Streamline your design-to-cost processes with Autodesk Navisworks

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Given today's competitive business climate, controlling costs is essential for the success of a building or construction project. But cost control is a challenge for many firms, especially when project teams and disconnected project data are spread around the world. It is often difficult for firms to produce the accurate, timely material takeoffs needed to estimate and control costs throughout a project. This paper explores how Autodesk® Navisworks® software helps you coordinate, synchronize, and calculate material quantities from project data to improve quantification and streamline your design-to-cost processes.

Overcome data disarray

Project quantification requires input, coordination, and communication among multiple project team members—from consultants and designers to subcontractors and estimators. To produce reliable material takeoffs, team members must be able to share accurate information throughout the cost-estimating process. You also need to access design data from multiple sources, and this data is often incompatible, incomplete, and inconsistent. As a result, the quantification process stalls and it becomes more difficult to produce cost alternatives.

Autodesk Navisworks helps overcome design data disarray, making it easier to consolidate data from multiple sources and, supplement it as needed. With Navisworks you can combine a wide variety of multidiscipline design data and engineering information—importing data as it becomes available throughout a project—into a single integrated project model for whole-project quantification. Takeoffs are based on more accurate, consolidated data containing object properties to measure and count items such as walls and doors, earthworks or drainage piping, HVAC ducts or structural members.

Data can come from multiple applications as Navisworks supports over 50 different formats including Autodesk design applications such as Autodesk® Revit®, AutoCAD® Architecture, and Autodesk® Civil 3D®. The software also supports files from most major 3D design applications, as well as laser scan file formats and non-CAD file formats such as PDF. As a result, you can use model data from Building Information Modeling (BIM) processes to perform automated takeoffs, and perform manual takeoffs using 2D drawings as needed—more effectively utilizing your 3D and 2D project data.

As a project progresses through design and engineering, you simply update the Navisworks project model and takeoffs to create new estimates. All takeoffs can be exported to spreadsheets to be shared with other project team members or imported into your cost estimation system.

