



**TXDOT ENGINEERING SOFTWARE SUPPORT
INFORMATION**

**Prestressed Concrete Girder SUPERstructure
Design and Analysis Program
(PGSuperTM)**

This document provides end-user support information for the PGSuper application. This support information will be updated, as needed, to remain current.

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ABOUT PGSUPER

This software has been collaboratively developed and maintained by the Washington State Department of Transportation (WSDOT), the Texas Department of Transportation (TxDOT) and the Kansas Department of Transportation (KDOT) under the Alternate Route Project initiated and managed by WSDOT. (<http://www.wsdot.wa.gov/eesc/bridge/alternateroute/licenses.htm>)

The TxDOT-customized version of PGSuper is versatile, user friendly, Windows-based software for the design, analysis, and load rating of multi-span precast-prestressed concrete bridge beams/girders in accordance with the AASHTO LRFD Bridge Design Specifications (thru the 7th Edition, 2014, as modified by 2015 and 2016 Interim Revisions) and TxDOT design policies and guidelines. Properties of TxDOT standard I-girders (TxGirders), U beams, Slab beams, Decked Slab beams, Box beams and X-Beams and TxDOT design criteria are included in templates and libraries published by TxDOT on a server accessible via the Internet. Thus, the software is capable of periodically updating the installed templates and libraries with the most current versions published by TxDOT.

Custom defined beam shapes that fit within each family of girder types supported by PGSuper can also be added to a user's installed copy of the templates, thereby extending the girder shapes that the user can design, analyze and load rate with the program.

The flexural design feature computes the required number and pattern of prestressing strands and the minimum required release and final concrete strengths. For TxGirders, the design algorithm considers three strand pattern types: 1) all straight fully bonded strands, 2) all straight with some partially debonded strands and a mix of straight fully bonded and draped fully bonded strands. Specification checking evaluates girders for compliance with strength, serviceability and detailing criteria. Horizontal and vertical shear design, analysis and load rating is also facilitated.

A variety of results reporting is provided, including exhaustive and comprehensive reports, reports tailored to specific design or analysis features, fabricator optional design evaluation reports and a TxDOT Girder Schedule Report ("TxDOT CAD Output").

Certain functionality of this version of PGSuper has been enhanced over that of the previous release and most known issues/bugs present in the previous release are fixed in this release. For a list of these changes see the PGSuper support Information Document.

To report bugs and for questions or technical support, please send an email to: TxDOT_PGSuperHelp@txdot.gov

GENERAL SUPPORT INFORMATION

Product Name: PGSuper

Current TxDOT Production Release: Version 2.9.2

Technical Support

Non-TxDOT users may request technical support when this software product is used to perform services for the department. **Note:** For WSDOT BEToolbox support, users must contact WSDOT. TxDOT does not provide technical support for these tools which are included in the WSDOT 2.9.1 installation package.

Reporting Problems

TxDOT is committed to correcting problems associated with this software product. Users are encouraged to report all problems.

Contact Information

To request technical support or to report problems contact:

Texas Department of Transportation
Bridge Division
TxDOT_PGSuperHelp@txdot.gov

Release History and Support Status

| Product Name | Version | Release Date | Support Status |
|--------------|---------|----------------|----------------|
| PGSuper | 2.4.0 | October 2010 | Not Supported |
| PGSuper | 2.5.1 | September 2011 | Not Supported |
| PGSuper | 2.7.2 | December 2012 | Not Supported |
| PGSuper | 2.7.3 | October 2013 | Supported |
| PGSuper | 2.8.0 | March 2014 | Supported |
| PGSuper | 2.8.2 | November 2014 | Supported |
| PGSuper | 2.9.0 | July 2015 | Supported |
| PGSuper | 2.9.1 | March 2016 | Supported |
| PGSuper | 2.9.2 | June 2016 | Supported |

Determining the Installed Version

To determine the version of PGSuper installed on your computer, run PGSuper and select **Help | About PGSuper** on the main menu.

VERSION 2.9.2

Status

PGSuper Version 2.9.2 is the current TxDOT production release.

Known Problems/Issues

There were no known problems associated with this release when it was released by WsDOT.

