Low Cost Housing Solution

by

Mohd Harris Ismail, PhD

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MOHD HARRIS ISMAIL, PhD

**Industry Involvement**

CEO, Ascension Technology Sdn Bhd

Deputy Chairman of MY BuildingSMART Berhad

Corresponding Member of BuildingSMART International

ASEAN BIM Trainer for RICS : 2017 - 2018

PAM’s Professional Practice Speaker – 2016

MMC-Gamuda KVMRT (T) BIM Process Trainer

Member of RICS ASEAN BIM Working Group 2015

Former Deputy Director of IBS Center, CIDB

Member of APEC STANDARD DEV COMMITTEE 2012 - 2014

Trainer and Panel for Curriculum Development (BIM) for MOHE, Malaysia

Patron of Draftermal (3D Modeler) Association Malaysia 2016 – 2018

24 years experience in Construction and Project Management

**Academic Qualification**

PhD in Architecture, UKM

Construction Management, UiTM

Civil Engineering, UTM

Academic Qualification

PhD in Architecture, UKM

Construction Management, UiTM

Civil Engineering, UTM
We are proud to have served the following agencies and organisations
IBS & BIM........ In line with national inspiration

To transform the construction sector
- Improving knowledge content
- Productivity driven (through IBS and BIM)
- Fostering sustainable practices in construction value
- Increasing Internalisation

More than doubling productivity, matched by higher wages

2.5x increase in productivity to US$16,500 per worker
BIM DELIVERS VALUE TODAY

- Reduced Conflicts
- Improved Collective
- Improved Overall Project
- Reduced Changes
- Reduced Number of RFIs
- Better Cost

### Common Objectives for BIM in Malaysia (Goals)

- **3D Coordination / clash detection**
- **5D Quantity Take off, Cost Calculation and Control**
- **4D Construction progress monitoring**
- **Facility Management**

#### Based on Case Study

**Conflicts & Complexity of Design**
- Inadequate design information
- Inadequate site investigation

**Poor communications**
- Unrealistic time targets

<table>
<thead>
<tr>
<th>TO ADDRESS ISSUES</th>
</tr>
</thead>
<tbody>
<tr>
<td>Conflicts &amp; Complexity of Design</td>
</tr>
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<td>Inadequate design information</td>
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</tr>
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</tr>
<tr>
<td>Unrealistic time targets</td>
</tr>
</tbody>
</table>
WHY BIM?

- Reduce Waste
  - Time
  - Money
  - Effort
  - Material
- Improve
  - Efficiency
  - Coordination
  - Design
POTENTIAL ADVANTAGES OF USING BIM

Faster delivery
50%
reduction in overall time, from inception to completion, for newbuild and refurbished assets

Lower costs
33%
reduction in the initial cost of construction and the whole life cost of built assets
WHY IBS?

- Improved Delivery Time
- Standardised Design
- Increase Productivity
- Improved Quality
- Reduced foreign labour dependency
MODERN METHOD CONSTRUCTION
- IBS

6 TYPES OF CIDB INDUSTRIALIZED BUILDING SYSTEMS (CIDB IBS)

1. Precast Concrete System
2. Blockwork System
3. Steel Framing System
4. Timber Framing System
5. Formwork System
6. Innovative System (AGIBS)
<table>
<thead>
<tr>
<th>CASE STUDY</th>
<th>3 BLOCKS CONDOMINIUM IN JOHOR BAHRU</th>
</tr>
</thead>
<tbody>
<tr>
<td>No. of Floors</td>
<td>31</td>
</tr>
<tr>
<td>GFA</td>
<td>1,700,000 sqft</td>
</tr>
<tr>
<td><strong>WITHOUT BIM</strong></td>
<td><strong>WITH BIM TECHNOLOGY</strong></td>
</tr>
<tr>
<td>Response to LA comments</td>
<td>6 - 8 weeks</td>
</tr>
<tr>
<td>Time Taken for Measurement</td>
<td>6 Weeks</td>
</tr>
<tr>
<td>No. of QS involved</td>
<td>4</td>
</tr>
</tbody>
</table>
# POTENTIAL ADVANTAGES OF USING BIM

## PROPOSE KPI FOR BIM

<table>
<thead>
<tr>
<th>OUTCOME METRICS</th>
<th>CASE STUDY 1 (without BIM)</th>
<th>CASE STUDY 2 (with BIM)</th>
</tr>
</thead>
<tbody>
<tr>
<td>RFI's due to Conflicts during CONSTRUCTION</td>
<td>677</td>
<td>2</td>
</tr>
<tr>
<td>Change Orders due to Conflicts during CONSTRUCTION</td>
<td>311</td>
<td>0</td>
</tr>
<tr>
<td>% Rework Hours compared to Total Hours</td>
<td>20%</td>
<td>Less than 1%</td>
</tr>
<tr>
<td>Minutes per day spent resolving issues between MEP trades</td>
<td>180</td>
<td>20-30</td>
</tr>
</tbody>
</table>

