SCADA Pro™ 15
Eurocodes

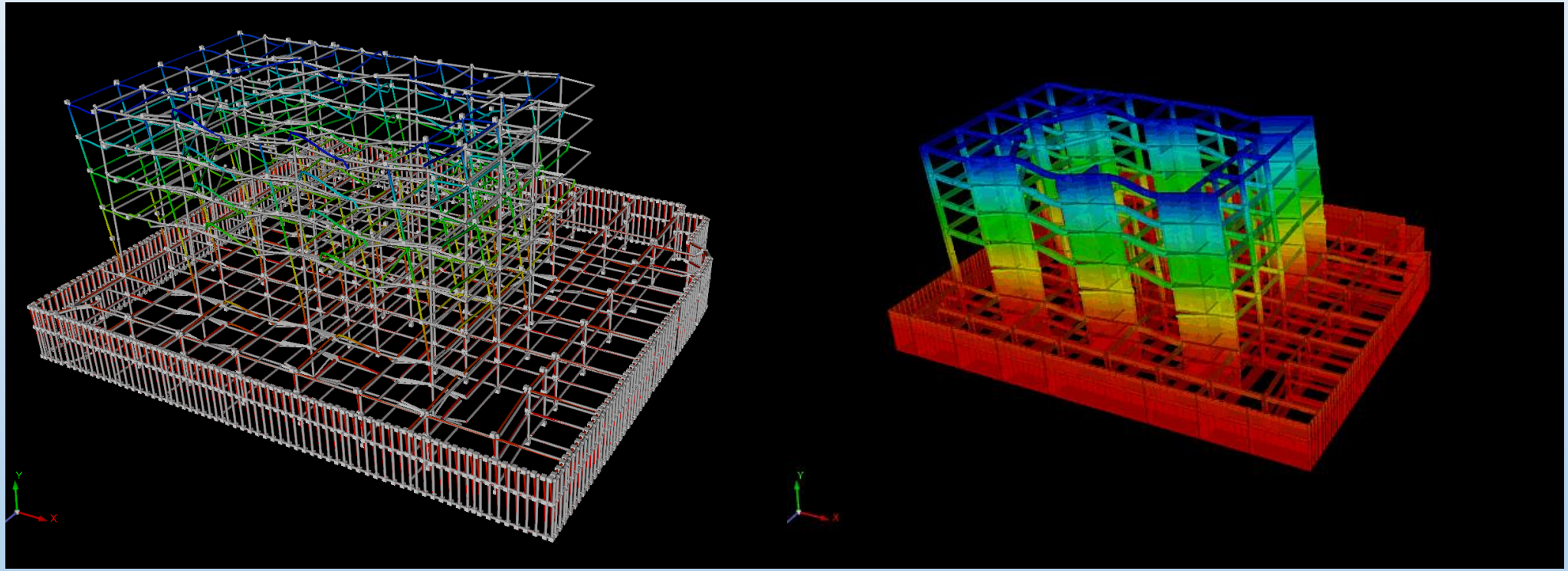
Innovative
Intuitive
Intelligent

SCADA Pro

Structural Analysis & Design

SCADA Pro™ Eurocodes

Structural Analysis & Design



Why SCADA Pro

Agenda

- General Features
- Technical Specifications
- Interoperability with leading applications and standard file types
- Integrated Interface
- Multilingual environment
- Eurocodes and National Annexes
- Detailing - Design
- Add-on MODULES with extra capabilities

ELEMENT TYPES

- Linear
- Surface Finite 3D

TYPES OF ANALYSES

- Linear
- Non Linear
- Time History

MATERIALS

- Concrete
- Steel
- Timber
- Masonry

DESIGN

- Checks
- Assessment
- Connections
- Redesign
- Reinforcements

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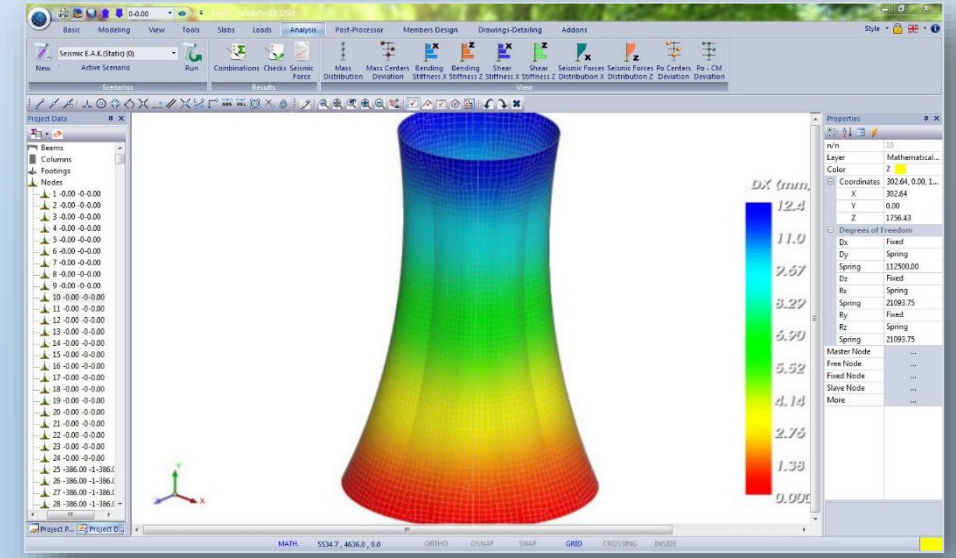
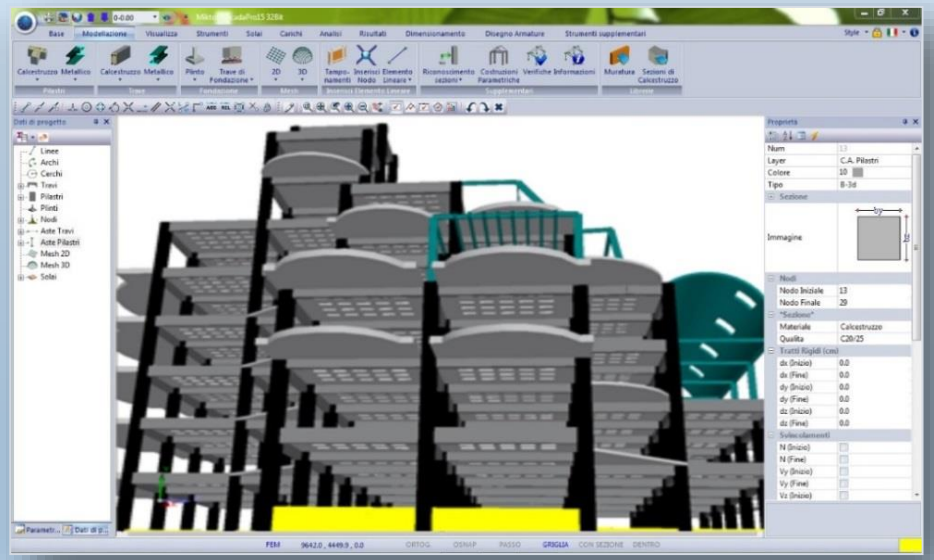
Overview:

1. General Features:

- Software for static - dynamic analysis and design of structures
- 35 years of continuous research and development
- Reliable, precise, fast and productive.





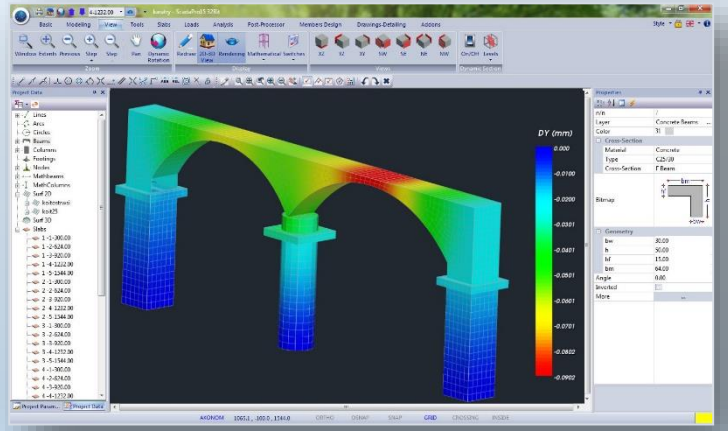
2. Technical Specifications :

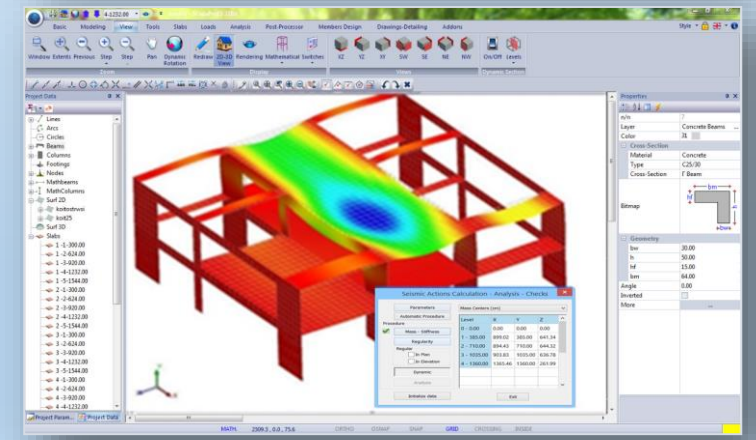
- Follows leading standards (it is certified from Microsoft and Autodesk)

Compatible with Windows 7

Revit Structure 2011 Compatible
Autodesk

- Uses :
  - industry standards (dwg, dxf, ifc4, xml, docx, pdf, excel)
  - the most modern technologies (Finite Element Method, Adaptive Mesh Generation, Direct X/Open GL graphics, .NET, C# and more)
  - the latest numerical analysis methods
  - new optimized algorithms 64-bit to generate large linear and surface finite element models
  - high computational performance (HPC) methods for reducing the computational time and very effective for the analysis of big structures
  - Automated templates for typical structures





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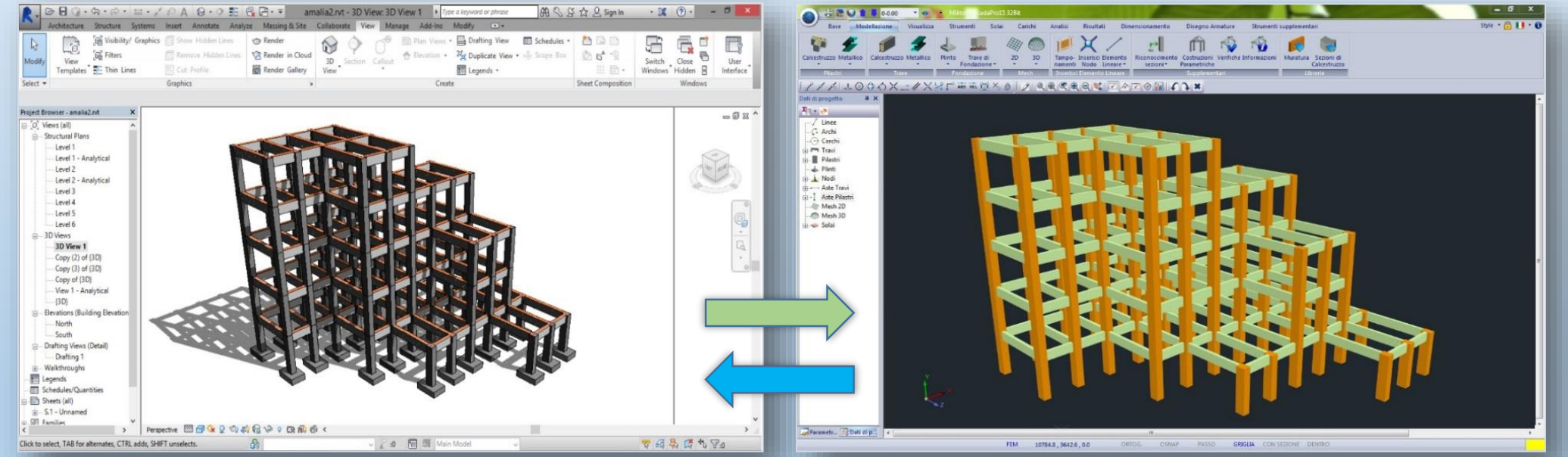
3. Interoperability with leading applications and standard file types:

- **SCADA Pro** integrates **BIM technology** and two-way communication with both architectural applications (Autodesk AutoCAD, Revit Structure) and other structural programs (ETABS, SAP2000).

- **Bidirectional communication** with architectural applications:
  - Imports **ifc** files from Autodesk **Revit** and uses built-in libraries to recognize, automatically, all the structural elements (columns, beams, slabs etc.) with their respective properties, in order to create the model for analysis and design.

