



LWS

LAMINATED WOOD SYSTEMS

STEEL TECHNICAL DATA

- INSTALLATION
RECOMMENDATIONS
- MATERIAL SPECIFICATIONS
- SIZING CHARTS
- TOOLS & ACCESSORIES

PHASERAISER®

U.S. Patent 6,115,988 6,151,860
Canadian Patent 2,252,115 2,297,318

PoleEnforcer®

U.S. Patent No. 5,383,749

PoleEnforcer SRS®
Spliced Reinforcement System

U.S. Patent No. 9,777,500

PRS

POLEENFORCER®

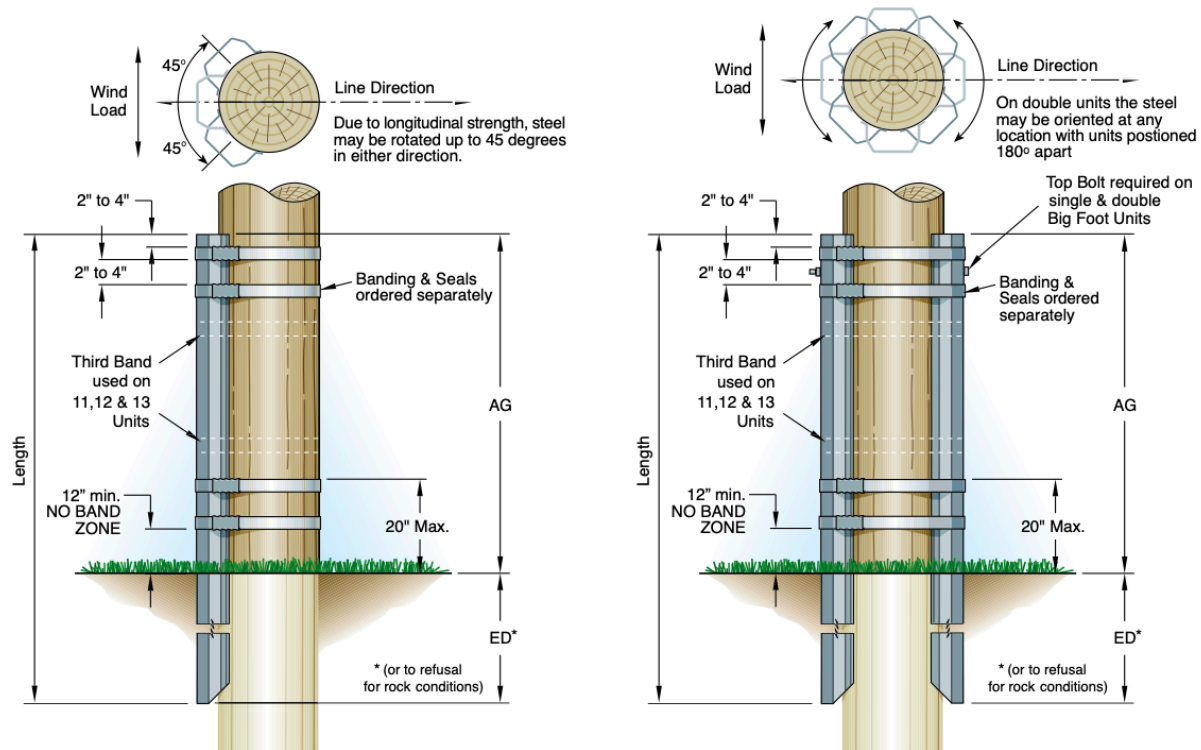
U.S. Patent No. 5,383,749

PoleEnforcer's® patented full length taper and flange design ensures that the steel unit maintains contact with the pole below grade, thereby transferring the load back into sound material in the pole butt below grade. These features result in the strongest, most effective reinforcement available on the market today. Because of its superior design, PoleEnforcer® units can be used to reinforce poles that have been determined to be rejects, resulting in significant cost savings.

Complete pneumatic and drop weight tool systems can be purchased or rented from LWS. For sizing and ordering information visit www.lwsinc.com.



SINGLE & DOUBLE UNIT INSTALLATION



POLEENFORCER® STRENGTH CHART

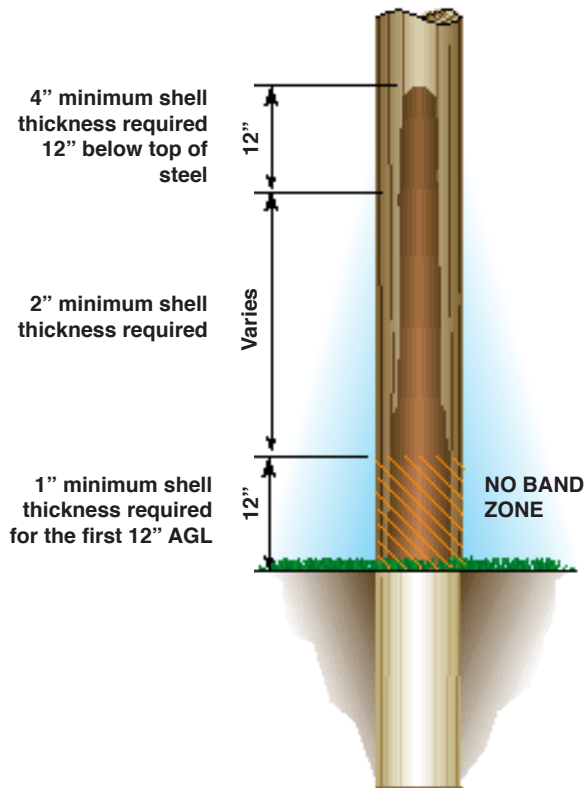
	PoleEnforcer® Unit Number	Ultimate Transverse Strength (Ft.-Lbs.)		Ultimate Longitudinal Strength (ft - lbs) Single Unit	Unit Dimensions			E D* Embedment Depth (ft)	A G Above Ground (ft)	Unit Weight (Lbs.) Single Unit
		Single Unit	Double Unit		Width (in)	Length (ft)	Thickness (in)			
80ksi A-656 Grade 80 Steel	PE - 27 - 10	27,600	55,200	15,000	5.500	10	0.1875	5.0	5.0	85
	PE - 37 - 10	37,900	75,800	22,000	6.250	10	0.1875	5.0	5.0	101
	PE - 51 - 10	51,000	102,000	28,000	7.375	10	0.1875	5.0	5.0	115
	PE - 58 - 10	58,600	117,200	30,000	7.750	10	0.1875	5.0	5.0	124
	PE - 73 - 10	73,500	147,000	35,000	9.000	10	0.1875	5.0	5.0	136
	7 - 10 - 5	78,300	156,600	49,000	7.000	10	0.3125	5.0	5.0	180
	8 - 11 - 5	91,700	183,400	56,000	8.000	11	0.3125	5.5	5.5	210
	9 - 11 - 4	85,200	170,400	47,000	9.000	11	0.2500	5.5	5.5	179
	9 - 11 - 5	108,000	216,000	62,000	9.000	11	0.3125	5.5	5.5	222
	9 - 11 - 6	128,600	257,200	72,000	9.000	11	0.3750	6.0	5.0	266
	10 - 11 - 5	123,700	247,400	69,000	10.000	11	0.3125	6.0	5.0	234
	10 - 11 - 6	148,100	296,200	80,000	10.000	11	0.3750	6.0	5.0	286
	11 - 11 - 6	169,500	339,000	87,000	11.000	11	0.3750	6.0	5.0	294
	12 - 12 - 6	191,500	383,000	95,000	12.000	12	0.3750	6.0	6.0	337
	13 - 12 - 6	211,500	423,000	103,000	13.000	12	0.3750	6.0	6.0	352

All PoleEnforcers are hot dip galvanized per ASTM A-123 specifications. *Longer lengths or SRS® units are available for higher decay applications.

