

*Building information modeling significantly improves the quality and accuracy of the information that we push downstream. Our construction documents are created directly from the Revit Structure model. If the model is correct, then the drawings are automatically correct. As a result, we're able to spend a lot less time producing documentation and more time up front modeling the structure.*

—Jim Jacobi  
Principal  
Walter P. Moore



# Integrated modeling for structural analysis and construction documentation.

## **Improve Efficiency and Accuracy**

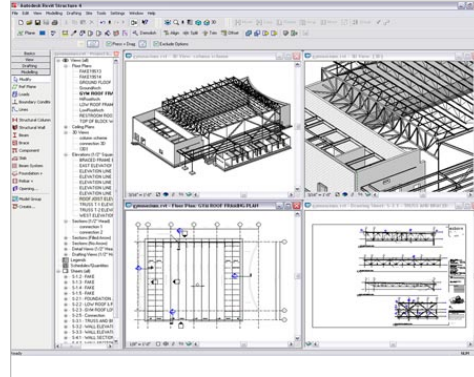
Autodesk® Revit® Structure software improves the way structural engineers and drafters work. It minimizes repetitive modeling and drawing tasks, as well as errors due to manual coordination between structural engineers, architects, and drafters. It helps reduce time spent producing final construction drawings and increases the accuracy of documentation, improving overall project deliverables for your clients.

## **Seamless Coordination**

Because Autodesk Revit Structure uses building information modeling, every view, drawing sheet, and schedule is a direct representation of the same underlying database. As project team members work on the same project, making inevitable and necessary changes to the building structure, parametric change technology in Revit Structure automatically coordinates changes across all other representations of the project—model views, drawing sheets, schedules, sections, plans, and details. The design and documentation stay coordinated, consistent, and complete.

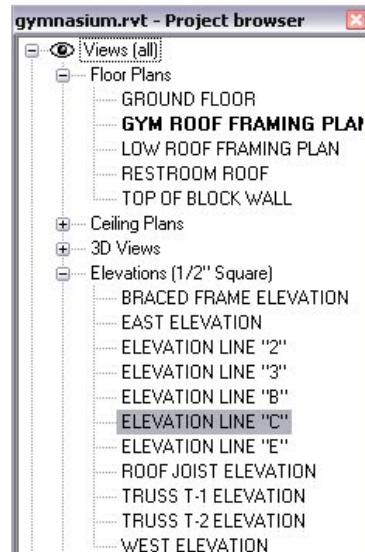
### Bidirectional Associativity

The building model and all of its views are part of the same information system. This means changes to any part of the structure need to be made only once, maintaining consistency throughout the documentation sets. For example, if sheet scales change, annotations and graphics are properly resized. If a structural member changes, the views where this element is displayed are coordinated and updated automatically, including name tags and other labels referring to the element properties.



### Project Browser

Navigate through the various views, sections, elevations, details, schedules, and drawing sheets of your structural project. Because all information is conveniently stored in a single file, design teams spend less time managing project content. Reorganize the project browser's views and sections to match your desired project organization.

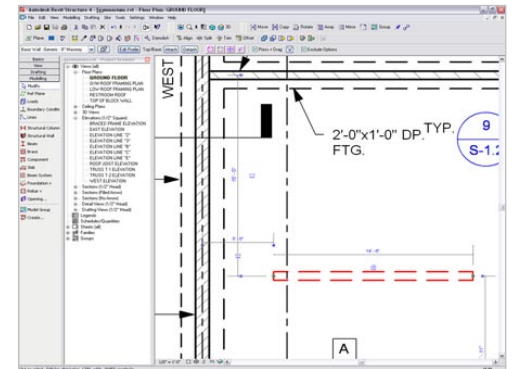


### Enhance Your Structural Modeling Capabilities

Revit Structure focuses on the modeling of multimaterial (steel, precast concrete, cast-in-place concrete, masonry, and wood) building structures, from regular to complex shapes, such as curved and sloped roofs and floors. Standard design tools include walls, beams, columns, beam systems, slabs, and foundations. Additional structural objects are available to define as parametric components.

