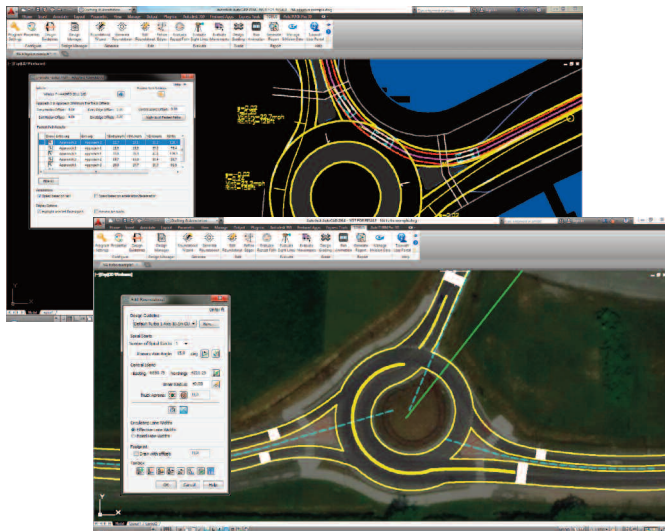


THE ULTIMATE ROUNDABOUT DESIGN SOLUTION

5



TORUS is advanced CAD-based software for the design of modern roundabouts. Powered by the trusted AutoTURN engine, TORUS takes the **innovative approach of generating roundabout geometries using vehicle swept path movements**. This method minimizes iteration cycles in the design process while also incorporating speed, design vehicle and sight distance checks.



» ADVANCED ROUNDABOUT DESIGN

Accelerate the design of roundabouts with a full complement of intuitive features. Generate single lane and multilane roundabouts based on design vehicle movements and clearance offsets. Specify inscribed circle and central island diameters, truck apron, and approach leg points. And any change to a design element or geometric parameter automatically updates all other design values in the entire roundabout layout!

» TURBO AND ADAPTIVE ROUNDABOUT DESIGN

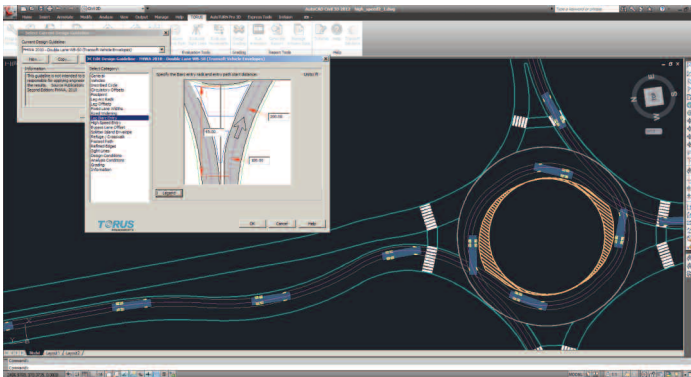
Engineers can now design variations of turbo roundabouts for improving road safety conditions as well as check a vehicle's fastest path with any manually drawn roundabouts in CAD (includes oval, non-circular, spiral roundabouts) using the new Adaptive Roundabout feature.

» VEHICLE SENSITIVE DESIGN

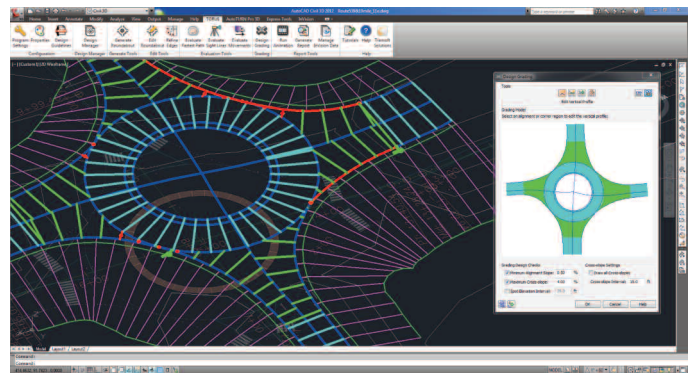
Customize the roundabout design with vehicle swept paths. Designers can apply this to define the geometry of custom truck aprons, outer aprons, extended central islands, and outer roadway edges. Now each roundabout can be designed uniquely to meet site constraints and vehicle requirements on any number of roundabout projects.

» CIVIL 3D® INTEGRATION

The new version of TORUS can now generate Autodesk® AutoCAD® Civil 3D® surfaces, vertical, and horizontal alignments. Civil 3D objects (such as corridors) are updated dynamically using the easy-to-use grading model in TORUS. With the new integration, engineers can assess the roundabout footprint based on the 3D grading design much quicker than before.