Compatibility

PGSuper input files are backward compatible. This means that newer versions of the program can always open files created by an older version, but older versions of the program typically cannot open files saved by a newer version.

Installing and Removing the Software

TxDOT User

Use current TxDOT procedures for managing software on your workstation.

Non-TxDOT User

Prerequisites

Note that you must have adequate privileges (typically administrator level) on your computer in order to install or uninstall PGSuper. If you do not have such privileges, contact your management/IT staff to install the program.

Multiple versions of PGSuper 2.9.2 and earlier cannot run on the same computer. Therefore, remove any existing version of PGSuper prior to attempting to install a new version. The installer program for version 2.9.2 will do this automatically so no need to manually remove the existing version before installing 2.9.2. Note also that versions of PGSuper, PGSplice and the WBFL libraries are co-dependent. If you have older versions of PGSplice, or the WBFL, you must also remove them prior to installing PGSuper.

Installation

The current TxDOT production version of PGSuper can be downloaded from http://www.txdot.gov/business/contractors_consultants/engineering_software.htm. Look for the description for PGSuper, click on the title of the description, review the TxDOT Software License Agreement, fill out the short registration form (preferably with your real name, physical address and email address) and click 'I Accept these Terms'. After you have downloaded the txdot_pgsuper_v2.9.2 archive file double click it to extract the txdot_pgsuper_v2.9.2.msi and Readme.txt files. Read the Readme.txt file and then double-click txdot_pgsuper_v2.9.2.msi to start the installation.

The first time you run PGSuper, you will be prompted to configure the program. Select "Download and synchronize..." with the TxDOT publisher. This will insure that your version of the PGSuper library is synchronized with the most current TxDOT standards. If you do not have Internet access, or if PGSuper is blocked by your firewall, you must either resolve the issue or as last resort contact TxDOT at TxDOT_PGSuperHelp@txdot.gov to get the most current version of the library and template files.

Removal

PGSuper can be uninstalled from the Control Panel "Add and Remove Programs" (Windows XP) / "Programs and Features" (Windows 7) under the Start window. Simply double-click on "PGSuper" to start the removal process. The installer program for version 2.9.2 will do this automatically in the case of an install so no need to manually remove the existing version. The installer can also be run after installation of 2.9.2 and the installation changed, repaired or removed.

Summary of Changes

The following is a summary of the changes that have been applied to Version **2.9.2** (WSDOT release date of June 8, 2016). Listed are all TxDOT, KDOT and WSDOT directed changes since the Version 2.8.2 release. Also listed are archives of all such changes made to PGSuper back thru the Version 2.5.2 release:

Current/Production Version: 2.9.2 – June 8, 2016

- Fixed synchronization and context issues for context menu commands in the Girder View
- Fixed problem with program becoming nonresponsive when trying to resolve an "L/S out of range" error from the Status Center
- Fixed typographical error in the "Effective Flange Width parameters out of range" message
- Fixed formatting problems with raised straight strand designs using the TxDOT Cad Export feature
- Fixed formatting issues with the TxDOT Girder Schedule report
- Fixed issue with file filter in the File Open dialog not remembering the last file type opened
- Improved guidance message for the LLDF Range of applicability message for non-parallel girders
- Fixed problem with the shear LLDF for exterior girders of Type f and g sections when I or J violates the Range of Applicability

Archived Version: 2.9.1 – February 8, 2016

- Added support for LRFD 2016 interims
- Modified TxDOT CAD Export Format for I Girders (IGND) with Straight/Raised strands
- Shrank Length of TxDOT Summary Report (Short Form)
- Status center now alerts if zero overlay load is input
- Updated WSDOT Girder Schedule to reflect new stirrup information
- Stirrup Detailing Check now reported for Strength II Limit State
- Fixed issue displaying strand locations at mid-span in Select Strands dialog
- Fixed issue when switching spacing type to spread spacing
- Fixed issue when overlay weight input not recorded properly
- Fixed errant message stating that stirrup data does not match library
- Fixed error in Bursting Resistance check for debonded strands
- Fixed issue in Stability View - Hauling Mode when using KDOT hauling calculations
- Fixed issue creating Lifting Factors of Safety view when harp points are at 0.5L
- Fixed issue where lower mat of deck rebar was used for moment capacity analysis when slab panels are used
- Fixed crash when defining girder due to errors with design strategy input
- Fixed minor issues with live load distribution factors
- Fixed issues associated with modifying strand patterns
- Fixed issue where excess camber was reported incorrectly in Camber Details Chapter
- Fixed issue where horizontal curve delta angle input for right angles less than 1 degree got changed to left angles
- Fixed error with harped strand input when defined by CG from bottom of girder
- Fixed issues applying future overlay dead load for rating analysis

