

2019 PLS-CADD Advanced Training and User Group

PLS-CADD & PLS-POLE Integration with ikeGPS

by

Ali Khavari

Power Line Reporting

<https://powerlinereporting.com/ike>

Meet the IKE

<https://youtu.be/dwPhreVE5LU>



ike^{GPS}

How Accurate Is It?

Attachment Heights

- **1 in** on a 40 ft Pole

Spans, Anchors, Poles, Wire Sag

- **1%** of Target Distance

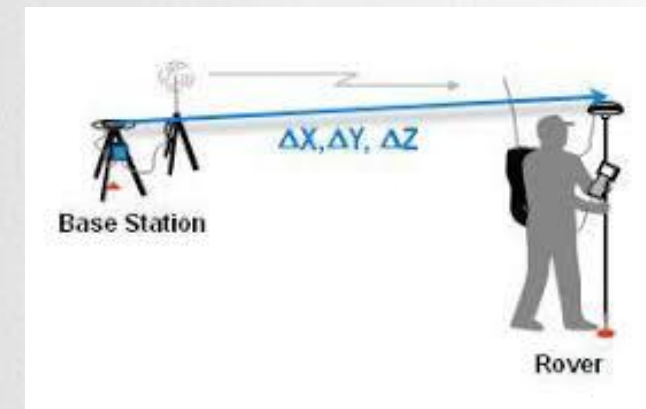
GPS

- Horizontal Accuracy: **1-4 m**
- Vertical Accuracy: **3-12 m**



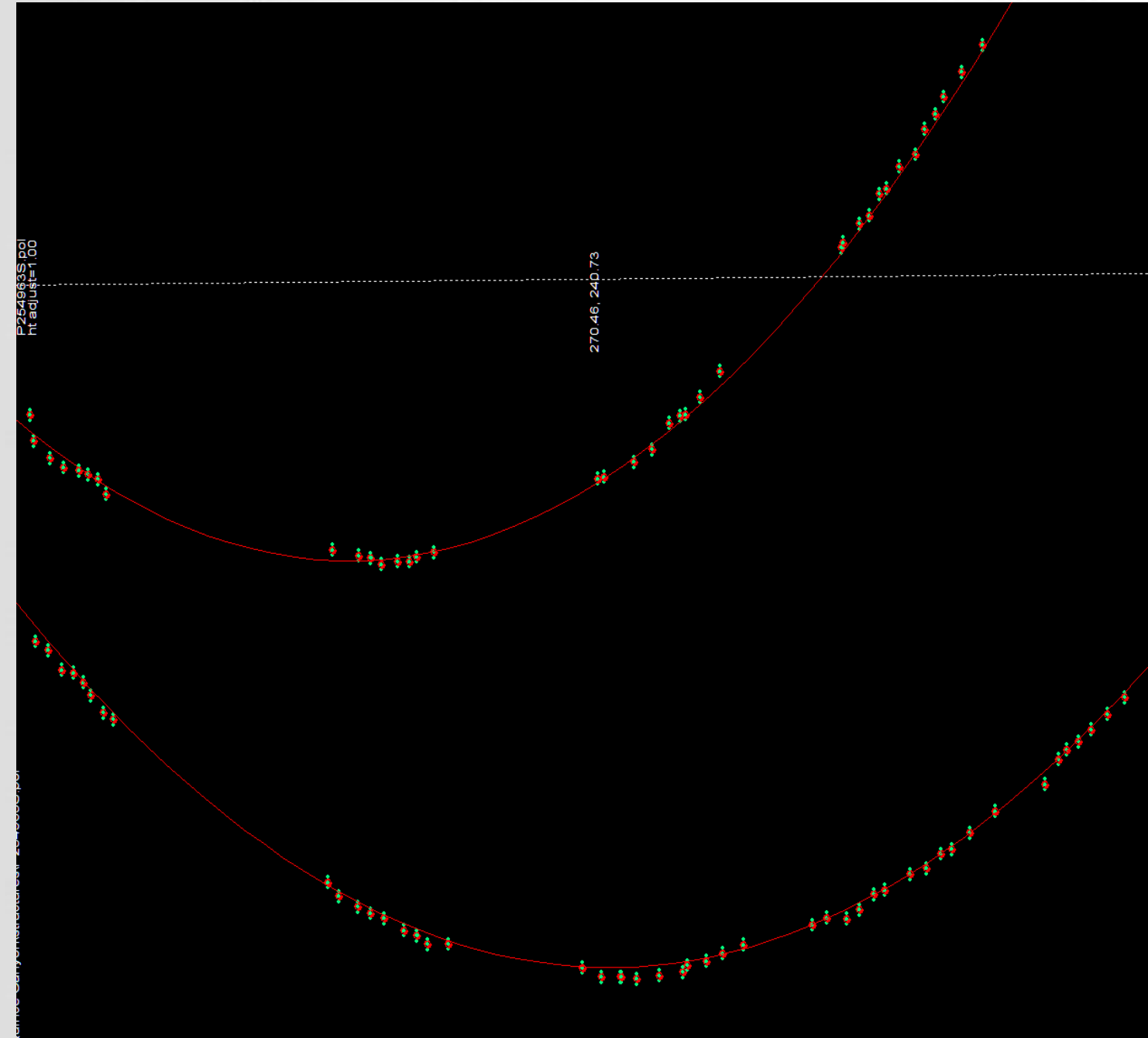
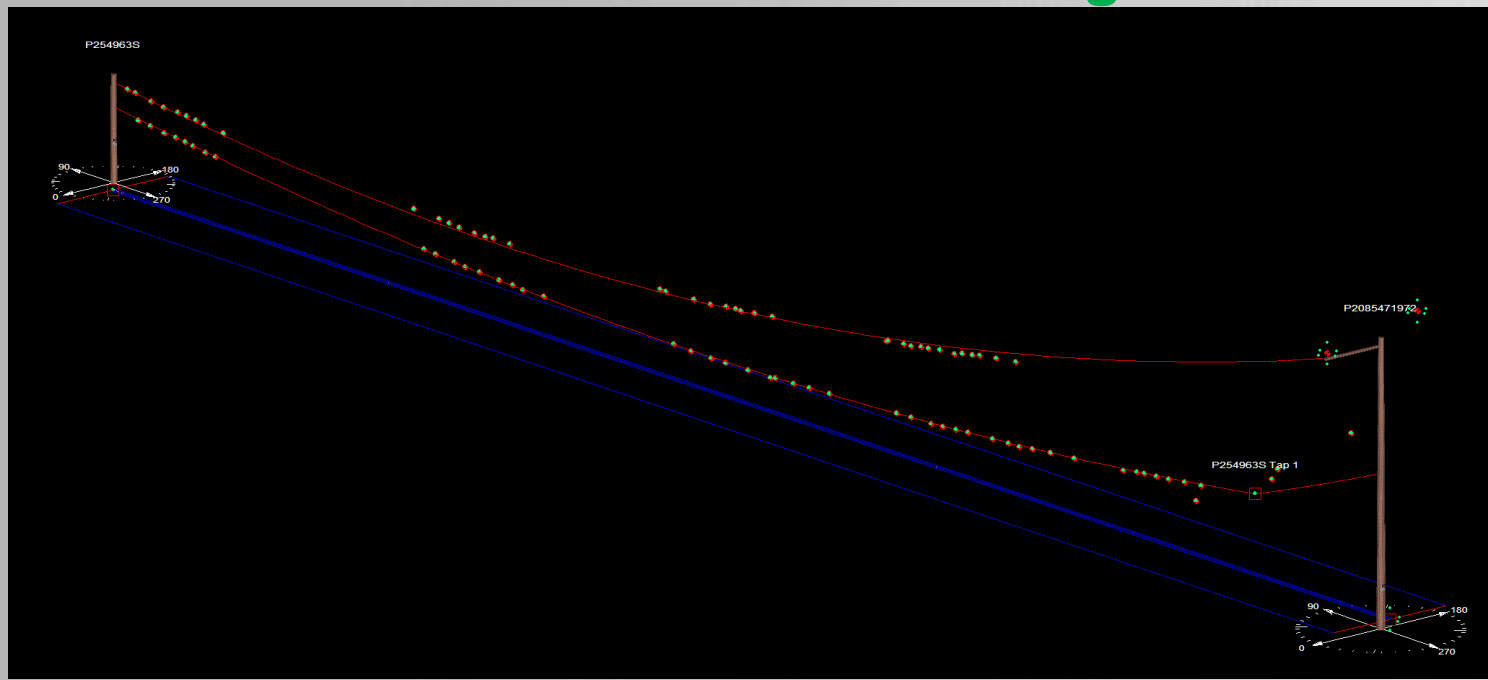
IKE 4+ (RTK Enabled)

- **GPS** - Structure Base, Survey Points
 - Horizontal Accuracy: **2-4 cm**
 - Vertical Accuracy: **10 cm**
- **'Point and Shoot' Survey Points**
 - Vertical Accuracy: **0.5% Target Distance**
 - Horizontal Accuracy: **0.5-20% Target Distance**



'Point and Shoot' Vertical Accuracy

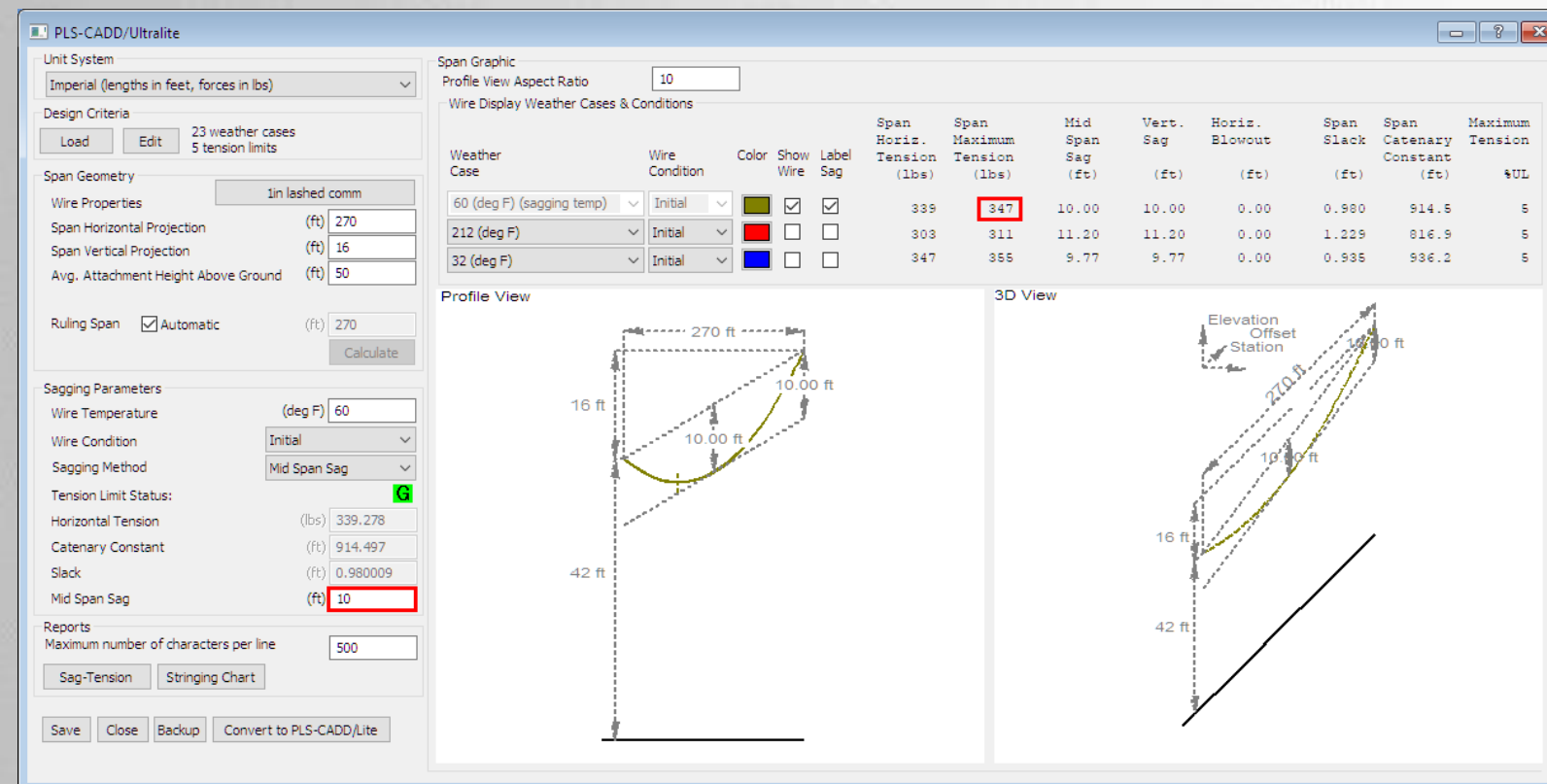
Span Length	270 ft
Target Distance	30 ft
Sample Size	85 Points
Average Distance to Wire	1.38 in
Max Distance to Wire	3.96 in
Standard Deviation	0.95 in
Accuracy = 1.38 in / 30 ft	0.5%
	Target Distance



