3D Wind Load Generator

esas.46.01
esas.46.05

3D Wind Load Generator

Scia Engineer is equipped with a tool: the “3D wind load generator”. It allows the user to generate wind loads on closed 3D buildings. The functionality is available for the EC-EN, EC-EN/NA UK and IBC codes.

Datasheet Scia Engineer

esas.46.01 / esas.46.05

Scia Group nv • Industrieweg 1007 • B-3540 Herk-de-Stad • Tel: +32 13 55 17 75 • Fax: +32 13 55 41 75 • info@scia-online.com

www.scia-online.com

3D Wind Load Generator

3D Wind Load Generator belongs to the family of load generators in Scia Engineer. While the 2D Wind Load Generator is suitable for regular frames or halls, the 3D Wind Load Generator allows the user to generate wind loads on closed 3D buildings.

Complete design of a structure for wind loads represents a tedious task due to a great number of wind zones and load cases that must be considered in the calculations. Scia Engineer and its 3D Wind Load Generator simplify this part of the design process.

"Coat" the wind can blow against

Before the 3D Wind Load Generator can be used, the model of the analysed structure must have "something" – a kind of "coat" - the wind can blow against. For model with outer walls and roof inputted as a part of the analysis model, there is nothing to care about. But, for frame structures, it is necessary to define facade and/or roof panels on which the wind load can be applied. The principle of these panels is that, while the panel itself is ignored in the calculation, any surface load defined on the panel is automatically transferred to load bearing parts of the structure. The bearing parts are either the beams supporting the panel, or edges of the panel, or vertices of the panel.

All the "coat" elements, either the straight walls and plates or panels, are categorised by their function in the building as a wall or roof. For the roof also a proper type is assigned:

- Flat,
- Monopitch,
- Duopitch,
- Hipped.

This categorisation is needed for automatic creation of wind zones on the "coat" elements.

Wind direction

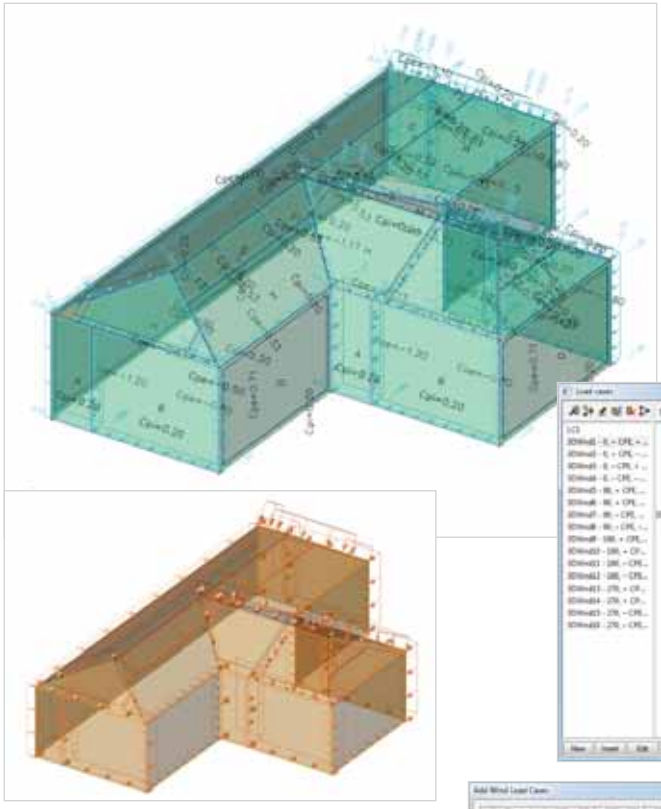
In addition to the type of the "coat" elements the user must specify the direction of the wind and combination of signs (+ + / + – / – + / – –) for Cpe/Cpi coefficients. It is possible to input as many wind directions and sign combinations as required.

The 3D Wind Load Generator then takes care of the rest:

- Creation of wind zones,
- Generation of all required load cases,
- Input of actual loads.

Wind zones

The generated wind zones can be viewed, edited, if required, or even input manually in the Zone Editor.



In normal working procedure, wind zones with related Cp values are generated by the generator.

However, if required, the generated zones can be edited by the user or even input manually. Actually, three possibilities are available for creation of the zones:

- Template according to the code: the geometry of zones is calculated according to the inputted value 'e' (see for example picture 7.5 of EN1991-1-4); the value of Cpe has to be inputted manually.
- Manual design: geometry and other values are inputted manually by the user.
- Generate: in this case, the geometry of zones and wind coefficients are automatically calculated by the generator.

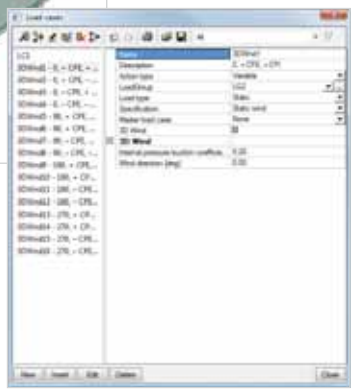
The graphical window displays both the generated wind zones and calculated CPE coefficients.

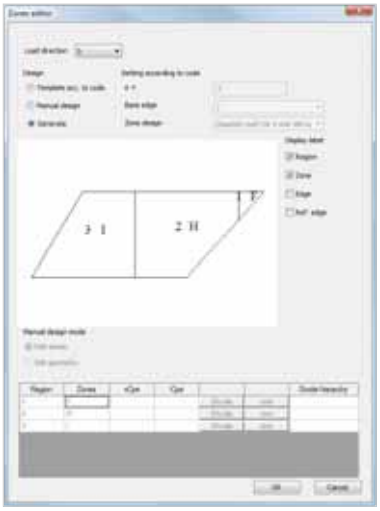
Load cases

For the specified wind direction and Cpe/Cpi sign combination the appropriate load cases are generated. The generated load cases are added to the already existing load cases in the project and can be reviewed in the Load Case Manager.

Load

The load in individual generated load cases can be reviewed in the graphical window. The view flags enable the user to swap between seeing the Cpe coefficients and the actual load.





Highlights

NEW

- The 3D wind generator is a user-friendly and easy-to-use tool. With a few clicks, wind zones and loads are generated on the whole structure.
- Zones and related C factors are visible in the graphical window
- All types of closed 3D buildings can be analyzed for the resistance to wind loads.

Required module: esas.29.

esas.46.01 / esas.46.05