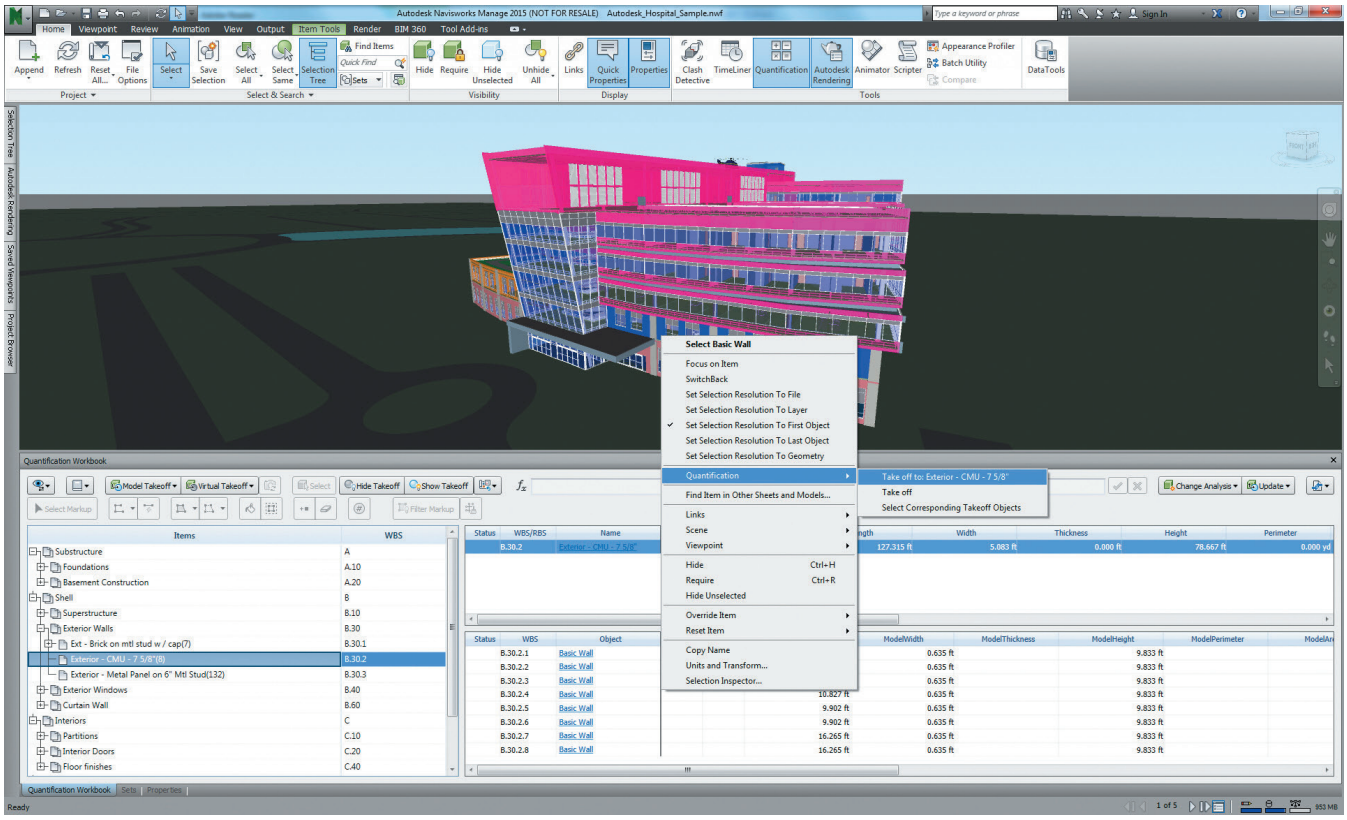

Figure 1. Model based takeoff in Navisworks from a coordinated project model comprising of architectural, structural and mechanical disciplines.

Cost early and often

Many firms wait until a design is nearly finished (and most of the design data is complete) to estimate project costs simply because their takeoff and estimating processes are so work- and time-intensive. But to include price in your design decision-making, you must be able to start providing project quantities very early on instead of waiting until designs are nearly complete. In addition, you need to be able to easily update your project model to quickly update the takeoffs and cost estimates throughout the design process.

To make estimating an iterative process you need to minimize time-consuming, manual quantification processes. Autodesk Navisworks software can help you cut the time needed for a takeoff from days to just minutes—particularly if the design and engineering data resides in an intelligent 3D project model.

With Navisworks, you do not need to wait for completely developed data. You can produce a takeoff at any point in the process, with 3D models, 2D drawings, or both, in a single project. You can import design and engineering data into Navisworks whenever you want, even supplementing incomplete information for more accurate quantities. For example, if your Revit model does not yet include floor-slab data, but you need to create a slab volume calculation, simply outline the floor slab in Navisworks to get a measurement of the floor slab area that can be used to calculate volume. Or perhaps you want to estimate the amount of gypsum board and metal studs needed to build a wall, but the information is not in your design drawings. You can use item and resource calculations in your Navisworks quantification workbook to quickly generate a bill of materials for these wall components.

By automating many aspects of quantification, Navisworks helps you complete more estimates throughout your projects. And continuously updating quantities makes it easier to stay in line with cost parameters and helps identify high-cost problems sooner.