'Point and Shoot' Vertical Accuracy

Sag Tension Comparison

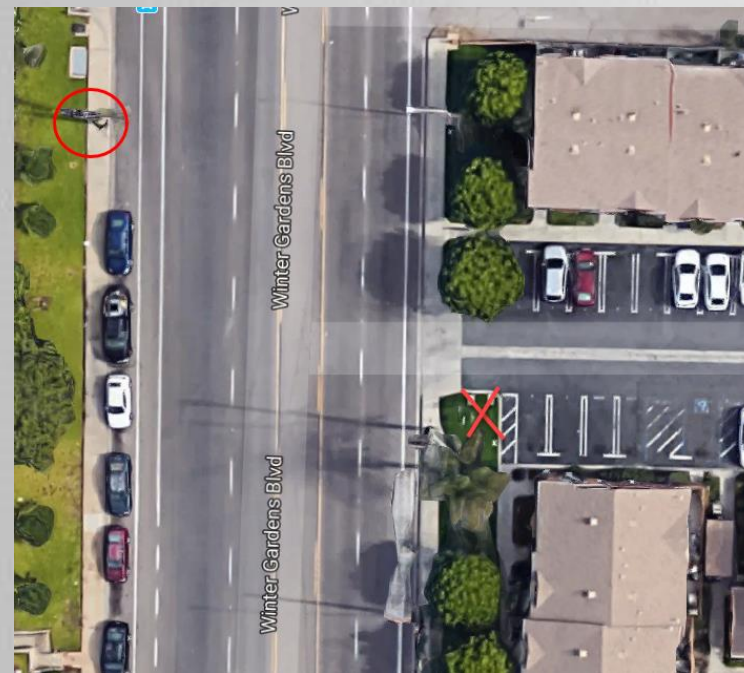
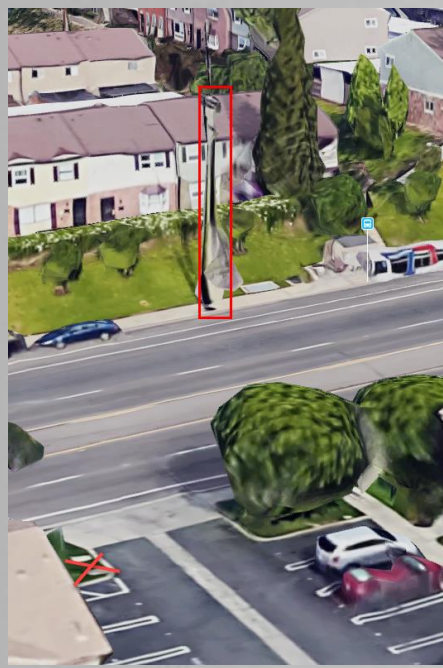
Sag Fit	Mid Span Sag (ft)	Tension (lbs)	% Difference
Best Fit	10	347	
Best Fit +/- Average Distance to Wire	10 +/- 0.12	347 +/- 3	1
Best Fit +/- Max Distance to Wire	10 +/- 0.33	347 +/- 11	3



'Point and Shoot' Horizontal Accuracy

IKE+ vs Professional Survey: Structure 1

- No overhead power line, clear open position
- Base Difference: 2 in
- Target Distance: 80 ft
- Average Horizontal & Vertical Difference: **4 in**
- Horizontal & Vertical Accuracy = 4 in / 80 ft ~ **0.5% of Target Distance**



'Point and Shoot' Horizontal Accuracy

IKE+ vs Professional Survey: Structure 2

– Directly under power line, in Gas Station, large metal overhang

– Base Difference: 3 in

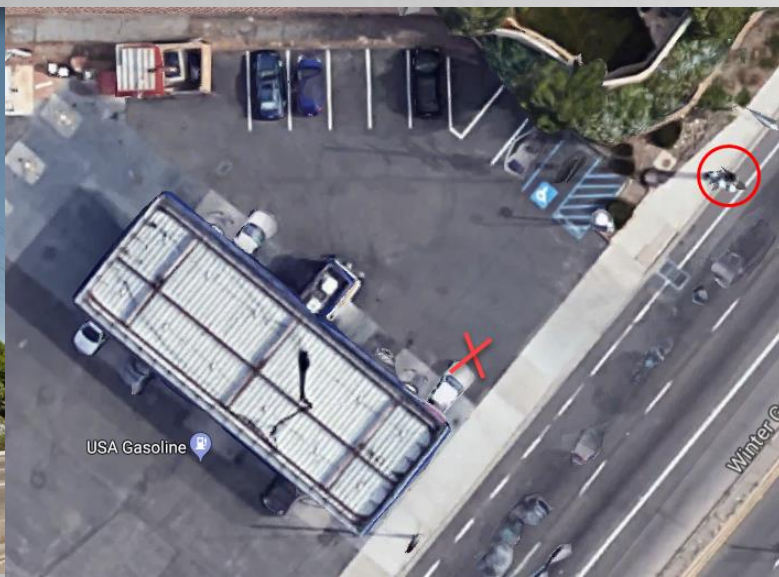
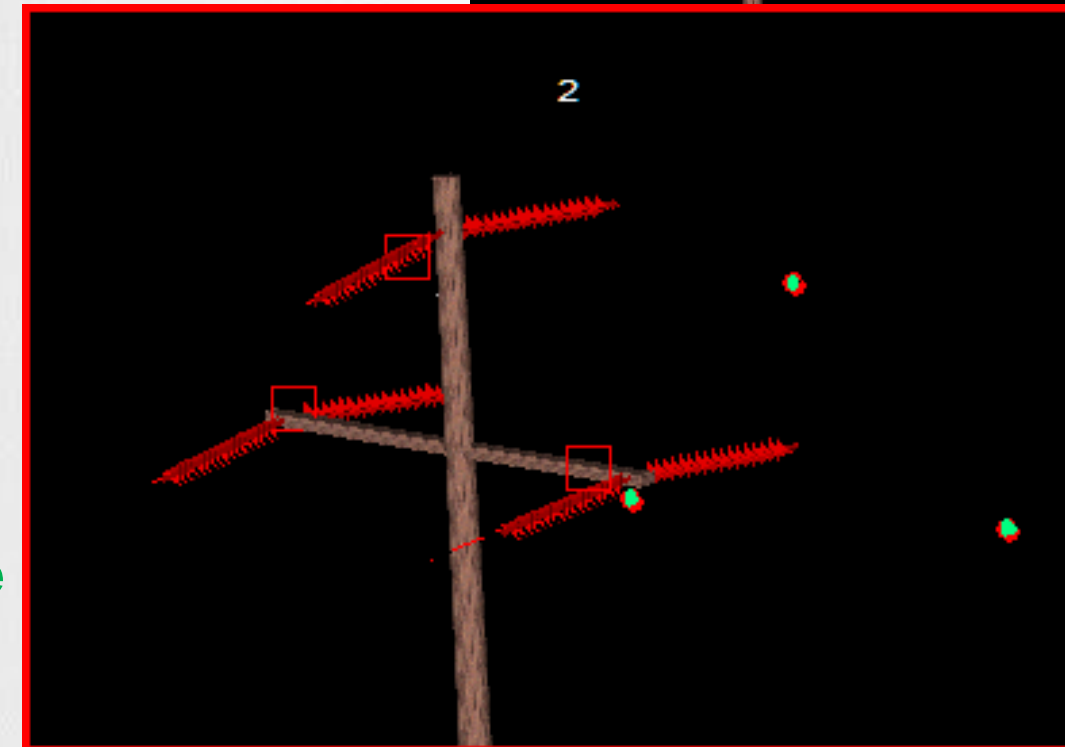
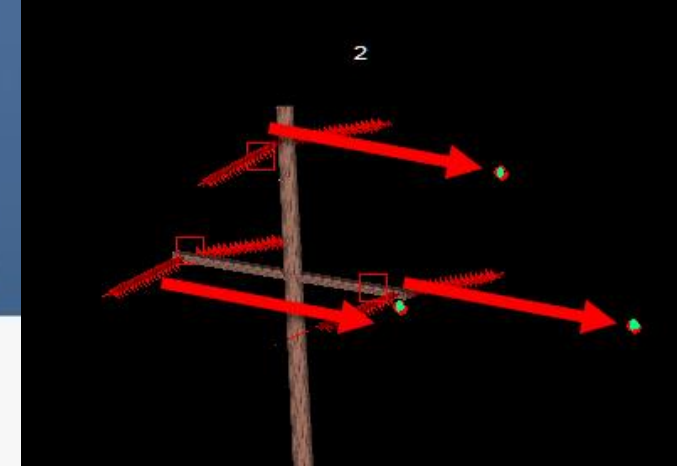
– Target Distance: 50 ft

– Average Horizontal Difference: **10 ft**

– Average Vertical Difference: **9 in**

– Horizontal Accuracy = 10 ft / 50 ft **20% of Target Distance**

– Vertical Accuracy = 9 in / 50 ft **1.5% of Target Distance**



IKE Use Case for PLS-CADD Users

Distribution

- System Hardening
- Joint Use Requests
- Pole Replacements

Transmission

- Emergency Projects
- Pole Replacements
- As-Built Validation

**PHOTO VERIFIABLE
ACCURACY, BETTER
PRODUCTIVITY &
SAFETY**

- Aerial Distribution Projects
- Joint Use
- New Attachment Permitting
- Make Ready Engineering



H: 37'6" XARM

H: 27'3" SECONDARY

H: 26'4" SECONDARY

H: 25'2" SECONDARY

H: 21'0" STREETLIGHT

H: 21'0" NESC CLEARANCE

H: 18'7" FIBER

H: 17'8" PHONE

H: 16'9" PHONE

Tip: 38'3"

H: 31'8" TRANSFORMER

H: 28'5" SECONDARY, ELECTRIC SERVICE



IKE to PLS Integration Overview

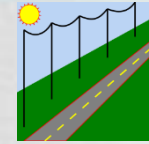


1. IKE Form
2. IKE Field
3. IKE Office



Power Line Reporting

4. IKE to PLS-POLE Automation
5. Project Directory Standardization



PLS

8. Structure Spotting
9. Automatic Stringing
10. Batch Thermal Calculation
11. Model Finalization
 - Wire Sagging
 - Structure Adjustments
 - Load Case Assignment
12. Analysis & Reporting



Power Line Reporting

13. Custom XML Processing

IKE Form

PLS-POLE - [guy assembly.pol]

File Edit View General Components Geometry Loads Model Drafting Window Help

guy assembly.pol Project Report

PLS-POLE Preferences

Saved to file: C:\Users\AIR\Downloads\PLS_CADD.INI

Unit System: Imperial (U.S.)

Use Current For New: Save All Libraries As

Settings: Always keep vector loads (LGA File) saved. Auto-update model geometry tables as you if Powers attachments from Global 2 to data. Default to Rich Text Format (RTF) when rich text is used. Disable auto-transposing of tables when er. Enable background color coding in tables. Font size for status bar text. Include full path name of files in XML export as a cr. Maximize full-screen dialogs to applicativ

File or Directory	Default for New Projects	Setting for Project guy assembly.pol
1 Application Directory	C:\Program Files (x86)\PLS\plc_pole	Not Applicable
2 Temporary Directory	C:\Users\AIR\AppData\Roaming	Not Applicable
3 Project Directory	C:\Users\Public\Documents\PLS\PLS_FC	Not Applicable
4 Part/Assembly Library	C:\Users\Public\Documents\PLS\PLS_FC	Not Applicable
5 Schema File	C:\Users\AIR\AppData\Roaming	Not Applicable
6 Cable Library	C:\Users\Public\Documents\PLS\PLS_FC	C:\Appa_Training\18.50\data\build w
7 Brace Library	C:\Users\Public\Documents\PLS\PLS_FC	C:\Appa_Training\18.50\data\build w
8 Davit arm Library	C:\Users\Public\Documents\PLS\PLS_FC	C:\Appa_Training\18.50\data\build w
9 Tubular davit arm Library	C:\Users\Public\Documents\PLS\PLS_FC	C:\Appa_Training\18.50\data\build w
10 X-arm Library	C:\Users\Public\Documents\PLS\PLS_FC	C:\Appa_Training\18.50\data\build w
11 Tubular X-Arm Library	C:\Users\Public\Documents\PLS\PLS_FC	C:\Appa_Training\18.50\data\build w
12 Equipment Library	C:\Users\Public\Documents\PLS\PLS_FC	C:\Appa_Training\18.50\data\build w
13 Connection and Anchor Libr	C:\Users\Public\Documents\PLS\PLS_FC	C:\Appa_Training\18.50\data\build w
14 Framing Library	C:\Users\Public\Documents\PLS\PLS_FC	C:\Appa_Training\18.50\data\build w
15 Mast Library	C:\Users\Public\Documents\PLS\PLS_FC	C:\Appa_Training\18.50\data\build w
16 Wood Pole Library	C:\Users\Public\Documents\PLS\PLS_FC	C:\Appa_Training\18.50\data\build w
17 Wood Material Library	C:\Users\Public\Documents\PLS\PLS_FC	C:\Appa_Training\18.50\data\build w
18 Steel Pole Library	C:\Users\Public\Documents\PLS\PLS_FC	C:\Appa_Training\18.50\data\build w
19 Concrete Pole Library	C:\Users\Public\Documents\PLS\PLS_FC	C:\Appa_Training\18.50\data\build w
20 Laminated Wood Pole Library	C:\Users\Public\Documents\PLS\PLS_FC	C:\Appa_Training\18.50\data\build w
21 FRP Pole Library	C:\Users\Public\Documents\PLS\PLS_FC	C:\Appa_Training\18.50\data\build w
22 Insulator Library	C:\Users\Public\Documents\PLS\PLS_FC	C:\Appa_Training\18.50\data\build w
23 Steel Shape Library	C:\Users\Public\Documents\PLS\PLS_FC	C:\Appa_Training\18.50\data\build w

IKE Integration - 2019.2.1

Generate IKE Form Designer

Create New IKE Form

Replace Existing IKE Form

Power Line Reporting - SDG&E

Help Settings Ike Form Editor

PLS POLE COMPONENT FILE DEFINITION

Import Paths From PLS-POLE Continue

- Cable Library
- Brace library
- Davit arm Library
- Tubular davit arm Library
- X-arm Library
- Tubular X-Arm Library
- Equipment Library
- Connection and Anchor Library
- Framing Library
- Mast Library
- Wood Pole Library
- Wood Material Library
- Steel Pole Library
- Concrete Pole Library
- Laminated Wood Pole Library
- FRP Pole Library
- InsulatorType Library
- Steel Shape Library

