Appendix II

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Pure Translational and Rotational Loading Results:

- Undrained Shear Strength Data from T-Bar Test
- Translational Loading Test: Load Cell Readings versus Motor Line Displacement, organized test type and anchor
- Rotational Loading Test: Load Cell Readings versus Motor Line Displacement, organized test type and anchor

In-plane Results:

- Original Anchor: Undrained Shear Strength Data from T-Bar Test and Load Cell Readings versus Motor Line Displacement, organized by date
- Wider Fluke Anchor: Original Anchor: Undrained Shear Strength Data from T-Bar Test and Load Cell Readings versus Motor Line Displacement, organized by date

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Additional Magnetometer Results: Compact Disc with Sample Videos of the Anchor Trajectory

Tables

Table 1 - Pure Translational and Rotational Loading Tests for Original Anchor

Original Anchor

Area of Fluke	0.0625	ft2
Weight	0.065	lbs

Normal Load for Original Fluke Anchor

Test ID	Test Date	Anchor Configuration	Embed Depth (in)	Approximate Undrained Shear Strength, s_u (psf)	Force (Fmax) (lbs)	Calculated N_p	
2010.02.19_pullout1	2/19/2010	Normal	12	18.98	14.42	12.15	
2010.02.19_pullout2	2/19/2010	Normal	12	18.32	13.64	11.91	
2010.02.19_pullout3	2/19/2010	Normal	12	18.21	11.91	10.46	
2010.06.17_anchorB_pullout1	6/17/2010	Normal	11.5	11.55	8.23	11.39	
2010.06.17_anchorB_pullout2	6/17/2010	Normal	11	11.55	8.22	11.38	Average
2010.06.17_anchorB_pullout3	6/17/2010	Normal	11	11.55	8.30	11.49	11.46

Shear for Original Fluke Anchor

Test ID	Test Date	Anchor Configuration	Embed Depth (in)	Approximated s_u (psf)	Force (Fmax) (lbs)	Calculated N_p	
2010.06.17_anchorB_pureshearA_1	6/17/2010	In-plane Shear	11	12.4	4.21	5.43	
2010.06.17_anchorB_pureshearA_2	6/17/2010	In-plane Shear	11	12.4	4.18	5.39	Average
2010.06.17_anchorB_pureshearA_3	6/17/2010	In-plane Shear	11	12.4	4.19	5.40	5.40
2010.06.17_anchorB_pureshearB_1	6/17/2010	Out-of-plane Shear	10.5	12.4	5.33	6.87	
2010.06.17_anchorB_pureshearB_2	6/17/2010	Out-of-plane Shear	11	12.4	5.24	6.75	Average
2010.06.17_anchorB_pureshearB_3	6/17/2010	Out-of-plane Shear	11	12.4	5.43	7.00	6.88

Table 1 - Pure Translational and Rotational Loading Tests for Original Anchor

Rotation for Original Fluke Anchor

Test ID	Test Date	Anchor Configuration	Embed Depth (in)	Approximated s_u (psf)	Average Moment (Mmax) (in-lbs)	Calculated N_m assume square	Calculated N_m per unit width (ft)
2010.06.11_anchorB_pitching_1	6/11/2010	Pitch	10.5	11.40	5.26	2.46	0.62
2010.06.11_anchorB_pitching_2	6/11/2010	Pitch	10.5	11.40	5.18	2.42	0.61
2010.06.11_anchorB_pitching_3	6/11/2010	Pitch	10.5	11.40	5.13	2.40	0.60
2010.06.11_anchorB_pitching_4	6/11/2010	Pitch	10.5	11.40	5.12	2.40	0.60
2010.06.11_anchorB_pitching_5	6/11/2010	Pitch	10.5	11.40	5.08	2.38	0.59
2010.06.11_anchorB_pitching_6	6/11/2010	Pitch	10.5	11.40	5.10	2.39	0.60
2010.06.11_anchorB_rolling_1	6/11/2010	Rolling	10.5	10.00	5.43	2.89	0.72
2010.06.11_anchorB_rolling_2	6/11/2010	Rolling	10.5	10.00	5.32	2.84	0.71
2010.06.11_anchorB_rolling_3	6/11/2010	Rolling	10.5	10.00	5.23	2.79	0.70
2010.06.11_anchorB_rolling_4	6/11/2010	Rolling	10.5	10.00	5.22	2.78	0.70
2010.06.11_anchorB_rolling_5	6/11/2010	Rolling	10.5	10.00	5.22	2.79	0.70
2010.06.11_anchorB_rolling_6	6/11/2010	Rolling	10.5	10.00	5.35	2.85	0.71
2010.06.11_anchorB_yaw_1	6/11/2010	Yaw	10.5	11.72	3.81	1.73	0.43
2010.06.11_anchorB_yaw_2	6/11/2010	Yaw	10.5	11.72	3.77	1.72	0.43
2010.06.11_anchorB_yaw_3	6/11/2010	Yaw	10.5	11.72	3.76	1.71	0.43
2010.06.11_anchorB_yaw_4	6/11/2010	Yaw	10.5	11.72	3.74	1.70	0.43
2010.06.11_anchorB_yaw_5	6/11/2010	Yaw	10.5	11.72	3.75	1.71	0.43
2010.06.11_anchorB_yaw_6	6/11/2010	Yaw	10.5	11.72	3.74	1.70	0.42

Table 2 - Pure Translational and Rotational Loading Tests for Wider Fluke Anchor

Wider Fluke Anchor

Area of Fluke	0.072	ft2
Weight	0.072	lbs

Normal Load for Wider Fluke Anchor

Test ID	Test Date	Anchor	Embed Depth	Approximate Undrained Shear Strength, s_u	Force (Fmax)	Calculated N_p
With Rod		Configuration	(in)	(psf)	(lbs)	
2010.06.14_anchorC1_pullout1	6/14/2010	Normal	14	10.58	8.15	10.7
2010.06.14_anchorC1_pullout2	6/14/2010	Normal	12.5	10.58	8.23	10.8
2010.06.14_anchorC1_pullout3	6/14/2010	Normal	11	10.58	7.99	10.5
2010.06.14_anchorC1_pullout4	6/14/2010	Normal	12	10.58	8.02	10.5
2010.06.14_anchorC1_pullout5	6/14/2010	Normal	13	10.58	8.20	10.8
2010.06.14_anchorC1_pullout6	6/14/2010	Normal	11	10.93	8.20	10.4
2010.06.17_anchorC1_pullout1	6/17/2010	Normal	10	11.48	9.94	12.0
2010.06.17_anchorC1_pullout2	6/17/2010	Normal	13	11.45	9.34	11.3
2010.06.17_anchorC1_pullout3	6/17/2010	Normal	13	11.45	9.33	11.3

Shear for Wider Fluke Anchor

Test ID	Test Date	Anchor	Embed Depth	Approximate Undrained Shear Strength, s_u	Force (Fmax)	Calculated N_p
		Configuration	(in)	(psf)	(lbs)	
2011.02.03_IPS_7	2/3/2011	In-plane Shear	0.5 to 7	12.96	3.94	4.2
2011.02.03_IPS_8	2/3/2011	In-plane Shear	0.5 to 7	12.92	3.92	4.2
2011.02.03_IPS_9	2/3/2011	In-plane Shear	0.5 to 7	13.00	3.95	4.2
2011.02.03_IPS_4_wMag	2/3/2011	In-plane Shear with Magnetometer Sensor	0.5 to 7	12.95	4.06	4.4
2011.02.03_IPS_5_wMag	2/3/2011	In-plane Shear with Magnetometer Sensor	0.5 to 7	12.95	4.24	4.5
2011.02.03_IPS_6_wMag	2/3/2011	In-plane Shear with Magnetometer Sensor	0.5 to 7	12.95	4.27	4.6
2010.06.16_anchorC1_pureshearB_1	6/16/2010	Out-of-plane Shear	11	12.03	5.508	6.4
2010.06.16_anchorC1_pureshearB_2	6/16/2010	Out-of-plane Shear	11	12.03	5.208	6.0
2010.06.16_anchorC1_pureshearB_3	6/16/2010	Out-of-plane Shear	10	12.03	5.028	5.8
2010.06.16_anchorC1_pureshearB_4	6/16/2010	Out-of-plane Shear	12	12.03	5.098	5.9
2010.06.16_anchorC1_pureshearB_5	6/16/2010	Out-of-plane Shear	11	12.03	5.128	5.9

Table 2 - Pure Translational and Rotational Loading Tests for Wider Fluke Anchor

Rotation for Wider Fluke Anchor

Test ID	Test Date	Anchor Configuration	Embed Depth (in)	Approximated s_u (psf)	Average Moment (Mmax) (in-lbs)	Calculated N_m assume square
2010.06.11_anchorC1_pitching_1	6/11/2010	Pitch	10.5			Load cell was caught
2010.06.11_anchorC1_pitching_2	6/11/2010	Pitch	10.5	9.97	5.75	2.49
2010.06.11_anchorC1_pitching_3	6/11/2010	Pitch	10.5	9.97	5.49	2.38
2010.06.11_anchorC1_pitching_4	6/11/2010	Pitch	10.5	9.97	5.50	2.38
2010.06.11_anchorC1_pitching_5	6/11/2010	Pitch	10.5	9.97	5.48	2.37
2010.06.11_anchorC1_pitching_6	6/11/2010	Pitch	10.5	9.97	5.50	2.38
2010.06.11_anchorC1_rolling_1	6/11/2010	Rolling	10.5	10.86	6.57	2.61
2010.06.11_anchorC1_rolling_2	6/11/2010	Rolling	10.5	10.86	6.49	2.58
2010.06.11_anchorC1_rolling_3	6/11/2010	Rolling	10.5	10.86	6.45	2.56
2010.06.11_anchorC1_rolling_4	6/11/2010	Rolling	10.5	10.86	6.45	2.56
2010.06.11_anchorC1_rolling_5	6/11/2010	Rolling	10.5	10.86	6.49	2.58
2010.06.11_anchorC1_rolling_6	6/11/2010	Rolling	10.5	10.86	6.45	2.56
2010.06.10_anchorC1_yaw_1	6/11/2010	Yaw	10.5	9.67	4.35	1.94
2010.06.10_anchorC1_yaw_2	6/11/2010	Yaw	10.5	9.67	4.22	1.88
2010.06.10_anchorC1_yaw_3	6/11/2010	Yaw	10.5	9.67	4.38	1.95
2010.06.10_anchorC1_yaw_4	6/11/2010	Yaw	10.5	9.67	4.25	1.90
2010.06.10_anchorC1_yaw_5	6/11/2010	Yaw	10.5	9.67	4.38	1.95
2010.06.10_anchorC1_yaw_6	6/11/2010	Yaw	10.5	9.67	4.30	1.92

Table 3 - In-plane Drag Embedment Tests with Wider Fluke Anchor and Thick Anchor Line

Notes: 1. The Line Load at the Mudline is 80% of the Load Cell Reading to account for the load cell being vertical, after the pulley, instead of in line with the anchor line.

Test Name	Type of Test	Diameter of Anchor Line (in)	Initial Embedment (in)	Final Embedment (in)	Drag Distance (in)	Final Orientation	Load Cell Reading (Final Embedment) (lbs)	Line Load at Mudline (Final Embedment) (lbs)	Suo at Mudline (psf)	Undrained Shear Strength Gradient (psf/ft)	Su at Shank (Final Embedment) (psf)	Su at Fluke (Final Embedment) (psf)	Bearing Capacity Factor (Final Embedment)	Comment
06/24/2010_IP_Track 3_4	In-plane	0.09	0	9	43	flat	5.17	4.14	3.00	8.50	7.69	9.38	6.13	-
06/24/2010_IP_Track 3_5	In-plane	0.09	0	9	37.5	diving	5.02	4.02	3.00	8.50	7.69	9.38	5.95	-
06/30/2010_IP_Track 2_1	In-plane	0.09	0	9	44	flat	5.46	4.37	2.00	10.50	7.80	9.88	6.14	-
06/30/2010_IP_Track 2_2	In-plane	0.09	0	9	42	flat	4.06	3.25	2.00	10.50	7.80	9.88	4.57	-
06/30/2010_IP_Track 2_3	In-plane	0.09	0	10	41.5	flat	4.1	3.28	2.00	10.50	8.67	10.75	4.24	-
06/30/2010_IP_Track 2_4	In-plane	0.09	5	13	43	flat	5.2	4.16	2.00	10.50	11.30	13.38	4.32	-
07/12/2010_IP_Track 2_2	In-plane	0.09	0	9	45	flat	3.8	3.04	0.80	8.00	5.22	6.80	6.21	-
07/12/2010_IP_Track 2_3	In-plane	0.09	0	10	48	flat	4.52	3.62	0.80	8.00	5.88	7.47	6.73	-
07/12/2010_IP_Track 2_4	In-plane	0.09	0	10	46	flat	4.45	3.56	0.80	8.00	5.88	7.47	6.62	-
06/24/2010_IP_Track 2_3	In-plane	0.09	0	10	44	rolled	6.09	4.87	2.50	9.00	8.22	10.00	6.77	Magnetometer Sensor Attached to Anchor
07/22/2010_IP_Track 2_1	In-plane	0.09	0	8	41.4	flat	8.33	6.66	2.50	9.00	6.72	8.50	10.89	Magnetometer Sensor Attached to Anchor
07/22/2010_IP_Track 2_2	In-plane	0.09	0	8.5	41	flat	6.13	4.90	2.50	9.00	7.09	8.88	7.67	Magnetometer Sensor Attached to Anchor
07/22/2010_IP_Track 2_3	In-plane	0.09	0	9.5	43	flat	4.82	3.86	2.50	9.00	7.84	9.63	5.56	Magnetometer Sensor Attached to Anchor
07/22/2010_IP_Track 2_4	In-plane	0.09	0	10	43	flat	7.66	6.13	2.50	9.00	8.22	10.00	8.51	Magnetometer Sensor Attached to Anchor
07/22/2010_IP_Track 2_5	In-plane	0.09	0	8.5	44	flat	6.02	4.82	2.50	9.00	7.09	8.88	7.54	Magnetometer Sensor Attached to Anchor
07/12/2010_IP_Track 2_5	In-plane	0.09	0	9.5	43	flat	3.81	3.05	0.80	8.00	5.55	7.13	5.93	Stopped to measure trajectory
06/24/2010_IP_Track 3_6	In-plane	0.09	0	10	37	flat	3.51	2.81	3.00	8.50	8.40	10.08	3.87	Stopped to measure trajectory
06/30/2010_IP_Track 2_5	In-plane	0.09	0	9	44	flat	3.33	2.66	2.00	10.50	7.80	9.88	3.75	Stopped to measure trajectory
06/24/2010_IP_Track 2_1	In-plane	0.09	0	unknown	35-40	rolled	5.04	4.03	2.50	9.00	-	-	-	Magnetometer Sensor Attached to Anchor
06/24/2010_IP_Track 2_2	In-plane	0.09	0	0	44	flat-at mudline	1.21	0.97	2.50	9.00	0.72	2.5	-	Sensor Attached to Anchor
07/12/2010_IP_Track 2_1	In-plane	0.09	0	9	46	flat	-	-	0.80	8.00	5.22	6.8	-	Load Cell wire was caught

Table 4 - In-plane Drag Embedment Tests with Wider Fluke Anchor and Thin Anchor Line

Notes: 1. The Line Load at the Mudline is 80% of the Load Cell Reading to account for the load cell being vertical, after the pulley, instead of in line with the anchor line.

Test	Type of Test	Diameter of Anchor Line (in)	Initial Embedment (in)	Final Embedment (in)	Drag Distance (in)	Final Orientation	Load Cell Reading (Final Embedment) (lbs)	Line Load at Mudline (Final Embedment) (lbs)	Suo at Mudline (psf)	Undrained Shear Strength Gradient (psf/ft)	Su at Shank (Final Embedment) (psf)	Su at Fluke (Final Embedment) (psf)	Bearing Capacity Factor (Final Embedment)	Comment
07/12/2010_IP_Track 3_1	In-plane	0.022	0	13	45	flat	4.26	3.83	0.80	8.00	7.88	9.5	6.25	-
07/12/2010_IP_Track 3_2	In-plane	0.022	0	13	51	flat	4.74	4.27	0.80	8.00	7.88	9.5	6.95	-
07/12/2010_IP_Track 3_3	In-plane	0.022	0	13	50	flat	4.33	3.90	0.80	8.00	7.88	9.5	6.35	-
07/12/2010_IP_Track 3_4	In-plane	0.022	0	13	51	flat	4.61	4.15	0.80	8.00	7.88	9.5	6.76	-

Table 5 - In-plane Drag Embedment Tests with Steep Anchor Line Angle

Notes: 1. The Line Load at the Mudline is 80% of the Load Cell Reading to account for the load cell being vertical, after the pulley, instead of in line with the anchor line.

Test Name	Type of Test	Diameter of Anchor Line (in)	Initial Embedment (in)	Final Embedment (in)	Drag Distance (in)	Final Orientation	Load Cell Reading (Final Embedment) (lbs)	Line Load at Mudline (Final Embedment) (lbs)	Suo at Mudline (psf)	Undrained Shear Strength Gradient (psf/ft)	Su at Shank (Final Embedment) (psf)	Su at Fluke (Final Embedment) (psf)	Bearing Capacity Factor (Final Embedment)	Comment
10/20/2010_IP_Track3_1	In-plane	0.09	0	3.5	33	Pitched up	4.58	3.66	0.8	10	1.74	3.7	8.19	Embedments Noted, Max Load was measured at 6.5 in of embedment, Bearing capacity factor was calculated at that max load
10/20/2010_IP_Track3_2	In-plane	0.09	0	6	24	Slightly pitched pitched	3.38	2.70	0.8	10	3.82	5.8	6.48	
10/20/2010_IP_Track3_3	In-plane	0.09	0	7.5	23	Slightly pitched pitched	-	-	0.8	10	5.07	7.1	-	Load Cell got Caught
10/20/2010_IP_Track3_4	In-plane	0.09	0	6	23	Flat	3.38	2.70	0.8	10	3.82	5.8	6.48	

Table 6 - In-plane Drag Embedment Tests with Magnetometer

Notes: 1. The Line Load at the Mudline is 80% of the Load Cell Reading to account for the load cell being vertical, after the pulley, instead of in line with the anchor line.

Test	Type of Test	Diameter of Anchor Line (in)	Initial Embedment (in)	Max Embedment (in)	Drag Distance at Max Embedment (in)	Final Orientation	Load Cell Reading (Maximum Embedment) (lbs)	Line Load at Mudline (Maximum Embedment) (lbs)	Suo at Mudline (psf)	Undrained Shear Strength Gradient (psf/ft)	Su at Shank (Maximum Embedment) (psf)	Su at Fluke (Maximuml Embedment) (psf)	Bearing Capacity Factor (Maximum Embedment)	Comment
08/2/2010_IP_Black Tub_1	In-plane	0.022	0	4.77	19.02	Rolled 10° at max dive, pulled out	8.43	6.74	-	-	-	-	-	Used Magnetometer to track trajectory
08/2/2010_IP_Black Tub_2	In-plane	0.022	0	4.57	22.2	rolling ~10° right	7.12	5.70	-	-	-	-	-	Used Magnetometer to track trajectory
08/2/2010_IP_Black Tub_4	In-plane	0.022	0	4.03	17.86	rolling ~15° right	7.4	5.92	-	-	-	-	-	Used Magnetometer to track trajectory
08/2/2010_IP_Black Tub_5	In-plane	0.022	0	4.06	18.32	rolling ~15° right	6.52	5.22	-	-	-	-	-	Used Magnetometer to track trajectory
08/9/2010_IP_Black Tub_1	In-plane	0.022	1.46	5.41	22.45	Slightly rolling, 1.5°	8.01	6.41	-	-	-	-	-	Used Magnetometer to track trajectory
08/9/2010_IP_Black Tub_2	In-plane	0.022	4.83	6.5	15.31	Rolling to Right, -11°	8.09	6.47	-	-	-	-	-	Used Magnetometer to track trajectory
10/20/2010_IP_Black Tub_1	In-plane	0.09	1.39	5.97	21.5	Rolling -16°, Pitch -6°	15.27	12.22	25.50	0.00	25.50	25.50	6.65	
10/20/2010_IP_Black Tub_2	In-plane	0.09	1.39	5.35	20.9	Rolling -13, Pitch -12°	14.28	11.42	25.50	0.00	25.50	25.50	6.22	Used Magnetometer to track trajectory
10/20/2010_IP_Black Tub_3	In-plane	0.09	1.44	5.6	20.71	Rolling -13, Pitch -12°	14.14	11.31	25.50	0.00	25.50	25.50	6.16	Used Magnetometer to track trajectory

Table 7 - In-plane Drag Embedment Tests with Original Anchor and Thick Anchor Line

Notes: 1. The Line Load at the Mudline is 80% of the Load Cell Reading to account for the load cell being vertical, after the pulley, instead of in line with the anchor line.

Test	Type of Test	Diameter of Anchor Line (in)	Initial Embedment (in)	Max Embedment (in)	Drag Distance at Max Embedment (in)	Final Orientation	Load Cell Reading (Final Embedment) (lbs)	Line Load at Mudline (Final Embedment) (lbs)	Suo at Mudline (psf)	Undrained Shear Strength Gradient (psf/ft)	Su at Shank (Final Embedment) (psf)	Su at Fluke (Final Embedment) (psf)	Bearing Capacity Factor (Final Embedment)	Comment
2010.1.19_drag_1	In-plane	0.09	4.5	11	43	Flat	2.58	2.06	2.00	9.00	8.47	10.25	3.22	-
2010.1.19_drag_3	In-plane	0.09	4.5	13	42	Flat	3.9	3.12	2.00	9.00	9.97	11.75	4.25	-
2010.1.29_drag_3	In-plane	0.09	0	12.5	43	Flat	2.96	2.37	2.00	9.00	9.59	11.38	3.33	-
2010.1.29_drag_5	In-plane	0.09	0	10	42	Flat	4.45	3.56	2.00	9.00	7.72	9.50	6.00	-
2010.1.29_drag_7	In-plane	0.09	0	10	41	Flat	2.57	2.06	2.00	9.00	7.72	9.50	3.46	-
2010.1.29_drag_8	In-plane	0.09	0	11.5	43	Flat	3.14	2.51	2.00	9.00	8.84	10.63	3.78	-
2010.02.01_drag_1	In-plane	0.09	0	11	49	Flat	2.99	2.39	1.75	7.25	6.96	8.40	4.56	-
2010.02.01_drag_2	In-plane	0.09	0	11	49	Flat	2.91	2.33	1.75	7.25	6.96	8.40	4.44	-
2010.02.01_drag_4	In-plane	0.09	0	9	43	Flat	2.22	1.78	1.75	7.25	5.75	7.19	3.95	-
2010.02.08_drag_4	In-plane	0.09	0	8	44	Flat	2.22	1.78	1.75	7.25	5.15	6.58	4.32	-
2010.02.08_drag_5	In-plane	0.09	0	8	42	Flat	1.85	1.48	1.75	7.25	5.15	6.58	3.60	-
2010.02.08_drag_6	In-plane	0.09	0	10	45	Flat	3.38	2.70	1.75	7.25	6.36	7.79	5.55	-
2010.02.08_drag_8	In-plane	0.09	0	10	46	Flat	2.61	2.09	1.75	7.25	6.36	7.79	4.29	-
2010.02.08_drag_10	In-plane	0.09	0	9	46	Flat	1.84	1.47	1.75	7.25	5.75	7.19	3.28	-
2010.02.01_drag_5	In-plane	0.09	0	4	45	Rolled	2.39	1.91	1.75	7.25	2.73	4.17	7.34	-
2010.02.01_drag_6	In-plane	0.09	0	6	42	Rolled	1.8	1.44	1.75	7.25	3.94	5.38	4.29	-
2010.02.01_drag_7	In-plane	0.09	0	8	45	Rolled slightly	2.14	1.71	1.75	7.25	5.15	6.58	4.16	-
2010.02.08_drag_7	In-plane	0.09	0	6	46	Rolled	3.13	2.50	1.75	7.25	3.94	5.38	7.45	-
2010.1.29_drag_1	In-plane	0.09	0	N/A	42	Rolled	1.6	1.28	2.00	9.00	-	-	-	-
2010.1.29_drag_2	In-plane	0.09	0	N/A	43	Flat	2.7	2.16	2.00	9.00	-	-	-	-
2010.1.29_drag_4	In-plane	0.09	0	N/A	44	Flat	2.2	1.76	2.00	9.00	-	-	-	-
2010.1.29_drag_6	In-plane	0.09	0	N/A	42	Rolled completely	1.51	1.21	2.00	9.00	-	-	-	-
2010.02.08_drag_1	In-plane	0.09	0	N/A	42	Rolled completely	2.21	1.77	1.75	7.25	-	-	-	-
2010.02.08_drag_9	In-plane	0.09	0	N/A	44	Rolled completely	2.34	1.87	1.75	7.25	-	-	-	-
2010.02.08_drag_9a	In-plane	0.09	0	N/A	45	Rolled completely	N/A	N/A	1.75	7.25	-	-	-	-
2010.02.08_drag_9b	In-plane	0.09	0	10	46	Flat	N/A	N/A	1.75	7.25	6.36	7.79	-	-
2010.02.08_drag_2	In-plane	0.09	0	9	43	Flat	N/A	-	1.75	7.25	5.75	7.19	-	Problem with Load Cell
2010.02.08_drag_3	In-plane	0.09	0	11	42	Flat	N/A	-	1.75	7.25	6.96	8.40	-	Problem with Load Cell

Table 8 - Out-of-plane Tests with Wider Fluke Anchor: In-plane test run from 0 in. embedment to maximum embedment, then the loading direction was changed to 15° or 25° out of plane

Notes:
1. Anchor Line direction changed from approximately 14° at the end of in-plane to 12° at the beginning of the out of plane, causing the anchor to dive.
2. The Line Load at the Mudline is 80% of the Load Cell Reading to account for the load cell being vertical, after the pulley, instead of in line with the anchor line.

Test Name	Type of Test	Diameter of Anchor Line (in)	Initial Embedment (in)	Final Embedment (in)	Drag Distance (in)	Setup Time (min)	Final Orientation	Load Cell Reading (Final Embedment) (lbs)	Line Load at Mudline (Final Embedment) (lbs)	Suo at Mudline (psf)	Undrained Shear Strength Gradient (psf/ft)	Su at Shank (Final Embedment) (psf)	Su at Fluke (Final Embedment) (psf)	Bearing Capacity Factor (Final Embedment) (psf)	Comment
08/31/2010_IP_1	In-plane	0.09	0	8.5	9.0208333	< 2	diving	4.87	3.90	2.00	10.00	7.10	9.08	5.96	Pulled in-plane to expected maximum embedment
08/31/2010_OOP_1	Out-of-plane, 25°	0.09	8.5	10	10.75	7.0	flat	7.87	6.30	0.50	17.50	11.62	15.08	5.80	Pulled Out of Plane ~25° from in-plane embedment
08/31/2010_IP_2	In-plane	0.09	0	8.5	9.4375	< 2	diving	5.08	4.06	2.00	10.00	7.10	9.08	6.21	Pulled in-plane to expected maximum embedment
08/31/2010_OOP_2	Out-of-plane, 25°	0.09	8.5	9.5	10.3125	9.2	rolled to right	7.19	5.75	0.50	17.50	10.89	14.35	5.57	Pulled Out of Plane ~25° from in-plane embedment
08/31/2010_IP_3	In-plane	0.09	0	9	9.88	< 2	diving	4.66	3.73	2.00	10.00	7.52	9.50	5.45	Pulled in-plane to expected maximum embedment
08/31/2010_OOP_3	Out-of-plane, 25°	0.09	9	9.5	28.0	18.2	rolled to right	8.77	7.02	0.50	17.50	10.89	14.35	6.79	Pulled Out of Plane ~25° from in-plane embedment
08/10/2010_IP_4	In-plane	0.09	0	8	28	< 2	slightly diving	5.25	4.20	2.00	9.50	6.45	8.33	7.00	Pulled in-plane to expected maximum embedment
08/10/2010_OOP_4	Out-of-plane, 15°	0.09	8	8.5	16.6	5.4	rolled to right	6.15	4.92	0.50	17.50	9.43	12.90	5.30	Pulled Out of Plane ~15° from in-plane embedment
08/10/2010_IP_3	In-plane	0.09	0	9	25	< 2	slightly diving	4.18	3.34	2.00	9.50	7.24	9.13	5.09	Pulled in-plane to expected maximum embedment
08/10/2010_OOP_3	Out-of-plane, 15°	0.09	9	-	30.0	5.9	pulled out	6.05	4.84	0.50	17.50	-	-	-	Pulled Out of Plane ~15° from in-plane embedment
08/10/2010_IP_1	In-plane	0.09	0	8	22	< 2	slightly diving	4.71	3.77	2.00	9.50	6.45	8.33	6.28	Pulled in-plane to expected maximum embedment
08/10/2010_OOP_1	Out-of-plane, 25°	0.09	8	7	27.6	4.1	rolled to right	6	4.80	0.50	17.50	7.24	10.71	6.23	Anchor line slipped off pulley
08/10/2010_IP_2	In-plane	0.09	0	9.5	23	< 2	slightly diving	4.95	3.96	2.00	9.50	7.64	9.52	5.78	Pulled in-plane to expected maximum embedment
08/10/2010_OOP_2	Out-of-plane, 25°	0.09	9.5	8	27.6	7.6	flat	8.85	7.08	0.50	17.50	8.70	12.17	8.08	Anchor line slipped off pulley

Table 9 - Out-of-plane Tests with Wider Fluke Anchor : In-plane test run from 0 in. embedment to one-fluke length of embedment, then the loading direction was changed to 25 ° out of plane

Notes:
1. Anchor Line direction changed from approximately 10° at the end of in-plane to 9° at the beginning of the out of plane.
2. The Line Load at the Mudline is 80% of the Load Cell Reading to account for the load cell being vertical, after the pulley, instead of in line with the anchor line.

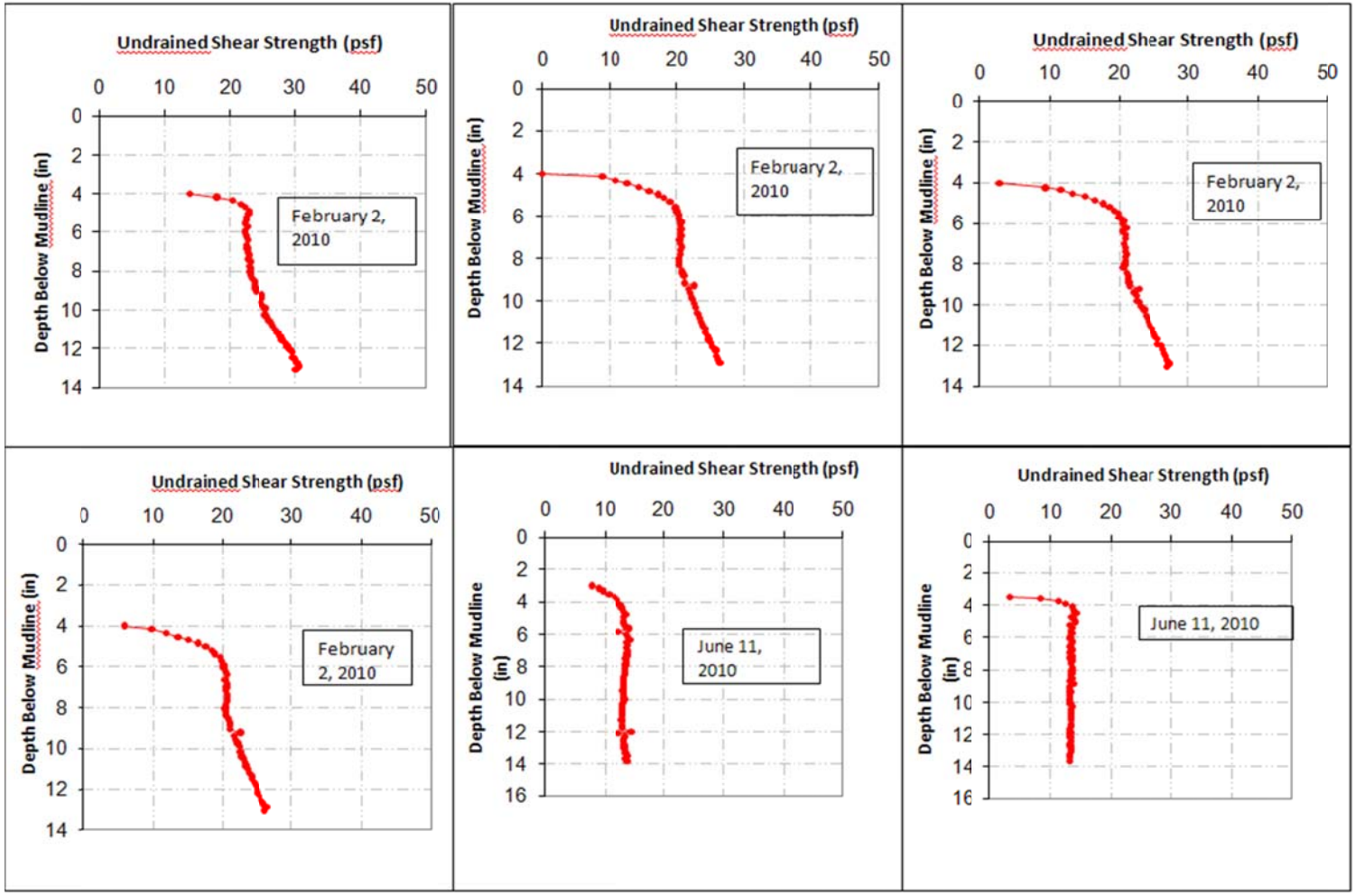
Test Name	Type of Test	Diameter of Anchor Line (in)	Initial Embedment (in)	Final Embedment (in)	Drag Distance (in)	Setup Time (min)	Final Orientation	Load Cell Reading (Final Embedment) (lbs)	Line Load at Mudline (Final Embedment) (lbs)	Suo at Mudline (psf)	Undrained Shear Strength Gradient (psf/ft)	Su at Shank (Final Embedment) (psf)	Su at Fluke (Final Embedment) (psf)	Bearing Capacity Factor (Final Embedment) (psf)	Comment
09/3/2010_IP_1	In-plane	0.09	1	5.5	9	< 2	diving	2.14	1.71	2.00	10.00	4.60	6.58	3.61	Measure trajectory, Pulled in-plane to one fluke length embedment
09/3/2010_OOP_1	Out-of-plane, 25°	0.09	5.5	10.5	30.5	8.7	slightly diving, rolling	6.98	5.58	0.50	12.50	8.96	11.44	6.78	Pulled Out of Plane ~25° from in-plane embedment
09/3/2010_IP_2	In-plane	0.09	1.5	6.5	11	< 2	diving	3.91	3.13	2.00	10.00	5.44	7.42	5.86	Pulled in-plane to one fluke length embedment
09/3/2010_OOP_2	Out-of-plane, 25°	0.09	6.5	11.5	29.0	8.2	Unknown	8.09	6.47	0.50	15.50	12.29	15.35	5.85	Pulled Out of Plane ~25° from in-plane embedment
09/3/2010_IP_3	In-plane	0.09	1	5	10	< 2	diving	2.63	2.10	2.00	10.00	4.19	6.17	4.74	Measure trajectory, Pulled in-plane to one fluke length embedment
09/3/2010_OOP_3	Out-of-plane, 25°	0.09	5	10.5	32.6	5.8	Unknown	6.45	5.16	0.50	15.50	10.99	14.06	5.10	Measured Trajectory, Pulled Out of Plane ~25° from in-plane embedment

Table 10 - Out-of-plane Drag Embedment Tests in with Wider Fluke Anchor and Magnetometer: tests were conducted by embedding the anchor at the expected in-plane orientation at maximum embedment and with an out-of-plane angle of 30, 60, or 90 °

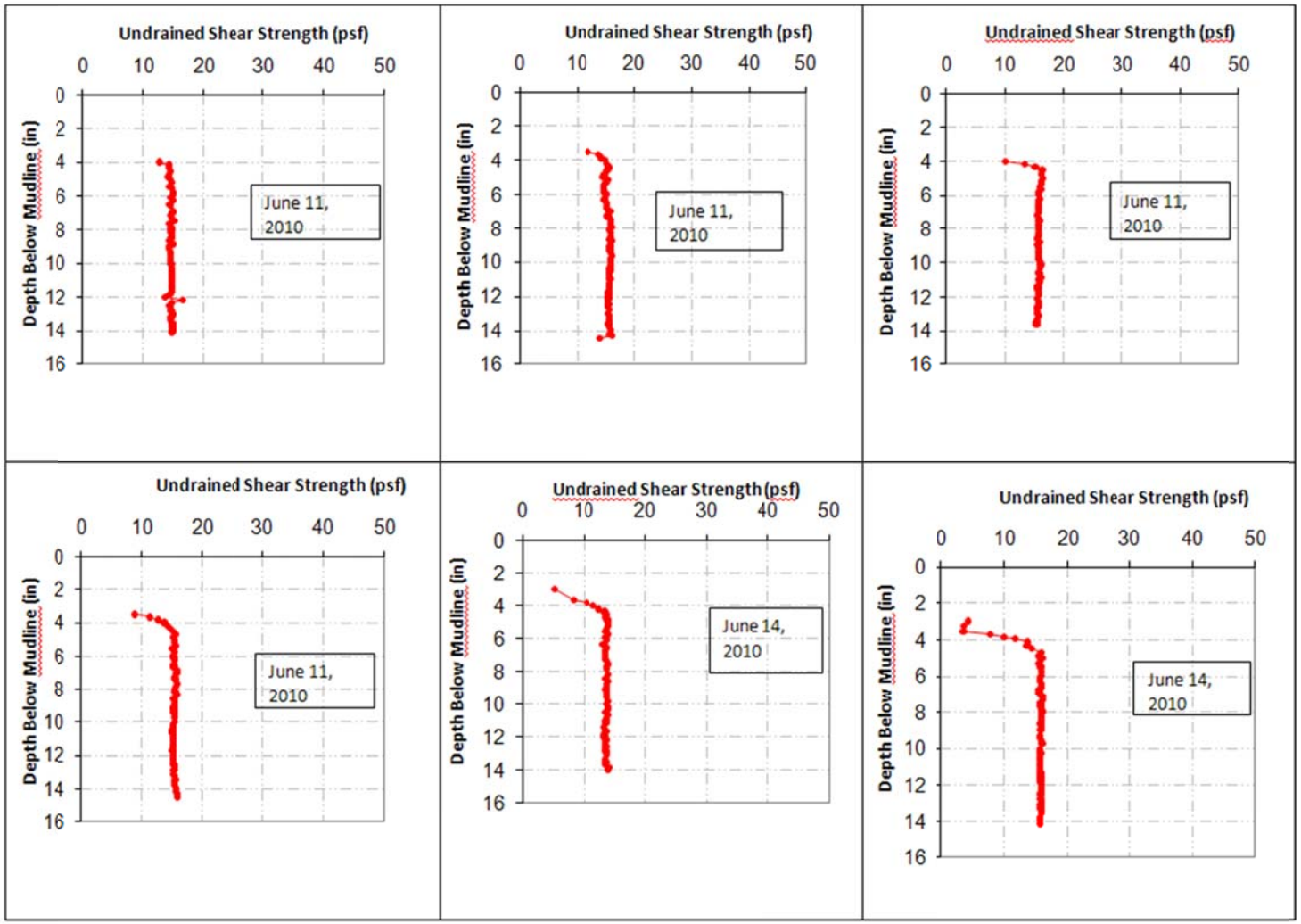
Test Name	Type of Test	Diameter of Anchor Line (in)	Initial Embedment (in)	Max Embedment (in)	Drag Distance at Max Embedment (in)	Setup Time (min)	Final Orientation (roll)	Load Cell Reading (Maximum Embedment) (lbs)	Line Load at Mudline (Maximum Embedment) (lbs)	Suo at Mudline (psf)	Undrained Shear Strength Gradient (psf/ft)	Su at Shank (Maximum Embedment) (psf)	Su at Fluke (Maximuml Embedment) (psf)	Bearing Capacity Factor (Maximum Embedment)	Comment
08/9/2010_OOP_Black Tub_3	Out-of-plane, 35°	0.022	4.59	6.31	18.3	< 2	-0.6	8.64	9.07	-	-	-	-	-	Oriented by hand at 30° Out of Plane
08/9/2010_OOP_Black Tub_4	Out-of-plane	0.022	4.67	5.69	14.8	< 2	-6.06	8.44	8.86	-	-	-	-	-	Oriented by hand at 60° Out of Plane
08/9/2010_OOP_Black Tub_5	Out-of-plane	0.022	4.66	5.4	13.56	< 2	19.7	9.7	10.19	-	-	-	-	-	Oriented by hand at 90° Out of Plane

Pure Translational and Rotational Loading Results

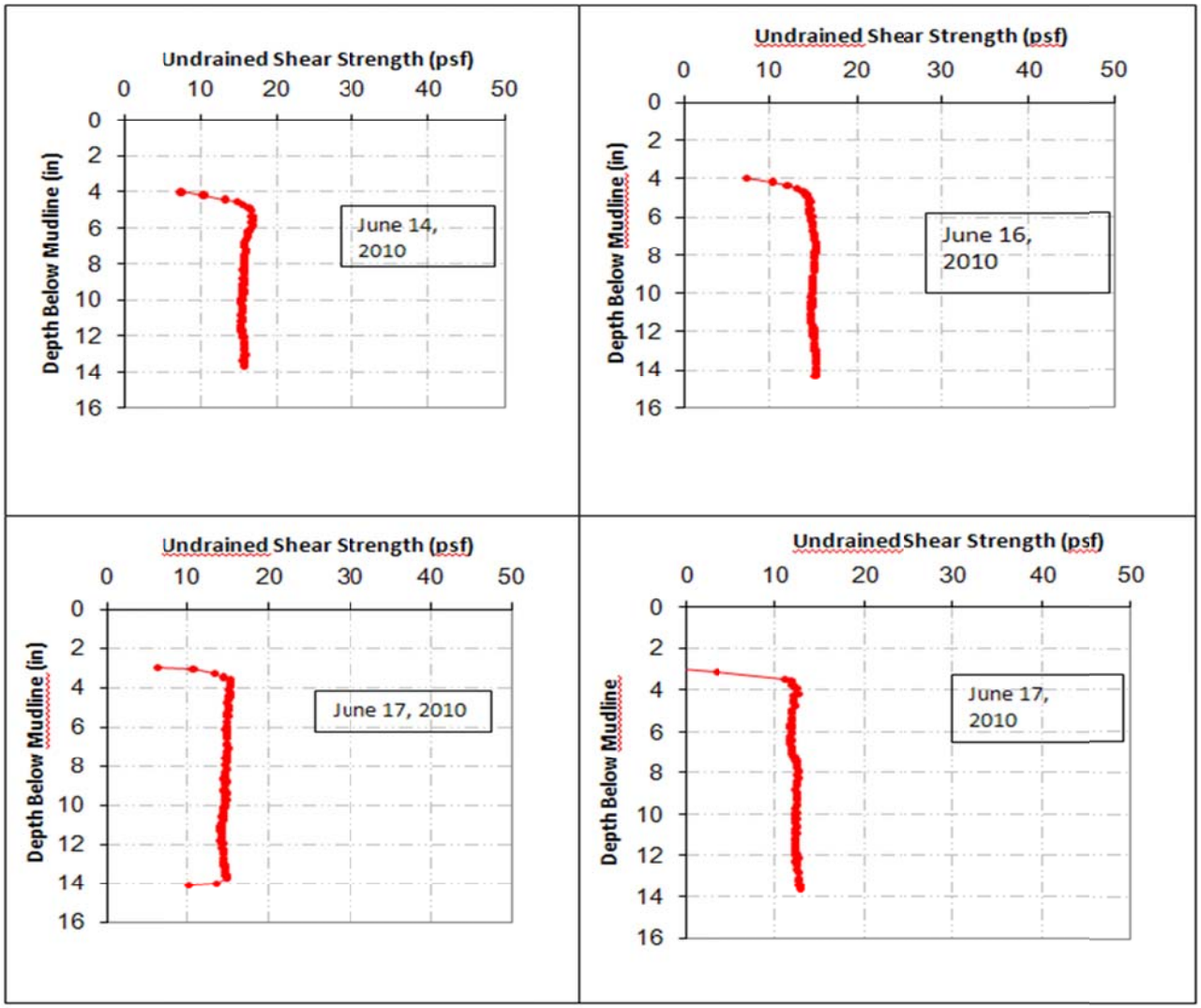
Undrained Shear Strength Profiles for Pure Translational and Rotational Loading Tests



