Case Study: A Full-Service Design and Build Firm's BIM Implementation Strategy—A to Z and Beyond

Joseph Joseph – Managing Director, BIM/CAD/Technologies – SAIC | www.saic.com/bim

CM5237

SAIC is one of the top 50 design firms in the United States, according to Engineering News-Record. In this class, we will showcase our BIM implementation strategy from A to Z and explore our future planning. If you are a member of a single or multidiscipline design or construction firm and want to gauge your BIM capability, approach BIM for the first time, or find out how much others are investing in BIM, come to this class. Class topics will address high-level strategic deployment, BIM services, the different types of projects/activities required to implement BIM, and SAIC’s future plans as it continues to develop its BIM implementation.

About the Speaker:
Joseph Joseph attended the Lebanese American University where he studied Architecture. In 1997, he came to the United States to complete his studies in Architecture as well as complete a two-year degree program specializing in CAD/Technology Management. Joseph has over 16 years of direct industry exposure from Job Captain/Project Architect to Managing Director of Information/CAD/BIM Technologies. He has served as a strategic and tactical partner to many architectural/engineering organizations (50–3000 employees) spearheading CAD/BIM planning, deployment, implementation, and training strategies. In addition, he has taught/supported multiple Autodesk® products at the higher education level. Joseph Joseph joined SAIC early in 2010 as the company’s Managing Director overseeing all BIM/CAD Technologies aspects and focusing on revamping the firms BIM/CAD initiatives from the ground-up, including strategizing, standards, and implementation of BIM in a true design/build environment.

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Overview

This session is designed for principals, owners, business developers, project managers, BIM directors and CAD Managers to look at a real-life case-study of a design & designbuild firm’s building information modeling (BIM) implementation strategy. This hand-out will have in-depth information on this topic and will mainly be used to keep up with the presenter.

LEARNING OBJECTIVES

- BIM commitment as a business decision in hiring the key-staff and champions to lead the implementation.
- Defining BIM within the firm: Projects, Services, Technologies and future goals.
- A strategic look at how to approach BIM projects from a workflow perspective: True Projects Model Breakdowns, Content Development and deliverables
- Leveraging BIM to enhance business offerings and services

EXPECTATIONS

The focus is not technical: we will not be getting into BIM software bells, whistles or clicks. As BIM continues to penetrate the market and emerge as the trendiest process chosen by owners, designers and contractors, there are a lot of companies still skeptical about the implementation of BIM and/or too focused on BIM being a 3D tool. This case-study should provide validation, or assistance to approach a rework for other individuals or firms.

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Introduction to BIM Implementation Challenges

In this session, we won’t spend too much time talking about the industry challenges dealing with BIM Implementations as we optimistically think that most of the industry is beyond the ROI discussion of BIM and by now should fully understand that if you don’t adopt it you will struggle to sustain business and you will impede on your ability to function within larger collaborative teams and projects that leverage BIM as a process to integrate Design and construction.

To set the stage, we will go over a few challenges that we dealt with in our pre-BIM-implementation era, then through subsequent sections of this session and hand-out we will present a true case-study of our step-by-step mitigation of issues to quickly stop the bleeding on what could have been a failed BIM strategy, implementation and deployment.

INITIAL APPROACH

The initial approach was very technology focused. It was our perception that in order to get into “BIM” we must procure the software and then begin training. As a result, that is exactly what we got, an initial investment of dollars without a large return and a frustration among multiple layers with our firm:

Cultural Frustration – A confused community that looked at BIM as a technological method of shifting from 2D-Drafting into 3D Modeling + Documentation, great one more thing for us to do. And thus the conversation became: Do I need 3D on this project? YES – Let’s do BIM… NO – Let’s not do BIM.

Leadership vs. Staff Gap – Our BIM Implementation and vision has been top-to-bottom mature since day one. Although very fortunate in that regard, there was a significant gap between what leadership envisioned of BIM to be versus what each office and staff comprehended of that BIM implementation.

Lack of BIM Capabilities – while the software approach was a great start for staff to begin work in “3D” BIM, a true set of capabilities to engage with BIM on collaborative projects was not being established. As a result, this was evident in our ability to continue to bid work, respond to RFPs, have discussions at a project-manager and client-facing staff levels and finally show-up to presentations with lack of BIM vision and definition.

Technology Frustration – Gearing up the software skills is one thing, adjusting your entire project approach from the perspective of: datasets, hardware and LAN/WAN infrastructure is something totally different. Technology created a functional frustration but also a strategic separation between information technology management and the new needs of the design and construction side of the business that was evolving to BIM.