IKE Office Power Line Reporting

Form Information

Display Name: PLS V7 Description: Arm Brace + Push Poles

Text Height Number Photo Measure Date Select List Yes No Nested List

Subform Location Image Vector

Text Display Name ID -F Label field Cloneable

Location Display Name Location -F Target Pole Base

Subform Display Name Poles -F Cloneable

Subform Display Name Spans -F Cloneable

Subform Display Name Taps -F Cloneable

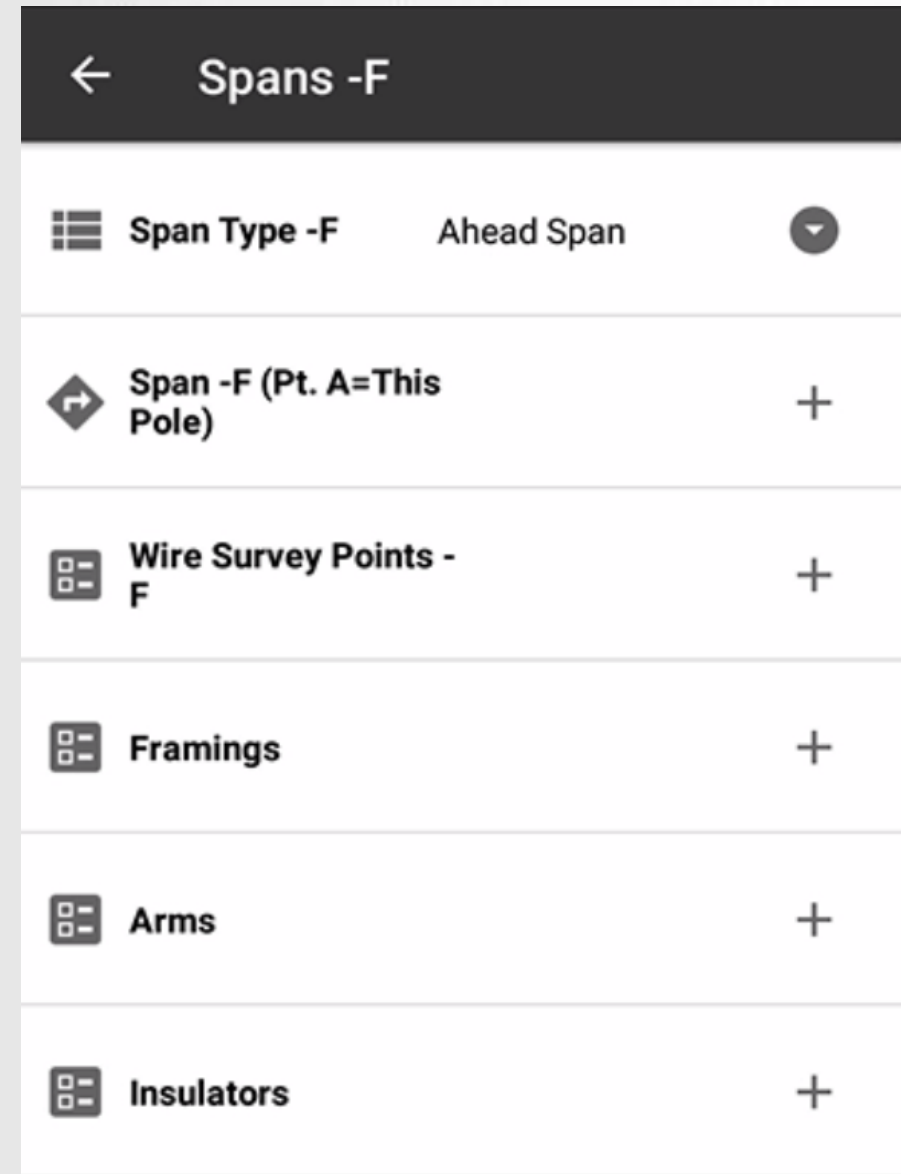
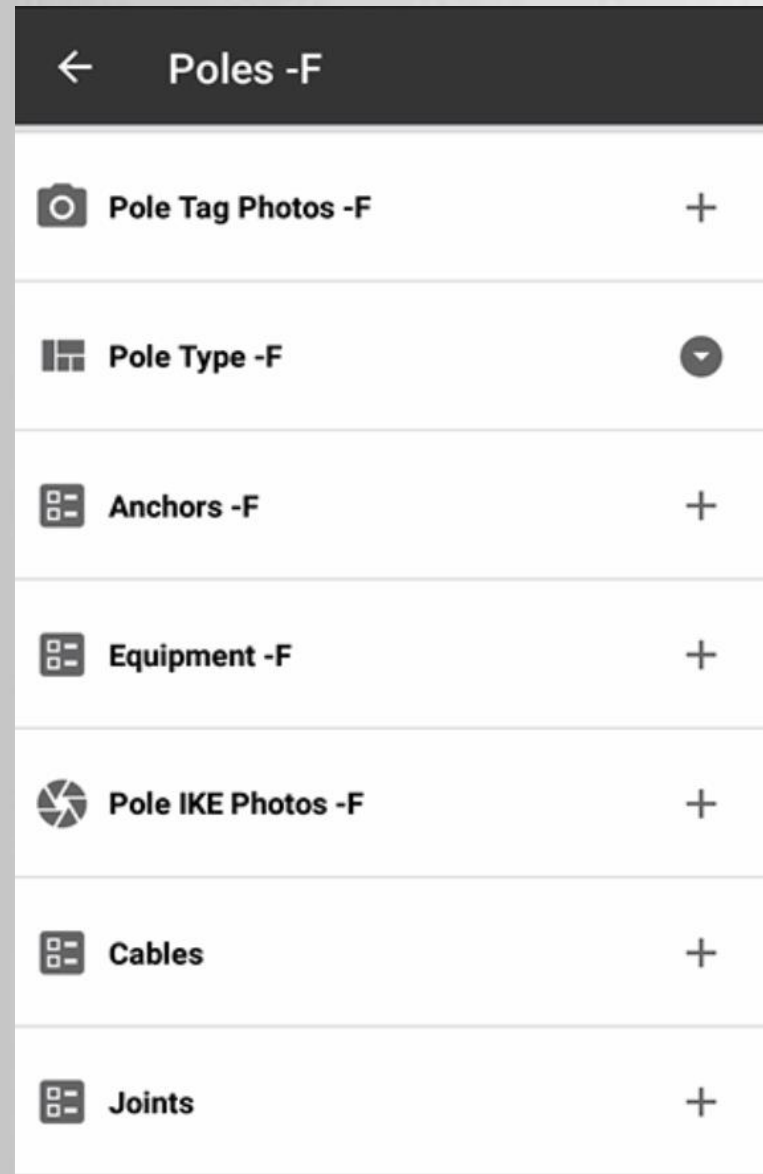
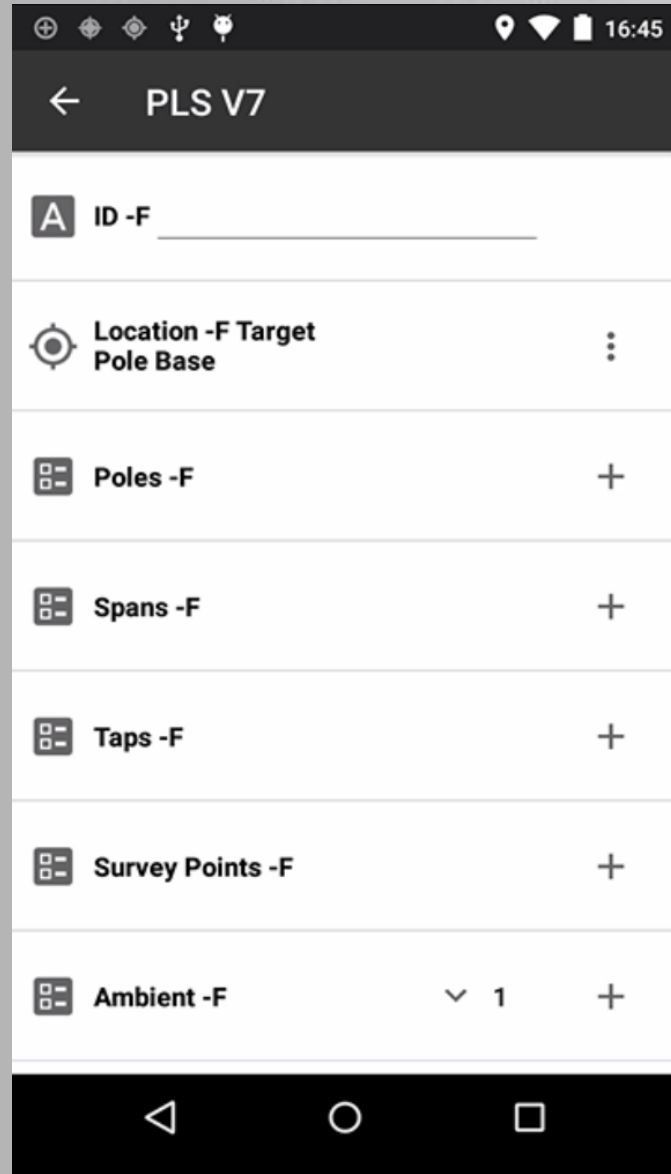
Subform Display Name Survey Points -F Cloneable

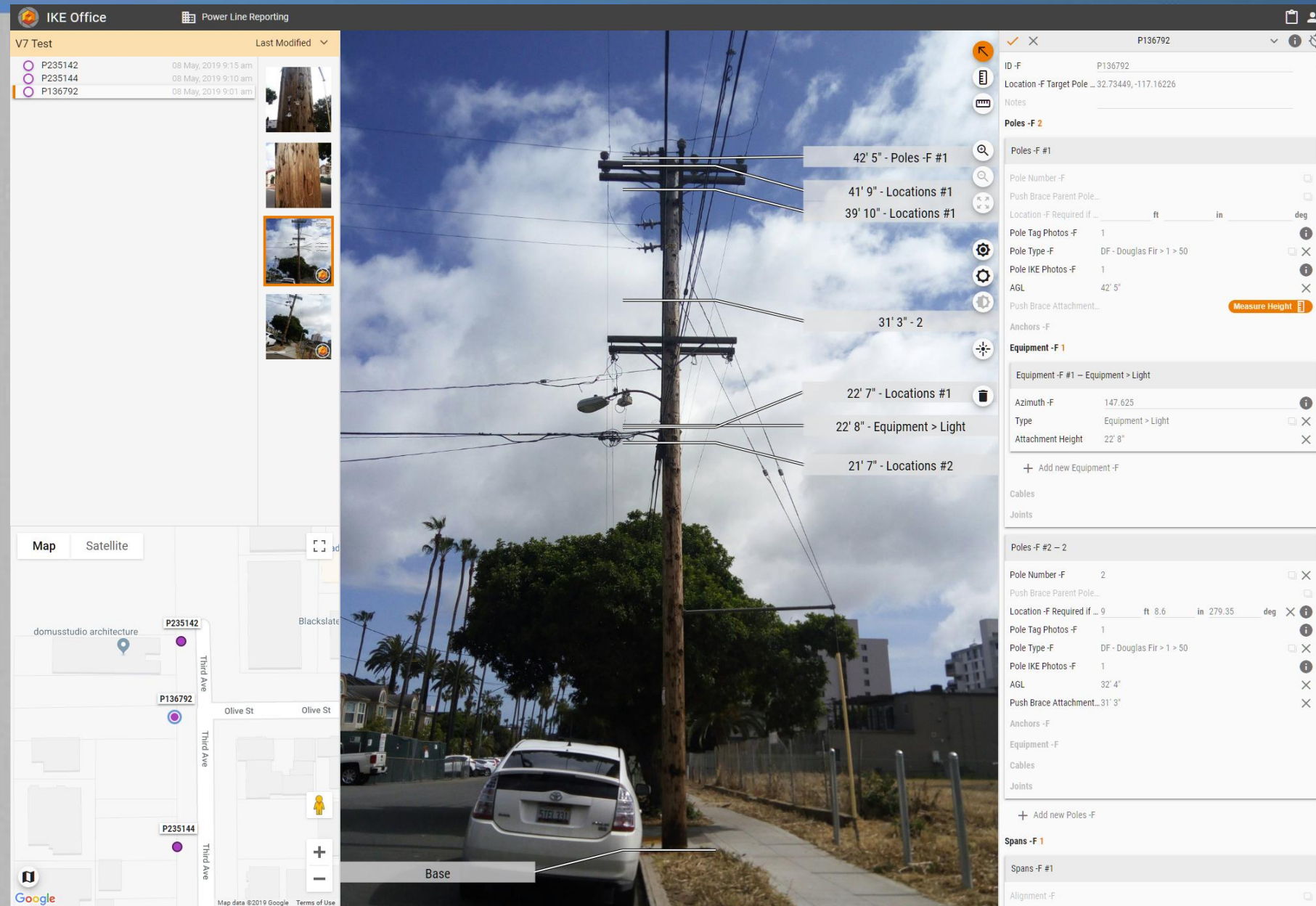
Subform Display Name Ambient -F Cloneable

Text Display Name Notes Label field Cloneable

6/11/2019

Power Line Systems, Inc.





