2D to 3D: Is it all it's cracked up to be?

The recent push by CAD vendors to make the transition to 3D CAD design and drafting easier and more accessible has been met with scepticism and seen as another method of coercion to get users to upgrade.

2D CAD drafting has been the most common method of communicating design intent for over twenty years until the release of AutoCAD 2007. This incorporated a 3D "dashboard", making 3D drafting on vanilla AutoCAD less difficult and much more accessible to the user (see Fig.1).

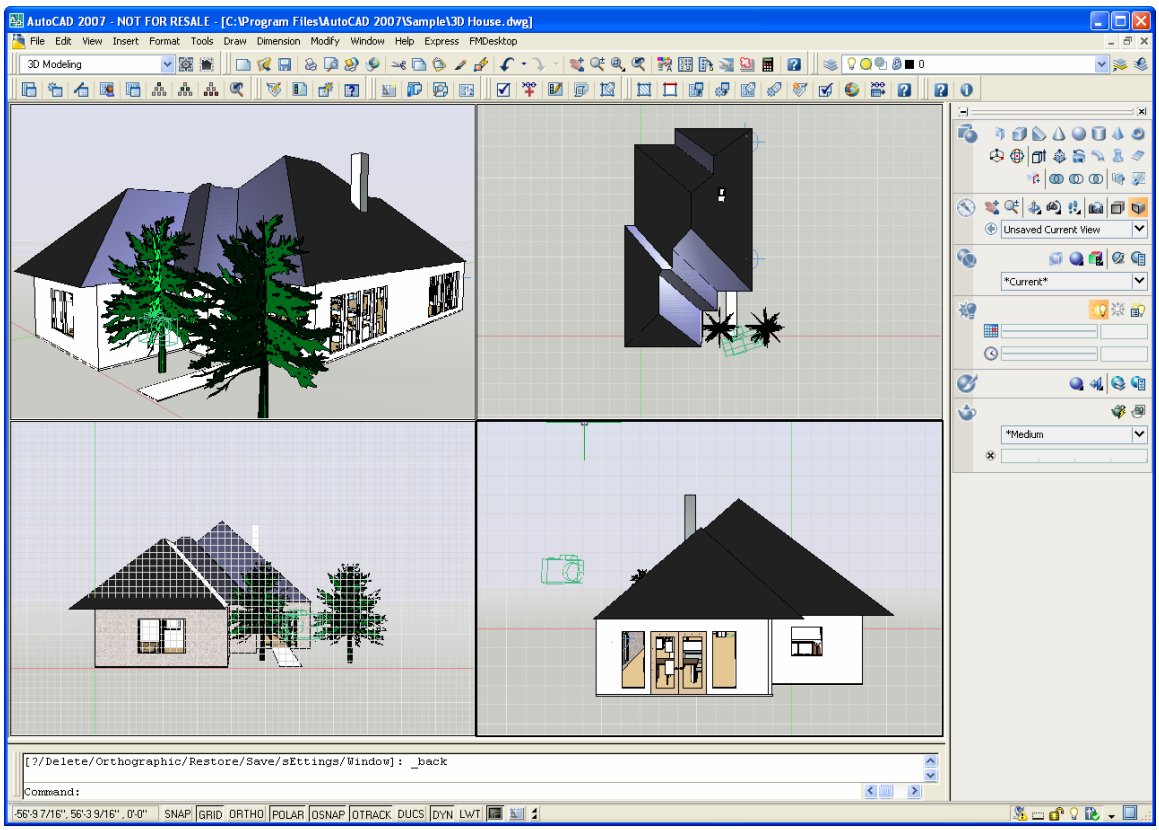

Fig.1 – AutoCAD 2007 with dashboard enabled (© Autodesk, Inc.)

Although AutoCAD is viewed as the main 2D drafting tool of the CAD world, 3D design can be readily enabled, providing the user has had appropriate training. What is holding CAD users back from 3D? Why do they stick with 2D?

The main stumbling block is user perception. 2D users wrongly view the transition to 3D as a difficult process. Autodesk Official Training Courseware (AOTC) provides excellent 3D training material with all Autodesk ATC's accredited to provide this type of training using only Autodesk Approved Instructors (AAI's). Most AAI's have come from their respective industry; hence they provide not only training expertise, but a focus on how the training can be utilized by the user in their specific industry sector to become more productive within their organization.

Let's consider the 2D and 3D drafting process for a new building.

In 2D AutoCAD, the views would be drawn up using 2D tools and traditional drafting methods, utilising construction lines to generate the sections and elevations. This is

repetitive and time consuming. It generates a large number of objects on the drawing that are not required for the final output.

The same building, undergoing a 3D process, would be modelled in real space, full-size. Elevations, sections and floor plans of the building could be generated quickly. Construction lines are not required as the 3D model is available from all angles. Camera views and 3D walkthroughs can be enabled with true-to-life visualisation and rendering of the proposed design.

