



香港岩土及岩土環境工程專業協會
ASSOCIATION OF GEOTECHNICAL &
GEOENVIRONMENTAL SPECIALISTS (HONG KONG)



BIM – Challenges in BIM implementation in HK

*Simon Ng
Associate Director & Regional Senior BIM Manager*

Agenda

1. Why BIM fails?

- a) True BIM? Fake BIM?*
- b) Top 10 BIM Killers*

2. Re-engineering

- a) Information Management*
- b) BIM is game changer*
- c) Think out of box*

3. Conclusion

About Simon

- § BEng (Hons) in Mechanical Engineering, HKU
- § MSc in Environmental Engineering, HKUST
- § 20 years of experience in engineering design and management
- § Young BIMer of the Year, BIM Excellence Awards, Construction Industry Council Hong Kong (2014)
- § Chairman, Autodesk Industry Advisory Board, Hong Kong (AIAB) (2015 – 2017)
- § Professional Member, Hong Kong Institution of Building Information Modelling (MHKIBIM)
- § Speaker, Autodesk University, China (2013, 2016, 2017)
- § Speaker, HKIBIM Annual Conference (2013, 2015)
- § Speaker, AIAB Annual Conference (2014)



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About WSP

- § As one of the world's leading professional services firms, WSP provides engineering design, planning, management and other professional consultancy service
- § With more than 37,700 talented people in 500 offices across 40 countries
- § More than 2,400 employees in China
- § Participate in a number of large-scale projects and iconic construction engineering design
- § In ENR "International Engineering Design", ranked for the first time in two consecutive years among 225 companies.

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After May 2017



Before May 2017



ENR THE TOP 225

WSP Ranks Number 1

Super High Rise Project



International five-stars Hotel project



Financial Centre Project



Large Scale Project



WSP BIM – offers full range of BIM services across project whole life cycle



Singapore Culture Centre



Hans Shanghai Jing An Building



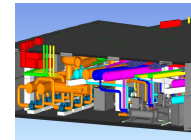
Hong Kong Kerry Centre



Jinhua Crown Hotel



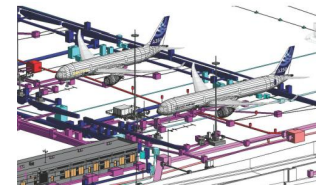
Hengqin International Business Service Base & Supporting Project Phase 1



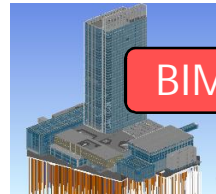
Xujiahui Centre



Guangzhou Southern Tower



HK Airport Midfield Apron Dev. Works (P568)



Shanghai Jing An Kerry Centre



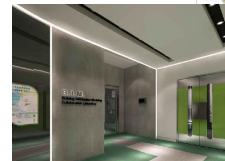
Hung Shui Kiu Public Retail Housing



Tianjin City CBD, TJ117



(HOS) 2016, HKHA



HK CIC Training Centre



Huawei Suzhou R&D Centre



Shenzhen Ping An Financial Centre South Tower



Logan Property Guangming 玖龙台 Project

BIM Design

BIM Consultation

BIM Coordination

BIM Management

BIM Facility Management

BIM Training

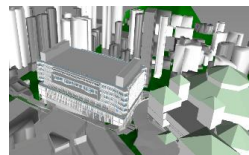
5



大连东港朗亭



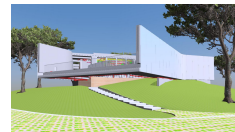
HK No. 1 Ede Road



HKJC Happy Valley



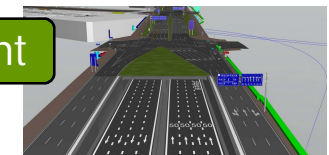
So Kwun Wat (The Bloomsway)



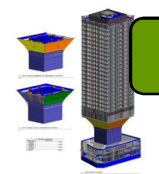
M + Pavilion West Kowloon Cultural



HK Arch.SD Data Centre



Shenzhen QIANHAI (V VI) GUIWAN QIANWAN



Asian House at 1 Hennessy Road



Hong Kong Madonnell Road



Tsuen Wan West Station TW5



Ho Man Tin (The Mantin Height)



HK EPD, Organic Waste Treatment Facilities, Phase 1



Rezoning for Wah Fu Est. & Reception Site Development at Pok Fu Lam South



NTT Financial Data Centre



Home Ownership Scheme, HKHA



WHY BIM FAILS

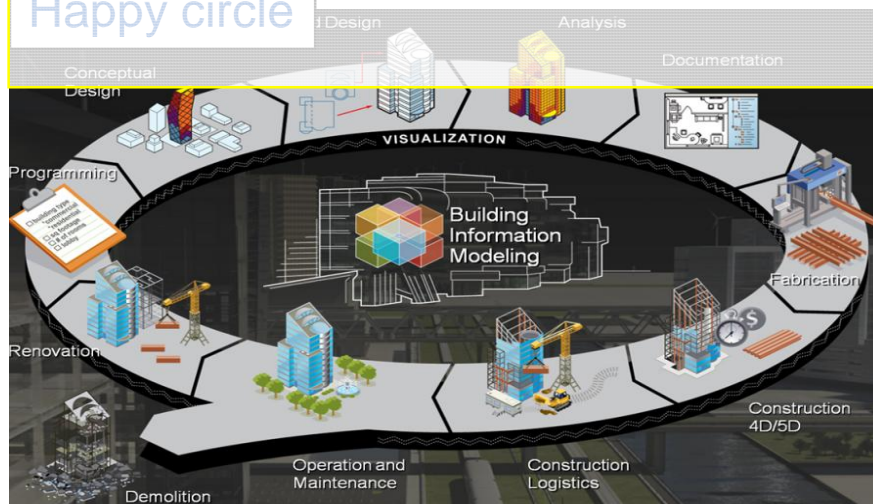
6

wsp

7



Happy circle



Magic words



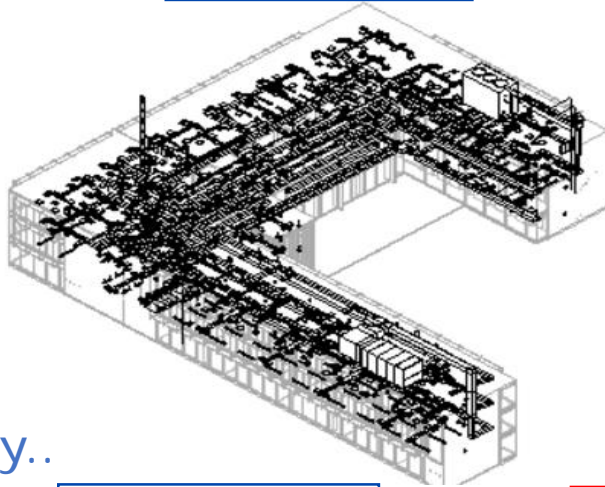
TRUE BIM? FAKE BIM

8

True BIM? Fake BIM?

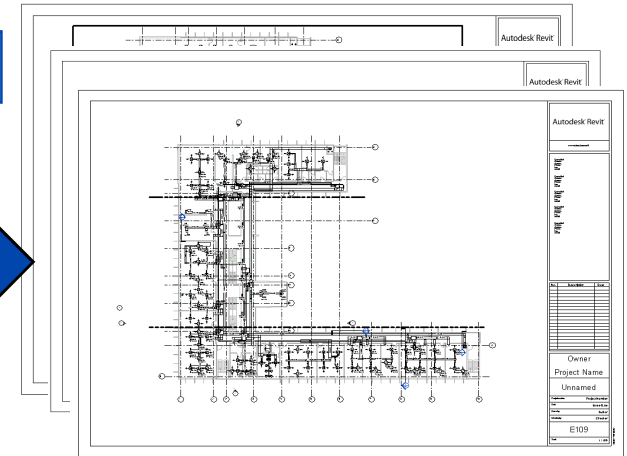
Should be..

Design in BIM



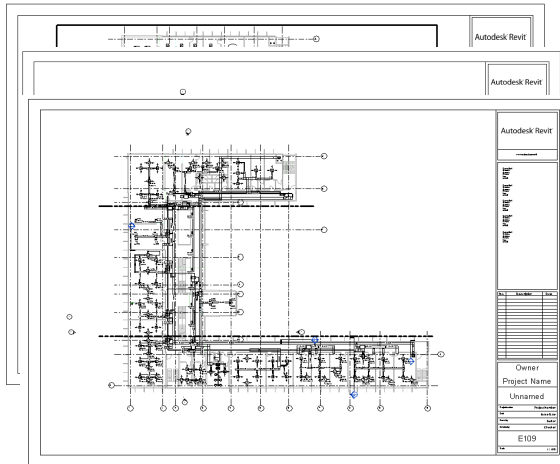
BIM Coordination

Drawings produced by BIM

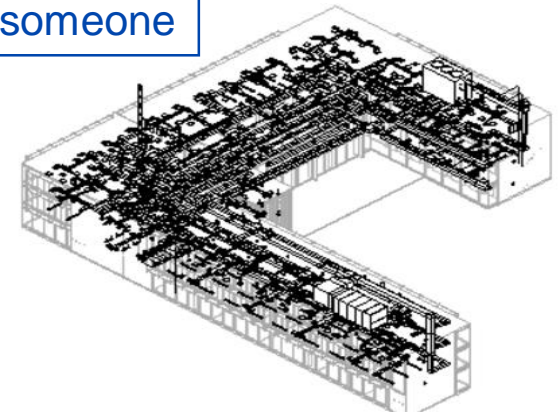


Reality..

