2019 PLS-CADD Advanced Training and User Group

Jumpers

by

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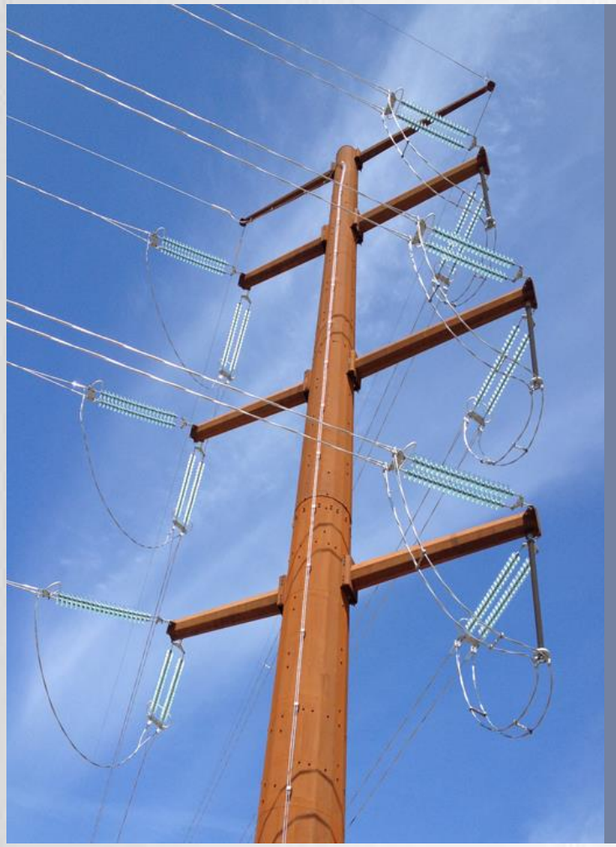
Power Line Systems

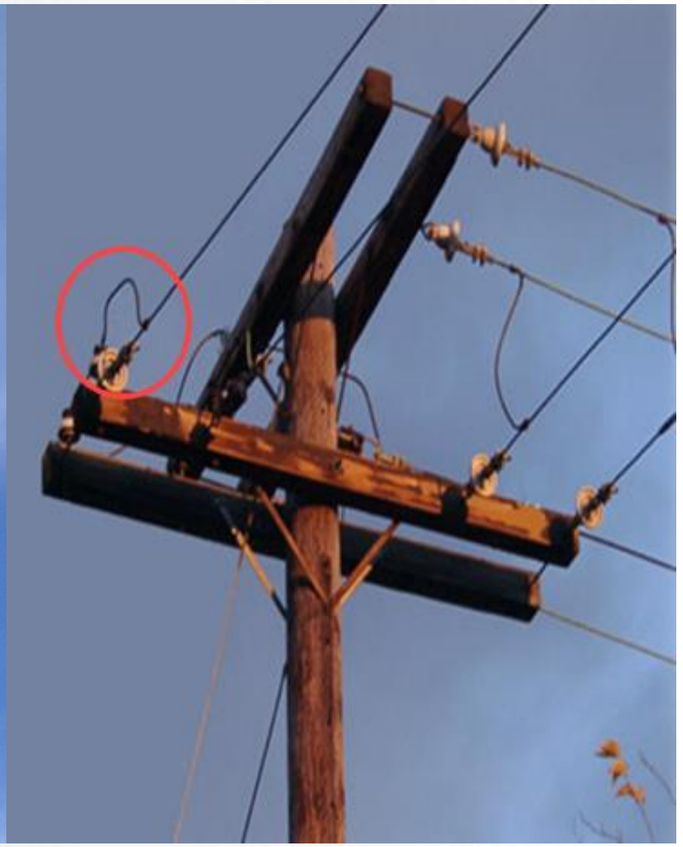
Introduction

- Overview of Jumpers
- Rules for modeling jumpers
- Loads from Jumpers
- Reasons to model Jumpers in PLS-CADD
- Examples

