

# SEISMOBUILD

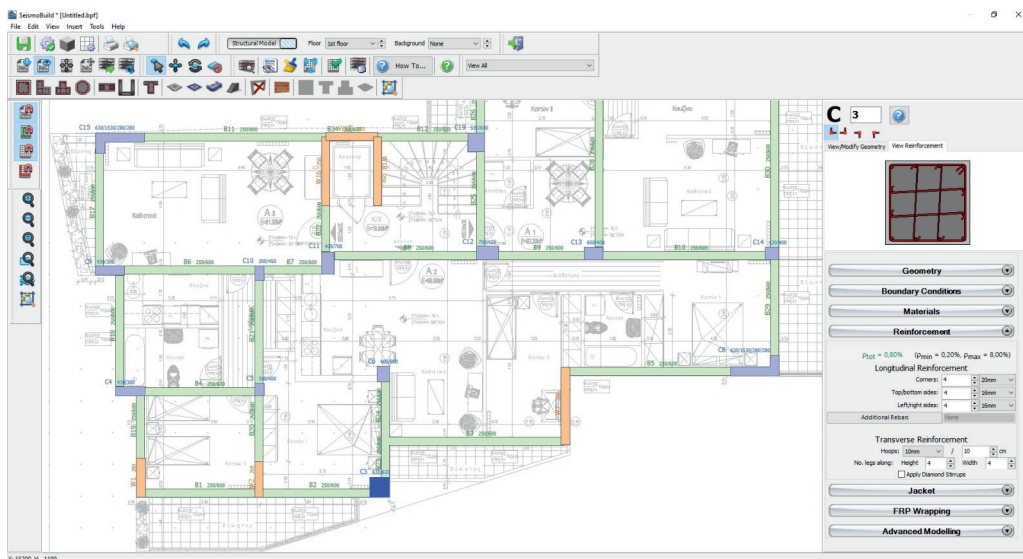
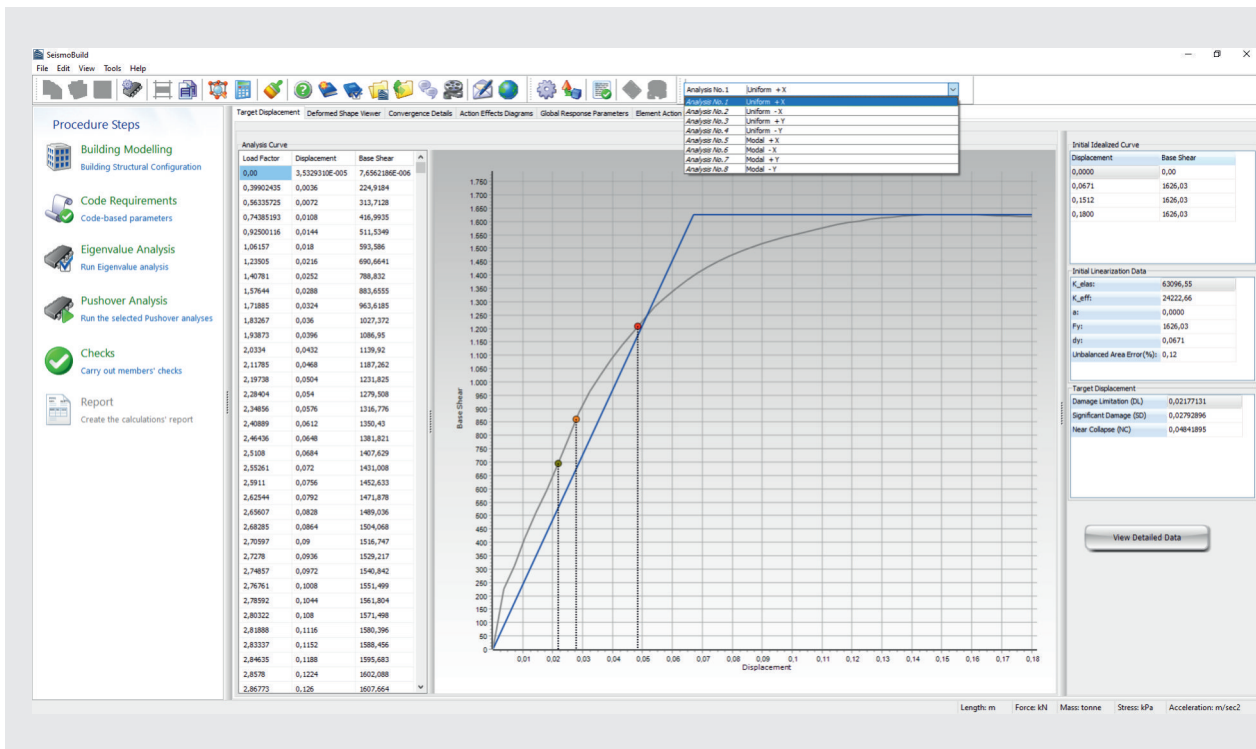


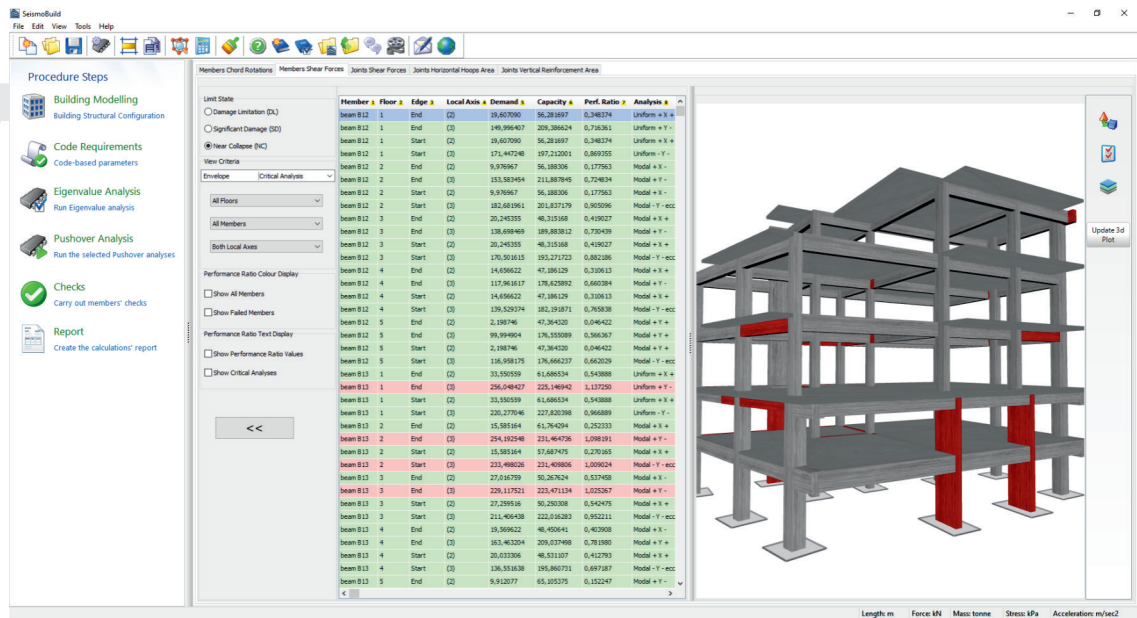
Advancing seismic assessment  
and strengthening of buildings