Project Approach & Deliverables – Depending on the make-up of the projects, it was difficult to understand that the process of design, staffing teams properly from a schedule perspective and achieving deliverables demanded a different approach. The largest issue was the level of collaboration, coordinating and interaction between all of our design disciplines from the very start and through the end of the project.

In addition to all of the challenges and many more such as legal concerns, etc… we were forced to take a full and holistic approach to our implementation that would set a solid foundation for our BIM vision.
Step 1 | A Business Commitment & BIM Leadership

BUSINESS COMMITMENT

As a professional in the AEC industry overseeing the adoption, implementation, failures and successes of technology innovation within Architectural, engineering and construction firms over the past 16+ years. And someone that served under two kinds of senior leaderships: one that treats technology as a vehicle to deliver a product and another that fully understands that technology innovation is the foundation of your business success. I will tell you from experience that the unwavering commitment of Business Leadership in the adoption of BIM is the most critical part of this session.

The basic difference between the two is that BIM Leaders can spend their time justifying cost (which you will have to do anyways) or doing a little of that and a lot of innovation, out of the box thinking and trying to stay ahead of technology and everyone else. The latter, is much more fun to do day in and day out.

The leadership had a vision to leverage BIM far beyond the low-hanging-fruit of 3D modeling and clash-detection. A business commitment was made on multiple levels to open a managing director role for a BIM Technologies Director that will oversee the business aspects of materializing their BIM vision into a strategy that can be implemented, followed and successfully sought through.

What Commitment Means? – the commitments made are beyond hiring one person. It needs to be understood that this is a large dollar-amount investment that is parametric to the size of your organization. This includes procurement of technology, training and implementation. The commitment also means a change in business philosophy, adopting a new process to do things differently as part of your design and construction workflow.

BIM LEADERSHIP ROLE

Who is the BIM Leader and why? – In order to bring BIM knowledge into your organization to build confidence, expertise and credentials, you will need a BIM Leader to bridge this gap. This is a MUST, if no one will emerge organically, hire one!

This is not a traditional technology focused role. BIM requires a well faceted individual that understands both the business and operations side of the industry. Someone that champions the effort and understands they are strategically redefining your organization. Just like an IT Project Manager doesn’t have to know how to install network racks, a BIM Leader doesn’t have to know how to model in REVIT®. The duties of a BIM Leader will be focused on much more critical concepts such as:

- Selling BIM internally by educating staff.
- Attend client meetings, presentation pitches to showcase the BIM portfolio.
- Lead the strategic implementation, development and deployment of BIM.
Step 1 | A Business Commitment & BIM Leadership

BIM LEADERSHIP ROLE – CONTINUED

- Address RFPs and manage clients’ BIM expectations and requirements.
- Keep-up with the evolution and BIM trends within the industry.
- Engage in social networking and broadcasting the BIM buzz factors of your company.
- Manage a team of BIM Manager / Applications Specialists.
- Ensure balance between what the company is offering on the client front and what is actually being deployed internally in technologies and processes.
- Build an overall competent BIM Implementation that will set the company aside from competition.

Stakeholder Relationships: BIM leaders have the task of reaching out and establishing relationships with stakeholders. These stakeholders are both internal/external clients: marketing, finance, legal, principals, owners and their representatives. By fostering such relationships, your BIM Leader will understand the needs of your clients and hear first-hand the requirements of being able to compete in the industry. Creating such synergies will lead to a unique synchronized BIM vision: one that combines internal technology with external business strategy.

Deal with Roadblocks: Identify, understand and plan how to address your roadblocks. Those can be your clients, projects, processes and staff (production / management). When promoting new ideas remember to build a compelling case, most of the time individuals will fight advancement because of the unknown factor. The job of the BIM leader is once again to bridge the gap and open up the roadblocks.

The Art of Innovative Persuasion: BIM Directors can be told “no” a lot. Individuals in this role should always be willing to take an innovative risk to come up with solutions and strategies to address challenges. Persuading up and down the ladder on topics involving adoption of new methodologies and technologies is vital, but must come with the ability to balance with meaningful project and client benefits.

Understanding Business: Solid understanding of fellow managing directors, studio leaders and those who are continuously pressured to make numbers, achieve productivity and financial commitment to their superiors and the ability to reason with them could mean the difference between succeeding or failing at this role. Must understand the project lifecycle and what is at stake when making decisions.