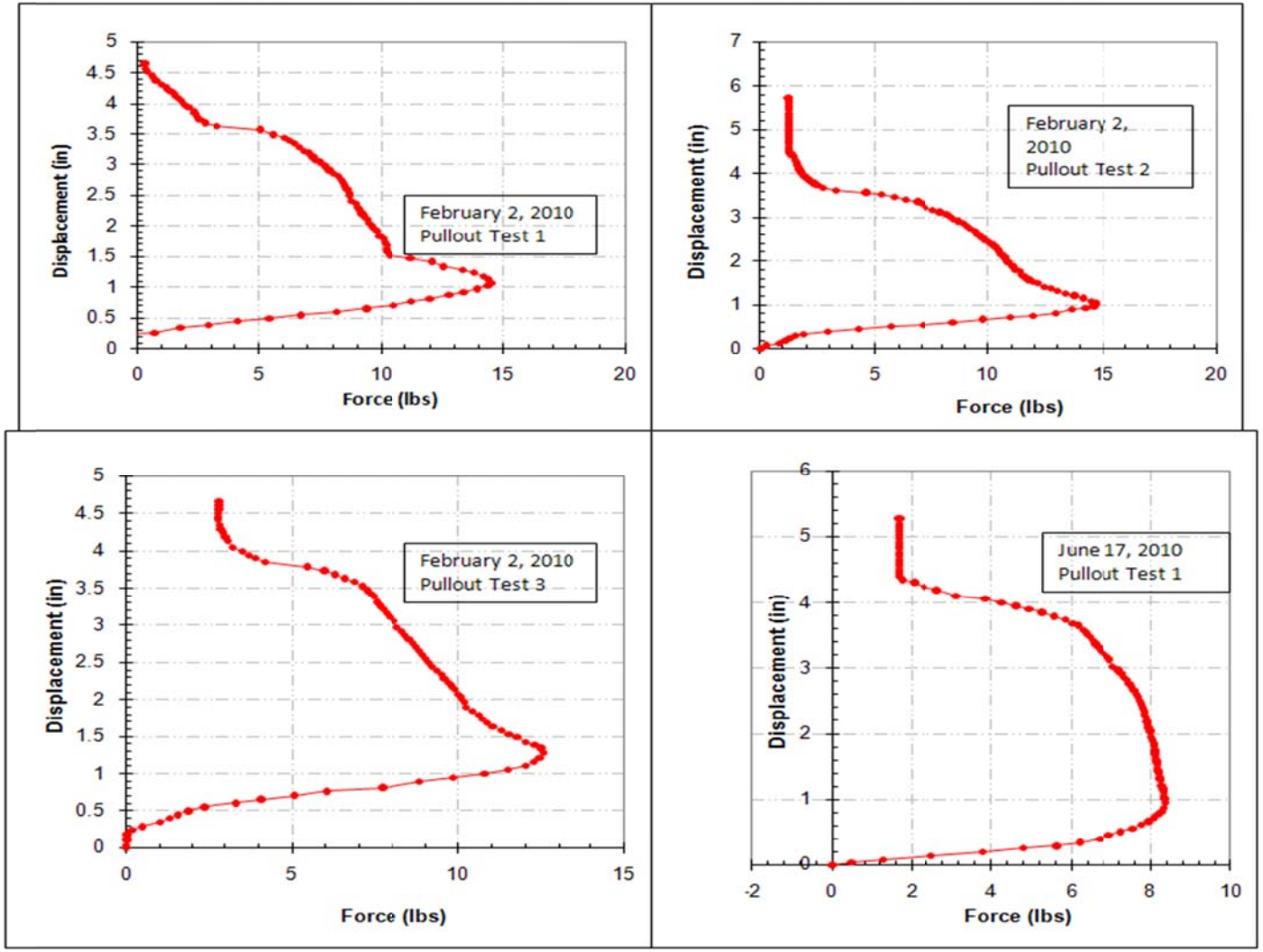
Undrained Shear Strength Profiles for Pure Translational and Rotational Loading Tests (con't)



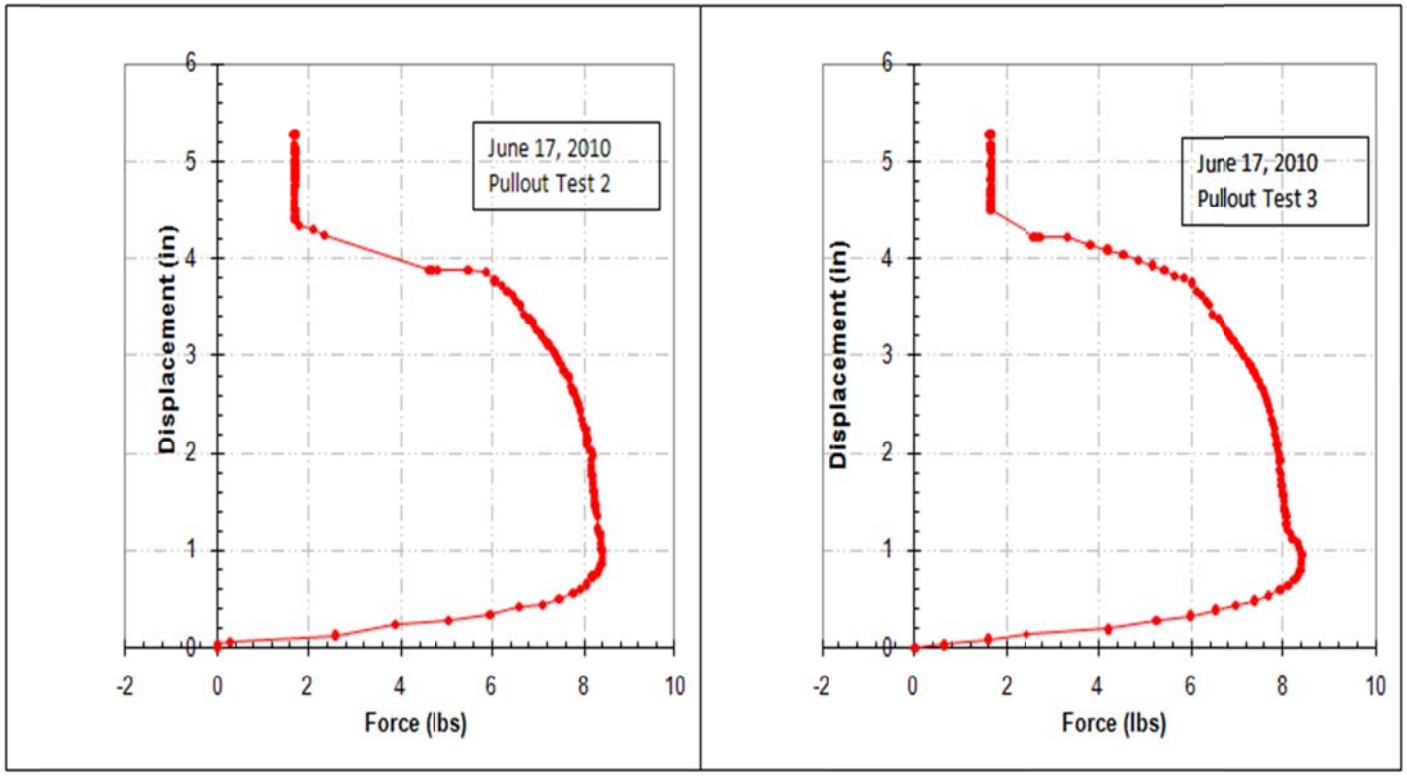
Undrained Shear Strength Profiles for Pure Translational and Rotational Loading Tests (con't)



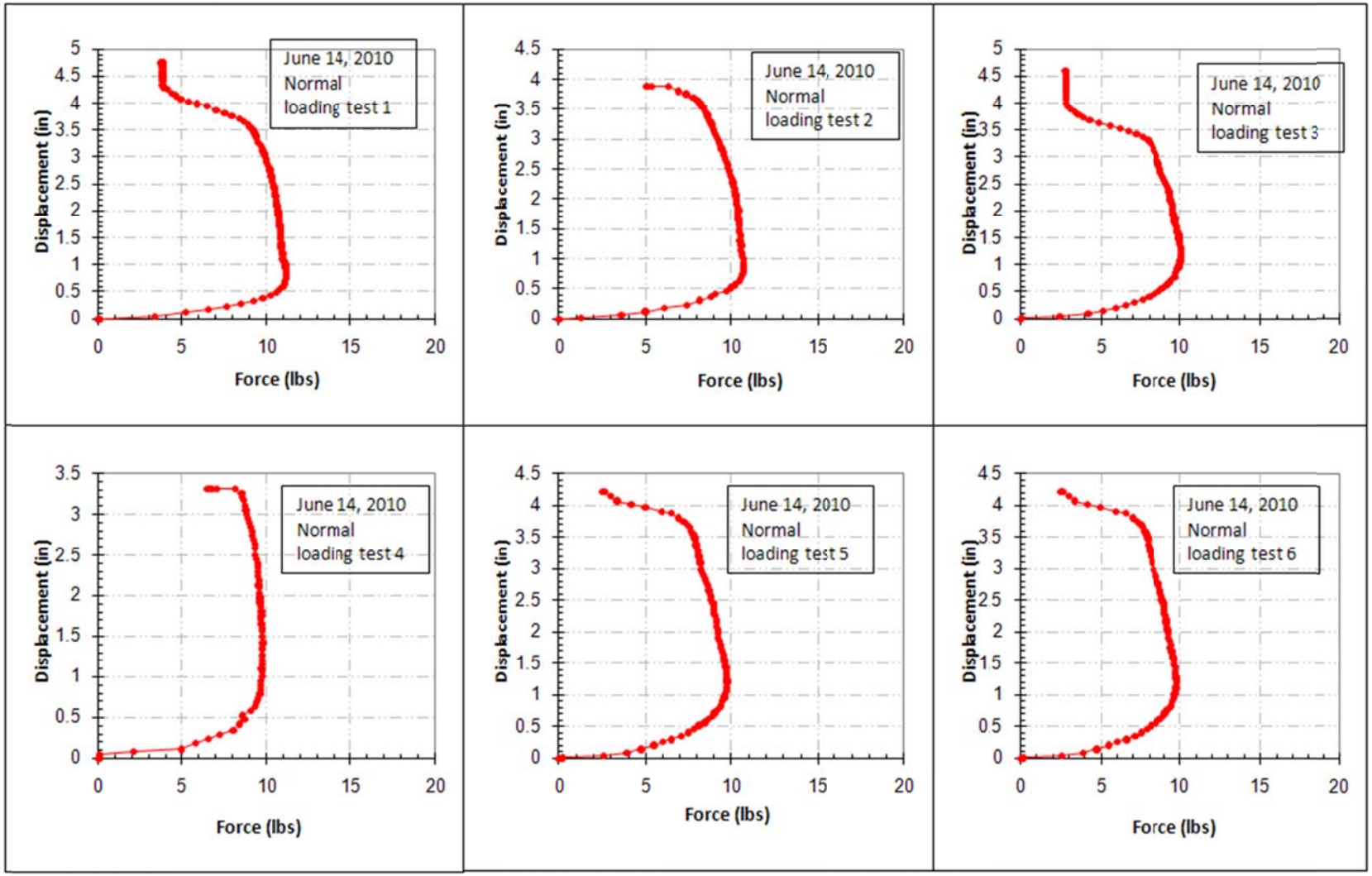
Normal Loading Tests: Original Anchor



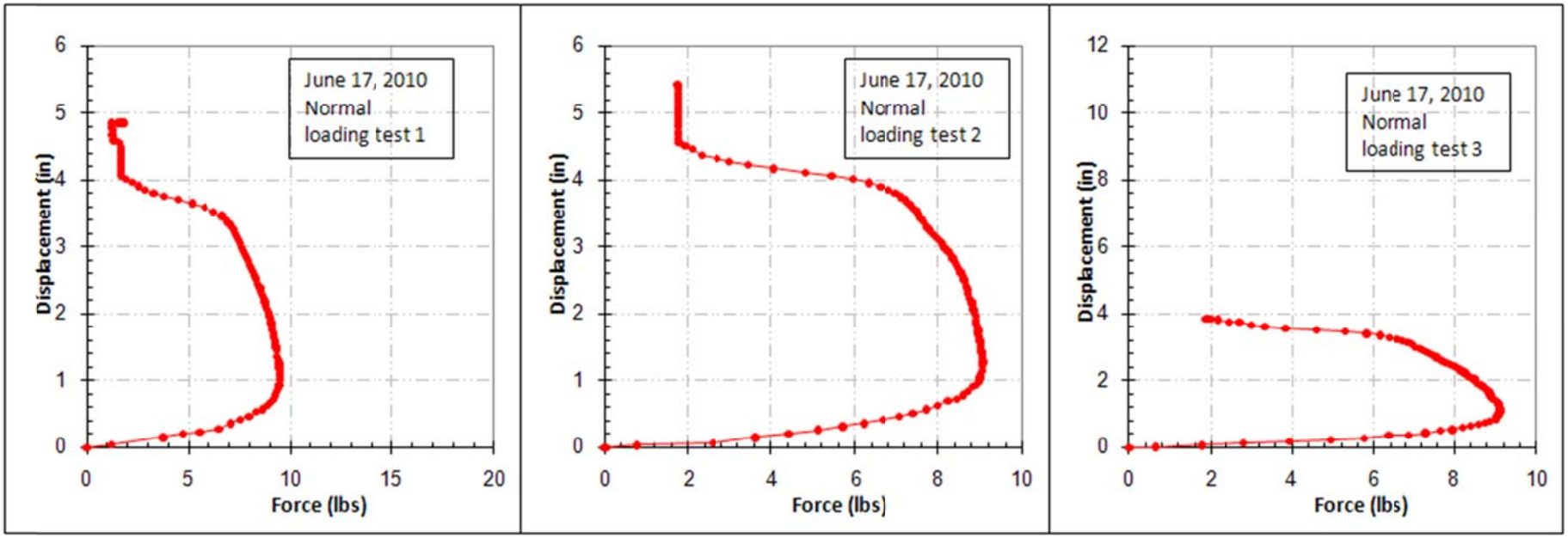
Normal Loading Tests: Original Anchor (con't)



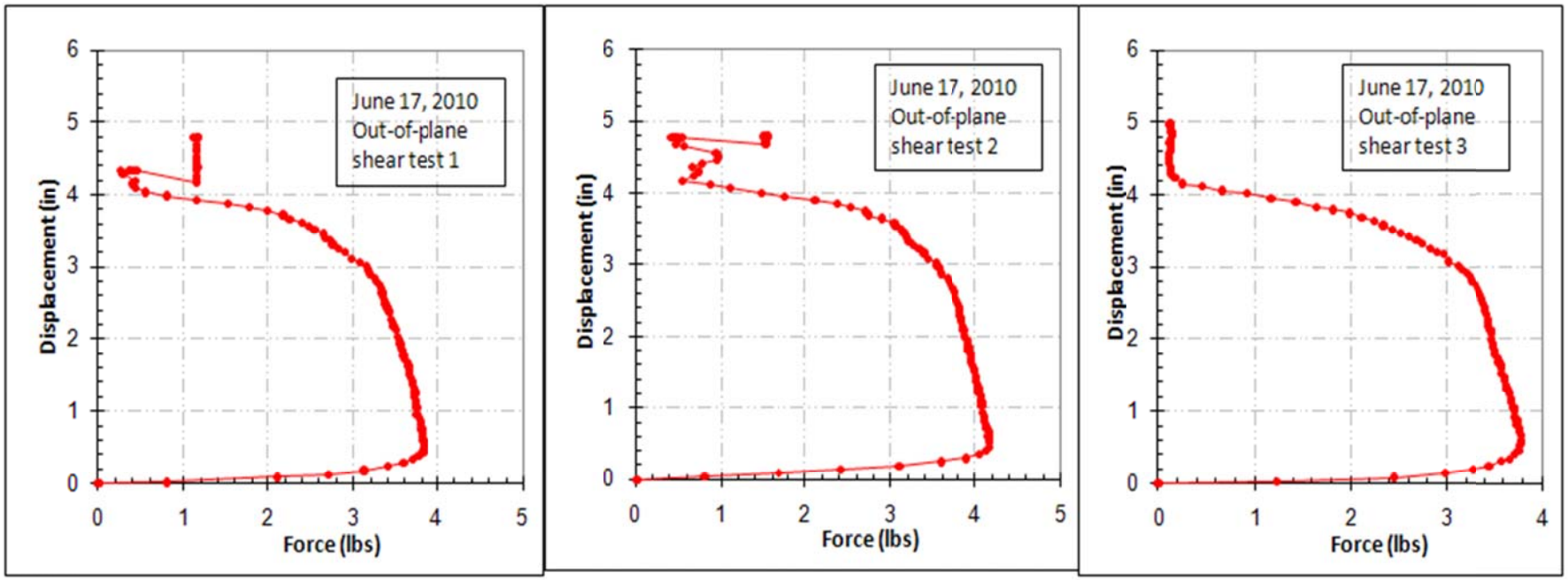
Normal loading tests: Wider Fluke Anchor



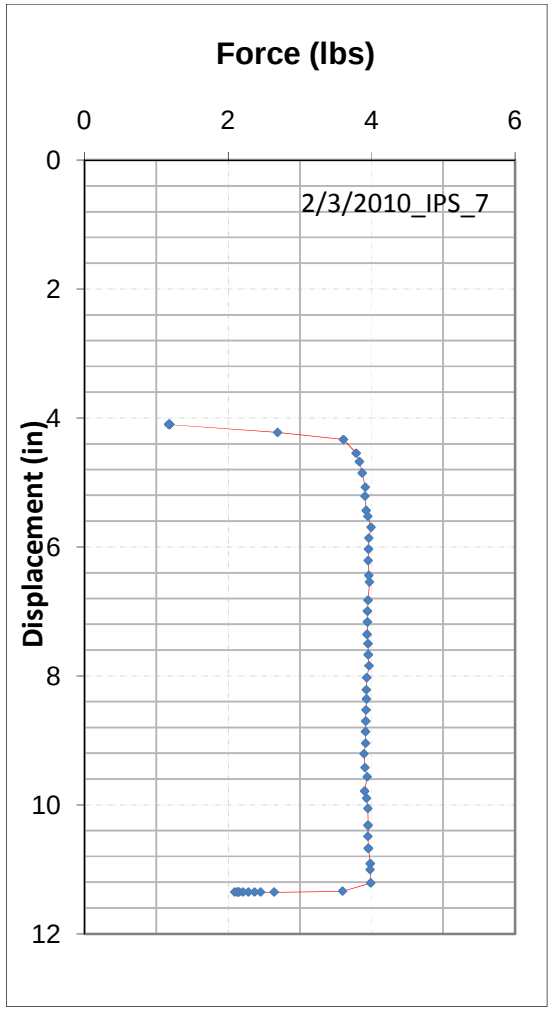
Normal loading tests: Wider Fluke Anchor (con't)

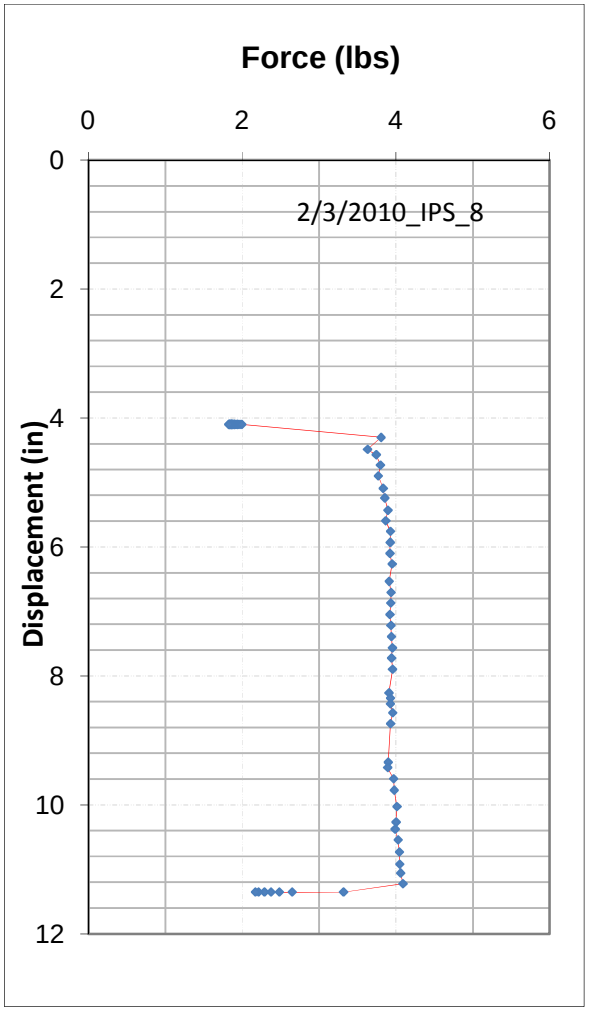


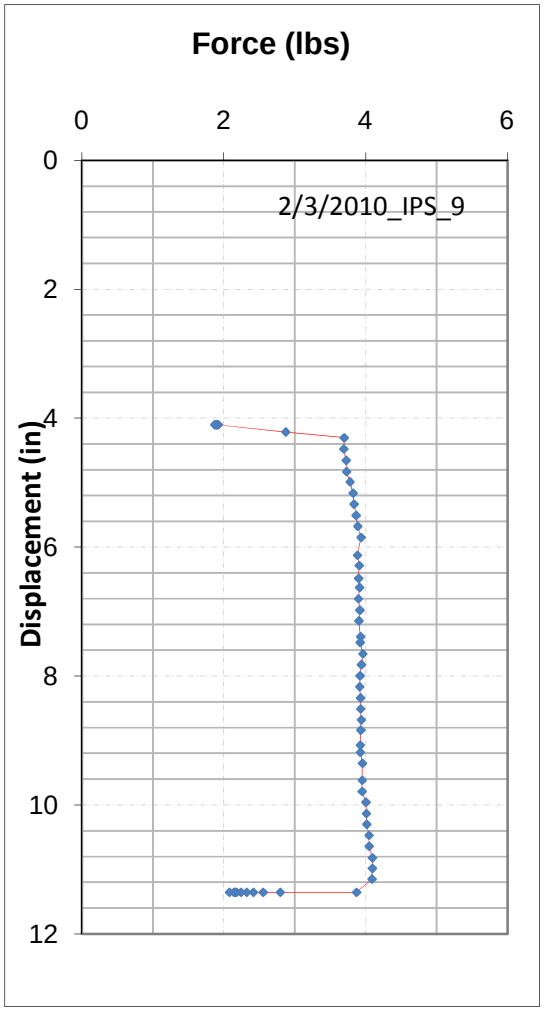
Out-of-plane shear tests: Original Anchor



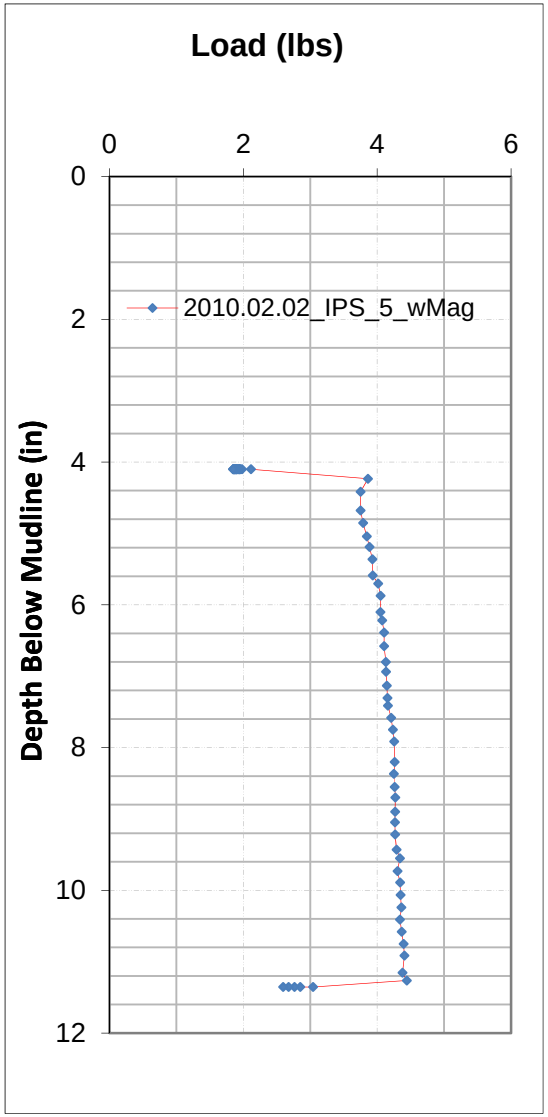
In-plane shear tests: Wider Fluke Anchor

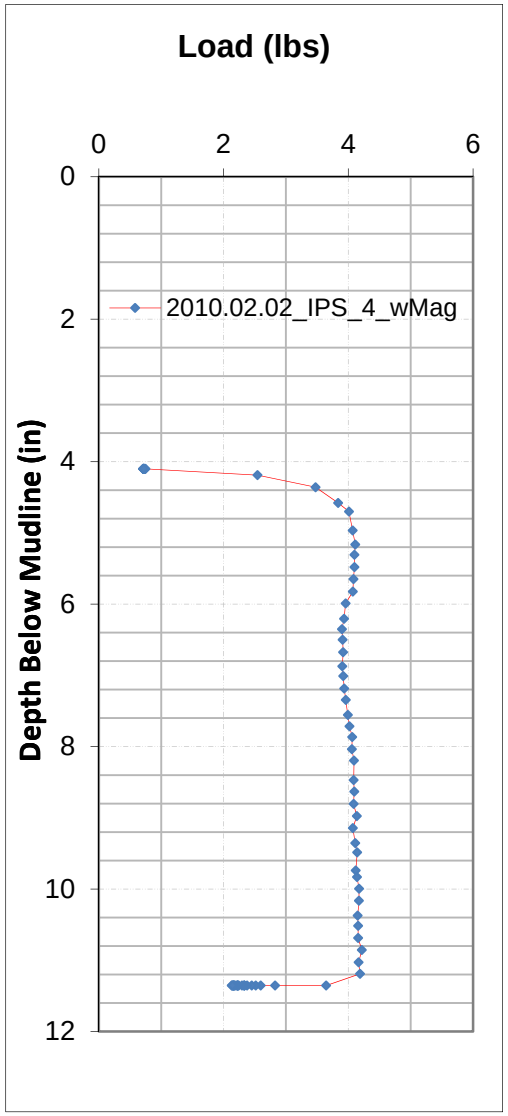


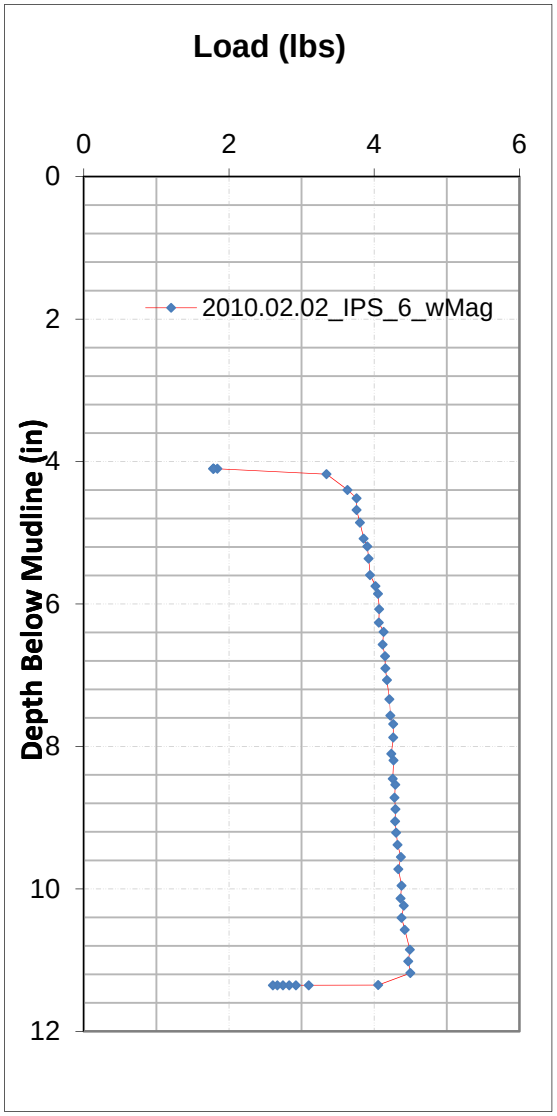




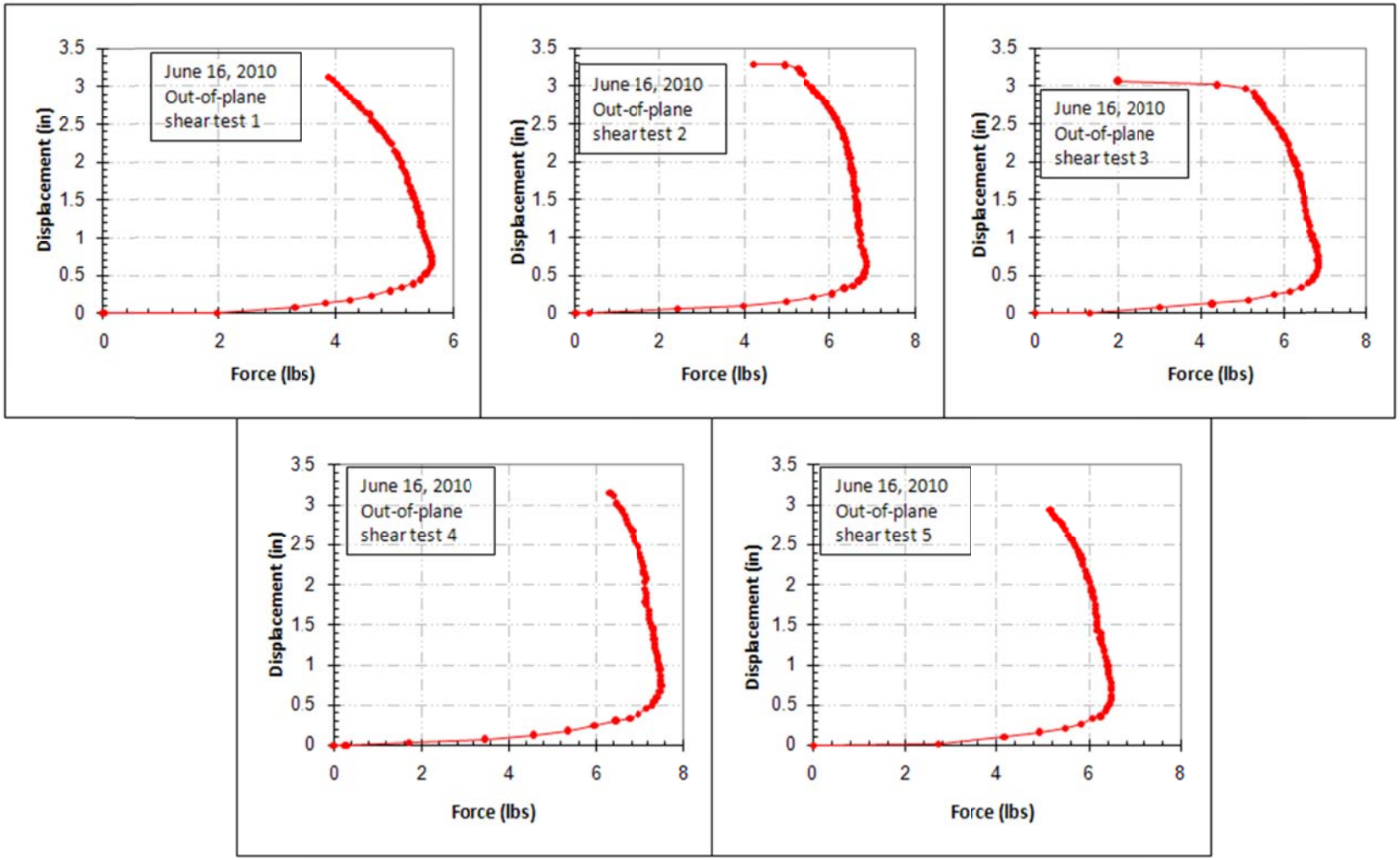
In-plane shear tests: Wider Fluke Anchor with Magnetometer Attached



