



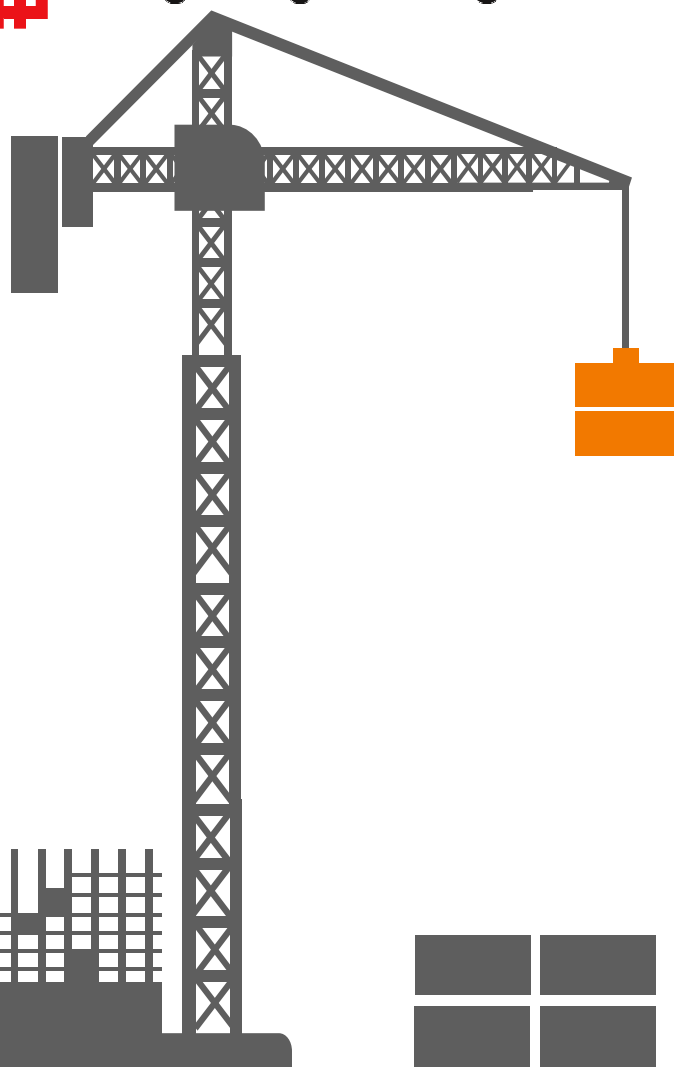
Hong Kong Housing Authority

Housing Authority Industry Forum

Innovative Construction Methods for HA Public Housing Developments

2 August 2019 (Friday)





Time	Forum Agenda
13:45 – 14:00	Forum Registration
14:00 – 14:15	Welcoming Speech
14:15 – 14:30	Group Photo
14:30 – 14:45	Introduction
14:45 – 15:15	Off-site prefabrication <ul style="list-style-type: none"> ➤ Presentation by Mr. KWAN Kai-sing (CSE/DC) ➤ Presentation by The Hong Kong Construction Association ➤ Panel Discussion and Q&A
15:15 – 15:45	Building Information Modeling (BIM) application in public housing developments <ul style="list-style-type: none"> ➤ Presentation by Mr. Kenneth LEUNG Tak-yan (CCE/2) ➤ Presentation by China BIM Expert for International BIM ISO Standards, China BIM Expert Committee ➤ Panel Discussion and Q&A
15:45 – 16:15	Break and Light Refreshment
16:15 – 16:45	Robotics application in construction site Presentations & Panel Discussion <ul style="list-style-type: none"> ➤ Presentation by Mr. Rudolf LAU Fu-kwok (CA/P) ➤ Presentation by The Nano and Advanced Materials Institute Limited ➤ Panel Discussion and Q&A
16:45 – 17:05	Conclusion
17:05 – 17:15	Closing Remark
17:15	End of Forum