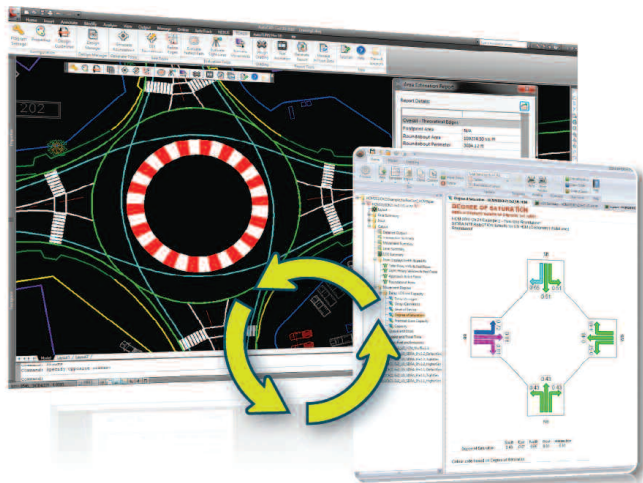


» Set design vehicles to draw outer edges on entry and exit side of legs.



» AutoCAD® Civil 3D® objects are now recognized within TORUS.

THE REVOLUTION OF ROUNDABOUT DESIGN IS HERE



» CAPACITY ANALYSIS WITH SIDRA INTERSECTION

TORUS now features integration with SIDRA INTERSECTION enhancing the workflow process. Key SIDRA vehicle capacity data can be imported and synchronized with the current TORUS roundabout, updating its geometry to fit the conditions. As well, essential capacity analysis information such as fuel consumption, emissions, costs, delay, capacity, speed, volume, and queue can be displayed in the CAD drawing with different colors and line styles.

» DESIGN GUIDELINES

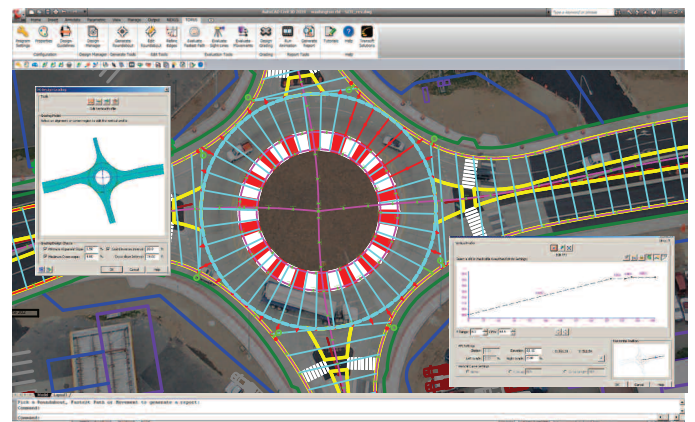
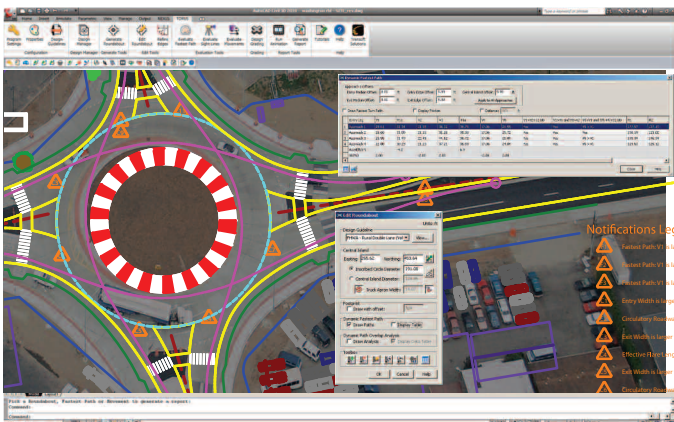
TORUS now includes new roundabout design guidelines from the FHWA 2010 and AUSTRROADS 2009. Define and then save roundabout Design Guidelines to meet local standards, setting rules for design vehicles, and the different geometric elements governed from their movements (i.e. outer edge geometry, splitter island envelopes, bypass lanes, refuge areas, and crosswalks).

» FASTEST PATH ANALYSIS

Use TORUS to evaluate the fastest path a design vehicle can maneuver through the roundabout for capacity and safety analysis. User-defined parameters for superelevation, acceleration, and critical offsets can also be applied for calculations. Additionally, fastest path results and speed differentials can be reviewed during roundabout placement and can even be generated for roundabouts created outside of TORUS!

