

Easy.

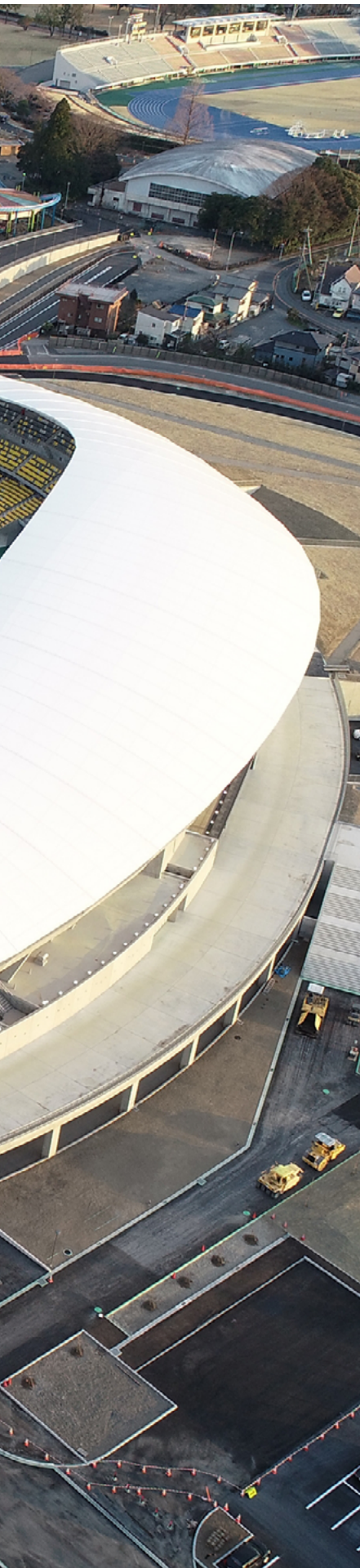
LIGHTWEIGHT STRUCTURE DESIGN

Formfinding, Statics and Cutting Patterns
of Lightweight Structures

Easy.Form
Easy.Static
Easy.Cut

Easy.





BE A PART OF OUR NET – YOUR BENEFITS AT A GLANCE

The software ensures seamless free-form design, precise structural analysis, and automated cutting pattern generation. Easy is the ultimate all-in-one solution for designing lightweight structures with efficiency and precision.

- Over 35 years of expertise in membrane structures
- Professional support at every stage of your project
- Industry-specific and cross-disciplinary knowledge
- Cutting-edge, high-precision algorithms for top performance
- Intuitive and user-friendly software solutions
- Customized solutions based on a reliable standard software platform

PRECISION IN LIGHTWEIGHT STRUCTURE DESIGN

The design of lightweight tensile structures is inherently linked to their internal forces, their shapes cannot be determined purely by geometry. Easy facilitates precise formfinding by calculating structural equilibrium, ensuring optimal shapes for tensile and inflatable systems.

To guarantee stability, the software performs detailed analyses of internal stresses and deformations caused by external loads such as wind and snow.

Additionally, it provides highly accurate cutting pattern generation, essential for the manufacturing process.

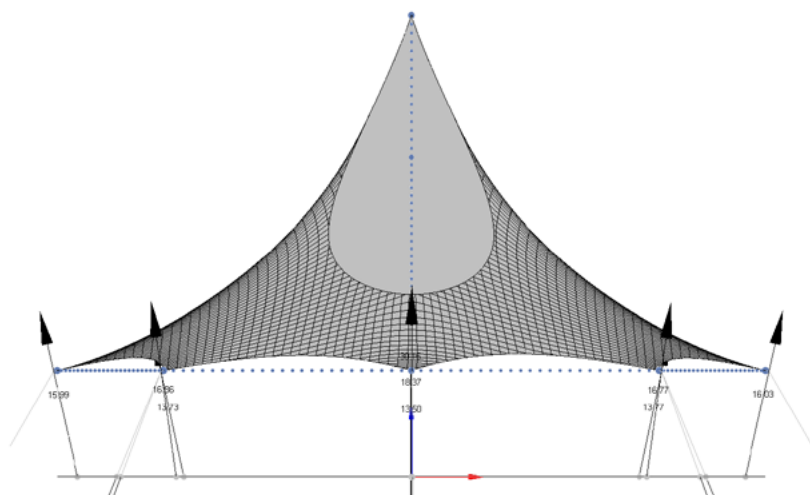
To optimise the workflow, the software offers powerful batch job technology. Create your own scripts to automate routine tasks and boost productivity – fully aligned with your project requirements.

