AXISVM

developed by:

INTER CAD

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Vienna University of Economics
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AXISVM

Since 1991
BY CIVIL ENGINEERS
FOR CIVIL ENGINEERS

SIMPLICITY
and
EFFICIENCY

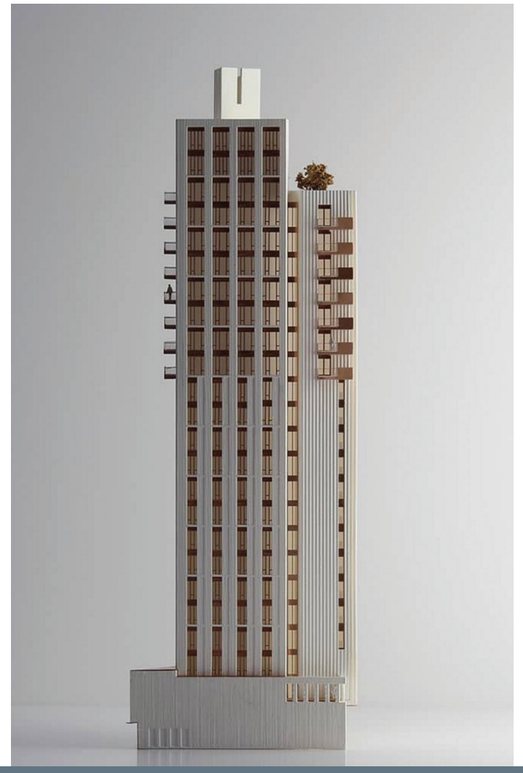
AXIS VM

Continuously developed since 1991 especially for structural engineers with the use of state-of-the-art methods, AxisVM assists engineers in the code-based design process in numerous countries around the world.

Due to the easy-to-use graphical interface, the software is quick to learn. Features include linear and nonlinear static, buckling and vibration analyses, and seismic/time-history analysis. Three-dimensional models can be created with the use of truss, beam, rib, plate, membrane, and shell finite elements.

Reinforced concrete, timber structures, and structural steel design modules are available for member and connection design, according to Eurocode and corresponding National Annexes like SIA (Switzerland), NEN (Netherlands). The software includes a documentation wizard, which can be used to create design documentation in different languages. AxisVM is available in 10 European languages and is a powerful design aid in the hands of engineers throughout 25 European countries.

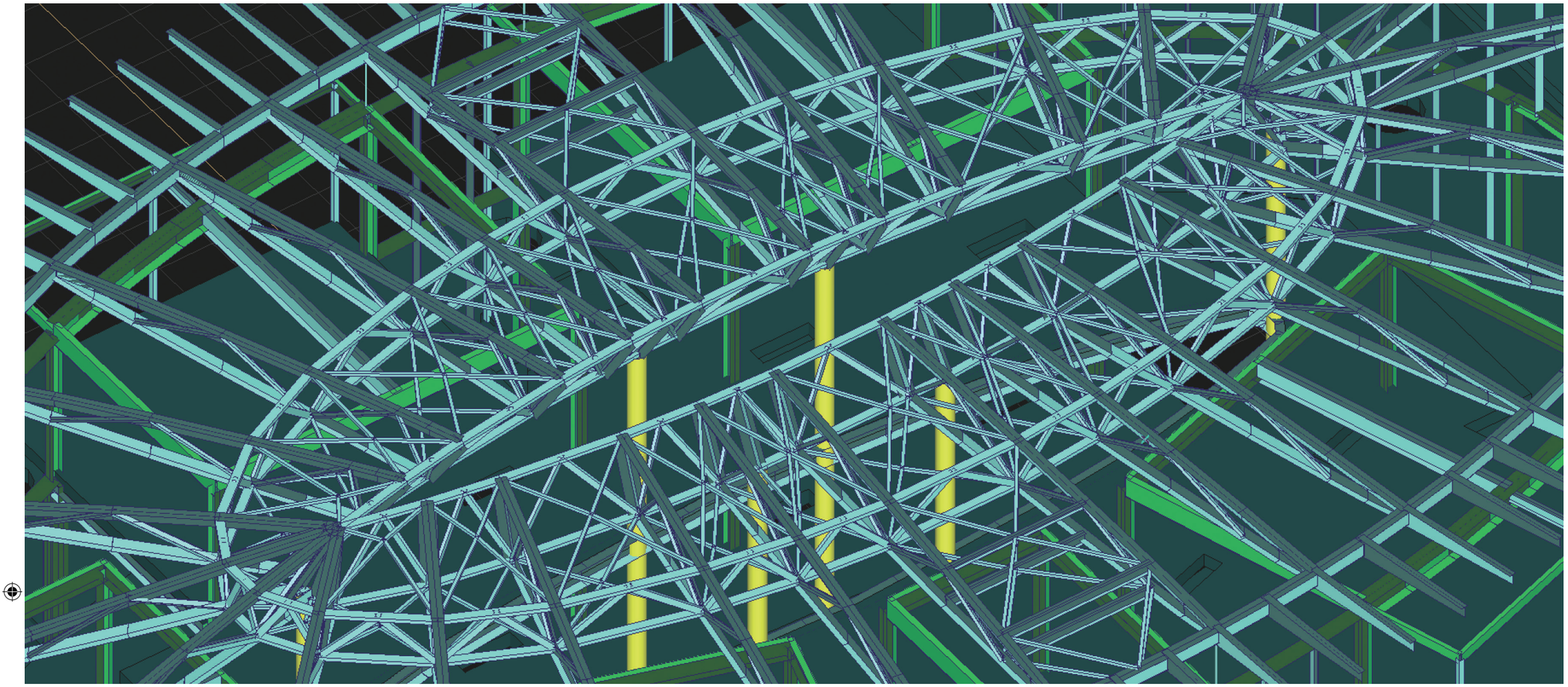
Third Millenium Bridge, Zaragoza, Spain, 2008
design: Arenas & Asociados
structural design: Arenas & Asociados