MINIMUM SHELL THICKNESS

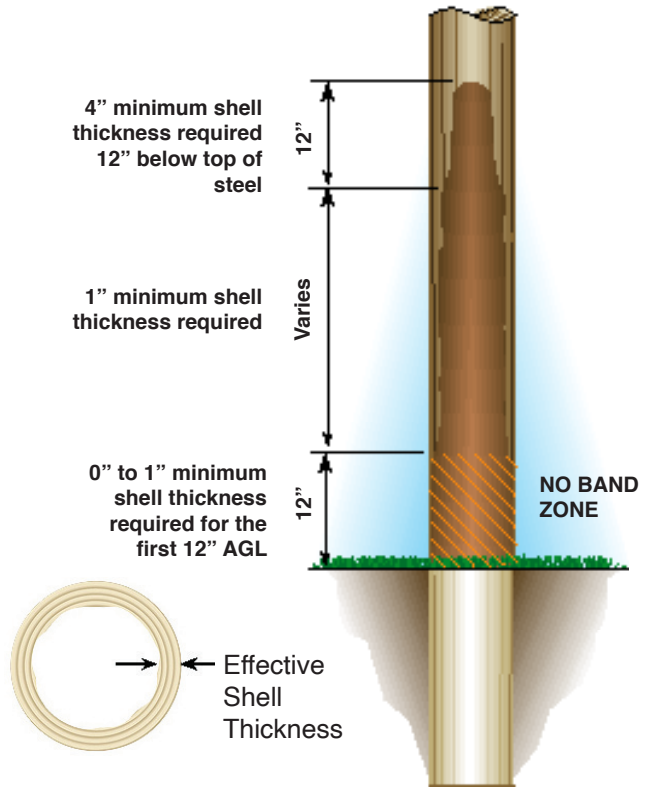
Semi-Thin Shell

Single Units (or double units)



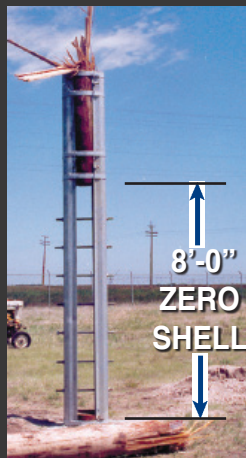
Thin Shell

Double Units (only)



PHASERAISER® TEST... "ZERO THIN SHELL"

Tests conducted on the patented PhaseRaiser® structure lifting system (the design of which is based on the patented PoleEnforcer®) proved the remarkable strength of the PoleEnforcer® in thin shell applications. The test simulated the equivalent of 8'-0" of ZERO SHELL THICKNESS.



50'-0" Class 3 Pole

Pole
Failure..... 3,550 lbs

Loaded.... 48'-0" AGL

Groundline
Moment
Failure..... 170,400 ft-lbs

No permanent
deformation of steel.

PoleEnforcer® + Crossbolts = PhaseRaiser®

NESC Grade B & C Construction - Per NESC Rule 250B & C/D Restoration Factors (67% & 75%)														
Required PoleEnforcer - Semi Thin Shell - (Single or Double Units)														
Pole Length	Pole Class													
	H6	H5	H4	H3	H2	H1	1	2	3	4	5	6	7	9
20 ft.							PE-51-10	PE-37-10	PE-37-10	PE-27-10	PE-27-10	PE-27-10	PE-27-10	PE-27-10
25 ft.							PE-58-10	PE-51-10	PE-37-10	PE-37-10	PE-27-10	PE-27-10	PE-27-10	PE-27-10
30 ft.							PE-73-10	PE-58-10	PE-51-10	PE-37-10	PE-37-10	PE-27-10	PE-27-10	PE-27-10
35 ft.					10-11-5	9-11-5	9-11-4	PE-73-10	PE-58-10	PE-51-10	PE-37-10	PE-27-10	PE-27-10	
40 ft.			12-12-6	11-11-6	10-11-6	10-11-5	9-11-5	9-11-4	PE-73-10	PE-58-10	PE-51-10	PE-37-10		
45 ft.	10-11-6D	10-11-5D	9-11-5D	12-12-6	11-11-6	10-11-6	10-11-5	8-11-5	PE-73-10	PE-58-10	PE-51-10	PE-37-10		
50 ft.	11-11-6D	10-11-6D	10-11-5D	13-12-6	12-12-6	10-11-6	10-11-5	9-11-5	9-11-4	PE-73-10	PE-58-10			
55 ft.	12-12-6D	11-11-6D	10-11-6D	10-11-5D	13-12-6	11-11-6	10-11-6	10-11-5	8-11-5	PE-73-10				
60 ft.	12-12-6D	11-11-6D	10-11-6D	9-11-6D	9-11-5D	12-12-6	11-11-6	10-11-5	9-11-5	9-11-4				
65 ft.	13-12-6D	12-12-6D	11-11-6D	10-11-6D	10-11-5D	13-12-6	11-11-6	10-11-6	10-11-5	8-11-5				
70 ft.			13-12-6D	11-11-6D	10-11-6D	10-11-5D	13-12-6	11-11-6	10-11-6	9-11-5				
75 ft.			13-12-6D	12-12-6D	11-11-6D	9-11-6D	9-11-5D	12-12-6	10-11-6					
80 ft.				12-12-6D	11-11-6D	10-11-6D	10-11-5D	12-12-6	11-11-6					
85 ft.				13-12-6D	12-12-6D	10-11-6D	10-11-5D	13-12-6	11-11-6					
90 ft.					12-12-6D	11-11-6D	10-11-6D	9-11-5D	12-12-6					
95 ft.					13-12-6D	11-11-6D	10-11-6D	10-11-5D						
100 ft.					13-12-6D	12-12-6D	10-11-6D	10-11-5D						
105 ft.						12-12-6D	11-11-6D	9-11-6D						
110 ft.						13-12-6D	11-11-6D	10-11-6D						
115 ft.						13-12-6D	11-11-6D	10-11-6D						
120 ft.						13-12-6D	12-12-6D	10-11-6D						
125 ft.							12-12-6D	11-11-6D						

D = DOUBLE UNIT | LARGER UNITS AVAILABLE UPON REQUEST

THE POLEENFORCER® PATENTED ADVANTAGE



NESC Grade B & C Construction - Per NESC Rule 250B & C/D Restoration Factors (67% & 75%)

Required PoleEnforcer - Thin Shell - (Double Units Only)

Pole Length	Pole Class													
	H6	H5	H4	H3	H2	H1	1	2	3	4	5	6	7	9
20 ft.							PE-27-10D	PE-27-10D	PE-27-10D	PE-27-10D	PE-27-10D	PE-27-10D	PE-27-10D	PE-27-10D
25 ft.							PE-27-10D	PE-27-10D	PE-27-10D	PE-27-10D	PE-27-10D	PE-27-10D	PE-27-10D	PE-27-10D
30 ft.							PE-37-10D	PE-37-10D	PE-27-10D	PE-27-10D	PE-27-10D	PE-27-10D	PE-27-10D	PE-27-10D
35 ft.					PE-73-10D	PE-51-10D	PE-51-10D	PE-37-10D	PE-27-10D	PE-27-10D	PE-27-10D	PE-27-10D	PE-27-10D	
40 ft.			9-11-5D	9-11-4D	PE-73-10D	PE-58-10D	PE-51-10D	PE-51-10D	PE-37-10D	PE-27-10D	PE-27-10D	PE-27-10D		
45 ft.	10-11-6D	10-11-5D	9-11-5D	8-11-5D	7-10-5D	PE-73-10D	PE-58-10D	PE-51-10D	PE-37-10D	PE-37-10D	PE-27-10D	PE-27-10D		
50 ft.	11-11-6D	10-11-6D	10-11-6D	9-11-5D	8-11-5D	7-10-5D	PE-73-10D	PE-51-10D	PE-51-10D	PE-37-10D	PE-27-10D			
55 ft.	12-12-6D	11-11-6D	10-11-6D	10-11-5D	9-11-5D	9-11-4D	PE-73-10D	PE-58-10D	PE-51-10D	PE-37-10D				
60 ft.	12-12-6D	11-11-6D	10-11-6D	9-11-6D	9-11-5D	8-11-5D	7-10-5D	PE-73-10D	PE-51-10D	PE-51-10D				
65 ft.	13-12-6D	12-12-6D	11-11-6D	10-11-6D	10-11-5D	9-11-5D	9-11-4D	PE-73-10D	PE-58-10D	PE-51-10D				
70 ft.			13-12-6D	11-11-6D	10-11-6D	10-11-5D	9-11-5D	9-11-4D	PE-73-10D	PE-58-10D				
75 ft.			13-12-6D	12-12-6D	11-11-6D	9-11-6D	9-11-5D	8-11-5D	PE-73-10D					
80 ft.				12-12-6D	11-11-6D	10-11-6D	10-11-5D	9-11-5D	7-10-5D					
85 ft.				13-12-6D	12-12-6D	10-11-6D	10-11-5D	9-11-5D	9-11-4D					
90 ft.					12-12-6D	11-11-6D	10-11-6D	9-11-5D	8-11-5D					
95 ft.					13-12-6D	11-11-6D	10-11-6D	10-11-5D						
100 ft.					13-12-6D	12-12-6D	10-11-6D	10-11-5D						
105 ft.						12-12-6D	11-11-6D	9-11-6D						
110 ft.						13-12-6D	11-11-6D	10-11-6D						
115 ft.						13-12-6D	11-11-6D	10-11-6D						
120 ft.						13-12-6D	12-12-6D	10-11-6D						
125 ft.							12-12-6D	11-11-6D						

D = DOUBLE UNIT | LARGER UNITS AVAILABLE UPON REQUEST





PNEUMATIC DRIVING SYSTEM

PE90HHB-BD AIR HAMMER & BRACKET ASSEMBLY



(A) PE-90-AH	90LB. AIR HAMMER	90 LBS.
(B) PE90HB	BRACKET	22 LBS.
(C) PE2118DH	SHOE & SHANK ASSEMBLY	26 LBS.

PE90WP 18'-6" SECTIONAL WINCH POLE ASSEMBLY



(A) PEPY	POLE YOKE
(B) W2000	WINCH

54 LBS. TOTAL



PE90TWB PULL DOWN WINCH ASSEMBLY

(A) W3200	PULL DOWN WINCH	73 LBS.
(B) PEBR	BRIDAL ROLLER (BLACK)	10 LBS.
(C) PETR	TENSION ROLLER (WHITE)	2 LBS.