Design in CAD

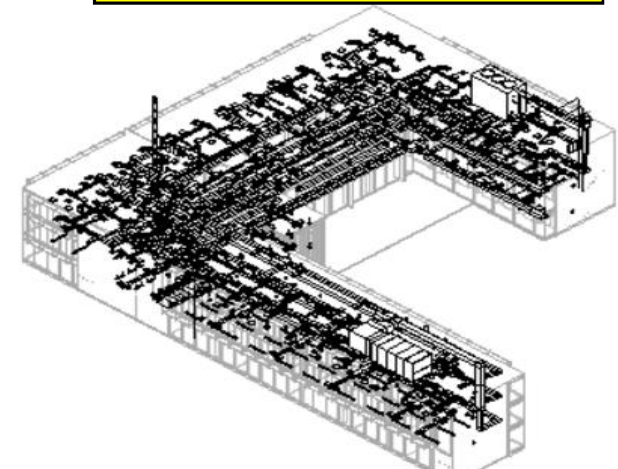
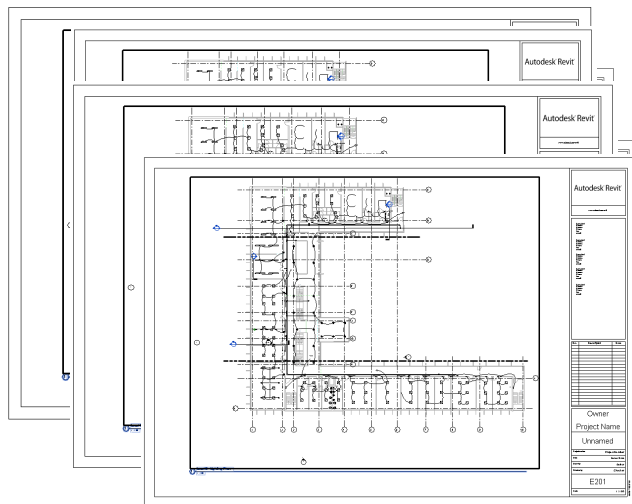
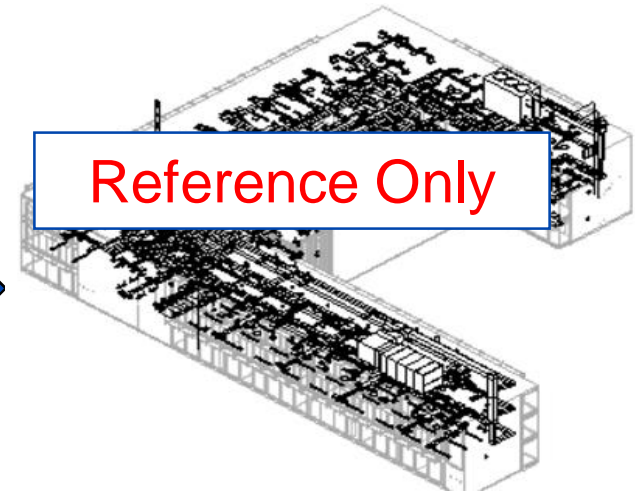
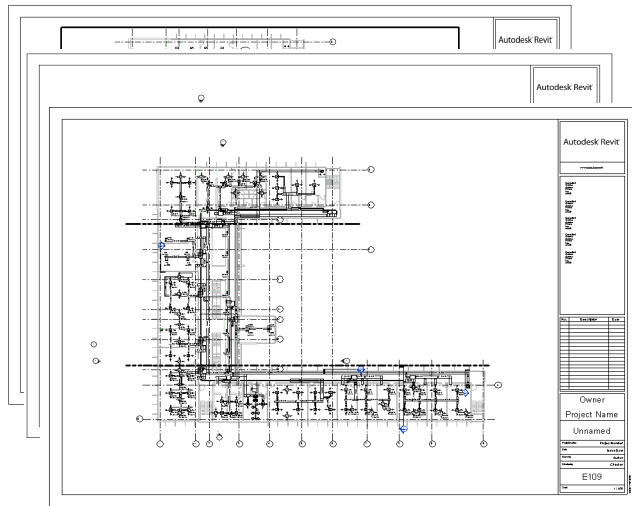


Outsource to someone



1. I don't have time, so issue CAD (deliverable) first
2. BIM will not affect my schedule
3. I can outsource, lower my cost

Consequence of fake BIM



No trust on BIM data

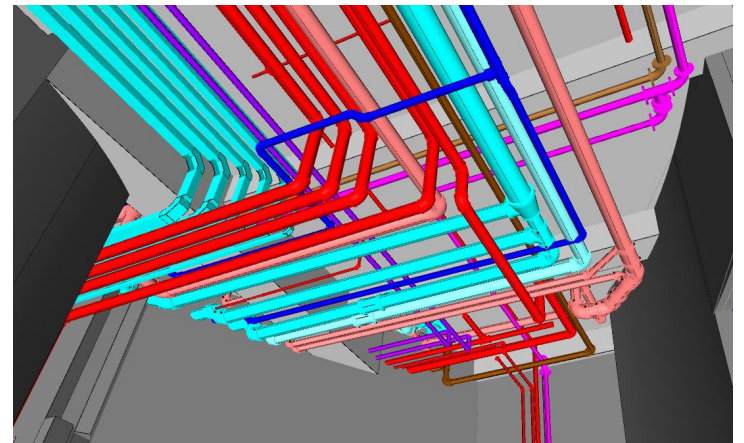
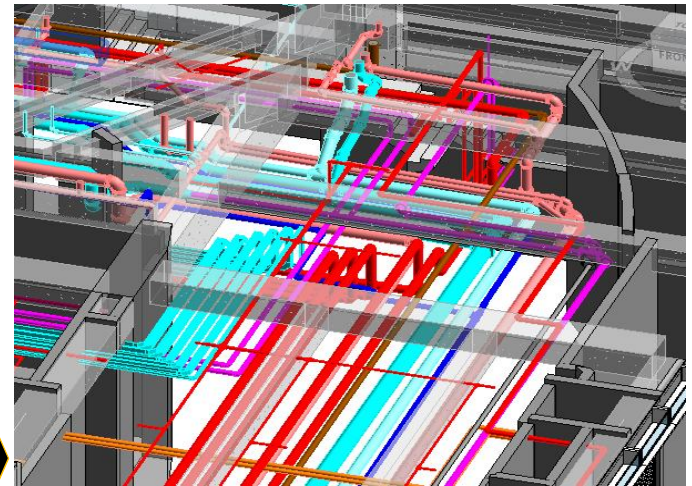
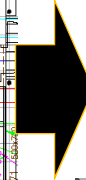
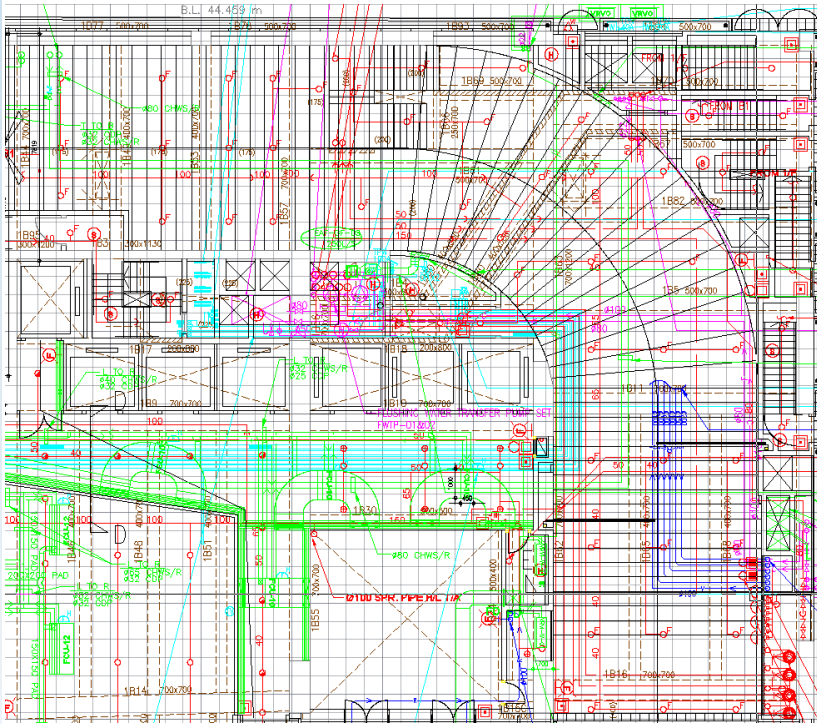
As build BIM

Top 10 BIM Killers

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1. Increase workload and liability

