BIM-Masonry:

Design Tool Paves Way for More Effective Project Delivery

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Information technology has served the design and construction industry well, and the increasing growth of Building Information Modeling (BIM) demonstrates the importance of a tool that aids in effectively sharing knowledge while coordinating the design and construction processes.

BIM has changed how architects, engineers, and contractors communicate and solve problems that may occur during the course of designing and constructing a building. BIM has opened the door for collaboration in a way that brings the design/build team back to the table, though virtually, to build projects more effectively and efficiently.

Communication is key to successful design and construction. BIM’s role as the go-to design and delivery method is marked by its ability to provide clear, complete, concise and correct information from the earliest conceptual stages, through design, and construction and eventually throughout the operational life of the building. Today, the masonry industry celebrates its ability to advance BIM technologies by providing a platform built with specific information gathered from the designer, engineer, masonry contractor, general contractor, and material supplier. In so doing, BIM for Masonry (BIM-M), will bridge informational resources often individually held by the various representatives of the design-build team. BIM-M hopes to allow each participant to add to and reference back information that will return great efficiencies to the project under consideration as well as advance the prospects of increasing creativity and efficiencies on future masonry projects.

Why does the industry need Building Information Modeling for Masonry (BIM-M)?

The choice of a material system for building projects is dictated by a variety of issues. Whether selected for its durability, aesthetics, acoustics, cost, maintenance schedule or life cycle, masonry materials offer a variety of attributes. Masonry choices additionally include the use of the material in a structural assembly or as a material systems contributor to energy performance through passive design measures.

While BIM is often credited for “clash detection” anticipating where various trades may meet in a building, BIM-Masonry seeks to serve as a gap closer for segregated information. BIM-Masonry will be able to build on a designer’s creativity by unleashing the full potential of masonry as a structural element, design feature, or high-performing envelope. As Associate Professor Russ Gentry, Georgia Tech’s project manager for the national Building Information Modeling for Masonry initiative, states, “BIM lets architects and engineers look beneath the surface at the drawing and say, ‘I want to know where the lintels are; I want to know how many ties to order; I want to know where I need to brace the wall today because I’m not coming back until Monday.’ All of that information can be embodied in a BIM model,” says Dr. Gentry.

BIM-M, therefore, provides a tool to effectively and efficiently design a masonry building while consistently providing industry information from other stakeholders in a timeline that provides for better costs and improved constructability.

Building BIM-M through the eyes of industry workgroups – Architectural Workgroup

“We want to build more masonry buildings,” explains Dr. Gentry. “We want masonry to compete with other materials, so we have to think like architects because they are the ones who initiate masonry buildings.”

Working together with workgroups emphasizing engineering, construction management, construction activities, and material supplier processes, the Architectural Modeling Workgroup serves to gather guidelines for enhancing the channel of communication between all stakeholders to improve the exchange of design ideas into a tangible building. The workgroup focused on early stage design, considered how masonry systems might be represented in modeling programs, and addressed both new and existing construction. The wish list from the Architectural Modeling Workgroup reflects the industry’s belief that architects do, in fact, want to build more masonry buildings. There is ample appreciation for the variety of design that masonry materials offer. Furthermore,
there is uniform appreciation of the value of reinvigorating existing masonry buildings with new functions and uses. Yet, while the group found a uniform level of understanding of masonry as a cladding material, there is a lack of understanding or possible reticence attached to stretching masonry’s flexibility. Architects know masonry is more than running bond on a veneer system, yet the design industry needs a tool that helps incorporate more advanced elements to the building – arches, corbels, quoins, ledges, projections, water tables, and variety of patterning. As a technical educator, the International Masonry Institute (IMI) has often assisted architects on a project by project basis and welcomes the opportunity to add its expertise to that held by other industry specialists.

Surveys conducted by Georgia Tech indicate that architects want information that comes from outside their traditional area of technical concentration yet enhances their design expertise. There is a need for a modeling program that provides more than clash detection, a program that extends into a design aid tool.

Design tasks that may be considered difficult to achieve, such as interfacing correctly with openings, or coordinating details into assembly processes, are tailored for information exchanges through modeling. BIM-M opens the door to provide the architecture community with necessary information on wall control layers – moisture, air, thermal and vapor, as well as drainage planes and connectors. BIM-M may additionally open the door for logical opportunities to integrate masonry as the

**What if you had a tool that helps you:**
- Understand structure beyond scope of schematics
- Inform wall type horizontally and vertically
- Recognize interferences and assemblies within masonry structures
- Recognize masonry attributes
- Calculate thermal performance
- Report sustainability attributes
- Confirm fire ratings
- Understand potential labor requirements or certification needs
- Address first cost together with lifecycle
- Integrate acoustic needs
- Represent wall types
- Locate movement joints
- Provide square foot costs
- Identify economies of scale
- Provide valuation for existing buildings
- Generate accessory schedules – rebar, flashing, lintels
- Produce quantity take off
- Inform on availability and lead time

**Then you would understand the architectural value of BIM-Masonry.** BIM-M will help ease the work of an architect already familiar with masonry construction while facilitating the learning curve of an architect who is just starting their work with masonry systems.
structure on future buildings and extend masonry’s innovative potential.

Recognizing the economic power of existing buildings and future potential of retrofitted or restored masonry structures, the Architectural Modeling Workgroup also touched on the need to incorporate specific modeling criteria to address the preservation of existing and historic buildings. Of great importance to the group is a tool that can pinpoint a building’s economic value. Architects need an accurate method to help guide repair/replace/improve decisions that are at the center of restoration work. BIM-M offers a method for this determination through condition assessment tags and reports that may later be accessed by owner teams for operation and maintenance.

**What does industry collaboration hope to provide the AEC?**

BIM-M is wisely approaching the development of a modeling tool built through the collaborative experience, research and resources representing multi-disciplinary stakeholders. By uniting the masonry industry around a tool that serves the whole, BIM-M expects to remain robust in its ability to continually gather information that mutually benefits the full design build team.

Numerous affiliated groups have joined in with their support. Financial sponsorship of the effort is provided by the International Masonry Institute (IMI), the International Union of Bricklayers and Allied Craftworkers (IUBAC), the Mason Contractors Association of America (MCAA), the National Concrete Masonry Association (NCMA), the Masonry Society (TMS), and the Western States Clay Products Association (WSCPA). Russell Gentry, professor at the Digital Building Laboratory of the Georgia Institute of Technology, and David Biggs, principal of Biggs Consulting Engineering, are leading this industry consortium. “The purpose of our initiative is to unify the masonry industry and all supporting industries through the development and implementation of BIM for masonry software to create smoother workflows and collaboration across all disciplines,” says Gentry. Charles Eastman, recognized for his development of BIM, is the technical lead on the project.

**The BIM-M Roadmap**

A roadmap for developing and deploying building information modeling for the masonry industry was distributed to the National Building Information Modeling for Masonry Initiative at the beginning of 2013. The roadmap outlines phases, projects, and timelines that the masonry industry must undertake so as to prepare the technical foundation for the development and distribution of a BIM-M product. In the meantime, BIM-M has been receiving much attention as it seeks to minimize the informational gap across all owners, designers, builders, and material suppliers of masonry buildings.

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