Mapleton Crescent, Wandsworth London, UK, 2017
architects: Metropolitan Workshop
structural design: Barrett Mahony Consulting Engineers
photo: Metropolitan Workshop

Smart Green Tower, Freiburg, Germany, 2017
architects: Frey Architekten
structural design: Poetzsch Bauingenieure GmbH
photo: Frey Architekten

Watertower Budafok, Hungary, 2008
architects: Perényi Tamás DLA, Kolossa József DLA
structural design: Thoma József,
Mérei László, Felföldy Gábor



Clinique des Grangettes - Centre for paediatric emergency service, Geneve, Switzerland, 2009
architects: Brodbeck & Roulet SA
structural design: Guscetti & Tournier Ingénierie Civile SA

The integrated visual modeling system is a fundamental part of the software. The capability to build the complete 3D model within the software makes it an ideal tool for structural engineering purposes by not requiring additional CAD software.

Visual modeling allows the engineer to graphically handle and supervise all relevant data and operations of his/her work throughout the model generation, analysis, and result evaluation processes. AxisVM implements numerical methods, finite elements, and design modules, which support the fast and efficient design of engineering structures (beam, plate, membrane, shell structures), even in the most demanding modeling cases.

The software performs static and dynamic analysis on three dimensional structures using linear and nonlinear analysis methods. Using AxisVM, the following structure types can be modeled: frames, trusses, grid slabs, beams on elastic foundation, membranes in both plane strain and plain stress, plates with or without ribs, plates on elastic foundation, and arbitrary shell structures. Unlimited number of finite elements can be used in a model.

AxisVM is a comprehensive structural analysis and design software for civil engineers

