2019 PLS-CADD Advanced Training and User Group

Multi-Pole Structures and Embedment on slopes

by

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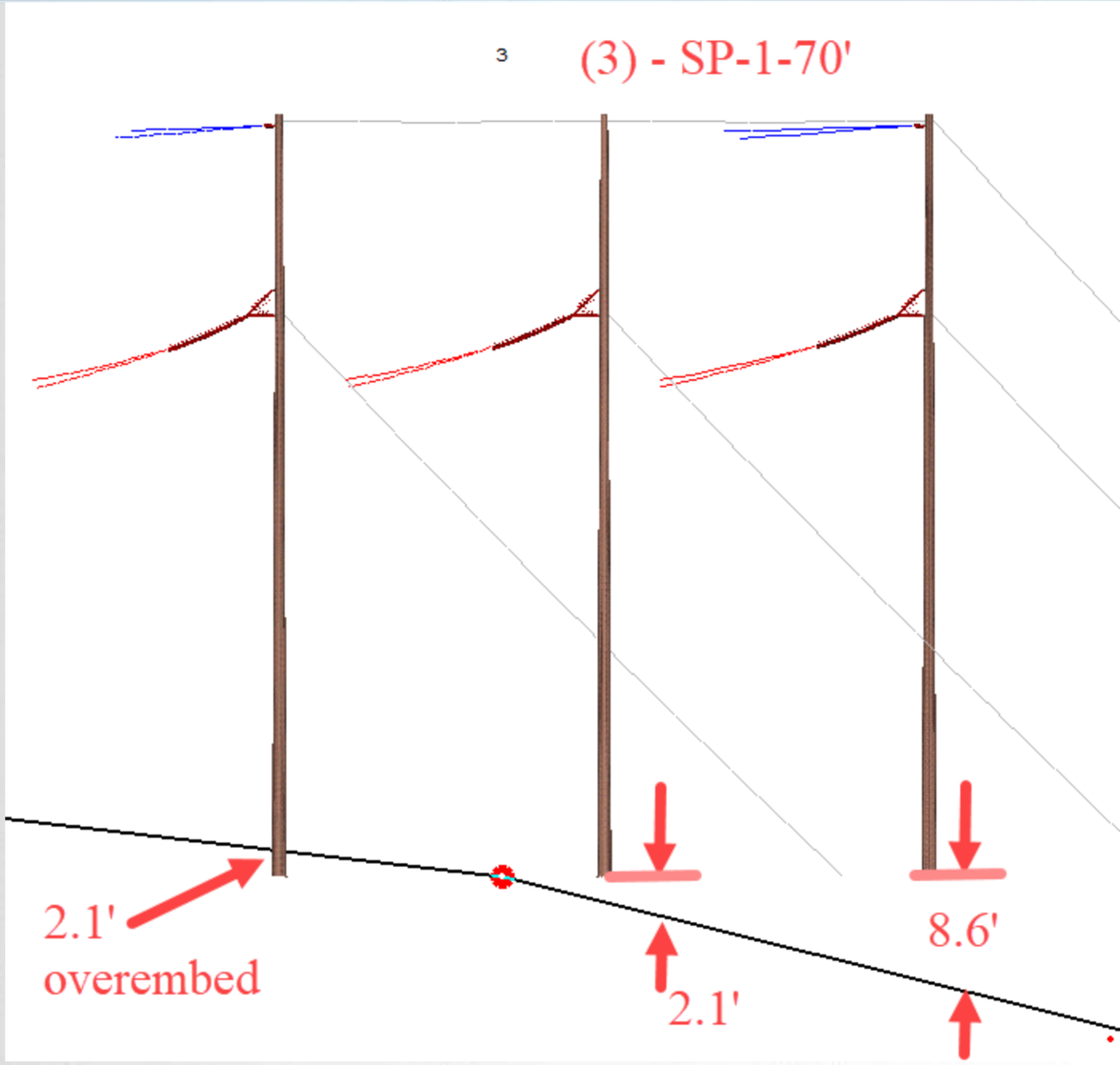
Power Line Systems

Introduction

- Multi-Pole structures and embedment on slopes
  - PLS-CADD
    - Terrain information
    - Reports
  - PLS-POLE
    - Adjustments to PLS-POLE model
  - Example

