

Objectives of the Competition

To raise awareness and built competency in

Computational design and

BIM (Building Information Modelling)

innovatively for

Design for Manufacture and Assembly (DfMA)

About the Competition

- Open to all full-time students from a registered tertiary institution in their respective countries.
- Members need not be from the same school.
- 1 interim Submission (Local Only);
- 1 Submission (Local and International);
- 1 Final Presentation for shortlisted participants (Local and International).

Competition Topic

Design of an Exhibition Pavilion with
Computational Design and
Building Information Modeling (BIM) towards
Design for Manufacture and Assembly (DfMA)

Design Challenges

1. Sustainability

- 1.1 Resource Efficiency
- 1.2 Environmental Impact
- 1.3 Social Impact

2. Constructability

- 2.1 Modularity
- 2.2 Prefabrication
- 2.3 Rapid Assembly

3. Productivity

- 3.1 Maximizing Value
- 3.2 Minimizing Waste

Target Participants

Institute of Higher Learnings (IHLs)

- Local and overseas **Universities**
- Local and overseas **Polytechnics**
- Local and overseas **Institutes**

Overall Planning

Months	Tasks
June	Pre-enrolment, Enrolment and Preparation
July	Enrolment and training material preparation
August	Preparation
September	Competition Submission & Final Presentation
October	SCPW Award

BCA International BIM Competition 2016 Detail Schedule

Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday
June 2016						
			1 Teaser	2	3	4
5	6	7	8	9	10	11
12	13 Reg.	14	15	16	17	18
19	20	21	22	23	24	25
26	27	28	29	30		
July 2016						
					1	2
3	4	5	6	7	8	9
10	11	12	13	14	15	16
17	18	19	20	21	22	23
24	25	26	27	28	29	30
31						
August 2016						
	1 Prep	2	3	4	5	6
7	8	9	10	11	12	13
14	15	16	17	18	19	20
21	22	23	24	25	26	27
28	29 Topic release	30 Prep.	31 Prep.			
September 2016						
				1 Prep.	2 Prep.	3 Prep.
4 Prep.	5 Prep	6 Prep	7 Interim Submission	8 Prep.	9 Final Submission	10
11	12 BCA Shortlisting	13 BCA Shortlisting	14 BCA Shortlisting	15 BCA Shortlisting	16 Inform shortlisted Participants for Final Presentation	17
18	19	20	21	22	23 30mins Presentation (incl. 10mins Q&A)	24
25	26	27	28	29	30	
October 2016						
						1
2	3	4	5	6	7	8
9	10	11	12	13	14	15
16	17	18 SCPW	19 SCPW	20 SCPW	21	22

International BIM Competition 2016 - Computational BIM for DfMA	
Tasks	Dates
○ Teaser – Group Forming / Preparation	1 – 12 Jun
○ Registration Starts / Preparation	13 Jun - 31 Jul Extended to 28 Aug
● Topic Released (PM Session)	29 Aug
● Preparation by Students	1 Aug - 5 Sep
● Competition Submissions (2 dates)	7 - 9 Sep
● Shortlisting & informing Final Presentation	12 - 16 Sep
● Final Presentation & results finalisation	23 Sep

Notes:

- Local registered participants will be informed to join the sharing sessions arranged by BCA
- International registered participants can refer to BIMSG.ORG and BIMWIZ.BIMSG.ORG
- Topic release at BIMSG.ORG and BIMWIZ.BIMSG.ORG
- There will be a briefing on 29 Aug 2016 in Singapore Polytechnic with recordings released online on the same day.

Day : 29 August 2016
Time: 2:30 pm to 4:30 pm
Venue: SINGAPORE POLYTECHNIC
 500 Dover Road
 Singapore 139651
 Lecture Theatre (LT) 4A, located at T4A

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Recommended Roles and Area of Considerations

Team Leader / Project Manager

Architect

Mechanical Engineer & Electrical Engineer

Civil & Structural Engineer

Quantity Surveyor

Builder

Specialist (DfMA, Etc.)

Production personnel (Multimedia/Power point slides/Etc.)

