



September 29, 2017

## Release Notes for tnxTower Version 7.0

This document describes Version 7.0 of tnxTower. If you have not received your update instructions, please contact TNX Support at [support@townrx.com](mailto:support@townrx.com).

### New Features and Bug Fixes

#### v. 7.0.8

1. Corrected calculations of the Ca coefficient for round appurtenances with the aspect ratio  $< 7$ . Previously, the Ca was taken as 0.6.
2. Corrected calculations of the shielding factor Ka for feed line clusters. Previously, in some scenarios, non-subcritical flow was assumed for the clusters, which resulted in the Ka of 1.0.
3. Corrected calculations of tributary forces for buried poles. Previously, the shielding factor Ka was not considered.
4. Corrected calculations of self-weight for truss-leg members. Previously, the ice weight assumed for these members was excessive in many cases.
5. Corrected ice thickness calculations for Discrete Loads to include the vertical offset.
6. Corrected calculations of global torsion due to feed line eccentricity.
7. Corrected calculations of the effective slenderness ratio for the minor principal axis of angle legs in staggered bracing configurations.
8. Optimized calculations of the flexural strength, based on lateral-torsional buckling, for channels and wide flange shapes, to avoid triggering the "Division by 0" error for sections with thin walls.
9. Removed superfluous routines in analyses and section checks of guyed towers. This change may reduce the total run time by 20% or more, and eliminate instances of stalled runs, previously reported for certain models.
10. Eliminated the possibility of feed line Ka values, previously saved for a different feed line type, being applied to monopole Surface Ar and Surface Af feed lines.



11. Changed the maximum number of spans within a member from 40 to 120. The change will affect limits for leg and monopole reinforcing members.
12. Changed the maximum number of Discrete Loads (the # column) from 20 to 120.
13. Increased the Anchor Azimuth Adjustment angle on the Guys page to 180 deg. This change will allow to model additional guy configurations.
14. Changed the base plate minimum thickness limit to 0.25". Added warnings when the thickness entered is outside the permissible range.
15. Added an option to immediately terminate analysis runs producing the "Division by 0" error.
16. Eliminated a candelabra import error, which occurred for candelabra files with uppercase extensions.
17. Modified the Sentinel Cloud implementation to improve the performance of the licensing system (network interface).
18. Eliminated the possibility of halting the authentication as a result of entering the licensing IDs with leading or trailing spaces.
19. Added a foundation data export option, which will be used with the upcoming tnxFoundation program.

#### **v. 7.0.7**

1. Corrected values of the Wind Load With Ice and Ice Thickness Importance Factors used with the "ASCE-7-10 wind speeds" and "Use TIA load combinations" options selected. Previously, in some scenarios, the values of the factors defaulted to zero.
2. Added the ability to define ice loads when "ASCE-7-10 wind speeds" and "Risk Category I" are selected.
3. Excluded hip members from the calculation of the projected area of structural components.
4. Corrected the calculation of the effective slenderness ratios for schifflerized angle and 60 deg. bent plate leg members with staggered bracing patterns. Previously, the  $kl/r$  ratios for the X, Y, and Z axes were not applied correctly.
5. Corrected the display of bolt connection strength on the Leg Compression screen to be consistent with the location of the bolt at the top/bottom of the section.



Previously, the diagram showed bolt capacity at the top of the section, regardless of the bolt position setting.

#### v. 7.0.6

1. Corrected a bug in version 7.0 that affected the calculation of the Lu for tower leg members. The Lu, and consequently member capacity values, were reported incorrectly in some models for leg members with more than 11 panel points.
2. Changed the Importance Factor values, used with wind speeds converted from ASCE 7-10 values to nominal values (for use with TIA-222-G load combinations), to 1.0. Previously, the converted wind speeds were used with TIA-222-G Importance Factors.
3. Corrected the calculation of supporting member forces for horizontals in K-Up/Down bracing schemes.

