

MOMENT AND FORCES IN DAVIT

(Ref:Pressure Vessel Design Manual 3rd Edition by Dennis R. Moss Page 291~295)

1.0 Load on davit

Weight of Blind, W_L	:	665	Kg	=	6523.65	N
Weight of Davit Boom, W_1	:	60.0	Kg	=	588.60	N
Total Weight of Davit, W_d	:	80.00	Kg	=	784.80	N

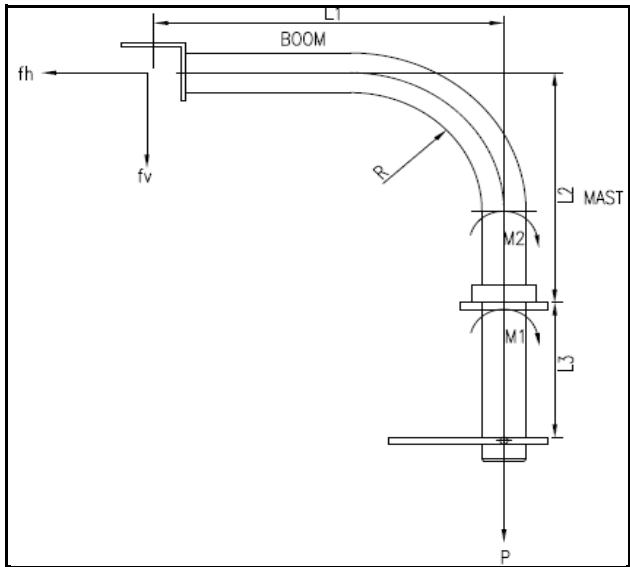
Vertical Impact Factor, C_v	:	1.5
Horizontal Impact Factor, C_h	:	0.2

Vertical Force, $f_v = C_v \times W_L$	=	9785.475	N
Horizontal Force, $f_h = C_h \times W_L$	=	1304.73	N
Axial Load, $P = f_v + W_d$	=	10570.28	N

2.0 Bending Moment in Davit Mast, M_1

Length of Boom, L_1	=	619	mm
Length of Mast, L_2	=	594	mm
Distance Between Guide to Support, L_3	=	270	mm

Moment, $M_1 = f_v L_1 + 0.5 W_1 L_1 + f_h L_2$	=	7014390.35	Nmm
---	---	------------	-----



Force and Moment in Davit.

STRESS IN DAVIT

1.0 Mast Properties

Davit Material	:	S355J2
Outside Diameter, D	=	80 mm
Outside Radius, a	=	40 mm

Moment Inertia, $I = \pi/64 \times (D^4)$	=	2010619.3	mm ⁴
Cross Sectional Area, $A = \pi/4 \times (D^2)$	=	5026.5	mm ²
Section Modulus, $Z = \pi/32 \times (D^3)$	=	50265.5	mm ³
Radius of Gyration, $r = D/4$	=	20.0	mm

Yield Stress, F_y	=	355	N/mm ²
Allowable Axial Stress, $F_a = 0.6 F_y$	=	213.0	N/mm ²
Allowable Bending Stress, $F_b = 0.66 F_y$	=	234.3	N/mm ²

Bend Radius, R	=	200	mm
Wall Thickness of Davit, t_p	=	40	mm

2.0 Stress Coefficient

Coefficient α (Alpha) = $(t_p \times R)/a^2$	=	5.0
Coefficient β (Beta) = $6/(5 + 6\alpha^2)$	=	0.0387
Coefficient $K = 1 - (9/(10 + 12\alpha^2))$	=	0.9710

Axial Stress, $f_a = P/A$	=	2.10	N/mm ²
Bending Moment at Davit Curve $M_2 = M_1(L_2 - R)/L_2$	=	4652643	Nmm

Bending Stress at Mast, $f_b = M_1/Z$	=	140	N/mm ²
Bending Moment at Davit Curve $f_b = (M_2 a/I)[2/(3K \sqrt{3\beta})]$	=	186	N/mm ²

Combined Stress, $f_a/F_a + f_b/F_b$	≤	1
Calculate Combined Stress	=	0.80583

Since Calculate Combined Stress < 1 = Satisfactory