

# Eurocodes in Scia Engineer

## Design of steel structures



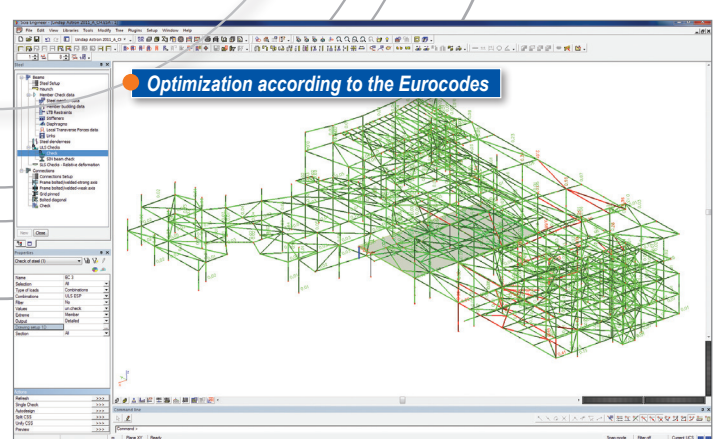
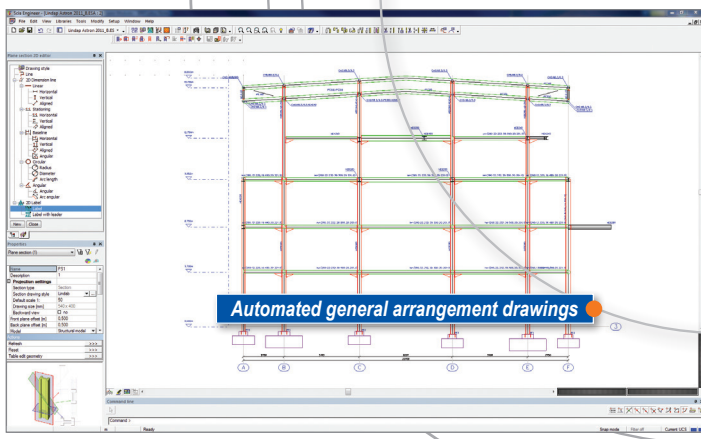
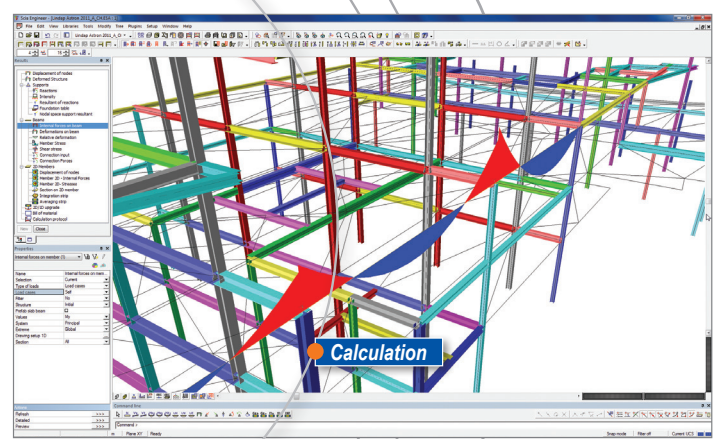
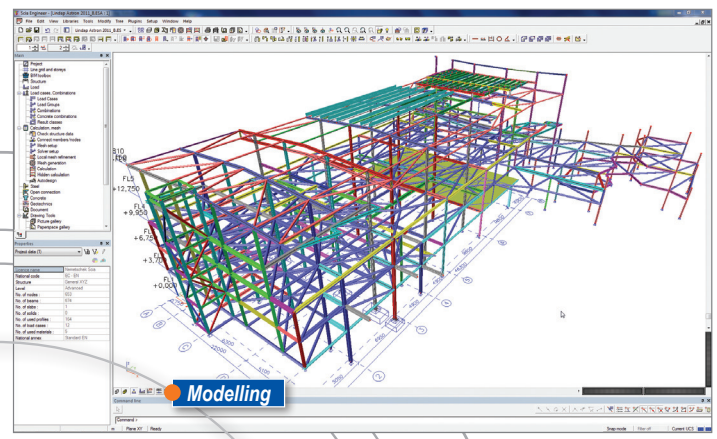
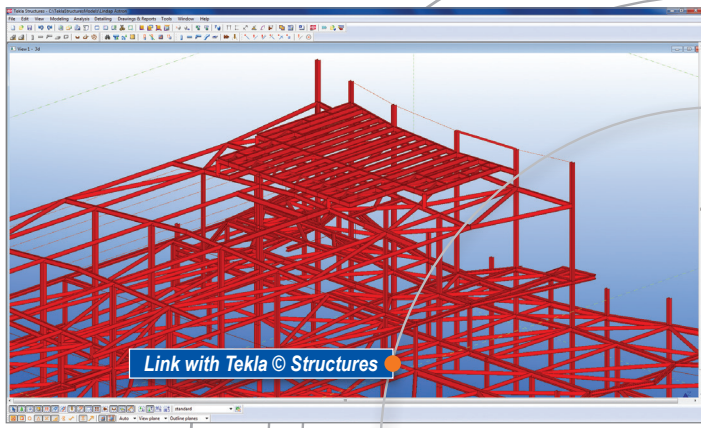
Scia Engineer is structural design software that goes beyond simple analysis and helps you excel in today's collaborative 3D workflows. It provides for fast, efficient modelling, simple analysis, integrated code compliant design and automated general arrangement drawings. It centralizes your design tasks in ONE program. Scia Engineer is versatile structural design software for engineers dealing with civil engineering structures of any kind. To meet the needs of steel designers, dedicated Steel Frame packages are offered.