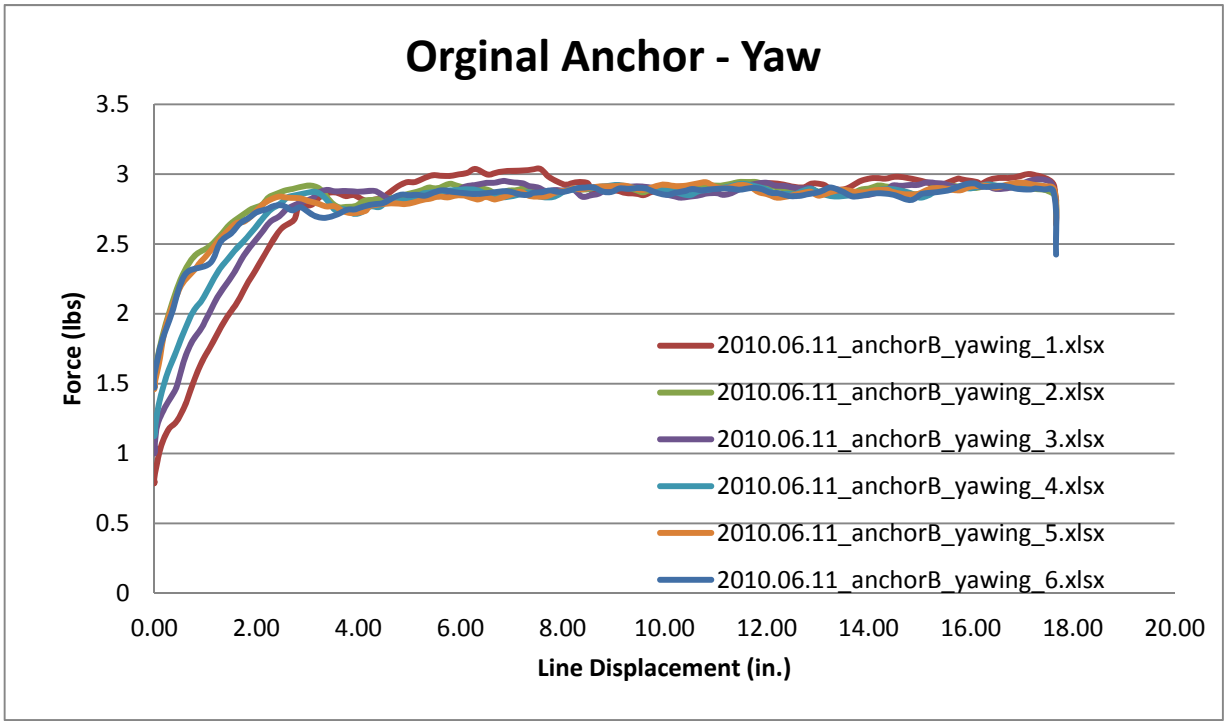


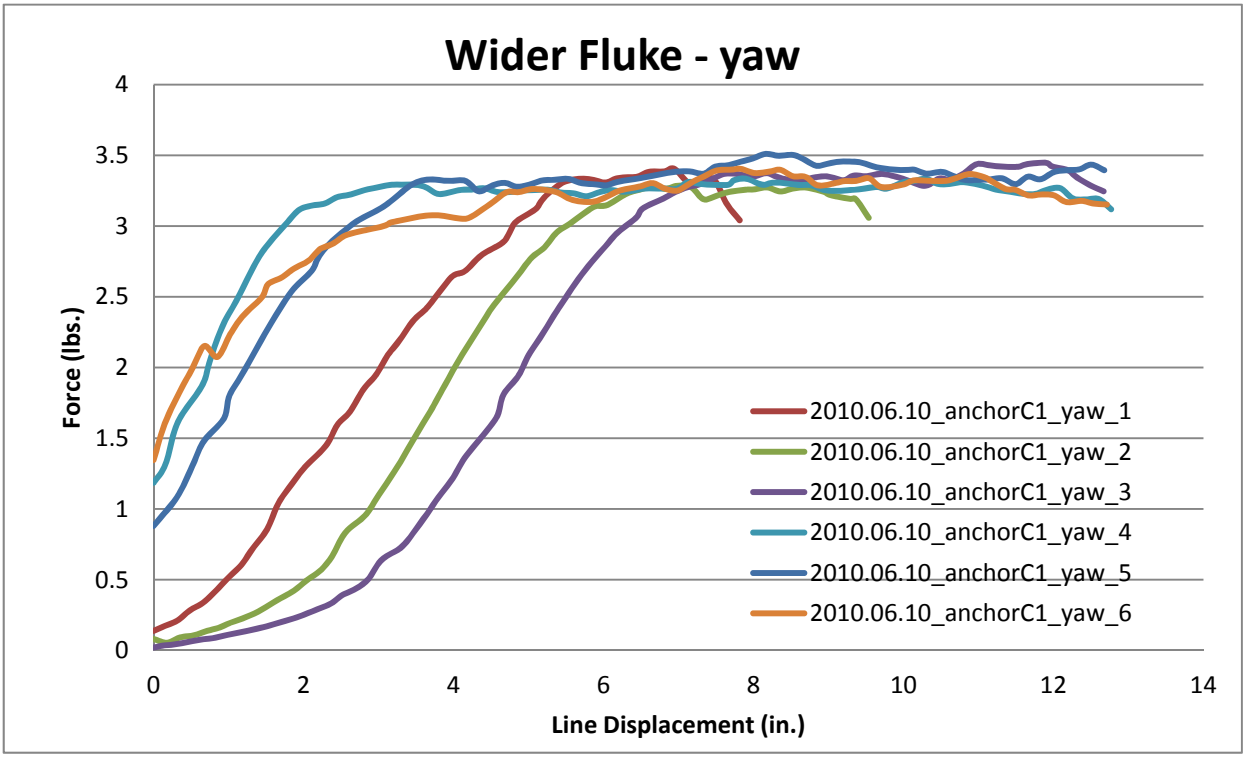


Out-of-plane shear tests: Wider Fluke Anchor

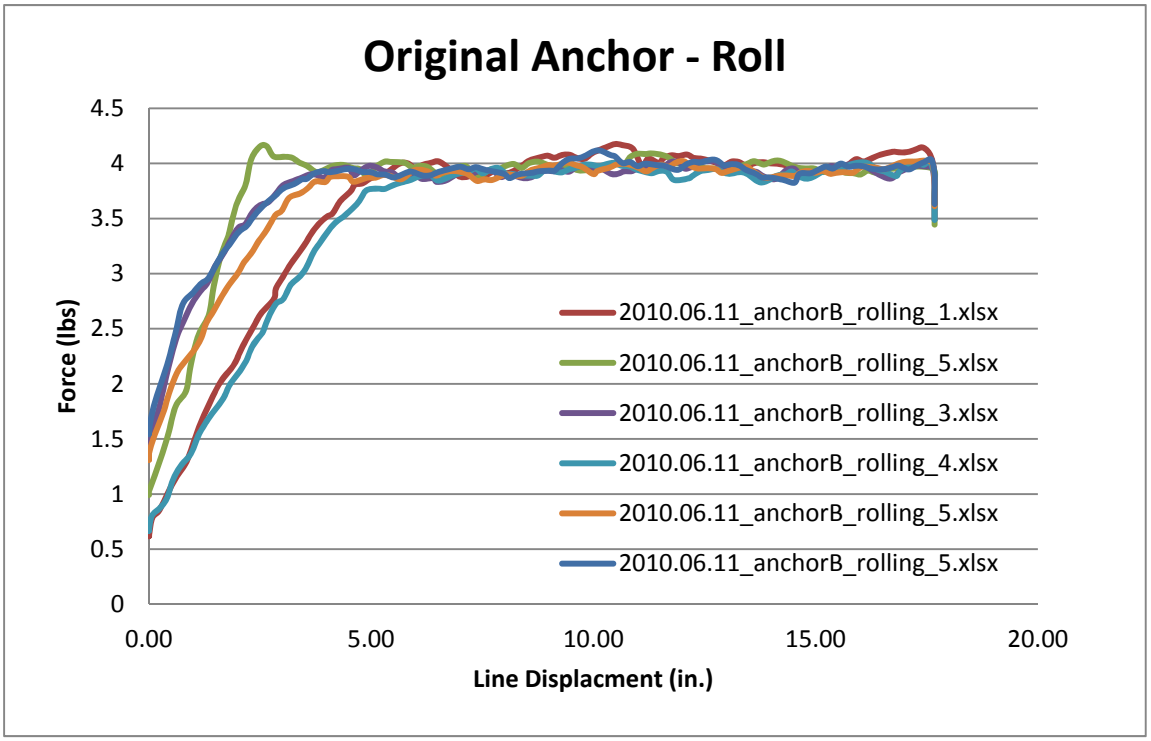


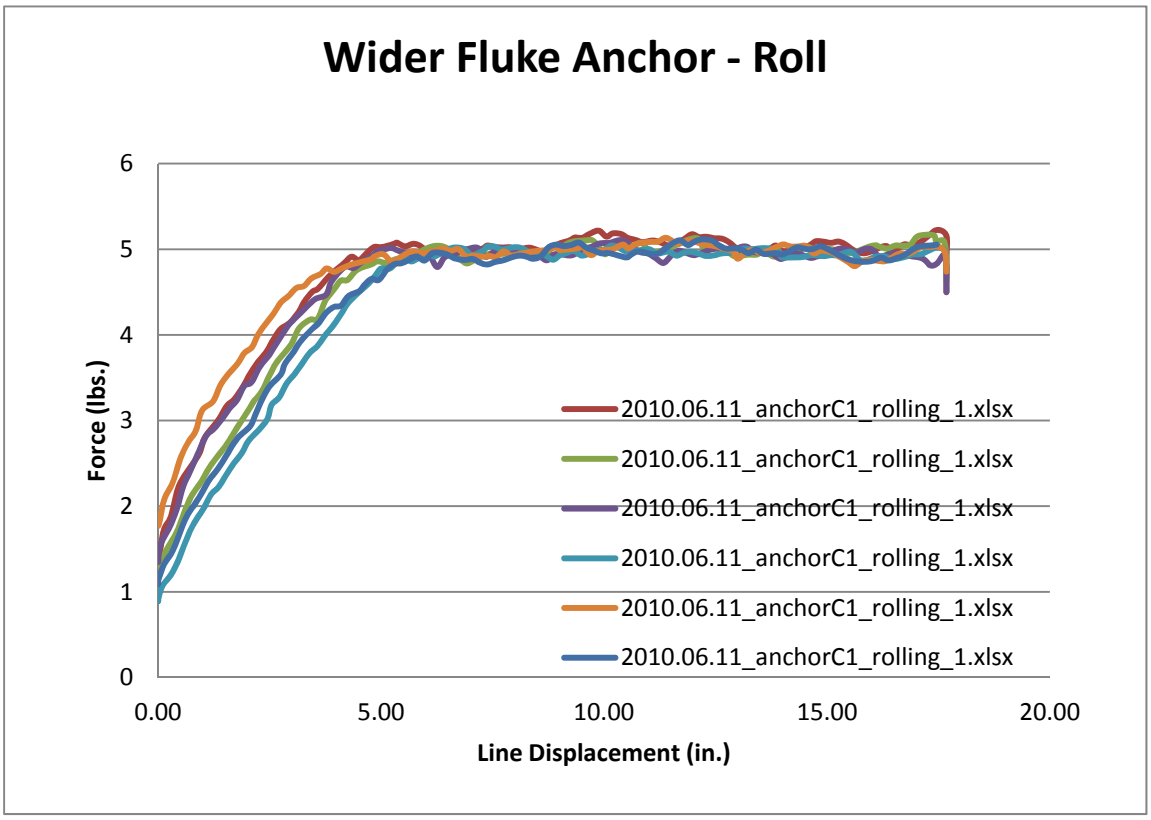
Pure Rotational Tests – Yaw



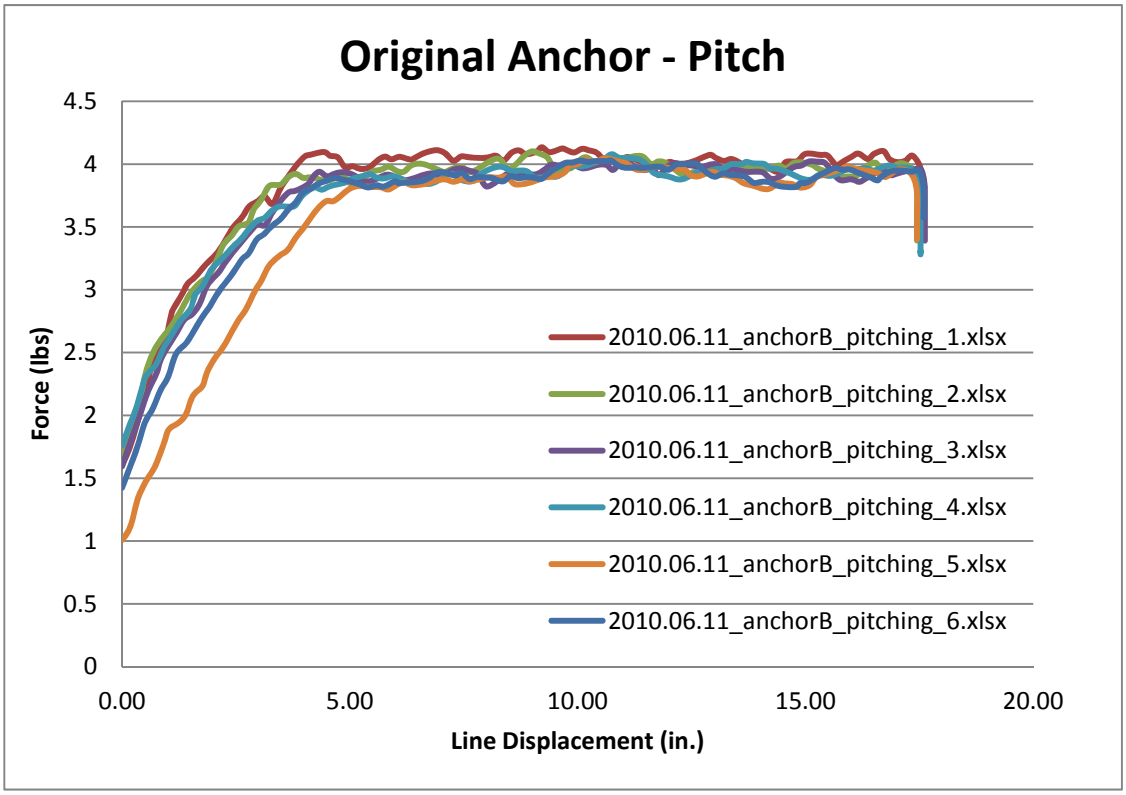


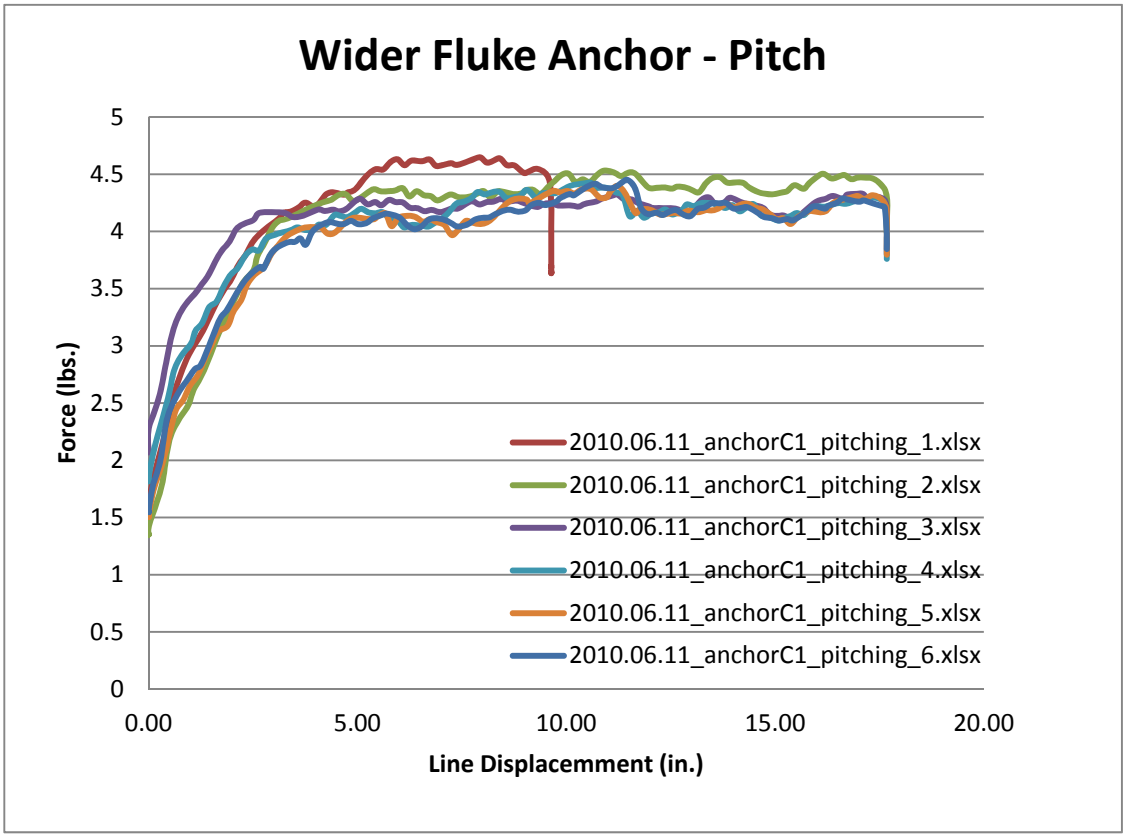
Pure Rotational Tests – Roll





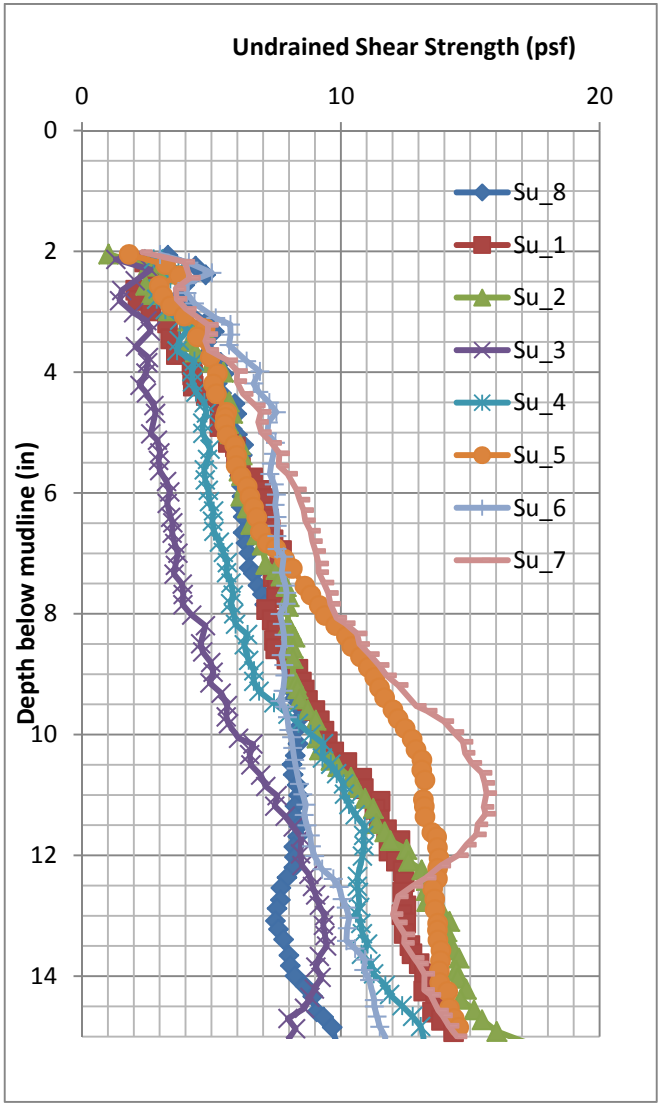
Pure Rotational Tests – Pitch



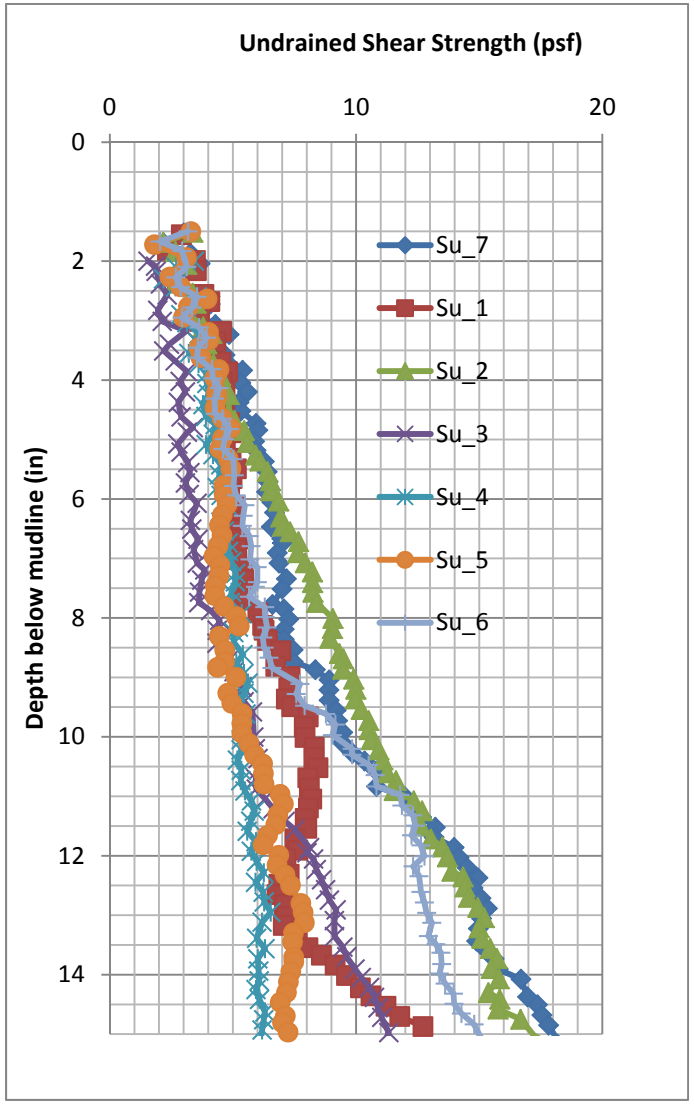


In-plane Results

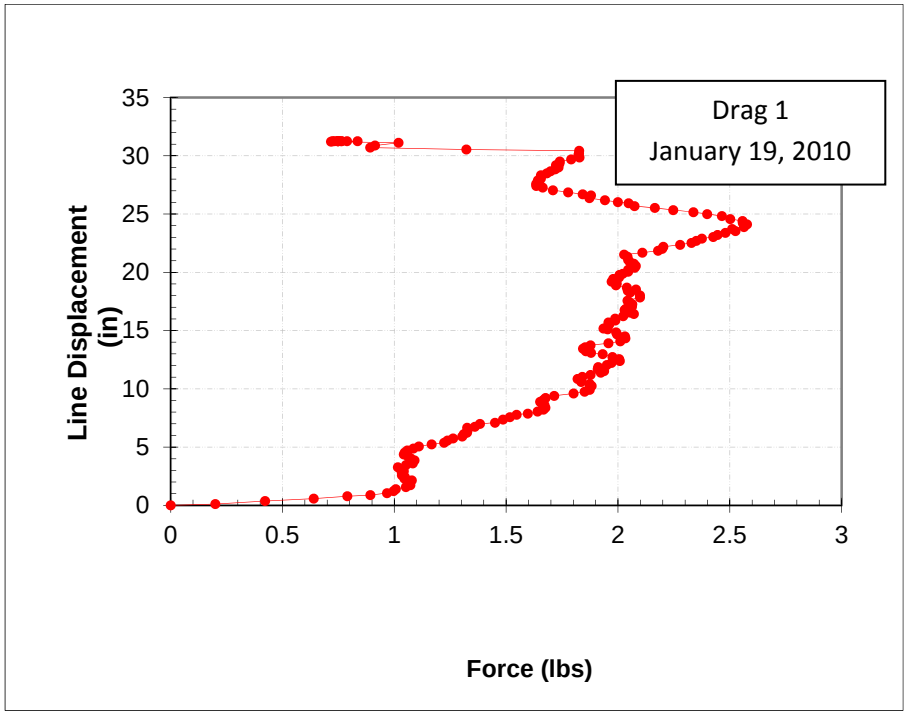
Undrained Shear Strength Data: January 19, 2010



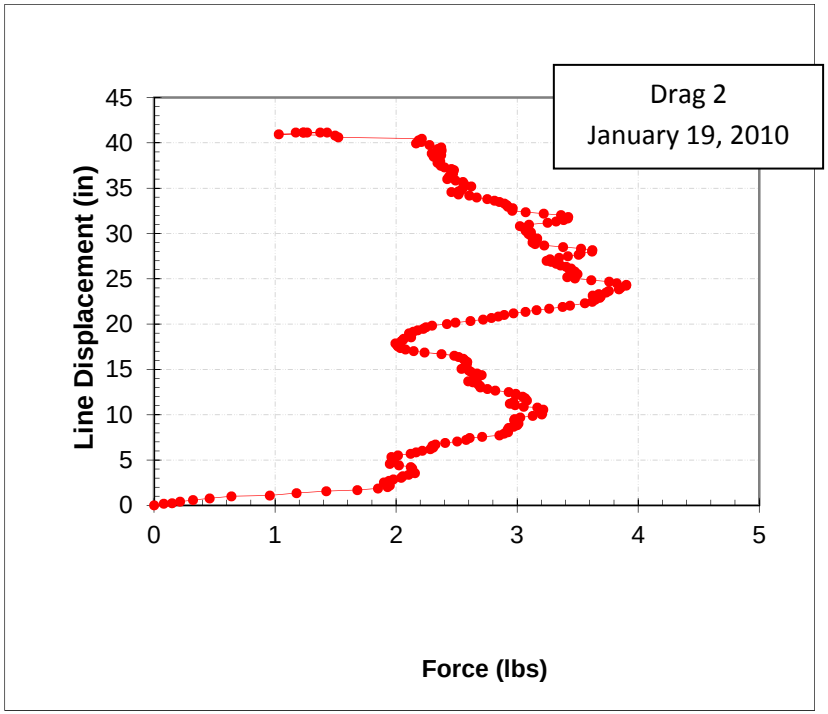
Undrained Shear Strength Data: February 1, 2010



In-Plane Drag Embedment Tests: Original Anchor

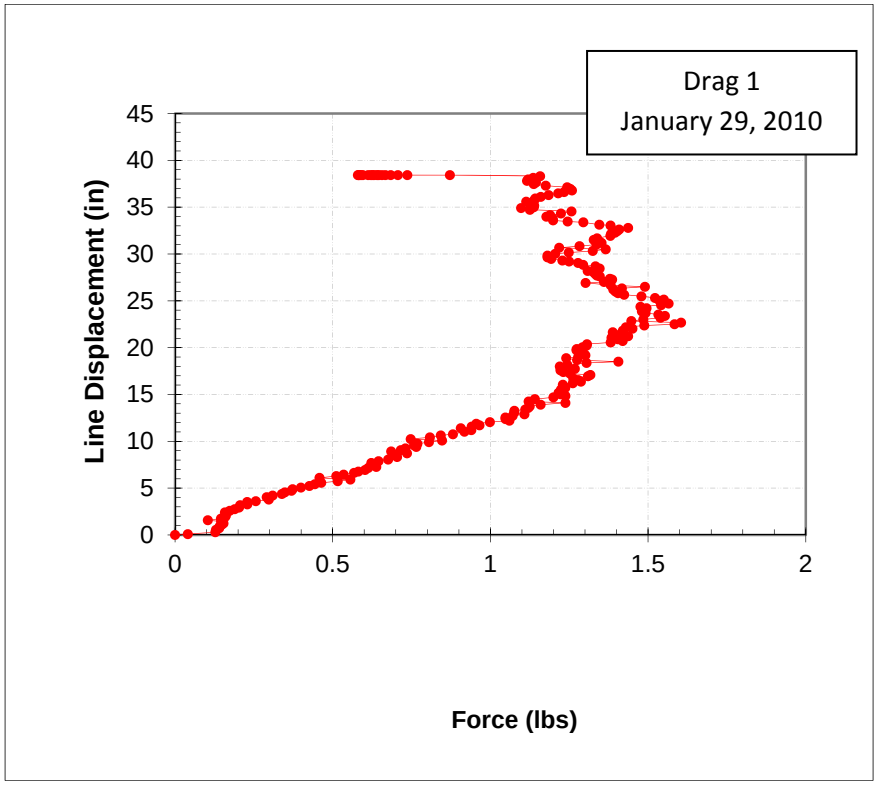


Anchor with 45 degrees fluke shank angle
Initial Embedment 4.5 in. with Horizontal Shank
Final Embedment = 11 in, Drag Distance = 43 in
Initial Line Angle at 10 degrees to Horizontal, In-plane loading
Final Orientation was Flat

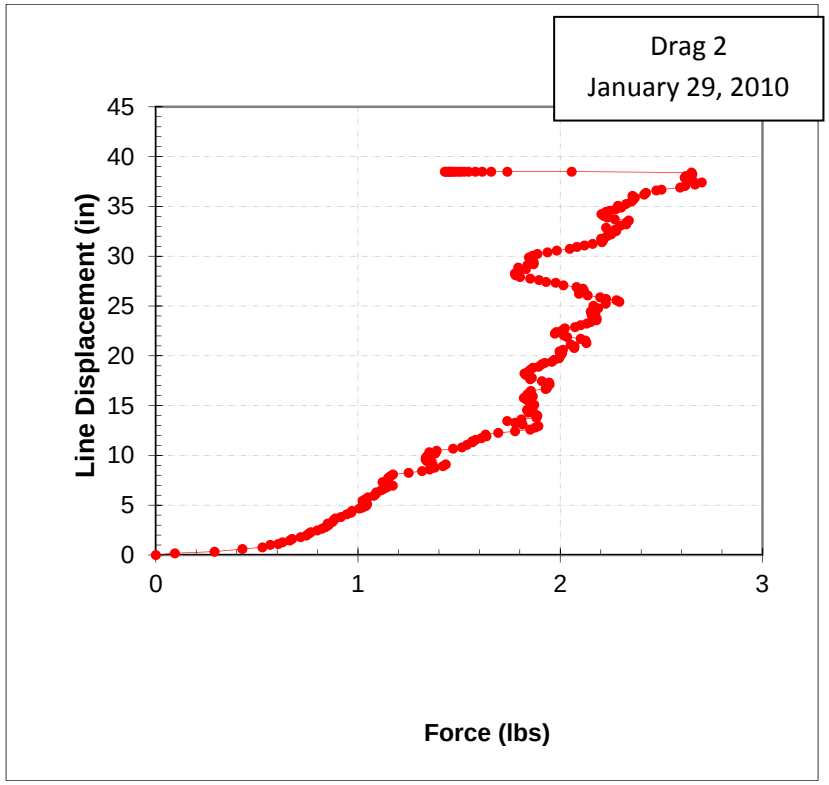


Anchor with 45 degrees fluke shank angle
Initial Embedment 4.5 in. with Horizontal Shank
Final Embedment = 13 in, Drag Distance = 44 in
Initial Line Angle at 10 degrees to Horizontal, In-plane loading
Final Orientation was Flat

In-Plane Drag Embedment Tests: Original Anchor

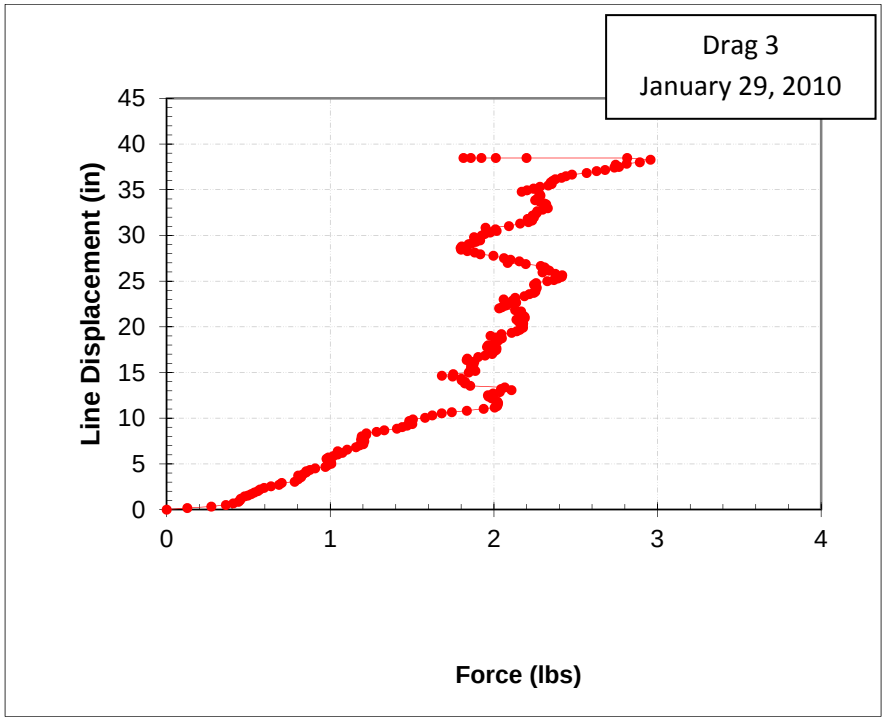


Anchor with 45 degrees fluke shank angle
Initial Embedment 0 in. with Horizontal Shank
Drag Distance = 42 in
Initial Line Angle at 10 degrees to Horizontal, In-plane loading
The Anchor rolled

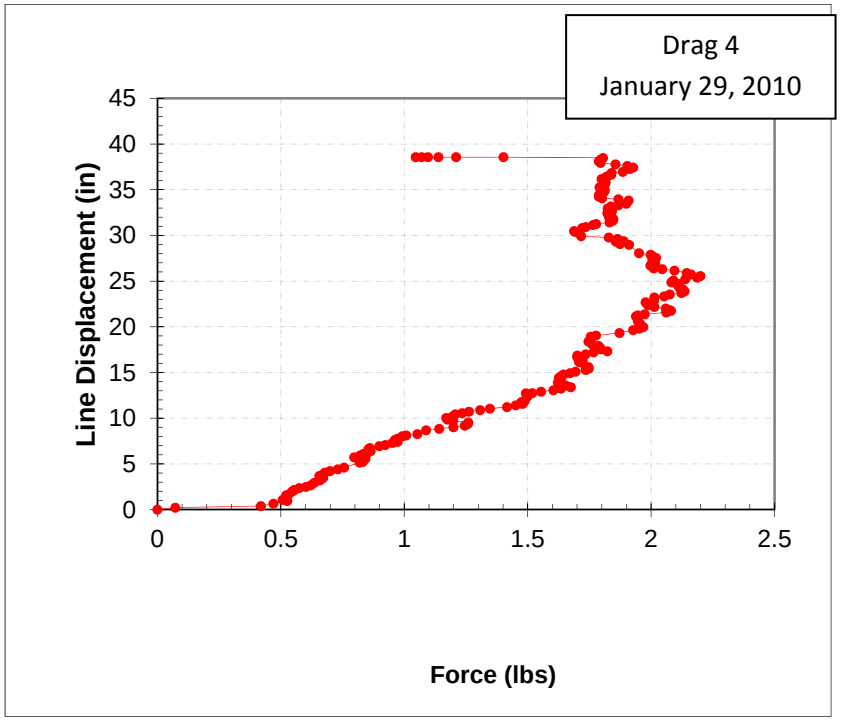


Anchor with 45 degrees fluke shank angle
Initial Embedment 0 in. with Horizontal Shank
Drag Distance = 43 in
Initial Line Angle at 10 degrees to Horizontal, In-plane loading
Final orientation was Flat

In-Plane Drag Embedment Tests: Original Anchor

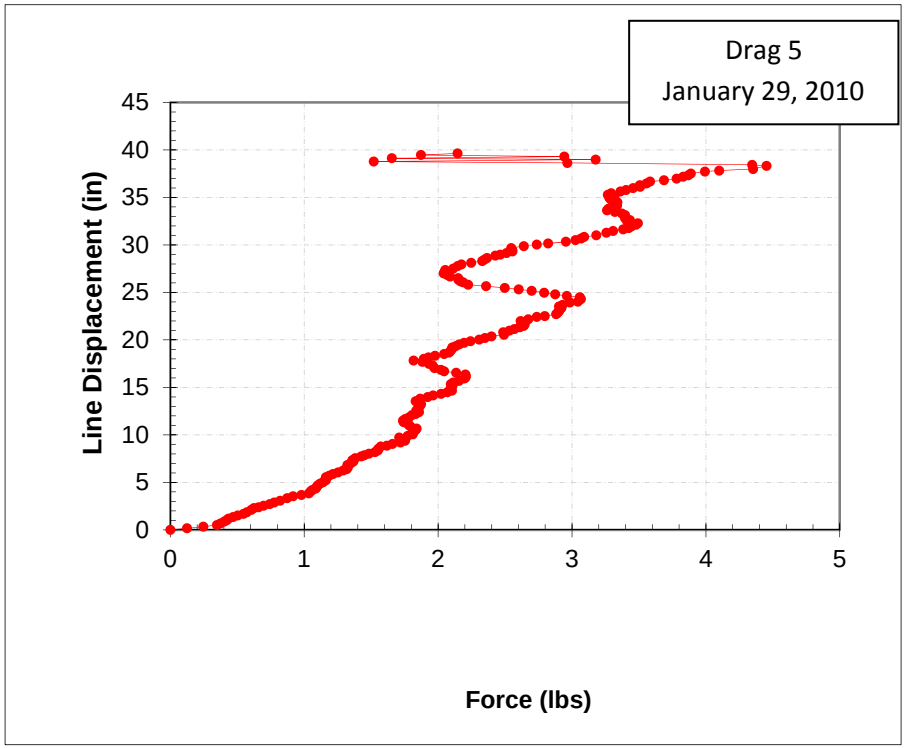


Anchor with 45 degrees fluke shank angle
Initial Embedment 0 in. with Horizontal Shank
Final Embedment = 12.5in, Drag Distance = 43 in
Initial Line Angle at 10 degrees to Horizontal, In-plane loading
Final orientation was Flat

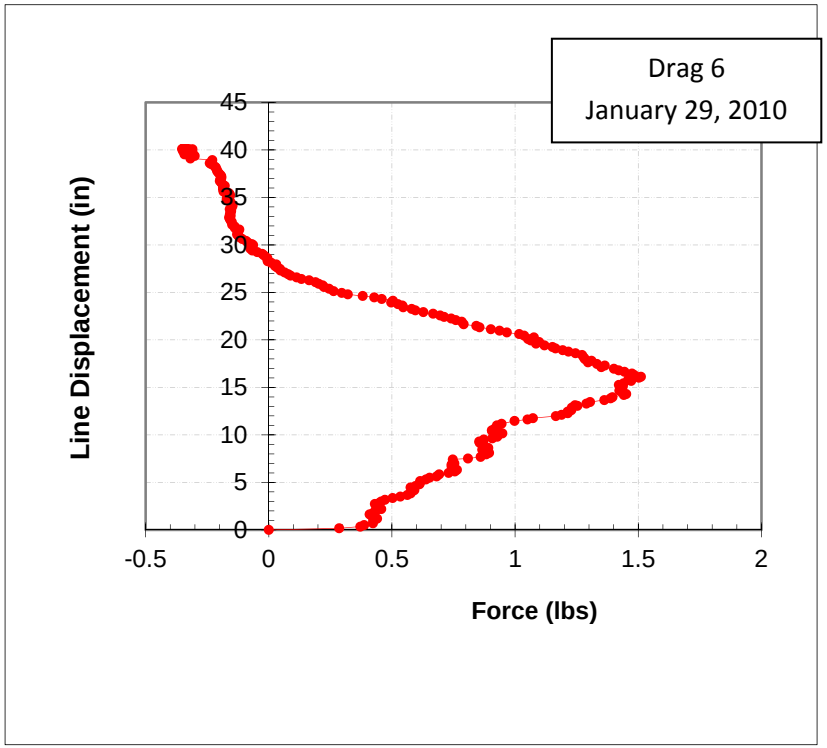


Anchor with 45 degrees fluke shank angle
Initial Embedment 0 in. with Horizontal Shank
Drag Distance = 44 in
Initial Line Angle at 10 degrees to Horizontal, In-plane loading
Final orientation was Flat

In-Plane Drag Embedment Tests: Original Anchor

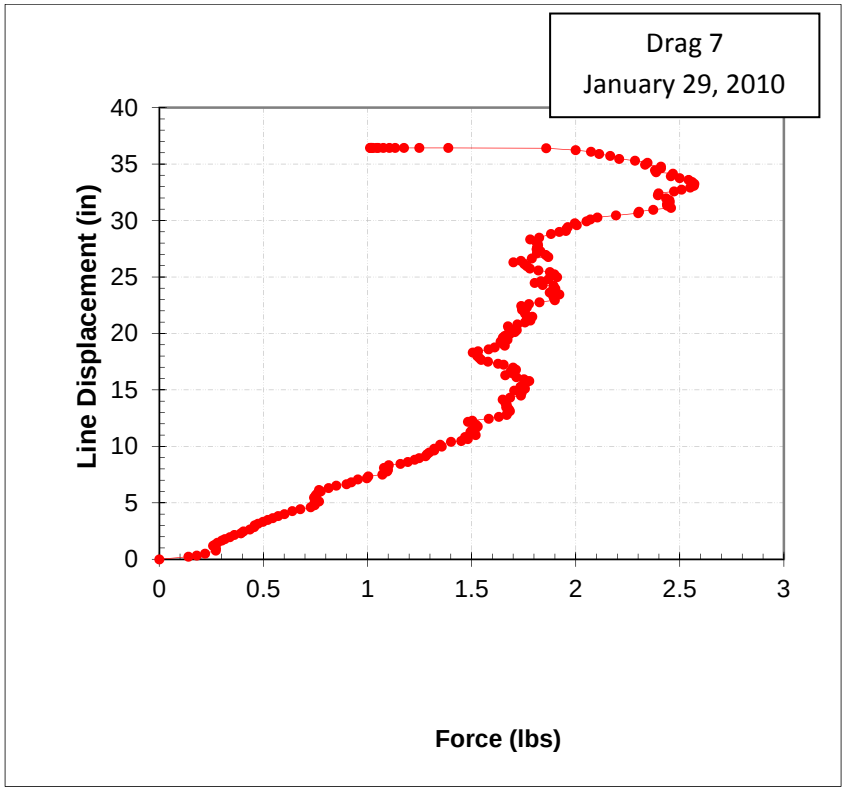


Anchor with 45 degrees fluke shank angle
Initial Embedment 0 in. with Horizontal Shank
Final Embedment = 10in, Drag Distance = 42 in
Initial Line Angle at 10 degrees to Horizontal, In-plane loading
Final orientation was Flat

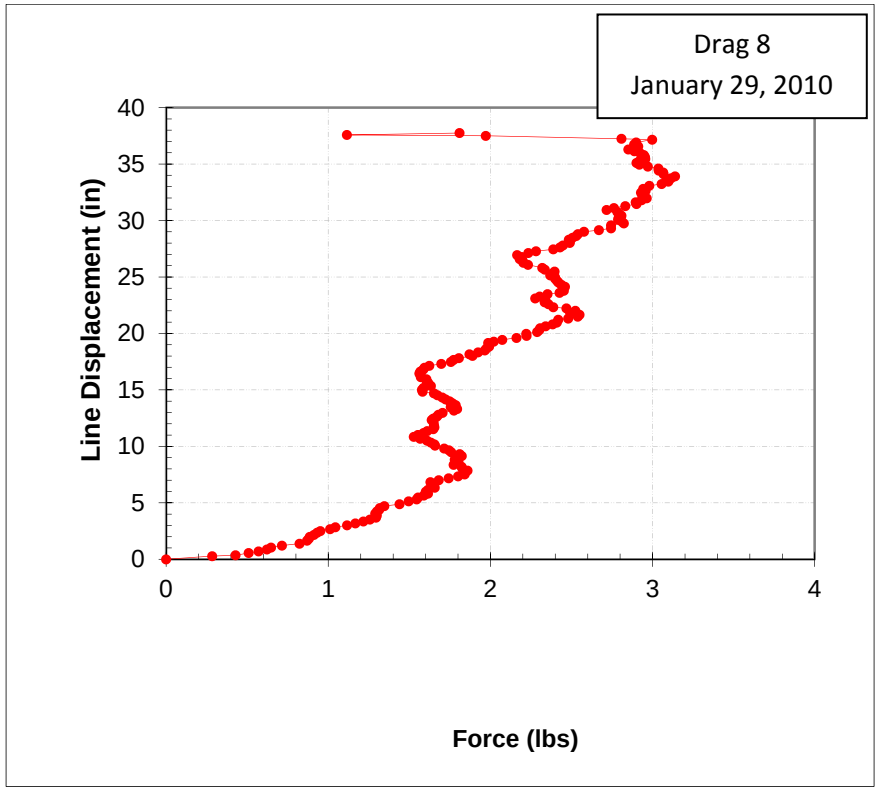


Anchor with 45 degrees fluke shank angle
Initial Embedment 0 in. with Horizontal Shank
Drag Distance = 42 in
Initial Line Angle at 10 degrees to Horizontal, In-plane loading
Anchor rolled over completely

In-Plane Drag Embedment Tests: Original Anchor

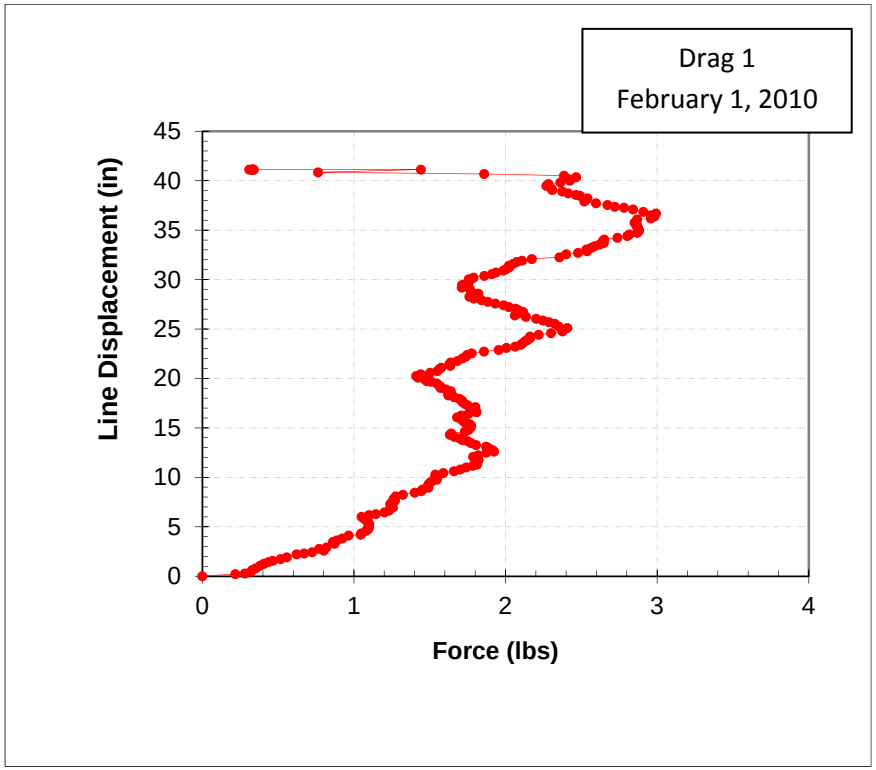


Anchor with 45 degrees fluke shank angle
Initial Embedment 0 in. with Horizontal Shank
Final Embedment = 10in, Drag Distance = 42 in
Initial Line Angle at 10 degrees to Horizontal, In-plane loading
Final orientation was Flat

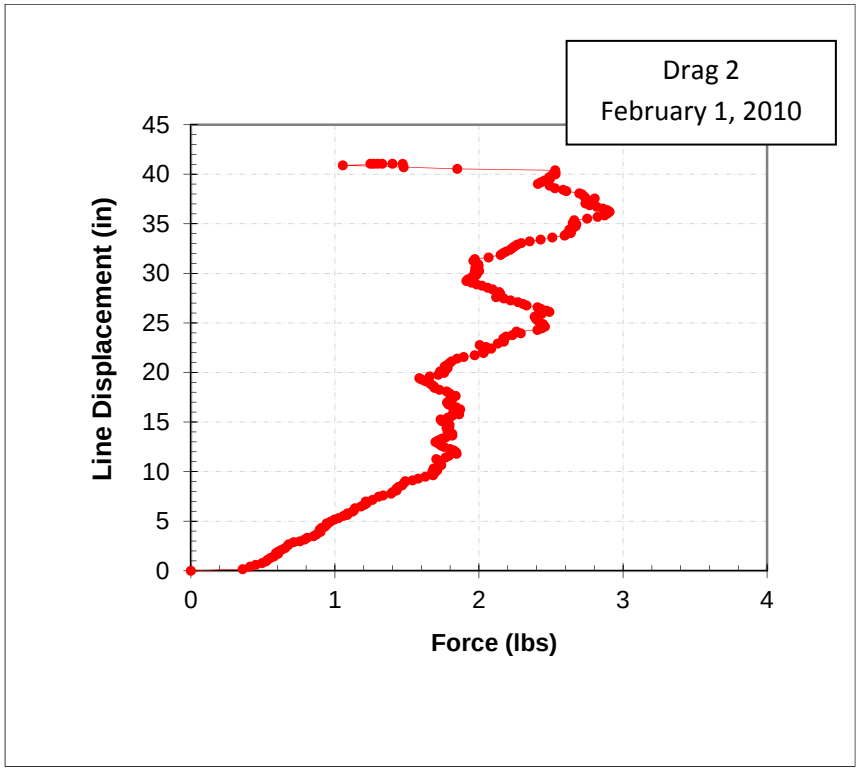


Anchor with 45 degrees fluke shank angle
Initial Embedment 0 in. with Horizontal Shank
Final Embedment = 11.5in, Drag Distance = 42 in
Initial Line Angle at 10 degrees to Horizontal, In-plane loading
Final orientation was Flat

In-Plane Drag Embedment Tests: Original Anchor

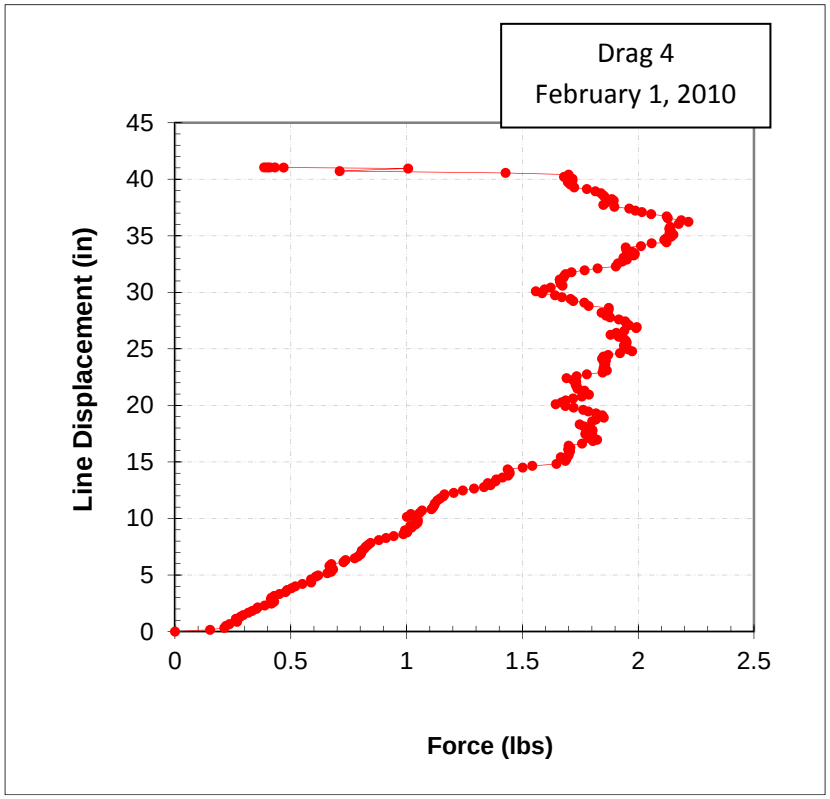


Anchor with 45 degrees fluke shank angle
Initial Embedment 0 in. with Horizontal Shank
Final Embedment = 11in, Drag Distance = 49 in
Initial Line Angle at 10 degrees to Horizontal, In-plane loading
Final orientation was Flat

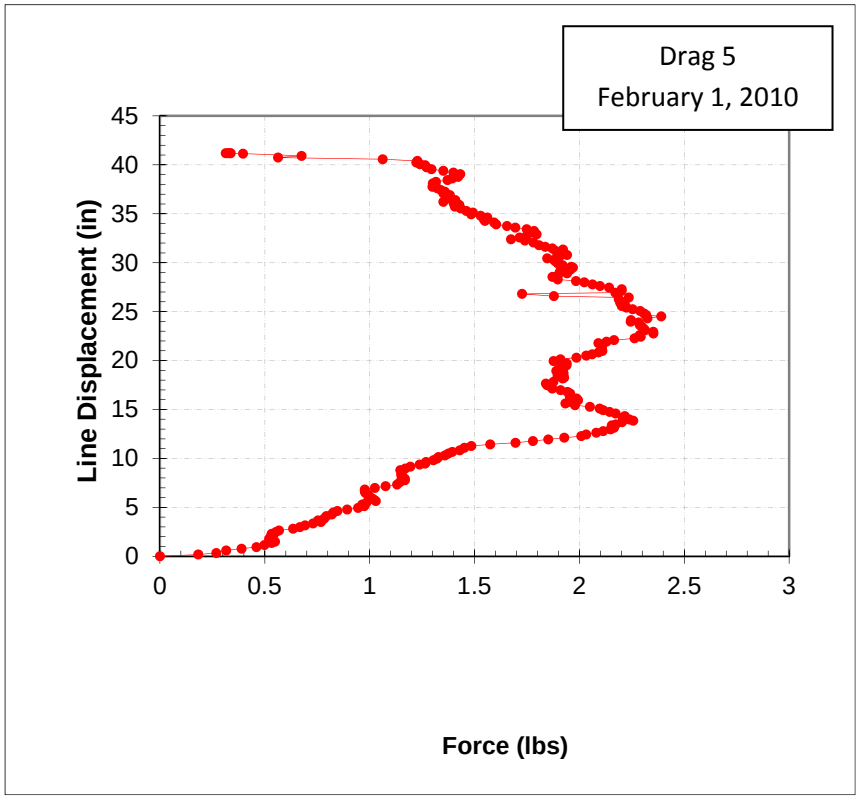


Anchor with 45 degrees fluke shank angle
Initial Embedment 0 in. with Horizontal Shank
Final Embedment = 11in, Drag Distance = 49 in
Initial Line Angle at 10 degrees to Horizontal, In-plane loading
Final orientation was Flat

