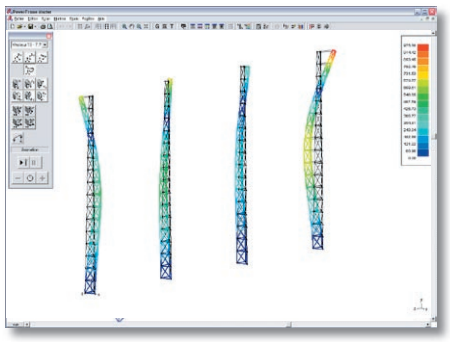
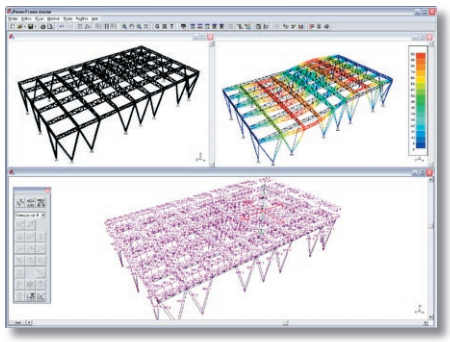
PowerFrame

Advanced dynamic analysis



Intuitive

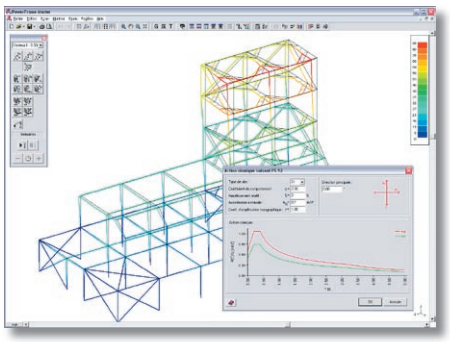
Within PowerFrame's user-friendly environment, the user completes model geometry, boundary conditions and loads with data on the seismic action. The seismic design spectrum can simply be defined as a function of the seismic zone for which the design is to be made, and as a function of the sub-soil class. At any time, the user keeps a clear view on the definition of the seismic action.



Powerful

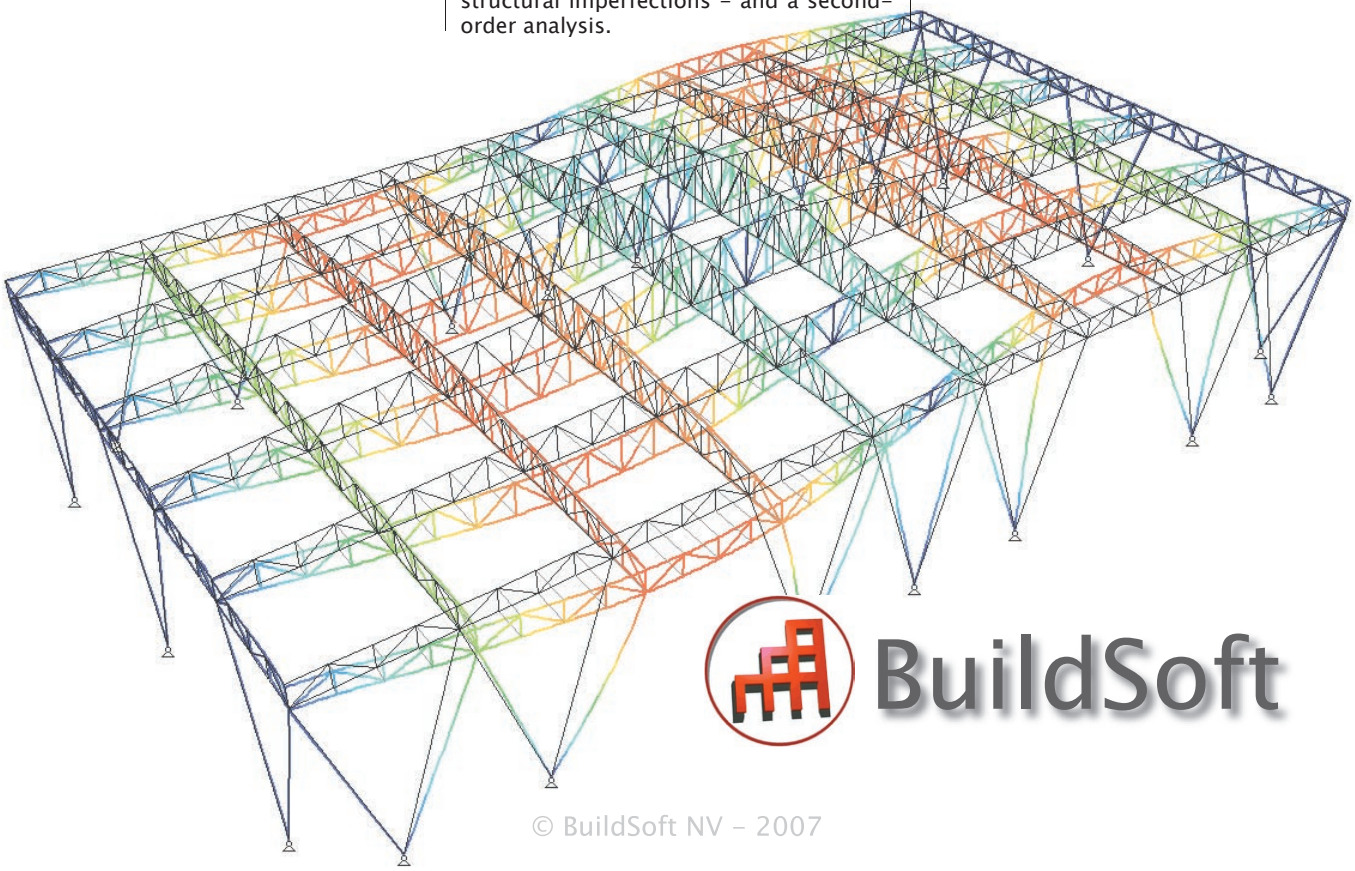
Thanks to PowerFrame's advanced modal analysis techniques, 3D structures subjected to a seismic action can be calculated very efficiently. PowerFrame summarizes effective modal masses for each direction, such that the validity of calculations can be verified at any time.

