

POLE REPAIR

from Laminated Wood Systems, Inc.

- **Soft Soil**
- **Car Damage**
- **Woodpecker Damage**
- **Burned Poles**
- **High Decay**



A safe and quick way to repair damaged poles in the field using the patented PoleEnforcer® Groundline Reinforcement System.

PoleEnforcer SRS[®]
Spliced Reinforcement System

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

PoleEnforcer[®]

The logo for Laminated Wood Systems, Inc., consisting of the letters 'LWS' in a bold, green, sans-serif font.

Laminated Wood Systems, Inc.

800-949-3526
www.lwsinc.com

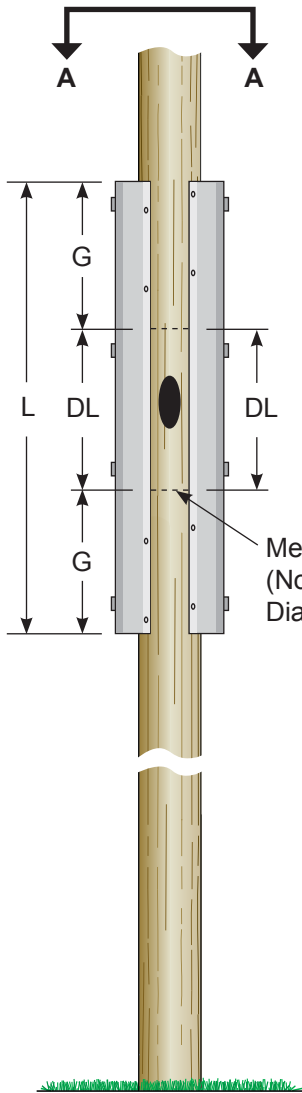
Woodpecker or Burn Damage Above Grade Reinforcement



Unlike typical void-filling remedies, the steel PoleEnforcer® units not only restore the strength of the pole but actually allow the woodpeckers to remain in their habitat. Maintaining their habitat reduces the potential for further damage to the pole or a replacement pole.

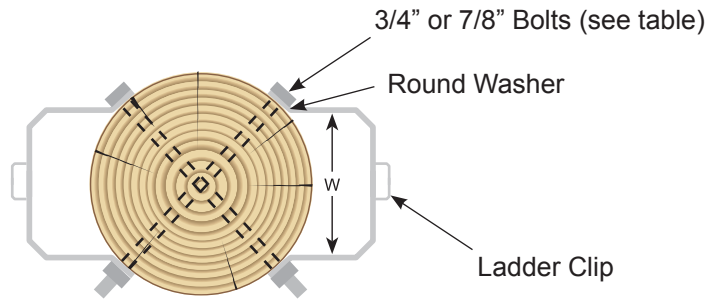


Woodpecker or Burn Damage Above Grade Reinforcement



Standard Units for "DL"
(Damage Area) = 5 ft.,
10 ft., or 15 ft.

Measured Pole Circumference
(Note: Minimum Pole
Diameter = "W" + 3 in.)



View "A - A"

NESC Grade B Construction

PoleEnforcer® System Number	Max. Circumference*		"W"	"G"	"L"	Mounting Bolt Dia.
	Douglas-fir or SYP	WRC				
PE-WPD5 - "L"A	32 in.	35 in.	5 in.	5.5 ft.	"DL" + 11 ft.	3/4 in.
PE-WPD5.75 - "L"A	35 in.	38 in.	5.75 in.	5.5 ft.	"DL" + 11 ft.	3/4 in.
PE-WPD7 - "L"A	41 in.	46 in.	7 in.	5.5 ft.	"DL" + 11 ft.	7/8 in.
PE-WPD8 - "L"A	44 in.	49 in.	8 in.	5.5 ft.	"DL" + 11 ft.	7/8 in.
PE-WPD9 - "L"A	47 in.	52 in.	9 in.	5.5 ft.	"DL" + 11 ft.	7/8 in.
PE-WPD10 - "L"A	50 in.	55 in.	10 in.	5.5 ft.	"DL" + 11 ft.	7/8 in.
PE-WPD11 - "L"A	53 in.	58 in.	11 in.	6 ft.	"DL" + 12 ft.	7/8 in.
PE-WPD12 - "L"A	55 in.	60 in.	12 in.	6 ft.	"DL" + 12 ft.	7/8 in.