PE-90-PDS COMPLETE PNEUMATIC DRIVING SYSTEM TOOL PACKAGE

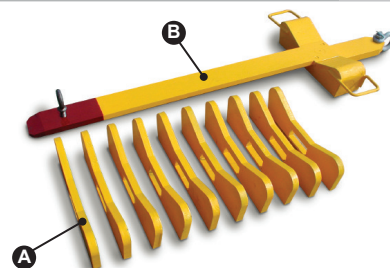
PE90HHB-BD	AIR HAMMER BRACKET ASSEMBLY
PE90WP	WINCH POLE ASSEMBLY
PE90TWB	PULL DOWN WINCH ASSEMBLY
DH1-2	BANDING DISPENSER
PEAT2	AIR TENSIONER

PEAS2	AIR SEALER
PEBS2	MANUAL BANDING SHEAR
PE-FRL	FILTER REGULATOR LUBRICATOR
PE38AH25	(2 EA) 3/8" TOOL HOSE (25 FT. EA.)
PE152RT	NYLON RATCHET STRAP

DROP WEIGHT DRIVING SYSTEM

PE-500-DWS DROP WEIGHT SYSTEM

(A)	PE-25-WW-1B-LT	25LB. WAFER WEIGHTS (10)	25 LBS. EA.
(B)	PE-250-DS	DRIVING SHANK W/ SHACKLE AND EYEBOLT	250 LBS.



BANDING & SEALING TOOLS

PEMT2P MANUAL TENSIONER

3/4" TO 2" PUSH TENSIONER 8 LBS.



PEAT2 AIR TENSIONER

2" AIR TENSIONER 9 LBS.



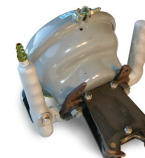
PEMS2 MANUAL SEALER

2" MANUAL SEALER 11 LBS.



PEAS2 AIR SEALER

2" AIR SEALER 25 LBS.



PEBS2 MANUAL BANDING SHEAR

2" MANUAL BANDING SHEAR 7 LBS.



DH1-2 2" BANDING DISPENSER

2" BANDING DISPENSER 46 LBS.



PEOS2GL GALVANIZED SEALS

2" X 4-1/4" OPEN CRIMP SEAL



SAFETY CAPS

PE2SC CAP W/ NAILS (6" TO 9" UNITS)
PE3SC CAP W/ NAILS (10" TO 13" UNITS)



PEB2G85ROLL 2" GALVANIZED BANDING

2" X .044" STEEL BANDING
12,000 LBS. ULTIMATE TENSILE STRENGTH
138,000 PSI



INSTALLATION ACCESSORIES

PE-FRL FILTER-REGULATOR-LUBRICATOR

FILTER-REGULATOR-LUBRICATOR ASSY
6 LBS.



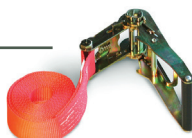
PE38AH25 3/8" TOOL HOSE

25' AIR HOSE ASSEMBLY 5 LBS.



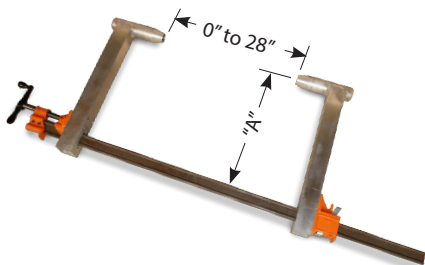
PE152RT NYLON RATCHET STRAP

10' X 2" RATCHET STRAP 4 LBS.



DRILLING ALIGNMENT TOOL

PE78DJ SMALL ALIGNMENT TOOL ("A"=16") 12 LBS.
PE78DJ2 LARGE ALIGNMENT TOOL ("A"=20") 14 LBS.



PEPDW-EXT PULL DOWN WINCH EXTENSION

6' WINCH EXTENSION ASSEMBLY 26 LBS.

PULL DOWN WINCH ASSY
(ORDERED SEPARATELY)



RP-2 STANDARD ROLLER PLATE

ROLLER PLATE (USED DOUBLE UNITS AND
W/WINCH EXTENSION)
8 LBS.



LWS

PoleEnforcer SRS[®]

Spliced Reinforcement System

U.S. Patent No. 9,777,500

Canadian Patent No. 2,986,026

LWS

LAMINATED WOOD SYSTEMS

SPLICED REINFORCEMENT SYSTEM

U.S. PATENT NO. 9,777,500

Canadian Patent No. 2,986,026



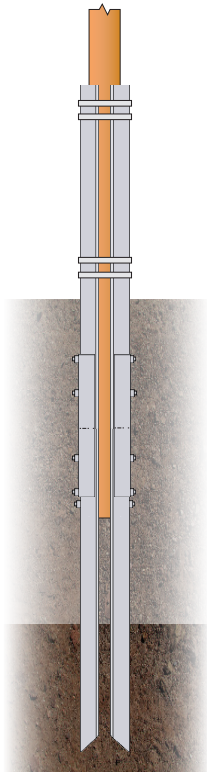
- SOFT SOIL APPLICATIONS
- HIGH DECAY
- CAR DAMAGED POLES
- BURNED POLES
- POLES IN ICE OR WATER
- EXCAVATION NEAR POLE
- ENVIRONMENTALLY SENSITIVE SOIL

PoleEnforcer SRS® Spliced Reinforcement System

U.S. Patent No. 9,777,500

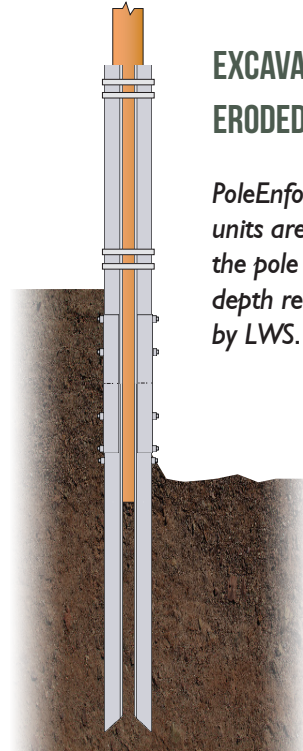
Canadian Patent No. 2,986,026

TYPICAL APPLICATIONS



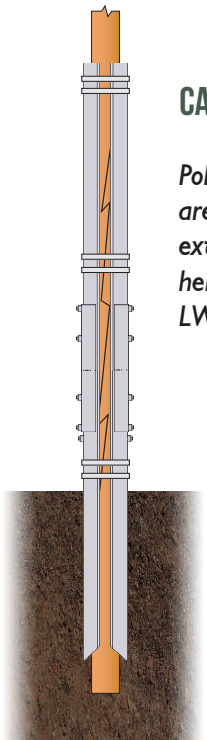
SOFT SOIL

PoleEnforcer SRS® units are driven below the pole butt into the good soil to a depth recommended by LWS.



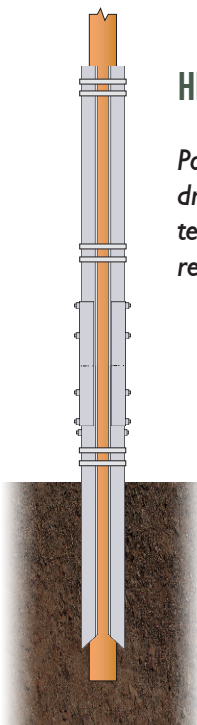
EXCAVATED OR ERODED SOIL

PoleEnforcer SRS® units are driven below the pole butt to a depth recommended by LWS.



CAR BREAKS

PoleEnforcer SRS® units are driven below grade and extend above grade to a height recommended by LWS.



HIGH DECAY

PoleEnforcer SRS® units are driven below grade and extend above grade to a height recommended by LWS.



PHASERAISER®

U.S. Patent No. 6,115,988 & 6,151,860

Canadian Patent No. 2,252,115 & 2,297,318

INCREASE HEIGHT, CAPACITY, AND REVENUE

Patented in the US & Canada, the PhaseRaiser® Structure Lifting System is the most innovative and economical solution to address conductor clearance points of interest. More than 13,000 energized structures have been safely raised since 1997. A line crew of 5 or 6 can typically raise three structures per day.

The PhaseRaiser® system costs significantly less than a structure changeout, is performed on energized lines, and utilizes low impact equipment. The system utilizes a specialized tool trailer that can be rented or purchased.

To obtain a quote on your next structure upgrade project, fill out the PhaseRaiser® Structure Information worksheet at www.lwsinc.com.

STRUCTURE INFORMATION WORKSHEET

Use this form to provide LWS engineers information regarding your structure and unique lift requirements. LWS can provide a complete computer analysis on your structure(s) and will recommend & supply complete material kits that will: raise, raise and reinforce the ground line, or raise, reinforce and reclassify the poles for each structure. LWS designers may recommend additional X-braces or foundation systems with the material kits.