With Easy, engineers and designers gain a powerful, efficient tool for the optimal and economic planning of lightweight structures.

Easy.Form

FORMFINDING OF MECHANICALLY STRESSED STRUCTURES

- Analytical formfinding as a function of internal stress
- Determining the flow of forces as support for the design process
- Formfinding with linear Force Density Method
- Mixed formfinding: Stiffness elements (e.g. compression or tension members) are directly integrated into the formfinding process. This creates a primary structure that takes into account both the desired shape and structural efficiency
- Water dimensioning: Slope lines and contour lines
- Textile structures, cable net structures, hybrid structures and tensegrity structures





THE STANDARD MODULE CAN BE EXTENDED WITH THE OPTIONAL EXTRA “VOLUME FORMFINDING” FOR THE ANALYSIS OF PNEUMATICALLY STRESSED STRUCTURES

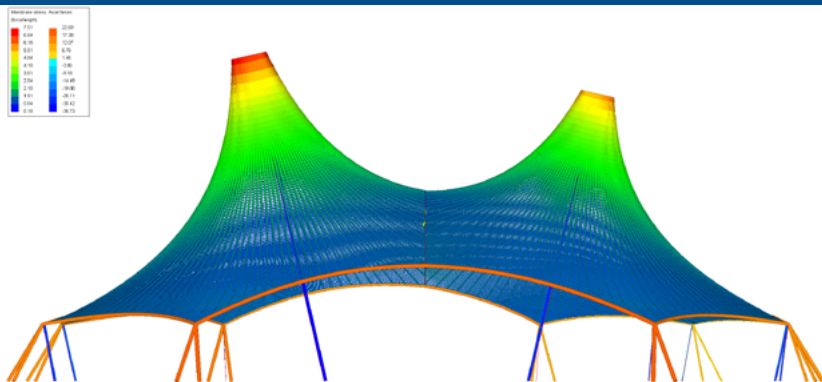
- Formfinding in consideration of a volume created by a given inner pressure or a given volume
- Interface for a parametric NURBS-driven 3D design platform
- Air-supported structures: The internal air pressure acts on a membrane and maintains its shape through overpressure. Typical examples include sports halls or temporary pavilions
- Air-inflated structures: The structure itself consists of air-filled chambers that retain their shape through internal pressure, such as ETFE cushions or inflatable sculptures



Easy.Static

THE BASIC MODULE PERFORMS CALCULATIONS BASED ON TENSION AND COMPRESSION ELEMENTS SUBJECTED TO PURE AXIAL LOADS

- Extensive material and cross-section database with a wide variety of standard materials and ready-to-use profiles for structural members and cables – designed to support intuitive, accurate, and efficient modeling
- External loads generation
- Non-conservative external loads
- Non-linear, fast calculation
- Material properties assignment:
 - Precise material laws with finite membrane element with warp/weft-stiffness including transverse extension and shear stiffness, essential for foils
 - Simplified material laws for orthotropic fabrics described by warp/weft-stiffness
- Membrane-specific visualisation of stress
- Slip cables can be used to simulate an edge cable 'slipping' in its pocket
- Result analysis with reports
- Evaluation- and visualization tools:
 - Contour lines: It can be quickly recognised whether the membrane geometry is correctly pre-stressed or shaped – or whether geometric errors (e.g. incorrect support point heights) lead to ponding
 - Slope lines for a fast drainage dimensioning
- Seamless integration of cables on or beneath the surface into the structural model – either freely placed or guided within a sliding pocket

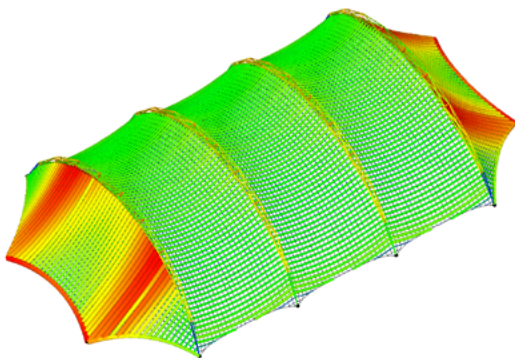


**ENHANCED OPTIONAL EXTRA
“BEAM ELEMENT” FEATURING
COMPREHENSIVE BEAM MODELLING
CAPABILITIES AND A WIDE RANGE
OF ADVANCED TOOLS FOR
STRUCTURAL ANALYSIS**