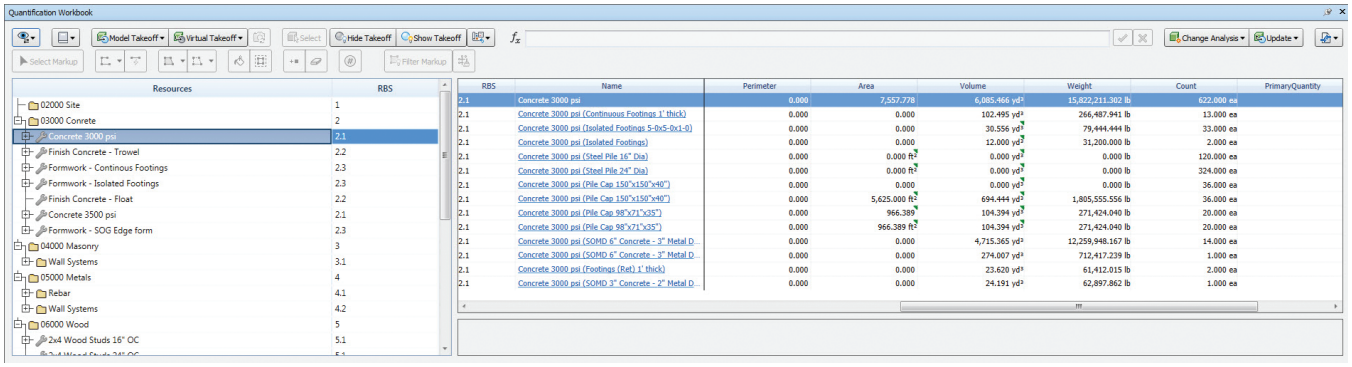

Figure 2. Reporting of quantities: review quantities for individual items and as rollup for entire project. In this case showing the breakdown by item

Realize efficiencies without disrupting workflow

The disadvantages of a manual quantification process are clear: there is rarely enough time to look at cost alternatives; it is difficult to include design data received in multiple formats; and a project priced only at the end of the design process may need a complete overhaul to fit budget requirements. But many firms are still reluctant to change their workflows, especially if it means throwing away the decades of costing experience accumulated by their best estimators.

Autodesk Navisworks is straightforward and intuitive—designed to work the way you think. Your workflow stays the same, but it is faster, easier, and produces results that are more accurate. The software automates tedious counting tasks while minimizing errors. For example, the Show/Hide Takeoff function makes it easier to locate and complete takeoffs to ensure every object in the model is accounted for. You can still include any manual calculations, measurements, and counts as part of your natural workflow, then organize your results in the project catalog.

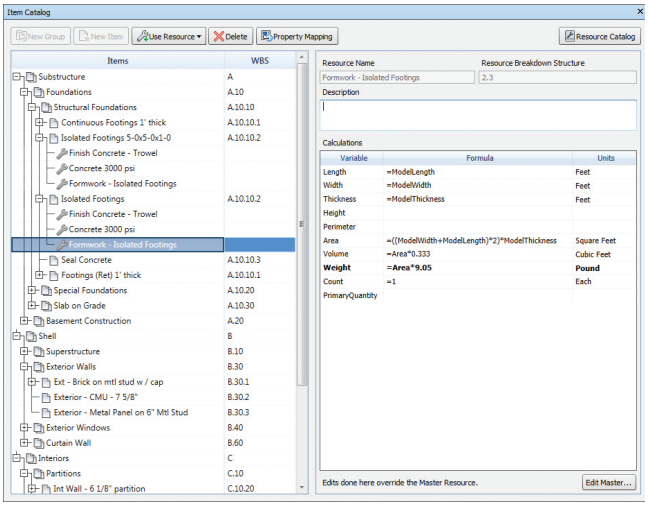

Figure 3. Item catalog allows users to structure their quantities in their desired format, and also enables them to capture calculations using known variables and constants, e.g. calculating weight using the known volume and density of concrete.

