THE ROLE of BIM in Managing the SUPPLY CHAIN
During Temporary Works

ACHASM
Conference 2018, Belmont Square

Willem Adriaan Brits
Director – Head of Engineering Sub Saharan Africa
PERI – Formwork Scaffolding Engineer (Pty) Ltd
Smart design wins projects: poor design costs time and money and failure, should it occur, often results in fatality.”

Bill Hewlett MA, FICE, C.Eng.

The importance of BIM in temporary works.
Change is difficult, even terrifying, and it will require you to leave your comfort zone.

The 3 biggest problems in the construction industry:

1) Cost underestimation - a “budget overrun” is the consequence of underestimating costs in the first place.

2) Optimistic planning - a “time overrun” is the consequence of underestimating actual time used or lack of detail in the planning.

3) Lack of communication - construction is one of the least tech-driven industries and we are extremely silo-based.

“Nicholas Klokhholm
Copenhagen, Capital Region, Denmark”
A Early Inclusion of Specialist Suppliers
B Onsite Collaboration
C Safety and Commissioning of Sub Elements
D Questions & Answers
Limited to No Pre-Tender / Planning phase involvement

- **Raw Materials:** Steel, Bituminous, Cement, Stone etc.
- **Suppliers:** Material / Services, Plant & Tools
- **Consultants:** Architects, Engineers
- **Contractors:** Civil, Building
- **End user: Clients** State, Commercial

Leads to the Industry suffering from “It will be sorted out on site sickness”.
This can be Changed / Improved through an Inclusiveness (BIM) Pre-Tendering phase:

- Improvement on constructibility methods.
- Saving time and money.
EARLY INCLUSION OF SPECIALIST SUPPLIERS

RCS C-06
- Minimize Risk to all parties involved;
  - Detail available at the touch of a button;

3D Model + Document links
This can be Changed / Improved through an Inclusiveness (BIM) Pre-Tendering phase:

- Improvement on constructibility methods
- Saving time and money.
- Understanding what the project delivery method is and what is required from the client.
BIM Execution Plan (BEP) is required to enable early involvement;
- Are clients informed?
- Are clients fully aware?

- Data Exchange Protocols & Security?
- BIM Mock-up?
- Minimize Risk to both parties involved;
  - Details available on a touch of a button - checklists
- Minimize Risk to both parties involved;
- From the suppliers side (H&S as well as functionality)

Correct Installation Verified – real time
**ONGOING COLLABORATION**

- On site problem solving or issues raised;
  - Direct link to supplier and professional team
  - Early corrective measures – problem identification
  - Improvement on future project via Route Cause Analysis

The following new issue was reported:
1 issues had comments added
0 issues changed status
0 issues changed their assigned company

Click the link below to log in to Autodesk BIM 360 Field for details on these issues. Your user name is pieter.strydom@peri.co.za

https://bim360field.autodesk.com/iset_project?ld=ec0562a0-693b-4cb4-b107-2a86c5deabfd&return_to=%2Fissues

Here is a sampling of the changes:

New issues reported included (showing 1 of 1 total):
000082: In regards to Issue Number… created as Void

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If you have any questions about Autodesk BIM 360 Field, visit our Help site at http://help.autodesk.com/view/BM360F/ENU/

You are receiving this notification due to your user settings. To adjust your settings, click your initials and go to Settings. To stop receiving these messages go to:

https://bim360field.autodesk.com/logout/9ADF63B6E4644426B1E4A6E2CF4C96D
On site problem solving and issues raised
**ONSITE COLLABORATION**

- On site Monitoring & Control for Professional Team & Supplier;
- Reduction in paper work – more time spend on actual site – lead to improvements - Reporting

<table>
<thead>
<tr>
<th>Shakeda MOG project</th>
<th>Checklist Details</th>
</tr>
</thead>
<tbody>
<tr>
<td>Details</td>
<td></td>
</tr>
<tr>
<td>ID</td>
<td>001754</td>
</tr>
<tr>
<td>Name</td>
<td>Wall Inspection - Location One</td>
</tr>
<tr>
<td>Description</td>
<td><a href="mailto:jacob.schulitz@ehho.co.za">jacob.schulitz@ehho.co.za</a></td>
</tr>
<tr>
<td>Author</td>
<td>21 Sep 2017 10:39 AM</td>
</tr>
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**Signature:** Jacob Schulitz 21 Sep 2017 10:57 AM

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<th>Item #</th>
<th>Item Text</th>
<th>Response</th>
<th># Issues</th>
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</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Ensure all BD's are installed and fixed correctly as per issued drawing.</td>
<td>Yes</td>
<td>0</td>
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<tr>
<td></td>
<td></td>
<td>Ensure all walls are installed and fixed correctly as per issued drawing.</td>
<td>Yes</td>
<td>0</td>
</tr>
<tr>
<td>Contents:</td>
<td></td>
<td>Additional walls added at top 2 joints</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Ensure all Tie-rods &amp; Wrought Steel Plates are installed as per issued drawing</td>
<td>Yes</td>
<td>0</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Ensure 5K Cone System is installed per instruction per tie fixing position</td>
<td>Yes</td>
<td>0</td>
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<tr>
<td></td>
<td></td>
<td>Ensure bottom Walls are installed and fixed to TRG Panels per issued drawing</td>
<td>Yes</td>
<td>0</td>
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<tr>
<td></td>
<td></td>
<td>Ensure work Anchors are installed and drilled to correct depth as per issued drawing</td>
<td>Yes</td>
<td>0</td>
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<tr>
<td></td>
<td></td>
<td>Ensure front bolt installed on Special Design Water</td>
<td>Yes</td>
<td>0</td>
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<tr>
<td></td>
<td></td>
<td>Ensure all brackets are installed correctly on inclined side only</td>
<td>Yes</td>
<td>0</td>
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<tr>
<td></td>
<td></td>
<td>Ensure sufficient number of props are used per wall pour. Refer to issued drawing</td>
<td>Yes</td>
<td>0</td>
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<tr>
<td></td>
<td></td>
<td>Ensure concrete platform openings and edges are closed</td>
<td>Yes</td>
<td>0</td>
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<tr>
<td></td>
<td></td>
<td>Ensure PERI Stabilized Tie are not overloaded</td>
<td>Yes</td>
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</table>