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HA Presentation

Off-site Prefabrication

by

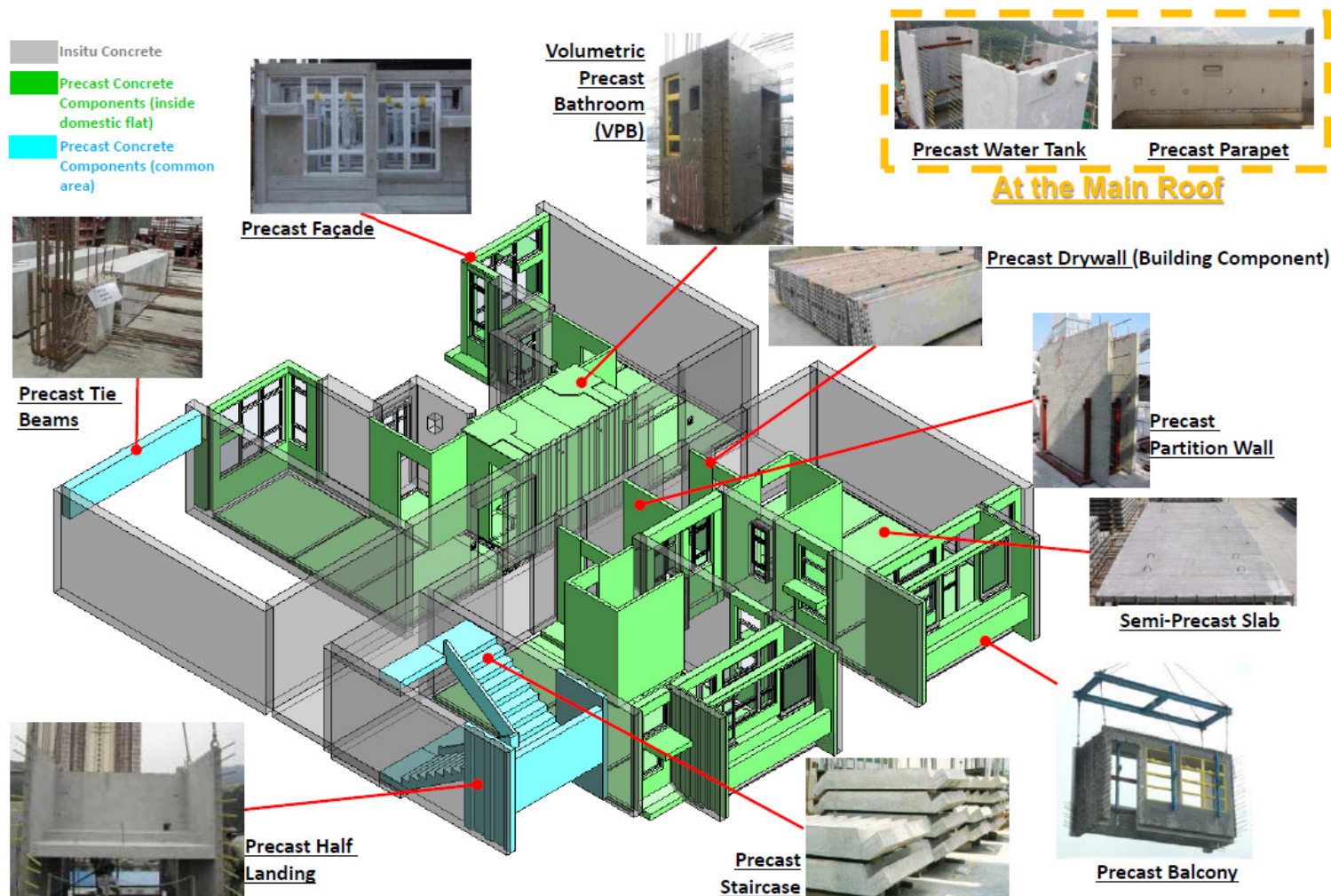
Mr. KWAN Kai-sing

(Chief Structural Engineer)





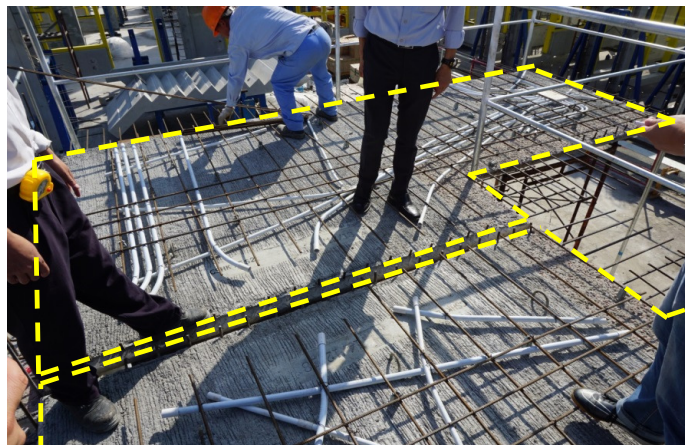
Precast Concrete Components (PCCs)



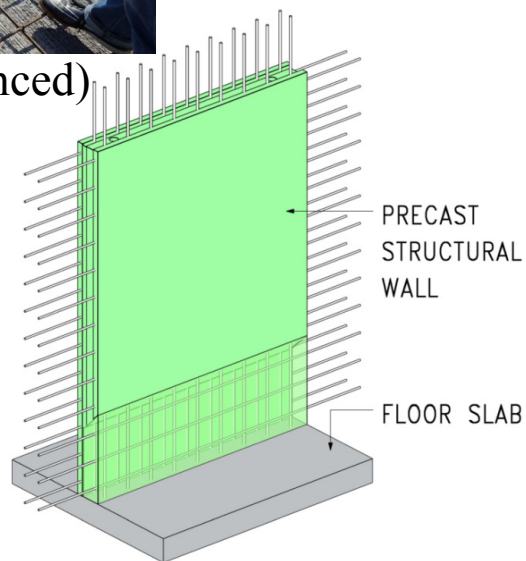


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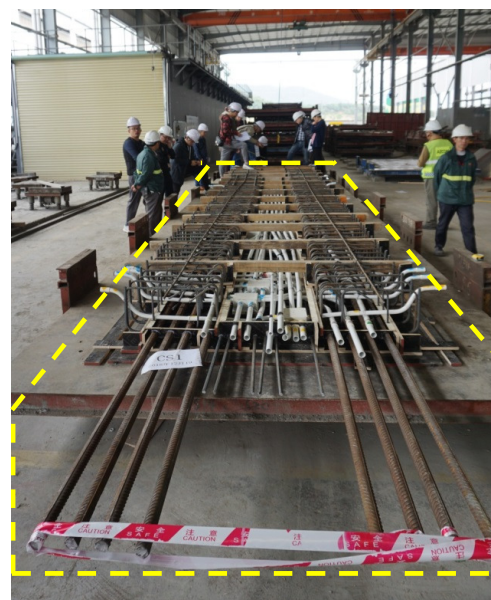
Enhanced Precast Concrete Components (EPCCs)



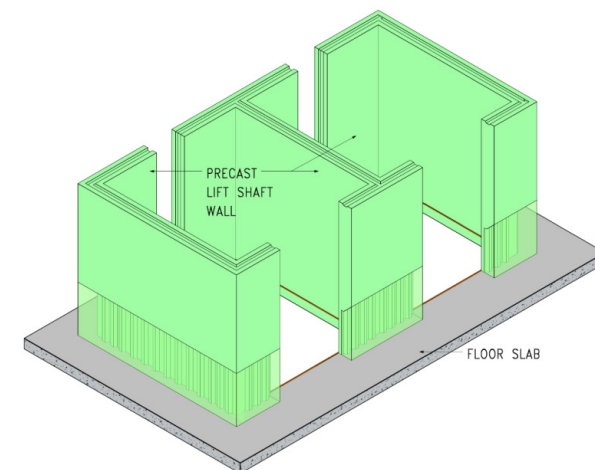
Semi-precast slab (enhanced)