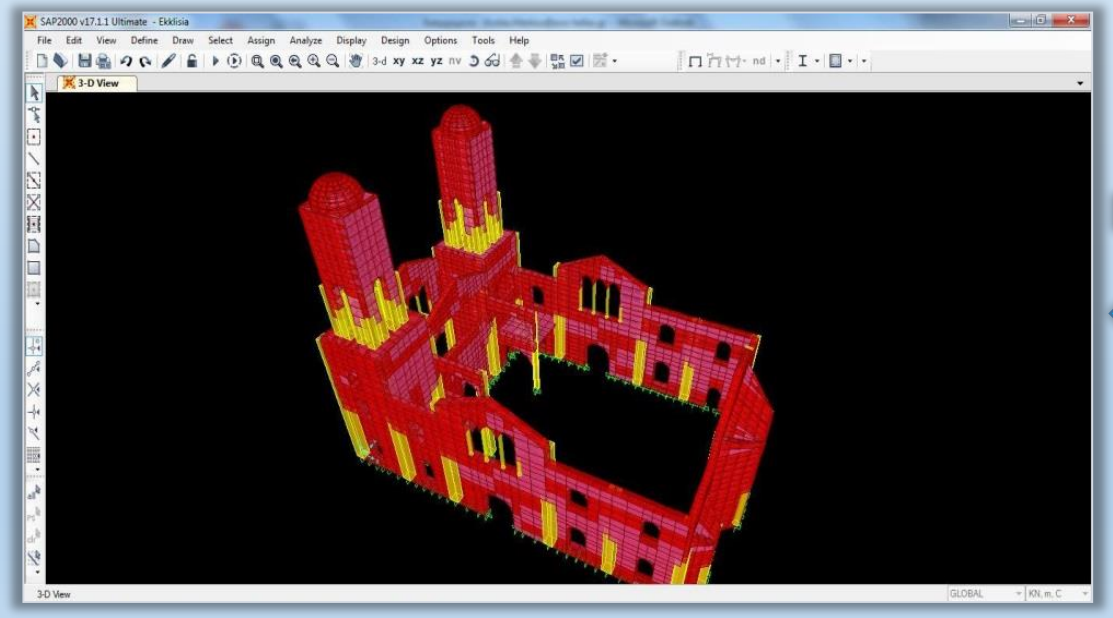


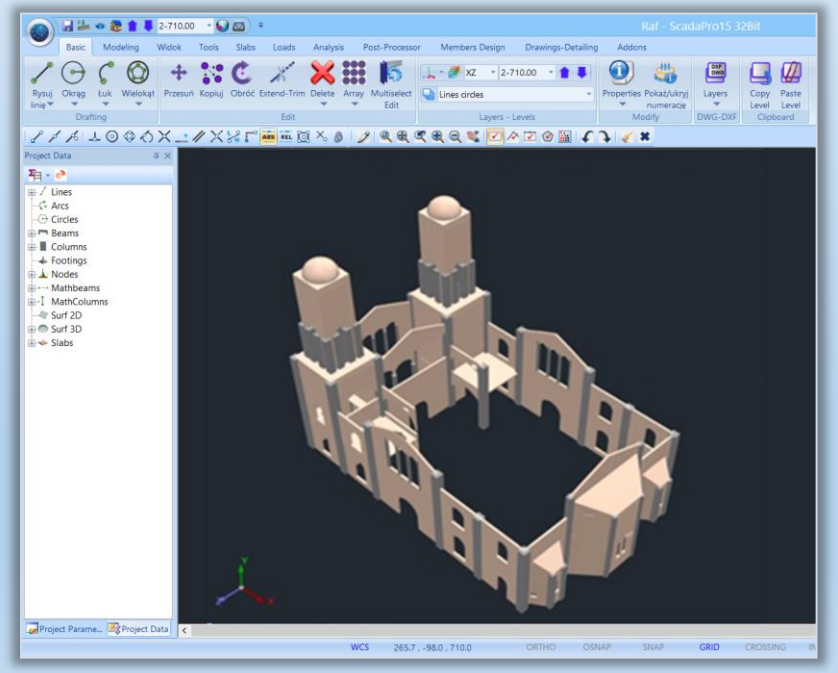
Why SCADA Pro

- **Bidirectional communication** between **ETABS** and **SAP2000** with **SCADA Pro**:

Exporting and importing structures of:
- concrete
- steel
- timber
- masonry

to and from **SCADA Pro** for analysis and design





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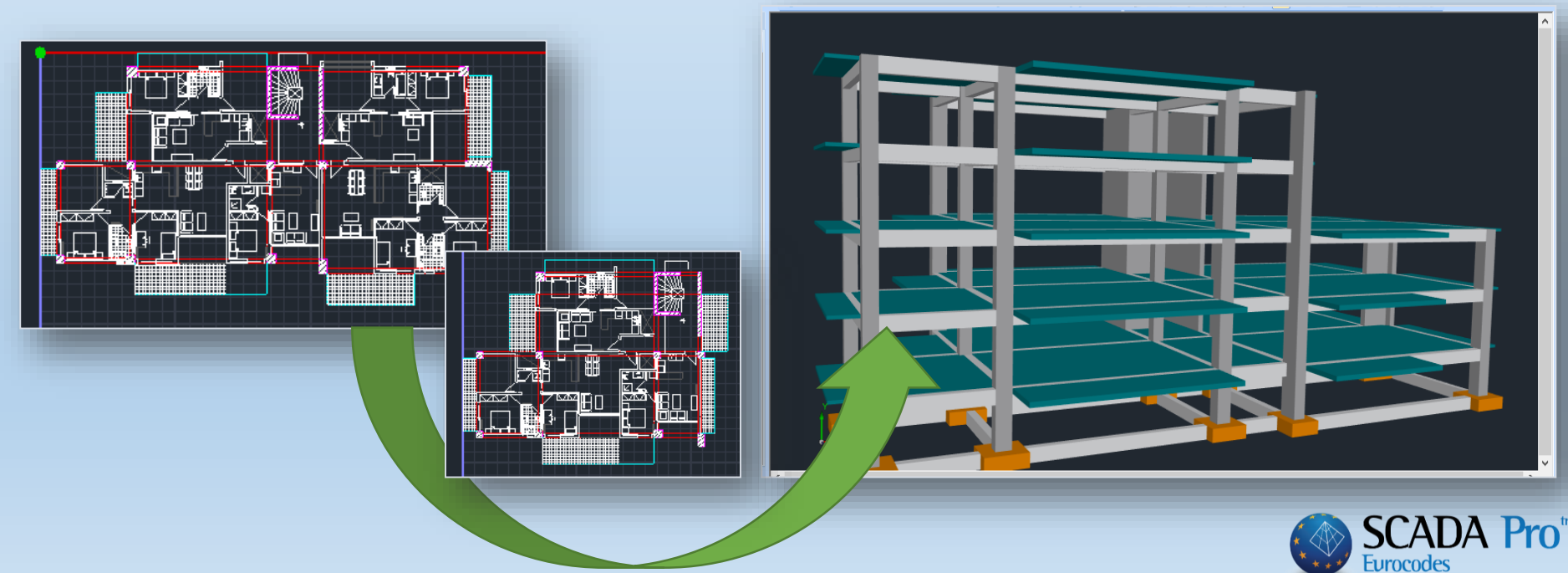
Why SCADA Pro

- Enables users to:
  - **Automatically Recognize** Cross Sections from any architectural **dxf** or **dwg** design
  - Import and rotate different design files (**dwg**, **dxf**) at each level of the building, including:
    - automatic recognition of Structural Elements and creation of the whole structure
    - automatic creation and pre-design of the foundation



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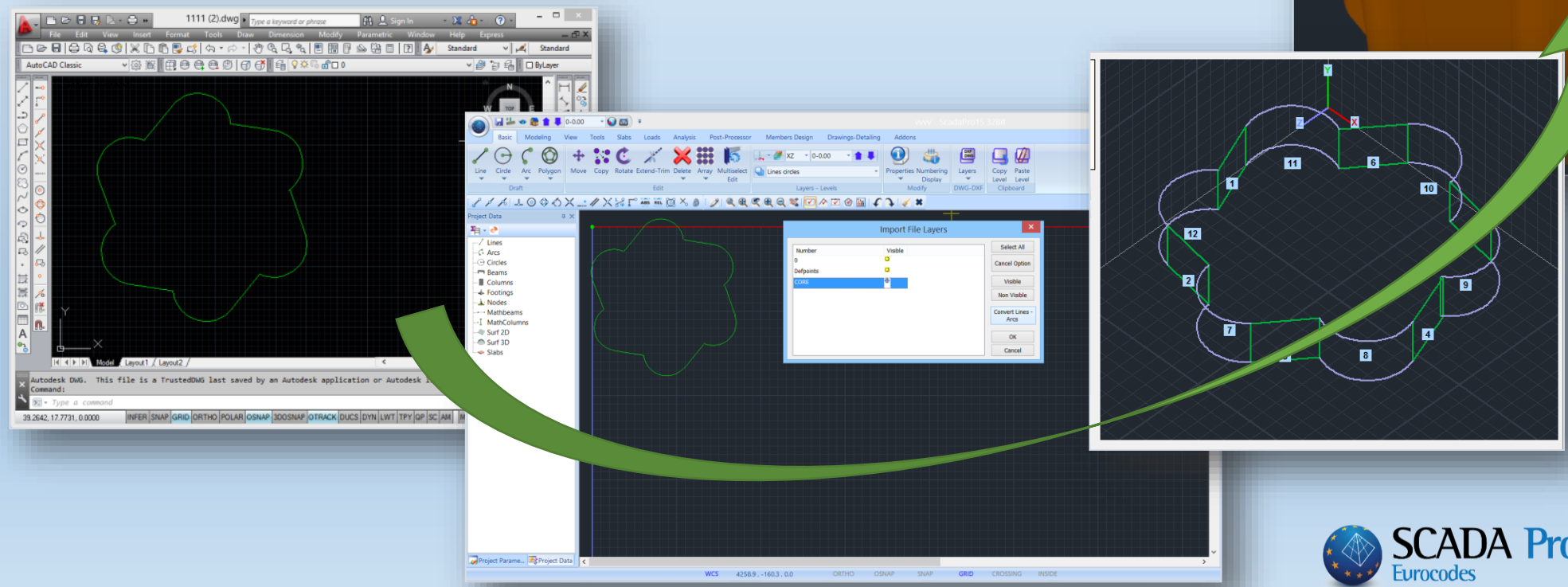
Why SCADA Pro

- Enables user to:
  - **Automatically Convert** lines, arcs and circles to corresponding design objects of **SCADA Pro**
  - **Automatically create** 3D **objects** (core, silos) from the outline of any shape through "*Front View Identification*".



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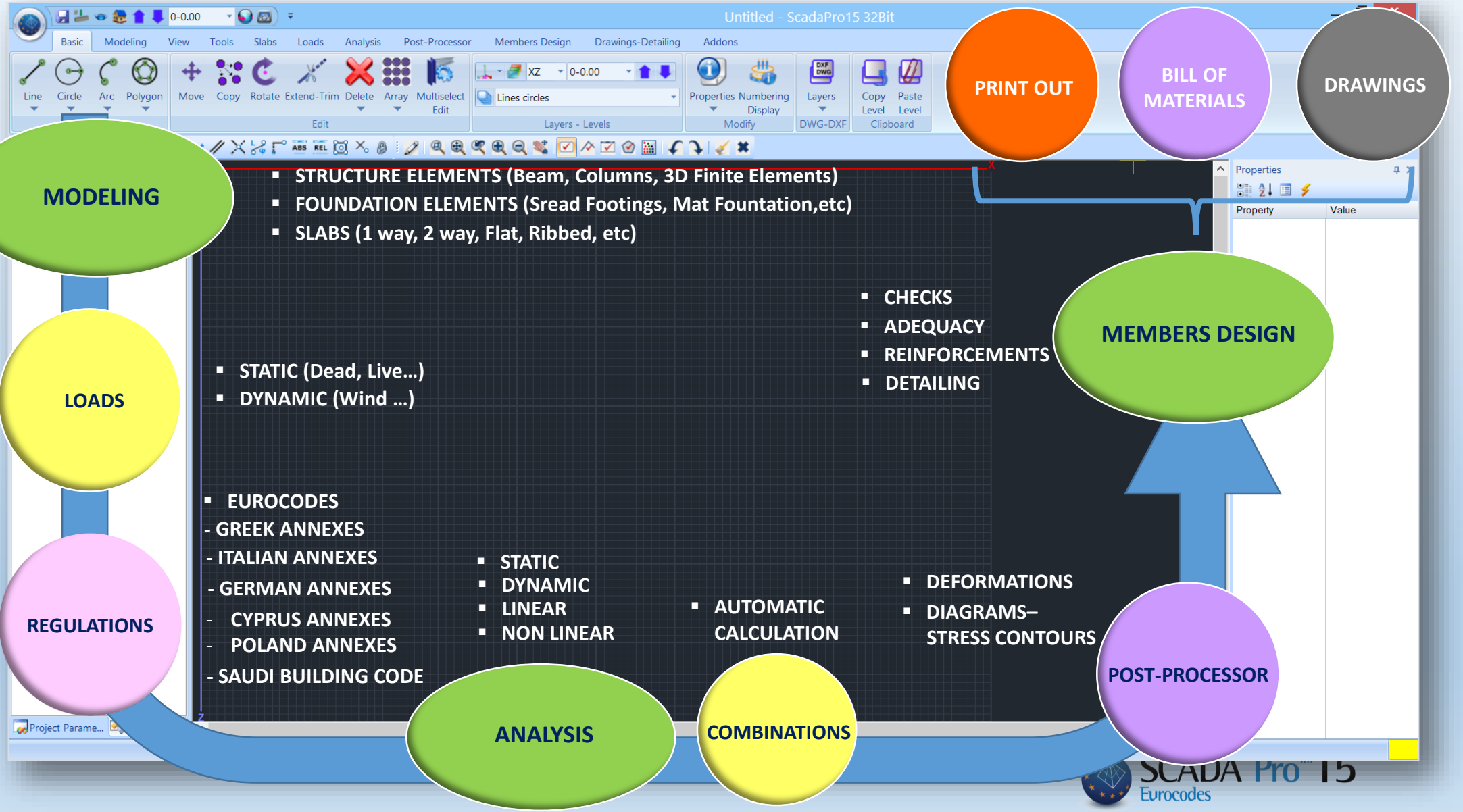
Why SCADA Pro

4. Integrated Interface



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5. Multilingual environment

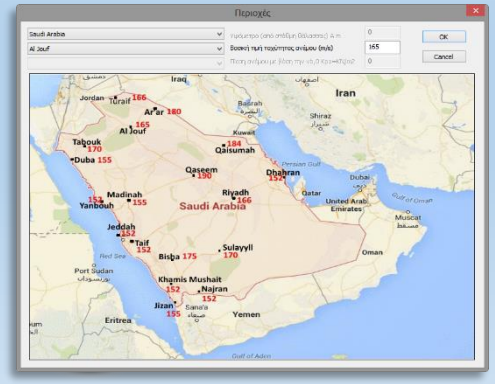
- Multilingual environment with automatic language switching






FURTHERMORE :

- Analysis design and checks according to country regulations and national annexes
- Printouts in the respective language
- Integration of Arab regulations (Saudi Building Code) regarding loads and design of concrete, steel and masonry buildings.