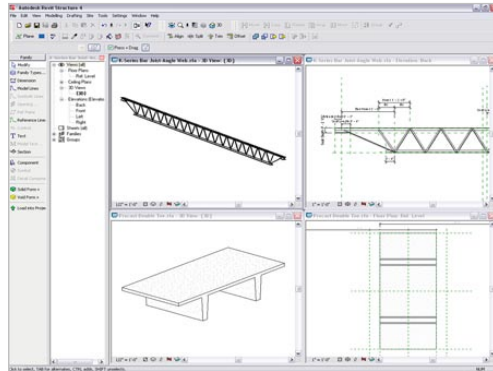
### Temporary Dimensioning

As the user creates each new element, Autodesk Revit Structure applies temporary dimensions to the element in reference to adjacent objects or gridlines. Because engineers and drafters can manually select the reference points, they can modify the position and geometry of an element simply by typing a new value.



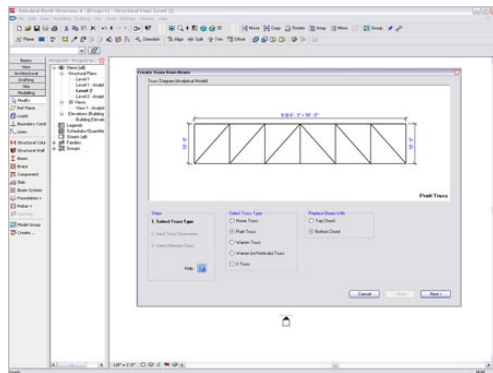
### Parametric Components

Autodesk Revit Structure has a full set of tools for the creation of all types of structural components, such as joist systems, beams, dynamic open web joist libraries, and intelligent wall families. No programming language or coding is required to use Parametric Components, also known as families. The family definition contains all the data to graphically represent an element in 2D and 3D at various levels of detail. The term *family* refers to an element's ability to have multiple types defined within it, each of a different size and shape. Changes to a family or type definition ripple through the project and are automatically reflected in every instance of that family or type in the project. This capability keeps everything coordinated and saves the time and effort of manually tracking down components to update. Families are saved in a master database and can be conveniently loaded into new projects.



### Revit Structure TrussWizard

Autodesk Revit Structure offers subscription customers an application to help model and create trusses using industry-standard truss profiles as templates. Users can define the number of panels, peak locations, and truss heights as well as truss member sizes, and the TrussWizard creates the truss within the Revit Structure model.

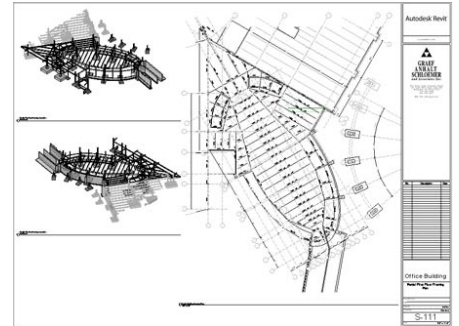


### Groups

Groups allow parametric modular design and are used to create repetitive units. Create a group by selecting several related elements. For example, select the rebars in a reinforced concrete beam for reuse in other views. Or create a group of structural beam systems for reuse on different floors. Or group a part of upper and lower chords with diagonals for reuse in new trusses.

### Filters

The filter management tool enables users to highlight specific objects for improved visibility within the structural model. User-defined selection filters provide a visual method to call out objects that share common properties. For example, objects selected in the filter can be turned on or off, highlighted in a specific color or line style, or even turned half-tone. Engineers can also use selection filters with structural boundary conditions to send substructures (such as a frame, floor, or wing of the building) to their analysis software without sending the entire model.

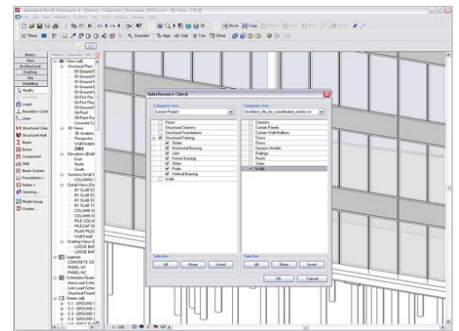


### Design Options

With Autodesk Revit Structure, engineers stay focused on structural engineering. Explore design changes. Develop and study multiple simultaneous design alternatives to make key design decisions. Easily present multiple schematic designs to clients. Each option can be substituted into the model for visualization, quantification, and other analyses to help team members make informed decisions.