NESC Grade C Construction

PoleEnforcer® System Number	Max. Circumference*		"W"	"G"	"L"	Mounting Bolt Dia.
	Douglas-fir or SYP	WRC				
PE-WPD5 - "L"A	30 in.	33 in.	5 in.	5.5 ft.	"DL" + 11 ft.	3/4 in.
PE-WPD5.75 - "L"A	33 in.	37 in.	5.75 in.	5.5 ft.	"DL" + 11 ft.	3/4 in.
PE-WPD7 - "L"A	40 in.	44 in.	7 in.	5.5 ft.	"DL" + 11 ft.	7/8 in.
PE-WPD8 - "L"A	42 in.	47 in.	8 in.	5.5 ft.	"DL" + 11 ft.	7/8 in.
PE-WPD9 - "L"A	45 in.	49 in.	9 in.	5.5 ft.	"DL" + 11 ft.	7/8 in.
PE-WPD10 - "L"A	48 in.	53 in.	10 in.	5.5 ft.	"DL" + 11 ft.	7/8 in.
PE-WPD11 - "L"A	50 in.	56 in.	11 in.	6 ft.	"DL" + 12 ft.	7/8 in.
PE-WPD12 - "L"A	53 in.	58 in.	12 in.	6 ft.	"DL" + 12 ft.	7/8 in.

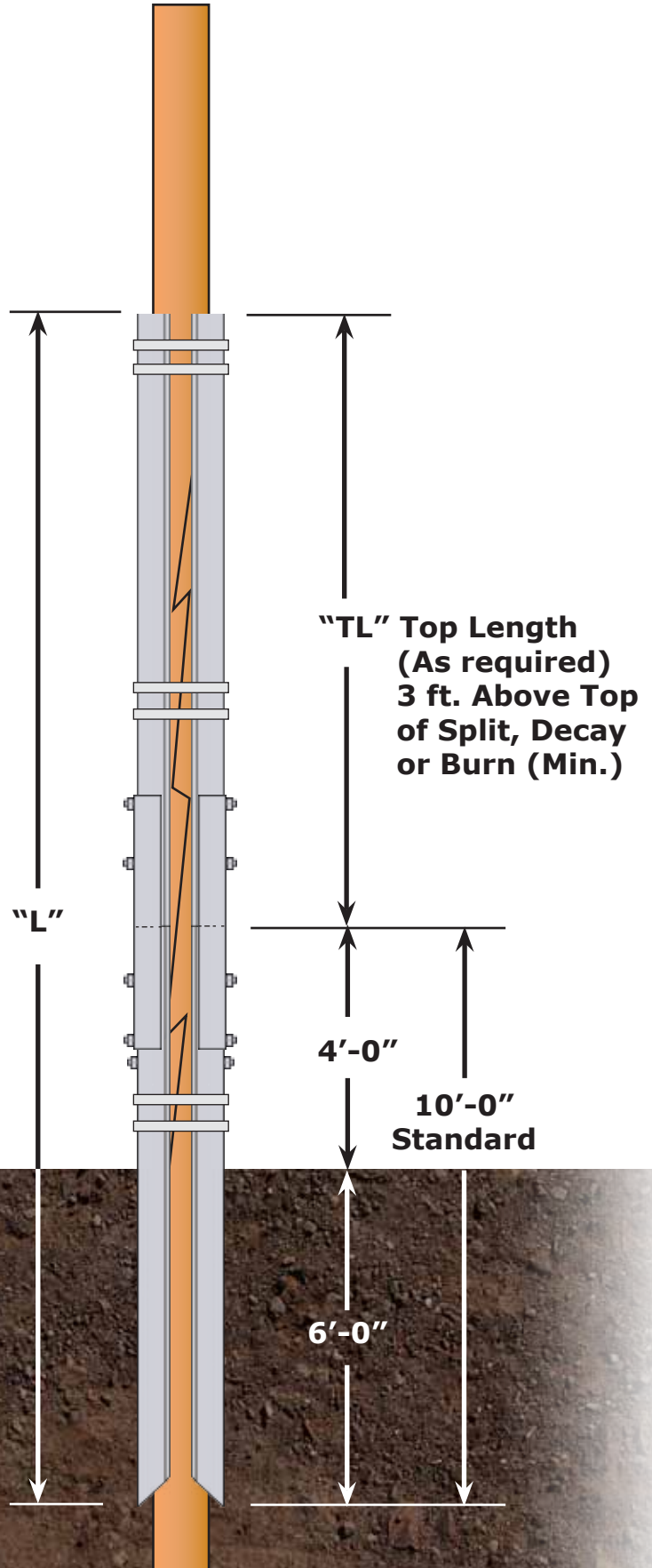
* Based on 100% pole utilization and NESC Grade "B" & "C" construction.