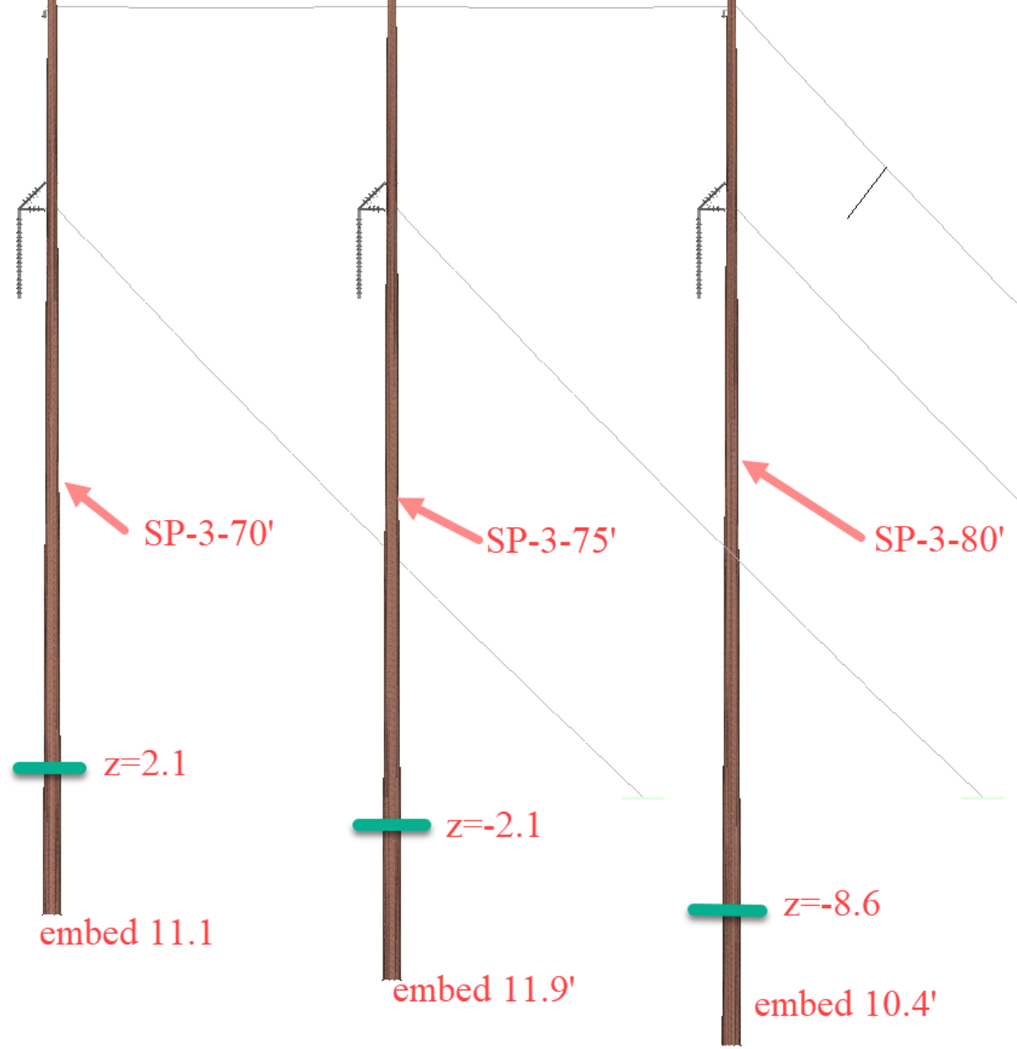
Multi-Pole embedment with a side slope

- Multi-Pole embedment with side slope adjustments need to be made in PLS-POLE to bring structure to ground and maintain minimum or maximum embedment.



Adjustments in PLS-POLE

- Update Z of Base, Wood Pole Property Set and Embedment Override.



Wood Pole Connectivity

Model Check Report

No errors or relevant warnings detected.

Note: poles may be located in one of two ways:
1) By tip and base joint. This is only appropriate for A-Frame, Y-Frame and other complicated structures.
2) By X, Y and Z of base and X, Y inclination angles. This should be used for single poles and simple frames. For example, to locate a single pole at 0,0,0 leave the tip, base, X, Y, Z and X, Y angle columns all blank.

	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	Push Brace	Base Connec	mbed ° Overrid	Embed C. Override (ft)	Top Cut Length (ft)	Bot. Cut Length (ft)
1	LP			0	-18	2.1	0	0	SP-3-70	SP-Southern Pine	Edit (4 points)	No	Fixed	0.000	11.1	0.000	0.000
2	CP			0	8	-2.1	0	0	SP-3-75	SP-Southern Pine	Edit (4 points)	No	Fixed	0.000	11.9	0.000	0.000
3	RP			0	34	-8.6	0	0	SP-3-80	SP-Southern Pine	Edit (4 points)	No	Fixed	0.000	10.4	0.000	0.000

PLS-CADD Reports

Lines/Reports/Construction Staking Report...