Overview of Jumpers

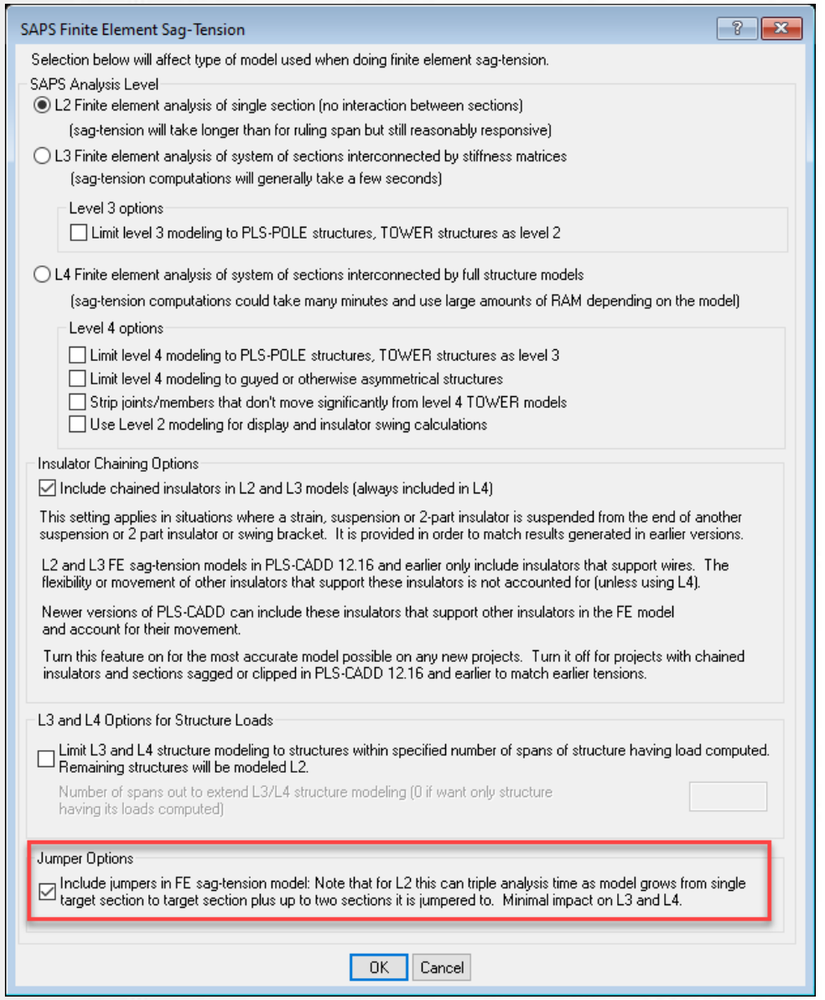
- First added in version 14.50 (beta)
- Added in version 15.00 (production) of PLS-CADD
  - Date -8/31/2017
- Flexible or Rigid Jumpers can be modeled
  - Flexible jumpers are catenaries with no stiffness
  - Rigid jumpers are straight line segments with infinite stiffness