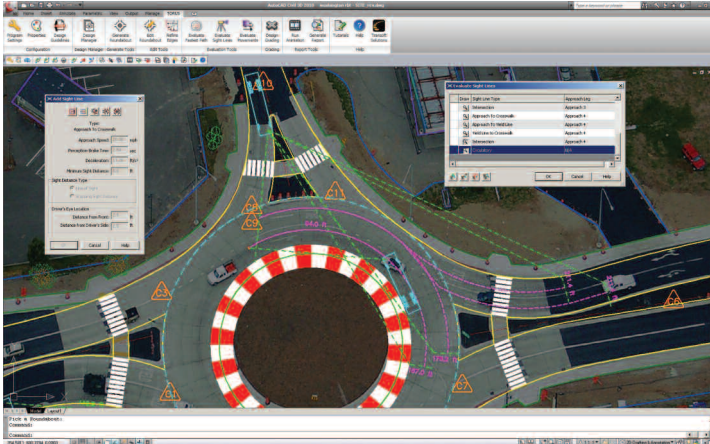
» INNOVATIVE ROAD GRADING

Instantly generate roundabout grading with contours lines, crown alignments, and cross slopes to review drainage patterns in 3D. Ensure approach roads enter and exit the roundabout at optimal grades and that the roundabout plateau does not exceed stipulated cross slopes affecting vehicle stability. Grading models can be exported into LandXML format to be used in different vertical CAD platforms.



» Get instant visual feedback for fastest path assessment. Review roundabout geometries based on the fastest path of a vehicle moving through the design.

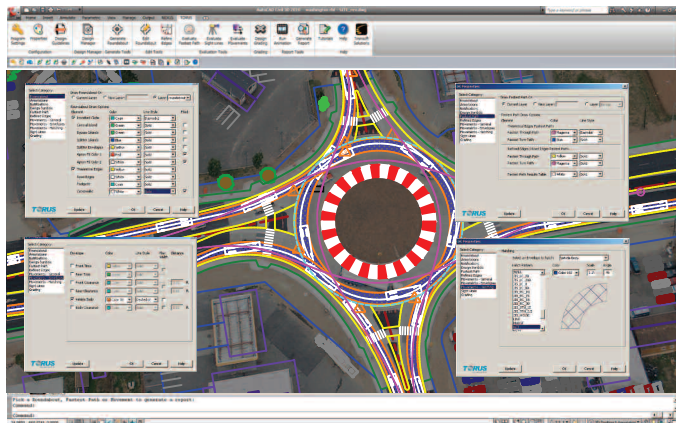
» Easy to use grading model allows engineers to define profiles, spot elevations, and cross slopes.



» Generate various types of sight lines in the drawing. Existing sight lines can also be edited and removed. Sight line analysis is important for determining safety constraints in a roundabout.

» EFFICIENT DESIGN EDITING

Easily create new roundabout iterations by editing previously generated roundabouts to check different placement positions and design parameters. You can quickly see how changes in the geometry affect operational safety and performance. TORUS editing features all the same controls and abilities found in the Generate Roundabout tool.



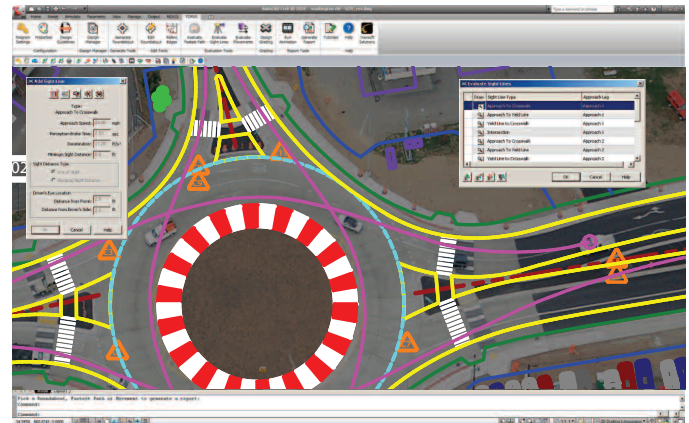
» Select and view different roundabout iterations from your saved files for project decision making and client review. Each roundabout design can have its own design symbol and independent set of iterations.

» REFINE ROUNDABOUT GEOMETRY

Initial theoretical outer edges of bypass lanes, turning lanes, and inscribed circle geometry of the roundabout based on the vehicle's swept path movements can be created and refined to produce ideal line and arc geometry as well as curve tables for construction and survey purposes.

» ADVANCED SIGHT LINE EVALUATION

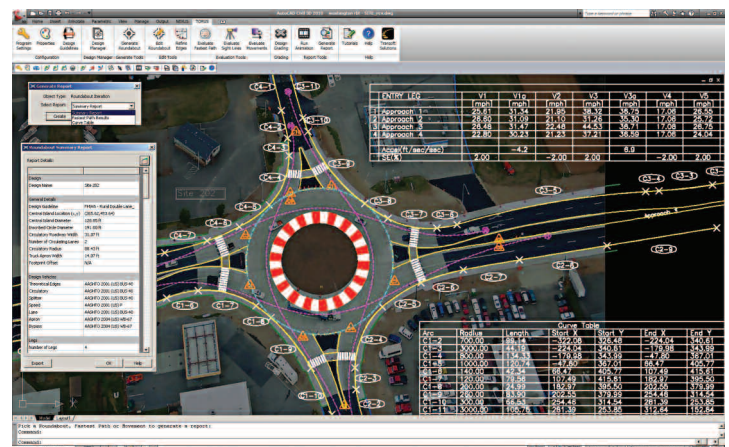
Evaluate critical sight lines between approach legs or for circulating vehicle movements to ensure adequate stopping, merging, and driver decision distances. Sight line assessments include Approach to Crosswalk, Approach to Yield Line, Yield to Crosswalk, Intersection and Circulatory based on criteria for approach speed, perception-brake time, deceleration, and critical gap.