In-Plane Drag Embedment Tests: Original Anchor

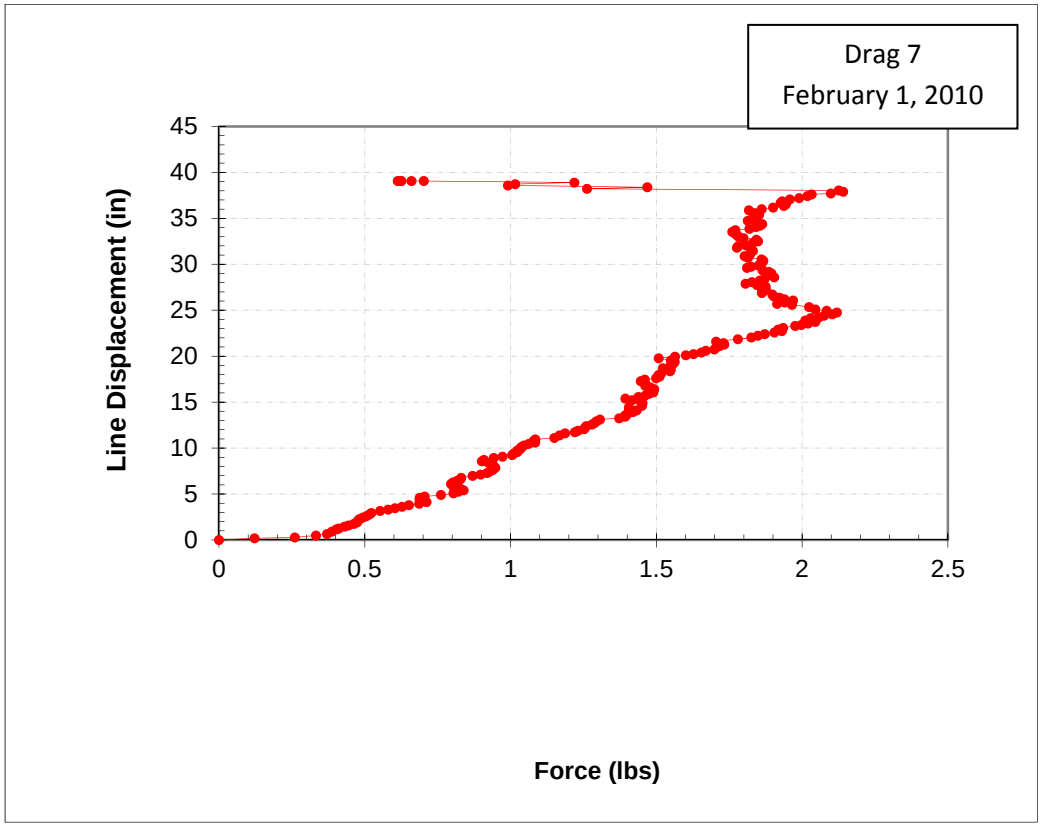


Anchor with 45 degrees fluke shank angle
Initial Embedment 0 in. with Horizontal Shank
Final Embedment = 9in, Drag Distance = 43 in
Initial Line Angle at 10 degrees to Horizontal, In-plane loading
Final orientation was Flat



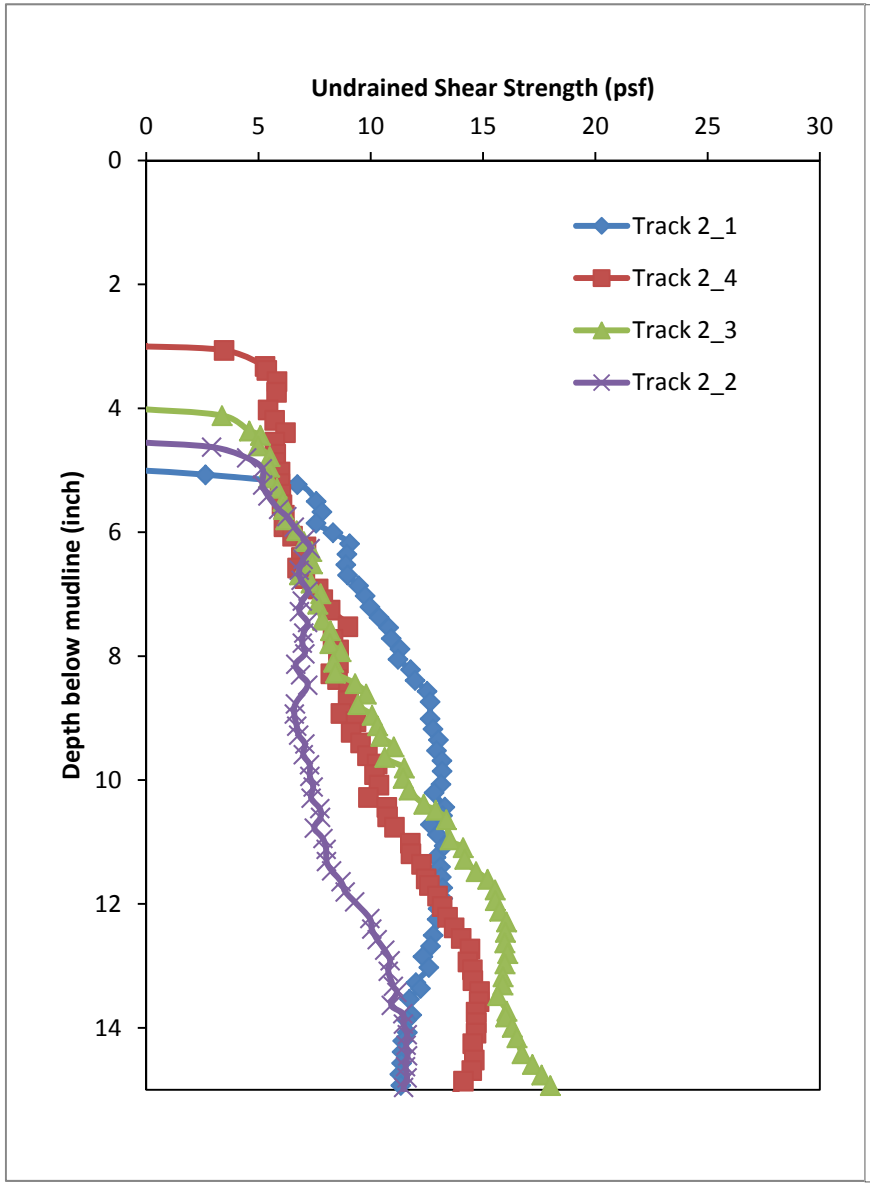
Anchor with 45 degrees fluke shank angle
Initial Embedment 0 in. with Horizontal Shank
Final Embedment = 4in, Drag Distance = 45 in
Initial Line Angle at 10 degrees to Horizontal, In-plane loading
Anchor rolled

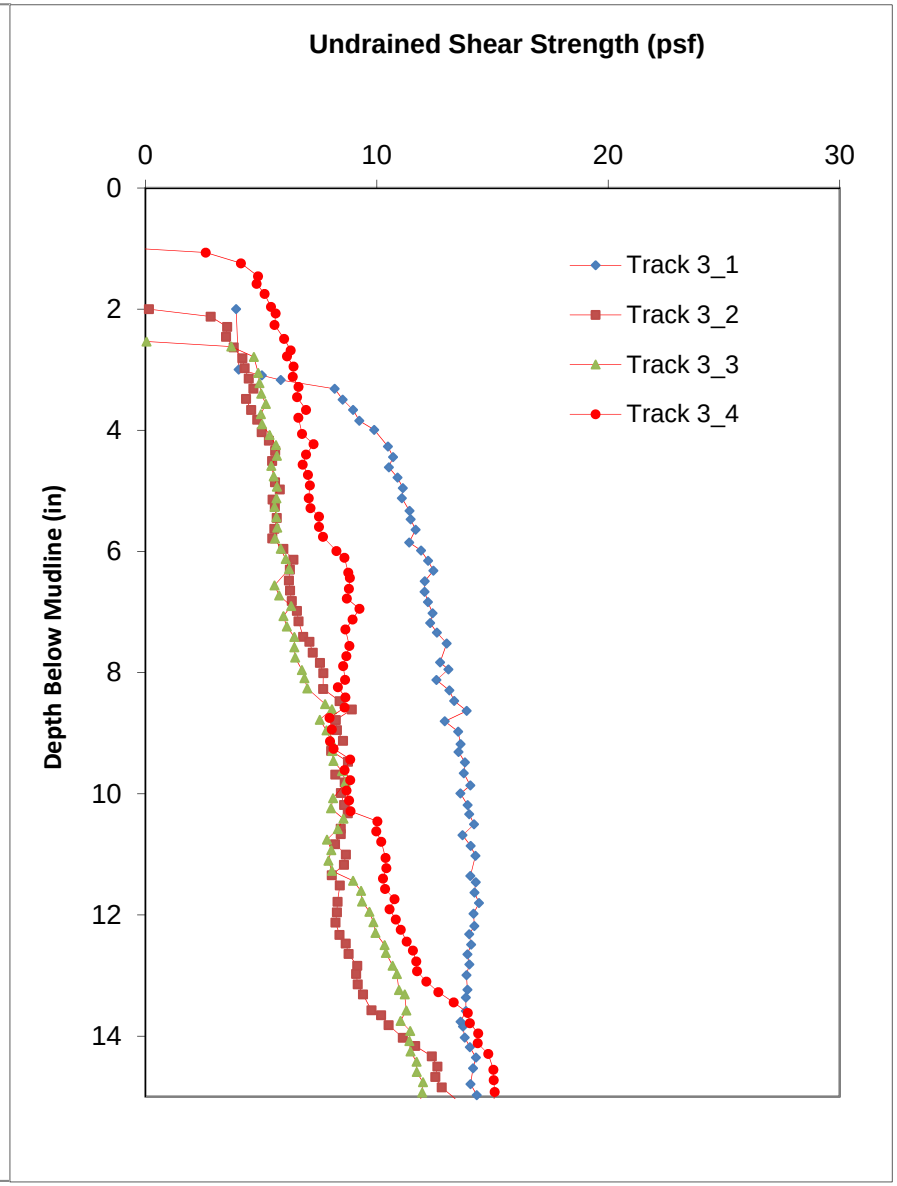
In-Plane Drag Embedment Tests: Original Anchor



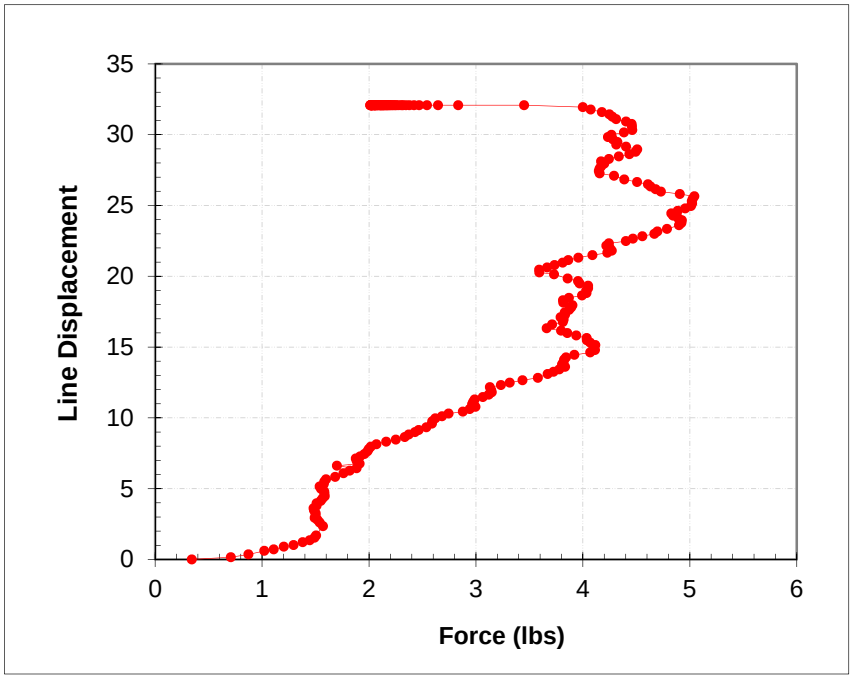
Anchor with 45 degrees fluke shank angle
Initial Embedment 0 in. with Horizontal Shank
Final Embedment = 8in, Drag Distance = 45 in
Initial Line Angle at 10 degrees to Horizontal, In-plane loading
Anchor rolled

Undrained Shear Strength Profiles for 6/22/10



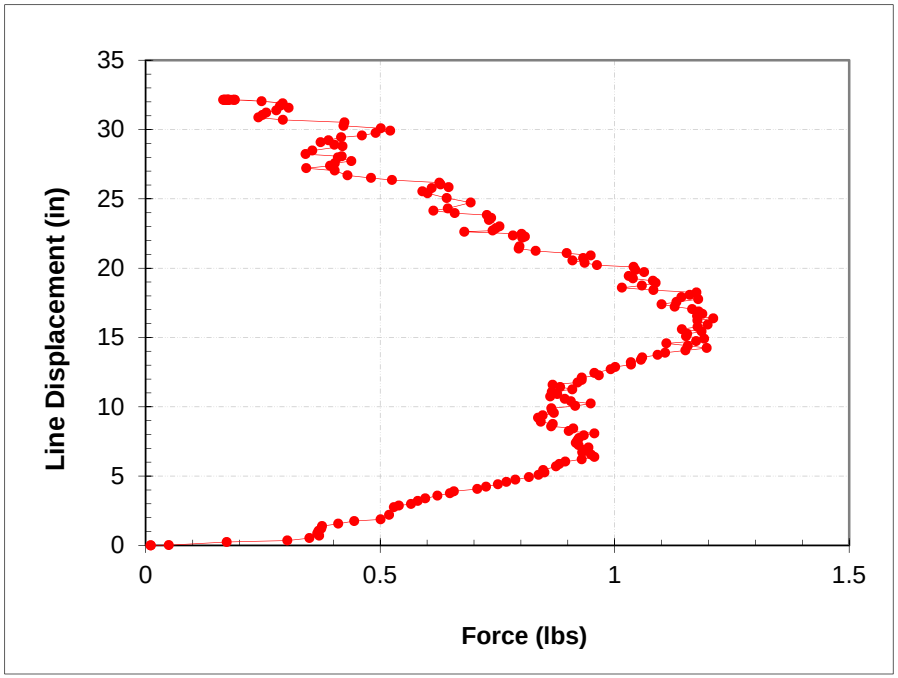


In-plane Drag Embedment Test



Wider Fluke Anchor with 45° fluke-shank angle
Date: 6/24/2010
Tank Track: Track 2
Test No.: 1
Anchor Line Type: Thick
Initial Embedment: 0 in.
Comments: Used Magnetometer

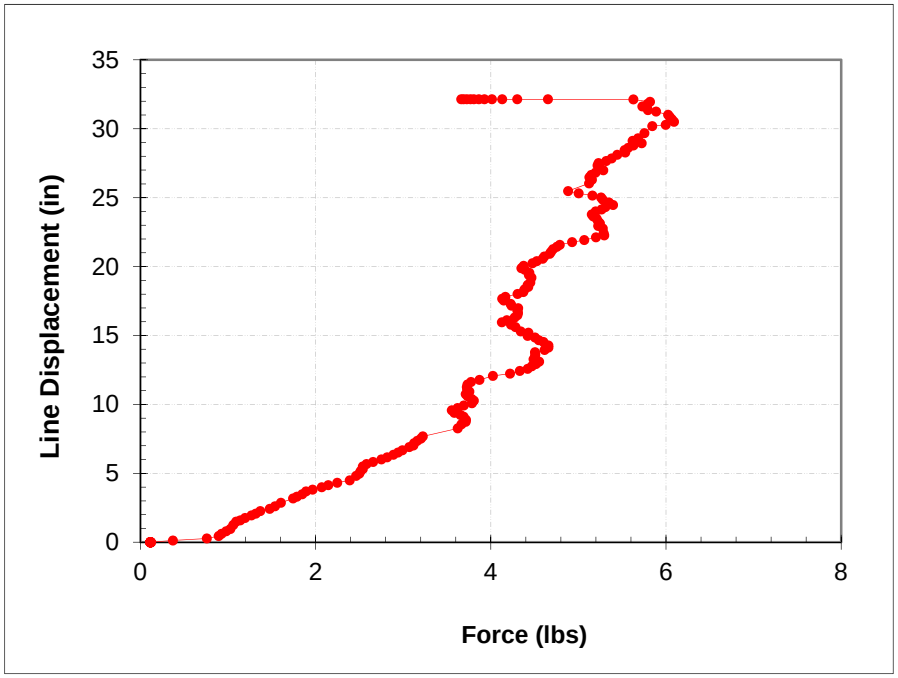
Load Cell Reading at Final Embedment: **5.04 lbs.**
Final Embedment: **in.**
Drag Distance: **35-40 in.**
Final Orientation: **rolled**



Wider Fluke Anchor with 45° fluke-shank angle
Date: 6/24/2010
Tank Track: Track 2
Test No.: 2
Anchor Line Type: Thick
Initial Embedment: 0 in.
Comments: Used Magnetometer

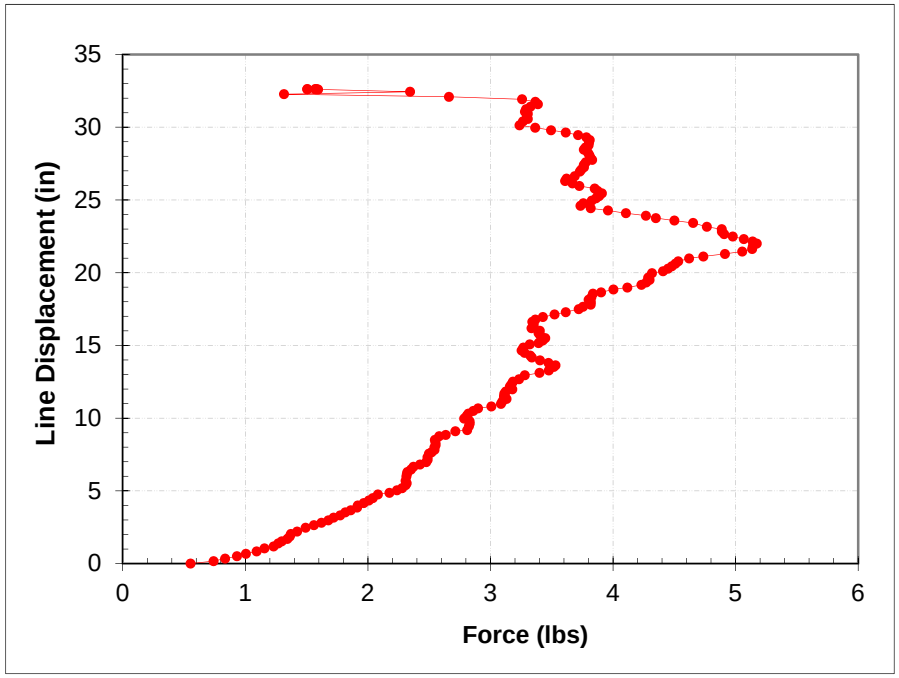
Load Cell Reading at Final Embedment: **1.21 lbs.**
Final Embedment: **0 in.**
Drag Distance: **44 in.**
Final Orientation: **flat-at mudline**

In-plane Drag Embedment Test



Wider Fluke Anchor with 45° fluke-shank angle
Date: 6/24/2010
Tank Track: Track 2
Test No.: 3
Anchor Line Type: Thick
Initial Embedment: 0 in.
Comments: Used Magnetometer

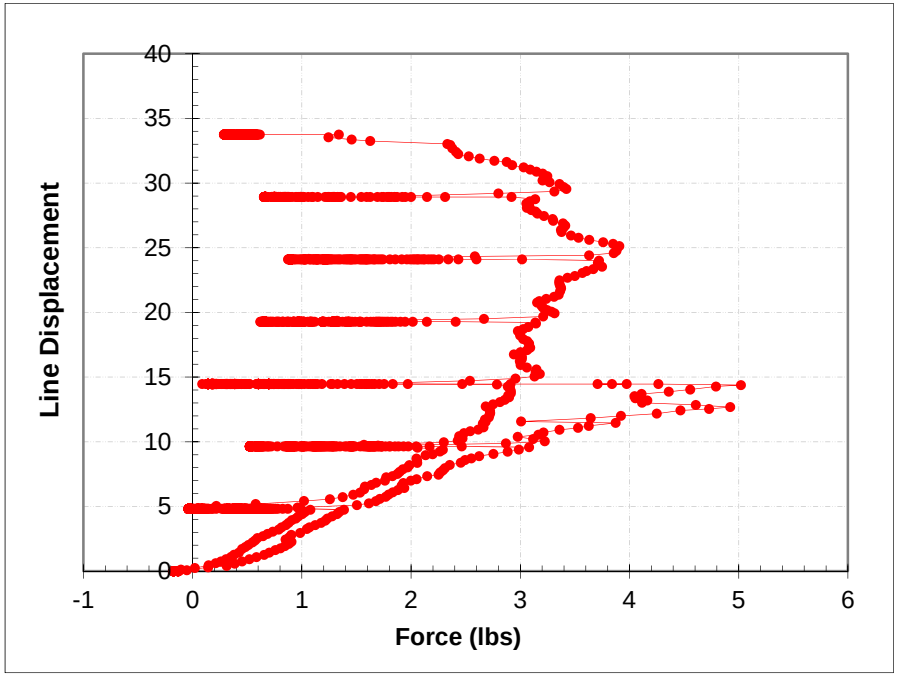
Load Cell Reading at Final Embedment: **6.09 lbs.**
Final Embedment: **10 in.**
Drag Distance: **44 in.**
Final Orientation: **rolled**



Wider Fluke Anchor with 45° fluke-shank angle
Date: 6/24/2010
Tank Track: Track 3
Test No.: 4
Anchor Line Type: Thick
Initial Embedment: 0 in.
Comments: -

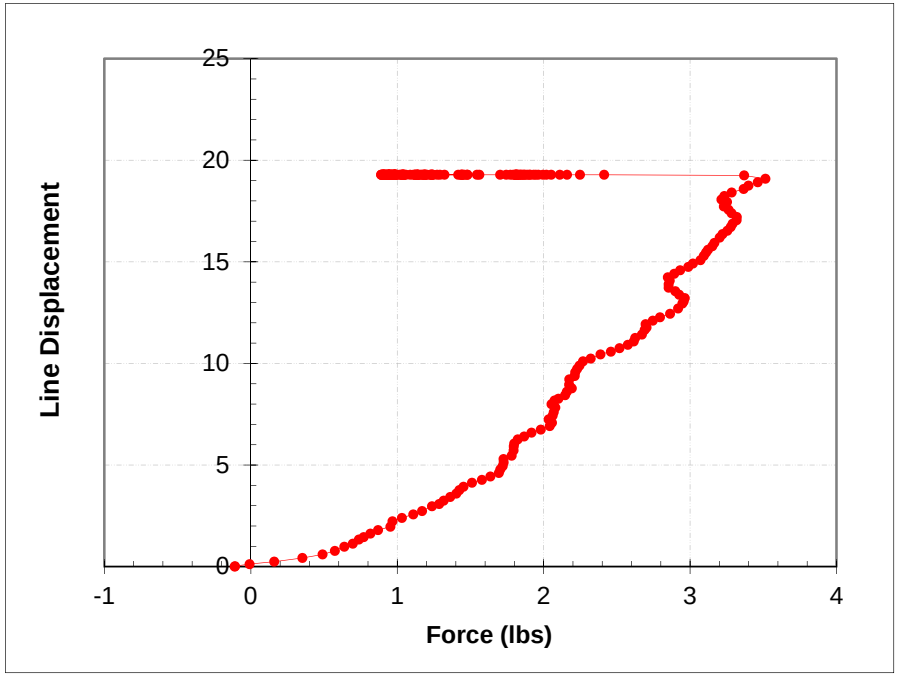
Load Cell Reading at Final Embedment: **5.17 lbs.**
Final Embedment: **9 in.**
Drag Distance: **43 in.**
Final Orientation: **flat**

In-plane Drag Embedment Test



Wider Fluke Anchor with 45° fluke-shank angle
Date: 6/24/2010
Tank Track: Track 3
Test No.: 5
Anchor Line Type: Thick
Initial Embedment: 0 in.
Comments: Stopped to measure trajectory

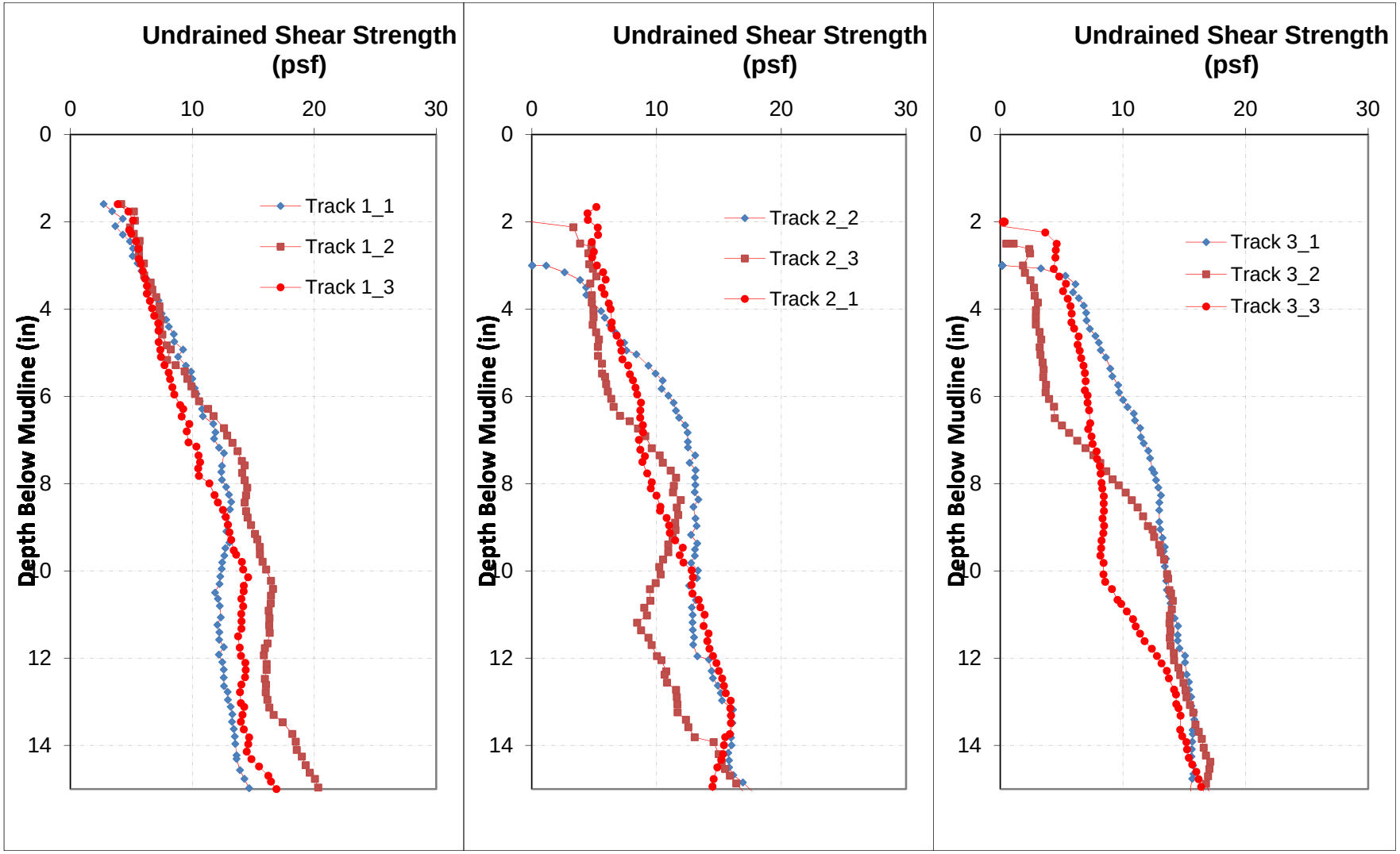
Load Cell Reading at Final Embedment: **5.02 lbs.**
Final Embedment: **9 in.**
Drag Distance: **37.5 in.**
Final Orientation: **diving**



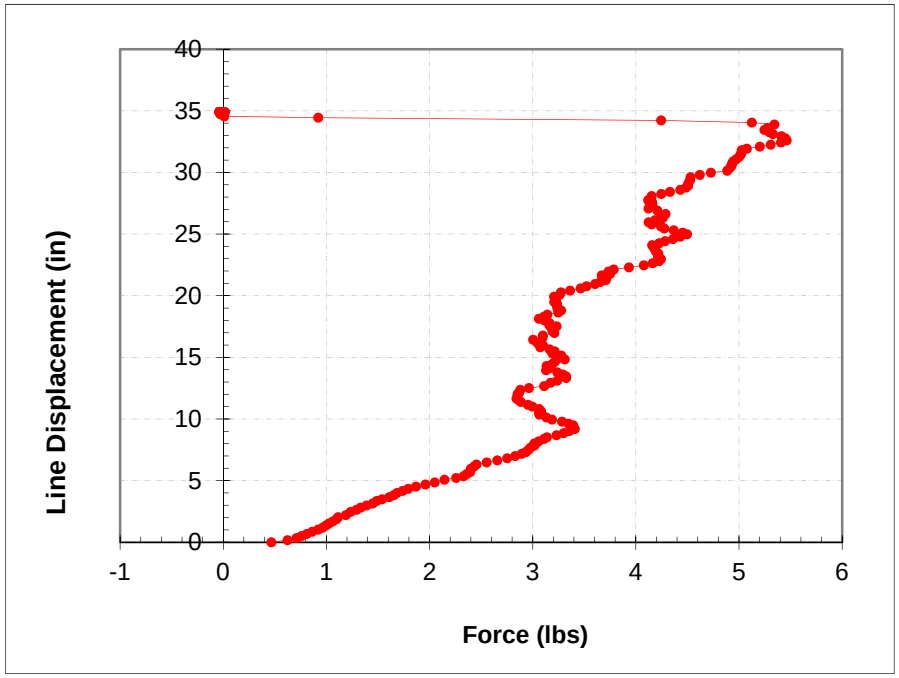
Wider Fluke Anchor with 45° fluke-shank angle
Date: 6/24/2010
Tank Track: Track 3
Test No.: 6
Anchor Line Type: Thick
Initial Embedment: 0 in.
Comments: Stopped to measure trajectory

Load Cell Reading at Final Embedment: **3.51 lbs.**
Final Embedment: **10 in.**
Drag Distance: **37 in.**
Final Orientation: **flat**

Undrained Shear Strength Profiles for 6/30/10

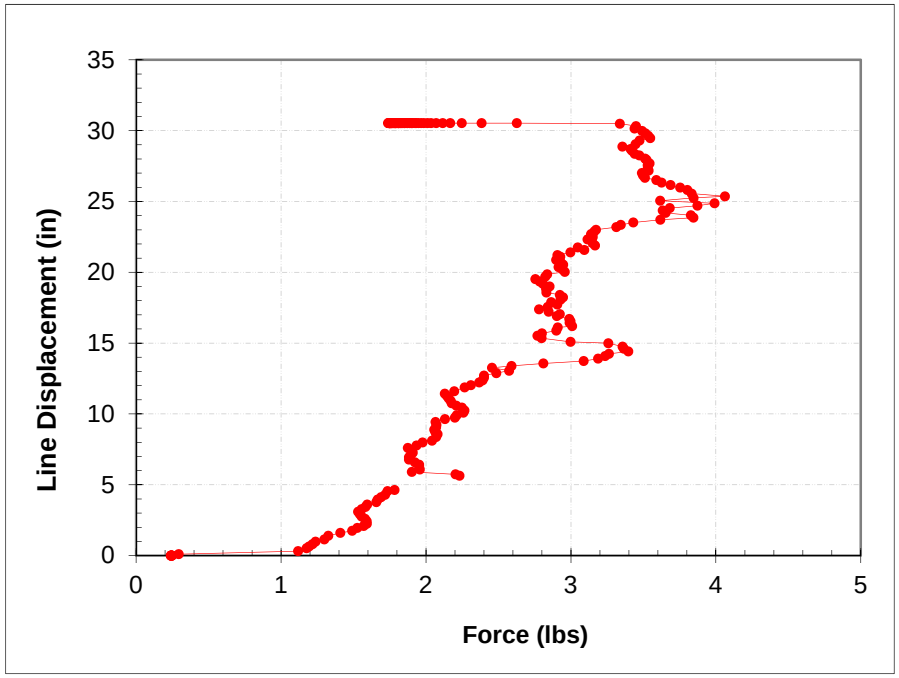


In-plane Drag Embedment Test



Wider Fluke Anchor with 45° fluke-shank angle
Date: 6/30/2010
Tank Track: Track 2
Test No.: 1
Anchor Line Type: Thick
Initial Embedment: 0 in.
Comments: -

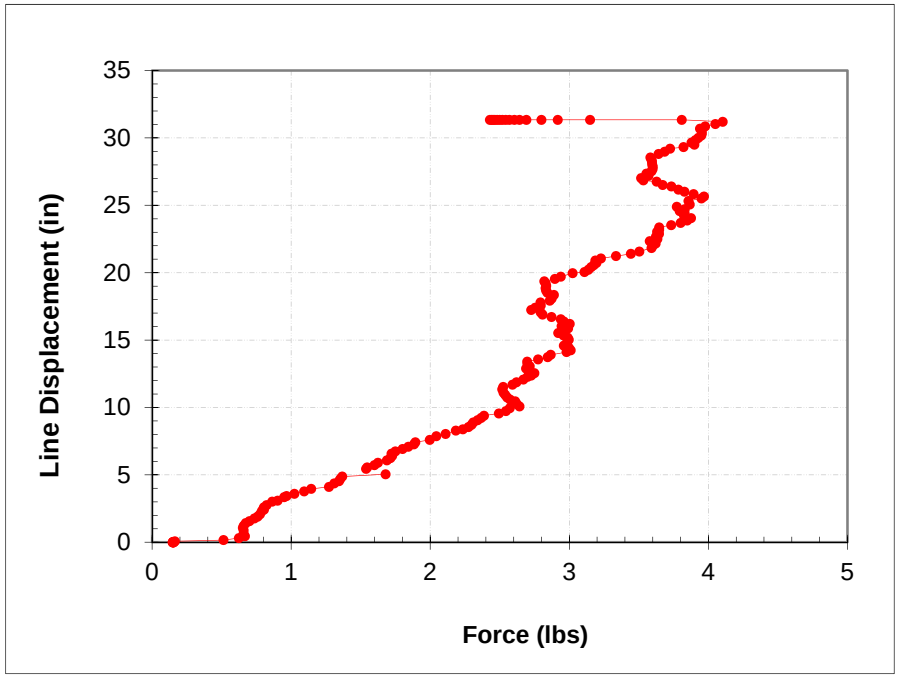
Load Cell Reading at Final Embedment: **5.46 lbs.**
Final Embedment: **9 in.**
Drag Distance: **44 in.**
Final Orientation: **flat**



Wider Fluke Anchor with 45° fluke-shank angle
Date: 6/30/2010
Tank Track: Track 2
Test No.: 2
Anchor Line Type: Thick
Initial Embedment: 0 in.
Comments: -

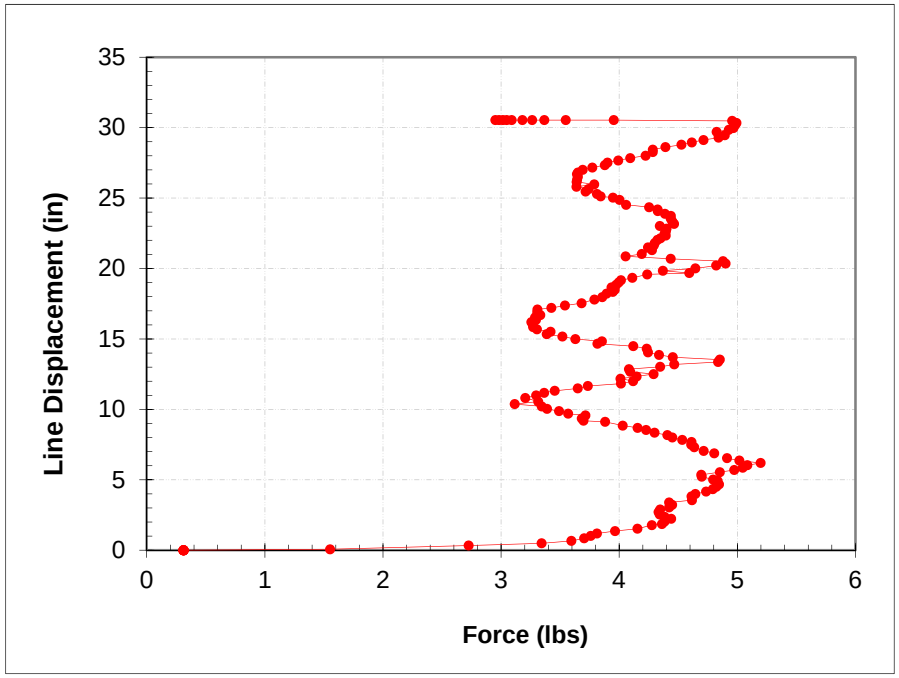
Load Cell Reading at Final Embedment: **4.06 lbs.**
Final Embedment: **9 in.**
Drag Distance: **42 in.**
Final Orientation: **flat**

In-plane Drag Embedment Test



Wider Fluke Anchor with 45° fluke-shank angle
Date: 6/30/2010
Tank Track: Track 2
Test No.: 3
Anchor Line Type: Thick
Initial Embedment: 0 in.
Comments: -

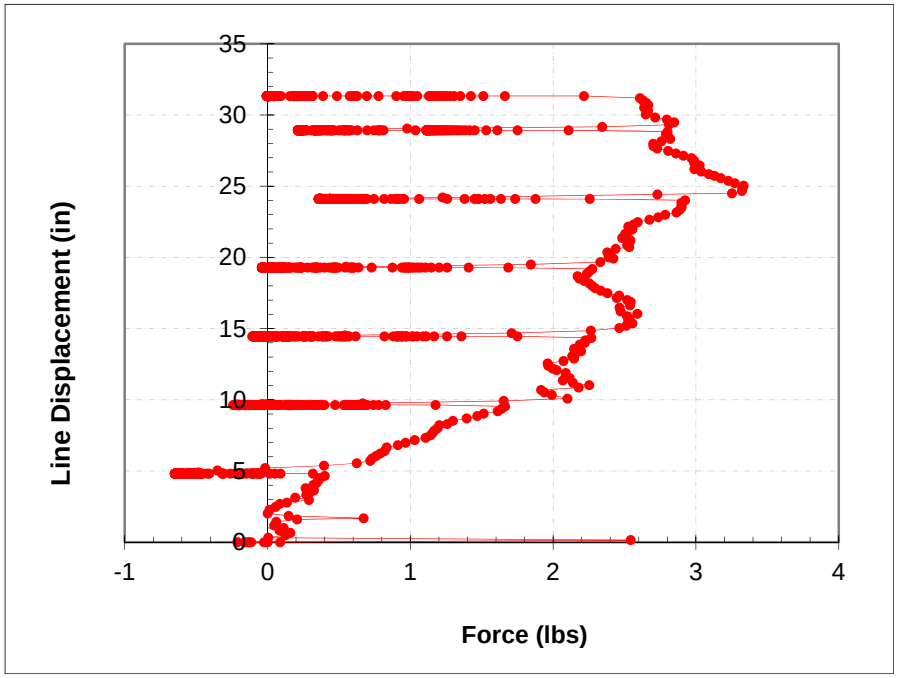
Load Cell Reading at Final Embedment: **4.1 lbs.**
Final Embedment: **10 in.**
Drag Distance: **41.5 in.**
Final Orientation: **flat**



Wider Fluke Anchor with 45° fluke-shank angle
Date: 6/30/2010
Tank Track: Track 2
Test No.: 4
Anchor Line Type: Thick
Initial Embedment: 5 in.
Comments: -

Load Cell Reading at Final Embedment: **5.2 lbs.**
Final Embedment: **13 in.**
Drag Distance: **43 in.**
Final Orientation: **flat**

In-plane Drag Embedment Test



Wider Fluke Anchor with 45° fluke-shank angle

Date: 6/30/2010

Tank Track: Track 2

Test No.: 5

Anchor Line Type: Thick

Initial Embedment: 0 in.

Comments: Stopped to measure trajectory

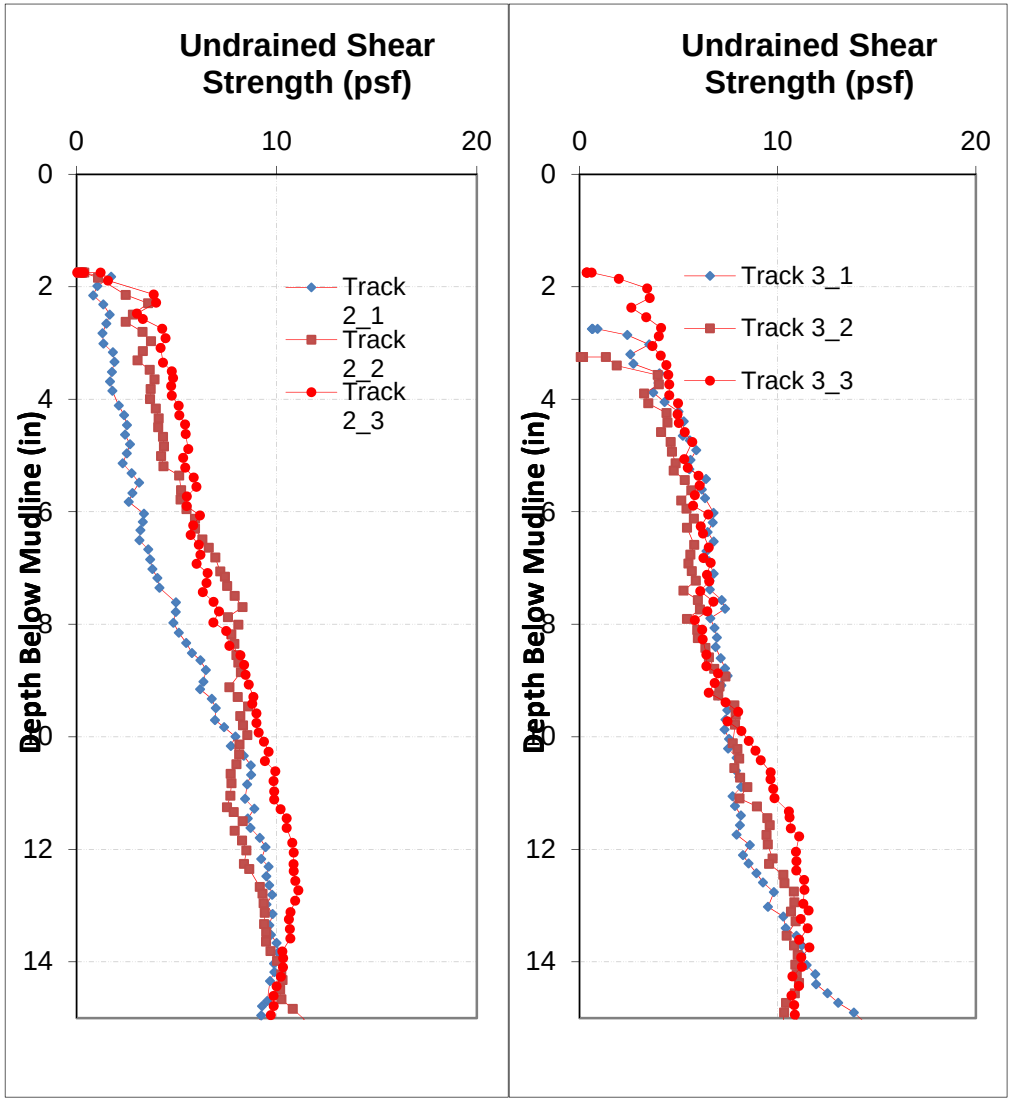
Load Cell Reading at Final Embedment: **3.33 lbs.**

Final Embedment: **9 in.**

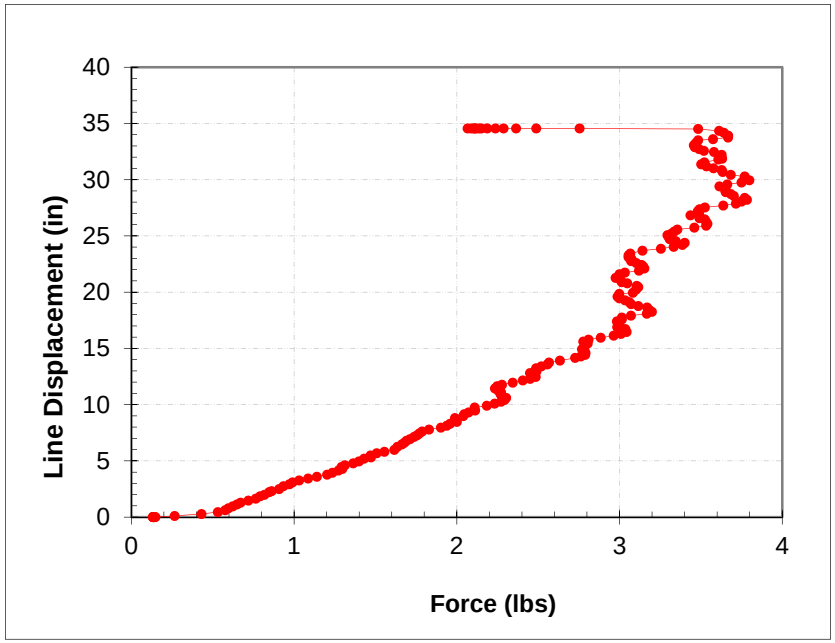
Drag Distance: **44 in.**

Final Orientation: **flat**

Undrained Shear Strength Profiles for 7/12/2010



In-plane Drag Embedment Test



Wider Fluke Anchor with 45° fluke-shank angle

Date: 7/12/2010

Tank Track: Track 2

Test No.: 2

Anchor Line Type: Thick

Initial Embedment: 0 in.