End of Wall Inspection - Location One - 001754 Images
Effect of Mapping on projects key
- Doing it right vs doing it in detail??
From a supply side (Intelligent Parts)

- Progress can be monitored in terms of supply on large scale project
- Detail parts for order placement / planning
■ **Intelligent Parts**
  - Detail parts for order placement / planning;
  - Incorporation or QR coding;

**3D Model Incl. QR or other coding**

**Actual Coding**
- Improvement of Health and Safety on site.
- On site monitoring – find ENCOURAGE: repsonsiveness are bigger onus to do actual check – knowing that someone will know -

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<tbody>
<tr>
<td>ID</td>
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<tr>
<td>Name</td>
<td>EK Pre-Concreting</td>
</tr>
<tr>
<td>Description</td>
<td><a href="mailto:Jacobsachitesseke@gmail.com">Jacobsachitesseke@gmail.com</a></td>
</tr>
<tr>
<td>Author</td>
<td>07-44-3030 8:15 AM</td>
</tr>
<tr>
<td>Created On Date</td>
<td>05 Feb 2018 7:23 AM</td>
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**Checklist Items**

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<th>Response</th>
<th># Issues</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Ensure &quot;Roller Table &quot;Truss&quot; is not in contact with Lifting Rail</td>
<td>Yes</td>
<td>0</td>
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<tr>
<td>2</td>
<td>Ensure Tie-Rods are tensioned on all &quot;Roller Table &quot;Trusses&quot; (the string) placed per plan. Ensure tie combinations adhere to all Roller Table Tresses.</td>
<td>Yes</td>
<td>0</td>
</tr>
<tr>
<td>3</td>
<td>Ensure Carcuits are engaged within &quot;The Hike Frame&quot;</td>
<td>Yes</td>
<td>0</td>
</tr>
<tr>
<td>4</td>
<td>Ensure &quot;Hike The Frame&quot; is secured with D25/35 Pin. Allow Cutter Pin</td>
<td>No</td>
<td>0</td>
</tr>
<tr>
<td>Comments</td>
<td>Not as per drawings</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

- Ensure Wall Bracket is secured and Anchored. Yes | 0
- Ensure Bottom Chord is levelling equally on roller - Insure continued. Yes | 0
- Ensure tension is Anchored back to prevent your ensure special base plate is anchored. Yes | 0
- Ensure bracing strips are tensioned and engaged. Yes | 0
- Pin Bay - Bracing Posts to be removed/dismantled engaged prior to concreting. Yes | 0
- Ensure Truss Bay - Ensure are engaged and have tightened. Yes | 0
- Ensure Rigid and Wood Jacks and "Pipe Jacks" are prior to concrete. Yes | 0
- Ensure paring around columns are fully "safe". Yes | 0

Report issued on 15 Feb 2018 11:01 AM by Peter Strydom (peter.strydom@peri.co.za)
Improvement of Health and Safety on site.

Hi Pieter,

Can we also split the Gantry into 7 sections as discussed on site, so we can check each one on its own.

Regards

Clifford Overbury
Improvement of Health and Safety on site by following processes
Ensuring Standards (design and manufacturing) are adhered to and maintained within the project.

Improving Quality
Improvement of Health and Safety on site by following processes;
SAFETY AND COMMISSIONING OF SUB ELEMENTS

- **Shortcoming**
  - Lack of automated Weather data:
  - Wind speed, rainfall etc.

- GPS location’s for check’s performed on site;
SAFETY AND COMMISSIONING OF SUB ELEMENTS

- Shortcoming - Cell & Andriod use
- Case Study
  - Using BIM 360 Field on Iphones for inspection checks – Resivior with SS
BENEFITS TO INFRASTRUCTURE OWNERS

Actual Findings from Suppliers side on SALDANHA OIL BUNKERS

- High Level of Risk Mitigation achieved
- Inverse safety
- Decrease in assembly time due to visual and interactive assembly aids
- Improved accuracies
- Reduced turn around times on missing detail etc.
- Improved Intercation and response time from PERI due to realtime (as close as possible) information.
BENEFITS TO INFRASTRUCTURE OWNERS

- “Though Enabling Suppliers; Owners and Professional Teams can realise all benefits”

**INFRASTRUCTURE OWNERS**

- Reduction on built time
- Cost saving
- Quality enhancement
- Health & Safety – OSHAct

**PROFESSIONAL TEAM**

- Easier documentation
- Easier communication
- Less danger situations
- Cost & Time saving
- Quality enhancement

- Site Monitoring
- Accurate planning
In closing “I have heard consultants say”:

“Yes, we already knew it would go above budget but as we are in a tendering situation, we deliver what they ask for to the level they demand, and we take the rest on the go with the client as we would not have gotten the job otherwise”.
QUESTIONS?