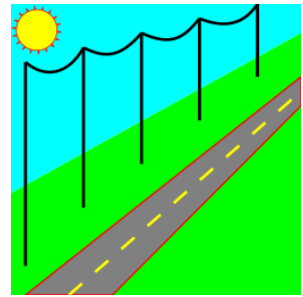


2019 PLS-CADD Advanced Training and User Group Meeting What's New in PLS-CADD™



Summary of changes since June 2017 User Group Versions 14.54 - 16.00

Reliability, Usability & Performance

- 1) Speedups in **SAPS** Finite Element sag-tension: ~1.05x for Level 2, ~1.15x for Level 3 and ~1.35x for Level 4.
- 2) The Departure Angle report now runs up to 25 times faster.
- 3) Multi-threaded calculation of TIN average normal vectors for # cores speedup. Reduced time for benchmark from 2.5 hours to 13 minutes on an 8 core computer with hyper-threading.
- 4) Made **Terrain/Edit/Adjust H and Z for Points with same X and Y** cancelable, run ~2x faster and parallelized across cores for another # cores times speedup (for example, it now runs 8x faster on a 4 core machine than the previous version did).
- 5) **Lines/Reports/Survey Point Clearances** now runs up to 160x faster creating a Wire Envelope TIN.
- 6) Sped up updating available structure list and various other update operations when using level 3 or 4 FE sag-tension.
- 7) "Web Upgrade Request" feature in **Help/Download Upgrade** makes it possible to request and obtain upgrades directly from within the application without using email.
- 8) Standard **PLS-CADD** without access to **SAPS** FE sag-tension feature now gives error message when attempting to open a project that requires FE sag-tension to display correctly.
- 9) Addressed incompatibility with Windows 10 version 1803 update that caused issues with many software packages.

Structures

- 1) **Structure Clearances** commands now use angle member rotation angle beta to orient angles correctly.
- 2) Added mini-pref setting "Customize structure name with user structure number rather than true structure number for site specific structures" (ATUG17).
- 3) The **Structure Modify** dialog now has an "Apply" button (ATUG17).
- 4) Added support for insulator shed draw option for **PLS-POLE** and **TOWER** structures and built in method 1 structure editor.
- 5) Now respect **PLS-POLE/TOWER** suspension insulator rigid Yes/No setting.
- 6) Added **Structures/Customize Structure/Insulators/Move Guy Strain Insulator** for moving Guy Strain introduced in recent versions of **PLS-POLE** and **TOWER**.

- 7) Structure groups can now be contingent on presence of **PLS-POLE** or **TOWER** structure Components with settings for "No requirement", "Has wood pole", "Has steel pole", "Has concrete pole", "Has laminated wood pole", "Has FRP pole", "Has mast", "Has guy". (feature requires use of structure files saved in version 12.18 or later of **PLS-POLE** or **TOWER**).
- 8) Added **Structures/Automatic Spotting/Optimum Body and Leg Extension Selection** function.
 - a. **PLS-CADD** can now invoke the **TOWER** Family Manager and have it generate all possible permutations of all body and leg extensions. This allows the program to check potentially tens of thousands of leg and body extension combinations without you having to actually create them.
 - b. You may specify an optional path override input that is used for any permutation **TOWER** models that are created.
 - c. Towers with grillage foundations are optimized by verifying the embedment of the center of each grillage in addition to minimizing reveal for each leg.
- 9) Structure loads calculation now searches all sections attached to a structure for anything that requires promotion of RS condition to FE (clipped, marker ball...). If any are found then it will promote from RS condition to FE for sag-tension driving loads calculation for all attached sections. Earlier versions let sag-tension decide on a section by section basis if FE promotion was required which could lead to scenario where loads on a structure were based on combination of RS and FE sag-tension runs.
- 10) Structure check bitmaps now display for XY located structures.
- 11) **Structures/Create New Structure** now substitutes ".stk" file extension rather than giving an error if you omit a file extension.
- 12) **Structures/Check** dialog now has a Configure button that leads to a dialog where the **Pole Overview** report options can be set. Note that displaying a structure photograph is a new option.
- 13) Added **Structures/Customize Structure/Move Framing/Rotate Perpendicular to Wire**, **Structures/Customize Structure/Move Framing/Attachment Point/Snap to Survey Point**, **Structures/Rotate/Freehand** and **Structures/Customize Structure/Move Framing/Attachment Point/Freehand** commands.
- 14) Added **Structures/Add/XY Structure/At Survey Point** command.
- 15) Added **Structures/Rotate/Bisect Points** command which will bisect the angle between two other points.
- 16) Added entity info command to rotate framings.
- 17) The comments in **Structure/Modify** will now recognize URLs so you can select them from the menu created by the View button (e.g. entering <https://www.powerlinesystems.com> will allow you to launch a web browser at that site from the menu displayed by the View button).