Comments: -

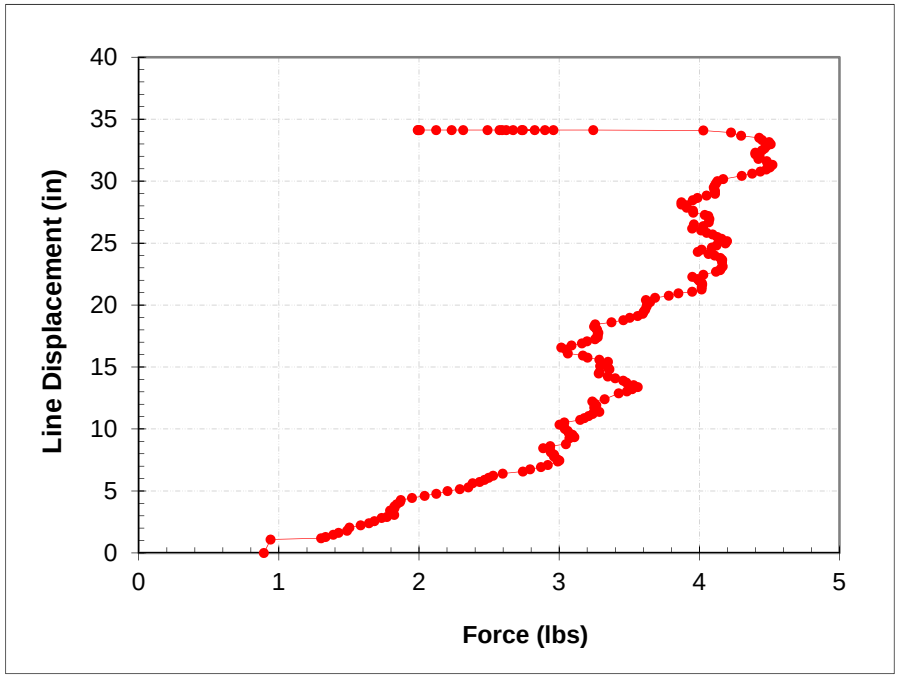
Load Cell Reading at Final Embedment: **3.8 lbs.**

Final Embedment: **9 in.**

Drag Distance: **45 in.**

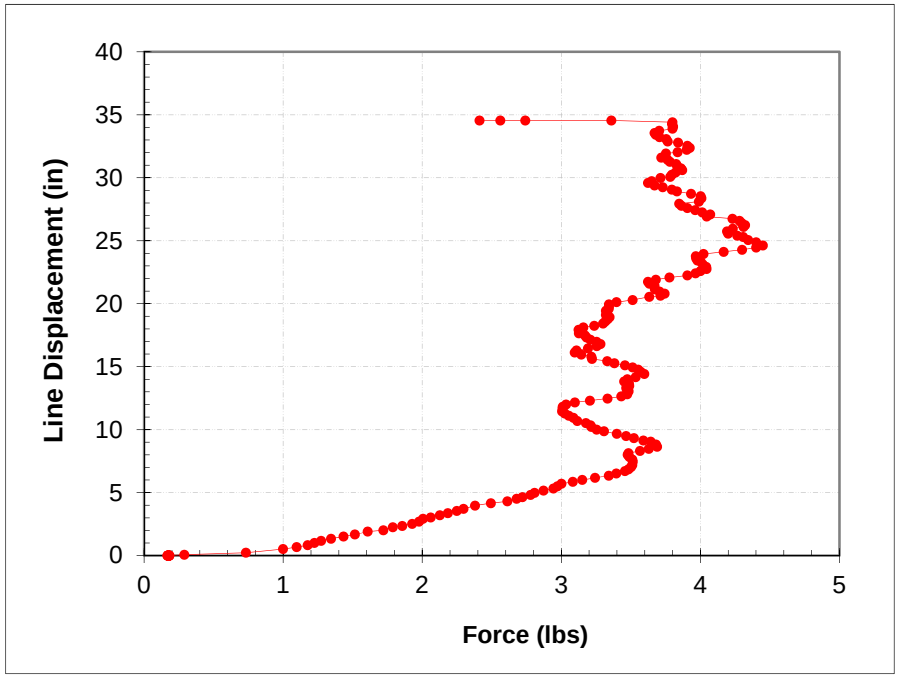
Final Orientation: **flat**

In-plane Drag Embedment Test



Wider Fluke Anchor with 45° fluke-shank angle
Date: 7/12/2010
Tank Track: Track 2
Test No.: 3
Anchor Line Type: Thick
Initial Embedment: 0 in.
Comments: -

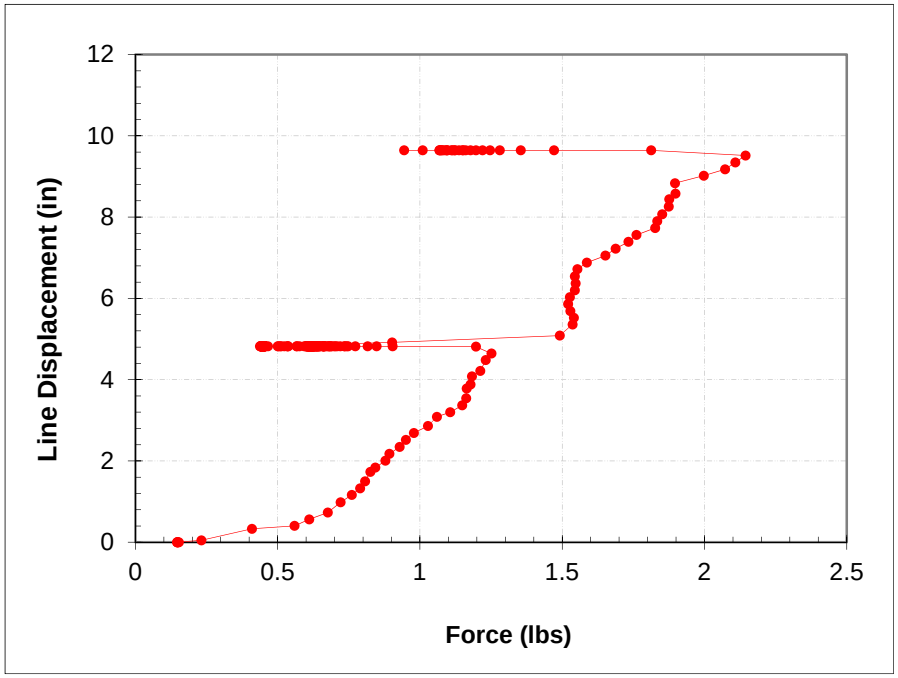
Load Cell Reading at Final Embedment: **4.52 lbs.**
Final Embedment: **10 in.**
Drag Distance: **48 in.**
Final Orientation: **flat**



Wider Fluke Anchor with 45° fluke-shank angle
Date: 7/12/2010
Tank Track: Track 2
Test No.: 4
Anchor Line Type: Thick
Initial Embedment: 0 in.
Comments: -

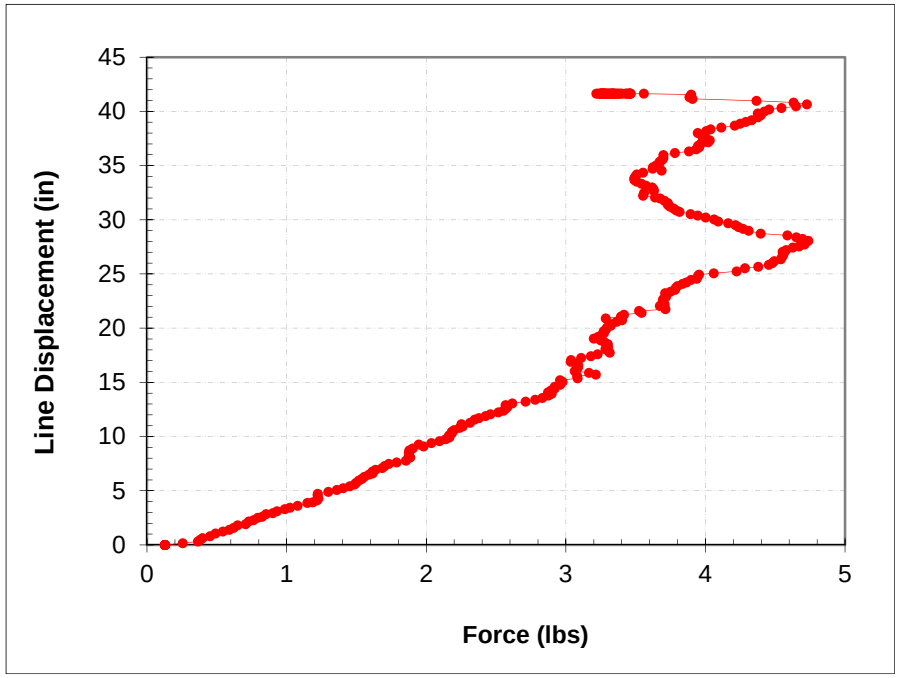
Load Cell Reading at Final Embedment: **4.45 lbs.**
Final Embedment: **10 in.**
Drag Distance: **46 in.**
Final Orientation: **flat**

In-plane Drag Embedment Test



Wider Fluke Anchor with 45° fluke-shank angle
Date: 7/12/2010
Tank Track: Track 2
Test No.: 5
Anchor Line Type: Thick
Initial Embedment: 0 in.
Comments: Stopped to measure trajectory

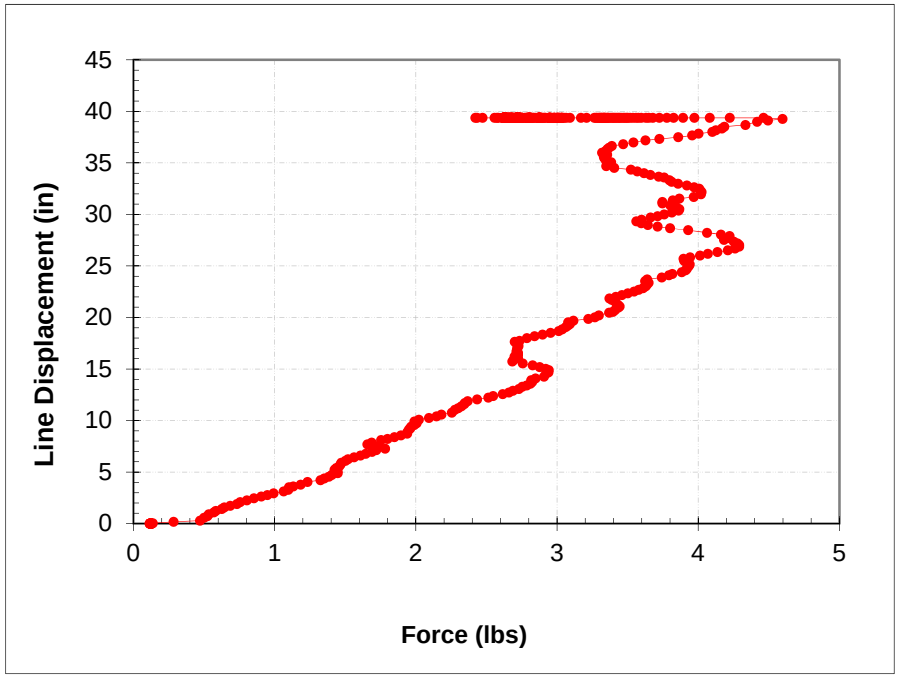
Load Cell Reading at Final Embedment: **3.81 lbs.**
Final Embedment: **9.5 in.**
Drag Distance: **43 in.**
Final Orientation: **flat**



Wider Fluke Anchor with 45° fluke-shank angle
Date: 7/12/2010
Tank Track: Track 3
Test No.: 1
Anchor Line Type: Thin
Initial Embedment: 0 in.
Comments: -

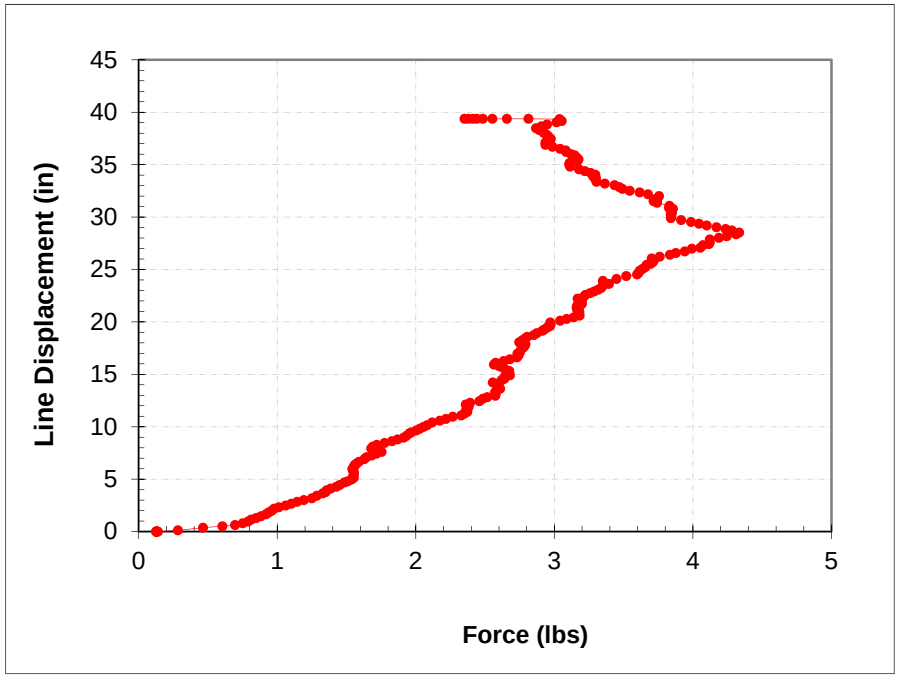
Load Cell Reading at Final Embedment: **4.26 lbs.**
Final Embedment: **13 in.**
Drag Distance: **45 in.**
Final Orientation: **flat**

In-plane Drag Embedment Test



Wider Fluke Anchor with 45° fluke-shank angle
Date: 7/12/2010
Tank Track: Track 3
Test No.: 2
Anchor Line Type: Thin
Initial Embedment: 0 in.
Comments: -

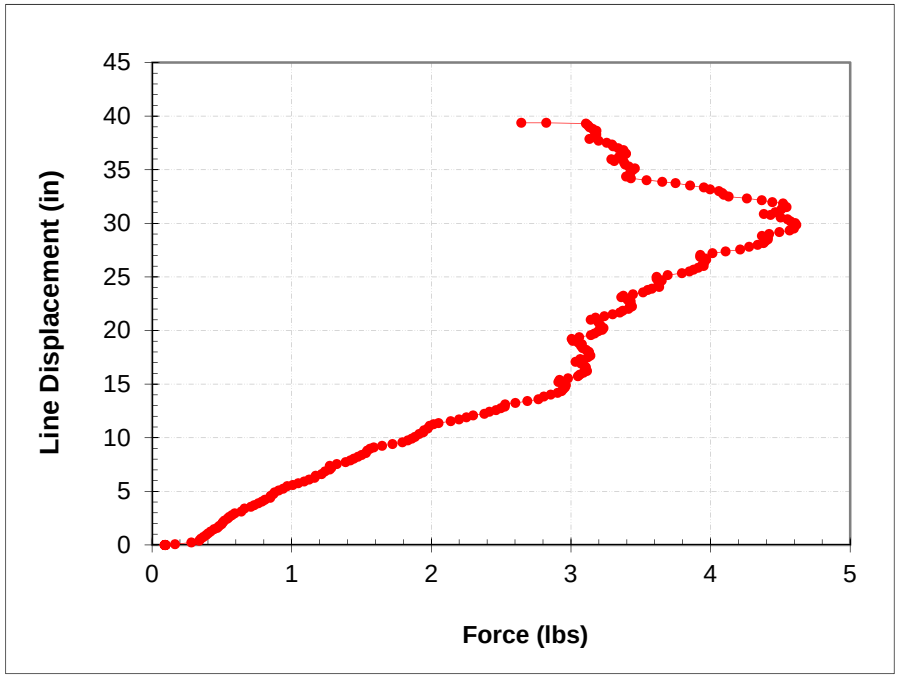
Load Cell Reading at Final Embedment: **4.74 lbs.**
Final Embedment: **13 in.**
Drag Distance: **51 in.**
Final Orientation: **flat**



Wider Fluke Anchor with 45° fluke-shank angle
Date: 7/12/2010
Tank Track: Track 3
Test No.: 3
Anchor Line Type: Thin
Initial Embedment: 0 in.
Comments: -

Load Cell Reading at Final Embedment: **4.33 lbs.**
Final Embedment: **13 in.**
Drag Distance: **50 in.**
Final Orientation: **flat**

In-plane Drag Embedment Test



Wider Fluke Anchor with 45° fluke-shank angle

Date: 7/12/2010

Tank Track: Track 3

Test No.: 4

Anchor Line Type: Thin

Initial Embedment: 0 in.

Comments: -

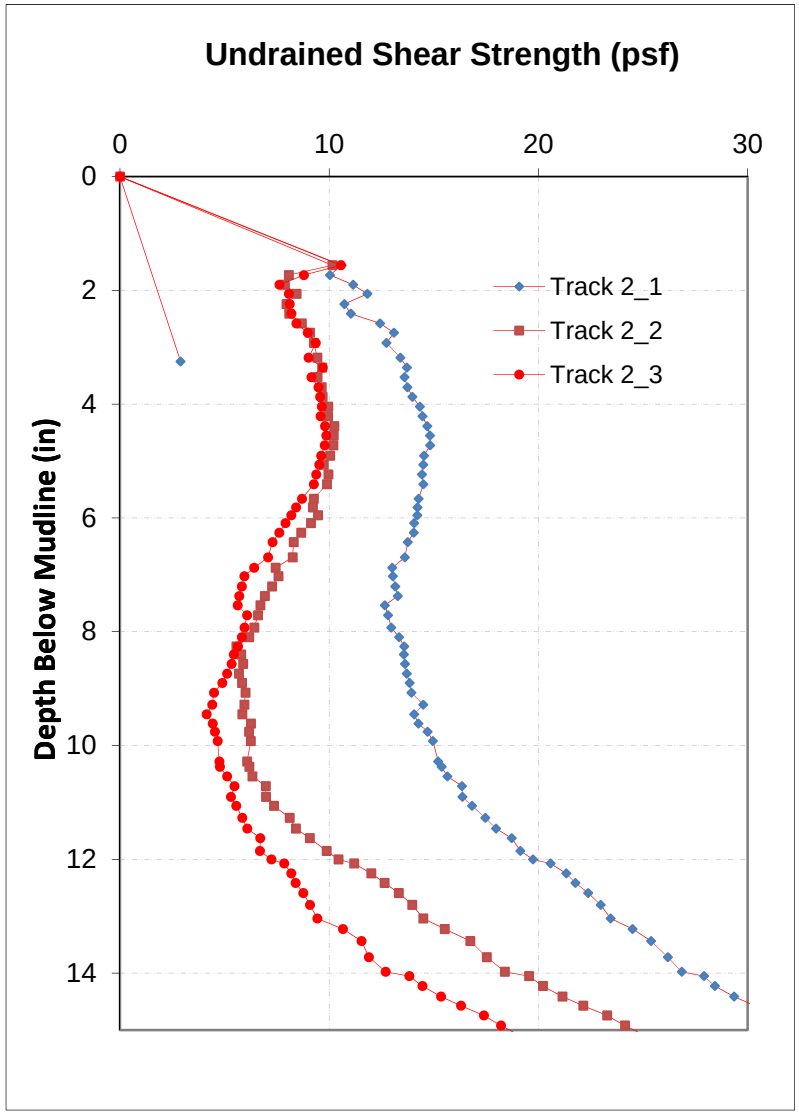
Load Cell Reading at Final Embedment: **4.61 lbs.**

Final Embedment: **13 in.**

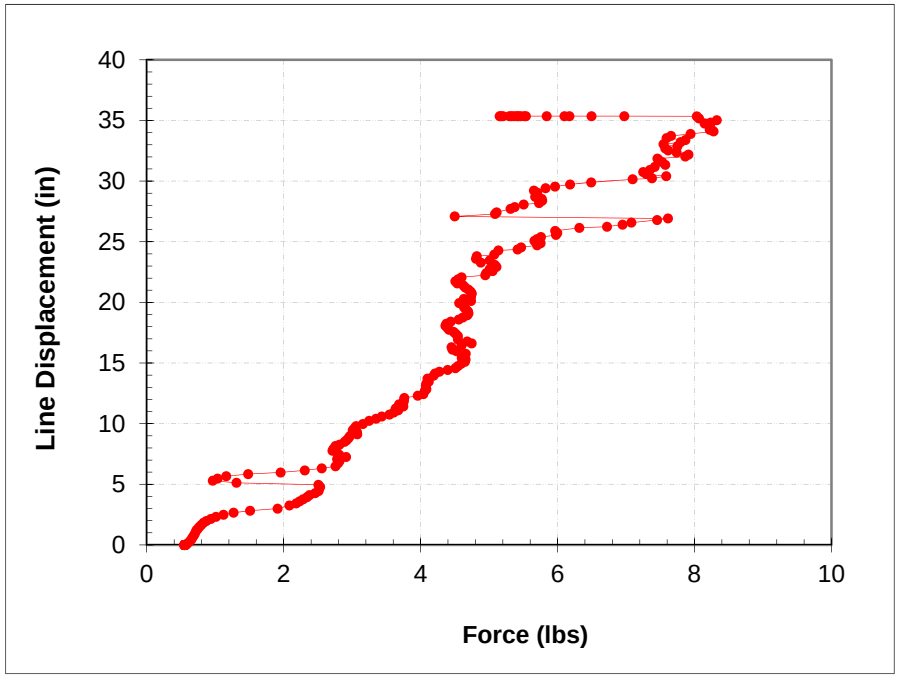
Drag Distance: **51 in.**

Final Orientation: **flat**

Undrained Shear Strength Profiles for 7/22/2010



In-plane Drag Embedment Test



Wider Fluke Anchor with 45° fluke-shank angle

Date: 7/22/2010

Tank Track: Track 2

Test No.: 1

Anchor Line Type: Thick

Initial Embedment: 0 in.

Comments: Used Magnetometer

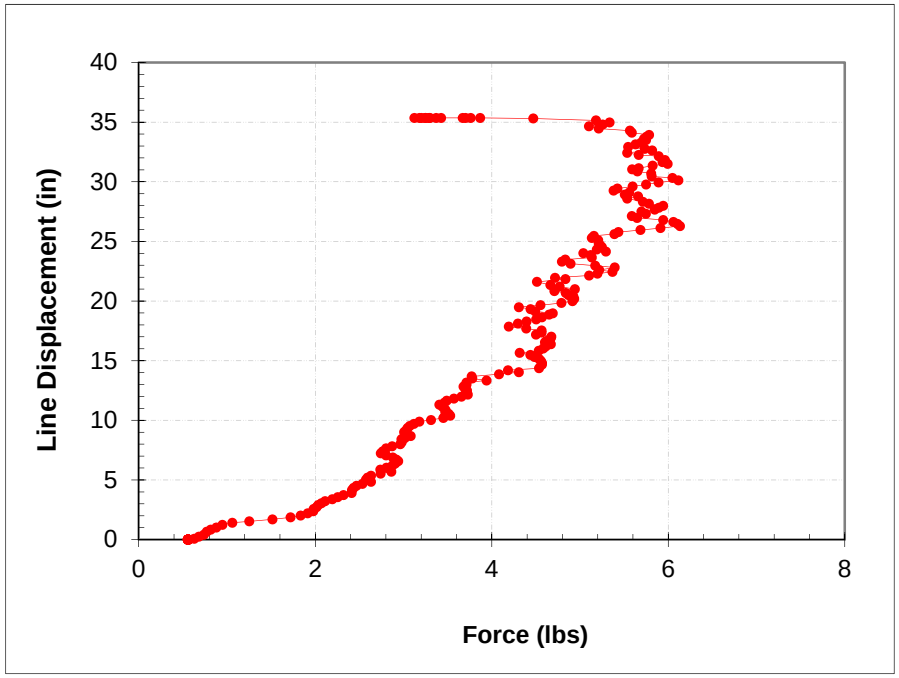
Load Cell Reading at Final Embedment: **8.33 lbs.**

Final Embedment: **8 in.**

Drag Distance: **41.4 in.**

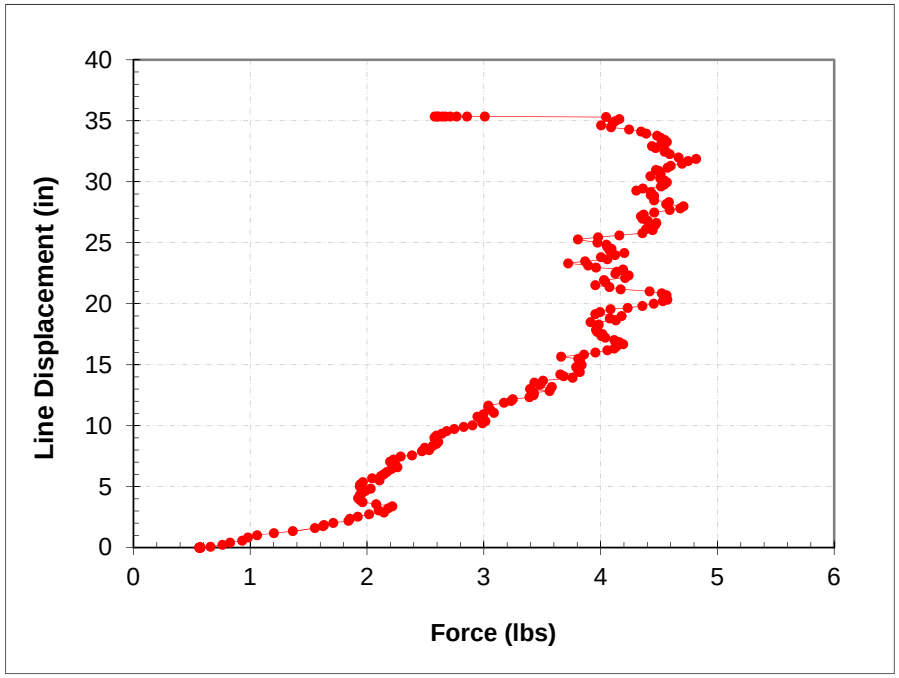
Final Orientation: **flat**

In-plane Drag Embedment Test



Wider Fluke Anchor with 45° fluke-shank angle
Date: 7/22/2010
Tank Track: Track 2
Test No.: 2
Anchor Line Type: Thick
Initial Embedment: 0 in.
Comments: Used Magnetometer

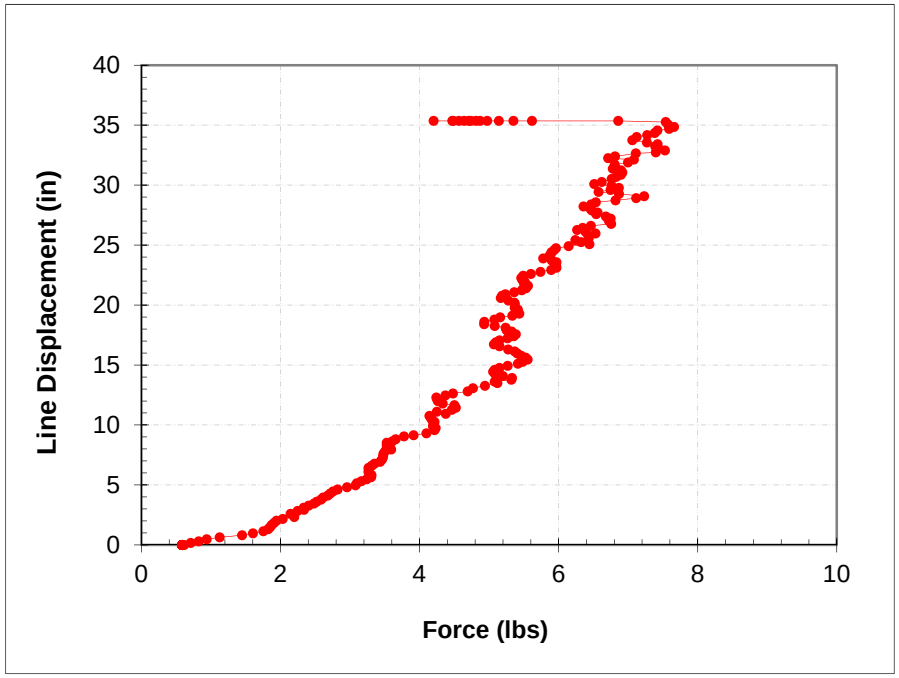
Load Cell Reading at Final Embedment: **6.13 lbs.**
Final Embedment: **8.5 in.**
Drag Distance: **41 in.**
Final Orientation: **flat**



Wider Fluke Anchor with 45° fluke-shank angle
Date: 7/22/2010
Tank Track: Track 2
Test No.: 3
Anchor Line Type: Thick
Initial Embedment: 0 in.
Comments: Used Magnetometer

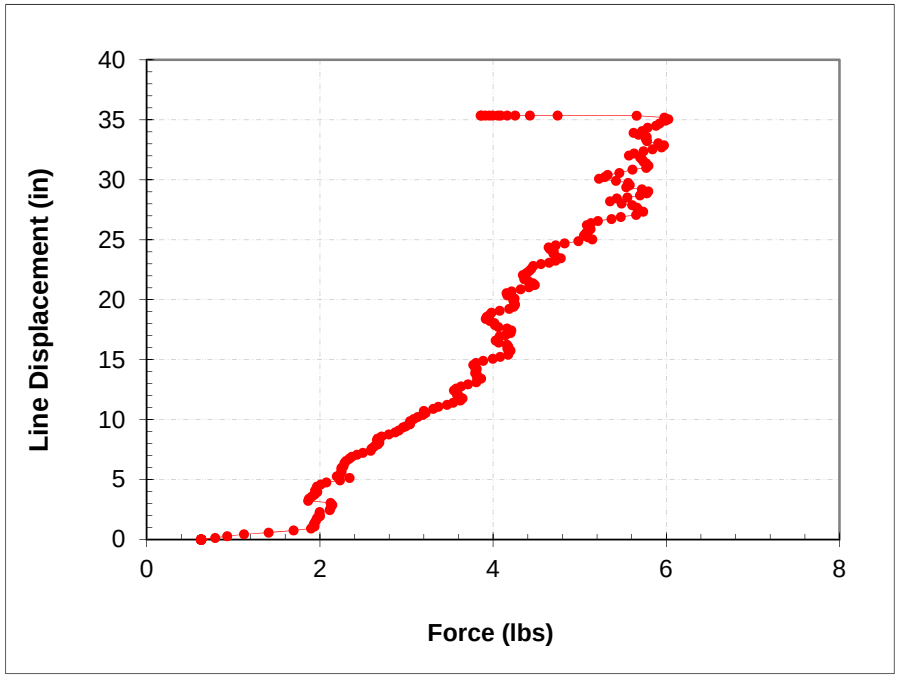
Load Cell Reading at Final Embedment: **4.82 lbs.**
Final Embedment: **9.5 in.**
Drag Distance: **43 in.**
Final Orientation: **flat**

In-plane Drag Embedment Test



Wider Fluke Anchor with 45° fluke-shank angle
Date: 7/22/2010
Tank Track: Track 2
Test No.: 4
Anchor Line Type: Thick
Initial Embedment: 0 in.
Comments: Used Magnetometer

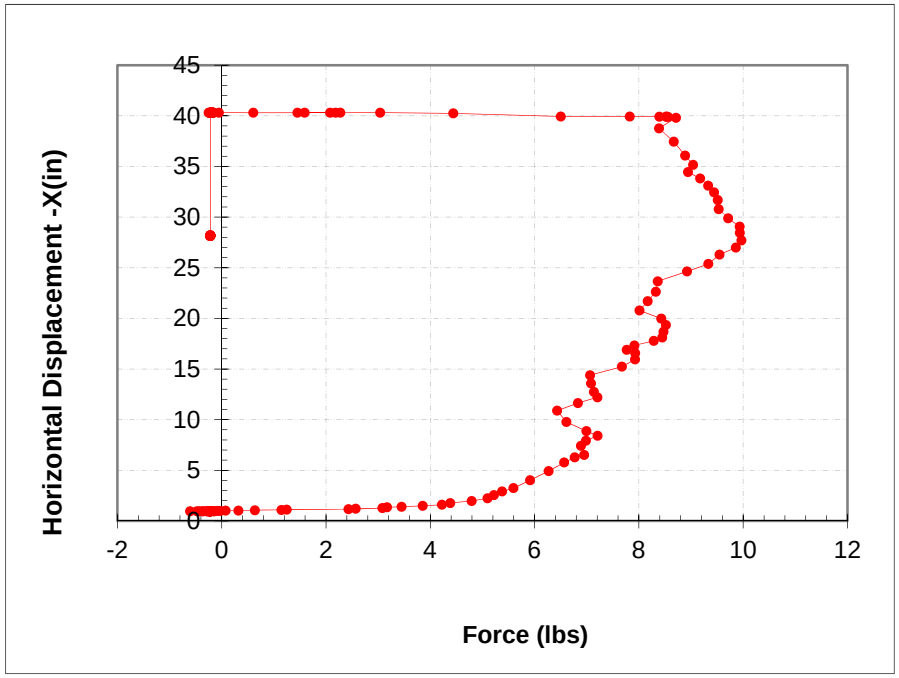
Load Cell Reading at Final Embedment: **7.66 lbs.**
Final Embedment: **10 in.**
Drag Distance: **43 in.**
Final Orientation: **flat**



Wider Fluke Anchor with 45° fluke-shank angle
Date: 7/22/2010
Tank Track: Track 2
Test No.: 5
Anchor Line Type: Thick
Initial Embedment: 0 in.
Comments: Used Magnetometer

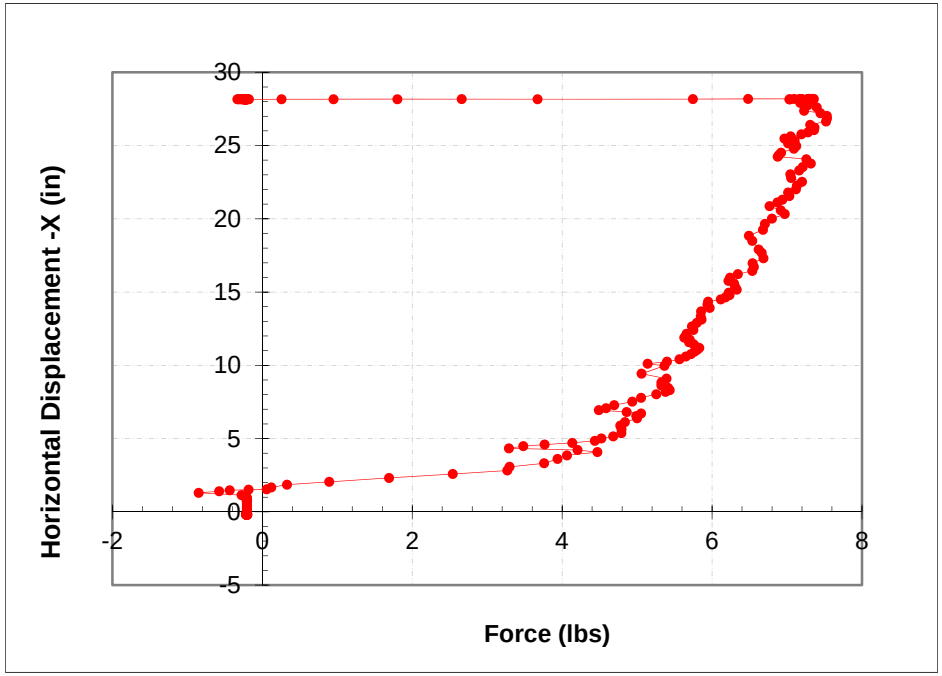
Load Cell Reading at Final Embedment: **6.02 lbs.**
Final Embedment: **8.5 in.**
Drag Distance: **44 in.**
Final Orientation: **flat**

In-plane Drag Embedment Test



Wider Fluke Anchor with 45° fluke-shank angle
Date: 8/02/10
Tank Track: Black Tub
Test No.: 1
Anchor Line Type: Thin
Initial Embedment: 0 in.
Comments: Used Magnetometer, Run by Hand

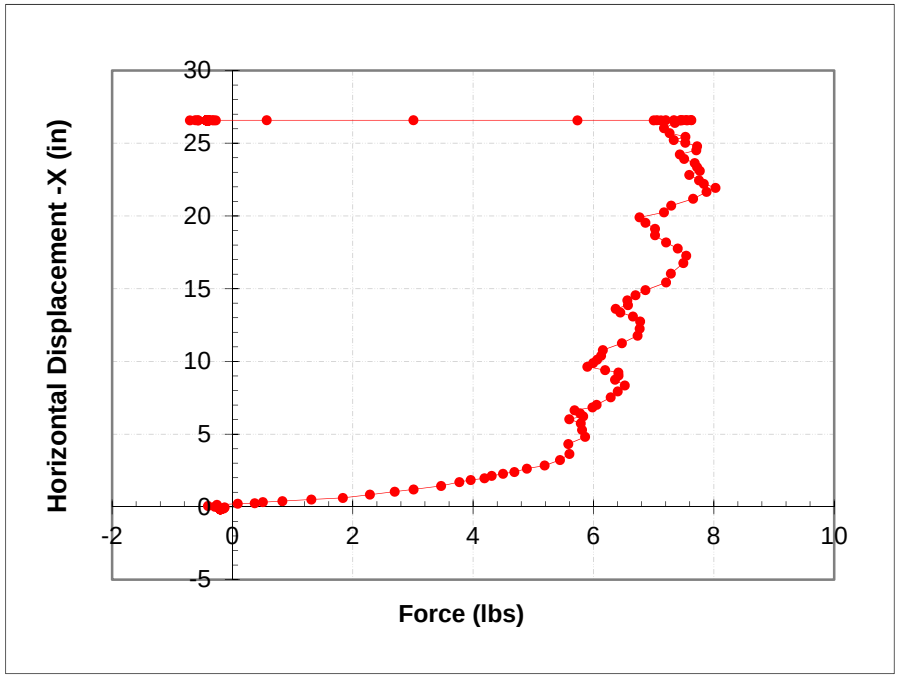
Load Cell Reading at Final Embedment: **9.97 lbs.**
Final Embedment: **4.21 in.**
Drag Distance: **26.75 in.**
Final Orientation: **pulled out**



Wider Fluke Anchor with 45° fluke-shank angle
Date: 8/02/10
Tank Track: Black Tub
Test No.: 2
Anchor Line Type: Thin
Initial Embedment: 0 in.
Comments: Used Magnetometer, Run by Hand

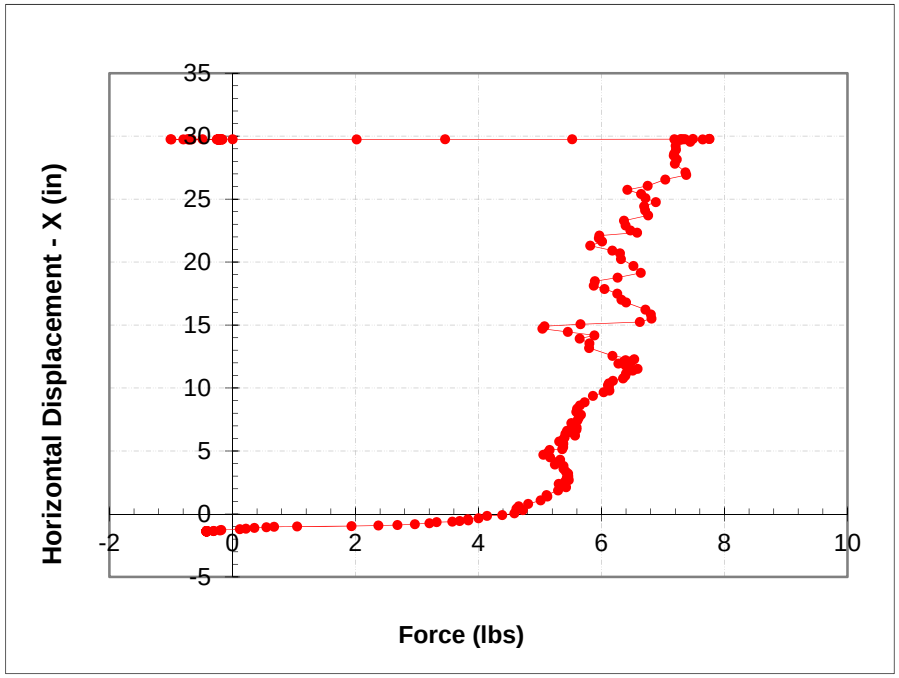
Load Cell Reading at Final Embedment: **7.53 lbs.**
Final Embedment: **4.21 in.**
Drag Distance: **27.22 in.**
Final Orientation: **rolling slightly to right**

In-plane Drag Embedment Test



Wider Fluke Anchor with 45° fluke-shank angle
Date: 8/02/10
Tank Track: Black Tub
Test No.: 4
Anchor Line Type: Thin
Initial Embedment: 0 in.
Comments: Used Magnetometer, Run by Hand

Load Cell Reading at Final Embedment: **8.03 lbs.**
Final Embedment: **4.11 in.**
Drag Distance: **23.06 in.**
Final Orientation: **rolling right**



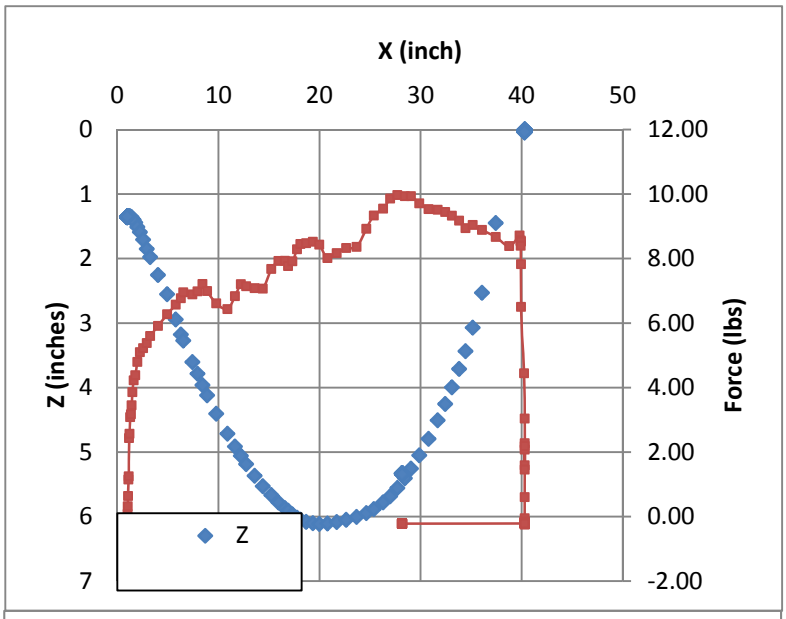
Wider Fluke Anchor with 45° fluke-shank angle
Date: 8/02/10
Tank Track: Black Tub
Test No.: 5
Anchor Line Type: Thin
Initial Embedment: 0 in.
Comments: Used Magnetometer, Run by Hand

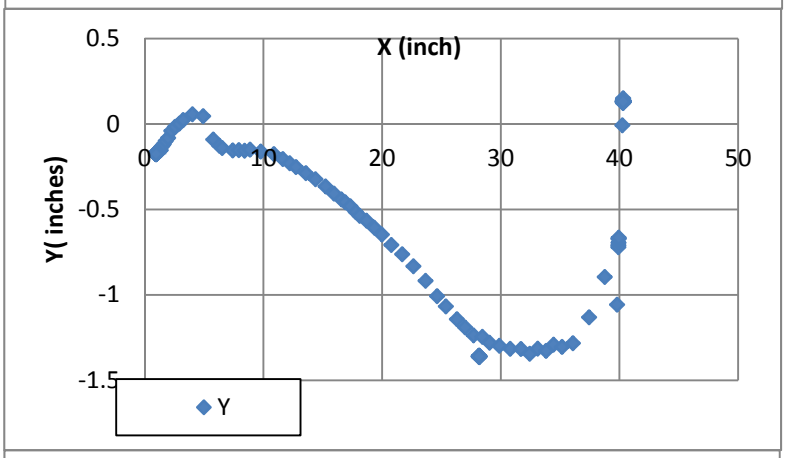
Load Cell Reading at Final Embedment: **7.76 lbs.**
Final Embedment: **2.52 in.**
Drag Distance: **28.39 in.**
Final Orientation: **rolling right**

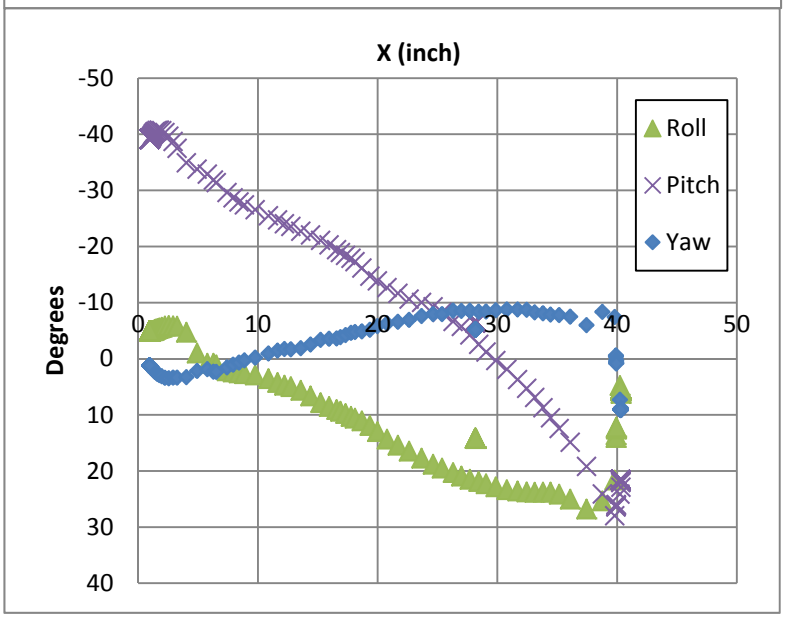
In-plane Drag Embedment Test

Wider Fluke Anchor with 45° fluke-shank angle
Date: 40392
Tank Track: Black Tub
Test No.: 08/2/2010_IP_Black Tub_1
Anchor Line Type: Thick
Initial Embedment: 0 in.
Comments: Used Magnetometer to track trajectory

Load Cell Reading at
Final Embedment: **8.43 lbs.**
Final Embedment: **0 in.**
Drag Distance: **19.02 in.**
Final Orientation: **Rolled 10° at max dive, pulled out**







In-plane Drag Embedment Test

Wider Fluke Anchor with 45° fluke-shank angle

Date: 40392

Tank Track: Black Tub

Test No.: 08/2/2010_IP_Black Tub_2

Anchor Line Type: Thick

Initial Embedment: 0 in.

