

SJ MEPLA Version 3.5

The dimensioning and stress calculation of structural glass is a standard task of the daily engineering practice. Panes varying from a rectangular form, point supported glass or laminated glass can no more be calculated by tabulations or formula but have to be evaluated by the method of the finite elements.

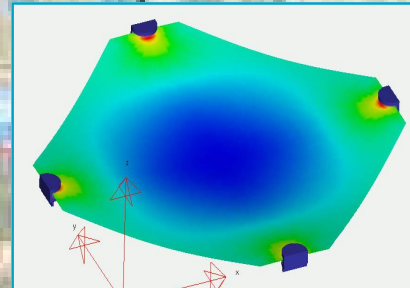
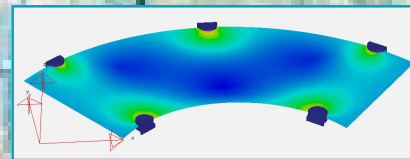
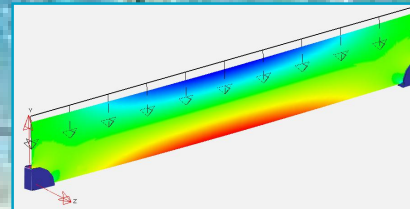
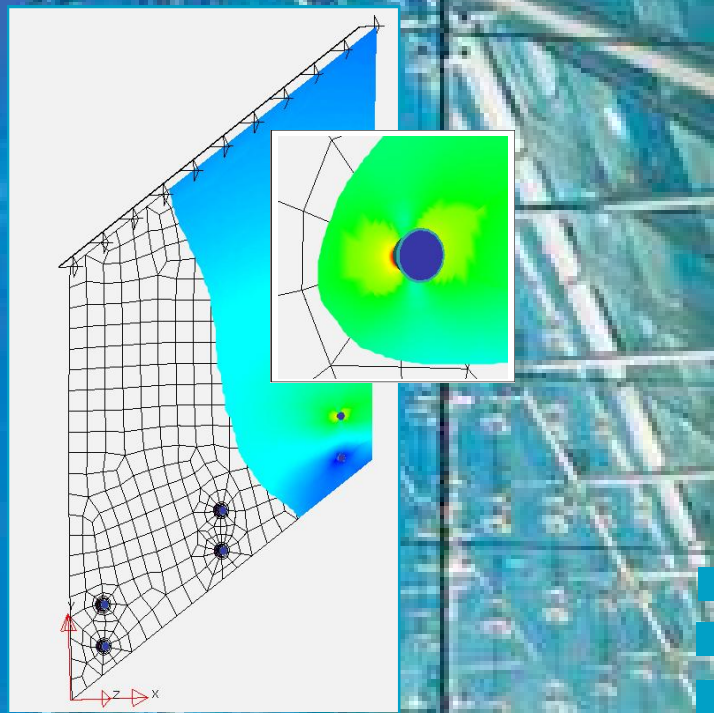
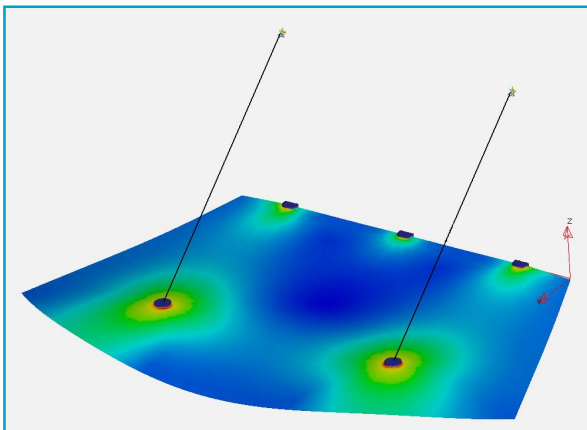
For insulating glass units, there is hardly a possibility for calculation if any shape, any kind of fitting, laminated glass, the gas pressure law or geometrically non-linear approaches shall be considered.

This is where the program SJ MEPLA applies:

All inputs, like the geometry, the bearing conditions, the kind of loads, the calculation approach or the requested output, are guided and displayed by input masks. The control and output of the results occurs visually in a graphics window and a calculation protocol, which can be used for the structural assessment.

Special new finite element methods allow the simple input and quick calculation of sandwich structures (laminated safety glass), so that the entire problem can be solved at shortest time (within a few minutes).

Thus the program is suited for static calculations as well as also for dimensioning, for which it offers a variety of calculation possibilities:



Geometry

- automated mesh generation for any system build from straight or curved borders only by defining the corner points
- The element size is preset, but may also be changed manually to increase the accuracy of the calculation. (The user, however, is not aware of the fact that he is working with a Finite Element Program).
- any system shapes including cut-offs and holes are possible
- the mesh for the point support is build automatically too

Layer

- laminated glass considering the stiffness of the compound material PVB. The user has only to define the layer order.
- sandwich theory is used
- any layer design up to 20 layers is possible - even for insulating glass
- calculation of insulation glass considering the real gas pressure law
- up to 3 gaps under any loading (climate loads like pressure differences, thermal expansion of the gas, external loads, pendulum impact,...) can be given