Terrain & Alignment

- 1) Added **Terrain/Edit/Change Feature Code/From Raster Attachment Values** which modifies survey point feature codes based on NDVI data inside an image. Also updated **Terrain/Edit/Merge Points from "External File/Merge Points from Raster Attachment..."** to work with additional data formats.
- 2) Made **Terrain/Coordinate System/Reproject Project** work with XY based structures.
- 3) LAS 1.4 files may now be read thanks to an upgraded LASlib library. This includes the extended class information that may be stored in a 1.4 file.
- 4) Added option for LAS Import to color by elevation when RGB data isn't available (uses median absolute deviation to account for outliers and a conversion from an HSV color percentage to RGB to get a smoother transition).
- 5) Updated ASPRS class descriptions for LAS Import and added capability to read user-defined classification descriptions from LAS files.
- 6) **Terrain/Edit/Merge Points from External File/Merge Points from KML/KMZ Files** and **Terrain/Edit/Merge Points from External File/Merge XYZ Points from User Defined XYZ Files** has an option to get elevation from TIN.
- 7) **Terrain/Alignment/Delete P.I. Range** command that can delete many PI's at once as long as the alignment segments don't have structures spotted.
- 8) Added "EDCL Rwanda" coordinate system to the custom coordinate systems category.
- 9) Improved delete PI commands so that instead of just preventing you from deleting a PI when the previous PI has a structure on it now warn you that the structure orientation angle may change and give you the option of preserving it.
- 10) Enabled **Terrain/Edit/Merge Points from External File/Merge Points from Raster Attachment** to be used with other than 32 bpp images.
- 11) **Terrain/Edit/Merge Points from External File/Merge Points from LAS/LAZ Files** will now work with geographic coordinates (degrees of longitude and latitude). Try selecting EPSG:4326 as the LAS coordinate system on import.
- 12) Added **Terrain/Edit/Merge Points from External File/Merge Points from Internet** command that automatically imports SRTM data into your project from PLS servers.