### Interference Check

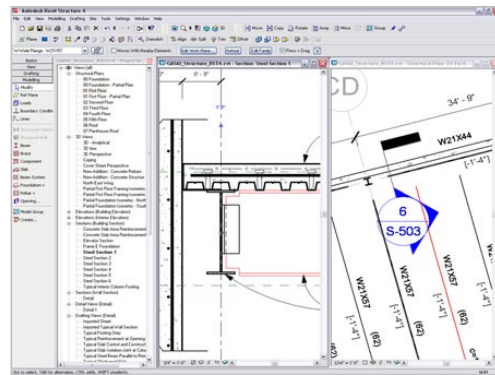
This option enables users to set parameters to scan the model for conflicts between structural elements. For example, columns can be checked to make sure they do not interfere with shear walls.



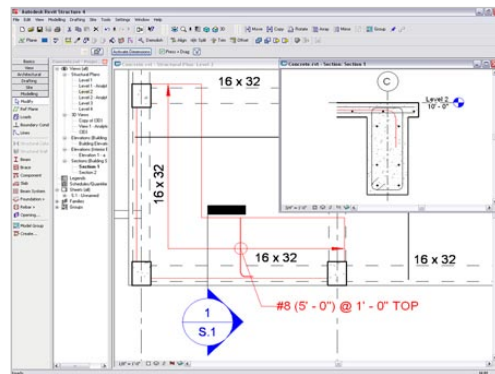
## Deliver Comprehensive Construction Documents and Structural Details

Autodesk Revit Structure has a full set of dedicated tools to help users deliver more complete and accurate structural drawings, reducing errors due to manual coordination of design changes to accommodate clients' requests.

Material-specific tools are included to help ensure that construction documents conform to industry and office standards. For steel, features such as beam coping and automatic symbolic cutbacks, as well as an extensive library of detail components, enable drafters to document and detail entire structures.

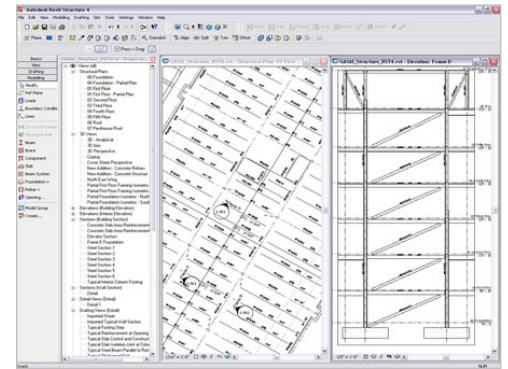


Features like area and path reinforcement for concrete structures allow drafters to add steel reinforcing to walls and slabs in section, while symbolically representing the reinforcing in plan views. Concrete beams and columns automatically join when created. Additional display options provide control over the visibility of the concrete elements.



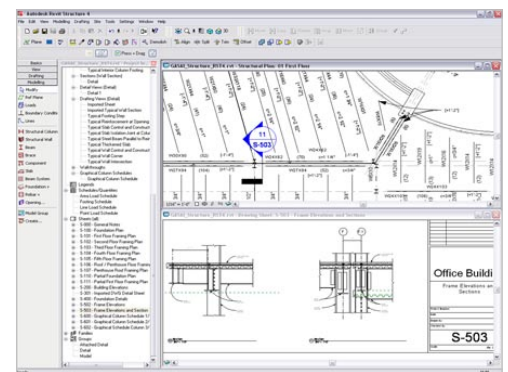
## Automatic Sections and Elevations

Creating sections and elevations in Autodesk Revit Structure is simple compared to traditional methods. Because views are just a different representation of the entire building model, you get instant cuts throughout your structure. Change them any time you want so you can work in the most appropriate view. When the construction documents are ready to print, save time with the automatic hiding of section tags and elevation symbols of the views that are not placed onto any drawing sheet.



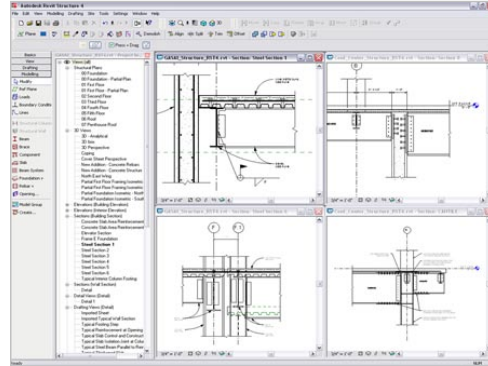
## Automatic Drawing Sheet References

This functionality helps ensure that no section, elevation, or callout references the wrong drawing or sheet and that all data and graphics, details, schedules, drawings, and sheets in the drawing set are current and coordinated.