POLE REPAIR

PoleEnforcer SRS[®] Spliced Reinforcement System

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

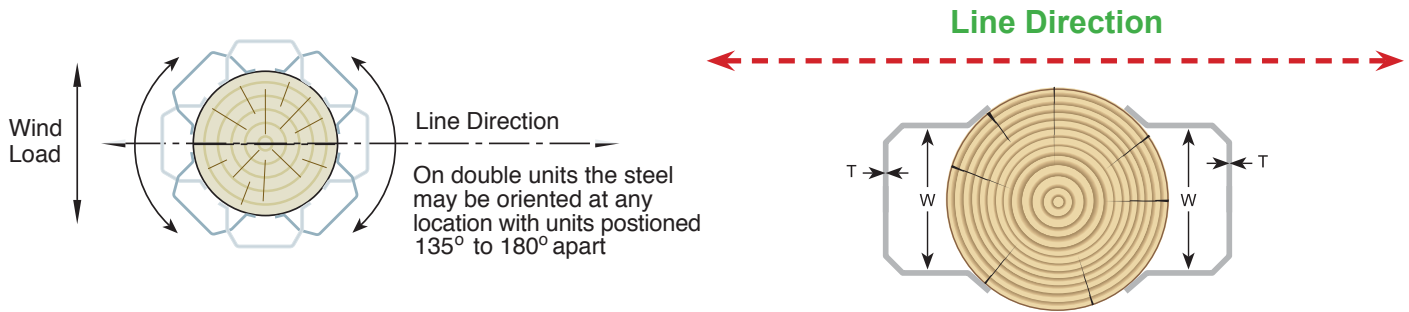
**Spliced Reinforcement System
for Car Break Poles, High Decay
or High Burn Damage
(Double Units)**



PoleEnforcer SRS®

Spliced Reinforcement System

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



PoleEnforcer SRS® Strength Chart				
PoleEnforcer SRS® Unit Number	Rated Bending Strength (Ft.-Lbs.)	Unit Dimensions		“E D” (min.)
		“W”	“T”	
CPE42 -“L”- S	84,000	5-1/8”	1/4”	6.0 ft.
CPE75 -“L”- S	150,000	7-1/8”	1/4”	6.0 ft.
CPE91 -“L”- S	182,000	7-1/4”	5/16”	6.0 ft.
CPE148 -“L”- S	296,000	9”	3/8”	6.0 ft.