General features

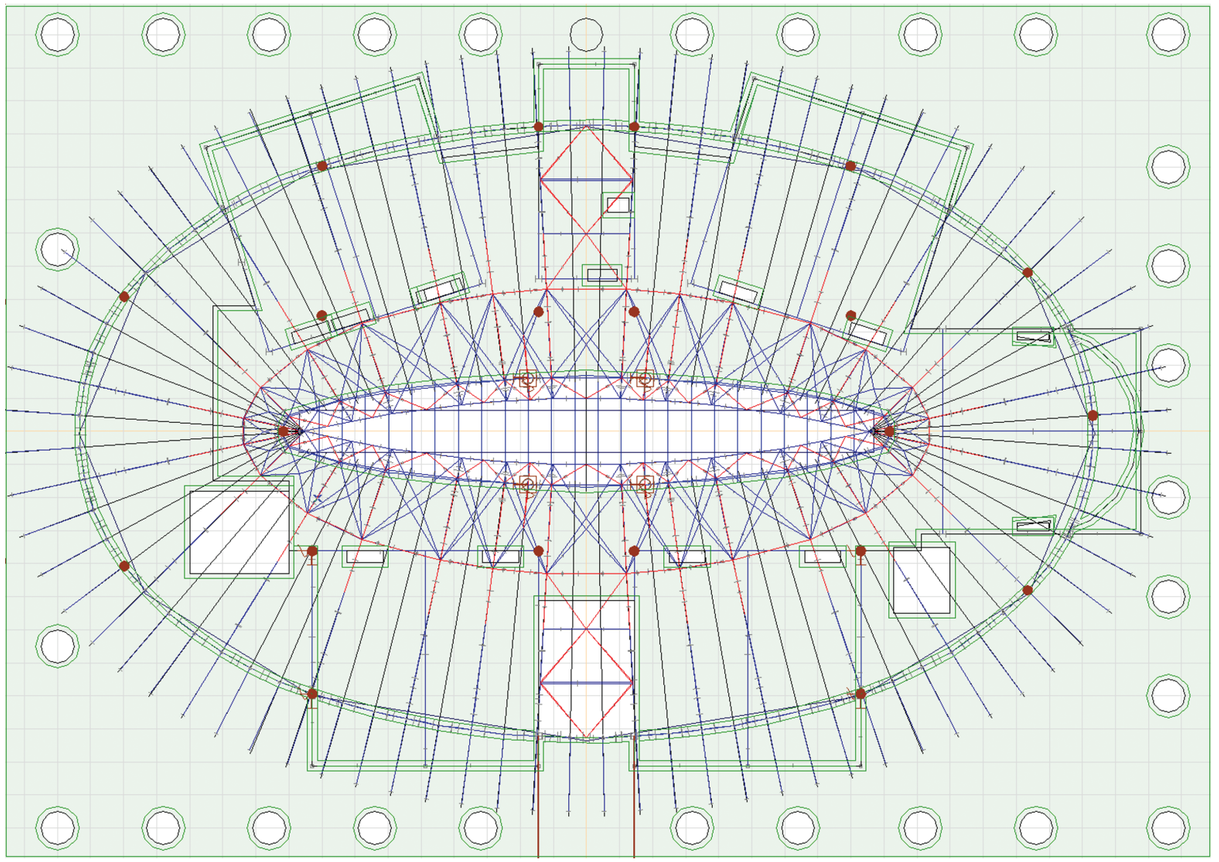
Any type of unit can be defined for all input and output data

Material grade database in accordance with EC, SIA, NEN, etc.

BIM collaboration
Bi-directional connection to architectural and other design software using the latest IFC standard (ArchiCAD, Nemetschek, ADT, Revit, XSteel/Tekla and 3D DXF)

Graphics card hardware-acceleration is employed when displaying 3D models

Graphical interface with advanced editing functions



Documentation wizard creates an associative documentation using numerical and graphics data in any of the available languages (English, German, French, Dutch, Czech, Italian, Polish, Romanian, Hungarian)

Import of cross-section geometry from DXF format

Graphical cross section editor for unique or built-up cross-sections (automatic determination of cross-section properties)

Cross section database of European, American, and Chinese profiles

AxisVM calculation engine can be launched from Tekla

Export of geometric and graphics data to BMP, JPG, PNG, WMF and 3D PDF formats

Output interfaces for XSteel and for BoCAD

Bi-directional real-time connection with Rhino/Grasshopper for 3D parametric beam structure design

Software and User's Manual in English, German, French, Dutch, Italian, Czech, Polish, Romanian, and Hungarian

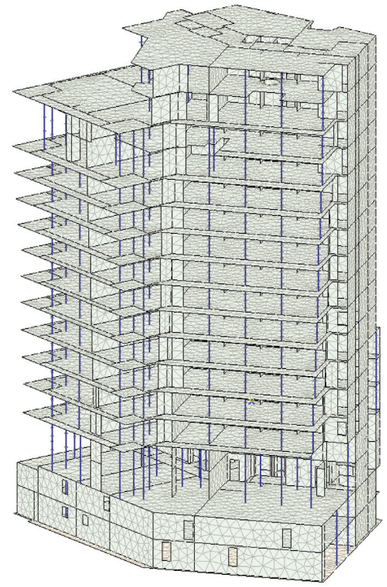
Mülimatt Sports Education and Training Centre, Windisch, Switzerland, 2010
architects: Studio Vacchini Architetti
structural design: Fürst Laffranchi Bauingenieure GmbH
photo: René Rötheli

