

# 2013 PLS-CADD Advanced Training and User Group Meeting

## What's New in PLS-POLE™

Summary of changes since July 2011 User Group, covers versions 11.18-12.50

### Engineering

- 1) Increased the maximum number of load cases to 1000 and incremented the LCA and LIC file versions as a result.
- 2) Added another solution strategy to the nonlinear finite element engine which is automatically used when have particularly sensitive models.
- 3) Added horizontal shear capacity input to *Geometry/Foundation Strength* for checking circular drilled shaft foundations and incremented .pol file format to store it.
- 4) Can now model Duratel FRP poles. Doing so required incrementing the .fpp library version.
- 5) FRP poles can now be built out of user defined tubes (for Shakespeare and the new Duratel libraries) in addition to predefined modules (RS libraries).
- 6) Rectangular concrete poles now use less conservative assumption for wind loading: the exact transverse and longitudinal areas are exposed to wind rather than the maximum of the two.
- 7) The Connections and Anchors check can now include loads from up to two insulators.
- 8) Now issue warning in the "Detailed Steel Pole Usages for Load Case..." output when a splice is in tension.
- 9) Can now model laminated wood poles from McFarland Cascade through addition of four new laminated pole types: SYP and CDF for both Raked and Tangent applications.
- 10) Wood Pole Material Properties now has Allowable Shear Stress and Allowable Compressive Stress for use with AS/NZS 7000:2010 wood pole check.
- 11) *Geometry/Foundation Strength* now has a Bending Moment Capacity that checks the resultant of transverse and longitudinal moments.
- 12) Added a "Lap Factor" column to Steel Tubes so you may input a factor other than 1.5 for the overlap. The overlap calculated from the "Lap Factor" is additive with the input "Lap Length".
- 13) Round steel poles no longer try to use the special case equations (table 5.1 of ASCE48-11) for poles primarily loaded in bending ( $f_a < 1$ ksi) that applies to poles with 8 or fewer sides.

### Standards and Codes

- 1) You may now select ASCE 48-11 as the strength check for steel poles. The primary change from ASCE 48-05 is the use of the "wedge" method for checking base plates. When using ASCE 48-11, the effective bend line length override input is disabled as this value is not used by the ASCE 48-11 base plate check.
- 2) Added NESC 2012 and IS802:1995 options to the Wind/Ice Model column in *Loads/Vector Loads* and *Loads/Wire Loads*. See [http://www.powline.com/products/version7\\_loads.pdf](http://www.powline.com/products/version7_loads.pdf) for details

- 3) The "UK NNA" loading method now has an option in the "Loading Method Parameters" dialog to use the corrigenda wind height adjust equation instead of the one published in 2001.
- 4) Added EN50341-1:2012 loading methods (both face and member based) and renamed old CENELEC method to "EN50341-1:2001". See [http://www.powline.com/products/version7\\_loads.pdf](http://www.powline.com/products/version7_loads.pdf) for details
- 5) Added AS/NZS 7000 48-05 and AS/NZS 7000 48-11 steel pole strength checks which are identical to their respective ASCE48 checks with the addition of an 0.9 strength factor as per Appendix K2.
- 6) Can now check wood poles according to AS/NZS 7000:2010.