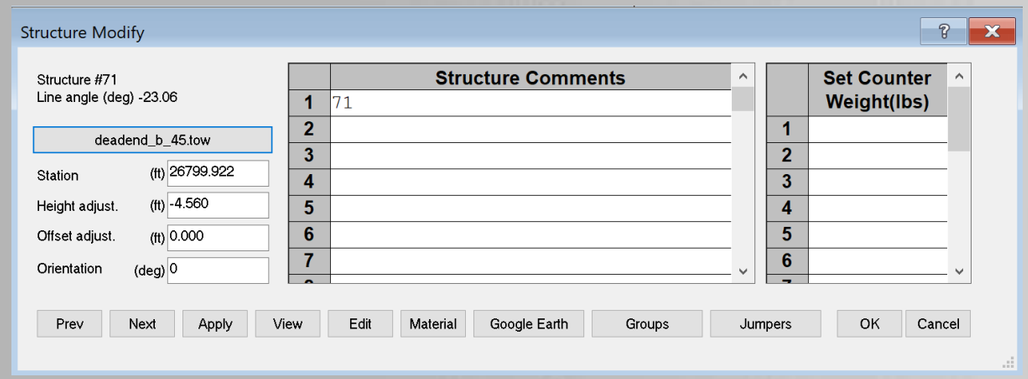
Rules for modeling jumpers

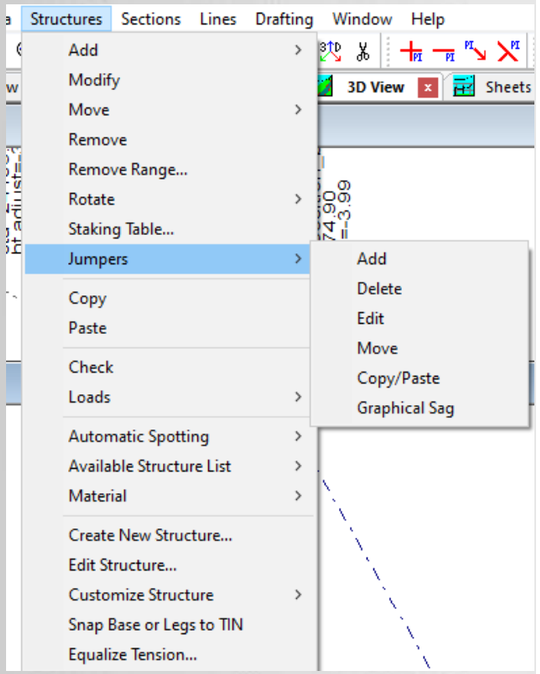
- To enable jumpers in PLS-CADD go to **Criteria/ SAPS Finite Element Sag Tension** and check the Jumper Options box at the bottom of the dialog.
- Cable properties of the back span are used for the jumper
- A jumper must begin and end on a dead-end section
- Suspension, 2-part and post insulators can be used as idler or jumper support insulators but strain or clamp insulators cannot be used for idlers.
- Only one jumper can connect to any given set:phase

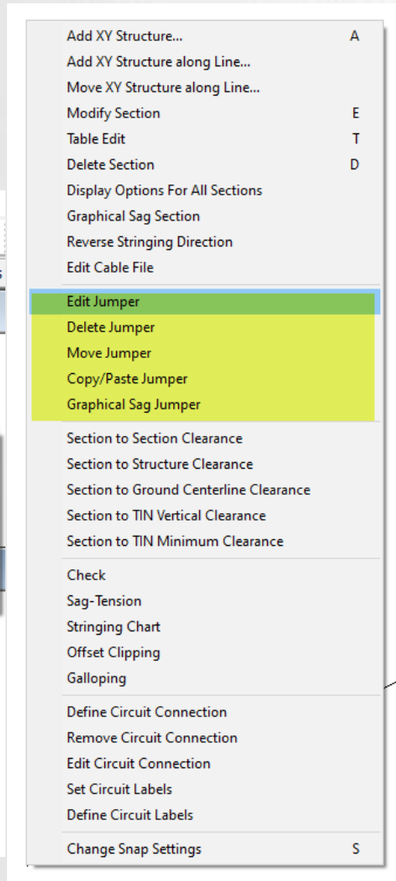


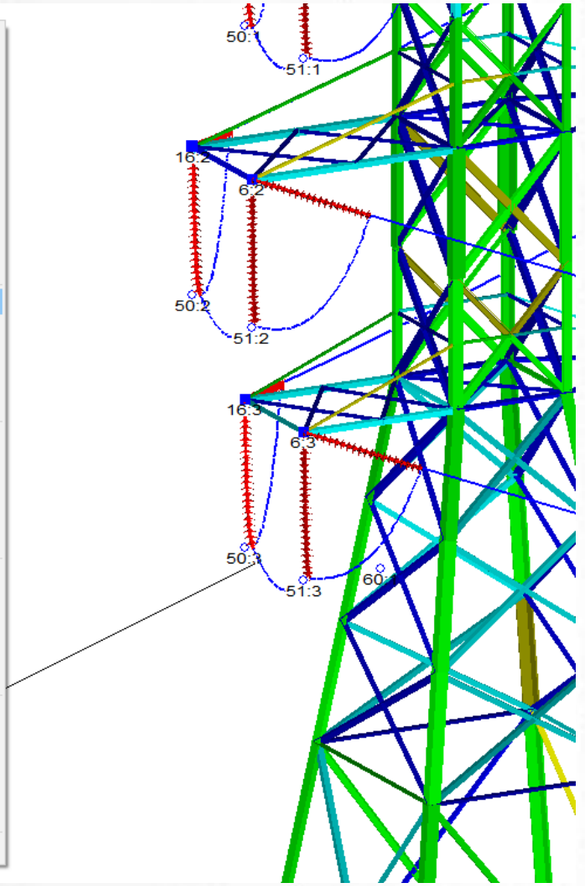
Adding & Editing Jumpers

- **Structure/Modify** and Jumpers button
- **Suctures/Jumpers** and **content menu** have commands that include Add, Delete, Move, Copy, Paste, Edit and Graphical Sag of jumpers