Geometry

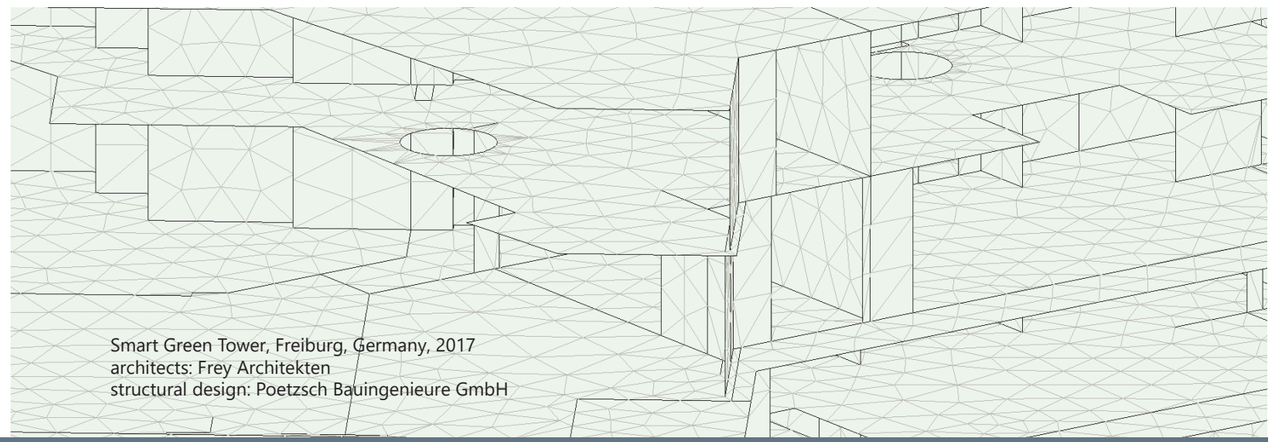
- Editing the 3D model easily, in any view or perspective
- Use of editing planes in any desired location
- Use of unique editing grids
- Handling multi-storey models, storey by storey.
- Generating the frame geometry directly from the architectural model
- Use of orthogonal, cylindrical, or spherical coordinate systems, all with absolute and relative origin
- “Smart” curved lines can be defined for beam and rib members, and as domain contours
- Automatic mesh generation (geometry following) is possible for domains and beams
- Use of associative dimension lines, elevations, and notes
- Generation of partial views is possible, even with the use of filters
- The software automatically categorizes logically matching elements, which makes the modeling and the separated results evaluation very easy
- Associative working planes can be defined
- Architectural rendered view of structural members
- Modeling with BIM cooperation

Finite elements

- Object-oriented finite element architecture
- Truss element with linear, tension-only, or compression-only behavior, even with limited load capacity
- Beam and rib elements for spatial loading (bending, shear, torsion), even with tapered members and/or along curved lines
- Semi-rigid end connections
- Use of plastic hinges at beam ends
- Membrane elements with plain stress or plain strain
- Plate elements (bending, shear)
- Shell elements, incorporating plate and membrane elements
- Hinges along edges
- Contact elements for one-way boundary conditions
- Elastic support, active only in one direction
- Special spring element for modeling irregular connections



