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(rev. 1)

## Release Notes for tnxTower Version 8.0

This document describes Version 8.0 of tnxTower. Please contact TNX Support at [support@towernx.com](mailto:support@towernx.com) if you need update instructions.

### New Features and Bug Fixes

#### v. 8.0.9.0

1. Corrected data reported in the supplementary MPAUXDATA files. Previously, internal forces were output as zero values.
2. Corrected the functionality of the Reset Bolt Grades button on the Code page. Previously, the reset would not affect bolt grades for some member types.
3. Set the Section Height Above Base column on the Advanced page as non-scrollable.
4. Rearranged some of the wording in the headers on the Advanced page.

#### v. 8.0.8.8

1. Added the ability to store supplementary, arbitrary text data in the model input file.
2. Added the design of bolted connections for redundant members.
3. Added a partial restraint option to connections of bracing members.
4. Added input on the Code page for the demand-capacity ratio to be used with Annex S Target Reliabilities. Previously, the ratios could be set via the Stress Ratio and Safety Factor inputs, but this functionality was unavailable for DL-only load combinations.
5. Corrected the recalculation of Discrete Loads' CaAa when the Code on the Code page is toggled between different settings. Previously, the CaAa values would not recalculate when the Code was changed to TIA-222-F from a newer Revision.



6. Corrected the limiting value of the C coefficient (Table 2-9) for subcritical flow. Previously, 32.0 was used rather than 39.0. (TIA-222-H)
7. Corrected the CaAa calculation for Discrete Loads for the serviceability limit state. Previously, the strength limit state No-Ice CaAa values were used. (TIA-222-G and H)
8. Corrected an error in the serviceability loads calculation. Previously, the reduction factor Rr was calculated using the strength wind speed. (TIA-222-G and H)
9. Amended calculations of buckling length for horizontals in k-down/up bracing schemes to automatically consider full member length when the strength of the horizontal is evaluated based on the leg supporting member criteria.
10. Restructured and corrected internal calculations for the Minimum Bracing Resistance requirements.
11. Increased the No Ice wind speed input limit on the Code page. Previously, the speeds entered could not exceed 250 mph.
12. Corrected the display of guy anchor reactions on the MTO screen for some tower configurations. Previously, the reactions might be misaligned with the position of the anchor.

#### **v. 8.0.7.5**

1. Corrected a custom data import feature. This version of the program remains unchanged from the previous general availability version in all other respects.

#### **v. 8.0.7.4**

1. Added the consideration of flat attachments placed on flat sides of polygonal monopole shafts. As permitted by TIA-222-H Addendum 1, attachments in the Windward Zone, within the width of the flat sides of the shaft, may now be ignored in the calculation of the Rw ratio. (TIA-222-H)
2. Corrected the wind loading patterns generation. Previously, the mean velocity pressure value might be set too high for some tower configurations. For guyed towers exactly 450.0' tall, the program did not apply the full wind velocity pressure pattern to the entire height of the tower. (TIA-222-G and H)



3. Revised the implementation of Table 2-8c. Previously, the reduction of the force coefficient  $C_f$  might not be accurate for some monopoles with known corner radii. (TIA-222-H)
4. Corrected the  $C$  and  $C w/I_{ce}$  values in the 222-H Section Verification ArRr By Element report table. Previously, the values shown did not include the ground elevation factor  $K_e$ . This problem did not affect the  $C$  and  $C w/I_{ce}$  values used internally by the program. (TIA-222-H)
5. Corrected unsupported length  $L_u$  calculations. Previously, in some tower models with the Use Clear Spans For  $KL/r$  option selected, the reported  $L_u$  value for controlling bracing members might be based on the leg size in the adjacent tower section.
6. Corrected calculations of the compression strength of double angle members. Previously, the program used the torsional constant  $J$  of a double angle rather than a single angle in the  $F_{ez}$  calculation. (TIA-222-H)
7. For calculations of the  $w/t$  ratio for polygonal shapes, the program will now assume the flat side dimension  $w$  at  $4 \times$  wall thickness, regardless of the inside bend radius input. Previously,  $w$  was based on the smaller of the actual radius and  $4 \times$  wall thickness. (TIA-222-G)
8. Corrected pairing of member shear forces and shear strengths. Previously, the x-x shear utilization ratios were calculated based on the y-y shear forces, and vice versa.
9. Corrected service deflection, tilt, and twist diagrams and reports for analyses including seismic load combinations. Previously, when seismic displacements exceeded service displacements, the seismic values were shown. (TIA-222-G and H)
10. Increased the range of the % Initial Tension setting on the Guys page to 50%.