- Fixed issue where load rating live load factors could not be modified, even if rating criteria permitted it
- Fixed error Reporting Beam Spacing in TOGA
- Fixed error displaying grid index number in TOGA
- Fixed error where TOGA could not deal with adjustable strands that are not harped in library
- Fixed issue where tolerance bug in lifting design caused infrequent crashes
- Fixed issue where flexural design fails when LLDF range of applicability is errantly violated
- Fixed error computing stress due to deck shrinkage during design
- Fixed minor error with debond design causing algorithm not to converge in rare cases
- Fixed case when ultimate vertical shear design was not considering Strength II
- Fixed minor issues with the flexural design algorithm

Archived Version: 2.9.0 – May 11, 2015

- Added support for AASHTO LRFD 7th Edition 2014
- Added support for AASHTO LRFD 2015 interim provisions
- Added deck shrinkage effects to analysis results stress graph
- Added new TxDOT loss method
- Added new cascading design strategies feature
- Added Favorite Reports feature
- Added Custom Reports feature
- Added new constructability checks
- Added new limit state evaluations
- Added feature to disable limit state evaluations that are not required by AASHTO
- Updated Live Load Distribution Factors computed by WSDOT method due to policy change
- Fixed issue modeling future overlay load
- Fixed issue applying deck shrinkage elastic gain multiplier
- Fixed issue with harped strand adjustment controls for direct filled strand input
- Fixed issue reporting effective prestress with live load
- Fixed issue evaluating specification compliance for girder hauling analysis
- Fixed issue with deck V/S ratio for creep coefficients
- Fixed issue with time of initial loading for computing creep coefficients

Archived Version: 2.8.2 - January 29, 2014

- Fixed problem with WSDOT Load Rating Summary Report causing the program to crash
- Fixed problem with Load Rating Report causing the program to crash
- Fixed problem with Load Rating Analysis crashing when HL93 is used for legal load ratings
- Revised girder sag warning feature. Sag warning can now be based on upper bound, average, or lower bound camber. This warning can also be completely disabled.

Archive Version: 2.8.1 – September 15, 2014

- **NOTE: PGSuper files created with version 2.8.1 cannot be opened with version 2.8.0.**
- Fixed reporting of reactions for load rating vehicles. Reactions are provided in one location of the Load Rating Report.
- Fixed problem opening old files that used spline curves to model the edge of deck.
- Fixed problem modeling complex deck edges using compound spline curves.
- Fixed problem of vehicles used only for negative moment effects being considered for positive moment yield stress ratios in the load rating analysis.

- Fixed problem modeling unique spacing at each end of a span. Spacing values would be applied at the wrong end of the span.
- Fixed problem with negative moment capacity calculations. Mild reinforcement in the girder was not included in the capacity analysis even if the Project Criteria specified it was to be included.
- Fixed problem with schematic image of connection geometry for end abutments.
- Fixed problem detecting invalid deck rebar definition.
- Fixed problem with erroneous spec check Fail result for positive moment checks at the ends of girders.
- Fixed problem applying live load distribution factors to live load reactions in multi-span bridges with different number of girders in each span.
- Fixed problem creating Hauling Report for cases when the hauling analysis is disabled.
- Fixed problem with the live load load factor for permit load ratings. An invalid load factor was used when the ADTT was exactly 5000.
- Reduced the size of load rating reports.
- Added feature to disable stirrup layout checks.
- Added factor to define the variability of camber. It was previously assumed to be 50%.