“L” = Total Length of Steel in Feet

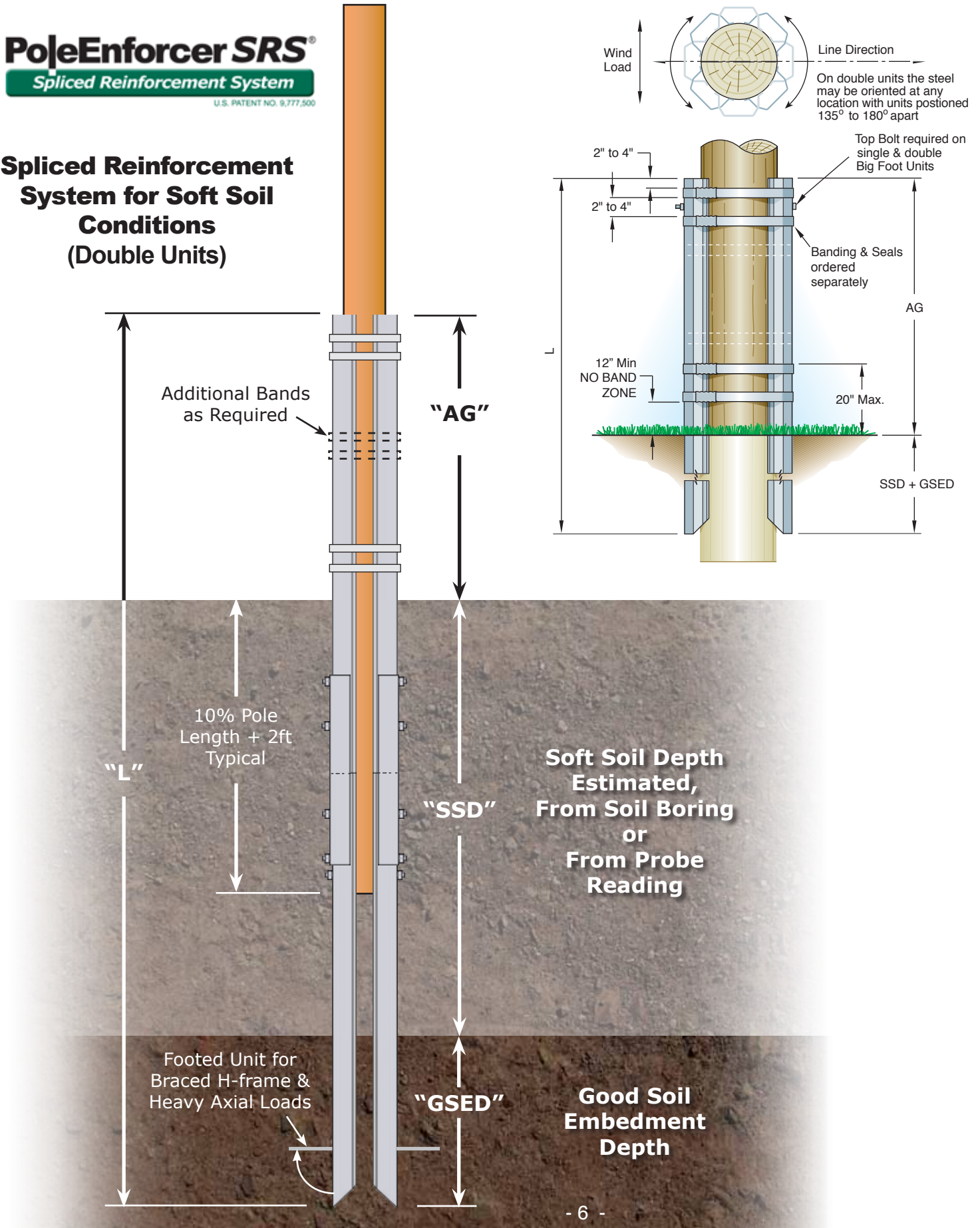
NESG Grade “B” Construction					
Pole Length (ft.)	(Double Units)				
	H1	1	Pole Class		
			2	3	4
35	CPE75	CPE42	CPE42	CPE42	CPE42
40	CPE75	CPE75	CPE42	CPE42	CPE42
45	CPE75	CPE75	CPE75	CPE42	CPE42
50	CPE75	CPE75	CPE75	CPE42	CPE42
55	CPE91	CPE75	CPE75	CPE75	CPE42
60	CPE91	CPE75	CPE75	CPE75	
65	CPE148	CPE91	CPE75	CPE75	
70	CPE148	CPE148	CPE91	CPE75	
75	CPE148	CPE148	CPE91	CPE75	
80	CPE148	CPE148	CPE148	CPE91	
85	CPE148	CPE148	CPE148	CPE91	
90		CPE148	CPE148		
95		CPE148	CPE148		
100			CPE148		

NESG Grade “C” Construction					
Pole Length (ft.)	(Double Units)				
	H1	1	Pole Class		
			2	3	4
35	CPE75	CPE75	CPE75	CPE42	CPE42
40	CPE75	CPE75	CPE75	CPE42	CPE42
45	CPE91	CPE75	CPE75	CPE75	CPE42
50	CPE148	CPE91	CPE75	CPE75	CPE42
55	CPE148	CPE91	CPE75	CPE75	CPE75
60	CPE148	CPE148	CPE91	CPE75	
65	CPE148	CPE148	CPE91	CPE75	
70	CPE148	CPE148	CPE148	CPE91	
75	CPE148	CPE148	CPE148	CPE91	
80		CPE148	CPE148	CPE91	
85		CPE148	CPE148	CPE148	
90		CPE148	CPE148		
95			CPE148		
100			CPE148		

POLE REPAIR

PoleEnforcer SRS[®]
Spliced Reinforcement System
U.S. PATENT NO. 9,777,509

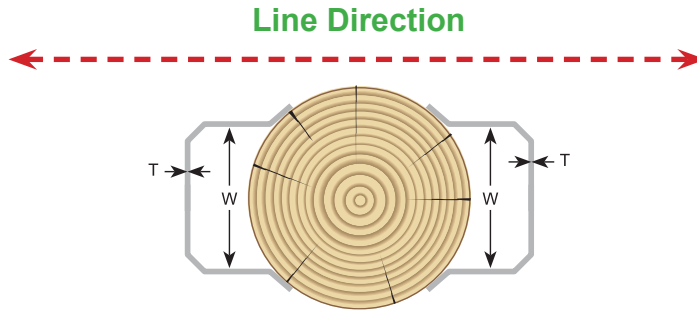
Spliced Reinforcement System for Soft Soil Conditions (Double Units)