6. Eurocodes and National Annexes

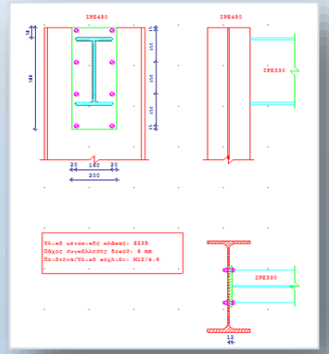
Regulations- Combinations			EN 1990		
Loads			EN 1991		
Design	EN 1992 Concrete	EN 1993 Steel	EN 1994 Composite	EN 1995 Timber	EN 1996 Masonry
Soil			EN 1997		
Seismic			EN 1998		
Aluminum			EN 1999		

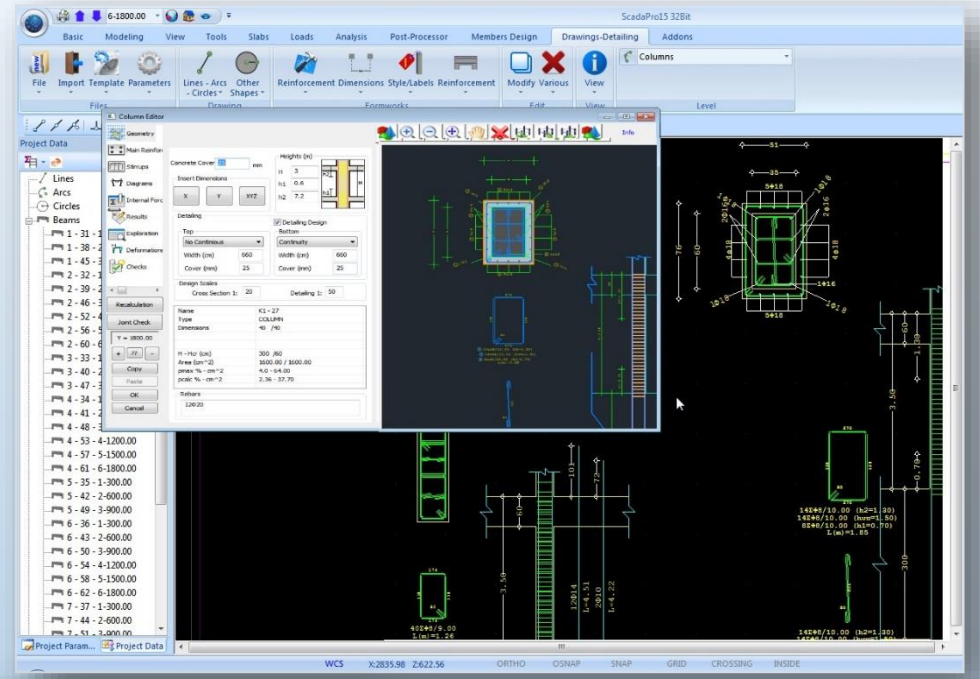
Yes Partly

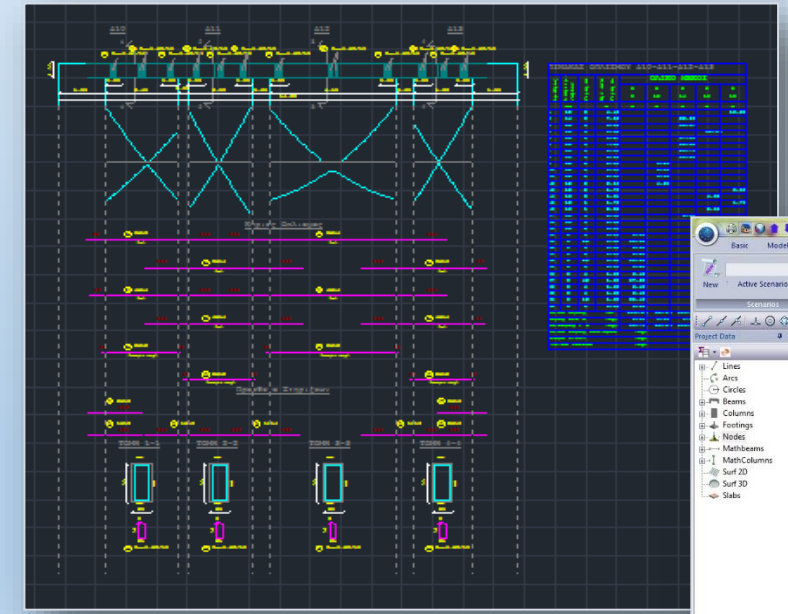
Why SCADA Pro

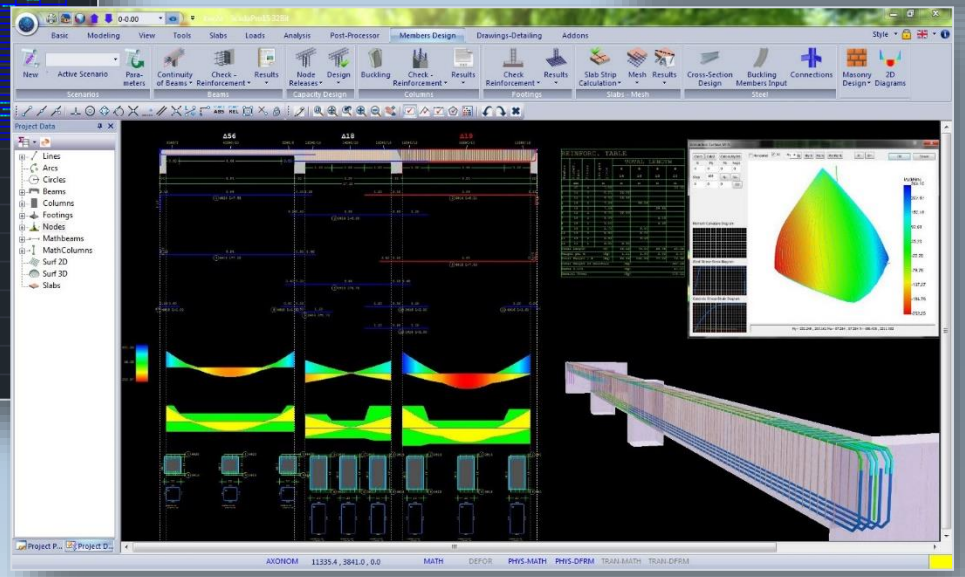
7. Design - Detailing

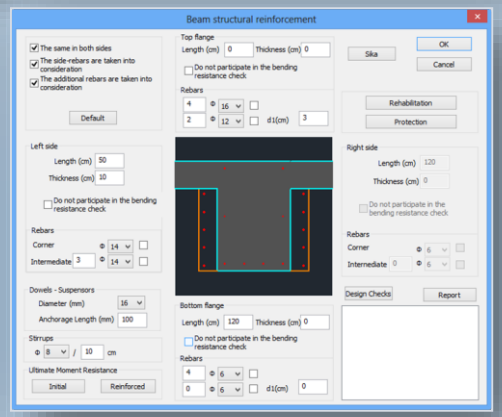
- Interaction between design & detailing
- Layout of beams and columns
- Connection detailing
- Reinforcement detailing











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Eurocodes

8. MODULES

Modules

ELEMENT TYPES
- Linear
- Surface Finite 3D

TYPES OF ANALYSES
- Linear
- Non Linear
- Time History

MATERIALS
- Concrete
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DESIGN
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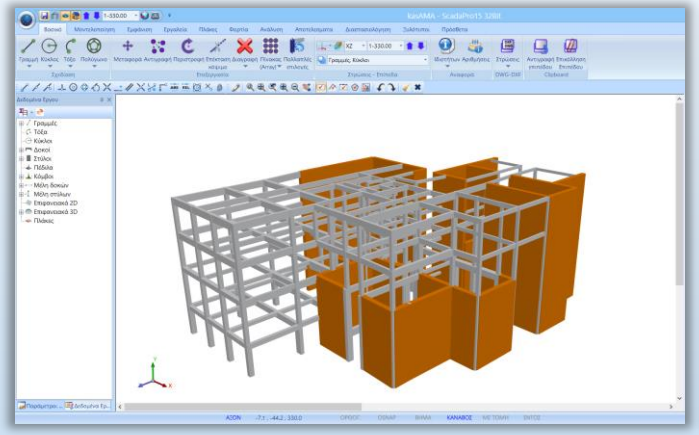
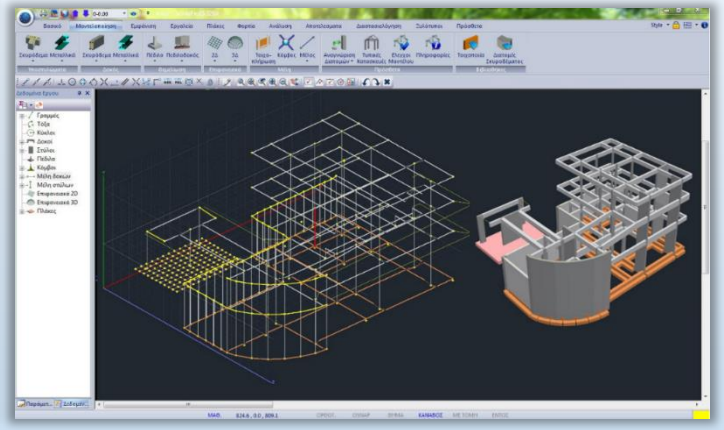
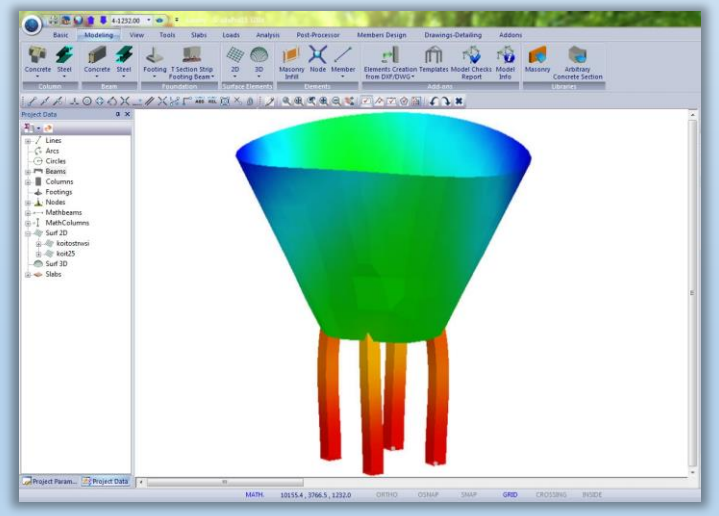
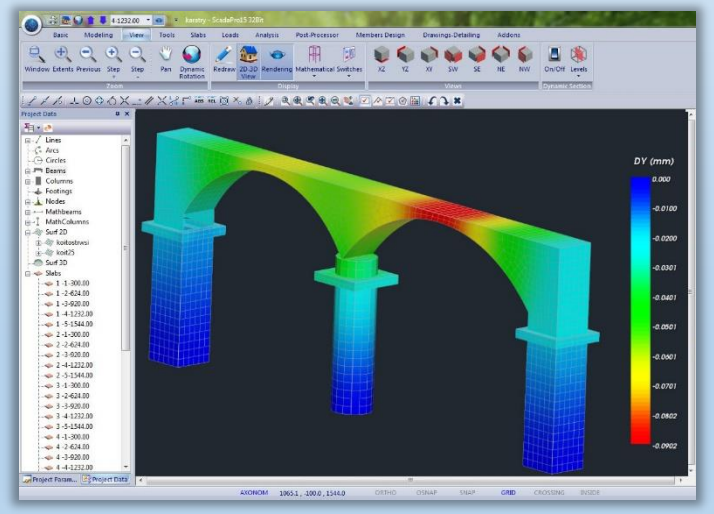
❑ ELEMENT TYPES

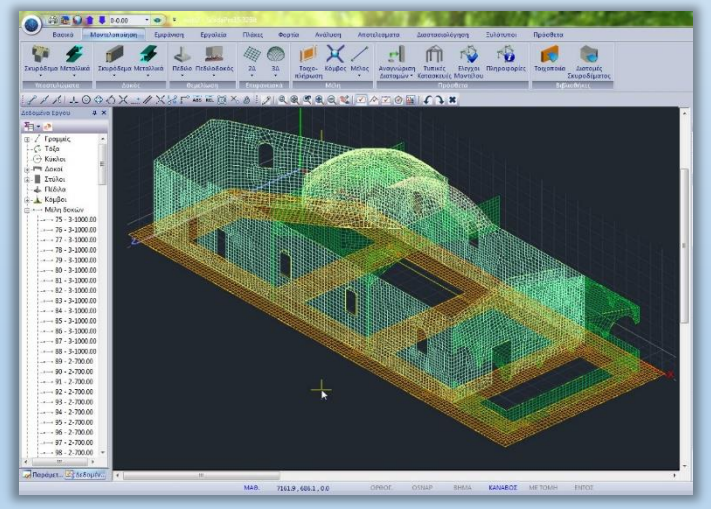
- Modeling Structures with **linear** or / and 3D **finite surface** elements
- Interaction between **linear** and **surface elements**