Notes:

- Min. 3 students and max 8 students to form a team
- Self-grouping to the above arrangement
- Only one submission per team

Progress (Guide)

Stage 1 Tasks - Analysis, Proposal, Collaboration, Concept Model, Day 1 Summary Report

- | | |
|---|--|
| <ul style="list-style-type: none">• Analysis diagrams• Summary Reports• Conceptual presentation sketches, models or scripts | <ol style="list-style-type: none">1) Research, Analysis and Studies2) Site, Function, Space, Sustainability, Form and Constructability3) Collaboration, Discussion and Conclusion |
| <ul style="list-style-type: none">• 2nos of A1 Panels | <ol style="list-style-type: none">4) Strategic Computational Design approach and innovation uses with Dynamo/Grasshopper & BIM platform including:<ol style="list-style-type: none">i. Attributes setting,ii. relationship buildingiii. data interoperabilityiv. parametric design – Conceptual Design (Modularity, Flexibility, Adaptability & Multiplicity) |

Stage 1 Target Progress

- Analysis diagrams
- Summary Reports
- Conceptual presentation sketches, models or scripts
- 2nos of A1 Panels

*Software preferences are self determined

*Above suggested file formats are common software used in Singapore

Interim Submission (Local)

Stage 2 Tasks – Design Development, Coordination, Design Documentation, Day 2 Summary Report

- | | |
|---|---|
| <ul style="list-style-type: none">• Architectural Drawings (Plans, Sections, Elevations, Isometric and other 3D Views)
(Suggested Scale 1:1000; 1:500; 1:100; 1:50)• Construction Details
(Suggested Scale 1:20; 1:10; 1:5; 1:2) | <ol style="list-style-type: none">1. Design Development<ol style="list-style-type: none">i. Detailed design documentation for typical modules including servicesii. Connection Detailsiii. Module configurations
(Materials, Sizes, Modules for Adaptability, Flexibility and Multiplicity, Data Extraction)2. Collaboration, Discussion and Conclusion
(Data Interoperability and Monitoring) |
| <ul style="list-style-type: none">• A4 Summary Report | <ol style="list-style-type: none">3. Coordinated Model and integrated design documentation for 3 disciplines4. Summary Report |

Interim Submissions (Locals)

- | | |
|--|---|
| <p>All items completed in Stage 1 and Stage 2 to be submitted by 9pm (Recommended)</p> | <ul style="list-style-type: none">• 2nos A1 Panels, (300dpi)<ul style="list-style-type: none">• Panel 1: Analysis, Proposal, Collaboration, Concept, etc• Panel 2: Design Development, Details & Design Integration, etc• A4 Summary Report (max. 5pages) |
|--|---|

Progress (Guide)

Stage 3 Tasks - Construction planning, Site Management, Cost Estimation, Consideration of Facility Management, Day 3 Summary Report

- Excel, diagrams, etc.

1. Construction / assembly planning and scheduling
2. Site Management
3. Module delivery, storage and hoisting logistics
4. Sequencing of module installation until completion

- A4 Summary Report

1. Data extraction and Management
2. Cost estimation (\$/sqm)
3. Consideration of Facility Management
(nos of light fittings, equipment, performance attributes, etc)

Stage 3 Progress

- A4 Summary Report (Excel, diagrams, etc.)

*Added points for participants who submit according to recommended timing

Final Submission (Compulsory)

Stage 4 Tasks – Presentation Panels, Presentation Slides, Simulation video of building installation, Multimedia video documentation, Final Consolidated Report

- | | |
|---|---|
| <ul style="list-style-type: none">• Multimedia, 4nos of refined A1 Presentation Panels in jpeg format (300 dpi)• PPT Slides for Final Presentation | <ol style="list-style-type: none">1. Presentation Panels showing all stages of project output2. Presentation slides |
| <ul style="list-style-type: none">• 1 Video AVI format (max. 2.5mins)• Max. 10 Pages A4 Reports* | <ol style="list-style-type: none">1. Simulation video of building installation (max. 3mins)2. Documentation of pre-competition research, collaboration strategy, learning points, etc. |

Final Submissions

All items to be submitted by 9September 2016, 9pm (Compulsory submission timeline)

- Multimedia, 4nos of refined A1 Presentation Panels in jpeg format (300 dpi)*
 - Panel 1: Design Quality: Analysis, Proposal, Collaboration, Concept, etc
 - Panel 2: Design for DfMA: Design Development, Details & Design Integration, etc
 - Panel 3: Project Delivery: Construction sequence and site planning
 - Panel 4: Summary and Conclusion
- PPT Slides for Final Presentation*
- 1 Video AVI format (max. 2.5mins for Part 1 and Part 2)*
- Max. 10 Pages consolidated A4 Report (Day 1 to Day 3)*

