O-Calc® Pro LD

Version 6.0

Quick Start Guide

Osmose O-Calc® Pro 5.3 User's Guide
June 2018
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Getting Started – What is O-Calc Pro Line Design?

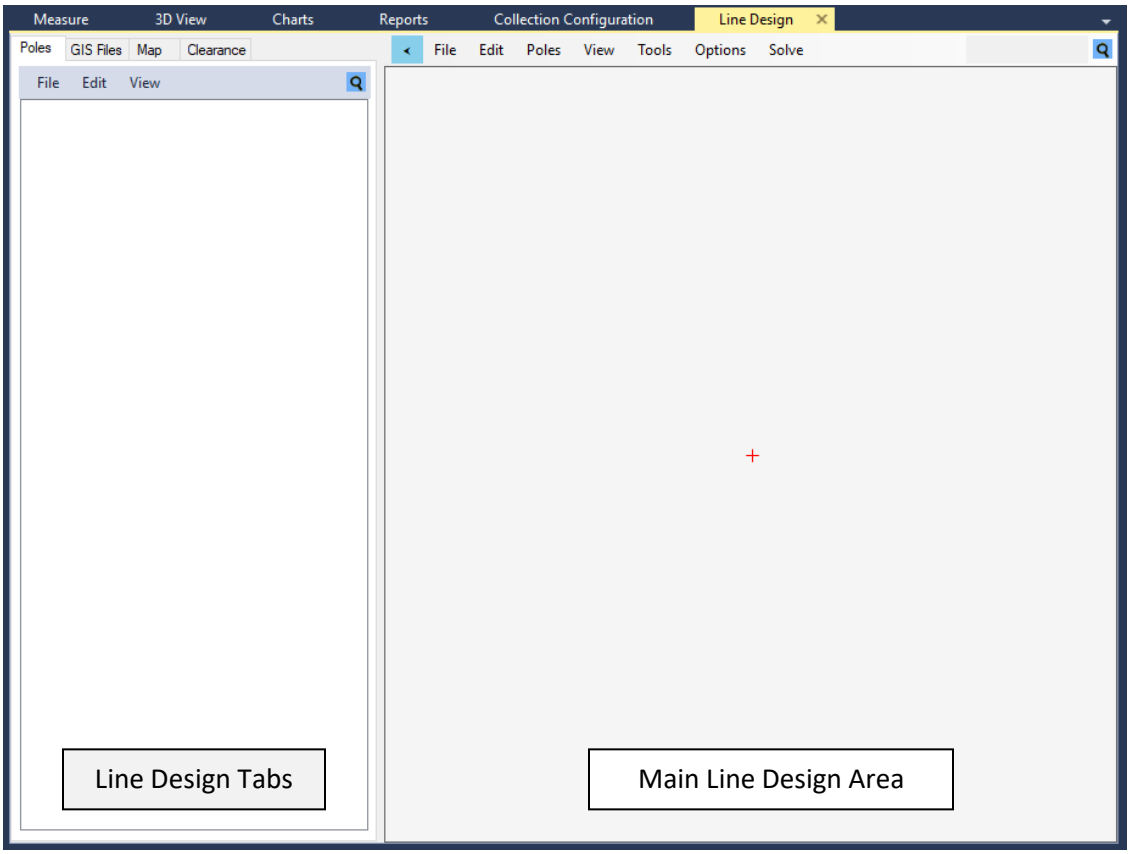
The latest version of O-Calc Pro Pole Loading Software dramatically changes the way poles can be analyzed. In previous versions of this program, only one pole could be analyzed at a time. This single pole could be modeled with all appropriate attachments and loadcase parameters, to return a value for the pole's maximum capacity utilization, to determine whether it was compliant with NESC or GO95 Safety Standards.

In O-Calc Pro Line Design, an entire line of poles can be modeled and analyzed together, considering the interactions between the poles and how load is distributed across an entire circuit. This document walks you through the various ways to create a line design of your own, as well as what features are new or different from previous versions.

For a more comprehensive review of the new features and options, please see the O-Calc Pro LD User Guide.

Understanding Line Design Interface

A new tab can be found next to the existing 3D View, Measure, Charts, and Reports tabs in the O-Calc® Pro interface.



This new tab has two main sections; one is identified as the main LD area, while the other contains a set of tabs for Poles, GIS Files, Maps, and Clearance Rules.

Main Line Design Area

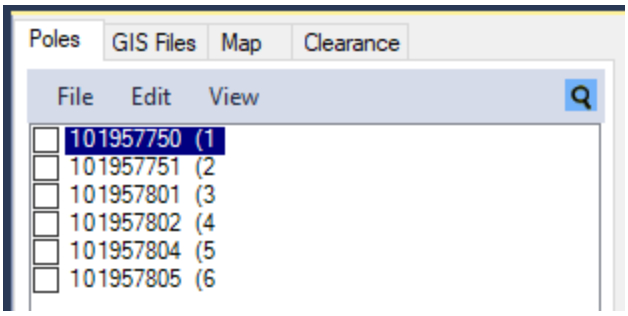
This portion of the interface will display the poles in a line design, as well as other resources that a user would need to accurately create a new line design.

Line Design Tabs

The tabs in this portion of the interface allow a user to manage the poles in a line design, as well as additional GIS files, maps, and clearance rules.

Poles Tab

The poles tab will be blank until poles are added to a new line design, or an existing line design has been opened. Once poles are added, a numbered list of the poles will be displayed.



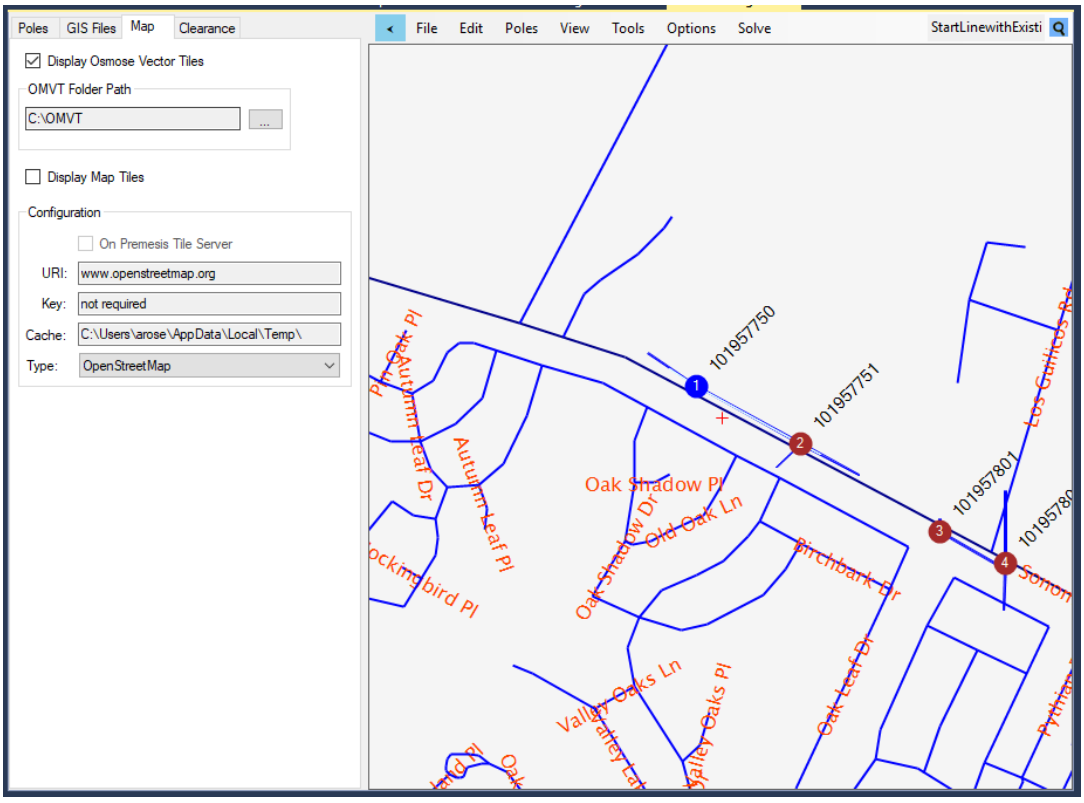
The numbering of each pole in the line design dictates the ordering for other features, like the profile view of the line design. For this reason, the number order of the poles is important to maintain.