IKE Office Power Line Reporting

V7 Test Last Modified

- P235142 08 May, 2019 9:15 am
- P235144 08 May, 2019 9:10 am
- P136792 08 May, 2019 9:01 am

Map **Satellite**

domusstudio architecture P235142
Blackslate
P136792
Olive St Olive St
Third Ave
P235144
Third Ave

Base

42' 5" - Poles -F #1

41' 9" - Locations #1

39' 10" - Locations #1

31' 3" - 2

22' 7" - Locations #1

22' 8" - Equipment > Light

21' 7" - Locations #2

P136792

ID -F P136792
Location -F Target Pole ... 32.73449, -117.16226
Notes

Poles -F 2

Poles -F #1

Pole Number -F
Push Brace Parent Pole...
Location -F Required if ... ft in deg
Pole Tag Photos -F 1
Pole Type -F DF - Douglas Fir > 1 > 50
Pole IKE Photos -F 1
AGL 42' 5"
Push Brace Attachment... **Measure Height**
Anchors -F

Equipment -F 1

Equipment -F #1 - Equipment > Light

Azimuth -F 147.625
Type Equipment > Light
Attachment Height 22' 8"

+ Add new Equipment -F

Cables
Joints

Poles -F #2 - 2

Pole Number -F 2
Push Brace Parent Pole...
Location -F Required if ... 9 ft 8.6 in 279.35 deg
Pole Tag Photos -F 1
Pole Type -F DF - Douglas Fir > 1 > 50
Pole IKE Photos -F 1
AGL 32' 4"
Push Brace Attachment... 31' 3"
Anchors -F
Equipment -F
Cables
Joints

+ Add new Poles -F

Spans -F 1

Spans -F #1
Alignment -F



Power Line Reporting Application

IKE Integration - 2019.1.6

Power Line Reporting

- PRG
- IKE 1**
- Converter
- BOM
- Grid Search
- LTG
- PLS Tools

Settings
Ike Form Editor
PLS-CADD Model Generation

Re-Load Ike Job List

Choose Job

- cuya ike
- V7 Test 2**
- Ute v6
- brace and push pole
- TL631 Z 476145
- Quince Canyon
- Z90070 3
- Z90070 1 inch

Choose Structures

-
- P235142
- P136792
- P235144

Global Survey Point Correction (ft)

X Correction	Y Correction	Z Correction
-11.64	-3.65	-3.5

Local Survey Point Correction

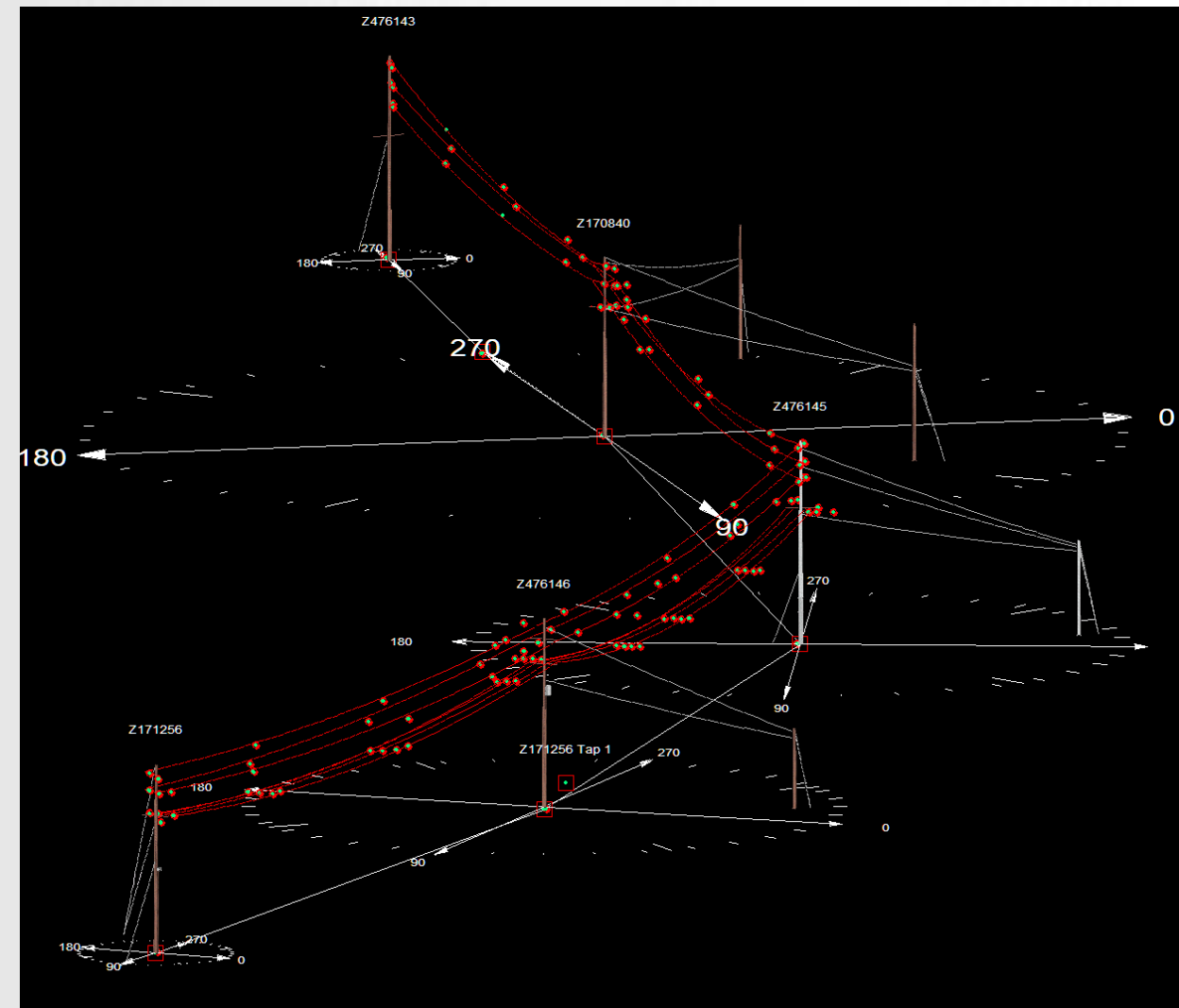
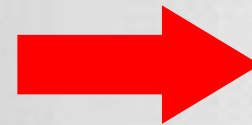
Structure Number	Latitude	Longitude	Elevation (ft)
P235142	32.7347499373759	-117.162239685738	140.753994205018
P136792	32.7344866243586	-117.162264564	139.900006350719
P235144	32.734038638711	-117.162253903567	146.01762002193

Use IKE Form Settings Load Settings From Selected Job

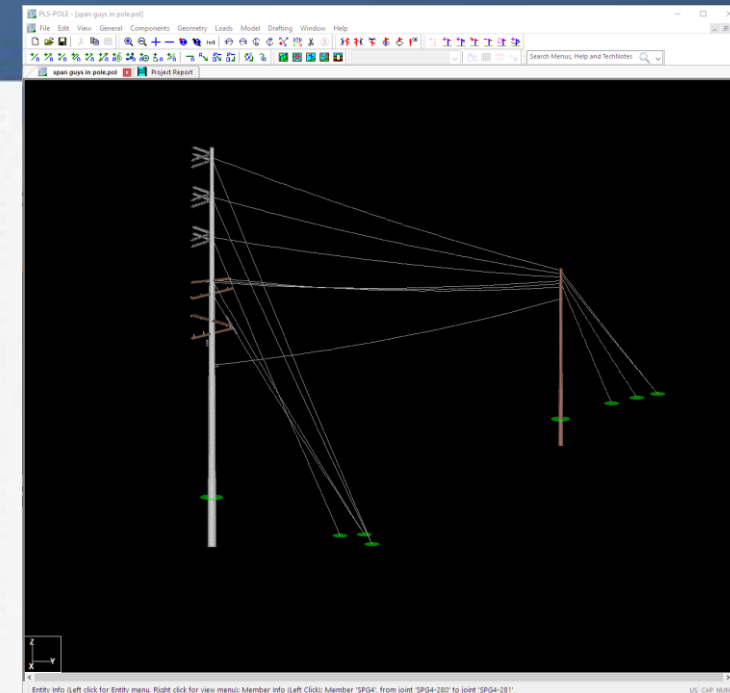
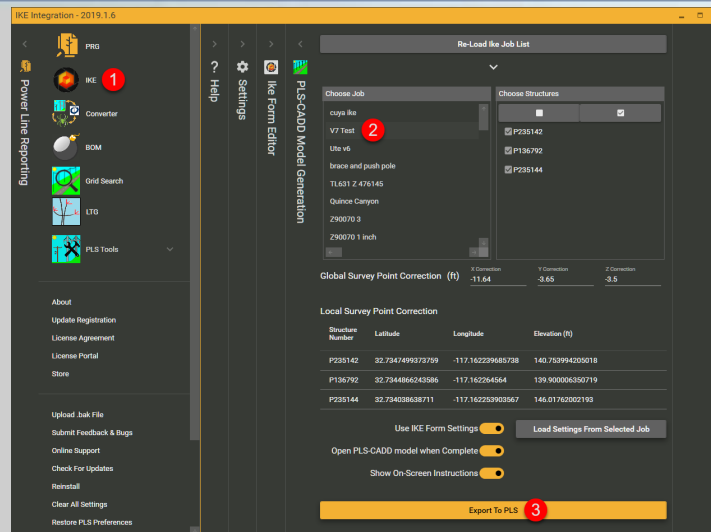
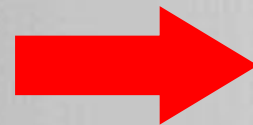
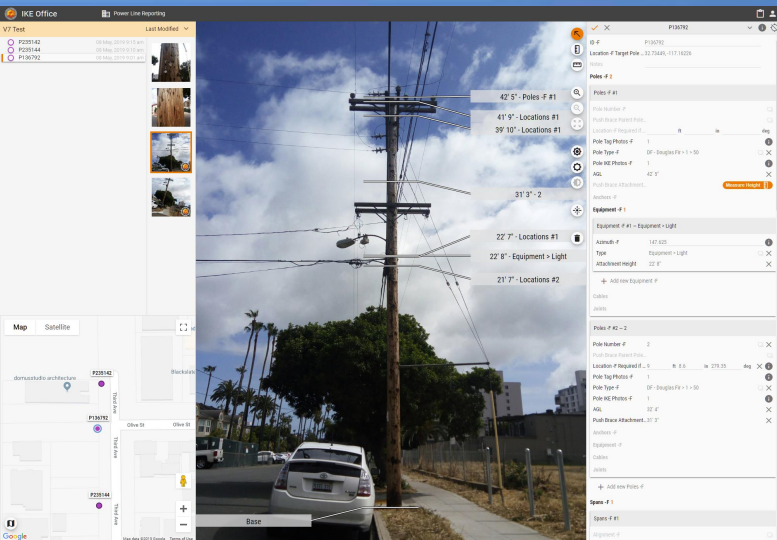
Open PLS-CADD model when Complete