# SeismoBuild overview

## SeismoBuild is an innovative Finite Elements package

that can be employed to carry out structural assessment and strengthening of reinforced concrete framed structures. The program supports all the linear and nonlinear analytical methodologies that are proposed by the Assessment Standards (Linear Static Procedure LSP, Linear Dynamic Procedure LDP, Nonlinear Static Procedure NSP and Nonlinear Dynamic Procedure NDP) and is capable of fully undertaking code defined seismic assessment methodologies, from the structural modelling through to the required analyses and the corresponding member checks.



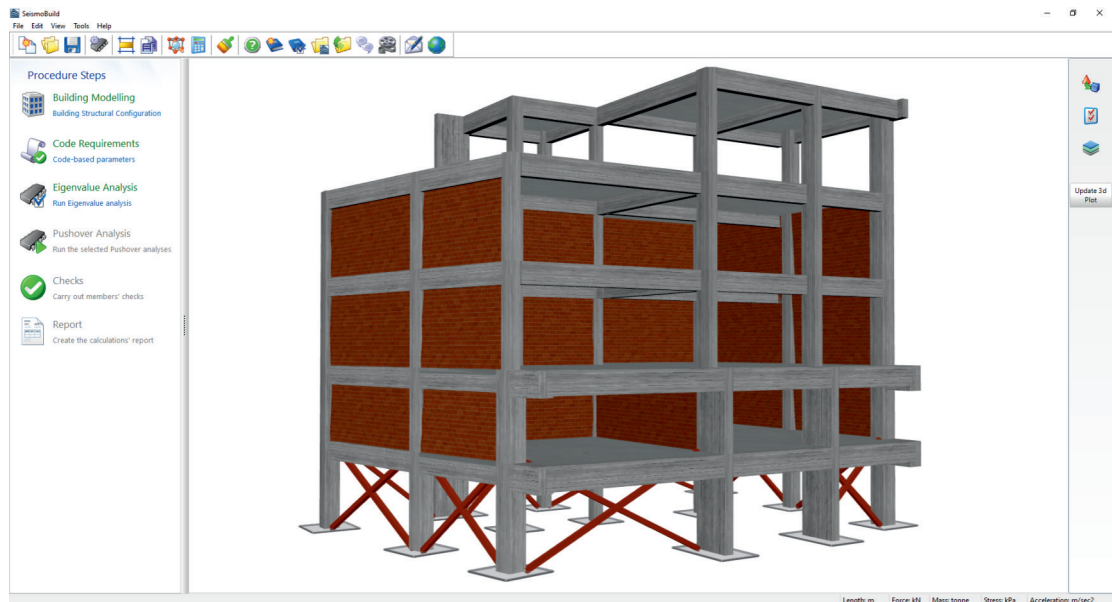


The rational and intuitive structure,

as well as the simplicity of this software tool, which stem from the fact that it is the only software worldwide that is exclusively dedicated to seismic assessment and strengthening of buildings, result in a very smooth learning curve even for engineers that are not familiar with the Finite Elements method.

The user-friendly,

CAD-based, graphical user interface increases the productivity significantly, to the point that the assessment of a multi-storey reinforced concrete building may be completed within a few minutes, including the creation of the technical report and the CAD drawings to be submitted to the client.

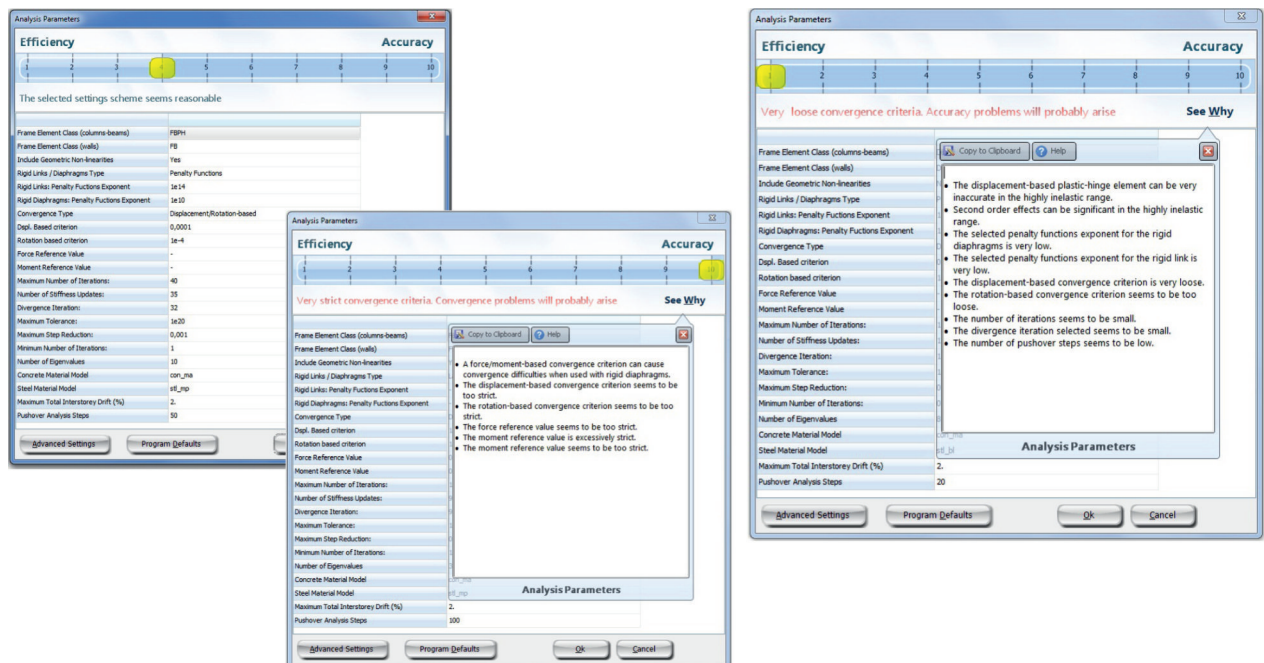




# why use SeismoBuild

✓ It is a software tool focused on seismic assessment and strengthening

SeismoBuild follows an innovative new methodology, by which seismic assessment is fully separated from the design procedures and parameters. The main advantage of this approach is simplicity and clarification. With just a limited number of settings, dedicated only to assessment, and with a linear, straightforward process from structural modelling through to the analysis, the capacity checks and the export of the technical report and the structural drawings, the entire approach is fully transparent and intuitive.



