

ACCT Tests of New Staple Placements, Texas, March 2-3, 1996

Loblolly Pine, 6" Staples (US made), Horizontal Orientation, No Pilot Hole		
Test #	Strength (lbs)	Notes
1	2350	
2	2689	
3	5891	
4	4655	
Average: 3896 Range: 3541 (59%) General Notes: 1. Staples were driven to a depth of approximately 3".		

Loblolly Pine, 6" Staples (US made), Horizontal Orientation, 3/8" x 3" Pilot Hole		
Test #	Strength (lbs)	Notes
1	2860	
2	2647	
3	3581	
Average: 3029 Range: 934 (31%) General Notes: 1. Staples were driven to a depth of approximately 3".		

Loblolly Pine, 6" Staples (US made), Vertical Orientation, No Pilot Hole		
Test #	Strength (lbs)	Notes
1	2350	
2		Bad Data
3	3950	
4		Bad Data
5	4514	
6	5102	
Average: 3183 Range: 2752 (86%) General Notes: 1. Staples were driven to a depth of approximately 3".		

Loblolly Pine, 6" Staples (US made), Vertical Orientation, 3/8" x 3" Pilot Hole		
Test #	Strength (lbs)	Notes
1	4064	
2	1971	
3	2416	
Average: 2817		
Range: 2093 (74%)		
General Notes: 1. Staples were driven to a depth of approximately 3".		

Live Oak, 6" Staples (US made), Vertical Orientation, 3/8" x 3" Pilot Hole		
Test #	Strength (lbs)	Notes
1	8503	
2	7825	
3		Bad Data
4	5397	
Average: 7242		
Range: 3106 (43%)		
General Notes: 1. Staples were driven to a depth of approximately 3".		

Live Oak, 6" Staples (US made), Horizontal Orientation, 3/8" x 3" Pilot Hole		
Test #	Strength (lbs)	Notes
1	6307	
2	5536	
3	6129	
Average: 5991		
Range: 771 (13%)		
General Notes: 1. Staples were driven to a depth of approximately 3".		

Southern Yellow Pine Pole, 6" Staples (US made), Horizontal Orientation, 3/8" Pilot Hole		
Test #	Strength (lbs)	Notes
1	7900	1 1/2" deep pilot hole
2	10130	3" deep pilot hole
3	7800	3" deep pilot hole
4	8050	3" deep pilot hole
5	8100	3" deep pilot hole
Average: 8396		
Range: 2330 (28%)		
General Notes: 1. Staples were driven to a depth of approximately 3".		

Southern Yellow Pine Pole, 6" Staples (US made), Vertical Orientation, 3/8" x 3" Pilot Hole		
Test #	Strength (lbs)	Notes
1	9460	1 1/2" deep pilot hole
2	9860	3" deep pilot hole
3	8094	3" deep pilot hole
4	8065	3" deep pilot hole
5	12000	3" deep pilot hole
Average: 9496		
Range: 3935 (41%)		
General Notes: 1. Staples were driven to a depth of approximately 3".		

ACCT Tests of Old Staple Placements, Colorado, 1997

Southern Yellow Pine Pole, 6" Staples, Horizontal Orientation, 3/8" Pilot Hole		
Test #	Strength (lbs)	Notes
1	6930	
2	7128	
3	6072	
Average: 6710 Range: 1056 (16%) General Notes: 1. Staples were driven to a depth of approximately 3". 2. One staple that was not predrilled pulled out at 9372 lb. - not recorded above. 3. Staple placements were 7 years old.		

Ponderosa Pine Tree, 6" Staples, Horizontal Orientation, No Pilot Hole		
Test #	Strength (lbs)	Notes
1	3454	3" of staple exposed
2	2618	3" of staple exposed
3	3278	3" of staple exposed
Average: 3117 Range: 836 (27%) General Notes: 1. Staples were driven to a depth of approximately 3". 2. Staple placements were 7 years old.		

ACCT Tests of Old Staple Placements in Trees, Massachusetts, November 1997

White Pine, 6" Staples, Horizontal Orientation, No Pilot Hole		
Test #	Strength (lbs)	Notes - amount of staple exposed (in)
1	3220	1 3/8
2	2140	1 1/2
3	2160	1 1/2
4	2310	1 3/4
General Notes: <ol style="list-style-type: none"> 1. Staple placements were 5 years old. 2. Bark depth = 1/2" 3. Averages not recorded because of variation in staple penetration. 		