- Geometrical Non-linear Beam Analysis
- Holistic approach for the static analysis of hybrid load-bearing structures with membranes/foils or cable nets
- Buoyancy loads
- Imperfection models for stability checks
- Calculation of natural frequency
- Consideration of the contact between two membrane surfaces

**FOR THE DESIGN OF STEEL
ELEMENTS (STRUTS, BEAMS AND
CABLES), THE OPTIONAL EXTRA
“STEEL DESIGN EUROCODE 3”
CAN BE INTEGRATED**

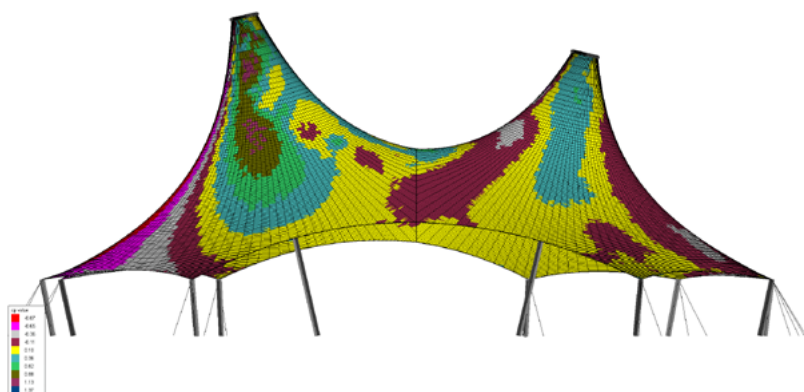
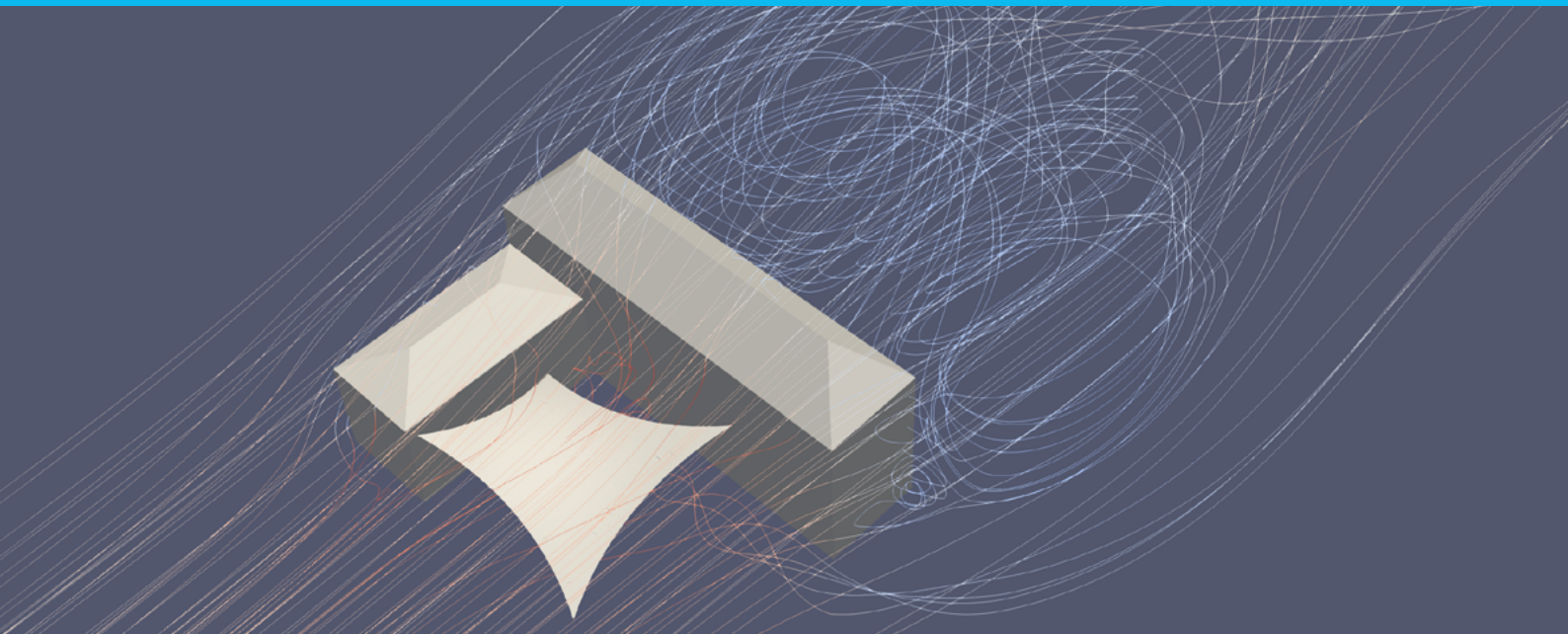
- EC3 Steel design according to EN 1993-1-1 and EN 1993-1-11
- Cross section and stability checks
- Automatic cross-section classification
- Integration of national annexes: Consideration of various national annexes with user-defined limit values and parameters
- Design cases: Design cases help structure the design checks by grouping relevant load cases, e.g. separate design situations tailored to the verification of different materials can be defined