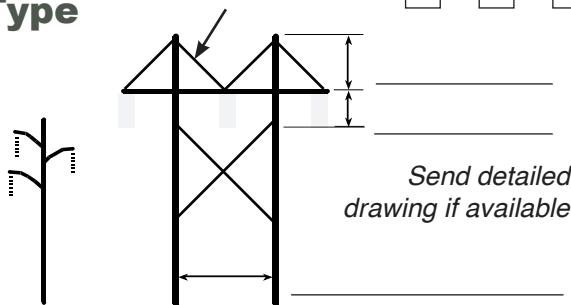
Complete the following form and send it to LWS at: **engineering@lwsinc.com** - **OR** fill out **ONLINE** at **www.lwsinc.com**

Customer Information

Customer Name: _____ Phone: _____
 Contact Name: _____
 Project Name: _____ Email: _____
 Project Address: _____ Constr Start Date: _____
 City / State: _____ Delivery Location: City / State / Zip _____

Structure Type

No. of Vee Braces ☐ 0 ☐ 2 ☐ 4



Send detailed drawing if available

☐ Single

☐ H-Frame

Pole Information

Pole Height(s): _____

Pole Class(es): _____

Species: ☐ Douglas-fir ☐ Southern Pine

☐ Cedar

Pole Condition at Groundline: _____

Inspection Report Available? ☐ Yes ☐ No

Structure Information

Line Voltage: ☐ 345kV ☐ 230kV ☐ 161kV ☐ 138kV

Conductor Size: _____ ☐ 115kV ☐ 69kV Other _____

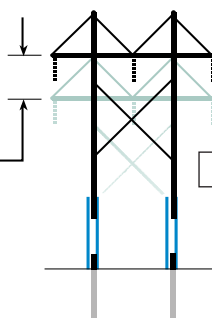
Shield Wire Size: _____ Span Length: _____ Date Line Built: _____

Lift and Reinforcement Needed

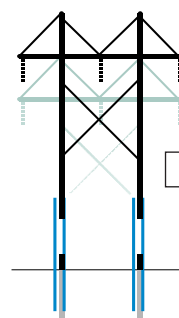
NOTE: Illustrations show PhaseRaisers rotated 90° on poles for clarity.

Desired Lift (5 to 20ft)

Additional Comments (I.E. - cable TV, Telephone etc.)

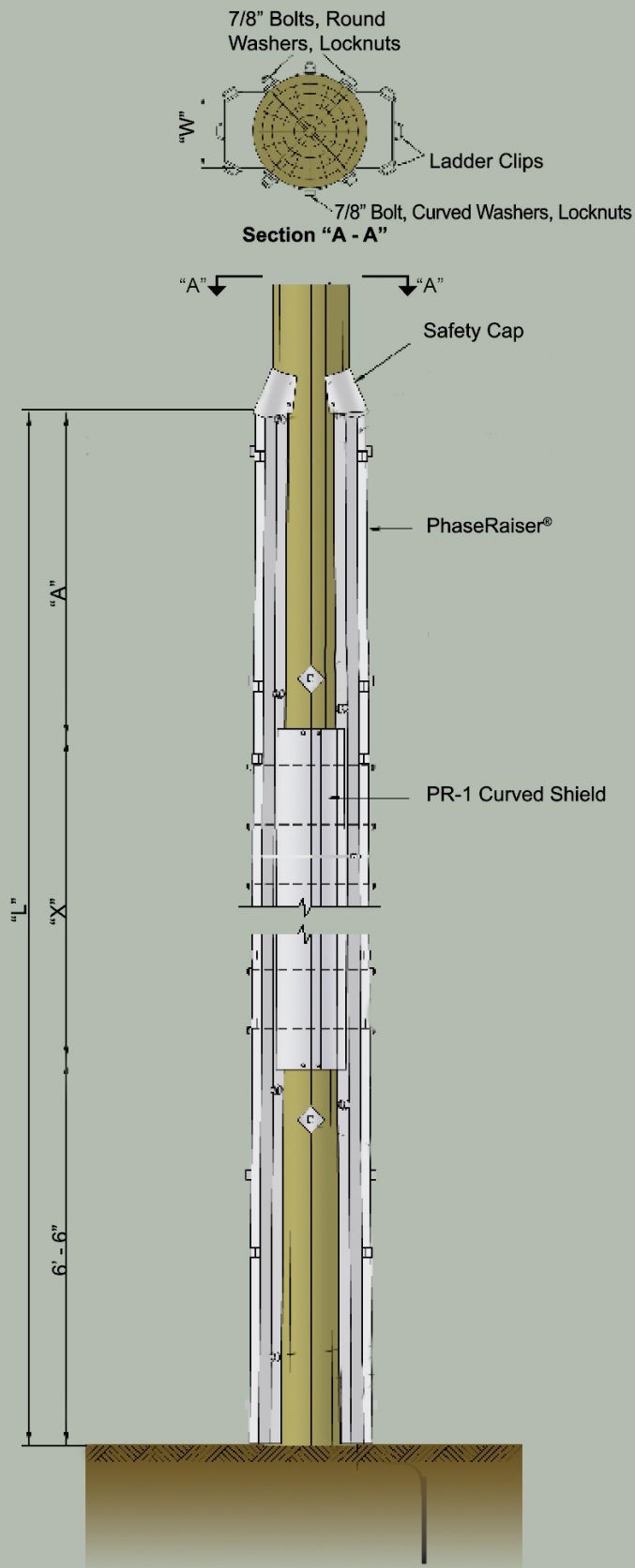


☐ Raise



☐ Raise/Reinforce

Standard Assembly for "PRH"



Type "PRH" - Raise Only

For H-Frames or other Multiple Pole Structures

Standard Raises are 5', 10', 15' or 20'

"X" = Lift Height

For lifts 0 to 15 feet:

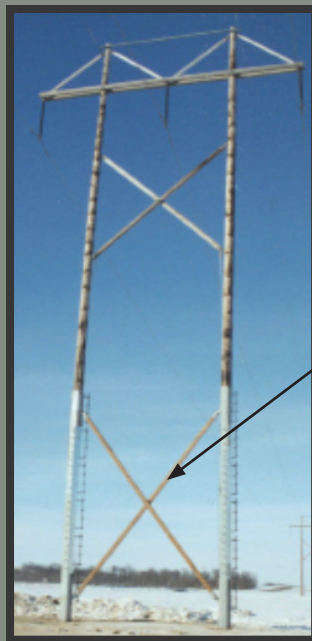
"L" = "X" + 12'-0"

"A" = 5'-6"

For lifts 16 to 20 feet:

"L" = "X" + 13'-0"

"A" = 6'-6"



20 ft. lift - North Dakota

Add additional X-brace to span gap for lifts 16ft or greater. X-BRACE ASSEMBLIES AVAILABLE FROM LWS (ORDERED SEPARATELY).

NOTE: Most H-frame strengths are limited by the pole capacity above the X-brace. However, the capacity of the structure after lift needs to be checked either with the use of PLS-POLE or by LWS to determine if additional X-bracing is required.

MULTI POLE					
Minimum Unit Size					
Existing Pole Length	Existing Pole Class				
	H2	H1	1	2	3
50'-0"	PRH9	PRH9	PRH7	PRH7	PRH7
55'-0"	PRH10	PRH9	PRH8	PRH7	PRH7
60'-0"	PRH11	PRH10	PRH9	PRH7	PRH7
65'-0"	PRH11	PRH10	PRH9	PRH8	PRH7
70'-0"	PRH12	PRH11	PRH10	PRH8	PRH7
75'-0"	PRH13	PRH12	PRH10	PRH9	PRH8
80'-0"	PRH13	PRH12	PRH11	PRH9	PRH8
85'-0"	PRH14	PRH13	PRH11	PRH10	PRH8
90'-0"	PRH14	PRH13	PRH12	PRH10	PRH9
95'-0"	PRH15-80	PRH14	PRH12	PRH10	—
100'-0"	PRH15-80	PRH14	PRH13	PRH11	—
105'-0"	PRH15-80	PRH14	PRH13	PRH11	—
110'-0"	PRH15-80	PRH15-80	PRH13	PRH12	—

Contact LWS for sizes not shown.

Ordering Example:

Need - Raise Structure 10'-0" (X=10'-0")

Existing Pole - 75'-0" Class 2

Order - **PRH9 - 22L**

"W" Width of steel

"L" Length of steel
($X + 12'-0"$)
PhaseRaiser unit size from table above.

Note: Material to be galvanized.
For weathering steel add "W", for painted steel add "P". Example:

PRH9 - 22LW

PRH9 - 22LP

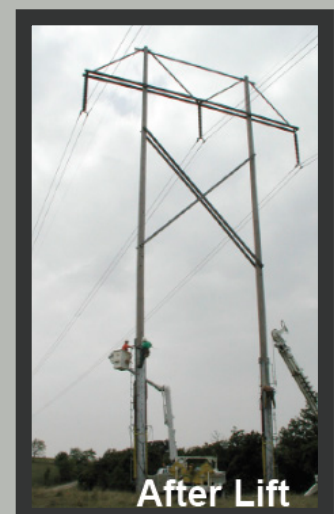
All PhaseRaiser® steel Units include mounting hardware, caps, and side shields.

