
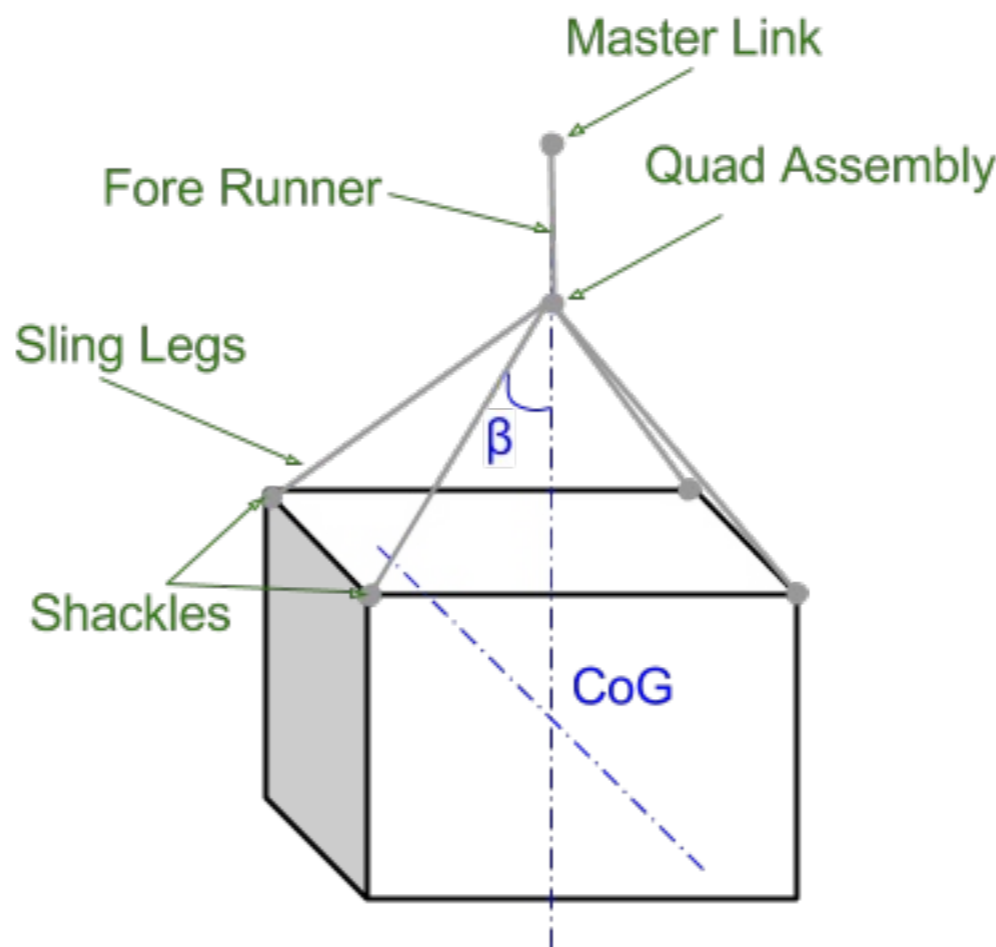


DNV DESIGN

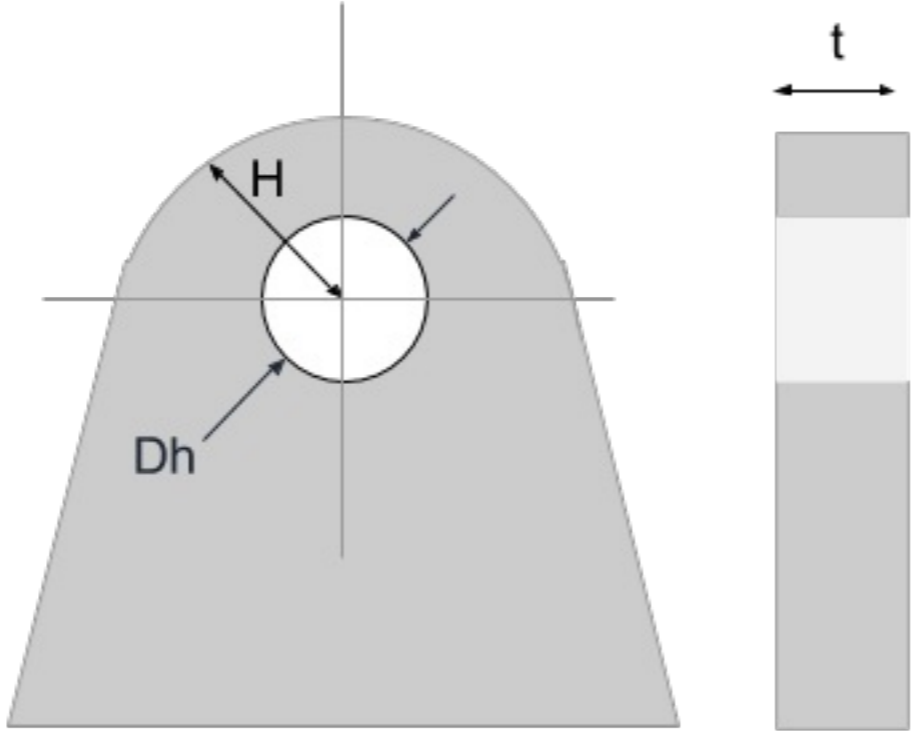
Details

Code Details			
Code	DNV 2.7-1 2006 with AISC 360-10 ASD	Description	This is the 2006 edition of the DNV Standard for Certification No 2.7-1, which defines minimum technical and safety related requirements to certify Offshore Containers, as mandated by the IMDG code. American Standard AISC 360-10 ASD is used to design the supporting members container.
Project Units	Imperial	Project ID	
Company		Logo	
Designer		Client	
Project Notes			

DNV

Setup	
Lifting Type (Symmetric)	
Leg Angle β (°)	48.19
Number of Padeyes	4
30° Tilt Test	Unit able to withstand 30 degree tilt.

Dimensions and Masses			
Container Length (inch)	120	Gross Mass (lb)	1000
Container Height (inch)	120	Tare Mass (lb)	500
Container Width (inch)	360	Payload Mass (lb)	500
Total Length of Load Bearing Members (inch)	120	Lifting Set Mass (lb)	200

Padeye Design	
Dh (inch)	1
H (inch)	2
t (inch)	1
Re (ksi)	50000
Padeye Type	

Design Loads

4.2.3 Lifting Loads

	Load on Structure (lbf)	Internal Load (lbf)
4.2.3.1 4-point lifting	11124.344	8899.475
4.2.3.2 Lifting with fork truck	8543.496	4983.706
4.6.3.3 2-point lifting	6674.606	4449.738

4.2.4 Impact Loads (Static Equivalent)

	Formula	Load (lbf)
4.2.4.1 Horizontal Impact (corner post, external bottom frame)	$F_{HI} = 0.25 \times R \times g$	1112.434
