BIM Concept to Completion

The bulk of the time spent on a design project is in the detailed design and construction document phases of a project, but the building's general appearance and cost are largely fixed very early on, during conceptual design. Because the conceptual design is so crucial to the final building design, it would make sense to have a consistent flow of digital building information from beginning to end. However, the conceptual modeling tools and the detailed design tools are usually separate environments (unrelated software solutions), so the building models resulting from these two design stages have no association - digitally speaking. This paper describes how Revit® Architecture links those two environments and the benefits of that relationship.

Conceptual Design in Isolation

Conceptual building models are often developed using specialized software that allows architects to extrude forms, push and pull the geometry, create carved shapes or forms, and so forth. When the schematic design is complete, the model is usually exported to a standard CAD file format (DXF™, DWG, etc.) and imported into a detailed design solution.

The drawbacks of disconnected schematic and detail design models are clear. First, there's the circuitous transition from one to the other. Importing and exporting files can be time consuming and error prone. Important building information captured during the schematic design is lost, most notably design intent. And what happens if the design has already progressed to the detailed design tool, but there's an unexpected change to the schematic design (due perhaps to a last-minute client revision). Do you revise the conceptual model, import it into the detailed design model and try to manually synchronize the models? Or do you just delete the affected detailed design elements, and start again based on the revised conceptual design? What about work you've done on drawings or renderings? Do you try to coordinate those to the new design? In any case, it will clearly be a waste of time and money.

Autodesk®

Conceptual Modeling with Revit Building Maker

The Revit® building information modeling solution connects the conceptual and detailed design stages with Revit® Building Maker, a conceptual design toolset within the Revit platform. With Revit Building Maker, the designer develops conceptual models independently and maps them directly to building model components as the design progresses - all from the standard Revit environment.

Building forms can be created from scratch using basic 3D shapes or generated by sweeping 2D profiles. Alternatively, existing conceptual design studies from your favorite 3D modeling software can be leveraged by importing ACIS® solid models into Revit Building Maker. Forms can be joined together or subtracted to create complex building geometry. Material properties can be associated with masses, which are then used during rendering. Architects can quickly iterate through design studies and create compelling renderings of their conceptual design. Even at this early stage, the designer can validate design features by slicing the model up into floors and calculating gross floor areas and overall building volumes.
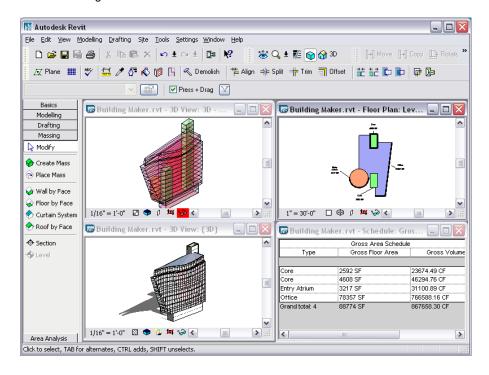

Figure 1

Revit Building Maker works like an architect thinks — seamlessly integrating the expressive and built form of a building design

Schematic Design to Design Development

At any point, the designer can convert individual faces of these building masses to building model components such as: walls, roofs, floors, curtain systems, etc. Although these model components aren't locked to the faces, Revit Architecture maintains the relationships between the conceptual model geometry and the building components that are formed by them — so changes to the conceptual model can ripple through to the detailed design model and even construction documents.

For example, if the height of a cylindrical building atrium needs to be increased, the designer can modify the cylindrical mass representing the atrium, then select the walls that need to be updated and Revit Architecture will adjust the affected design components accordingly.

The standard separation between the two design phases is gone. The designer works fluidly between the conceptual model and the building model while both design intent and detail is captured at the moment of conceptualization.

In addition, powerful building design tools usually associated with detailed design are available in the conceptual design phase as well: drawing production (elevations, sections, etc), informational takeoff/schedules, hidden line and shaded 3D views (even with shadows, for very effective presentation graphics), and integration with high-end rendering solutions such as Autodesk® VIZ or 3ds Max® software.

Unified Design Environment

Revit Building Maker is not only a powerful tool for common conceptual and schematic tasks; it also strengthens the relationship between the exploratory nature of conceptual design and design development. With Revit Building Maker, designers gain a cumulative understanding of the relationship between expressive and built form as their design develops. That's one reason we say that Revit Architecture is design software the works like an architect thinks.

About Revit

The Revit platform is Autodesk's purpose-built solution for building information modeling. Applications such as Revit Architecture, Revit® Structure, and Revit® MEP built on the Revit platform are complete, discipline-specific building design and documentation systems supporting all phases of design and construction documentation. From conceptual studies through the most detailed construction drawings and schedules, applications built on Revit help provide immediate competitive advantage, better coordination and quality, and can contribute to higher profitability for architects 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 — in model views or drawing sheets, schedules, sections, plans… you name it.

For more information about building information modeling please visit us at *http://www.autodesk.com/bim*. For more information about Revit and the discipline-specific applications built on Revit please visit us at *http://www.autodesk.com/revit*.

Autodesk®