New Generation QS Software for Cost Analysis, Budgeting and Control

CostX® Presentation

Ken Leung
Exactal Limited
Since the late 20th Century, the construction industry has begun to use electronic information in the project flow.

Computer facilities, software and databases and general business practices has been developed into the compatible manners for the purpose of improving their productivity.

However, most of QS are still using the traditional method for carrying out their measurement works, which include taking-off from the drawings and then transfer dimensions into spread sheets for issue out the cost reports to other parties.
**BACKGROUND**

**Inefficiencies Identified**

The process that is common in the industry is heavily dependent on paper. Once there is paper in a process, handling costs include:

- Drawings issued in hard copy incur costs of printing and postage/courier.
- Measuring using scale ruler can be an inefficient way to measure and may be open to the potential for human error.
- There is a potential risk that changes to a drawing can be missed if they are checked on hardcopy drawings manually.
- If the drawing standard is not an electronic format, it makes it difficult to achieve the potential savings that are available from computer aided measurement.

*Source: CITA 2008 “CITAX Project – Module 5 CAM”*
A. Traditional Method of Measurement

Traditional QS practice involved a manual process with drawings received on paper and Quantity Surveyors using scale rules to take measurements off the drawings and input them onto a computer system for the purposes of creating a Bill of Quantities.

Measurement Tools

- Dimension Paper (by hand marking)
- Scale Rulers
- Standard Method of Measurement
- Calculator
METHOD OF MEASUREMENT

B. Automation Measurement System

Most QS firms have embraced electronic measurement where appropriate because it could provide the most efficient in terms of productivity, particularly if drawings can be provided in an agreed layering convention.

- **2D Drawings**
  - On-screen measurement for taking-off quantities

- **3D Drawings**
  - Provides automatic quantities generation from 3D BIM models and a simple interface for the extraction of dimensions

Measurement Tools

- Computer
- Construction Take-off Software
METHOD OF MEASUREMENT

B. Automation Measurement System (Cont’d)

Pros

• Global trend in construction industry
• Customized automatic report presentations, particularly useful for high repetition
• Live linkage (ie. Cost Geometry)
• Elimination of errors and improved accuracy
• Dramatically reduced measurement time
• Continuous real time updating of costs with design

Cons

• Certain investment plus human resources, ie. Overhead cost
• Initial setup cost eg. Computer, Software, Network Costs etc.
• Considerable computer specification is required for 3D graphics
• Design errors may lead to discrepancies in measurement
WHAT IS BIM?

BIM is an acronym for Building Information Modelling

- BIM is the process of generating and managing building data during its life cycle via the use of 3D dynamic modelling which encompasses building geometry, spatial relationships, geographic information, and quantities and properties of building components (*Cadway Project 2010*)

- An evolution from traditional 2D design to a dynamic 3D model built around a database of a project’s functional properties
Building Information Modelling

Nowadays, QS profession is looking a new way to use Building Information Modelling (BIM) to boost efficiency and productivity by:

(1) Using automated quantities for measurement,
(2) Increase accuracy by reducing the errors
(3) Sharing of BIM data among project stakeholders.

The use of BIM has now reached the point where its use on building projects is widespread and increasing rapidly around the world. The evolution of 4D and 5D components inside the model is reality in commercial sense and it will change everywhere very soon.

It is evitable that documentation and data will be increasingly automated to the point where measurement and other technical processes will require minimal human intervention (Smith 2002).
The Fifth Dimension - 5D BIM

- 2D: 2 Dimensions - Paper Drawings, 2D CAD files
- 3D: 3 Dimensions – Models, 3D CAD Virtual Models
- 4D: Adding the aspect of Time (Scheduling)
- 5D: Adding the aspect of Cost (Estimating)

And, in some cases;

- 6D: Adding the aspect of Life Cycle Management (Owning)

BIM is about sharing knowledge. It provides a basis for Integrated Project Delivery
BIM and IPD (Integrated Project Delivery)

Industry usage of Digital Design data

- Design
- Estimating

BIM Transition with CostX
In the 21st Century, the new generation of 5D estimating software with BIM capabilities would allow you to:

- Read, edit and interrogate native BIM files
- Add relevant QS, BS, PM or FM information
- Import and export to other systems such as IFC
- Extract quantities from BIM models and able to import QS data from an external database
BENEFITS OF 5D COST ESTIMATING

End User Benefits

- Dramatically reduced measurement time
- Elimination of errors and improved accuracy
- Definition of scope and cost is transparent to all project stakeholders
- Continuous real-time updating of costs with design
- Greater accountability in management of projects
5D BIM Research Studies

BIM research of 32 projects by Stanford University (2007) found that:

• Up to **40%** elimination of unbudgeted change.
• Cost estimation accuracy within **3%**.
• Up to **80%** reduction in time taken to generate a cost estimate.
• A savings of up to **10%** of the contract value through clash detections.
• Up to **7%** reduction in project time.
BIM SOFTWARE

- Bentley
- Autodesk
- TEKLA potential
- exactal
- GRAPHISOFT
- buildingSMART
- AUTODESK NAVISWORKS
- dimtronix
5D Cost Estimating Methodology

LEVEL OF DEVELOPMENT

- LOD 100
  - Concept Design
    - Elemental Estimates
    - Mass Information

- LOD 200
  - Schematic Design
    - Elemental Estimates
    - General Assemblies
    - With Elemental Codes

- LOD 300
  - Developed Design
    - Sub-element Estimates
    - Specific Assemblies
    - With Sub-element & Trade Codes

- LOD 400
  - Cost Integrated As Constructed Model
    - Push Expected & Effective Lives
    - With Replacement & Running Costs

Work the Concept
- Cost Benchmarking
- Functional Efficiency
- Alternative Designs

Start Living Cost Plan
- Map Model & Links
- Alternative Methods & Systems Value Management

Living Cost Planning
- Re-map Model & Links
- Alternative Materials
- Life Cycle Costs
- Quantity Take-Off

Construction Trade Estimates
- Pull Zone Information
- Push Bid Rates
- Contract Administration

## Conceptual Design (LOD 100)

Building massing studies or other forms of data representation with indicative dimensions, area, volume, location and orientation.

### FLOOR AREA SCHEDULE

<table>
<thead>
<tr>
<th>TOWER</th>
<th>FLOOR USAGE</th>
<th>FLOOR AREA</th>
<th>AREA %</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>FLAT</td>
<td>2000</td>
<td>2.72%</td>
</tr>
<tr>
<td>2</td>
<td>FLAT</td>
<td>2000</td>
<td>2.72%</td>
</tr>
<tr>
<td>3</td>
<td>FLAT</td>
<td>4500</td>
<td>6.13%</td>
</tr>
<tr>
<td>4</td>
<td>FLAT</td>
<td>4500</td>
<td>6.13%</td>
</tr>
<tr>
<td>5</td>
<td>FLAT</td>
<td>6000</td>
<td>8.17%</td>
</tr>
<tr>
<td>6</td>
<td>FLAT</td>
<td>6000</td>
<td>8.17%</td>
</tr>
<tr>
<td>7</td>
<td>FLAT</td>
<td>8500</td>
<td>11.58%</td>
</tr>
<tr>
<td>8</td>
<td>FLAT</td>
<td>8500</td>
<td>11.58%</td>
</tr>
<tr>
<td>9</td>
<td>FLAT</td>
<td>9000</td>
<td>12.26%</td>
</tr>
<tr>
<td>10</td>
<td>FLAT</td>
<td>10000</td>
<td>13.62%</td>
</tr>
</tbody>
</table>

A

**SUB TOTAL:**

61,000.00  83.11%

1

**COMMON AREA**

1  600  0.82%
2  600  0.82%
3  900  1.23%
4  900  1.23%
5  1300  1.77%
6  1300  1.77%
7  1600  2.18%
8  1600  2.18%
9  1600  2.18%
10  2000  2.72%

B

**SUB TOTAL:**

12,400.00  16.89%

**GRAND TOTAL:**

73,400.00  m²

---

*Ref: Singapore BCA’s BIM Guide*
Schematic Design (LOD 200)

- PLANNING APPROVAL
- DESIGN & BUILD TENDER DOCUMENTATION

Generalized building component or system with approximate dimensions, shape, location, orientation, and quantity.