Easy.Static

THE OPTIONAL EXTRA „DIGITAL WIND TUNNEL“ CAN BE INTEGRATED FOR THE AUTOMATIC CALCULATION OF WIND LOADS

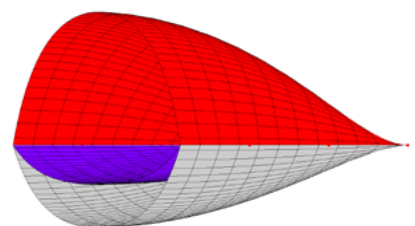
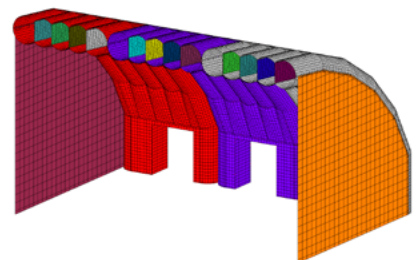
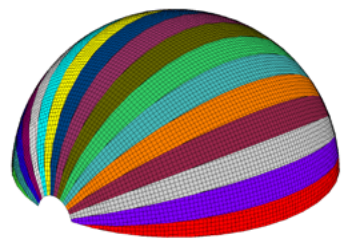
- Automatic generation of wind loads
- Steady-state and transient simulation
- Direct transfer of the wind simulation results into the structural load case analysis
- Additional surrounding models and obstacles
- Turbulence models: k-epsilon, k-omega, k-omega SST and Spalart-Allmaras-DDES
- Height dependent wind profiles
- Output of c_p values and load zones or load vectors
- Graphical analysis of the results





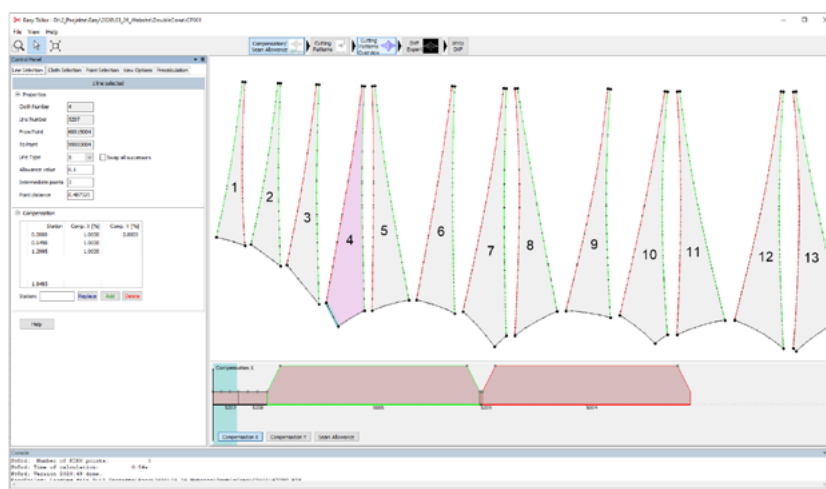
FOR PNEUMATIC STRUCTURES REQUIRING STATIC ANALYSIS, THE OPTIONAL EXTRA „VOLUME STATIC“ CAN BE INTEGRATED

- Static non-linear calculation subject to various types of physical laws:
 - Constant volume
 - Constant inner pressure
 - Constant product of inner pressure and volume
 - General gas equation, consideration of temperature and absolute pressure
- Buoyancy loads
- Contact between membrane surfaces: Precise modelling of the contact between membrane surfaces is crucial in order to correctly determine the actual air and gas volume in textile structures. If the contact is accurately taken into account, contact points, overlaps and potential deformations of the membranes can be recorded more precisely.