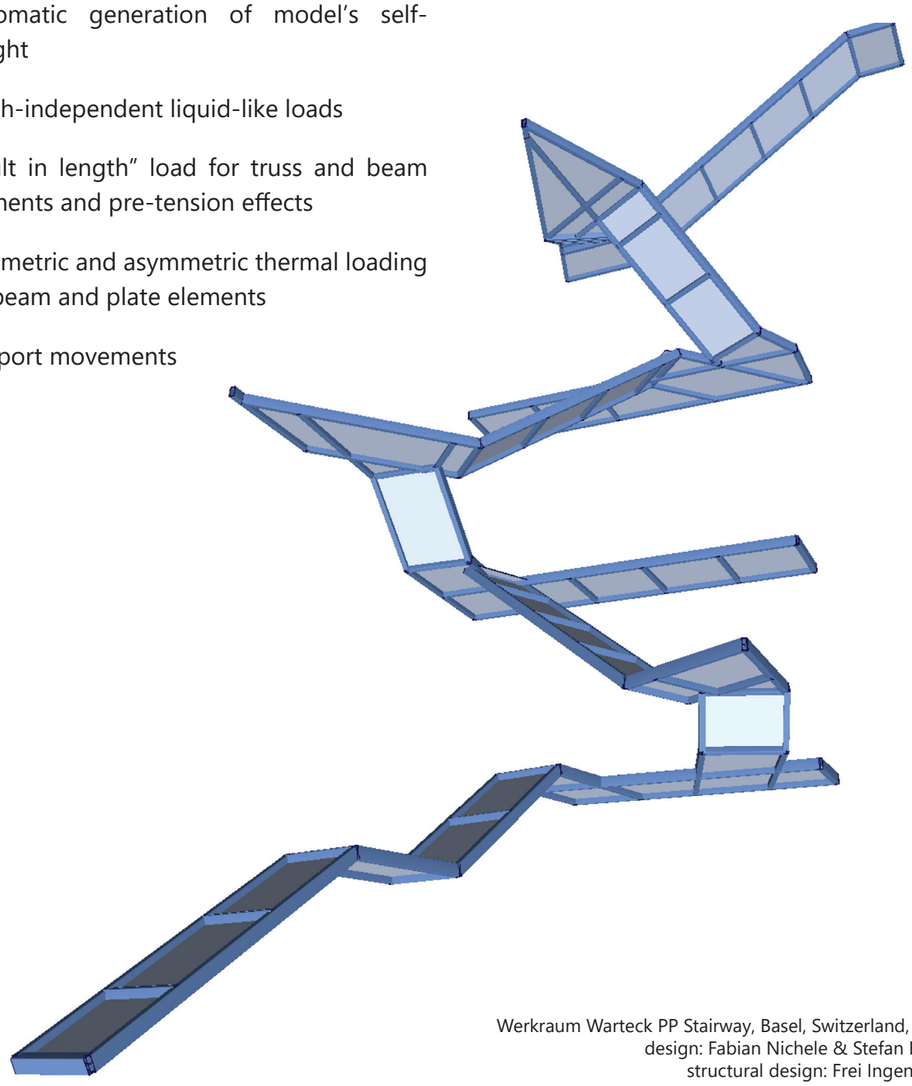
- Design of specific composite structures (XLAM/CLT)
- Tapered shell elements
- Hollow slabs
- Composite ribbed slabs
- Multi-ribbed slabs
- User defined stiffness matrix for surface elements



Smart Green Tower, Freiburg, Germany, 2017
architects: Frey Architekten
structural design: Poetzsch Bauingenieure GmbH

Loads

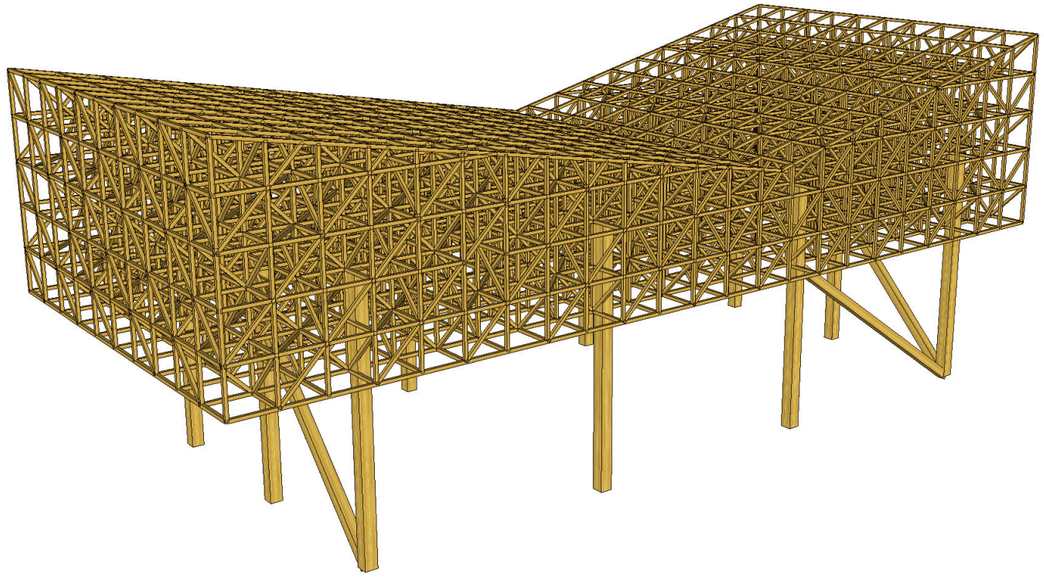
- Automatic generation of load combinations according to standards
- Manual definition of load combinations (for special cases, like seismic action or nonlinear analysis)
- Mesh-independent loads (concentrated and distributed load on lines, domains, etc.)
- Automatic generation of model's self-weight
- Mesh-independent liquid-like loads
- "Fault in length" load for truss and beam elements and pre-tension effects
- Symmetric and asymmetric thermal loading on beam and plate elements
- Support movements
- Mass on nodes (for vibration and dynamic analysis)
- Automatic distribution of surface loads on beams
- Automatic generation of wind and snow loads
- Fire generated loads



