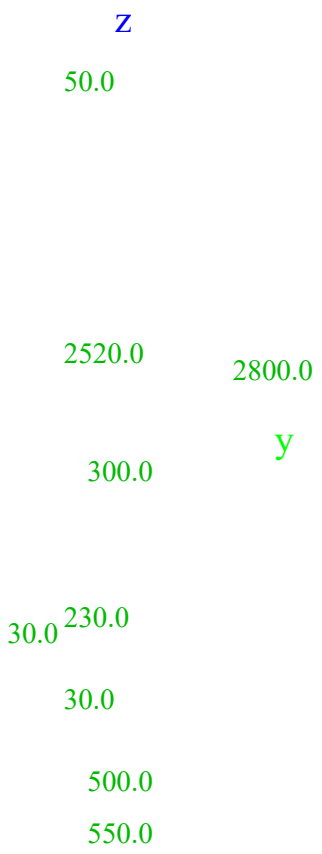
Main beam (500 * 30 + 550 * 30, h = 2800) 1

Type	Graphic cross section		
Extensive	2520.0; 30.0; 500.0; 30.0; 550.0		
Form type	Thin-walled		
Part material	LQmc 52 (eg 120%)		
Construction method	General		
Color			
Nod yy, nod zz	d		d
A [m 2]		7.6903e-02	
A y [m 2], A z [m 2]		4,3669e-02	3,4273e-02
A L [m 2 / m], A D [m 2 / m]		7.3650e + 00	7.3650e + 00
c Y.UCS [mm], c Z.UCS [mm]		0.0	1986.0
α [deg]		0.00	
I y [m 4], I z [m 4]		8.2824e-02	8.1887e-04
i y [mm], i z [mm]		1037.8	103.2
W el.y [m 3], W el.z [m 3]		4.1703e-02	2,9777e-03
W pl.y [m 3], W pl.z [m 3]		6.4318e-02	5.1460e-03
M pl.y. + [Nm], M pl.y.- [Nm]		2.25e + 07	2.25e + 07
M pl.z. + [Nm], M pl.z.- [Nm]		1.80th + 06	1.80th + 06
d y [mm], d z [mm]		0.0	0.0
I t [m 4], I w [m 6]		1.0557e-05	0.0000e + 00
β y [mm], β z [mm]		823.8	0.0

Project	IJssel Bridge
Part	Main bridge
Author	Ernst Klamer
Current date	29.01.2019

Project file name Main Bridge v6.0.esa

Image



Explanation of symbols

a	Area
A_y	Shear surface in main y direction
A_z	Shear surface in main z direction
A_L	Perimeter per unit length
A_D	Curing surface per unit length
$c_{Y.UCS}$	Center of gravity coordinates in Y direction of the input axis system
$c_{Z.UCS}$	Center of gravity coordinates in Z direction of the input axis system
$I_{Y.LCS}$	Second moment of the area around the YLCS axis
$I_{Z.LCS}$	Second moment of the area around the ZLCS axis
$I_{YZ.LCS}$	Product moment of the area the LCS system
α	Rotation angle of the main axes system
I_y	Second moment of the area around the main y-axis
I_z	Second moment of the area around the main z axis
i_y	Radius of inertia around the main y-axis
i_z	Radius of inertia around the main z axis

Explanation of symbols

$W_{el.y}$	Elastic cross-section modulus around the main y axis
$W_{el.z}$	Elastic cross-section modulus around the main z axis
$W_{pl.y}$	Plastic cross-section modulus around the main y axis
$W_{pl.z}$	Plastic cross-section modulus around the main z axis
$M_{pl.y.+}$	Plastic moment around the main y-axis for a positive My moment
$M_{pl.y.-}$	Plastic moment around the main y-axis for a negative My moment
$M_{pl.z.+}$	Plastic moment around the main z axis for a positive Mz moment
$M_{pl.z.-}$	Plastic moment around the main z axis for a negative Mz moment
d_y	Shear middle coordinate in head y direction measured from the center of gravity
d_z	Shear middle coordinate in head z direction measured from the center of gravity
I_t	Torque constant
I_w	Curving constant
β_y	Mono-symmetrical constant round the main y-axis
β_z	Mono-symmetrical constant round the main z axis

Page 12

Project	IJssel Bridge
Part	Main bridge
Author	Ernst Klamer
Current date	29.01.2019
Project file name	Main Bridge v6.0.esa

9. Crossbars

9.1. 3D overview

9.2. Construction

z

x y

Page 13

Project	IJssel Bridge
Part	Main bridge
Author	Ernst Klamer
Current date	29.01.2019
Project file name	Main Bridge v6.0.esa

9.3. Sections

Cross beam

Type	T		
Extensive	512.0; 250.0; 12.0; 10.0; 0.1		
Form standard	6 - T-section		
Form type	Thin-walled		
Part material	LQmc 52 (eg 138%)		
Construction method	welded		
Color			
Nod yy, nod zz	c	c	
A [m 2]	8.0000e-03		
A y [m 2], A z [m 2]	2.7636e-03	4,5889e-03	
A L [m 2 / m], A D [m 2 / m]	1.5239e + 00	1.5239e + 00	
c Y,UCS [mm], c Z,UCS [mm]	125.0	166.0	
α [deg]	0.00		
I y [m 4], I z [m 4]	2.2708e-04	1.5667e-05	
i y [mm], i z [mm]	168.5	44.3	
W el,y [m 3], W el,z [m 3]	6,5631e-04	1.2533e-04	
W pl,y [m 3], W pl,z [m 3]	1.1680e-03	2.0000e-04	
M pl,y, + [Nm], M pl,y,- [Nm]	4.09th + 05	4.09th + 05	
M pl,z, + [Nm], M pl,z,- [Nm]	7.00th + 04	7.00th + 04	
d y [mm], d z [mm]	0.0	-158.8	
I t [m 4], I w [m 6]	3,1267e-07	6.4912e-37	
β y [mm], β z [mm]	404.1	0.0	
Image			

s 10.0

z

512.0
H
y

t 12.0

B 250.0

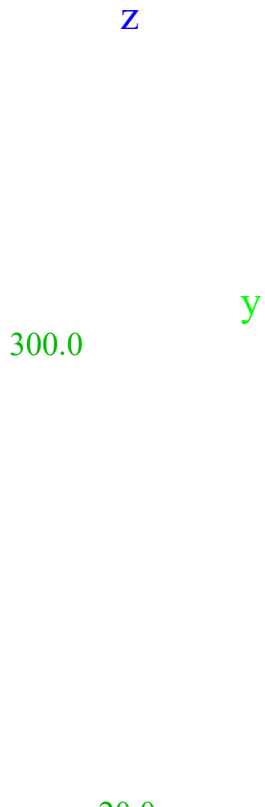
End cross beam 300 * 20

Type	Graphic cross section		
Form type	Thin-walled		
Part material	QMC 37 (eg 138%)		
Construction method	General		
Color			
Nod yy, nod zz	d	d	
A [m 2]	6.0000e-03		
A y [m 2], A z [m 2]	5.0000e-03	5.0000e-03	
A L [m 2 / m], A D [m 2 / m]	6.4000e-01	6.4000e-01	
c Y,UCS [mm], c Z,UCS [mm]	0.0	0.0	
α [deg]	0.00		
I y [m 4], I z [m 4]	4,5000e-05	2.0000e-07	
i y [mm], i z [mm]	86.6	5.8	
W el,y [m 3], W el,z [m 3]	3.0000e-04	2.0000e-05	
W pl,y [m 3], W pl,z [m 3]	4,5000e-04	3.0000e-05	
M pl,y,+ [Nm], M pl,y,- [Nm]	9.67th + 04	9.67th + 04	
M pl,z,+ [Nm], M pl,z,- [Nm]	6.45e + 03	6.45e + 03	
d y [mm], d z [mm]	0.0	0.0	
I t [m 4], I w [m 6]	7.1999th-07	0.0000e + 00	
β y [mm], β z [mm]	0.0	0.0	

Page 14

Project	IJssel Bridge
Part	Main bridge
Author	Ernst Klamer
Current date	29.01.2019
Project file name	Main Bridge v6.0.esa

Image



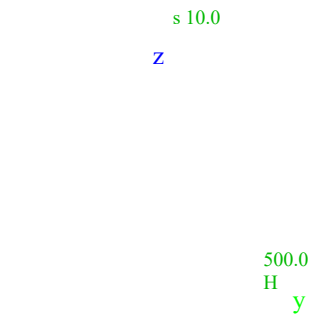
Console

Type	T		
Extensive	500.0; 250.0; 12.0; 10.0; 0.1		
Form standard	6 - T-section		
Form type	Thin-walled		
Part material	LQmc 52 (eg 138%)		
Construction method	welded		
Color			
Nod yy, nod zz	c		c
A [m 2]		7.8800e-03	
A y [m 2], A z [m 2]		2.7631e-03	4.4710e-03
A L [m 2 / m], A D [m 2 / m]		1.99999 + 00	1.99999 + 00
c Y,UCS [mm], c Z,UCS [mm]		125.0	160.8
α [deg]		0.00	
I y [m 4], I z [m 4]		2,1300e-04	1,5666e-05
i y [mm], i z [mm]		164.4	44.6
W el,y [m 3], W el,z [m 3]		6.2798e-04	1.2533e-04
W pl,y [m 3], W pl,z [m 3]		1.1204e-03	1.9970e-04
M pl,y, + [Nm], M pl,y,- [Nm]		3.92e + 05	3.92e + 05
M pl,z, + [Nm], M pl,z,- [Nm]		6.99 + 04	6.99 + 04
d y [mm], d z [mm]		0.0	-153.7
I t [m 4], I w [m 6]		3,0867e-07	2.4074e-38
β y [mm], β z [mm]		393.2	0.0

Page 15

Project	IJssel Bridge
Part	Main bridge
Author	Ernst Klamer
Current date	29.01.2019
Project file name	Main Bridge v6.0.esa

Image



Explanation of symbols

Explanation of symbols

Form standard	h - Height	i_z	Radius of inertia around the main z axis
	b - Flange width	$W_{el,y}$	Elastic cross-section modulus around the main y axis
	t - Flange thickness		
	s - Body thickness	$W_{el,z}$	Elastic cross-section modulus around the main z axis
	r - Radius at flange base		
	r1 - Radius at flange foot	$W_{pl,y}$	Plastic cross-section modulus around the main y axis
	r2 - Radius at body base		
	a1 - Flange inclination	$W_{pl,z}$	Plastic cross-section modulus around the main z axis
	a2 - Body slope		
a	Area	$M_{pl,y,+}$	Plastic moment around the main y-axis for a positive My moment
A_y	Shear surface in main y direction		
A_z	Shear surface in main z direction	$M_{pl,y,-}$	Plastic moment around the main y-axis for a negative My moment
A_L	Perimeter per unit length		
A_D	Curing surface per unit length	$M_{pl,z,+}$	Plastic moment around the main z axis for a positive Mz moment
$c_{Y,UCS}$	Center of gravity coordinates in Y direction of the input axis system	$M_{pl,z,-}$	Plastic moment around the main z axis for a negative Mz moment
$c_{Z,UCS}$	Center of gravity coordinates in Z direction of the input axis system	d_y	Shear middle coordinate in head y direction measured from the center of gravity
$I_{Y,LCS}$	Second moment of the area around the YLCS axis	d_z	Shear middle coordinate in head z direction measured from the center of gravity
$I_{Z,LCS}$	Second moment of the area around the ZLCS axis	I_t	Torque constant
$I_{YZ,LCS}$	Product moment of the area the LCS system	I_w	Curving constant
α	Rotation angle of the main axes system	β_y	Mono-symmetrical constant round the main y-axis
I_y	Second moment of the area around the main y-axis	β_z	Mono-symmetrical constant round the main z axis
I_z	Second moment of the area around the main z axis		
i_y	Radius of inertia around the main y-axis		

9.4. Consoles

Name	Rod	Intersection	Position	Alignment	Length x	Coör height [mm]
H1	S2	Console - T (500.0, 250.0, 12.0, 10.0, 0.1) Start		default	1,000 Rela	200.0
						250.0
H2	S5	Console - T (500.0, 250.0, 12.0, 10.0, 0.1) End		default	1,000 Rela	200.0
						250.0
H3	S7	Console - T (500.0, 250.0, 12.0, 10.0, 0.1) Start		default	1,000 Rela	200.0
						250.0
H4	S10	Console - T (500.0, 250.0, 12.0, 10.0, 0.1) End		default	1,000 Rela	200.0
						250.0
H5	S49	Console - T (500.0, 250.0, 12.0, 10.0, 0.1) Start		default	1,000 Rela	200.0

Project	IJssel Bridge
Part	Main bridge
Author	Ernst Klamer
Current date	29.01.2019
Project file name	Main Bridge v6.0.esa

Name	Rod	Intersection	Position	Alignment	Length x	Coör height [mm]
						250.0
H6	S52	Console - T (500.0, 250.0, 12.0, 10.0, 0.1) End		default	1,000 Rela	200.0
						250.0
H7	S86	Console - T (500.0, 250.0, 12.0, 10.0, 0.1) Start		default	1,000 Rela	200.0
						250.0
H8	S89	Console - T (500.0, 250.0, 12.0, 10.0, 0.1) End		default	1,000 Rela	200.0

H9	S161	Console - T (500.0, 250.0, 12.0, 10.0, 0.1) Start	default	1,000 Rela	250.0 200.0 250.0
H10	S164	Console - T (500.0, 250.0, 12.0, 10.0, 0.1) End	default	1,000 Rela	200.0 250.0
H11	S198	Console - T (500.0, 250.0, 12.0, 10.0, 0.1) Start	default	1,000 Rela	200.0 250.0
H12	S201	Console - T (500.0, 250.0, 12.0, 10.0, 0.1) End	default	1,000 Rela	200.0 250.0
H13	S235	Console - T (500.0, 250.0, 12.0, 10.0, 0.1) Start	default	1,000 Rela	200.0 250.0
H14	S238	Console - T (500.0, 250.0, 12.0, 10.0, 0.1) End	default	1,000 Rela	200.0 250.0
H15	S309	Console - T (500.0, 250.0, 12.0, 10.0, 0.1) Start	default	1,000 Rela	200.0 250.0
H16	S312	Console - T (500.0, 250.0, 12.0, 10.0, 0.1) End	default	1,000 Rela	200.0 250.0
H17	S351	Console - T (500.0, 250.0, 12.0, 10.0, 0.1) Start	default	1,000 Rela	200.0 250.0
H18	S354	Console - T (500.0, 250.0, 12.0, 10.0, 0.1) End	default	1,000 Rela	200.0 250.0
H19	S388	Console - T (500.0, 250.0, 12.0, 10.0, 0.1) Start	default	1,000 Rela	200.0 250.0
H20	S391	Console - T (500.0, 250.0, 12.0, 10.0, 0.1) End	default	1,000 Rela	200.0 250.0
H21	S398	Console - T (500.0, 250.0, 12.0, 10.0, 0.1) Start	default	1,000 Rela	200.0 250.0
H22	S401	Console - T (500.0, 250.0, 12.0, 10.0, 0.1) End	default	1,000 Rela	200.0 250.0
H23	S405	Console - T (500.0, 250.0, 12.0, 10.0, 0.1) Start	default	1,000 Rela	200.0 250.0
H24	S408	Console - T (500.0, 250.0, 12.0, 10.0, 0.1) End	default	1,000 Rela	200.0 250.0
H25	S445	Console - T (500.0, 250.0, 12.0, 10.0, 0.1) Start	default	1,000 Rela	200.0 250.0
H26	S448	Console - T (500.0, 250.0, 12.0, 10.0, 0.1) End	default	1,000 Rela	200.0 250.0
H27	S484	Console - T (500.0, 250.0, 12.0, 10.0, 0.1) Start	default	1,000 Rela	200.0 250.0
H28	S487	Console - T (500.0, 250.0, 12.0, 10.0, 0.1) End	default	1,000 Rela	200.0 250.0
H29	S526	Console - T (500.0, 250.0, 12.0, 10.0, 0.1) Start	default	1,000 Rela	200.0 250.0
H30	S529	Console - T (500.0, 250.0, 12.0, 10.0, 0.1) End	default	1,000 Rela	200.0 250.0
H31	S568	Console - T (500.0, 250.0, 12.0, 10.0, 0.1) Start	default	1,000 Rela	200.0 250.0
H32	S571	Console - T (500.0, 250.0, 12.0, 10.0, 0.1) End	default	1,000 Rela	200.0 250.0
H33	S610	Console - T (500.0, 250.0, 12.0, 10.0, 0.1) Start	default	1,000 Rela	200.0 250.0
H34	S613	Console - T (500.0, 250.0, 12.0, 10.0, 0.1) End	default	1,000 Rela	200.0 250.0
H35	S652	Console - T (500.0, 250.0, 12.0, 10.0, 0.1) Start	default	1,000 Rela	200.0 250.0
H36	S655	Console - T (500.0, 250.0, 12.0, 10.0, 0.1) End	default	1,000 Rela	200.0 250.0
H37	S692	Console - T (500.0, 250.0, 12.0, 10.0, 0.1) Start	default	1,000 Rela	200.0 250.0

Current date 29.01.2019
Project file name Main Bridge v6.0.esa

Name	Rod	Intersection	Position	Alignment Length x	Coör height [mm]	
H38	S695	Console - T (500.0, 250.0, 12.0, 10.0, 0.1) End		default	1,000 Rela	200.0
						250.0
H39	S729	Console - T (500.0, 250.0, 12.0, 10.0, 0.1) Start		default	1,000 Rela	200.0
						250.0
H40	S732	Console - T (500.0, 250.0, 12.0, 10.0, 0.1) End		default	1,000 Rela	200.0
						250.0
H41	S766	Console - T (500.0, 250.0, 12.0, 10.0, 0.1) Start		default	1,000 Rela	200.0
						250.0
H42	S769	Console - T (500.0, 250.0, 12.0, 10.0, 0.1) End		default	1,000 Rela	200.0
						250.0
H43	S803	Console - T (500.0, 250.0, 12.0, 10.0, 0.1) Start		default	1,000 Rela	200.0
						250.0
H44	S806	Console - T (500.0, 250.0, 12.0, 10.0, 0.1) End		default	1,000 Rela	200.0
						250.0
H45	S840	Console - T (500.0, 250.0, 12.0, 10.0, 0.1) Start		default	1,000 Rela	200.0
						250.0
H46	S843	Console - T (500.0, 250.0, 12.0, 10.0, 0.1) End		default	1,000 Rela	200.0
						250.0
H47	S877	Console - T (500.0, 250.0, 12.0, 10.0, 0.1) Start		default	1,000 Rela	200.0
						250.0
H48	S880	Console - T (500.0, 250.0, 12.0, 10.0, 0.1) End		default	1,000 Rela	200.0
						250.0
H49	S914	Console - T (500.0, 250.0, 12.0, 10.0, 0.1) Start		default	1,000 Rela	200.0
						250.0
H50	S917	Console - T (500.0, 250.0, 12.0, 10.0, 0.1) End		default	1,000 Rela	200.0
						250.0
H51	S983	Console - T (500.0, 250.0, 12.0, 10.0, 0.1) Start		default	1,000 Rela	200.0
						250.0
H52	S986	Console - T (500.0, 250.0, 12.0, 10.0, 0.1) End		default	1,000 Rela	200.0
						250.0
H53	S988	Console - T (500.0, 250.0, 12.0, 10.0, 0.1) Start		default	1,000 Rela	200.0
						250.0
H54	S991	Console - T (500.0, 250.0, 12.0, 10.0, 0.1) End		default	1,000 Rela	200.0
						250.0
H55	S993	Console - T (500.0, 250.0, 12.0, 10.0, 0.1) Start		default	1,000 Rela	200.0
						250.0
H56	S996	Console - T (500.0, 250.0, 12.0, 10.0, 0.1) End		default	1,000 Rela	200.0
						250.0
H57	S1064	Console - T (500.0, 250.0, 12.0, 10.0, 0.1) Start		default	1,000 Rela	200.0
						250.0
H58	S1067	Console - T (500.0, 250.0, 12.0, 10.0, 0.1) End		default	1,000 Rela	200.0
						250.0
H59	S1104	Console - T (500.0, 250.0, 12.0, 10.0, 0.1) Start		default	1,000 Rela	200.0
						250.0
H60	S1107	Console - T (500.0, 250.0, 12.0, 10.0, 0.1) End		default	1,000 Rela	200.0
						250.0
H61	S1141	Console - T (500.0, 250.0, 12.0, 10.0, 0.1) Start		default	1,000 Rela	200.0
						250.0
H62	S1144	Console - T (500.0, 250.0, 12.0, 10.0, 0.1) End		default	1,000 Rela	200.0
						250.0
H63	S1212	Console - T (500.0, 250.0, 12.0, 10.0, 0.1) Start		default	1,000 Rela	200.0
						250.0
H64	S1215	Console - T (500.0, 250.0, 12.0, 10.0, 0.1) End		default	1,000 Rela	200.0
						250.0
H65	S1220	Console - T (500.0, 250.0, 12.0, 10.0, 0.1) Start		default	1,000 Rela	200.0
						250.0
H66	S1223	Console - T (500.0, 250.0, 12.0, 10.0, 0.1) End		default	1,000 Rela	200.0
						250.0
H67	S1257	Console - T (500.0, 250.0, 12.0, 10.0, 0.1) Start		default	1,000 Rela	200.0
						250.0
H68	S1260	Console - T (500.0, 250.0, 12.0, 10.0, 0.1) End		default	1,000 Rela	200.0
						250.0
H69	S1328	Console - T (500.0, 250.0, 12.0, 10.0, 0.1) Start		default	1,000 Rela	200.0
						250.0
H70	S1331	Console - T (500.0, 250.0, 12.0, 10.0, 0.1) End		default	1,000 Rela	200.0

