嘉福機電 BYME
A member of the Bouygues Construction group

Practical Application of Design for Safety (DfS) in Engineering Upgrades of Occupied Buildings
設計安全 (DfS) 的實踐：減低現有建築物工程升級的健康與安全風險

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演講者：張美成

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BUILDING FOR LIFE

Agenda 議程

1 Who We Are 關於BYME

2 Key Challenges in Occupied Buildings 在運營環境裡施工的主要挑戰

3 Health and Safety Enhancement 職安健提升措施

1 Who We Are
關於BYME

Who We Are 關於BYME

Role 角色	M&E Building Services Specialist 機電屋宇設備專家
Scope 服務範圍	Design, supply, installation, testing and commissioning, maintenance and facility management of various mechanical and electrical systems 各類機械及電氣系統的設計、供應、安裝、測試及調試、維修保養及設施管理
Projects 項目類型	Buildings, Infrastructure, A&A Works and Facility Management 樓宇、基建工程、改建及加建工程（A&A）及設施管理
Focus 重點範疇	Alteration and Addition Works (A&A)and Repair, Maintenance, Addition & Alteration (RMAA) works 改建及加建工程（A&A）及維修、保養、改建及加建工程（RMAA）

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2 Key Challenges in Occupied Buildings
在運營環境裡施工的主要挑戰

Challenge 1 Existing facilities blocking replacement
挑戰一：現有設施阻礙更換工程

Traditional Design 傳統設計

Risks 風險

- Existing systems obstruct the new installations
  現有設施阻礙新設備安裝
- Removing infrastructure risk damaging structural elements or live services
  拆卸過程可能損壞結構構件或正在運作的系統

Optimized Design 優化設計

Safety Improvements 安全改善

Comprehensive Site Investigation
於前期進行全面現場調查

- Identify obstructions before replacement works
  在施工前清楚識別潛在阻礙

e.g. Apply ultrasonic testing for integrity verification
採用非破壞性測試（如超聲波測試）驗證結構完整性

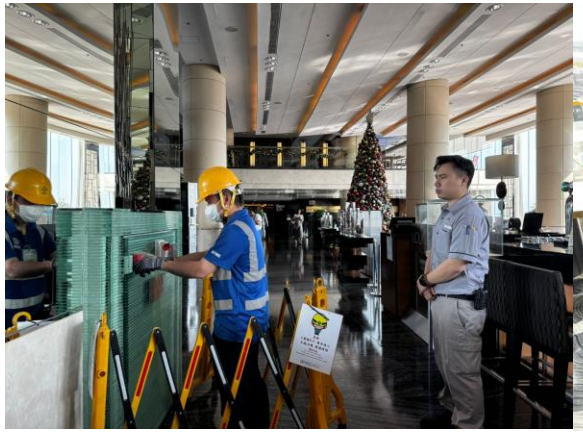
Challenge 2 Limited Site Space in dense urban area
高密度城市環境下的場地限制

Traditional Design 傳統設計

Risks 風險

- Works often occur during businesses operations
  工程期間建築物仍需正常運作
- Must minimize noise, dust, vibration, and restricted access
  噪音、塵埃、震動及通道受限帶來安全及聲譽風險
- Temporary shutdowns of utilities (water, electricity or fire systems) require careful planning
  公用系統（供水、供電、消防）暫停影響使用者及營運

