

GT STRUDL®

Structural modeling, analysis, and design



GT STRUDL®

Structural modeling, analysis, and design

GT STRUDL® is one of the most widely used, fully integrated, and adaptable structural analysis solutions in the world. The software has a proven track record in a variety of applications, such as nuclear and conventional power generation, onshore and offshore facilities, marine, civil engineering, and infrastructure. GT STRUDL offers engineers the accurate and complete technical data they need for cost-effective and efficient structural engineering and design decision-making. GT STRUDL is a market leader in its field for high quality results, proven reliability, and depth of technical support.

Track Record of Success

For almost 40 years, GT STRUDL has been one of the most widely accepted computer-aided engineering and design tools for structural analysis and design. It is trusted and used globally by thousands of engineers to quickly and efficiently deliver accurate results.

Comprehensive Solution

GT STRUDL offers fully integrated and database-driven software for general finite element analysis and comprehensive structural engineering design. The solution includes 10 functional areas that operate seamlessly with one another. Combined with amazingly fast computational speed, GT STRUDL provides virtually unlimited power and flexibility for projects of any size or complexity.

Nuclear Quality Assurance

Since 1983, the GT STRUDL Quality Assurance and Quality Control (QA/QC) program and procedures have been some of the industry's most rigorous. They are in full compliance with applicable provisions of the U.S. NRC's 10CFR21 and 10CFR50 Appendix B regulations. In addition, GT STRUDL QA procedures are in full conformance to the ASME NQA-1-2008, including the 2009 Addenda Subpart 2.7 (NQA-1a-2009).

The QA/QC program and procedures are routinely audited by independent auditors from nuclear industry corporate licensees several times each year. Auditors representing the Nuclear Procurement Issues Committee (NUPIC) and the Nuclear Industry Assessment Committee (NIAC) conduct audits every three years. Each version of GT STRUDL is thoroughly validated and verified (V&V) for its computational quality and performance with approximately 5,000 V&V test problems.

Analysis

The linear and nonlinear static and dynamic analysis capabilities and high performance equation solvers of GT STRUDL are respected globally. Few programs possess its depth and breadth of functionality. GT STRUDL includes all the tools necessary to analyze a broad range of structural projects, from the simplest to the most complex, and can do so accurately and reliably in a fraction of the time that many other solutions require.

Steel Design

Structural engineers can perform steel member design and code-checking to follow a large variety of global steel design codes dating back to the 1960s. Examples of recent codes include the AISC 14th Edition, Eurocode 3 (EC3) 2005 Edition, ANSI/AISC N690 2012 Edition, ASME BPVC Subsection NF 2007 Edition, ISO 19902:2007(E) Edition, API RP 2A-WSD 21st Edition, and others. Steel design details are extensively documented, enabling the engineer to review the details of the code-checking procedures. With GT STRUDL, engineers can manage the steel member design and code-checking process through a large number of control options that enable engineers to cost-effectively deliver optimal designs.

Benefits

- Bi-directional interface to Intergraph Smart™ 3D.
- CIS/2 analysis data interface.
- Conformance to nuclear industry QA/QC standards and regulations.
- Linear and nonlinear static analysis.
- Linear and nonlinear dynamic analysis.
- High-performance static and dynamic analysis equation solvers.
- Steel frame design features.
- Base plate modeling and analysis.
- Reinforced concrete design features.
- Offshore structure analysis and design.
- User control of the iterative analysis and design process.
- Database management of all model data and analysis results.
- Ability to effectively implement corporate structural engineering problem-solving strategies.
- More cost-effective, productive, and reliable structural engineering processes.
- Comprehensive and detailed user documentation.