Precast structural wall



Semi-precast corridor slab
(enhanced)

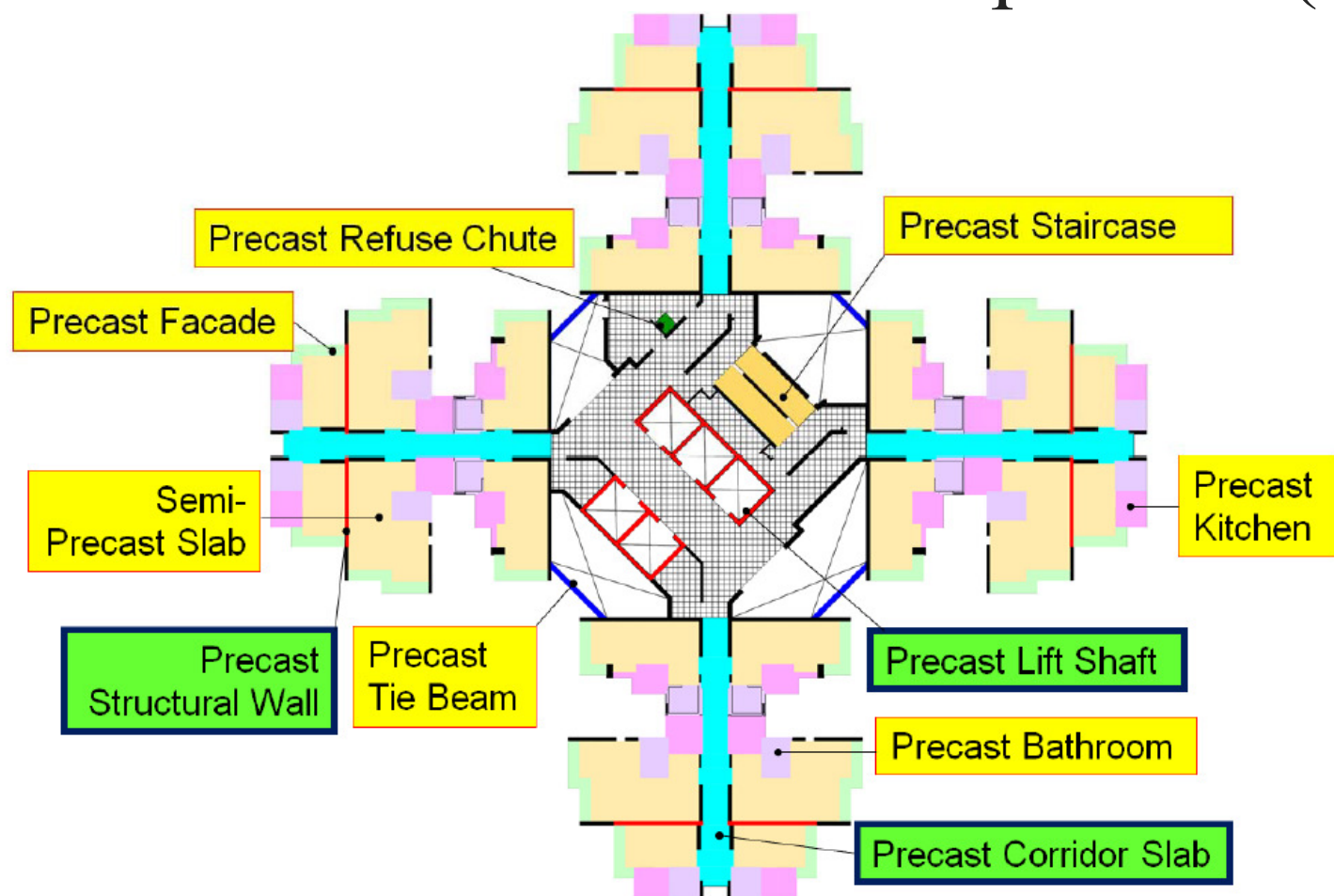


Precast lift shaft





Enhanced Precast Concrete Components (EPCCs)