These Steel Frame packages cover the needs of structural engineers who model, analyse and design frame, truss, grid and similar structures made of steel in accordance with the Eurocodes.

Take the full advantage of Scia Engineer Steel Frame packages and:

- Make your company more flexible and compete confidently for bigger building projects,
- Get the effective solution for everyday engineering tasks as well as for large complex projects,
- Persuade your clients with comprehensive project documentation and automated drawings,
- Share 3D models with your partners through Open BIM (Building Information Modelling),
- Integrate your company-devised steel-code checks and calculations.

“*Scia Engineer is very efficient for our day-to-day design work, and at the same time makes advanced non-linear analysis and design not only feasible, but cost effective.*”  
Michael Ajomale, Principal, Design Depictions Structural Engineering, P.C.



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## Main features of Scia Engineer Steel Frame packages

### Modeller

Highly efficient and flexible modeller for simple 2D frames as well as complex 3D structures with thousands of columns, beams, purlins, ties and other elements.

- Built-in libraries of materials, cross-sections
- Predefined shapes of typical steel structures
- Straight and curved beam members
- Haunches, cut-outs, variable cross-section, openings in webs or flanges
- Steel connections: bolted, welded frame connections, pinned frame connections, bolted diagonals and pinned grid connections with stiffeners and other parts
- BIM support:
  - interlinked calculation and structural models in one project,
  - wide range of exchange formats: IFC, SDNF, DStV, StepSteel, DWG, DXF, VRML, etc.
  - direct link with Tekla Structures

### Loads and analysis

Intuitive input of loads and various load generators for fast definition of loading. Robust and fast finite element engine for basic as well as advanced types of analysis.

- Eurocode load cases and load case combinations
- Load generators for surface load, wind load and snow load
- Linear and nonlinear supports and hinges
- Local nonlinearities: gaps, tension/compression only beams, etc.
- Linear static analysis
- 2nd order analysis (p-delta effects, bow imperfections),
- Seismic analysis, free vibration, harmonic and general dynamic analysis (option)
- Global stability analysis

### Design

Code checks with very detailed report, including references to appropriate code clauses and formulas for comprehensive, reliable and easy-to-verify design.

- Implemented national annexes: Austria, Belgium, Czech Republic, Finland, France, Germany, Greece, Ireland, Netherlands, Poland, Romania, Slovakia, Slovenia, United Kingdom.
- Code checks include section and stability checks, detailed buckling and lateral torsional buckling analysis. In addition lateral torsional buckling analysis can be carried out using a second order analysis (LTB II)
- Automatic determination of buckling lengths with manual adaptations as well as the derivation of the buckling curves from a stability analysis
- Use of the buckling shape as an imperfection for 2nd order analysis
- Fire resistance checks (resistance domain, temp/time domain, parametric fire curves, different types of insulations)
- Optimization of cross-sections: automatic resizing of the cross-section shape
- Relative deflection check
- Cold formed sections: effective section calculation for any cross-section shape including distortional buckling of stiffeners, advanced options for local transverse forces and special purlin checks for purlins supported by sheetings
- Design of connections for different connection types (rigid, pinned, bolted, welded, ...) including customizable geometry like stiffeners, haunches, backing plates, ...

- Automatic determination of the connection stiffness and its use in the analysis
- Expert system for optimal selection of a connection from an integrated library and possibility to store connections for use in future projects
- MS Excel check - possibility to display in Scia Engineer the results of checks performed in MS Excel in order to integrate a calculation in MS Excel with the overall design in Scia Engineer
- Design of pad foundations including optimization of the foundation block dimensions

### Project documentation

Professional calculation reports consisting of input data and computed results presented in tables and illustrations. Automated general arrangement drawings for simple, fast and automated generation of drawings from the 3D model.

- Active Document for synchronisation of the project model and calculation report after any changes
- ChapterMaker technology for fast and customized creation of sub-chapters for members, profiles, load cases, combinations, etc...
- Tables with tailor-made composition to easily meet the needs of individual customers
- Definition of a company style to create a uniform layout of all documentation within your company
- Predefined document templates for easy and fast reporting
- Export of the Document to PDF (including 3D PDF), RTF, HTML formats
- Automated generation of general arrangement drawings and connection drawings from the 3D model
- Optional manual editing of the generated images and drawings (for amending with e.g. labels and dimension lines)
- Permanent link of all pictures and drawings to the original model, which means simple automatic regeneration after modifications to the model
- Export of drawings to DXF, DWG, BMP, WMF, 3D PDF, etc.

## Other steel related applications

If required, the functionality of the Steel Packages can be extended by separate modules such as:

- Cellular beams: these are loaded from a library and checked according a similar method as the steel code checks
- Members with sinusoidal corrugated webs
- Steel-concrete composites: check and fire resistance check of composite steel-concrete beams, columns and plates
- Scaffolding constructions
- Revit Structure link
- Scia Engineer Optimizer for a general optimization of civil engineering structures with respect to their safety and serviceability according to technical codes
- Plastic analysis taking into account any plastic hinges appearing in the structure

“A unique feature of Scia Engineer is that modelling, analysis, design, and documentation are all linked together, so a change anywhere is reflected everywhere. This saves time and eliminates coordination errors.”

Mark Flamer, P.E., M.I. Flamer & Associates