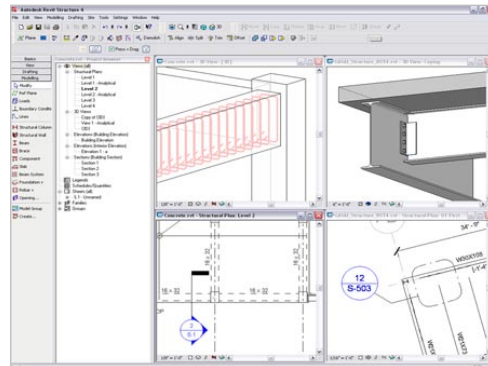
### Symbols

The library of structural symbols includes moment frame connections for beams, plate and splices for columns, brace representation in plan view, welded symbols, and more.



### Details

Autodesk Revit Structure allows several levels of details: callouts for typical details and for specific ones. Revit Structure supports the creation and management of entire sheets of typical details. Designers can import DWG details from AutoCAD® software and link them into Revit Structure using the view management system to keep the views coordinated. Or create details from scratch directly in Revit Structure using the 2D drafting tools as traditional computer-aided design (CAD). Or create details from views of the model and complete the model-based detail by adding 2D parametric components (anchor bolts in footings, fasteners, welded symbols, steel plates, reinforced concrete, rebars, and more) and annotations such as text and dimensions. When the geometry is more complicated, Revit Structure offers 3D representations such as rebars in 3D concrete elements or 3D steel connections with welded and bolted plates.



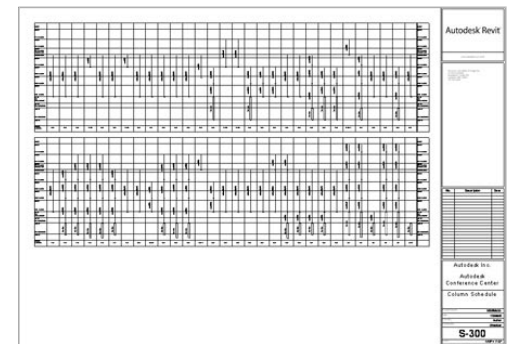
### Schedules

Save time by creating schedules on demand. Schedules are just another representation of the same building model. Change a schedule, and all other views of the model coordinate and update automatically. Schedule features include sorting, filtering, grouping, and counting, as well as user-defined formulas.

Footing Schedule					
Mark	Size	Count	Volume (Totals)	Reinforcing (Each Way, Unless Noted Otherwise)	
F1	5'-0" x 5'-0" x 18"	6	430.40 CF		6-#6
F2	6'-0" x 6'-0" x 21"	10	1260.00 CF		7-#6
F3	7'-0" x 7'-0" x 24"	14	2744.00 CF		7-#7
F4	8'-0" x 8'-0" x 27"	18	5184.00 CF		7-#8
F5	9'-0" x 9'-0" x 30"	11	4455.00 CF		7-#9
F6	10'-0" x 10'-0" x 33"	9	4950.00 CF		8-#9
F7	11'-0" x 11'-0" x 36"	8	5008.00 CF		10-#9
F8	12'-0" x 12'-0" x 39"	10	9360.00 CF		9-#10
F9	13'-0" x 13'-0" x 41"	8	9238.00 CF		11-#10
F10	15'-0" x 15'-0" x 47"	8	14100.00 CF		12-#11
F11	18'-0" x 18'-0" x 55"	8	22760.00 CF		17-#11
F12	20'-0" x 20'-0" x 61"	6	24400.00 CF		21-#11
F13	11'-0" x 9'-0" x 12"	5	550.00 CF		4-#6 LONG, 10-#6 SHORT
F14	5'-0" x 2'-0" x 66"	1	14256.00 CF		SEE DETAIL 7/6-401
F15	16'-0" x 16'-0" x 50"	4	8533.33 CF		13-#11
F16	16'-0" x 10'-0" x 40"	2	2133.33 CF		#7@12" TOP, #8@12" BOTTOM
F17	19'-0" x 12'-0" x 48"	1	1824.00 CF		#7@12" TOP, #11@8" BOTTOM (LONG), #9@12" BOTTOM (SHORT)
F18	20'-0" x 12'-0" x 48"	1	7680.00 CF		#7@12" TOP, #11@8" BOTTOM (LONG), #9@12" BOTTOM (SHORT)
F19	12'-0" x 8'-0" x 24"	6	1728.00 CF		#4@18" TOP, 10-#7 BOTTOM (LONG), 10-#5 BOTTOM (SHORT)
F20	16'-0" x 11'-0" x 12"	1	365.33 CF		
F21	16'-0" x 11'-0" x 12"	1	360.00 CF		
F22	6'-10" x 4'-0" x 12"	1	63.78 CF		
<b>Grand total</b>		<b>156</b>	<b>144624.93 CF</b>		

