Revit® Structure
2009

# Questions and Answers

## Revit® Structure software uses a single, intelligent model to coordinate all the tasks structural engineers and drafters need to complete during the building design process—from preliminary and schematic design to structural design and analysis to final construction documentation.

Revit Structure software works the way structural engineering firms work. A multimaterial physical model integrated with an independently editable analytical model delivers efficient, accurate, and flexible analysis, design, and documentation. Improve coordination by reusing crucial information from architectural files, whether it is from industry-standard 2D format or AutoCAD® Architecture or Revit® Architecture software files. Manage changes through bidirectional linking to popular structural analysis software, while parametric change management technology coordinates updates across the model and documentation. Use a complete set of drafting tools to create your documentation in Revit Structure. And import and export design data through widely used industry-standard formats for efficient collaboration.

Autodesk®

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# 1. General Product Information

**1.1 What is building information modeling, and how does it apply to Revit Structure?**

Building information modeling (BIM) is an innovative building design and documentation methodology that relies on the creation and collection of interrelated computable information about a building project. BIM makes reliable, coordinated, and internally consistent digital representations of the building available for design decision making, production of high-quality construction documents, construction planning, and predicting performance in various ways.

The ability to keep this information up-to-date and accessible in an integrated digital environment gives engineers, architects, builders, and owners a clear overall vision of their projects and contributes to the ability to make better decisions faster—for higher quality, more profitable projects.

Revit is Autodesk's platform for building information modeling. Applications such as Revit Structure (built on the Revit® platform) are complete, discipline-specific structural engineering, design, and documentation systems supporting all phases of structural modeling, analysis (with third-party software), and construction documentation.

For more information about building information modeling and Autodesk's strategy for the application of information technology to the building industry, see the white papers and other information available at **www.autodesk.com/bim.**

**1.2 What is the Revit platform?**

The Revit platform is Autodesk's software platform for building information modeling. From preliminary design through the most detailed construction drawings and schedules, applications built on Revit help provide immediate competitive advantage, as well as better coordination and accuracy, and can contribute to greater profitability for structural engineering firms and the rest of the building team.

At the heart of the Revit platform is the Revit parametric change engine, which automatically coordinates changes made anywhere: model views or drawing sheets, schedules, sections, plans—you name it.

**1.3 What is Revit Structure 2009?**

Revit Structure 2009 is a multimaterial structural modeling and drafting software system that provides concurrent physical and analytical modeling for design, coordination, and documentation. Bidirectional linking with industry-leading analysis applications is also another important capability of Revit Structure.

Revit Structure software integrates a physical model—for layout, coordination, and documentation—with an independently editable analytical model for multiple analyses. You can model from scratch or over 2D CAD files from the architect. Or, for even more powerful coordination, you can link directly to intelligent 3D architectural models from the AutoCAD Architecture or Revit Architecture software products. Bidirectional linking to industry-leading analysis software means analysis results update your Revit Structure model, while proven parametric change management technology coordinates those updates everywhere in your design and documentation. The bottom line: integrated modeling increases efficiency, improves accuracy, and streamlines coordination with your design team.

**1.4 What is AutoCAD Revit Structure Suite 2009?**
AutoCAD® Revit® Structure Suite software combines industry-leading AutoCAD®, AutoCAD® Structural Detailing, and Revit® Structure software for a complete suite of tools for modeling, documentation, detailing, and fabrication of shop drawings. You can accelerate your structural engineering workflow from early design all the way to fabrication by integrating the efficiency of building information modeling (BIM) with the ease of use of AutoCAD applications.

**1.5 What is AutoCAD Structural Detailing 2009?**
AutoCAD Structural Detailing is a complete AutoCAD-based solution for detailing and creating fabrication shop drawings for steel and reinforced concrete structures. In the steel module, you can use building information models from Revit Structure, import CIS/2 files, or create a model for fast and efficient generation of steel connections and shop drawings. In the formwork module, create a dynamic model and state-of-the-art concrete formwork drawings. In the concrete reinforcement module, you can automate the generation of reinforcement shop drawings for all types of structural concrete members. AutoCAD Structural Detailing also helps you create material-specific bills of quantities and schedules.