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2. Cannot meet CAD standard

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Development Bureau

Catalogue of CSWP Symbols and Line-styles V1.07.00

Catalogue of CSWP Symbols and Line-styles V1.07.00

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Catalogue of CSWP Symbols and Line-styles V1.07.00

The Government of the Hong Kong
Special Administrative Region

Development Bureau

Catalogue of

CSWP Symbols and Line-styles

Version 1.07.00

Date of Issue: 18 December 2007

Class 570 - AIR-CONDITIONING, VENTILATION

Symbol Name	Graphical Presentation	Description
ADR0201		SECTION OF SUPPLY AIR DUCT
ADR0202		SECTION OF RETURN AIR DUCT
ADR0203		SECTION OF PRIMARY AIR DUCT
ADR0204		SECTION OF EXHAUST AIR DUCT
ADR0205		PROPELLER FAN
ADR0206		DOMESTIC EXHAUST FAN
ADR0207		CASED AXIAL FAN
ADR0208		CENTRIFUGAL DUCT FAN

Class 590 - PARTS & ACCESSORIES

Symbol Name	Graphical Presentation	Description
ADR0401		EXPORT VALVE
ADR0402		REMOTE CONTROL QUICK CLOSING GATE VALVE
ADR0403		DOUBLE FOOT VALVE
ADR0404		PRESSURE/VACUUM RELIEF VALVE
ADR0405		PRESSURE REDUCING VALVE
ADR0406		PRESSURE REDUCING SET
ADR0407		HIGH LEVEL CUT OFF VALVE
ADR0408		TEMPERATURE CONTROL VALVE

Class 740 - SANITARY FIT

Symbol Name	Graphical Presentation	Description
740UR1		URINAL - PLAN
740UR2		URINAL - ELEVATION
740UR3		URINAL - SIDE ELEVATION
740UR4		URINAL DIVIDER
740WB1		WASH BASIN - PLAN
740WB2		WASH BASIN - ELEVATION
740WC1		WATER CLOSET - PLAN
740WC2		WATER CLOSET - ELEVATION

Class 620 - POWER

Symbol Name	Graphical Presentation	Description
ADR0409		SOCKET OUTLET - 15A SWITCHED WITH PILOT LIGHT
ADR0410		SHAVES SUPPLY UNIT
ADR0411		SOCKET OUTLET - 175W 1A WATERPROOF
ADR0412		SOCKET OUTLET - 30A 5PN
ADR0413		SOCKET OUTLET - 60A 5PN
ADR0414		FIXED CONNECTION UNIT - 1A
ADR0415		FIXED CONNECTION UNIT - 1A
ADR0416		FIXED CONNECTION UNIT - 1A

Appendix A

Layer Naming Convention for
Building Plan Area and Compensation Calculation

1. Building Plan Area Calculation

1.1 Layer Naming Convention

Field 1 - Agent Responsible Code (ARC) e.g. AGA

Field 2 - Building Plan Area Type (Sub-class)

Field 3 - CSWP Element Code assigned for Building Plan Area Calculation (Class)

Field 4 - Agent Responsible Code (ARC) e.g. AGA

Field	Description	Length/Type	Coding
1	Agent Responsible Code	3 (alphabetic)	See www.hkdp.gov.hk/comp
2	CSWP Element Code assigned for Building Plan Area Calculation (Class)	3 (numeric)	4) (B2 for Arch/MD & Plan/PA area calculation, N 100 for Land/PA area calculation)
3	Building Plan Area Type (Sub-class)	1 (numeric)	See section 1.1.1
4	Addition/Deduction Type	1 (alphabetic)	See section 1.1.2

1.1.1 Building Plan Area Type

Code	Building Plan Area Type
1	Site Coverage (SC) - Non-Domestic
2	Site Coverage (SC) - Domestic
3	Construction Floor Area (CFA)*
4	Ground Floor Area (GFA) - Non-Domestic
5	Ground Floor Area (GFA) - Domestic
6	Site Floor Area (SFA)*
7	Site Operating Floor Area (SOFA)
8	Usable Floor Area (UFA)
9	Usable Floor Area (UFA)
0	Open Space (OS)

* Note: For Arch/MD/PA area calculation only

PS/CSWP No. 01/2007

page 2 of 8

Development Bureau

CAD Standard for Works Projects V 1.03.00

Element Coding Tables

Class	Symbol Name	Graphical Presentation	Description
01	01-01		Class 01-01
02	02-01		Class 02-01
03	03-01		Class 03-01
04	04-01		Class 04-01
05	05-01		Class 05-01
06	06-01		Class 06-01
07	07-01		Class 07-01
08	08-01		Class 08-01
09	09-01		Class 09-01
10	10-01		Class 10-01
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00	00-01		Class 00-01

CLASS 01 - 09 - ELECTRICAL

CLASS 10 - 19 - MECHANICAL

Development Bureau


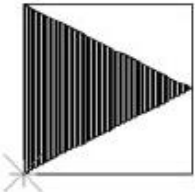
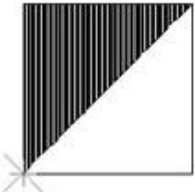
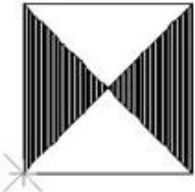
CAD Standard for Works Projects V 1.03.00

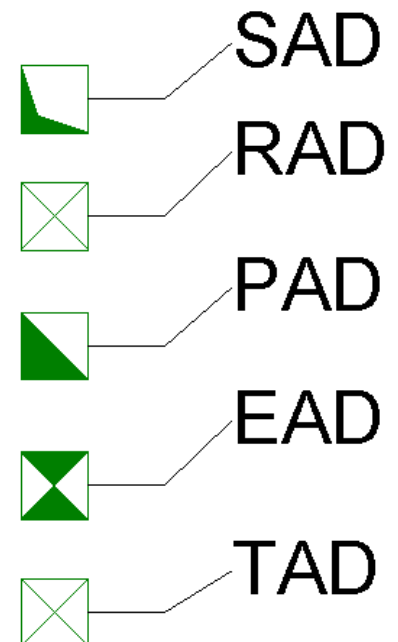
Element Coding Tables

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2. Cannot meet CAD standard

Class 570 - AIR-CONDITIONING, VENTILATION

Symbol Name	Graphical Presentation	Description
ADB201		SECTION OF SUPPLY AIR DUCT
ADB202		SECTION OF RETURN AIR DUCT
ADB203		SECTION OF PRIMARY AIR DUCT
ADB204		SECTION OF EXHAUST AIR DUCT



3. Cannot do Statutory submission



4. Too many clashes

Autodesk Navisworks										
Clash Report										
T001 ARC - Curtain Walls Vs STR - Columns	Tolerance	Clashes	New	Active	Reviewed	Approved	Resolved	Type	Status	
	0.05m	69	0	0	0	69	0	Hard	OK	
			Item 1			Item 2				
Image	Clash Name	Status	Distance	Grid Location	Date Found	Clash Point	Item ID	Layer Path	Item ID	Layer Path
T002 ARC - Curtain Walls Vs STR - Framing	Tolerance	Clashes	New	Active	Reviewed	Approved	Resolved	Type	Status	
	0.05m	67	0	0	0	67	0	Hard	OK	
			Item 1			Item 2				
Image	Clash Name	Status	Distance	Grid Location	Date Found	Clash Point	Item ID	Layer Path	Item ID	Layer Path
T003 ARC - Curtain Walls Vs STR - Floors	Tolerance	Clashes	New	Active	Reviewed	Approved	Resolved	Type	Status	
	0.05m	72	0	0	0	72	0	Hard	OK	
			Item 1			Item 2				
Image	Clash Name	Status	Distance	Grid Location	Date Found	Clash Point	Item ID	Layer Path	Item ID	Layer Path
T004 ARC - Curtain Walls Vs STR - Stairs	Tolerance	Clashes	New	Active	Reviewed	Approved	Resolved	Type	Status	
	0.05m	1	0	1	0	0	0	Hard	OK	
			Item 1			Item 2				
Image	Clash Name	Status	Distance	Grid Location	Date Found	Clash Point	Item ID	Layer Path	Item ID	Layer Path
	Clash1	Active	-0.09	1/K-1x3 : GF	2014/10/20 08:07:58	x:18.15, y:10.75, z:53.92	Element ID: 1246539	L20 File > P1T1 Clash Report 20141020.nwd > J2853_SKW_P1T1_S_All.rvt : 3 : location <Not Shared> > L20 > Walls > Basic Wall > 225mm THK > Basic Wall > Solid	Element ID: 1280495	L19 File > P1T1 Clash Report 20141020.nwd > J2853_SKW_P1T1_S_All.rvt : 3 : location <Not Shared> > L19 > Stairs > Cast-In-Place Stair > Concept Monolithic 2 > Cast-In-Place Stair > 1 mm Tread > 1 mm Tread > AEC_Concept - White
T005 ARC - Curtain Walls Vs STR - Walls	Tolerance	Clashes	New	Active	Reviewed	Approved	Resolved	Type	Status	