CUTTING PATTERN GENERATION

- Calculation of cutting patterns in consideration of maximum pattern width (cut-off minimisation)
- Automatic boundary adjustment
- Design for manufacturability (compensation, boundary allowance, welding marks)
- Constant, non-constant and user defined compensation
- Editor for customising the compensation
- Welding marks for high-precision welding seams
- Fully automated optimisation of pattern width in standard cases
- Small flattening distortion caused by the use of map projection theories
- Detailed control values for analysing the accuracy of the results
- Export to cutting machines



Special solutions

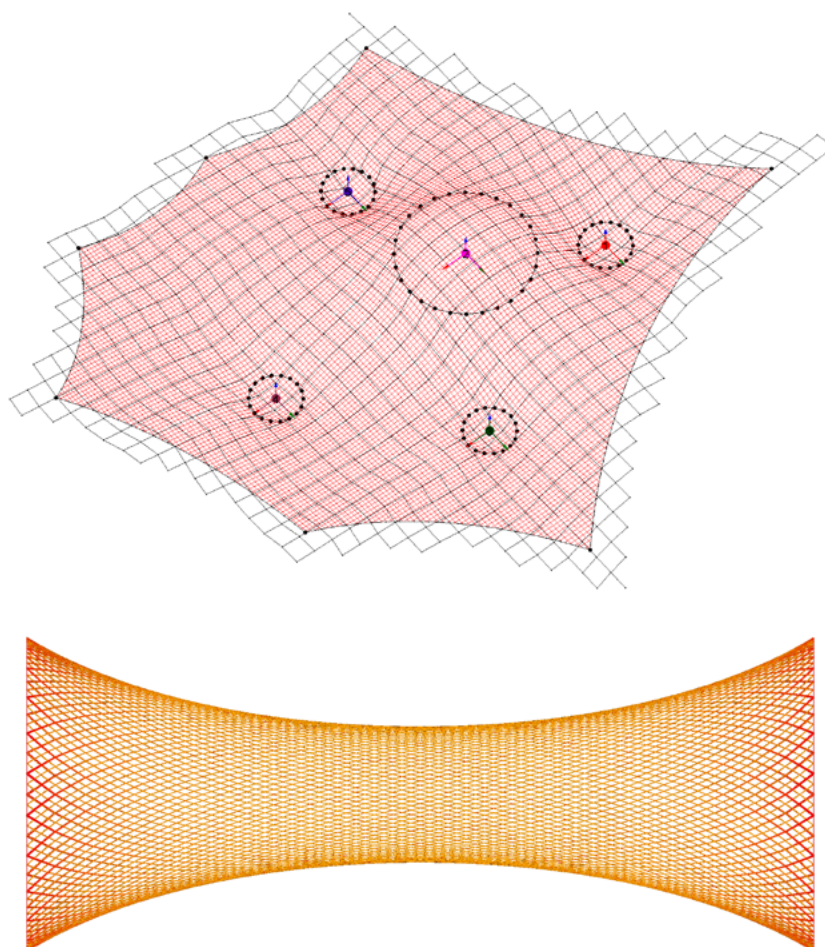
EASY.ADDON EQUIDISTANT MESH

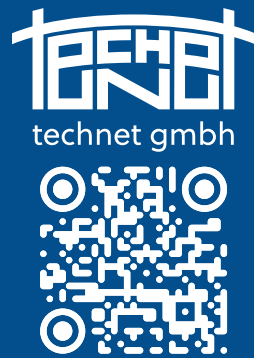
Engineering offices and cable net manufacturers are increasingly using these nets in areas such as playground structures, fall protection, zoo enclosures and reinforcements for pneumatic structures. Users require integrated solutions that make both the calculation (formfinding and statics) and the creation of cutting plans efficient and uncomplicated.

- Generation of equidistant meshes
- Generation of cutting plans and parts lists for cable nets
- Rapid generation of seamless, diamond-shaped tunnel meshes

CUSTOM EXTENSIONS

Based on our modular software, we develop customised solutions that are precisely aligned with your requirements. Whether you need specific features, interfaces or workflows – we adapt Easy to perfectly support your projects and processes.





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