Archive Version: 2.8.0 - January 29, 2014

- Enhanced modeling of longitudinal reinforcement in the girder to support partial length bars.
- The amount of reinforcement in a girder is now used to determine the allowable tension limit during prestress release.
- Added support for debonded strands in the Texas Optional Girder Analysis (TOGA) program.
- Added support for all TxDOT girder types in the Texas Optional Girder Analysis (TOGA) program.
- Added Kansas DOT Transportation Analysis.
- Updated bridge framing definition by adding an arbitrary datum line to locate abutments and piers.
- Updated modeling of connection geometry.
- Added specification checks minimum reinforcement spacing per LRFD 5.10.3.1.2.
- Added reduction to cross section depth for pre-decked bridges to account for the sacrificial wearing surface.
- Fixed issue with creating the Bridge Analysis Report when all load rating types are disabled.
- Fixed problems computing the slab dead load for single girder bridges.
- Fixed application of the future wearing surface dead load to account for cases when governing forces and stresses occur prior to installation of the overlay.
- Fixed problems validating the geometry layout of longitudinal reinforcement in girders.
- Fixed problems reporting reactions.
- Fixed problem computing prestress losses when precast deck panels are used. Dead load of deck panels were mistakenly omitted.
- Some combinations of input made it impossible to change the girder spacing datum. This problem has been resolved.
- Certain combinations of invalid alignment description data would cause PGSuper to crash. This problem has been resolved.
- Added analysis points at the start and end of distributed loads.
- Ctrl-Tab and Shift-Ctrl-Tab would not switch between windows. This problem has been resolved.

Archive Version: 2.7.4 - September 09, 2013

- Updated reference for WSDOT live load distribution factor calculation method from design memo to BDM.
- Corrected spelling of "screed".
- Corrected issue checking applicability of effective flange width calculation method (LRFD 4.6.2.6.1).

Support Information

Prestressed Concrete Girder Superstructure Design and Analysis Program (PGSuper™)

- Corrected issue computing slab offset ("A" Dimension) for U-girders where the crown point occurred between webs.
- Fixed issue where PGSuper would crash if an invalid file was opened.
- Fixed issue where PGSuper would crash if a span/pier is removed and there is deck reinforcement defined at the pier.
- Fixed issue initializing the input grid for defining negative moment reinforcement in the bridge deck.

Archive Version: 2.7.3 - July 29, 2013

- Updated for AASHTO LRFD Bridge Design Specifications, 6th Edition, 2013 interim provisions
- Updated for the AASHTO Manual for Bridge Evaluation, 2nd Edition, 2011 and 2013 interim provisions
- Updated WSDOT Girder Schedule to match current standards for WF and U sections
- Updated WSDOT libraries and templates to match current standards
- Updated TxDOT logo
- Added WSDOT BEToolbox to the installation package
- Added information to the vertical profile input to clarify Vertical Curve input parameters
- Added informational message to the Status Center to alert the user of zero length vertical curves
- Added stirrup layout constructability check
- The slab overhang load is now reported as load for the main slab and load for the slab haunch
- Fixed problem computing slab overhang load for exterior girders
- Fixed problem computing Slab Offset ("A" Dimension) for cases of full superelevation
- Fixed problem validating creep time parameter input values
- Fixed problem computing girder bearing reactions
- Fixed problem computing angle Theta for shear capacity computed by the simplified procedure (V_c/V_{cw})
- Fixed problem computing negative moment capacity with zero length supplemental reinforcement
- Fixed problem with Bridge Plan View span selector
- Fixed problem that made the TxDOT Box Beam inaccessible
- Fixed problem with V/S ratio in prestress loss calculations
- Fixed problem reporting controlling state for check of Debonding Limits
- Fixed display problem with strand locations in direct strand input mode
- Updated and fixed problems with shear design algorithm

Archive Version: 2.7.2 - November 09, 2012

- Clarified reporting of failed allowable tension stress checks in the Specification Check Summary
- Clarified report of Required Concrete strengths summary in the Details Report
- Made minor adjustments to the shear design algorithm
- Added Service III live load factor to calculation of effective prestress with live load
- Added girder end area to V/S ratio
- Fixed problem inputting extended straight strands
- Fixed problem creating reports for multiple girders
- Fixed problems evaluating horizontal interface shear