5. Super fast track project, too many changes



6. Culture of the industry

No Collaboration



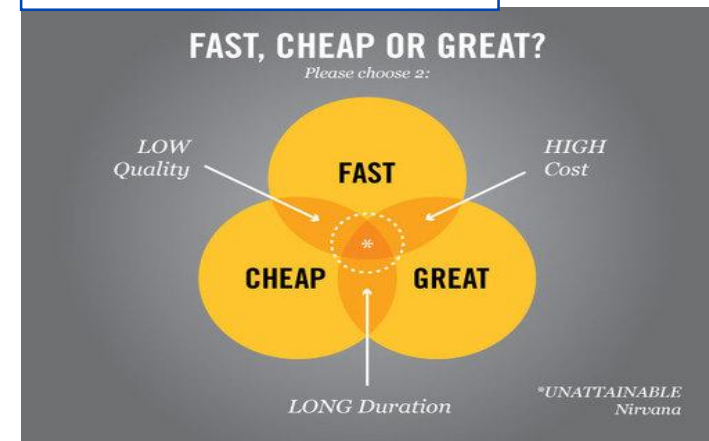
Finger pointing



Too much competition



Quality is not priority



7. Can build without BIM anyway



No need BIM



Coordination on spot 地盤夾

8. Not part of their professional

BIM = Draftsman

BIM = IT

CEng most important

Draftsman = low cost



10. Other excuses



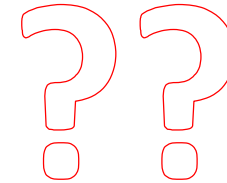
22

Other excuses...

- No Mandate – why so serious
- Other organisations haven't started yet, lets wait
- I am old, let young people do that
- No BIM standards
- Software too expensive
- Computer need upgrade first

What we can do?

1. Increase workload & liability
2. Cannot meet CAD standard
3. Cannot do Statutory submissions
4. Too many clashes
5. Super fast track / too many changes
6. Industry culture
7. Can built without BIM anyway
8. Not part of their professional
9. Oversell
10. Other excuses



What does “I” in BIM mean?

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What does “I” in BIM mean?

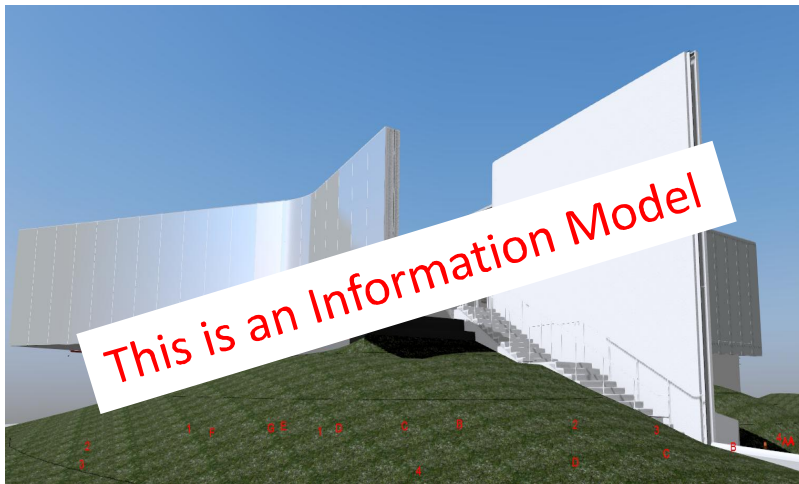
M+ Pavlion, West Kowloon Cultural District



Designers Rendering



Is the information in BIM model ready for construction?



BIM Model

Nope, depends on what LOD it is...



Opening ceremony

LOD – Level of Development

LoD	Definition	Stage
100	The model element may be graphically represented by the model with a symbol or other generic representation	Conceptual Design
200	The model element is graphically represented by the model as a generic system, object, or assembly with approximate quantities, size, shape, location and orientation	Schematic Design
300	The model element is graphically represented by the model as a specific system, object or assembly in terms of quantities, size, shape, location and orientation	Detail Design
400	The model element is graphically represented by the model as a specific system, object or assembly in terms of quantities, size, shape, location and orientation with detailing, fabrication, assembly and installation information .	Construction
500	The model element is a field verified representation in terms of size, shape, location, quantity and orientation.	As-built

Source:

HK Jockey Club BIM Standard

Equivalent to:

CIC HK BIM Standard

AIA E202-2008 "Building Information Modeling Protocol Exhibit"

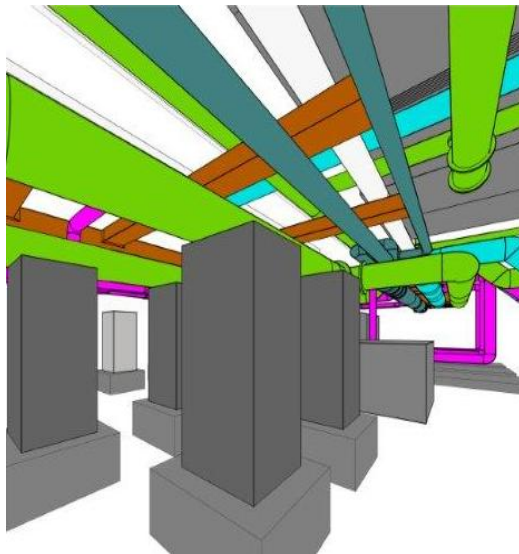
LOD – Level of Development

LOD = Level of Development
(not only “Level of Details”, but Maturity of information)

Date	Maturity of information		
1 year ago	A seminar in HKUST will be held on Q4	LOD100	Overall
3 months before seminar	A seminar in HKUST on 1st week of Nov, capacity approx. 200	LOD200	Approximate
1 month before seminar, start registration	A seminar in HKUST confirmed on 4 Nov, 9am, Lecture theater F is booked, max capacity of 200.	LOD300	Design (Plan)
1 day before seminar, final preparation	Seminar in HKUST, Lecture theater F on 4 Nov, 9am, 187 people registered , 1 is disable person so need wheelchair seat. 10 helper is needed.	LOD400	Act (include temp work)
After seminar	Seminar was held in HKUST, Lecture theater F, 4 Nov, 9:05am started, 165 people shown up	LOD500	As-is

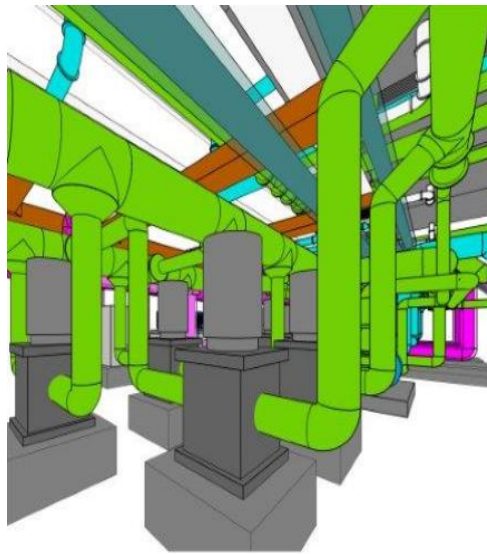
LOD – Level of Development

Schematic
Design



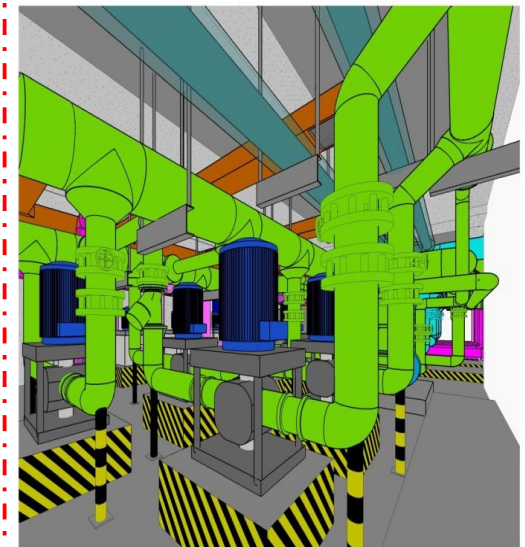
LOD 200

Detail Design /
Tendering



LOD 300

Construction /
As-build



LOD 400 / 500

1. “BIM design model for reference only”?