GIS Files Tab

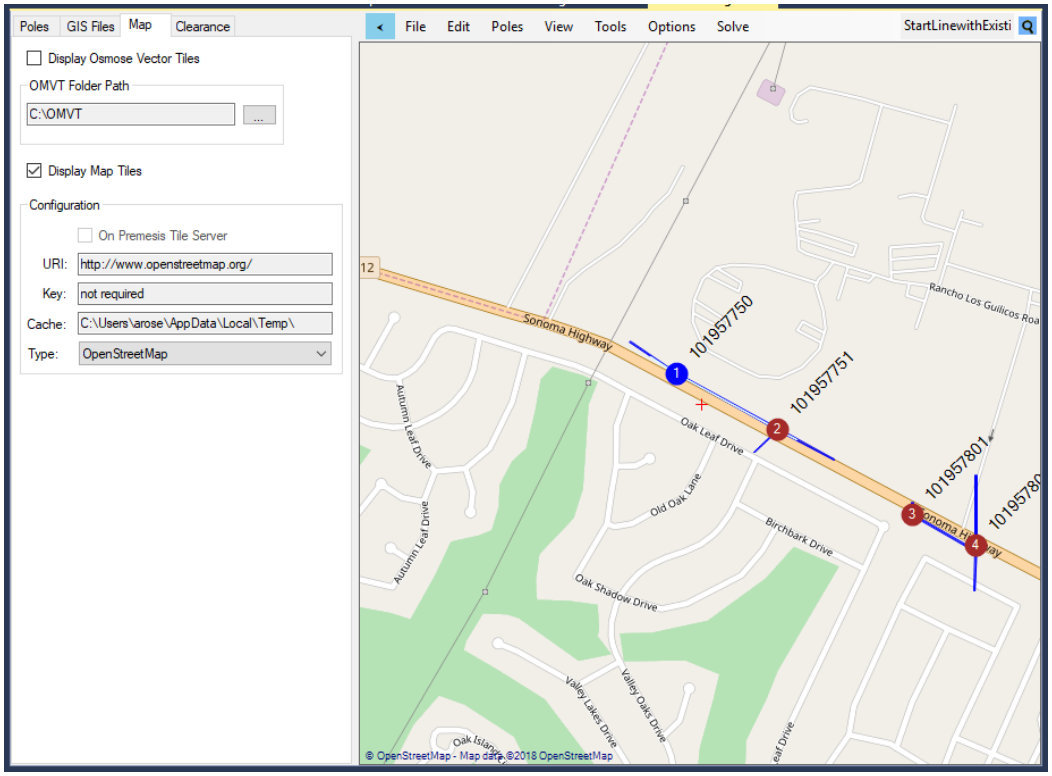
This area allows a user to add to or remove GIS Files from the main line design area. Shapefiles and GeoJSON files can both be added to a line design.

Map Tab

This area allows a user to display a map in the main line design area to assist in the modeling of a line design. Osmose Vector Tiles can be displayed, which show simplified roads and labels.



Additionally, a background map from OpenStreet, Google Maps, or Bing can be rendered.



For some maps, a key may be required that must be obtained by the user from the host's website. Osmose does not provide the keys to the user.

Clearance Tab

This tab allows a user to create and manage clearance rules to be applied to the line design. Like the previous clearance analysis tool, rules can be created to manage violations that may occur between spans and various objects like surfaces, foliage and structures. The main difference is that in this version of O-Calc Pro, the clearance rules can be verified in 3D rather than in profile, one vector at a time.

Updates to Other Areas & Features

In addition to the new Line Design Tab, some other areas of the program have been updated to work in sync with the line design features.

3D View Tab

Most of the changes to other interface areas can be seen in the 3D View tab. The first major change is that all poles in a line design can be seen at the same time in the 3D View tab.

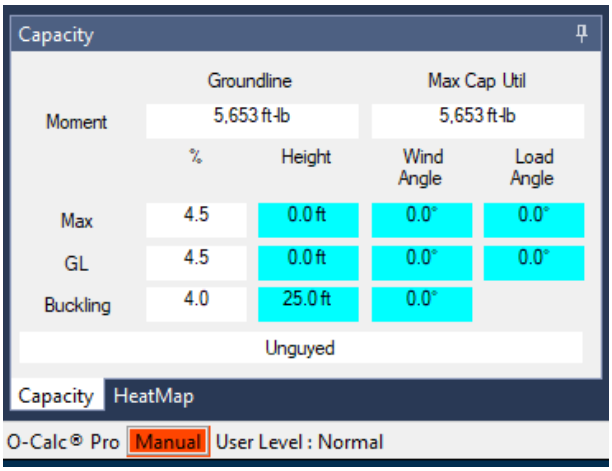
While there is still a compass shown in the 3D View tab, this compass is only shown under the **active pole** of the line design. Only one pole may be active at a time. The components of the active pole are also listed in the inventory. Switching the active pole can be done in the 3D view tab by left-clicking on the pole you wish to activate.

Additionally, new buttons have been added to the bottom right-hand corner of the 3D View tab. These buttons control the spacing between the poles in the 3D rendering of the line design. These values do

not represent actual span lengths between poles, but rather the scaling of the distance between poles that are drawn. This will make it easier to view poles that may be greater distances apart.

Capacity Calculation

While the capacity meter has not changed, the functionality of this area of the interface has been slightly modified. Typically, the percent maximum capacity utilization is automatically calculated for the user each time a change to the model is made. This option can be turned off under the Options menu. However, in line design, automatic calculation is turned off. This is indicated in the bottom ribbon of the program, right below the capacity utilization window.



Clicking on the “Manual” button will run the calculation for the line, provided each pole in the line has been assigned a loadcase.

Default Loadcase

In line design, the loadcase is set based on the loadcase from the pole used to start a line. For instance, when creating a line design using the wizard, a user will start out with one pole. The loadcase applied to this pole will automatically be applied to each subsequent pole created in the wizard.

