BUILDING MANIFEST

Design Manifest [DM] Construction Manifest [CM]

Building Information Modeling, as currently formulated, falls short of expectations. The solution is to extend BIM with the idea of the **Building Manifest**. This will redefine the BIM landscape and move the industry forward. Building Manifests will provide clarity that currently does not exist (and is very much in demand), and will be perceived as indispensible in the AEC industry once available.

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State of the Art

More than a few people in the AEC industry have practiced Building Information Modeling, by other names that predate the term, since the 1980's. Having done it myself continuously since 1996 in a number of architectural firms, I've come to realize that the concept of BIM and the use of it in practice falls short of its potential, because to date the ideas have not gone far enough.

The solution to that is a simple combination of existing drawing and modeling conventions.

Drawing Conventions

The search for clarity in communication is paramount in the design and construction industry.

Well known drawing conventions support this. First among them is the convention that drawings are drawn on a sheet, with a border, which is more significant than commonly realized; it names the author and denotes, literally, the limits of his/her intent and the limits of responsibility and liability.

The line of the border (or the edge of the paper) is a boundary within which the designer claims responsibility and outside of which (s)he does not.

The importance of this, and its absence within the context of an advancing BIM paradigm, is remarkable. There exists yet no equivalent convention for designating limits of intent and responsibility in a BIM model.

Building Information Models require disambiguation:

1. Designers require a way of indicating in models where there is explicit intent, and where there is not; a way of calling out which parts of a model are complete and correct, and which parts are not.

2. BIM models display too much information at once. Useful information is often obscured or hidden.

Only very rarely are design and construction teams sufficiently committed to modeling and working together smoothly enough to allow the Building Model alone to serve as a final deliverable prior to construction. The level of detail required is high and most often unattainable.

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The solution is not, as many have tried (myself included), to push all modeling to higher level of detail. This becomes a forced investment of resources with poor return even under ideal working conditions on extraordinary projects with excellent team collaboration.

Instead the solution resides in pushing the model in the direction it naturally goes with little resistance on typical projects constrained as they are by the usual obstacles to team process and commonly-found team skill sets.

That is to say, I propose a solution that works on most projects. I leave it to those at the high end of the skill set spectrum to determine if the method has value for their projects as well (I believe it does).

Combine the best of both

The idea simply is this:

Combine the conventions of drawing and modeling to bring out the best of both.

Where drawings are instantiated in models **in-situ (in the position in which they actually exist)** the clarity and value of drawings and models increase.

Drawings are easier to understand, because they are seen within the context of the model (with many presentation methods possible). The ambiguity of drawing is reduced while the value is increased.

The same is true for models. Ambiguity is reduced. Limits of liability are explicit. Areas of the model that are complete are designated by having drawings instantiated in position. Other areas are known to be contextual only and expected to be only partially complete. This increases the value of the model; it becomes deliverable.

The combination of drawings and models together describes a new kind of deliverable in the AEC industry. It has a suitable name: **Building Manifest**.

A Building Manifest combines a Building Information Model with conventional 2D drawings ***in-situ*** and is delivered in a standard viewing application like Adobe Acrobat. It positions both models and drawings for maximum communicative clarity and requires neither to do what the other is better able to do. This frees up design and construction teams to focus their efforts where they are most productive and increases the value of their communication.

Building Manifests can be phase-specific: **Design Manifest**, **Construction Manifest** . . .

From Webster's Third New International Dictionary:

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[1]***manifest*** *adj 1a: capable of being readily and instantly perceived by the senses and especially by the sight : not hidden or concealed : open to view (the earth's convexity had now become strikingly ~ -E.A.Poe)*

[2]***manifest*** *vb 1: to show plainly : make palpably evident or certain by showing or displaying (~ed precisely the same bone structure as the mask of the great author –Osbert Sitwell)*

[3]***manifest*** *n 3a: a list or invoice of cargo for any of several forms of transportation (as a ship or plane) usually containing marks or indications of contents or commodity, consignee, and other pertinent information for use at terminals or a customhouse.*

A Building Manifest makes things clear, shows plainly, makes things readily and instantly perceived by sight and documents the contents of a project.

This is precisely what neither BIM nor conventional drawing can do alone.

But together: problem solved.

Together, a project is manifest.

Focused Work and Delivery

One realizes that drawing and modeling efforts for a **Construction Manifest (CM)**or a **Design Manifest (DM)** are now focused where they offer the highest return.