Ref: Singapore BCA’s BIM Guide
Detailed Design (LOD 300)

- Building Plan Approval
- Continued Design & Build Tender Documentation

More detailed version of a generalized building component or system with accurate dimensions, shape, location, orientation, and quantity.

Ref: Singapore BCA’s BIM Guide
Construction (LOD 400)

BIM element is modeled with complete fabrication and assembly details where applicable or useful for construction works; otherwise, details may be represented in 2D CAD drawings to complement the Detailed Design stage level of detail.

Ref: Singapore BCA’s BIM Guide
Roadmap to BIM

2006
HA introduced BIM in its development of public rental housing projects

2007-13
Preparation or Trial Period For HA to be BIM ready in 2014-15

2014-15
BIM will be the standard design tool for housing projects

Source: SISV Conference - BIM and The QS - 9th November
BIM FOR QS

BIM models contain the data of measurements, properties and classifications.

BIM can provide consistent and automated quantification

BIM can assist in significantly reducing variability in cost estimates.
How does QS react in this new cost control section?
CHALLENGES AND STRATEGIES

Challenges:
- Lack of demand for BIM
- Entrenched in the current 2D drafting practices
- Steep learning curve to build up BIM expertise
- Lack of ready pool of skilled BIM manpower

Strategies:
- Public sector taking the lead
- Promoting success stories
- Removing impediments
- Building BIM capability & capacity
- Incentivising BIM adopters

Reference: BIM Journal
INDUSTRY CHALLENGES

- Submission Standards
- CAD/BIM Project Environment
- Changes in Practice
- Continuity of Information
COMPANY-LEVEL CHALLENGES

PROCESS ENHANCEMENT
- External and Internal

SOFTWARE & HARDWARE
- BIM software and hardware upgrade

EDUCATION & TRAINING RECREATING
- Customized training and BIM culture

RECREATING CAD DETAILS IN BIM
- 2D Detail library and 3D object library
INDIVIDUAL CHALLENGES

- Learning Curve
- Level of Knowledge
- Change of Mindset
- Communication
CostX® and BIM

CostX® reads parametric BIM models to automatically extract object properties and their associated quantities. Using digital data allows quantities and costs to be quickly and accurately assessed within a live electronic environment.
Cost Geometry® By CostX®