INCREASE HEIGHT, CAPACITY, AND REVENUE

345kV H-frame structure raised 15 feet (Iowa)

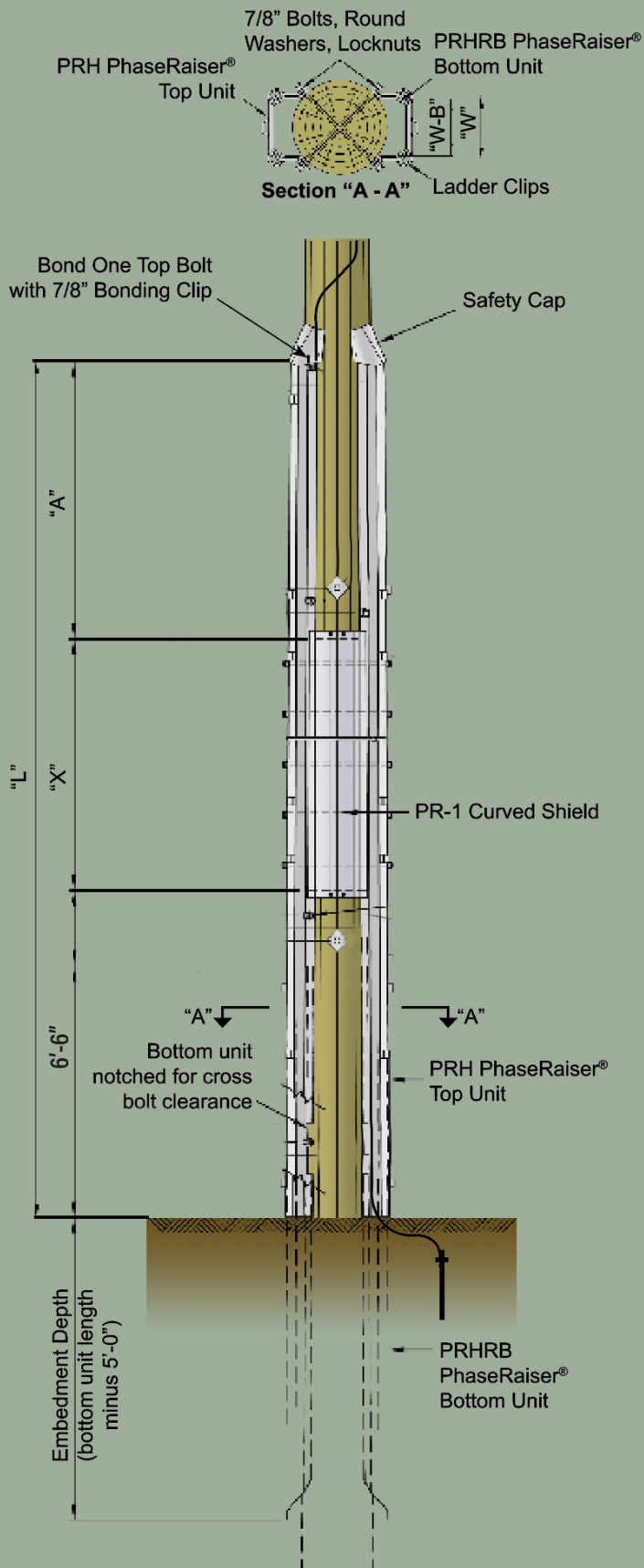


Before Lift



After Lift

Standard Assembly for "PRHR"



TYPE "PRHR" - RAISE & REINFORCE

USED WHEN GROUNDLINE DECAY IS, OR COULD BE AN ISSUE & ALL SINGLE POLE APPLICATIONS

"X" = Lift Height

Standard Raises are
5', 10', 15' or 20'

For lifts 0 to 15 feet:

"L" = "X" + 12'-0"

"A" = 5'-6"

For lifts 16 to 20 feet:

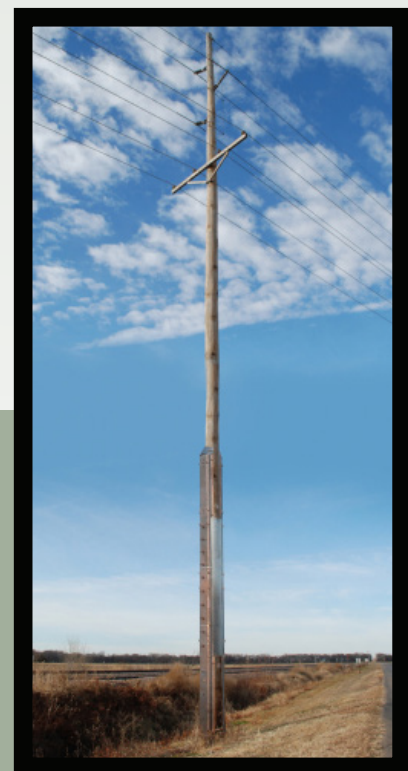
(H-Frames Only)

"L" = "X" + 13'-0"

"A" = 6'-6"

(For lifts 16' - 20' add additional X-brace)

Note: Material to be galvanized. For weathering steel add "W", for painted steel add "P".



SINGLE POLE

Top Unit Minimum Size

Existing Pole Length	Existing Pole Class				
	H2	H1	1	2	3
50'-0"	PRH9	PRH9	PRH7	PRH7	PRH7
55'-0"	PRH10	PRH9	PRH8	PRH7	PRH7
60'-0"	PRH11	PRH11	PRH10	PRH9	PRH8
65'-0"	PRH11	PRH12	PRH11	PRH10	PRH9
70'-0"	PRH12	PRH13	PRH11	PRH10	PRH9
75'-0"	PRH13	PRH13	PRH12	PRH10	PRH9
80'-0"	PRH13	PRH14	PRH12	PRH11	PRH10
85'-0"	PRH14	PRH14	PRH13	PRH11	PRH10
90'-0"	PRH14	PRH14	PRH13	PRH11	PRH10
95'-0"	PRH15-80	PRH15	PRH13	PRH12	—
100'-0"	PRH15-80	PRH15	PRH14	PRH12	—
105'-0"	PRH15-80	PRH15	PRH14	PRH12	—
110'-0"	PRH15-80	PRH15-80	PRH14	PRH12	—

The PRHR system is required for all single pole applications. The system is also used for multi-pole structures where ground-line decay is, or could be, an issue.

Bottom Unit Minimum Size (Embedment depth = "L" minus 5'-0")

Existing Pole Length	Existing Pole Class				
	H2	H1	1	2	3
50'-0"	PRHRB58-11	PRHRB58-11	PRHRB5A6-10	PRHRB5A6-10	PRHRB5A6-10
55'-0"	PRHRB59-11	PRHRB58-11	PRHRB5A7-10	PRHRB5A6-10	PRHRB5A6-10
60'-0"	PRHRB510-11	PRHRB510-11	PRHRB59-11	PRHRB58-11	PRHRB5A7-10
65'-0"	PRHRB510-11	PRHRB511-11	PRHRB510-11	PRHRB59-11	PRHRB58-11
70'-0"	PRHRB511-11	PRHRB512-11	PRHRB510-11	PRHRB59-11	PRHRB58-11
75'-0"	PRHRB512-11	PRHRB512-11	PRHRB511-11	PRHRB59-11	PRHRB58-11
80'-0"	PRHRB512-11	PRHRB513-11	PRHRB511-11	PRHRB510-11	PRHRB59-11
85'-0"	PRHRB513-11	PRHRB513-11	PRHRB512-11	PRHRB510-11	PRHRB59-11
90'-0"	PRHRB513-11	PRHRB513-11	PRHRB512-11	PRHRB510-11	PRHRB59-11
95'-0"	PRHRB614-12	PRHRB514-11	PRHRB512-11	PRHRB511-11	—
100'-0"	PRHRB614-12	PRHRB514-11	PRHRB514-11	PRHRB511-11	—
105'-0"	PRHRB614-12	PRHRB514-11	PRHRB514-11	PRHRB511-11	—
110'-0"	PRHRB614-12	PRHRB614-12	PRHRB514-11	PRHRB511-11	—

Ordering Example:

Need - Raise Structure 10'-0"
(X=10'-0")

Existing Pole - 75'-0" Class 1

Order - **PRHR 10 - 22 L**
 PhaseRaiser top unit size from table above. "W" Width of top unit steel "L" Length of top steel ("X" + 12'-0")

(Consists of two PRH10-22L Top Units and two PRHRB59-11 Bottom Units)
 "W-B" Width of bottom unit steel

Note: Material to be galvanized. For weathering steel add "W", for painted steel add "P".