Show On-Screen Instructions

Export To PLS 3



IKE to PLS-POLE Automation



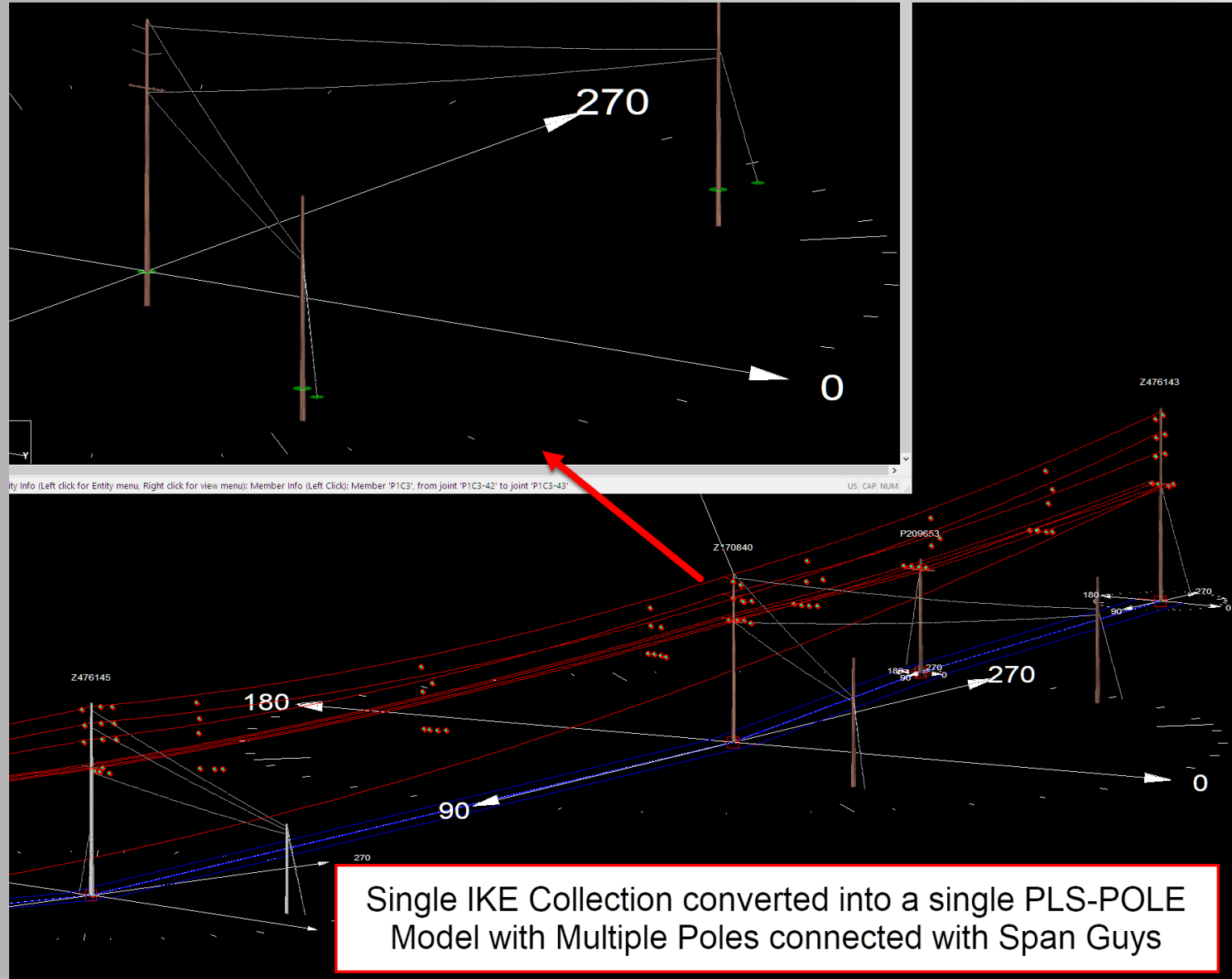
IKE Office API

- JSON Structure Data
- Photo File Store

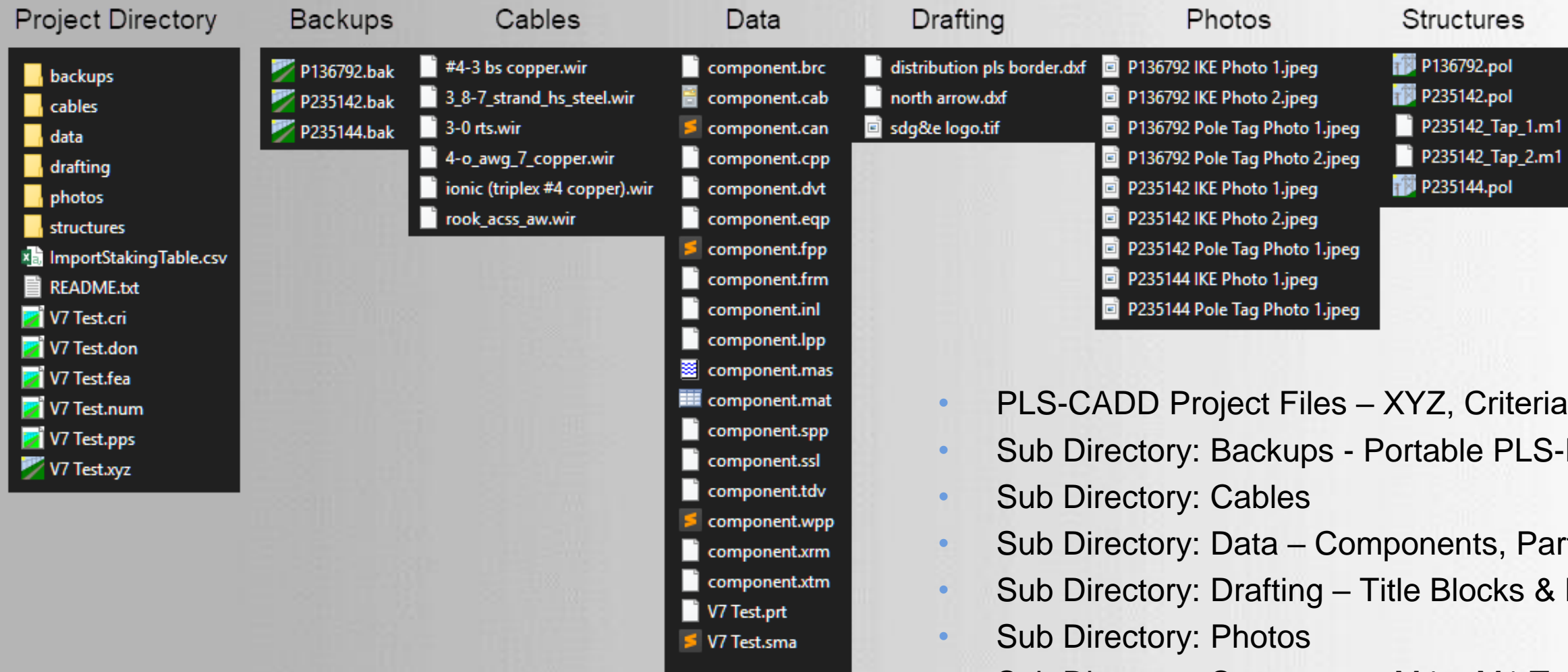
PLS API

- **Poles:** All Materials, Multi-Pole Arrangements, Push Brace
- **Arms:** All PLS-POLE Arm Types
- **Insulators:** ALL PLS-POLE Insulator Types
- **Equipment:** PLS-POLE Equipment / Framings
- **Guys:** Down / Span + Guy Strain Insulators
- **Framings:** Inserted at Attachment Height

IKE to PLS-POLE Samples



Project Directory Standardization



The screenshot displays a project directory structure with the following sub-directories and their contents:

- Project Directory**
 - backups
 - cables
 - data
 - drafting
 - photos
 - structures
 - ImportStakingTable.csv
 - README.txt
 - V7 Test.cri
 - V7 Test.don
 - V7 Test.fea
 - V7 Test.num
 - V7 Test.pps
 - V7 Test.xyz
- Backups**
 - P136792.bak
 - P235142.bak
 - P235144.bak
- Cables**
 - #4-3 bs copper.wir
 - 3_8-7_strand_hs_steel.wir
 - 3-0 rts.wir
 - 4-o_awg_7_copper.wir
 - ionic (triplex #4 copper).wir
 - rook_acss_aw.wir
- Data**
 - component.brc
 - component.cab
 - component.can
 - component.cpp
 - component.dvt
 - component.eqp
 - component.fpp
 - component.frm
 - component.inl
 - component.lpp
 - component.mas
 - component.mat
 - component.spp
 - component.ssl
 - component.tdv
 - component.wpp
 - component.xrm
 - component.xtm
 - V7 Test.prt
 - V7 Test.sma
- Drafting**
 - distribution pls border.dxf
 - north arrow.dxf
 - sdg&e logo.tif
- Photos**
 - P136792 IKE Photo 1.jpeg
 - P136792 IKE Photo 2.jpeg
 - P136792 Pole Tag Photo 1.jpeg
 - P136792 Pole Tag Photo 2.jpeg
 - P235142 IKE Photo 1.jpeg
 - P235142 IKE Photo 2.jpeg
 - P235142 Pole Tag Photo 1.jpeg
 - P235144 IKE Photo 1.jpeg
 - P235144 Pole Tag Photo 1.jpeg
- Structures**
 - P136792.pol
 - P235142.pol
 - P235142_Tap_1.m1
 - P235142_Tap_2.m1
 - P235144.pol

- PLS-CADD Project Files – XYZ, Criteria, Feature Code, ...
- Sub Directory: Backups - Portable PLS-POLE BAK Files
- Sub Directory: Cables
- Sub Directory: Data – Components, Part, Schema
- Sub Directory: Drafting – Title Blocks & Logos
- Sub Directory: Photos
- Sub Directory: Structures – M4 + M1 Taps
- Import Staking Table + Readme



Project Directory Standardization: XYZ File

```
1 TYPE='XYZ FILE' VERSION='4' UNITS='US' SOURCE='PLS-CADD Version 14.40' USER='PLR' FILENAME='C:\Users\AliKhavari\Downloads\V7-Test\V7-Test.xyz'  
2 'P235142' 1590549.37150078 11882852.3550424 137.253994205018 120 0.000 'C:\Users\AliKhavari\Downloads\V7-Test\structures\P235142.pol' ''  
3 'P235142_Tap_1' 1590541.15731391 11882807.2937559 156.526918206833 120 0.000 'C:\Users\AliKhavari\Downloads\V7-Test\structures\P235142_Tap_1.m1' ''  
4 'P235142_Tap_2' 1590643.4520664 11882811.8534273 139.043593721789 120 0.000 'C:\Users\AliKhavari\Downloads\V7-Test\structures\P235142_Tap_2.m1' ''  
5 'P136792' 1590541.57734515 11882756.5999715 136.400006350719 120 0.000 'C:\Users\AliKhavari\Downloads\V7-Test\structures\P136792.pol' ''  
6 'P235144' 1590544.60483582 11882593.6628594 142.51762002193 120 0.000 'C:\Users\AliKhavari\Downloads\V7-Test\structures\P235144.pol' ''  
7 '' 1590545.28206365 11882690.3564227 155.437412433897 75 0.000 '' ''  
8 '' 1590548.78183307 11882688.3921564 177.472860513444 75 0.000 '' ''  
9 '' 1590543.03245379 11882689.9745729 177.78778600004 75 0.000 '' ''  
10 '' 1590545.63766697 11882689.5214638 155.74807286933 75 0.000 '' ''  
11 '' 1590546.33386443 11882689.0881753 156.951676345849 75 0.000 '' ''
```

PLS-CADD Manual Appendix D

D.1 XYZ File Format

PLS-CADD can save XYZ files in either binary or ASCII format. The default format is binary and this results in much smaller files and faster file/open and file/save operations. The disadvantage of binary is that it is not human readable nor is it readable by programs other than PLS-CADD. To save in ASCII format use **File/Save As** and change the **Save as type** to "ASCII XYZ Files".

The ASCII format for an XYZ file consists of one record per line formatted as shown below. A record of that file, designated as R.* below, includes one or more data which must be separated by blanks.

Records

R.0 Header which includes:
TYPE=' XYZ FILE ', VERSION=' 4 ' or other, UNITS=' US ' or ' SI '
SOURCE=' PLS-CADD Version *** ', USER=' Username ', FILENAME=' '

Then for each terrain point a record that includes:

R.i Description of terrain point (text string limited to 256 characters included within single quotation marks)
x-coordinate (m or ft), y-coordinate (m or ft), z-coordinate (m or ft)
Feature code (Integer)
Obstacle height, h (m or ft) - must input zero value if there is no obstacle
Optional surveyor note to appear on all profile views (this is a text string limited to 256 characters that must be included within single quotation marks, for example ' poor soil ')
Optional surveyor note to appear on all plan views (this is a text string limited to 256 characters that must be included within single quotation marks)

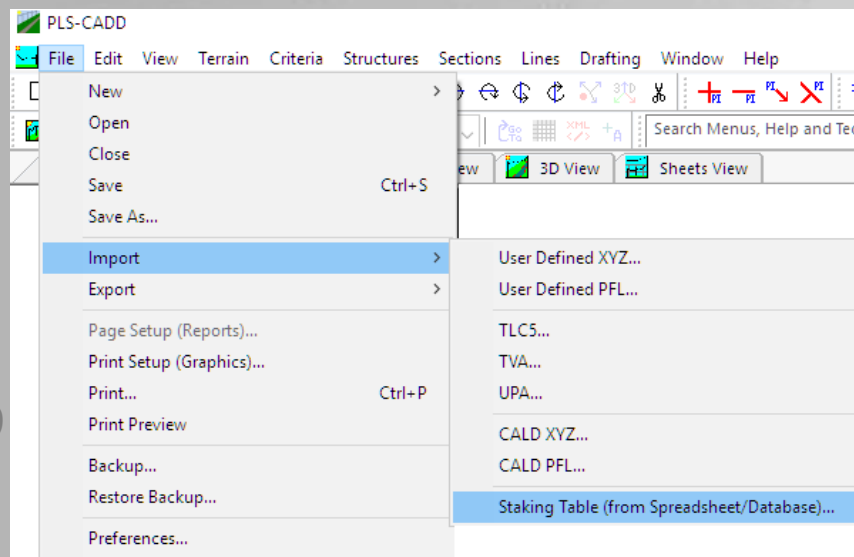
For example, the record { '12345' 1000. 500. 100. 200 0 ' ' ' Hydrant ' } will cause the word "Hydrant" to be drawn on all plan views at the location of ground point 12345.



Structure Spotting Options

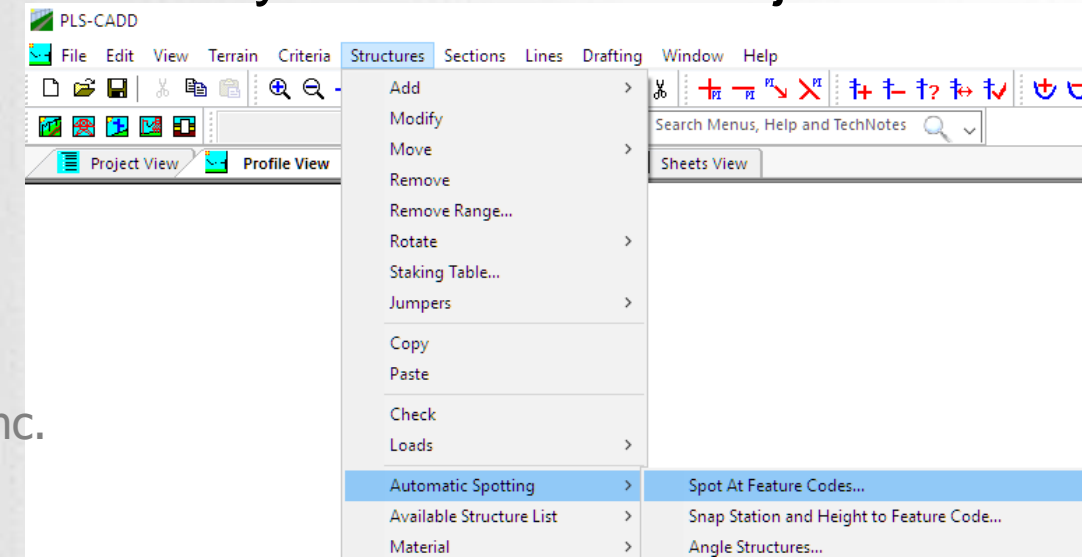
Import Staking Table

- Pros
 - Most Configurable Option
 - Alignment & XY Based Structures
 - Automatic structure orientation
 - Structure Comment Definition
- Cons
 - Requires more pre-processing to setup Staking Table



Feature Code Spotting

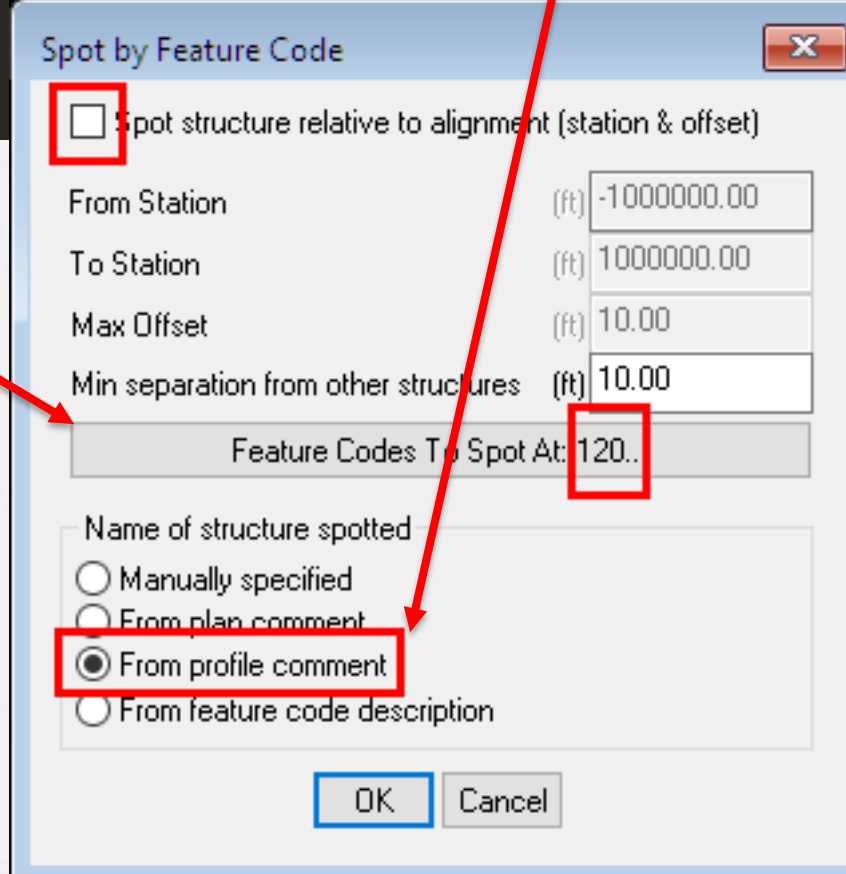
- Pros
 - Simple, easy to use
- Cons
 - XY Structures Only
 - Limited configurability
 - No alignment definition
 - Structures orientations must be manually reviewed and adjusted