Project	IJssel Bridge
Part	Main bridge
Author	Ernst Klamer
Current date	29.01.2019
Project file name	Main Bridge v6.0.esa

Name	Rod	Intersection	Position	Alignment Length x	Coör height [mm]
H71	S1336	Console - T (500.0, 250.0, 12.0, 10.0, 0.1) Start		default 1,000 Rela	250.0 200.0
H72	S1339	Console - T (500.0, 250.0, 12.0, 10.0, 0.1) End		default 1,000 Rela	250.0 200.0
H73	S1373	Console - T (500.0, 250.0, 12.0, 10.0, 0.1) Start		default 1,000 Rela	250.0 200.0
H74	S1376	Console - T (500.0, 250.0, 12.0, 10.0, 0.1) End		default 1,000 Rela	250.0 200.0
H75	S1444	Console - T (500.0, 250.0, 12.0, 10.0, 0.1) Start		default 1,000 Rela	250.0 200.0
H76	S1447	Console - T (500.0, 250.0, 12.0, 10.0, 0.1) End		default 1,000 Rela	250.0 200.0
H77	S1452	Console - T (500.0, 250.0, 12.0, 10.0, 0.1) Start		default 1,000 Rela	250.0 200.0
H78	S1455	Console - T (500.0, 250.0, 12.0, 10.0, 0.1) End		default 1,000 Rela	250.0 200.0
H79	S1491	Console - T (500.0, 250.0, 12.0, 10.0, 0.1) Start		default 1,000 Rela	250.0 200.0
H80	S1494	Console - T (500.0, 250.0, 12.0, 10.0, 0.1) End		default 1,000 Rela	250.0 200.0
H81	S1531	Console - T (500.0, 250.0, 12.0, 10.0, 0.1) Start		default 1,000 Rela	250.0 200.0
H82	S1534	Console - T (500.0, 250.0, 12.0, 10.0, 0.1) End		default 1,000 Rela	250.0 200.0
H83	S1570	Console - T (500.0, 250.0, 12.0, 10.0, 0.1) Start		default 1,000 Rela	250.0 200.0
H84	S1573	Console - T (500.0, 250.0, 12.0, 10.0, 0.1) End		default 1,000 Rela	250.0 200.0
H85	S1610	Console - T (500.0, 250.0, 12.0, 10.0, 0.1) Start		default 1,000 Rela	250.0 200.0
H86	S1613	Console - T (500.0, 250.0, 12.0, 10.0, 0.1) End		default 1,000 Rela	250.0 200.0
H87	S1647	Console - T (500.0, 250.0, 12.0, 10.0, 0.1) Start		default 1,000 Rela	250.0 200.0
H88	S1650	Console - T (500.0, 250.0, 12.0, 10.0, 0.1) End		default 1,000 Rela	250.0 200.0
H89	S1718	Console - T (500.0, 250.0, 12.0, 10.0, 0.1) Start		default 1,000 Rela	250.0 200.0
H90	S1721	Console - T (500.0, 250.0, 12.0, 10.0, 0.1) End		default 1,000 Rela	250.0 200.0
H91	S1726	Console - T (500.0, 250.0, 12.0, 10.0, 0.1) Start		default 1,000 Rela	250.0 200.0
H92	S1729	Console - T (500.0, 250.0, 12.0, 10.0, 0.1) End		default 1,000 Rela	250.0 200.0
H93	S1763	Console - T (500.0, 250.0, 12.0, 10.0, 0.1) Start		default 1,000 Rela	250.0 200.0
H94	S1766	Console - T (500.0, 250.0, 12.0, 10.0, 0.1) End		default 1,000 Rela	250.0 200.0
H95	S1802	Console - T (500.0, 250.0, 12.0, 10.0, 0.1) Start		default 1,000 Rela	250.0 200.0
H96	S1805	Console - T (500.0, 250.0, 12.0, 10.0, 0.1) End		default 1,000 Rela	250.0 200.0
H97	S1842	Console - T (500.0, 250.0, 12.0, 10.0, 0.1) Start		default 1,000 Rela	250.0 200.0

					250.0
H98	S1845	Console - T (500.0, 250.0, 12.0, 10.0, 0.1) End	default	1,000 Rela	200.0
					250.0
H99	S1911	Console - T (500.0, 250.0, 12.0, 10.0, 0.1) Start	default	1,000 Rela	200.0
					250.0
H100	S1914	Console - T (500.0, 250.0, 12.0, 10.0, 0.1) End	default	1,000 Rela	200.0
					250.0
H101	S1950	Console - T (500.0, 250.0, 12.0, 10.0, 0.1) Start	default	1,000 Rela	200.0
					250.0
H102	S1953	Console - T (500.0, 250.0, 12.0, 10.0, 0.1) End	default	1,000 Rela	200.0
					250.0

Project	IJssel Bridge
Part	Main bridge
Author	Ernst Klamer
Current date	29.01.2019
Project file name	Main Bridge v6.0.esa

Name	Rod	Intersection	Position	Alignment	Length x	Coör height [mm]
H103	S1958	Console - T (500.0, 250.0, 12.0, 10.0, 0.1) Start		default	1,000 Rela	200.0
						250.0
H104	S1961	Console - T (500.0, 250.0, 12.0, 10.0, 0.1) End		default	1,000 Rela	200.0
						250.0
H105	S2027	Console - T (500.0, 250.0, 12.0, 10.0, 0.1) Start		default	1,000 Rela	200.0
						250.0
H106	S2030	Console - T (500.0, 250.0, 12.0, 10.0, 0.1) End		default	1,000 Rela	200.0
						250.0
H107	S2066	Console - T (500.0, 250.0, 12.0, 10.0, 0.1) Start		default	1,000 Rela	200.0
						250.0
H108	S2069	Console - T (500.0, 250.0, 12.0, 10.0, 0.1) End		default	1,000 Rela	200.0
						250.0
H109	S2075	Console - T (500.0, 250.0, 12.0, 10.0, 0.1) Start		default	1,000 Rela	200.0
						250.0
H110	S2078	Console - T (500.0, 250.0, 12.0, 10.0, 0.1) End		default	1,000 Rela	200.0
						250.0
H111	S2112	Console - T (500.0, 250.0, 12.0, 10.0, 0.1) Start		default	1,000 Rela	200.0
						250.0
H112	S2115	Console - T (500.0, 250.0, 12.0, 10.0, 0.1) End		default	1,000 Rela	200.0
						250.0
H113	S2151	Console - T (500.0, 250.0, 12.0, 10.0, 0.1) Start		default	1,000 Rela	200.0
						250.0
H114	S2154	Console - T (500.0, 250.0, 12.0, 10.0, 0.1) End		default	1,000 Rela	200.0
						250.0
H115	S2191	Console - T (500.0, 250.0, 12.0, 10.0, 0.1) Start		default	1,000 Rela	200.0
						250.0
H116	S2194	Console - T (500.0, 250.0, 12.0, 10.0, 0.1) End		default	1,000 Rela	200.0
						250.0
H117	S2228	Console - T (500.0, 250.0, 12.0, 10.0, 0.1) Start		default	1,000 Rela	200.0
						250.0
H118	S2231	Console - T (500.0, 250.0, 12.0, 10.0, 0.1) End		default	1,000 Rela	200.0
						250.0
H119	S2267	Console - T (500.0, 250.0, 12.0, 10.0, 0.1) Start		default	1,000 Rela	200.0
						250.0
H120	S2270	Console - T (500.0, 250.0, 12.0, 10.0, 0.1) End		default	1,000 Rela	200.0
						250.0
H121	S2307	Console - T (500.0, 250.0, 12.0, 10.0, 0.1) Start		default	1,000 Rela	200.0
						250.0
H122	S2310	Console - T (500.0, 250.0, 12.0, 10.0, 0.1) End		default	1,000 Rela	200.0
						250.0
H123	S2344	Console - T (500.0, 250.0, 12.0, 10.0, 0.1) Start		default	1,000 Rela	200.0

					250.0
H124	S2347	Console - T (500.0, 250.0, 12.0, 10.0, 0.1) End	default	1,000 Rela	200.0
					250.0
H125	S2383	Console - T (500.0, 250.0, 12.0, 10.0, 0.1) Start	default	1,000 Rela	200.0
					250.0
H126	S2386	Console - T (500.0, 250.0, 12.0, 10.0, 0.1) End	default	1,000 Rela	200.0
					250.0
H127	S2423	Console - T (500.0, 250.0, 12.0, 10.0, 0.1) Start	default	1,000 Rela	200.0
					250.0
H128	S2426	Console - T (500.0, 250.0, 12.0, 10.0, 0.1) End	default	1,000 Rela	200.0
					250.0
H129	S2428	Console - T (500.0, 250.0, 12.0, 10.0, 0.1) Start	default	1,000 Rela	200.0
					250.0
H130	S2431	Console - T (500.0, 250.0, 12.0, 10.0, 0.1) End	default	1,000 Rela	200.0
					250.0
H131	S2467	Console - T (500.0, 250.0, 12.0, 10.0, 0.1) Start	default	1,000 Rela	200.0
					250.0
H132	S2470	Console - T (500.0, 250.0, 12.0, 10.0, 0.1) End	default	1,000 Rela	200.0
					250.0
H133	S2539	Console - T (500.0, 250.0, 12.0, 10.0, 0.1) Start	default	1,000 Rela	200.0
					250.0
H134	S2542	Console - T (500.0, 250.0, 12.0, 10.0, 0.1) End	default	1,000 Rela	200.0
					250.0
H135	S2544	Console - T (500.0, 250.0, 12.0, 10.0, 0.1) Start	default	1,000 Rela	200.0

Project	IJssel Bridge
Part	Main bridge
Author	Ernst Klamer
Current date	29.01.2019
Project file name	Main Bridge v6.0.esa

Name	Rod	Intersection	Position	Alignment	Length x	Coör height [mm]
						250.0
H136	S2547	Console - T (500.0, 250.0, 12.0, 10.0, 0.1) End		default	1,000 Rela	200.0
						250.0
H137	S2583	Console - T (500.0, 250.0, 12.0, 10.0, 0.1) Start		default	1,000 Rela	200.0
						250.0
H138	S2586	Console - T (500.0, 250.0, 12.0, 10.0, 0.1) End		default	1,000 Rela	200.0
						250.0
H139	S2655	Console - T (500.0, 250.0, 12.0, 10.0, 0.1) Start		default	1,000 Rela	200.0
						250.0
H140	S2658	Console - T (500.0, 250.0, 12.0, 10.0, 0.1) End		default	1,000 Rela	200.0
						250.0
H141	S2692	Console - T (500.0, 250.0, 12.0, 10.0, 0.1) Start		default	1,000 Rela	200.0
						250.0
H142	S2695	Console - T (500.0, 250.0, 12.0, 10.0, 0.1) End		default	1,000 Rela	200.0
						250.0
H143	S2699	Console - T (500.0, 250.0, 12.0, 10.0, 0.1) Start		default	1,000 Rela	200.0
						250.0
H144	S2702	Console - T (500.0, 250.0, 12.0, 10.0, 0.1) End		default	1,000 Rela	200.0
						250.0
H145	S2771	Console - T (500.0, 250.0, 12.0, 10.0, 0.1) Start		default	1,000 Rela	200.0
						250.0
H146	S2774	Console - T (500.0, 250.0, 12.0, 10.0, 0.1) End		default	1,000 Rela	200.0
						250.0
H147	S2776	Console - T (500.0, 250.0, 12.0, 10.0, 0.1) Start		default	1,000 Rela	200.0
						250.0
H148	S2779	Console - T (500.0, 250.0, 12.0, 10.0, 0.1) End		default	1,000 Rela	200.0
						250.0
H149	S2815	Console - T (500.0, 250.0, 12.0, 10.0, 0.1) Start		default	1,000 Rela	200.0
						250.0

H150	S2818	Console - T (500.0, 250.0, 12.0, 10.0, 0.1) End	default	1,000 Rela	200.0
					250.0
H151	S2887	Console - T (500.0, 250.0, 12.0, 10.0, 0.1) Start	default	1,000 Rela	200.0
					250.0
H152	S2890	Console - T (500.0, 250.0, 12.0, 10.0, 0.1) End	default	1,000 Rela	200.0
					250.0
H153	S2892	Console - T (500.0, 250.0, 12.0, 10.0, 0.1) Start	default	1,000 Rela	200.0
					250.0
H154	S2895	Console - T (500.0, 250.0, 12.0, 10.0, 0.1) End	default	1,000 Rela	200.0
					250.0
H155	S2931	Console - T (500.0, 250.0, 12.0, 10.0, 0.1) Start	default	1,000 Rela	200.0
					250.0
H156	S2934	Console - T (500.0, 250.0, 12.0, 10.0, 0.1) End	default	1,000 Rela	200.0
					250.0
H157	S3003	Console - T (500.0, 250.0, 12.0, 10.0, 0.1) Start	default	1,000 Rela	200.0
					250.0
H158	S3006	Console - T (500.0, 250.0, 12.0, 10.0, 0.1) End	default	1,000 Rela	200.0
					250.0
H159	S3040	Console - T (500.0, 250.0, 12.0, 10.0, 0.1) Start	default	1,000 Rela	200.0
					250.0
H160	S3043	Console - T (500.0, 250.0, 12.0, 10.0, 0.1) End	default	1,000 Rela	200.0
					250.0
H161	S3079	Console - T (500.0, 250.0, 12.0, 10.0, 0.1) Start	default	1,000 Rela	200.0
					250.0
H162	S3082	Console - T (500.0, 250.0, 12.0, 10.0, 0.1) End	default	1,000 Rela	200.0
					250.0
H163	S3151	Console - T (500.0, 250.0, 12.0, 10.0, 0.1) Start	default	1,000 Rela	200.0
					250.0
H164	S3154	Console - T (500.0, 250.0, 12.0, 10.0, 0.1) End	default	1,000 Rela	200.0
					250.0
H165	S3156	Console - T (500.0, 250.0, 12.0, 10.0, 0.1) Start	default	1,000 Rela	200.0
					250.0
H166	S3159	Console - T (500.0, 250.0, 12.0, 10.0, 0.1) End	default	1,000 Rela	200.0
					250.0
H167	S3227	Console - T (500.0, 250.0, 12.0, 10.0, 0.1) Start	default	1,000 Rela	200.0
					250.0

Project	IJssel Bridge
Part	Main bridge
Author	Ernst Klamer
Current date	29.01.2019
Project file name	Main Bridge v6.0.esa

Name	Rod	Intersection	Position	Alignment	Length x	Coör height [mm]
H168	S3230	Console - T (500.0, 250.0, 12.0, 10.0, 0.1) End		default	1,000 Rela	200.0
						250.0
H169	S3290	Console - T (500.0, 250.0, 12.0, 10.0, 0.1) Start		default	1,000 Rela	200.0
						250.0
H170	S3293	Console - T (500.0, 250.0, 12.0, 10.0, 0.1) End		default	1,000 Rela	200.0
						250.0
H171	S3329	Console - T (500.0, 250.0, 12.0, 10.0, 0.1) Start		default	1,000 Rela	200.0
						250.0
H172	S3332	Console - T (500.0, 250.0, 12.0, 10.0, 0.1) End		default	1,000 Rela	200.0
						250.0
H173	S3369	Console - T (500.0, 250.0, 12.0, 10.0, 0.1) Start		default	1,000 Rela	200.0
						250.0
H174	S3372	Console - T (500.0, 250.0, 12.0, 10.0, 0.1) End		default	1,000 Rela	200.0
						250.0
H175	S3406	Console - T (500.0, 250.0, 12.0, 10.0, 0.1) Start		default	1,000 Rela	200.0
						250.0
H176	S3409	Console - T (500.0, 250.0, 12.0, 10.0, 0.1) End		default	1,000 Rela	200.0

					250.0
H177	S3413	Console - T (500.0, 250.0, 12.0, 10.0, 0.1) Start	default	1,000 Rela	200.0
					250.0
H178	S3416	Console - T (500.0, 250.0, 12.0, 10.0, 0.1) End	default	1,000 Rela	200.0
					250.0
H179	S3485	Console - T (500.0, 250.0, 12.0, 10.0, 0.1) Start	default	1,000 Rela	200.0
					250.0
H180	S3488	Console - T (500.0, 250.0, 12.0, 10.0, 0.1) End	default	1,000 Rela	200.0
					250.0
H181	S3490	Console - T (500.0, 250.0, 12.0, 10.0, 0.1) Start	default	1,000 Rela	200.0
					250.0
H182	S3493	Console - T (500.0, 250.0, 12.0, 10.0, 0.1) End	default	1,000 Rela	200.0
					250.0
H183	S3529	Console - T (500.0, 250.0, 12.0, 10.0, 0.1) Start	default	1,000 Rela	200.0
					250.0
H184	S3532	Console - T (500.0, 250.0, 12.0, 10.0, 0.1) End	default	1,000 Rela	200.0
					250.0
H185	S3601	Console - T (500.0, 250.0, 12.0, 10.0, 0.1) Start	default	1,000 Rela	200.0
					250.0
H186	S3604	Console - T (500.0, 250.0, 12.0, 10.0, 0.1) End	default	1,000 Rela	200.0
					250.0
H187	S3606	Console - T (500.0, 250.0, 12.0, 10.0, 0.1) Start	default	1,000 Rela	200.0
					250.0
H188	S3609	Console - T (500.0, 250.0, 12.0, 10.0, 0.1) End	default	1,000 Rela	200.0
					250.0
H189	S3645	Console - T (500.0, 250.0, 12.0, 10.0, 0.1) Start	default	1,000 Rela	200.0
					250.0
H190	S3648	Console - T (500.0, 250.0, 12.0, 10.0, 0.1) End	default	1,000 Rela	200.0
					250.0
H191	S3717	Console - T (500.0, 250.0, 12.0, 10.0, 0.1) Start	default	1,000 Rela	200.0
					250.0
H192	S3720	Console - T (500.0, 250.0, 12.0, 10.0, 0.1) End	default	1,000 Rela	200.0
					250.0
H193	S3754	Console - T (500.0, 250.0, 12.0, 10.0, 0.1) Start	default	1,000 Rela	200.0
					250.0
H194	S3757	Console - T (500.0, 250.0, 12.0, 10.0, 0.1) End	default	1,000 Rela	200.0
					250.0
H195	S3793	Console - T (500.0, 250.0, 12.0, 10.0, 0.1) Start	default	1,000 Rela	200.0
					250.0
H196	S3796	Console - T (500.0, 250.0, 12.0, 10.0, 0.1) End	default	1,000 Rela	200.0
					250.0
H197	S3865	Console - T (500.0, 250.0, 12.0, 10.0, 0.1) Start	default	1,000 Rela	200.0
					250.0
H198	S3868	Console - T (500.0, 250.0, 12.0, 10.0, 0.1) End	default	1,000 Rela	200.0
					250.0
H199	S3870	Console - T (500.0, 250.0, 12.0, 10.0, 0.1) Start	default	1,000 Rela	200.0
					250.0
H200	S3873	Console - T (500.0, 250.0, 12.0, 10.0, 0.1) End	default	1,000 Rela	200.0

Project	IJssel Bridge
Part	Main bridge
Author	Ernst Klamer
Current date	29.01.2019
Project file name	Main Bridge v6.0.esa

