IMPROVING BIM CONTENT THROUGH PIM PROJECT INFORMATION MANAGEMENT

Previous | Next

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Many experienced users have expressed concerns that building information modeling (BIM) software packages lack content, especially when dealing with system objects.[1] Contractors have expressed a need to expand the information library offerings so that they can be used more specifically for coordination and assembly. As collecting and managing all of this new information is a challenge, the concept of project information management (PIM) has emerged, which is multifarious in its meaning.

"Product information model"[2] and "project integration model" are often used. Other authors from other industries use the term to mean project integration model. We shall focus on "Project Information" and the systems used to manage the information organization. Project managers use these systems to evolve the budget as the BIM model(s) are developed; not merely to extract quantities but to further refine which trade is responsible for what task along with the cost advantages of pre-assembly. This article takes a look at how project managers are benefiting from these applications and the comparison techniques (baseline versus actual) that are used to define time and scope advantages.

The evolution of PIM, used in conjunction with building models, is the next step in the development of improved management systems for our industry. As these systems mature from basic reporting activities to more bi-directional knowledge management databases, more measured results are possible. Because the integration with BIM is just beginning to be tested, construction executives hunger for showing owners more defined process improvements in how projects are constructed with PIM/BIM. Let's take a look at how this is being done in further detail.

As more intelligent objects are developed, elements can be defined according to which phase they are categorized, allowing for ties to schedules and cost. The systems that organize them need to understand this enriched BIM data with a new pattern structure. Staying on top of this is important when things change to keep the schedule and budget realistic and to minimize the need to correct field problems. As manufacturers further integrate into this process, owner representatives are recognizing the value of the PIM/BIM integration with their operating and maintenance staff.

Teams are discovering that having one model that is a single location for all information just is not practical.

"For one thing, the files become simply too large," according to Revit MEP specialist Anthony Miskinis of AEM, a BIM consulting firm based in Vernon Hills, Ill.

The Morphing of BIM

It is clear that as BIM evolves, it is morphing from the designer's model to more detail for code requirements and permit approval to further detail for coordination and fabrication at the contractor's level.

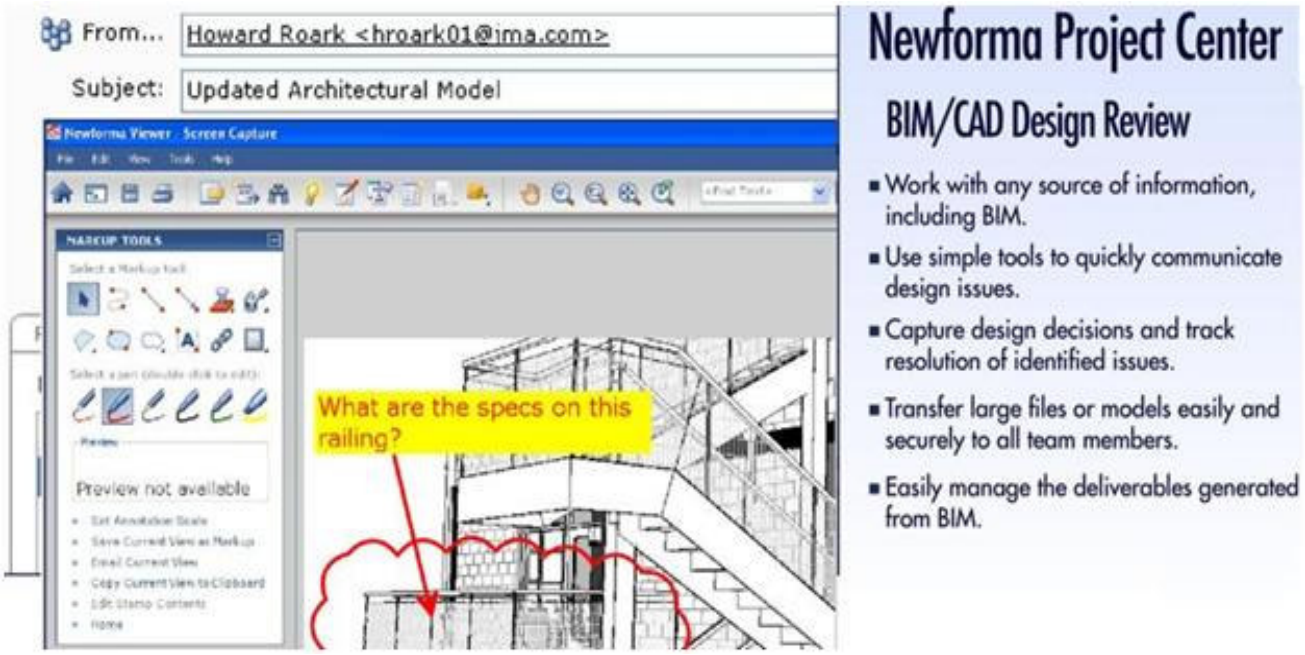
"Each party requires its own specific links with further specialized BIM data," Miskinis said.