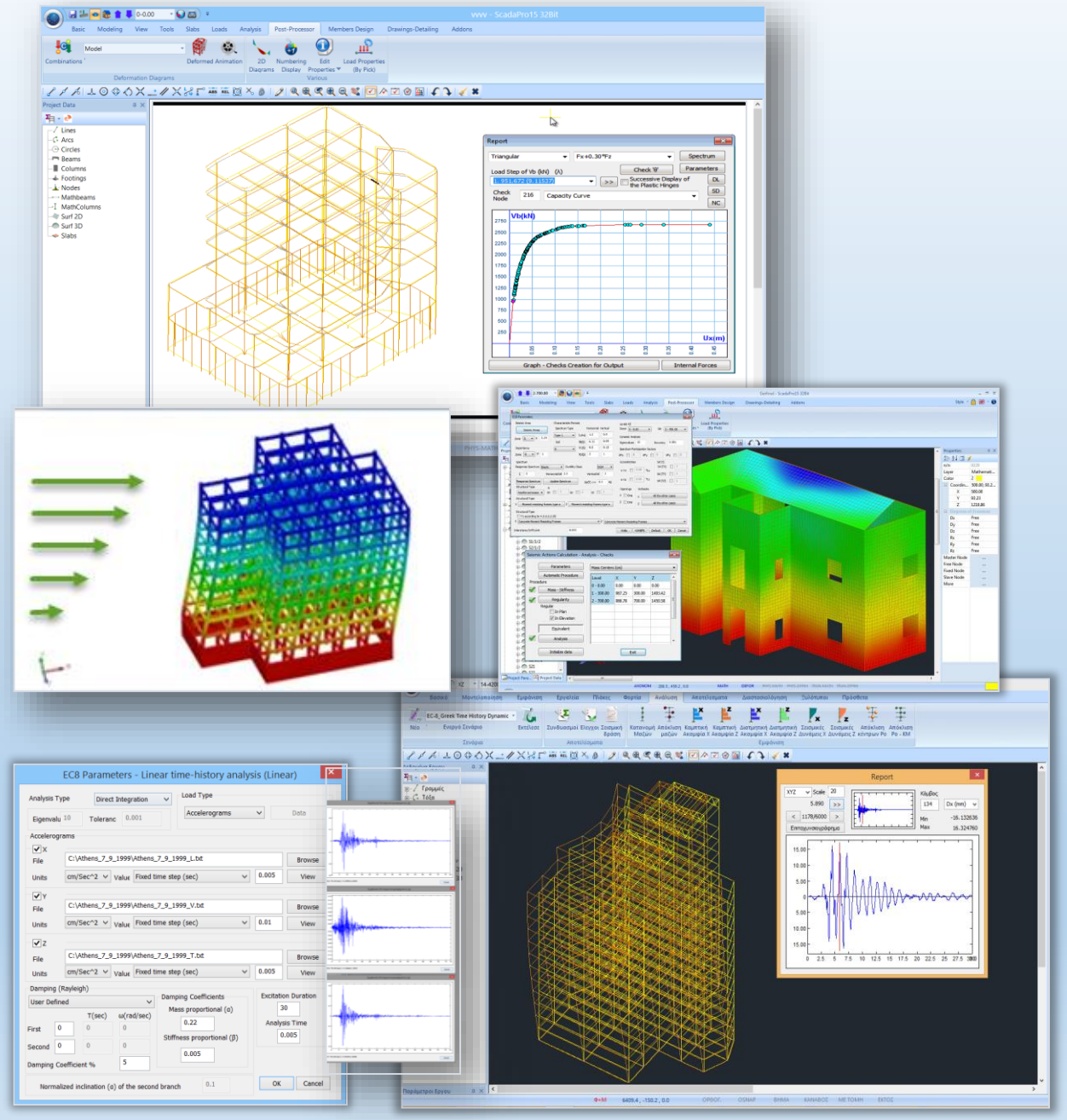




Why SCADA Pro

❑ TYPES OF ANALYSIS

CALCULATION METHODS	REGULATIONS
Static	EC 8 - SBC
Linear Calculation of Seismic Response:	
α) Linear Static Analysis	EC 8
β) Linear Dynamic Analysis	EC 8
Pushover Analysis	EC 8
Linear Time History Analysis	EC 8
Non Linear Time History Analysis	EC 8



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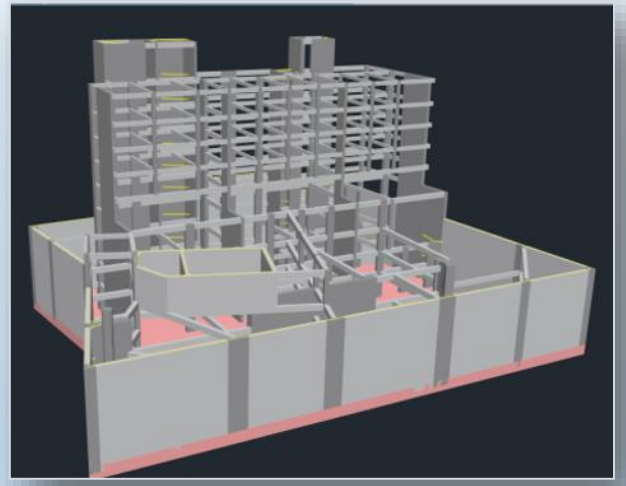
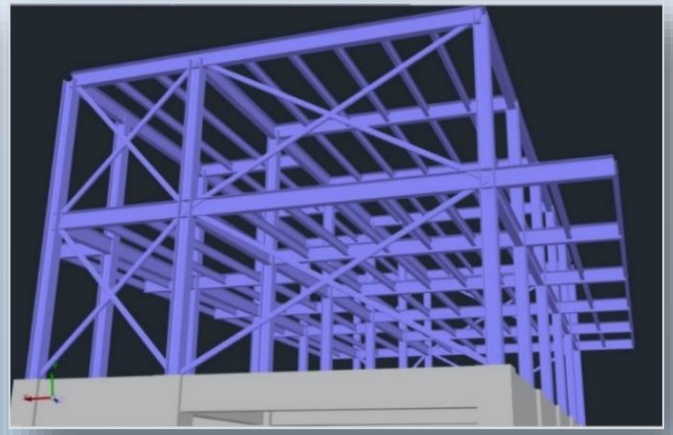
❑ MATERIAL

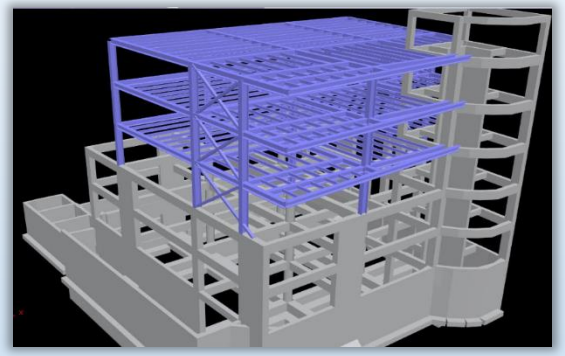
- Concrete

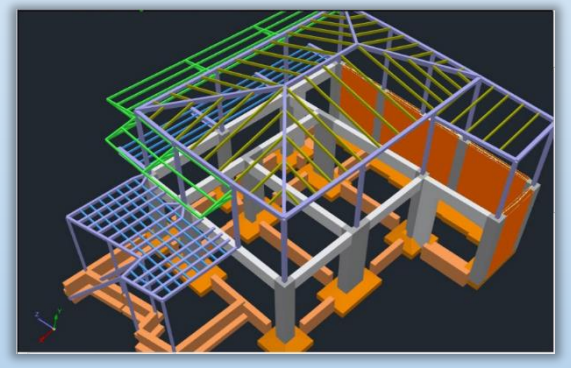


- Steel

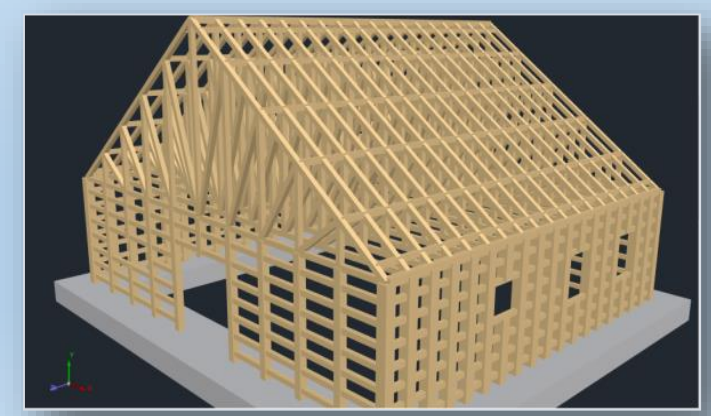


- *Composite*

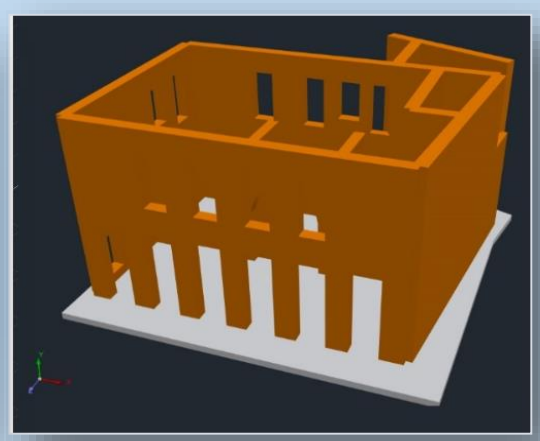


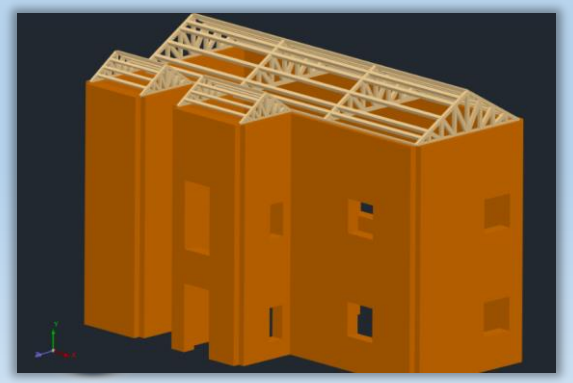


- Timber



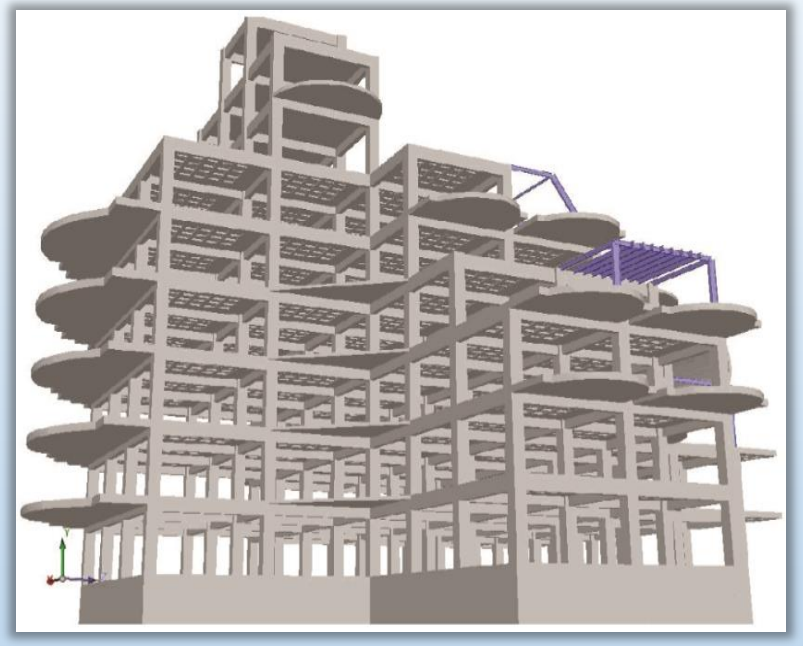
- Masonry



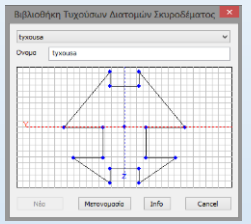


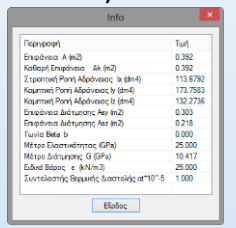
Why SCADA Pro

CONCRETE

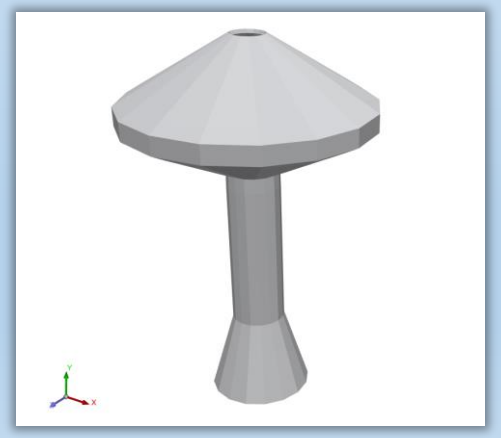


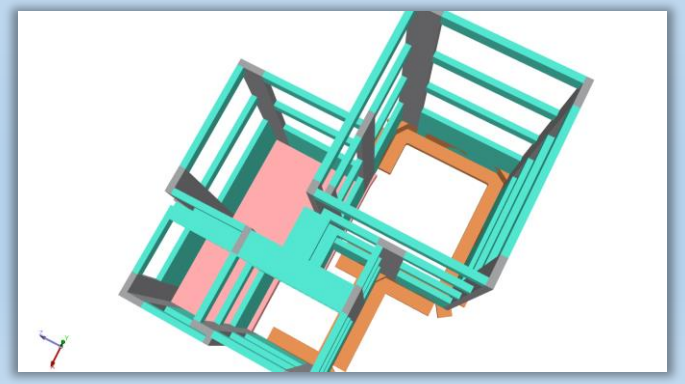
- Rich library of standard and arbitrary (user defined) cross sections