BIM Is information rich model, but should have clear explanation on information based on maturity:

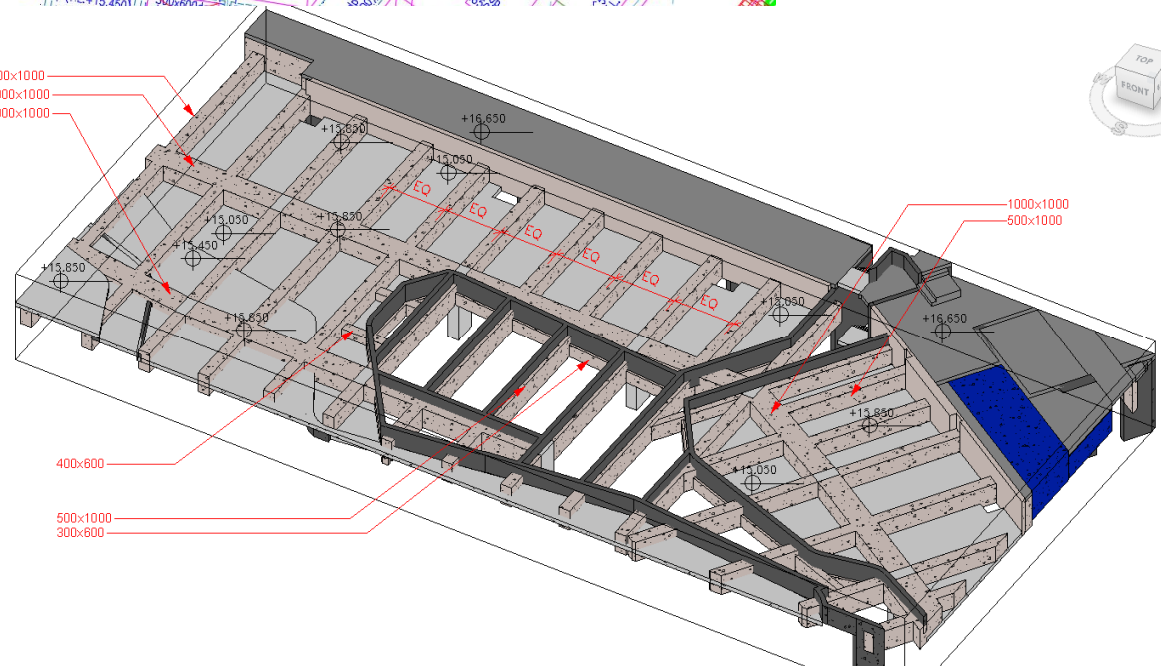
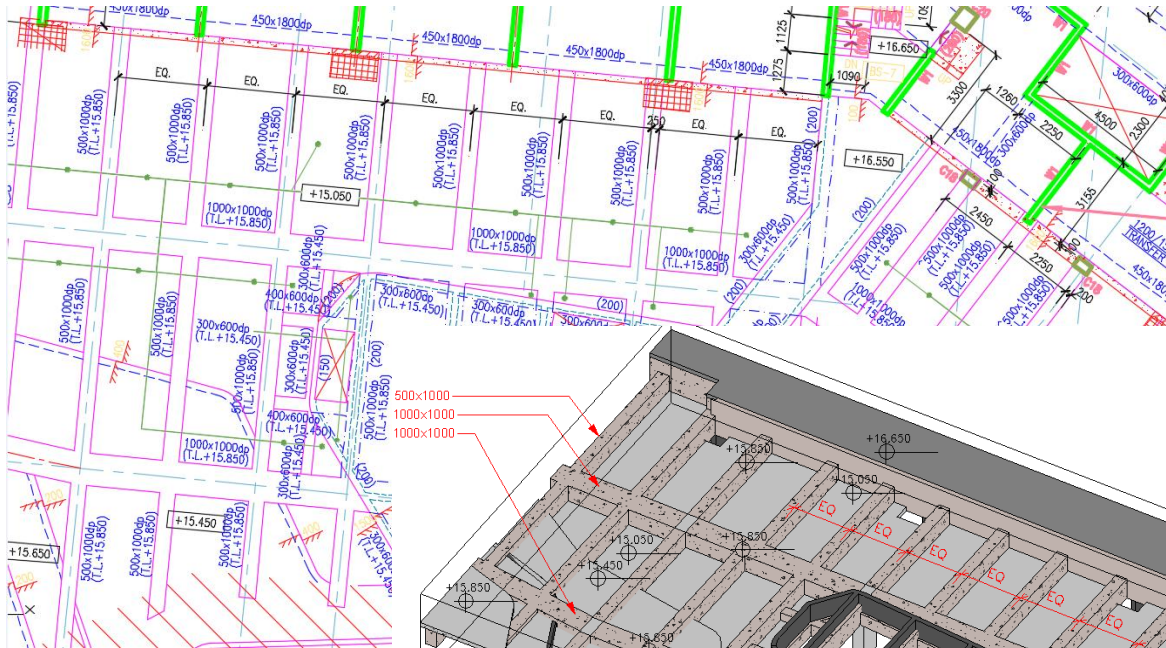
1. Design information for construction
2. Design intent
3. Indicative
4. Information not controlled

1. "BIM design model for reference only"?

1.1 Design Information for construction

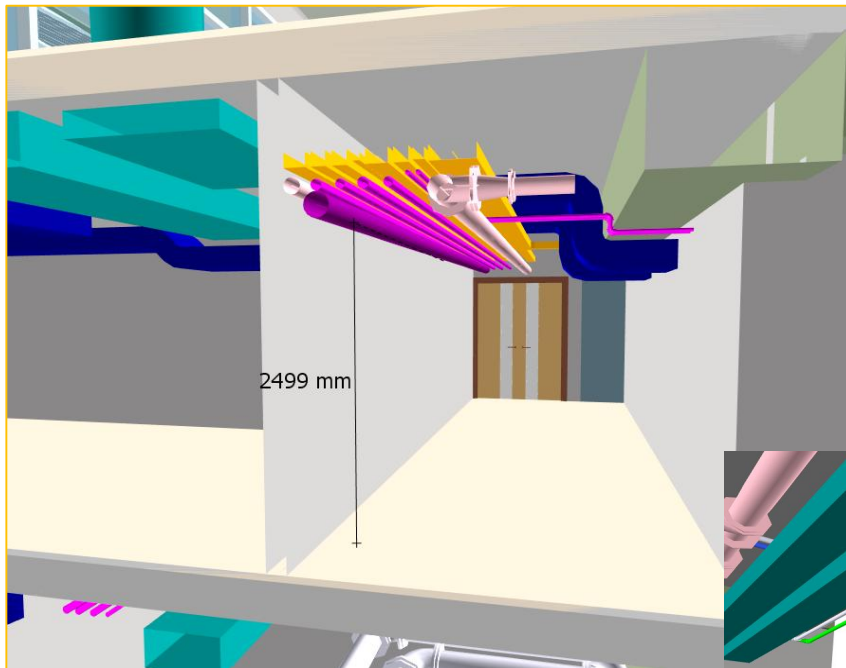
Examples:

1. Gridline, levels (SFL, FFL)
2. Size and setting out of beams and columns



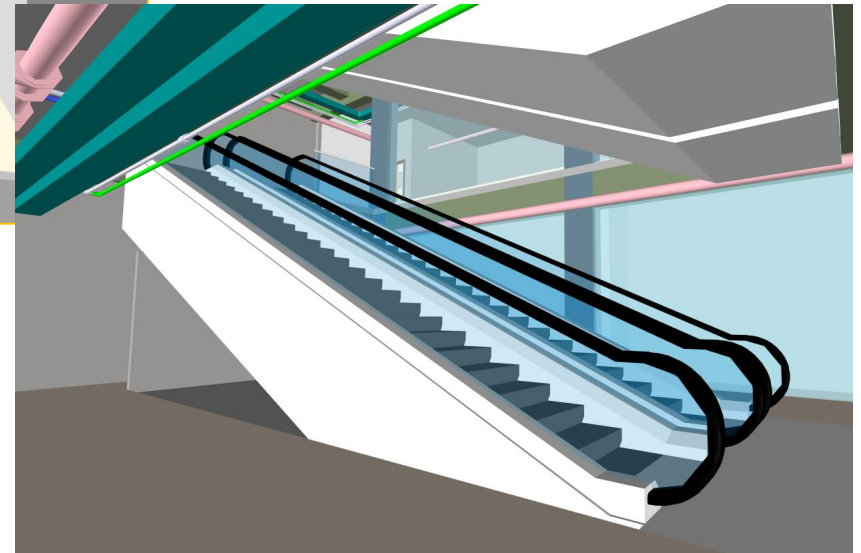
1. "BIM design model for reference only"?

1.2 Design inend



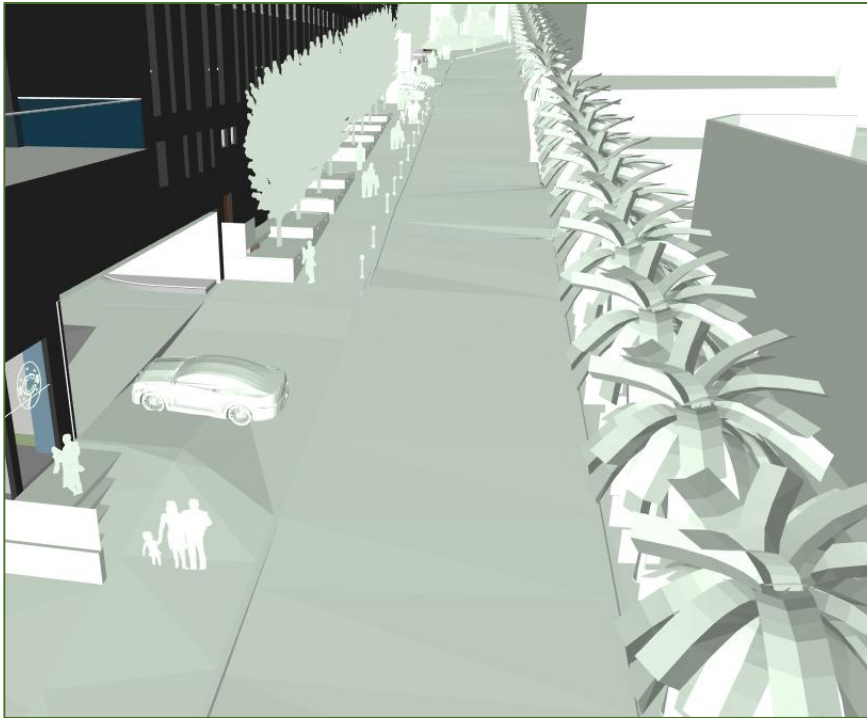
- Size, setting out and routing of ducts, pipes, cable containment

- Size and Setting out of Equipment, Fixture, Lift and Escalators.
- Panel and mullion size for Facade panel, glass and fins



1. “BIM design model for reference only”?