Developing BIM models with PIM allows each stakeholder to deliver his or her contractual obligations and allow other team players to see the adjustments with linking rather than having one central file that can get difficult to load and manage. Experts believe the code of the software must evolve so that these systems can be more responsive to the team.[3] Among the deficiencies with a single model system are software constraints, missing detail, details without proper definition, not to mention the horror of corruption without saving a backup.

And as more members of the team come to depend on the various versions of one model, it is clear why the PIM platform is becoming more important to manage all of these versions at each milestone: signoff of the design concept; establishment of the GMP; release for construction; as-built conditions; and FM, warranty, and maintenance work. At each of these milestones the BIM model reaches another set of derivatives, each linked with other models that address specific tasks -- structural frame analysis, MEP coordination, envelope performance, Leadership in Energy and Environmental Design (environmental) analysis, ductwork fabrication design, and so on. Each of these tasks then feed into a central integrated project model, a project integration model, where each team member benefits from an orchestrated and coordinated solution.

Tools such as Navisworks' freedom roamer are important, where various models from many different sources can be combined and reviewed, but this is a temporary solution. According to the University of Auckland's Robert Amor, who is conducting research for the next generation of BIM, which involves interface descriptions that use vector-based markup languages.[4] After talking with Amor at a recent International Council for Research and Innovation in Building and Construction conference[5], I predict we will see an evolution of a team play PIM/BIM that will be Web-based so that each team member can use it for an entirely outsourced solution.

This builds on the collaboration developments in the 1990s with the superior object-based software of today. Setting up project extranets can be a daunting task, and then pestering the team to use them is even more challenging," IS Berkebile Owings and Merril Director Aaron Kivett said. Kivett and his team have been using Revit models managed with Newforma's Project Center for PIM. They use Project Center to transmit edited images of Revit that surpasses Autodesk's design review tool because it is collected in a database that is controlled by the construction manager. "Owners expect better support and are not familiar with opening 3D models. They expect either the contractor or architect to help them. Contractors need simple information (object properties), and we use Project Center to help us with managing our BIM models for this purpose," Kivett added. Though most larger architecture firms such as Skidmore, Owings and Merril (SOM) and Hellmuth, Obata and Kassabaum begin with PIM just to get control over email, this is rapidly branching out to interact and view BIM models and markup tools [see figure 1].



As contractors who need the model realize the time investment to keep it updated branch off to develop their own version of the model, software is becoming specialized. The key is understanding when information needs to be defined (intelligent) and at what point it needs to be distributed after it is approved. It streamlines your model to purge or simplify -- strip out if you will -- the families and objects that do not need all of this underlying intelligence.

"Faster models are easier to open and use for the team," Miskinis said.

An example of this is once the structural engineer has analyzed his model for loading conditions and the frame is fixed (no further change), the model is able to be exported to fabricators and can be a simple link for the architect's and mechanical engineer's systems. The link will show geometry, placement, and physical size, but this is all that is needed by the team unless a modification (like a beam penetration) is needed. No further object properties are needed, except for detailing and erection cost by the steel contractor.

It's about understanding what has to be analyzed.

Project Integration Model SOM Director Doris Pulsifer had this to say about integrating PIM with BIM: "Managing project information through the use of BIM model views significantly shifts the staff time toward higher-value work and away from time-consuming and error-prone manual information tasks."