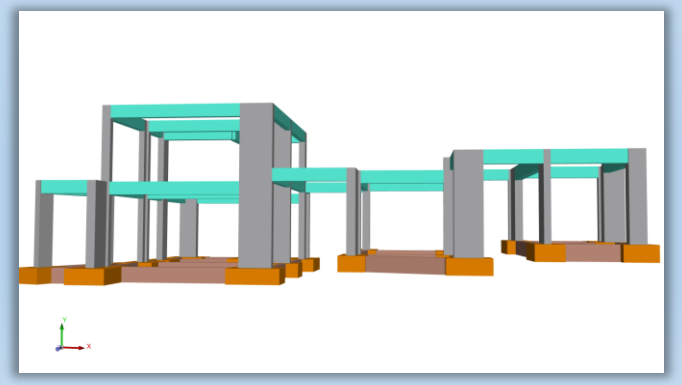




- Infinite modeling capabilities for inclined beams, columns arbitrary sections, slabs of any shape and type, shells, masonry infills
- Combined and multilevel foundations with footings, connecting beams, strip footing beams, mat foundations





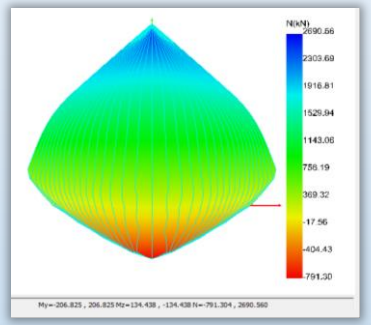


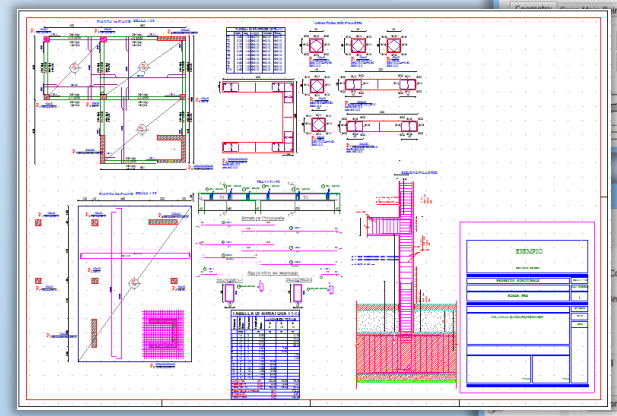
SCADA Pro™ 15 Eurocodes

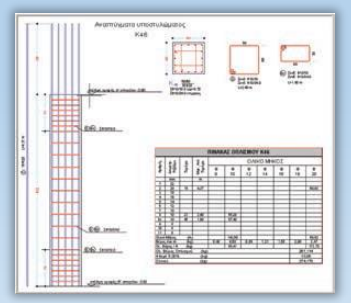
❑ DESIGN: Checks

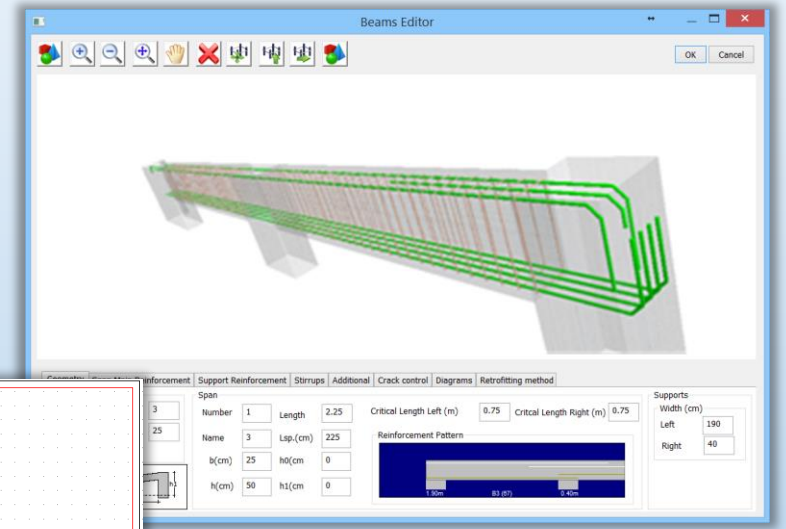
- **Members of Reinforced Concrete of upper structure and foundation– EUROCODE 2**

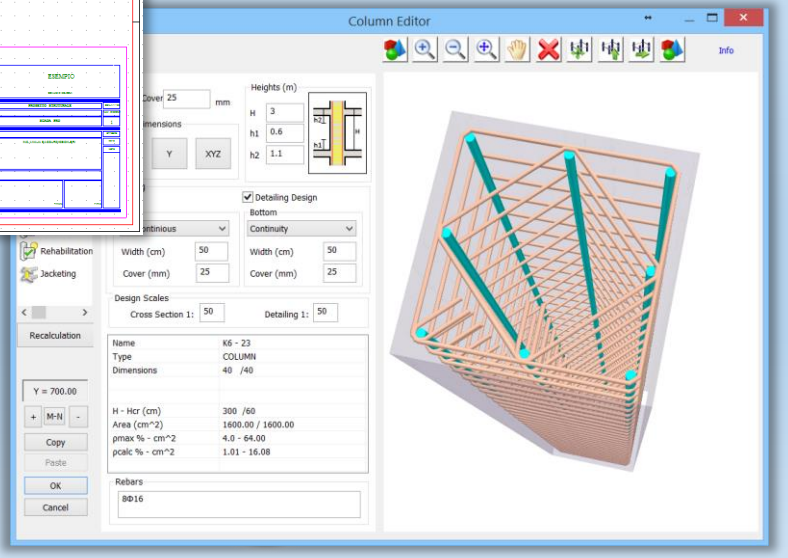
- Automatic design of all structural members
- Calculation of moments of resistance by the M-N interaction diagrams
- 3D color display of the diagrams
- New powerful reinforcement editor for easy editing and modification
- 3D display of the layout of the reinforcement
- Automatic bending - shear rechecking and moment resistant recalculation
- Automatic creation of the report and the structural drawings – detailing of the reinforcement, in dwg or dxf files.







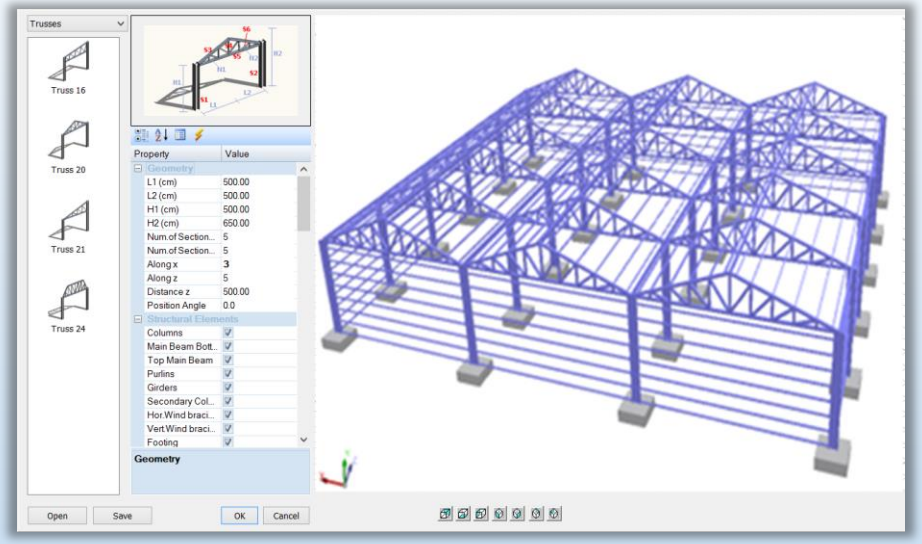


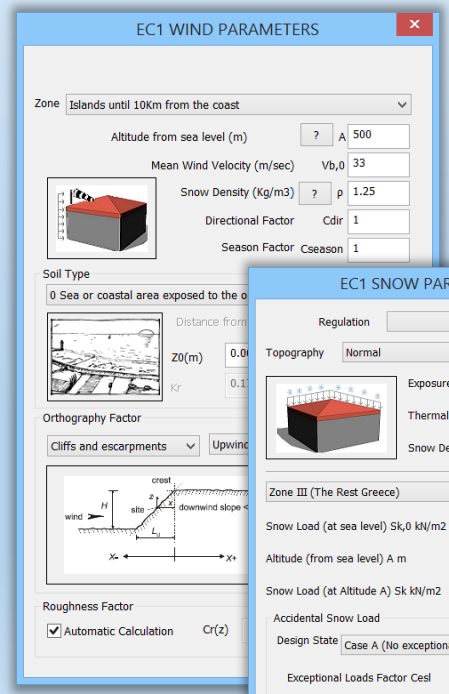


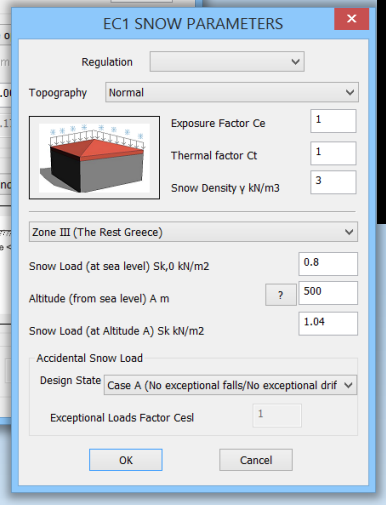
Why SCADA Pro

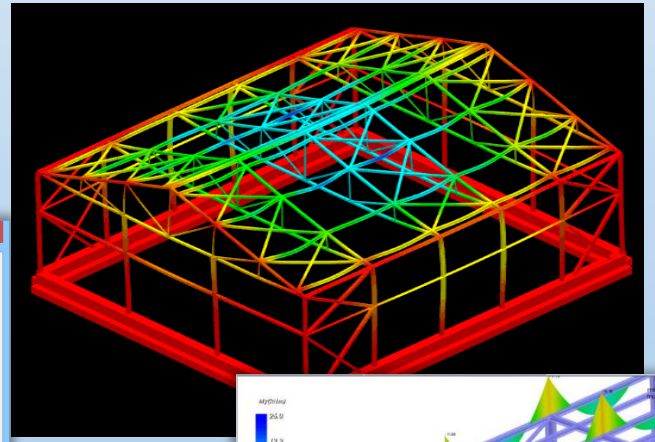
STEEL

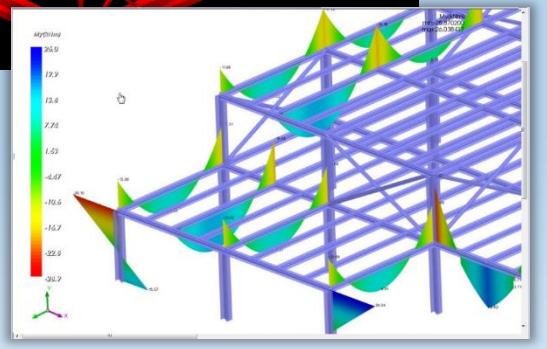
- Rich library of typical sections
- Automated templates for typical structures (trusses, frames)
- Automatic calculation and distribution of wind and snow loads (EC 1 – SBC 301)
- Automatic calculation of combinations (EC 0 – SBC 301)