Live-Links !!!
## Preliminary Estimate

### FACE AREA SCHEDULE

<table>
<thead>
<tr>
<th>TOWER</th>
<th>TYPE</th>
<th>AREA (m²)</th>
<th>AREA %</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>FULL GLASS</td>
<td>8513</td>
<td>11.60%</td>
</tr>
<tr>
<td>2</td>
<td>FULL GLASS</td>
<td>9487</td>
<td>12.93%</td>
</tr>
<tr>
<td>3</td>
<td>FULL GLASS</td>
<td>5985</td>
<td>8.15%</td>
</tr>
<tr>
<td>4</td>
<td>FULL GLASS</td>
<td>2807</td>
<td>3.82%</td>
</tr>
<tr>
<td>5</td>
<td>FULL GLASS</td>
<td>2399</td>
<td>3.27%</td>
</tr>
<tr>
<td>6</td>
<td>FULL GLASS</td>
<td>2130</td>
<td>2.90%</td>
</tr>
<tr>
<td>A</td>
<td>SUB TOTAL:</td>
<td>31,321.00</td>
<td>42.67%</td>
</tr>
<tr>
<td>1</td>
<td>FULL WALL</td>
<td>2390</td>
<td>3.26%</td>
</tr>
<tr>
<td>2</td>
<td>FULL WALL</td>
<td>4560</td>
<td>6.21%</td>
</tr>
<tr>
<td>3</td>
<td>FULL WALL</td>
<td>6709</td>
<td>9.14%</td>
</tr>
<tr>
<td>4</td>
<td>FULL WALL</td>
<td>6709</td>
<td>9.14%</td>
</tr>
<tr>
<td>5</td>
<td>FULL WALL</td>
<td>5678</td>
<td>7.74%</td>
</tr>
<tr>
<td>6</td>
<td>FULL WALL</td>
<td>5678</td>
<td>7.74%</td>
</tr>
<tr>
<td>B</td>
<td>SUB TOTAL:</td>
<td>31,724.00</td>
<td>43.22%</td>
</tr>
<tr>
<td>1</td>
<td>FULL WINDOW</td>
<td>1367</td>
<td>1.86%</td>
</tr>
<tr>
<td>2</td>
<td>FULL WINDOW</td>
<td>1367</td>
<td>1.86%</td>
</tr>
<tr>
<td>3</td>
<td>FULL WINDOW</td>
<td>2345</td>
<td>3.19%</td>
</tr>
<tr>
<td>4</td>
<td>FULL WINDOW</td>
<td>2345</td>
<td>3.19%</td>
</tr>
<tr>
<td>5</td>
<td>FULL WINDOW</td>
<td>3688</td>
<td>5.02%</td>
</tr>
<tr>
<td>6</td>
<td>FULL WINDOW</td>
<td>3688</td>
<td>5.02%</td>
</tr>
<tr>
<td>C</td>
<td>SUB TOTAL:</td>
<td>14,800.00</td>
<td>20.16%</td>
</tr>
<tr>
<td>1</td>
<td>PART WINDOW</td>
<td>678</td>
<td>0.92%</td>
</tr>
<tr>
<td>2</td>
<td>PART WINDOW</td>
<td>678</td>
<td>0.92%</td>
</tr>
<tr>
<td>3</td>
<td>PART WINDOW</td>
<td>876</td>
<td>1.19%</td>
</tr>
<tr>
<td>4</td>
<td>PART WINDOW</td>
<td>876</td>
<td>1.19%</td>
</tr>
<tr>
<td>5</td>
<td>PART WINDOW</td>
<td>1209</td>
<td>1.65%</td>
</tr>
<tr>
<td>6</td>
<td>PART WINDOW</td>
<td>1209</td>
<td>1.65%</td>
</tr>
<tr>
<td>D</td>
<td>SUB TOTAL:</td>
<td>5,526.00</td>
<td>7.53%</td>
</tr>
<tr>
<td></td>
<td>GRAND TOTAL:</td>
<td>83,371.00</td>
<td>m²</td>
</tr>
</tbody>
</table>
3D Architectural Measurement
3D Structural Measurement
3D E&M Measurement
Combined BIM Model

Architectural Model

E&M Model

Structural Model
### Bills of Quantities

<table>
<thead>
<tr>
<th>Code</th>
<th>Description</th>
<th>Quantity</th>
<th>Unit</th>
<th>Rate</th>
<th>Subtotal</th>
<th>Factor</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>2</td>
<td>Preliminaries</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>Preambles</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>Substructure</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>5</td>
<td>Podium</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>6</td>
<td>Superstructure</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>7</td>
<td>External works</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>8</td>
<td>Fixture, furniture and equipment</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>9</td>
<td>Electrical installation</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>10</td>
<td>Mechanical ventilation and air conditioning</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>11</td>
<td>Fire services installation</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>12</td>
<td>Plumbing and drainage</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>13</td>
<td>Lift installation</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>14</td>
<td>Site safety and environmental management</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>15</td>
<td>Provisional sums and attendances</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>16</td>
<td>Spare and spare parts</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Total:** 1,043,866,361.00

---

**Cost Report Sample**: This table presents the breakdown of costs for various components of a project, including preliminaries, substructure, superstructure, external works, fixture, furniture and equipment, electrical installation, mechanical ventilation and air conditioning, fire services installation, plumbing and drainage, lift installation, site safety and environmental management, and provisional sums and attendances. The total cost is calculated at 1,043,866,361.00.
3D Revisioning