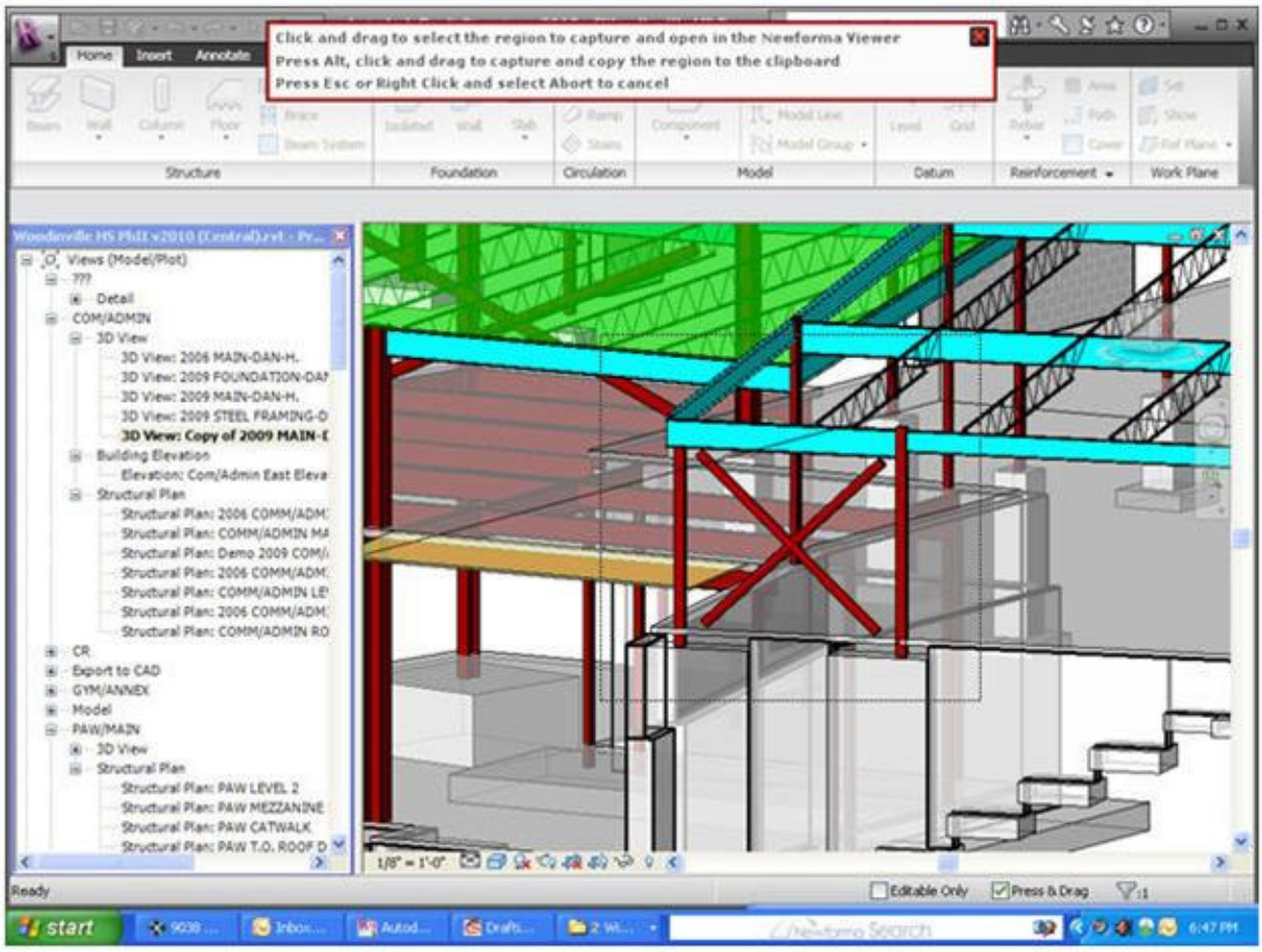
Newforma Chief Executive Officer Ian Howell added, "As we accelerate the adoption of BIM, PIM software needs to evolve in order to support a smooth transition from CAD-based projects to the new ways of working with model-based design. We are focused on advancing our solution in ways to facilitate this."

