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Advancements in the Use of Building Information Modeling (BIM) Systems

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ACI WEB SESSIONS

Transitioning to BIM for Structural Design

by
 Vincent Cadoret, Senior Applications Expert,
 IMAGINiT, Mississauga, ON, Canada

ACI WEB SESSIONS



Transitioning to BIM for Structural Design IMAGINiT
 Vincent Cadoret, Senior Applications Expert



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Introductions:

Vincent Cadoret, Senior Applications Expert
 vcadoret@rand.com T: 905-602-8783 x1258

- Building Systems Technologist
- 5 Years industry experience
- 4 years working as a BIM consultant

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Who is IMAGINiT:
 Industry Leading People, Organization and Resources



IMAGINiT Technologies:
 Largest staff of technical experts in the industry

- 20 years of experience
- 45,000+ satisfied customers
- 49 locations, 350+ people across North America and Asia Pacific

Building Architecture Manufacturing
 Civil Engineering Geospatial Media & Entertainment

A RAND Worldwide Company, leveraging proven methodologies

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Who is IMAGINiT:
 Industry Leading People, Organization and Resources

IMAGINiT: Services we provide

Professional Services	Software Solutions
<ul style="list-style-type: none"> • Consulting • Implementation • Technical training • Solution Center: PNOW • Software development • Data & Document Management • Project Management • Design Visualization 	<ul style="list-style-type: none"> • Autodesk Software Solutions • E-Specs (Specifications Mgmt) • ASCENT: Autodesk Courseware • SOLO: Searchable Online Learning Objects • Scan to BIM • Leica Scanner / Dealer • SmartBIM Content Management • Clarity for Revit Server

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BIM Defined:

The "I" (information) in BIM is what sets this approach apart from simple 3-D visualization.

- "Think of [BIM] as a database of building information that has the capability to be viewed in three dimensions" (1)
- "A building information model is a digital representation of physical and functional characteristics of a facility. As such, it serves as a shared knowledge resource for information about a facility, forming a reliable basis for decisions during its life-cycle, from inception onward."

(1) Markku Allison, resource architect, American Institute of Architects, Washington, D.C.

Driving the Transition to BIM:

Driving the Transition to BIM: The Construction Landscape

As much as 30 percent of the cost of construction is wasted in the field due to coordination errors, wasted material, labor inefficiencies, and other problems in the current construction approach.

— CMAA Emerging Technologies Committee Members: Soad Kousheshi, P.E., and Eric Westergren, A/E/C Strategy, Inc., Building Information Modeling and the Construction Management Practice: How to Deliver Value Today?

Driving the Transition to BIM: Why Change?

Common reasons

- "We are changing because firm XYZ is a competitor and I heard they are using it."
- "An Architect we work with said if we do not switch, they will have to start working with someone else to get BIM."
- "We are just looking for an efficiency gain (\$ overall project and/or \$ construction admin)."
- "We are having trouble attracting new talent."
- "There is no way we could have done this using 2d cad."

Driving the Transition to BIM: Owners want it

Owners are now beginning to require BIM

- Owners are hearing about projects coming in at **10% lower than budgeted** when architects and engineers created their drawings and specifications using BIM as their modeling tool
- There are early reports of projects coming in at 20% lower than budgeted when IPD (Integrated Project Delivery) is used on a project
- Conflicts are worked out in the model and not in the field
- Prefabrication is possible because dimensions are very accurate and there is confidence that the prefabricated items will fit

SOURCE: REED CONSTRUCTION DATA 02/08/10

Driving the Transition to BIM: Work Smarter not Harder

Analysis Integration

BIM can mean concurrent analytical and physical modeling. A capable BIM software package can:

- Create independently editable analytical representation of structural elements
- Perform analytical model consistency checks
- Create a Bidirectional link to multiple third-party structural analysis and design applications

BIM is Both a Process and Cultural Change

+

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BIM: both a Process and Cultural change

It's not Software, it's a Process

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Hardware/Software

BIM is both a Process and Cultural change

Market Triggers and Obstacles

BIM users face the need to balance the benefits of improved productivity and coordination with the challenges of BIM-related costs and training issues.

Don't get left in the dust!

