

BIM Powers for Safety Management Enhancement

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Company Background



CLP Power

- Electricity supply to over 80% of Hong Kong's population
- Safe and reliable power supply services

We build **“Green Substations”** and infrastructures as part of our transmission network development.

CLP Power Electricity Transmission Projects



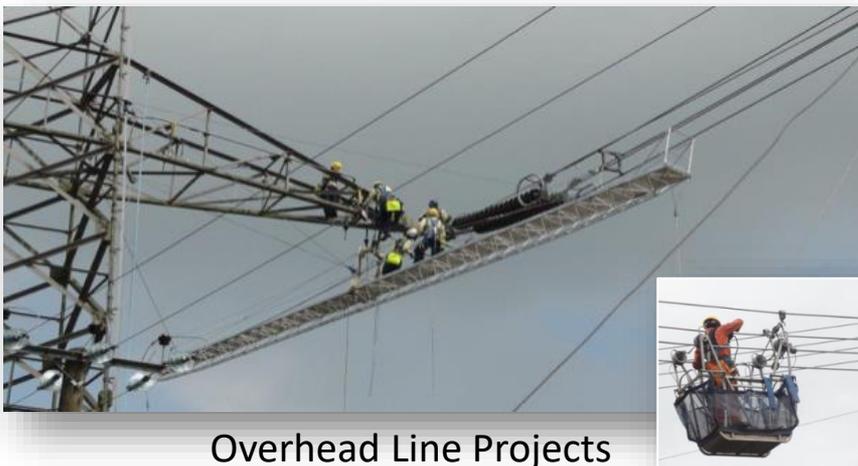
Transformer Erection



Substation Projects



Cable Tunnel Projects



Overhead Line Projects



Submarine Cable Installation

BIM Application from Planning to Operation



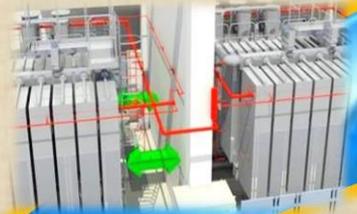
- **Quantity Take-off**
- Site Planning
- 3D Coordination
- Better Control in Cost,
- Site Safety and Programme



Operation & Maintenance



- **Spatial Requirements**
- Cost Estimation
- Phasing Planning
- Site Analysis



Construction



- **Record Model for Management**
- To Navigate and Review Record Model

Design

- **Coordination**
- Get Feedbacks Through Design Visualisation
- Improve Control in Quality, Safety, Cost and Risk
- Sustainability Evaluation

Planning

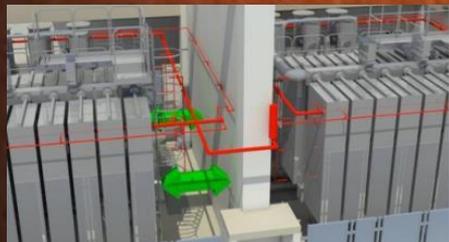


Extend BIM Application from Design to Safety Enhancement

Enhance Engineering Design

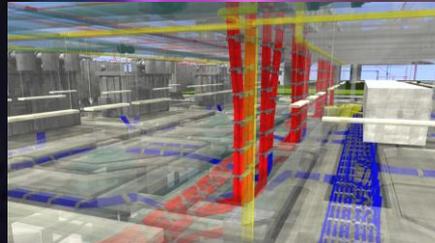


Lighting Layout inside Switchgear Room

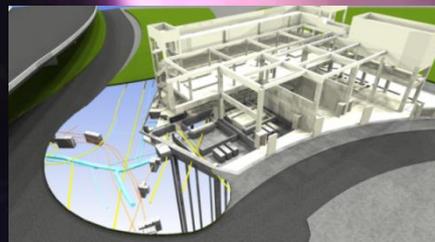


Space for Access inside a Congested Transformer Bay

Coordination of Building Works with Different Trades



Cables and Plants inside a Substation Building



Building Structure and Outdoor Utilities

Enhance Safety Planning and Implementation



Risk Evaluation before Commencement of Actual Site Work



Facilitate Discussion among Front-line Workers

BIM Applications in Safety Management

Design for safety



Safety planning
(job hazard analysis and pre-task planning)