Name	Rod	Intersection	Position	Alignment	Length x	Coör height [mm]
						250.0
H201	S3945	Console - T (500.0, 250.0, 12.0, 10.0, 0.1) Start		default	1,000 Rela	200.0
						250.0
H202	S3948	Console - T (500.0, 250.0, 12.0, 10.0, 0.1) End		default	1,000 Rela	200.0

H203	S3950	Console - T (500.0, 250.0, 12.0, 10.0, 0.1) Start	default	1,000 Rela	250.0 200.0 250.0
H204	S3953	Console - T (500.0, 250.0, 12.0, 10.0, 0.1) End	default	1,000 Rela	200.0 250.0
H205	S3991	Console - T (500.0, 250.0, 12.0, 10.0, 0.1) Start	default	1,000 Rela	200.0 250.0
H206	S3994	Console - T (500.0, 250.0, 12.0, 10.0, 0.1) End	default	1,000 Rela	200.0 250.0
H207	S4028	Console - T (500.0, 250.0, 12.0, 10.0, 0.1) Start	default	1,000 Rela	200.0 250.0
H208	S4031	Console - T (500.0, 250.0, 12.0, 10.0, 0.1) End	default	1,000 Rela	200.0 250.0
H209	S4103	Console - T (500.0, 250.0, 12.0, 10.0, 0.1) Start	default	1,000 Rela	200.0 250.0
H210	S4106	Console - T (500.0, 250.0, 12.0, 10.0, 0.1) End	default	1,000 Rela	200.0 250.0
H211	S4140	Console - T (500.0, 250.0, 12.0, 10.0, 0.1) Start	default	1,000 Rela	200.0 250.0
H212	S4143	Console - T (500.0, 250.0, 12.0, 10.0, 0.1) End	default	1,000 Rela	200.0 250.0
H213	S4177	Console - T (500.0, 250.0, 12.0, 10.0, 0.1) Start	default	1,000 Rela	200.0 250.0
H214	S4180	Console - T (500.0, 250.0, 12.0, 10.0, 0.1) End	default	1,000 Rela	200.0 250.0
H215	S4246	Console - T (500.0, 250.0, 12.0, 10.0, 0.1) Start	default	1,000 Rela	200.0 250.0
H216	S4249	Console - T (500.0, 250.0, 12.0, 10.0, 0.1) End	default	1,000 Rela	200.0 250.0
H217	S4288	Console - T (500.0, 250.0, 12.0, 10.0, 0.1) Start	default	1,000 Rela	200.0 250.0
H218	S4291	Console - T (500.0, 250.0, 12.0, 10.0, 0.1) End	default	1,000 Rela	200.0 250.0
H219	S4325	Console - T (500.0, 250.0, 12.0, 10.0, 0.1) Start	default	1,000 Rela	200.0 250.0
H220	S4328	Console - T (500.0, 250.0, 12.0, 10.0, 0.1) End	default	1,000 Rela	200.0 250.0
H221	S4335	Console - T (500.0, 250.0, 12.0, 10.0, 0.1) Start	default	1,000 Rela	200.0 250.0
H222	S4338	Console - T (500.0, 250.0, 12.0, 10.0, 0.1) End	default	1,000 Rela	200.0 250.0
H223	S4342	Console - T (500.0, 250.0, 12.0, 10.0, 0.1) Start	default	1,000 Rela	200.0 250.0
H224	S4345	Console - T (500.0, 250.0, 12.0, 10.0, 0.1) End	default	1,000 Rela	200.0 250.0
H225	S4380	Console - T (500.0, 250.0, 12.0, 10.0, 0.1) Start	default	1,000 Rela	200.0 250.0
H226	S4383	Console - T (500.0, 250.0, 12.0, 10.0, 0.1) End	default	1,000 Rela	200.0 250.0
H227	S4419	Console - T (500.0, 250.0, 12.0, 10.0, 0.1) Start	default	1,000 Rela	200.0 250.0
H228	S4422	Console - T (500.0, 250.0, 12.0, 10.0, 0.1) End	default	1,000 Rela	200.0 250.0
H229	S4461	Console - T (500.0, 250.0, 12.0, 10.0, 0.1) Start	default	1,000 Rela	200.0 250.0
H230	S4464	Console - T (500.0, 250.0, 12.0, 10.0, 0.1) End	default	1,000 Rela	200.0 250.0
H231	S4503	Console - T (500.0, 250.0, 12.0, 10.0, 0.1) Start	default	1,000 Rela	200.0 250.0
H232	S4506	Console - T (500.0, 250.0, 12.0, 10.0, 0.1) End	default	1,000 Rela	200.0 250.0

Part	Main bridge
Author	Ernst Klamer
Current date	29.01.2019
Project file name	Main Bridge v6.0.esa

Name	Rod	Intersection	Position	Alignment	Length x	Coör height [mm]
H233	S4545	Console - T (500.0, 250.0, 12.0, 10.0, 0.1) Start		default	1,000 Rela	200.0
						250.0
H234	S4548	Console - T (500.0, 250.0, 12.0, 10.0, 0.1) End		default	1,000 Rela	200.0
						250.0
H235	S4587	Console - T (500.0, 250.0, 12.0, 10.0, 0.1) Start		default	1,000 Rela	200.0
						250.0
H236	S4590	Console - T (500.0, 250.0, 12.0, 10.0, 0.1) End		default	1,000 Rela	200.0
						250.0
H237	S4627	Console - T (500.0, 250.0, 12.0, 10.0, 0.1) Start		default	1,000 Rela	200.0
						250.0
H238	S4630	Console - T (500.0, 250.0, 12.0, 10.0, 0.1) End		default	1,000 Rela	200.0
						250.0
H239	S4664	Console - T (500.0, 250.0, 12.0, 10.0, 0.1) Start		default	1,000 Rela	200.0
						250.0
H240	S4667	Console - T (500.0, 250.0, 12.0, 10.0, 0.1) End		default	1,000 Rela	200.0
						250.0
H241	S4701	Console - T (500.0, 250.0, 12.0, 10.0, 0.1) Start		default	1,000 Rela	200.0
						250.0
H242	S4704	Console - T (500.0, 250.0, 12.0, 10.0, 0.1) End		default	1,000 Rela	200.0
						250.0
H243	S4738	Console - T (500.0, 250.0, 12.0, 10.0, 0.1) Start		default	1,000 Rela	200.0
						250.0
H244	S4741	Console - T (500.0, 250.0, 12.0, 10.0, 0.1) End		default	1,000 Rela	200.0
						250.0
H245	S4775	Console - T (500.0, 250.0, 12.0, 10.0, 0.1) Start		default	1,000 Rela	200.0
						250.0
H246	S4778	Console - T (500.0, 250.0, 12.0, 10.0, 0.1) End		default	1,000 Rela	200.0
						250.0
H247	S4812	Console - T (500.0, 250.0, 12.0, 10.0, 0.1) Start		default	1,000 Rela	200.0
						250.0
H248	S4815	Console - T (500.0, 250.0, 12.0, 10.0, 0.1) End		default	1,000 Rela	200.0
						250.0
H249	S4849	Console - T (500.0, 250.0, 12.0, 10.0, 0.1) Start		default	1,000 Rela	200.0
						250.0
H250	S4852	Console - T (500.0, 250.0, 12.0, 10.0, 0.1) End		default	1,000 Rela	200.0
						250.0
H251	S4917	Console - T (500.0, 250.0, 12.0, 10.0, 0.1) Start		default	1,000 Rela	200.0
						250.0
H252	S4920	Console - T (500.0, 250.0, 12.0, 10.0, 0.1) End		default	1,000 Rela	200.0
						250.0
H253	S4925	Console - T (500.0, 250.0, 12.0, 10.0, 0.1) Start		default	1,000 Rela	200.0
						250.0
H254	S4928	Console - T (500.0, 250.0, 12.0, 10.0, 0.1) End		default	1,000 Rela	200.0
						250.0
H255	S4930	Console - T (500.0, 250.0, 12.0, 10.0, 0.1) Start		default	1,000 Rela	200.0
						250.0
H256	S4933	Console - T (500.0, 250.0, 12.0, 10.0, 0.1) End		default	1,000 Rela	200.0
						250.0
H257	S5001	Console - T (500.0, 250.0, 12.0, 10.0, 0.1) Start		default	1,000 Rela	200.0
						250.0
H258	S5004	Console - T (500.0, 250.0, 12.0, 10.0, 0.1) End		default	1,000 Rela	200.0
						250.0
H259	S5041	Console - T (500.0, 250.0, 12.0, 10.0, 0.1) Start		default	1,000 Rela	200.0
						250.0
H260	S5044	Console - T (500.0, 250.0, 12.0, 10.0, 0.1) End		default	1,000 Rela	200.0
						250.0
H261	S5078	Console - T (500.0, 250.0, 12.0, 10.0, 0.1) Start		default	1,000 Rela	200.0
						250.0
H262	S5081	Console - T (500.0, 250.0, 12.0, 10.0, 0.1) End		default	1,000 Rela	200.0
						250.0
H263	S5149	Console - T (500.0, 250.0, 12.0, 10.0, 0.1) Start		default	1,000 Rela	200.0
						250.0
H264	S5152	Console - T (500.0, 250.0, 12.0, 10.0, 0.1) End		default	1,000 Rela	200.0
						250.0

H265	S5157	Console - T (500.0, 250.0, 12.0, 10.0, 0.1) Start	default	1,000 Rela	200.0

Project	IJssel Bridge
Part	Main bridge
Author	Ernst Klamer
Current date	29.01.2019
Project file name	Main Bridge v6.0.esa

Name	Rod	Intersection	Position	Alignment Length x	Coör height [mm]
					250.0
H266	S5160	Console - T (500.0, 250.0, 12.0, 10.0, 0.1) End		default 1,000 Rela	200.0
					250.0
H267	S5194	Console - T (500.0, 250.0, 12.0, 10.0, 0.1) Start		default 1,000 Rela	200.0
					250.0
H268	S5197	Console - T (500.0, 250.0, 12.0, 10.0, 0.1) End		default 1,000 Rela	200.0
					250.0
H269	S5265	Console - T (500.0, 250.0, 12.0, 10.0, 0.1) Start		default 1,000 Rela	200.0
					250.0
H270	S5268	Console - T (500.0, 250.0, 12.0, 10.0, 0.1) End		default 1,000 Rela	200.0
					250.0
H271	S5273	Console - T (500.0, 250.0, 12.0, 10.0, 0.1) Start		default 1,000 Rela	200.0
					250.0
H272	S5276	Console - T (500.0, 250.0, 12.0, 10.0, 0.1) End		default 1,000 Rela	200.0
					250.0
H273	S5310	Console - T (500.0, 250.0, 12.0, 10.0, 0.1) Start		default 1,000 Rela	200.0
					250.0
H274	S5313	Console - T (500.0, 250.0, 12.0, 10.0, 0.1) End		default 1,000 Rela	200.0
					250.0
H275	S5381	Console - T (500.0, 250.0, 12.0, 10.0, 0.1) Start		default 1,000 Rela	200.0
					250.0
H276	S5384	Console - T (500.0, 250.0, 12.0, 10.0, 0.1) End		default 1,000 Rela	200.0
					250.0
H277	S5389	Console - T (500.0, 250.0, 12.0, 10.0, 0.1) Start		default 1,000 Rela	200.0
					250.0
H278	S5392	Console - T (500.0, 250.0, 12.0, 10.0, 0.1) End		default 1,000 Rela	200.0
					250.0
H279	S5428	Console - T (500.0, 250.0, 12.0, 10.0, 0.1) Start		default 1,000 Rela	200.0
					250.0
H280	S5431	Console - T (500.0, 250.0, 12.0, 10.0, 0.1) End		default 1,000 Rela	200.0
					250.0
H281	S5468	Console - T (500.0, 250.0, 12.0, 10.0, 0.1) Start		default 1,000 Rela	200.0
					250.0
H282	S5471	Console - T (500.0, 250.0, 12.0, 10.0, 0.1) End		default 1,000 Rela	200.0
					250.0
H283	S5507	Console - T (500.0, 250.0, 12.0, 10.0, 0.1) Start		default 1,000 Rela	200.0
					250.0
H284	S5510	Console - T (500.0, 250.0, 12.0, 10.0, 0.1) End		default 1,000 Rela	200.0
					250.0
H285	S5547	Console - T (500.0, 250.0, 12.0, 10.0, 0.1) Start		default 1,000 Rela	200.0
					250.0
H286	S5550	Console - T (500.0, 250.0, 12.0, 10.0, 0.1) End		default 1,000 Rela	200.0
					250.0
H287	S5584	Console - T (500.0, 250.0, 12.0, 10.0, 0.1) Start		default 1,000 Rela	200.0
					250.0
H288	S5587	Console - T (500.0, 250.0, 12.0, 10.0, 0.1) End		default 1,000 Rela	200.0
					250.0
H289	S5655	Console - T (500.0, 250.0, 12.0, 10.0, 0.1) Start		default 1,000 Rela	200.0
					250.0
H290	S5658	Console - T (500.0, 250.0, 12.0, 10.0, 0.1) End		default 1,000 Rela	200.0
					250.0
H291	S5663	Console - T (500.0, 250.0, 12.0, 10.0, 0.1) Start		default 1,000 Rela	200.0

					250.0
H292	S5666	Console - T (500.0, 250.0, 12.0, 10.0, 0.1) End	default	1,000 Rela	200.0
					250.0
H293	S5700	Console - T (500.0, 250.0, 12.0, 10.0, 0.1) Start	default	1,000 Rela	200.0
					250.0
H294	S5703	Console - T (500.0, 250.0, 12.0, 10.0, 0.1) End	default	1,000 Rela	200.0
					250.0
H295	S5739	Console - T (500.0, 250.0, 12.0, 10.0, 0.1) Start	default	1,000 Rela	200.0
					250.0
H296	S5742	Console - T (500.0, 250.0, 12.0, 10.0, 0.1) End	default	1,000 Rela	200.0
					250.0
H297	S5779	Console - T (500.0, 250.0, 12.0, 10.0, 0.1) Start	default	1,000 Rela	200.0
					250.0

Project	IJssel Bridge
Part	Main bridge
Author	Ernst Klamer
Current date	29.01.2019
Project file name	Main Bridge v6.0.esa

Name	Rod	Intersection	Position	Alignment	Length x	Coör height [mm]
H298	S5782	Console - T (500.0, 250.0, 12.0, 10.0, 0.1) End		default	1,000 Rela	200.0
						250.0
H299	S5848	Console - T (500.0, 250.0, 12.0, 10.0, 0.1) Start		default	1,000 Rela	200.0
						250.0
H300	S5851	Console - T (500.0, 250.0, 12.0, 10.0, 0.1) End		default	1,000 Rela	200.0
						250.0
H301	S5887	Console - T (500.0, 250.0, 12.0, 10.0, 0.1) Start		default	1,000 Rela	200.0
						250.0
H302	S5890	Console - T (500.0, 250.0, 12.0, 10.0, 0.1) End		default	1,000 Rela	200.0
						250.0
H303	S5895	Console - T (500.0, 250.0, 12.0, 10.0, 0.1) Start		default	1,000 Rela	200.0
						250.0
H304	S5898	Console - T (500.0, 250.0, 12.0, 10.0, 0.1) End		default	1,000 Rela	200.0
						250.0
H305	S5964	Console - T (500.0, 250.0, 12.0, 10.0, 0.1) Start		default	1,000 Rela	200.0
						250.0
H306	S5967	Console - T (500.0, 250.0, 12.0, 10.0, 0.1) End		default	1,000 Rela	200.0
						250.0
H307	S6003	Console - T (500.0, 250.0, 12.0, 10.0, 0.1) Start		default	1,000 Rela	200.0
						250.0
H308	S6006	Console - T (500.0, 250.0, 12.0, 10.0, 0.1) End		default	1,000 Rela	200.0
						250.0
H309	S6012	Console - T (500.0, 250.0, 12.0, 10.0, 0.1) Start		default	1,000 Rela	200.0
						250.0
H310	S6015	Console - T (500.0, 250.0, 12.0, 10.0, 0.1) End		default	1,000 Rela	200.0
						250.0
H311	S6049	Console - T (500.0, 250.0, 12.0, 10.0, 0.1) Start		default	1,000 Rela	200.0
						250.0
H312	S6052	Console - T (500.0, 250.0, 12.0, 10.0, 0.1) End		default	1,000 Rela	200.0
						250.0
H313	S6088	Console - T (500.0, 250.0, 12.0, 10.0, 0.1) Start		default	1,000 Rela	200.0
						250.0
H314	S6091	Console - T (500.0, 250.0, 12.0, 10.0, 0.1) End		default	1,000 Rela	200.0
						250.0
H315	S6128	Console - T (500.0, 250.0, 12.0, 10.0, 0.1) Start		default	1,000 Rela	200.0
						250.0
H316	S6131	Console - T (500.0, 250.0, 12.0, 10.0, 0.1) End		default	1,000 Rela	200.0
						250.0
H317	S6165	Console - T (500.0, 250.0, 12.0, 10.0, 0.1) Start		default	1,000 Rela	200.0

H318	S6168	Console - T (500.0, 250.0, 12.0, 10.0, 0.1) End	default	1,000 Rela	250.0 200.0
H319	S6204	Console - T (500.0, 250.0, 12.0, 10.0, 0.1) Start	default	1,000 Rela	250.0 200.0
H320	S6207	Console - T (500.0, 250.0, 12.0, 10.0, 0.1) End	default	1,000 Rela	250.0 200.0
H321	S6244	Console - T (500.0, 250.0, 12.0, 10.0, 0.1) Start	default	1,000 Rela	250.0 200.0
H322	S6247	Console - T (500.0, 250.0, 12.0, 10.0, 0.1) End	default	1,000 Rela	250.0 200.0
H323	S6281	Console - T (500.0, 250.0, 12.0, 10.0, 0.1) Start	default	1,000 Rela	250.0 200.0
H324	S6284	Console - T (500.0, 250.0, 12.0, 10.0, 0.1) End	default	1,000 Rela	250.0 200.0
H325	S6320	Console - T (500.0, 250.0, 12.0, 10.0, 0.1) Start	default	1,000 Rela	250.0 200.0
H326	S6323	Console - T (500.0, 250.0, 12.0, 10.0, 0.1) End	default	1,000 Rela	250.0 200.0
H327	S6360	Console - T (500.0, 250.0, 12.0, 10.0, 0.1) Start	default	1,000 Rela	250.0 200.0
H328	S6363	Console - T (500.0, 250.0, 12.0, 10.0, 0.1) End	default	1,000 Rela	250.0 200.0
H329	S6365	Console - T (500.0, 250.0, 12.0, 10.0, 0.1) Start	default	1,000 Rela	250.0 200.0
H330	S6368	Console - T (500.0, 250.0, 12.0, 10.0, 0.1) End	default	1,000 Rela	250.0 200.0

Project	IJssel Bridge
Part	Main bridge
Author	Ernst Klamer
Current date	29.01.2019
Project file name	Main Bridge v6.0.esa

Name	Rod	Intersection	Position	Alignment	Length x	Coör height [mm]
H331	S6404	Console - T (500.0, 250.0, 12.0, 10.0, 0.1) Start		default	1,000 Rela	250.0 200.0
H332	S6407	Console - T (500.0, 250.0, 12.0, 10.0, 0.1) End		default	1,000 Rela	250.0 200.0
H333	S6476	Console - T (500.0, 250.0, 12.0, 10.0, 0.1) Start		default	1,000 Rela	250.0 200.0
H334	S6479	Console - T (500.0, 250.0, 12.0, 10.0, 0.1) End		default	1,000 Rela	250.0 200.0

10. K-bandage normal cross beam

10.1. Construction model k-bandage

Page 27

Project	IJssel Bridge
Part	Main bridge
Author	Ernst Klamer
Current date	29.01.2019
Project file name	Main Bridge v6.0.esa

10.2. Construction model k-bandage

A rigid bond has been used between the knot at the top of the side member / cross member and the bottom of the cross member (shown in red).