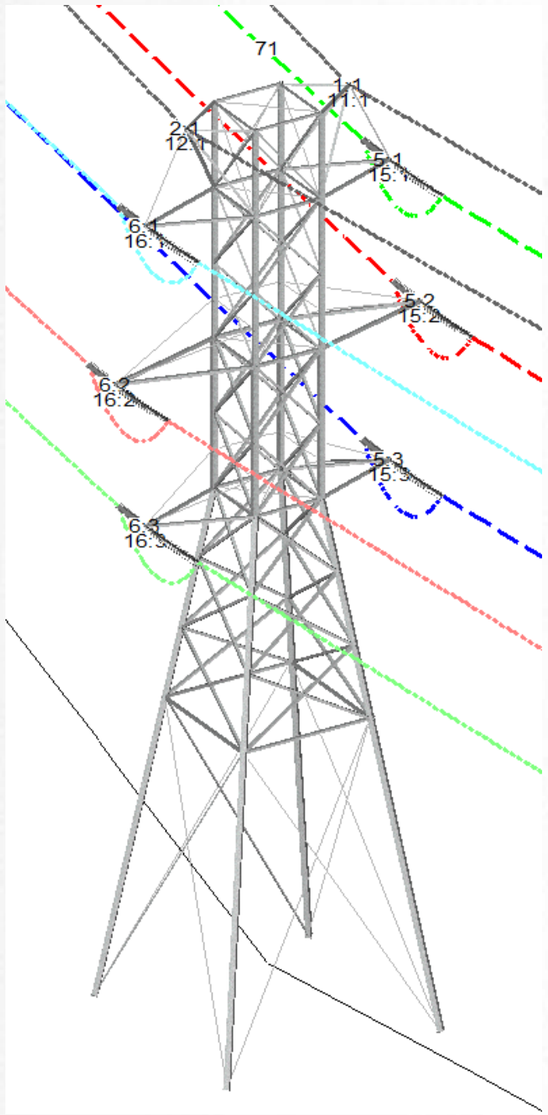


Modeling flexible jumpers

- Flexible Jumpers
  - Defined with a sag or length
  - wire attachment point used for suspension jumpers is the undeflected position
  - wire attachment point used strain insulators is the deflected position at the wire stringing condition
  - Idlers can be modeled from suspension, 2-part or post insulators
  - Up to 7 intermediate points