Customized schedules can be used by engineers and project managers to check the overall structural design. For example, schedule and review structural loads before integrating the model with analysis software. If the load value needs to be changed, it can be modified in the schedule and automatically coordinated throughout the model.

Use graphical tools to split the schedule table once it has been placed onto a drawing sheet. Split sections of the schedule table are associative; if you extend a section, the other section shortens accordingly. In addition, automatic graphical schedules—which you can customize to meet project requirements—are available for columns.

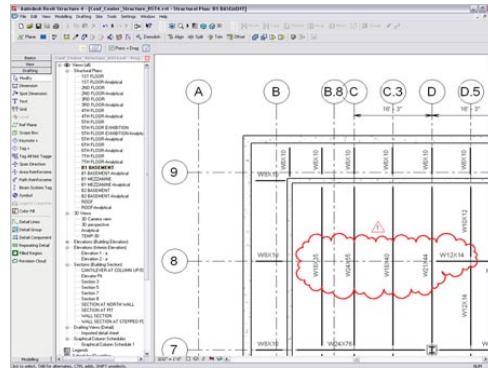


### Legends

Use the legend view to create symbol legends for a project. Place a single legend view on many sheets. Legends describe the building components and annotations used in your project and consist of two main types: annotation legends and building component legends. For example, annotation legends consist of section markers and tags. They are often referred to as symbol legends on construction documents. Building component legends are made up of components such as walls, slabs, and so forth. Components that are placed on a legend are representations of what that component looks like.

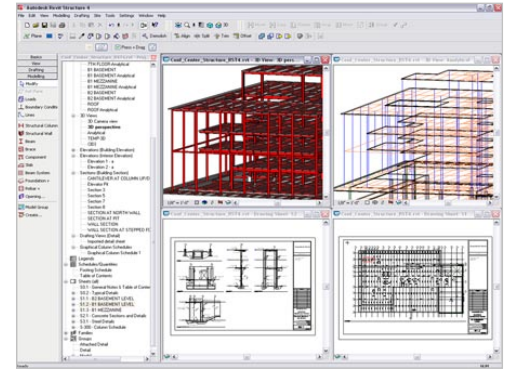
### Revision Tools

Autodesk Revit Structure includes a comprehensive revision mechanism. Revision clouds provide a way to insert bubble changes on construction documents and are associated to a revision number, for increased efficiency when tagging. Revision numbering can be either projectwide or sheet-specific. Revisions used on a sheet are displayed in a revision schedule on the title block. A comprehensive revision table lists all the changes made, by team member and date, so you can better manage changes and track documents.



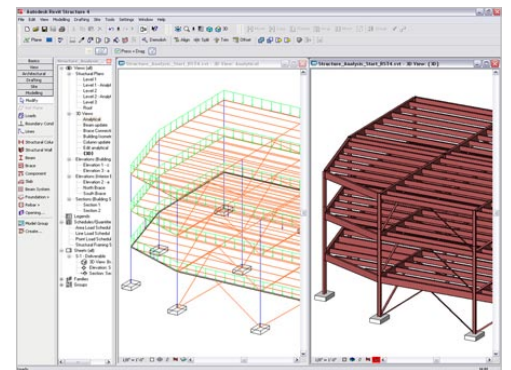
### Integrate with Leading Analysis Software

Autodesk Revit Structure concurrently delivers a physical model as well as a fully associated analytical model of the building.



The physical model drives the construction documentation. Drafters use this physical model to produce the drawing and detail sheets. Engineers and architects use it for coordination purposes such as interference checking.