Modeling and Analysis

- Lanczos Eigenvalue solver.
- Response Spectrum analysis.
- RMS, PRMS, CQC, Absolute, Algebraic, Ten-Percent, Double Sum, and Grouping mode combination methods.
- Gupta and Lindley-Yow mode combination methodologies.
- Missing mass load generation.
- Broad range of user-specified damping properties.
- Composite modal damping ratio calculations.
- Time history dynamic analysis.
- User-controlled and variable integration time steps.
- Maximum Response Harmonic analysis.
- Steady State time history dynamic analysis.
- Nonlinear Pushover Analysis.
- Nonlinear spring elements, support and member end springs, tension, and compression-only members, large sag catenary and parabolic cables.
- Nonlinear fiber element plastic hinge and plastic zone member models.
- Friction-bearing, base-isolation elements.
- Broad range of static and dynamic loading types.
- Structural analysis and design database management control.
- Powerful automatic mesh generation.
- Scalable problem size modeling.
- Integer and alphanumeric naming of joints, members, finite elements, and loading conditions.
- Model error detection.

Base Plate Wizard

Complex steel base plate modeling, linear and nonlinear analysis, and performance evaluations can be performed with an easy-to-use and full-featured graphical interface. Users can model a wide variety of base plate attributes such as holes, notches, tabs, anchors, attachments, stiffeners, bearing surface data, boundary conditions representing shear lugs, and edge welds.

Structural Model Data

GT STRUDL imports and exports models via CIS/2 files to Intergraph Smart™ 3D and other programs. This enables structural data-rich models created outside of GT STRUDL to fully leverage the power of GT STRUDL. External programs can benefit from the advanced power and benefits that GT STRUDL offers.

Reinforced Concrete Design

With GT STRUDL, engineers can design beams, columns, one-way slabs, shear walls, and two-way flat plate and flat slab structures per ACI 318. GT STRUDL also provides detailed quantity take-offs based on design results. A great deal of engineering time can be saved with this capability.

Offshore Jacket and Pile Analysis

Users can analyze and model environmental loadings, including:

- Wind loads.
- Buoyancy loads.
- Cyclic wave loads.
- Launching and lifting loads.
- Current loads.
- Seismic loads.

These environmental loads are applied to offshore structures, such as:

- Fixed jacket structures.
- Cable-stayed and tension-leg semi-submersible structures.
- Other rigid floating structures.

Engineers can perform a variety of analysis calculations with GT STRUDL, including:

- Linear and nonlinear analysis.
- Jacket launch.

- Stability and upending analysis.
- Stress concentration factor calculations.
- Fatigue checking using Power Spectral Density, Discreet Probability, and Deterministic methods.
- Nonlinear, pile-structure interaction analysis.
- Code checking by the ISO 19902:2007(E) and API RP 2A-WSD 21st Edition.

User Documentation

GT STRUDL includes an extensive collection of comprehensive and detailed user documentation detailing the product's functionalities. This documentation helps the engineer clearly understand GT STRUDL's powerful capabilities. Users can learn how to apply cutting-edge and rigorous computational structural analysis and design methodologies.

Technical Specifications

- Microsoft® Windows®-compatible.

Application Areas

- Nuclear and fossil fuel power.
- Petrochemical.
- Utilities.
- Plant design.
- Infrastructure, including bridges, dams, water, and waste treatment structures.
- General civil engineering.
- Special structures.
- Pharmaceutical.
- Food processing.
- Commercial.
- Government agencies.
- Residential buildings.
- Offshore structures.
- Ship structures and more.

ABOUT INTERGRAPH

Intergraph helps the world work smarter. The company's software and solutions improve the lives of millions of people through better facilities, safer communities and more reliable operations.

Intergraph Process, Power & Marine (PP&M) is the world's leading provider of enterprise engineering software enabling smarter design and operation of plants, ships and offshore facilities. Intergraph Security, Government & Infrastructure (SG&I) is the leader in smart solutions for

emergency response, utilities, transportation and other global challenges. For more information, visit www.intergraph.com.

Intergraph is part of Hexagon (Nordic exchange: HEXA B; www.hexagon.com), a leading global provider of design, measurement, and visualization technologies that enable customers to design, measure and position objects, and process and present data.