Werkraum Warteck PP Stairway, Basel, Switzerland, 2014
design: Fabian Nichele & Stefan Eisele
structural design: Frei Ingenieure

Analysis

- Linear and non-linear static analysis
- Geometric and material non-linearity
- Buckling analysis (buckling shape and critical load factor)
- Automatic determination of buckling lengths for steel design
- Refined input of lateral torsional buckling analysis parameters by specifying unique support conditions
- Vibration analysis for vibration shape and natural frequency determination
- Footfall analysis: checking the acceleration due to human induced vibrations
- Seismic design according to Eurocode, DIN, SIA, etc. standards
- Pushover analysis
- Transient loads and time history analysis
- Utilizing multi-core processors for computation
- Displacements, internal forces, stresses, and reaction forces at nodes and along lines and on surfaces



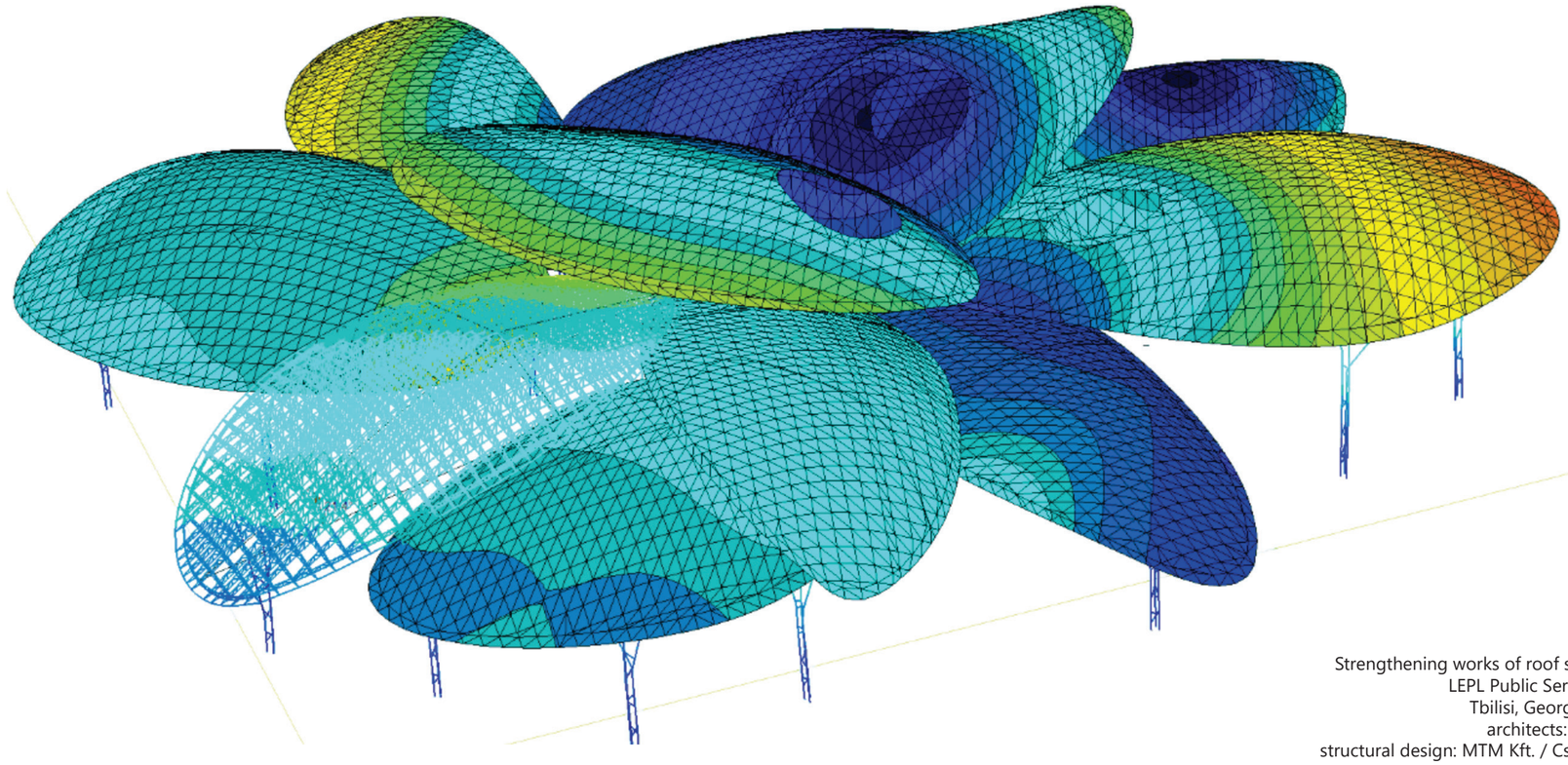
Pavilion of Reflections, Zürich, Switzerland, 2016
architects: Studio Tom Emerson
structural design: Holzbaubüro Reusser GmbH
photo: Johan Dehlin