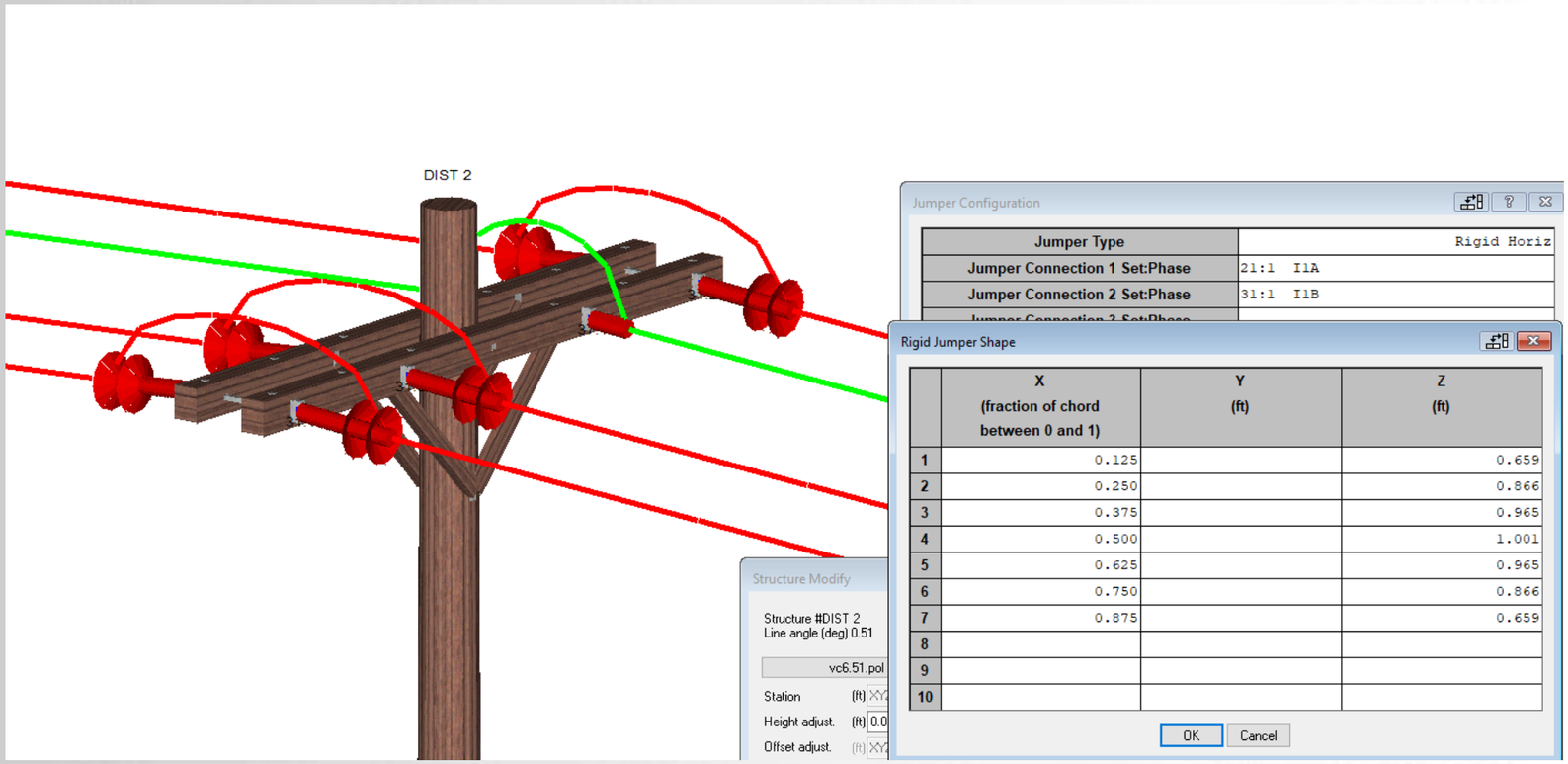
Jumper Configuration

	Jumper Type	Jumper Connection 1 Set:Phase	Jumper Connection 2 Set:Phase	Jumper Con. 3 Sag (+) or Len (-) (ft)	Jumper Con. 4 Sag (+) or Len (-) (ft)	Jumper Con. 5 Sag (+) or Len (-) (ft)	Jumper Con. 6 Sag (+) or Len (-) (ft)	Jumper Con. 7 Sag (+) or Len (-) (ft)	Jumper Con. 1 Sag (+) or Len (-) (ft)	Jumper Con. 2 Sag (+) or Len (-) (ft)	Jumper Con. 3 Sag (+) or Len (-) (ft)	Jumper Con. 4 Sag (+) or Len (-) (ft)	Jumper Con. 5 Sag (+) or Len (-) (ft)	Jumper Con. 6 Sag (+) or Len (-) (ft)
1	Flexible	5:1 Left Trans Ahead S1-A	15:1 Left Trans Back S1-B						4.000					
2	Flexible	5:2 Left Trans Ahead S2-A	15:2 Left Trans Back S2-B						4.000					
3	Flexible	5:3 Left Trans Ahead S3-A	15:3 Left Trans Back S3-B						4.000					
4	Flexible	6:1 Right Trans Ahead S4-A	16:1 Right Trans Back S4-B						4.000					
5	Flexible	6:2 Right Trans Ahead S5-A	16:2 Right Trans Back S5-B						4.000					
6	Flexible	6:3 Right Trans Ahead S6-A	16:3 Right Trans Back S6-B						4.000					
7	Flexible	1:1 Left SW Ahead C1-A	11:1 Left SW Back C1-B						0.500					
8	Flexible	2:1 Right SW Ahead C2-A	12:1 Right SW Back C2-B						0.500					



