Network for Productivity Leadership

Co-organized by:

Building and Construction Authority

Association of Consulting Engineers Singapore

Institution of Engineers Singapore

BCAA Auditorium (T1-1)

21 Sep 2017
PARTICIPANTS

152 professionals from organizations such as...

SMU
Land Transport Authority
NANYANG TECHNOLOGICAL UNIVERSITY
MOH HOLDINGS

Surbana Jurong
jtc
CHANGI airport group
ECAS
ARUP

CS Consulting Engineers Pte Ltd
MEINHARDT
aurecon

Schneider Electric
Woh Hup (Private) Limited
peikko

SHIMIZU CORPORATION
Shmz
CPG Consultants
Tiong Aik Construction Pte Ltd

TEAMBUILD BUILDING YOUR ASPIRATIONS
OBJECTIVES

1. To provide an opportunity for networking amongst professionals from the construction industry

2. To provide a platform for sharing of experiences in adopting Design for Manufacturing and Assembly (DfMA) and Virtual Design and Construction (VDC)
In this digital age, the advance of technology is growing rapidly, and we have to synchronise with this advancement for construction works...

We must continue to deepen our expertise and familiarity with using BIM, as it is a necessary precursor to realize our aim of Integrated Digital Delivery (IDD) and proliferation of DfMA...

We are confident that our fellow engineers will have many more opportunities to incorporate and enhance the finesse of digitalization...

Er. Chua Tong Seng
ACES President

Mr. Hugh Lim
BCA CEO

Er. Edwin Khew Teck Fook
IES President
**PRESENTATION 1:**

**Preview of the Construction Industry Transformation Map**

Ms. Nadia Sulaiman  
BCA

A brief introduction to illustrate BCA’s framework to drive productivity in the construction industry

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### Key Approaches

#### Integrated Digital Delivery (IDD)

**IDD to underpin the entire building lifecycle and unlock full benefits of DIMA**

<table>
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<tr>
<th>Digital Fabrication (off-site)</th>
<th>Digital Fabrication (on-site)</th>
<th>Digital Commissioning</th>
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<tbody>
<tr>
<td>e.g. Greyform: ✓ BIM-to-Production methodology translates BIM models into modules to be installed onsite.</td>
<td>e.g. Kimly + Pre-caster + NTU ✓ Modules are trackable at all times ✓ Automatically stored/installed ✓ Travel via a ‘ideal’ path (e.g. least distance).</td>
<td>e.g. CCDC (for High Park Residences): ✓ Quality and defects management system</td>
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**Enabled by Building Information Modelling and Virtual Design and Construction**

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### Desired Outcomes

1. **Increase adoption to 70%** to improve productivity by 2025
2. **Reduce cost premium by 50%** for sustained adoption

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### Design for Manufacturing and Assembly (DfMA)

**Desired Outcomes**

1. Increase adoption to 70% to improve productivity  
2. Reduce cost premium by 50% for sustained adoption

**Components:** Incremental Improvement → Continuum of Prefabrication & DfMA  
...Integrated Assemblies: Game-Changing Improvement

**Structural**
- Precast: 10%  
- Structural Steel Advanced Precast / Hybrid: 20%  
- Mass Engineered Timber (MET): 35%  
- Prefabricated Prefinished Woodframe Construction (PPWC): 40%

**Architectural**
- On-site Dry Applied Finishes: 30%  
- Prefinished Surfaces: 45%  
- PBUs: 60%  
- FPVC: 70%

**MEP**
- Flexible Water Pipe / Sprinkler Dropper  
- Prefab Ceiling Module / Prefab Plant  
- Prefab Module with Platform / Catwalk  
- FFVC

**Manpower Savings [Project Level]**

40%

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**Desired Vision**

1. **Green Buildings**  
2. **Design for Manufacturing and Assembly**  
3. **Integrated Digital Delivery**
PRESENTATION 2:
Lessons from UK’s Example of Prefab MEP Systems

Mr. Paul Moss, MEP Modular Manager
Gammon Construction

Gammon
Sharing on case studies of modular MEP projects in both UK and Singapore

UK’s Heathrow Airport (Terminal 2A)

Data Centre @ Tai Seng, Singapore
A joint case study of the Wisteria Project. Mr. Lim, the project architect, and Mr. Lee, the PPVC supplier, provided some insights on how to improve both quality and productivity of the system.

Under controlled factory environment, the fabricator was able to produce a better quality products at a higher productivity rate.
Mr. Colin Yip, Associate
Arup Singapore Pte Ltd

An introduction to Arup’s approach to integrate digital solutions in projects

VDR (Virtual Design and Review) – Lead by Consultants
- Focus on **Design Coordination**
- Using BIM Model to check Clashes
- Using BIM Model to propose Changes
- Design Data Resolution and Verification

VDC (Virtual Design and Construction) – Lead By Contractor
- Focus on **Construction Coordination**
- ICE Process – Consultants RFI, Coordination Meeting
- PPM Process – Sub Contractor Model inputs

Besides VDC, Arup has introduced the term VDR, and adopted both approaches under the framework of Integrated Digital Delivery (IDD).
The panel discussion was led by Er. Clement Tseng from BCA/SPO. It was an engaging session on topics related to DfMA and IDD.

Q: How do we overcome the challenges in incompatibility of BIM software among the design stakeholders in a project?
A: Use software with open API, which is a publicly available Application Programming Interface that provides developers with programmatic access to a proprietary software application or web service.

Q: What is the extent of integration of design and construction necessary to improve the work processes in the construction industry?
A: Digitalisation would be the future. The benefits of DfMA can be fully maximised when the adoption of DfMA incorporated machine learning and beyond the rudimentary process of moving activities from on site to off site.
The Construction Productivity Gallery featured various DfMA technologies and a newly enhanced Precast and Prefabrication zone!
This session marks the end of the successful joint NPL 2017 Series by BCA and the industry!

See you again next year!