BIM this, BIM that… What is BIM?

Q: What is BIM? And, exactly how does it relate to the civil engineering industry?

A: BIM, by definition, has nothing to do with civil engineering.

BIM stands for "Building Information Modeling". The term "BIM" originated in the Architectural world and, generally, defines the process of inputting information to and extracting information from a 3D model of a building/facility.

Definition of BIM from the National BIM Standard:

> *BIM is best thought of as "a digital representation of physical and functional characteristics of a facility…and a shared knowledge resource for information about a facility forming a reliable basis for decisions during its life-cycle; defined as existing from earliest conception to demolition."*

From the National Institute of Building Sciences:

> *Building Information Modeling (BIM) refers to the use of the concepts and practices of open and interoperable information exchanges, emerging technologies, new business structures and influencing the re-engineering of processes in ways that dramatically reduce multiple forms of waste in the building industry. The National BIM Standard, a key element of the overall industry transformation being supported and coordinated by the buildingSMART alliance™, establishes standard definitions for building information exchanges to support critical business decisions. Implemented in software,*

> *the consensus-based standard will form a basis for more accurate and efficient commerce within the capital facilities industry. The National BIM Standard is also intended to help participants in facilities-related processes achieve more reliable outcomes from commercial agreements.*

From Geomatics International:

> *A Building Information Model (BIM) is a digital representation of physical and functional characteristics of a building. Construction and management of buildings involves many stakeholders, so that proper sharing of information over the entire lifecycle of a building is very important. The Open Geospatial Consortium (OGC) is developing BIM standards that promote efficient web-based information sharing in the Architectural, Engineering, Construction and building Ownership and Operation (AECOO) markets.*

Because Wikipedia is open-source and able to be edited by anyone and everyone, the entry for BIM changes regularly. The entire entry looked like this as of February 26, 2009. Here is an excerpt:

> *Building Information Modeling (BIM) is the process of generating and managing building data during its life cycle[1]. Typically it uses three-dimensional, real-time, dynamic building modeling software to increase productivity in building design and construction.[2] The process produces the Building Information Model (also abbreviated BIM), which encompasses building geometry, spatial relationships, geographic information, and quantities and properties of building components.*

A lot of confusion is now occurring because Autodesk and their

civil resellers are trying to make the connection between BIM and Civil or, more specifically, Civil 3D. See examples here:

BIM for Civil Engineers by Sanjay Asnani, Autodesk
If link doesn't work, find this document HERE.

What Does BIM Mean for Civil Engineers? by Adam Strafaci, Autodesk

Civil 3D and BIM… How do they relate? by Melanie Santer, US CAD

However, if you simply Google **"bim building information modeling"** and look at the first two pages of returns, the only entries that attempt to connect BIM and civil engineering belong to Autodesk or one of their civil resellers. All other hits refer to BIM in an architectural/building sense. If there is a specific software program mentioned, it is Autodesk's Revit product. A caveat to this is the civil/structural engineering specialty field of bridge construction which can also be modeled using Revit. Bridge construction is a bit of a hybrid in that it is similar to building design and can also legitimately be related to BIM.

Among Autodesk's architectural team and resellers, most, if not all, references to BIM are solely in an architectural/building capacity. See examples here (pages were cached on 2/26/09):

Brave New BIM

The World According to BIM – Part 1

Summit AEC – Autodesk BIM & CAD Software

As you can see from the above links, it is technically incorrect to connect BIM and Civil. However, many in the civil world are

witnessing the Autodesk definition of BIM take hold. So, in the event you are ever asked or required to “BIM” a civil project, you are essentially being asked to design and deliver a dynamic, 3d model of the entire project.

It is important to realize that creating a dynamic 3d model for a Civil project (or “BIM”ing a civil project) is not limited to using a particular software program.

Find a civil engineering design software that allows you to design to specific criteria, is able to show a great visual representation of all the components of your project in 3D view and is able to dynamically reflect changes and you can “BIM” along with the rest of the world.

Designing a project using a dynamic model allows you to design according to specific criteria such as AASHTO (American Association of State Highway and Transportation Officials) standards or by specifying minimum/maximum values for storm or sanitary sewer design. It also is invaluable to detect, before construction, potential conflicts between a proposed network of roads and associated utility networks. As an example, a dynamic 3d model would trigger a warning if, when lowering a roadway, the rule for minimum cover over a pipe on an adjacent roadway has been violated. Also, creating this model allows you to view the model, make changes to vertical alignments and see dynamically updated cut/fill quantities all at once.

To reduce the confusion, it might be time to coin a new term such as “Site Information Modeling” to describe the process in the Civil industry. But, there is still quite a disparity between the “Information Modeling” done for a Building compared to that done for a Civil project. In true BIM, the “I” (Information) component is as important as the “M” (Modeling) component because determining usability and functionality of the

Building through its lifecycle is one of the goals of BIM. At this time, the process on the Civil side is still much more about the “Model” and not nearly so much about the “Information” going into and coming out of the model. When we are able to incorporate results of traffic flow analyses for a roadway or inspection reports showing sludge build-up and flow capacities in sewer/storm pipies and manholes, we will be truly using the “Information” as it was intended in an “Information Model”.

Originally posted on **Carlson Connection** by Jennifer Dibona