## Interface

- 1) Added a "read-only" check box to the *File/Open* dialog so that a file may be open for review without locking it.
- 2) *General/Attachments/Attachment Manager* now works with images in JPEG and TIFF formats.
- 3) *Geometry/Joints* now live updates geometry views as joints are edited and color codes fixed joints.
- 4) Right click results explorer menu in Deformed Geometry views now supports 1000 load cases.
- 5) Added the Quick Search Toolbar which can be used to search the menus, help, technical notes and videos. Also acts as a calculator (try typing " $=10*\sin(45)$ "). Please refer to video "Introduction to the QuickSearch Toolbar" (<http://youtu.be/DwYgf5e9IOk>).
- 6) Edit controls now support " $=help$ " expression to display list of available arithmetic operations and functions.
- 7) Most input control value out of range errors now displayed as message balloons rather than message boxes that must be OK'd.
- 8) Pressing the shift key and right clicking on a menu item now copies it to the clipboard.
- 9) The Custom Toolbar has been improved to allow up to 4 Custom Toolbars to be used simultaneously and to display icons instead of text for many of the commands.
- 10) You may now right click on any inset view (structure picture, connection inspector, etc.) to copy it to the Windows clipboard.
- 11) *View/Edit Customizations/Tables* "Report Format" buttons that used to require user to enter C language format strings (%8.1lf, %6s...) now display a dialog box with simple English language controls for modifying column widths, alignment and digits after the decimal.
- 12) Graph views (nonlinear convergence, post interaction capacity, interaction diagrams, etc.) now print the label of the curve under the mouse in the status bar.
- 13) Changed scales in interaction diagrams graphs so that entire graph is visible at the expense of showing less detail when have a wide range of values.
- 14) Converted Auto Arrange Toolbars from a command to a mode. When checked it will auto arrange whenever the program window size changes.
- 15) Support importing pole models from ikeAnnotate: <http://www.powline.com/products/ikeannotate.pdf>
- 16) Added a "Filter" button to the Post Interaction Capacity diagram input which removes collinear points and makes counter clockwise any clockwise convex polygons.
- 17) Added a Graphical Add/Move/Delete toolbar that enables graphical creation and manipulation of a model.
- 18) Added the "Zoom" toolbar (this is identical to the one previously available in TOWER and SAPS).

- 19) Added preference setting "Convert attachments from global Z to distance from pole top" which does just that once you exit the relative joints editing table.
- 20) Equipment elements may now be offset from their attachment joint by an azimuth and offset which can be relative to the face or center of a pole (or other element). The equipment components library now allows specification of a vertical offset from the middle of the equipment for drawing purposes.
- 21) Offset equipment attached to a structure is now drawn in the deformed geometry perpendicular to the displaced position of the vang it is attached to (older versions kept equipment vertical so it appeared mounted on a gimbal).

## Tables

- 1) Pressing Control-apostrophe (Ctrl-' ) in tables will copy into the current cell the contents of the cell above it. This is similar to the Excel keyboard shortcut.
- 2) Can now press F2 in tables to switch between move and edit mode for columns with text edit and combobox controls.
- 3) Output tables may now be filtered by any column, not just numeric columns.
- 4) Table controls evaluation of expressions now detect invalid expressions with a message balloon and prevent switching to other cells until it is fixed (older versions replaced expression typed in with a 0 w/o any warning).
- 5) Sped up navigation of very large output tables and fixed problem scrolling when have more than 32767 rows of data.

## Reporting

- 1) You may now enter a warning message in *General/Output Options* which will be printed in the Model Check, Analysis Results and Summary Results reports (for example, "Preliminary unverified model").
- 2) *General/Output Options* now has a "Print extended diagnostic output" setting. When checked intermediate calculations will be printed for allowable spans/interaction diagrams generation. Other intermediate calculations will be added in future versions.
- 3) Report right click menu now includes menu option to customize the current report schema.
- 4) Sped up creation of very long (20,000+ line) Analysis Results reports by 10-40%.
- 5) Right click results explorer menu in reports now organizes load cases in blocks of 25 and can now handle up to 3000 results (previously limited to 2000).

## View

- 1) Ground is now depicted at foundation joints and guy anchors by green translucent circles.
- 2) The portion of a pole below the fixity point is also now shown in the undeformed geometry view. The undeformed geometry now displays the portion of any pole that exists below the fixity point. The deformed geometry continues to just show what was analyzed.
- 3) Now suppress draw of member and joint labels if they will completely obscure the structure.