Cost of BIM Leadership: Finally, yes, this is an overhead role, one that is very expensive. In the sense that it would cost an organization too much risk not to invest into. This role represents our true vested interest and maturity in BIM. To be clear, a BIM Leader is not necessarily a REVIT® Manager.
Step 1 | A Business Commitment & BIM Leadership

BIM LEADERSHIP ROLE

Place In the Organization & Authority – Our leadership decided to give this BIM leadership role all the proper prestigious and authoritative credibility to run the “BIM side of the business” if you will. A Managing Director title that’s part of a managing directors group directly engaged in the business offerings of the firm. The BIM leader would be challenged by a group of intellectual but equal in level peers that are in charge of managing their own offices and accepting that the BIM leader is one of them and in charge of driving their implementation. What did this accomplish?

- Decision making authority on technology and BIM Direction in other offices.
- Shared risk and reward by a team of Managing Directors all with one goal of adopting BIM.
- National and international company recognition of a solid BIM program.
- BIM Vision led by a leader that is soliciting input from other leaders every step of the way.
- Negating any possible cultural or authoritative excuses for not getting things done.
- Putting in place a business leader instead of a technology manager.

CORPORATE SUPPORT STAFF

This is where the overhead spending really starts, the BIM Managing Director without a proper corporate staff that are dedicated to this effort of planning and deploying a successful BIM vision is a useless strategy. Companies that make the decision of not investing in a solid corporate team should realize that one person can’t do it all. Something will give at the end; you will come short on one front or the other.

In a competitive age, where organizations in the AEC industry are being asked to do more for less driving utilization up and G&A costs down – overhead positions are scrutinized more than ever. With that being said, these overhead positions are a little more than just the overhead spending evil. Organizations can’t afford to not have in place a solid BIM corporate support team to leads many of the initiatives and cater to their internal and external clients.

Corporate BIM Staff “On-site Consultants” – The placement of corporate staff are critical for the success of BIM Implementation across the organization, which includes the cultural, philosophical and technological shift. BIM corporate staff is responsible for the education, standards and deployment of a solid BIM strategy. Their skills are in place to expand the services the firm offer and will touch all of the areas in a firm including: overhead, marketing material and billable project aspects of the business.

The ratio of a team-size and hierarchy is critical to the size of your firm and the functions they will be supporting. Bringing balance between human, project and marketing areas is key and would lead to carrying a significant amount of overhead costs. Costs that will only be realized, beneficial or not, with the existence of such team. As a result, we began to build a solid team with proper expertise that is dedicated to growing our BIM strategy from the ground up without the pressures of being billable allowing the team to focus on their corporate duties and nothing else.
Step 1 | A Business Commitment & BIM Leadership

CORPORATE SUPPORT STAFF

BIM Applications Specialists – Without this role nothing can be done. This is a very focused individual at a very high skill of technology and AEC industry appetite. Filling this role is rather difficult as you are looking for a professional with a very unique set of skills. In this role, we’ve decided to replicate the Channel-Partners internal organization of Application Engineers, we just called it an Applications Specialist not to confuse it with the term: Professional Engineer. Our Senior Applications Specialist focuses on:

Project Template Set-up: Setting up projects from scratch with company BIM standards, making early decisions on how to break-up the models and distribute them based on design and construction team needs, geographical location and collaboration requirements. Finally lead BIM Kick-off meetings.

Model Management: Rotate projects to police standards, ensure that modeling is done properly and model sizes are kept at a minimum. Fluency in all REVIT® flavors is critical to ensure interoperability between the modeling products and to pass on critical information to BIM Technicians and the Job Captains.

Coaching and Developing: establishing training material under the direction of the BIM Director and conducting software training with own BIM Applications Specialists team to grow skills as well as project teams. Performing on-site real project shadowing for disciplines to help them execute skills.

Essential Responsibilities:
- Developing Marketing BIM Material: Images, Animations
- BIM Content Management, Creation, Approval and Procedures
- Establish documented processes, procedures and workflows
- Interoperability Management of BIM and design / engineering tools
- Proactive approach and learning of new technology software

Strategic Partnership – while we focused on building an internal team, promoting individuals and finding the proper chemical and technical fit, we realized that it was critical to align ourselves with outside consultants that are skilled at leading implementations that are cultural, process and technological in nature.