Top Obstacles to BIM Adoption

- Inadequate training
- No senior management buy-in
- Cost of software
- Cost of required hardware upgrades

The Top Benefits of BIM

- Easier coordination of different software and project personnel
- Improved productivity
- Improved communication
- Improved quality control

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BIM is both a Process and Cultural change

BIM is not Software it's a Process

BIM Changes the way we interact with our clients and our consultants:

Before BIM:

After BIM:

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Implementing BIM: Business Challenges

Business Challenges		
<h4 style="text-align: center;">Technology Challenge</h4> <p>What is BIM? Is BIM achievable? Is it real?</p> <p>What is everyone using out there? How did they do it? Where did they start?</p> <p>What tools are available for the designers, contractors, construction personal, owners etc.?</p> <p>What is the practical impact of a relational object based authoring tool?</p>	<h4 style="text-align: center;">Process Challenges</h4> <p>How do I incorporate BIM into my day to day business?</p> <p>How do I connect to all the relevant participants in my projects?</p> <p>Will acquiring BIM Enabling Technology give BIM to my firm?</p>	<h4 style="text-align: center;">Personal Challenges</h4> <p>How do I maintain the good people that I have?</p> <p>How do I bring new talent into the business?</p> <p>How can I raise the level of technology in my business without isolating and upsetting my best most experienced people?</p> <p>How do I raise the bar of technology but maintain strong relationships with my partners?</p>

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Implementing BIM:

The "BIM action Plan"

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Implementing BIM: A Structured Approach

"He who fails to plan is planning to fail"
"Winston Churchill"

Why a structured approach?

Protects against implementation risk by:

- Provides a clear plan for moving forward with BIM
- Sets clear tasks for all those involved
- Think ahead and anticipate possible roadblocks
- Mitigates risk
- Once you have completed the first project you can repeat it on the next

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Implementing BIM: A Structured Approach

There are a number of factors that can contribute to a failed software implementation, including:

- Improper implementation planning
- Inadequate project assessment
- Unrealistic goals
- Poor core team selection
- On-site project disagreements
- Lack of project leadership
- Insufficient executive support
- Incomplete process map
- Non-acceptance and adherence by end user

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Implementing BIM: A Structured Approach

Implementation Plan

Phase 1: Definition Phase 2: Development Phase 3: Pilot Project Phase 4: Production

Acquire an experienced consultant for a Support Foundation

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Implementing BIM: Our Implementation Approach

Definition

- Achieve buy-in from all stakeholders
- Establish project implementation goals
- Select core development team
- Devise and implement project plan
- *"Recommended"* find someone to help who has done this before

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Implementing BIM: A Structured Approach

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Implementing BIM: Our Implementation Approach

Development

- Research Best practices and developed corporate standards
- Map out your process for the first project
- Get Software training for "Pilot Teams"
- Library & Content creation training (*you need to understand how to create custom BIM content*)
- Data migration (*what can you reuse from your exiting 2D processes?*)
- Select a pilot project, establish scope and schedule requirements

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Implementing BIM: A Structured Approach

Implementation Plan

Phase 1: Definition

Phase 2: Development

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Implementing BIM: Our Implementation Approach

Pilot Project

- Start the Project using all you have learned
- Get Advanced product training if required
- Finish the Project
- "After Project" Analysis (*What went well, what were the problems areas*)
- Document and revise the implementation plan based on what you have learned from the "After Project Analysis"

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Implementing BIM: A Structured Approach

Implementation Plan

Phase 1: Definition

Phase 2: Development

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Phase 4: Production

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Implementing BIM: Our Implementation Approach

Production:

- Define "Best Practices" Using what you have learned on the first Project
- Establish corporate BIM Standards
- Train the balance of the staff based on experience with pilot Project
- Repeat this process with all your design teams until the whole firm has been transitioned

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All things Considered

Some final thoughts, Opinions, and Items to watch out for:

- You must have "Executive Buy-in" to have a successful "BIM Implementation"
- When selecting a "Pilot-Project"
 - Select a project type you know
 - Select a project that is not geometrically complex
 - Select a smaller scale project
 - Select a project that does not have a tight deadline
 - Don't make the most important project you will ever do your first project
- Team selection:
 - Ensure that people on team are positive and want to make this work
 - Keep the skeptical "Naysayers" off the first team and first project

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All things Considered

Some final thoughts, Opinions, and Items to watch out for:

- Plan your implementation
- Get the proper training not the just basics
- Establish Corporate BIM standards
- Every team must have a model manager (*usually an advanced technically savvy user*)
- Establish your templates "Before starting project"
- Make sure you know how to customize the objects within the BIM Program
- Get the proper hardware (BIM usually requires top of the line technology)
- Understand the network requirements
- Be aware of the workflow when working over a LAN vs. a WAN