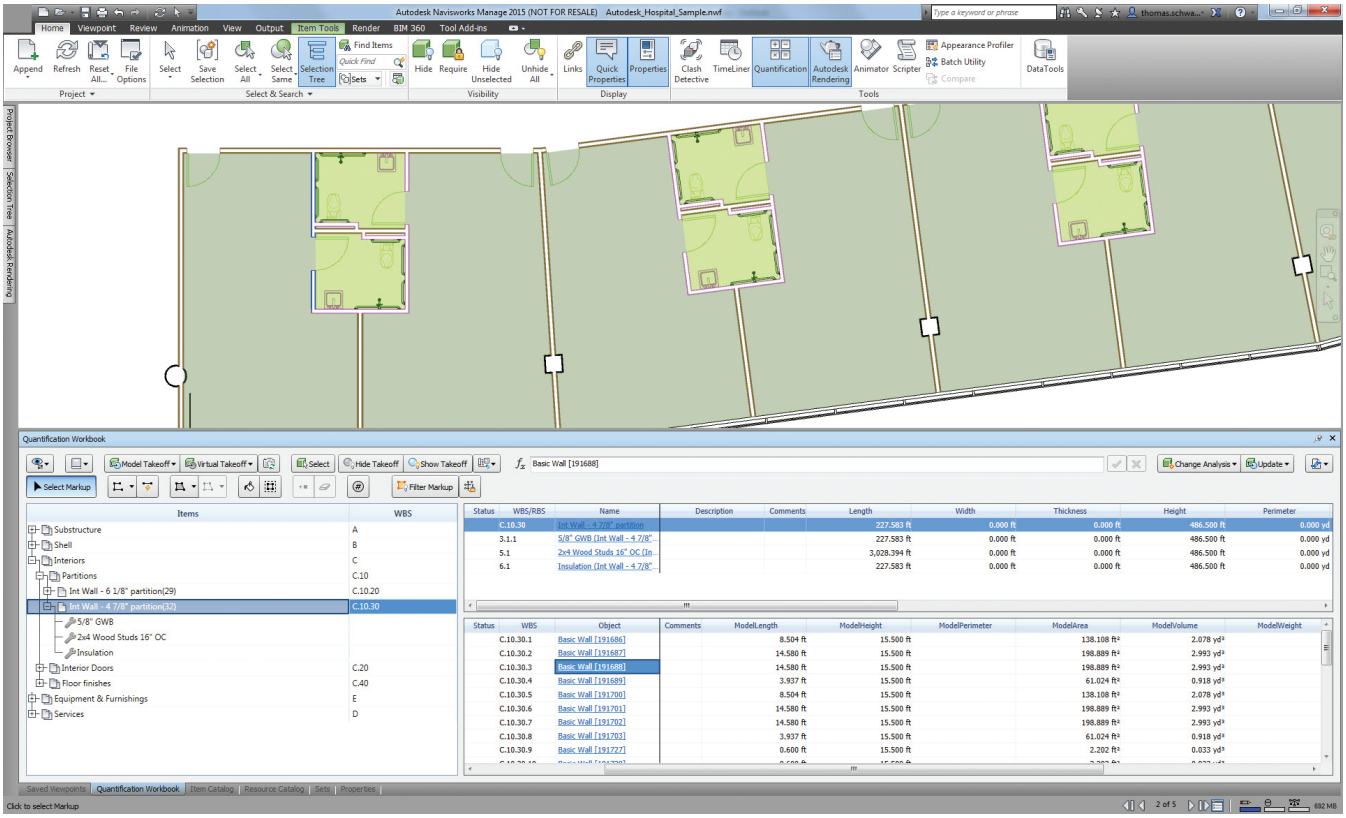

Figure 4. Takeoff from 2D drawings combined with results from automated takeoff from model.

Perform smarter takeoffs

Even in a recovering economy, your firm needs to meets client expectations and market demands for competitive pricing. To help ensure that your projects can be constructed within budget, you should begin quantification and costing using early iterations of the design. As the designs evolve, so should your quantities. Autodesk Navisworks software supports the quantification process in several important ways. It helps you coordinate and synchronize up-to-date, digital construction information throughout the quantification process. It lets you import a wide variety of intelligent and non-intelligent design data into a single environment, making it easier to perform takeoffs. It helps ensure that reports, materials quantities, and other data remain up to date—boosting confidence in your quantities and estimates.

As soon as new project data becomes available, you can add it to the project model in Navisworks. The built-in change management functions in Navisworks help you keep track of which objects have been added, changed, or removed, and how your quantities are affected by these changes. By collecting and synchronizing design data, your takeoffs are more up-to-date and accurate, providing early awareness of the cost implications of design changes and helping you choose design alternatives in line with your budget.

Navisworks can help you shave time off the estimating process and more easily produce multiple, iterative takeoffs throughout the project lifecycle. It supports 2D and 3D digital takeoff processes with automated takeoff tools. And you can start using quantification within Navisworks with minimal training—preserving the experience earned by your teams while helping to make your existing workflow faster and more productive.

For more information about quantification in Autodesk Navisworks, visit **www.autodesk.com/navisworks.**