4.2.4.1 Horizontal Impact (other primary structure)	$F_{HI} = 0.15 \times R \times g$	667.461
4.2.4.2 Vertical Impact (bottom)	$F_V = 0.25 \times R \times g$	1112.434

4.4.2 Loads on Intermediate Deck

	Formula	Load (lbf)
Tween Deck Load	$F_W = 0.5 \times P \times \Psi \times g$	3337.303

4.4.7 Internal Loads on Side Wall

	Formula	Load (lbf)
Load On Walls	$F_W = 0.6 \times P \times g$	1334.921

Distributed Loads on Floor

	Total Load		Distributed Load (Total Load / Length of Load Bearing Members)
	Formula	Load (lbf)	D. Load (lbf/inch)
4 Point Lift	$F = (2.5 \times R)g$	11124.344	3.65
2 Point Lift/ Diagonal Lift	$F = (1.5 \times R)g$	6674.606	2.19
Fork Pocket Lift	$F = 1.6 \times (R + S)g$	8543.496	2.803
Impact Loads	$F = R \times g$	4449.738	1.46

Padeye

Resulting Sling Force

Component	Magnitude(lbf)
Sling Angle	6674.605
F_V	4449.737
F_H	4974.957

Padeye Strength

Calculated Stresses	Magnitude (ksi)
Tear out stress	10.346
Contact stress, 6% clearance	76.364

Shackle Dimensions

Dimension	Formula	Magnitude (inch)
Minimum bolt diameter	$D_{min} = 0.94 \times Dh$	23.876
Maximum shackle inside width at pin	$W_{max} = tc / 0.75$	33.867

Padeye and Shackle Check

No shackle found in EN 13889:2000 that matches the pad eye. Proposing minimum recommended shackle with respect to strength.