Precast Rate : 90% (approx.) on plan

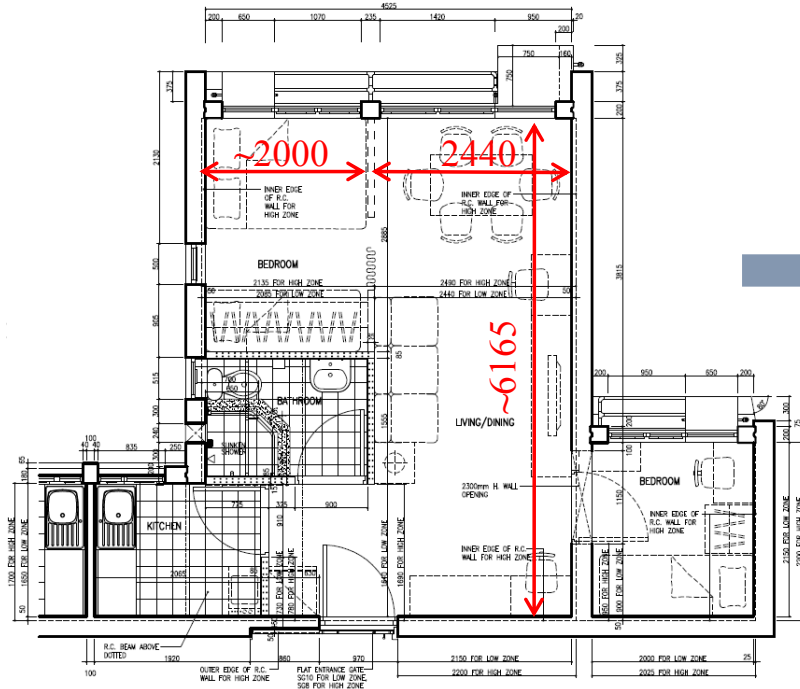




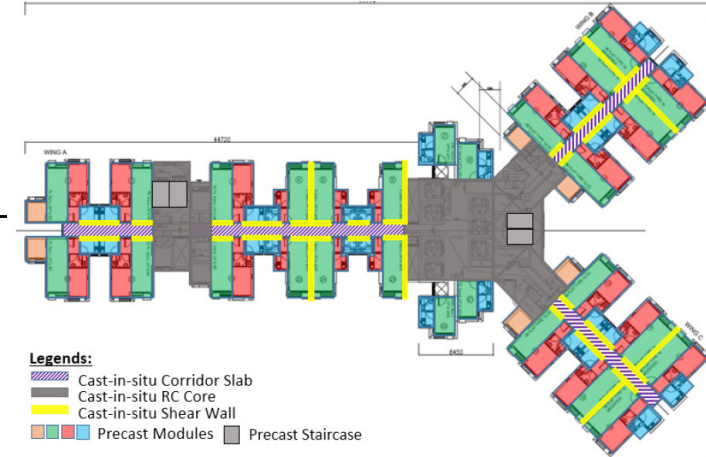
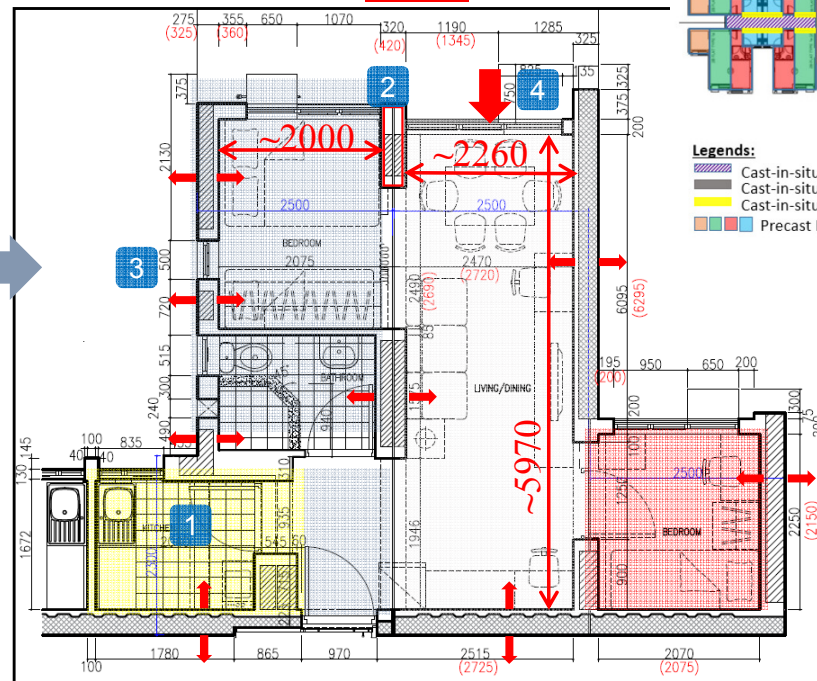
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Modular Integrated Construction (MiC)

Current MFD



MiC





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HA Presentation

Building Information Modeling (BIM) Application in Public Housing Developments

by

Mr. Kenneth LEUNG Tak-yan

(Chief Civil Engineer)



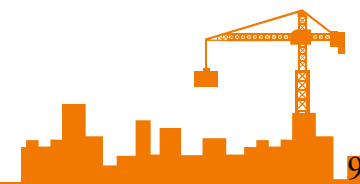


Part 1 - Introduction

a) Local BIM Development (2017 Policy Address)



The screenshot shows the official website of the Hong Kong Government for the 2017 Policy Address. The header includes the Hong Kong emblem and the text 'The Hong Kong Special Administrative Region of the People's Republic of China'. The main title is 'The Chief Executive's 2017 Policy Address'. A navigation bar contains links to 'Policy Address', 'Speech', 'Policy Agenda', 'Highlights', 'Webcast', 'Press Releases', 'Videos', 'Other Publications', 'Archives', 'Contact Us', and 'Sitemap'. The 'Policy Address' section is selected. The content area displays the title 'III. Diversified Economy' and 'Construction and Related Professional Services Sectors'. A paragraph (113) discusses the construction industry's challenges and the government's proactive promotion of technology and innovative construction methods. It mentions the establishment of large-scale and highly automated steel reinforcing bar prefabrication plants for the production of prefabricated steel reinforcement components for use in construction projects. It also states that the government will adopt Building Information Modelling technology in the design and construction of major government capital works projects that are scheduled to start in 2018, and promote the use of this technology in private construction projects. Besides, the new Construction Innovation and Technology Application Centre of the Construction Industry Council will be in operation by the end of this year to provide the latest information on local and overseas construction technologies and to support their adoption by small and medium enterprises.