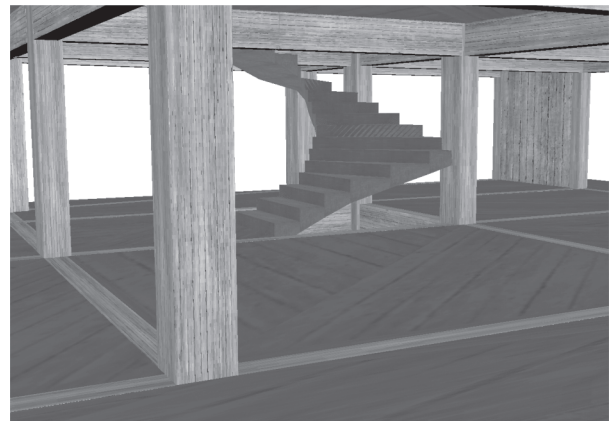
✓ It does not require specialised knowledge on nonlinear FE

Particular effort has been put on simplifying SeismoBuild, to the point that it can be used by engineers without any background on Finite Element procedures. The input provided by users is related only to either the structural details (geometry, materials, and reinforcement) or clearly defined code-based parameters, such as the limit states, the seismic action or the knowledge level. The entire structural model (including the material models parameters, the nodes location and the FE mesh, the elements geometry and offsets, the mass distribution and the loading patterns) is automatically created by the program without any intervention by the user.



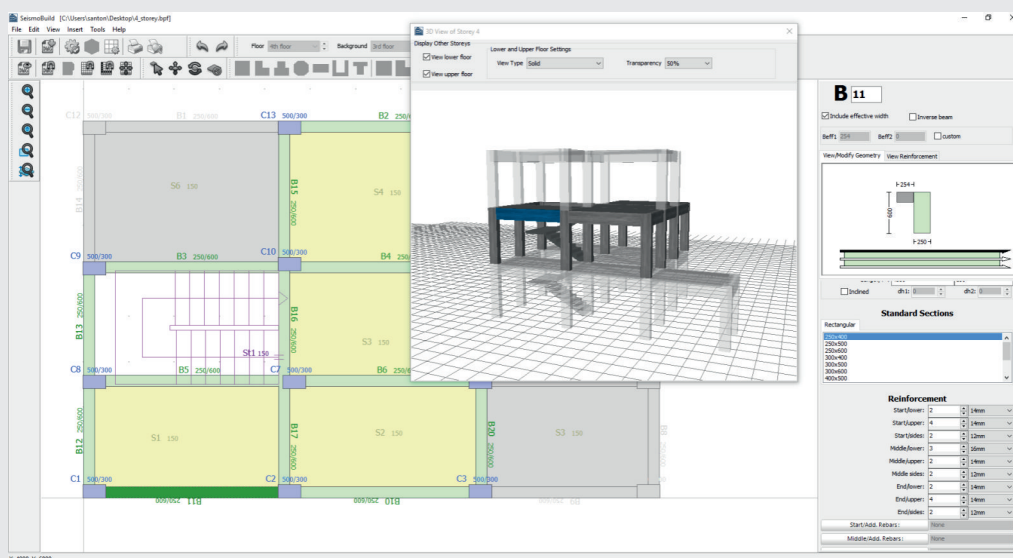
Further, a range of predefined schemes for the most important nonlinear analysis parameter settings has also been introduced, so that it is possible to get optimised solutions in terms of performance, efficiency and results accuracy.

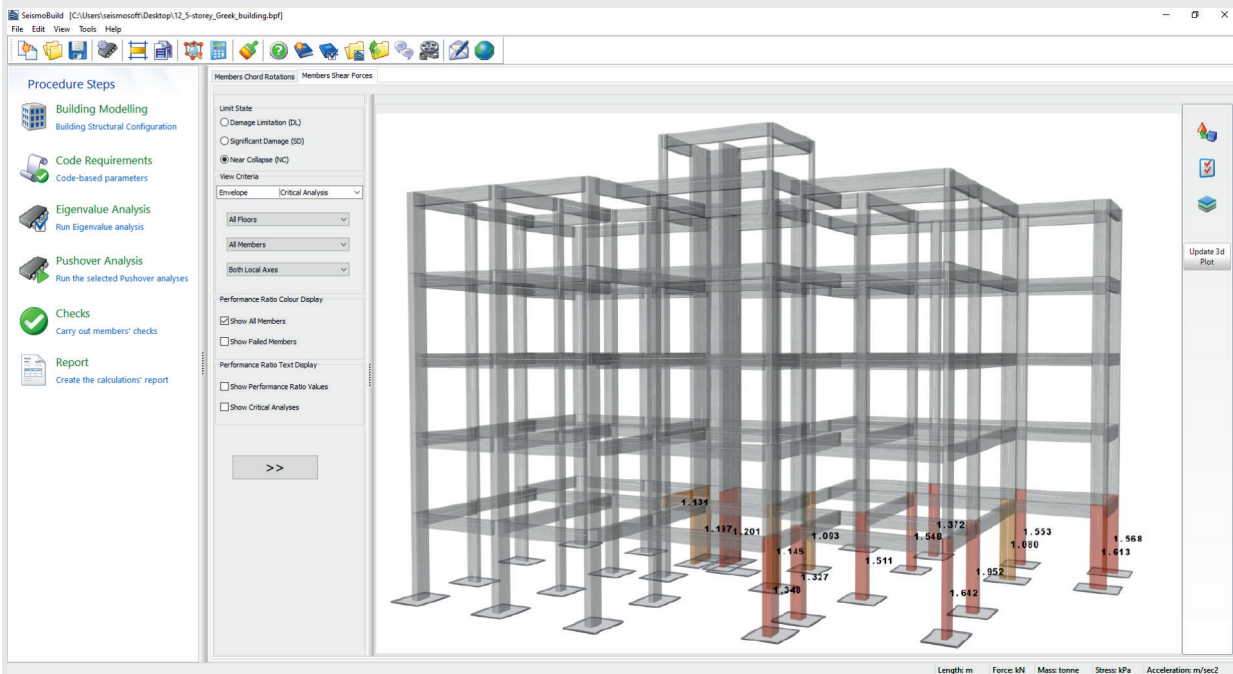
Moreover, the program carries out an internal check and a notification message is issued whenever one or more of these analysis parameters does not seem to suit the needs of a specific project. In such way, all the analyses are routinely completed with the pre-selected settings.