- 4) Member Info in deformed geometry views now color codes the status bar when an overstressed member is highlighted.
- 5) You can now switch from one info mode to another info mode using keyboard shortcuts: (J)oint, (M)ember, (G)roup, (P)roperty info.
- 6) Pressing the 'F' key in view joint info mode in the deformed geometry will now add annotation for all members connected to that joint with their forces in the global coordinate system.
- 7) The 3D Controls dialog now has an option to draw member labels only for overstressed members.
- 8) The 3D Controls dialog now has an Apply button so changes to the geometry may be made without leaving the dialog.
- 9) The 3D Controls dialog now has an option to "Lock" the displayed Geometry load case to that used for Labels so that the two are always in sync.
- 10) F6 now cycles the load case display through each load case one at a time keeping the display options intact.
- 11) *Edit/Copy* or Ctrl-C in graphics view now asks you if you want to copy current window as a bitmap or current statusbar text to the Windows clipboard or save as a TIFF image.
- 12) Status bar now right justifies text which is too long to fit in it.
- 13) The Dance Structure command now allows you to press "E" to edit the dance amplitude.
- 14) Image attachments may now have an azimuth angle specified. When an azimuth is specified, images will not be drawn if you are looking at them from behind.
- 15) Now draw vangs as a 3:1 rectangle with fixed 7.5/2.5cm (3/1") dimensions. This enables graphically selecting them.

## File/Preferences

- 1) Settings now colors items with non-default values in black and items with default values in gray to make it obvious which items have been modified.
- 2) Added the following settings:
  - 2.1) "Always keep vector loads (LCA file) saved with model, do not ask to save loads supplied by PLS-CADD." which eliminates a prompt when saving a model that has been edited directly from PLS-CADD.
  - 2.2) "Enable background color coding in tables" to allow disabling background colors for improved contrast.
  - 2.3) "Never suppress draw of view labels" which restores previous behavior where could get a cluttered view when zoomed out with labels displayed.
  - 2.4) "Prompt for permission before saving projects in new versions" setting which if enabled will cause issuance of a warning when you're about to save in a newer version of PLS-POLE than the one that last saved the model.
  - 2.5) "Prefer mm to cm for metric lengths" that substitutes mm where cm would otherwise have been used for both input and output.

## Batch Modify

1) Added commands to:

- 1.1) "PLS-CADD Insulator Link Supply Set Numbers To Blank Insulators" which will fill in blank rows (for up to 3 phases) in the insulator link table with a user supplied set number
- 1.2) "Remove .LCA/.LIC/.EIA Loads File References"
- 1.3) Apply the "User Defined Warning" from *General/Output Options*
- 1.4) Apply Tubular and Generic Davit arm and Tubular and Generic crossarm geometry

## Miscellaneous

1) *Geometry/Guys* now has a "Guy Anchor Type" column which explicitly describes the anchor and adds three methods for specifying an anchor location:

Relative: the anchor is located by adding the X,Y,Z coordinates (in a guy specific local coordinate system) to the position of the Reference anchor.

Slope-Offset: the anchor is located as per "Slope" with the addition of an offset perpendicular to the guy. Any anchors that Reference this guy do not include the offset (makes it easy to model split guys).

LeadL-Offset: the anchor is located as per "LeadLength" with the addition of an offset perpendicular to the guy. Any anchors that Reference this guy do not include the offset (makes it easy to model split guys).

2) Guy anchor Z coordinate is now relative to "Z of ground for wind height adjust and PLS-CADD" entered in *General/General Data* rather than zero.

3) Added check for invalid bolt spacing, end and edge distances.

4) All multi-file operations (*File/Batch Modify*, *File/Analyze Multiple Models*, *Lines/Reports/Structure Usage* from PLS-CADD, etc.) sped up by factor of 25-250% via component file caching.

5) Annotation polygons now have a "cloud" setting for making revision clouds.

6) Program Generated annotation now has the same graphical editing commands that user input annotation has.

7) Line and polygon annotation now allow you to select line type (dot, dash, dash-dot, etc.).

## Cool

1) Added an unsupported *F1/Debugging Stuff/STL Export* command which produces a STereoLithography ".stl" file that can be used with 3D printers. This is experimental so please relay your experience with it to support@powline.com.