Feature Code Spotting

```
1 TYPE='XYZ FILE' VERSION='4' UNITS='US' SOURCE='PLS-CADD Version 14.40' USER='PLR' FILENAME='C:\Users\AliKhavari\Downloads\V7-Test\V7-Test.xyz'  
2 'P235142' 1590549.37150078 11882852.3550424 137.253994205018 120 0.000 'C:\Users\AliKhavari\Downloads\V7-Test\structures\P235142.pol' ''  
3 'P235142_Tap_1' 1590541.15731391 11882807.2937559 156.526918206833 120 0.000 'C:\Users\AliKhavari\Downloads\V7-Test\structures\P235142_Tap_1.m1' ''  
4 'P235142_Tap_2' 1590643.4520664 11882811.8534273 139.043593721789 120 0.000 'C:\Users\AliKhavari\Downloads\V7-Test\structures\P235142_Tap_2.m1' ''  
5 'P136792' 1590541.57734515 11882756.5999715 136.400006350719 120 0.000 'C:\Users\AliKhavari\Downloads\V7-Test\structures\P136792.pol' ''  
6 'P235144' 1590544.60483582 11882593.6628594 142.51762002193 120 0.000 'C:\Users\AliKhavari\Downloads\V7-Test\structures\P235144.pol' ''  
7 '' 1590545.28206365 11882690.3564227 155.437412433897 75 0.000 '' ''  
8 '' 1590548.78183307 11882688.3921564 177.472860513444 75 0.000 '' ''  
9 '' 1590543.03245379 11882689.9745729 177.78778600004 75 0.000 '' ''  
10 '' 1590545.63766697 11882689.5214638 155.74807286933 75 0.000 '' ''  
11 '' 1590546.33386443 11882689.0881753 156.951676345849 75 0.000 '' ''
```



Spot by Feature Code

Spot structure relative to alignment (station & offset)

From Station (ft) -1000000.00

To Station (ft) 1000000.00

Max Offset (ft) 10.00

Min separation from other structures (ft) 10.00

Feature Codes To Spot At: 120..

Name of structure spotted

Manually specified

From plan comment

From profile comment

From feature code description

OK Cancel

Structures > Automatic Spotting > Spot at Feature Codes

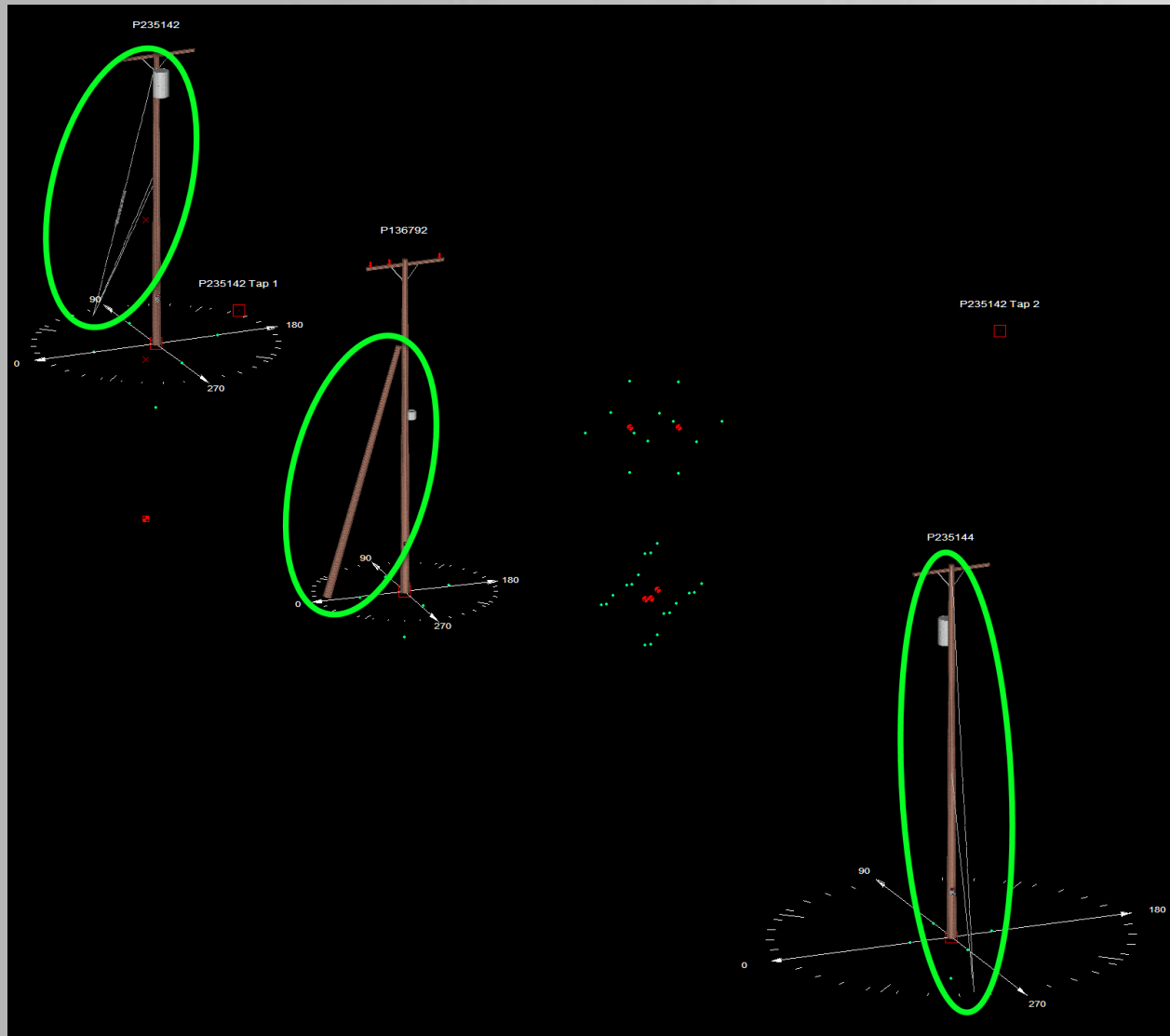
1. Uncheck 'Spot Structures Relative to Alignment'
2. Define Feature Code
3. Choose Correct Comment

Profile Comment is **First** Comment in XYZ File

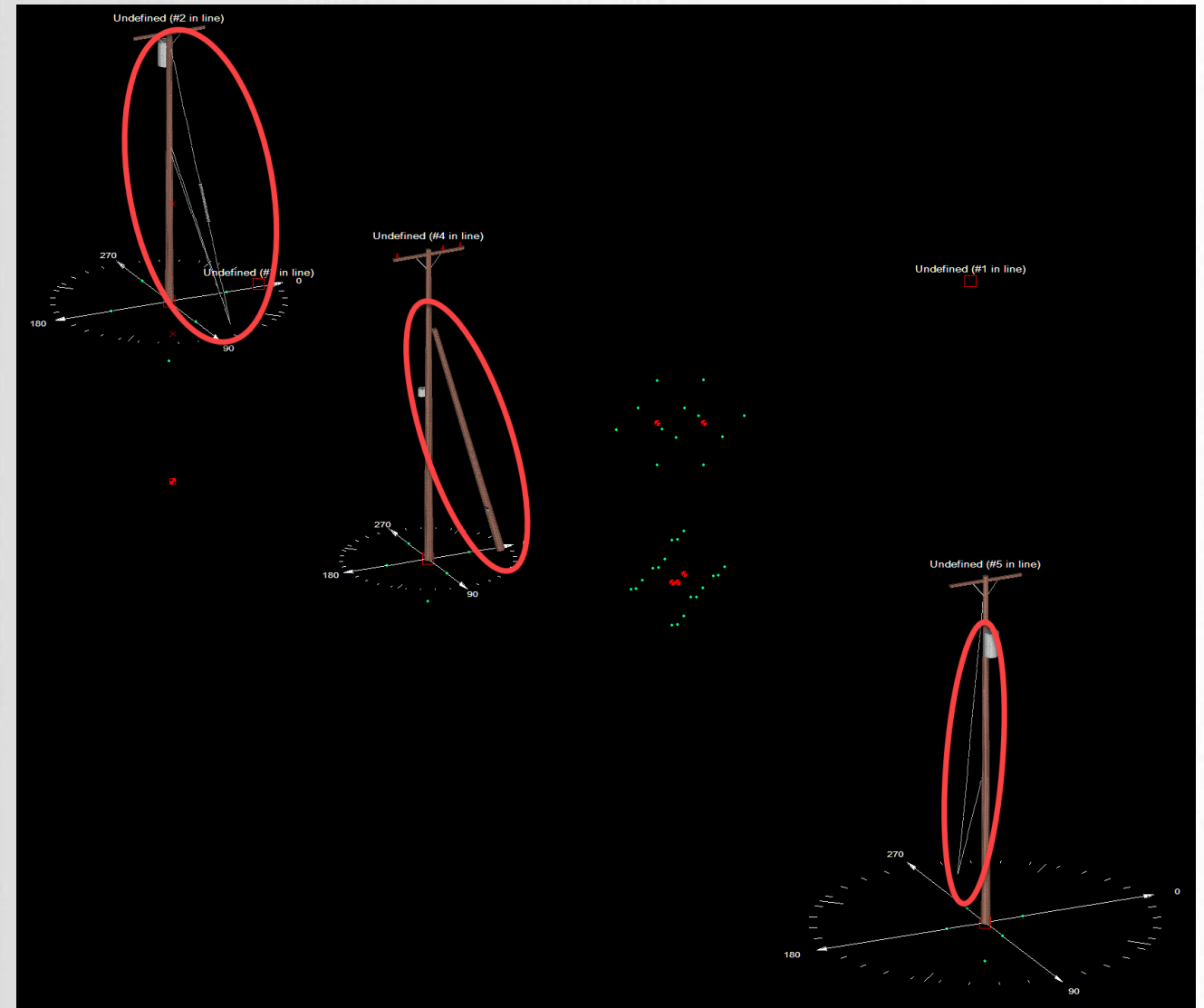


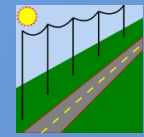
Structure Spotting Options

Import Staking Table



Feature Code Spotting





Import Staking Table & Line Angle "Cheat Codes"

PLS-CADD > File > Import > Staking Table (from Spreadsheet/Database)

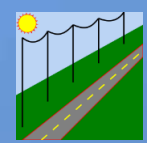
Import Staking Table

Use copy/paste commands to import data from a spreadsheet or database.
Structures should be in order of increasing station.

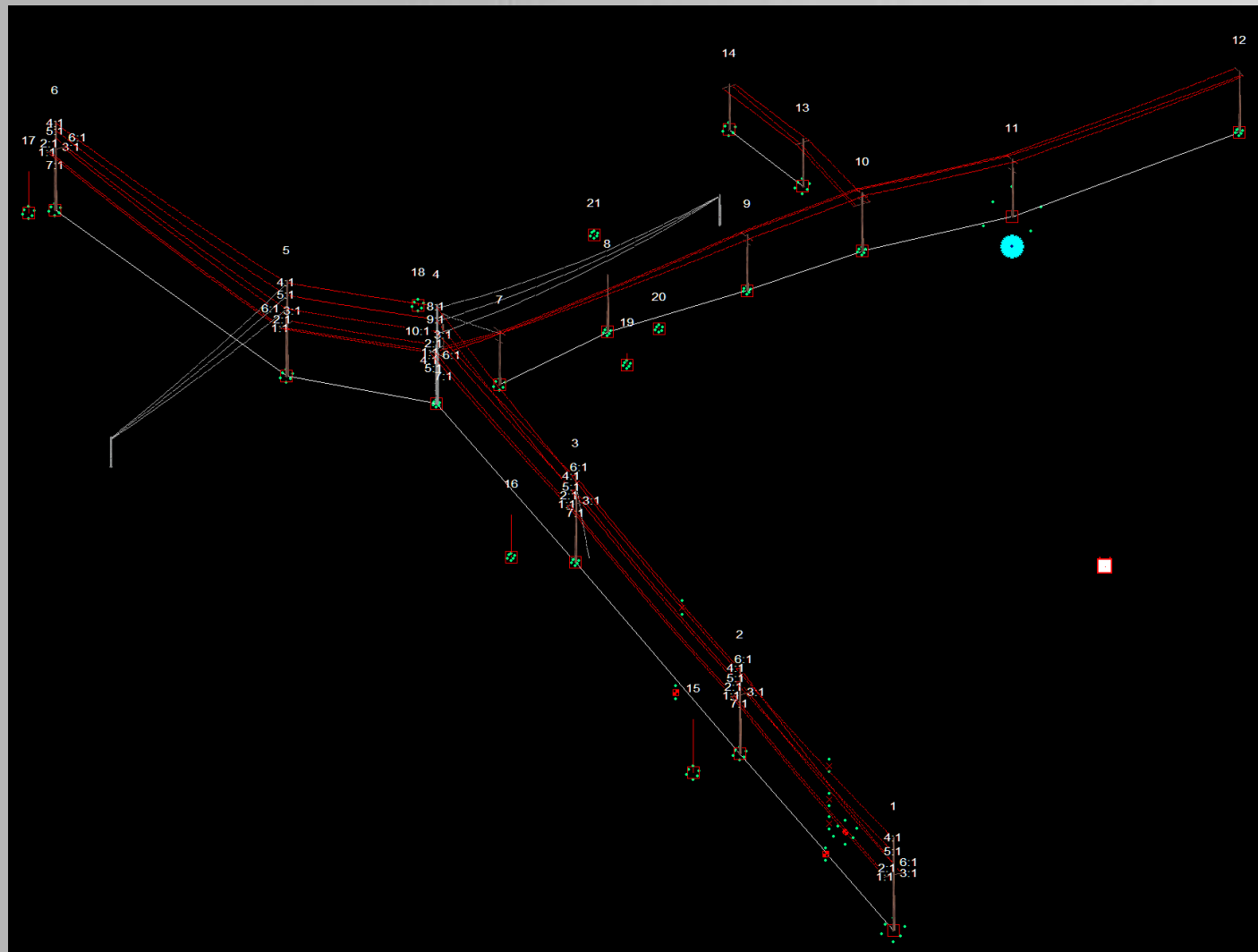
PI points are created for records with non zero line angle (angle value ignored and need not be correct). Use a line angle of 999 to start a new alignment.
To spot structures by XY rather than station use following codes in the line angle field:
500 for structure w/o PI
501 for structure and PI
502 for structure and PI on new alignment
When spotting by XY you should enter the desired structure base elevation in the 'CenterlineZ Elevation' column and the structure orientation angle is measured clockwise from the X axis.