It has a very smooth learning curve

Featuring an extremely intuitive graphical environment and a very straightforward methodology from the structural modelling to the capacity checks, SeismoBuild is extremely easy to learn, and can be used almost immediately. Neither manuals nor tutorial examples are required (though both are available), and any engineer may immediately start using the program effectively.

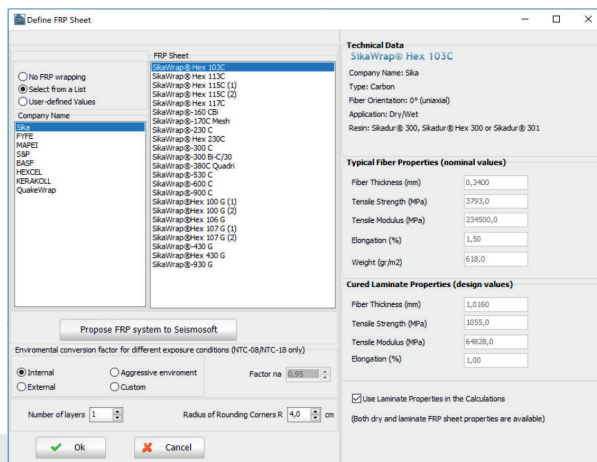




## It offers increased productivity

Particular emphasis has been put on rendering the program not only intuitive, but also easy and fast to use. Columns, beams, slabs and stairs may be assigned with just a few mouse clicks, large libraries

of materials have been included (including e.g. FRP wraps), the program default settings work for the vast majority of cases, and, whenever possible, the process is completely automated. Further, the execution of the capacity checks and the extraction of the results are also automatically carried out, whereas the technical report and the CAD drawings are derived in such a way that they require the minimum possible interventions by the user, before they are submitted. All these facilities result in an extremely user-friendly environment, whereby the modelling and checking of multi-storey buildings in a seismic assessment or strengthening project take no more than 1-2 hours.

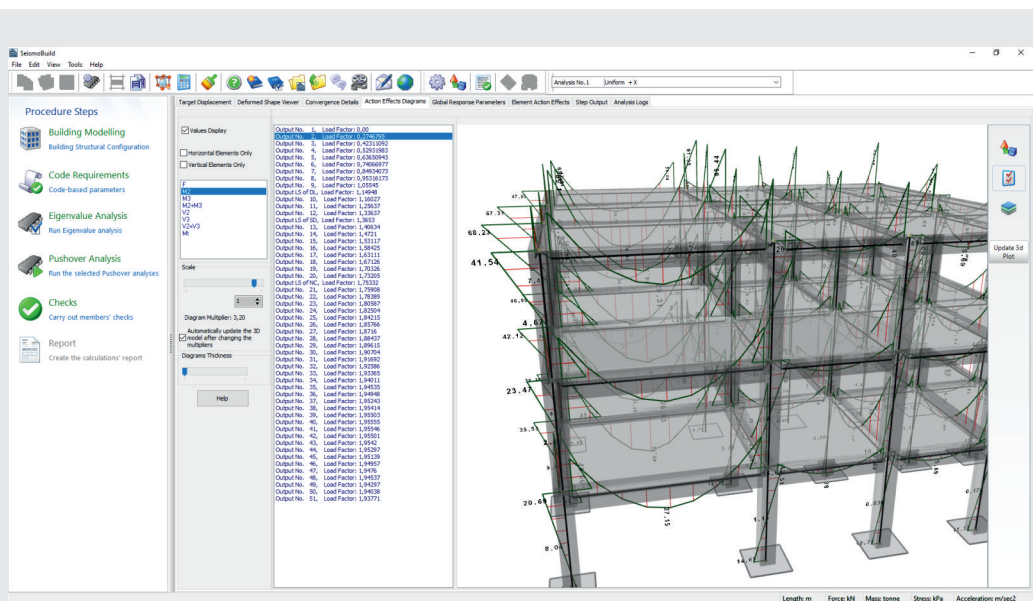
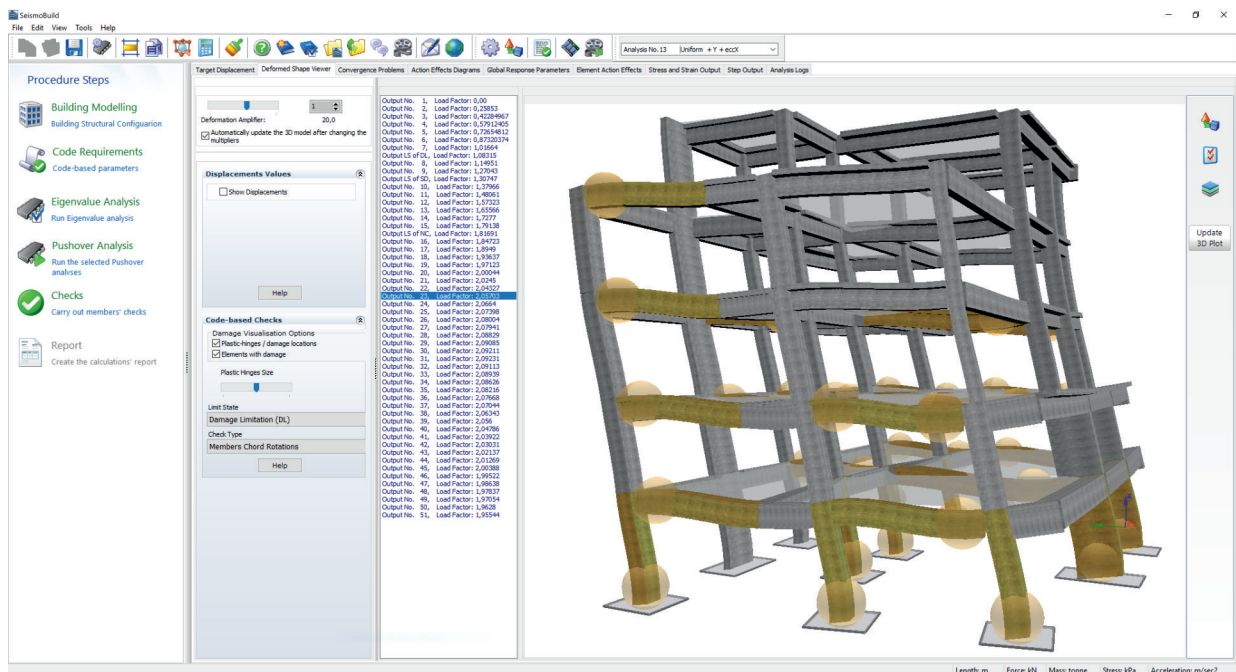