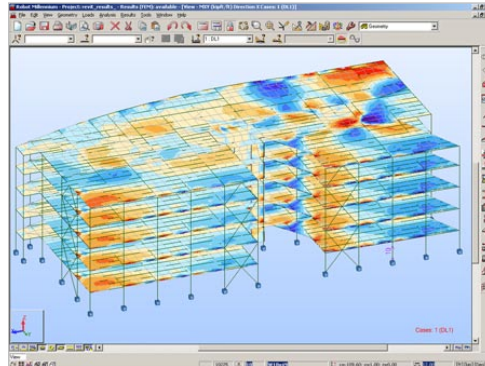
The analytical model contains information such as loads, load combinations, member sizes, and release conditions for use in leading third-party analysis applications. The analytical model could be the entire building model, one wing of the building, or even a single structural frame.



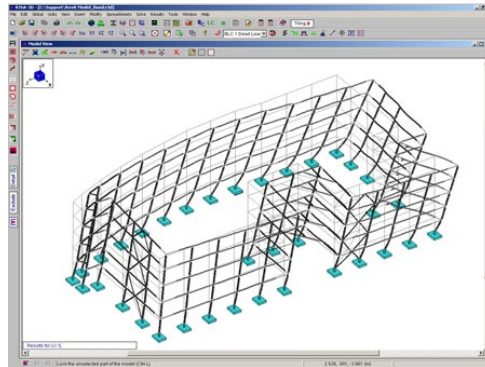
The creation of the analytical model uses a smart system of engineering rules to produce a consistent analytical representation of the physical structure. Of course, engineers can override initial analytical settings and edit the analytical model based on their judgment before linking to structural analysis packages. The analysis programs then return the design information such as changes in member sizes, which dynamically updates the entire physical model and therefore the documentation. This capability eliminates much of the redundant work and repetitive tasks done by structural engineers modeling frames and shells in many different applications.

Revit Structure also provides designers with greater engineering insight: it can check analytical inconsistencies such as missing supports, global instabilities, and framing anomalies before sending the model to structural analysis.

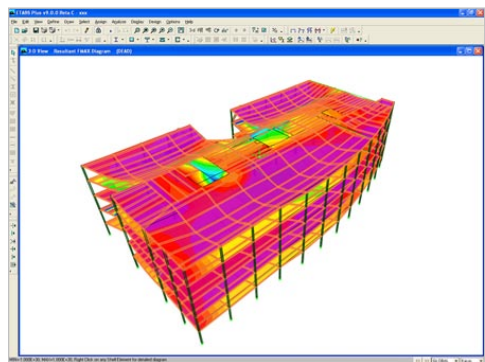
To find out which software partners have already linked their applications to Autodesk Revit Structure through the Revit platform API (application programming interface), visit [www.autodesk.com/revitstructure-partners](http://www.autodesk.com/revitstructure-partners).



ROBOT Millennium model courtesy of Robotat



RISA-3D model courtesy of RISA Technologies



ETABS model courtesy of Computers and Structures, Inc. (CSI)

## Coordinate Across the Disciplines

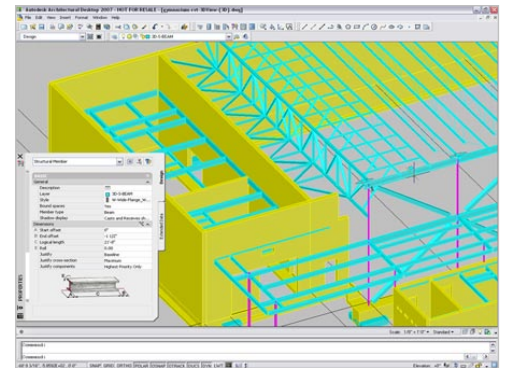
### Coordination with Architects

#### Supported Workflow with DWG/DXF/DGN/IFC Formats

Import, export, and link to DWG™, DXF™, DGN, and IFC formats help to assure fully compatible data exchange between engineering firms and their client architects. Revit Structure supports the traditional workflow where structural modeling starts with 2D DWG files provided and created by the architect in AutoCAD software. This workflow includes timesaving features such as creation of structural walls and grids by directly selecting DWG lines instead of tracing over them. For example, once the construction documents are finalized in Revit Structure, the structural drawings can be sent to the architect for review as DWG files.

#### Link with Autodesk Architectural Desktop

Autodesk Revit Structure also supports the workflow in which structural modeling starts with an architectural design done in Autodesk® Architectural Desktop. Engineers can import the entire 3D architectural model for visualization and query in Revit Structure. Engineers can also use individual plan views from Architectural Desktop as reference when they start their structural layout. For better coordination, structural engineers can export their Revit Structure model to Architectural Desktop. Architects using Architectural Desktop 2007, the latest release, can review the exported structural elements as true Architectural Desktop objects.