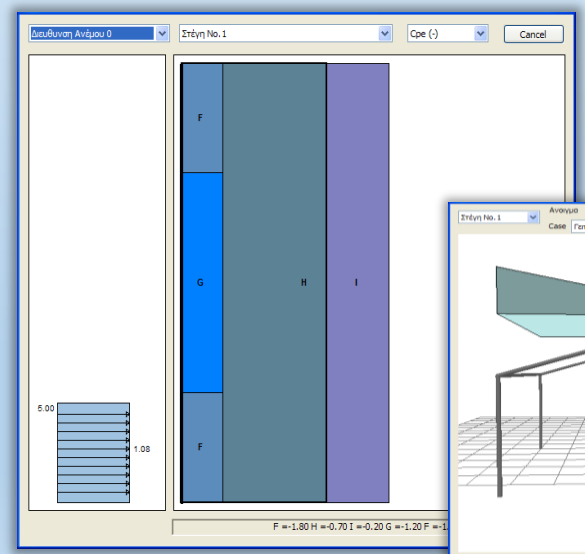


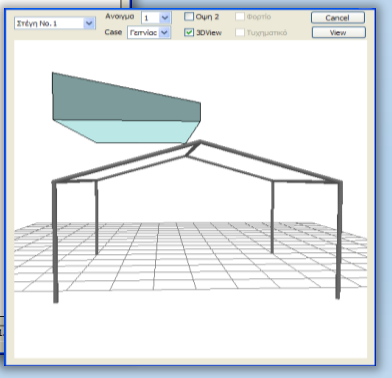












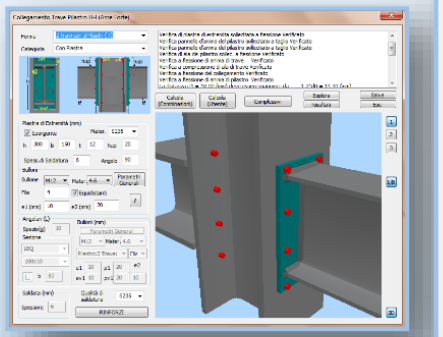
SCADA Pro™ 15 Eurocodes

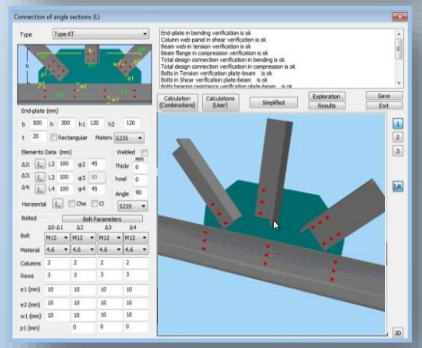
Why SCADA Pro

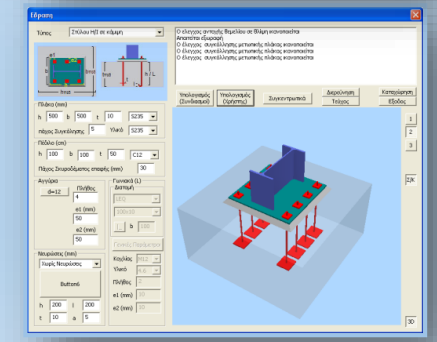
STEEL CONNECTIONS

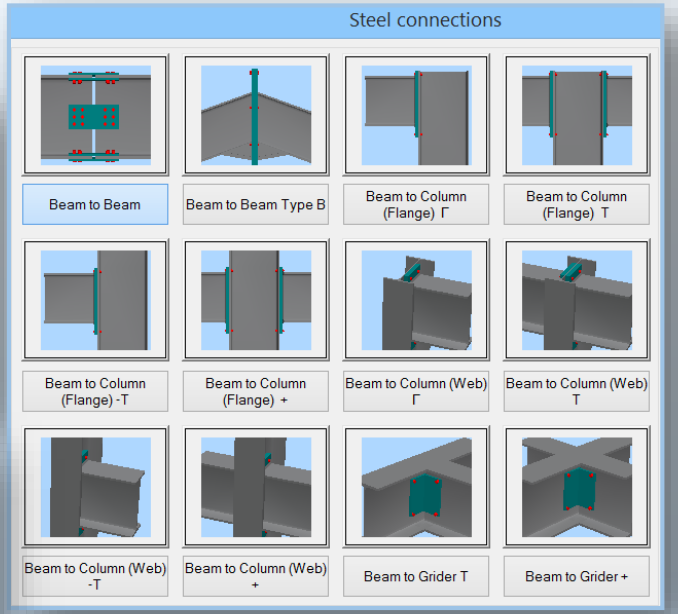
- Beam to Column on the strong or on the weak axis with bolts and end-plate, bolted or welded
- Hollow Sections
- Angle Cross Sections
- Beam to Beam
- Column Base
- Flange and Web Stiffeners and Brackets
- Beam continuity rehabilitation
- 3D display of the Connection
- Detailed check results
- Detailed drawings

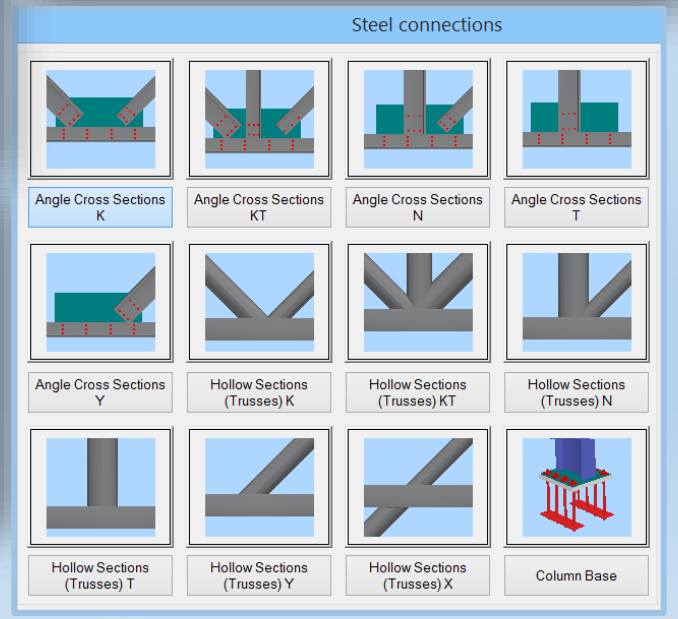
More than 120 Connection types







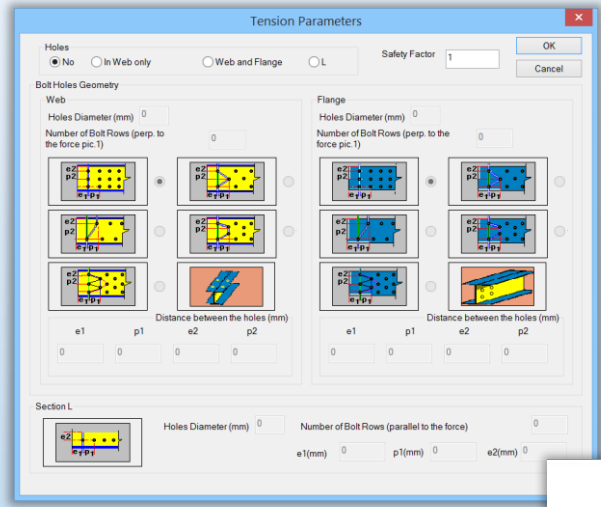


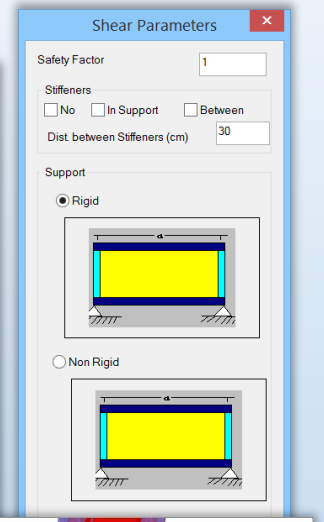


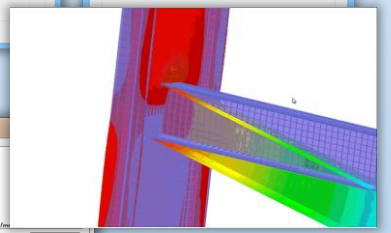
❑ DESIGN: Checks

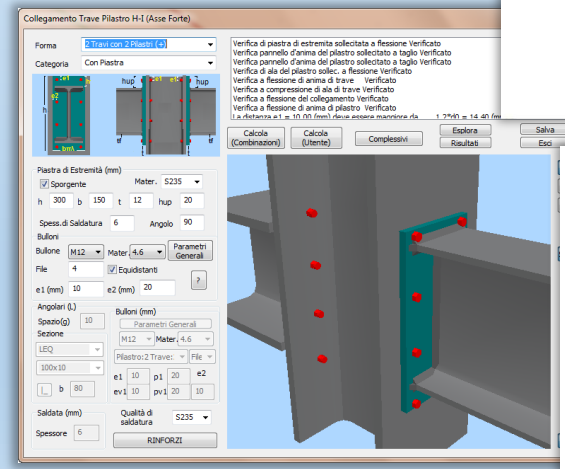
- **Steel members and connections - EUROCODE 3**

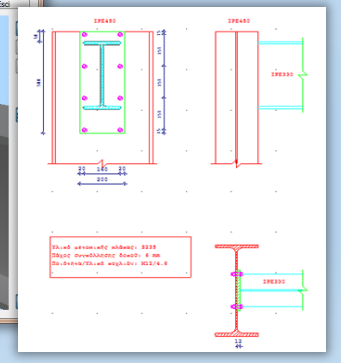
- Checking of all structural members in bending and torsional buckling.
- All necessary checks for the ultimate and serviceability limit states
- Analysis and design of composite construction (steel and reinforced concrete)
- Design of more than 120 types of steel connections (welded or bolted) with 3D visualization of the connection detailing
- Plan, elevation and section view connection detailing with capability of exporting and saving in DWG file format

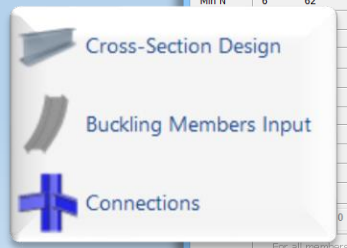


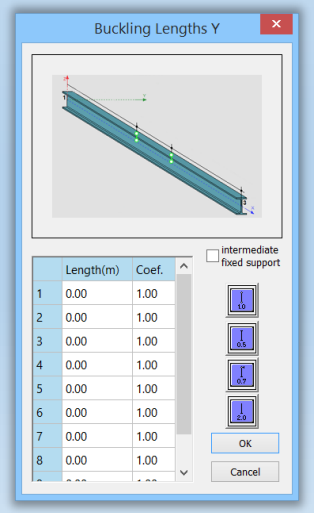












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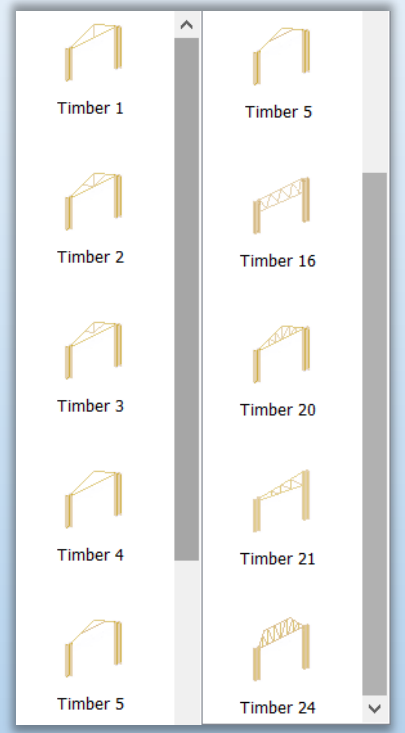
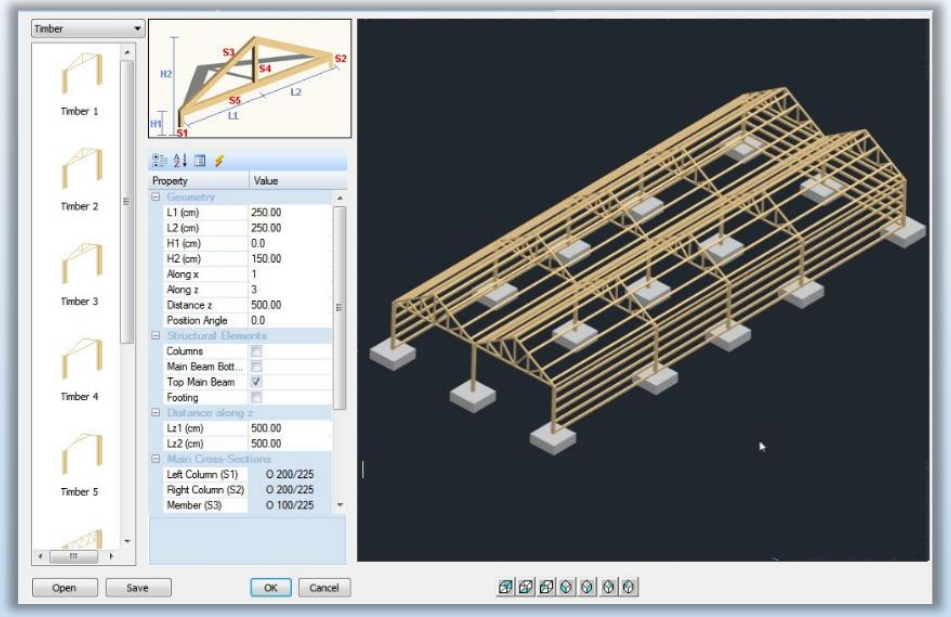
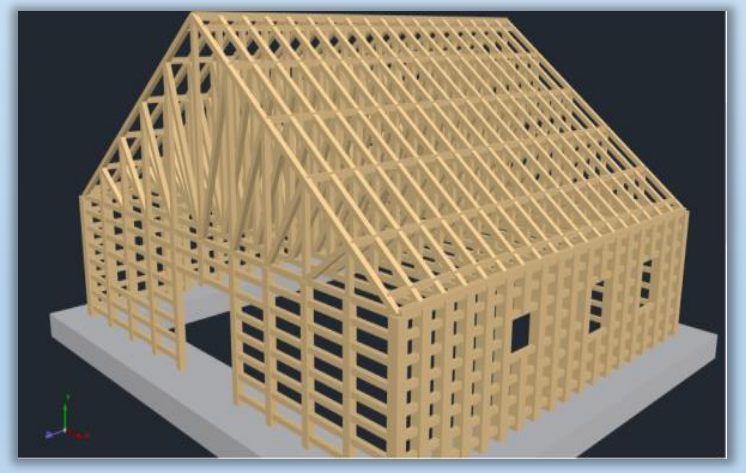
Why SCADA Pro

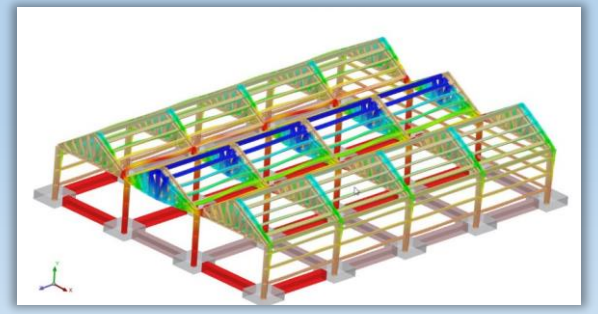
TIMBER

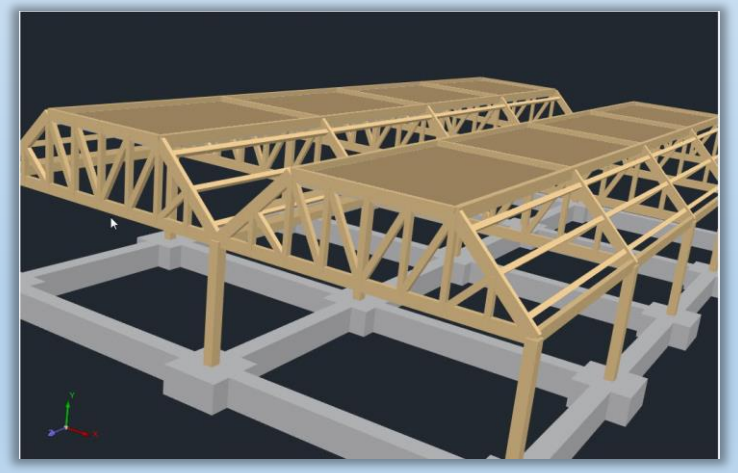
- Rich library of typical sections
- Automated templates for typical structures
- Design and checks of all members according to Eurocode 5 and the respective national annexes