1.3 Indicative

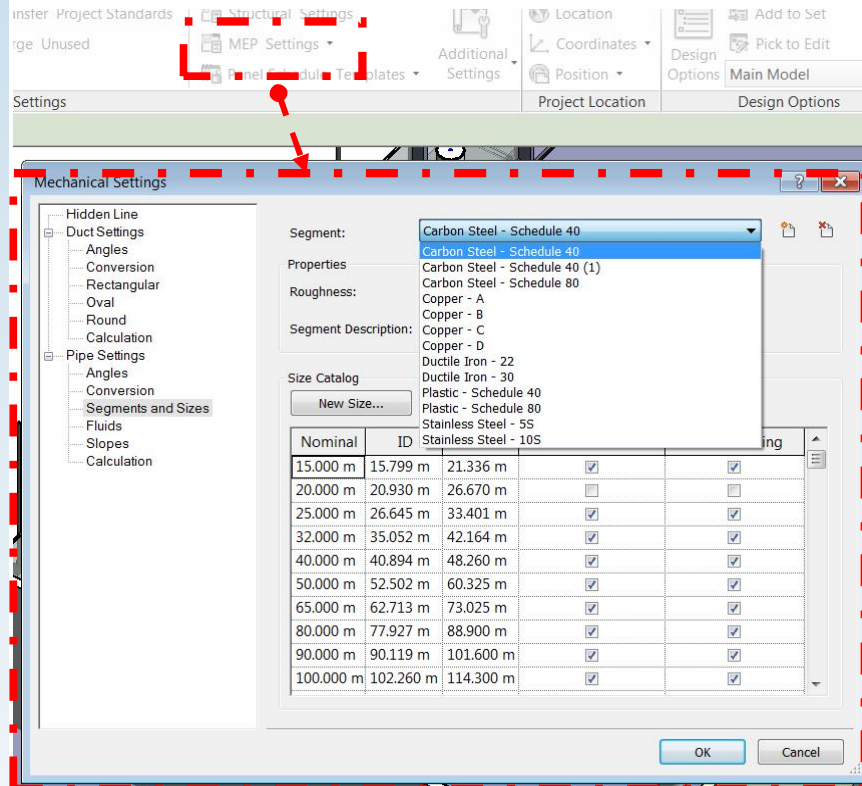


- Surrounding buildings, road and trees.
- Furniture and non-building equipment (if any)



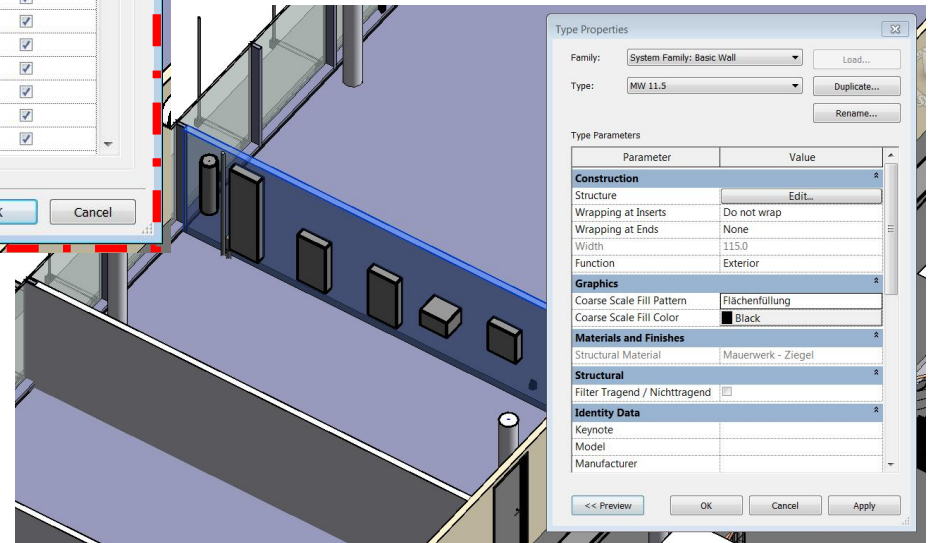
1. “BIM design model for reference only”?

1.4 Information not controlled

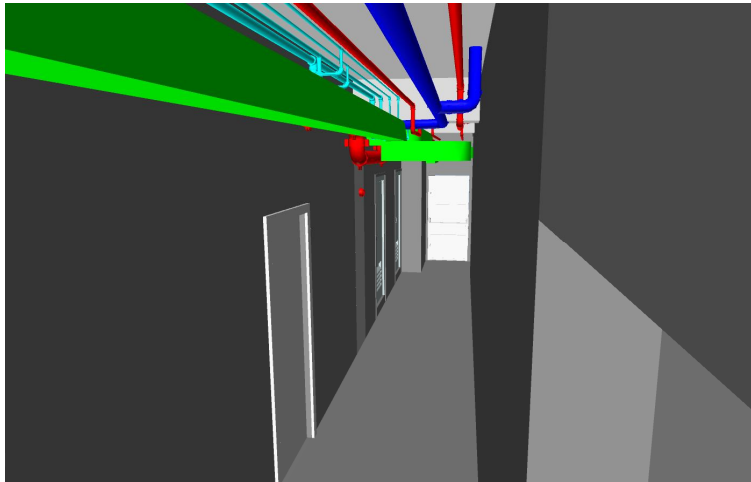


- Pipe material, nominal diameter

- Wall materials, color and texture
- Ironmongery



2. Level of Development (LOD)



LOD 300

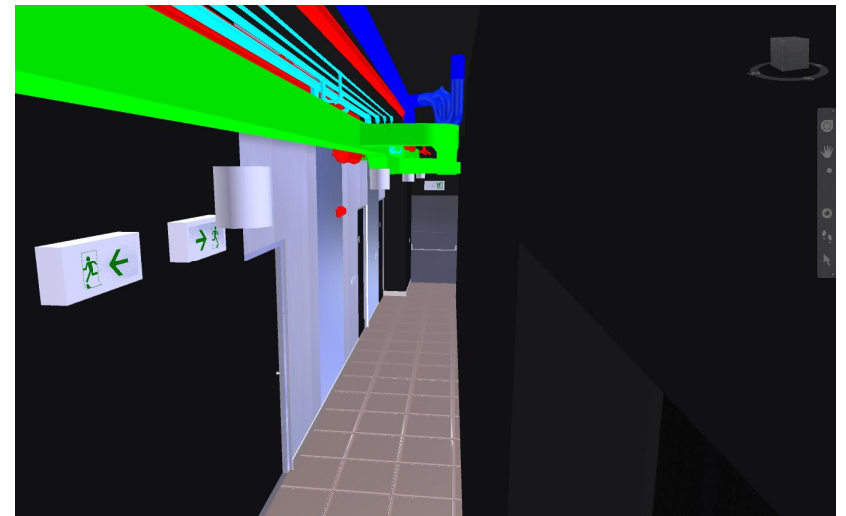
Setting out and routing of ducts, pipes, are the design intend from engineer.

It is contractor's responsibility to coordinate based on i) site condition, ii) material approval iii) contractor's design to propose routing for approval

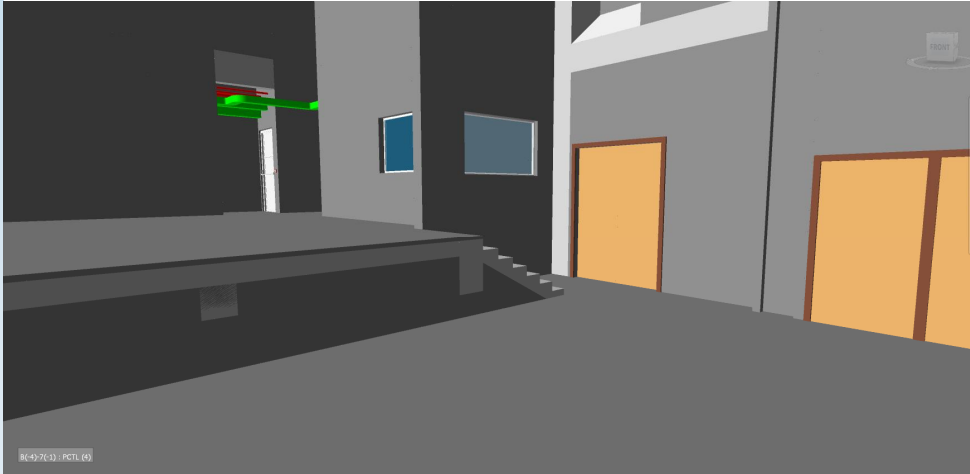
LOD 400/500

Setting out are the arrangement-to-be.