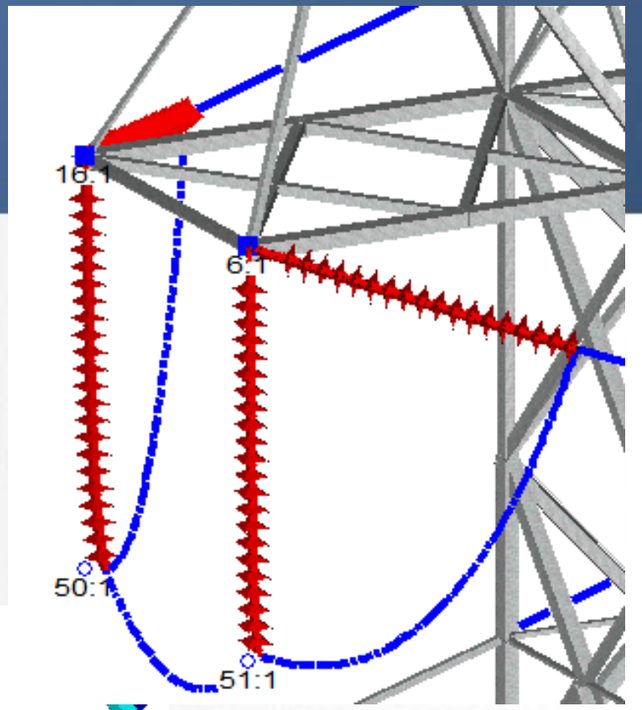
Modeling rigid jumpers

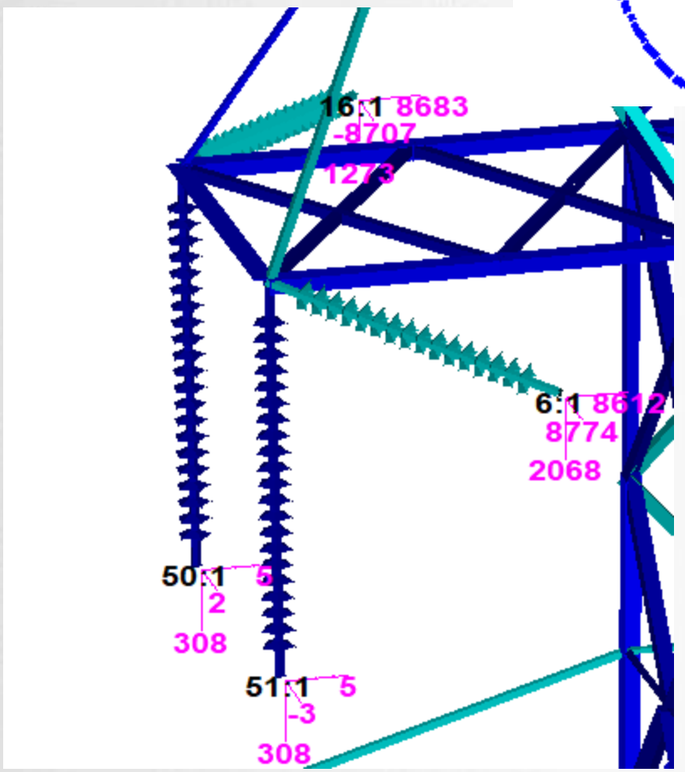
- Rigid Jumpers
  - Vertical or Horizontal options
  - Defined with up to 7 intermediate points
  - Insulators are defined by the shape in Rigid Jumper Shape table
    - X is the fraction of the chord between the attachments
    - Y & Z defines the jumper in the horizontal and vertical plane between the attachments.
  - Post Insulators recommended for idlers
  - Suspension and 2-part insulators not recommended for idlers because not part of FE analysis



Loads from Jumpers

- Flexible Jumpers
  - Flexible jumpers are included in the FE Sag-Tension Model
- Rigid Jumpers
  - Not part of the FE Sag-Tension Analysis
  - Any loads from the rigid jumpers are added post analysis of the wire system