	Structure Number	Station (ft)	Height Adjust. (ft)	Offset Adjust. (ft)	Orientation Angle (deg)	X Easting (ft)	Y Northing (ft)	Centerline Z Elevation (ft)	TIN Z Elevation (ft)	Ahead Span (ft)	Line Angle (deg)	Sets In XY Structure Line Angle Calculation	Transverse Axis Azimuth (deg)	Structure Name
1														
2														
3														

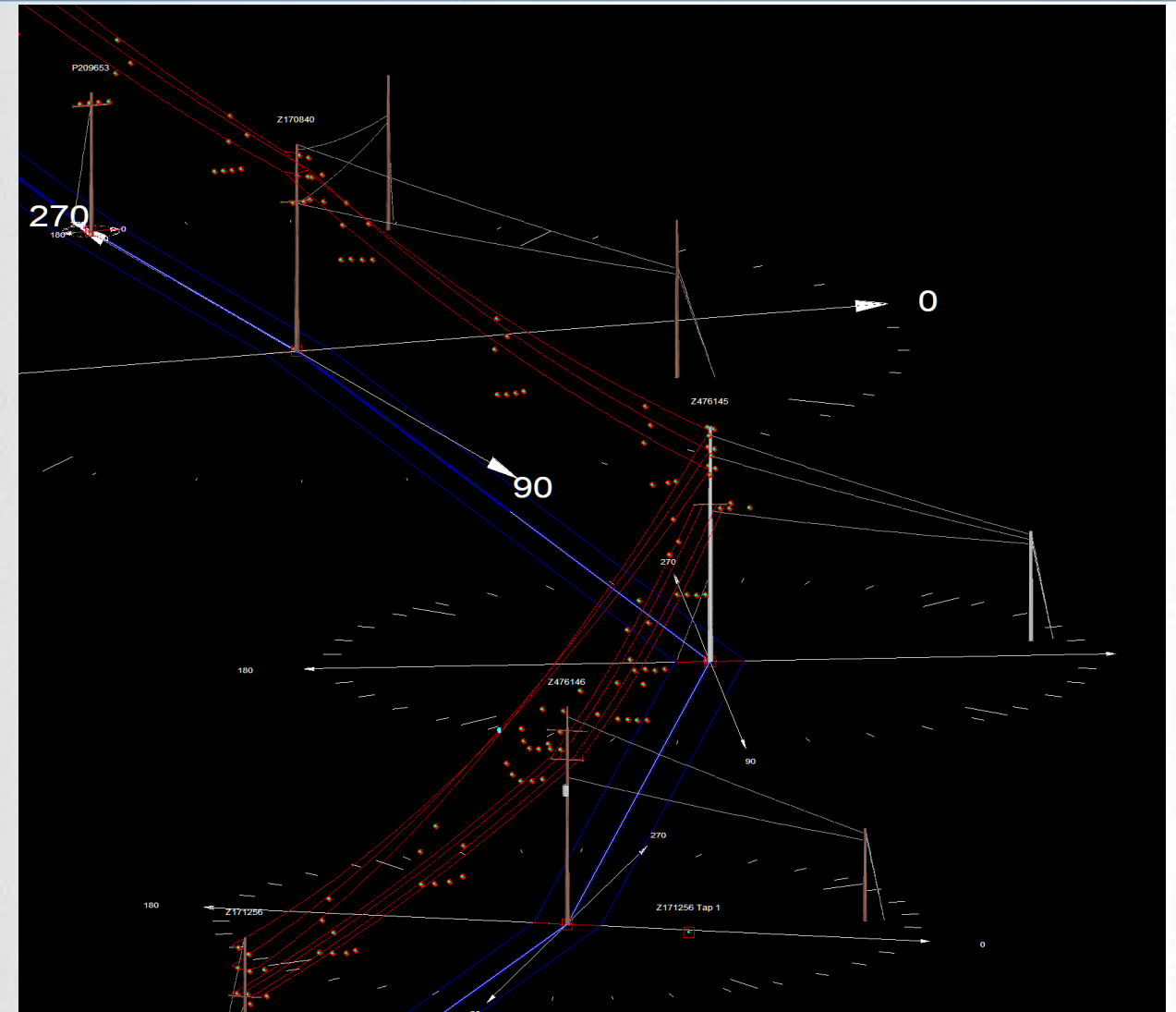
PI points are created for records with non zero line angle (angle value ignored and need not be correct). Use a line angle of 999 to start a new alignment.
To spot structures by XY rather than station use following codes in the line angle field:
500 for structure w/o PI
501 for structure and PI
502 for structure and PI on new alignment



IKE to PLS-CADD Samples: XY vs Alignment



XY with PI Points, 3 Alignments



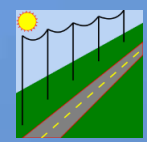
Alignment Based



Import Staking Table Automation

The screenshot shows an Excel spreadsheet with the following data:

	C	D	E	F	G	H	K	L	N	R	S	T	U	V
1	Height Adjust	Offset Adjust	Orientation Angle	X Easting	Y Northing	Centerline Z Elevation	Line Angle	Sets in XY Structure Line Angle Calculation	Structure Name	Structure Comment 1	...	Structure Comment 49	Structure Comment 50	
2	0	0	0	1590549	11882852	137.2539942	0.0001	1 2 3 4 5 6 21 22 23 24 25 26 11	C:\Users\	P235142		C:\Users\AliKh	C:\Users\AliKhavari\	
3	0	0	0	1590542	11882757	136.4000064	-3.5678	1 2 3 4 5 6 21 22 23 24 25 26 11	C:\Users\	P136792		C:\Users\AliKh	C:\Users\AliKhavari\	
4	0	0	0	1590545	11882594	142.51762	0.0001	1 2 3 4 5 6 21 22 23 24 25 26 11	C:\Users\	P235144		C:\Users\AliKh	C:\Users\AliKhavari\	
5	0	0	0	1590541	11882807	156.5269182	500	1 2 3 4 5 6 21 22 23 24 25 26 11	C:\Users\	P235142 Tap 1				
6	0	0	0	1590643	11882812	139.0435937	500	1 2 3 4 5 6 21 22 23 24 25 26 11	C:\Users\	P235142 Tap 2				
7														
8														
9														
10														
11														
12														
13														



Automatic Stringing

Automatically Presented after Import Staking Table

Manually Performed using 'PLS-CADD > Sections > Automatic Stringing'

Automatic Stringing

Program will attempt to automatically string wire between compatible structure sets.

Only string wire between sets that have the same set description
 Ignore set description and string to the first available set

Structure to start stringing at: P235142
Structure to end stringing at: P235142 Tap 2

Cable file name: ***

Conductors per phase: 1

Range of sets to string: Set 1, Set 2, Set 3, Set 4, Set 5, Set 6, Set 7, Set 8, Set 9

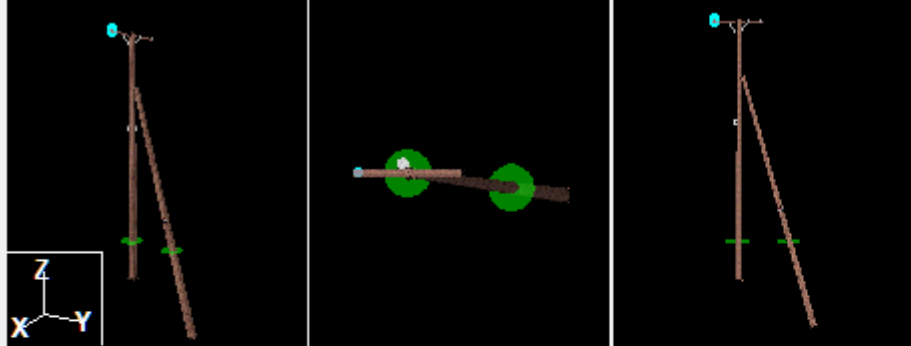
OK Cancel Apply



Automatic Stringing Optimization

Optimize Automatic Stringing by Defining Set, Phase, and Set Description

PLS-CADD Link Cable Sets



Model Check Report
No errors or relevant warnings detected.

	Insulator Label	Conductor Attach Label	Insulator Type	Set Number	Phase Number	Set Description	Dead End	Framing Source
1	S1A1L1I1	S1A1L1I1	Post	7	1	Distribution A1	No	
2	S1A1L1I2	S1A1L1I2	Post	7	2	Distribution A1	No	
3	S1A1L1I3	S1A1L1I3	Post	7	3	Distribution A1	No	
4	S1I1L1	A1:S1I1L1	Clamp	40	1	Comms A1	No	
5	S1I1L2	A1:S1I1L2	Clamp	41	1	Comms A1	No	

OK Cancel





Batch Thermal Calculator

12:04

Ambient -F

Date Of Survey 05/07/2019

Hour of Day (10=10am, 14=2pm) 16

Air Temperature (°F) 65

Wind Speed (ft/s) 3

Wind Direction (0°=N, 90°=E) 270

Batch Thermal Calculator Default Values

Enter default values to use when specific values are not found in table rows

Day to use to calculate the solar radiation

Use day of year producing maximum solar heating

Use specified day of year 5/ 7/2019

Sun time to use to calculate the solar radiation

No Sun

Use specified sun time (10=10am, 14=2pm, etc) 16

Atmosphere Clear

Air temperature (deg F) 65

Wind speed (ft/s) 3

Wind-to-conductor angle (deg) 90

Global wind direction (0=towards North, 90=towards East) (deg) 270

Steady-state current to use to calculate temperature (Amps) 100

Conductor temperature to use to calculate current (deg F) 212

Radial thermal conductivity (Watt/m-K) 2

Atmospheric cleanness ratio 0

Cable inclination (deg) 0

OK Cancel

PLS-CADD

File Edit View Terrain Criteria Structures Sections Lines Drafting Window Help

1 Sections

2 Thermal Calculations (IEEE, CIGRE and TNSP)

3 Batch Thermal Calculator...

Steady-State Temperature versus Current Graph...

Steady-State Conductor Temperature...

Steady-State Thermal Rating...

Conductor Temperature for Current Change...

Transient Thermal or Fault Rating...

Batch Thermal Calculator

Calculations Options

Find conductor temperatures for given steady-state currents

Find currents for given steady-state conductor temperatures

4 Project Options

5 Import Project Wires...

6 Save computed cable temperature in Section 'As Surveyed' temperature and Display Weather Case...

7 Calculate wind-to-conductor angle from global wind direction and line azimuth

Import from Project

Options per row

Import one section per row

Section azimuth

Use azimuth of line between end structures

Use average of spans azimuths

Import one span set per row

Clear existing rows

Clear only project rows

Clear all rows

Default Values... OK Cancel

Save Temperatures To Sections

Replace display weather case saved with section with:

Coldest of section spans temperatures

Average of section spans temperatures

Warmest of section spans temperatures

OK Cancel

Section Table

Sort Sections by:

Section number

Structure number section starts upon

Attachment set section starts upon

Voltage

Cable file name

Displayed Phase will not take effect until override in Section/Display-Options is disabled.

Sec #	Start Str #	End Str #	Ruling Span (ft)	Insul. Clipped	Sec Notes	Cable File Name	Voltage (kV)	Wires Per Phase	Sag Condition	Sag Temp. (deg F)	Sag Horiz. Ten. (lbs)	Display Weather Case	Display Condition	Disp. Wind From	Disp. Phase	Disp. Color	Command To Apply
1	135142:7	135144:7	142	No		opper.wir	-1	1	Initial	60.0	2144.4	75.8 (deg F)	Creep RS	Both	1		
2	235142:40	35144:40	142	No		opper.wir	-1	1	Initial	60.0	2144.4	75.8 (deg F)	Creep RS	Both	1		
3	335142:41	35144:41	142	No		opper.wir	-1	1	Initial	60.0	2144.4	75.8 (deg F)	Creep RS	Both	1		
4	4:ap 1:40	ap 2:40	101	No		opper.wir	-1	1	Initial	60.0	2144.4	79.8 (deg F)	Creep RS	Both	1		