More detail such as adding trap in drainage pipe, lighting arrangement, exit sign.



2. Level of Development (LOD)



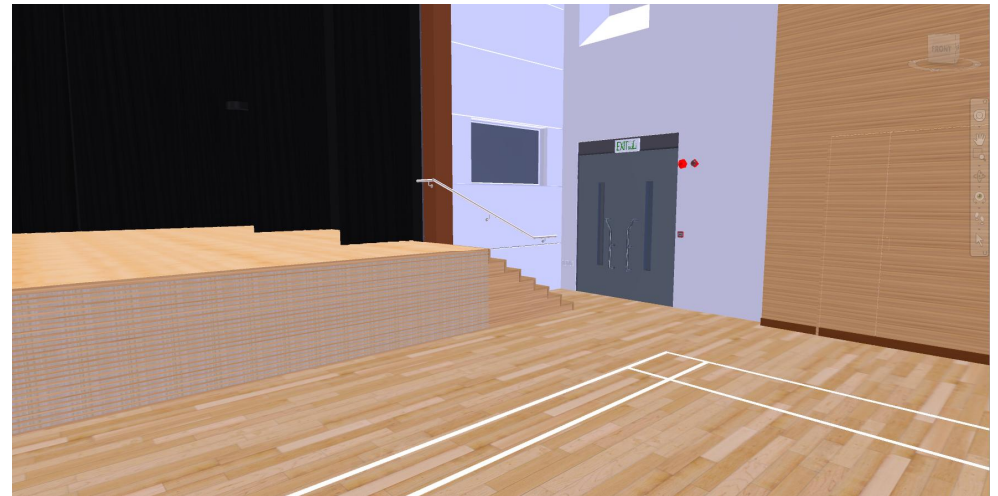
Following information
are not controlled:

- Type of Door
- Ironmongery
- Wall materials color and texture

LOD 300

Confirmed door type,
ironmongery, wall
materials

Add more details: exit sign, breakglass, alarm



LOD 400 / 500

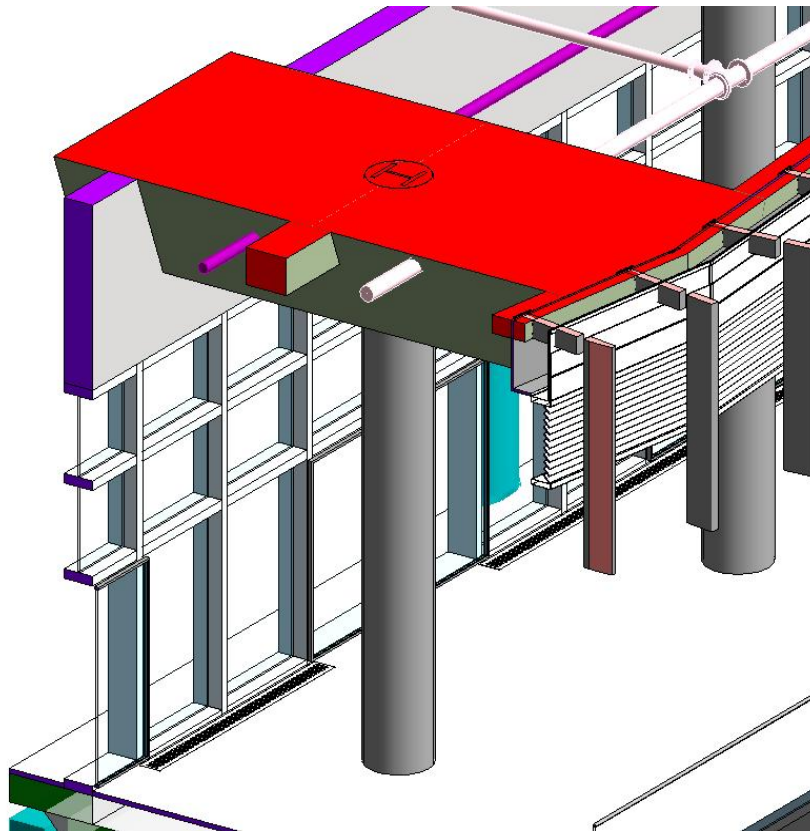
3. Clash Free model?

Which one matter?

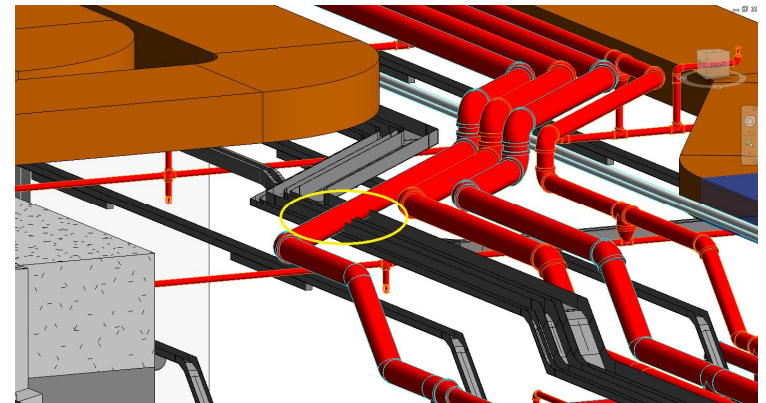
Clashes should be classified as:

- Penetrations
- Minor clashes not affect construction
- Software problem
- Real major clash

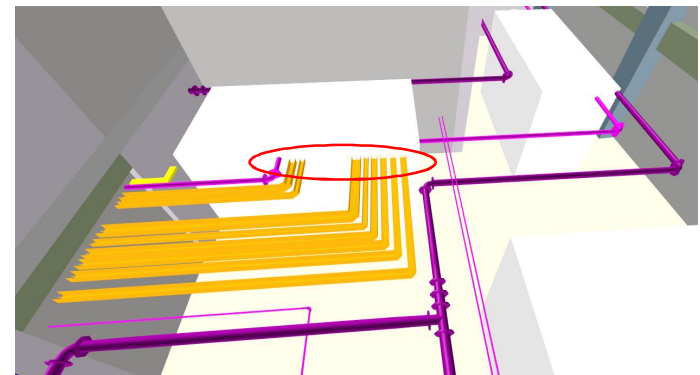
Openings



MEP self clashes



Connection to equipment



BIM is the game changer

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Opportunity ? Re- allocation of resources