Part 1 - Introduction

b) BIM in Hong Kong Housing Authority (Integrating BIM to Enhance Productivity)

1982

- Tenancies Management, Stock Control, and CADD applications on mainframe

- PASS (Performance Assessment Scoring System)
- Executive Information System

1990

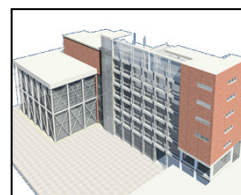
- HA Intranets (e-Housing Portal)

1996

- HAFIS

- HOMES

- **BIM**



2005

- ERP (Enterprise Resources Planning System)

2011

- ETrMS (Enterprise Tree Management System)

- HePLAN

- DCSMS (Site Mobile System)

2016

2015

1984

- Integrated System of Housing Management (EMMS)

1992

- HA/HD Website
- MISIS

1980

- Structural Engineering, Statistical Analysis, and financial accounting applications on PC Platforms

2001

- COMIS
- HRMS

2009

- GIS (Geographic Information System)

- RSMS (Remote Site Monitoring System)

2012

- DrgMS (Drawing Management System)

2014

- SLIS (Specification Library System)

2017

- SAFD (Systematic Approach to Foundation Design)

Legend

IT tools for drawing production, construction and use of mobile for site inspection

Other IT tools/platforms



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Reference : BC Paper No. 35/2019
(Paragraph 4)

Part 1 - Introduction

c) BIM in Hong Kong Housing Authority (BIM Implementation in Projects)

Number of BIM Projects in the Past 10 Years

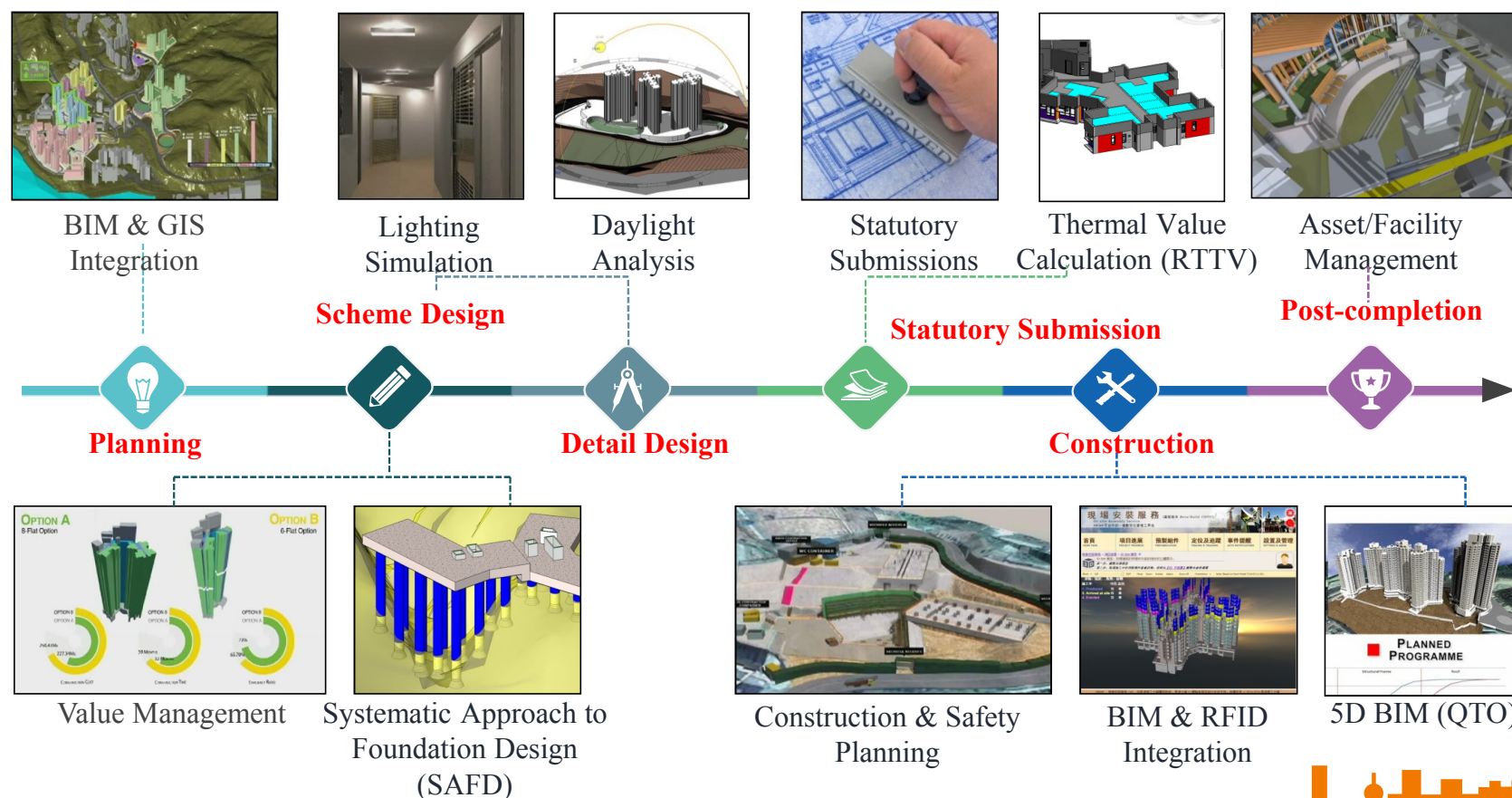
98





Part 2 - BIM Applications in Various Project Stages

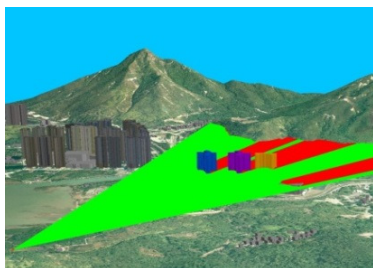
HA's BIM Applications now Encompass Full Design and Construction Cycle





Part 2 - BIM Applications in Various Project Stages (Planning Stage)