White Pine, 6" Staples, Horizontal Orientation, No Pilot Hole		
Test #	Strength (lbs)	Notes - amount of staple exposed (in)
1	2440	1 3/4
2	2590	1 1/4
3	3490	1 5/8 - pulled off angle
4	1970	2 - pulled slightly off angle
General Notes: <ol style="list-style-type: none"> 1. Staple placements were 10 years old. 2. Bark depth = 1/2" to 3/4" 3. Averages not recorded because of variation in staple penetration. 		

Hemlock, 6" Staples, Horizontal Orientation, 3/8" Pilot Hole		
Test #	Strength (lbs)	Notes - amount of staple exposed (in)
1	2110	2 1/4
2	1905	2 1/8
3	1800	2 1/2
General Notes: <ol style="list-style-type: none"> 1. Staple placements were 5 months old. 2. Bark depth = 3/8" to 1/2" 3. Averages not recorded because of variation in staple penetration. 		

White Oak, 6" Staples, Horizontal Orientation, 3/8" Pilot Hole

Test #	Strength (lbs)	Notes - amount of staple exposed (in)
1	2410	1 3/8
2	2240	1 7/8
3	3480	2 1/8

- General Notes:**
1. Staple placements were 6 to 8 years old.
 2. Bark depth = 1/2" to 3/4"
 3. Bark condition around staples was poor.
 4. Averages not recorded because of variation in staple penetration.

White Oak, 6" Staples, Horizontal Orientation, 3/8" Pilot Hole

Test #	Strength (lbs)	Notes - amount of staple exposed (in)
1	5800	1 1/4 - truck slipped
2	4640	1 1/2
3	5160	1 5/8 - truck slipped

- General Notes:**
1. Staple placements were 6 to 8 years old.
 2. Bark depth = 1/2" to 3/4"
 3. Bark condition around staples was good.
 4. Averages not recorded because of variation in staple penetration.

ACCT Tests of New Placements, Single White Pine Tree, Massachusetts, Oct. 31, 2002

US made 8" Barbed Staple, Inserted 5"		
Test #	Strength (lbs)	Notes
1a	2560	Bottom holding strap slipped up the trunk. Staple was not completely removed.
1b	2390	Same staple as in trial 1a pulled to failure.
2	2490	
3	3360	
4	2470	
5	2380	
6	2200	
7	3130	
Average: 2672		
Range: 1160 (43%)		
General Notes: 1. The average only takes into account tests 2 through 7. Test 1 was omitted. 2. Staple driven until depth mark was even with the tree bark. 3. Pilot holes drilled with 3/8" bit to 4 1/2" depth.		

US made 8" Staple, Inserted 5"		
Test #	Strength (lbs)	Notes
1	2710	
2	3600	
3	3120	
4	4030	
5	3730	
6	3690	
Average: 3480		
Range: 1320 (38%)		
General Notes: 1. Staple driven until depth mark was even with the tree bark. 2. Pilot holes drilled with 3/8" bit to 4 1/2" depth.		

Canadian 8" Staple, Inserted 5"		
Test #	Strength (lbs)	Notes
1	2980	
2	2470	
3	3270	
4	2870	
Average: 2898 Range: 800 (28%) General Notes: 1. Staple driven until depth mark was even with the tree bark. 2. Pilot holes drilled with 3/8" bit to 4 1/2" depth.		
Australian 8" Staple, Inserted 5"		
Test #	Strength (lbs)	Notes
1	4020	
2	4100	
3	3580	
4	4460	
Average: 4040 Range: 880 (22%) General Notes: 1. Staple driven until depth mark was even with the tree bark. 2. Pilot holes drilled with 3/8" bit to 4 1/2" depth.		

US made 8" Staple, Inserted 4"		
Test #	Strength (lbs)	Notes
1	3170	
2	2570	
3	2740	
4	3060	
5	2530	
6	2390	
Average: 2743 Range: 780 (28%) General Notes: 1. Staple driven until depth mark was even with the tree bark. 2. Pilot holes drilled with 3/8" bit to 3 1/2" depth.		