Project	IJssel Bridge
Part	Main bridge
Author	Ernst Klamer
Current date	29.01.2019
Project file name	Main Bridge v6.0.esa

10.3. Construction model k-band normal crossbeam

10.4. Overview K-bandages 1st span

Project	IJssel Bridge
Part	Main bridge
Author	Ernst Klamer
Current date	29.01.2019
Project file name	Main Bridge v6.0.esa

10.5. Overview K-bandages 2nd span

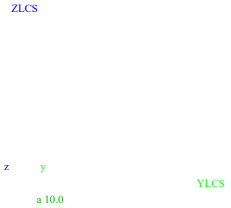
10.6. Overview K-bandages 3rd span

Project	IJssel Bridge
Part	Main bridge
Author	Ernst Klamer
Current date	29.01.2019
Project file name	Main Bridge v6.0.esa

10.7. Sections

2x L80x8

Type	2LX		
Extensive	L80X8; 10.0		
Form type	Thin-walled		
Part material	QMC 37 (eg 111%)		
Construction method	rolled		
Color			
Nod yy, nod zz	c		c
A [m 2]		2.4539e-03	
A y [m 2], A z [m 2]		1.1539e-03	2,0754e-03
A L [m 2 / m], A D [m 2 / m]		6.2275e-01	6.2275e-01
c Y.UCS [mm], c Z.UCS [mm]		85.0	85.0
I Y.LCS [m 4], I Z.LCS [m 4]		3,3060e-06	3,3060e-06
I YZ.LCS [m 4]		1.0148e-06	
α [deg]		45.00	
I y [m 4], I z [m 4]		2.2913e-06	4,3208e-06
i y [mm], i z [mm]		30.6	42.0
W el.y [m 3], W el.z [m 3]		4,0504e-05	6.4291e-05
W pl.y [m 3], W pl.z [m 3]		6.4379e-05	9.5585e-05
M pl.y. + [Nm], M pl.y.- [Nm]		1.38e + 04	1.38e + 04
M pl.z. + [Nm], M pl.z.- [Nm]		2.06e + 04	2.06e + 04
d y [mm], d z [mm]		0.0	0.0
I t [m 4], I w [m 6]		5.5978e-08	4.5754e-10
β y [mm], β z [mm]		0.0	0.0
Image			



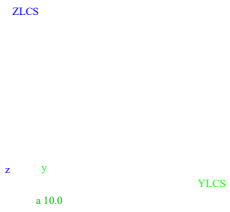
2x L90x9

Type	2LX		
Extensive	L90X9; 10.0		
Form type	Thin-walled		
Part material	QMC 37 (eg 111%)		
Construction method	rolled		
Color			
Nod yy, nod zz	c		c
A [m 2]		3.1044e-03	
A y [m 2], A z [m 2]		1.8943e-03	2,6479e-03
A L [m 2 / m], A D [m 2 / m]		7.0103e-01	7.0103e-01

c Y.UCS [mm], c Z.UCS [mm]	95.0	95.0
I Y.LCS [m 4], I Z.LCS [m 4]	5.1811e-06	5.1811e-06
I YZ.LCS [m 4]	1.5070th-06	
α [deg]	45.00	
I y [m 4], I z [m 4]	3.6741e-06	6.6881e-06
i y [mm], i z [mm]	34.4	46.4
W el.y [m 3], W el.z [m 3]	5.7733e-05	8.9442e-05
W pl.y [m 3], W pl.z [m 3]	9.1727e-05	1,3338e-04
M pl.y. + [Nm], M pl.y.- [Nm]	1.97e + 04	1.97e + 04
M pl.z. + [Nm], M pl.z.- [Nm]	2.87e + 04	2.87e + 04
d y [mm], d z [mm]	0.0	0.0
I t [m 4], I w [m 6]	8.9295e-08	8.2700e-10
β y [mm], β z [mm]	0.0	0.0

Project	IJssel Bridge
Part	Main bridge
Author	Ernst Klamer
Current date	29.01.2019
Project file name	Main Bridge v6.0.esa

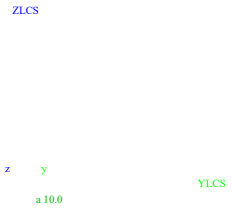
Image



2x L100x10

Type	2LX		
Extensive	L100X10; 10.0		
Form type	Thin-walled		
Part material	QMC 37 (eg 124%)		
Construction method	rolled		
Color			
Nod yy, nod zz	c		c
A [m 2]		3.8315e-03	
A y [m 2], A z [m 2]		2.1826e-03	3.2364e-03
A L [m 2 / m], A D [m 2 / m]		7.7930e-01	7.7930e-01
c Y.UCS [mm], c Z.UCS [mm]		105.0	105.0
I Y.LCS [m 4], I Z.LCS [m 4]		7.7597e-06	7.7597e-06
I YZ.LCS [m 4]		2,1551e-06	
α [deg]		45.00	
I y [m 4], I z [m 4]		5,6046e-06	9,9148e-06
i y [mm], i z [mm]		38.2	50.9
W el.y [m 3], W el.z [m 3]		7,9262e-05	1.2041e-04
W pl.y [m 3], W pl.z [m 3]		1.2589e-04	1,7999e-04
M pl.y. + [Nm], M pl.y.- [Nm]		2.71e + 04	2.71e + 04
M pl.z. + [Nm], M pl.z.- [Nm]		3.87e + 04	3.87e + 04
d y [mm], d z [mm]		0.0	0.0
I t [m 4], I w [m 6]		1.3565e-07	1.4154e-09
β y [mm], β z [mm]		0.0	0.0

Image



1/2 DIN 20

Type	T		
Extensive	100.0; 200.0; 16.0; 10.0; 15.0		
Form standard	6 - T-section		
Form type	Thin-walled		
Part material	QMC 37 (eg 111%)		
Construction method	rolled		
Color			
Nod yy, nod zz	c		c
A [m 2]		4.1384e-03	
A y [m 2], A z [m 2]		3,0358e-03	1.1241e-03
A L [m 2 / m], A D [m 2 / m]		5.8706e-01	5.8706e-01
c Y,UCS [mm], c Z,UCS [mm]		100.0	18.4
α [deg]		0.00	

Project	IJssel Bridge
Part	Main bridge
Author	Ernst Klamer
Current date	29.01.2019
Project file name	Main Bridge v6.0.esa

I y [m 4], I z [m 4]	2,2265e-06	1.0681e-05
i y [mm], i z [mm]	23.2	50.8
W el,y [m 3], W el,z [m 3]	2.7292e-05	1.0681e-04
W pl,y [m 3], W pl,z [m 3]	5.4820e-05	1.6293e-04
M pl,y,+ [Nm], M pl,y,- [Nm]	1.18e + 04	1.18e + 04
M pl,z,+ [Nm], M pl,z,- [Nm]	3.50th + 04	3.50th + 04
d y [mm], d z [mm]	0.0	-10.3
I t [m 4], I w [m 6]	3,0373e-07	2.1378e-40
β y [mm], β z [mm]	17.9	0.0

Image

1/2 INP24 + 1/2 INP24

Type	Graphic cross section	
Form type	Thin-walled	
Part material	QMC 37 (eg 0%)	
Construction method	General	
Color		
Nod yy, nod zz	d	d
A [m 2]	4,6087e-03	

A_y [m 2], A_z [m 2]	2.9612e-01	9.8771e-04
A_L [m 2 / m], A_D [m 2 / m]	8,6143e-01	8,6143e-01
$c_{Y,UCS}$ [mm], $c_{Z,UCS}$ [mm]	0.0	-29.1
α [deg]	0.00	
I_y [m 4], I_z [m 4]	2.5864e-05	2.1992nd-04
i_y [mm], i_z [mm]	74.9	218.4
$W_{el,y}$ [m 3], $W_{el,z}$ [m 3]	1,6673e-04	4.1495e-03
$W_{pl,y}$ [m 3], $W_{pl,z}$ [m 3]	3.0417e-04	6.9969e-05
$M_{pl,y,+}$ [Nm], $M_{pl,y,-}$ [Nm]	6.54th + 04	6.54th + 04
$M_{pl,z,+}$ [Nm], $M_{pl,z,-}$ [Nm]	1.50th + 04	1.50th + 04
d_y [mm], d_z [mm]	0.0	0.0
I_t [m 4], I_w [m 6]	4.3450e-07	0.0000e + 00
β_y [mm], β_z [mm]	6.9	0.0

Image

1/2 INP24 + 1/2 INP30

Type	Graphic cross section
Form type	Thin-walled
Part material	QMC 37 (eg 0%)

Page 33

Project	IJssel Bridge
Part	Main bridge
Author	Ernst Klamer
Current date	29.01.2019
Project file name	Main Bridge v6.0.esa

Construction method	General		
Color			
Nod yy, nod zz	d		d
A [m 2]		5.7547e-03	
A_y [m 2], A_z [m 2]		3.7252e-01	7.1162e-04
A_L [m 2 / m], A_D [m 2 / m]		9.5513e-01	9.5513e-01
$c_{Y,UCS}$ [mm], $c_{Z,UCS}$ [mm]		0.0	-10.7
α [deg]		0.00	
I_y [m 4], I_z [m 4]		3,7176e-05	3.3461e-04
i_y [mm], i_z [mm]		80.4	241.1
$W_{el,y}$ [m 3], $W_{el,z}$ [m 3]		2.2297e-04	5.3537e-03
$W_{pl,y}$ [m 3], $W_{pl,z}$ [m 3]		3.6716e-04	9.5816e-05
$M_{pl,y,+}$ [Nm], $M_{pl,y,-}$ [Nm]		7.89e + 04	7.89e + 04
$M_{pl,z,+}$ [Nm], $M_{pl,z,-}$ [Nm]		2.06e + 04	2.06e + 04

d_y [mm], d_z [mm]	0.0	0.0
I_t [m^4], I_w [m^6]	7.3454e-07	0.0000e + 00
β_y [mm], β_z [mm]	1.4	0.0

Image

1/2 INP30 + 1/2 INP30

Type	Graphic cross section		
Form type	Thin-walled		
Part material	QMC 37 (eg 0%)		
Construction method	General		
Color			
Nod yy, nod zz	d		d
A [m^2]		6,9007e-03	
A_y [m^2], A_z [m^2]		4,3400e-01	2.7211e-03
A_L [m^2 / m], A_D [m^2 / m]		1.0488e + 00	1.0488e + 00
$c_{Y.UCS}$ [mm], $c_{Z.UCS}$ [mm]		0.0	-35.4
α [deg]		0.00	
I_y [m^4], I_z [m^4]		5,9088e-05	4.4929e-04
i_y [mm], i_z [mm]		92.5	255.2
$W_{el.y}$ [m^3], $W_{el.z}$ [m^3]		3,0877e-04	7.1887e-03
$W_{pl.y}$ [m^3], $W_{pl.z}$ [m^3]		5.5895e-04	1.2166e-04
$M_{pl.y.+}$ [Nm], $M_{pl.y.-}$ [Nm]		1.20th + 05	1.20th + 05
$M_{pl.z.+}$ [Nm], $M_{pl.z.-}$ [Nm]		2.62e + 04	2.62e + 04
d_y [mm], d_z [mm]		0.0	0.0
I_t [m^4], I_w [m^6]		9.5666e-07	0.0000e + 00
β_y [mm], β_z [mm]		8.8	0.0

Project	IJssel Bridge
Part	Main bridge
Author	Ernst Klamer
Current date	29.01.2019
Project file name	Main Bridge v6.0.esa

Image

z

y

1/2 INP24

Type	Graphic cross section		
Form type	Thin-walled		
Part material	QMC 37 (eg 0%)		
Construction method	General		
Color			
Nod yy, nod zz	d	d	
A [m 2]		2,3043e-03	
A y [m 2], A z [m 2]		1.4806e-01	1.0154e-03
A L [m 2 / m], A D [m 2 / m]		4,3072e-01	4,3072e-01
c Y,UCS [mm], c Z,UCS [mm]		0.0	-89.1
α [deg]		0.00	
I y [m 4], I z [m 4]		2.8945e-06	1.0996e-04
i y [mm], i z [mm]		35.4	218.4
W el,y [m 3], W el,z [m 3]		3.2476e-05	2.0747e-03
W pl,y [m 3], W pl,z [m 3]		5.8556e-05	3.4984e-05
M pl,y, + [Nm], M pl,y,- [Nm]		1.26th + 04	1.26th + 04
M pl,z, + [Nm], M pl,z,- [Nm]		7.52nd + 03	7.52nd + 03
d y [mm], d z [mm]		0.0	0.0
I t [m 4], I w [m 6]		2.2766e-07	0.0000e + 00
β y [mm], β z [mm]		30.6	0.0
Image			

z

y

Explanation of symbols

a	Area
A y	Shear surface in main y direction - Calculated by 2D FEM analysis

Explanation of symbols

A z	Shear surface in main z direction - Calculated by 2D FEM analysis
A L	Perimeter per unit length

Project	IJssel Bridge
Part	Main bridge
Author	Ernst Klamer
Current date	29.01.2019
Project file name	Main Bridge v6.0.esa

Explanation of symbols

A_D	Curing surface per unit length
$c_{Y.UCS}$	Center of gravity coordinates in Y direction of the input axis system
$c_{Z.UCS}$	Center of gravity coordinates in Z direction of the input axis system
$I_{Y.LCS}$	Second moment of the area around the YLCS axis
$I_{Z.LCS}$	Second moment of the area around the ZLCS axis
$I_{YZ.LCS}$	Product moment of the area the LCS system
α	Rotation angle of the main axes system
I_y	Second moment of the area around the main y-axis
I_z	Second moment of the area around the main z axis
i_y	Radius of inertia around the main y-axis
i_z	Radius of inertia around the main z axis
$W_{el.y}$	Elastic cross-section modulus around the main y axis
$W_{el.z.}$	Elastic cross-section modulus around the main z axis

Explanation of symbols

$W_{pl.y}$	Plastic cross-section modulus around the main y axis
$W_{pl.z.}$	Plastic cross-section modulus around the main z axis
$M_{pl.y.+}$	Plastic moment around the main y-axis for a positive My moment
$M_{pl.y.-}$	Plastic moment around the main y-axis for a negative My moment
$M_{pl.z.+}$	Plastic moment around the main z axis for a positive Mz moment
$M_{pl.z.-}$	Plastic moment around the main z axis for a negative Mz moment
d_y	Shear middle coordinate in head y direction measured from the center of gravity - Calculated by 2D FEM analysis
d_z	Shear middle coordinate in head z direction measured from the center of gravity - Calculated by 2D FEM analysis
I_t	Torsion constant - Calculated by 2D FEM analysis
I_w	Curvature constant - Calculated by 2D FEM analysis
β_y	Mono-symmetrical constant round the main y-axis
β_z	Mono-symmetrical constant round the main z axis

11. Portals

11.1. Construction model portal A north

Z.

X Y.

Project	IJssel Bridge
Part	Main bridge
Author	Ernst Klamer
Current date	29.01.2019
Project file name	Main Bridge v6.0.esa

11.2. Construction model Portal A abutment south

A rigid bond has been used between the knot at the top of the side member / cross member and the bottom of the cross member (shown in red).

Page 37

Project	IJssel Bridge
Part	Main bridge
Author	Ernst Klamer
Current date	29.01.2019
Project file name	Main Bridge v6.0.esa

11.3. Construction model Portal B

11.4. Construction model Portal B

123/136

Page 38

Project	IJssel Bridge
Part	Main bridge
Author	Ernst Klamer
Current date	29.01.2019
Project file name	Main Bridge v6.0.esa

A rigid bond has been used between the knot at the top of the side member / cross member and the bottom of the cross member (shown in red).
At the location of the connection of the diagonals, a rigid bond has also been made to the system line of the bottom edge (shown in red).

11.5. Construction model Portal C

z.

x y.

A rigid bond is used between the knot at the top of the side member / cross member and the bottom side of the cross member

11.6. Sections

L90x90x9			
Type	L90X9		
Form standard	4 - L section		
Form type	Thin-walled		
Part material	QMC 37 (eg 111%)		
Construction method	rolled		
Color			
Nod yy, nod zz	b		b
A [m 2]		1,5500e-03	
A y [m 2], A z [m 2]		1.3024e-03	1.3168e-03
A L [m 2 / m], A D [m 2 / m]		3,5000e-01	3,5051e-01
c Y.UCS [mm], c Z.UCS [mm]		25.4	25.4
I Y.LCS [m 4], I Z.LCS [m 4]		1.1600e-06	1.1600e-06
I YZ.LCS [m 4]		-6.7916e-07	
α [deg]		45.00	
I y [m 4], I z [m 4]		1,8400e-06	4,7800e-07
i y [mm], i z [mm]		34.5	17.6
W el.y [m 3], W el.z [m 3]		2.8867e-05	1.3338e-05
W pl.y [m 3], W pl.z [m 3]		4,5863e-05	2.3580th-05
M pl.y. + [Nm], M pl.y.- [Nm]		9.86e + 03	9.86e + 03
M pl.z. + [Nm], M pl.z.- [Nm]		5.07th + 03	5.07th + 03
d y [mm], d z [mm]		-28.3	0.0
I t [m 4], I w [m 6]		4.4566e-08	2.1916e-11
β y [mm], β z [mm]		0.0	115.0

Project	IJssel Bridge
Part	Main bridge
Author	Ernst Klamer
Current date	29.01.2019
Project file name	Main Bridge v6.0.esa

Image

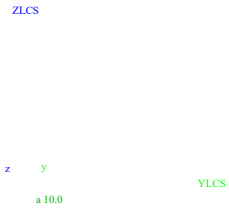
ZLCS

z y

YLCS

2x L100x10

Type	2LX		
Extensive	L100X10; 10.0		
Form type	Thin-walled		
Part material	QMC 37 (eg 124%)		
Construction method	rolled		
Color			
Nod yy, nod zz	c		c
A [m 2]		3.8315e-03	
A y [m 2], A z [m 2]		2.1826e-03	3.2364e-03
A L [m 2 / m], A D [m 2 / m]		7.7930e-01	7.7930e-01
c Y,UCS [mm], c Z,UCS [mm]		105.0	105.0
I Y,LCS [m 4], I Z,LCS [m 4]		7.7597e-06	7.7597e-06
I YZ,LCS [m 4]		2,1551e-06	
α [deg]		45.00	
I y [m 4], I z [m 4]		5,6046e-06	9,9148e-06
i y [mm], i z [mm]		38.2	50.9
W el,y [m 3], W el,z [m 3]		7,9262e-05	1.2041e-04
W pl,y [m 3], W pl,z [m 3]		1.2589e-04	1,7999e-04
M pl,y,+ [Nm], M pl,y,- [Nm]		2.71e + 04	2.71e + 04
M pl,z,+ [Nm], M pl,z,- [Nm]		3.87e + 04	3.87e + 04
d y [mm], d z [mm]		0.0	0.0
I t [m 4], I w [m 6]		1.3565e-07	1.4154e-09
β y [mm], β z [mm]		0.0	0.0
Image			



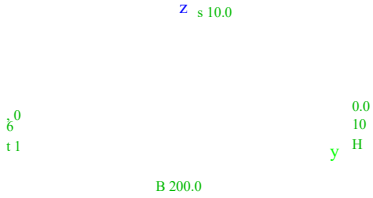
1/2 DIN 20

Type	T		
Extensive	100.0; 200.0; 16.0; 10.0; 15.0		
Form standard	6 - T-section		
Form type	Thin-walled		
Part material	QMC 37 (eg 111%)		
Construction method	rolled		
Color			
Nod yy, nod zz	c		c
A [m 2]		4.1384e-03	
A y [m 2], A z [m 2]		3,0358e-03	1.1241e-03
A L [m 2 / m], A D [m 2 / m]		5.8706e-01	5.8706e-01
c Y,UCS [mm], c Z,UCS [mm]		100.0	18.4
α [deg]		0.00	
I y [m 4], I z [m 4]		2,2265e-06	1.0681e-05

Project	IJssel Bridge
Part	Main bridge
Author	Ernst Klamer
Current date	29.01.2019
Project file name	Main Bridge v6.0.esa

i_y [mm], i_z [mm]	23.2	50.8
$W_{el,y}$ [m^3], $W_{el,z}$ [m^3]	2.7292e-05	1.0681e-04
$W_{pl,y}$ [m^3], $W_{pl,z}$ [m^3]	5.4820e-05	1.6293e-04
$M_{pl,y,+}$ [Nm], $M_{pl,y,-}$ [Nm]	1.18e + 04	1.18e + 04
$M_{pl,z,+}$ [Nm], $M_{pl,z,-}$ [Nm]	3.50th + 04	3.50th + 04
d_y [mm], d_z [mm]	0.0	-10.3
I_t [m^4], I_w [m^6]	3,0373e-07	2.1378e-40
β_y [mm], β_z [mm]	17.9	0.0