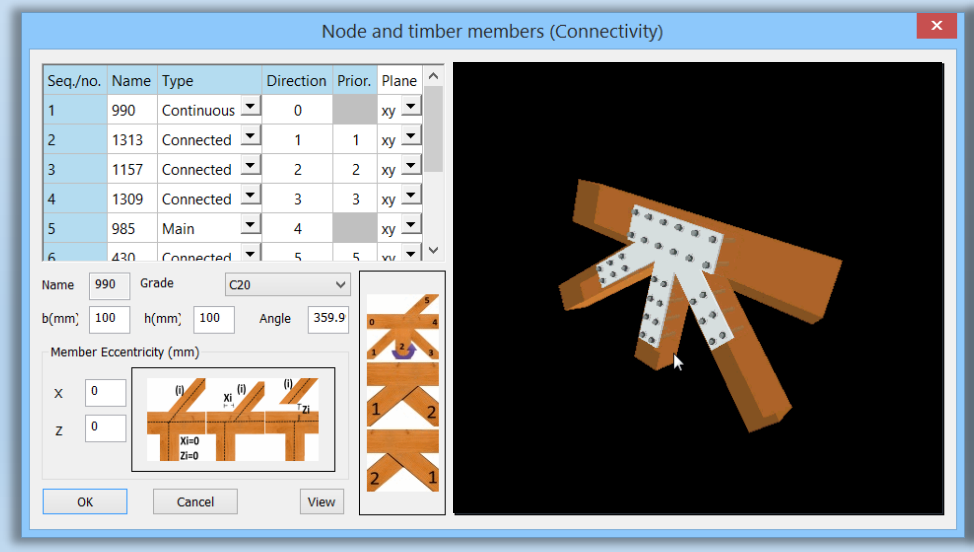


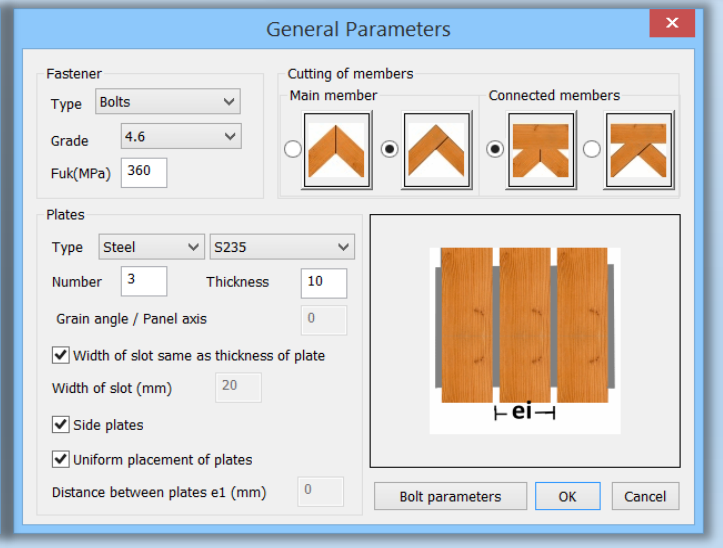
SCADA Pro™ 15 Eurocodes

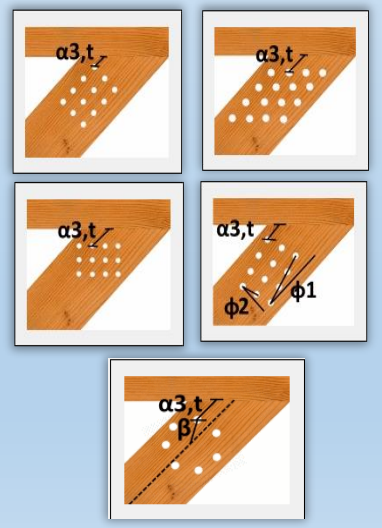
Why SCADA Pro

TIMBER CONNECTIONS

- Connections with metal dowel type fasteners (nails, bolts, screws, dowels, staples)
- Steel and timber plates
- Placements angle and fasteners arrangement
- 3D display of the details
- Detailed check results





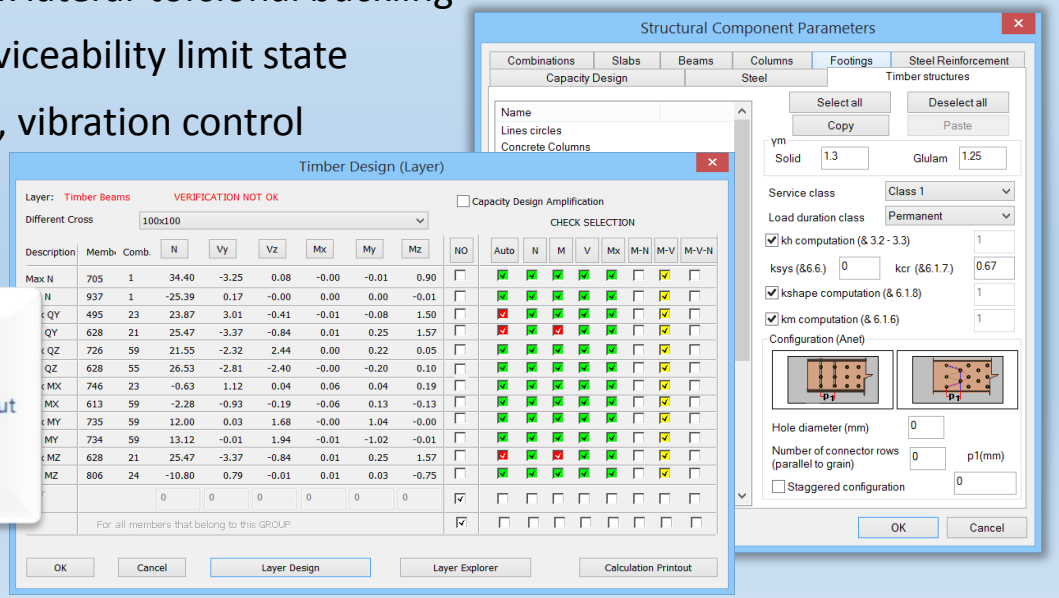


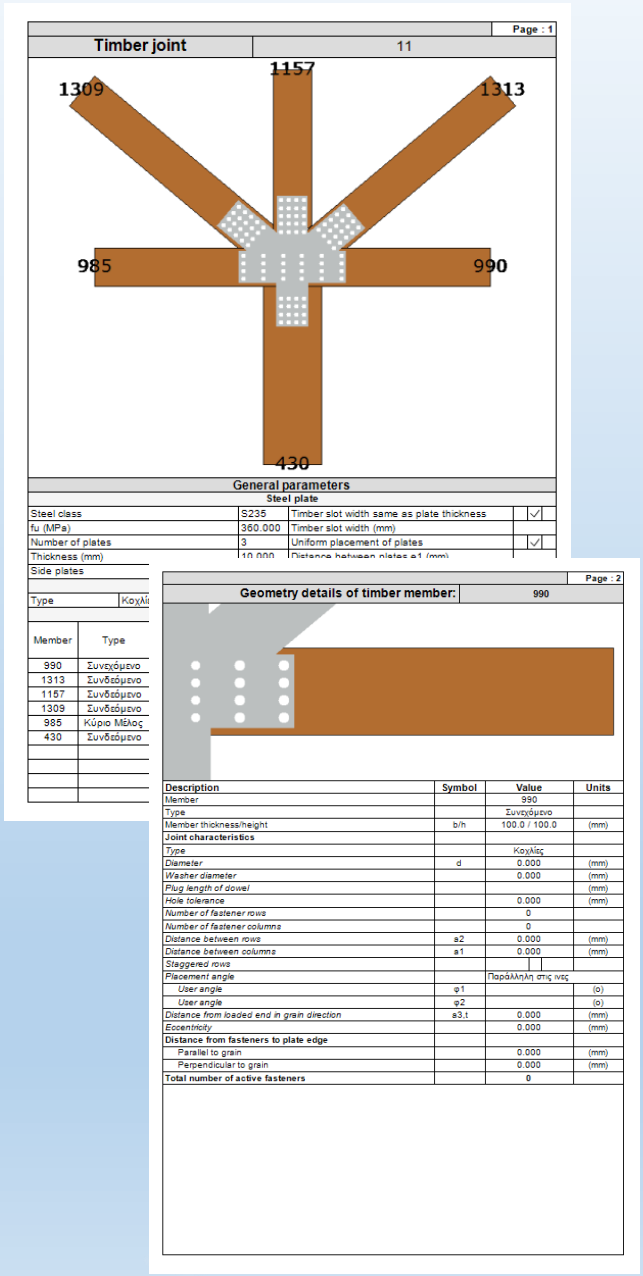
SCADA Pro™ 15 Eurocodes

❑ DESIGN: Checks

▪ Timber members and connections - EUROCODE 5

- Design of a cross-section for the ultimate limit state
- Design checks of a cross section under tension/compression parallel/vertical to the fibers
- Check of a cross section under bending/shear/torsion
- Check of a cross section under combined stress
- Design of a structural member for the ultimate limit state (member stability)
- Column design check in compression buckling
- Beam design check lateral-torsional buckling
- Design for the serviceability limit state
- Deflection control, vibration control

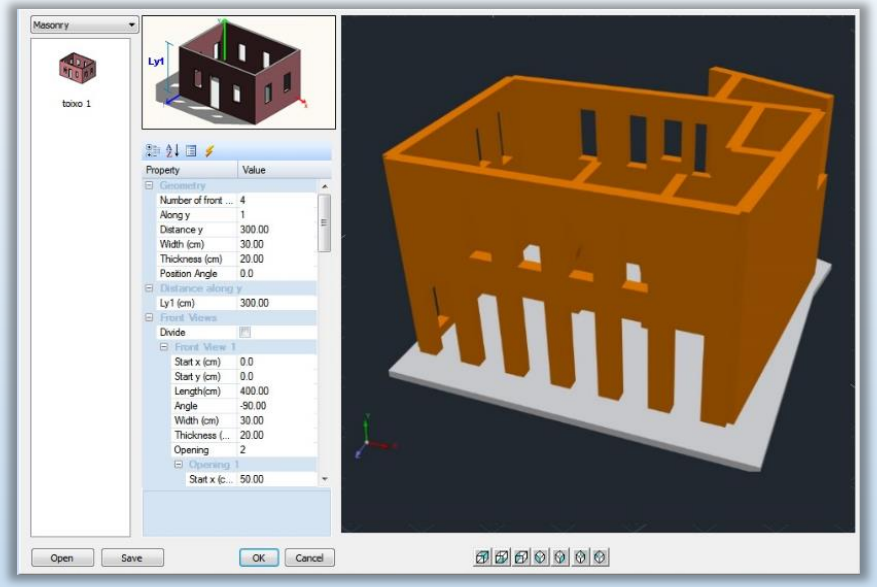


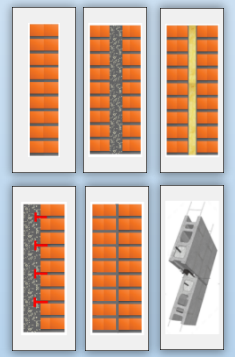


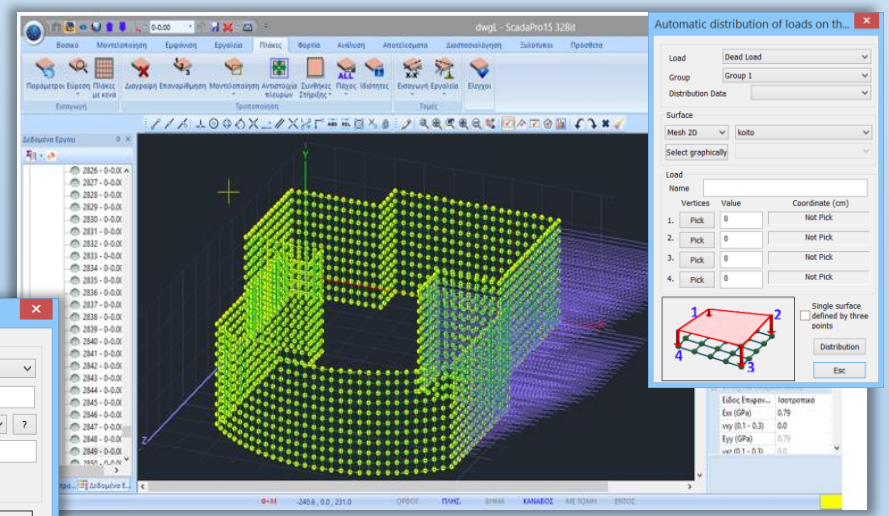
Why SCADA Pro

MASONRY

- Rich library of masonry units, mortars and walls
- Automated templates for typical structures
- Modeling with 3D finite surface elements
- Automatic “Front View Identification” from dwg file
- Unreinforced - Reinforced - Confined masonry
- Automatic load distribution tool on surface elements







