Design – BIM – Build – Operate

OWNER REQUIREMENTS INFLUENCING CONSTRUCTION FIRM STAFFING AND ACADEMIC EMPHASIS

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Introduction

• Speaker –
  ○ Worked for both General Contractor and Owner’s Rep
    - Clark Construction / Hines, Inc
  ○ Responsible for over $700 million worth of in-place construction
  ○ Current Assistant Professor at the University of Florida

• Current relation to BIM
  ○ BIM teaches construction practices vs. preconstruction
  ○ Emphasis on student national competitive abilities
Traditional

Design  Bid  Build
Traditional Reality

- Schematic
- Design Development
- Construction Documents

Design

Bid
- Bid Risk
- 50 – 75% Complete Drawings

Bid

Contractor and Subcontractor Coordinated Build
- Build Risk
- RFI
- Change order
- Warranty

Build
Concept

Design

BIM

Build

Operate
Formal and Informal Barriers to Change

- **Change**
  - Informal and formal barriers
  - Resistance due to vulnerabilities

- **Risk**
  - What makes you an expert in construction?
  - How is money lost on projects?

- **Owner/Engineer resistance**
  - Owner groups and energy models
  - Predicted versus actual performance
Champion of Change in the Built Environment

- Competitiveness
- Qualifying for work
- Service industry
- Seeking negotiated work
- Schedule and risk dependent
2004 – Started internal use of BIM as a tool to facilitate pre-planning and fund raising efforts.

2007 – Initial foray into use on UF major projects. This was a grassroots effort between project team, not required by owner.

2008 – Selective use of BIM initiated by owner with project teams. BIM not required as qualification, however minor language included in contracts for BIM deliverables.

2009 – Formally introduced into Consultant & CM selection process for firms having “BIM” experience. Pilot projects initiated. Several projects underway not designed in BIM, however CM staff converts from CAD to BIM to facilitate coordination and clash detection.

2010 – Formally included BIM language in suite of model contracts. Several projects underway utilizing BIM as the primary design tool to document the project through entire process.

2011 – Goal to collaborate with other UF entities and facilitate campus wide BIM implementation strategy.
UF’s Strategic Plan

- Goal is to reduce formal and informal barriers
  - Simple structures and renovations
    - Educate local builders and provide simple benefits to staff
  - High profile
    - Need for BIM to reduce schedule/cost risks
    - Large budgets – greater than $15 million
    - Provide cutting edge and builders with expertise
  - Research facilities
    - Need for clash detection / long term operations
UF’s Early Benefits

- Early identification of interferences
- Effective communication across disciplines
- Deeper understanding of designed space
  - Arch, Owner, Contractor, Fire safety, Users . . .
- Higher order of collaboration
- Reduction in delayed decision making
- Reduced RFI’s
UF’s BIM Contractual Requirements

- **Design Development**
  - High level analysis of models
  - Navis-based jobsite
  - Sequence illustrations

- **Construction Documents**
  - Detailed analysis
  - Clash detections
  - Sequence and schedule illustrations

- **Conformed Bid Documents**
  - Enhanced construction model
  - Incorporate in final estimate
  - Sequence final schedule

- **Construction Phase**
  - Use models to coordinate work
  - Update models upon completion of shops
  - Update models based on submittals

- **Substantial Completion**
  - Submit "red-line" model to A/E
  - Update A/E models in process
  - Finalize model
Real Difference

BIM Asbuilt
• Limited Benefits

BIM Pre-construction
• Subcontractor Buy-in
• Architect Coordinated final model with proactive input
Impacts to Construction Programs

- **Owner requirements for contractors**
  - Seeking pre-trained workers
  - Seeking champions for change
  - Seeking specific and general understanding for building modeling

- **Contractor requirements for construction programs**
  - Seeking trained students
  - Seeking exposure to students
  - Seeking deliverables and defined and general skills
UF Trailer/Company Example

Preconstruction / Corporate Support

- Contractual team member assigned to project deliverables
- Coordinate corporate training
- Provide jobsite support
- Serve as lead for internal preconstruction departments
- Service being absorbed by departments

Jobsite Requirements

- New jobsite role
- Actual salary added to jobs – this is new!
- Goal to coordinate model – communicate with team – model becomes light table!
- Technology expert for all inputs and electronic tools
Current Students Career Paths

- Work with trades and transfer of file data
- Coordinate jobsite conditions
- Submit final asbuilt

Jobsite Coordination

Department Level Operation
- Understanding of company goals for BIM Technology
- Fostering higher level internal coordination

Construction Executive
- Project Manager or Superintendent
- Understanding of technology / applications
• Conclusion

  o Owner requirements influence rate of change

  o Contractor contractual requirements requiring new skill sets

  o Programs / Students need to adjust to changing career paths