Image



1/2 INP30 + 1/2 INP30

Type	Graphic cross section		
Form type	Thin-walled		
Part material	QMC 37 (eg 0%)		
Construction method	General		
Color			
Nod yy, nod zz	d		d
A [m^2]		6,9007e-03	
A_y [m^2], A_z [m^2]		4,3400e-01	2.7211e-03
A_L [m^2 / m], A_D [m^2 / m]		1.0488e + 00	1.0488e + 00
$c_{Y,UCS}$ [mm], $c_{Z,UCS}$ [mm]		0.0	-35.4
α [deg]		0.00	
I_y [m^4], I_z [m^4]		5,9088e-05	4.4929e-04
i_y [mm], i_z [mm]		92.5	255.2
$W_{el,y}$ [m^3], $W_{el,z}$ [m^3]		3,0877e-04	7.1887e-03
$W_{pl,y}$ [m^3], $W_{pl,z}$ [m^3]		5.5895e-04	1.2166e-04
$M_{pl,y,+}$ [Nm], $M_{pl,y,-}$ [Nm]		1.20th + 05	1.20th + 05
$M_{pl,z,+}$ [Nm], $M_{pl,z,-}$ [Nm]		2.62e + 04	2.62e + 04
d_y [mm], d_z [mm]		0.0	0.0
I_t [m^4], I_w [m^6]		9.5666e-07	0.0000e + 00
β_y [mm], β_z [mm]		8.8	0.0

Image

1/2 INP30

Type	Graphic cross section
Form type	Thin-walled
Part material	QMC 37 (eg 0%)

Page 41

Project	IJssel Bridge
Part	Main bridge
Author	Ernst Klamer
Current date	29.01.2019
Project file name	Main Bridge v6.0.esa

Construction method	General		
Color			
Nod yy, nod zz	d		d
A [m 2]		3,4503e-03	
A y [m 2], A z [m 2]		2.1700e-01	1,5671e-03
A L [m 2 / m], A D [m 2 / m]		5.2441e-01	5.2441e-01
c Y,UCS [mm], c Z,UCS [mm]		0.0	-110.4
α [deg]		0.00	
I y [m 4], I z [m 4]		6,9062e-06	2.2465e-04
i y [mm], i z [mm]		44.7	255.2
W el,y [m 3], W el,z [m 3]		6.2576e-05	3,5944e-03
W pl,y [m 3], W pl,z [m 3]		1.1280e-04	6.0832e-05
M pl,y,+ [Nm], M pl,y,- [Nm]		2.43rd + 04	2.43rd + 04
M pl,z,+ [Nm], M pl,z,- [Nm]		1.31st + 04	1.31st + 04
d y [mm], d z [mm]		0.0	0.0
I t [m 4], I w [m 6]		4.8787e-07	0.0000e + 00
β y [mm], β z [mm]		37.8	0.0

Image

z

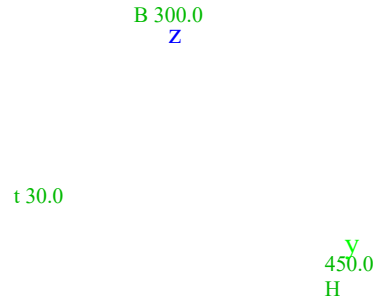
y

Bottom edge of portal B

Type	I		
Extensive	450.0; 300.0; 30.0; 12.0; 0.1		
Form standard	1 - I section		
Form type	Thin-walled		
Part material	LQmc 52 (eg 181%)		
Construction method	rolled		
Color			
Nod yy, nod zz	a		b
A [m 2]		2.2680e-02	
A y [m 2], A z [m 2]		1.6287e-02	5.4761e-03
A L [m 2 / m], A D [m 2 / m]		2.0758e + 00	2.0758e + 00
c Y,UCS [mm], c Z,UCS [mm]		150.0	225.0
α [deg]		0.00	
I y [m 4], I z [m 4]		8,5447e-04	1.3506e-04
i y [mm], i z [mm]		194.1	77.2
W el,y [m 3], W el,z [m 3]		3.7976e-03	9.0037e-04
W pl,y [m 3], W pl,z [m 3]		4.2363e-03	1.3640e-03
M pl,y,+ [Nm], M pl,y,- [Nm]		1.48e + 06	1.48e + 06
M pl,z,+ [Nm], M pl,z,- [Nm]		4.77e + 05	4.77e + 05
d y [mm], d z [mm]		0.0	0.0
I t [m 4], I w [m 6]		5.3951e-06	5.9535e-06
β y [mm], β z [mm]		0.0	0.0

Project	IJssel Bridge
Part	Main bridge
Author	Ernst Klamer
Current date	29.01.2019
Project file name	Main Bridge v6.0.esa

Image



Vertical portal B - 150x12 + 126x12 + 1/2 INP30

Type	Graphic cross section		
Form type	Thin-walled		
Part material	QMC 37 (eg 0%)		
Construction method	General		
Color			
Nod yy, nod zz	d		d
A [m 2]		6.7623e-03	
A y [m 2], A z [m 2]		4,1217e-01	3.2406e-03
A L [m 2 / m], A D [m 2 / m]		1,1004th + 00	1,1004th + 00
c Y,UCS [mm], c Z,UCS [mm]		0.0	-38.1
α [deg]		0.00	
I y [m 4], I z [m 4]		5,6029e-05	5.6396e-04
i y [mm], i z [mm]		91.0	288.8
W el,y [m 3], W el,z [m 3]		3,0774e-04	7.5195e-03
W pl,y [m 3], W pl,z [m 3]		5.4430e-04	1.3287e-04
M pl,y,+ [Nm], M pl,y,- [Nm]		1.17e + 05	1.17e + 05
M pl,z,+ [Nm], M pl,z,- [Nm]		2.86e + 04	2.86e + 04
d y [mm], d z [mm]		0.0	0.0
I t [m 4], I w [m 6]		9.2838e-07	0.0000e + 00
β y [mm], β z [mm]		8.5	0.0

Image

6.0
12

12.0

y

Horizontal and diagonal portal C.

128/136

Page 43

Project	IJssel Bridge
Part	Main bridge
Author	Ernst Klamer
Current date	29.01.2019
Project file name	Main Bridge v6.0.esa

Type	2Uo		
Extensive	UNP260; 280.0		
Form type	Thin-walled		
Part material	QMC 37 (eg 124%)		
Construction method	rolled		
Color			
Nod yy, nod zz	c		c
A [m 2]		9.6590e-03	
A y [m 2], A z [m 2]		4.7507e-03	5.1220e-03
A L [m 2 / m], A D [m 2 / m]		1.6654e + 00	1.6654e + 00
c Y,UCS [mm], c Z,UCS [mm]		230.0	130.0
α [deg]		0.00	
I y [m 4], I z [m 4]		9.6512e-05	2.6509e-04
i y [mm], i z [mm]		100.0	165.7
W el,y [m 3], W el,z [m 3]		7.4240e-04	1.1525e-03
W pl,y [m 3], W pl,z [m 3]		8,8508e-04	1.5809e-03
M pl,y,+ [Nm], M pl,y,- [Nm]		1.90th + 05	1.90th + 05
M pl,z,+ [Nm], M pl,z,- [Nm]		3.40th + 05	3.40th + 05
d y [mm], d z [mm]		0.0	0.0
I t [m 4], I w [m 6]		5,1022e-07	1.4038e-06
β y [mm], β z [mm]		0.0	0.0
Image			

z

a 280.0

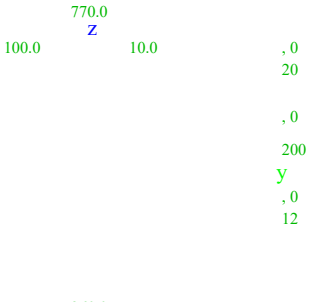
y

Vertical portal C

Type	Graphic cross section

Form type	Thin-walled		
Part material	QMC 37 (eg 0%)		
Construction method	General		
Color			
Nod yy, nod zz	d		d
A [m 2]		3.4480e-02	
A y [m 2], A z [m 2]		1.7071e + 00	1.0813e-02
A L [m 2 / m], A D [m 2 / m]		5.6080th + 00	5.6080th + 00
c Y.UCS [mm], c Z.UCS [mm]		0.0	0.0
α [deg]		0.00	
I y [m 4], I z [m 4]		5.5708e-04	1.3106e-01
i y [mm], i z [mm]		127.1	1949.6
W el.y [m 3], W el.z [m 3]		2,3407e-03	3,4042e-01
W pl.y [m 3], W pl.z [m 3]		2.9898e-03	6.0374e-03
M pl.y. + [Nm], M pl.y.- [Nm]		6.43rd + 05	6.43rd + 05
M pl.z. + [Nm], M pl.z.- [Nm]		1.30th + 06	1.30th + 06
d y [mm], d z [mm]		0.0	0.0
I t [m 4], I w [m 6]		2.4813e-05	0.0000e + 00
β y [mm], β z [mm]		0.0	0.0

Image



Page 44

Project	IJssel Bridge
Part	Main bridge
Author	Ernst Klamer
Current date	29.01.2019
Project file name	Main Bridge v6.0.esa

Explanation of symbols

Form standard	h - Height
	b - Width
	t - Thickness
	r - Radius at flange base
	r1 - Radius at flange foot
	W1 - Bolt distance
	W2 - Bolt distance
	W3 - Bolt distance
a	Area
A y	Shear surface in main y direction - Calculated by 2D FEM analysis
A z	Shear surface in main z direction - Calculated by 2D FEM analysis
A L	Perimeter per unit length
A D	Curing surface per unit length
c Y.UCS	Center of gravity coordinates in Y direction of the input axis system
c Z.UCS	Center of gravity coordinates in Z direction of the input axis system
I Y.LCS	Second moment of the area around

Explanation of symbols

i z	Radius of inertia around the main z axis
W el.y	Elastic cross-section modulus around the main y axis
W el.z.	Elastic cross-section modulus around the main z axis
W pl.y	Plastic cross-section modulus around the main y axis
W pl.z.	Plastic cross-section modulus around the main z axis
M pl.y. +	Plastic moment around the main y-axis for a positive My moment
M pl.y.-	Plastic moment around the main y-axis for a negative My moment
M pl.z. +	Plastic moment around the main z axis for a positive Mz moment
M pl.z.-	Plastic moment around the main z axis for a negative Mz moment
d y	Shear middle coordinate in head y direction measured from the center of gravity - Calculated by 2D FEM analysis

	the YLCS axis	d_z	Shear middle coordinate in head
$I_{Z.LCS}$	Second moment of the area around the ZLCS axis		z direction measured from the center of gravity - Calculated by 2D FEM analysis
$I_{YZ.LCS}$	Product moment of the area the LCS system	I_t	Torsion constant - Calculated by 2D FEM analysis
α	Rotation angle of the main axes system	I_w	Curvature constant - Calculated by 2D FEM analysis
I_y	Second moment of the area around the main y-axis	β_y	Mono-symmetrical constant round the main y-axis
I_z	Second moment of the area around the main z axis	β_z	Mono-symmetrical constant round the main z axis
i_y	Radius of inertia around the main y-axis		

12. Deck construction

12.1. Cover plate

Two thicknesses are used in the cover plate. The yellow parts have a plate thickness of t = 10 mm, the pink parts t = 12 mm.

Project	IJssel Bridge
Part	Main bridge
Author	Ernst Klamer
Current date	29.01.2019
Project file name	Main Bridge v6.0.esa

12.2. Cover 1st and 2nd span

12.3. Deck 3rd span

Project	IJssel Bridge
Part	Main bridge
Author	Ernst Klamer
Current date	29.01.2019

Project file name Main Bridge v6.0.esa

12.4. 2D members

Name	Low	Type	Element type	Material	Thickness type	D. [mm]	Add
E1	Cover plate (t = 10 mm)	plate (90)	Standard	LQmc 52 (eg 108%)	constant	10.0	ST1 - placement part 0-14 and 20-34
E150	Cover plate (t = 12 mm)	plate (90)	Standard	LQmc 52 (eg 108%)	constant	12.0	ST1 - placement part 0-14 and 20-34
E240	Cover plate (t = 12 mm)	plate (90)	Standard	LQmc 52 (eg 108%)	constant	12.0	ST2 - placement part 14-20

Not all plates are shown in the table above. One element is shown per plate type (10/12 mm + construction phases).

12.5. Bulbs and edge strips

In order not to make the calculation model too heavy, the bulbs are combined per 3 (shown in red) or per 2 (shown in pink). The cross-section properties and weight are multiplied by 3 and 2 respectively to model the correct behavior. To the
On the outside, the border strip (445x10) and the first stiffening rib (100x8) are also shown in green.

12.6. Overview

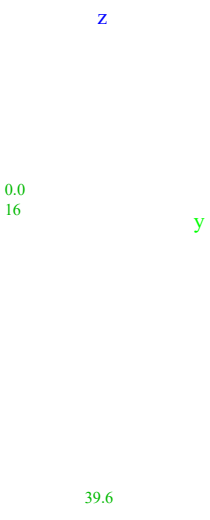
Page 47

Project	IJssel Bridge
Part	Main bridge
Author	Ernst Klamer
Current date	29.01.2019
Project file name	Main Bridge v6.0.esa

12.7. Cross section deck

12.8. Sections

Bulb (3x)			Image
Type	Graphic cross section		
Form type	Thin-walled		
Part material	LQmc 52 (eg 324%)		
Construction method	welded		
Color			
Nod yy, nod zz	d	d	
A [m 2]	5.1368e-03		
A y [m 2], A z [m 2]	2.7619e-03	3.4737e-03	
A L [m 2 / m], A D [m 2 / m]	3,7886e-01	3,7886e-01	
c Y,UCS [mm], c Z,UCS [mm]	0.0	-98.3	
α [deg]	0.00		
I y [m 4], I z [m 4]	1.3307e-05	1.9420e-07	
i y [mm], i z [mm]	50.9	6.1	
W el,y [m 3], W el,z [m 3]	1.3538e-04	9.7099th-06	
W pl,y [m 3], W pl,z [m 3]	2,3004e-04	2.1594e-05	
M pl,y, + [Nm], M pl,y,- [Nm]	8.05e + 04	8.05e + 04	
M pl,z, + [Nm], M pl,z,- [Nm]	7.56e + 03	7.56e + 03	
d y [mm], d z [mm]	0.0	0.0	
I t [m 4], I w [m 6]	1.4533e-07	0.0000e + 00	
β y [mm], β z [mm]	19.1	0.0	



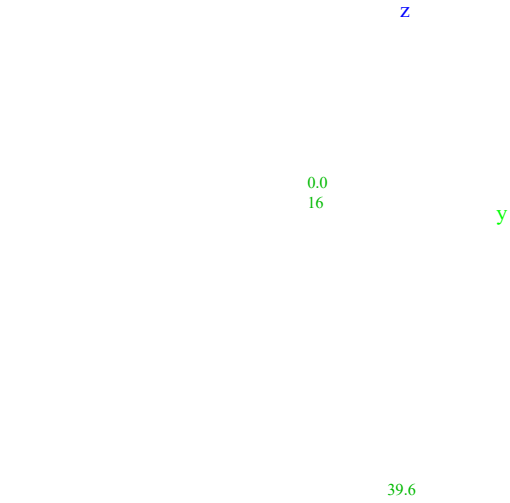
Bulb (2x)

Type	Graphic cross section	
Form type	Thin-walled	
Part material	LQmc 52 (eg 216%)	
Construction method	welded	
Color		
Nod yy, nod zz	d	d
A [m 2]	3,4245e-03	
A y [m 2], A z [m 2]	1.8413e-03	2.3158e-03
A L [m 2 / m], A D [m 2 / m]	3,7886e-01	3,7886e-01

Project	IJssel Bridge
Part	Main bridge
Author	Ernst Klamer
Current date	29.01.2019
Project file name	Main Bridge v6.0.esa

c Y,UCS [mm], c Z,UCS [mm]	0.0	-98.3
α [deg]	0.00	
I y [m 4], I z [m 4]	8.8712e-06	1.2946e-07
i y [mm], i z [mm]	50.9	6.1
W el,y [m 3], W el,z [m 3]	9.0255e-05	6.4733e-06
W pl,y [m 3], W pl,z [m 3]	1.5336e-04	1.4396e-05
M pl,y,+ [Nm], M pl,y,- [Nm]	5.37e + 04	5.37e + 04
M pl,z,+ [Nm], M pl,z,- [Nm]	5.04e + 03	5.04e + 03
d y [mm], d z [mm]	0.0	0.0
I t [m 4], I w [m 6]	9.6884e-08	0.0000e + 00
β y [mm], β z [mm]	19.1	0.0

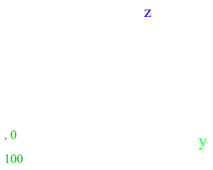
Image



Bulb 100 * 8

Type	Graphic cross section	
Form type	Thin-walled	
Part material	QMC 37 (eg 108%)	
Construction method	General	
Color		
Nod yy, nod zz	d	d
A [m 2]	8.0000e-04	
A y [m 2], A z [m 2]	6.6667e-04	6.6667e-04
A L [m 2 / m], A D [m 2 / m]	2.1600e-01	2.1600e-01
c Y,UCS [mm], c Z,UCS [mm]	0.0	-50.0
α [deg]	0.00	
I y [m 4], I z [m 4]	6.6667e-07	4.2667e-09

Image



Bulb rim 445 * 10

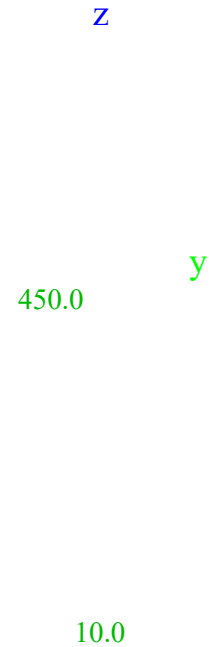
Type	Graphic cross section	
Form type	Thin-walled	
Part material	QMC 37 (eg 108%)	
Construction method	General	
Color		
Nod yy, nod zz	d	d
A [m 2]	4,5000e-03	
A y [m 2], A z [m 2]	3,7500e-03	3,7500e-03
A L [m 2 / m], A D [m 2 / m]	9.2000e-01	9.2000e-01
c Y,UCS [mm], c Z,UCS [mm]	0.0	0.0
α [deg]	0.00	
I y [m 4], I z [m 4]	7.5938e-05	3,7500e-08
i y [mm], i z [mm]	129.9	2.9
W el,y [m 3], W el,z [m 3]	3.3750e-04	7,5000th-06
W pl,y [m 3], W pl,z [m 3]	5.0625e-04	1.1250e-05
M pl,y,+ [Nm], M pl,y,- [Nm]	1.09e + 05	1.09e + 05
M pl,z,+ [Nm], M pl,z,- [Nm]	2.42e + 03	2.42e + 03
d y [mm], d z [mm]	0.0	0.0
I t [m 4], I w [m 6]	1,3500e-07	0.0000e + 00
β y [mm], β z [mm]	0.0	0.0

i_y [mm], i_z [mm]	28.9	2.3
$W_{el,y}$ [m^3], $W_{el,z}$ [m^3]	1.3333e-05	1.0667e-06
$W_{pl,y}$ [m^3], $W_{pl,z}$ [m^3]	2.0000e-05	1,6000e-06
$M_{pl,y,+}$ [Nm], $M_{pl,y,-}$ [Nm]	4.30th + 03	4.30th + 03
$M_{pl,z,+}$ [Nm], $M_{pl,z,-}$ [Nm]	3.44e + 02	3.44e + 02
d_y [mm], d_z [mm]	0.0	0.0
I_t [m^4], I_w [m^6]	1.5360e-08	0.0000e + 00
β_y [mm], β_z [mm]	0.0	0.0

Page 49

Project	IJssel Bridge
Part	Main bridge
Author	Ernst Klamer
Current date	29.01.2019
Project file name	Main Bridge v6.0.esa

Image



Explanation of symbols

a	Area
A_y	Shear surface in main y direction
A_z	Shear surface in main z direction
A_L	Perimeter per unit length

Explanation of symbols

$W_{el,y}$	Elastic cross-section modulus around the main y axis
$W_{el,z}$	Elastic cross-section modulus around the main z axis