Additionally, creating a line design using a set of existing .pplx files will maintain the loadcase that had been set on those poles. It is also possible to have poles in a line with different loadcases. In this case, when a new pole is added, it adopts the loadcase of the pole identified as pole number 1 in the list of poles in the line design.

Auto-Guy

The Auto-Guy feature allows a user to take a default guying assembly, and place the entire assembly on the pole. The Guy wire’s attachment height is set to the point on the pole where the user has right-clicked, while the anchor is placed in a position that corrects the pole the most. However, in Line Design, it is not possible to use Auto-Guy on a pole. This is because as the line design is being built, no calculation of capacity is being run automatically. Without that calculation, the program is not able to determine the best position for the guying assembly, so Auto-Guy will not work as expected.

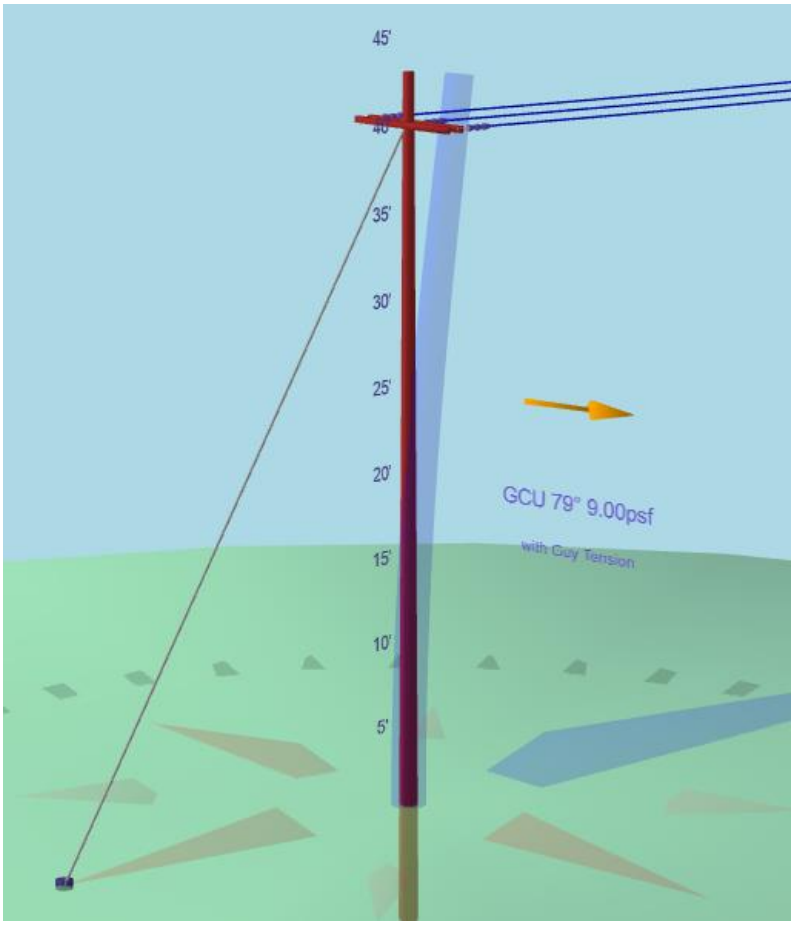
However, manual guying of a pole may still be performed prior to the line design capacity calculations being run. If a user runs the calculation, the auto-guy feature will be available.

Creating Line Designs

This section outlines the ways a new line design can be started. Primarily, a user will create a line design using the line design wizard, create one from an existing .pplx file, or create one from a set of .pplx files.

Using the Line Design Wizard

The Line Design Wizard is the easiest option for creating a new line design. Typically, this would start with a dead-end structure that is modeled in the traditional way; this structure could be considered the start or the end of the line.

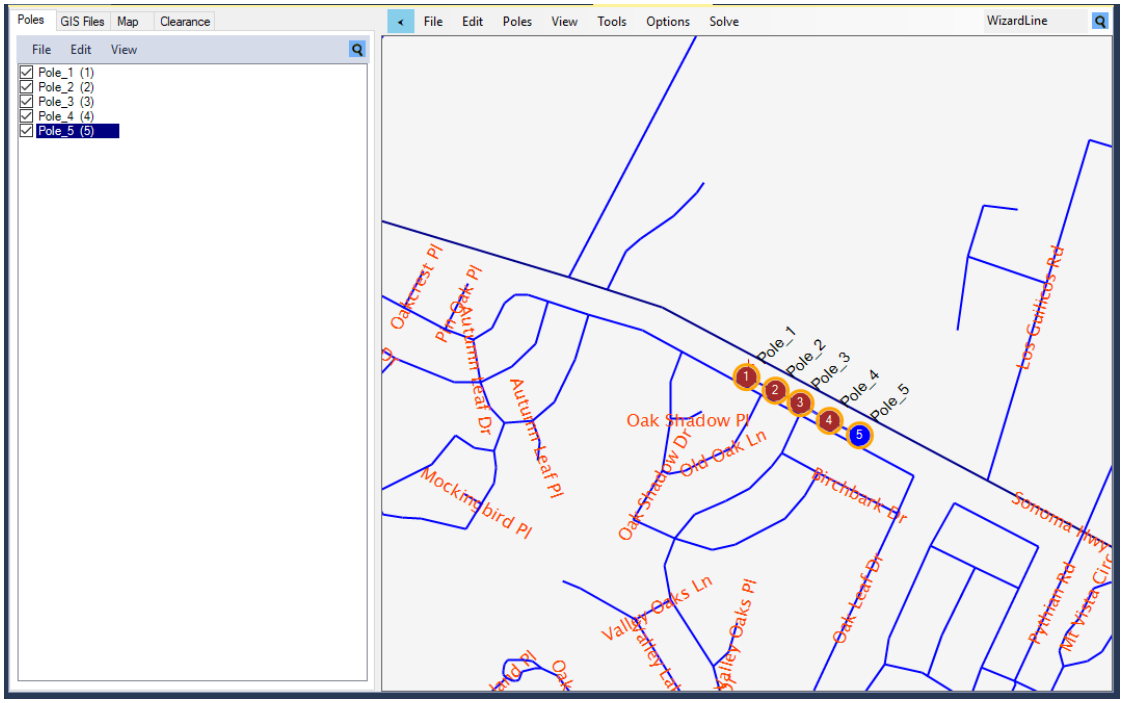


Once the start or end of the line is created and saved as a .pplx file, the following steps can be used to build a line design that has the same components on the subsequent poles as the starting pole.

1. Open or create a deadend pole
2. In the LD Tab's main LD area, select **File > Use New Line Wizard**
3. Ensure vector tiles or maps are displayed, to determine where to position poles
4. Left-click on the map in the main LD area to place the pole at the clicked location
5. Give the first pole a Pole ID, if desired; click 'OK'
6. Verify a red dot is placed for this pole

This will create the beginnings of a line design. The pole is not added to the poles tab until the line design has been finished. Next, to add additional poles to the line design, follow these steps:

1. Left-click on a place for the next pole
2. Update the Pole ID
3. Continue adding as many poles as needed for the line
4. When finished, click the yellow “Extend” option, in the ribbon of the main Line Design area
5. When prompted, name and save the LD
6. Verify each pole is added to the Poles list, each with the correct number



By using the wizard, all of the pole are created and linked together, saving the user time and effort to link up the spans of each pole to their neighbors.