Results

- Vibration modes, natural frequencies
- Buckling shapes, critical load multiplier
- Envelope diagrams
- Direct display of critical load combinations results
- Diagrams, isolines, or isosurfaces
- Labeling minimum and maximum values of results
- Labeling results at user specified points
- Animated results of buckling shapes and vibration modes
- Displaying surface results along given section lines
- Mean and resultant calculation on section lines
- Integrated internal forces on surface elements (virtual beams and strips)
- Influence diagrams
- Displaying results on isolated model parts
- Documentation editor and wizard
- Detailed documentation of design results

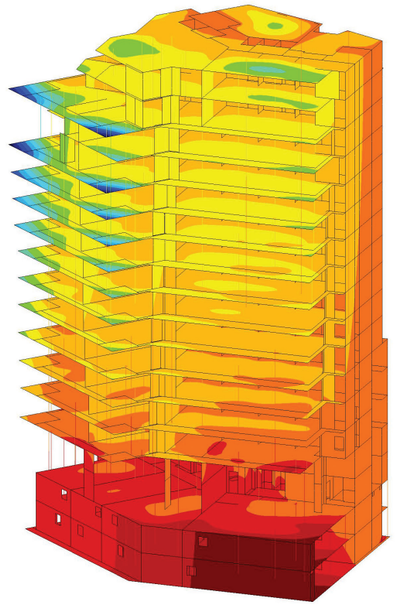
Design/Check

- Setting of default values of design code parameters (steel and reinforced concrete design)
- Design of beam reinforcement (amount of reinforcement, stirrup spacing, deflections, and crack width calculation)
- Design check for concrete columns of any shape using interaction diagram (considering eccentricity)
- Analysis of plate, membrane and shell reinforcement, and corresponding crack width



Strengthening works of roof structure
LEPL Public Service Hall
Tbilisi, Georgia, 2018
architects: FUKSAS
structural design: MTM Kft. / Csaba Bán

- Non-linear deflection of plates
- Calculation of shear capacity for plates and shells
- Punching shear check for slabs and footings according to EC2 and SIA
- Design of spread footings and strip footings, with consideration to settlements
- Calculation of composite ribbed and hollow core slabs
- Efficiency calculation of steel members according to the EC3 standard (combined loading, buckling, and lateral torsional buckling)
- Endplate moment bearing connection according to EC3
- Analysis and design of structural steel connections (EC3)
- Efficiency check of timber members (EC5)
- Glulam timber design
- Shape optimization of steel and timber members and automatic economic shape design (EC3, EC5, SIA)
- Fire resistance assessment of steel and timber structures (determination of the critical temperature)
- Design efficiencies of XLAM/CLT panels



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