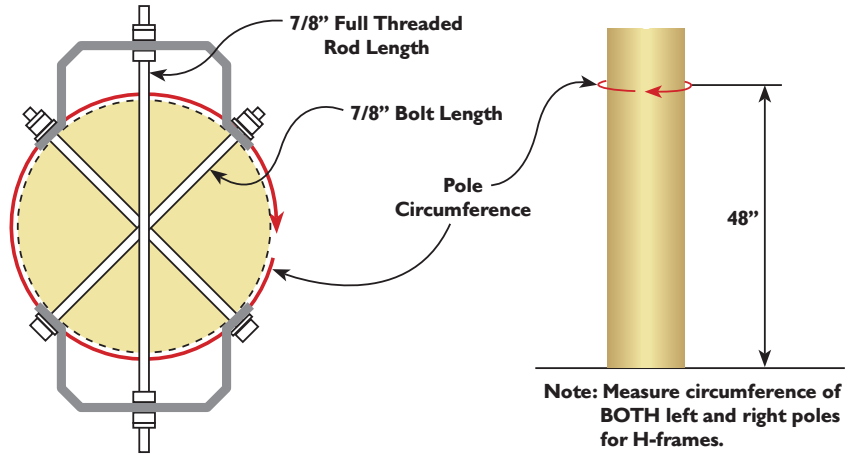
Example:
 PRH 9 - 22 L W
 PRH 9 - 22 L P

All PhaseRaiser® steel Units include mounting hardware, caps, and side shields.

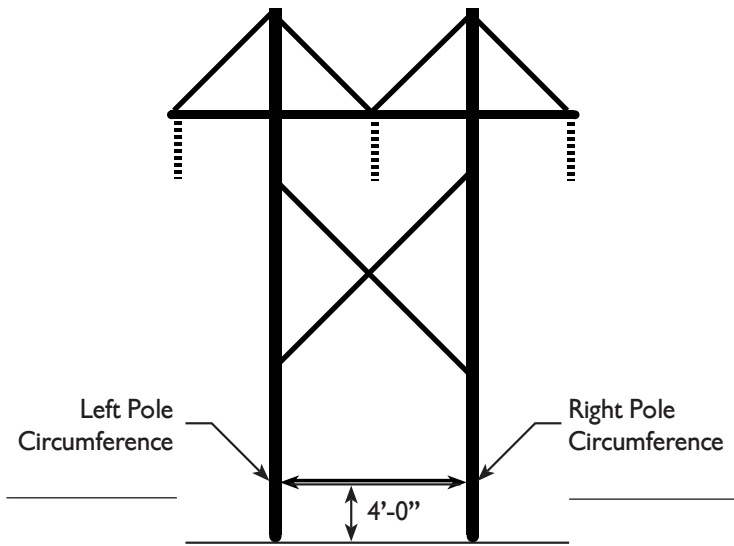
IMPORTANT PHASERAISER® FIELD INFORMATION

The owner should provide the pole circumference measurement taken at 48" above ground to ensure that proper bolt and threaded rod lengths are supplied by LWS.

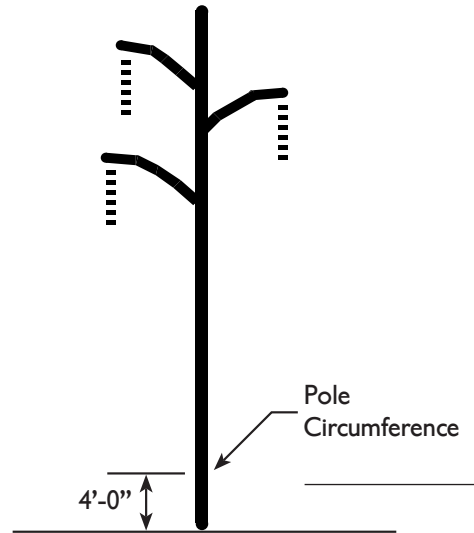
LWS reserves the right to refuse any returned material if pole measurements are not provided as specified above. When measurements are not provided, LWS will reference ANSI 05.1-2017 Pole Dimensions to determine bolt and rod lengths. Based on these estimated dimensions, the customer will be responsible for any material and delivery costs of replacement bolts and rods.



H-Frame Structures

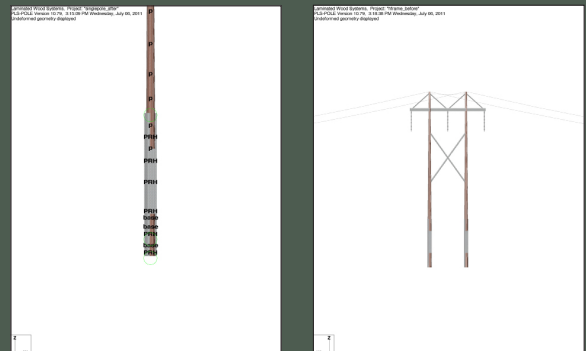


Single Pole Structures



USE THE PHASERAISER® WIZARD WITH PLS-CADD™ TO SIMULATE RAISING CONDUCTOR CLEARANCES

The PLS-CADD PhaseRaiser Wizard allows users to easily and accurately model the effects of a PhaseRaiser installation on each specific structure as well as the adjacent structures.



Materials, Equipment & Manpower Required for Typical Installations

PhaseRaiser® units are made of high strength galvanized steel. All bolts conform to ANSI C135.1

The PhaseRaiser® units are also available in painted and weathering steel.

Materials



Safety Cap

Steel
PhaseRaiser®
Units

7/8" Anti-split Bolts

7/8" Cross Bolts

7/8" Threaded Rods

Side Shields

Cover Band

Personnel

The PhaseRaiser® system enables a crew as small as **three** for single pole or a crew of **five** for H-frame structures to cut the existing poles, install custom designed galvanized or painted steel PhaseRaiser® units, then raise and secure the structure to the desired height up to an additional twenty feet.

LWS Field Support - A skilled field trainer from LWS works with qualified lineworkers until they develop a comfortable skill level - normally after raising two to three structures.

Equipment



The PhaseRaiser® system requires specialized training, tools and equipment for installation. This equipment is available for purchase or rent and includes on-site training by LWS field personnel as well as the following specialized tools and equipment:

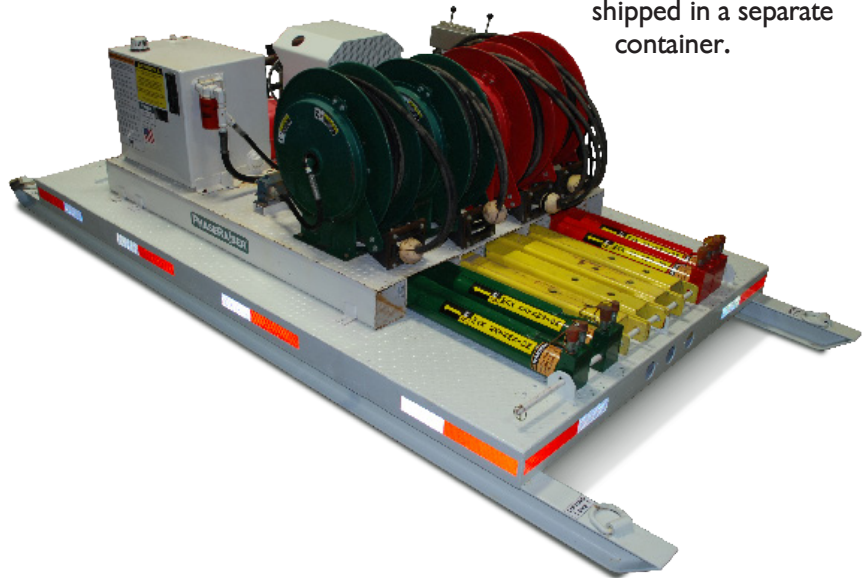
- **Custom Equipment Trailer w/ Tool Boxes**
 - Hydraulic Lifting Unit
 - Hydraulic Hoses
 - 4" x 8' Hydraulic Cylinders
 - 4" x 14' Hydraulic Cylinders
- **Cylinder Extensions**
- **Galvanized Lifting Vangs**
- **Cylinder Pins • Nylon Ratchet Straps**
- **Banding Dispenser • Banding Shear**
- **Drilling Alignment Tools**
- **4' Working Ladders**

In addition to the equipment trailer, a line or boom truck, chain saw and air compressor are also needed.



Skid Mounted Hydraulic System

For use in remote access areas or environmentally sensitive locations where conventional equipment cannot be used. Additional tools are shipped in a separate container.



