Wind & Current Loads on Ships

50,000 dwt, ballast condition

By: W.P. Stewart, P.E. 1990, last modified 2008 | 9/19/2010 Date of run | File name: WINDCURR1.XLS

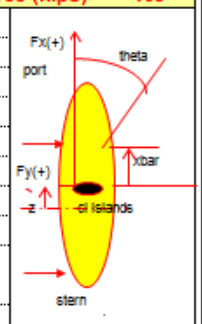
INPUT DATA BELOW | Vessel Name:>>>> | FSO, full load

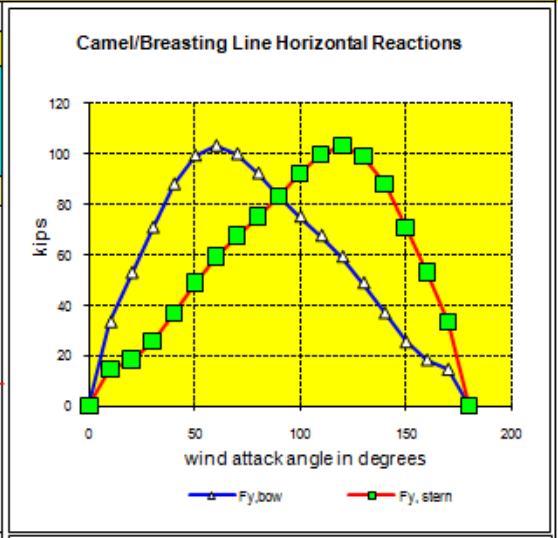
This file was originally developed as a worksheet for aiding the US Navy in mooring very large ships at piers where there were just two berthing camels and two major sets of breasing lines. The methods to compute wind and current forces on the ship come from the Navy Design Manuals and are implemented in Mathcad for currents and entirely for wind in this worksheet, using the data in yellow cells below. The forces for a 1-knot current must be entered around rows 139 to 160. The FyBow and FyStern forces may be used in STA TWOPOINT analyses.

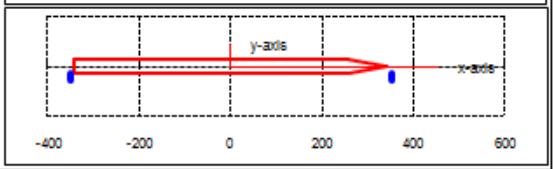
This is the first of three pages of information that may be printed. | max. beam force (kips)> 168

2943	As, superstuct.side area (sqft)	45.00	Vr. ref.wind speed @33.33 ft (knots)
26486	Ah, hull side area (sqft)	16.08	hh, average height of hull (ft)
29429	Ay, total broadside wind area (sqft)	57.15	hs, average height superstruct. (ft)
5317	Frontal wind area (sqft)	0.92	Cyw modifier coefficient (0.92 in DM)
682	Length overall (ft)	90	thetawz, Cx=0 position
700	dist.between camels (ft)	0.4	CxwB, headwind drag force coef.
0	z, vessel cg ahead of island centers (ft)	0.4	CxwS, sternwind drag force coef.
		0.12	Cxyw, max.
		0.15	Cxyc, max
			(max val. ec/Lwl, Fig.59)
S	P=loads on port, S=loads on stbd side.	S	P=camels on port, S=camels on stbd side.

Current Force Input | Go to Two Point Analysis







Documentation of terms provided below tabular data. *Current forces from Mathcad in cells B107-I145*

An elliptical current "rose" is specified in cells below (principal ellipse axis is x-axis of the vessel).

2.60 principal current velocity (kn)
0.50 minor current velocity (kn)

Attack angle sign convention shown above and right

Loads are from STARBOARD side of ship

Attack Angle theta deg.	DM-26.4 WIND FORCES 50,000 dwt, ballast condition								DM-26.4 CURRENT FORCES									
	Fx kips	Cxw	Cyw	Cxyw 0.12	Fyw (kip)	M wind (ft-kip)	xb/L ratio	xbar (ft)	Vcurr (kt)	FyCurr (kip)	FxCurr (kip)	ec/LwL 0.15	M curr. (ft-kip)	ec (ft)	FyBow (kip)	FyStern (kip)	Fxtot (kip)	Fytot (kip)	Moment (ft-kip)
0	-15	0.40	0.00	0.00	0	0	0.00	0	2.60	0	-8.51	0.00	0.0000	0	0	0	-23	0	0
10	-14	0.39	0.11	0.04	22	5642	0.37	252	1.95	26	-4.70	0.05	0.0019	35	33	15	-19	48	5642
20	-14	0.38	0.24	0.08	48	10603	0.32	219	1.29	23	-2.04	0.10	0.0032	66	53	18	-16	71	10603
30	-13	0.35	0.39	0.10	79	14285	0.27	182	0.95	18	-1.00	0.13	0.0034	89	71	26	-14	96	14285
40	-11	0.31	0.54	0.12	109	16244	0.22	149	0.76	16	-0.62	0.15	0.0034	101	88	37	-12	125	16244
50	-9	0.26	0.67	0.12	134	16244	0.18	121	0.64	14	-0.38	0.15	0.0030	101	99	49	-10	148	16244
60	-7	0.20	0.75	0.10	150	14285	0.14	95	0.57	12	-0.23	0.13	0.0023	89	103	59	-8	162	14285
70	-5	0.14	0.78	0.08	157	10603	0.10	68	0.53	11	-0.13	0.10	0.0015	66	100	68	-5	168	10603
80	-3	0.07	0.78	0.04	157	5642	0.05	36	0.51	10	-0.06	0.05	0.0007	35	92	75	-3	167	5642
90	0	0.00	0.78	0.00	157	0	0.00	0	0.50	10	0.00	0.00	0.0000	0	83	83	0	167	0
100	3	-0.07	0.78	-0.04	157	-5642	-0.05	-36	0.51	10	0.06	-0.05	-0.0007	-35	75	92	3	167	-5642
110	5	-0.14	0.78	-0.08	157	-10603	-0.10	-68	0.53	11	0.13	-0.10	-0.0015	-66	68	100	5	168	-10603
120	7	-0.20	0.75	-0.10	150	-14285	-0.14	-95	0.57	12	0.23	-0.13	-0.0023	-89	59	103	8	162	-14285
130	9	-0.26	0.67	-0.12	134	-16244	-0.18	-121	0.64	14	0.38	-0.15	-0.0030	-101	49	99	10	148	-16244
140	11	-0.31	0.54	-0.12	109	-16244	-0.22	-149	0.76	16	0.62	-0.15	-0.0034	-101	37	88	12	125	-16244
150	13	-0.35	0.39	-0.10	79	-14285	-0.27	-182	0.95	18	1.00	-0.13	-0.0034	-89	26	71	14	96	-14285
160	14	-0.38	0.24	-0.08	48	-10603	-0.32	-219	1.29	23	2.04	-0.10	-0.0032	-66	18	53	16	71	-10603
170	14	-0.39	0.11	-0.04	22	-5642	-0.37	-252	1.95	26	4.70	-0.05	-0.0019	-35	15	33	19	48	-5642
180	15	-0.40	0.00	0.00	0	0	0.00	0	2.60	0	8.51	0.00	0.0000	0	0	0	23	0	0