**1.6 Who benefits from Revit Structure?**
Structural engineers, especially those who use multiple analysis software products, will find that Revit Structure—with its better change management and coordination tools—significantly improves how they are working today. For structural drafters, the production of construction drawings is expedited by the reduction of tedious rework caused by design changes. Clients and construction teams also benefit from sharing clear, unambiguous 3D models.

# 2. Technology

**2.1 What does *parametric* mean, and how does the parametric change engine keep everything updated when I make changes? Why is the concept important?**
The term *parametric* in this context refers to the relationships among and between all elements of the model that are created either automatically by the software or deliberately by the user as the user works. These relationships make possible the coordination and change management that Revit Structure provides.

A fundamental characteristic of a BIM application is the ability to coordinate changes and maintain consistency at all times. The user does not have to intervene to update drawings or links.

At the heart of Revit Structure is technology that is new to structural design, engineering, and documentation systems: a parametric change engine. Revit Structure is built from the ground up using this technology. The Revit Structure parametric change engine uses the information captured as you work to build a network of relationships between elements. When you change something, Revit Structure immediately applies that change to any related elements.

This concept is important because it is this capability that delivers the fundamental coordination and productivity benefits of Revit Structure: change anything at any time anywhere in the project, and Revit Structure coordinates that change through the entire

project. This change management is also one of the fundamental characteristics of a BIM solution.

**2.2 What are the primary features of Revit Structure?**
The most important features include the following:

- Multiple structural materials can be used: steel, precast concrete, cast-in-place concrete, masonry, and wood—all within the same building model.
- Create your required construction documentation using one standard application.
- A state-of-the-art analytical model is created simultaneously and coordinated with the physical model.
- Create one model and bidirectionally link it with multiple analysis programs.
- Bidirectional associativity between the model, views, drawing sheets, details, and schedules helps create consistent construction documents.
- Multiple design options can be maintained within the same model.
- Multiple users can work on the model simultaneously.
- Import and export DWG™, DXF™, DGN, IFC, SAT, and CIS/2 files.
- Export and import 3D intelligent building objects for structural elements native to AutoCAD Architecture and AutoCAD® MEP software products.
- Full interoperability with Revit Architecture (from interference checking to coordination monitoring) and Revit® MEP software helps maintain coordinated and consistent designs with the project team .
- Smart relationships are created between structural members; these adjust when conditions between structural elements are modified. For example, if a column is moved, the beams framing into that column adjust automatically.
- Use standard templates to generate specific structural families using the family editor.

**2.3 How does Revit Structure support finite element analysis and building code design?**
Revit Structure does not perform structural analysis; however, it integrates with several popular third-party analysis applications through the Revit API (application programming interface). See **www.autodesk.com/revitstructure-partners** for up-to-date information about Revit Structure partner products, or contact your local authorized Autodesk channel partner.

Users can also link their in-house spreadsheets or in-house analysis and design software through the API.

**2.4 Who builds the model in Revit Structure: engineers or drafters?**
Revit Structure supports different ways of working. Structural designers and drafters may create the model, and engineers then complete it with loads and load combinations, release conditions, and material properties before performing analyses. Or structural engineers may build the physical model themselves and then continue the analysis process while the drafters complete the construction documents. Revit Structure simplifies the creation of structural drawings by automatically generating drawings and schedules

directly from the physical model. This enables drafters to focus on detail views, annotations, and the other particulars required for construction.

**2.5 Can I use Revit Structure just for drafting?**
You can work entirely in Revit Structure to generate your construction documentation. AutoCAD software is not required. Revit Structure includes all necessary drafting tools to complete drawings, structural details, and schedules, including dimensions, annotations, symbols, detail components, detail lines, and revision tools. You can also reuse existing typical details from AutoCAD by importing DWG files. All construction documents created in Revit Structure can be exported to DWG format for other consultants to use.

**2.6 How does Revit Structure handle concurrent users on the same project?**
Revit Structure worksharing distributes the power of the Revit parametric building modeler across the structural engineering team. Worksharing provides a complete range of collaboration modes: from on-the-fly simultaneous access to the shared model through the formal division of the project into defined systems to complete separation of discrete project parts (such as wings or separate buildings) into individually managed linked models. Worksharing enables structural team members to choose the best way to collaborate and interact based on workflow and project requirements. For example, after enabling worksharing on a structural model, while the structural engineer is performing structural analysis and design in another application, the structural drafter can simultaneously prepare all the model views, drawings, details, and schedules for documentation. When the drafter loads the latest file saved by the engineer, all design changes made to the model by the engineer automatically update the corresponding information in the drafter's work.