Traditional Method

Design Drawing

Construction Drawing

Completion Drawing

Due to missing the chance

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BIM

Design Model

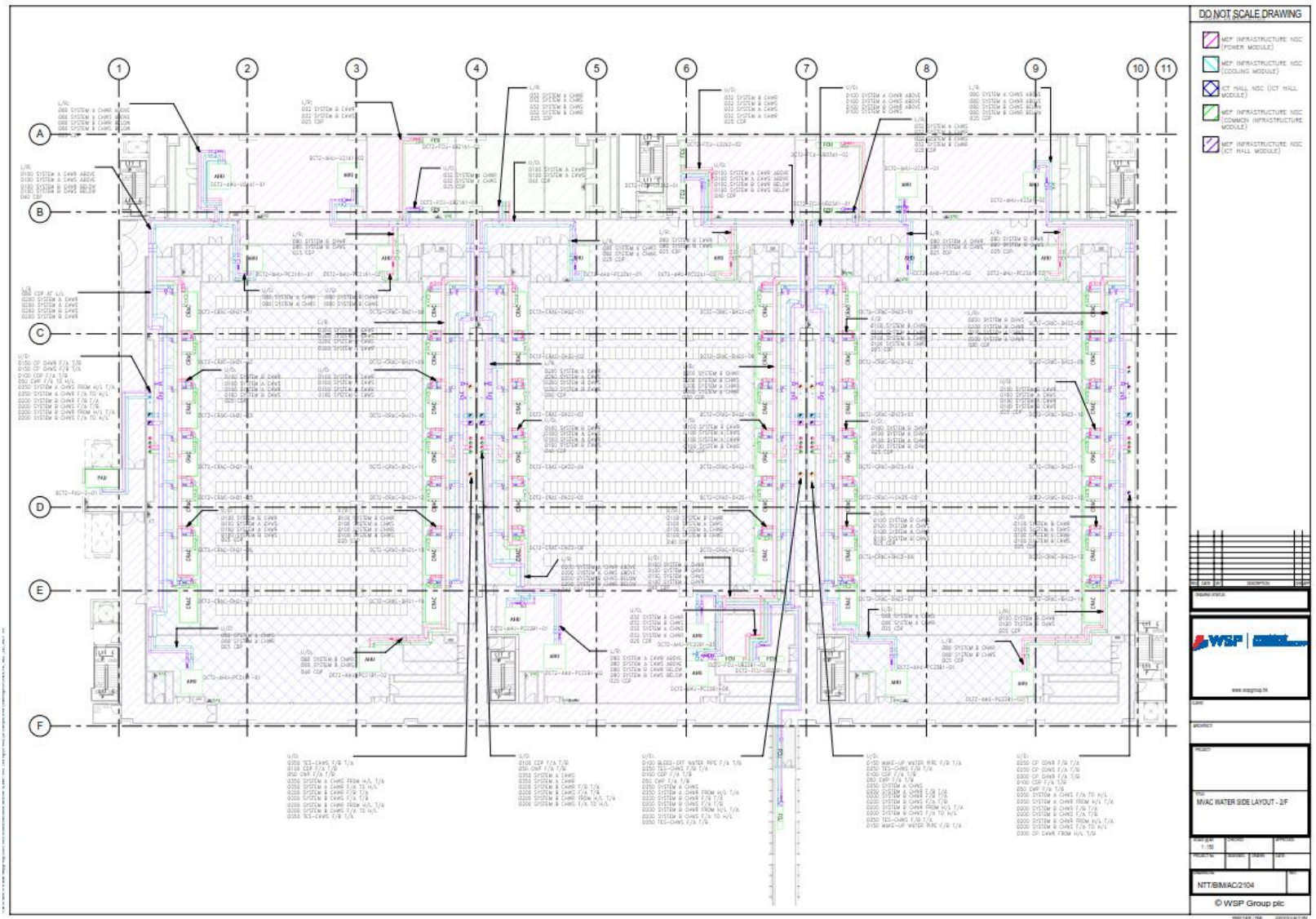
Construction Model

Completion model

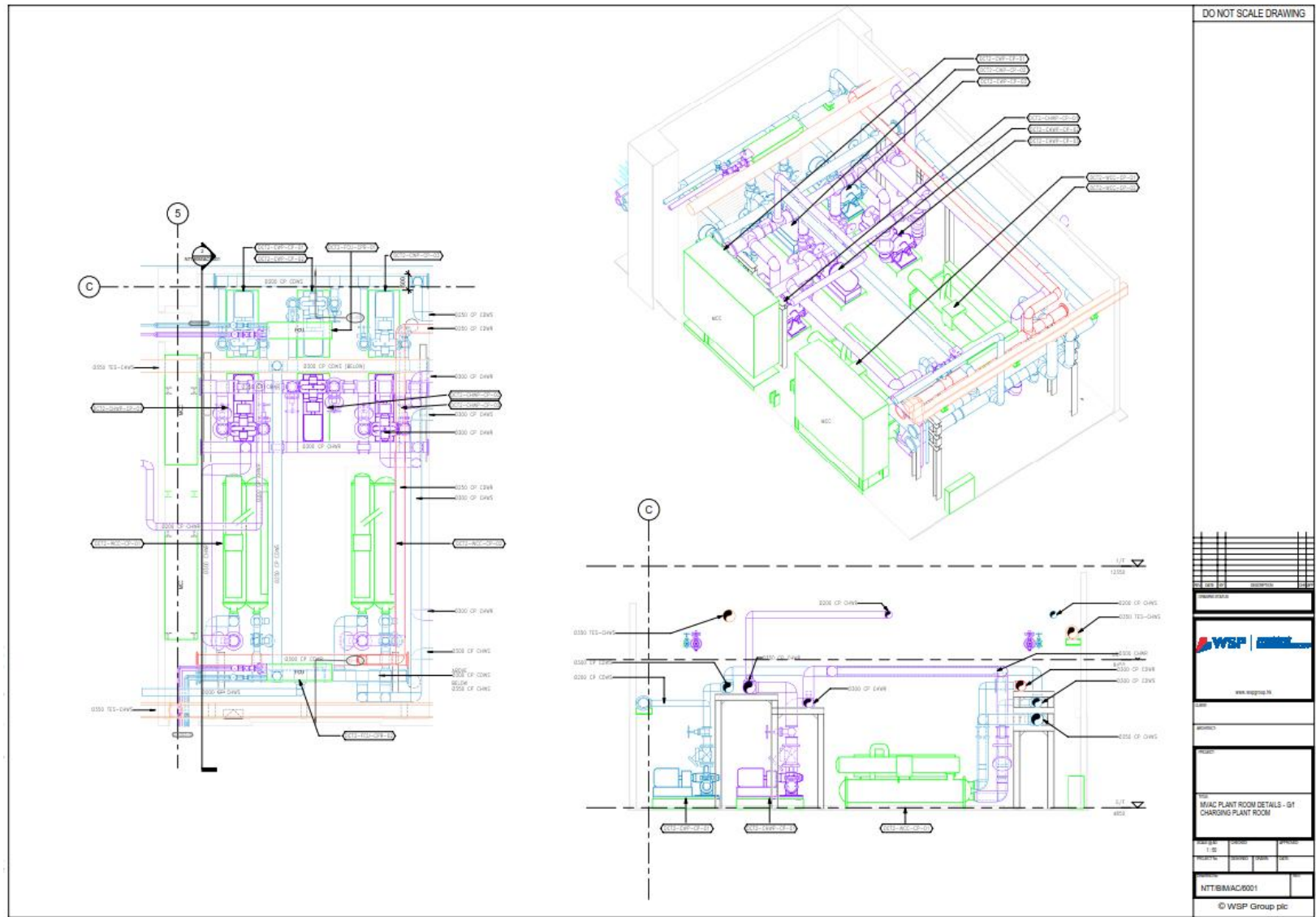
3D coordination force

Complete building data

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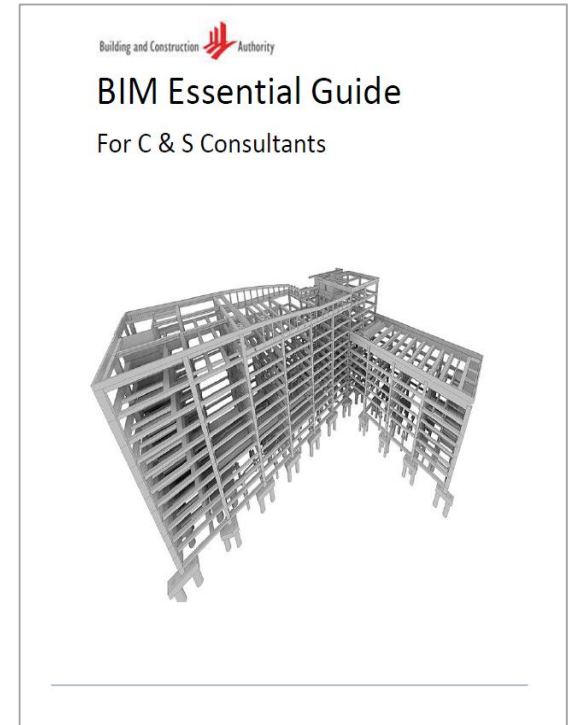
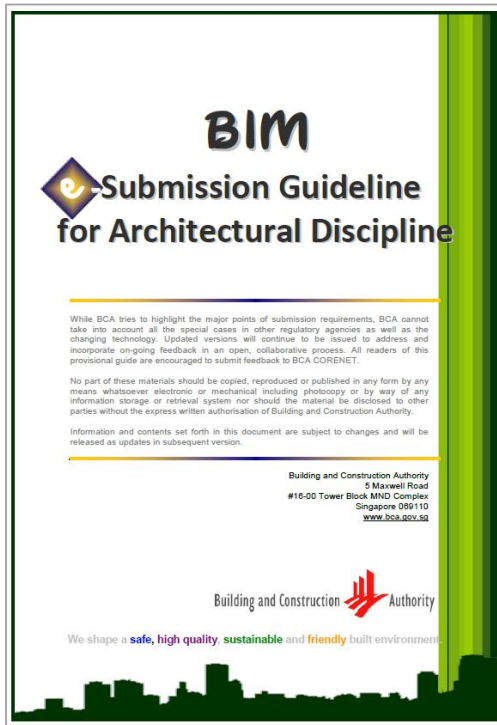


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BIM for Statutory submission

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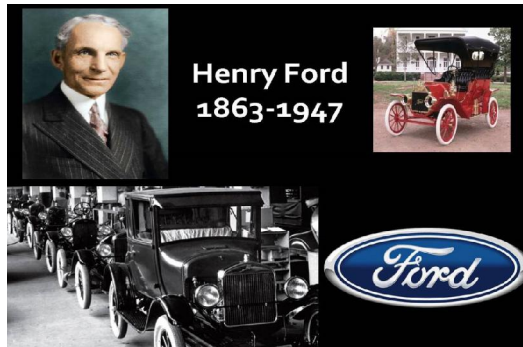


THINK OUT OF BOX

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Think out of the box



Henry Ford



Fed Smith – Founder of FedEx



Steve Jobs

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Conclusion

BIM Challenges, What we can do?

1. Increase workload & liability
2. Cannot meet CAD standard
3. Cannot do Statutory submissions
4. Too many clashes
5. Super fast track / too many changes
6. Industry culture
7. Can built without BIM anyway
8. Not part of their professional
9. Oversell
10. Other excuses

BIM is about game changer

BIM is Information Management

BIM is "think out of box"

Thank you!



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