## It offers enhanced accuracy and reliability

The nonlinear analysis solver of SeismoBuild is based on the advanced solution algorithms of SeismoStruct, a package that features both geometric nonlinearities and material inelasticity and has been extensively used and verified by thousands of users for more than ten years. The accuracy of the solver in the nonlinear analysis of framed structures is very well demonstrated by the numerous successes of SeismoStruct in Blind Test Prediction Exercises, such as the Concrete Column Blind Prediction Contest 2010 (UCSD, San Diego, USA), which was sponsored by the Network for Earthquake Engineering Simulation (NEES) and the Pacific Earthquake Engineering Research Center (PEER, Berkeley University), or the Blind Test Challenge of the 15th World Conference on Earthquake Engineering (LNEC, Lisbon, Portugal), amongst others.

In nonlinear analysis SeismoBuild possesses the ability to smartly subdivide the loading increment whenever convergence problems arise, with the level of subdivision depending on the convergence difficulties encountered.

When the convergence difficulties are overcome, the program automatically increases the loading increment back to its original value. In this way, the program achieves numerical stability and accuracy even at very high strain levels.



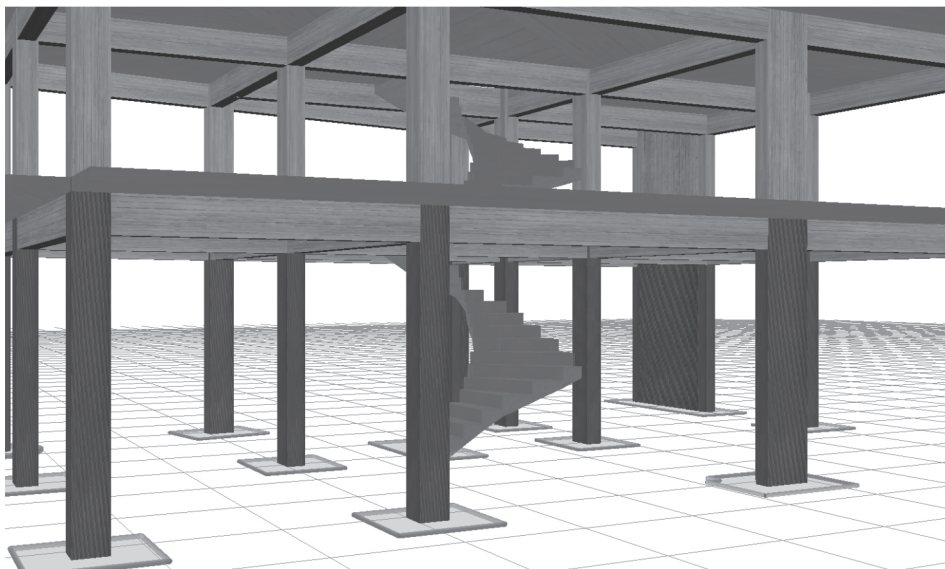
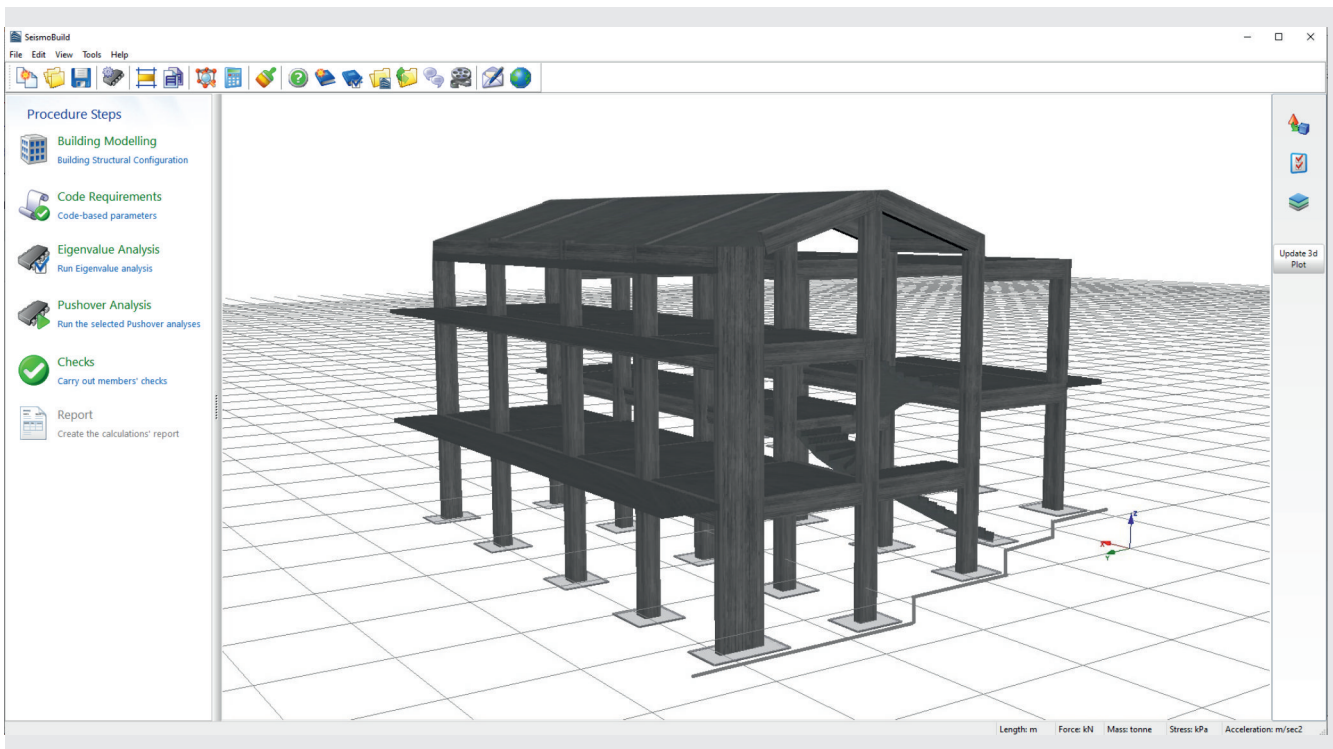
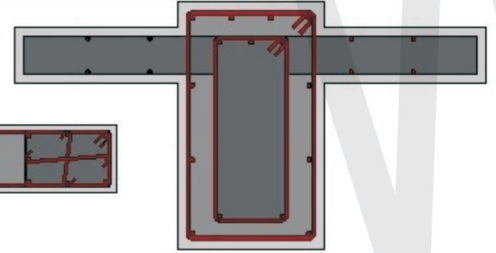
why use SeismoBuild