Sections, Jumpers, and Cables

- 1) Changed default value for **Sections/ Add Graphical/** "Make connections to all intermediate structures skipped" checkbox to unchecked (ATUG17).
- 2) **Sections/Thermal Calculations** now supports "CIGRE Brochure 601 December 2014" calculation method.
- 3) Added **Sections/Cable and Concentrated Loads Files/Create Bundled Cable File** command for creating twisted pair, lashed bundle or spacer cable from an existing cable file
- 4) **F1/Custom/Under Development/Sag Span to Known Sag** improved through addition of weather case and condition inputs as well as option to enter time and wave number instead of sag.
- 5) Now issue warnings if clipped sections tension in sagging condition and weather case not within 20% of input sagging tension. This was done to encourage input of a reasonable sagging tension, a quantity we use to estimate stretch due to creep and load.
- 6) Section Notes are now printed in the status bar when selecting a section graphically.
- 7) Increased the maximum number of jumper connections from 5 to 7.
- 8) Added **Graphical Add/Delete/Move/Copy/Paste/Edit** commands for jumpers.
- 9) **Sections/Thermal Calculations** now supports TNSP 2009 Thermal Rating Method (for Australia).
- 10) Thermal reports redesigned to greatly improve readability.
- 11) Added ability to define and label circuits under **Sections/Electric/**
 - a) Create custom labels for circuits and each phase within the circuit using **Sections/Electric/Define Circuits and Phases/Labels**
 - b) Assign a circuit label to each section and assign a phase label to each phase within a section with **Sections/Electric/Define Circuits and Phases/Table**
 - c) Connect sections and phases between sections to define a circuit.
 - d) Circuits connections will follow jumpers if they are modeled.
 - e) Connect sections for circuits using the graphical command **Sections/Electric/Define Circuits and Phases/Graphical** or from the context menu when snapping to wires.
 - f) Control the color and line style for each circuit or phase independently in **Sections/Electric/Define Circuits and Phases/Labels**
 - g) Display wires in all views by circuit color and line style using new options in **Sections/Display Options**
 - h) Hide circuits in the display windows and in plan and profile sheets by setting the circuit's Line Style to None.
 - i) Display circuit and phase labels in profile view and in plan and profile sheets using Wire Labels in **Drafting/Structure and Section Labeling/Profile View... and Sheet Profile View**
- 12) Added **Structures/Jumpers/Graphical Sag** which enables graphically sagging flexible jumpers.
- 13) Reverse Stringing Direction and Reverse Alignment now update Circuit definitions, so circuit assignments are not lost.
- 14) Added **Sections/Electric/Full Line Constants Calculator** that computes the phase matrices and symmetrical components (including zero sequence) for impedance and susceptance accounting for mutual

coupling and ground returns.

- 15) Implemented a IEEE P1283/D8 Elevated Temperature Creep (ETC) calculator (**Sections/Thermal Calculations (IEEE, CIGRE and TNSP)/Elevated Temperature Creep**).
- 16) Added cable file name to **Sections/Electric/Define Circuits and Phases/Table** to help identify which sections should be linked.

Finite Element Sag Tension

- 1) Now save custom user input **SAPS** convergence parameters in the DON file as optional values. A warning will be given on project open whenever a project has non-default convergence parameters.
- 2) **SAPS** Convergence Parameters are now printed in the Criteria Report when they are not at default values along with a warning. They have also been added to the Project XML file.
- 3) Added **Criteria/SAPS Finite Element Sag-Tension** L4 option "Use Level 2 modeling for display and insulator swing calculations" which allows loads to be L4 while display, swing and **Terrain Clearance Line** use the vastly faster Level 2 analysis. This setting is saved as an optional value in the .CRI file.
- 4) **Structures/Equalize Tension** now has a checkbox for "Use SAPS L2 (L3 & L4 experimental and very slow)". Enables user to turn off default L2 for equalize tension.

Criteria, Codes & Structure Loading

- 1) Criteria limit on weather cases (and many other items) increased from 100 to 200.
- 2) **Criteria/Structure Loads (methods 3,4)**... now has a "Strength Factor Hardware" column.
- 3) "EN50341-3-9:2001 UK NNA" automatic calculation of Kcom is now supported when computing loads in FE conditions.
- 4) Added "EN50341-2-9:2017 UK NNA" options in **Criteria/Weather** and "**Criteria/Structure Loads (methods 3,4)**".
- 5) **Criteria/Notes** now has a "Print the following notes at the top of all reports" setting so you can suppress notes automatically.
- 6) The EN50341-2-9 (UKNNA) now applies the 800m limit on Lm for Gc calculation to design approach 1 in the 2017 edition instead of design approach 3 (this is one of the corrections made in the 2017 edition from the 2015 edition).
- 7) New criteria files now default: jumper modeling (if SAPS enabled) to on and limiting L3/L4 to two spans.
- 8) Modified EN50341-2-22:2016 (Poland NNA) to use Method 7 for calculating Gc and wind height adjust instead of Method 4. Method 7 uses suspension/2-part insulator to structure attachment point instead of insulator to wire.