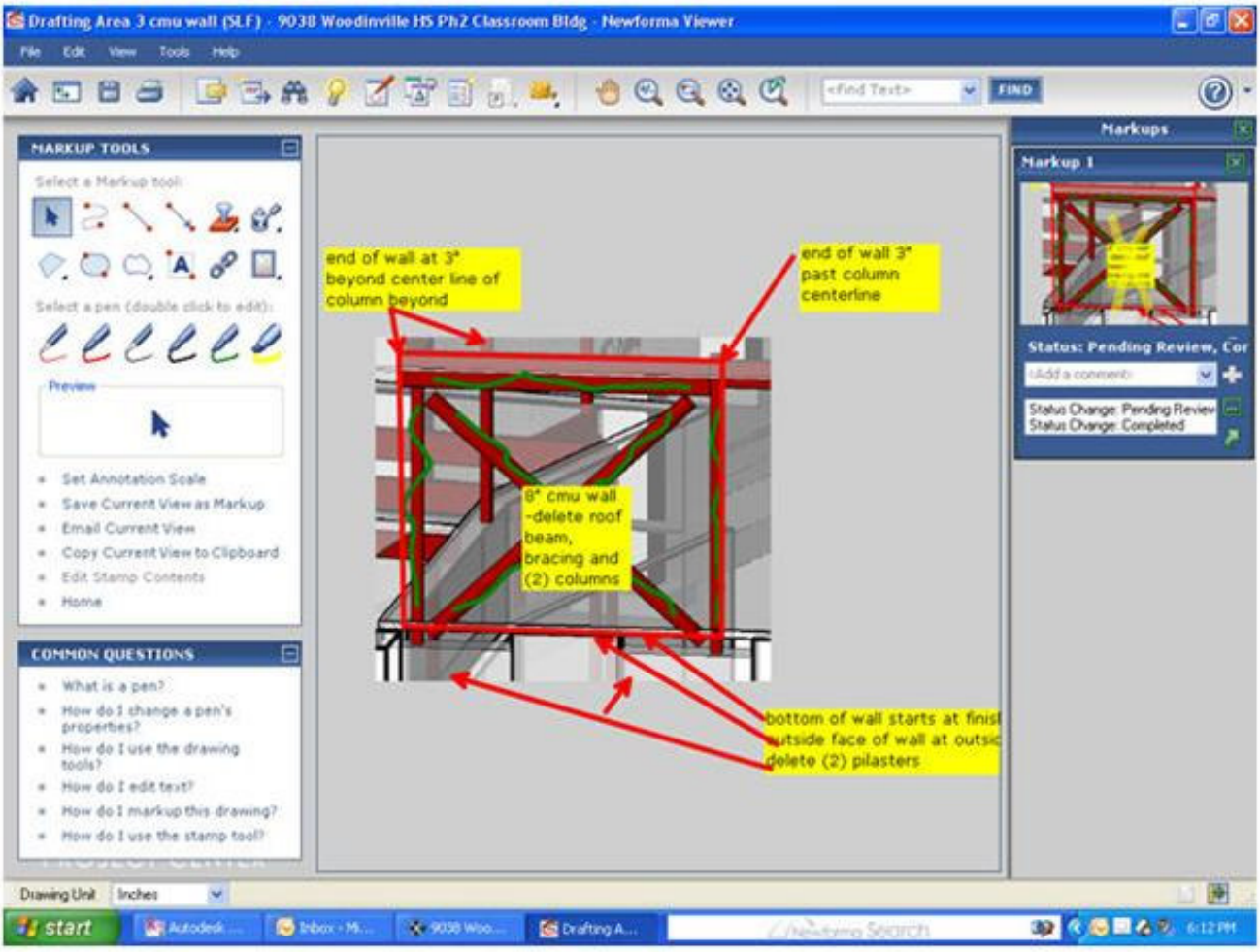
One way PIM/BIM information is being developed is through a shared online repository. Another vehicle is to allow subcontractors to use an open-sourced, object-based common language such

as Common Object Request Broker Architecture to share data.

While Newforma is certainly leading the pack, there are other vendors considering similar plans to integrate BIM markup and storage capabilities with their current bidding networks. (See vendor list below)

The idea of PIM/BIM is to have developed model information with sufficient descriptive completeness as the project evolves and the information is needed. Using technology to become more efficient by spending less time with error-prone activities (such as looking up information) is what this trend is about. It helps us to focus and get the more important things done.





References:

PIM Vendors: Newforma Project Center **www.newforma.com**.

ITB tools are rapidly morphing into PIM/BIM management networks

Gradebeam's network for contractor's managing PIM with BIM **www.gradebeam.com**. See also **www.isqft.com/** and **www.oncenter.com/msg/**.

Future reading: Robert Amor's publications on improving BIM:
http://www.cs.auckland.ac.nz/~trebor/publicat.htm

Common Object Request Broker Architecture
http://www.omg.org/gettingstarted/corbafaq.htm.

[1] BIM Forum posting by Laura Handler January, 2008.

[2] Tuffin, Brian, Avatech White paper July 20, 2007.

[3]Amor, Robert interview by author after reviewing his 2008 thesis on the Flow of Control Systems.

[4]See Microsoft description of VML at **http://msdn.microsoft.com/en-us/library/bb250524(VS.85).aspx**.

[5]International Council for Research and Innovation in Building and Construction-CIB.

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