**2.7 What types of structural elements are supported out of the box?**
Libraries of all standard walls, columns, foundations, beams, floor systems, braces, trusses, and open web joists are provided. Special foundations, precast concrete elements, and other useful structural libraries, such as castellated beams, steel connections, stiffeners, and concrete reinforcement, are also supported. Structural boundary conditions, load cases, and load types are included and can be exported to analysis and design software along with the other structural elements.

**2.8 What types of structural materials does Revit Structure support?**
Revit Structure supports steel, precast concrete, cast-in-place concrete, wood, and masonry.

**2.9 What are the advantages of modeling in Revit Structure instead of in an analysis program?**
Research has shown that structural engineers use an average of three different analysis/design programs. Revit Structure can be used as a common structural modeling tool to link with the analysis software. Working this way, structural engineers can spend more time engineering and less time learning multiple modeling tools.

Another advantage of Revit Structure is the engineering insight available during the modeling process. For example, Revit Structure automatically detects unsupported structural elements, global and local instabilities, and framing anomalies before sending the model to analysis software.

Revit Structure models can also be created externally using models from certain analysis programs. This enables you to create, view, and use Revit Structure models of projects

that have been started in an analysis program or projects that have already been constructed.

# 3. Installation, Configuration, and Licensing

**3.1 Does Revit Structure 2009 use the AutoCAD Network Installation wizard for network deployment?**
No, Revit Structure 2009 uses a different network installation technology and process from that used for products based on AutoCAD software. The Network Installation wizard is designed to work only with AutoCAD software–based products.

**3.2 What should I do if I need help installing the FLEX*lm*® license server or getting my single-user copy authorized?**
As with all other products, you should contact your reseller first for help with installation and licensing issues. Resellers can then escalate problems that cannot be easily resolved to Autodesk Revit Client Services. Autodesk® Subscription customers can email Autodesk directly with installation support questions.

# 4. Compatibility and Interoperability

**4.1 How does Revit Structure 2009 link with third-party structural analysis and design programs?**
Revit Structure 2009 ships with a structural API development toolkit. Software partners use the API toolkit to develop links between their software applications and Revit Structure. Structural analysis and design partners that have done so currently include the following:

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| Autodesk<br>• ROBOT Millennium | Oasys (Arup)<br>• GSA |
| ADAPT Corporation<br>• ADAPT Builder™ | RISA Technologies<br>• RISAFloor<br>• RISA-3D |
| Bentley Systems, Inc.<br>• RAM Structural System | SOFiSTiK AG<br>• SOFiSTiK |
| Computers and Structures, Inc.<br>• ETABS | SOFTEK Services Ltd.<br>• S-Frame® |
| CSC (UK) Ltd.<br>• Fastrak Building Designer<br>• Orion™ | Space Gass<br>• Space Gass |
| Midas | |

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| • Midas/Gen | |

For more information about Revit Structure third-party structural analysis and design partners, visit **www.autodesk.com/revitstructure-partners.**

**4.2 How does Revit Structure 2009 work with Revit Architecture and Revit MEP software?**
Revit Structure 2009 is built on the same Revit technology platform as Revit Architecture. If both the structural engineer and the architect are using Revit applications but are in separate organizations, they can exchange and cross-link RVT format files so each has access to the other's information as they work. Working on the same Revit platform enables engineers and architects to perform interference checks between structural and architectural elements. It also provides automatic coordination monitoring tools so that each discipline can get an electronic notification each time the other makes a change to a level, grid, column, wall, floor, or opening.

Structural engineers who are working with mechanical, electrical, or plumbing engineers using Revit MEP can take full advantage of building information modeling to share the same underlying building database. Interference checking similar to the coordination between Revit Structure and Revit Architecture is available in all Revit applications for better coordination. For instance, structural engineers can check for interferences between ductwork and structural elements. They can also simply gain a better overall understanding of the entire structure by linking the Revit models together.