Shackle Parameter	Value
Working Load Limit (t)	4.75
Nominal pin diameter (inch)	22
Nominal inside width at pin (inch)	31
Dee - min. inside length S (inch)	52
Bow - min. inside length S (inch)	65

Lifting Sets

Strength Requirements for Lifting Sets

Enhancement factor (x)	No factor given
Working Load Limit (t)	7

Quad Assembly (Masterlink + Intermediate links) Requirements

Load on quad assembly (t)	7
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Forerunner Requirements

Load on forerunner (t)	7
Wire rope sling, fibre core EN 13414-1 (inch)	26
Wire rope sling, steel core EN 13414-1 (inch)	26
Chain sling EN 818-4 (inch)	16

Sling Leg Requirements

Load per sling leg (t)	3.5
Wire rope sling, fibre core EN 13414-1 (inch)	20
Wire rope sling, steel core EN 13414-1 (inch)	18
Chain sling EN 818-4 (inch)	13

Shackle Requirements

Load on each shackle (t)	3.5
Recommended min. standard shackle EN 13889 (t)	4.75

AISC MEMBER DESIGN

Project Details

Design Code: DNV 2.7-1 2006 with AISC 360-10 ASD
 Provision: ASD
 Country: International



User Name: Sam
 Project Name: POU_Rect
 Unit System: Imperial

NOTE: The calculations for this design code are in **BETA** stage development. If you notice any irregularities or problems please contact support@skyciv.com.

Design Input Information

Design Factors			
Ω_t	Ω_c	Ω_b	Ω_v
1.67	1.67	1.67	1.67

Design Materials			
ID	E (ksi)	Fy (ksi)	Fu (ksi)
1	29008	38	59

Section Dimensions					
ID	Name	d (in)	tw (in)	bf (in)	tf (in)
1	W10x22	1.020e+1	2.400e-1	5.750e+0	3.600e-1
ID	Name	d (in)	tw (in)		
2	HSS5.563x0.188	5.563e+0	1.740e-1		
ID	Name	d (in)	bf (in)	tw (in)	
3	HSS14x14x3/8	1.400e+1	1.400e+1	3.490e-1	

Section Properties								
ID	Name	A (in ²)	J (in ⁴)	I _{yp} (in ⁴)	I _{zp} (in ⁴)	I _w (in ⁶)	S _{yp} (in ³)	S _{zp} (in ³)
1	W10x22	6.4900e+0	2.3900e-1	1.1400e+1	1.1800e+2	2.7500e+2	6.1000e+0	2.6000e+1
2	HSS5.563x0.188	2.9500e+0	2.1400e+1	1.0700e+1	1.0700e+1	0.0000e+0	5.0500e+0	5.0500e+0
3	HSS14x14x3/8	1.8700e+1	9.0000e+2	5.7700e+2	5.7700e+2	0.0000e+0	9.5400e+1	9.5400e+1

Member Properties							
Member ID	Section ID	K _z L (ft)	K _y L (ft)	C _b	LST	LSC	LD
1	1	10	10	1.40	300	200	250
2	1	20	20	2.10	300	200	250
3	1	10	10	2.18	300	200	250
4	1	20	20	2.10	300	200	250
5	1	10	10	2.19	300	200	250
6	1	10	10	1.00	300	200	250
7	1	20	20	1.42	300	200	250
8	1	10	10	1.00	300	200	250
9	1	20	20	1.42	300	200	250
10	1	10	10	2.20	300	200	250
11	1	10	10	2.19	300	200	250
16	1	10	10	2.20	300	200	250
17	3	22.3607	22.3607	-	300	200	250
18	3	22.3607	22.3607	-	300	200	250
19	3	14.1421	14.1421	-	300	200	250
20	3	14.1421	14.1421	-	300	200	250
21	3	22.3607	22.3607	-	300	200	250
22	3	22.3607	22.3607	-	300	200	250