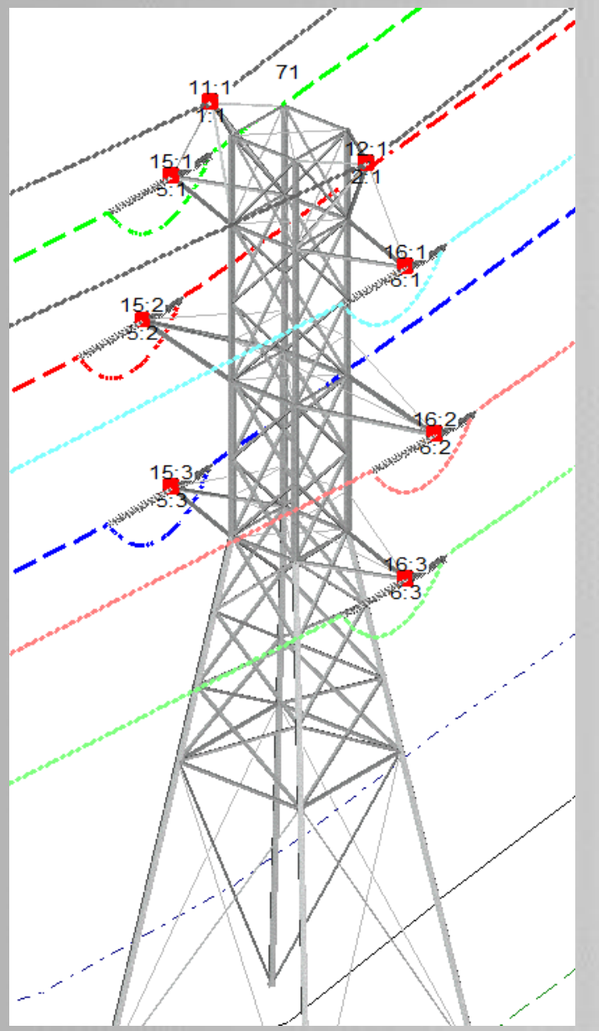


Why model Jumpers in PLS-CADD

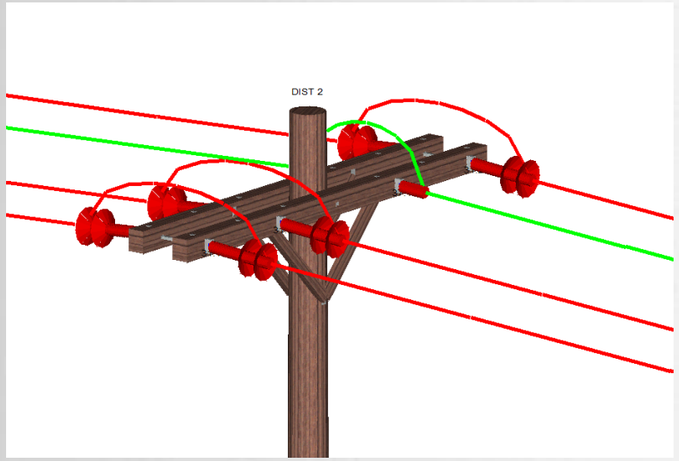
- Material accountability
- Clearances To Ground or TIN
- Jumper to Structure Clearances
- Jumper to Wire Clearances
- Structure Loads from Jumpers
- Helps Define Circuits and Phases for use in
  - Sections/Electric/Simple Line Constants Calculator...
  - Sections/Electric/Full Line Constants Calculator...
  - Lines/Reports/Survey Point Clearances...
  - Other reports