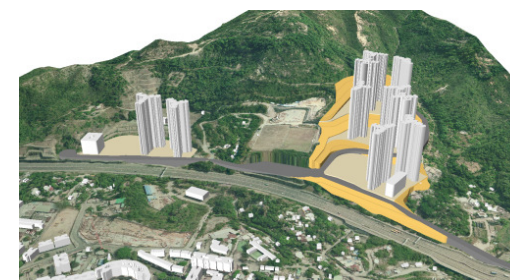
a) Integrated use of BIM and GIS



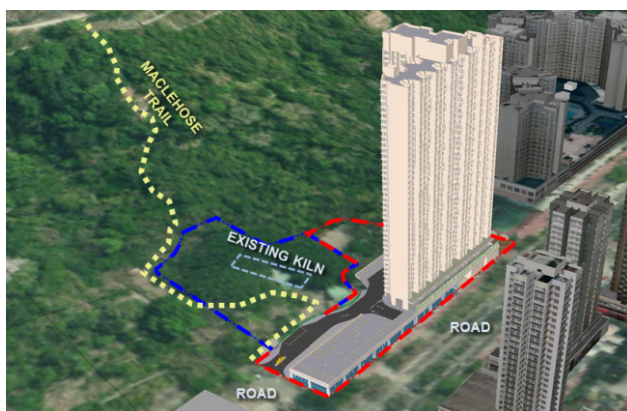
Sight Line Analysis

Number of projects (from 2014 to 2018)

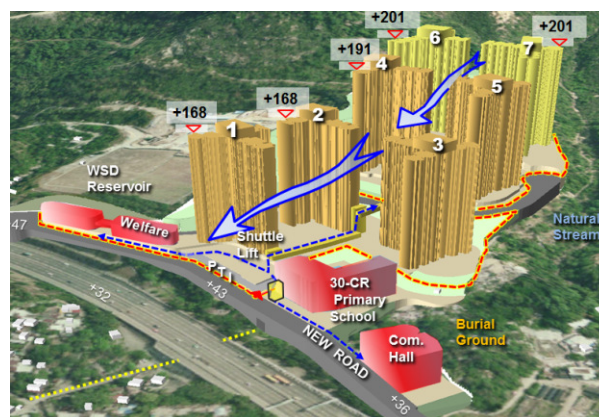
93



Site Terrain Analysis



Heritage Impact



Environmental



Visual Impact

Planning

Scheme Design

Detail Design

Statutory Submission

Construction

Post-completion



Part 2 - BIM Applications in Various Project Stages (Scheme Design Stage)

b) BIM for Modular Flat Design (MFD)

Modular Flat Design

- Standardized building components (building facades, bathrooms, kitchens)



Type A : 1-2 Person Flat



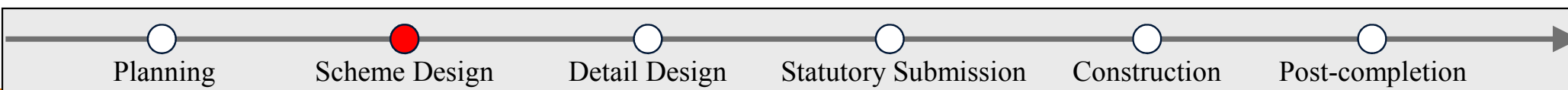
Type C : 3-4 Person Flat



Type B : 2-3 Person Flat



Type D: 4-5 Person Flat



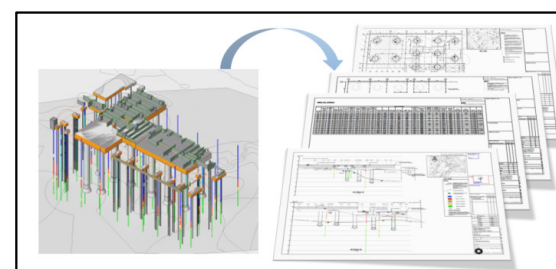
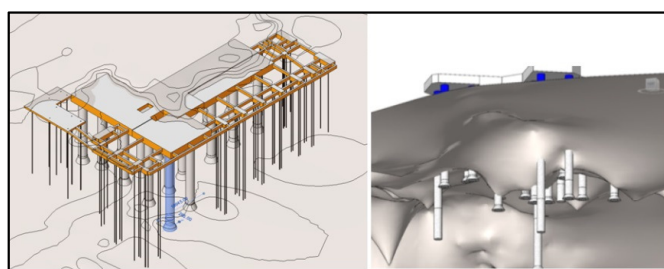
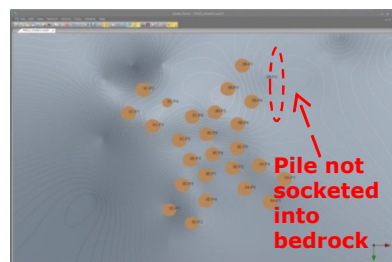
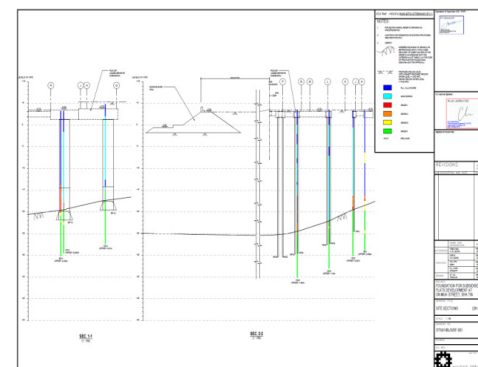
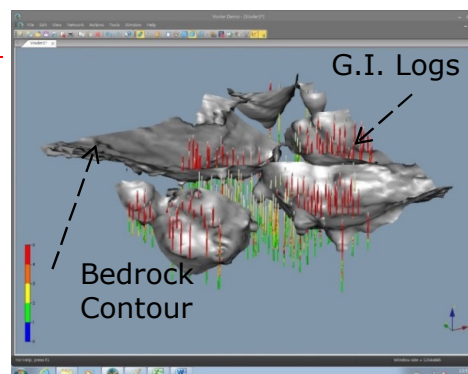


Part 2 - BIM Applications in Various Project Stages (Detail Design Stage)

c) BIM-enabled Systematic Approach to Foundation Design (BIM-SAFD)

Three major deliverables of BIM-SAFD:

1. 3D Visualization of Pile-Bedrock/ GI logs Relationships;
2. Use of BIM to produce Drawings for ICU Submission; and
3. Quantity measurement from Revit Models.



