



**2007 PLS-CADD User Group  
April 17-18, 2007  
What's new in PLS-CADD, PLS-POLE and TOWER**

**Improvements Shared by PLS-CADD, PLS-POLE and TOWER**

- 1) Version updates: New versions available and for download using *Help/Download Upgrade* (production version is 8.10). Upgrade requests made via *Help/Download Upgrade* are now processed automatically typically resulting in a response within 15 minutes.
- 2) Manuals: Last updated in January 2007 and can be downloaded using *Help/Check For Updated Manual*
- 3) Performance and reliability improved
- 4) Windows Vista compatibility (official Vista version 8.16 within a few weeks, versions 8.10-8.13 work if follow instructions at <http://www.powline.com/products/vista.html>)
- 5) Windows x64 Editions: Programs run in "Large Address Aware" mode enabling access to up to 4GB of memory (double the 2GB possible on 32 bit Windows). Enables use of bigger terrain files and imagery in PLS-CADD. Also helps in TOWER when running families of structures with many load cases.
- 6) Added NESC 2007 wire wind height adjustment, structure wind loading model and wire GRF options. Results are identical to NESC 2002 selections but were added for clarity.
- 7) Project repair wizard: Provides options for locating project files that were moved or renamed since project saved.

**PLS-CADD Drafting Improvements**

- 1) Reduction in collisions between labels: Minor changes to labeling of PI in sheet plan view to reduce collisions between these labels. Also added "restrict labeling of PI in sheet plan view to same PI visible in sheet profile view" option under *View/Display options/Text position orientation & background*. Using this to eliminate PI labels for tap or parallel alignments that aren't in the sheets station range can reduce plan view clutter.
- 2) Automatic wrapping of survey point labels that go off edge of sheet (*View/Display Options/Text Position.../ Wrap text to keep it on plan & profile sheet*)
- 3) Improved sheet cutting: Numerous changes to plan & profile paging and drawing routines for improved reliability and better looking output.

4) DXF import/export: DXF export dialog box simplified and many refinements made to DXF export and drawing routines. AutoCAD users will benefit from change from SOLID to 3DFACE entities for improved rendering and changes made to make exported images draw more reliably. Microstation users should see improved polyline style and layer control. All users should see reduced file sizes and improved redraw times. Also added support for LWPOLYLINES with OCS bulges and MTEXT with extrusion direction.

5) Sheet station labeling: New Drafting/Scales options for horizontal or vertical station labels and standard or station-plus (1000 vs. 10+00)

6) Page specific imagery and DXF attachments: Can attach to a specific sheet rather than repeating on all pages

7) Projection of 3D plan DXF in profile: Show 3D buildings and trees in profile using F1/Custom.../Project plan view DXF into profile view

8) Annotation improvements: New annotation tool bar and improved commands for Add Line, Arrow From, Arrow To, Polygon, Text and Dimension. Streamlines annotation placement and includes new features like horizontal and vertical line "snap".

### **PLS-CADD Structure Improvements**

1) More load cases, marker balls and structure comment rows: Max load cases increase from 100 to 256, marker balls per span from 5 to 20, structure comment rows from 16 to 32. Structure comment rows can now be named in View/Display Options/Profile View Structure Labels.

2) Pole tip deflection limits: *Criteria/Structure Loads* now has "Pole Tip Deflection Check" and "Pole Tip Deflection Limit" columns.

3) Material system refinements: Edit Part List, Edit Assembly List and parts download from database much more responsive when using large part files (100,000+ parts).

4) Laminated wood pole support: Automatic pole selector and drawing routines modified to accommodate laminated wood material.

5) Detailed Angle Member Uprating Report: New section in *Lines/Reports/Structure Usage report* showing TOWER angle members that fail.

6) New Structure Data Editor:

- a) Different insulator types and properties for each phase in a set
- b) Minimum vertical load limit or uplift capacity for each phase
- c) 4th set of suspension insulator swing and 2-part insulator load angle limits (previously had 3 sets of limits)
- d) Graphical display of attachment positions and allowable swings

7) Construction staking table additions: Now shows pole property label, weight, length, base diameter and embedded depth for PLS-POLE 7.72 and newer structures (this information is optional and can be turned off using View/Edit Customizations to reduce report width).

8) Custom menu titles, tips and hot keys: *View/Edit Customizations/Menu Titles, Tips & Hot Keys* (can even remove menu items)

- 9) Custom toolbar: Make your own toolbar for easy access to frequently used menu items with *View/Edit Customizations/Custom Toolbar*
- 10) Label swings, attachment displacements and loads for FE conditions: *F1/SAPS.../Label insulator swings...*