We know already, having routinely driven drawings from models (and models from drawings) in BIM software environments over the last 10 to 20 years that the drawings in a Manifest may be derived in real-time from the BIM model. And we understand more clearly now where, how, and when to make the right decisions regarding whether to detail using conventional 2D drawing, or modeling, or both. We enter the model-drawing negotiation better informed of our own delivery target which is no longer either the drawings or the model, but both together as the Building Manifest.

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Multi-media / Multi-format

One also realizes that Building Manifests (DMs or CMs) are, at their best, multi-media and multi-format.

The **Building Manifest / Design Manifest (DM) / Construction Manifest (CM)** can be viewed using any pre-set (or interactive) model display clipping volumes, transparency volumes, and illustrative shading styles that allow any single drawing (wall or building section, plan, detail . . .), or many drawings at once, to be seen and understood within the context of the model, thus increasing the understandability and usefulness of both the drawings and models. Power comes from realizing that both the models and the drawings and other content coexist in the Manifest although they may originate in different media and different software application formats:

1. **Building Manifest ***

    1.1. BIM Model *

    1.2. Real-time dynamic views through model *

        1.2.1.1. Viewed in the model
        1.2.1.2. Referenced to drawing sheets
        1.2.1.3. On the fly sheet arrangement by query of various selection criteria, index number, or position

    1.3. Drawings and multi-media referenced to model, in-situ (designating completeness) *

        1.3.1.1. Drawn fully automated, real-time from model ,marked and saved in-situ (complete detail - from model only)
        1.3.1.2. Drawn from real-time as a template only, with detail added manually
        1.3.1.3. Drawn conventionally from scratch – 2D vector graphics
        1.3.1.4. Drawn by hand (paradoxically, there no longer is any bias against this), then scanned and referenced to model
        1.3.1.5. Photos, renderings, videos / animations . . .
        1.3.1.6. Others (audio links?)

    1.4. Links to other information (schedules, specs, cut sheets, cost data, etc.) *

    * (multi-formats, referenced / multi-office, referenced)

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The **Building Manifest** includes **1.1, 1.2, 1.3 and 1.4:**

- the BIM model **(1.1)**
- real-time drawing views of the model **(1.2)** - displayed real-time in the model, and on sheets if desired, via the index
- drawings (and other content) referenced to and displayed with the model **(1.3)** – designating intent, completeness and liability limit.
- Other information (schedules, cost, etc.) linked to and displayed with the model **(1.4)**

Current industry conceptions of the **BIM** environment include only items **1.1 and 1.2.1.2**, with links to automated drawings arranged on sheets only (not viewed in the model), and excluding real-time views within the model and all drawings and other content and media referenced and presented in place in the model.

A Manifest, certainly, is a linked environment. Any of the drawings (and other content), designed to be viewed in context, also can be clicked on for viewing separately, the way drawings are conventionally viewed. Along with printing, drawing viewing can also be driven from an index of drawings in the Manifest, with the index created automatically from the reference attachment (and saved view) list.

Likewise, from the index a conventional drawing layout can be pre-determined by the author(s), or assembled as needed on the fly through query on various selection criteria, by index number, or by position / proximity.

Time sequencing and cost data (4D and 5D) proceeds from the Manifest precisely as it does today from BIM models (the Manifest includes the BIM model).

Bentley Systems

(Hopefully) Bentley will be the first software developer to articulate and deliver the concept of the Building Manifest (Design Manifest / Construction Manifest).

Why Bentley?

They have already the tools to deliver it:

- BIM tools of increasing intelligence (like other vendors)

- Depth of technical expertise referencing and presenting many data sources together (unique to Bentley)
    i. Includes Bentley data (Bentley strength)

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ii. Includes openness to reference of non-Bentley data (unique to Bentley) (advantages of reference versus import are significant / unique to Bentley in extensiveness)

- Dynamic Views (in Athens)
  i. Real-time resymbolized section graphics through model viewed dynamically within the context of the model (unique to Bentley) or referenced as needed to sheets.

- Collaborative relationship with Adobe development for delivery of complex content in a universal viewer (Adobe Acrobat)

- Extensible enterprise functionality in a Bentley Viewer (ProjectWise Navigator, with reference capability – unique to Bentley)

- Development commitment to a platform (Microstation) to deliver all Building Manifest functions within the originating working environment (no export and discontinuity of project data required; no need to export data to a "purpose-built" Building Manifest application –unique to Bentley)

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