## COST AVOIDANCE

1.0% from construction cost = RM500 mil @ **RM 5.0mil**
Community House in Besut was built using IBS System for Besut Parliament in Terengganu

$RM26,000.00$
9 days
IBS Methodology

LOW COST AND SPEEDY EXECUTION
Low Cost Housing

50 units in 100 days @ RM40,000.00 per units
Acknowledged by MOF and MoHE

Visit by the Secretary General of MOHE to Manjung site in 2017
Low Cost Housing Programme

With the support from Government agencies and ministries, Ascension is rightly positioned to accommodate the needs for low-cost houses.

<table>
<thead>
<tr>
<th>COLLABORATORS</th>
<th>OUTPUT</th>
<th>COST &amp; DURATION</th>
<th>IMPACT</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>RM 40,000</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>3 bedrooms 2 WC</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Speedy 50 house in 100 days</td>
<td></td>
</tr>
</tbody>
</table>

**COLLABORATORS**
- KEMENTERIAN PENDIDIKAN TINGGI
- POLITEKNIK MALAYSIA

**OUTPUT**
- 2500 Houses
  - Build for the needy, selected by state government in respective area
- Easy to build
  - Light weight panel, easy transferred by hand, only weighs 15kg max
- Teams of builders from Community College and Polytechnic students
- High Precision
  - Better alignment to ensure better quality

**IMPACT**
- Real Life Experience
  - (Students & Academicians)
- More House Ownership for People
- Knowledge transfer
  - (Industry R&D for Community)

**Cost Efficiency**
- (A single formwork can be use for 300 times max)
Ascension is well-accepted to build affordable homes for B40 community

Low Cost Housing Program for B40
- Manjung, Perak
- Kubang Pasu, Kedah
- Merlimau, Melaka
- Mak Kemas, Terengganu
- PPRT Houses, Kuala Nerus

Rumah Komuniti Project
- MP of Besut

Rumah Perwira, LTAT
- Segari, Perak
TWO CONSTRUCTION METHOD ONE
RESULT
PERFECT COMBINATION

IBS System

Production per house
- fwk installation 1.5 days
- Concrete set in less 1 day
- Roof installation 3 days
- No plastering required
- Skim coat – 1.5 days

Management

- Proper planning & sequence
  4D BIM
- Financial management
  5D BIM
- Manpower management
  4D BIM

Production for 50 units
- Structure (Concrete) Works completed in 45 days
- Roof and Covering completed in 33 days
- Finishes, Fittings and Fixtures – 43 days
PLAN VIEW of BUNGALOW HOUSE

PELAN LANTAI
SKALA 1:50

Built up Area 750 Sqft
PLAN VIEW OF SEMI-D HOUSE

Built up - 750 sqft
PERSPEKTIF 1
My Beautiful New Home

PERSPEKTIF 2
# SPECIFICATIONS

<table>
<thead>
<tr>
<th>KETERANGAN</th>
<th>BAHAN/KEMASAN</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Struktur</strong></td>
<td></td>
</tr>
<tr>
<td>Lantai</td>
<td>Konkrit Bertetulang</td>
</tr>
<tr>
<td>Dinding</td>
<td>Konkrit Bertetulang</td>
</tr>
<tr>
<td>Kerangka Bumbung</td>
<td>Light Weight Steel Truss</td>
</tr>
<tr>
<td>Penutup Bumbung</td>
<td>Metal deck</td>
</tr>
<tr>
<td><strong>Pintu &amp; Tingkap</strong></td>
<td></td>
</tr>
<tr>
<td>Bingkai</td>
<td>Solid Timber Frame</td>
</tr>
<tr>
<td>Pintu</td>
<td>Plywood Flush Door</td>
</tr>
<tr>
<td></td>
<td>PVC Folding Door</td>
</tr>
<tr>
<td>Tingkap</td>
<td>Adjustable Louvres</td>
</tr>
<tr>
<td></td>
<td>Fixed Louvres (Bilik Air &amp; Tandas)</td>
</tr>
<tr>
<td><strong>Kemasan</strong></td>
<td></td>
</tr>
<tr>
<td>Lantai</td>
<td>Cement Render</td>
</tr>
<tr>
<td></td>
<td>Ceramic Tiles (Bilik Air &amp; Tandas)</td>
</tr>
<tr>
<td>Dinding</td>
<td>Skimcoat &amp; Paint</td>
</tr>
<tr>
<td><strong>Kelengkapan Bilik Air / Tandas</strong></td>
<td></td>
</tr>
<tr>
<td>WC</td>
<td>Sitting WC</td>
</tr>
<tr>
<td>Basin</td>
<td>Wall Mounted</td>
</tr>
<tr>
<td><strong>Lain-lain</strong></td>
<td></td>
</tr>
<tr>
<td>Siling</td>
<td>2’ x 4’ Suspended Ceiling</td>
</tr>
<tr>
<td>Sinki</td>
<td>Single Bowl Aluminum Sink</td>
</tr>
</tbody>
</table>
FORMWORK DESIGN
(Using BIM tools)
• Automatic Formwork – Generating Shop Drawing
SLAB to be ready with level