#### v. 8.0.5.0

1. Added consideration of target reliabilities in accordance with TIA-222-H, Annex S. (TIA-222-H)
2. Added the Individual Lines Feed Line Cluster Treatment for monopoles under TIA-222-H. (TIA-222-H)
3. Corrected calculations for poles with linear attachments. Previously, some feed line configurations and their impact on the pole force coefficient  $C_f$  were not properly considered. (TIA-222-H)



4. Adjusted calculations for pole attachments located at the point where the Windward, Leeward, and Lateral zones meet to ensure that such attachments are excluded from the  $R_w$  ratio calculation. (TIA-222-H)
5. Corrected calculations of  $P_n$  and  $T_n$  for polygonal poles. Previously, the  $P_n$  calculation did not include the  $F_y$  limit on the  $F_y$  value. In the  $T_n$  calculation, the flat-to-flat width was determined incorrectly, which impacted the calculated  $C_t$  value. (TIA-222-H)
6. Corrected a problem with User Forces data omission. Previously, in scenarios where some of the input rows were disabled, the program might not include all active rows in forces applied to the structure.
7. Corrected calculations of the torsional constant  $J$  for square and rectangular tubes.
8. Corrected calculations of  $M_n$  for square and rectangular tubes. (TIA-222-G and H)
9. Corrected calculations of  $M_n$  for channels. (TIA-222-G and H)
10. Changed calculations of bolt strengths for some default grades. Previously, the program used database rather than hard-coded strength parameter values. (TIA-222-G and earlier)
11. Increased the number of input entries on the User Forces page.
12. Corrected the Risk Category description on the Material Take-Off page. Previously, an incorrect or no category identifier was displayed for Risk Category IV. (TIA-222-H)
13. Corrected the location description on the Material Take-Off sheet. Previously, an incorrect location might be shown under TIA-222-H, if the model was generated under a Standard earlier than TIA-222-H with the Use County/State Lookup option selected. (TIA-222-H)
14. Added a notification alerting the user when a file being opened was saved by a different version of the program and analysis results exist.

#### **v. 8.0.4.0**

1. Corrected shear capacity calculations for pipes. (TIA/EIA-222-F and earlier, CSA S37-01)
2. Corrected occurrences of superfluous characters in the analysis and design report, which might be generated for some feed line configurations.



3. Increased the number of input rows on the User Forces page.

#### **v. 8.0.3.2**

1. Added seismic data input on the User Forces page. (TIA-222-G, H)
2. Added seismic load combinations. Currently, these load combinations only use data entered in the Seismic section of the User Forces page. (TIA-222-G, H)
3. Revised the treatment of feed lines attached to Upper Structure poles on top of Base Towers. Such feed lines are now considered also when specified with the Surface Component Type. Previously, the Surface Component Type was considered for monopoles only. (TIA-222-G, H)
4. Added an option on the Feed Lines page to exclude individual feed lines from the global torque calculation.
5. Added an option to ignore the KL/ry ratio of schifflerized angle and 60 deg. bent plate legs in staggered bracing patterns. (TIA-222-G and earlier, CSA S37-01)
6. Added the ability to set custom utilization ratio limits, using the Stress Ratio For Wind and Safety Factor For Guys settings on the Code page. (TIA-222-G, H, CSA S37-01)
7. Added a force and moment diagram for seismic loads on the Material Take-Off screen.
8. Corrected exported tower base dimensions in the tnxFoundation data transfer file for models in the metric unit system.
9. Changed the wording of some labels in the Design group on the Code page for consistency reasons.
10. Increased the length limit for text strings entered as Additional Notes on the Material Take-Off screen.

#### **v. 8.0.2.1**

1. Corrected Cf calculations for poles with linear attachments. Previously, the program might report incorrect, larger Cf values. (TIA-222-H)
2. Adjusted Ca calculations for flat feed lines with aspect ratios less than 25.



3. Corrected Ca calculations for flat feed lines under the metric system.
4. Corrected calculations of global torsion due to feed lines. (TIA/EIA-222-F and earlier)
5. Corrected calculations of global torsion due to feed lines for monopoles for service load combinations.
6. Corrected calculations of the Rooftop Wind Speed-Up Factor, Ks. Previously, the Base Elevation input was not considered in the determination of different Ks zones on a tower. (TIA-222-H)
7. Modified and clarified calculations of the coordinates in the Feed Line Center of Pressure table. Previously, the coordinates were output as zeros for some tower types.
8. Eliminated the KL/r(y) consideration for schifflerized angle and bent plate legs with K Brace Left and L Brace Right bracing (staggered bracing patterns). This change makes the design consistent with the requirements stipulated in Table 4-3 of the Standard. (TIA-222-H)
9. Corrected calculations of grouted pipe strengths. Currently, grouted pipe members generate an error in the design stage. (TIA-222-H)
10. Corrected the sign of overturning moments applied as point loads in models exported to RISA-3D. Previously, the moments in exported models had an incorrect direction. This problem affected only exported models, on the RISA-3D side.

#### **v. 8.0.1.0**

1. Added support for the TIA-222-H Standard, except for Section 2.7, Seismic Load Effects. Section 2.7 will be implemented in a future release of the program.
2. Corrected application of wind loads associated with feed lines on lattice towers. Previously, for some feed line configurations, the program might underestimate reactions, displacements, and member forces.
3. Modified generation of feed line eccentric loads for all Feed Line Cluster Treatment settings to more accurately model global torsional effects.
4. Adjusted calculations of wind forces on monopole feed lines to better reflect line spacing parameters.
5. Corrected calculations of areas ( $A_E$ ), forces (F), and overturning moments (OTM) reported in the Tower Forces tables.



6. Corrected interpolated values of the wind direction factor for flat structural components,  $D_f$ , for certain wind directions.