Drafting

- 1) Fixed command for deleting sheet pages (was accidentally deleting other sheet page items if the page number was one after the page being deleted) (ATUG17).
- 2) Now detect when adjacent span length labels will overlap and move one of them to prevent it (tested with project having spans as short as 9').
- 3) Inset view tables now allow up to 1000 entries (previously limited to 200).
- 4) DXF export of circles refined so that circles are clipped to view port rather than not being drawn when center of circle is outside the view port.
- 5) Now draw multi-pixel lines with square rather than rounded end caps to make line styles look better.
- 6) Added **Drafting/Inset Views/Add/Inset Phasing Diagram** command to automate the creation of phasing diagrams using the information entered in **Sections/Electric/Define Circuits and Phases/Tab**
- 7) Added command **Drafting/Show Circuit and Phase Labels in 3D Views** which shows them on structure attachments in 3D view and profile inset structure views.
- 8) Added ability to include circuit and phase labels in inset plan views.
- 9) Added structure snap context menu command to **Add Phasing Diagram for Structure**.
- 10) You may now pan, zoom and rotate inset views using the new **Drafting/Inset Views/Pan, Rotate, or Zoom Inset View**.
- 11) **Drafting/Show Stringing Direction** now draws direction arrows on jumpers.

Drafting Attachments (DXF, SHP, BMP, TIF, ECW, JP2, JPG)

- 1) **Drafting/Plan & Profile Sheet Configuration/Scales** dialog has new "Default location for structure text" option of "in profile at set distance above structure base".
- 2) WMS 1.1.1 servers are now supported for image import (already supported more current WMS 1.3)
- 3) WMS Import now includes "Toporama Canada (NRCan)" in addition to remembering and letting you rapidly select from list of last 10 custom server settings used.
- 4) Added **Terrain/Edit/Merge Points from External File/Merge Points from Raster Attachment** to extract elevation data encoded in DEM images.
- 5) Added **Terrain/Edit/Change Feature Code/From Raster Attachment Values** to change survey point feature codes based on NDVI data encoded in an image.
- 6) Added support for PNG image attachments (most useful for WMS imagery).
- 7) Can now read TIFF files that exceed 4GB in size.
- 8) WMS import now issues warning asking you if you are sure you want to import when number of image tiles exceeds 10,000.
- 9) **File/Export/DXF** now converts degenerate ellipses into circles since AutoCAD refuses to read a file with a degenerate ellipse.
- 10) Upgraded ECW/JP2 library for improved speed, compatibility and support for Unicode file names.
- 11) The program can now read from tiled TIFF images with other than 8 or 32 bits per pixel (bpp).

Interface & Other

- 1) Added a right click "Jump List" to the program's taskbar icon in Windows 7/8/10. The Jump List contains your Most Frequently Used and Most Recently Used models. You may also "pin" any model you like to the Jump List.
- 2) Added full project path to Project Wizard MRU buttons tooltips (ATUG17).
- 3) Added **Terrain/Update Wire Clearance Line or Profile Below Wire** (tip is "If you have defined a Wire Clearance Line or Profile Below Wire clearance line under **Terrain/Clearance Line**. then selecting this will refresh them."). Can assign this to a custom toolbar button to get one click regeneration. (ATUG17).
- 4) Added **F1/Debugging Stuff/Toggle Background Color** which switches the background color between black (best on screen) and white (best when projecting).
- 5) Improved high DPI display support with new high resolution icons and better font scaling.
- 6) **Sections/Concentrated Loads** menu now has new items for "Add", "Move", "Delete" and "Copy" of concentrated loads. Left click context menu also provides these options when snapping to a concentrated load.
- 7) **View/Goto Structure** now has an option for entering longitude and latitude to go to instead of a structure number.
- 8) The Structure Check dialog now displays details from the summary report for the maximum element and

insulator usages and pole deflections when you click in the dialog.