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All things Considered

Some final thoughts, Opinions, and Items to watch out for:

- Don't ever fall back to CAD it should not be an option
- Remember this is not drafting
- Understand that your BIM drawing sets **Will not look 100% like your current cad drawings**
- When working with the Architects and MEP designers:
 - You need to have a Project Kickoff Meeting
 - Establish common insertion points
 - Ideally the structural engineers should be involved early in the process
 - Ensure that all trades are using the same version and update version
 - Establish a procedure for sharing the model and update frequency




Case Studies with this Process: DLW Architects

DLW Architects Survives Florida Downturn with Autodesk® Revit® and IMAGINiT Technologies
 Family Firm Invests in Tough Economic Times to Secure a Competitive Advantage and Potential Clients



David L. Wallace & Associates (DLW) architectural firm in Dunedin, Florida with a relatively small team that works on big projects ranging from mixed-use projects in urban centers to standalone suburban restaurants and everything in between.

DLW was a pure AutoCAD shop and in particular, the production manager had no intention of converting to Revit. But firm principal, David L. Wallace Jr. listened to his intuition and put together a small team to learn Revit in order to handle this client's business.




Case Studies with this Process: DLW Architects

After the initial Training with IMAGINiT the team returned and started to work in Revit. Just five weeks later, the production manager realized the great gains they made and recommended that the entire firm convert to Revit.

DLW had made many customizations to AutoCAD to make their work easier yet the benefits of building information modeling (BIM) and Revit would far outweigh what they would leave behind.





Case Studies with this Process: DLW Architects

DLW worked with outsourced engineers who were still using AutoCAD. Wallace identified the need to partner with engineers working in Revit. IMAGINiT was able to introduce them to a local engineering firms already using Revit

"Now, all of our work is produced in Revit, including architectural, structural, mechanical, plumbing and electrical. I wouldn't work with an engineering firm that doesn't use Revit," said Wallace.






Case Studies with this Process: Hobbs+Black Architects

Hobbs+Black to BIM During Landmark Project



Founded in 1965, Hobbs+Black ranks among the top ten architectural firms in Michigan, with more than a hundred employees in its Ann Arbor headquarters and its full-service regional offices in Lansing, Michigan and Phoenix, Arizona.

In 2010, Hobbs+Black were in the midst of a significant project – the Tucson Medical Center – and at the same time were migrating from their existing AutoCAD-based environment to a Building Information Modeling (BIM) platform.




Case Studies with this Process: Hobbs+Black Architects

Through a BIM implementation, architects, engineers, builders, and owners can explore a project's key physical and functional characteristics digitally in a way never before possible – before a shovel breaks ground and when design changes and refinements can still be made with minimal operational or cost repercussions.

The 760-bed Tucson Medical Center represented a five-year, multi-million-dollar endeavor, and was the second-largest project in Hobbs+Black's portfolio at the time.





Case Studies with this Process: Hobbs+Black Architects

"We knew BIM would be the future for the industry," says Brandon LaCourciere, BIM Manager at Hobbs+Black. "We'd already invested in Revit software, basic BIM training and hired a number of professionals, but we had deferred a complete transition.

"We made a company-wide commitment to not do anything half-measured," said Ellen Callahan, Vice-President, Marketing at Hobbs+Black

IMAGINiT customized training for each of the firm's eight sector-specific design studios. IMAGINiT set about working with Hobbs+Black to implement a full-scale rollout throughout the firm. "They got us in and swimming!" says Callahan. "We rolled out the program in a systemized fashion -- *and* did it on time."



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Case Studies with this Process: Hobbs+Black Architects

Transitioning the firm to BIM with IMAGINiT's support has equipped Hobbs+Black with the cutting-edge tools, skills and workflows to market itself more compellingly in an increasingly competitive market.

"It was absolutely essential to the firm and to our clients that our transition to BIM was seamless."
— Brandon LaCourciere BIM Manager, Hobbs+Black

"Now if a potential client asks 'do you use BIM?' we can say 'of course, and we're doing it at Level Three'," says Callahan. "This really helps position us as a leader in our field, and the Tucson Medical Center is an exceptional project to illustrate our experience and capabilities -- and that means more business."



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Questions?

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Thank you

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