Planning

Scheme Design

Detail Design

Statutory Submission

Construction

Post-completion





Part 2 - BIM Applications in Various Project Stages (Construction Stage)

e) BIM for Construction Planning and Safety



Sha Tin Area 52 Phase 2 - Footbridge Construction and Safety Planning
沙田第52區 第二期



Planning

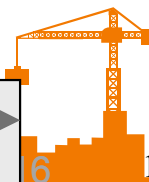
Scheme Design

Detail Design

Statutory Submission

Construction

Post-completion





Part 3 – Way Forward

We will continue to strive for wider application of BIM in public housing developments and our target is to apply BIM to all our projects in 2021.





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HA Presentation

Robotics Application in Construction Site (A Procurement Approach)

by

Mr. Rudolf LAU Fu-kwok

(Chief Architect)





We are committed to securing competent, reliable and long-term partners through equitable procurement operations all in accordance with our corporate vision and mission.

*How to select a more **capable** contractor offering the **best value** for money through tender evaluation?*



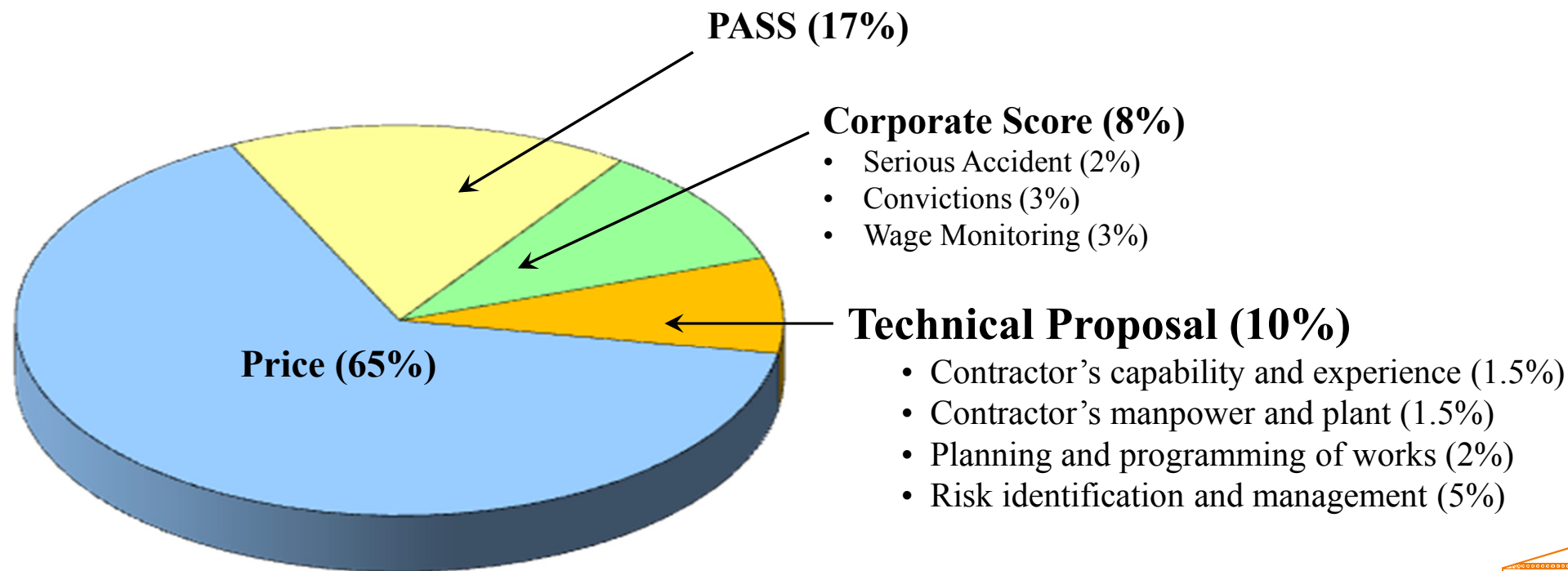


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Tender Assessment for Building Contract