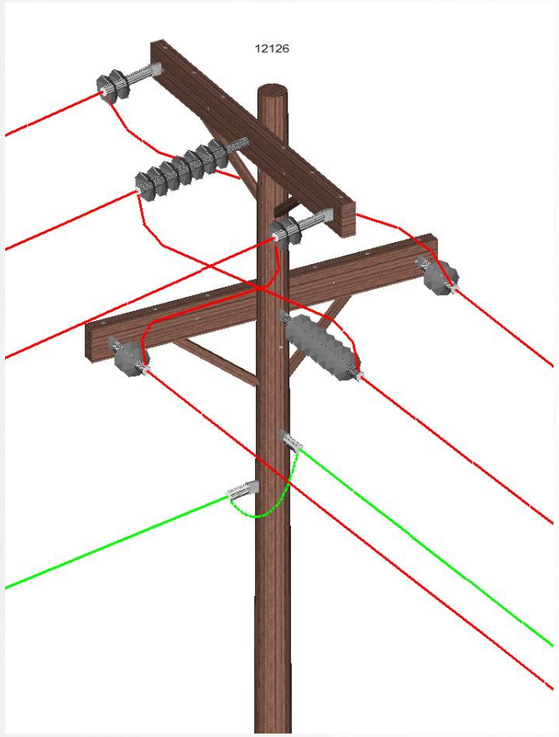
Examples-Dead End Structures

#71 from WPL_example



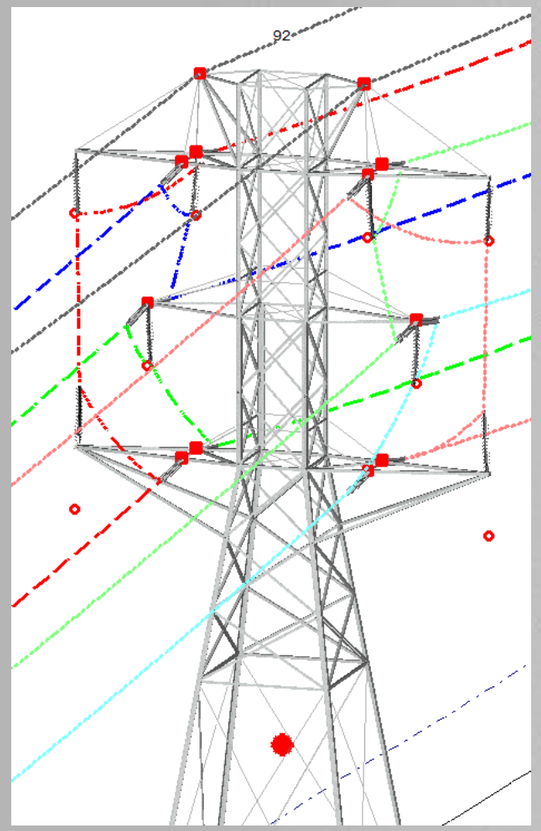
Distribution Poles



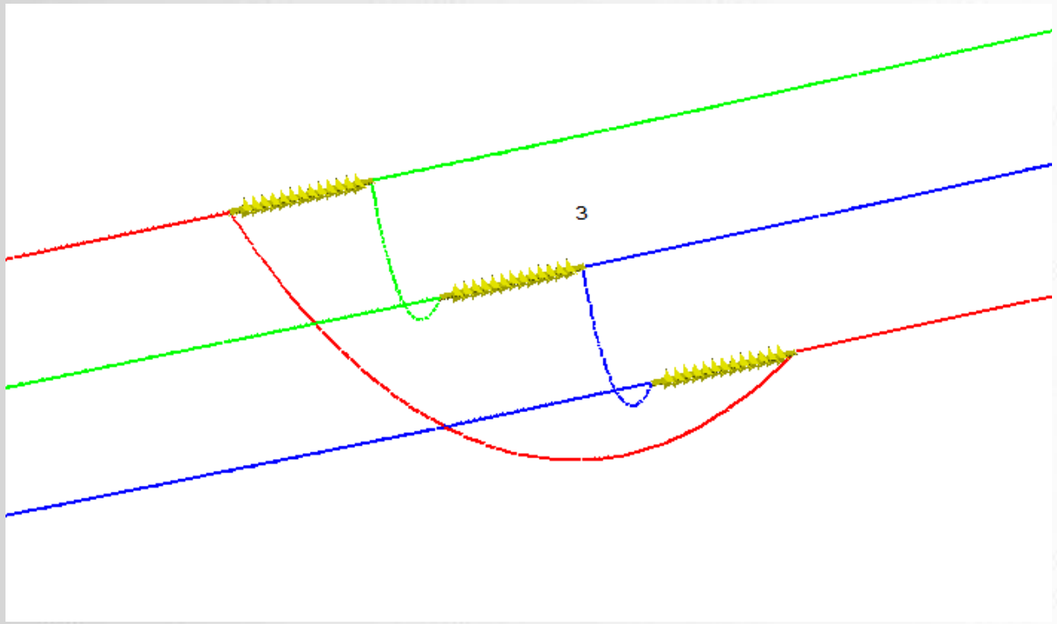


Examples-Transpositions

#92 from WPL_example



Mid-span



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