Comments: Used Magnetometer to track trajectory

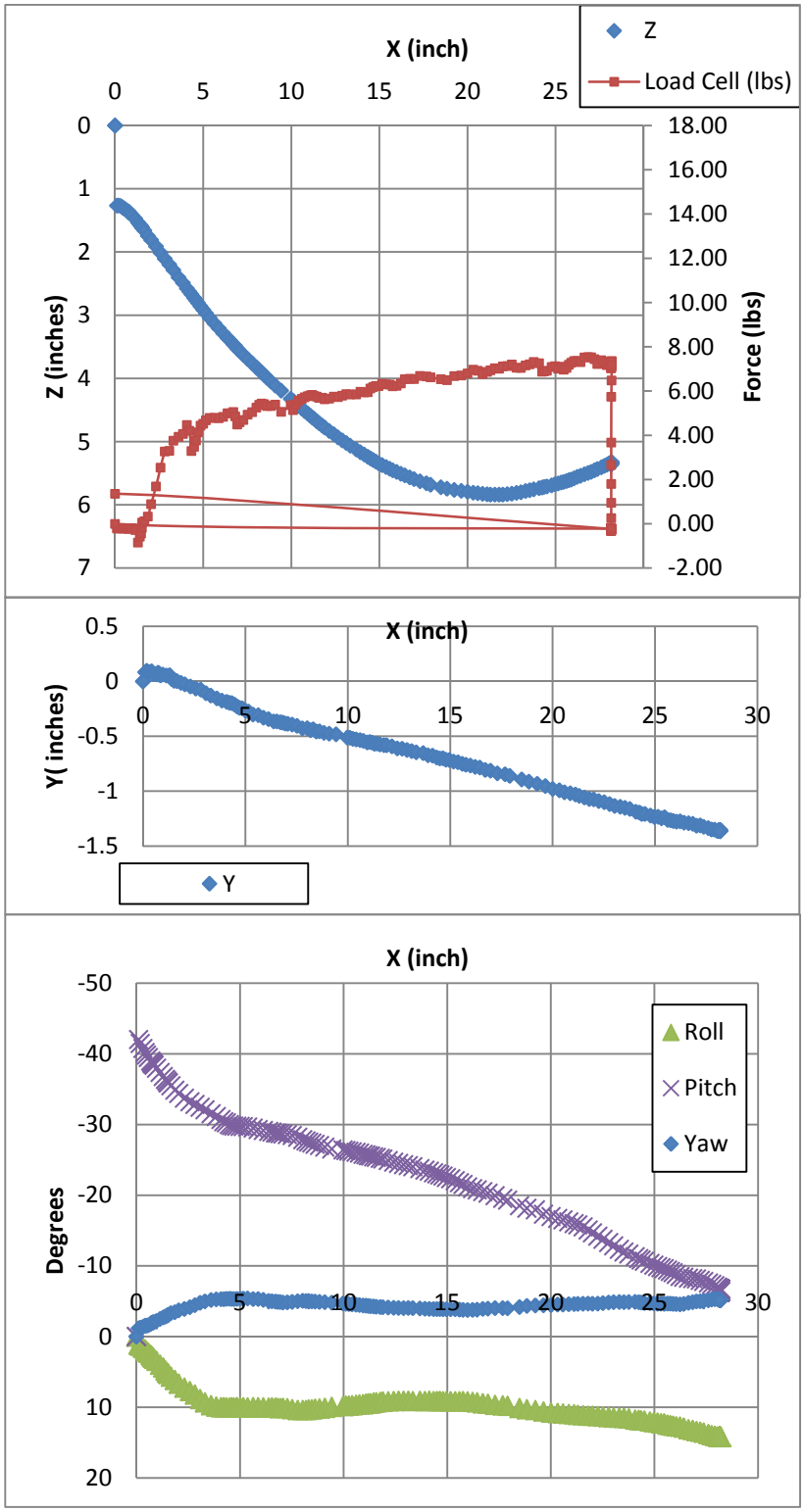
Load Cell Reading at

Final Embedment: **7.12 lbs.**

Final Embedment: **0 in.**

Drag Distance: **22.2 in.**

Final Orientation: **rolling ~10° right**



In-plane Drag Embedment Test

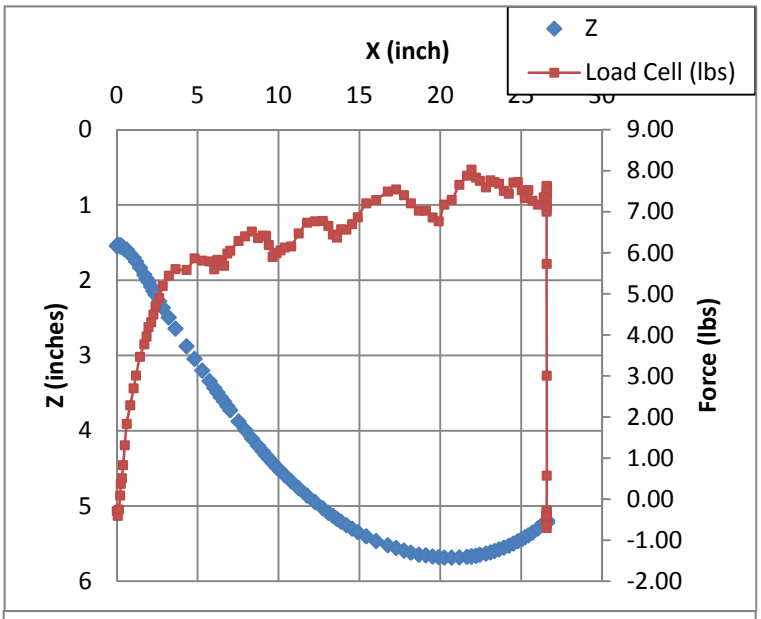
Wider Fluke Anchor with 45° fluke-shank angle
Date: 40392
Tank Track: Black Tub
Test No.: 08/2/2010_IP_Black Tub_3
Anchor Line Type: Thick
Initial Embedment: 0 in.
Comments: Error in Trajectory Readings

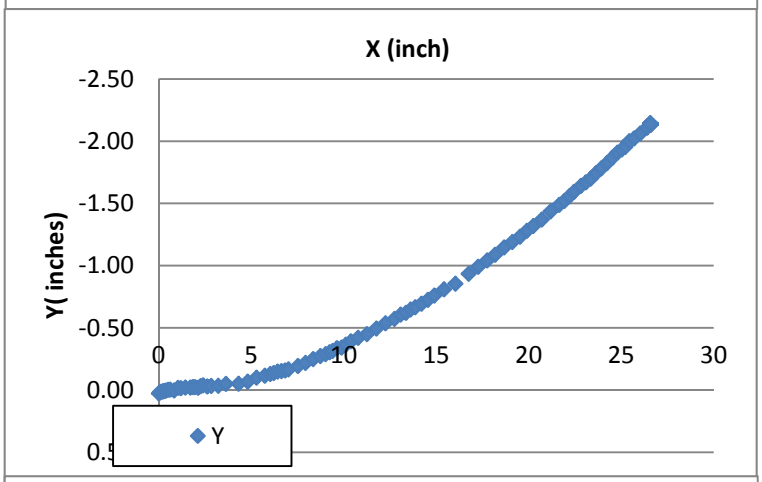
Load Cell Reading at Final Embedment: **- lbs.**
Final Embedment: **0 in.**
Drag Distance: **- in.**
Final Orientation: **rolling right**

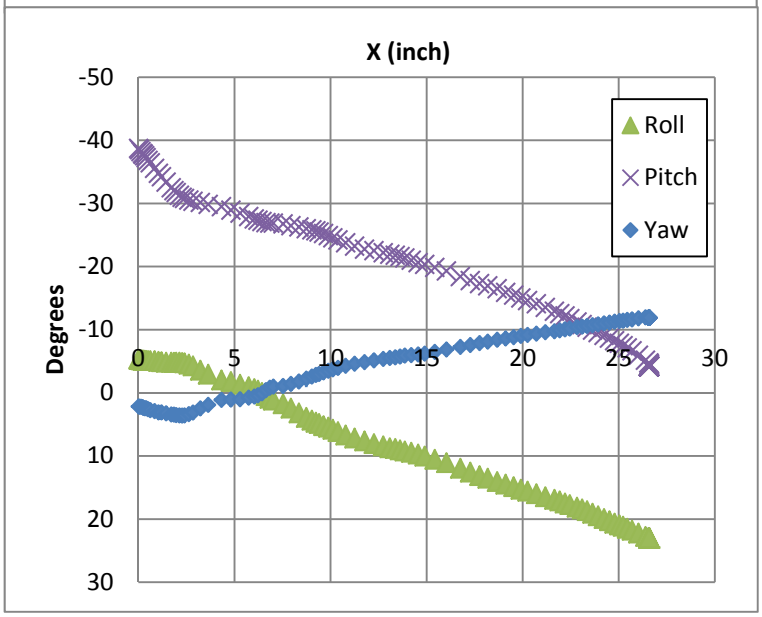
In-plane Drag Embedment Test

Wider Fluke Anchor with 45° fluke-shank angle
Date: 40392
Tank Track: Black Tub
Test No.: 08/2/2010_IP_Black Tub_4
Anchor Line Type: Thick
Initial Embedment: 0 in.
Comments: Used Magnetometer to track trajectory

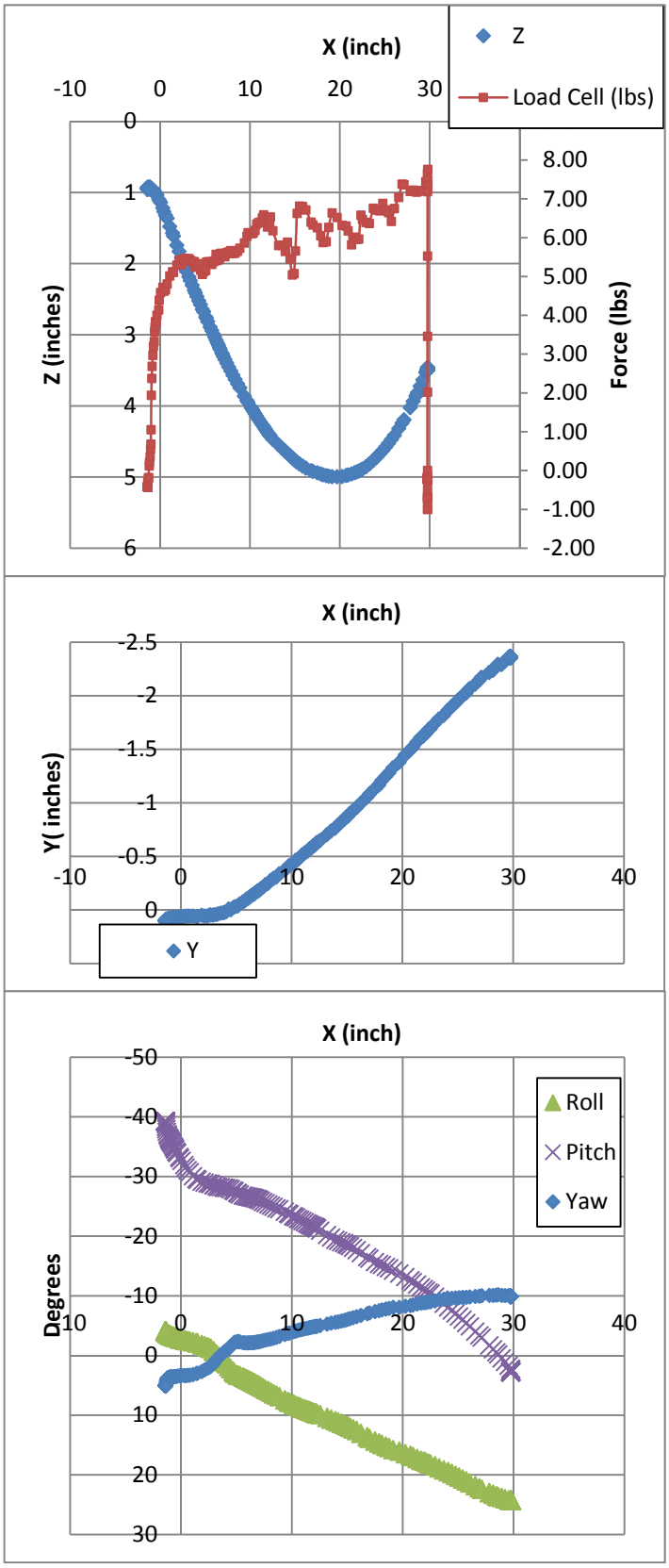
Load Cell Reading at
Final Embedment: **7.4 lbs.**
Final Embedment: **0 in.**
Drag Distance: **17.86 in.**
Final Orientation: **rolling ~15° right**







In-plane Drag Embedment Test



Wider Fluke Anchor with 45° fluke-shank angle

Date: 40392

Tank Track: Black Tub

Test No.: 08/2/2010_IP_Black Tub_5

Anchor Line Type: Thick

Initial Embedment: 0 in.

Comments: Used Magnetometer to track trajectory

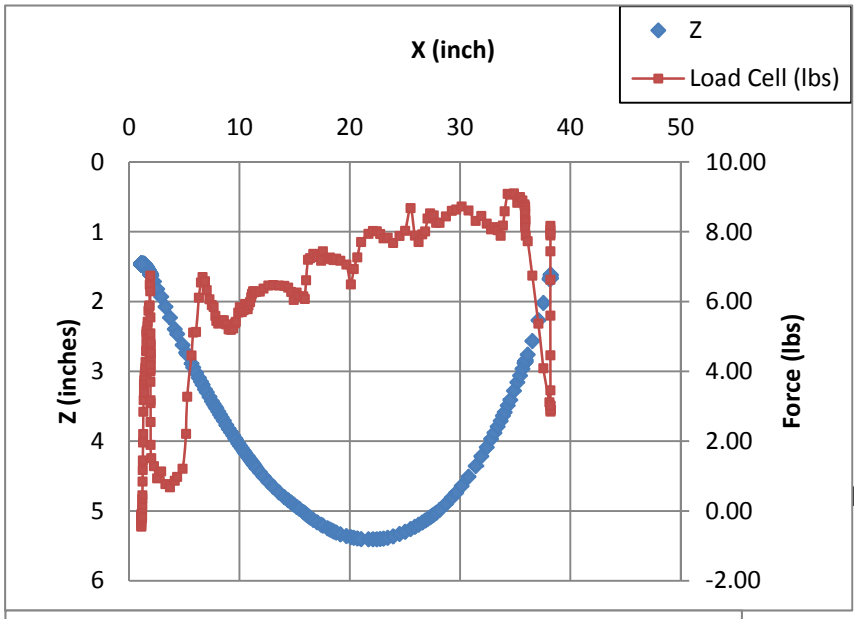
Load Cell Reading at Final Embedment: **6.52 lbs.**

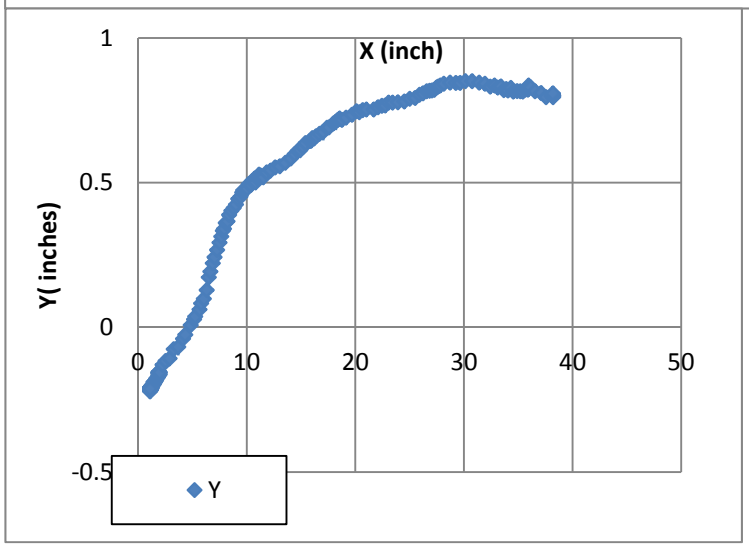
Final Embedment: **0 in.**

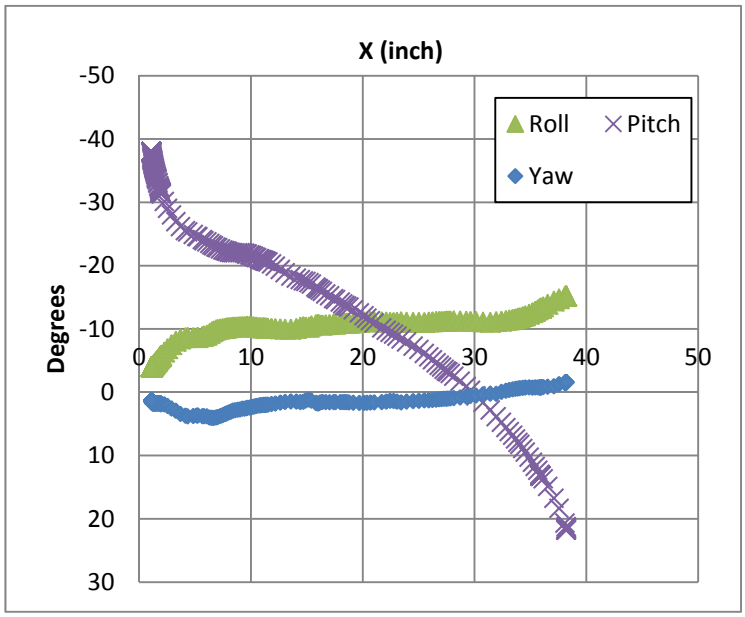
Drag Distance: **18.32 in.**

Final Orientation: **rolling ~15° right**

In-plane Drag Embedment Test



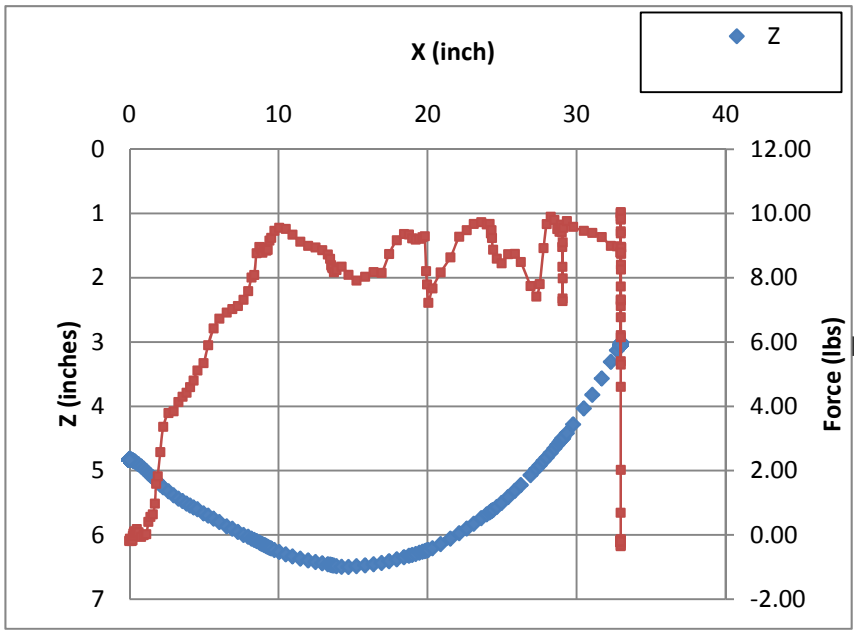




Wider Fluke Anchor with
45° fluke-shank angle
Date: 8/9/2010
Tank Track: Black Tub
Test No.: 1
Type of Test: In-plane
Anchor Line Type: Thin
Initial Embedment: 1.46 in.
Comments: In-plane

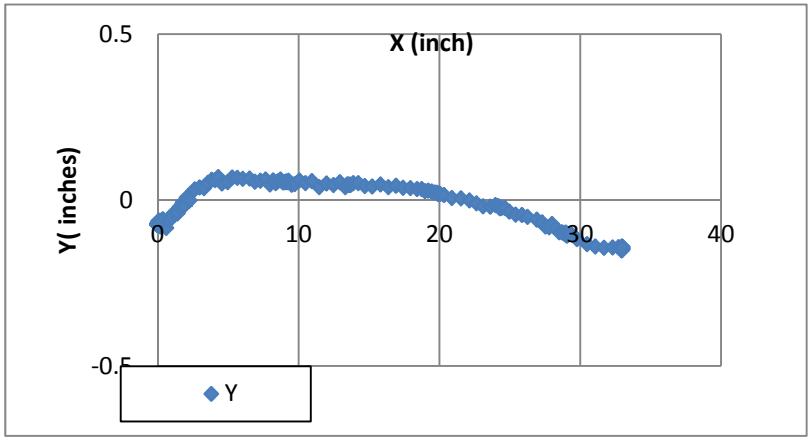
Cell Reading at Final Embedment: **8.01 lbs.**
Final Embedment: **5.41 in.**
Drag Distance: **22.45 in.**
Final Orientation: **-9.5**

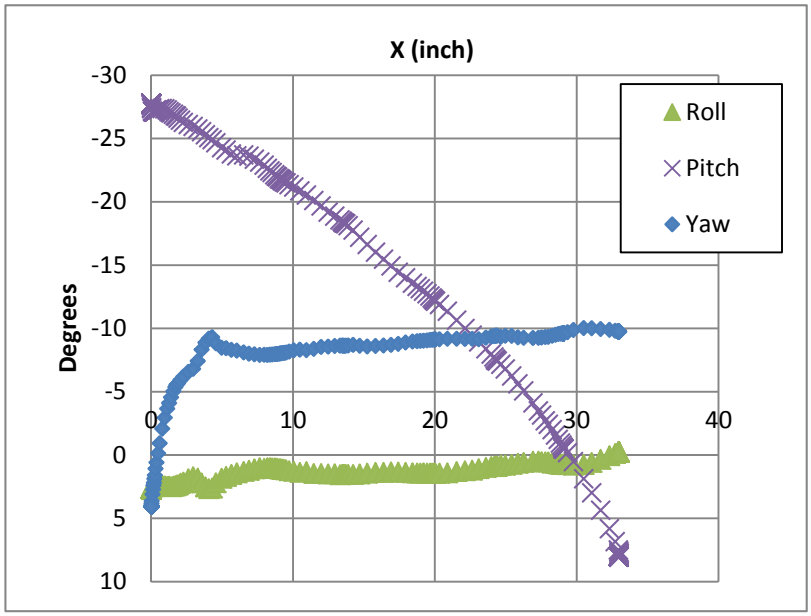
In-plane Drag Embedment Test



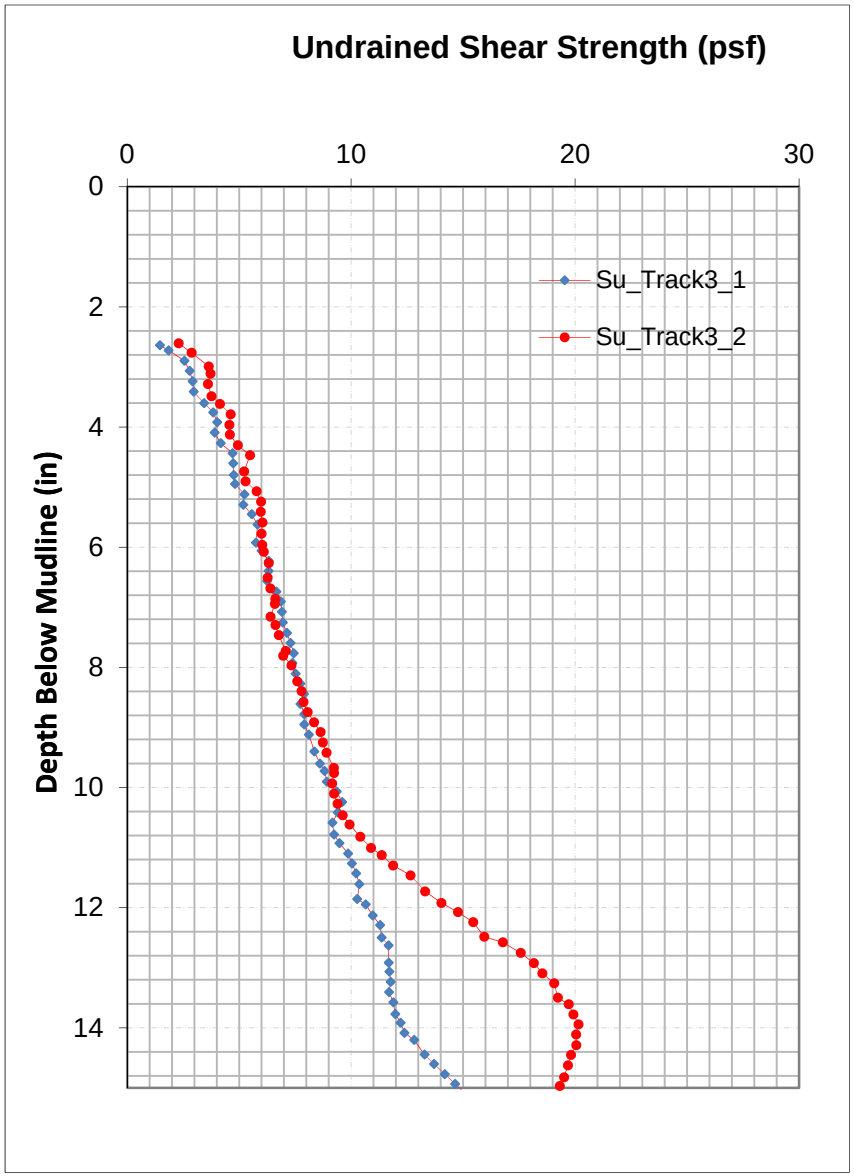
Wider Fluke Anchor with
45° fluke-shank angle
Date: 8/9/2010
Tank Track: Black Tub
Test No.: 2
Anchor Line Type: Thin
Initial Embedment: 4.83 in.
Comments: In-plane, embeded

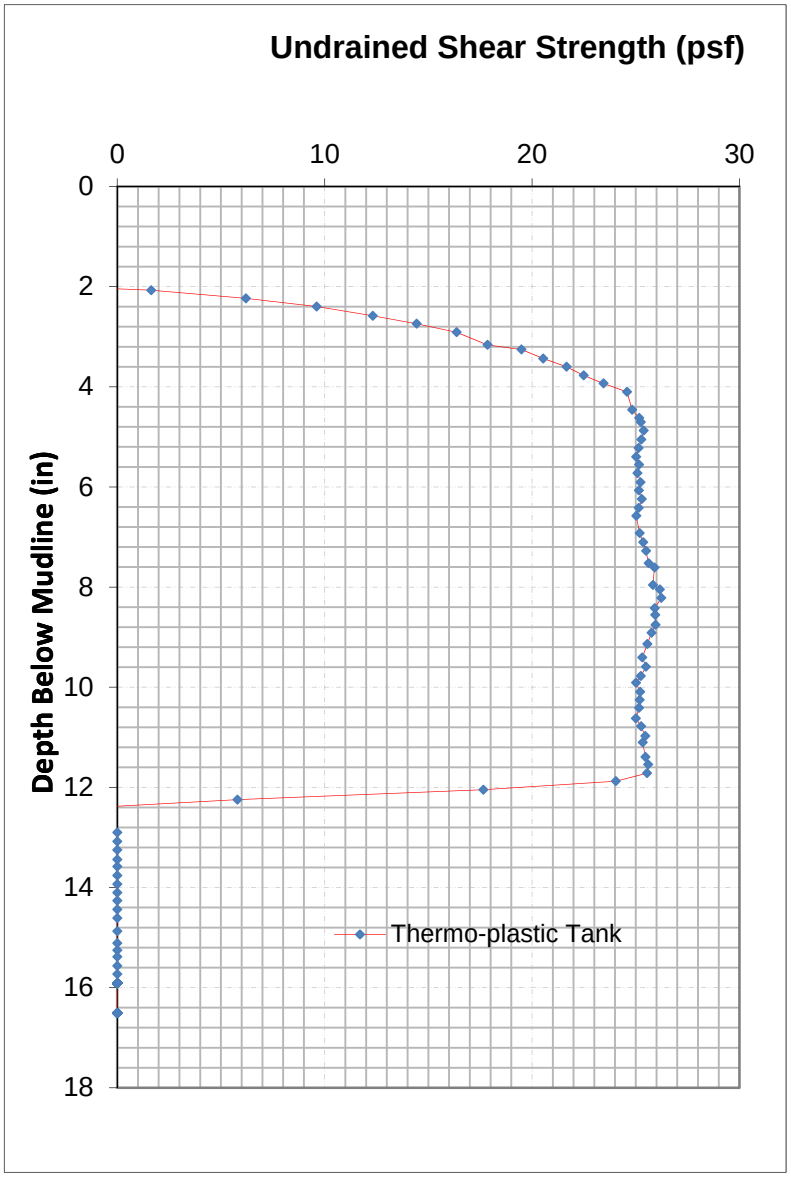
Cell Reading at Final Embedment: **8.09 lbs.**
Final Embedment: **6.5 in.**
Drag Distance: **15.31 in.**
Final Orientation: **-17**



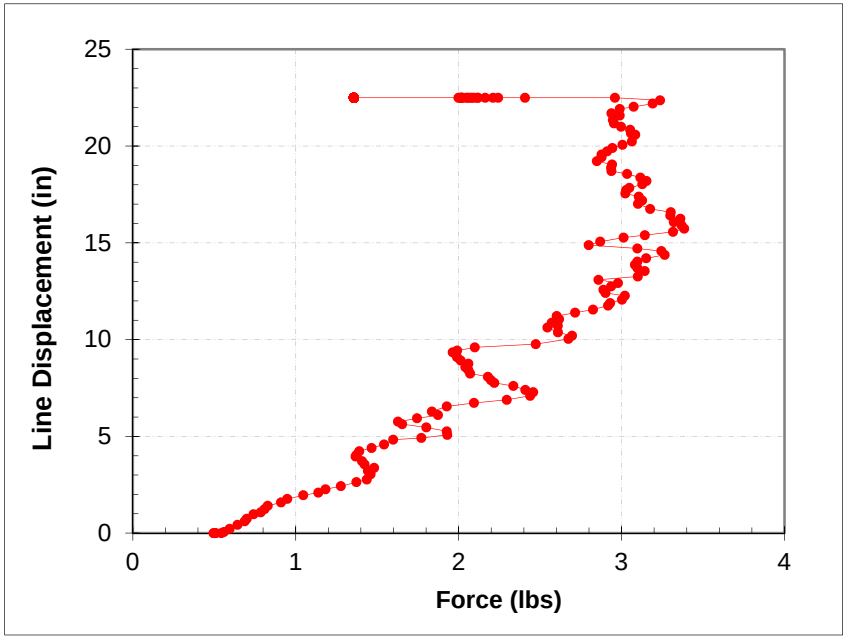


Undrain Shear Strength Data for 10/20/2010



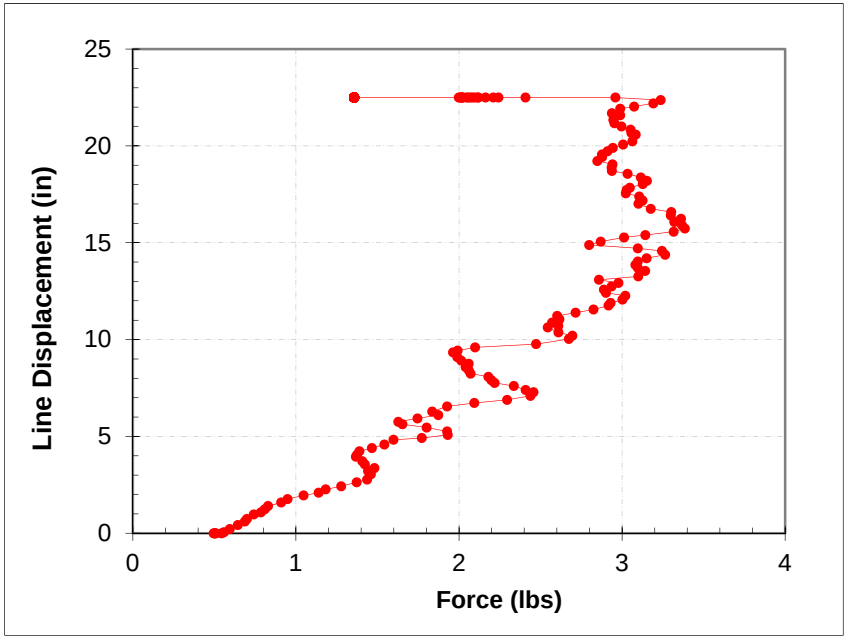


In-plane Drag Embedment Test



Wider Fluke Anchor with 45° fluke-shank angle
Date: 40471
Tank Track: 3
Test No.: 10/20/2010_IP_Track3_1
Anchor Line Type: Thick
Initial Embedment: 0 in.
Comments: Max Load at 6.5 in, Bearing capacity factor calculated at max load and corresponding dive

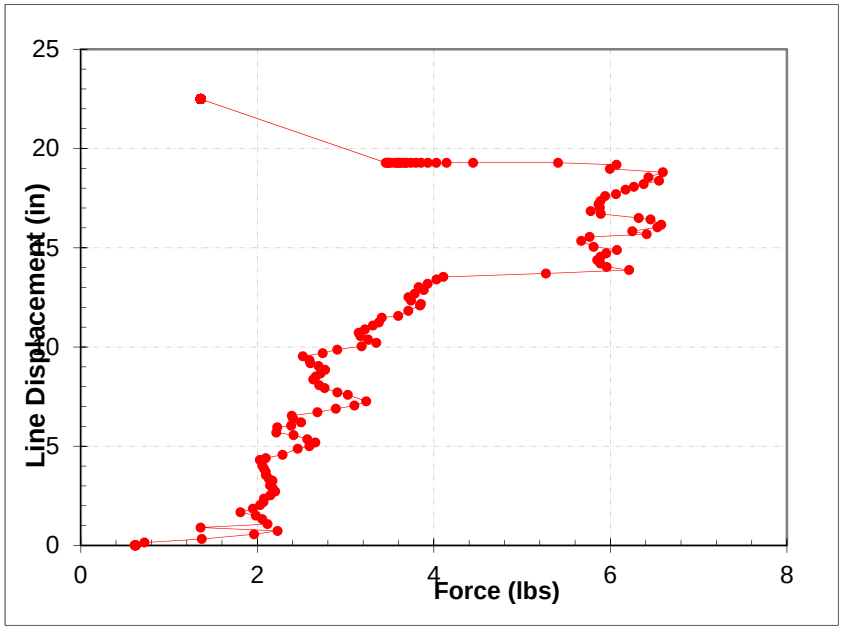
Load Cell Reading at Final Embedment: **4.58 lbs.**
Final Embedment: **0 in.**
Drag Distance: **33 in.**
Final Orientation: **Pitched up**



Wider Fluke Anchor with 45° fluke-shank angle
Date: 40471
Tank Track: 3
Test No.: 10/20/2010_IP_Track3_2
Anchor Line Type: Thick
Initial Embedment: 0 in.
Comments:

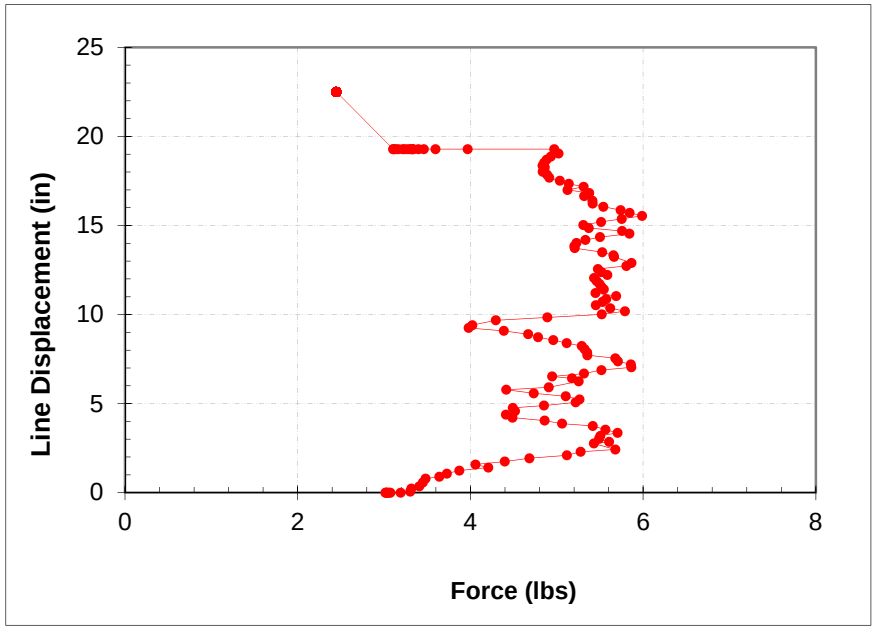
Load Cell Reading at Final Embedment: **3.38 lbs.**
Final Embedment: **0 in.**
Drag Distance: **24 in.**
Final Orientation: **Slightly pitched pitched**

In-plane Drag Embedment Test



Wider Fluke Anchor with 45° fluke-shank angle
Date: 40471
Tank Track: 3
Test No.: 10/20/2010_IP_Track3_3
Anchor Line Type: Thick
Initial Embedment: 0 in.
Comments: Load Cell got Caught

Load Cell Reading at Final Embedment: **- lbs.**
Final Embedment: **0 in.**
Drag Distance: **23 in.**
Final Orientation: **Slightly pitched pitched**



Wider Fluke Anchor with 45° fluke-shank angle
Date: 40471
Tank Track: 3
Test No.: 10/20/2010_IP_Track3_4
Anchor Line Type: Thick
Initial Embedment: 0 in.
Comments:

Load Cell Reading at Final Embedment: **3.38 lbs.**
Final Embedment: **0 in.**
Drag Distance: **23 in.**
Final Orientation: **Flat**

In-plane Drag Embedment Test

Wider Fluke Anchor with 45° fluke-shank angle

Date: 40471

Tank Track: Black Tub

Test No.: 10/20/2010_IP_Black Tub_1

Anchor Line Type: Thick

Initial Embedment: 1.39 in.