Archive Version: 2.7.1 - September 25, 2012

- Added Kansas DOT to product branding
- Added Direct Selection Strand Input method
- Added support for all three strand relaxation loss methods defined in the AASHTO LRFD
- Added method to control elastic gains and losses
- Added a header to the Reports
- Added output for girder bearing reactions
- Added span selector to the bridge view window

- Added LRFD reference for shear check failure due to excessive span to depth ratio
- Improved reporting of shear capacity details in girder end zones
- Improved evaluation of LRFD 5.8.4.3 - waiver for horizontal interface shear requirements
- Improved the Girder Designer shear design algorithm
- Improved the load distribution of barrier, sidewalk and pedestrian loads
- Moved definition of load factors from the project library to the project file
- Crack spacing is now considered when determine the Beta factor for shear capacity calculations
- Fixed evaluation of horizontal interface shear when no interface bars are present
- Fixed problem with shear force used to evaluate horizontal interface shear
- Fixed problem accounting for U-Beam end blocks when determining the horizontal interface shear width
- Fixed problem drawing the Standard toolbar
- Fixed problem with disabled menu items
- Fixed problem opening wrong tab when using the Edit Stirrups option from the Girder View
- Fixed problem entering concrete unit weight for a railing system
- Fixed problem displaying sidewalks and barriers
- Fixed problem modeling girders with very small end distances
- Fixed problem copying select data between girders
- Fixed problem with erroneous library conflict message when using box beams
- Fixed problem labeling X-axis in the Analysis Results View
- Fixed problem opening a PGSuper Project file when dragging-and-dropping onto the Report view
- Fixed problem reporting debond information in the TxDOT CAD Report
- Fixed problem generating overlay dead loads for varying deck widths
- Fixed problem computing cracking moment for negative moment
- Fixed problem graphing multiple minimum moment capacity graphs
- Fixed problem computing 1.33μ for the Strength II limit state
- Fixed problem creating load rating report for models with no design live load vehicles
- Fixed problem computing live load deflections when a live load other than HL-93 is used for design
- Fixed problem with Fatigue I limit state results when a live load other than the Fatigue truck is used
- Fixed problem loading rating bridges with pedestrian loads
- Updated load rating summary to include the yield stress ratio
- Updated WSDOT Load Rating Summary to indicate if the cracking moment is exceeded for the yield stress ratio check

Archive Version: 2.6.1 - June 04, 2012

- Removed dead load of future overlays from load rating calculations
- Added missing details for shear live load distribution factors
- Percentage of debonded strands is now based on total number of strands
- Percentage of debonded strands is now displayed correctly on the Debonding tab
- Fixed problem copying girder properties

Archive Version: 2.6.0 - May 01, 2012

- Added support for AASHTO Bridge Design Specification, 6th Edition, 2012.
- Added support for extended strands
- Added options for determining μ for negative moment computations
- Updated computation of d_e and f_{po} for nominal shear capacity to conform to the PCI Bridge Design Manual

Support Information

Prestressed Concrete Girder Superstructure Design and Analysis Program (PGSuper™)

Archive Version: 2.5.3 - January 23, 2012

- Fixed problem computing live load shears for long truck trains on short spans.
- Fixed crash when creating a Bridge Analysis Report for bridges with different number of girders in each span.
- Fixed crash when number of girders is increased and live load distribution factors are user defined.
- Fixed problem updating pier stations when a span is deleted.

Archive Version: 2.5.2 - November 28, 2011

- Added most recently used list to the File Open button on the TOGA toolbar
- Fixed crash when creating a report with adjacent beams and a different number of beams in every span
- Fixed crash when changing alignment parameters
- Fixed crash when graphing DC and prestress displacements for Bridge Site Stage 2 in the Analysis Results View
- Fixed error computing CL bearing stations in the Bridge Geometry Report
- Fixed error computing live load distribution factors by the rigid method
- Fixed issue with mislabeled chamfers in box beams
- Fixed issue with deleting loads listed in the Status Center
- Fixed issue detecting if LWC is used with the approximate methods for computing losses

Changes between all versions of PGSuper are cataloged by the PGSuper Release History at:

http://www.wsdot.wa.gov/eesc/bridge/software/index.cfm?fuseaction=release_history&software_id=47