Find out Additional $$$ with CostX®
Variation Report

<table>
<thead>
<tr>
<th>Code</th>
<th>Description</th>
<th>Unit</th>
<th>Quantity</th>
<th>Previous Quantity</th>
<th>Variance Quantity</th>
<th>Total</th>
<th>Previous Total</th>
<th>Variance Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>SB</td>
<td>Substructure</td>
<td>m2</td>
<td>419</td>
<td>377</td>
<td>42</td>
<td>36,240</td>
<td>31,200</td>
<td>5,040</td>
</tr>
<tr>
<td>CL</td>
<td>Columns</td>
<td>m2</td>
<td>419</td>
<td>377</td>
<td>42</td>
<td>16,965</td>
<td>16,545</td>
<td>420</td>
</tr>
<tr>
<td>UF</td>
<td>Upper Floors</td>
<td>m2</td>
<td>419</td>
<td>377</td>
<td>42</td>
<td>24,580</td>
<td>24,580</td>
<td>0</td>
</tr>
<tr>
<td>SC</td>
<td>Staircase</td>
<td>m2</td>
<td>419</td>
<td>377</td>
<td>42</td>
<td>8,100</td>
<td>8,100</td>
<td>0</td>
</tr>
<tr>
<td>RF</td>
<td>Roof</td>
<td>m2</td>
<td>419</td>
<td>377</td>
<td>42</td>
<td>50,148</td>
<td>41,012</td>
<td>9,136</td>
</tr>
<tr>
<td>EW</td>
<td>External Walls</td>
<td>m2</td>
<td>419</td>
<td>377</td>
<td>42</td>
<td>51,810</td>
<td>43,960</td>
<td>7,850</td>
</tr>
<tr>
<td>WW</td>
<td>Windows</td>
<td>m2</td>
<td>419</td>
<td>377</td>
<td>42</td>
<td>20,100</td>
<td>20,600</td>
<td>500</td>
</tr>
<tr>
<td>ED</td>
<td>External Doors</td>
<td>m2</td>
<td>419</td>
<td>377</td>
<td>42</td>
<td>15,400</td>
<td>11,800</td>
<td>3,600</td>
</tr>
<tr>
<td>NW</td>
<td>Internal Walls</td>
<td>m2</td>
<td>419</td>
<td>377</td>
<td>42</td>
<td>6,660</td>
<td>6,660</td>
<td>0</td>
</tr>
<tr>
<td>NS</td>
<td>Internal Screens &amp; Borrowed Lights</td>
<td>No</td>
<td>419</td>
<td>377</td>
<td>42</td>
<td>4,600</td>
<td>4,600</td>
<td>0</td>
</tr>
<tr>
<td>ND</td>
<td>Internal Doors</td>
<td>No</td>
<td>419</td>
<td>377</td>
<td>42</td>
<td>17,450</td>
<td>17,450</td>
<td>0</td>
</tr>
<tr>
<td>WF</td>
<td>Wall Finishes</td>
<td>m2</td>
<td>419</td>
<td>377</td>
<td>42</td>
<td>47,865</td>
<td>44,885</td>
<td>2,980</td>
</tr>
<tr>
<td>FF</td>
<td>Floor Finishes</td>
<td>m2</td>
<td>419</td>
<td>377</td>
<td>42</td>
<td>24,000</td>
<td>22,740</td>
<td>1,260</td>
</tr>
<tr>
<td>CF</td>
<td>Ceiling Finishes</td>
<td>m2</td>
<td>419</td>
<td>377</td>
<td>42</td>
<td>15,550</td>
<td>14,290</td>
<td>1,260</td>
</tr>
<tr>
<td>FT</td>
<td>Fixtures</td>
<td>No</td>
<td>419</td>
<td>377</td>
<td>42</td>
<td>32,500</td>
<td>32,500</td>
<td>0</td>
</tr>
<tr>
<td>SE</td>
<td>Special Equipment</td>
<td>No</td>
<td>419</td>
<td>377</td>
<td>42</td>
<td>4,500</td>
<td>4,500</td>
<td>0</td>
</tr>
<tr>
<td>PD</td>
<td>Sanitary Fixtures, Plumbing &amp; Gas</td>
<td>No</td>
<td>419</td>
<td>377</td>
<td>42</td>
<td>32,000</td>
<td>32,000</td>
<td>0</td>
</tr>
<tr>
<td>FP</td>
<td>Fire Protection</td>
<td>m2</td>
<td>419</td>
<td>377</td>
<td>42</td>
<td>2,095</td>
<td>1,885</td>
<td>210</td>
</tr>
<tr>
<td>LP</td>
<td>Electric Light, Power &amp; Communications</td>
<td>m2</td>
<td>419</td>
<td>377</td>
<td>42</td>
<td>39,072</td>
<td>38,082</td>
<td>990</td>
</tr>
<tr>
<td>SG</td>
<td>Special Services</td>
<td>m2</td>
<td>419</td>
<td>377</td>
<td>42</td>
<td>2,051</td>
<td>1,841</td>
<td>210</td>
</tr>
<tr>
<td>XS</td>
<td>External Services</td>
<td>m2</td>
<td>419</td>
<td>377</td>
<td>42</td>
<td>5,000</td>
<td>5,000</td>
<td>0</td>
</tr>
<tr>
<td>Element Sub-Total</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>456,386</td>
<td>421,100</td>
<td>35,287</td>
<td></td>
</tr>
<tr>
<td>PR</td>
<td>Preliminaries</td>
<td>%</td>
<td>9.50</td>
<td>9.50</td>
<td>0.00</td>
<td>43,387</td>
<td>40,054</td>
<td>3,332</td>
</tr>
<tr>
<td>BM</td>
<td>Builders Margin</td>
<td>%</td>
<td>6.50</td>
<td>6.50</td>
<td>0.00</td>
<td>62,148</td>
<td>57,343</td>
<td>4,805</td>
</tr>
<tr>
<td>YY</td>
<td>Contingency Provisions</td>
<td>%</td>
<td>5.00</td>
<td>5.00</td>
<td>0.00</td>
<td>50,914</td>
<td>48,977</td>
<td>3,937</td>
</tr>
<tr>
<td>ET</td>
<td>Escalation To Tender</td>
<td>%</td>
<td>2.50</td>
<td>2.50</td>
<td>0.00</td>
<td>38,720</td>
<td>38,720</td>
<td>0</td>
</tr>
<tr>
<td>Building Total</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>639,535</td>
<td>590,088</td>
<td>49,447</td>
<td></td>
</tr>
</tbody>
</table>