Once all poles have been added and modified, the line design can be saved and analyzed.

Using Existing .pplx Files to Start a Line

An experienced O-Calc® Pro user will have created many .pplx files in the past. These .pplx files may even be part of the same line of poles. Rather than starting from scratch, a user can take existing .pplx files and create a new line design from them.

To begin, open any existing .pplx file. This file will be hown in the 3D View Window, as in previous version.

Next, in the Line Design tab’s main ribbon:

7. Select **File > Start Line with Current Pole(s)**
8. Save the Line Design File (.pplld)
9. Click Ok

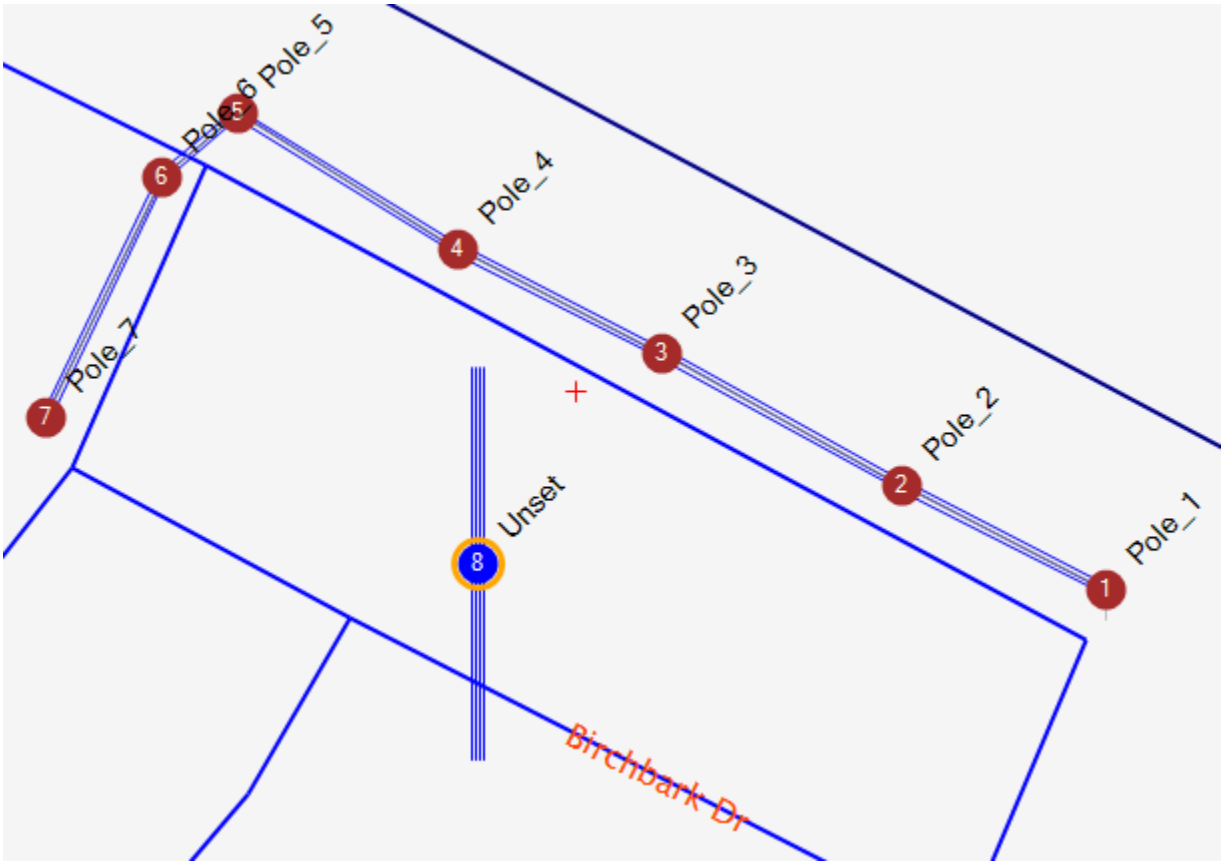
This will add the .pplx file to the list of Poles under the Line Design tab.

Adding Existing .pplx Files to an Existing Line Design

Once the line has been started, additional existing .pplx files can be added to a design.

1. In the Poles list of the Line Design tab, select the **File** drop-down
2. Select **Add PPLX Files to Line Design**
3. In the pop-up window, select one or more poles to add to design
    a. Hold down CTRL Key to select multiple poles
4. Click Ok

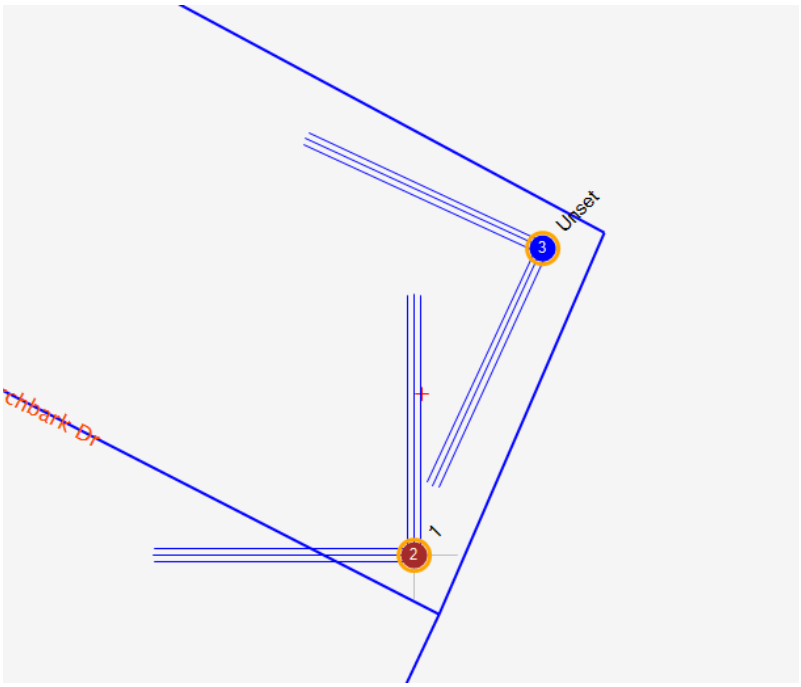
The selected poles should be added to the line design window. The poles in the line design should remain connected, while the original pole will need to be 'hooked up' to one of the other poles in the line.