Seismic design analysis is fully integrated within the elastic structural analysis, enabling the user to account for effects of seismic actions both during a first-order analysis – possibly accounting for structural imperfections – and a second-order analysis.



Complete

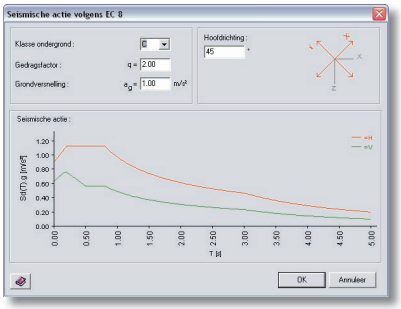
The advanced dynamic analysis module is available as an add-on to each PowerFrame version (Starter, Standard & Master). Fully integrated with the implemented design rules for reinforced concrete, steel and timber, this module offers a complete and powerful seismic design tool.

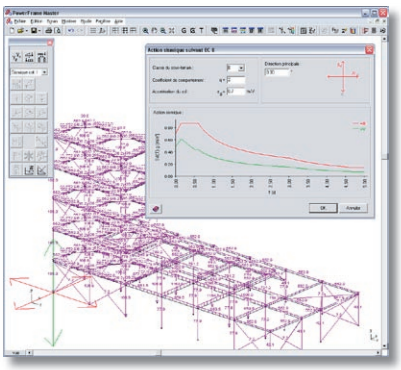


BuildSoft

PowerFrame

The advanced dynamic analysis module is available as an add-on to all PowerFrame versions (Starter, Standard & Master). Each version offers a complete set of analysis capabilities dedicated to a specific application range.





Features

Automated definition of design gravity loads to be considered during modal and seismic analysis. Design gravity loads are derived as a function of the permanent loads and a fraction of the life loads through correlation coefficients.

Seismic analysis using modal superposition method - re-use of available eigenmodes upon modification of seismic action, damping, ...

First-order static analysis and second-order static analysis with user-controlled accuracy level, taking into consideration the effects of seismic and dynamic loads.

Verification of cross-section resistance and member stability in ultimate limit states, both with respect to fundamental and accidental combinations. Verification of deflections for serviceability limit states.

Interactive definition of correlation coefficients for design gravity loads.

Definition of the seismic action based on the design spectrum (PS92 and Eurocode 8). Interactive definition of the seismic action's principal directions. Automatic derivation of the seismic action's vertical component.

Seismic design analysis through multi-modal response analysis. Selection of the structural modes based on their effective modal masses corresponding to the seismic action's principal directions.

Quasi-static correction accounting for unavailable mode shapes.

Non-linear structural behaviour during a seismic event is accounted for through an equivalent linear elastic analysis based on the seismic design spectrum and the behaviour factor q.

Combination of the effects related to the horizontal and vertical components of the seismic action. Envelope results are derived for internal forces, reaction forces, stresses and deformations.

Combination of permanent loads, life loads and seismic action in accidental combinations.

Benefits

Thanks to its advanced dynamic analysis module, PowerFrame enables engineers to design steel, concrete and timber structural frames for maximum economy, also for regions in which earthquake resistance is a fundamental requirement.

PowerFrame's multi-modal response analysis capabilities allow for seismic design using 3D analysis models, not imposing any restrictions on the building structure's regularity.

PowerFrame makes the complex standards related to earthquake resistant design and the advanced dynamic analysis capabilities easily accessible for the engineer.

For more information on PowerFrame, please contact:

PowerFrame is a product of BuildSoft NV

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