The process also allows external data to be linked to 3D objects during the design and construction process through Building Information Modelling (BIM). With the move by Autodesk to industry-focused products such as Architectural Desktop and Revit Building, the transition to 3D and BIM can be made even easier (see Fig.2).

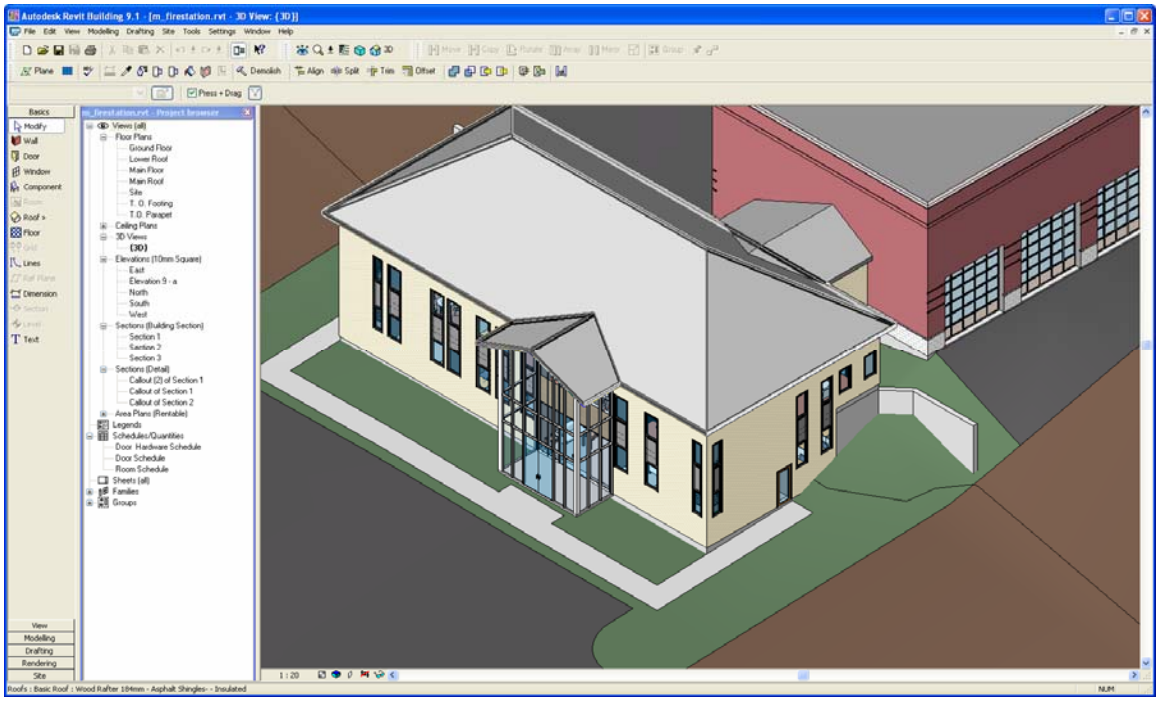

Fig.2 – Revit Building 9.1 (© Autodesk, Inc.)

BIM: The Building Information Model

BIM allows the user to build 3D geometry and assign relationships to geometry, quantities and properties of building components. BIM can also be used to manage the building lifecycle including construction processes and facility operation, allowing the user to extract quantities and properties of materials in tables and schedules.

Scopes of work can be isolated and defined as well as sequences within the entire facility or group of facilities. Drawings, procurement details, environmental conditions, submittal processes and specifications can be linked to the model so that the project information is accessible.

BIM provides a new philosophy to CAD whereby a complete model of the new building can be created from the ground up, enabling data created to be leveraged aiding the construction process. The American Institute of Architects has defined BIM as "a model-based technology linked with a database of project

information". This then leads to the ability to link drawing and model data to databases incorporating text documents such as specifications, bills of materials and manufacturers details. These can be searched and linked to regional, national, and international standards.

As mentioned earlier, Autodesk Revit provides excellent tools to allow users to implement BIM in the workplace. Looking at the benefits provided to the architect, building contractor and structural engineer, one begins to wonder why there is resistance to moving from 2D to 3D. The main reason is simple, human nature. When something works and feels comfortable (such as AutoCAD), you don't want to change it. Call it fear of the unknown to use an extreme.

Changing people's attitudes is easy. It is changing their behaviour that is difficult. People do see the benefits and agree that the way forward is 3D, but how do you get them to make that move?

Users can see the productivity gains 3D provides, leading many organisations to make the transition. However, for each company or organisation that has moved forward there are probably ten that haven't. For example, take a company that has cross-graded to Architectural Desktop 2007 but has not fully migrated to 3D due to a user still detailing on AutoCAD 2002. If the appropriate training was given, the user's perceptions would change and he too, could make the transition from 2D to 3D. However, the organisation has incorrectly decided to work around him, lowering productivity by performing repetitive tasks with drawings being reworked and saved to older DWG files.

The solution is simple. Analysis and education will change user perception. ATC's provide the appropriate skills analysis, training and handholding, enabling users to have confidence in their own skills, hence increasing productivity.

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