BIM can help
improve workers'
safety and health



Site Safety Management

Safety training and
education

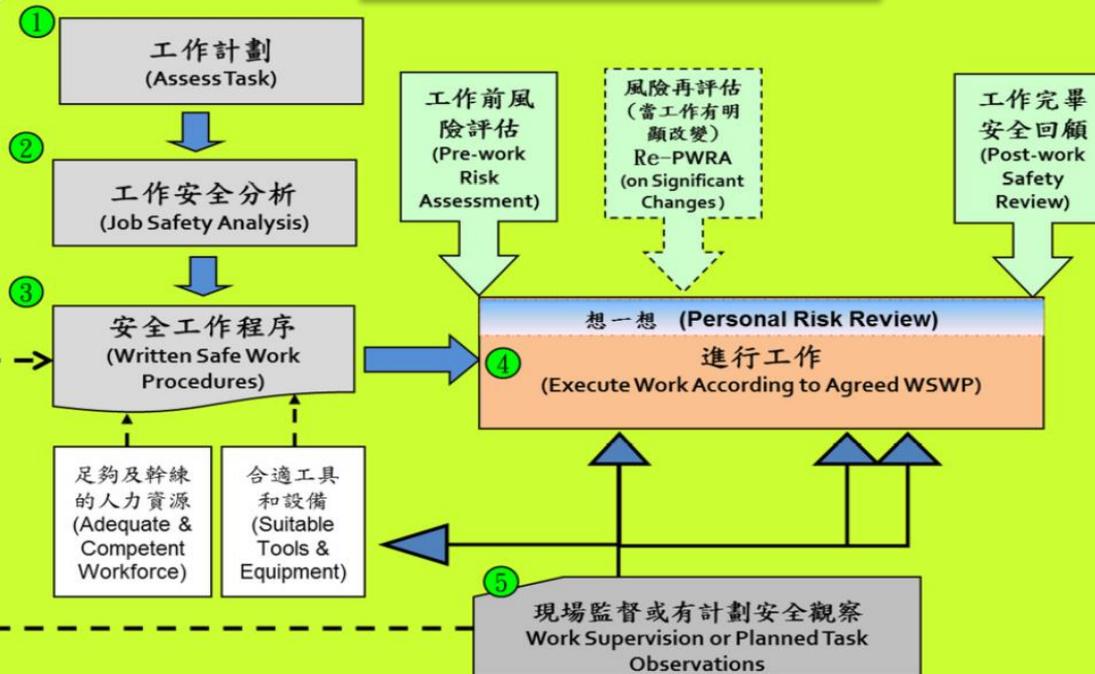


Development of Communication Format for Safety - DOCUMENT

Document



Safe Systems of Work



Development of Communication Format for Safety - VIDEO

Document



Cartoon



Photo



Video



TRAFFIC SAFETY BULLETIN

轉線安全防範

駕駛時:

- 留意可視距離、車距及外、不要長時間停留在快線上行駛。
- 不可在車線之間忽左忽右。
- 轉線時須留意其他車道在該線的車輛。
- 避免在交通交匯處轉線。

請記:

- 留意預備轉線車道之「預設安全轉線」指示燈亮起。
- 留意轉線之車線與車道之「預設安全轉線」指示燈亮起。
- 在轉線前預先「預設轉線」指示燈亮起後再進行之轉線。

TRAFFIC SAFETY BULLETIN

Using Mobile Phone Causes Distracted Driving

Driving and mobile phone conversation both require great deal of thought. Doing them both simultaneously weakens your brain's judgement and responsiveness. Using mobile phone while driving would easily cause accident.

A survey conducted in 2014 on distracted driving in HK revealed that:

- 73% respondents had answered phone calls without using hands-free device
- Over 50% respondents had sent text message while driving
- 27% respondents had used mobile phone or tablet surfing on internet or even watching film

The rapid increase of traffic incident caused by "Driving Inattentively" in recent years is highly related to using mobile phone while driving.

HK Traffic Incidents by Driver Contributory Factors

Year	Driving too close to vehicle in front	Careless lane changing	Lost control of vehicle	Driving inattentively
2010	~1500	~1000	~1000	~1000
2011	~1800	~1200	~1200	~1500
2012	~2200	~1500	~1500	~2000
2013	~2800	~1800	~1800	~2500
2014	~3500	~2200	~2200	~3000

Mobile call message
Watching tablet



Video

- Attract attention
- Comprehensive content
- Audio visual communication

Development of Communication Format for Safety - ANIMATION

Document



Cartoon



Photo



Video



Animation



Animation through Building Information Modeling (BIM):

- Information rich
- Physics
- Produce animation files easily

Merits of BIM on Safety Management

Physics

- Data rich digital information
- Spatial data: geometry
- Geographic information
- Time lapse
- Lighting level, sunlight glare, temperature, etc