Boundaries

- fully automated generation of point fixings only by defining the position within in the plate
- eccentricities for bending effects are considered
- the properties of the point fixings can be stored in a database and can be directly chosen for insertion
- all point fixings can be calculated with contact algorithms
- countersunk, disk or special fixings with covering layers
- balustrade clips with circular or angular shape (usable as glass shoes for e.g. glass beams or fins)
- downholders with circular or angular shape
- bonded point fixing without a generated hole
- considering stiffness of the sub-construction or special mechanisms (e.g. a ball shaped head)
- applying loads or moments at point fixings
- optional use of springs or tie bars at the point fixing
- point supported insulating glass units (e.g. *LITEWALL*)
- spacers in insulation glass (e.g. unsupported borders)
- elastic edge or line supports including contact conditions
- elastic beams acting at the borders
- any position of local springs with translational and rotational degrees of freedom
- elastically bonded edges and structural glazing
- predefined support conditions directly assigned to the borders

Loads

- face loads, line loads, water pressure, dead weight
- any point loads distributed over a definable area
- all loads can be combined
- use of safety factors
- calculation of load cases with any combinations of loads and related safety factors
- calculation of stresses resulting from temperature differences given for each layer
- dynamical calculation of the pendulum impact for single-layer glass, laminated and insulation glass of any design
- the drop height of the pendulum and the impact point can be chosen freely
- dynamically calculated pressure hits like wind blasts

Options

- all subsequent calculations can be made linear or geometrically non-linear (large deformations).
- output of curve diagrams for forces, deformations and stresses during the impact period for any predefined position
- printable protocol for the structural assessment including all settings, maximum stresses, deformations, reaction forces
- multi-language protocol version (German, English, French, Dutch, Italian, Espaniol, Portuguese)
- for 32 or 64 bit operating systems
- In-Core or Out-Of-Core solver for largest projects
- supports multiprocessor systems, parallel computing

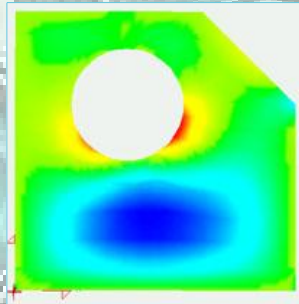
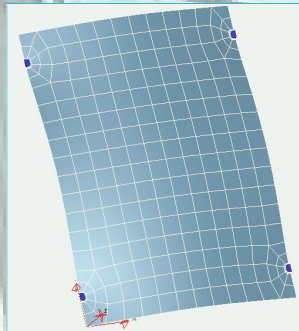
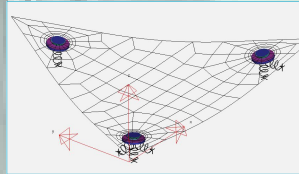
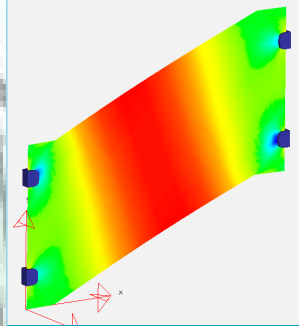
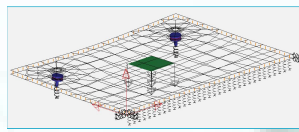
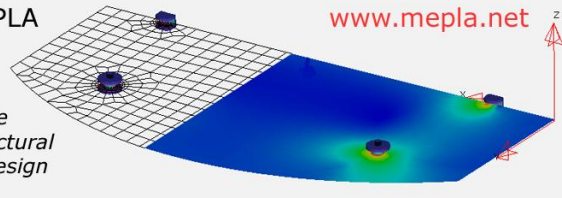
Graphics

- manifold evaluation possibilities in the post-processor
- stresses over the plate thickness and the layer order at any point
- display of the pendulum impact in slow-motion
- output of all stress components
- display of the spring reaction forces
- vector-plot of the principal stresses
- magnification of deformations and much more

SJ MEPLA

www.mepla.net

Software
for Structural
Glass Design



References

Germany

SAINT-GOBAIN GLASS Deutschland GmbH
RWTH Aachen, Institut of Steel Construction
INTERPANE
Vetrotech Saint-Gobain International AG
Josef Gartner, Fassadenbau
Ed. Züblin AG, Hauptverwaltung
TU München - Institut of Steel Construction
Dr. Kunkel & Partner KG, Ingenieurbüro
CSK, Ingenieurgesellschaft mbH
Loos & Partner, Ingenieurbüro
Bangratz, Ingenieurbüro
Wetzel & von Seht, Ingenieurbüro
Windels - Timm - Morgen, Ingenieurbüro
Schlaich Bergermann und Partner
Zilch + Müller GmbH, Ingenieurbüro
Novum Structures GmbH

Austria

Wagner-Biró
Eckelt Glas GmbH
Kamer Consulting ZT GmbH

Switzerland

Schmidlin AG
feroplan engineering ag
Fahmi AG

Great Britain

Whitby Bird & Partners Engineers
Solaglas Ltd.
Space Decks Ltd.

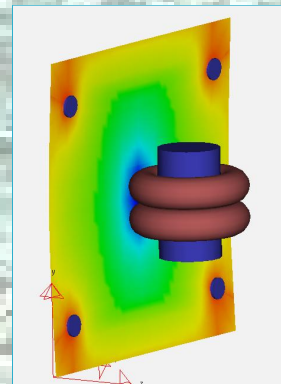
Italy

Permasteelisa SPA

Spain

Bellapart S.A. Construccions Metalliques

Belgium, Netherlands, Finland, USA,
Canada, China, United Arab Emirates,
France, India, Poland, Denmark, Greece,
Portugal, Croatia, Russia, Egypt,
Norway, Brazil, Malaysia, Chile



SJ MEPLA
Software for
Structural Glass Design

info@mepla.net

www.mepla.net