# SeismoBuild features

## general

- ✓ SI and English Units supported
- ✓ European and American reinforcing rebar types
- ✓ Support for Eurocode 8 and the Eurocodes framework, the American Code for Seismic Evaluation and Retrofit of Existing Buildings ASCE 41, the Italian National Seismic Code NTC-18, the Greek Seismic interventions Code KANEPE and the Turkish Seismic Evaluation Building Code TBDY

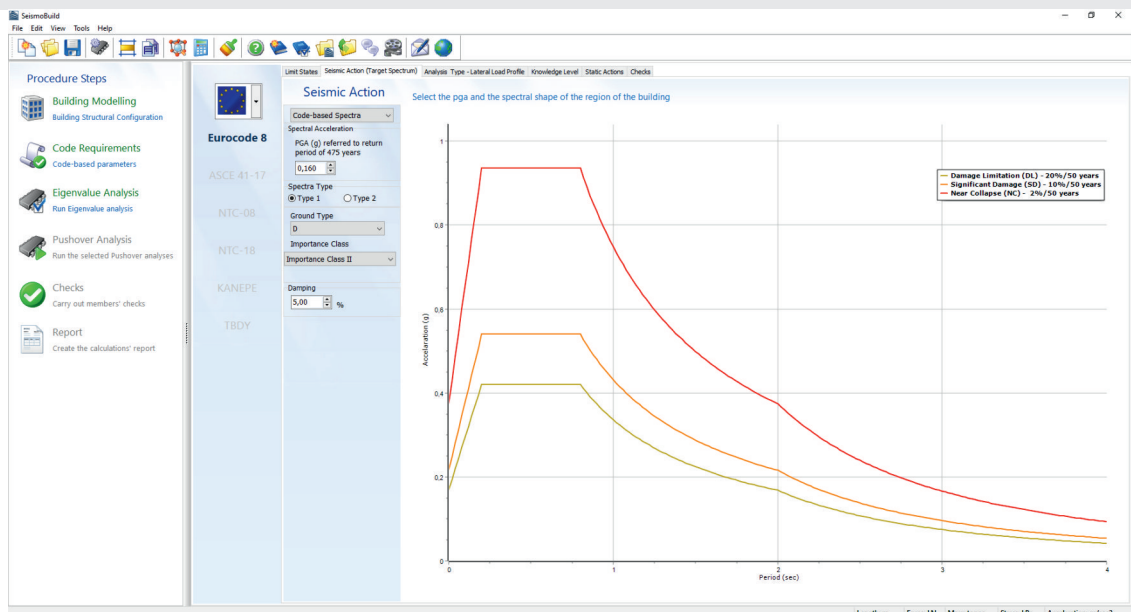


## building modeller

- ✓ **Easy CAD-based input;** the floor's plan view can be used as background
- ✓ **Predefined built-in cross-sections** for both existing and strengthened (jacketed) members (rectangular, L-shaped, T-shaped, circular, shear walls, normal or inverted T-beams)
- ✓ **Very fast input of the longitudinal and transverse rebars** through reinforcement patterns
- ✓ **Predefined material sets** for existing and new members; multiple material sets may be applied in the same model
- ✓ **Strengthening with Fibre-Reinforced Polymers (FRP);** a large library of existing FRP materials is available
- ✓ **Strengthening with steel braces** of different configurations (X-braces, V-braces or diagonal braces)
- ✓ **Easy modelling of infills,** automatic calculation of their strength
- ✓ **Simple foundation modelling**
- ✓ **Simple input with a few mouse clicks** for columns, slabs, beams and walls
- ✓ **Simple insertion of stairs**
- ✓ **Easy modelling of inclined** beams and slabs
- ✓ **Modelling of short columns** with automatic column subdivision
- ✓ **Advanced editing,** copying and member renumbering facilities
- ✓ **Snap, grid and ortho** facilities

