BIM-related issues

shared during the BIM Steering Committee Dialogue with Engineers, ACES/IES Members

1) Cost, fee and time for BIM effort
2) Preparing Engineering Students for BIM
3) Difficulties in hiring/training BIM staff
4) Technical BIM trouble-shooting
5) BIM Submission
6) TA(D) Index

Extras:

BIMSG.ORG blog – free to download MEP objects

Revised fee schedule

1) Cost, fee and time for BIM effort

Clients' perspective

- BIM is stated upfront in contract, so consultants should price in effort of BIM

Engineers' perspective

- Client is unable to fully appreciate extra upfront effort nor accept data directly from BIM models. Thus all deliverables become 2D-based

Ongoing / Suggested Solutions

- Clients are learning importance of specifying clearly BIM requirements and enforcing it throughout their project.
- Engineers play an important part in guiding the client on recognizing BIM effort and maximizing benefits in the project process

(see examples in next slide)

1) Cost, fee and time for BIM effort

Example #1

- MOHH has embarked on 2 pilot projects where consultancy tenders state that Structural Engineers are to price in effort and other considerations, towards delivery of ST BIM for construction tender release
- MOHH has in-house BIM expertise to monitor and ensure that design BIM meet various specific MOHH BIM requirements for coordination, tender, Asset Model delivery etc.

1) Cost, fee and time for BIM effort

Example #2

- For one PA's small-scale project, PA discussed with their structural engineer on releasing a portion of the native ST BIM model (Multi Purpose Hall) for tender release
- The structural engineer counter-suggested to PA (and convinced the architect and M&E engineer) that it would be more meaningful if the part-model was released as a 3-discipline coordinated native BIM instead
- PA accepted the suggestion, and is considering this for future projects.

2) Preparing Engineering Students for BIM

Engineers' perspective

- BIM curriculum in school is inadequate to prepare graduates for working world
- Staff spend a lot of time teaching graduates on how to use BIM, apart from the many other things they have to teach them

Ongoing / Suggested Solutions

- BCA has set up a Built Environment Skillsfuture Tripartite (BEST) taskforce, which include reps from CIJC and IHLs, to improve the IHLs' implementation of education on green/productivity/BIM for students and existing professionals, and attract more entrants to the Built Environment

2) Preparing Engineering Students for BIM

Ongoing / Suggested Solutions

- PEB, IES and ACES are represented in the taskforce
- Some of the topics discussed include increasing industry involvement and competency of IHL lecturers to ensure that students are not just learning text-book knowledge
- Exploring proposal to introduce inter-disciplinary capstone projects sponsored by industry to allow students from different disciplines to learn collaboration

NUS National University of Singapore

NANYANG TECHNOLOGICAL UNIVERSITY SINGAPORE

SINGAPORE UNIVERSITY OF TECHNOLOGY AND DESIGN
Established in collaboration with MIT

SIT SINGAPORE INSTITUTE OF TECHNOLOGY

3) Difficulties in hiring / training BIM staff

Engineers' perspective

- Difficult to hire BIM staff
- Engineers design, not model
- Drafters have challenges learning BIM, especially older generation

Ongoing / Suggested Solution

- Some engineers, such as LSW Engineers, have embarked on the challenge of training all design engineers to directly design in BIM, reducing the need for BIM modellers or drafters to translate design into BIM

4) Technical BIM trouble-shooting

Engineers' Perspective

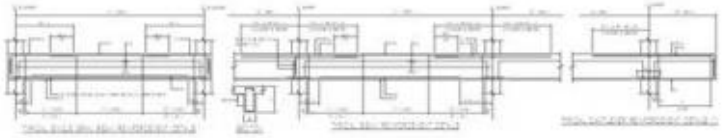
- Not possible to represent Rebars in BIM
- Design management too frequent for engineers to catch up with clients and architects to update design in BIM

Ongoing / Suggested Solutions

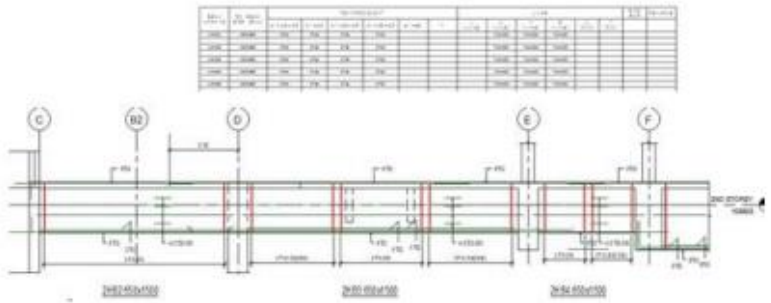
- Code of Practice for BIM e-Submission states 3 options for rebar representation
- Representation of rebar spacing has been simplified for CD Shelter submissions
- Apps are available for automated updates of elements, e.g.
  - BIM update via Excel, using Ideate BIMLink
  - "Cut Opening" app that automatically inserts openings in Archi/ST BIM models to help MEP design