If you are wondering why this portion is placed under “Corporate Support Staff” don’t, forming a relationship with proper consultants that we called a true team extension to our corporate support staff. It is not a “reseller” but a true partner approach that is genuinely interested in helping you move beyond software and look at your implementation as a whole. The major benefits are:

- Significant resources to draw on.
- Industry exposure to firms in the industry and learning from their mistakes.
- Even your corporate support staff and their leader need a life line to call when in a corner.
- Obtain consulting services to carry the workload in the beginning instead of bearing a lot of G&A cost that you have to turn around and let go when the work slows down following initial stage.
Step 2 | Temporary Solution & Deployment

TRAINING

Since this session is a true Case-Study, it will not be pretty and/or book-perfect. It will reflect a true back and forth of what we went through to get to where we are today. For our BIM vision and planning to have begun, we had to go through step 2, which is what I like to call the “Temporary Deployment” stage.

Software Training – It was and still is a requirement that no employee will get any BIM software without formal training. In addition, you didn’t get any formal training without a real-project to kick-off. This strategy kept everyone honest from upper management to project staff. Everyone was motivated to find a project to execute on for training to actually happen.

A combination of training sessions began on multiple projects that kicked off at the same time. Some sessions were taken on by our own BIM Applications Specialists while others were conducted through the channel-partnership relationship. There were several requirements:

- No training to take place by outside partnership without a strategy call with our corporate team.
- Ensured that we pass on the same message and strategy to all staff, irrespective of who conducted training throughout the company.
- Even if the classroom can absorb more students, the project team trained together. No One Else!
- Training sessions were respected and not interrupted.
- Every single training session leveraged the actual project that the team would start on.

HARDWARE & TECHNOLOGY

Hardware Upgrades – It became evident very quickly that we will need to update our Hardware to keep-up with the BIM Requirements. A team of information technology engineers and BIM Applications Specialists was assembled to run BIM software in a testing lab gauging different desktop/laptop hardware on LAN, WAN and Local environments. Our initial goal was to at least double our specifications to plan for future growth. We arrived at the following BIM Computer Specifications, that’s still in use today:

- DELL T5500 Boxes
- Windows 7 64-bit Platform
- Dual 24” Adjustable Screens
- i7 6-Core with 16GB
- 256 SSD for high User-File Performance
- Gigabit Switch and network capabilities

PROJECT STANDARDS & SUPPORT

Running several projects utilizing excellent trainers and providing top-notch support still had major challenges. We worked with the software for the most part with out of the box configurations and without special templates and content. At that stage several strategies had to be developed to keep-up with the internal client “end-users” demands:

- Engaged consultant-partner to help corporate team set a BIM Standards & REVIT® Templates.
- Began to look at bottleneck scenarios of creating and approving content.
- Put in place documented processes and procedures for day-to-day use of the product.
- Discovered a major gap between end-users and Project Management / Business Development.
- The need for internal education of what BIM is and defining became critical to succeed.
Step 3 | Defining Building Information Modeling

BIM VISION

We then moved on to establish a solid BIM vision and mission that’s not only used externally with our clients, but rather leveraged internally with all staff involved within the organization. An overall strategic BIM Vision plan will set the course of your path and start showcasing to methodical and graphical individuals the major differences between BIM and legacy structures paving the way to healthy and successful BIM Implementation that tackles all aspects beyond the technology piece. A BIM Vision Plan allowed us to accomplish:

- Organizational culture towards BIM philosophy
- Role and place in the marketplace as it relates to BIM
- BIM path and vision that we plan to lead moving forward and into the future

BIM VISION STATEMENT

As part of developing our vision, we establish a strategic vision statement that incorporated BIM within the DNA and fabric of our organization. This BIM definition was directly tied to our company’s philosophy and goals.

“SAIC fully adopted building information modeling (BIM) as a process and technology that integrates within the fabric of our design and construction projects. This BIM philosophy transformed our design and construction approach to deliver greater benefits to our customers. BIM allowed our customers to engage in the design of their spaces by visualizing the process much earlier in design stages as well as yield significant dollar savings in spotting construction issues prior to taking place on-site.