INCREASE POLE STRENGTH WITH PRS POLE RECLASSIFICATION SYSTEM®

With Patented Features

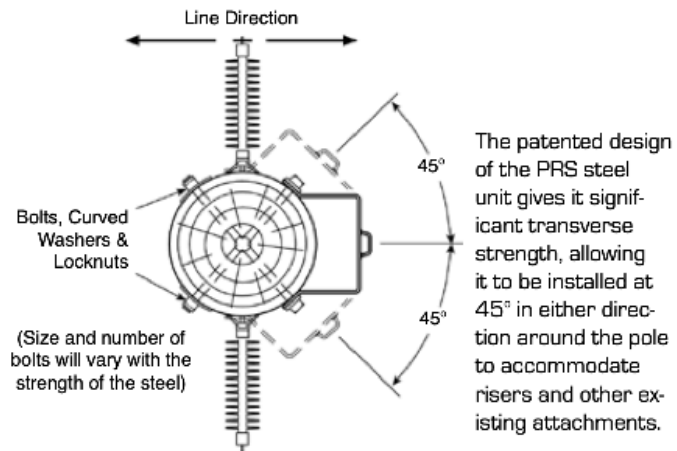
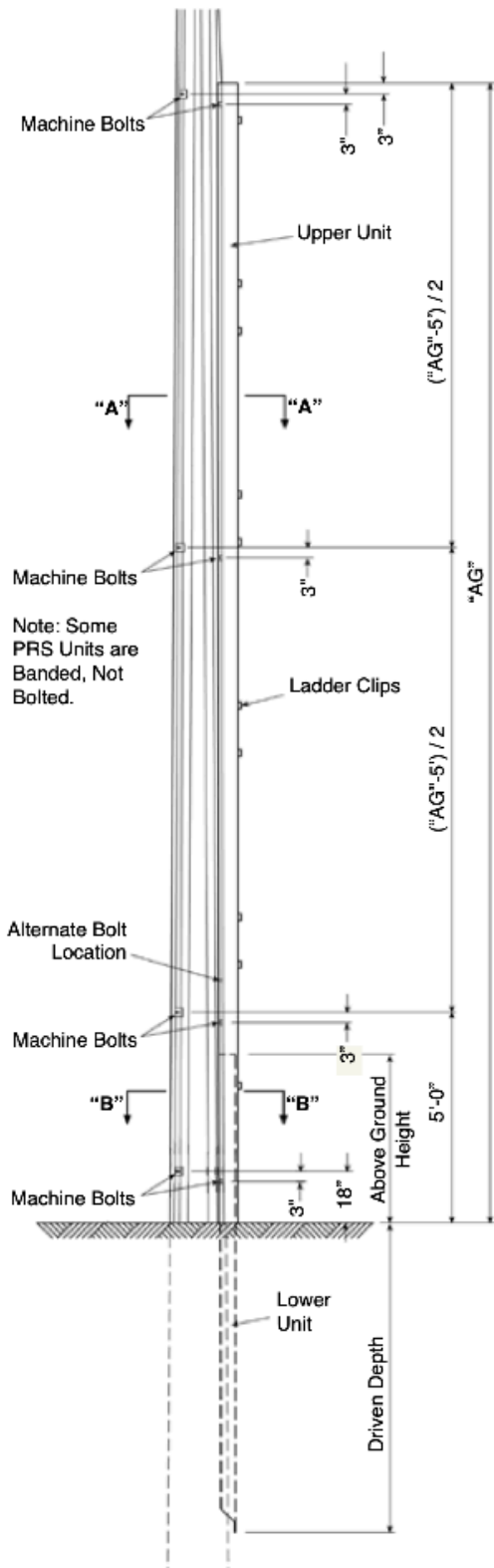
The PRS system is the perfect solution when existing poles are, or will be, loaded beyond their original design strength with the addition of assets or system hardening. The system incorporates a lower driven steel unit and an upper steel unit that is cross bolted to the pole. When the PRS is used on steel or concrete poles, the upper unit is banded with high strength banding. Reclassifying existing poles with the PRS saves thousands of dollars versus pole changeouts. LWS engineers will specify the appropriate PRS units based upon the existing pole size and desired loading information provided.



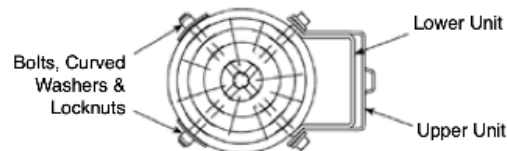
INCREASE EXISTING POLE CLASS

- EXTEND LIFE OF EXISTING POLES
- AVOID COSTLY OUTAGES

Components of the PRS System



View "A-A"



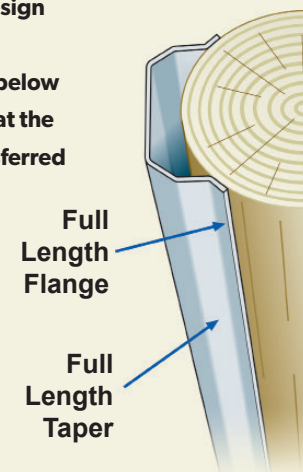
View "B-B"

PRS Unique Patented Features

The PRS system utilizes the patented features of the PoleEnforcer® groundline reinforcement system.

As the lower steel units are driven into the ground, the full length taper design forces the full length flanges to maintain contact with the pole below the groundline. This ensures that the increased load is properly transferred to the pole butt and soil.

PRS upper units incorporate a full length flange. Depending on the design, the upper units can either be tapered or straight.



PATENT NO. 5,383,749

PRS Engineering Worksheet

The LWS engineering staff will assist you in determining which standard PRS configuration will best suit your needs. Complete structural engineering analysis including foundation design is provided at no extra cost. Just fill in the requested information on this page along with a sketch of your current configuration and send to **engineering@lwsinc.com**. OR you may fill out this form online by visiting www.lwsinc.com.

Customer Name _____

Contact Name _____

Project Name _____

Project Address _____

Phone _____

Email _____

Delivery Address _____

Construction Type _____

Line Voltage(s) _____

Number of Conductors _____

Conductor Size _____

Underbuild Conductor Size _____

Underbuild Number of Wires _____

Number of Neutral/Shield Wires _____

Cable TV _____ Diameter _____ No. of Wires _____

Telephone _____ Diameter _____ No. of Wires _____

Neutral/Shield Wire Size _____

Spans (feet) _____ to _____

Loading Conditions _____

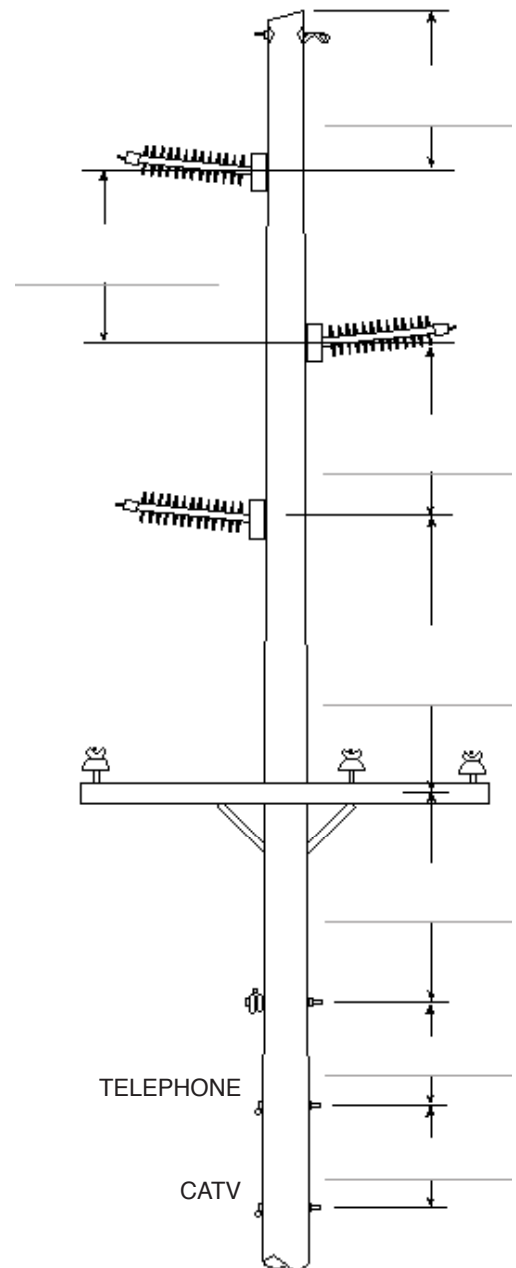
Example - NESC Heavy Loading, Grade B Construction, Extreme Wind

Pole Height, Range _____ to _____

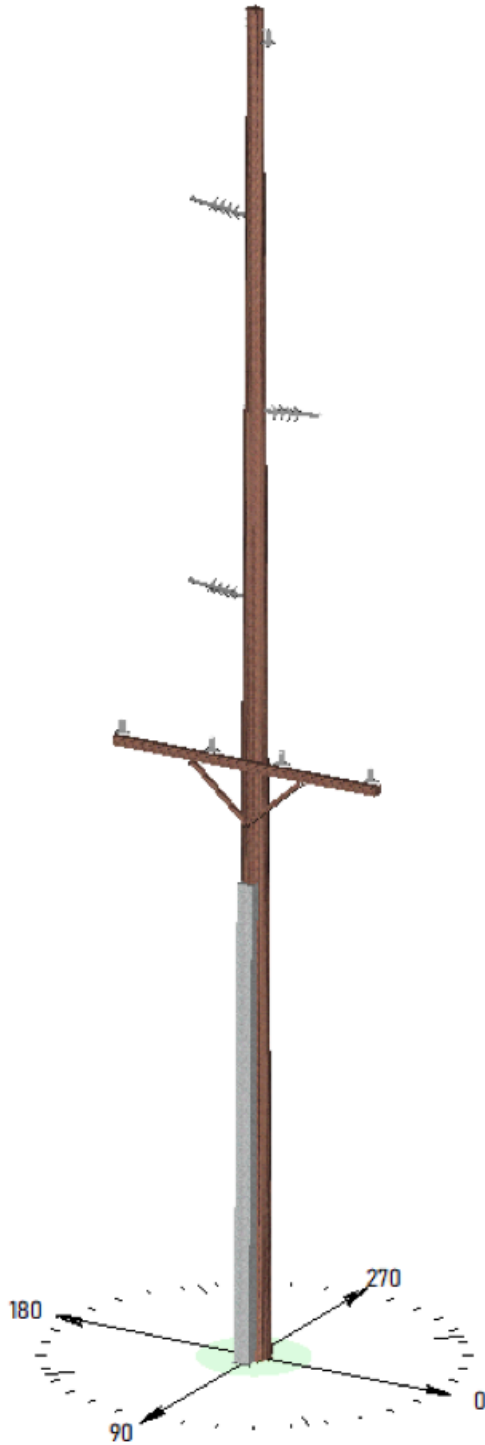
Pole Class _____ Soil Type _____

Age of Line _____ Leaners ____Yes ____No

Please attach your standard drawing(s) which include the required information as shown below:



Additional Comments: _____



Modeling LWS Steel Reclassification Units (PRS) in PLS-Pole

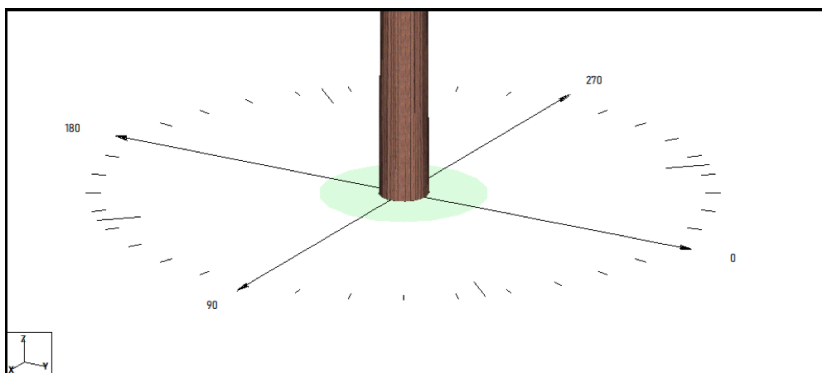
Step 1.

Add global joint “Grnd” at the groundline as shown below.

Menu Tab: Geometry - Joints

The location of this joint should be offset from the pole centerline a distance equal to 1/2 the pole diameter at the groundline in the direction of the location of the unit. Generally speaking, this is on the longitudinal pole face.

	Joint Label	Symmetry Code	X Coord. (ft)	Y Coord. (ft)	Z Coord. (ft)
1	Grnd	None	0.67	0	0
2					



X, Y, & Z Disp. Rest. as well as X, Y, & Z Rot. Rest. should all be fixed.

X Disp. Rest.	Y Disp. Rest.	Z Disp. Rest.	X Rot. Rest.	Y Rot. Rest.	Z Rot. Rest.
Fixed	Fixed	Fixed	Fixed	Fixed	Fixed

Step 2.

Add attachment label “Prst” at the estimated height of the top of the PRS unit as shown below.

Menu Tab: Geometry – Wood Poles – Attach. Labels

	Joint Label	Distance From Origin/Top Joint (ft)	Global Z of Attach (ft)	Hole Diameter (in)	Hole Azimuth (deg)
1	P:S	0.83333333	0	0.6875	0
2	P:C	8.75	0	0.8125	0
3	P:L	16.75	0	0.8125	0
4	P:R	24.75	0	0.8125	0
5	P:F1-F0	31.5	0	0.6875	90
6	P:F1-F1	34	0	0.6875	90
7	P:Prst	36.5	0	0	0
8					

Step 3.

Add PRS and PRS “Offset” properties to the crossarm component table.

Menu Tab: Components – Crossarms

The PRS “Offset” properties should be sufficiently rigid (infinitely stiff) to effectively transfer load between the pole and the top of the PRS unit. This member allows PRS to be applied at the face of the pole in any desired direction. Generally speaking, that is on the longitudinal pole face. Length of the offset should be equal to 1/2 the pole diameter at the top of the PRS unit.

Properties of the PRS unit itself (as well as the PRS “Offset” if desired) will be provided by LWS.

	Cross Arm Property Label	Stock Number	Cross Section Area (in ²)	X Inertia (in ⁴)	Z Inertia (in ⁴)	Weight (lbs)	Depth (in)	Width (in)	Length (ft)	Modulus of Elasticity (ksi)
1	Offset		1	1000	1000	1	1	1	0.5625	29000
2	PRS49-20		3.57	43.94	43.94	243	8.375	8.375	20	29000

Step 4.

Attach the PRS “Offset” and PRS unit to the pole by adding a crossarm entry.

Menu Tab: Geometry – Crossarms

The azimuth of the PRS “Offset” should be in the direction of the pole face on which the PRS unit is being applied. Generally speaking, this is the longitudinal face. This should coincide with the location of joint “Grnd” at the groundline.

	Pole Label	Tip Joint	Base Joint	X of Base (ft)	Y of Base (ft)	Z of Base (ft)	Inclin. About X (deg)	Inclin. About Y (deg)	Wood Pole Property Set	Material Property Set	Attach. Labels
1	P			0	0	0	0	0	WC-2-65	WC-Western Red Cedar	Edit (7 points)
2											

Connect PRS “Offset” to wood pole label “Prst”. Connection codes should be fixed.

	Attach Label	Offset (ft)	Connect At	Connection Code Type
1	Offset:O	0.000	P:Prst	Fixed
2	Offset:E	0.563		Fixed

Connect PRS unit to Joint “Grnd” and end of PRS “Offset”. Connection codes should be fixed.

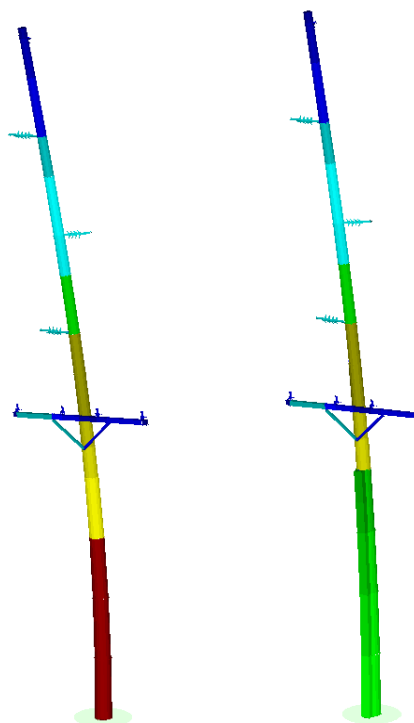
	Attach Label	Offset (ft)	Connect At	Connection Code Type
1	PRS:O	0.000	GrndP	Fixed
2	PRS:E	20.000	Offset:E	Fixed

Step 5.

Adjust the PRS unit length and strength as necessary

To adjust length:

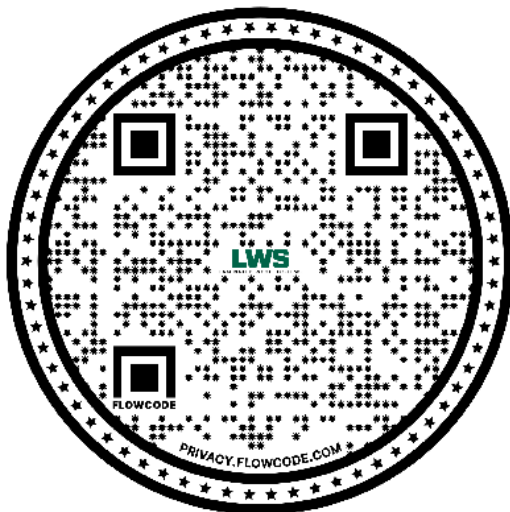
- Change the “Global Z” dimension of the “Prst” label in the wood pole at attachment label table to the desired location.
- Select a PRS unit length that corresponds to the new “Global Z” dimension.
- Component information for other PRS units can be supplied by LWS upon request if other strength ratings are required.



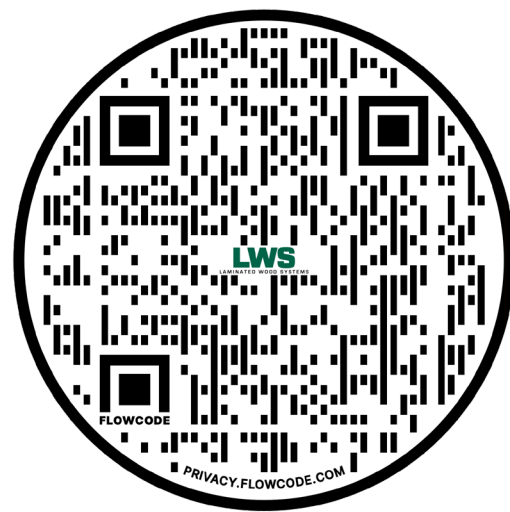
WITHOUT PRS

WITH PRS

WEBSITE



INSTALLATION VIDEOS



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