***Note: If a Pole that is added is not within an appropriate distance of the other poles in the line design, an error message will display warning the user of this.*

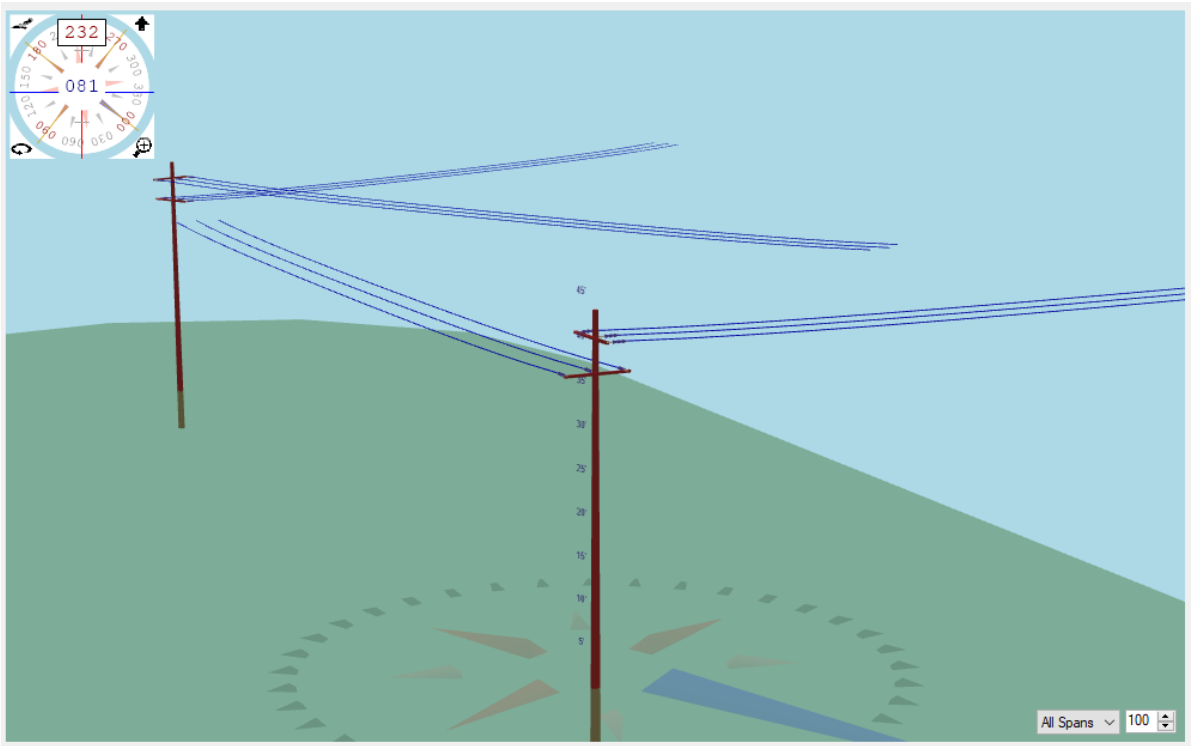
Linking Spans between Poles in a Line Design

When multiple existing .pplx files are used to create a new LD, or are added to a line design, the individual poles are not linked to one another by the spans. This connection between them must be done manually, using the 3D View window. For example, below is a picture of such a scenario:



These two poles would need to be connected in order to analyze them as a single line design; in other words, to account for the interactions between the two poles.

In a line design created with at least two existing .pplx files, go to the 3D View tab. All poles in the design will be shown in 3D View, but the compass will display under the active pole.

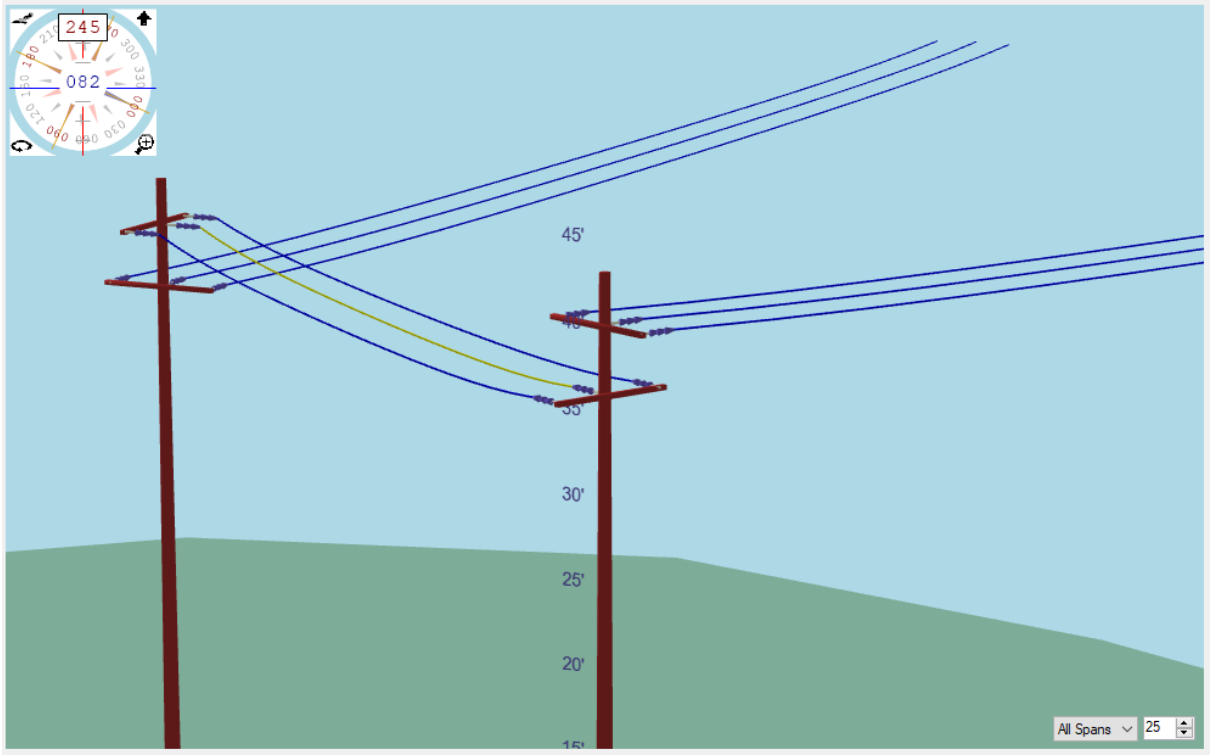


Notice in the previous image that the compass only appears only one of the poles – this is the active one in this design.