Total Variance: 49,447
As-Built BIM Model
Additional QS Parameters

Extra Parameters

- Capital rates
- Life cycle cost
- Carbon reduction
- Capital allowances
- Building reinstatement cost
- Health & safety
- Client accountancy coding
- Asset registers
- Trade package coding
- Risk management
- Facility management planning
- Material scheduling
Facility Management
Final Words

Benefits of BIM

• Greater Speed
• Lower costs
• Uniform design base
• Cost estimating
• Conflict resolution
• Visualisation and constructability review
• Drawing fabrication
• Facilities management

Barriers of BIM

• Slow adopting market
• Software capabilities and current technology
• Legal barriers for building contracts.
Final Words

Risks of BIM

(1) BIM Design Errors
Who shall be responsible and liable for any design errors? Architect or Contractor?

(2) BIM Communication
Collaboration and access to BIM model by the project stakeholders during the construction stage.

(3) BIM Control
The risk of changing a BIM model without approval. Alteration by unauthorized parties

(4) BIM Construction Costs
Market fluctuation or price variation from emerging market such as metals, petrol etc. can not be ignored.
Final Words

QS in the BIM Movement

5D estimating ultimately creates better prospect for QS in the construction industry:

- Transparency of scope and cost decisions
- Enabling early cost decisions
- Benefits to the Costing Process through greater interoperability
- Other considerations – Better Document Admin. & Management
- Workflow and Productivity Benefits
- Greater certainty of outcome
- Savings in program time for better cost advice, client approvals, package lettings
- Better scope management (ie. Reduction in project cost overrun)

QS Should Takes More Proactive Approach !!!
Final Words

Future Use Of BIM

• BIM is most feasible for estimating (i.e. cost planning).

• If model populated correctly, a lot of information can be produced – e.g. rebar information.

• For measurement purpose, most practical way is to work on BIM Model and supplemented by 2D drawings.

• Post contract – 2D drawings from CAD drawings cut from BIM model. Supplemented by 2D detailed drawings.

• New SMM and BIM Guideline for Costing are recommended for the industry.
End of Presentation

Thank you 😊

Apply for the Student Version of CostX in below link:

http://techweb.exactal.com/resources/educational_request.php