Construction Staking Report

Structure Number	Structure Name	Stake Description	Structure Height or Pole Length (ft)	Actual Embedded Depth (ft)	Modeled Embedded Depth (ft)	Pole Base Diameter (in)	Warnings
1	th-235d.#1.pol	C/L Hub					
		Structure Hub	61.00				
		LP	70.00	12.90	12.90	17.0	
		CP	70.00	9.00	9.00	17.0	
		RP	75.00	10.10	10.10	17.4	

Terrain/TIN/Leg and Guy Extension Report...

Leg and Guy Extension Report

In the report below the program has identified structure members that are connected to fixed joints.
The program has projected the X and Y coordinates of these joints onto the TIN model to determine the ground elevation below these joints.
The program has also calculated the point of intersection of a line passing through these structure members and the TIN model.
Values of -9999 indicate there is no valid TIN model at the specified point.

Warning: The results below are based on the coordinates of fixed joints in the structure model.
These results may need to be adjusted if the structures were modeled with a fixity point other than ground.

Structure Number	Member Label or Type	From Joint	To Joint	Member Length (ft)	Member Top Z (ft)	Member Bottom X (ft)	Member Bottom Y (ft)	Member Bottom Z (ft)	TIN Z at Member Bot. XY (ft)	Reveal at Member Bot. XY (ft)	Slope Intersect X (ft)	Slope Intersect Y (ft)	Slope Intersect Z (ft)	Intersect Addl. Len Required (ft)	Intersect Total Len Required (ft)	OK or NG
1	CP	CP:t	CP:g	61.000	171.00	50.00	50.00	110.00	110.00	0.00	50.00	50.00	110.00	-0.00	61.00	NG
	RP	RP:t	RP:g	61.000	171.00	50.00	30.50	110.00	106.10	3.90	50.00	30.50	106.10	3.90	64.90	NG
	LP	LP:t	LP:g	61.000	171.00	50.00	69.50	110.00	113.90	-3.90	50.00	69.50	113.90	-3.90	57.10	NG
2	RP	RP:t	RP:g	61.000	175.50	375.00	40.25	114.50	112.55	1.95	375.00	40.25	112.55	1.95	62.95	NG
	LP	LP:t	LP:g	61.000	175.50	375.00	59.75	114.50	114.31	0.19	375.00	59.75	114.31	0.19	61.20	NG

Calculations to updates poles

XML or Table View options allow for pole update calculations. Below is a simple spreadsheet that provides updates in red.

	A	B	C	D	E	G	H	J	K
1	Structure Number	Structure Height or Pole Length (ft)	Actual Embedded Depth (ft)	Modeled Embedded Depth (ft)	Top of Pole		Value to adjust Z in POLE	Adjusted Pole Height	Value to Override embedment with
2	1	70	12.9	9	61		3.9	70	12.9
3	1	70	9	9	61		0	70	9
4	1	70	5.1	9	61		-3.9	75	10.1
5	2	70	8.81	9	61		-0.19	75	13.81
6	2	70	7.05	9	61		-1.95	75	12.05
7	3	70	11.1	9	61		2.1	70	11.1
8	3	70	7.01	9	61		-1.99	75	12.01
9	3	70	0.52	9	61		-8.48	80	10.52
10	4	70	14.46	9	61		5.46	65	9.46
11	4	70	0	9	61		-9	80	10
12	4	70	5.33	9	61		-3.67	75	10.33
13									

Construction Staking Report | **Pole Updates** | Sheet3

Update PLS-POLE Models

Update wood pole geometry in PLS-POLE models.

Good time for site specific structures

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1	LP			0	-18	2.1	0	0	SP-3-70	SP-Southern Pine	Edit (4 points)	No	Fixed	0.000	11.1	0.000	0.000
2	CP			0	8	-1.99	0	0	SP-3-75	SP-Southern Pine	Edit (4 points)	No	Fixed	0.000	12.01	0.000	0.000
3	RP			0	34	-8.48	0	0	SP-3-80	SP-Southern Pine	Edit (4 points)	No	Fixed	0.000	10.52	0.000	0.000

Power Line Systems

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