Preparation of Slab & Delivery of frames
On-site fabrication of AGIBS frame
Wall frames fabricated
Fabrication and Erection of Wall
Wet/Solid Wall ...

- Load bearing steel framing
- Sandwiched with RIBLATH mesh (loss formwork)
- infilled with cement mortar/concrete
Fixing is easy, only light and simple tools required
Concreting in progress

1 week

Plastering

Completed concreting
CONCRETE & PLASTERING COMPLETED
Double Storey Hybrid
(1st Floor Only)

Mukim Kuala Nerus
Kuala Terengganu
(154 units)
DOUBLE STOREY HYBRID (2ND FLOOR ONLY) KUALA TERENGGANU
DOUBLE STOREY HYBRID (2ND FLOOR ONLY) KUALA TERENGGANU
PR1MA
MIX HOUSING DEVELOPMENT
SG. RAIA, SIMPANG PULAI
PERAK

(376 units Double Storey Terrace)
PRIMA SG. RAIA, SIMPANG PULAI, PERAK
PRIMA SG. RAIA, SIMPANG PULAI, PERAK
PRIMA SG. RAIA, SIMPANG PULAI, PERAK
PRIMA SG. RAIA, SIMPANG PULAI, PERAK
PRIMA TAPAH, PERAK

223 units Single Storey
(7 months)
424 units Double Storey Terrace
(15 months)

6/2016 – 12/2017
PRIMA TAPAH, PERAK
PRIMA TAPAH, PERAK
PEMBAIKAN SEKOLAH DAIF (PAKEJ 10)
KELANTAN (Double Storeys)

• SK GETING, TUMPAT KB (6 BILIK DARJAH)
• SK KANDIS, BACHOK, KB (6 BILIK DARJAH)
• SK GONG KULIM, PASIR PUTIH (6 BILIK DARJAH)
SEKOLAH DAIF - SK GETING TUMPAT, KELANTAN (10 WEEKS)
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<table>
<thead>
<tr>
<th>Types of Building</th>
<th>Grade of Concrete/Mortar</th>
</tr>
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<tbody>
<tr>
<td></td>
<td>Party Wall</td>
</tr>
<tr>
<td>Residential Single Storey</td>
<td>MS15</td>
</tr>
<tr>
<td>Residential Double Storey</td>
<td>Ground Floor</td>
</tr>
<tr>
<td></td>
<td>First Floor</td>
</tr>
<tr>
<td>Light Industrial Single Storey</td>
<td>G25</td>
</tr>
<tr>
<td>Concrete Slump</td>
<td>Minimum (100mm + 25 mm)</td>
</tr>
</tbody>
</table>
BENEFITS...

1. IBS concept, fast to construct
2. Mobility and maneuverability on site
3. Green - uses sustainable lightweight steel materials
4. Quality Controlled – components manufactured in ISO factories
5. Manpower efficient – reduced work force
6. Mortar/Concrete infill Wet Wall System provides
   • **Solid and Cool** - low thermal conductivity
   • **Quieter** - low sound transmission
   • **Weather resistance** - rain or shine
   • **Seamless finish** not prone to cracks
7. Easy to install, **no/limited heavy machinery/equipment required**
8. Minimal debris - cleaner and safer site
9. Commercially competitive
10. Proven in several housing projects and **DAIF schools**
Contributing to CITP ....

CONSTRUCTION INDUSTRY TRANSFORMATION PROGRAMME 2016 - 2020
Driving Construction Excellence Together

Source - http://www.citp.my
TVET INITIATIVES - COLLABORATION WITH MALAYSIA’S POLITEKNIK

Source - www.moe.gov.my
Please feel free to subscribe to BIM&Beyond YouTube channel at bit.ly/BIMBeyond
THANK YOU!

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