### **PLS-CADD Survey Point Visualization, Editing and Clearances**

- 1) Pan all views together: *View/Display Options/Pan all Views in Unison* keeps profile, plan and 3D views centered about same station.
- 2) Colorized LiDAR points: *Terrain/Survey Data Display Options* allows assignment of a color on a point by point basis. See <http://www.powline.com/newstuff/colorlidar/colorlidar.html> for sample images. Color can come from LiDAR vendor supplied plan comment or can be extracted from aerial imagery.
- 3) Cross section command: 'C' key or *View/Scales.../Cross Section*, includes following recent improvements:
  - a) Option to draw cross section at specified station or structure
  - b) Option to draw elevation and offset grid lines
  - c) Option to generate a report with a cross section view at each structure.
  - d) Option to orient cross section relative to alignment or structure transverse axis (45 degrees to structure for tower leg extension profiles)
  - e) Cross section ground line (points on this line interpolated from TIN)
- 4) Thermal rating report with graphical indication of points controlling rating: Now have option to insert profile and cross section graphics showing the point that controls the rating in each span.
- 5) Survey point clearance improvements: *Lines/Reports/Survey Point Clearances* replaces earlier "Clearance by span" and "Clearance by point" commands and improves upon them in the following ways:
  - a) "Desired Level of Detail" options for reporting on all points or only the one with the lowest clearance in each span
  - b) Ability to restrict report to selected feature codes.
  - c) Option to place 3D and profile view markers to graphically indicate positions of clearance violations.
  - d) Report includes survey point feature code, point descriptor, X, Y, Z, station and offset fields (also option for survey comments).
  - e) Report is now customizable and supports more options for export.
  - f) Option to put markers showing wire positions considered (older versions did this only in 3d view, not in profile)
- 6) Loading/Saving of markers: *View/Markers/Load Marker File* and *Save Marker File* (Markers are temporary graphics created by clearance routines that couldn't previously be saved)
- 7) Improved reports: "Thermal rating report", "Terrain Clearances by Span Report", "Terrain Clearances by Survey Point Report", "Clearance to Survey Point Report" and PLS-CADD/Lite "Display Information", "Span Geometry" and "Sagging Information" reports reformatted for better looking output and can now be exported to XML or viewed in a table.
- 8) Graphical sag with option to adjust structure positions: New option that can adjust structure positions to get attachments in the right place in addition to adjusting wire lengths for correct sag. See [http://www.powline.com/products/fe\\_sagten/fe\\_graphsag.html](http://www.powline.com/products/fe_sagten/fe_graphsag.html) for more information.

Program starts with a crude catenary fit through three points in the span. It then improves on this using a least squares catenary fit through wire points within a certain distance of the crude fit. Next it calculates the intersection between catenary curves for adjacent spans and provides options to snap attachment points to these intersection points and to adjust wire lengths to match calculated catenary constants.

9) Wire clearance line or envelope: *Terrain/Clearance Line* dialog can now display sections for multiple weather cases at once. Display can be shifted up, down, left or right. One can shift the wire downward and check for collisions with ground as an alternative to standard PLS-CADD clearance line where upward shifted ground is checked for collision with wire. New option can also be used to visualize the envelope occupied by the wires over a range of temperature and wind values.

9) Clearance line spike suppression: *Terrain/Clearance Line* dialog now has option to suppress spikes for selected feature codes.

10) Interactive clearance to centerline and TIN: *Sections/Clearance to Ground* gives distance from selected point on wire to your choice of TIN ground below selected point, closest point on TIN or ground centerline.

11) Commands for finding and zooming in on XYZ or PFL points: *Terrain/Edit* dialogs have "Find" button for locating XYZ or PFL points with specified coordinates, feature codes or comments. Also have "ZoomTo" button to make all graphic views zoom in on selected point.

12) Commands for sorting XYZ points: *Terrain/Edit/Sort XYZ* sub menu with new options to sort by point descriptor, profile comment, plan comment or feature code in addition to already existing sort by XYZ coordinates option.

13) Edit feature code attributes function: Quickly make changes to the feature code definition for a selected point clicking on the "Edit Feature Code Attributes" button or menu that appears in terrain edit dialogs and when middle clicking or pressing return in terrain info and clearance commands.

14) Isoclearance Lines: Use commands in *Terrain/TIN/Isoclearance* to draw contour lines of constant clearance to wires. Use these for vegetation management or to identify areas of inadequate ground clearance. See [http://tdworld.com/mag/power\\_airborne\\_surveying\\_aids/index.html](http://tdworld.com/mag/power_airborne_surveying_aids/index.html) for a related T&D World article.

15) Reserve memory for millions of XYZ points: Use *F1/Survey + Terrain Features/Preallocate memory for XYZ points* to tell PLS-CADD how many XYZ points you expect to have. This lets the program reserve memory for the points before memory gets fragmented enabling you to work with larger data sets before getting out of memory errors.

## **PLS-CADD Coordinate Projections, Imagery and Google Earth**

1) Survey coordinate system definition: *Terrain/Coordinate System* dialog box has inputs for defining your survey data coordinate system. This enables use of coordinate system conversions in other functions described below. See <http://www.powline.com/products/coordsys.pdf> for more information on coordinate systems.