A_D	Curing surface per unit length	$W_{pl.y}$	Plastic cross-section modulus around the main y axis
$c_{Y.UCS}$	Center of gravity coordinates in Y direction of the input axis system	$W_{pl.z.}$	Plastic cross-section modulus around the main z axis
$c_{Z.UCS}$	Center of gravity coordinates in Z direction of the input axis system	$M_{pl.y.+}$	Plastic moment around the main y-axis for a positive My moment
$I_{Y.LCS}$	Second moment of the area around the YLCS axis	$M_{pl.y.-}$	Plastic moment around the main y-axis for a negative My moment
$I_{Z.LCS}$	Second moment of the area around the ZLCS axis	$M_{pl.z.+}$	Plastic moment around the main z axis for a positive Mz moment
$I_{YZ.LCS}$	Product moment of the area the LCS system	$M_{pl.z.-}$	Plastic moment around the main z axis for a negative Mz moment
α	Rotation angle of the main axes system	d_y	Shear middle coordinate in head y direction measured from the center of gravity
I_y	Second moment of the area around the main y-axis	d_z	Shear middle coordinate in head z direction measured from the center of gravity
I_z	Second moment of the area around the main z axis	I_t	Torque constant
i_y	Radius of inertia around the main y-axis	I_w	Curving constant
i_z	Radius of inertia around the main z axis	β_y	Mono-symmetrical constant round the main y-axis
		β_z	Mono-symmetrical constant round the main z axis

13. Settings net

Name	Net Setup 1
Generation of eccentric elements on variable height bars	✗
Generation of nodes on bars	✗
Generation of nodes at point loads on beams	✓
Floating buttons for preload	✓
Elastic net	✓
Distribution on consoles and variable bars	5

Project	IJssel Bridge
Part	Main bridge
Author	Ernst Klamer
Current date	29.01.2019
Project file name	Main Bridge v6.0.esa

Distribution for 2D-1D upgrade	50
Average number of waypoints on 1D element	1
Average size of 2D member / curved element [m]	0.250
Minimum length of bar element [m]	0.100
Maximum length of bar element [m]	1000,000
Average size of cables, bars on elastic bed, non-linear ground spring [m]	1,000
Maximum angle from the plane of the quadrilateral element [mrad]	30.0
Incr. predefined net	1.5
Minimum distance between definition point and line [m]	0.001
Average dimension of panel element [m]	1,000
Mesh refinement according to the beam type	No
Definition of mesh elements dimensions for panels	Manually

14. Solver settings

Name	SolverSetup1
Ignore shear deformations (Ay, Az >> A)	✗
Initial voltage	✗
Apply changing factors to properties	✓
Number of plate rib thicknesses	20

Maximum number of soil interaction iterations	10
Number of cuts on medium bar	10
Step for soil / water pressure [m]	0.500
C1x [MN / m 3]	1.0000e-01
C1y [MN / m 3]	1.0000e-01
C1z [MN / m 3]	1.0000th + 01
C2x [MN / m]	5.0000th + 00
C2y [MN / m]	5.0000th + 00
Reinforcement coefficient	1
Warning if the maximum translation is greater than [mm]	1000.0
Warning if the maximum rotation is greater than [mrad]	100.0
Parallelism tolerance for automatic calculation [deg]	10.00
Span length ratio L / beff, max (1 side) for automatic calculation [-]	8.00
Single superimposed beam [-]	1.00
Internal span [-]	0.70
End span [-]	0.85
Cantilever [-]	2.00
Ground combination	No
Bending theory of plate / scale calculation	Mindlin
Solver type	Straight away

Appendix

Appendix P - Import SCIA - Bridging

IJssel Bridge

Author	Abdulkadir Akyel
Current date	29.01.2019
Project file name	IJssel bridge bridge v27 all phases

1. Table of Contents

2. Project

License name	Royal HaskoningDHV
Project	IJssel Bridge
Part	Bridge
Description	-
Author	Abdulkadir Akyel
Date	14.05.2018
Construction	General XYZ
Number of knots:	755
Number of bars:	439
Number of plates:	474
Number of solids:	0
Number of cross sections used:	16
Number of load cases:	185
Number of materials used:	12
Gravitational acceleration [m / s 2]	9,810
National standard	EC - EN

Page 53

Project	IJssel Bridge
Part	Bridge
Author	Abdulkadir Akyel
Current date	29.01.2019
Project file name	IJssel bridge bridge v27 all phases

3. Overview of the model

Project	IJssel Bridge
Part	Bridge
Author	Abdulkadir Akyel
Current date	29.01.2019
Project file name	IJssel bridge bridge v27 all phases

4. Construction phasing

4.1. Construction stages

Name	Phase sequence	Description	Global time [day]
ST1		1 Steel weight	1.00
ST2		2 Bulk density of prestressed concrete	2.00
ST4		3 Prestressed concrete deck in model and jacking	4.00

ST5	4 Pouring reinforced concrete	5.00
ST6	5 Reinforced concrete deck in model and lowering	6.00
ST7	6 Asphalt pavement	7.00
ST8a	7 Other permanent taxes a	8.00
ST8b	8 Other permanent taxes b	9.00
ST8c	9 Other permanent taxes c	10.00
ST8d	10 Other permanent taxes d	11.00
ST9	11 Shrink and creep	12.00
ST10	12 Preload loss	13.00
ST11	13 Variable loads	14.00

4.2. Construction phase settings

Type	Stiffness change
$\gamma_{G,min}$ [-]	1.00
$\gamma_{G,max}$ [-]	1.00
$\gamma_{P,min}$ [-]	1.00
$\gamma_{P,max}$ [-]	1.00
ψ [-]	1.00
$\gamma_{creep,min}$ [-]	
$\gamma_{creep,max}$ [-]	
Number of "time nodes" between two construction phases	
Relative humidity [%]	
Automatic calculation of time steps	

Project	IJssel Bridge
Part	Bridge
Author	Abdulkadir Akyel
Current date	29.01.2019
Project file name	IJssel bridge bridge v27 all phases

Total number of user-entered time steps	
Time of depositing [day]	
Hardening time [day]	
Hardening time of steel-concrete parts of cross-section [day]	
Line support (formwork)	
Time of release of movements in X direction [day]	
Time of release of movements in Z direction [day]	
Average reinforcement percentage [%]	
Generate output text file	
Name of generated ULS combination (max)	F {O} -MAX
Name of generated ULS combination (min)	F {O} -MIN
Generated bell. case name for creep	
Name of generated BGT combination	F {O} SLS
Name of generated nonlinear combination	
Name of generated standard combination	F {O} - {CODE}

4.3. Stiffness change

Name	t [day]	E [-]
Prestressed concrete	0.00	0.28
	1.00	0.39
	2.00	0.33
	3.00	0.42
	4.00	0.42
	5.00	0.42
	6.00	0.42
	7.00	0.42
	8.00	0.32
	9.00	0.33

Reinforced concrete	10.00	1.00
	0.00	0.28
	1.00	0.39
	2.00	0.39
	3.00	0.39
	4.00	0.39
	5.00	0.39
	6.00	0.32
	7.00	0.33
	8.00	1.00

The stiffness of concrete is a function of time and is defined as a factor E (t) / Eref, where Eref is the uncracked stiffness. The time is used fictitiously, where each t + 1 corresponds to the next phase. t = 0 always corresponds to the phase in which the relevant concrete deck will be added. This therefore differs between the reinforced concrete deck and the prestressed concrete deck.

Project	IJssel Bridge
Part	Bridge
Author	Abdulkadir Akyel
Current date	29.01.2019
Project file name	IJssel bridge bridge v27 all phases

4.4. Phase 1 and 2

4.5. Phase 4 and 5

Project	IJssel Bridge
Part	Bridge
Author	Abdulkadir Akyel
Current date	29.01.2019
Project file name	IJssel bridge bridge v27 all phases

4.6. Phase 6-11

5. Impositions

5.1. Overview of bearings

Project	IJssel Bridge
Part	Bridge
Author	Abdulkadir Akyel
Current date	29.01.2019
Project file name	IJssel bridge bridge v27 all phases

5.2. Button supports

Name	Button	System	Type	X	Y.	Z.	Rx	Ry	Rz	remove
Sn1	N6	GCS	Standard	Free	Fixed	Fixed	Fixed	Free	Free	None
Sn4	N16	GCS	Standard	Free	Fixed	Fixed	Fixed	Free	Free	None
Sn9	N404	GCS	Standard	Free	Fixed	Fixed	Fixed	Free	Free	None
Sn10	N412	GCS	Standard	Free	Fixed	Fixed	Fixed	Free	Free	None
Sn11	N621	GCS	Standard	Free	Fixed	Fixed	Fixed	Free	Free	None
Sn12	N622	GCS	Standard	Free	Fixed	Fixed	Fixed	Free	Free	None
Sn5	N839	GCS	Standard	Fixed	Fixed	Fixed	Free		Free	Free None
Sn6	N840	GCS	Standard	Fixed	Fixed	Fixed	Free		Free	Free None

5.3. Portal for fixed support

Project	IJssel Bridge
Part	Bridge
Author	Abdulkadir Akyel
Current date	29.01.2019
Project file name	IJssel bridge bridge v27 all phases

5.4. Portal for roller bearings

6. Materials

Steel EC3

Name	ρ [kg / m 3]	E mod [MPa] G mod [MPa]	μ α [m / mK]	Lower limit [mm]	Upper limit [mm]	F y [MPa]	F u [MPa]	Color
LQmc 52	7850.0	2.1000e + 05	0.3	0.0	40.0	350.0	510.0	
		8.0769e + 04	0.00	40.0	80.0	350.0	510.0	
LQmc 52 (141%)	11068.5	2.1000e + 05	0.3	0.0	40.0	350.0	510.0	
		8.0769e + 04	0.00	40.0	80.0	350.0	510.0	
LQmc 52 (147%)	11539.5	2.1000e + 05	0.3	0.0	40.0	350.0	510.0	
		8.0769e + 04	0.00	40.0	80.0	350.0	510.0	
LQmc 52 (207%)	16249.5	2.1000th + 05	0.3	0.0	40.0	350.0	510.0	
		8.0769e + 04	0.00	40.0	80.0	350.0	510.0	
LQmc 52 (268%)	21038.0	2.1000e + 05	0.3	0.0	40.0	350.0	510.0	
		8.0769e + 04	0.00	40.0	80.0	350.0	510.0	
Qmc 37	7850.0	2.1000e + 05	0.3	0.0	40.0	215.0	340.0	
		8.0769e + 04	0.00	40.0	80.0	215.0	340.0	

Qmc 37 (105%)	8242.5	2.1000e + 05	0.3	0.0	40.0	215.0	340.0
		8.0769e + 04	0.00	40.0	80.0	215.0	340.0
Qmc 37 (109%)	8556.5	2.1000e + 05	0.3	0.0	40.0	215.0	340.0
		8.0769e + 04	0.00	40.0	80.0	215.0	340.0
Qmc 37 (119%)	9341.5	2.1000e + 05	0.3	0.0	40.0	215.0	340.0
		8.0769e + 04	0.00	40.0	80.0	215.0	340.0

Name	Type	ρ [kg / m 3]	Density when wet [kg / m 3]		E_{mod} [MPa]	μ	α [m / mK]	$f_{c.28}$ [MPa]	Color
C32 / 40 (prestressed concrete)	Concrete	2500.0		2600.0	3,3000th + 04	0.2	0.00	32.00	
C32 / 40 (reinforced concrete)	Concrete	2500.0		2600.0	3,3000th + 04	0.2	0.00	32.00	

Project	IJssel Bridge
Part	Bridge
Author	Abdulkadir Akyel
Current date	29.01.2019
Project file name	IJssel bridge bridge v27 all phases

Explanation of symbols

Density when wet	The value of the density of the attribute new condition used only as one composite deck is introduced and the load of the own weight.

Rebar EC2

Name	Type	ρ [kg / m 3]	E_{mod} [MPa]	G_{mod} [MPa]	α [m / mK]	$f_{y.k}$ [MPa]
QR 42	Reinforcement steel	7850.0	2.0000th + 05	8.3333rd + 04	0.00	420.0

7. Main beams

7.1. Main beams

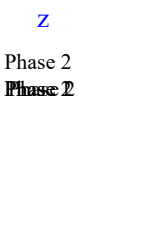
The blue part of the main beam has a constant I-shaped cross section. The purple part has an extra thickness plate in the bottom flange

7.2. Sections

Main spar (268%)		
Type	General cross-section	
Form type	Thin-walled	
Part material	LQmc 52 (268%)	
	LQmc 52 (268%)	
Construction method	General	
Color		
Nod yy, nod zz	d	d
A [m 2]	4.6920e-02	
A y [m 2], A z [m 2]	1.7754e-02	2.5251e-02
A L [m 2 / m], A D [m 2 / m]	5.7320e + 00	5.7320e + 00
c Y,UCS [mm], c Z,UCS [mm]	200.0	1041.5
α [deg]	0.00	
I y [m 4], I z [m 4]	3.1834e-02	2.2161e-04
i y [mm], i z [mm]	823.7	68.7
W el,y [m 3], W el,z [m 3]	2.9850e-02	1.1080e-03
W pl,y [m 3], W pl,z [m 3]	3,5343e-02	1,8507e-03
M pl,y,+ [Nm], M pl,y,- [Nm]	1.24th + 07	1.24th + 07
M pl,z,+ [Nm], M pl,z,- [Nm]	6.48th + 05	6.48th + 05
d y [mm], d z [mm]	0.0	-349.6
I t [m 4], I w [m 6]	6,6287e-06	2,1068e-04
β y [mm], β z [mm]	689.0	0.0

Project	IJssel Bridge
Part	Bridge
Author	Abdulkadir Akyel
Current date	29.01.2019
Project file name	IJssel bridge bridge v27 all phases

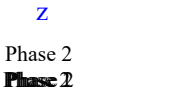
Image



Main beam + 380 * 20 (141%)		
Type	General cross-section	
Form type	Thin-walled	
Part material	LQmc 52 (141%)	
Construction method	General	
Color		
Nod yy, nod zz	d	d
A [m 2]	5.0520e-02	
A y [m 2], A z [m 2]	2,3021e-02	2.4766e-02
A L [m 2 / m], A D [m 2 / m]	5.7320e + 00	5.7320e + 00

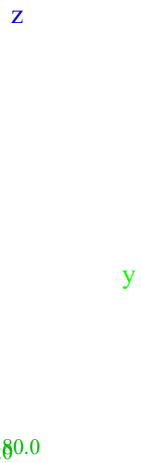
Main beam + 380 * 20 (207%)		
Type	General cross-section	
Form type	Thin-walled	
Part material	LQmc 52 (207%)	
	LQmc 52 (207%)	
Construction method	General	
Color		
Nod yy, nod zz	d	d
A [m 2]	5.4520e-02	
A y [m 2], A z [m 2]	2.4871e-02	2.5426e-02
A L [m 2 / m], A D [m 2 / m]	5.7720e + 00	5.7720e + 00
c Y,UCS [mm], c Z,UCS [mm]	200.0	894.9
α [deg]	0.00	
I y [m 4], I z [m 4]	3,9067e-02	3.1306e-04
i y [mm], i z [mm]	846.5	75.8
W el,y [m 3], W el,z [m 3]	3.2205e-02	1.5653e-03
W pl,y [m 3], W pl,z [m 3]	4.2193e-02	2.5727e-03
M pl,y,+ [Nm], M pl,y,- [Nm]	1.48e + 07	1.48e + 07
M pl,z,+ [Nm], M pl,z,- [Nm]	9.00th + 05	9.00th + 05
d y [mm], d z [mm]	0.0	-409.3
I t [m 4], I w [m 6]	1.6938e-05	2.4289e-04
β y [mm], β z [mm]	1026.8	0.0

Image



$c_{y,UCS}$ [mm], $c_{z,UCS}$ [mm]	0.0	-1298.0
α [deg]	0.00	
I_y [m^4], I_z [m^4]	3,4083e-02	3.1254e-04
i_y [mm], i_z [mm]	821.4	78.7
$W_{el,y}$ [m^3], $W_{el,z}$ [m^3]	2.6258e-02	1.5627e-03
$W_{pl,y}$ [m^3], $W_{pl,z}$ [m^3]	3.6920e-02	2.5287e-03
$M_{pl,y,+}$ [Nm], $M_{pl,y,-}$ [Nm]	1.29th + 07	1.29th + 07
$M_{pl,z,+}$ [Nm], $M_{pl,z,-}$ [Nm]	8.85th + 05	8.85th + 05
d_y [mm], d_z [mm]	0.0	-326.7
I_t [m^4], I_w [m^6]	1.5113e-05	2.4183e-04
β_y [mm], β_z [mm]	1002.5	0.0

Image



Phase 1

K-bandage, vertical (INP 32 12mm between)

Type	General cross-section	
Form type	Thin-walled	
Part material	Qmc 37	
Construction method	General	
Color		
Nod yy, nod zz	d	d
A [m^2]	7.7719e-03	
A_y [m^2], A_z [m^2]	4.7753e-01	3.4629e-03
A_L [m^2 / m], A_D [m^2 / m]	1.1101e + 00	1.1101e + 00
$c_{y,UCS}$ [mm], $c_{z,UCS}$ [mm]	0.0	0.0
α [deg]	0.00	
I_y [m^4], I_z [m^4]	1.3619e-04	5.5400e-04
i_y [mm], i_z [mm]	132.4	267.0
$W_{el,y}$ [m^3], $W_{el,z}$ [m^3]	8,2043e-04	8.4581e-03
$W_{pl,y}$ [m^3], $W_{pl,z}$ [m^3]	9.5935e-04	1.4323e-04
$M_{pl,y,+}$ [Nm], $M_{pl,y,-}$ [Nm]	2.25e + 05	2.25e + 05
$M_{pl,z,+}$ [Nm], $M_{pl,z,-}$ [Nm]	3.37e + 04	3.37e + 04
d_y [mm], d_z [mm]	0.0	0.0
I_t [m^4], I_w [m^6]	6.6700e-07	1,2993e-07
β_y [mm], β_z [mm]	0.0	0.0

Project	IJssel Bridge
Part	Bridge
Author	Abdulkadir Akyel
Current date	29.01.2019
Project file name	IJssel bridge bridge v27 all phases

Image

Explanation of symbols

Explanation of symbols

a	Area
A_y	Shear surface in main y direction - Calculated by 2D FEM analysis
A_z	Shear surface in main z direction - Calculated by 2D FEM analysis
A_L	Perimeter per unit length
A_D	Curing surface per unit length
$c_{Y.UCS}$	Center of gravity coordinates in Y direction of the input axis system
$c_{Z.UCS}$	Center of gravity coordinates in Z direction of the input axis system
$I_{Y.LCS}$	Second moment of the area around the YLCS axis
$I_{Z.LCS}$	Second moment of the area around the ZLCS axis
$I_{YZ.LCS}$	Product moment of the area the LCS system
α	Rotation angle of the main axes system
I_y	Second moment of the area around the main y-axis
I_z	Second moment of the area around the main z axis
i_y	Radius of inertia around the main y-axis
i_z	Radius of inertia around the main z axis
$W_{el.y}$	Elastic cross-section modulus around the main y axis
$W_{el.z}$	Elastic cross-section modulus around the main z axis
$W_{pl.y}$	Plastic cross-section modulus around the main y axis
$W_{pl.z}$	Plastic cross-section modulus around the main z axis
$M_{pl.y.+}$	Plastic moment around the main y-axis for a positive My moment
$M_{pl.y.-}$	Plastic moment around the main y-axis for a negative My moment
$M_{pl.z.+}$	Plastic moment around the main z axis for a positive Mz moment
$M_{pl.z.-}$	Plastic moment around the main z axis for a negative Mz moment
d_y	Shear middle coordinate in head y direction measured from the center of gravity - Calculated by 2D FEM analysis
d_z	Shear middle coordinate in head z direction measured from the center of gravity - Calculated by 2D FEM analysis
I_t	Torsion constant - Calculated by 2D FEM analysis
I_w	Curvature constant - Calculated by 2D FEM analysis
β_y	Mono-symmetrical constant round the main y-axis
β_z	Mono-symmetrical constant round the main z axis

Project	IJssel Bridge
Part	Bridge
Author	Abdulkadir Akyel
Current date	29.01.2019
Project file name	IJssel bridge bridge v27 all phases

7.3. Distance between the main beams

Y.

Z. X

8. Cross bars

8.1. End cross member

Z.

X Y.