#### v. 7.0.5

1. Corrected the calculation of the Ca coefficient for Discrete Loads under TIA-222-G. Previously the Kz and Kzt values were based on the location of the center of the tower section, rather than the center of the appurtenance.
2. Corrected the calculation of the Ca coefficient for round appurtenances with the aspect ratio lower than 7. Previously the Ca was taken as 0.6.
3. Corrected the calculation of the aspect ratio for round appurtenances with ice, as part of the calculation of the force coefficient Ca (Table 2-8, TIA-222-G).
4. Corrected the calculation of supporting member forces for secondary horizontals of x-braced sections (4.4.1 of TIA-222-G). Previously, the values (calculated in post-processing) were not accurate for some models and loading scenarios.
5. Corrected the calculation of the reduction of the member unsupported length Lu due to bolted connections.
6. Ineffectiveness of non-triangulated plan bracing is now enforced. This pertains to bracing schemes with more than one intermediate node in horizontal members (e.g., K2A Down).



7. Corrected the calculation of the EPAs for some appurtenances when using the metric system.
8. Fixed a glitch that resulted in a "Division by 0" error message.
9. Adjusted data entry fields on the Geometry page to eliminate superfluous columns for some bracing patterns.

#### **v. 7.0.3**

1. Corrected an issue which affected parsing of some input files saved by earlier versions of the program.
2. Corrected a problem that prevented the direct opening of model files.

#### **v. 7.0.2**

1. Changed the protection and licensing management system to an Internet-based solution (SafeNet Sentinel Cloud). The new system does not require hardware keys and allows a more flexible access to the program on machines with and without the Internet connectivity.
2. Discrete Loads' EPAs under TIA-222-G are now recalculated at the analysis time to reflect the requirements of Table 2-8 for round appurtenances. In addition, the EPA for flat panels is calculated for the full range of aspect ratios.
3. PiRod solid round sleeve connections, including the net tension area, are now calculated in a way that more accurately reflects the connection configuration. The diameter of the leg in the section below the current section is used for the calculation of bottom end splices.
4. Expanded the range of modeling options for hip members. The program will now enforce the triangulation requirements for hip members.
5. Added new bracing pattern - K3A M Down, for towers with single hip horizontals and diagonals.
6. Stitch bolt location input for diagonals, horizontals, and redundants has been enhanced by addition of mid-point, third-point, and numeric value options.
7. Gage Distance input has been added on the Advanced page. Previously, AISC usual gage distances were assumed.



8. There are now separate settings on the Options page of the program for solid round bracing members' cut ends and concentric placement.
9. Application of the user-provided effective length factors for diagonals of K-braced sections has been simplified. The input values, as entered by the user, are now applied to the unsupported lengths of the diagonals.
10. Secondary Horizontals in the X Brace bracing scheme are now connected to the diagonals at the cross-over point.
11. Bracing Resistance Exemption (TIA-222-G, 15.6 b) has been added. This option applies to redundant members in existing structures.
12. Corrected the pairing of leg segment forces and leg segment strengths, used in the calculation of the member utilization ratios. Previously, in some instances, the ratio was calculated using the maximum load effect within a member, rather than the one in the member segment under consideration.
13. For single and double angles on the Advanced page, the effective length factor  $K_z$  is now an assumed value equal to the user-provided  $K_x$  or  $K_y$ , as follows: If  $(K_x * L_x) < (K_y * L_y)$ ,  $K_z = K_x$ , otherwise  $K_z = K_y$ .
14. Corrected the calculation of the leg effective slenderness ratios for certain bracing schemes in conjunction with the determination of the minimum bracing resistance (TIA-222-G, 4.4.1).
15. Changed  $M_n$  calculation for solid round members from  $1.5 * S * F_y$  to  $Z * F_y$ , as per Rev. G 4.7.1.
16. The equivalent round members'  $R_r$  calculations for truss-leg members has been changed to use subcritical flow, as per 2.6.9.1.1.1. Previously, the assumed flow depended on the C value in all cases.
17. Fixed auto-calculation of torque arm areas for CSA S37 analyses.
18. Service wind speed value defaults to 50 mph on the Code page for TIA/EIA-222-F analyses.
19. Added the ability to specify custom Classification Categories in the tnxtower.ini file for use on the Feed Line, Discrete Loads, and Dishes input pages. Previously, the Categories were limited to a predefined list.
20. Removed the read-only attribute from some of the database files provided with the program.
21. Improved handling of some instances of corrupted databases.