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Robot™ Structural Analysis Professional

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Autodesk® Robot™ Structural Analysis Professional 2010

FEATURE SUMMARY

Following is an overview of new features in Autodesk® Robot™ Structural Analysis Professional 2010 software in the following three categories:

- Structure modeling and analysis
- Reinforced concrete design
- Steel design

You can find more complete descriptions of all features in the Help file and the user's manual.

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STRUCTURE MODELING AND ANALYSIS

General

User-defined Eurocode safety factors

In Job Preferences, you can now define partial factors for steel and RC design based on Eurocode. You can use values of the factors for a selected National Application Document, or define your own values.

Regional settings for Australia

Regional settings for Australia/New Zealand have been fixed:

- Standard steel section database (updated with respect to version 2009)
- Typical material database
- Template for generating code combinations (according to AS/NZS 1170.0:2002)
- Default steel design code—AS4100:1998
- Set of basic work units

These settings are established after you select Australia as a code country.

Regional settings for Sweden

Regional settings for Sweden have been fixed:

- Standard steel section database
- Typical material database
- Default steel design code: BSK99, SS-EN 1993-1-1:2005/AC 2006

These settings are established after you select Sweden as a code country. English is the default language for working and for printouts.

Updated Italian steel section database

The UNI steel section database has been updated.

Educational version

The following changes have been made in the educational version of the software:

- EULA reminder display about the student version when software launches
- Watermark printing on projects created using the student version
- Notification on opening the files created using the student version

API Development

A complete definition of API (application programming interface) functions is available in the SDK (software developer kit) part of the Installation.

New API functions for model definition/presentation

The following functions have been added to the existing API:

- Define grid lines
- Manage display of attributes
- Include stories in structural axis manager

New API functions for analysis handling

The following functions have been added to the existing API:

- Parameters and results of footfall analysis management
- Parameters and results of frequency response function (FRF) analysis management
- Results for stories management

New API functions for concrete elements

The existing API functions have been extended with grouping the bars and creating components of an RC project.

Support for Robot Extensions

If Robot™ Extensions for Autodesk® Robot™ Structural Analysis software has been registered previously, opening the program manager is enabled.

Model Edition

Import DXF/DWG files as a background

Load plans in DXF™ /DWG file formats as backgrounds for defining objects in the projection, cross-section, or elevation view. For a background that is being loaded you can specify:

- Insertion point
- Insertion plane
- Rotation angle
- Scale

Also, you can specify visibility parameters:

- Line color
- Visibility in selected projections or cross-sections
- Filter for layers saved in the background file

Snapping to the lines of the plan and adding lines between two parallel lines make editing stories easier.

New object types—building components

A new attribute—structure object has been added; it is assigned to typical structure elements:

- Slab
- Beam
- Column
- Wall

When you work using stories, you can use new dialogs for these objects; this attribute is assigned automatically to them, but you can change it in the Inspector pane. When beams and columns are defined, selecting an appropriate section type limits the selection of sections to those that correspond to the object. New objects are grouped in the Inspector pane.

The object type is added to the list in the Copy Properties dialog box.

Loadings

Loads on cladding distributed to nodes and panel edges, for selected objects

A set of loads acting on claddings and loads for panels (2D areas) has been unified. You can now transfer loads from a cladding (which is not a load-carrying cladding) using a schematic trapezoidal and triangular distribution model, and distribute loads in specified directions X and Y.

A list of objects to which loads will be transferred has been extended to include wall edges and nodes of columns and supports that adjoin the cladding.

You can select objects that do not participate in distributing this type of load using the selection command.

New rules for load combinations

New regulations for load combinations have been added based on the following codes:

- SABS 0160-1989:1993 (RSA)
- AS/NZS 1170.0:2002 (Australia)

Snow and wind loads according to French Eurocode 1

You can define snow and wind loads with regard to the French edition of Eurocode 1—NF EN 1991-1-3/NA mai 2007, NF EN 1991-1-4/NA mars 2008.