CLP 中電

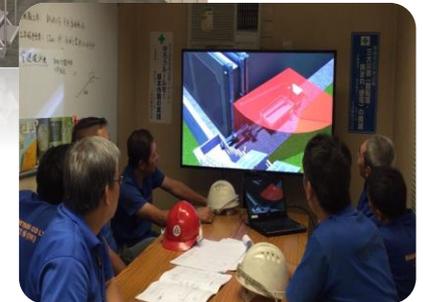
Scenarios

- Site specific with data
- Selected views from different perspectives
- Risk identification
- What-if analysis



Worker Engagement

- Visualisation, easy to understand
- Invite participation and comments
- Highly stimulating



General Process / Cost Saving of BIM in Enhancing Site Safety

5 Steps for BIM to Enhance the Construction Site Safety



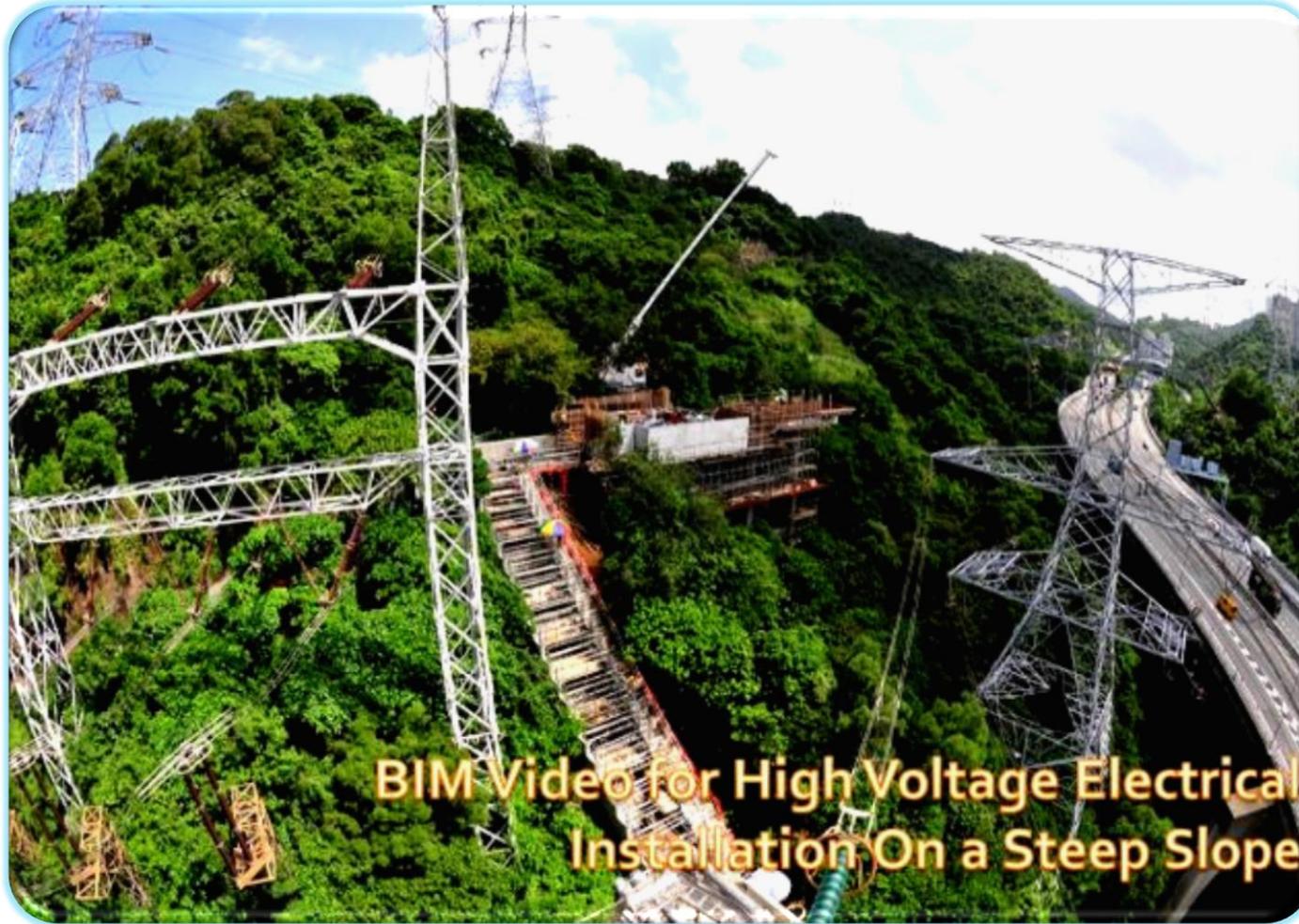
Overhead Cable Termination Structure On a Steep Slope