2) Report on structure longitude and latitude: *Lines/Reports/Structure Longitude and Latitude Report* (FAA reporting requirements)

- 3) Improved aerial imagery download: *Drafting/Attachments/TerraServer Image Download* function for free download of United States imagery now performs automatic conversion from UTM NAD83 (TerraServer coordinates) to survey data coordinates (no longer need to input of UTM NAD83 coordinates for first and last PI).
- 4) Google Earth Export: *File/Export KMZ* exports 3D view to Google Earth. See the technical note [http://www.powline.com/products/ge\\_tips.html](http://www.powline.com/products/ge_tips.html) for detailed instructions and <http://www.powline.com/newstuff/ge.wmv> for a sample Google Earth video and <http://www.powline.com/newstuff/optimizationworkshop.kmz> for a file you can load into Google Earth.
- 5) Solve out of memory while printing problems: *Drafting/Attachments/Image Drawing Options* allows you to override the minimum pixel size PLS-CADD uses when printing. This degrades output quality but can resolve printing problems when the system or printer has inadequate memory to print at full resolution.
- 6) Graphical interface for aerial imagery: *Drafting/Attachments/Image Info* tells you what image your mouse cursor is over and gives easy access to show, hide, crop and attachment options for that image.
- 7) Support for JPEG200 imagery: Switched to new ECW library which supports JPEG 2000 (.JP2) imagery (see <http://www.powline.com/products/photos.html> for details on the different imagery types).
- 15) Screen image capture: Use *Edit/Copy* from a graphics view to insert a bitmap of that view into the Windows clipboard. Image size defaults to size shown on screen. Image size can be overridden to produce higher quality output (not limited to screen resolution).

### **PLS-POLE and TOWER Shared Improvements**

- 1) Relaxed restrictions on insulator types and properties: Each phase within a set can now have different insulator type and properties.
- 2) Additional insulator swing limit: Added support for a fourth set of limits for suspension insulator swing and 2-part load angle. While the limits for swing angles and load angles are established in TOWER they are not checked in TOWER. Verification that actual swing and load angles are within these limits will not happen until the structure is checked in PLS-CADD.
- 3) Minimum Vertical Load Limit: Like with the swing angle and load angle limits, TOWER does not check to see if this limit is exceeded but it does prompt for this limit and passes it to PLS-CADD. Verification that the Minimum Vertical Load Limit isn't exceeded will happen when the structure is checked in PLS-CADD.
- 4) Guy attachment loads: Analysis Results report now has "Loads At Guy Attachments For All Load Cases" summary
- 5) Identify the load cases that control: Right click in the deformed geometry view and select "Create Controlling LCA Subset" to write a new LCA file that contains only the load cases that controlled at least one component of the structure.
- 6) The File/Backup option to include additional models now allows you to include models from many different folders.
- 7) Improved annotation: Now have same annotation commands and toolbar as PLS-CADD: Add Line, Arrow To, Arrow From, Dimension, Text and Polygon, also graphical move, edit and delete commands. These commands work in the front plane of the structure (initial view).

8) NESC 2007 options: NESC 2007 loading method for Wind/Ice Model column in *Loads/Vector Loads* and *Loads/Wire Loads*.

9) ANSI/TIA/EIA 222-G update: Made changes to implement the published version of the code. See [http://www.powline.com/products/222-g\\_notes.pdf](http://www.powline.com/products/222-g_notes.pdf) for notes on the 222-G implementation. This includes automatic loading for four microwave antenna types. Will begin working on 222-G addendum once it is released (April 07?)

10) CSA S37-01 support: Added CSA S37-01 loading option, see [http://www.powline.com/products/s37\\_notes.pdf](http://www.powline.com/products/s37_notes.pdf) for details.

### **PLS-POLE Specific Improvements**

1) Post insulator interaction curves: You can now input multiple strength interaction curves for post insulators (see <http://www.powline.com/products/post-curves.pdf>)

2) Extended batch modify capability: New options for Linear Appurtenances, Fixity Point As a % of Buried Length , Brace Components File, Vangs, Wood Pole Defects and Foundation Strength.

3) Pole deflection limits: Steel pole shaft optimizer and optimum pole selector now support pole deflection limits. Optimizer also has new minimum taper input.

4) Laminated wood support: Requires PLS-POLE/LW+MAST option (modular aluminum mast and laminated wood)

### **TOWER Specific Improvements**

1) File/Batch Modify now has option for Linear Appurtenances.

2) Reduced label clutter: "Hide Symmetrical Labels" option in the 3D Controls/Set dialog prevents display of joint or member labels that were generated by symmetry.

3) Controlling tension and compression color coding: Controlling tension and compression capacities in the Member Capacities and Groups Summary tables are now color coded.

4) Replacment bolt type: *General/Optimization Options* allows specification of replacement bolt type for use in Interactive Member Sizing and Auto-Fix Angles commands.

5) Resizeable interactive member sizing dialog: Right click on title bar to resize

6) Tension-only beam element type: Added option for Angle Groups which can stabilize models that require tension-only members that are not stable when modeled with a truss.

7) Crossing diagonal checks: Added Crossing Diagonal Unbraced Length Check as per ASCE 10, TIA/EIA 222-G, ECCS and CENELEC. See the technical note at <http://www.powline.com/products/tower-crossing-diagonal-check.pdf> for details.

8) Family optimization mode: New option in *General/Optimization Options* that allows multiple models to be considered during the optimization (see the dialog for details).