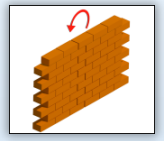
SCADA Pro™ 15 Eurocodes

Why SCADA Pro

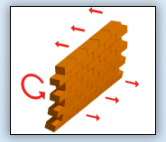
❑ DESIGN: Checks

New masonry building (EC6)

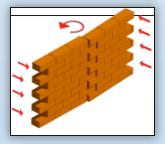
- **Piers and the spandrels of a masonry wall – EUROCODE 6**



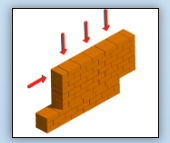
- Check in plane bending



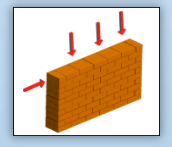
- Check out of plane bending parallel to the horizontal joint



- Check out of plane bending perpendicular to the horizontal joint

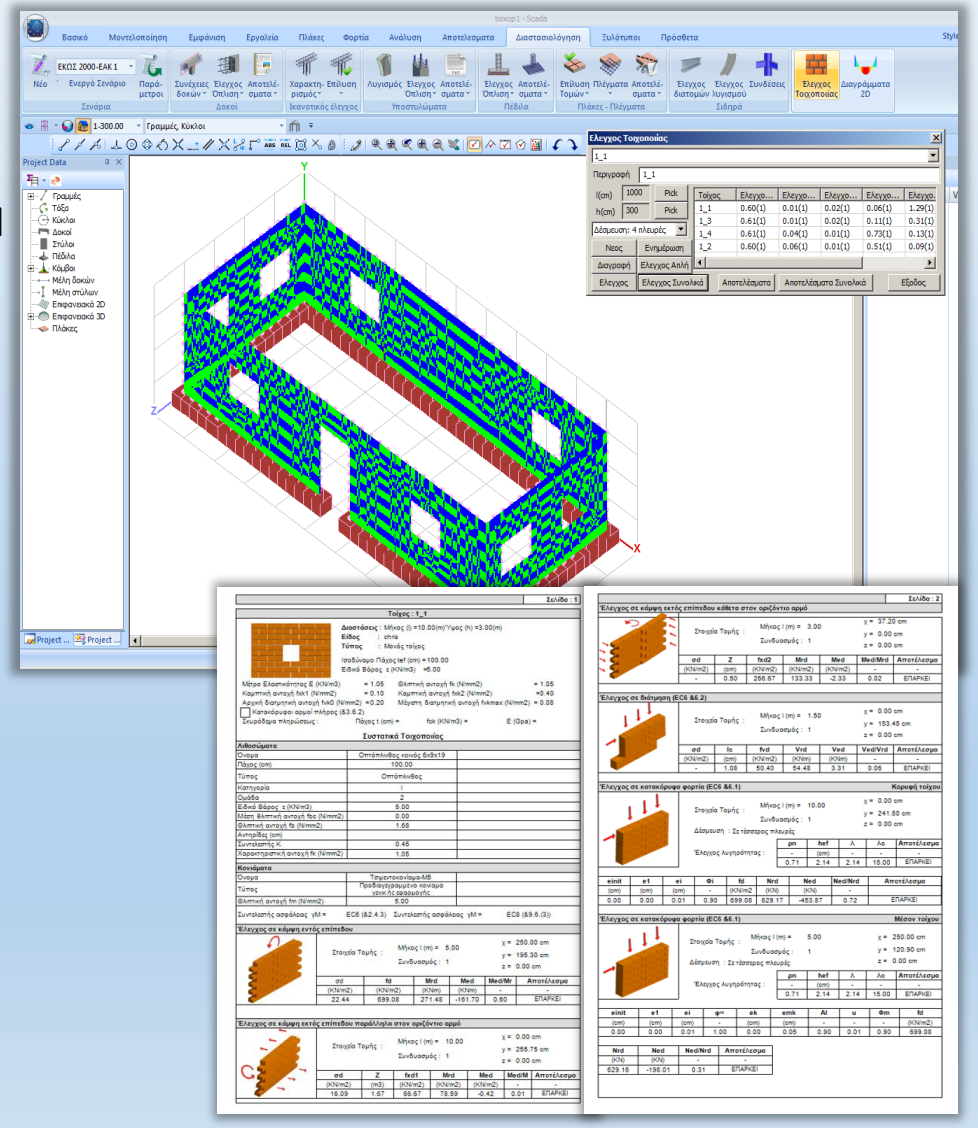


- Shear verification



- Testing to vertical loads on the top, middle, and bottom of the wall

- Automatic creation of detailed report

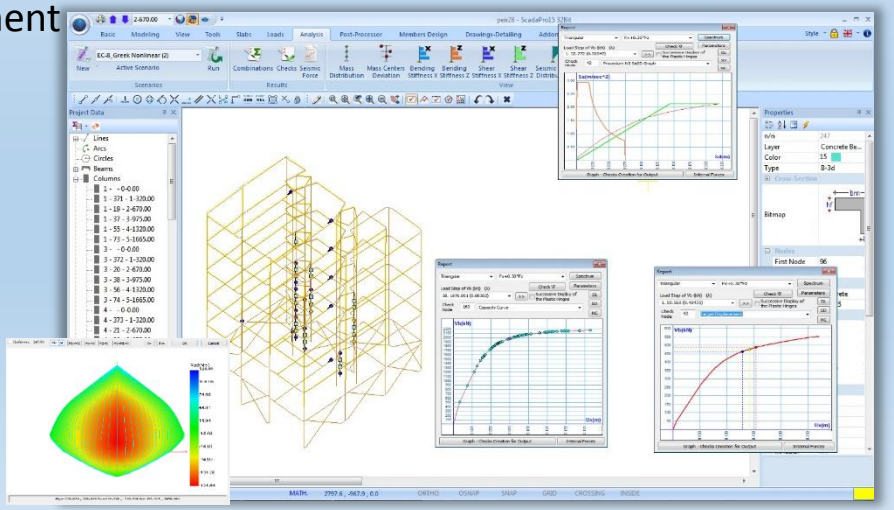


Why SCADA Pro

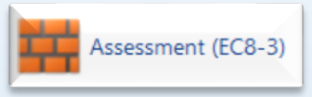
❑ ASSESSMENT

• Reinforced Concrete Structures

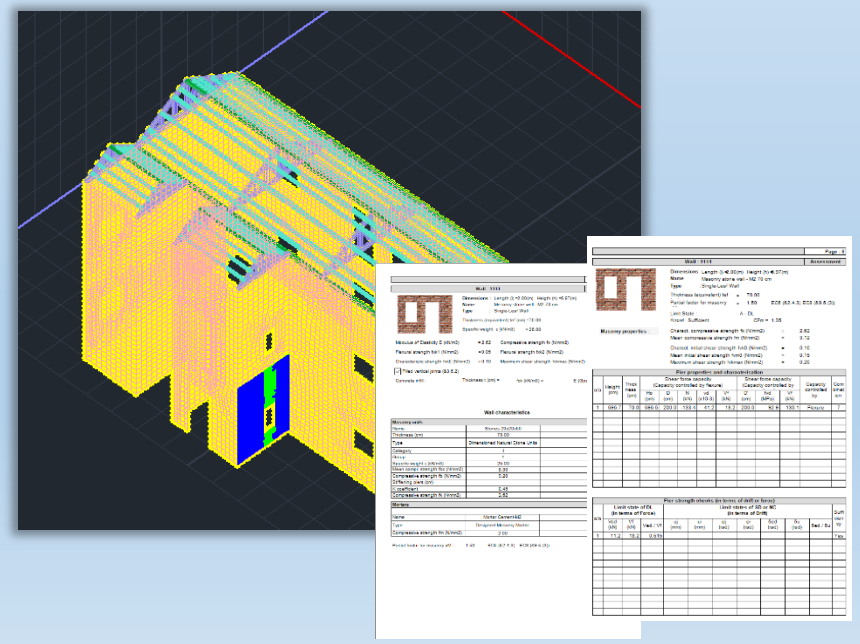
- Contains the Eurocode 8, Part 3 (EN1998-3) provisions and design checks for the assessment of existing buildings
- Nonlinear static analysis method (Pushover) and Linear static analysis considering the uniform behavior factor **q** and the local ductility factors **m** methods
- Accurate derivation of the stress resultants and the deformed shape of the structure
- Direct location of the “weak” regions on the structure
- Definition of the nonlinear relation of the bending moment versus the plastic hinge rotation of each end of the structural element
- Analytical calculation of all necessary parameters in each step of the Pushover analysis.



• Masonry Structures



- Contains the provisions of EC8, Part 3 about the assessment of bearing masonry structures under seismic loading.
- The design code recommendations are applied on masonry structural elements that resist against in-plane lateral forces.
- The corresponding structural elements are the piers and the spandrels of a masonry wall.

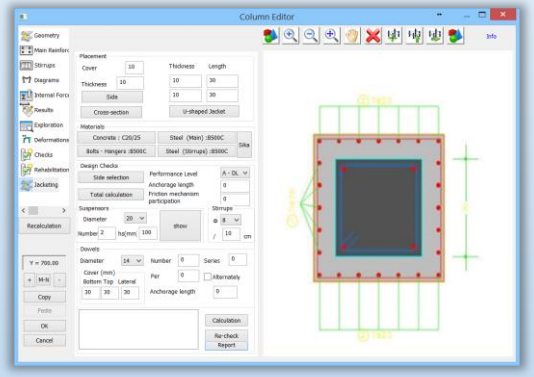


Why SCADA Pro

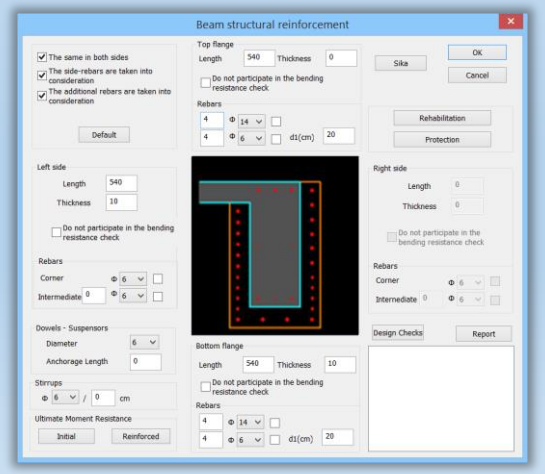
❑ REDESIGN

• Reinforced Concrete Structures

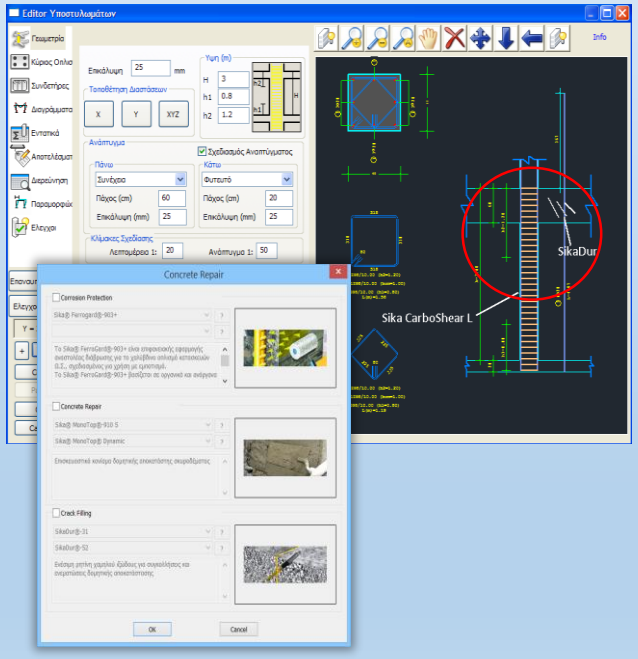
- Columns reinforced cast concrete jacket and shotcrete jacket
- Fiber reinforced polymers (FRPs)



Beams reinforcement choosing material and side

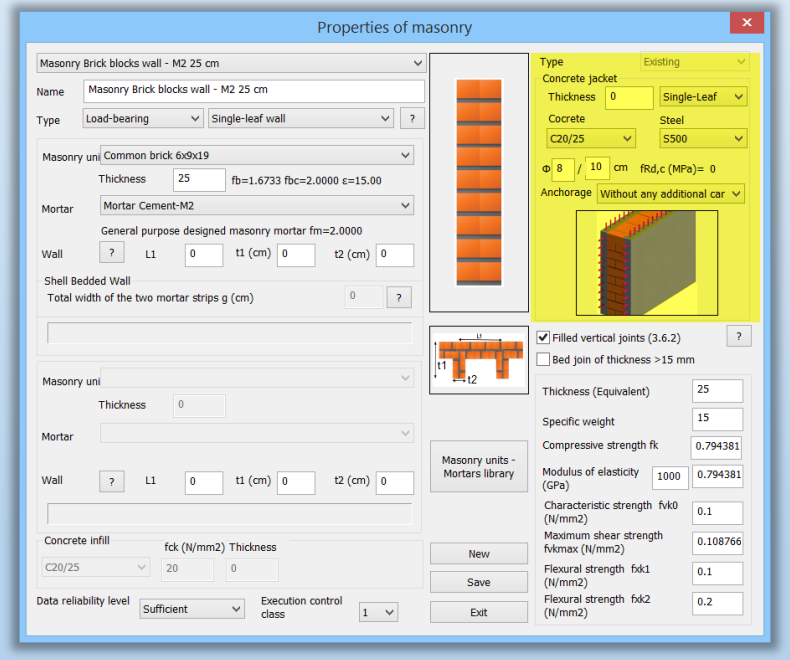


Integration of the Sika products and the calculating program for chemical and mechanical anchors of Fischer company



• Masonry Structures

The reinforcing method of a masonry structural element is modeled by applying single or double leaf reinforced concrete jacket



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Thank you
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