*All items to be submitted online by 9September 2016, 9pm (Singapore time)

*Multimedia to showcase

Part 1 Documentation of overall competition process

Part 2 Documentation of computational approach (Design, Analysis, Collaboration/Integration & Documentation)

*PPT Slides

Structured according to Judging Criteria

*A4 Report

- Font: Calibri, size 10

- Exclude content page

- Additional information to be attached as appendix (max. 5 pages)

*Only shortlisted teams will be notified by 16 Sep 2016, for 23 Sep 2016 presentation

Computational BIM (Creativity and Innovation)

Consideration Pointers

1. Pre-design

- *Target and objectives (Architects, C&S, M&E)*
- *Attributes setup*
(*Sustainability – lux level, building openings, ventilation, solar, lights; LEAN - time, resources factors, Structural System, M&E system*)
- *Collaborated and Multi-directional communication*

2. Conceptual / Design Development

- *Strategic Form Modelling*
 - *Modularity*
 - *Flexibility*
 - *Adaptability*
 - *Multiplicity*
- *Rule Base design*
- *Procedural design*

3. Design Documentation/Tender

- *Automated information modelling*
- *Production Management (Modelling for production instead of drafting)*
- *Script Library (Reusable and can be further modified and developed)*
- *Data consistency and Interoperability (analysis & simulation)*

4. Construction Phase

- *Time, Resources and Task management (Relationship setup with attributes)*
- *Quantity/Material takeoff (data extraction and management)*
- *Visualized with graphs*

5. Operation & Management Phase

- *Data Extraction*
- *Consistency in data from design to hand over*
- *For maintenance prediction (performance)*

DfMA Considerations (Construction & Planning)

Consideration Pointers

1. Construction planning (Scheduling)

- Hoisting time of one module: __minutes
- Production rate of factory: __modules/day
- Storage capacity of factory: __modules
- Project timeline __months (max)
- Sequence of works

2. Site planning (logistic & storage allocation)

- Access and deliveries
- Traffic routing and accessibility into site
- Delivery and loading area
- Equipment: __Number of cranes of __ loading capacity (if any)
- Tower crane coverage
- Storage provision of modules on site: Enough for __days worth of installation

3. Design Pre-fabrication

- Connection details and treatment of joints
- Standardization, modularization and adaptation

4. Costing

- Data Extraction (Area, Number and type of components)
- Estimation by Area, Materials, Resources, Equipment, facilities and etc.
- Integrated M&E Services consideration
- MEP main lines to fit circulation areas: number and size per service type

Judging Criteria

Criteria	Scorings
Design Quality Team effort in overall planning, research, design and presentation	(30%)
Design for DfMA The ability to demonstrate multiple design options using computational BIM and other design tools to arrive a optimum solution to meet sustainability, productivity and DfMA considerations. (modularity, flexibility, adaptability, multiplicity, etc.)	(40%)
Project Delivery The ability to demonstrate the design can be constructed easily using standard and modular yet flexible components in the shortest possible erecting time, least costs and manpower.	(30%)
*Computational BIM to be incorporated throughout	

Prizes

Prize	Cash Rewards (Sgd)	Plaque & Certificate
First Prize	\$ 5000.00	<ul style="list-style-type: none">• One Plaque per group• One certificate per member
Second Prize	\$ 3000.00	
Third Prize	\$ 2000.00	
Merit (max. 6nos)	\$ 800.00	
Other participants	-	<ul style="list-style-type: none">• Certification of Participation

Online Submission



Online Platform

Google Drive for submission

Accessibility

- Organizer will send two (2) google drive dummy links to the team leaders' via email (to be registered to the access links)
- Each participating team shall have test the accessibility to the assigned folders.

Submission day and time

- **7 September 2016, 9pm**
- **9 September 2016, 9pm**
- Singapore time zone, UTC+08:00

Information Management



Reference Folder

Contain all necessary competition information and references including:

- Design Brief
- Deliverables
- Templates and etc.

Submission Folder

- Organizer will send two (2) google drive dummy links to the team leaders' via email (to be registered to the access links)
- Each participating team shall have test the accessibility to the assigned folders.