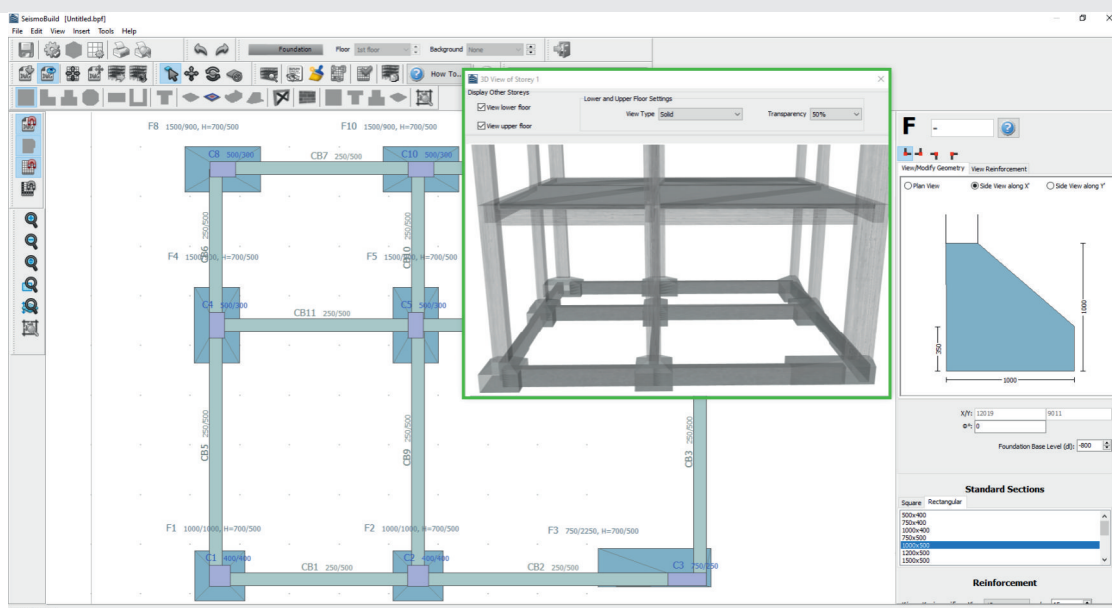
## codes & standards

- ✓ **Straightforward definition** of code-based parameters
- ✓ **Simple input** of limit states, building performance levels, earthquake hazard levels and knowledge levels
- ✓ **Easy definition of the parameters** needed for the nonlinear analysis, with a range of predefined settings schemes and detailed guidelines with suggestions by the program

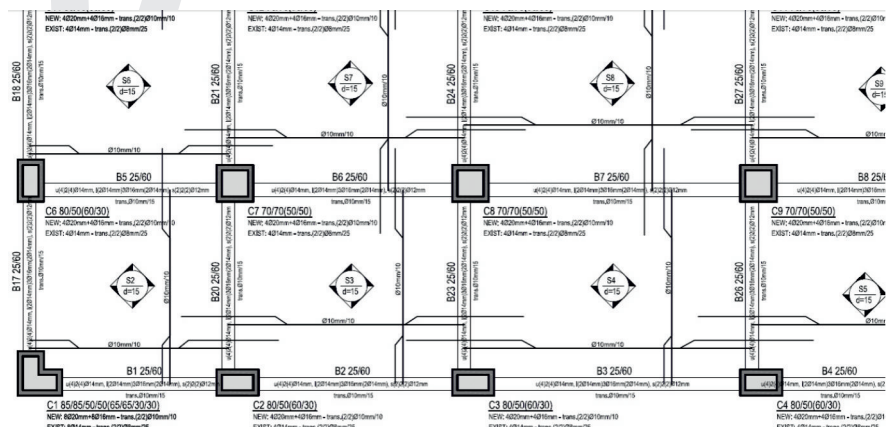


## structural modelling, analysis and checks

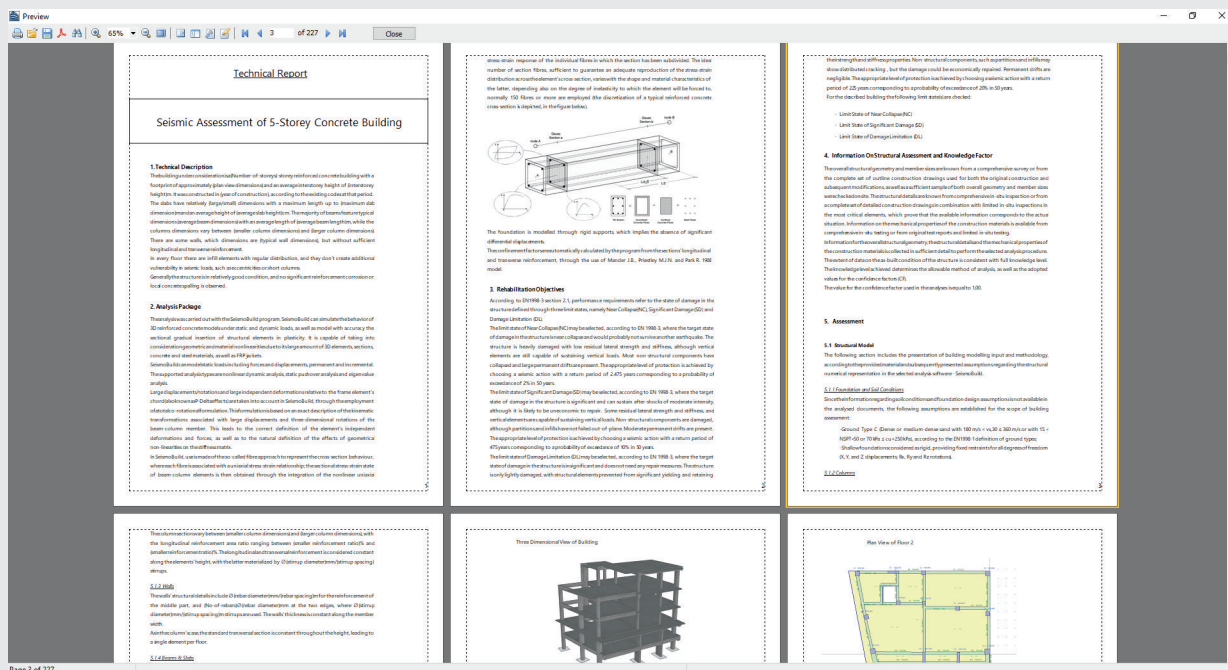
- ✓ After the model input is completed, the structural model is automatically created by the program (material models, nodes, FE mesh, elements, offsets, mass distribution and loading patterns)
- ✓ Geometric nonlinearities and material inelasticity are considered
- ✓ Large library of nonlinear models for concrete and steel materials
- ✓ Four different types of inelastic frame elements (fibre-based models and plastic hinge models)
- ✓ Distributed plasticity models to accurately model the distribution of inelasticity along the entire height of large walls
- ✓ Support for eigenvalue analysis, static linear analysis, response spectrum analysis, pushover analysis and nonlinear dynamic analysis
- ✓ SeismoStruct's advanced, accurate and stable nonlinear solver is employed
- ✓ Automatic calculation of the target displacement
- ✓ Detailed and intuitive presentation of the analytical results; tables, charts and 3D plots are available
- ✓ 3D plots with the deformed shapes; AVI movies to illustrate the sequence of structural deformation
- ✓ All the code-defined capacity checks are supported (shear capacity, chord rotation capacity, bending moment capacity, inter-storey drift level, beam-column joints checks)
- ✓ Checks presented on a table and on the 3D plot; easy identification with colours of the failed members