SAIC’s BIM processes utilize various advanced software technologies and procedural workflows to virtually design, study, and build smarter, more efficient buildings containing intelligent three-dimensional (3-D) dynamic components. Our use of BIM spans throughout our portfolio of expertise encompassing all disciplines of a building in both facilities and industrial type structures.” [www.saic.com/bim](http://www.saic.com/bim)
Step 3 | Defining Building Information Modeling

BIM SERVICES

The second strategic aspect was to define BIM internally to our organization and employees as well as to our external clients by deciding how we will be leveraging BIM on projects. We found this to be the best path to set our own business developers expectations and those of our clients as to what BIM services we are able to offer. Our overall goal was to become the BIM masters for our clients and arrived at two distinct service offerings:

Part of a Service – this method will incorporate BIM as part of a major service offered to your clients “sub-service”. You are utilizing it as a process and tool to accomplish and/or adhere to your client’s requirements. This service mainly leverages BIM as a technology & process during Design & Construction.

A Line of Business – through this model, you are offering BIM to be an independent line of service within your organization. It will continue to be interwoven within your projects; however, you are able to offer pieces of it as a specific scope depending on the needs of clients. Review: BO4449 BIM A Marketing Effort

“3D” BIM: MODELING & DOCUMENTATION
This service allows for utilizing BIM as a tool to develop and deliver design for all disciplines in a 3D format with intelligence built into the delivery to be harvested and/or utilized at a later time. This service offers clients:
- Focus on design – not drafting.
- Early visualization by client – faster approval cycles.
- Ease of coordination between construction documents.
- Spatial Coordination between disciplines
- Clash detection and conflict resolution limiting issues on-site and during construction.

“4D” BIM: INTEGRATION FOR CONSTRUCTION
Here we are able to build upon the “3D” service by adding timeline and schedule attributes to ensure on-time, smooth constructability and delivery of projects:
- Extraction of intelligent data and automated schedules.
- Ability to take-off materials and quantities.
- Models + Projects Schedules → Construction Sequencing.
- Projecting future construction sequence conflicts.
- Tracking and identifying location of material and pieces on-site in a simulated environment.
- Visualization of construction-sites for contractors, subs and clients on-site in trailers.
- Integration of BIM with mobile-devices for managing construction & commissioning / hand-over.

“5D” BIM: COST ESTIMATION
Not just about simulating cost on a BIM model, it really redefines the way you communicate with the owner and offer them live up-to-date information that helps them see the current cost and compare it to the estimated total target cost of their project. As well as interim costs against design during design phases.

“6D” BIM: BUILDING LIFECYCLE INTEGRATION
Offering integrated, maybe proprietary, facility management solutions to clients by utilizing BIM information from 3D, 4D and 5D to integrate in the operation, maintenance and future renovations of buildings. Through such service, you are able to assist the client in controlling cost and getting the best out of their designed product. Now leveraging BIM to assist in a state-of-the-art FM / O&M solutions.
Step 3 | Defining Building Information Modeling

BIM SPECIALTY SERVICES

As BIM experts, you should be able to offer guidance to your clients on how to utilize and/or implement BIM within their organizations and / or on their projects to the way best fits their needs and future. This leads to a more educated client and manageable expectations, not to mention further opportunities:

- BIM Roadmaps and Integration: documented standards and procedures.
- Project Execution Plans for Collaboration.
- Establish and/or build intelligent bldg. prototypes / content libraries for use with other consultants.
- Convert existing building to BIM virtual models.
- Oversee and manage BIM process during design / construction projects.
- Maintain an up-to-date BIM As-Builts during construction.
- Better RFP documents with direct expectations and anticipated results.

Deep Domain BIM Project Experience

SAIC's BIM services help deliver compelling, effective and innovative project solutions for our customers. Through our commitment to the BIM implementation process, SAIC's multidisciplined design and construction team defines standard communication barriers and provides a seamless workflow and communication process to mitigate obstacles when working together or as part of a larger team. We focus our BIM services on designing and building the best facilities for our customers.

We utilize the power of BIM on our customers' projects as a method to bring together owners, architects, interior designers, MEP engineers, and constructors as one solid team to coordinate, collaborate and spot concerns before breaking ground. This new level of communication allows owners, end users and facility operators to plan spaces before they are even constructed. Our capabilities include:

- 3-D - Advanced BIM modeling through level of development
- Internal / external BIM coordination meetings and reviews
- 4-D - Construction sequencing and simulation
- 5-D - Cost estimation
- Building analysis
- As-built BIM models delivery

BIM Strategic Expertise Provides Best Value

Our dedicated BIM technologies team and solid diverse BIM implementation strategy are reflected in our ability to serve a wide range of customers. We've built equal competencies and relationships with the industry's leading BIM software manufacturers from Autodesk REVIT Suites to Bentley BIM products.