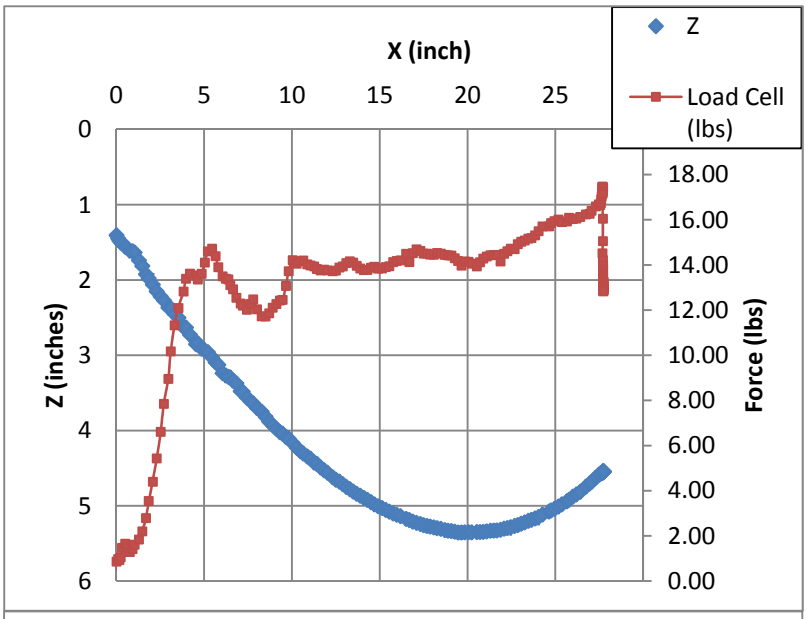
Comments: Error in Trajectory Readings

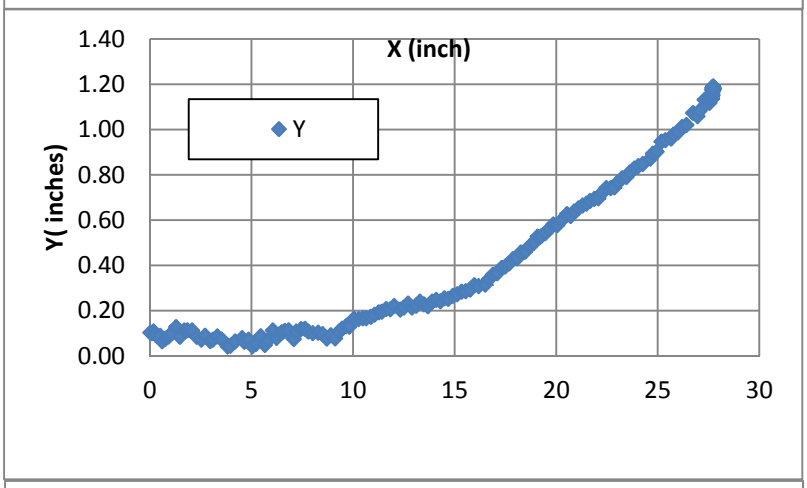
Load Cell Reading at Final Embedment: **15.27 lbs.**

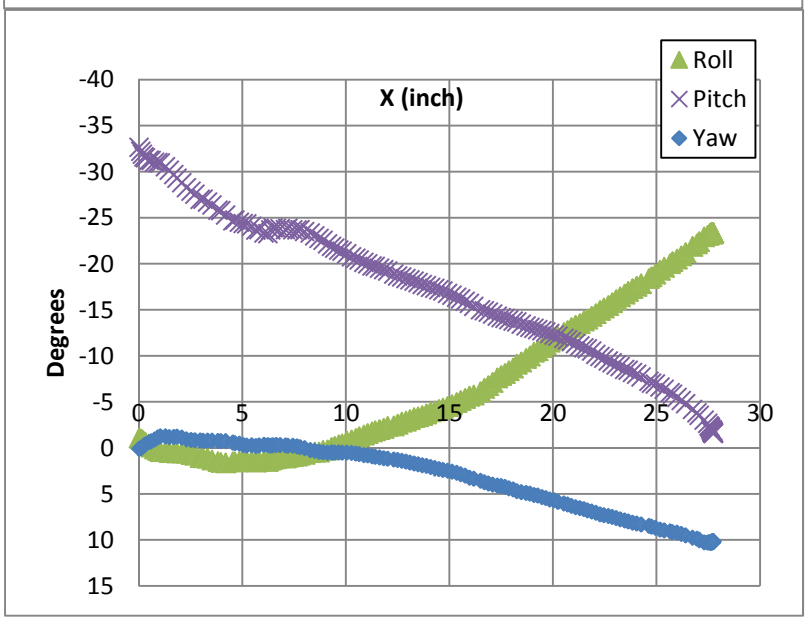
Final Embedment: **1.39 in.**

Drag Distance: **21.5 in.**

Final Orientation: **Rolling -16°, Pitch -6°**



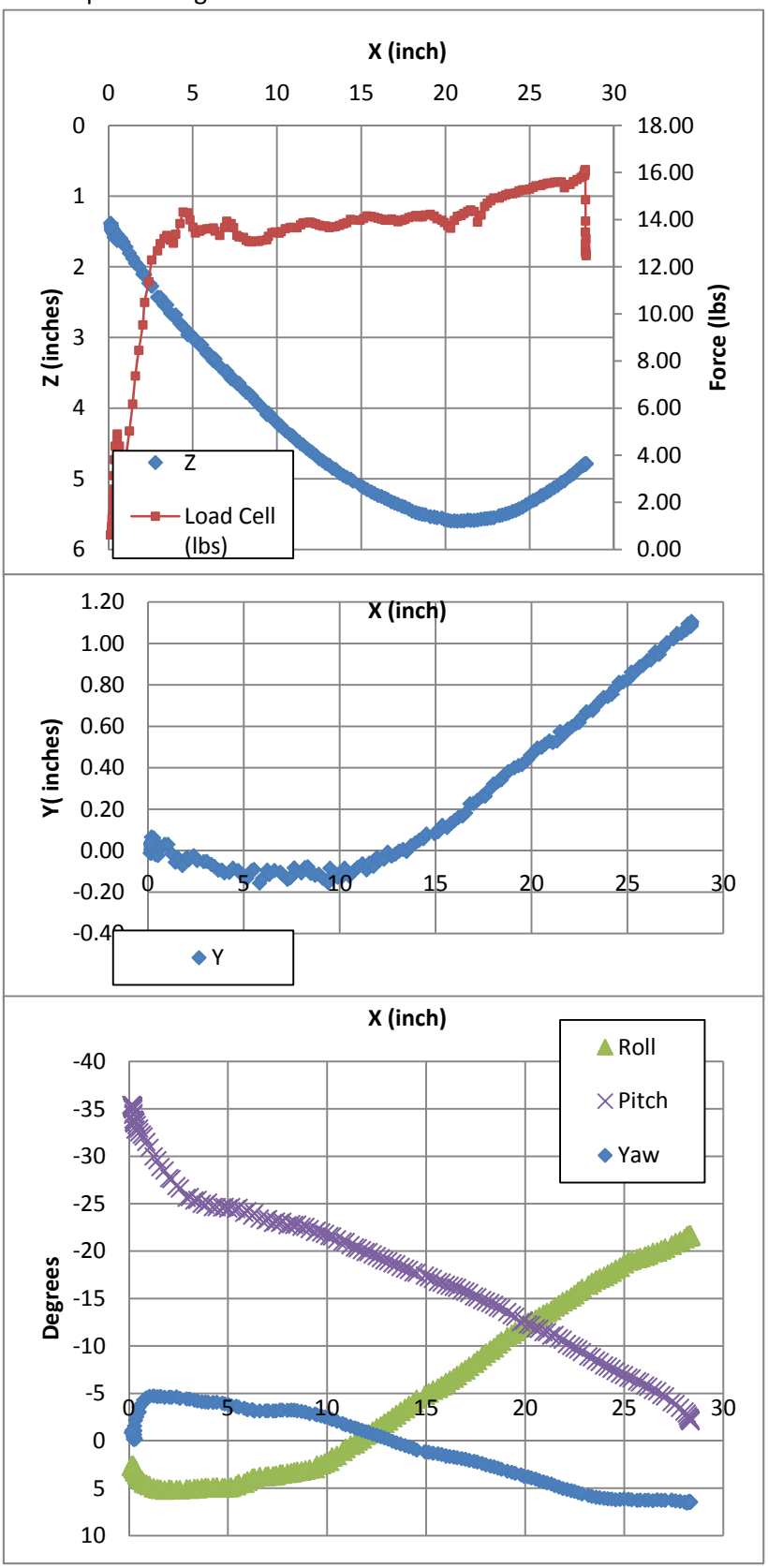




Wider Fluke Anchor with
45° fluke-shank angle
Date: 40471
Tank Track: Black Tub
Test No.: 10/20/2010_IP_Black Tub_2
Anchor Line Type: Thick
Initial Embedment: 1.39 in.
Comments: Used Magnetometer
to track trajectory

Load Cell Reading at
Final Embedment: **14.28 lbs.**
Final Embedment: **1.39 in.**
Drag Distance: **20.9 in.**
Final Orientation: **Rolling -13, Pitch -12°**

In-plane Drag Embedment Test

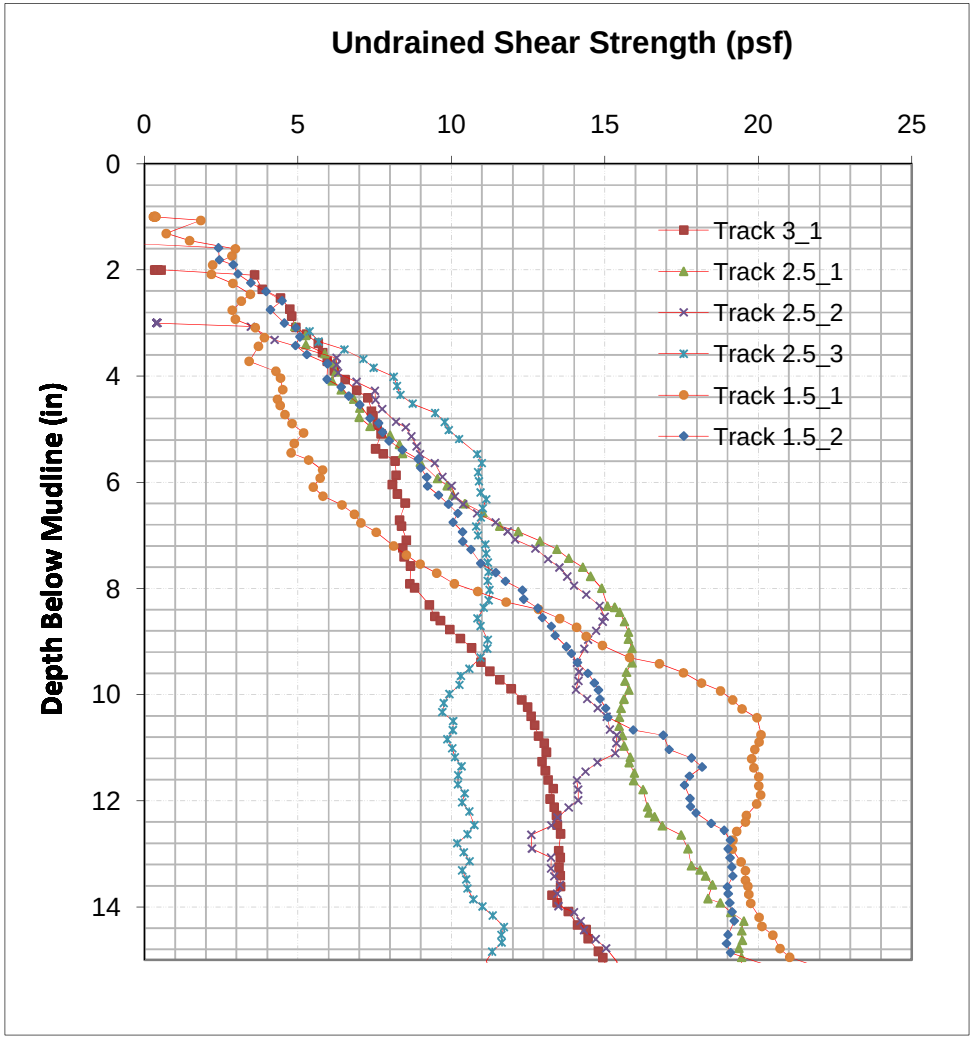


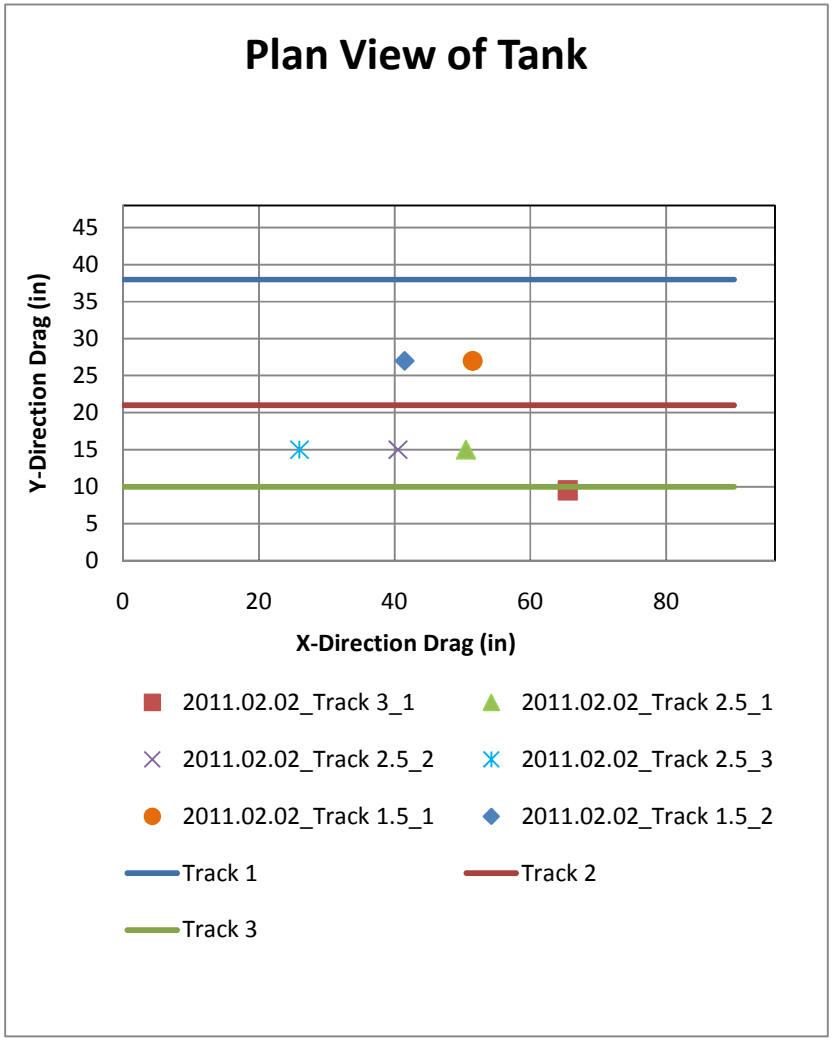
Wider Fluke Anchor with
45° fluke-shank angle
Date: 40471
Tank Track: Black Tub
Test No.: 10/20/2010_IP_Black Tub_3
Anchor Line Type: Thick
Initial Embedment: 1.44 in.
Comments: Used Magnetometer
to track trajectory

Load Cell Reading at
Final Embedment: **14.14 lbs.**
Final Embedment: **1.44 in.**
Drag Distance: **20.71 in.**
Final Orientation: **Rolling -13, Pitch -12°**

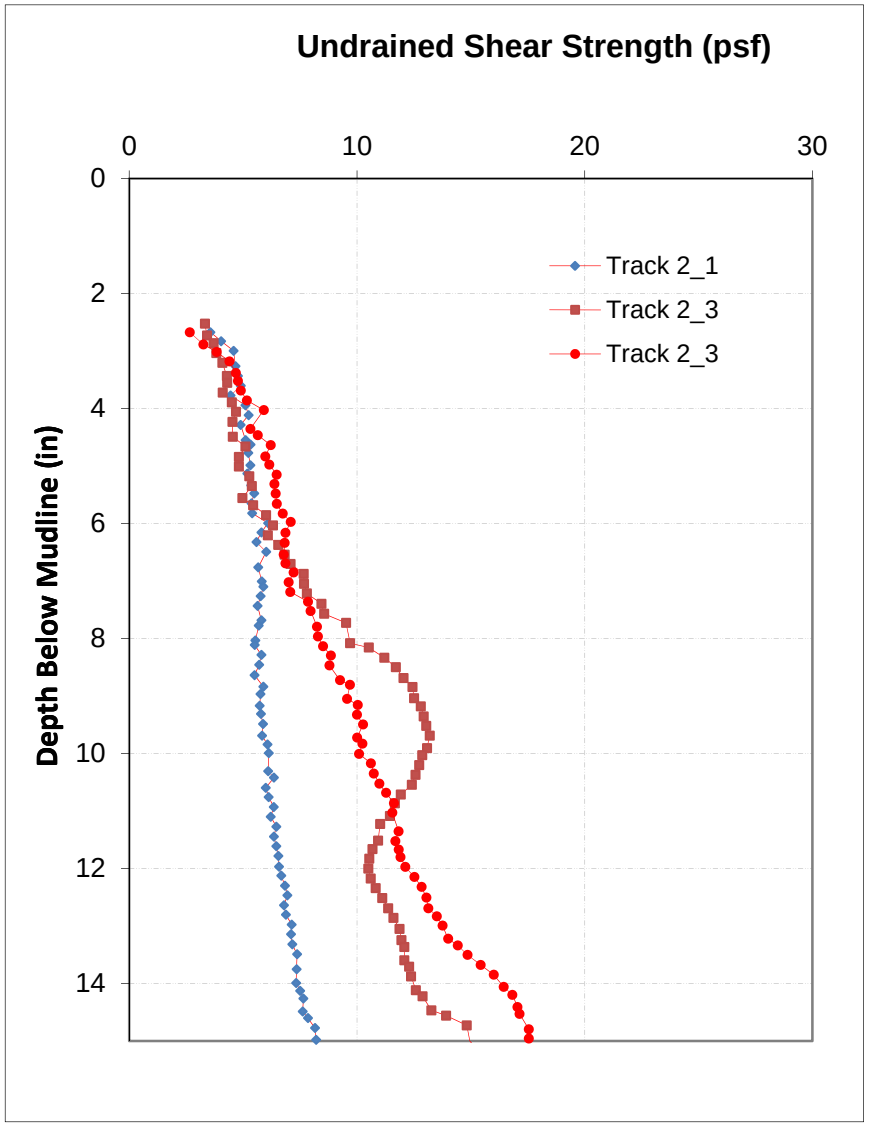
Out-of-plane Results

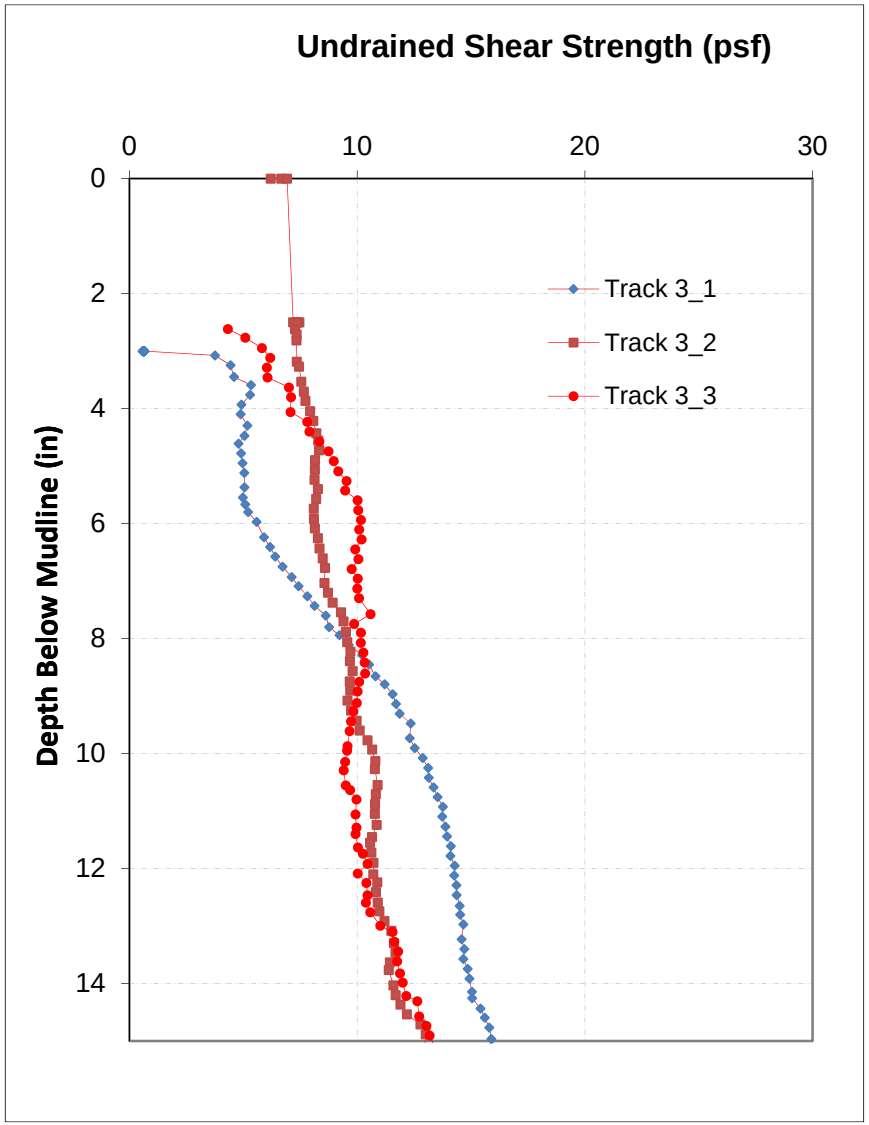
Undrained Shear Strength Profile 2/03/2011
Between Track Locations



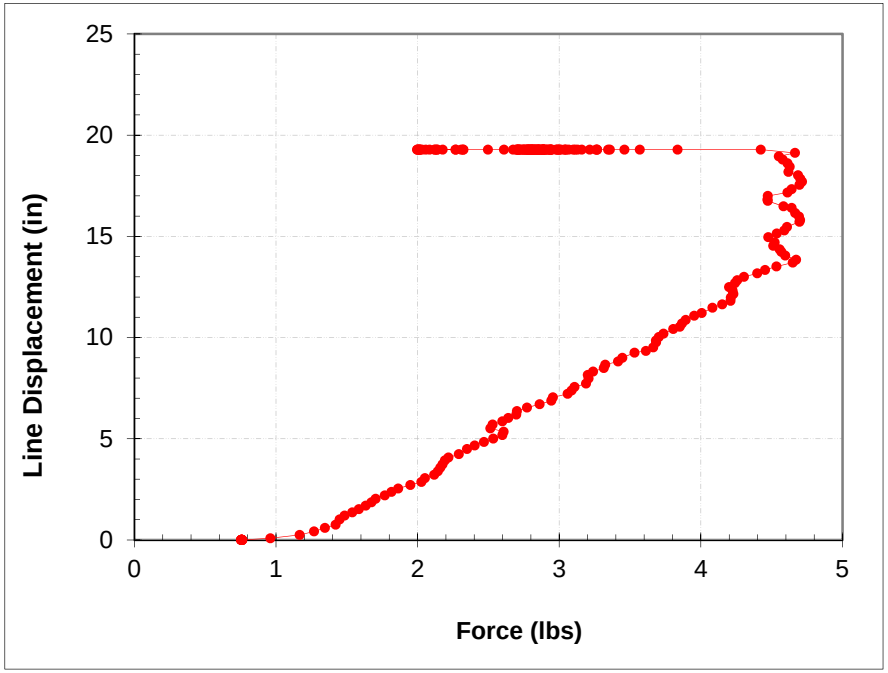


Undrained Shear Strength Profile 8/10/2010



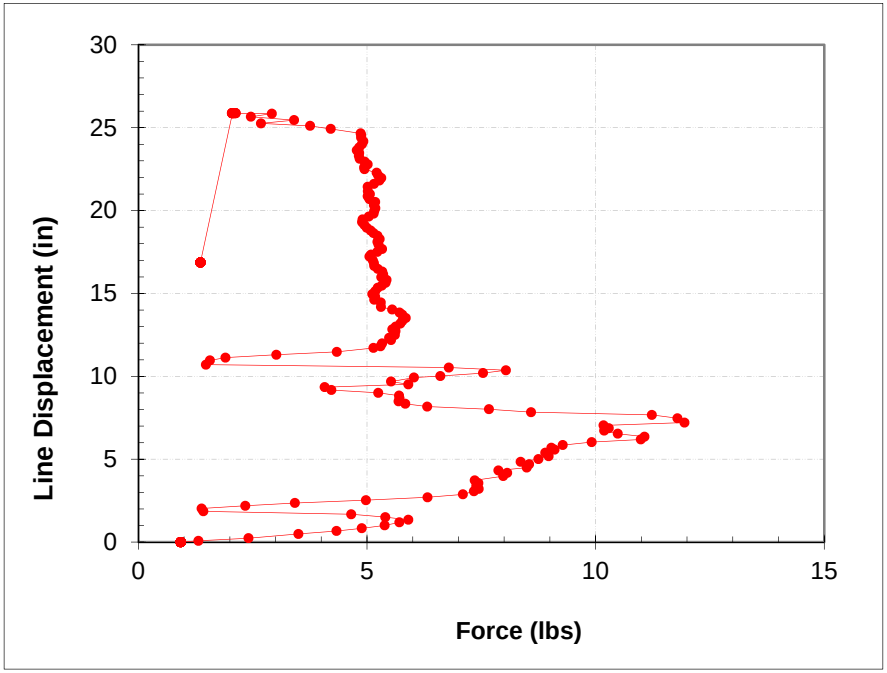


Out-of-plane Drag Embedment Test



Wider Fluke Anchor with 45° fluke-shank angle
Date: 8/10/2010
Tank Track: Track 1 to 3
Test No.: 1
Type of Test: In-plane
Anchor Line Type: Thick
Initial Embedment: 0 in.
Comments: In-plane

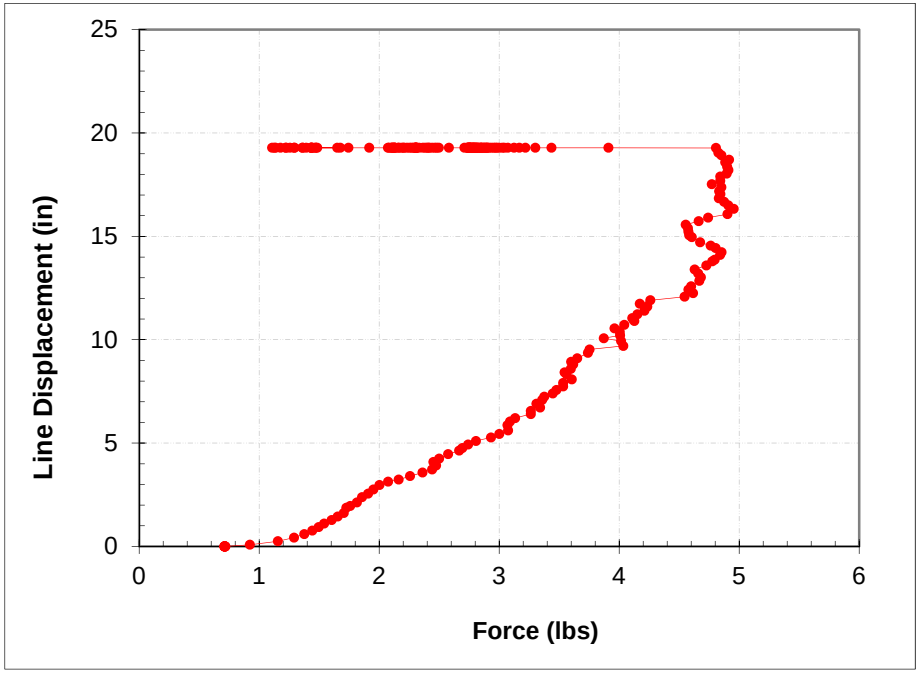
Load Cell Reading at Final Embedment: **4.71 lbs.**
Final Embedment: **8 in.**
Drag Distance: **22 in.**
Final Orientation: **slightly diving**



Wider Fluke Anchor with 45° fluke-shank angle
Date: 8/10/2010
Tank Track: Track 1 to 3
Test No.: 1
Anchor Line Type: Thick
Initial Embedment: 8 in.
Comments: Out of Plane, ~25°

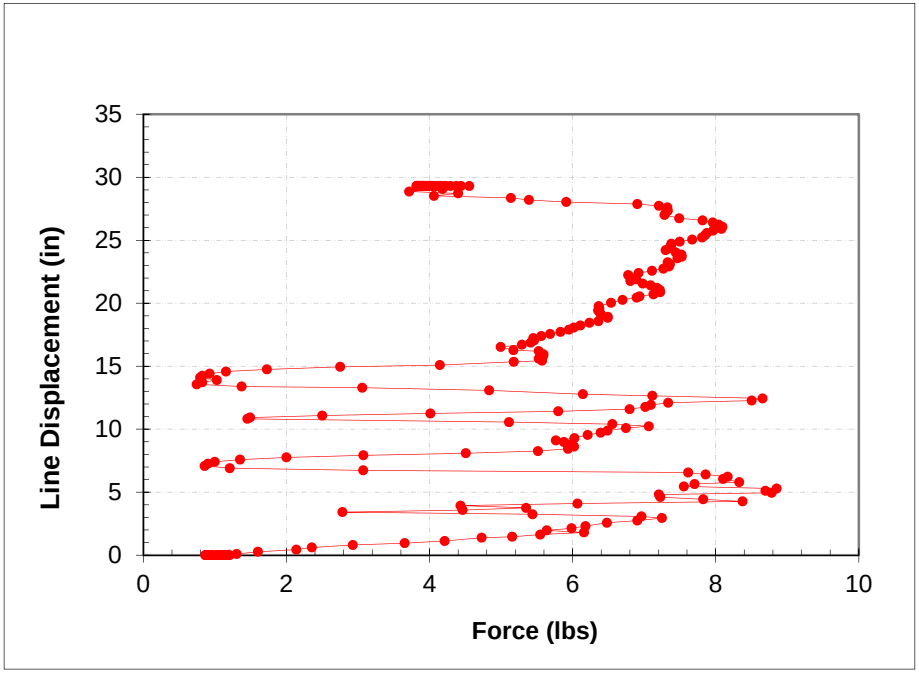
Load Cell Reading at Final Embedment: **~6 lbs slipped off pulley**
Final Embedment: **7 in.**
Drag Distance: **27.584447974 in.**
Final Orientation: **rolled to right**

Out-of-plane Drag Embedment Test



Wider Fluke Anchor with 45° fluke-shank angle
Date: 8/10/2010
Tank Track: Track 1 to 3
Test No.: 2
Type of Test: In-plane
Anchor Line Type: Thick
Initial Embedment: 0 in.
Comments: In--plane

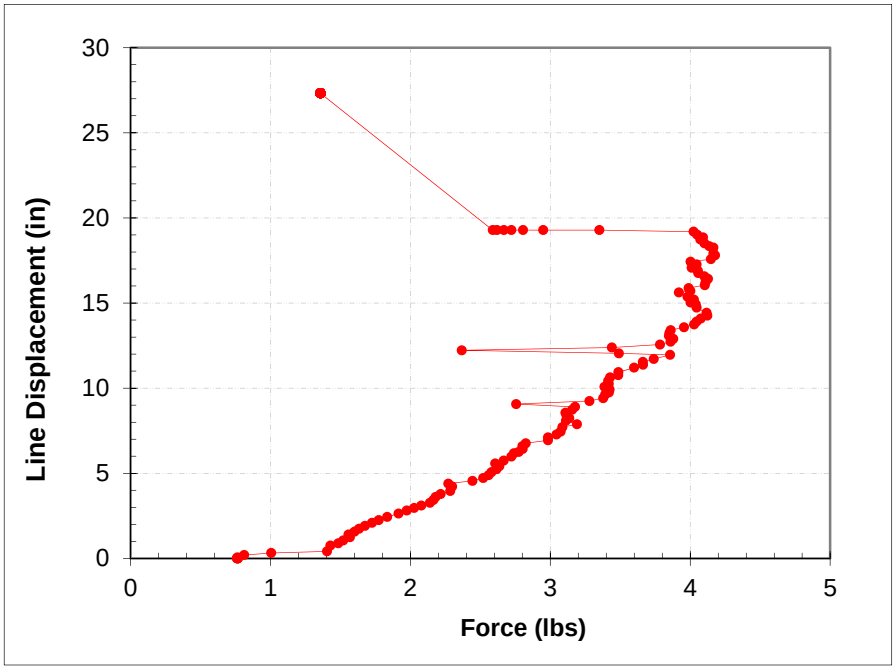
Load Cell Reading at Final Embedment: **4.95 lbs.**
Final Embedment: **9.5 in.**
Drag Distance: **23 in.**
Final Orientation: **slightly diving**



Wider Fluke Anchor with 45° fluke-shank angle
Date: 8/10/2010
Tank Track: Track 1 to 3
Test No.: 2
Anchor Line Type: Thick
Initial Embedment: 9.5 in.
Comments: Out of Plane, ~25°

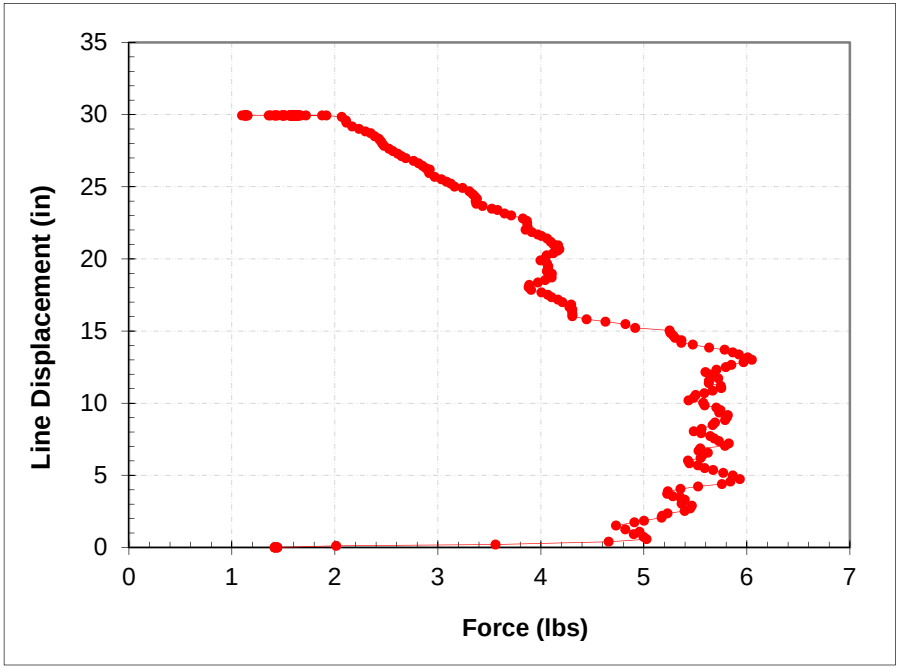
Load Cell Reading at Final Embedment: **8.85 lbs scattered slipped off pulley**
Final Embedment: **8 in.**
Drag Distance: **27.584447974 in.**
Final Orientation: **flat**

Out-of-plane Drag Embedment Test



Wider Fluke Anchor with 45° fluke-shank angle
Date: 8/10/2010
Tank Track: Track 1 to 3
Test No.: 3
Type of Test: In-plane
Anchor Line Type: Thick
Initial Embedment: 0 in.
Comments: In--plane

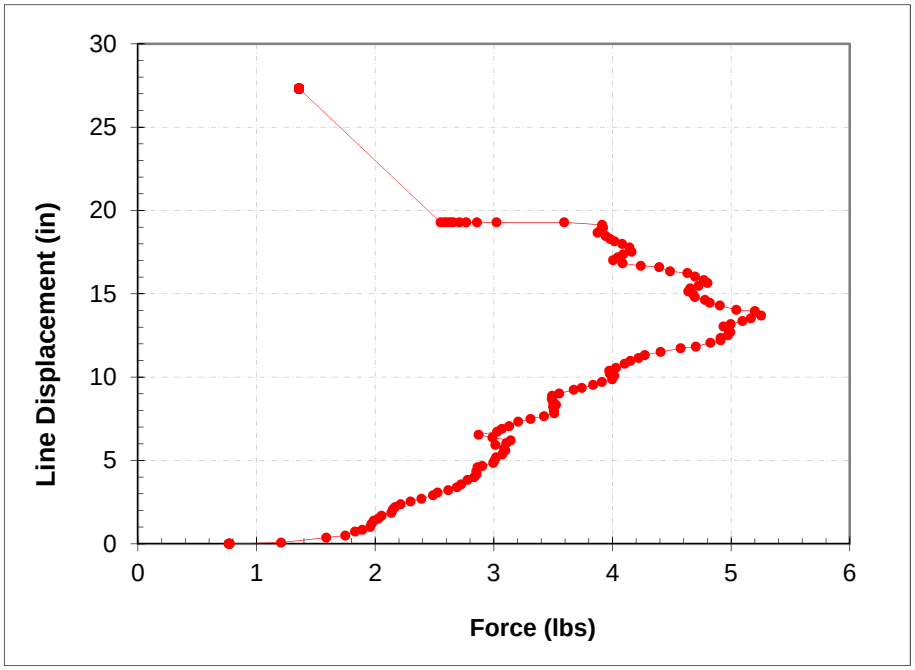
Load Cell Reading at Final Embedment: **4.18 lbs.**
Final Embedment: **9 in.**
Drag Distance: **25 in.**
Final Orientation: **slightly diving**



Wider Fluke Anchor with 45° fluke-shank angle
Date: 8/10/2010
Tank Track: Track 1 to 3
Test No.: 3
Anchor Line Type: Thick
Initial Embedment: 9 in.
Comments: Out of Plane, ~15°

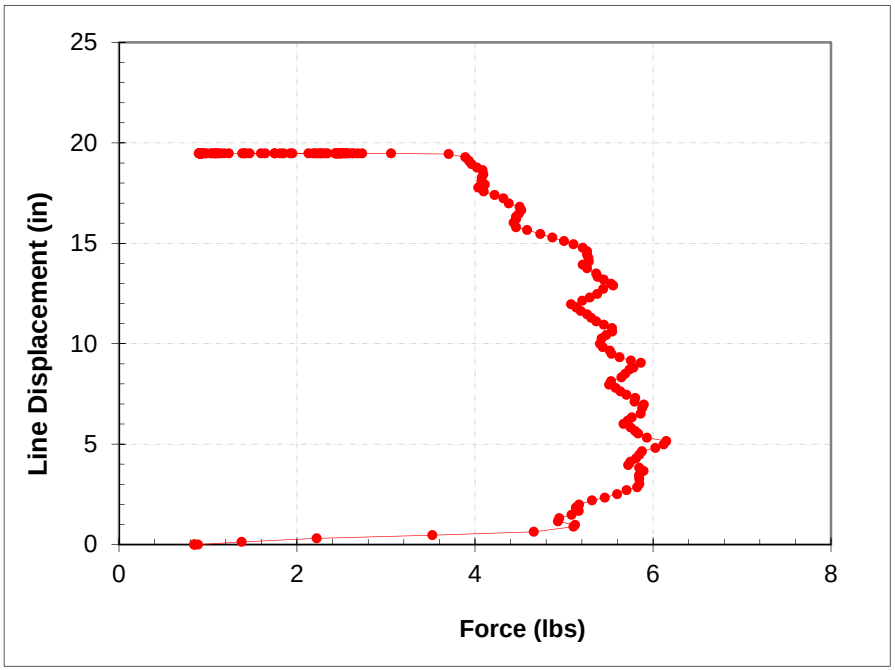
Load Cell Reading at Final Embedment: **6.05 lbs.**
Final Embedment: **- in.**
Drag Distance: **30.0 in.**
Final Orientation: **pulled out**

Out-of-plane Drag Embedment Test



Wider Fluke Anchor with 45° fluke-shank angle
Date: 8/10/2010
Tank Track: Track 1 to 3
Test No.: 4
Type of Test: In-plane
Anchor Line Type: Thick
Initial Embedment: 0 in.
Comments: In--plane

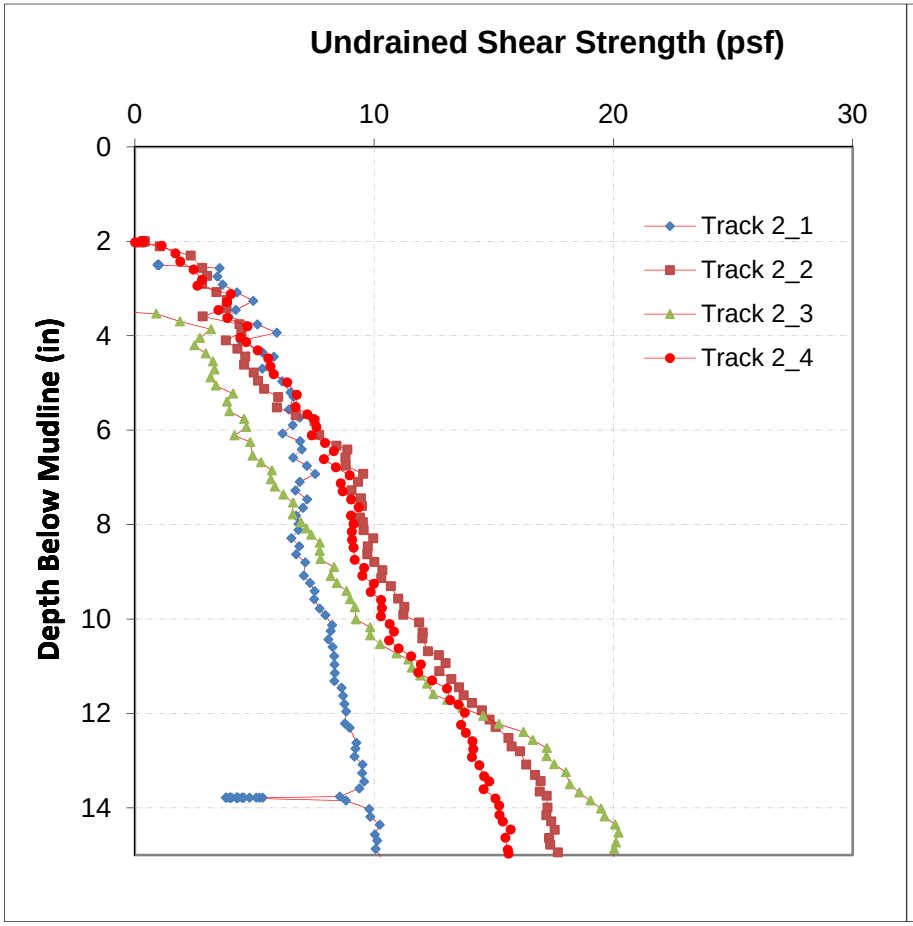
Load Cell Reading at Final Embedment: **5.25 lbs.**
Final Embedment: **8 in.**
Drag Distance: **28 in.**
Final Orientation: **slightly diving**

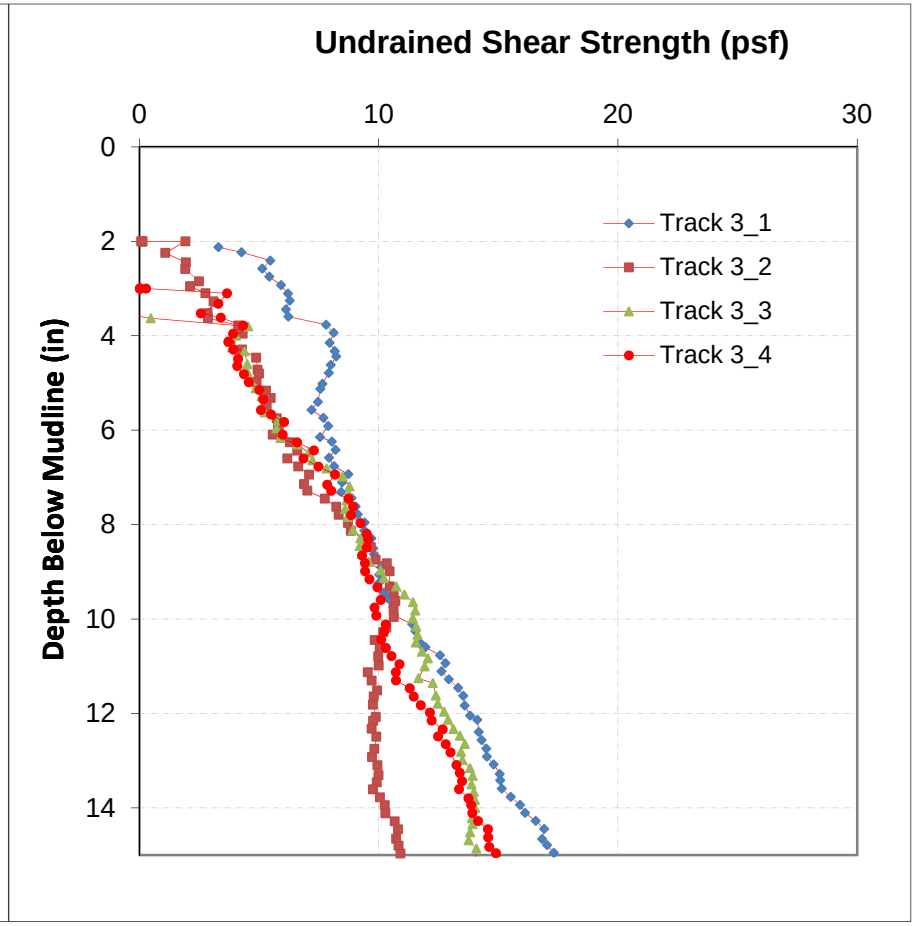


Wider Fluke Anchor with 45° fluke-shank angle
Date: 8/10/2010
Tank Track: Track 1 to 3
Test No.: 4
Anchor Line Type: Thick
Initial Embedment: 8 in.
Comments: Out of Plane, ~15°