- 9) Now include a Windows Shell Extension that renders structure geometry inside Windows Explorer when displaying medium, large or extra large icons. Additionally, structure geometry may be previewed in Windows Explorer.
- 10) Added **File/Preferences** setting to limit table and dialog maximize to size of the application rather than full-screen (more efficiently uses space on 4k monitors).
- 11) Cable selection dialogs now display information on the cable selected in the bottom of the dialog.
- 12) **Sections/Table** now uses decaNewtona (daN) when it is selected in **File/Preferences** (previously just did this for Section/Modify).
- 13) Added **File/Preferences** setting to "Default to Rich Text Format (RTF) when right-clicking to Save/Save-As in a report".
- 14) Now only allow importing of spans to **Batch Thermal Calculator** when **SAPS** capability is present since per span temperature is only possible with finite element sag-tension.
- 15) Introduced new high resolution application icon.
- 16) Now remove periods from attribute (field) names in shapefile (.shp) export.

Networking

- 1) Tested all network functionality using IPv6.
- 2) Now check servers @plscloud.com for availability of upgrades rather than @powline.com
- 3) The new "Web Upgrade Request" feature in **Help/Download Upgrade** enables requesting and obtaining upgrades directly from within the application without using email.
- 4) Made changes to network file access code to reduce the chance of crashing when the network unexpectedly becomes inaccessible.
- 5) Changed how files are uploaded to Power Line Systems for technical support to improve reliability.
- 6) Updated supporting libraries for Internet access. Manuals and SMA files are now downloaded exclusively via HTTPS.
- 7) Fixed issue that could prevent program from detecting the availability of new versions if running on Windows 7 with certain Microsoft security updates installed.
- 8) Improved use of automatic IE proxy server configuration. This should now work for clients who use a proxy server configuration PAC script.

Reports

- 1) Made majority of file export commands allow mixed case file names (ATUG17).
- 2) **Lines/Reports/Bill of Material by Structure Location** now allows multi-select of dis-contiguous ranges of structures.
- 3) Now add "Foundation Design Forces For All Load Cases" section to Structure Usage Report when include detailed results.
- 4) Definition of "Actual Embedded Depth" in the Construction Staking Report consistent with that in the structure programs. It is the distance between the TIN and the butt of the pole (not the vertical component of that distance).
- 5) The Multiple Section Stringing Chart report can now be run on a circuit by circuit basis.
- 6) Added filtering by circuit and phase to the following reports: **Lines/Reports/Thermal Rating Report**, **Lines/Reports/Survey Point Clearances** and **Lines/Reports/Danger Tree Locator**.
- 7) Added option to **Lines/Reports/Thermal Rating Report** to sort by station instead of critical temperature.
- 8) Improved the user interface for **Lines/Reports/Danger Tree Locator** by combining three input dialogs down to one tabbed dialog.
- 9) Added circuit definition table to **Lines/Reports/Summary**.
- 10) **Lines/Reports/Section Sag-Tension Report** now uses the new standard "Structures and Circuits" selection dialog tab.
- 11) The sag-tension report header now lists any cable specific creep weather cases used when generating the report.
- 12) Added circuit and phase labels to Structure Attachment Coordinates table in Summary Report (allows for KML export).
- 13) Added **Pole Overview** report to Check Structure results dialog while modernizing the Check Structure dialog so that report options are immediately accessible reducing the number of clicks to get a report in half. Also added **Pole Overview** report option for **PLS-POLE** structures only.
- 14) Added **File/Preferences** setting "Show Safety Factor instead of usage in overview of distribution poles report" that can be used to produce a GO95 compatible report.
- 15) Bill of material report headers now indicate if jumper material is included or not.