SAIC helps provide our customers with a BIM approach and strategy that best suits their needs in their respective markets. This BIM consultative approach allows us to provide:

- BIM implementation strategies, execution plans, and request-for-proposal requirements
- Develop BIM templates, prototypes and content
- Establish client-specific BIM standards that are process and technology driven
- Workflow enhancements, coaching and development of customers' BIM staff
- Conversion of existing computer-aided design (CAD) drawings to BIM models

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Step 4 | BIM & Project Approach

DESIGN & CONSTRUCTION WORKFLOW – DELIVERABLES

From Step 2 above, we learned to focus on our challenges with workflows and deliverables of projects. We studied from previous projects how BIM is affecting our internal quality, deadline, pace and years of pre-establish design and production workflows.

A workflow plan will define project programing, design-development through construction management and hand-over to the client. The workflow will showcase how BIM requires a totally new approach with design tools: from documentation, visualization to engineering calculations.

- Workflow of Production Process
- The role of technology within workflow
- Roles and responsibilities of designers
- Collaboration and Integration of individuals
- Interoperability of software
- When to stop modeling and to start creating sheets.

BIM PROJECT APPROACH

While several projects were in the run, our lessons learned program taught us that we needed to put a great deal of focus on our projects and how they are leveraging BIM throughout design and documentation phases.

Design Charrette – From the Design Director all the way to junior design staff, our team of designers were trained in REVIT® properly to leverage as a programming and design tool. The team was coached with certain concepts and procedures to make the modeling transition to DD and CD easier on others. The design team leveraged BIM in this stage to attend design initiation meetings with government and commercial projects for brainstorming sessions, diagraming, block-planning through conceptual design.

Design to Production Hand-Over – Once the conceptual design period is over, the BIM Corporate Staff managed the procedural transition from a Conceptual Design Model → DD Model. This process encompasses model-clean-ups, proper template component usage and by-discipline-model-breakdown.

Project Specific Workflow Documents – We put in place a set of workflow documents that we leveraged as a custom project BIM execution strategy for every project. The term “workflow” was internally used because it mainly kept everyone educated and on-track to understand what BIM is and how it will impact their project. It set expectations and helped significantly with lowering anxieties that are caused by the “BIM Unknown Factors”.

- BIM Model Breakdown
- Work-sets configurations and settings
- Address BIM Coordination and Spatial Collaboration / Communication on Project
- Clash-Detection, Conflict Resolution.
Step 4 | BIM & Project Approach

BIM PROJECT APPROACH – CONTINUED

Project BIM Kick-Off Meetings – This is a critical point in the project for us, irrelevant if this is a new BIM team or an existing one. BIM Kick-off meetings became an integral part of our project schedules and yes, these tasks are charged to the project hours.

- Assemble all the disciplines: Professional, Designers / Technicians & Project Manager.
- A method to communicate all BIM expectations on a project.
- Multi-Discipline teams BIM collaboration project discussions regarding contract requirements and/or BIM execution plans.
- Present project specific BIM workflow documents mentioned above.
- Go over model-breakdown, Models LOD requirements and other expectations.
- Assign a project BIM Job Captain Lead to oversee the model management and production of the project.
Step 4 | BIM & Project Approach

BIM PROJECT APPROACH – CONTINUED

Project BIM Job Captains – (Model Managers)

Because BIM forces the issue of higher level of understanding as to how a building comes together, we revived the vintage project role: “Job Captain” and this is how we arrived at a BIM Job Captain being at the helm of BIM projects and becoming the project BIM and virtual design leader as well as liaison with BIM Corporate Staff.

Job Description: BIM Job Captains must understand the business thoroughly, their primary function is to manage the process of virtually constructing a building and documenting the design contract documents accurately. This would encompass managing a team of production professionals, designers and technicians of multiple disciplines and own the construction-documents set through as-built submittals. It is also critical for them to lead model management and BIM planning, collaboration and coordination on projects they are leading. The position becomes the go – to person on the project for modeling, documentation and verifying design intent during CD phase.

Roles & Responsibilities of a BIM Job Captain:

- Produce construction documents for one or more disciplines
- Lead the effort of putting together a set of construction documents
- Model Management and administration ensuring a health BIM database
- Coach, mentor and supervise the process of virtually constructing a building by production (modeling and documentation tasks)
- Lead BIM Coordination Meetings: Spatial Coordination of Disciplines, gathering all disciplines BIM models including civil and preforming coordination tasks.
- Conducting Clash-detection and conflict resolution. Coaching each discipline on leveraging Clash-detection tools on their own discipline to proactively build and design in a smart fashion.
- Assist BIM Corporate staff in deploying project-templates on specific projects and ensuring team adherence to them.
- BIM Content Development approvals for the project.
- Coordinating with professional staff on reviewing models and comments via Design-Review.
- High level of communication and fostering teamwork to assemble a work environment for different individuals representing multiple disciplines to achieve optimum BIM performance.