New Works Building Contract – “Complex” 65:25:10

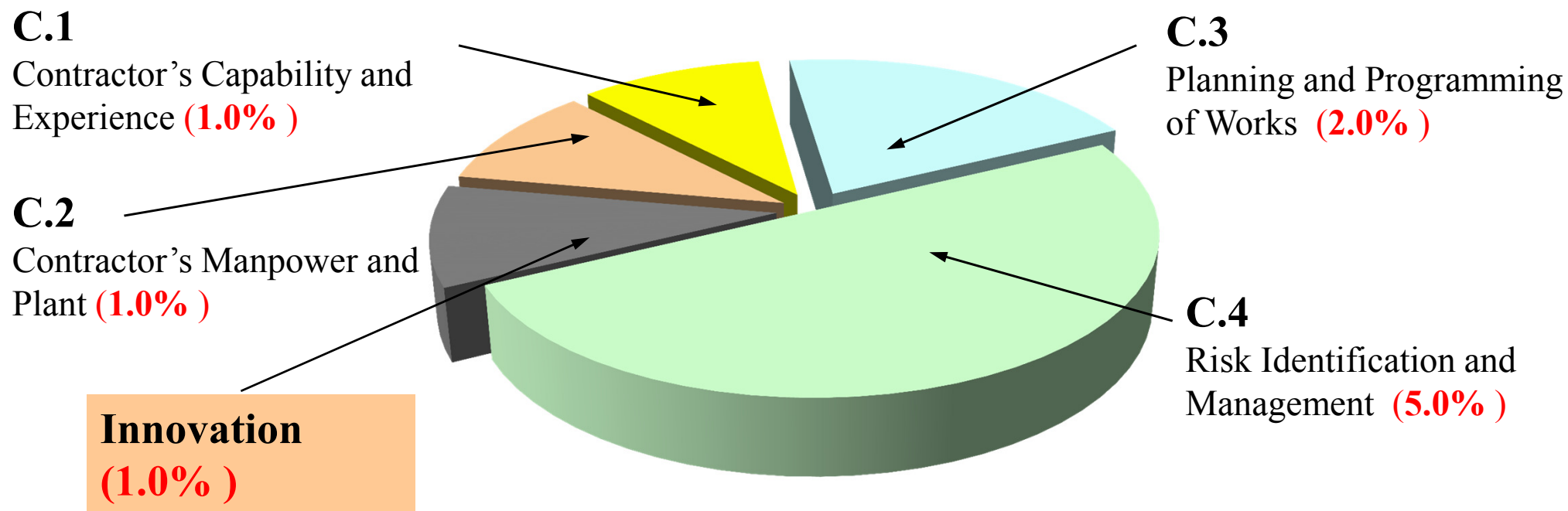
Two Envelope Tendering System





Tender Assessment for Building Contract

Proposed Technical Score (Preliminary) - Total 10%



Contractor's Proposed Robotic Construction Methods (1%)



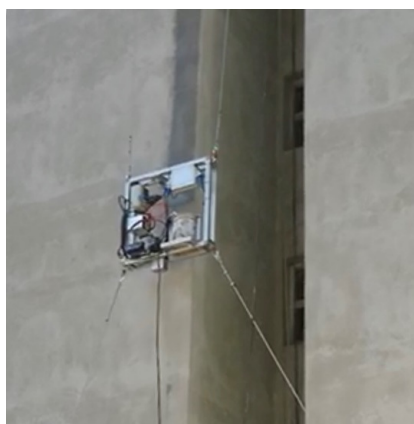


Possible Options

Contractor's proposals for robotic application -

Internal survey on labour force in public housing developments – most labour intensive works are painting and plumbing works.

1. Painting on external walls;
2. Painting on internal walls;
3. Tile laying at corridor of typical floors; and
4. Any area of works.





Possible Assessment Criteria and Standard

Contractors are required to submit a write-up to illustrate the use of robot in **four areas** of improvement in the following -

1. Productivity (max. 30%) - sustain the current productivity
2. Quality (max. 25%) - uplift the works quality
3. Safety (max. 25%) - enhance the safety
4. Environment (max. 20%) - protect the environment

Score level	Productivity	Quality	Safety	Environment
1. High	30%	25%	25%	20%
2. Medium	20%	16%	16%	14%
3. Low	10%	8%	8%	7%





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One Small Step for HA, One Giant Leap for ...

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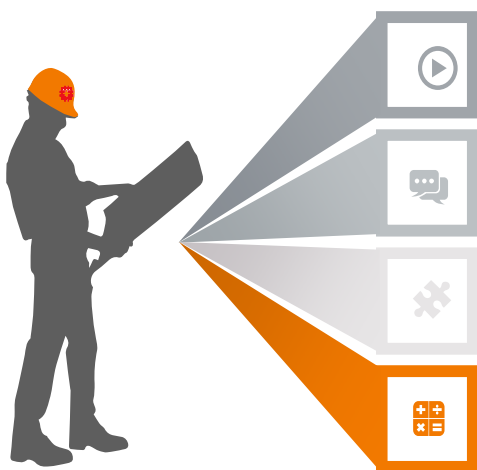


Conclusion



Conclusion – Off-site prefabrication

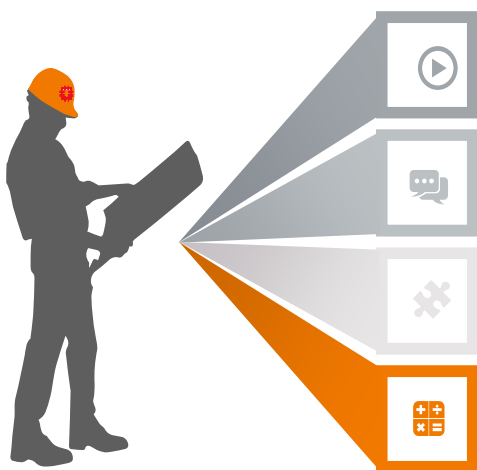
- Continuous to apply PCCs and EPCCs for Public Housing Development to enhance safety, quality, productivity and environmental aspects.
- Explore opportunities in increasing precast rate such as precast roof machine room.
- Be open and receptive to all innovative construction methods that can improve safety, quality, productivity and environmental aspects.
- Explore if any actual benefits of MiC applications in public housing development. Mock-up exercise will be conducted in early 2020. HA is currently looking at a suitable MiC pilot projects.





Conclusion – BIM application in public housing developments

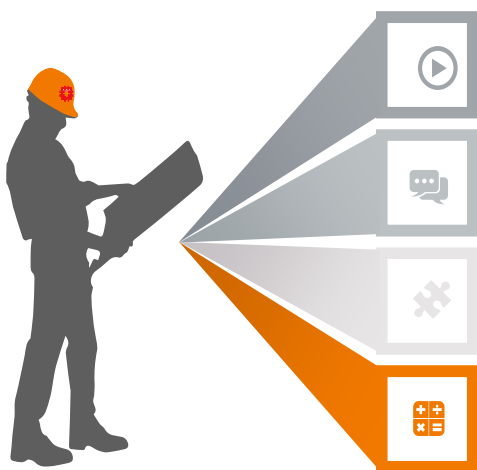
- Continue to strive for wider application of BIM in public housing developments and target to apply BIM to all our projects in 2021.
- Continue to partner with various stake-holders of the construction industry (including contractors, professional institutes, academia and CIC) on BIM development in HK.





Conclusion – Robotics application in construction site

- Promote robotics applications in construction site for productivity, safety and quality;
- Procure robotics innovations by assigning technical score;
- Continue to explore robotic technology in Industry and through R&D works.
- Drive and stimulate the industry forward and bring benefits to the Government, the public and the industry at large.





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Thank You

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