Canadian 8" Staple, Inserted 4"		
Test #	Strength (lbs)	Notes
1	3460	
2	1790	
3	1730	
4		Inconclusive - faulty gauge reading
5	1780	
6	1810	
7	1690	
Average: 2043 Range: 1770 (87%) General Notes: 1. Staple driven until depth mark was even with the tree bark. 2. Pilot holes drilled with 3/8" bit to 3 1/2" depth.		

Australian 8" Staple, Inserted 4"		
Test #	Strength (lbs)	Notes
1	2770	
2	3160	
3	3550	
4	2590	
Average: 3018		
Range: 960 (32%)		
General Notes: 1. Staple driven until depth mark was even with the tree bark. 2. Pilot holes drilled with 3/8" bit to 3 1/2" depth.		

British 8" Staple, Inserted 5"		
Test #	Strength (lbs)	Notes
1	2800	
2	2940	
3	3440	
Average: 3060		
Range: 640 (21%)		
General Notes: 1. Staple driven until depth mark was even with the tree bark. 2. Pilot holes drilled with 3/8" bit to 4 1/2" depth.		

US made 8" Staple, Inserted 5" - 5/16" Pilot Hole		
Test #	Strength (lbs)	Notes
42	4860	
43	3610	
44	no readout	
45	3790	
46	2850	
47	3230	
Average: 3668		
Range: 2010 (55%)		
General Notes: 1. Staple driven until depth mark was even with the tree bark. 2. Pilot holes drilled with 5/16" bit to 4 1/2" depth.		

Tests Conducted by Project Adventure on Loblolly Pine Trees, Georgia, Oct. 27, 2003

8" (US made), Loblolly Pine, 2 Year Old Placement		
Test #	Strength (lbs)	Amount of Staple Protruding From Bark (in)
1	5553	2 7/8
2	5800	2 1/2
3	5672	2 3/4
4	6025	2 5/8
5	5912	2 7/8
6	5441	2 7/8
7	5687	2 3/8
8	5454	2 7/8
9	5650	3 1/4
10	4989	3
General Notes: 1. These staples were normal placements in a healthy tree. 2. Predrilled with a 3/8" bit to 4 1/2" depth. 3. All test results were greater than 5,000 lb. 4. Average and range not calculated as depths varied.		

8" (US made), Loblolly Pine, New Placements

Test #	Strength (lbs)	Amount of Staple Protruding From Bark (in)
1	6519	3
2	5672	3
3	4858	3
4	5249	3
5	5200	3
6	5694	3
7	5112	3
8	5081	3
9	5079	3
10	5308	3

Average: 5377

Range: 1768 (71%)

- General Notes:**
1. These staples were normal placements in a healthy tree.
 2. Predrilled with a 3/8" bit to 4 1/2" depth.
 3. All test results except #3 were greater than 5,000 lb.

6", Loblolly Pine, 5+ Year Old Placements

Test #	Strength (lbs)	Amount of Staple Protruding From Bark (in)
1	3613	1 7/8
2	3392	2 1/4
3	3220	2 1/4
4	2712	2 3/8
5	3655	2
6	3833	2 1/4
7	3295	2
8	2477	2 1/2
9	2859	2 1/2
10	3128	1 3/4

- General Notes:**
1. These staples were normal placements in a healthy tree.
 2. Predrilled with a 3/8" bit, depth unknown.
 3. Average and range not calculated as depths varied.

6", Loblolly Pine, 8-10 Year Old Placements		
Test #	Strength (lbs)	Amount of Staple Protruding From Bark (in)
1	4043	1 3/4
2	3481	1 7/8
3	4717	1 5/8
4	5222	1 3/4
5	4735	1 7/8
6	4140	2
7	4515	1 7/8
8	3657	1 3/4
9	4521	1 7/8
10	3381	2

General Notes:

1. These staples were normal placements in a healthy tree.
2. Predrilled with a 3/8" bit, depth unknown.
3. Average and range not calculated as depths varied.

6" (US made), Loblolly Pine, New Placements		
Test #	Strength (lbs)	Distance from Bark Surface to End of Staple (in)
1	3602	3
2	2317	3
3	3117	3
4	2286	3
5	2899	3
6	2506	3
7	1834	3
8	2160	3
9	2191	3
10	1869	3

Average: 2478

Range: 1768 (71%)

General Notes:

1. These staples were normal placements in a healthy tree.
2. Predrilled with a 3/8" bit, 2" depth.