PoleEnforcer SRS®

Spliced Reinforcement System

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



PoleEnforcer SRS® Strength Chart				
PoleEnforcer SRS® Unit Number	Rated Bending Strength (Ft.-Lbs.)	Unit Dimensions		“A G” (min.)
		“W”	“T”	
CPE42 -“L”- S*	84,000	5-1/8”	1/4”	5.0 ft.
CPE75 -“L”- S*	150,000	7-1/8”	1/4”	5.0 ft.
CPE91 -“L”- S*	182,000	7-1/4”	5/16”	5.5 ft.
CPE148 -“L”- S*	296,000	9”	3/8”	5.5 ft.

“L” = Total Length of Steel in Feet * = Number of Splices for More than One
NOTE: “F” After Length for Footed Units

NESC Grade “B” Construction - Double Units

Soft Soil Depth “SSD” = 5 ft.			Pole Length (ft.)	Pole Class				
				H1	1	2	3	4
Steel Size	“GSED” (min.)	“AG” (min.)	35	CPE75	CPE75	CPE42	CPE42	CPE42
CPE42	8 ft.	5 ft.	40	CPE75	CPE75	CPE75	CPE42	CPE42
CPE75	9.5 ft.	5 ft.	45	CPE75	CPE75	CPE75	CPE42	CPE42
CPE91	10.5 ft.	5.5 ft.	50	CPE91	CPE75	CPE75	CPE75	CPE42
CPE148	13 ft.	5.5 ft.	55	CPE91	CPE75	CPE75	CPE75	CPE42
			60	CPE148	CPE91	CPE75	CPE75	CPE75
			65	CPE148	CPE91	CPE75	CPE75	CPE75
			70	CPE148	CPE148	CPE91	CPE75	CPE75
			75	CPE148	CPE148	CPE148	CPE91	
			80	CPE148	CPE148	CPE148	CPE91	
			85		CPE148	CPE148	CPE91	
			90		CPE148	CPE148		
			95		CPE148	CPE148		
			100			CPE148		

OTHER SIZES
AVAILABLE ON
REQUEST

PoleEnforcer SRS® Strength & Sizing Charts

NESC Grade “B” Construction - Double Units

<div style="border: 1px solid black; padding: 5px; text-align: center;"> Soft Soil Depth “SSD” = 10 ft. </div>			Pole Length (ft.)	Pole Class				
				H1	1	2	3	4
Steel Size	“GSED” (min.)	“AG” (min.)	35	CPE75	CPE75	CPE75	CPE42	CPE42
CPE42	8 ft.	5 ft.	40	CPE75	CPE75	CPE75	CPE42	CPE42
CPE75	9.5 ft.	5 ft.	45	CPE91	CPE75	CPE75	CPE75	CPE42
CPE91	10.5 ft.	5.5 ft.	50	CPE91	CPE75	CPE75	CPE75	CPE42
CPE148	13 ft.	5.5 ft.	55	CPE148	CPE91	CPE75	CPE75	CPE75
<i>OTHER SIZES AVAILABLE ON REQUEST</i>			60	CPE148	CPE91	CPE75	CPE75	CPE75
			65	CPE148	CPE148	CPE91	CPE75	CPE75
			70	CPE148	CPE148	CPE148	CPE91	CPE75
			75		CPE148	CPE148	CPE91	
			80		CPE148	CPE148	CPE91	
			85		CPE148	CPE148	CPE148	
			90		CPE148	CPE148		
			95			CPE148		
			100			CPE148		

NESC Grade “B” Construction - Double Units

<div style="border: 1px solid black; padding: 5px; text-align: center;"> Soft Soil Depth “SSD” = 15 ft. </div>			Pole Length (ft.)	Pole Class				
				H1	1	2	3	4
Steel Size	“GSED” (min.)	“AG” (min.)	35	CPE75	CPE75	CPE75	CPE42	CPE42
CPE42	8 ft.	5 ft.	40	CPE91	CPE75	CPE75	CPE75	CPE42
CPE75	9.5 ft.	5 ft.	45	CPE91	CPE91	CPE75	CPE75	CPE42
CPE91	10.5 ft.	5.5 ft.	50	CPE148	CPE91	CPE75	CPE75	CPE75
CPE148	13 ft.	5.5 ft.	55	CPE148	CPE91	CPE75	CPE75	CPE75
<i>OTHER SIZES AVAILABLE ON REQUEST</i>			60	CPE148	CPE148	CPE91	CPE75	CPE75
			65	CPE148	CPE148	CPE91	CPE75	CPE75
			70		CPE148	CPE148	CPE91	CPE75
			75		CPE148	CPE148	CPE91	
			80		CPE148	CPE148	CPE148	
			85		CPE148	CPE148		
			90			CPE148		
			95			CPE148		
			100			CPE148		