OK Cancel Apply

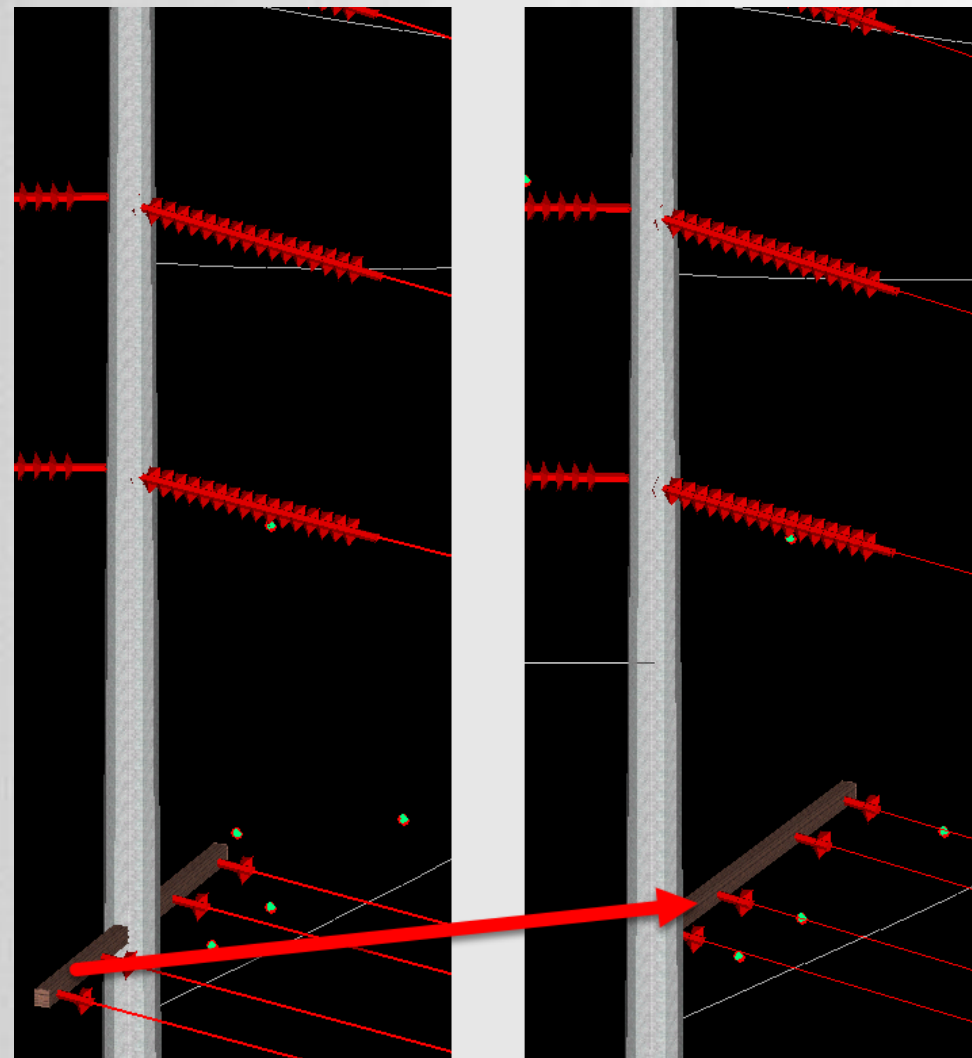
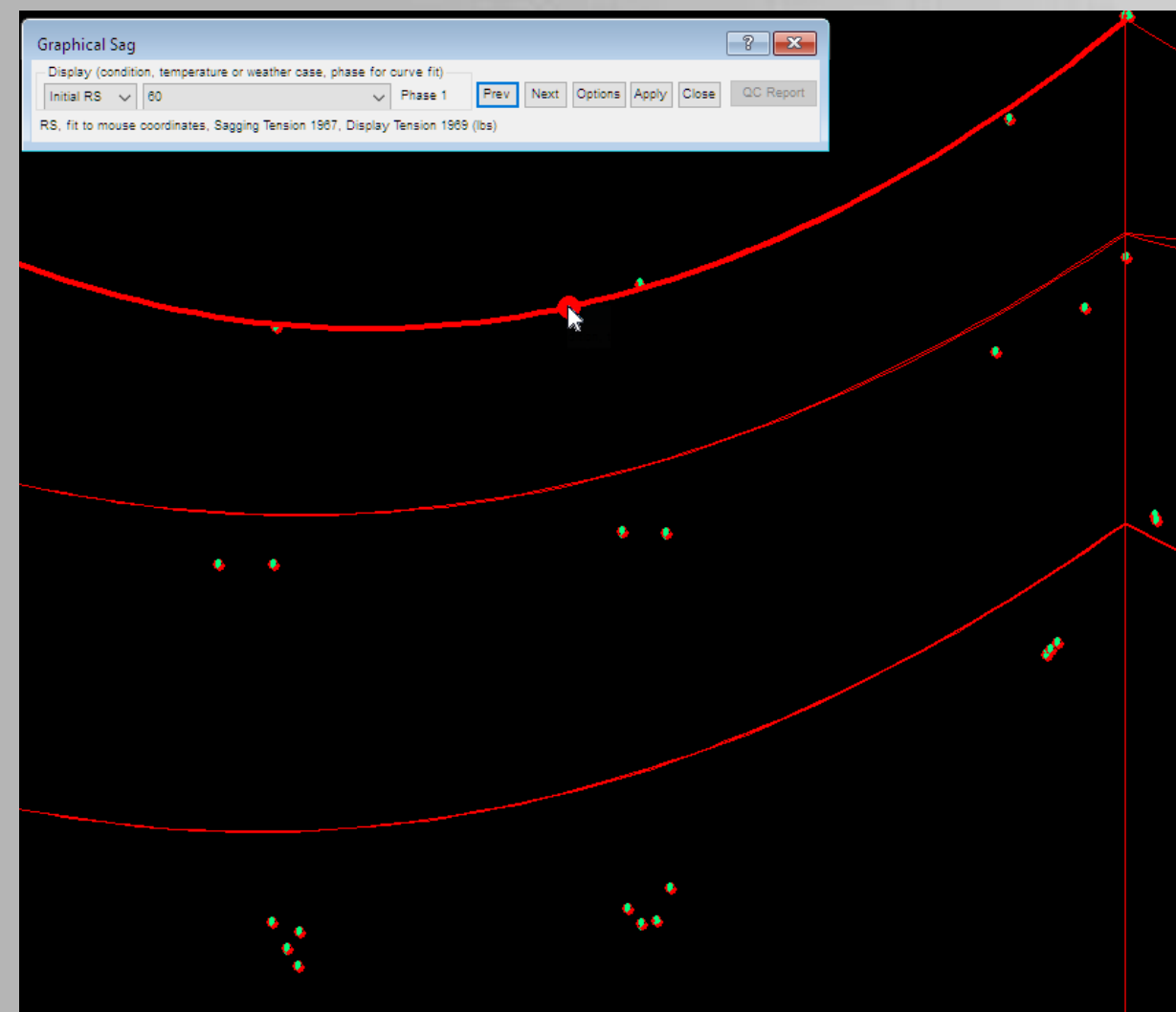


Model Finalization

Sag Wires to IKE Survey

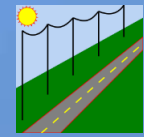
True Up Structures

Apply Loads



Staking Table

	Automatic Structure Group Membership	Manual Structure Group Membership	
1	'All', 'Has DE'	'GO95LT_A_REP'	21712
2	'All', 'Has DE'	'GO95LT_A_REP'	24761
3	'All', 'Has DE'	'GO95LT_A_REP'	24761
4	'All', 'No DE'	'GO95LT_A_REP'	21708
5	'All', 'No DE'	'GO95LT_A_REP'	2096
6	'All', 'Has DE'	'GO95LT_A_REP'	24761
7	'All', 'Has DE'	'GO95LT_A_REP'	21712



Analysis & Reporting

New 'Pole Overview' Report – Coming in PLS 16!

Structure Check: [X]

Prev Next Edit Modify Close **NG** Strength 159.9% Swing 0.0% Min.Vert.Load OK Deflect 160.2%

Available Reports

Standard Summary Analysis Geometry Pole Overview **Configure** **Report**

Pole Overview Report Configuration

Location: Structure comment #1 (Unnamed)

Comments: Structure comment #2 (Unnamed)

Picture: Structure comment #3 (Unnamed)

Select reports to be included in overview.

- Framing Properties
- Pole Usage
- Insulator Usage
- Davit Usage
- Crossarm Usage
- Brace Usage
- Guy Usage
- Cable Usage
- Maximum Usage by Load Case
- Foundation Design
- Pole Deflection
- Buckling Check
- Summary Cable Loading
- Detailed Cable Loading
- Pole Material Properties
- Davit Properties
- Crossarm Properties
- Brace Properties
- Guy Properties
- Cable Properties
- Insulator Properties
- Weather Cases

Select All Select None

OK Cancel

Z476145.dwg PLS-CADD Version 16.01 Updated to Power Line Reporting Generated on 06/21/24 0:11:2019

POWER LINE SYSTEMS

Line: IKE Survey 70 °F Pole Number: Type:

Notes: Location: Comments: Latitude (DMS) Longitude (DMS) Ground Elevation (ft)

Analysis Results Maximum Usage

Type	Usage	Label	Load Case
Steel Pole	99.00	Steel Pole "A1"	UpHLS NA+
Insulator	4.93	Strain "B11L1"	UpHLS NA+

Steel Pole Properties and Embedment

Pole Label	Property Label	Stock Number	Base Plate	Shear	Tubes	Length (ft)	Embed. (ft)	Modulus (ksi)	OL Diam. (in)	OL Circ. (in)
A1	SW-H3-85-SALV-DULL	000790-S	No	12P	2 tubes	90.0	14.7	29.8	64.7	
A2	SW-H3-40-WEATH	000900-S	No	12P	1 tube	40.0	7.2	15.2	47.0	

Summary of Steel Pole Usages

Steel Pole Label	Maximum Usage %	Load Case	Weight (lbs)
A1	99.00	UpHLS NA+	2052.4
A2	27.54	UpHLS NA+	1076.0

Summary of Insulator Usages

Insulator Label	Insulator Type	Maximum Usage %	Load Case	Weight (lbs)
B1A1L1	Strain	1.11	UpHLS NA+	10.0
B1A1L2	Strain	1.38	UpHLS NA+	10.0
B1A1L3	Strain	1.37	UpHLS NA+	10.0
B1A1L4	Strain	1.48	UpHLS NA+	10.0
B1L1	Strain	4.93	UpHLS NA+	40.0
B1L2	Strain	4.16	UpHLS NA+	40.0
B1L3	Strain	4.71	UpHLS NA+	40.0

Summary of Guy Usages

Guy Label	Maximum Usage %	Load Case	Weight (lbs)	Unstressed Length (ft)
P1A1_01	99.90	UpHLS NA+	7.1	20.89
P2A1_01	31.21	UpHLS NA+	9.9	32.75
P2A1_02	21.89	UpHLS NA+	9.0	31.39
P2A1_03	32.94	UpHLS NA+	9.2	30.88

Summary of Cable Usages

Cable Label	Maximum Usage %	Load Case	Weight (lbs)	Unstressed Length (ft)
P1C1	10.45	UpHLS NA+	27.5	100.70
P1C2	14.83	UpHLS NA+	27.0	98.95
P1C3	9.14	UpHLS NA+	25.1	95.71

Maximum Usages by Load Case

Load Case	Maximum Usage %	Element Label	Element Type
90 deg P.S. NA+	79.90	A1	Steel Pole
90 deg P.S. NA+	3.98	B11L1	Strain
UpHLS NA+	99.00	A1	Steel Pole
UpHLS NA+	4.93	B11L1	Strain

Custom XML Processing

- PLS-CADD QC Automation
- Customized Reports
- Database Integrations

Pole Report Generator - 2019.2.1

Structure Number	Include In Reports	Clearances OK?	Date Field Data Collected	Date Intrusive Records	Structure Category	Circuit	Groundline Circumference	Notes
	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	7/7/2007		Dead End	IKE		
	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	7/7/2007		Dead End	IKE		
	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	7/7/2007		Tangent	IKE	44.4	
	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	7/7/2007		Terminal Dead End	IKE	54.2	

Errors

Description	Action Taken / Resolution	Object
Missing Guy Anchor	For a more accurate model, associate an Anchor to this Guy in PLS-POLE / Tower under Geometry > CAN. Ensure the Attach Label corresponds to the ground point of the guy. Guy can be defined in any of the Connect Member Type and Label Fields (1,2,3,or 4)	dg1

Warnings

Description	Action Taken / Resolution
FAA Notice Criteria Exceeded	This structure Exceeds 1 or More FAA Notice Criteria. Please file this structure with the FAA.

Pole Specific Definition - Select and Rename Stub / Push Brace Poles

Reported Structure Number	Date Intrusive Records	Date Data Collected	Groundline Circumference [in.]	Pole Property Label
	7/7/2007		54.2	DF-130

```
<?xml version="1.0" encoding="utf-8" standalone="yes"?>  
<!-- Created by PLS-CADD version 34.20 on 11/26/2019 10:37:37 AM on desktop-HELP31 -->  
...  
<!-- application -->  
<!-- structure -->  
<!-- wire -->  
<!-- load -->  
...  
<!-- section -->  
<!-- report -->  
...  
</!-->
```

PLS-CADD

File Edit View Terrain Criteria Structures Sections Lines Drafting Win

- New
- Open
- Close
- Save Ctrl+S
- Save As...
- Import
- Export
 - DXF...
 - XML...**
 - XML Settings...
 - KMZ (Google Earth) ...
 - PFL...
- Page Setup (Reports)...
- Print Setup (Graphics)...
- Print... Ctrl+P
- Print Preview

Span guys in cadd-stub Training Model
24% G095LT GRD-B- AT REPLACEMENT Guy

Choose Line C442
Choose Line Type Existing

Rev	Date	User	Summary	Description
1	1/1/001	Alikhvari	Initial Upload	

6/11/2019

Takeaways

- **Demo**
 - <https://youtu.be/Wyst3QZxzxs>
- The **Import Staking Table** Is the Most Complete way to Integrate Third Party Data into PLS-CADD
 - Multiple Alignments
 - XY Spotting: Set Line Angle = 500
 - Correct Structure Orientation
 - Automated Stringing
 - Structure Comments
- **Pole Overview Report** in PLS Version 16
- **IKE+ Accuracy**
 - **2-4 cm** Accurate Structure Base Spotting
 - IKE+ can be used to collect generic survey points in budget or time constrained PLS-CADD Modeling applications.

Power Line Systems

IT'S ALL ABOUT YOUR POWER LINES

Advanced Sag & Tension

IEC

FAC 008/009

NESC

Materials Management

LiDAR Modeling

Structural Analysis

PLS-CADD

CSA

Pole Analysis

CENELEC

Distribution

Transmission

NERC Ratings

Line Optimization

Project Estimating

PowerLineReporting.com/ike

FAC 003

ASCE

Joint Use

PLS-POLE

GO95

Vegetation Management

1000+ Users in 100+ Countries

Storm Hardening



Power Line Reporting
Ali Khavari
ali@PowerLineReporting.com

IEEE

Line Ratings

TOWER

Drafting



ikeGPS
Brian Bauer
Brian.Bauer@ikegps.com