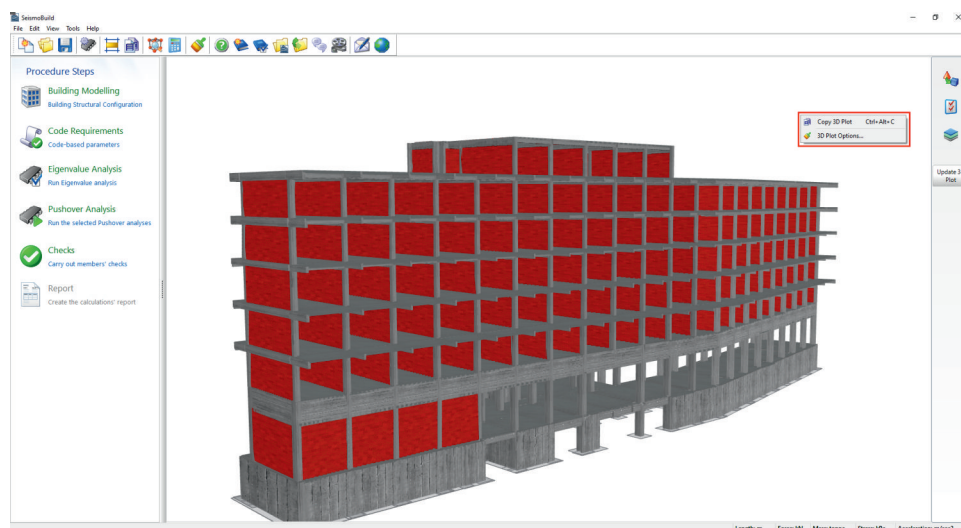




- ✓ Detailed technical report in PDF, RTF or HTML format; the content (text, plots and tables) and the size of the report are determined by the users
- ✓ CAD drawings with plan views, members' cross sections and reinforcement tables; specially created \*.ctb files are included



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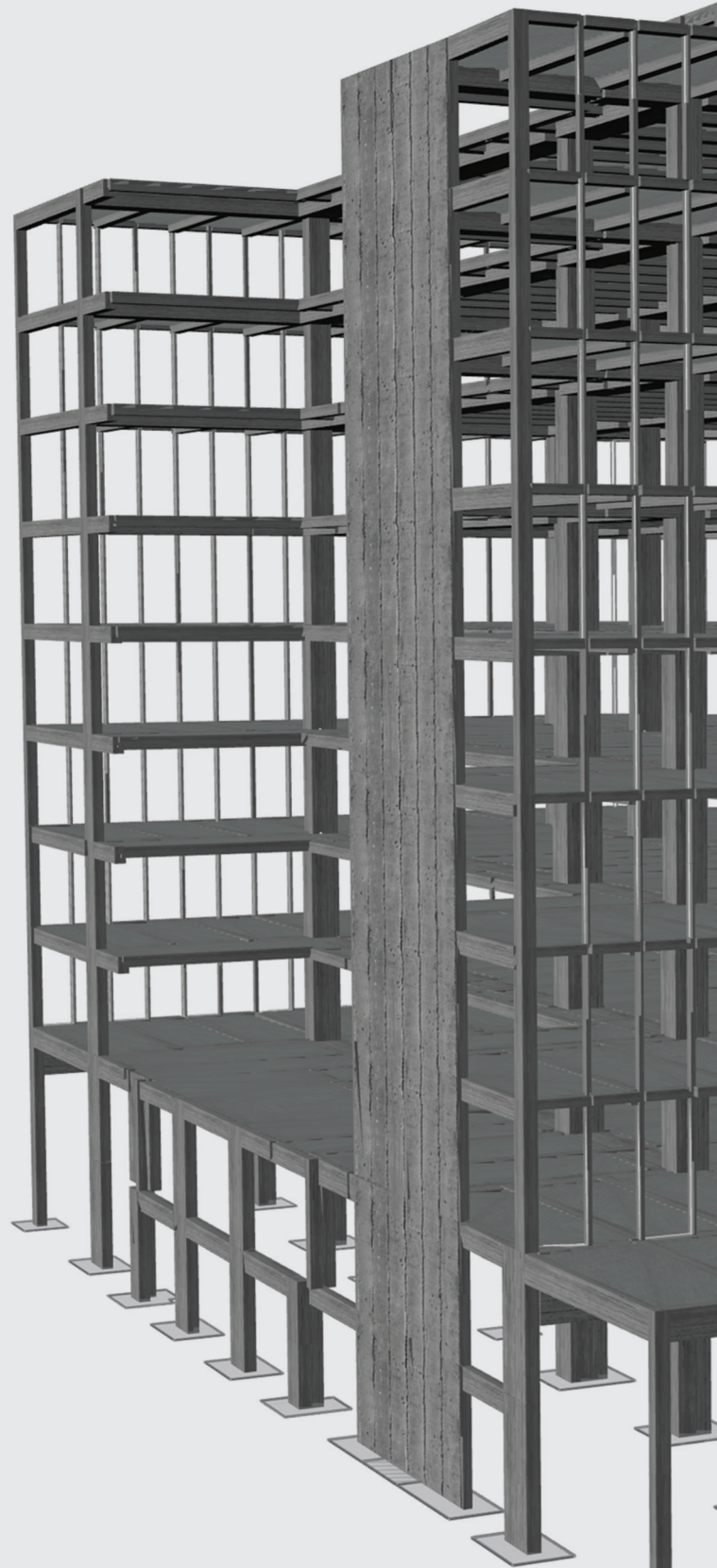
- ✓ Easy copying of all the data, tables and plots to any other Windows application

## Seismosoft in brief

Founded in 2002,  
Seismosoft provides the  
earthquake engineering community  
with access to powerful and  
state-of-the-art analytical tools,  
such as SeismoBuild,  
SeismoStruct, SeismoSignal,  
SeismoSelect, SeismoMatch,  
SeismoArtif, SeismoSpect  
and FRP Designer.

With more than 1000 software  
license requests per month,  
and users in thousands of  
international academic/research  
institutions and practicing  
companies in more than  
110 countries worldwide,  
Seismosoft is now recognised  
as a leading enterprise in this field.  
Seismosoft provides the full spectrum  
of earthquake engineering  
stakeholders, tools and methods  
that feature not only technical  
excellence but also efficiency  
and user-friendliness.

Ultimately, we hope to somehow  
contribute, even if modestly,  
to the continuous search  
for higher mitigation of the risks  
that earthquakes pose to humankind.



**SEISMOSOFT**  
EARTHQUAKE ENGINEERING SOFTWARE SOLUTIONS

### How to Contact

Up to date Seismosoft contact details are always available on our website at

**[www.seismosoft.com](http://www.seismosoft.com)**



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