PoleEnforcer SRS® Strength & Sizing Charts

NESC Grade “C” Construction - Double Units

<div style="border: 1px solid black; padding: 5px; text-align: center;"> Soft Soil Depth “SSD” = 5 ft. </div>			Pole Length (ft.)	Pole Class				
				H1	1	2	3	4
Steel Size	“GSED” (min.)	“AG” (min.)	35	CPE75	CPE75	CPE75	CPE42	CPE42
CPE42	8 ft.	5 ft.	40	CPE91	CPE75	CPE75	CPE75	CPE42
CPE75	9.5 ft.	5 ft.	45	CPE148	CPE91	CPE75	CPE75	CPE75
CPE91	10.5 ft.	5.5 ft.	50	CPE148	CPE91	CPE75	CPE75	CPE75
CPE148	13 ft.	5.5 ft.	55	CPE148	CPE148	CPE91	CPE75	CPE75
<i>OTHER SIZES AVAILABLE ON REQUEST</i>			60	CPE148	CPE148	CPE91	CPE75	CPE75
			65	CPE148	CPE148	CPE148	CPE91	CPE75
			70	CPE148	CPE148	CPE148	CPE91	CPE75
			75		CPE148	CPE148	CPE91	
			80		CPE148	CPE148	CPE148	
			85			CPE148	CPE148	
			90			CPE148		
			95			CPE148		
			100			CPE148		

NESC Grade “C” Construction - Double Units

<div style="border: 1px solid black; padding: 5px; text-align: center;"> Soft Soil Depth “SSD” = 10 ft. </div>			Pole Length (ft.)	Pole Class				
				H1	1	2	3	4
Steel Size	“GSED” (min.)	“AG” (min.)	35	CPE91	CPE75	CPE75	CPE75	CPE42
CPE42	8 ft.	5 ft.	40	CPE148	CPE91	CPE75	CPE75	CPE75
CPE75	9.5 ft.	5 ft.	45	CPE148	CPE91	CPE75	CPE75	CPE75
CPE91	10.5 ft.	5.5 ft.	50	CPE148	CPE148	CPE91	CPE91	CPE75
CPE148	13 ft.	5.5 ft.	55	CPE148	CPE148	CPE91	CPE91	CPE75
<i>OTHER SIZES AVAILABLE ON REQUEST</i>			60	CPE148	CPE148	CPE148	CPE91	CPE75
			65		CPE148	CPE148	CPE91	CPE75
			70		CPE148	CPE148	CPE91	CPE75
			75		CPE148	CPE148	CPE148	
			80			CPE148	CPE148	
			85			CPE148	CPE148	
			90			CPE148		
			95			CPE148		

PoleEnforcer SRS® Strength & Sizing Charts

NESC Grade “C” Construction - Double Units

Soft Soil Depth “SSD” = 15 ft.			Pole Length (ft.)	Pole Class				
				H1	1	2	3	4
			35	CPE148	CPE91	CPE75	CPE75	CPE75
			40	CPE148	CPE91	CPE75	CPE75	CPE75
			45	CPE148	CPE148	CPE91	CPE75	CPE75
			50	CPE148	CPE148	CPE91	CPE75	CPE75
			55	CPE148	CPE148	CPE148	CPE91	CPE75
			60		CPE148	CPE148	CPE91	CPE75
			65		CPE148	CPE148	CPE91	CPE75
			70		CPE148	CPE148	CPE148	CPE91
			75			CPE148	CPE148	
			80			CPE148	CPE148	
			85			CPE148	CPE148	
			90			CPE148		
Steel Size	“GSED” (min.)	“AG” (min.)						
CPE42	8 ft.	5 ft.						
CPE75	9.5 ft.	5 ft.						
CPE91	10.5 ft.	5.5 ft.						
CPE148	13 ft.	5.5 ft.						
<i>OTHER SIZES AVAILABLE ON REQUEST</i>								