Fig. 19 - QP three (3) options for structural detailing in native BIM

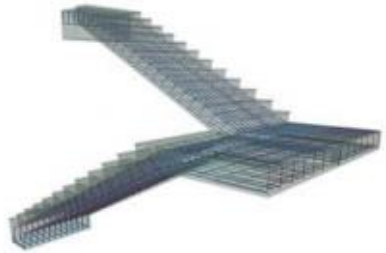
Option 1: Schedule



Option 2: (3D objects + 2D annotations created in BIM)



Option 3: 3D Connections



5) BIM e-submission

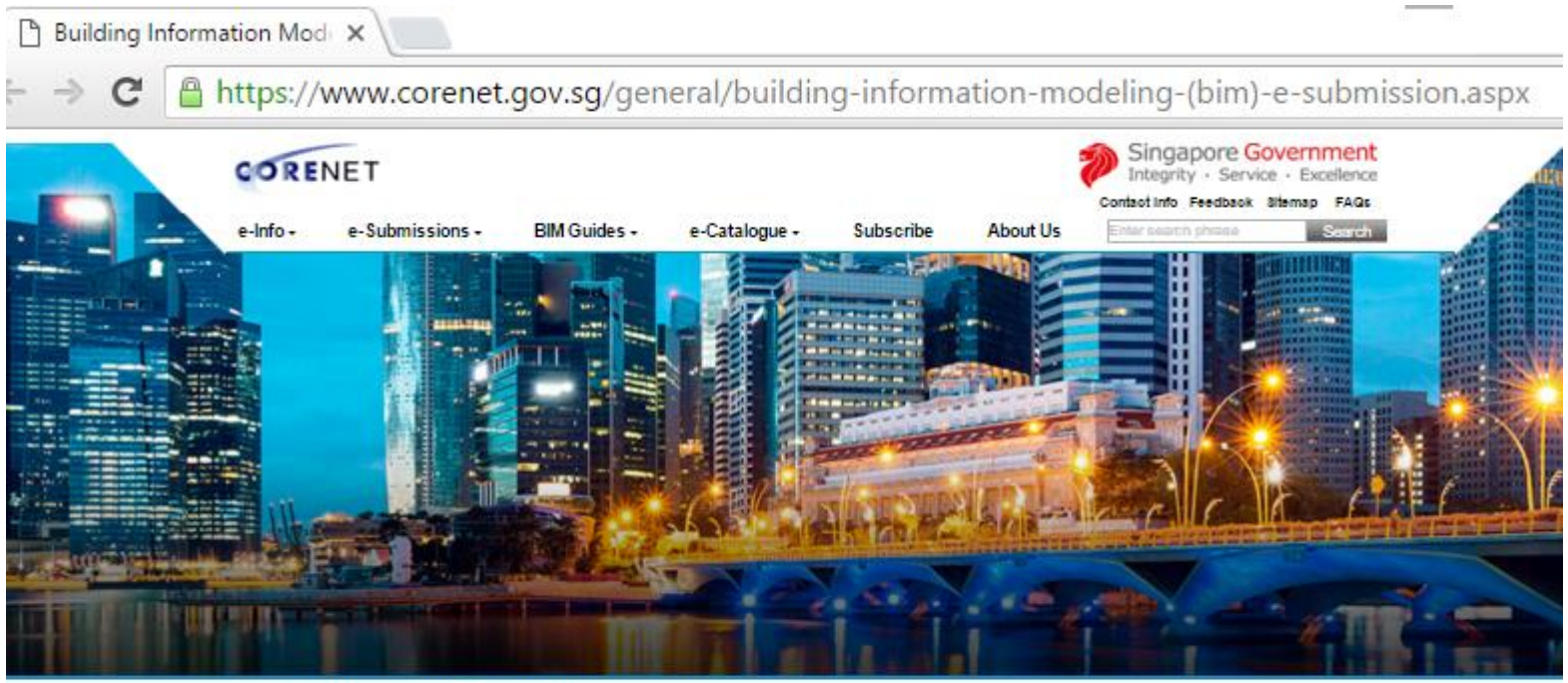
Engineers' perspective

- What does voluntary native BIM engineering submission entail? Can my firm use our in-house BIM standards to interpret the COP for engineering BIM e-submission for the relevant agency's consideration?