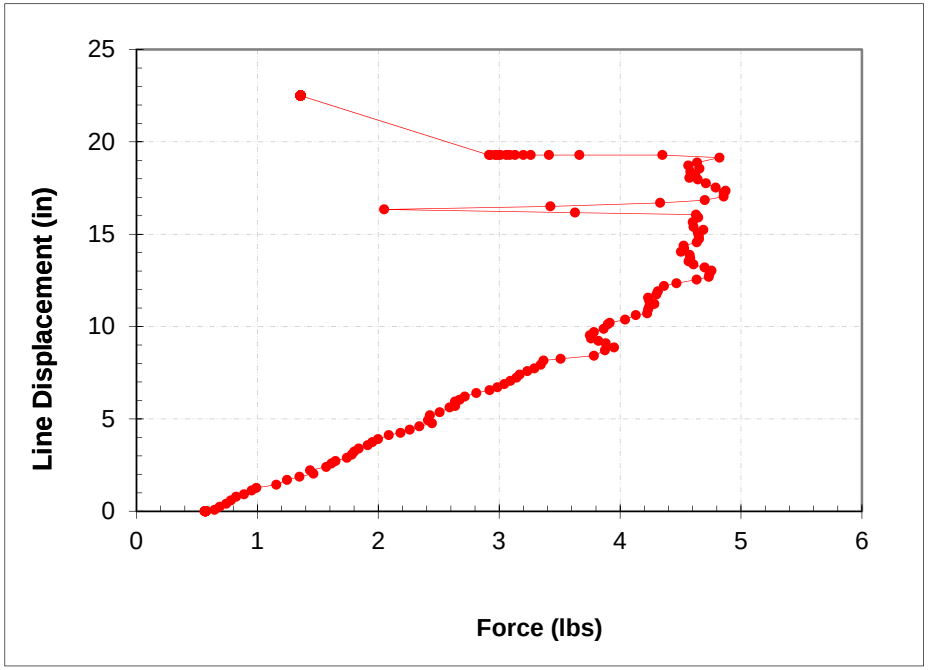
Load Cell Reading at Final Embedment: **6.15 lbs.**
Final Embedment: **8.5 in.**
Drag Distance: **16.564418887 in.**
Final Orientation: **rolled to right**

Undrained Shear Strength Profile 8/30/2010



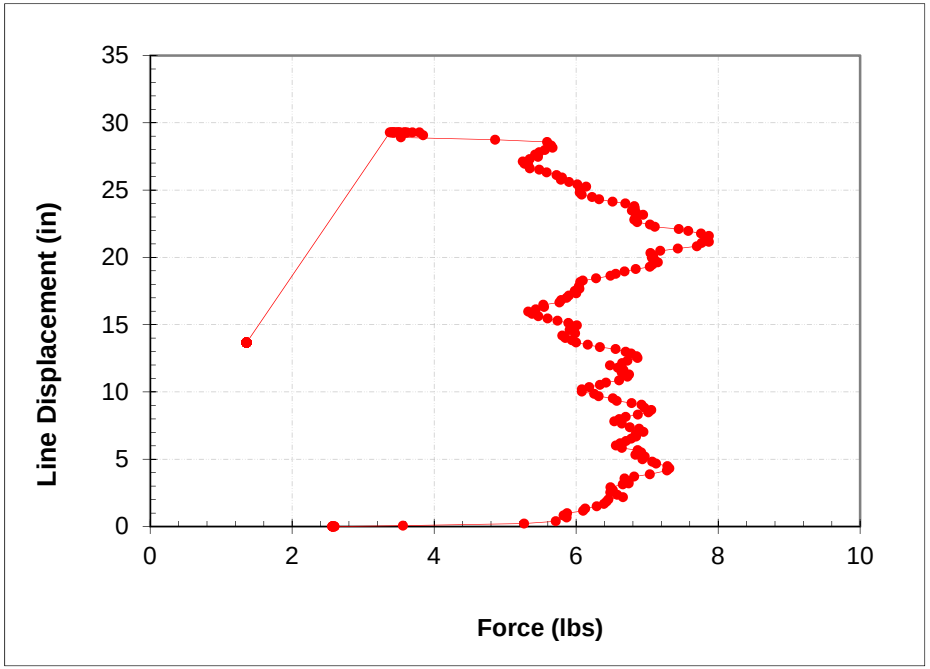


Out-of-plane Drag Embedment Test



Wider Fluke Anchor with 45° fluke-shank angle
Date: 8/31/2010
Tank Track: Track 1 to 3
Test No.: 1
Type of Test: In-plane
Anchor Line Type: Thick
Initial Embedment: 0 in.
Comments: In-plane to full embedment

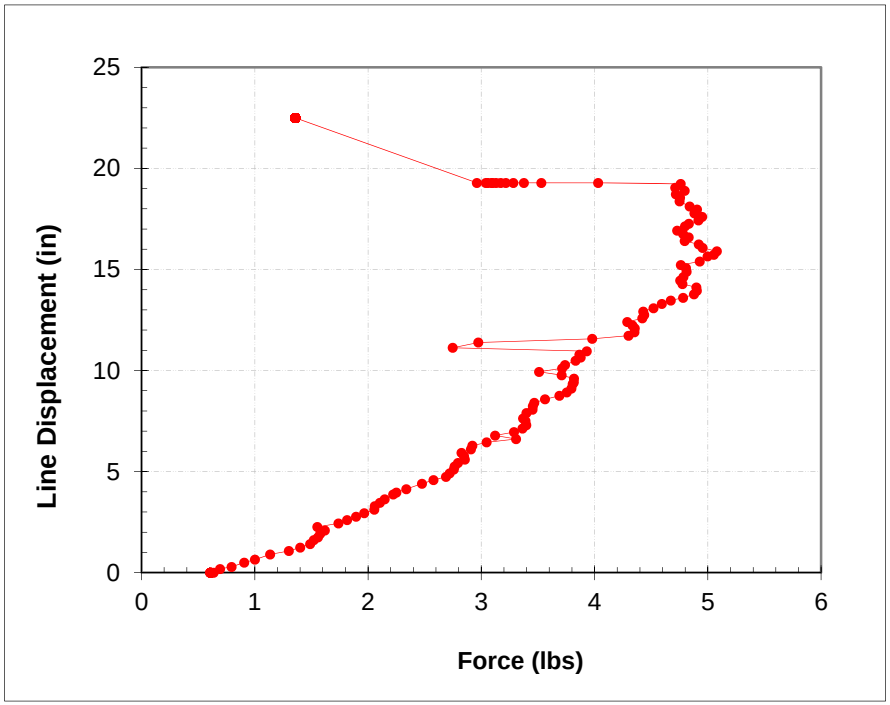
Load Cell Reading at Final Embedment: **4.87 lbs.**
Final Embedment: **8.5 in.**
Drag Distance: **20 in.**
Final Orientation: **diving**



Wider Fluke Anchor with 45° fluke-shank angle
Date: 8/31/2010
Tank Track: Track 1 to 3
Test No.: 1
Anchor Line Type: Thick
Initial Embedment: 8.5 in.
Comments: Out of Plane, ~25°

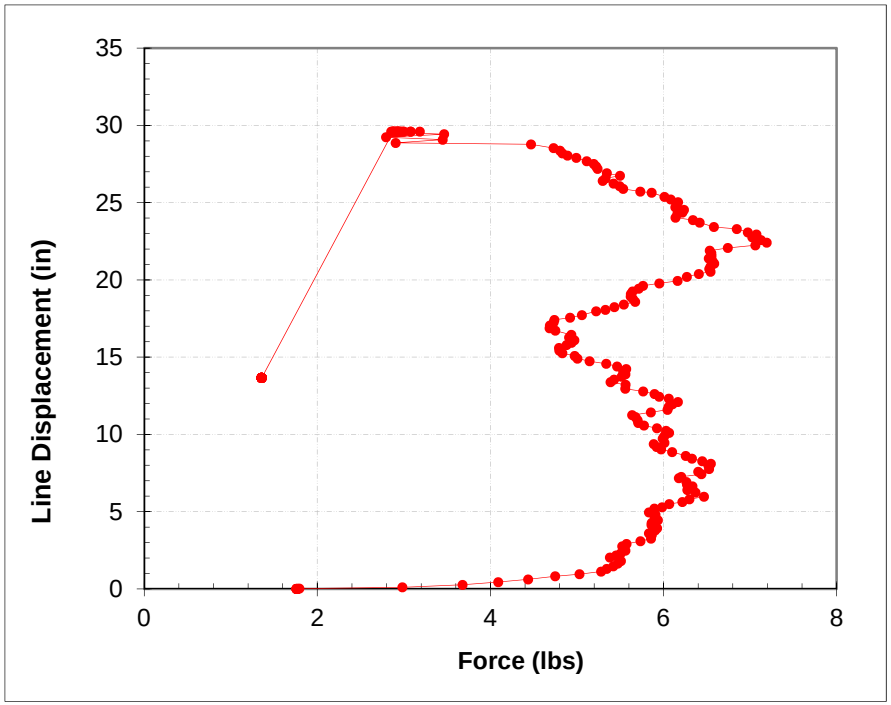
Load Cell Reading at Final Embedment: **7.87 lbs.**
Final Embedment: **10 in.**
Drag Distance: **29.317034717 in.**
Final Orientation: **flat**

Out-of-plane Drag Embedment Test



Wider Fluke Anchor with 45° fluke-shank angle
Date: 8/31/2010
Tank Track: Track 1 to 3
Test No.: 2
Type of Test: In-plane
Anchor Line Type: Thick
Initial Embedment: 0 in.
Comments: In-plane to full embedment

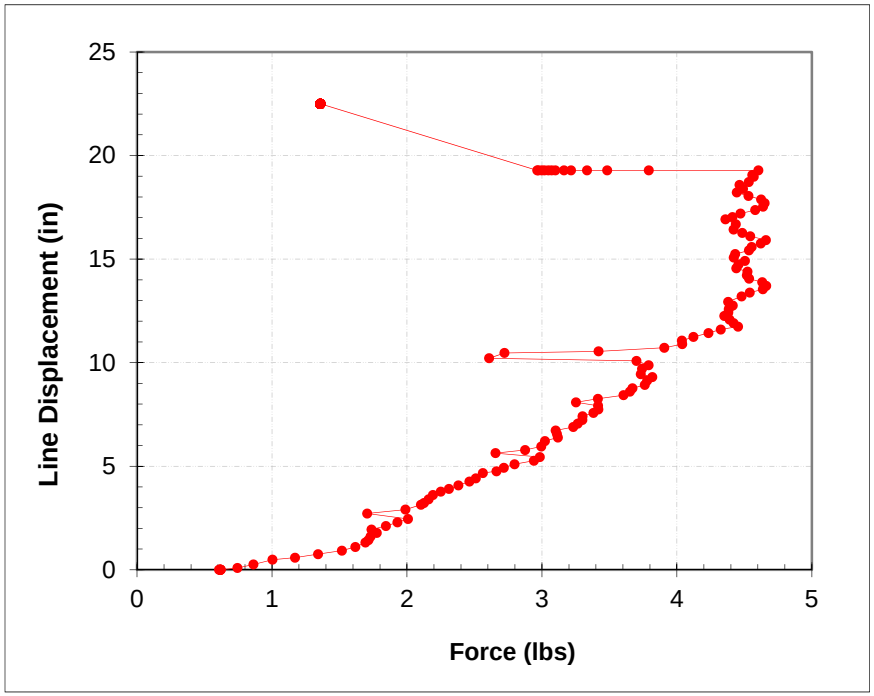
Load Cell Reading at Final Embedment: **5.08 lbs.**
Final Embedment: **8.5 in.**
Drag Distance: **20 in.**
Final Orientation: **diving**



Wider Fluke Anchor with 45° fluke-shank angle
Date: 8/31/2010
Tank Track: Track 1 to 3
Test No.: 2
Anchor Line Type: Thick
Initial Embedment: 8.5 in.
Comments: Out of Plane, ~25°

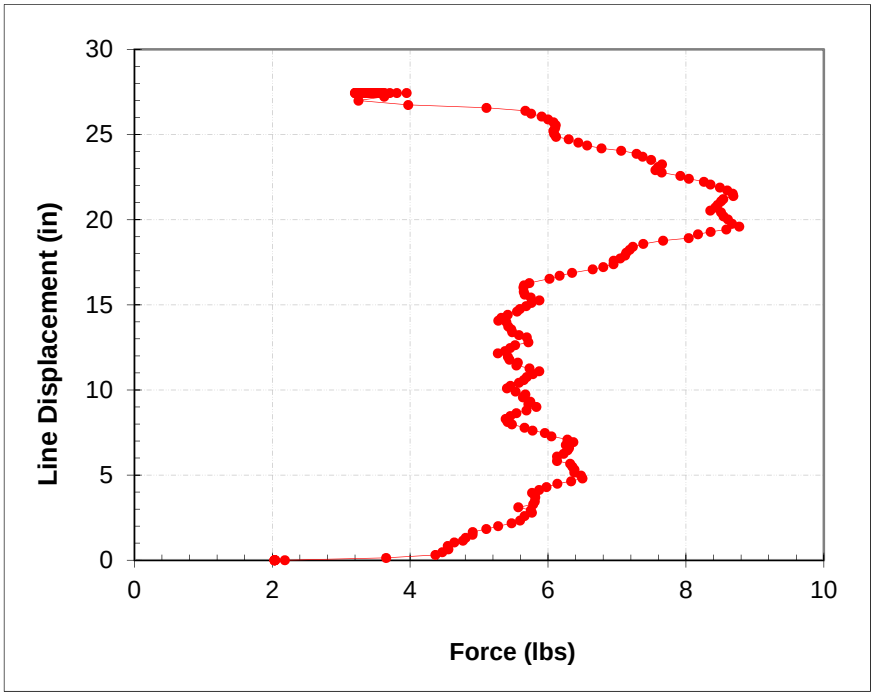
Load Cell Reading at Final Embedment: **7.19 lbs.**
Final Embedment: **9.5 in.**
Drag Distance: **29.646930468 in.**
Final Orientation: **rolled to right**

Out-of-plane Drag Embedment Test



Wider Fluke Anchor with 45° fluke-shank angle
Date: 8/31/2010
Tank Track: Track 1 to 3
Test No.: 3
Type of Test: In-plane
Anchor Line Type: Thick
Initial Embedment: 0 in.
Comments: In-plane to full embedment

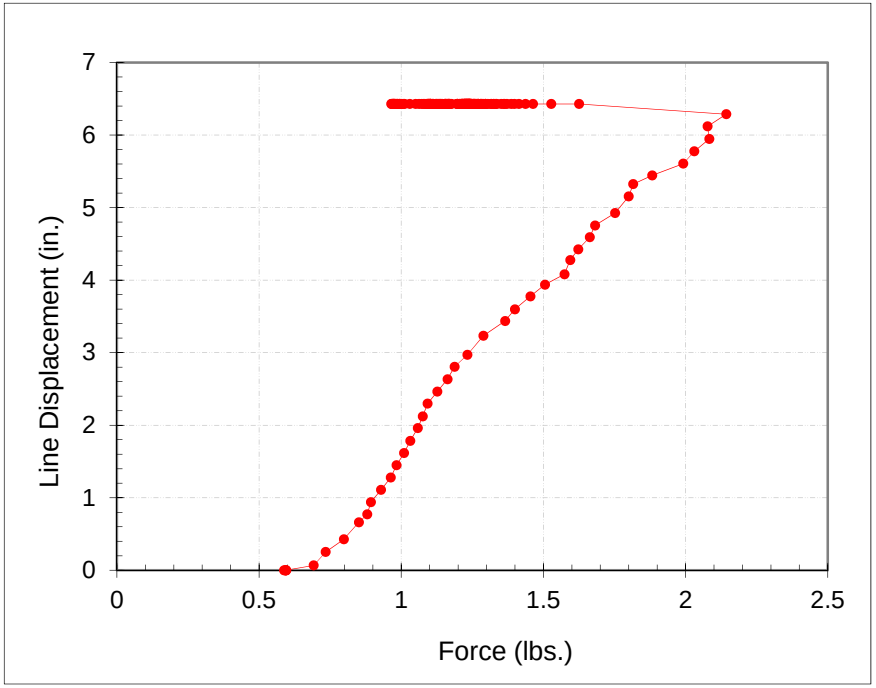
Load Cell Reading at Final Embedment: **4.66 lbs.**
Final Embedment: **9 in.**
Drag Distance: **21 in.**
Final Orientation: **diving**



Wider Fluke Anchor with 45° fluke-shank angle
Date: 8/31/2010
Tank Track: Track 1 to 3
Test No.: 3
Anchor Line Type: Thick
Initial Embedment: 9 in.
Comments: Out of Plane, ~25°

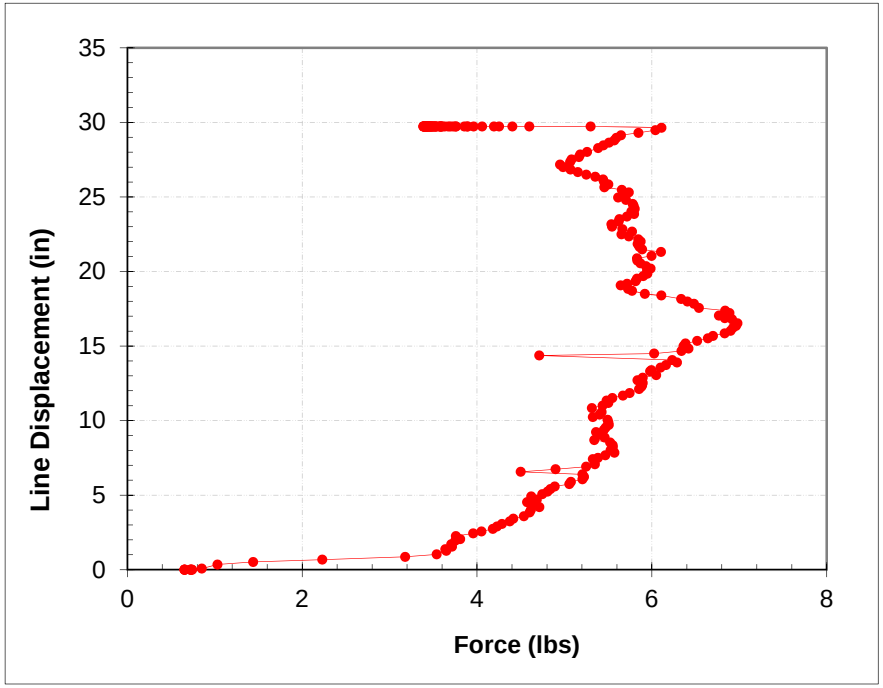
Load Cell Reading at Final Embedment: **8.77 lbs.**
Final Embedment: **9.5 in.**
Drag Distance: **28 in.**
Final Orientation: **rolled to right**

Out-of-plane Drag Embedment Test



Wider Fluke Anchor with 45° fluke-shank angle
Date: 9/3/2010
Tank Track: Track 1 to 3
Test No.: 1
Type of Test: In-plane
Anchor Line Type: Thick
Initial Embedment: 1 in.
Comments: In-plane to one fluke length, measure trajectory

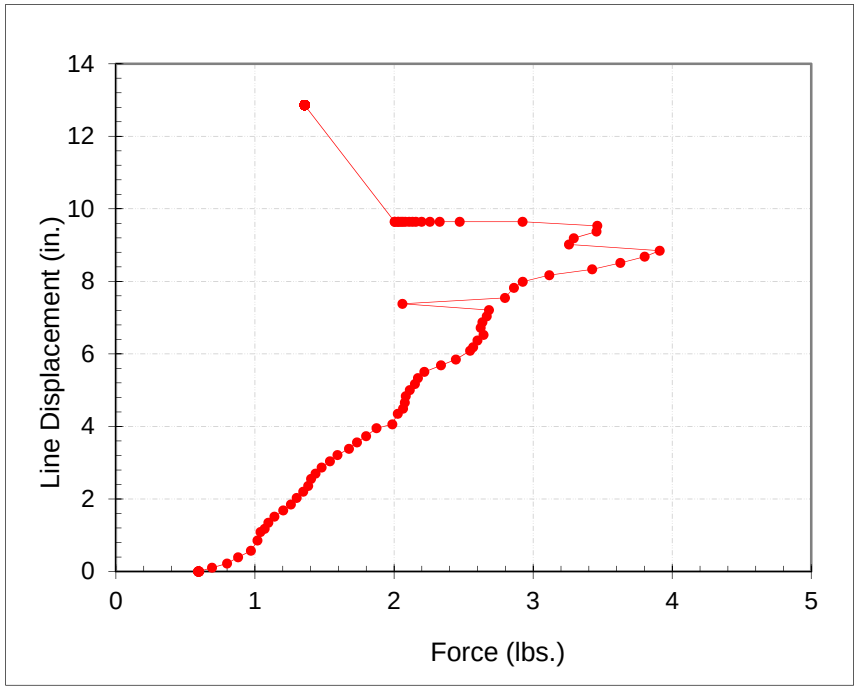
Load Cell Reading at Final Embedment: **2.14 lbs.**
Final Embedment: **5.5 in.**
Drag Distance: **9 in.**
Final Orientation: **diving**



Wider Fluke Anchor with 45° fluke-shank angle
Date: 9/3/2010
Tank Track: Track 1 to 3
Test No.: 1
Anchor Line Type: Thick
Initial Embedment: 5.5 in.
Comments: Out of Plane, ~25°

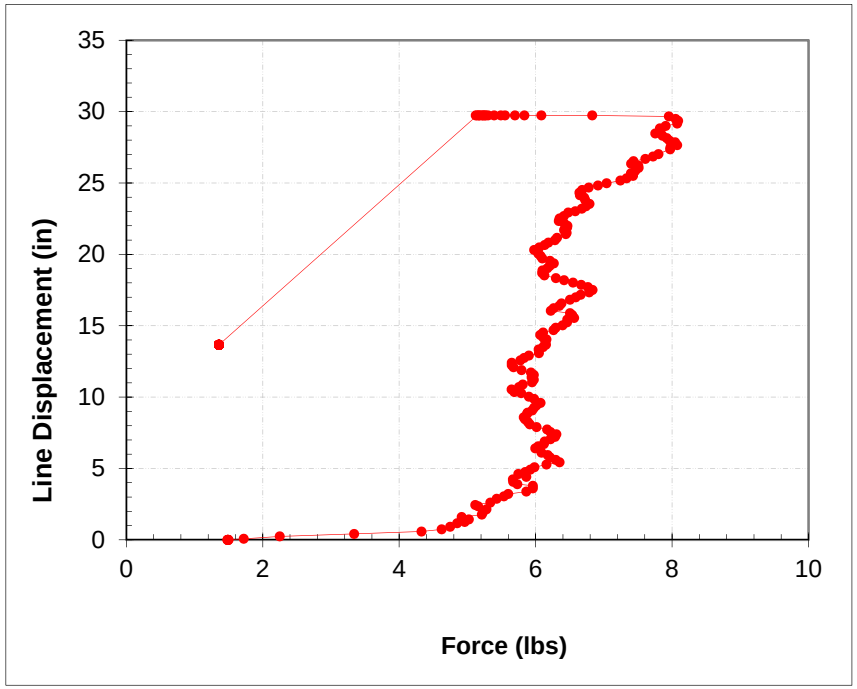
Load Cell Reading at Final Embedment: **6.98 lbs.**
Final Embedment: **10.5 in.**
Drag Distance: **30.5 in.**
Final Orientation: **slightly diving, rolling**

Out-of-plane Drag Embedment Test



Wider Fluke Anchor with 45° fluke-shank angle
Date: 9/3/2010
Tank Track: Track 1 to 3
Test No.: 2
Type of Test: In-plane
Anchor Line Type: Thick
Initial Embedment: 1.5 in.
Comments: In-plane to one fluke length

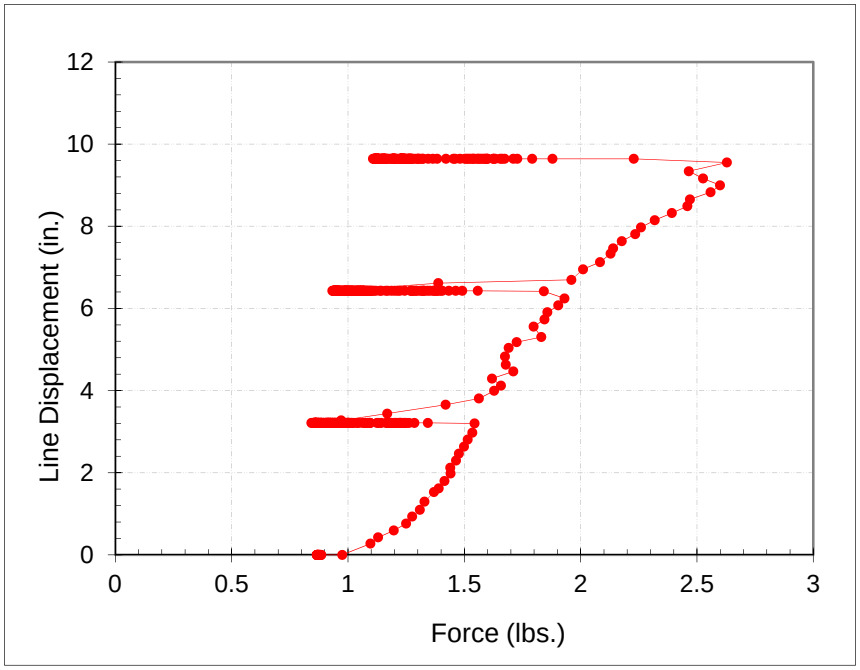
Load Cell Reading at Final Embedment: **3.91 lbs.**
Final Embedment: **6.5 in.**
Drag Distance: **11 in.**
Final Orientation: **diving**



Wider Fluke Anchor with 45° fluke-shank angle
Date: 9/3/2010
Tank Track: Track 1 to 3
Test No.: 2
Anchor Line Type: Thick
Initial Embedment: 6.5 in.
Comments: Out of Plane, ~25°

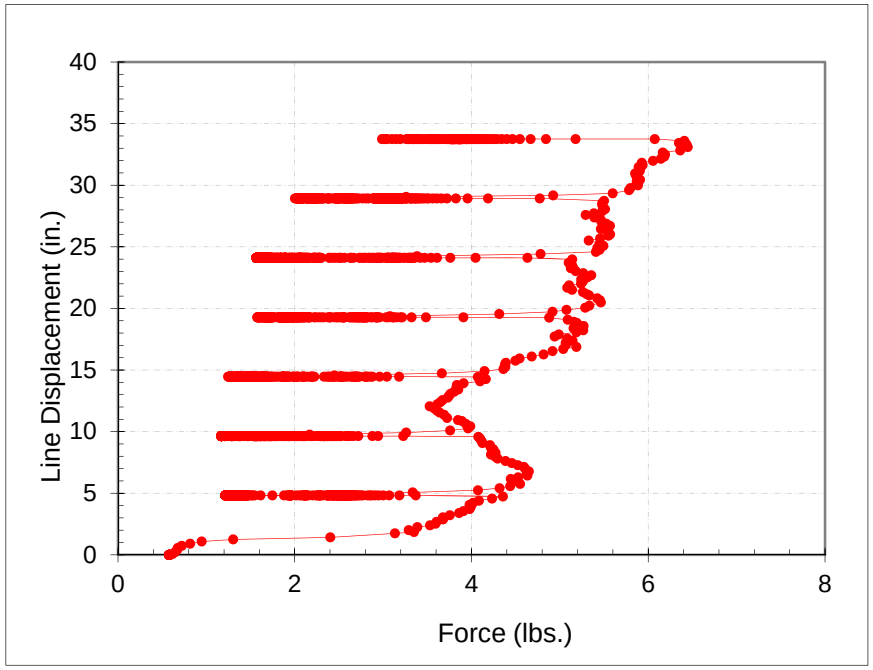
Load Cell Reading at Final Embedment: **8.09 lbs.**
Final Embedment: **11.5 in.**
Drag Distance: **28.9 in.**
Final Orientation: **Unknown**

Out-of-plane Drag Embedment Test



Wider Fluke Anchor with 45° fluke-shank angle
Date: 9/3/2010
Tank Track: Track 1 to 3
Test No.: 3
Type of Test: In-plane
Anchor Line Type: Thick
Initial Embedment: 1 in.
Comments: In-plane to one fluke length

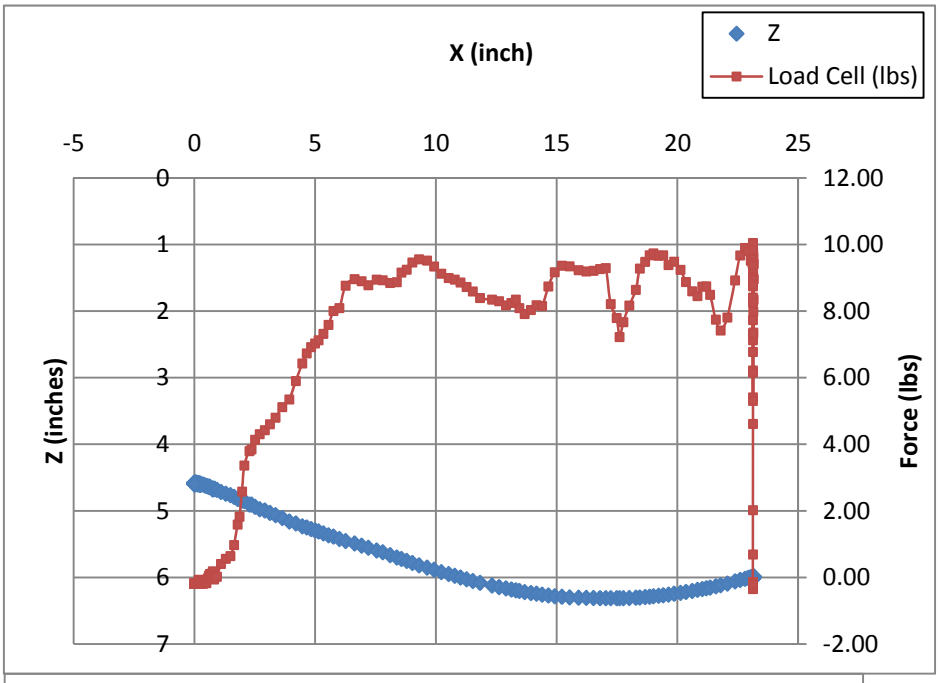
Load Cell Reading at Final Embedment: **2.63 lbs.**
Final Embedment: **5 in.**
Drag Distance: **10 in.**
Final Orientation: **diving**

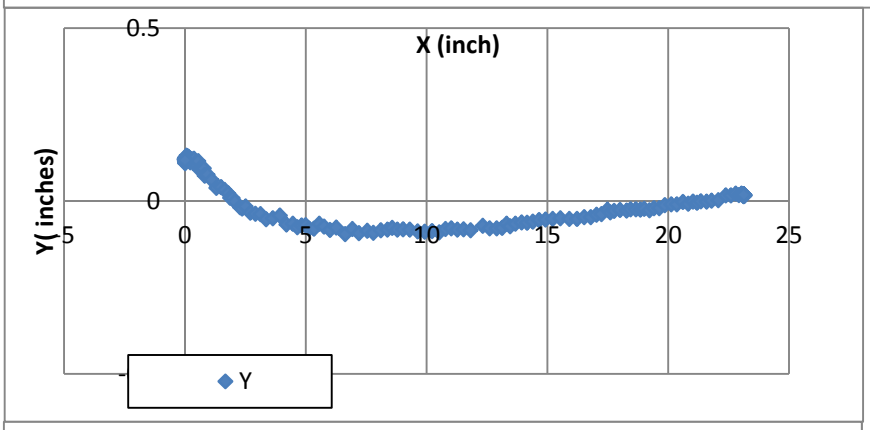


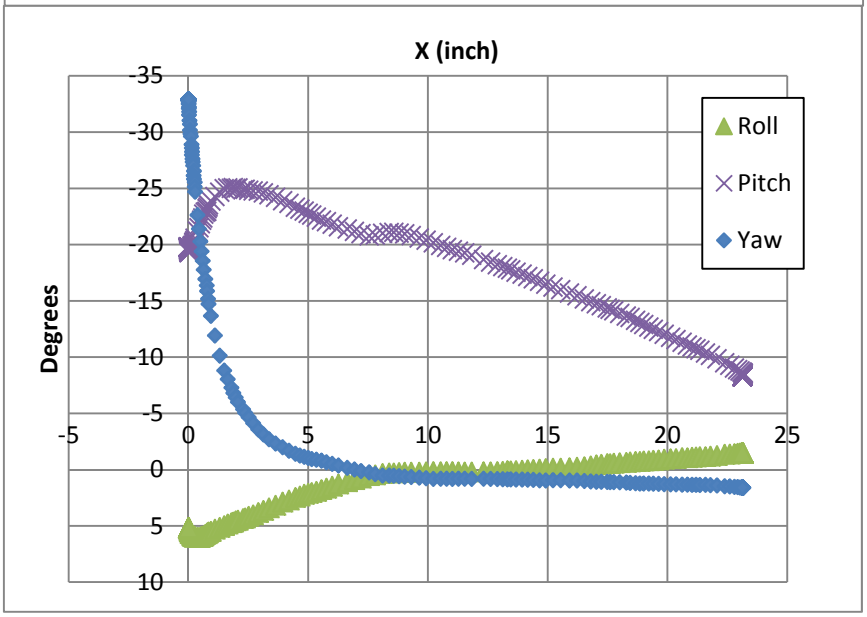
Wider Fluke Anchor with 45° fluke-shank angle
Date: 9/3/2010
Tank Track: Track 1 to 3
Test No.: 3
Anchor Line Type: Thick
Initial Embedment: 5 in.
Comments: ~25°, measured trajectory

Load Cell Reading at Final Embedment: **6.45 lbs.**
Final Embedment: **10.5 in.**
Drag Distance: **32.552951283 in.**
Final Orientation: **Unknown**

Out-of-plane Drag Embedment Test







Wider Fluke Anchor with 45° fluke-shank angle

Date: 8/9/2010

Tank Track: Black Tub

Test No.: 3

Type of Test: Out-of-plane

Anchor Line Type: Thin

Initial Embedment: 4.59 in.

Comments: Out of Plane, 30°

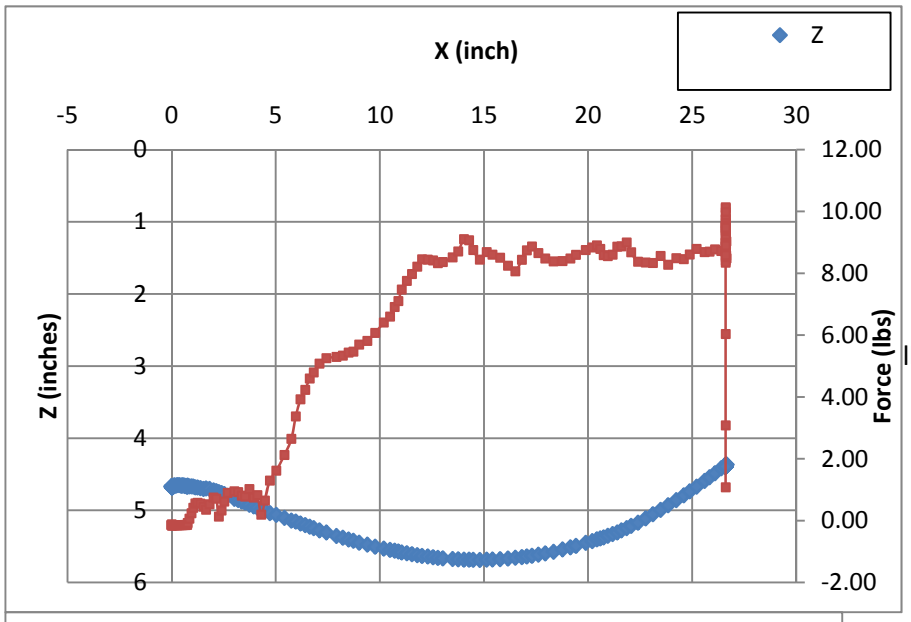
Reading at Final Embedment: **8.64 lbs.**

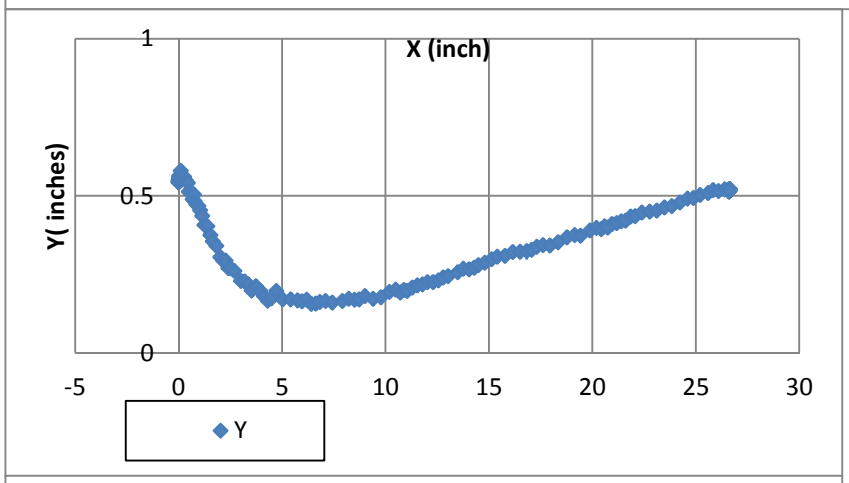
Final Embedment: **6.31 in.**

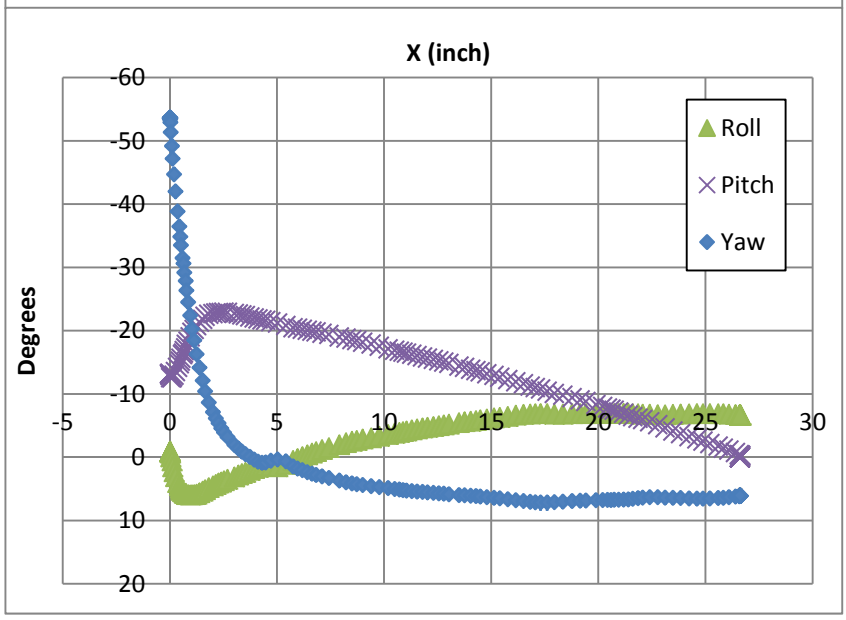
Drag Distance: **18.3 in.**

Final Orientation: **-13**

Out-of-plane Drag Embedment Test



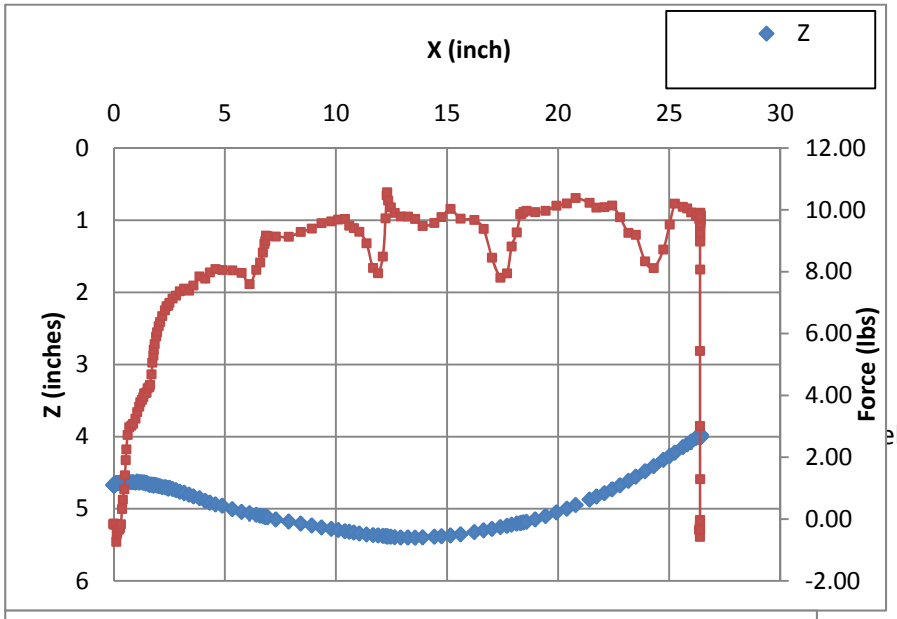


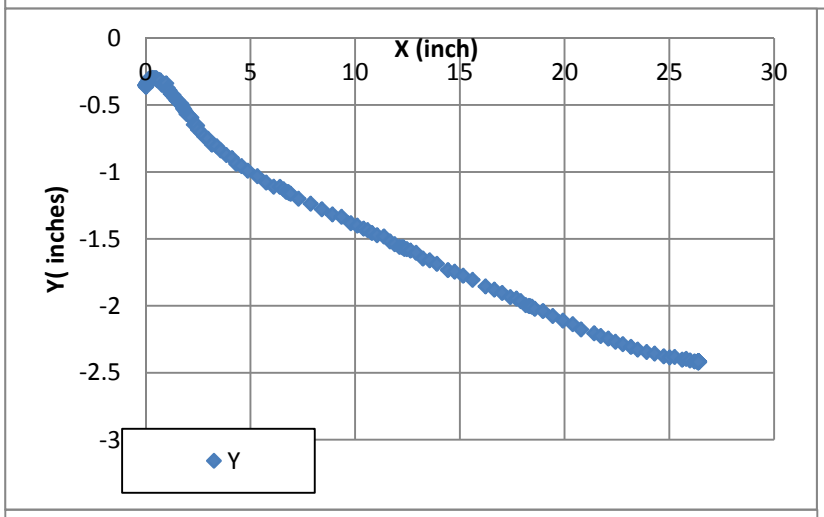


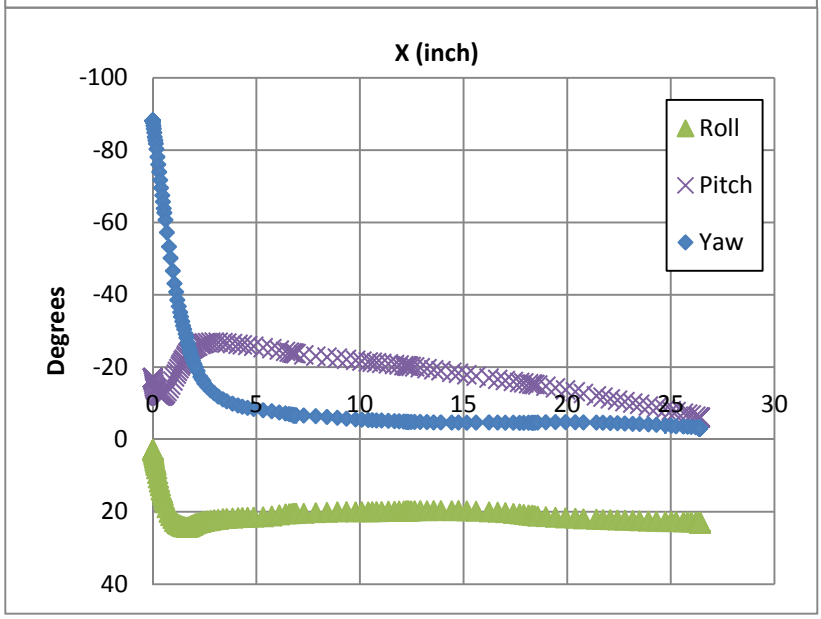
Wider Fluke Anchor with 45° fluke-shank angle
Date: 8/9/2010
Tank Track: Black Tub
Test No.: 4
Anchor Line Type: Thin
Initial Embedment: 4.67 in.
Comments: Out of Plane, 60°

ll Reading at Final Embedment: **8.44 lbs.**
Final Embedment: **5.69 in.**
Drag Distance: **14.8 in.**
Final Orientation: **-13**

Out-of-plane Drag Embedment Test







Wider Fluke Anchor with 45° fluke-shank angle
Date: 8/9/2010
Tank Track: Black Tub
Test No.: 5
Type of Test: Out-of-plane
Anchor Line Type: Thin
Initial Embedment: 4.66 in.
Comments: Out of Plane, 90°

ell Reading at Final Embedment: **9.7 lbs.**
Final Embedment: **5.4 in.**
Drag Distance: **13.56 in.**
Final Orientation: **-19**