Installation Procedure



1. Lower steel unit is driven next to pole.



2. Back splice plate is attached to the lower steel unit.



3. Upper steel unit is positioned on top of lower unit.



4. Splice channel is attached and secured with nuts and locknuts.



5. Steel SRS units are driven to desired depth.



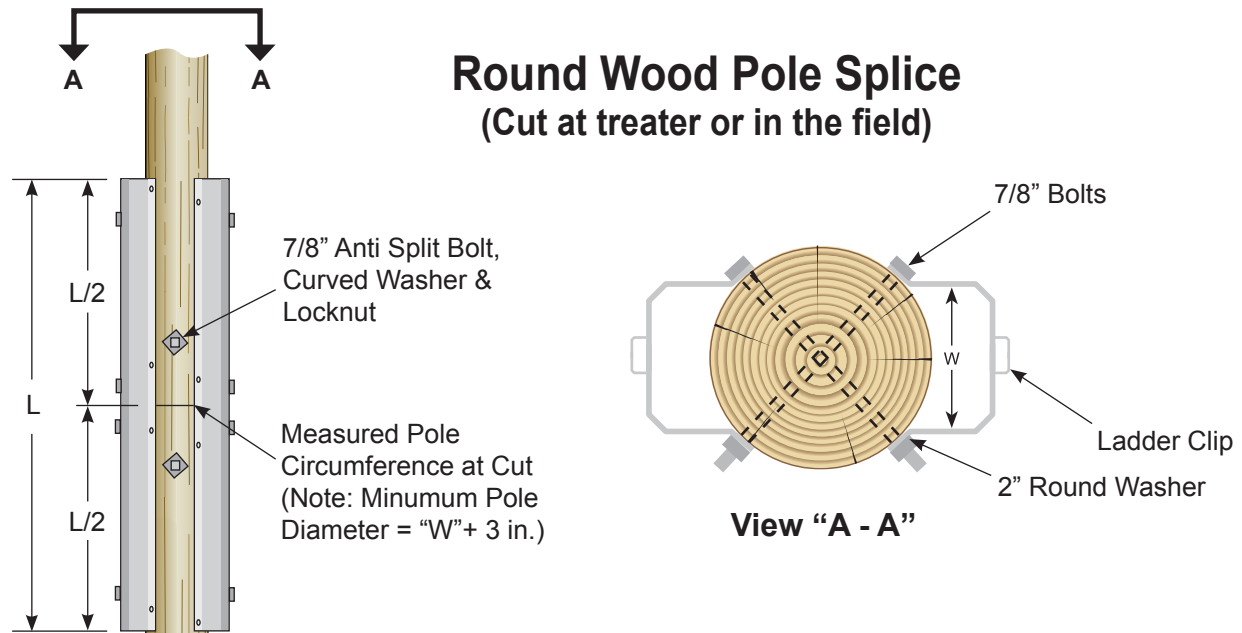
6. Units are banded and caps are installed.

POLE REPAIR

Round Wood Pole Splice

Used when transportation constraints limit site access to longer round wood poles.
Drilled and cut in the field or at the treater.





NESC Grade B Construction

PoleEnforcer® System Number	Max. Circumference*		"W"	"L"	Mounting Bolt Dia.
	Douglas-fir or SYP	WRC			
PE-WPD7 - 11A	41 in.	46 in.	7 in.	11 ft.	7/8 in.
PE-WPD8 - 11A	44 in.	49 in.	8 in.	11 ft.	7/8 in.
PE-WPD9 - 11A	47 in.	52 in.	9 in.	11 ft.	7/8 in.
PE-WPD10 - 11A	50 in.	55 in.	10 in.	11 ft.	7/8 in.
PE-WPD11 - 12A	53 in.	58 in.	11 in.	12 ft.	7/8 in.
PE-WPD12 - 12A	55 in.	60 in.	12 in.	12 ft.	7/8 in.



Spliced Reinforcement System for Wood Poles Located Adjacent to Excavations (Double Units) Spliced

If "PD" \geq Excavation Depth:

"ND1" = (Pole length x 0.12 + 2 ft.) - (PD - Excavation Depth) Rounded to 6 inches