Ongoing / Suggested Solution

- Yes, BCA has been facilitating meetings between relevant agencies' processing officers with firms who want to submit voluntary BIM e-submission, to ensure their proposed native submission format will be processed successfully.

5) BIM e-submission



Building Information Modeling (BIM) e-Submission >

Building Information Modeling (BIM) e-Submission

Announcement

With effect from 19 October 2016 (for architectural plans) and 01 October 2017 (for C&S/MEP Engineering plans), BCA will accept voluntary BIM e-submissions in Native BIM format. Such submissions should be prepared in accordance with the prevailing CP.

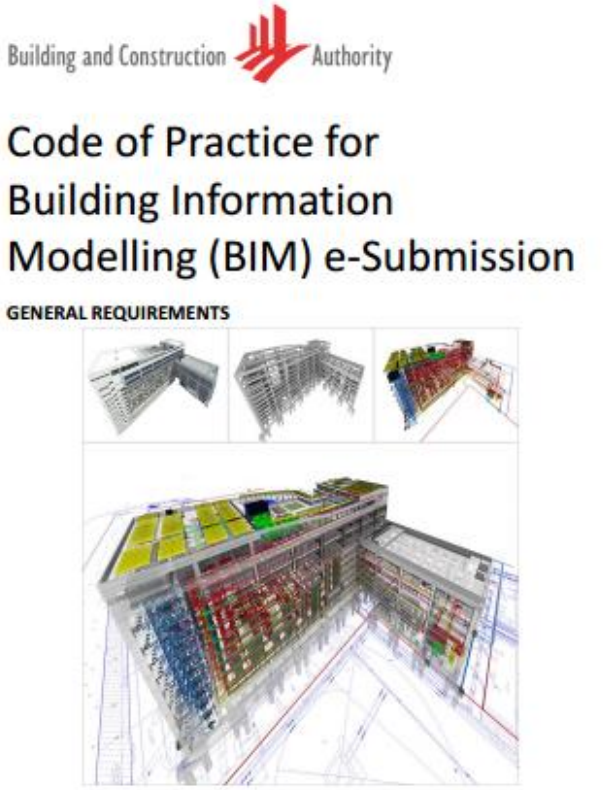
Circular on 'Changes to Building Information Modelling (BIM) e-Submission Requirements for Plan Submission to BCA'

Codes of Practice for BIM e-Submission (4 parts):

- General Requirements v1.0
- General Requirements v1.1
- Architectural Requirements v1.0
- Architectural Requirements v1.1
- Civil & Structural (C&S) Requirements v1.0
- Civil & Structural (C&S) Requirements v1.1
- Mechanical, Electrical & Plumbing (MEP) Requirements v1.0
- Mechanical, Electrical & Plumbing (MEP) Requirements v1.1

If you have any comments or feedback on the Code of Practice for BIM e-Submission, please email to the respective officers.

- General & Architectural Requirements - mary_ann_samaniego@bca.gov.sg
- C&S Requirements - mary_ann_samaniego@bca.gov.sg
- MEP Requirements - liu_ziwen@bca.gov.sg