***Note: For additional information on navigating the 3D View, see the full O-Calc Pro User Guide.*

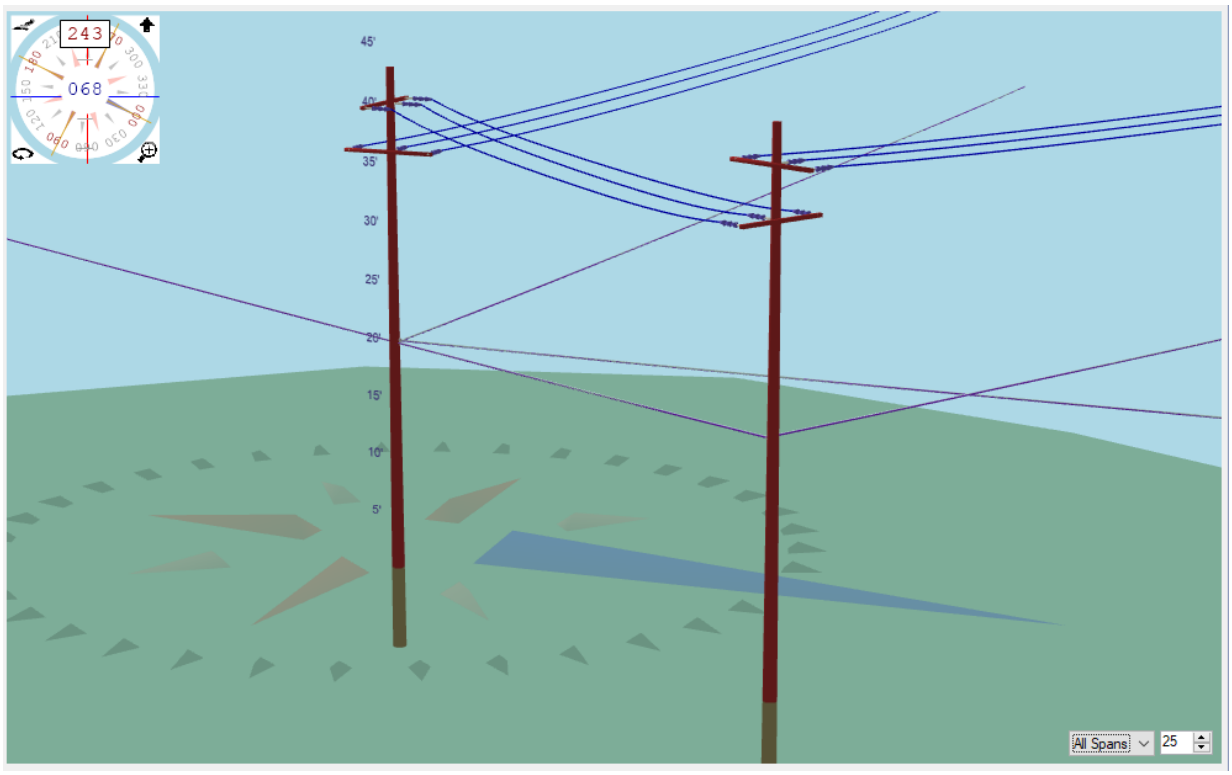
To connect spans from one pole to the spans of another:

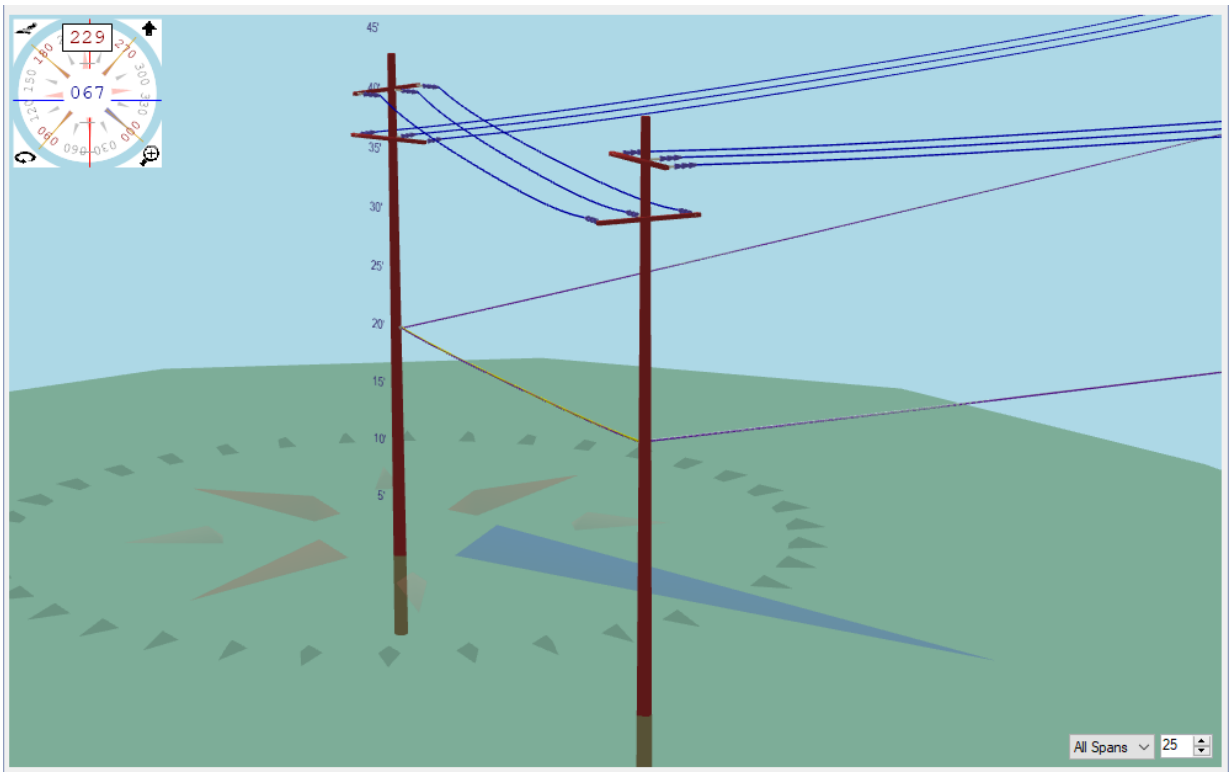
1. Select a span on the active pole in the 3D View tab
2. Left-click and hold on the span
3. Drag the cursor, while maintaining the left-click, to the span to be connected on the next pole in the line
4. When the replace symbol is visible, release the left-click
5. Verify that the spans are now linked



To connect communication spans, or span bundles form one pole to the span bundles of another:

1. Select the messenger wire of the communication bundle on the active pole in the 3D View or Inventory tab
2. Left-click and hold on the messenger
3. Drag the cursor, while maintaining the left-click, to the messenger being connected on the next pole in the line
4. When the replace symbol is visible, release the left-click
5. Verify that the spans are now linked





Switching the Active Pole in 3D View

Note that when connecting existing .pplx files, only the spans on the ***active*** pole may be selected and linked to spans on a neighboring pole. Once the active pole is connected to neighboring poles, proceed to the next pole in the line to continue the connection process.

To switch the active pole:

1. Go to the 3D View tab
2. Left-click on the next pole in the line
3. Wait a moment, then verify that the clicked pole is now active
4. Continue connecting spans in the same manor

Alternatively, selecting a different pole from the list of poles in the line design will also change the active pole.

Un-Linking Spans in Line Design

If for some reason you connect two spans that should not be connected, you are able to Un-link them. To un-link spans, simply right-click on the linked span on the currently active pole. In the right-click menu, select “Un-Link Span”. This will break the connection *for this pole*. Next, go to the pole with the other span that was part of this connection. Right-click on that span, and select “Un-Link Span”. It is imperative that when spans are Un-Linked, both parts of the link are broken, even if it is already performed on one of the spans involved.

If both parts of the Link are not Un-Linked, it will not be possible to Link together new spans with these, or Re-Link them together.