### BIM Staffing – Design Projects

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<tr>
<td>Project Concentration</td>
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<td>BIM Coordination</td>
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<td>Project Content</td>
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<td>10+ Arch. MEP</td>
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**BIM Technicians – Arch**

- Arch. Modeling | Documentation
- Arch. Collaboration & Coordination
- Arch. Detailing | 3D Visualization

**BIM Technicians – Struct**

- Struct. Modeling | Documentation
- Struct. Collaboration & Coordination
- Struct. Engineering Calculation

**BIM Technicians – MEP**

- MEP Modeling | Documentation
- MEP Collaboration & Coordination
- MEP Engineering Calculation
Step 4 | BIM & Project Approach

BIM PROJECT APPROACH – CONTINUED

Content Creation & Staff Support – Part of the project approach strategy is dealing with staff support issues, helping them gear up the skill level on BIM software, workflow and one of the most challenging support topics is getting a hold of the REVIT® content.

Content Support: We read all the articles about making sure that you manage your BIM content closely or carefully or you could find your firm in a BIM Model Garbage in = Garbage Out situation. As a result, we implemented a set of procedures to oversee a smooth Content Development and Support strategy:

- Content creation requests gathered at project staff level and documented properly.
- So that you don’t create a bottleneck effect, grow content champions on projects with proper training to handle certain content development to submit to Corporate for approvals.
- **No Content Downloads Period.**
- Project Content Champions = Job Captains or BIM Technicians with proper appetite.
- Content champions MUST understand the LOD 100 – 500 concept before being approved to develop content for the organization.
Step 4 | BIM & Project Approach

BIM PROJECT APPROACH – CONTINUED

Clash Detection & Conflict Resolution – One of the low-hanging-fruits that we refer to in-regards to utilizing BIM. We’ve implemented two levels of conducting clash-detection and conflict resolution on a project.

Daily Conflict Resolution: As part of our daily design and documentation, design disciplines took communication and interaction to a higher level to achieve smart designs in a shorter amount of time. While in the software, when running across interferences and clashes, the team tag those and communicate through screen-shots, e-mails and screen-sharing to address the conflict as they go.

Weekly Clash-Detection Reports: A customizable clash-detection process and reports conducted in Navisworks® Manage by the BIM Job Captain with proper clash tolerances set by professional staff and then distributed to the entire team to address as they virtually construct their design. These reports can also be shared with the owner as part of interim submittals depending on contract requirements. Finally such clashes are previewed in Spatial and BIM Coordination meetings.
Step 4 | BIM & Project Approach

BIM PROJECT APPROACH – CONTINUED

BIM Coordination Meetings: {Spatial Collaboration}

At first, you may struggle with the valid reason for hosting a BIM Coordination meeting. It is important to come-up with a list of requirements to add yet another project meeting to all the other meetings required to get the work done.

Finally, we understood that this isn’t necessarily a project coordination meeting, but rather a Spatial Coordination meeting giving all of the disciplines face and/or collaborative time to sit together, look at the building and infrastructure systems, design and integrations. These meetings are not required throughout the project life-cycle, however, they have their proper time and must be taken advantage of as long as design and documentation is undergoing.

Construction Site Benefits – BIM collaboration meetings and spatial coordination concepts were moved to the construction site in a form of visualization. With that implementation we are leveraging BIM on-site to help our subs, clients and manufactures take advantage of this process and positively apply it to their day-to-day role on the project.
Step 5 | Company Standards

Standards – A session like this can’t start and end without the mention of standards. We didn’t look at those from a rigid perspective of legacy “CAD Standards” point of view. As a matter of fact, we came-up with three different standards categories that work together to facilitate to our end-users and projectteams a fluid, dynamic yet structured environment to work with. These Standards are flexible documents that can give and take, not hand-cuffs for our employees and customers.

Drawing Standards: A product that was produced by gathering all disciplines leads throughout the organization to discuss the look and feel of the drawings. This is not a technology conversation, but rather a design documentation issue that had to be resolved, understanding that the technology is changing and keeping in mind the capabilities of the new software adopted.