Optimized Design 優化設計

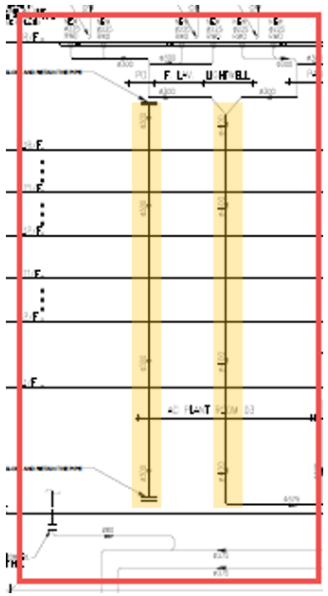


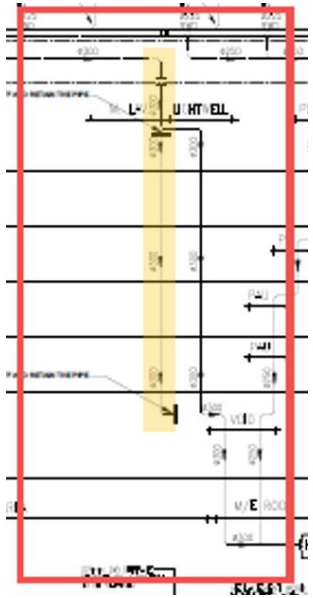
Safety Improvements 安全改善

- Client coordination
  與業主及相關持份者緊密協調
- Align work schedules to minimize disruption
  優化施工工序以減低干擾
- Manage risks in public areas to protect client reputation
  於公眾區域加強風險控制，保障使用者及企業形象

Challenge 3 Design for Integration
挑戰三：系統整合設計

Traditional Design 傳統設計

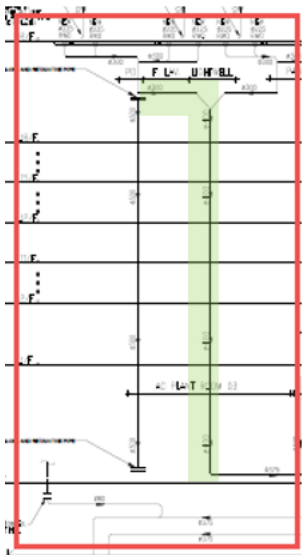




Risks 風險

- Hard for maintenance
  系統整合不足，導致日後維修困難
- Disruption to hotel operations and guest experience
  對酒店營運及使用者體驗造成干擾

Optimized Design 優化設計



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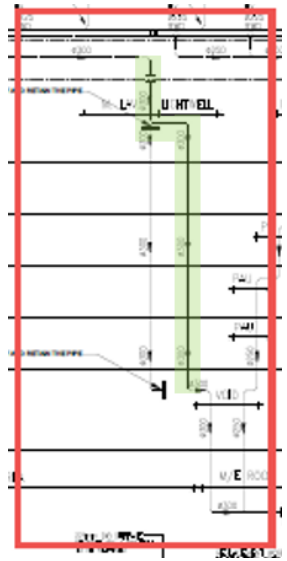

Rerouting

Safety Improvements 安全改善

- Propose alternatives that ease future maintenance
  提出有利於未來維修的替代設計方案
- Reroute cables, reuse existing materials where feasible
  在可行情況下重新佈置管線並整合系統
- Conduct market product reviews to reduce operational impact
  透過市場產品研究，降低對營運的影響

3 Health and Safety Enhancement
職安健提升措施

Health and Safety Enhance (1/2)
職安健提升措施

4S system-Smart Watch & SmarTag
4S 系統 - 智能手錶及智能標籤

- Real-time monitoring of worker positions
  即時監察工人位置
- Enhances safety oversight and emergency response
  提升安全監督及緊急應變能力

VR Safety Training
VR 安全培訓

- Immersive hazard awareness training
  沉浸式危害認知培訓
- Reduces accident risks through simulated scenarios
  透過模擬情景降低事故風險

Shoulder Exoskeleton

- Supports overhead tasks
  支援頭頂作業
- Helps relieve shoulder and neck fatigue, improving comfort, reducing injury risks, and sustaining productivity
  減輕肩頸疲勞，提升舒適度，降低受傷風險，並維持工作效率

Health and Safety Enhance (2/2)
職安健提升措施

Dust Removal System
塵埃清除系統

- Efficient dust collection during drilling
  鑽孔作業期間高效收集塵埃
- Improves air quality and worker health
  改善空氣質素及工人健康

Tools lanyard
工具繫繩

- Prevents falling objects, especially in public areas
  防止物件墜落，尤其適用於公眾區域
- Improves safety by securing tools during elevated work
  於高處作業時固定工具，提升安全水平

Portable Electric Power Station
便攜式電力供應站

- Independent power supply for tools/equipment
  為工具及設備提供獨立電力供應
- Prevents disruption or overload of building systems
  避免對大樓系統造成干擾或過載

THANK YOU

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