### Link with Autodesk Revit Building

Engineers working with architects using Autodesk® Revit® Building software can take full advantage of building information modeling and share the same underlying building database. Creation of the structural model is much faster with integrated Revit platform tools. For example, engineers can define structural columns by selecting existing architectural columns.

After linking the architectural Revit Building model into Revit Structure, the engineer can perform interference checking between structural and architectural objects. And coordination problems can be instantly detected before the drawings are sent to the construction site.

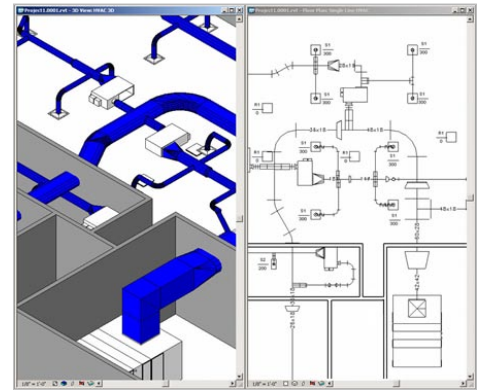
Using the coordination monitor feature, engineers and architects get electronic notification of any changes made during the design process by either discipline on levels, grids, columns, walls, slabs, and openings. The result is synchronized workflow and better-coordinated construction documents. If engineers work with in-house architects using Autodesk Revit Building, they can simultaneously share a single building model instead of linking two separate models, and navigate through the multidiscipline design using the Worksharing tool. Finally, all structural drawings, details, and schedules are directly available on the Revit platform for architectural review in Revit Building.



### Collaboration with MEP Engineers and Designers

Structural engineers working with mechanical, electrical, or plumbing (MEP) engineers using Autodesk® Building Systems can improve design coordination. Autodesk Revit Structure users can export their structural model into Autodesk Building Systems, where the MEP engineer can perform clash detection between pipes and structural elements. Revit Structure can also import 3D duct and pipe objects from Building Systems into the structural model via ACIS® solids to detect interferences visually.

Structural engineers who are working with MEP engineers and using Autodesk® Revit® Systems can take full advantage of building information modeling to share the same underlying building database. Interference checking is available in both Revit-based applications for better coordination.



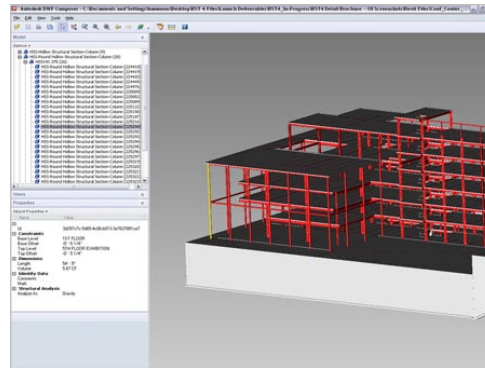
## Manage and Share

### Worksharing

Worksharing enables multiple team members on the same network to work together on the same model, while their work stays fully coordinated. Worksharing provides a complete range of collaboration modes from on-the-fly, simultaneous access to the shared model, to formal division of the project into discrete shared units or individually managed linked models.

### 2D and 3D DWF Integration

Autodesk Revit Structure supports complete round-tripping of markups with Autodesk® Design Review software for easier revision management with no need to reenter information. Publishing a Revit Structure model to 3D DWF™ format provides high-impact, dynamic communication of 3D design information in a lightweight format.



### Publish to Autodesk Buzzsaw

The Publish to Autodesk® Buzzsaw® functionality enables design teams to easily upload files from Autodesk Revit Structure to a Buzzsaw project site and automatically convert Revit Structure files to either DWG or DWF format.

## Learn More or Purchase

For more information about Autodesk Revit Structure software, visit [www.autodesk.com/revitstructure](http://www.autodesk.com/revitstructure).

For more information on extending the power of your design technology, visit [www.autodesk.com/subscription](http://www.autodesk.com/subscription).

For more information on making the most of your software investment, visit [www.autodesk.com/consulting](http://www.autodesk.com/consulting).

Purchase Revit Structure through your Autodesk Premier Solutions Provider or Autodesk Authorized Reseller. To locate the reseller nearest you, visit [www.autodesk.com/reseller](http://www.autodesk.com/reseller).