A brief introduction to BIM

BIM – what is it and why it is important?

Research interests

- Lean Construction and BIM
- IT in construction
- Knowledge Management
- Field/Mobile computing

- Currently Leading
  - Application of Mobile/Field Computing in Production Management
  - Development of VisiLean – Production Management with Lean, BIM and Augmented Reality

Presentation Structure

- Introduction to BIM
- A brief History
- Applications of BIM
  - Design
  - Visualisation
  - 4D and 5D BIM
  - Handover and FM
- Importance of Process and People

Why is BIM important

What is BIM?

- “a verb or a phrase to describe tools, processes, and technologies that are facilitated by digital machine-readable documentation about a building, its performance, its planning, its construction, and later its operation” (Eastman et al, 2009)
- An accurate parametric and 3D geometrical representation of a building (or any structure) digitally
- A virtual representation of the “built environment”
What is BIM

- Parametric
- Object oriented
- Capture/develop once and reuse many times
- Continuously improve over lifecycle

What is NOT BIM

- Just a 3D representation of the built environment without any parametric details (Eastman et al., 2011)
- 3D models that lack
  - Form
  - Function
  - Behaviour

A shift from the two dimensional world

- Designers do not just learn to make drawings, they learn to think through drawings (Fällman, 2003)
  - We cannot continue in this way
  - Our built environment and the world around us is not two-dimensional
  - Then why is our thinking?
- We have to educate ourselves to think in 3D with models, not drawings!

But is BIM the correct term?

- Need to rethink
- Building Information Modelling
  - It is not always a building
  - Represents a much larger part of reality
  - Rather virtual representation of the built environment
So is it a new thing?

- 1975 – Article by Chuck Eastman in AIA
  - Working prototype – “Building Description System”
- Early 1970s – 1980s – first commercial systems
  - RUCAPS – GMW Computers (Really Universal Computer Aided Production System)
- The term Building Information Model – coined by van Nederveen and Tolman (1992)

Historical systems

- What did RUCAPS and other contemporary systems offer?
- Parametric modelling and visualisation
- Analysis
  - Energy simulation
  - Thermal simulation
  - Acoustics, and so on...
- Facilities management

A RUCAPS 3D model

Radar CH (1984) (later Graphisoft)

BIM Workflow

BIM, BAM, BOOM

- [http://youtu.be/5lgdcCemvl](http://youtu.be/5lgdcCemvl)
BIM Applications

Visualisation

Courtesy, Tekla

Visualisation

http://youtu.be/wvSPzG7AgLY

Clash detection

Tendering and Estimating (5D)

Courtesy, Vico Software
**Tendering & Estimating**

![Image](https://via.placeholder.com/150)

*Courtesy: Sutter Health*

**Planning and Sequencing - 4DBIM**

![Image](https://via.placeholder.com/150)

**Detailed Production Planning - VisiLean**

![Image](https://via.placeholder.com/150)

**Construction Sequencing**

- [http://youtu.be/SgpgFaFnwWk](http://youtu.be/SgpgFaFnwWk)

**Model based manufacturing**

- Design models can be used as input data to surveyors and used to guide machinery
- After field validations data can be combined with design model for actual construction compared to designed

**Machine guidance and surveying**

*SKANSKA*
1. Accurate MEP Coordination
   Courtesy: Sutter Health

2. Handover and As-Built Model
   Courtesy: Sutter Health

3. Handover and FM
   Courtesy: Sutter Health

4. FM - Information Integration

5. Facilities Management
   Courtesy: Sutter Health

6. Facilities Management and AR
   - [YouTube Video](http://www.youtube.com/watch?v=uYFIybqvog0&feature=share&list=UU4Ms07FsOlW5VCJ0rODRw&index=1)
Contour Crafting – 3D printing with concrete

Source: Prof Behrokh Khoshnevis
University of Southern California

Digital Cities

- http://youtu.be/J9z4-Sm6T0s?t=1m3s

3D printed house

What has changed in last 30 years?

- Incremental development
- User friendly, feature rich and sophisticated
- Better communication facilities
- Yet covering almost the same functions

- It is not about the technology, but the process
  - Only now the industry starts taking it seriously
  - Major initiatives, USA, UK, Finland, Estonia…
**BIM is not about technology only…**

…it is an enabler, but most benefits require significant changes in the processes, working culture and business models.

**People, Process and Technology**

  - Too much dependence on just technological innovation and hope that it will solve all problems
  - In many cases technology (when implemented inappropriately) has negative effects on productivity

- Toyota (Liker, 2004)
  - Only implement reliable, relevant and tested technological solutions
  - Thoughtless implementation of BIM and other technology will not bring benefits

**Always remember!**

I don’t want a better model! - I want a better house and more value for money!

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**Thank you!**

- Questions/Discussion