XML/KML

- 1) **File/Export/KMZ (Google Earth)** improvements
 - a. Has an "Include Insulator Sheds" option
 - b. Uses different opacity settings to eliminate transparent effect previously visible
 - c. Reduces size of KMZ files
 - d. Details section information such as cable, voltage, to/from structure/set, display condition and notes
 - e. Adds "Draw cables with actual thickness (small cables will effectively be invisible)" option. Physical width is frequently impossible to see as Google Earth has difficulty with very thin lines. This option requires us to write a KML 2.2 (GE 6.0 and newer only) file. If your software has trouble with our 2.2 KML file then do not use this option.
 - f. Allows you to control whether the "Elevation shift" applies to the export of reports to KML
 - g. Stores the "Elevation shift" and "keep z constant" settings from **File/Export KMZ (Google Earth)** so that these values can be automatically reused when exporting a report to KMZ
 - h. Now switches to a 3d view (or creates one) to execute the export rather than telling you to do it
 - i. Exports Marker Balls as a sphere rather than a circle and faithfully exports bi-colored marker balls
 - j. Increased number of vertices used for approximating a circle (previously did not look smooth).
- 2) **File/Export XML** now includes a <saps_fe_options> section which echos the settings from **Criteria/SAPS Finite Element Sag-Tension**
- 3) **File/Export XML** now includes "Concentrated Loads Locations"
- 4) Circuit definitions are now included in the Project XML file.
- 5) Added "Wire Lengths in each Span" to XML Export.
- 6) Added circuit label to the section description for KML export.
- 7) Added **File/Preferences** setting "Generate LCA Files During XML Export" which when set to Yes writes LCA files for each structure to the PLS temporary directory.
- 8) Added **F1/Custom / Under Development/Limit some XML output to a specified structure range** which does just that for time consuming reports over structure range (like loads and check), but does not impact sections based reports. Can achieve significant speedups depending on the line and how many structures are selected. This setting is NOT saved.

Web & Examples

- 1) New Website at <https://www.powerlinesystems.com/>
- 2) New Videos
 - a. Download XYZ Point Data from Internet <https://www.youtube.com/watch?v=ERPMWbNY2Gk>
 - b. **PLS-CADD** FE Improvements in Version 15.50 <https://www.youtube.com/watch?v=HskIY6pcDLM>
 - c. Optimum Body and Leg Extension Spotting in **PLS-CADD** <https://youtu.be/QZeBA8mPsSA>
 - d. PLS Windows User Interface Improvements video at <https://youtu.be/QZeBA8mPsSA>
 - e. Defining and Labeling Circuits and Electrical Phasing
<https://www.youtube.com/watch?v=1W5ddfSKvuc>
 - f. Creating Phasing Diagrams <https://www.youtube.com/watch?v=X-Ppk6yxqD8>
 - g. Jumper Modeling https://www.youtube.com/watch?v=-LuTwKixIYY&list=PLwe4rLIKBgOtExrVqMAsdRNkZvXGY_2o6&index=10&t=0s
 - h. Lightning Protection
https://www.youtube.com/watch?v=Cksfqt8LBJ4&list=PLwe4rLIKBgOtExrVqMAsdRNkZvXGY_2o6&index=11&t=5s
- 3) New Technical Notes
 - a. Full Line Constants Feature https://www.powline.com/technotes/PLS_Full_Line_Constants.pdf
 - b. Overview of Power Line Systems software and Grid Integrity at
https://www.powline.com/technotes/PLS_Grid_Integrity_Executive_Summary_Overview.pdf
 - c. Wildfire Risk Assessment using **PLS-CADD** and LiDAR Survey at
https://www.powline.com/technotes/Wildfire_Risk_Assessment_Using_PLS-CADD.pdf
 - d. Graphical Sagging to Match Surveyed Data of Conductors
https://www.powline.com/technotes/graphical_sagging.pdf
 - e. Optimum Body and Leg Extension Selection in **PLS-CADD**
https://www.powline.com/technotes/Optimum_BLE_Selection.pdf
 - f. Defining and Labeling Circuits and Electrical Phasing <https://www.powline.com/technotes/circuits.pdf>
 - g. Thermal Rating Properties for Cables <https://www.powline.com/technotes/thermal.html>