Member Design Capacity

Member ID	P_n/Ω_t (kip)	P_n/Ω_c (kip)	M_{zn}/Ω_b (k-ft)	M_{yn}/Ω_b (k-ft)	V_{yn}/Ω_v (kip)	V_{zn}/Ω_v (kip)
1	147.68	93.65	49.30	11.57	37.21	56.52
2	147.68	29.76	49.30	11.57	37.21	56.52
3	147.68	93.65	49.30	11.57	37.21	56.52
4	147.68	29.76	49.30	11.57	37.21	56.52
5	147.68	93.65	49.30	11.57	37.21	56.52
6	147.68	93.65	41.68	11.57	37.21	56.52
7	147.68	29.76	33.86	11.57	37.21	56.52
8	147.68	93.65	41.68	11.57	37.21	56.52
9	147.68	29.76	33.86	11.57	37.21	56.52
10	147.68	93.65	49.30	11.57	37.21	56.52
11	147.68	93.65	49.30	11.57	37.21	56.52
16	147.68	93.65	49.30	11.57	37.21	56.52
17	425.51	373.77	161.33	161.33	123.44	123.44
18	425.51	373.77	161.33	161.33	123.44	123.44
19	425.51	404.01	161.33	161.33	123.44	123.44
20	425.51	404.01	161.33	161.33	123.44	123.44
21	425.51	373.77	161.33	161.33	123.44	123.44
22	425.51	373.77	161.33	161.33	123.44	123.44

Design Ratio

Member ID	P	Mz	My	Vy	Vz	(P,Mz,My)	KL/r	δ	Status
1	0.05	0.06	0.00	0.07	0.00	0.09	0.45	0.03	OK
2	0.18	0.32	0.01	0.14	0.00	0.42	0.91	0.14	OK
3	0.05	0.08	0.01	0.07	0.00	0.11	0.45	0.02	OK
4	0.18	0.32	0.01	0.14	0.00	0.42	0.91	0.14	OK
5	0.02	0.11	0.01	0.02	0.00	0.13	0.30	0.01	OK
6	0.00	0.02	0.00	0.00	0.00	0.02	0.30	0.00	OK
7	0.00	0.01	0.01	0.00	0.00	0.02	0.60	0.01	OK
8	0.00	0.00	0.00	0.00	0.00	0.01	0.30	0.00	OK
9	0.00	0.01	0.01	0.00	0.00	0.02	0.60	0.01	OK
10	0.02	0.09	0.00	0.02	0.00	0.10	0.30	0.00	OK
11	0.02	0.11	0.01	0.02	0.00	0.13	0.30	0.01	OK
16	0.02	0.09	0.00	0.02	0.00	0.10	0.30	0.00	OK
17	0.01	0.05	0.02	0.00	0.00	0.07	0.24	0.02	OK
18	0.01	0.06	0.01	0.00	0.00	0.07	0.24	0.02	OK
19	0.00	0.01	0.03	0.00	0.00	0.04	0.10	0.00	OK
20	0.00	0.01	0.03	0.00	0.00	0.04	0.10	0.00	OK
21	0.01	0.05	0.02	0.00	0.00	0.07	0.24	0.02	OK
22	0.01	0.06	0.01	0.00	0.00	0.07	0.24	0.02	OK

Definitions

Ω_t	Safety factor for tensile
Ω_c	Safety factor for compression
Ω_b	Safety factor for flexure
Ω_v	Safety factor for shear
E	Modulus of elasticity
F_y	Specified minimum yield stress
F_u	Specified minimum tensile strength
A	Cross-sectional area
J	Torsional constant
I_{yp}	Moment of inertia about the Y axes
I_{zp}	Moment of inertia about the Z axes
I_w	Warping constant
S_{yp}	Plastic section modulus about the Y axis
S_{zp}	Plastic section modulus about the Z axis
KL	Effective length
C_b	Buckling modification factor (from all load combinations)
L_b	Length between braced points
LST	Limited slenderness for tension
LSC	Limited slenderness for compression
LD	Limited deflection
P_n	Nominal axial strength (tension/compression)
M_n	Nominal flexural strength (about Z/Y axis)
V_n	Nominal shear strength (along Z/Y axis)
P	Design ratio in case of axial force
M_z	Design ratio in case of bending about Z axis
M_y	Design ratio in case of bending about Y axis
V_y	Design ratio in case of shear along Y axis
V_z	Design ratio in case of shear along Z axis
(P, M_z , M_y)	Design ratio in case of axial force and bending action
KL/r	Design ratio in case of section slenderness
δ	Design ratio in case of member deflection
OK	Capacity is provided
NG	Capacity is not provided