Connecting Spans with Jumper Cables

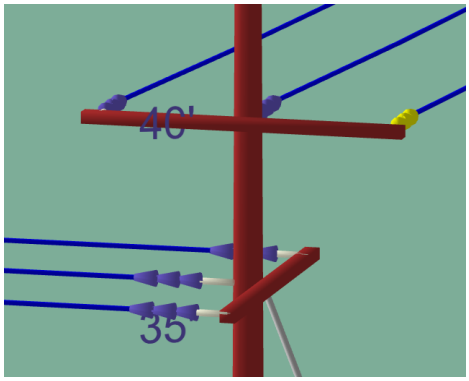
As a new component of O-Calc Pro 6.0, a user can now model jumper cables between spans on a pole. In situations like a double deadend, these jumper cables allow for the connectivity of the model to continue, for features like stringing a new span or replacing a span type across an entire line.

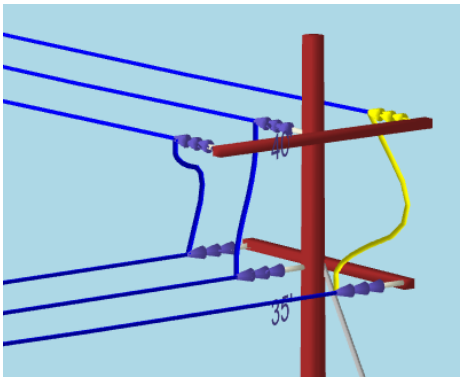
To add a jumper between insulators on a pole, follow these steps:

1. Select the first insulator that the jumper will start from
2. Left-click and hold on that insulator, drag-and-drop while maintaining the left-click, to the insulator the jumper will terminate at
3. Upon releasing the left-click, a menu will appear
4. Select the “Add Jumper” Option
5. Verify that a Jumper Cable is drawn between the two insulators involved.

Jumper cables can also be drawn between an insulator and an object, by using what is called a Terminal. The Terminal is a point where the Jumper cables will end, typically placed as a point near equipment, such as a transformer.

Note that jumper cables can go from one insulator, to another, but not loop around back to the original insulator.





Using Created Pole to Generate Next Pole

In Line Design, an entire pole can essentially be copied, and inserted as the next pole in a line. This ensures connectivity to the previous pole, as well as ensures that all the spans and equipment from the first pole continue onto the next.

In an existing line design, the following steps can be used to copy a pole and essentially repeat it as the next pole in a line.

1. Select the pole to be copied
2. In the main LD area, go to **Tools**
3. Select the **Extend Line from Current Pole** option
4. Assign a Pole ID
5. Click on a point to set the location of the new pole
6. Click 'OK' in the Geolocation Window
7. Verify that a new pole was added
8. Link spans when appropriate

Occasionally, when using this method to create a new pole, spans can become entangled. For more information on correcting a line design, see the complete O-Calc Pro Line Design User Guide.

Splitting Spans to Insert a Pole

Once an analysis is performed, a user may find that the poles in the line fail because of span lengths that are too long, applying too much tension to one or more poles in the line design. To remedy this, an option exists to split span lengths, and insert a pole at the midpoint.

Begin with two connected poles, with spans of any distance. Let's say 200 feet, as this is the default span length in O-Cal Pro.

1. Go to the LD Tab, under the Poles window
2. Select (check) poles whose spans are to be split
3. Select the **Edit** option in the Poles window
4. Select **Split Spans and Insert Pole**
5. Enter a Pole ID (for the inserted pole), click 'Ok'
6. Verify pole added to design
7. Make appropriate edits to pole
8. Save Line Design

Merging Spans to Remove a Pole

On the other hand, once an analysis is performed, a user may find that a pole is not needed in an area. In this situation, an option exists to merge together spans from two selected poles, and remove any poles between them.

Begin with at least three poles, two end poles with one pole between them.

1. Go to the LD Tab, under the Pole window
2. Select (check) poles with spans to be merged (don't select the pole to be removed)
3. Select the **Edit** option in the Poles Window
4. Select **Remove Pole and Merge Spans**
5. In Prompted, select 'Yes' to delete the middle pole
6. Verify pole removed from design
7. Make appropriate edits to remaining poles
8. Save Line Design

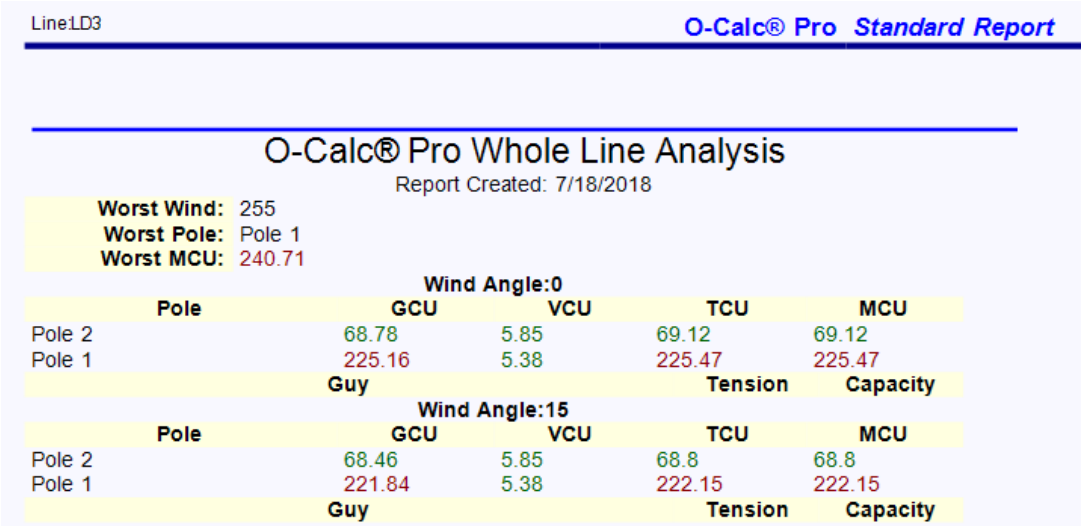
Performing an Analysis and Reading the Results

As previously stated, automatic calculation of the loading on a pole is disabled in Line Design Mode. Instead, when a line is complete, a user has the option to solve a pole, or the entire line.

Once a line design is finished, use the following steps to generate a report:

1. In the main line design area ribbon, select **Solve**
2. Choose **Entire Line Design** from the menu
3. Select either fixed or swept wind
    a. For fixed wind, Set the wind angle
    b. For swept wind, set the start angle, end angle and increment for analysis
4. The report will generate in the Reports tab

The report generated in the reports tab will look something like this:



Line:LD3 O-Calc® Pro *Standard Report*

O-Calc® Pro Whole Line Analysis

Report Created: 7/18/2018

Worst Wind: 255
Worst Pole: Pole 1
Worst MCU: 240.71

Wind Angle:0

Pole	GCU	VCU	TCU	MCU
Pole 2	68.78	5.85	69.12	69.12
Pole 1	225.16	5.38	225.47	225.47

Guy	Tension	Capacity

Wind Angle:15

Pole	GCU	VCU	TCU	MCU
Pole 2	68.46	5.85	68.8	68.8
Pole 1	221.84	5.38	222.15	222.15

Guy	Tension	Capacity

On this report, several pieces of information are provided:

- Name of Line Design in Upper-left corner
- Overall Worst Wind Direction
- Work Pole in the Line – or the pole with the highest MCU under the worst-case conditions
- The value of the worst Pole's MCu
- In subsequent sections, each wind angle is shown for the calculation that was run, along with values for each pole in the line, given a certain wind angle
    - GCU – Groundline Capacity Utilization
    - VCU – Vertical Capacity Utilization
    - TCU – Total Capacity Utilization
    - MCU – Maximum Capacity Utilization
- Guying information would also be provided, if guying were present on any poles in the line.