REVIT® Standards: A true technology document, outlining the software side of the standards specifically as it relates to templates, their contents and how to be leveraged on projects including processes and procedures.

BIM Standards: A BIM roadmap, that talks about our BIM Implementation strategy covering the human interaction, cultural changes, technology integration and future enhancements of our business while adopting BIM as a design and design-build firm.
Step 6 | Enhance Business Offering

CREATING PORTFOLIO

This is your company's BIM resume. Just like the rest of your credentials, and exhibits of qualifications it should shine to engage your clients. When creating a BIM portfolio, we involved key-individuals within the organization and strategized on how we will present ideas, graphics and capabilities to showcase BIM.

- Mediums include: Marketing Brochures | BIM Gallery of Images | BIM Case-Studies.
- Our BIM Capabilities were real – knowledge, skill and project expertise.
- Tracked number of users, percentage deployed and SF / Dollars designs and construction.
- Don’t oversell yourself. Your experience will reflect your true capabilities.
- Build material for: Showcasing BIM Expertise | What is & Why BIM? This material is needed for clients and owners that don’t understand the value of BIM.
- Build material with “cool” factor: Presentation slides, sequencing animations, etc…

USING BIM CREDENTIALS

The new credentials created will mainly act in one of two major categories helping you showcase to clients, team-players and internal employees the ability to expand on your design and construction expertise:

Support Material – added to RFP responses/provided as customer solicit for BIM expertise and services. Internal Communication – utilize internally to educate staff, specifically project managers on the abilities of the firm to leverage and tap into when talking to customers. Marketing Positioning – Target web-site, podcasts, press-releases and social media to broadcast to the industry your commitment to BIM.

Integration of BIM with Marketing mediums

This initiative is an ongoing task, material will come from successful projects and will build over-time. The most critical aspect of this stage is meeting with marketing staff. You will need them to understand the following:

- What is BIM? How did it change your company and the industry?
- Why is this important and the consequences for not exhibiting BIM Capabilities within material.
- How to go about implementing BIM in the medium discussed above.
Future of BIM

I challenge you to think about what makes you different from the others when you think of the letter: B I M. We call it the competitive advantage, what makes our team better than the other. Traditionally we leveraged design, presentations, and innovations in putting together better products. Today, BIM will play a role in that as well and should be leveraged in setting your company aside from the next one walking in to compete with you on the same work.

Cloud Computing – We should see clouds become more and more interwoven within the design and construction industry. That is implementing clouds for our own businesses:

- Resolving mobility issues of traveling staff.
- Better geographical collaboration across offices.
- Real-Time BIM Collaboration and data-sharing.
- Delivering IPD and Design-Build to clients more intelligently.

Interoperability – Let’s realize that interoperability will continue to play a major role in our industry as we continue to immerse ourselves in BIM and how modeling fits with design, construction, operations and maintenance of our clients’ buildings. We will dedicate the time, funds and efforts to continue to research and develop better ways of doing things to get our technologies to talk to one another in order for us to see our investments through and do the best job we can for our clients.

Immersive Technologies – Just like it is a fun experience to touch a screen at a car-showroom and customize the look and feel of a client’s soon-to-be-assembled-car. We see great value with immersive technologies to allow our customers to interact with their designed spaces throughout the project’s lifecycle in a virtual design and construction environment. From a hand-gesture to a large-touch-screen, a method that is very unintimidating in nature and one that attracts our customers to enjoy the experience of their current project and look forward to do more with us in years to come.
Conclusion

Following a stretch of 20-months of exciting implementation strategy, project deployments, training and dealing with challenges, it is very rewarding to step back and look at the accomplishment that a company would achieve in such a short time. All such accomplishments are dedicated to the top to bottom support of and hard work of employees that are willing to go over and beyond status quo of just picking up a paycheck and actually pushing themselves to learn new ways of doing things.

One could spend all the dollars, put in place the latest and greatest technologies, but without the buy-in from the professionals and humans that are leveraging it to enhance their career and evolve to move forward; your company would be at a standstill.

To summarized, our implementation to-day cost:

- 6.0 MIL SF of BIM Projects.
- $6.0 BIL of Construction.
- $1.6 MIL in BIM Implementation Budget
- 75% of staff trained and actively working on various BIM projects.
- Priceless achievement and price put on the hard-work and dedication of staff willing to undergo a major milestone in a paradigm shift of their industry.