

Short pull (line to c.g. of mast 14.5' from bottom)

assume weight= 150#, center of mass at 14.5 feet from pivot

length of "gin pole" = 10

beginning angle of mast to horizontal = 9 degrees

angle of mast line to "gin pole" = 62 degrees

T1= tension on line to the mast

T2= tension on line to winch

F2= axial force on "gin pole"

mast angle	torque	T1	phi	L	A	theta	F3	T2	F2
0	2175	247	101.5	16.798	35.68708	42.81292	217.5	320.038	351.8841
5	2167	246	96.5	16.18939	37.85882	45.64118	216.6723	303.0487	328.5424
9	2148	244	92.5	15.68067	39.57747	47.92253	214.8222	289.4244	309.6232
15	2101	239	86.5	14.88273	42.11852	51.38148	210.0889	268.8901	280.9441
20	2044	232	81.5	14.18733	44.19575	54.30425	204.3831	251.6641	256.8902
25	1971	224	76.5	13.46578	46.2285	57.2715	197.1219	234.3225	232.8278
30	1884	214	71.5	12.71959	48.20734	60.29266	188.3605	216.8633	208.8926
35	1782	202	66.5	11.95038	50.12011	63.37989	178.1656	199.291	185.2292
40	1666	189	61.5	11.15984	51.95081	66.54919	166.6147	181.6157	161.9888
45	1538	175	56.5	10.34982	53.67802	69.82198	153.7957	163.8521	139.3293
50	1398	159	51.5	9.522294	55.27236	73.22764	139.8063	146.0181	117.4144
55	1248	142	46.5	8.679481	56.69242	76.80758	124.7529	128.1345	96.41562
60	1088	124	41.5	7.823894	57.87807	80.62193	108.75	110.2232	76.51653
65	919	104	36.5	6.958545	58.73865	84.76135	91.91947	92.30503	57.92139
70	744	84	31.5	6.087269	59.13143	89.36857	74.38938	74.3939	40.8744
75	563	64	26.5	5.21539	58.81951	94.68049	56.29314	56.48149	25.7019
80	378	43	21.5	4.351173	57.38427	101.1157	37.76848	38.49057	12.91558
85	190	22	16.5	3.509274	54.03033	109.4697	18.95637	20.10608	3.505441
88	76	9	13.5	3.026187	50.48135	116.0187	7.590641	8.446703	0.381877
90	0	0	11.5	2.719843	47.13956	121.3604	1.33E-14	1.56E-14	-9.46E-16

max tension on line to mast about 244 pounds

max tension on line to winch about 289 pounds

max downward pressure on pole about 309 pounds

max axial force on mast toward pivot about 218 pounds

Long pull (line to top of mast)

assume weight= 150#, center of mass at 14.5 feet from pivot

length of "gin pole" = 10

beginning angle of mast to horizontal = 9 degrees

angle of mast line to "gin pole" = 62 degrees

T1= tension on line to the mast

T2= tension on line to winch

F2= axial force on "gin pole"

mast angle	torque	T1	phi	L	A	theta	F3	T2	F2
0	2175	220	101.5	16.798	35.68708	42.81292	193.9449	285.378	313.7752
5	2167	219	96.5	16.18939	37.85882	45.64118	193.2068	270.2287	292.9614
9	2148	218	92.5	15.68067	39.57747	47.92253	191.5571	258.0799	276.0912
15	2101	213	86.5	14.88273	42.11852	51.38148	187.3363	239.7694	250.518
20	2044	207	81.5	14.18733	44.19575	54.30425	182.2485	224.409	229.0691
25	1971	200	76.5	13.46578	46.2285	57.2715	175.7737	208.9455	207.6126
30	1884	191	71.5	12.71959	48.20734	60.29266	167.9612	193.3771	186.2697
35	1782	180	66.5	11.95038	50.12011	63.37989	158.8703	177.7079	165.1689
40	1666	169	61.5	11.15984	51.95081	66.54919	148.5704	161.9468	144.4455
45	1538	156	56.5	10.34982	53.67802	69.82198	137.1397	146.107	124.24
50	1398	142	51.5	9.522294	55.27236	73.22764	124.6653	130.2044	104.6984
55	1248	126	46.5	8.679481	56.69242	76.80758	111.2422	114.2576	85.97386
60	1088	110	41.5	7.823894	57.87807	80.62193	96.97243	98.28606	68.22983
65	919	93	36.5	6.958545	58.73865	84.76135	81.96464	82.30844	51.64853
70	744	75	31.5	6.087269	59.13143	89.36857	66.33305	66.33707	36.44772
75	563	57	26.5	5.21539	58.81951	94.68049	50.19662	50.36458	22.91839
80	378	38	21.5	4.351173	57.38427	101.1157	33.67817	34.32206	11.51683
85	190	19	16.5	3.509274	54.03033	109.4697	16.90341	17.9286	3.125804
88	76	8	13.5	3.026187	50.48135	116.0187	6.768578	7.531929	0.34052
90	0	0	11.5	2.719843	47.13956	121.3604	1.19E-14	1.39E-14	-8.44E-16

max tension on line to mast about 218 pounds
max tension on line to winch about 258 pounds
max downward pressure on pole about 276 pounds
max axial force on mast toward pivot about 217 pounds