"ED" = PD + ND1

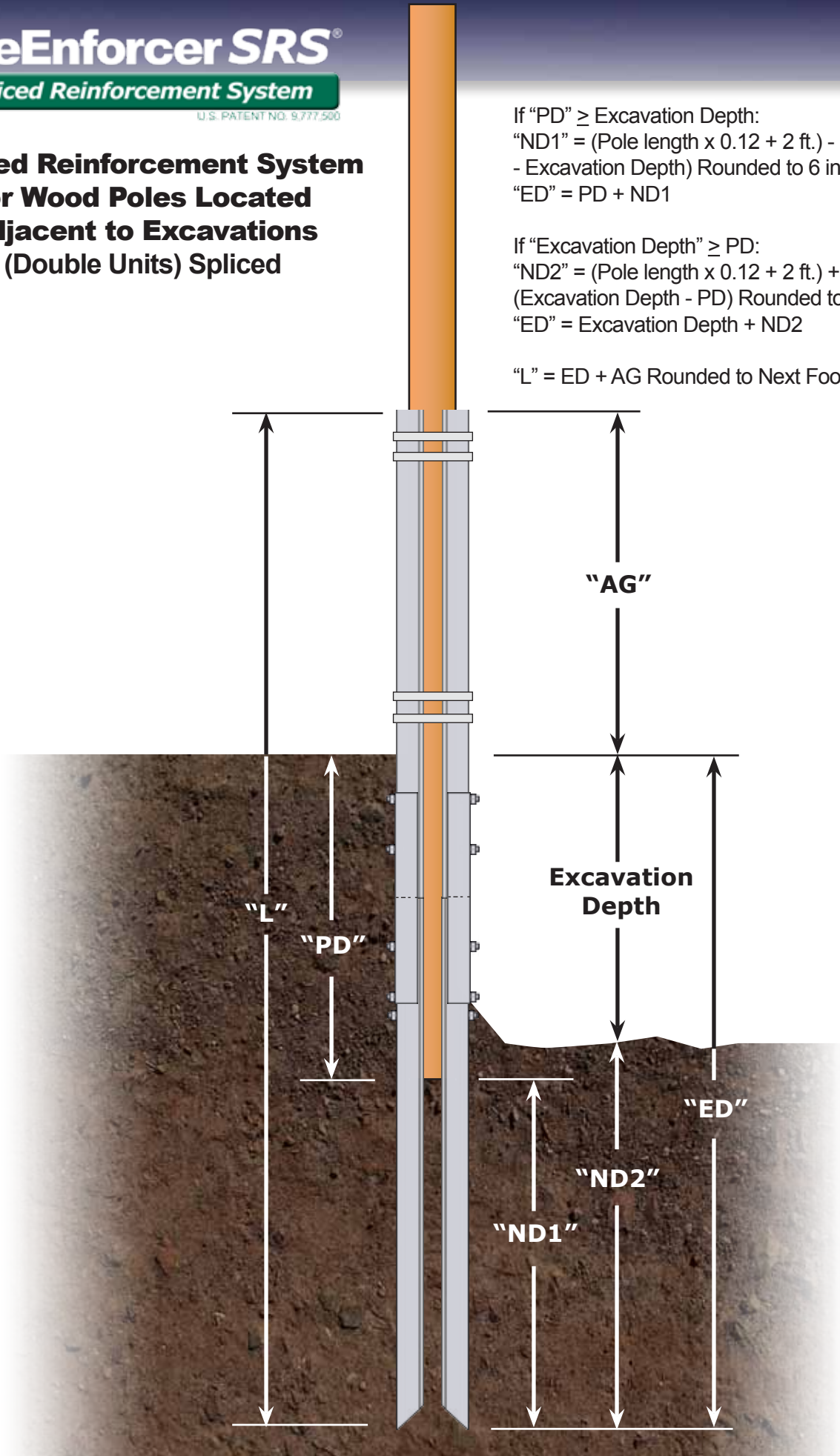
If "Excavation Depth" \geq PD:

"ND2" = (Pole length x 0.12 + 2 ft.) +

(Excavation Depth - PD) Rounded to 6 inches

"ED" = Excavation Depth + ND2

"L" = ED + AG Rounded to Next Foot



PoleEnforcer SRS[®]

Spliced Reinforcement System

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



The **LWS** “Family of Steel”

Innovative, Patented Products Designed to Strengthen, Maximize and Extend the Life of the Electric Utility Infrastructure



PHASERAISER

- **RAISE** existing structures to increase conductor clearances while the line **REMAINS IN SERVICE**
- Increase line capacity and revenues
- Increase conductor clearance an additional 3 to 20 feet
- Save many thousands of dollars by avoiding an outage
- Patented systems available for both single pole and H-frame structures



PoleEnforcer

- **REINFORCE** existing poles with thin shell or “no shell” at the groundline
- Save thousands of dollars by reinforcing poles that others reject
- Repair & reinforce burnt and broken poles



PRS

Pole Reclassification System®

- **RECLASSIFY** existing poles up to 3 or more classes
- Eliminate the cost of expensive pole change outs
- Reinforce groundline strength
- Use in transmission or distribution applications



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Laminated Wood Systems, Inc.

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