6) QFM Productivity Indices – Technology Adoption (Design) Index

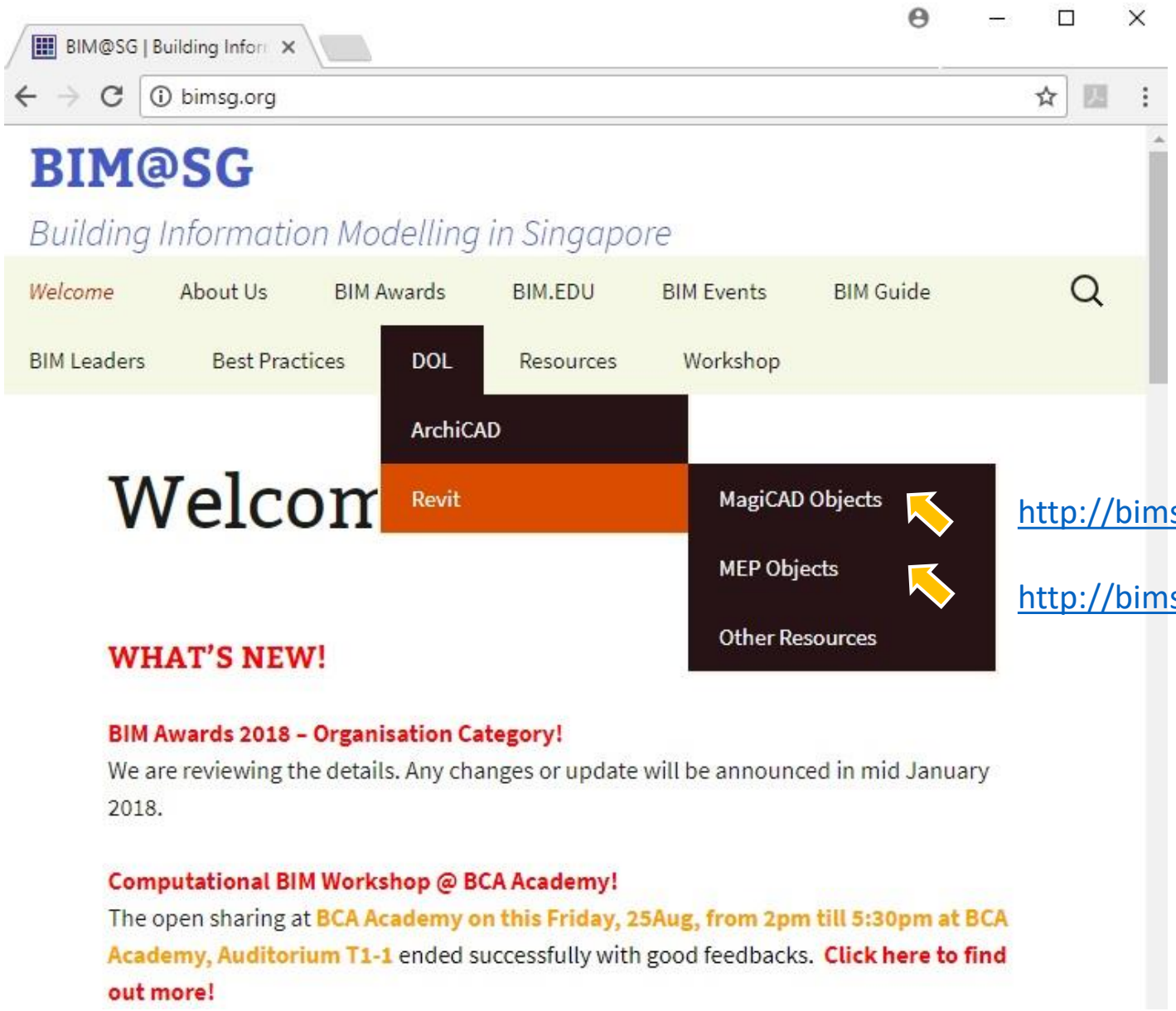
Engineers' perspective

- BIM capability should not be equated to BIM funding quantum in public tendering evaluation

Ongoing / Suggested Solutions

- BCA's earlier proposal on evaluating track records was not accepted
- Moving forward, BCA is finalising on the reduction of BIM funding quantum to 1%, instead of 2%. Thus impact of BIM fund quantum towards QFM is reduced
- Further details will be released to industry at a later date

BIMSG.ORG blog – free to download MEP objects



http://bimsg.org/design-object-library/revit/magicad-objects/

http://bimsg.org/design-object-library/revit/autodesk-revit-mep-cp83/

Revised fee schedule

Since June 2012, BCA has provided Government Procurement Entities a reference set of payment schedules for projects that are using BIM.

The BIM payment schedules for the consultants reflect a 5% shift from the construction to design/tender stage to allow for the increased efforts at the earlier project stages, as recommended in the Singapore BIM Guide.

3.4 COMPENSATION EXPECTATIONS

In general, additional upfront preparation is required for one to use BIM effectively and to build up an information rich BIM model as compared with the current use of 2D for design and construction. This upfront work starts with design consultants working on the BIM model at various design stages, as well as with builders who build a construction model from 2D drawing or design BIM model. It is essential to recognise this upfront effort by all the parties.

The Singapore BIM Steering Committee, recognizing that BIM adoption increases efforts at the design stages, recommends a 5% shift in percentage-based consultancy fee payment, from the Construction to Design stages, as illustrated in Table 4. However, this upstream shift of effort does not necessarily result in increased in the consultancy fees.

Table 4: Example of a Payment Schedule in a BIM Project

Project Stage	% change from non-BIM to BIM payment
Preliminary Design	+2.5
Planning Approval	0
Design Development	+2.5
Tender and Award	0
DESIGN STAGES *	**+5**
Construction Administration	-5
Post construction	0
CONSTRUCTION STAGES*	**-5**
Percentage change in total fees	0

* refers to cumulative percentage fees

When releasing design BIM from designers to builders, there may be some cost implications. The Singapore BIM Steering Committee also recommends that this cost should be made known to all builders at the tender stage.