Project	IJssel Bridge
Part	Bridge
Author	Abdulkadir Akyel
Current date	29.01.2019
Project file name	IJssel bridge bridge v27 all phases

8.2. Cross bars with portal

8.3. Sections

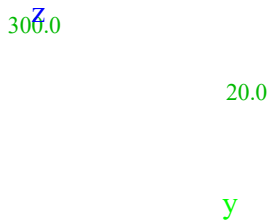
End cross beam (DIE 45 + 300 * 20)

Type	General cross-section		
Form type	Thin-walled		
Part material	Qmc 37		
Construction method	General		
Color			
Nod yy, nod zz	d		d
A [m 2]		2.4259e-02	
A y [m 2], A z [m 2]		1.7711e-02	5.6812e-03
A L [m 2 / m], A D [m 2 / m]		2.0463e + 00	2.0463e + 00
c Y,UCS [mm], c Z,UCS [mm]		0.0	56.6
α [deg]		0.00	
I y [m 4], I z [m 4]		8,8111e-04	1.4118e-04
i y [mm], i z [mm]		190.6	76.3
W el,y [m 3], W el,z [m 3]		3,1966e-03	9.4122e-04
W pl,y [m 3], W pl,z [m 3]		3,9321e-03	1.4397e-03
M pl,y, + [Nm], M pl,y,- [Nm]		9.24th + 05	9.24th + 05
M pl,z, + [Nm], M pl,z,- [Nm]		3.38e + 05	3.38e + 05
d y [mm], d z [mm]		0.0	15.8
I t [m 4], I w [m 6]		8,5205e-06	5,6791e-06
β y [mm], β z [mm]		-121.9	0.0

Page 65

Project	IJssel Bridge
Part	Bridge
Author	Abdulkadir Akyel
Current date	29.01.2019
Project file name	IJssel bridge bridge v27 all phases

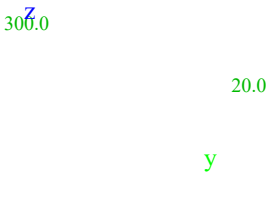
Image



End cross beam (DIE 45, h = 338 mm + 300 * 20)

Type	General cross-section		
Form type	Thin-walled		
Part material	Qmc 37		
Construction method	General		
Color			
Nod yy, nod zz	d	d	
A [m 2]		2.2381e-02	
A y [m 2], A z [m 2]		1.7775e-02	3,8854e-03
A L [m 2 / m], A D [m 2 / m]		1.7333rd + 00	1.7333rd + 00
c Y,UCS [mm], c Z,UCS [mm]		0.0	118.7
α [deg]		0.00	
I y [m 4], I z [m 4]		3.3990e-04	1.4116e-04
i y [mm], i z [mm]		123.2	79.4
W el,y [m 3], W el,z [m 3]		1.8762e-03	9.4107e-04
W pl,y [m 3], W pl,z [m 3]		2.2749e-03	1.4340e-03
M pl,y,+ [Nm], M pl,y,- [Nm]		5.35e + 05	5.35e + 05
M pl,z,+ [Nm], M pl,z,- [Nm]		3.37e + 05	3.37e + 05
d y [mm], d z [mm]		0.0	7.1
I t [m 4], I w [m 6]		8.4245e-06	2.2624e-06
β y [mm], β z [mm]		-75.8	0.0

Image



End cross member (console, start)

Type	General cross-section		
Form type	Thin-walled		
Part material	Qmc 37		
Construction method	General		
Color			
Nod yy, nod zz	d		d
A [m 2]		1.6381e-02	
A y [m 2], A z [m 2]		1,2367e-02	3,5801e-03
A L [m 2 / m], A D [m 2 / m]		1.6873e + 00	1.6873e + 00
c Y,UCS [mm], c Z,UCS [mm]		0.0	78.3

Project	IJssel Bridge
Part	Bridge
Author	Abdulkadir Akyel
Current date	29.01.2019
Project file name	IJssel bridge bridge v27 all phases

α [deg]	0.00	
I y [m 4], I z [m 4]	2,3990e-04	9,6161e-05
i y [mm], i z [mm]	121.0	76.6
W el,y [m 3], W el,z [m 3]	1.7044e-03	6.4755e-04
W pl,y [m 3], W pl,z [m 3]	1.9173e-03	9.8403e-04
M pl,y, + [Nm], M pl,y,- [Nm]	4.51st + 05	4.51st + 05
M pl,z, + [Nm], M pl,z,- [Nm]	2.31st + 05	2.31st + 05
d y [mm], d z [mm]	0.0	0.0
I t [m 4], I w [m 6]	2,5008e-06	1.5838e-06
β y [mm], β z [mm]	0.0	0.0

Image

End cross member (console, end)

Type	General cross-section		
Form type	Thin-walled		
Part material	Qmc 37		
Construction method	General		
Color			
Nod yy, nod zz	d		d
A [m 2]		1,6003e-02	
A y [m 2], A z [m 2]		1,2343e-02	3.2258e-03
A L [m 2 / m], A D [m 2 / m]		1.6243rd + 00	1.6243rd + 00
c Y,UCS [mm], c Z,UCS [mm]		0.0	78.3
α [deg]		0.00	
I y [m 4], I z [m 4]		1,8353e-04	9,6156e-05

i_y [mm], i_z [mm]	107.1	77.5
$W_{el.y}$ [m^3], $W_{el.z}$ [m^3]	1.4683e-03	6.4752e-04
$W_{pl.y}$ [m^3], $W_{pl.z}$ [m^3]	1.6623e-03	9,8289e-04
$M_{pl.y.+}$ [Nm], $M_{pl.y.-}$ [Nm]	3.91e + 05	3.91e + 05
$M_{pl.z.+}$ [Nm], $M_{pl.z.-}$ [Nm]	2.31st + 05	2.31st + 05
d_y [mm], d_z [mm]	0.0	0.0
I_t [m^4], I_w [m^6]	2.4831e-06	1.2194e-06
β_y [mm], β_z [mm]	0.0	0.0

Image

z

y

Cross beam (DIE 45)

Type	I
Extensive	438.0; 297.0; 22.0; 12.0; 23.0
Form standard	1 - I section
Form type	Thin-walled
Part material	Qmc 37

Project	IJssel Bridge
Part	Bridge
Author	Abdulkadir Akyel
Current date	29.01.2019
Project file name	IJssel bridge bridge v27 all phases

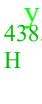
Construction method	rolled		
Color			
Nod yy, nod zz	a		b
A [m^2]		1.8259e-02	
A_y [m^2], A_z [m^2]		1.2404e-02	5.3928e-03
A_L [m^2 / m], A_D [m^2 / m]		2,0003rd + 00	2,0003rd + 00
$c_{Y.UCS}$ [mm], $c_{Z.UCS}$ [mm]		148.5	219.0
α [deg]		0.00	
I_y [m^4], I_z [m^4]		6.4409e-04	9.6183e-05
i_y [mm], i_z [mm]		187.8	72.6
$W_{el.y}$ [m^3], $W_{el.z}$ [m^3]		2.9410e-03	6.4770e-04
$W_{pl.y}$ [m^3], $W_{pl.z}$ [m^3]		3.2726e-03	9.8966e-04
$M_{pl.y.+}$ [Nm], $M_{pl.y.-}$ [Nm]		7.69th + 05	7.69th + 05
$M_{pl.z.+}$ [Nm], $M_{pl.z.-}$ [Nm]		2.33rd + 05	2.33rd + 05
d_y [mm], d_z [mm]		0.0	0.0
I_t [m^4], I_w [m^6]		2.6166e-06	4.1559e-06
β_y [mm], β_z [mm]		0.0	0.0

Image

B 297.0

z

t 22.0

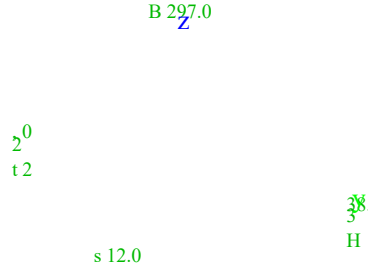


Cross beam (DIE 45, h = 338mm)

Type	I		
Extensive	338.0; 297.0; 22.0; 12.0; 23.0		
Form standard	1 - I section		
Form type	Thin-walled		
Part material	Qmc 37		
Construction method	rolled		
Color			
Nod yy, nod zz	b		c
A [m 2]		1.7059e-02	
A y [m 2], A z [m 2]		1.2356e-02	4.2566e-03
A L [m 2 / m], A D [m 2 / m]		1,8003rd + 00	1,8003rd + 00
c Y,UCS [mm], c Z,UCS [mm]		148.5	169.0
α [deg]		0.00	
I y [m 4], I z [m 4]		3.6148e-04	9,6169e-05
i y [mm], i z [mm]		145.6	75.1
W el,y [m 3], W el,z [m 3]		2.1389e-03	6.4760e-04
W pl,y [m 3], W pl,z [m 3]		2.3896e-03	9.8606e-04
M pl,y,+ [Nm], M pl,y,- [Nm]		5.62e + 05	5.62e + 05
M pl,z,+ [Nm], M pl,z,- [Nm]		2.32nd + 05	2.32nd + 05
d y [mm], d z [mm]		0.0	0.0
I t [m 4], I w [m 6]		2,5590e-06	2.3980th-06
β y [mm], β z [mm]		0.0	0.0

Project	IJssel Bridge
Part	Bridge
Author	Abdulkadir Akyel
Current date	29.01.2019
Project file name	IJssel bridge bridge v27 all phases

Image



Cross beam (DIE 45, T-section)

Type	General cross-section		
Form type	Thin-walled		
Part material	Qmc 37		
Construction method	General		
Color			
Nod yy, nod zz	d		d
A [m 2]		1.0101e-02	
A y [m 2], A z [m 2]		6.1569e-03	3.3400e-03
A L [m 2 / m], A D [m 2 / m]		1.1742e + 00	1.1742e + 00
c Y,UCS [mm], c Z,UCS [mm]		0.0	-158.1
α [deg]		0.00	
I y [m 4], I z [m 4]		7.1712e-05	4,8103e-05
i y [mm], i z [mm]		84.3	69.0
W el,y [m 3], W el,z [m 3]		2,9994e-04	3.2393e-04
W pl,y [m 3], W pl,z [m 3]		5.2937e-04	4.9775e-04
M pl,y,+ [Nm], M pl,y,- [Nm]		1.14e + 05	1.14e + 05
M pl,z,+ [Nm], M pl,z,- [Nm]		1.07e + 05	1.07e + 05
d y [mm], d z [mm]		0.0	-48.3
I t [m 4], I w [m 6]		1,3449e-06	2.5528e-09
β y [mm], β z [mm]		187.9	0.0
Image			

K-bandage, vertical (1 / 2INP 32)

Type	General cross-section		
Form type	Thin-walled		
Part material	Qmc 37		
Construction method	General		
Color			
Nod yy, nod zz	d		d
A [m 2]		3,8859e-03	
A y [m 2], A z [m 2]		2.3880th-01	1.7431e-03
A L [m 2 / m], A D [m 2 / m]		5,5504e-01	5,5504e-01
c Y,UCS [mm], c Z,UCS [mm]		0.0	-117.4
α [deg]		0.00	
I y [m 4], I z [m 4]		8.8860e-06	2.7700e-04
i y [mm], i z [mm]		47.8	267.0

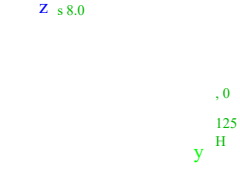
Project	IJssel Bridge
Part	Bridge
Author	Abdulkadir Akyel
Current date	29.01.2019
Project file name	IJssel bridge bridge v27 all phases

W el,y [m 3], W el,z [m 3]	7.5665e-05	4.2290e-03

$W_{pl.y}$ [m^3], $W_{pl.z}$ [m^3]		1,3641e-04	7.1617e-05
$M_{pl.y.+}$ [Nm], $M_{pl.y.-}$ [Nm]		3.21st + 04	3.21st + 04
$M_{pl.z.+}$ [Nm], $M_{pl.z.-}$ [Nm]		1.68e + 04	1.68e + 04
d_y [mm], d_z [mm]		0.0	-30.0
I_t [m^4], I_w [m^6]		3.3696e-07	1.6574e-10
β_y [mm], β_z [mm]		100.2	0.0
Image			

K-bandage, horizontal (1 / 2IE 26))

Type	T		
Extensive	125.0; 257.0; 13.0; 8.0; 17.0		
Form standard	6 - T-section		
Form type	Thin-walled		
Part material	Qmc 37 (109%)		
Construction method	rolled		
Color			
Nod yy, nod zz	c		c
A [m^2]		4.3633e-03	
A_y [m^2], A_z [m^2]		3.1306e-03	1.0478e-03
A_L [m^2 / m], A_D [m^2 / m]		7.4934e-01	7.4934e-01
$c_{Y.UCS}$ [mm], $c_{Z.UCS}$ [mm]		128.5	19.6
α [deg]		0.00	
I_y [m^4], I_z [m^4]		3,7459e-06	1,8403e-05
i_y [mm], i_z [mm]		29.3	64.9
$W_{el.y}$ [m^3], $W_{el.z}$ [m^3]		3,5551e-05	1.4321e-04
$W_{pl.y}$ [m^3], $W_{pl.z}$ [m^3]		6.7148e-05	2.1744e-04
$M_{pl.y.+}$ [Nm], $M_{pl.y.-}$ [Nm]		1.44e + 04	1.44e + 04
$M_{pl.z.+}$ [Nm], $M_{pl.z.-}$ [Nm]		4.68e + 04	4.68e + 04
d_y [mm], d_z [mm]		0.0	-13.1
I_t [m^4], I_w [m^6]		2.0843e-07	2,1641e-39
β_y [mm], β_z [mm]		25.1	0.0
Image			



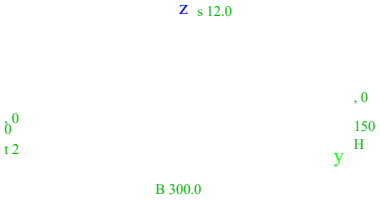
K-bandage, horizontal (1 / 2DIN 30))

Type	T		
Extensive	150.0; 300.0; 20.0; 12.0; 18.0		
Form standard	6 - T-section		
Form type	Thin-walled		
Part material	Qmc 37 (105%)		
Construction method	rolled		
Color			
Nod yy, nod zz	c		c
A [m^2]		7.7016e-03	

Project	IJssel Bridge
Part	Bridge
Author	Abdulkadir Akyel
Current date	29.01.2019
Project file name	IJssel bridge bridge v27 all phases

A_y [m 2], A_z [m 2]	5.5840e-03	1,9109e-03
A_L [m 2 / m], A_D [m 2 / m]	8.8448e-01	8.8448e-01
$c_{Y,UCS}$ [mm], $c_{Z,UCS}$ [mm]	150.0	25.5
α [deg]	0.00	
I_y [m 4], I_z [m 4]	9.3632e-06	4,5035e-05
i_y [mm], i_z [mm]	34.9	76.5
$W_{el,y}$ [m 3], $W_{el,z}$ [m 3]	7,5177e-05	3.0023e-04
$W_{pl,y}$ [m 3], $W_{pl,z}$ [m 3]	1.4658e-04	4.5611e-04
$M_{pl,y,+}$ [Nm], $M_{pl,y,-}$ [Nm]	3.15e + 04	3.15e + 04
$M_{pl,z,+}$ [Nm], $M_{pl,z,-}$ [Nm]	9.81st + 04	9.81st + 04
d_y [mm], d_z [mm]	0.0	-15.3
I_t [m 4], I_w [m 6]	8,8064e-07	3,5434e-39
$β_y$ [mm], $β_z$ [mm]	30.2	0.0

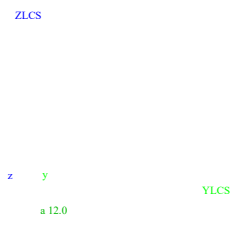
Image



K-bandage, diagonal (L80x10)

Type	2LX		
Extensive	L80X10; 12.0		
Form type	Thin-walled		
Part material	Qmc 37 (119%)		
Construction method	rolled		
Color			
Nod yy, nod zz	c		c
A [m 2]		3.0219e-03	
A_y [m 2], A_z [m 2]		9.9743e-04	2.5565e-03
A_L [m 2 / m], A_D [m 2 / m]		6.2275e-01	6.2275e-01
$c_{Y,UCS}$ [mm], $c_{Z,UCS}$ [mm]		86.0	86.0
$I_{Y,LCS}$ [m 4], $I_{Z,LCS}$ [m 4]		4.3536e-06	4.3536e-06
$I_{YZ,LCS}$ [m 4]		1.5819e-06	
α [deg]		45.00	
I_y [m 4], I_z [m 4]		2,7717e-06	5,9355e-06
i_y [mm], i_z [mm]		30.3	44.3
$W_{el,y}$ [m 3], $W_{el,z}$ [m 3]		4.8997e-05	8.4750e-05
$W_{pl,y}$ [m 3], $W_{pl,z}$ [m 3]		7.8669e-05	1.2545e-04
$M_{pl,y,+}$ [Nm], $M_{pl,y,-}$ [Nm]		1.69e + 04	1.69e + 04
$M_{pl,z,+}$ [Nm], $M_{pl,z,-}$ [Nm]		2.70e + 04	2.70e + 04
d_y [mm], d_z [mm]		0.0	0.0
I_t [m 4], I_w [m 6]		3.1823e-07	0.0000e + 00
$β_y$ [mm], $β_z$ [mm]		0.0	0.0

Image



Explanation of symbols		Explanation of symbols	
a	Area		Calculated by 2D FEM analysis
A_y	Shear surface in main y direction - Calculated by 2D FEM analysis	A_L	Perimeter per unit length
A_z	Shear surface in main z direction -	A_D	Curing surface per unit length

Project	IJssel Bridge
Part	Bridge
Author	Abdulkadir Akyel
Current date	29.01.2019
Project file name	IJssel bridge bridge v27 all phases

Explanation of symbols		Explanation of symbols	
$c_{Y,UCS}$	Center of gravity coordinates in Y direction of the input axis system	$W_{pl.z.}$	Plastic cross-section modulus around the main z axis
$c_{Z,UCS}$	Center of gravity coordinates in Z direction of the input axis system	$M_{pl.y.+}$	Plastic moment around the main y-axis for a positive My moment
$I_{Y,LCS}$	Second moment of the area around the YLCS axis	$M_{pl.y.-}$	Plastic moment around the main y-axis for a negative My moment
$I_{Z,LCS}$	Second moment of the area around the ZLCS axis	$M_{pl.z.+}$	Plastic moment around the main z axis for a positive Mz moment
$I_{YZ,LCS}$	Product moment of the area the LCS system	$M_{pl.z.-}$	Plastic moment around the main z axis for a negative Mz moment
α	Rotation angle of the main axes system	d_y	Shear middle coordinate in head y direction measured from the center of gravity - Calculated by 2D FEM analysis
I_y	Second moment of the area around the main y-axis	d_z	Shear middle coordinate in head z direction measured from the center of gravity - Calculated by 2D FEM analysis
I_z	Second moment of the area around the main z axis	I_t	Torsion constant - Calculated by 2D FEM analysis
i_y	Radius of inertia around the main y-axis	I_w	Curvature constant - Calculated by 2D FEM analysis
i_z	Radius of inertia around the main z axis	β_y	Mono-symmetrical constant round the main y-axis
$W_{el.y}$	Elastic cross-section modulus around the main y axis	β_z	Mono-symmetrical constant round the main z axis
$W_{el.z.}$	Elastic cross-section modulus around the main z axis		
$W_{pl.y}$	Plastic cross-section modulus around the main y axis		

8.4. Distance between the cross bars

Y.

Z. X

Page 72

Project	IJssel Bridge
Part	Bridge
Author	Abdulkadir Akyel
Current date	29.01.2019
Project file name	IJssel bridge bridge v27 all phases

9. Rigid bindings

The center lines of the diagonals of the K-band intersect with the main beam at the lower edge of the cross beam. The connection between diagonals and the main beams is realized with the help of the end plates. This node is by means of an infinitely rigid bar (rigid bond) connected to the top flange of the main beam.

9.1. Rigid bindings for connection K-bandage

Z.

Y.
X

9.2. Rigid bindings

Name	Master	'Slave'	Hinge on 'master'	Hinge on 'slave'
RA1	N1	N5	X	X
RA2	N3	N15	X	X
RA3	N31	N26	X	X
RA4	N32	N28	X	X
RA5	N158	N147	X	X
RA6	N163	N149	X	X
RA7	N205	N200	X	X
RA8	N210	N202	X	X
RA9	N258	N264	X	X
RA10	N263	N265	X	X
RA11	N324	N319	X	X
RA12	N329	N321	X	X
RA13	N383	N372	X	X
RA14	N388	N374	X	X
RA15	N399	N403	X	X
RA16	N401	N411	X	X
RA17	N419	N414	X	X
RA18	N420	N416	X	X
RA19	N526	N515	X	X
RA20	N531	N517	X	X
RA21	N573	N568	X	X
RA22	N578	N570	X	X
RA23	N624	N630	X	X
RA24	N629	N631	X	X

Project	IJssel Bridge
Part	Bridge
Author	Abdulkadir Akyel
Current date	29.01.2019
Project file name	IJssel bridge bridge v27 all phases

Name	Master	'Slave'	Hinge on 'master'	Hinge on 'slave'
RA25	N679	N674	X	X
RA26	N684	N676	X	X

10. Concrete deck

10.1. Concrete deck on crossbars and main beam

Project	IJssel Bridge
Part	Bridge
Author	Abdulkadir Akyel
Current date	29.01.2019
Project file name	IJssel bridge bridge v27 all phases

10.2. Section across the concrete deck

10.3. Prestressed concrete deck

Project	IJssel Bridge
Part	Bridge
Author	Abdulkadir Akyel
Current date	29.01.2019
Project file name	IJssel bridge bridge v27 all phases

The prestressed concrete deck is shown in gray, the reinforced concrete deck is shown in yellow.