**4.3 How does Revit Structure 2009 work with AutoCAD or other 2D software?**
Revit Structure 2009 provides industry-leading DWG compatibility for data import and export. Revit Structure 2009 can produce DWG deliverables just as AutoCAD software can. It supports the process most engineering firms use with their clients by producing consistent and layered DWG files using user-defined layering standards. With Revit Structure 2009, nothing in an exported DWG file ends up on the wrong layer. This level of accuracy eases client interactions and expedites the design and construction process.

Revit Structure 2009 enables imported or linked DWG files from clients or consultants to be used for coordination as reference geometry or as the starting point for a new design. Any CAD system that supports the DWG or DXF file format can work effectively with Revit Structure 2009.

**4.4 Can I use Autodesk® Design Review markup functionality with Revit Structure 2009?**
Yes, Revit Structure 2009 supports round-trip export and import of DWF™ markups for an all-digital review, markup, and editing process.

# 5. Consulting, Training, and Support

**5.1 What consulting services are available for Revit Structure 2009?**
Check with your local Autodesk Authorized Reseller to learn what consulting services they offer. Visit **www.autodesk.com/reseller** to find a reseller near you.

Autodesk Consulting also provides consulting offerings for project assessments, process audits, and a range of Revit Structure implementation services. Custom consulting

offerings are also available to meet your specific needs. For more information about Autodesk Consulting, contact your local Autodesk Authorized Reseller or Autodesk Account Executive, or visit **www.autodesk.com/consulting.**

**5.2 Where can I find training courses for Revit Structure 2009?**
Training courses are available from Autodesk Authorized Resellers, Autodesk Consulting, and Autodesk® Authorized Training Center (ATC®) sites. Check with your local Autodesk Authorized Reseller for a schedule of training classes. (In the United States and Canada, call 800-964-6432 to locate a reseller near you, or visit **www.autodesk.com/reseller.**)

You can enroll in instructor-led training at Autodesk Authorized Training Centers around the world. These training centers use Autodesk Official Training Courseware (AOTC) to deliver comprehensive courses for new and intermediate Revit Structure users. To learn more, visit **www.autodesk.com/atc.**

Training courses through Autodesk Consulting include Autodesk Classroom Training (onsite or at Autodesk), Revit Distance Learning Seminars (online or instructor-led), and custom training to match your specific needs. For more information, or to register for a course, go to **www.autodesk.com/revit-training.**

For more information about Autodesk's training services for Revit Structure, send an email to RevitEducation@autodesk.com.

**5.3 How can I get technical support information?**
Technical support information is available from several sources. First, Autodesk Authorized Resellers offer technical support information to their customers. Second, you can find answers to frequently asked technical questions in the support knowledge base at **www.autodesk.com/revit-support.** Third, you can ask questions and read information about the use of Autodesk products in the peer-to-peer discussion groups at **www.autodesk.com/discussion.**

Autodesk Subscription members receive personalized web support from Autodesk technical experts. For complete information, visit **www.autodesk.com/subscription** or contact your Autodesk Authorized Reseller.

Autodesk Authorized Resellers also provide telephone support services for Revit Structure and all other Autodesk products. In the United States and Canada, call 800-964-6432 to locate a reseller near you, or visit **www.autodesk.com/reseller.**

Find a complete list of support options on the Autodesk website at **www.autodesk.com/revit-support.**

# 6. Subscription

**6.1 Is Revit Structure 2009 available on subscription?**
Yes, Revit Structure 2009 is available on subscription. Autodesk Subscription is the best way to keep your design tools and learning up-to-date. For an annual fee you get any new upgrades of your Autodesk software and any incremental product enhancements, if these are released during your subscription term, and you get exclusive license terms available only to subscription members. Revit Structure subscription customers have access to regularly updated content produced specifically for structural analysis and design.

Autodesk Subscription includes direct web support. You get one-to-one online communication with Autodesk support technicians for fast, complete answers to your installation, configuration, and troubleshooting questions. Web and email communications deliver support straight to your desktop. Plus, you have web access to your account, so you can track and manage questions and responses.

In addition, Autodesk Subscription includes Subscription Modules (such as DWG Compare), access to Autodesk University (AU) conference materials, and home use licensing options.