» Produce all required roundabout geometries including the inscribed circle diameter, the diameter of the central island, circulatory roadway, and much more.

» MANAGE AND REPORT YOUR ROUNDABOUTS

The TORUS Design Manager provides a one-of-a-kind ability to manage multiple iterations of roundabout placements and varying design criteria within a single CAD drawing. All key parameters can be saved, recalled, and reported on for comparison between different roundabout iterations to aid in the selection of the optimal preliminary layouts to move on to the final design stage.



» The roundabout design is instantly updated when edits are made to different elements such as approach lanes and exit radius.

USHER IN A NEW ERA OF SAFETY AND EFFICIENCY

» ROUNDABOUT DESIGN FEATURES

- Modify the approach leg reference geometry (e.g. lines, arcs, polylines/complex chains) using grip-points to test vehicle entry deflection and the corresponding effects on fastest path, entry angle, and sight lines
- Generate single or multilane roundabouts based on design vehicle paths
- Drag and position roundabouts in the design to assess optimal locations
- Specify design parameters for approach legs (offsets, widths, bypass lanes, entry/exit lanes, crosswalk sizes, splitter islands, and taper angles)
- Modify inscribed circle diameter, central island diameter, and circulatory width
- Calculate and draw truck apron width based on design vehicle movements or user-defined specifications
- Set offset geometry for inscribed circle diameter, circulating roadway, footprint, and bypass lanes
- Calculate the vehicle drive paths for path overlap analysis and draw the entry and exit paths
- Draw grading model to represent crown alignments and cross slopes
- Ensure drainage patterns work within the roundabout layout (e.g. slope away from the central island)
- Check grading values for: Maximum Cross-Slope percentage; Minimum Alignment Slope percentage; and Contour Line Resolution value
- Add vertical curves to an alignment by K-Value with the Edit Vertical Profile Tool

» ADVANCED GEOMETRIC CONTROL

- Employ vehicle speed reduction treatment using successive curves on approaches
- Generate edges based on design vehicle tire tracks, offsets and radii as specified in the design guidelines
- Refine complex edge geometry into lines and arcs, then output survey data to a curve table

» VEHICLE MOVEMENT FEATURES

- Generate standard design vehicle path movements between approaches
- Review and display previously generated vehicle movements and adjust entry/exit approach leg, driving lane, and standard design vehicle
- Vehicle movements updated dynamically when design edits are applied to a roundabout

» FASTEST PATH AND SIGHT LINE ANALYSIS

- Generate a vehicle's fastest path through a roundabout for design analysis and checking purposes
- Calculate and display fastest paths based on theoretical edges and refined edges of a TORUS generated roundabout
- Evaluate critical sight lines between approach legs and roundabout features.
- Insert sight lines assessments for: Approach to Crosswalk; Approach to Yield Line; Yield to Crosswalk; Intersection; Circulatory; Angle of Visibility

» VEHICLE CAPACITY ANALYSIS FEATURES

- Import roundabout capacity analysis data from SIDRA INTERSECTION 5.1 (sold separately) into the current roundabout design
- Link SIDRA INTERSECTION data values to any of the TORUS geometric design methods (i.e. Vehicle Envelope or Regional Design Methods)
- Export the synchronized capacity data from TORUS Roundabouts for further study in SIDRA INTERSECTION

» REPORTING FEATURES

- **Area Estimation Report** - Generate a report that shows the approximate land area and perimeter used by a selected roundabout
- **Summary Report** - Create a report with all required design information. Data can be exported to text and CSV formats
- **Fastest Path Results** - Generate a table containing vehicle speed and radii values

» COMPATIBILITY

- Minimum AutoTURN 8.0, AutoTURN Pro 3D 8.0 or AutoTURN InSite 2.0 (sold separately) installed on the same workstation or network server
- Autodesk® AutoCAD® 2007 – 2015 series of products (except AutoCAD LT)
- Autodesk® AutoCAD® Civil 3D® 2010 – 2015
- Bentley® MicroStation® XM, V8i
- Full support for 32 and 64 bit operating systems
- **System requirements:**
 Workstation: Windows® XP, Vista, Windows® 7, Windows 8
 Network Server: Windows® Server 2000, 2003, 2008

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