New loads library (ASCE 7-05)

Typical loads based on Minimum Design Loads for Buildings and Other Structures, ASCE/SEI 7-05 have been added.

Analysis

Harmonic analysis with damping

You can now define harmonic analysis cases with damping. To define this case, you must define a modal analysis case first; parameters of this analysis are used in harmonic analysis calculations. You can specify constant damping for all vibration modes, or specify damping for each mode separately, or use Rayleigh modal damping, where damping percentage is calculated for each mode based on material damping.

This change has unified the way dynamic cases are defined and has extended footfall analysis calculations with new types of damping.

Static/dynamic analysis of membranes, and diaphragms

You can now select calculation models for 2D structure objects (panels). The predefined models of slab, diaphragm, and deck decrease a number of degrees of freedom and eliminate vibration modes that are negligible for the seismic analysis (such as vibrations of slabs in their planes).

A calculation model contains a finite element type, a method of distributing loads on adjoining objects; using a calculation model, you can also eliminate selected displacements inside the panel (without changing rigidity of the system).

Improved footfall analysis

Some improvements and amendments have been added to the footfall analysis.

For input:

- Analysis for stairs based on the SCI P354 guide
- Choice of weighting factors for SCI P354 method
- Implementation of modal damping, calculated on the basis of eigenvector and material damping

For output:

- Eigenvectors and modal mass in tables
- Root mean square acceleration results in tables and diagrams
- Maps on bars for footfall results

REINFORCED CONCRETE DESIGN

Usability

Display prefabricated parts and openings on 3D view

3D views of precast elements and RC elements have been differentiated, and a real view of cross-sections in the layouts for defining beams and deep-beams has been enabled.

User interface enhancement

There are new dialogs for modifying bar groups, as well as a new method of presenting data about a selected type of reinforcement that is being modified. Using additional commands, you can change diameters of reinforcing bars, keeping the existing spacing of reinforcement.

For RC columns you can define technological breaks independently.

Reinforcement pattern dialogs and dialogs for parameterization of drawings have been reorganized.

Common r-bar databases

The process of making common databases of reinforcing bar shapes for AutoCAD® Structural Detailing software and Autodesk Robot Structural Analysis Professional software has been completed.

Check spread footing for additional loads

You can now check existing reinforcement of spread footings for new sets of forces imported from a calculation model.

New Design Codes

New code—Eurocode 2 (EN 1992-1-1 2004/AC 2008)

Design based on the current edition of Eurocode 2 (EN 1992-1-1 2004/AC 2008) has been enabled for:

- Beams
- Columns
- Spread footings
- Slabs

New codes—NAs for EN 1992-1-1 2004/AC 2008

Regulations based on the following updated National Application Documents have been added to the design of beams, columns, spread footings, and RC slabs:

- Finnish—SFS-EN 1992-1-1
- Italian—UNI-EN1992-1-1
- Polish—PN-EN 1992-1-1:2008

STEEL DESIGN

Steel Connections

New common steel connection definitions

There are new common dialogs for defining the following typical steel connections:

- Concrete column base connection
- Pinned and fixed column base connection
- Beam-to-beam end plated rigid connection
- Beam-to-beam pinned connection
- Beam-to-column end plated rigid connection
- Beam-to-column pinned connection
- Gusset plate connection—K and X types
- Tube truss node

Steel Members Design

New Australian code—AS4100:1998

The design of steel members based on the Australian code AS4100:1998 has been enabled.

New codes—NAs for EN 1993-1:2005

Calculations of steel members based on the new edition of the following National Application Documents have been enabled:

- Italian—UNI-EN 1993-1-1:2005/AC:2007
- Polish—PN-EN 1993-1-1:2005/AC:2006
- Swedish—SS-EN 1993-1-1:2005/AC:2006



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