An analysis can also be run on an individual pole. To do this, select a pole from the list in the Line Design area.

1. In the main line design area ribbon, select **Solve**
2. Choose **Current Pole** from the menu
3. The calculation will run, and the Capacity window will show the overall MCU
4. More details can be seen for this pole in the Reports tab, by running any of the available reports.

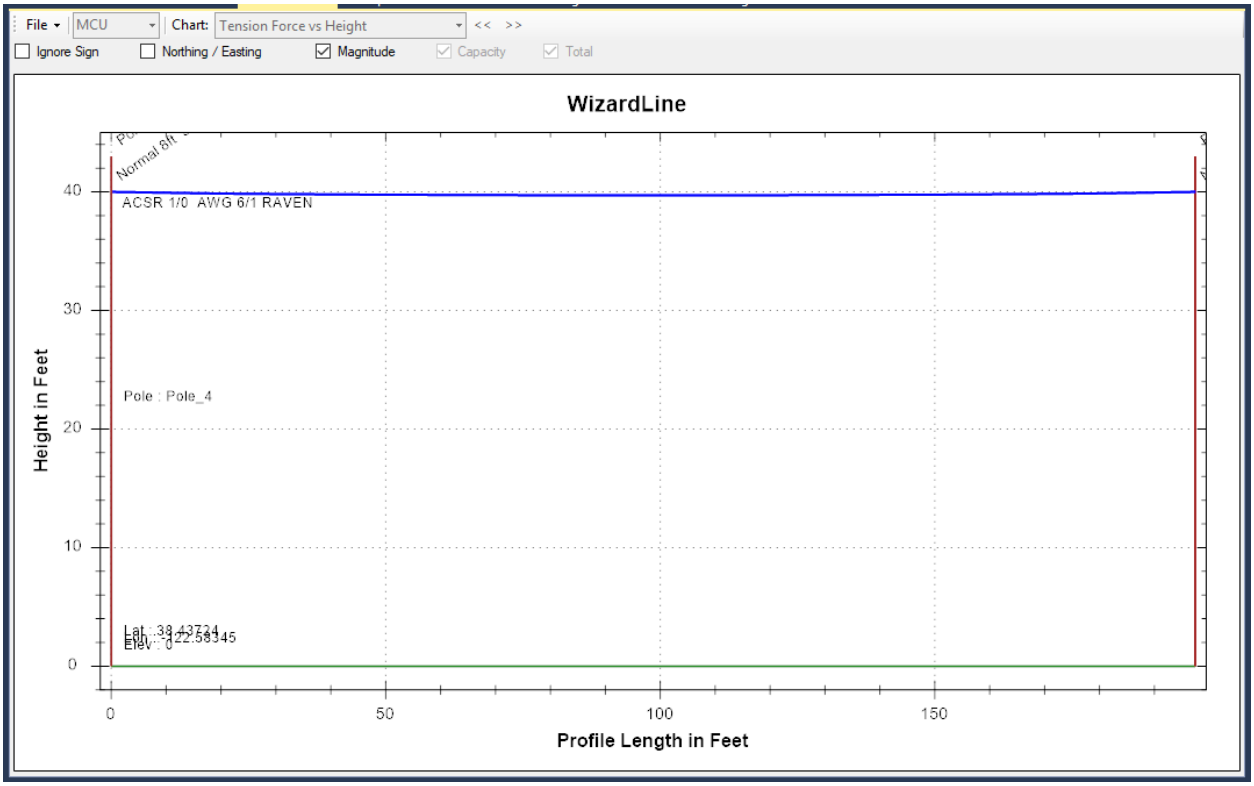
Useful Features and Tools

In the main LD area ribbon, there are several additional dropdown menus. This list contains several features that may be useful when getting started with line design.

Profile View

It is possible to view a profile of a set of poles in a line, like how schematic view is displayed for a single pole in previous versions of O-Calc Pro. To utilize this feature, follow these steps:

1. Complete and save a line design
2. Select (Check) the poles to be included in the view
3. In the main LD area, select the **View** drop-down list
4. Select **Profile View**
5. Verify poles in the profile view in the Charts tab



Profile view can be extremely useful, especially in cases where elevation data is significant to the analysis of the line.

Other 'View' Options

Additional options are available to help a user navigate around the Line Design Area. The 'View' drop-down list in the main line design area ribbon provides several options for easily navigating to a location.

The **Zoom to Poles** option will pan to and focus on the selected poles in the main line design area.

The **Center on Coordinate** option allows a user to enter a specific coordinate in the Geolocation window, and will move to that location.

The **Center on Address** option allows a user to type in an address, which will then move the center of the display to that location.

Performing Stringing and Adding Drops

An immensely valuable tool available is the ability to perform stringing, or attach a span to the entire length of a line, running from one pole to the next. First, a default stringing assembly must be set up.

1. In the Master or User Catalog, find a stringing assembly
    a. An assembly could be any crossarm or insulator with a wire on it, or a span head guy
2. Right-click on the desired assembly, and select **Set Line Design Stringing Assembly**
3. In the line design tab, select (check) all the poles that you wish to add the stringing assembly to
    a. Pole order is important here; stringing is performed from the pole identified as 1, to 2, to 3, and so on. Poles out of order will have the stringing assembly drawn in that order.
4. In the **Tools** drop-down menu in the line design tab, select **Perform Stringing**
5. Select either all of the poles, or the selected (checked) poles
6. Enter the height at which the stringing assembly will be placed; click “OK”
7. Verify that the stringing assembly has been added to all the selected poles

Once a span has been placed using this option, additional edits can be made. These can include changing the positioning of the insulator on each pole, or changing properties of the span itself.

To add drops to a pole, a similar process is used:

1. In the Master or User Catalog, find a stringing assembly
    a. An assembly could be any crossarm or insulator with a wire on it, or a span head guy
2. Right-click on the desired assembly, and select **Set Line Design Stringing Assembly**
3. In the line design tab, select the pole you wish to add drops to; if multiple poles are checked, the drops will be added to the active pole
4. In the **Tools** drop-down menu in the line design tab, select **Add Drops to Current Pole**
5. Enter the height at which the drop will be placed on the pole; click “OK”
6. In the main line design drawing area, notice the cursor display lat and long values wherever it is place. Click on the screen where the service drop or drops should end.
    a. Clicking in multiple spots will add a service drop ending at each of the clicked lcoations
7. When done placing drops, click the yellow **Add Drops (Click here when done)** button in the main line design ribbon

After placement, these can be edited as well.

What Next?

Congratualtions! You have successfully finished the O-Calc Pro Line Design Quick Start Guide. You are well on your way to becoming a Line Design expert!

Additional material on these and more advanced topics can be found in the Line Design User Guide. Plus, there are youtube video's and wiki page articles available online for review, each with a focus on a particular topic.