11. 2D member internal edges

Name	2D member 1	Length [m]	Form	Button	Edge
ES4	S513	0.150	Line	N1 N65	Line
ES5	S4	1,947	Line	N65 N2	Line
ES6	S8	1,947	Line	N66 N4	Line
ES13	S14	2,500	Line	N2 N73	Line
ES14	S27	2,500	Line	N73 N89	Line
ES15	S36	2,500	Line	N89 N31	Line
ES16	S45	2,500	Line	N31 N117	Line
ES17	S54	2,500	Line	N117 N123	Line
ES18	S63	2,500	Line	N123 N129	Line
ES19	S72	2,500	Line	N129 N158	Line
ES20	S81	2,500	Line	N158 N170	Line
ES21	S99	2,500	Line	N170 N176	Line
ES22	S90	2,500	Line	N176 N182	Line
ES23	S108	2,500	Line	N182 N205	Line
ES24	S117	2,500	Line	N205 N223	Line
ES26	S448	1,003	Line	N820 N229	Line
ES27	S135	2,500	Line	N229 N235	Line
ES28	S144	2,497	Line	N235 N258	Line
ES29	S153	2,497	Line	N258 N289	Line
ES30	S162	2,500	Line	N289 N295	Line
ES31	S467	1,003	Line	N295 N824	Line
ES32	S466	1,497	Line	N824 N301	Line
ES33	S180	2,500	Line	N301 N324	Line
ES34	S189	2,500	Line	N324 N342	Line
ES35	S198	2,500	Line	N342 N348	Line
ES36	S207	2,500	Line	N348 N354	Line
ES37	S216	2,500	Line	N354 N383	Line
ES38	S433	2,500	Line	N383 N709	Line
ES39	S424	2,500	Line	N709 N703	Line
ES40	S415	2,500	Line	N703 N697	Line
ES41	S406	2,500	Line	N697	Line

Project	IJssel Bridge
Part	Bridge
Author	Abdulkadir Akyel
Current date	29.01.2019
Project file name	IJssel bridge bridge v27 all phases

Name	2D member 1	Length [m]	Form	Button	Edge
				N679	
ES42	S397	2,500	Line	N679	Line
				N656	
ES43	S484	1,497	Line	N656	Line
				N826	
ES44	S485	1,003	Line	N826	Line
				N650	
ES45	S379	2,500	Line	N650	Line
				N644	
ES46	S370	2,497	Line	N644	Line
				N624	
ES47	S361	2,497	Line	N624	Line
				N603	
ES48	S352	2,500	Line	N603	Line
				N597	
ES49	S502	1,003	Line	N597	Line
				N822	
ES51	S334	2,500	Line	N591	Line
				N573	
ES52	S325	2,500	Line	N573	Line
				N550	
ES53	S307	2,500	Line	N550	Line
				N544	
ES54	S316	2,500	Line	N544	Line
				N538	
ES55	S298	2,500	Line	N538	Line
				N526	
ES56	S289	2,500	Line	N526	Line
				N497	
ES57	S280	2,500	Line	N497	Line
				N491	
ES58	S271	2,500	Line	N491	Line
				N485	
ES59	S262	2,500	Line	N485	Line
				N419	
ES60	S253	2,500	Line	N419	Line
				N457	
ES61	S244	2,500	Line	N457	Line
				N451	
ES62	S231	2,500	Line	N451	Line
				N400	
ES63	S221	2,347	Line	N400	Line
				N443	
ES64	S511	0.150	Line	N443	Line
				N399	
ES66	S18	2,500	Line	N4	Line
				N78	
ES67	S23	2,500	Line	N78	Line
				N94	
ES68	S32	2,500	Line	N94	Line
				N32	
ES69	S41	2,500	Line	N32	Line
				N122	
ES70	S50	2,500	Line	N122	Line
				N128	
ES71	S59	2,500	Line	N128	Line
				N134	

ES72	S68	2,500	Line	N134 N163	Line
ES73	S77	2,500	Line	N163 N175	Line
ES74	S95	2,500	Line	N175 N181	Line
ES75	S86	2,500	Line	N181 N187	Line

Project	IJssel Bridge
Part	Bridge
Author	Abdulkadir Akyel
Current date	29.01.2019
Project file name	IJssel bridge bridge v27 all phases

Name	2D member 1	Length [m]	Form	Button	Edge
ES76	S104	2,500	Line	N187 N210	Line
ES77	S113	2,500	Line	N210 N228	Line
ES79	S441	1,003	Line	N819 N234	Line
ES80	S131	2,500	Line	N234 N240	Line
ES81	S140	2,497	Line	N240 N263	Line
ES82	S149	2,497	Line	N263 N294	Line
ES83	S158	2,500	Line	N294 N300	Line
ES84	S458	1,003	Line	N300 N823	Line
ES85	S459	1,497	Line	N823 N306	Line
ES86	S176	2,500	Line	N306 N329	Line
ES87	S185	2,500	Line	N329 N347	Line
ES88	S194	2,500	Line	N347 N353	Line
ES89	S203	2,500	Line	N353 N359	Line
ES90	S212	2,500	Line	N359 N388	Line
ES91	S429	2,500	Line	N388 N714	Line
ES92	S420	2,500	Line	N714 N708	Line
ES93	S411	2,500	Line	N708 N702	Line
ES94	S402	2,500	Line	N702 N684	Line
ES95	S393	2,500	Line	N684 N661	Line
ES96	S477	1,497	Line	N661 N825	Line
ES97	S476	1,003	Line	N825 N655	Line
ES98	S375	2,500	Line	N655 N649	Line
ES99	S366	2,497	Line	N649	Line

				N629	
ES100	S357	2,497	Line	N629	Line
				N608	
ES101	S348	2,500	Line	N608	Line
				N602	
ES102	S495	1,003	Line	N602	Line
				N821	
ES104	S330	2,500	Line	N596	Line
				N578	
ES105	S321	2,500	Line	N578	Line
				N555	
ES106	S303	2,500	Line	N555	Line
				N549	
ES107	S312	2,500	Line	N549	Line
				N543	
ES108	S294	2,500	Line	N543	Line
				N531	
ES109	S285	2,500	Line	N531	Line
				N502	
ES110	S276	2,500	Line	N502	Line

Project	IJssel Bridge
Part	Bridge
Author	Abdulkadir Akyel
Current date	29.01.2019
Project file name	IJssel bridge bridge v27 all phases

Name	2D member 1	Length [m]	Form	Button	Edge
				N496	
ES111	S267	2,500	Line	N496	Line
				N490	
ES112	S258	2,500	Line	N490	Line
				N420	
ES113	S249	2,500	Line	N420	Line
				N462	
ES114	S240	2,500	Line	N462	Line
				N456	
ES115	S235	2,500	Line	N456	Line
				N402	
ES116	S225	2,347	Line	N402	Line
				N827	
ES118	S503	0.527	Line	N822	Line
				N816	
ES119	S503	0.970	Line	N816	Line
				N591	
ES120	S449	0.970	Line	N223	Line
				N818	
ES121	S449	0.527	Line	N818	Line
				N820	
ES122	S440	0.970	Line	N228	Line
				N817	
ES123	S440	0.527	Line	N817	Line
				N819	
ES124	S494	0.527	Line	N821	Line
				N815	
ES125	S494	0.970	Line	N815	Line
				N596	
ES126	S513	1,837	Line	N11	Line
				N834	
ES127	S515	5,376	Line	N834	Line

			N835	
ES128	S516	1,837 Line	N835	Line
			N14	
ES129	S511	1,837 Line	N407	Line
			N833	
ES130	S512	5,376 Line	N833	Line
			N832	
ES131	S510	1,837 Line	N832	Line
			N410	
ES132	S516	0.150 Line	N66	Line
			N3	
ES133	S510	0.150 Line	N827	Line
			N401	

12. Solver settings

Name	SolverSetup1
Ignore shear deformations (Ay, Az >> A)	✗
Initial voltage	✗
Apply changing factors to properties	✓
Number of plate rib thicknesses	20
Maximum number of soil interaction iterations	10
Number of cuts on medium bar	10
Step for soil / water pressure [m]	0.500
C1x [MN / m 3]	1.0000e-01
C1y [MN / m 3]	1.0000e-01
C1z [MN / m 3]	1.0000th + 01
C2x [MN / m]	5.0000th + 00
C2y [MN / m]	5.0000th + 00
Reinforcement coefficient	1
Warning if the maximum translation is greater than [mm]	1000.0
Warning if the maximum rotation is greater than [mrad]	100.0
Parallelism tolerance for automatic calculation [deg]	10.00

Project	IJssel Bridge
Part	Bridge
Author	Abdulkadir Akyel
Current date	29.01.2019
Project file name	IJssel bridge bridge v27 all phases

Span length ratio L / beff, max (1 side) for automatic calculation [-]	8.00
Single superimposed beam [-]	1.00
Internal span [-]	0.70
End span [-]	0.85
Cantilever [-]	2.00
Ground combination	No
Bending theory of plate / scale calculation	Mindlin
Solver type	Straight away

13. Settings net

Name	MeshSetup 1
Generation of eccentric elements on variable height bars	✗
Generation of nodes on bars	✗
Generation of nodes at point loads on beams	✓
Floating buttons for preload	✓
Elastic net	✓
Distribution on consoles and variable bars	5
Distribution for 2D-1D upgrade	50
Average number of waypoints on 1D element	1
Average size of 2D member / curved element [m]	0.200
Minimum length of bar element [m]	0.100

Maximum length of bar element [m]	1000,000
Average size of cables, bars on elastic bed, non-linear ground spring [m]	1,000
Maximum angle from the plane of the quadrilateral element [mrad]	30.0
Incr. predefined net	1.5
Minimum distance between definition point and line [m]	0.001
Average dimension of panel element [m]	0.200
Mesh refinement according to the beam type	No
Definition of mesh elements dimensions for panels	Manually

Appendix

Appendix Q - Import SCIA - Main bridge local model

IJssel Bridge

Project	IJssel Bridge
Part	Main span
Author	Ernst Klamer
Current date	29.01.2019

Project file name	Local model V11.esa

1. Table of Contents

2. Project

License name	Royal HaskoningDHV	
Project	IJssel Bridge	
Part	Main span	
Description	Local model	
Author	Ernst Klamer	
Date	06.03.2018	
Construction	General XYZ	
Number of knots:		5423
Number of bars:		0
Number of plates:		2266
Number of solids:		0
Number of cross sections used:		0
Number of load cases:		100
Number of materials used:		13
Gravitational acceleration [m / s 2]		9,810
National standard	EC - EN	

3. Overview

The local model was created in part of main bridge. The model is constructed from cross beam 11 to 14.

Page 82

Project	IJssel Bridge
Part	Main span
Author	Ernst Klamer
Current date	29.01.2019
Project file name	Local model V11.esa

3.1. Overview

3.2. shafts

Page 83

Project	IJssel Bridge
Part	Main span
Author	Ernst Klamer
Current date	29.01.2019
Project file name	Local model V11.esa

3.3. Distances between cross beams

4. Crossbars

The variable cross-section of the main beams changes the height of the K-braces. Here is an overview for each K-relationship, as well as an overview of the intermediate cross member.

Page 84

Project	IJssel Bridge
Part	Main span
Author	Ernst Klamer
Current date	29.01.2019
Project file name	Local model V11.esa

4.1. Cross beam shaft 11

4.2. Cross beam shaft 12

Project	IJssel Bridge
Part	Main span
Author	Ernst Klamer
Current date	29.01.2019
Project file name	Local model V11.esa

4.3. Cross beam shaft 13

4.4. Cross beam shaft 14

Project	IJssel Bridge
Part	Main span
Author	Ernst Klamer
Current date	29.01.2019
Project file name	Local model V11.esa

4.5. Intermediate cross member

5. Deck construction

5.1. Top view

Project	IJssel Bridge
Part	Main span

Author	Ernst Klamer
Current date	29.01.2019
Project file name	Local model V11.esa

5.2. Bottom view

5.3. Bulbs under-deck

Page 88

Project	IJssel Bridge
Part	Main span
Author	Ernst Klamer
Current date	29.01.2019
Project file name	Local model V11.esa

5.4. Bulbs and crossbars

6. Geometry

6.1. Main beams

Page 89

Project	IJssel Bridge
Part	Main span
Author	Ernst Klamer
Current date	29.01.2019
Project file name	Local model V11.esa

6.2. Explanation

In order for the body and the flanges to work together constructively, the system line of the plates must be extended until they meet to cut. As a result, the length of the body is modeled a little longer to the heart of the flanges. For the height of the main beam, it becomes height of the system line. The bottom flange is equipped with different plate thicknesses due to the thickening plates.

Project	IJssel Bridge
Part	Main span
Author	Ernst Klamer
Current date	29.01.2019
Project file name	Local model V11.esa

6.3. Cross beam

X Y.

The end plates and L pieces for the joints are modeled with local thickening of the flange and / or the main beam web and / or the crossbars. The roundings in the end plates or in the profiles are also modeled.

Project	IJssel Bridge
Part	Main span
Author	Ernst Klamer
Current date	29.01.2019
Project file name	Local model V11.esa

6.4. Console

6.5. Cross beam - main beam connection

Project	IJssel Bridge
Part	Main span
Author	Ernst Klamer
Current date	29.01.2019
Project file name	Local model V11.esa

6.6. Stiffeners on body main beams


Z.
X
Y.


Z.
Y.
X

Project	IJssel Bridge
Part	Main span
Author	Ernst Klamer
Current date	29.01.2019
Project file name	Local model V11.esa

6.7. K frame

X Y

Page 94

Project	IJssel Bridge
Part	Main span
Author	Ernst Klamer
Current date	29.01.2019
Project file name	Local model V11.esa

Z
Y
X

Page 95

Project	IJssel Bridge
Part	Main span
Author	Ernst Klamer
Current date	29.01.2019
Project file name	Local model V11.esa

6.8. Bulbs

Project	IJssel Bridge
Part	Main span
Author	Ernst Klamer
Current date	29.01.2019
Project file name	Local model V11.esa

6.9. Console

Bulbs are modeled with two plates that form a T-piece. The flange of these tees is chosen so that the total cross section has the same surface area and moment of resistance as the actual bulbs, as shown in the drawing.

7. Impositions

7.1. Button supports

Name	Button	System	Type	X	Y.	Z.	Rx	Ry	Rz
Sn1	N3722	GCS	Standard	Free	Free	Fixed	Free	Free	Free
Sn2	N3961	GCS	Standard	Free	Free	Fixed	Free	Free	Free
Sn3	N39	GCS	Standard	Free	Free	Fixed	Free	Free	Free
Sn4	N1183	GCS	Standard	Free	Free	Fixed	Free	Free	Free
Sn7	K1289	GCS	Standard	Fixed	Free	Free	Free	Free	Free
Sn8	K1290	GCS	Standard	Fixed	Free	Free	Free	Free	Free
Sn9	K6764	GCS	Standard	Free	Fixed	Free	Free	Free	Free
Sn10	K6757	GCS	Standard	Free	Fixed	Free	Free	Free	Free
Sn11	N40	GCS	Standard	Free	Free	Fixed	Free	Free	Free
Sn12	N515	GCS	Standard	Free	Free	Fixed	Free	Free	Free
Sn13	N1687	GCS	Standard	Free	Free	Fixed	Free	Free	Free
Sn14	N1848	GCS	Standard	Free	Free	Fixed	Free	Free	Free
Sn15	N2546	GCS	Standard	Free	Free	Fixed	Free	Free	Free
Sn16	N2934	GCS	Standard	Free	Free	Fixed	Free	Free	Free
Sn17	N3612	GCS	Standard	Free	Free	Fixed	Free	Free	Free
Sn18	N2798	GCS	Standard	Free	Free	Fixed	Free	Free	Free
Sn19	N2413	GCS	Standard	Free	Free	Fixed	Free	Free	Free
Sn20	N1705	GCS	Standard	Free	Free	Fixed	Free	Free	Free
Sn21	N1222	GCS	Standard	Free	Free	Fixed	Free	Free	Free
Sn22	N1184	GCS	Standard	Free	Free	Fixed	Free	Free	Free

Project	IJssel Bridge
Part	Main span
Author	Ernst Klamer
Current date	29.01.2019
Project file name	Local model V11.esa

7.2. Laying conditions

8. Materials

Steel EC3

Name	ρ [kg / m 3]	E mod [MPa] G mod [MPa]	μ α [m / mK]	Lower limit [mm]	Upper limit [mm]	F y [MPa]	F u [MPa]	Color
LQmc 52	7850.0	2.1000e + 05	0.3	0.0	40.0	350.0	510.0	
		8.0769e + 04	0.00	40.0	80.0	350.0	510.0	
QMC 37	7850.0	2.1000e + 05	0.3	0.0	40.0	215.0	340.0	
		8.0769e + 04	0.00	40.0	80.0	215.0	340.0	

9. Solver settings

Name	SolverSetup1
Ignore shear deformations (Ay, Az >> A)	✗
Initial voltage	✗
Apply changing factors to properties	✓
Number of plate rib thicknesses	20
Maximum number of soil interaction iterations	10
Number of cuts on medium bar	10
Step for soil / water pressure [m]	0.500
C1x [MN / m 3]	1.0000e-01
C1y [MN / m 3]	1.0000e-01
C1z [MN / m 3]	1.0000th + 01
C2x [MN / m]	5.0000th + 00
C2y [MN / m]	5.0000th + 00
Reinforcement coefficient	1
Warning if the maximum translation is greater than [mm]	1000.0
Warning if the maximum rotation is greater than [mrad]	100.0
Parallelism tolerance for automatic calculation [deg]	10.00
Span length ratio L / beff, max (1 side) for automatic calculation [-]	8.00

Project	IJssel Bridge
Part	Main span
Author	Ernst Klamer
Current date	29.01.2019
Project file name	Local model V11.esa

Single superimposed beam [-]	1.00
Internal span [-]	0.70
End span [-]	0.85

Cantilever [-]	2.00
Ground combination	No
Bending theory of plate / scale calculation	Mindlin
Solver type	Straight away

10. Settings just

Name	Net Setup 1
Generation of eccentric elements on variable height bars	✗
Generation of nodes on bars	✗
Generation of nodes at point loads on beams	✓
Floating buttons for preload	✓
Elastic net	✓
Apply automatic mesh refinement	✗
Distribution on consoles and variable bars	5
Distribution for 2D-1D upgrade	50
Average number of waypoints on 1D element	1
Average size of 2D member / curved element [m]	0.050
Minimum length of bar element [m]	0.100
Maximum length of bar element [m]	1000,000
Average size of cables, bars on elastic bed, non-linear ground spring [m]	1,000
Maximum angle from the plane of the quadrilateral element [mrad]	30.0
Incr. predefined net	1.5
Minimum distance between definition point and line [m]	0.001
Average dimension of panel element [m]	1,000
Mesh refinement according to the beam type	No
Definition of mesh elements dimensions for panels	Manually

With its headquarters in Amersfoort, The Netherlands, Royal HaskoningDHV is an independent, international project management, engineering and consultancy service provider. Ranking globally in the top 10 of independently owned, nonlisted companies and top 40 overall, the Company's 6,000 staff provide services across the world from more than 100 offices in over 35 countries.

Our connections

Innovation is a collaborative process, which is why Royal HaskoningDHV works in association with clients, project partners, universities, government agencies, NGOs and many other organizations to develop and introduce new ways of living and working to enhance society together, now and in the future.

Memberships

Royal HaskoningDHV is a member of the recognized engineering and environmental bodies in those countries where it has a permanent office base.

All Royal HaskoningDHV consultants, architects and engineers are members of their individual branch organizations in their various countries.

Integrity

Royal HaskoningDHV is the first and only engineering consultancy with ETHIC Intelligence anti-corruption certificate since 2010.

royalhaskoningdhv.com