BIM simulate the site challenges on the steep slope before actual site work

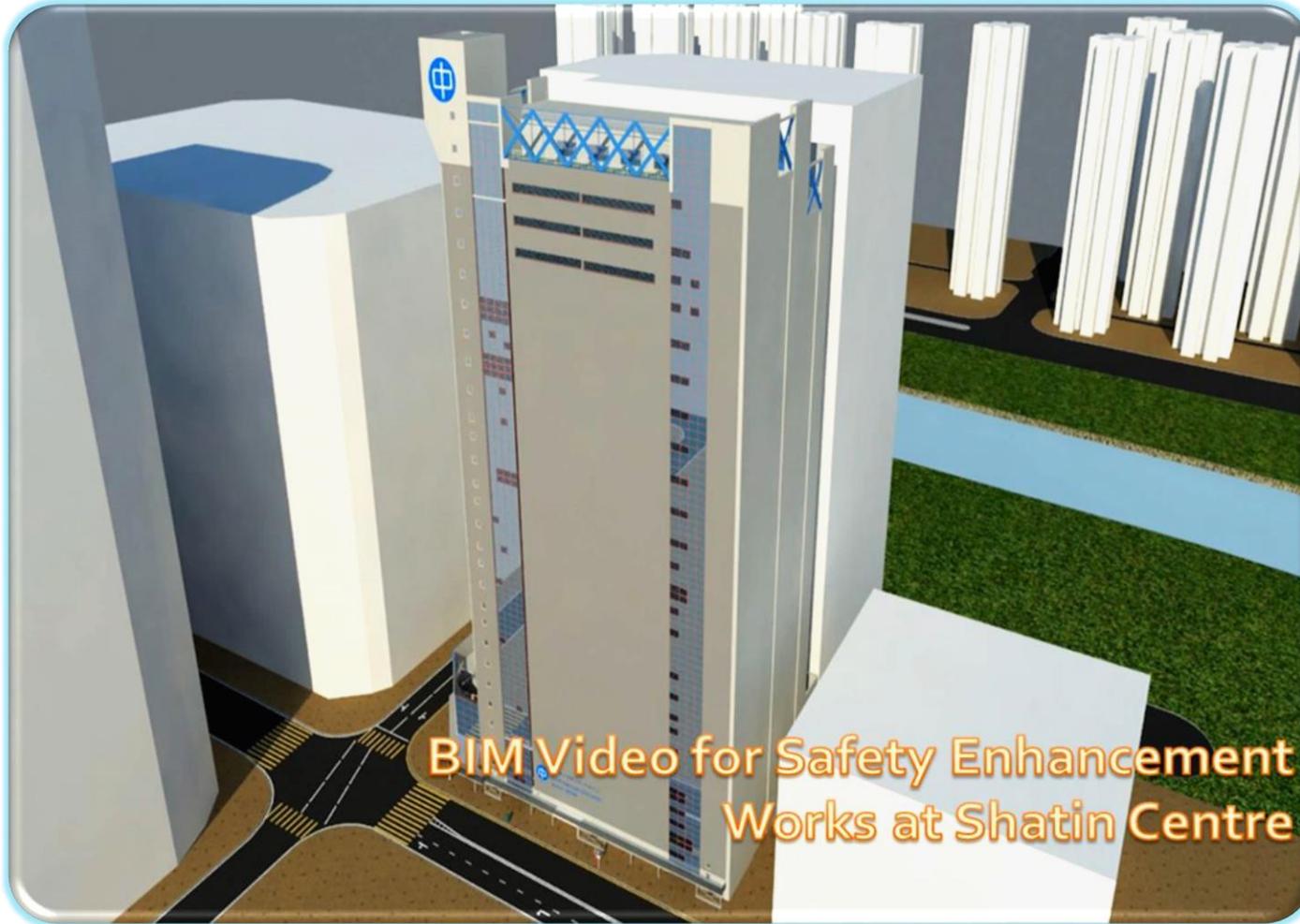


GIB Installation Works



BIM Enhances Planning for Safety and Emergency Action

Safety Enhancement Works at CLP Shatin Centre



Delivery of Transformer Unit to Underground Substation

TRANSPORTATION OF
TRANSFORMER TO BASEMENT

SBG 132kV TRANSFORMER ROOM

Slope Upgrading Works



Slope Upgrading Works for
CLP Tower 4CPD1



Conclusion and Way Forward



- CLP Power has explored the opportunity of using animation to enhance the safety planning and execution in construction work.
- The 'fit for purpose' BIM process is proved to be cost effective and well accepted by the front-line workers.
- CLP Power would continue to explore the opportunity of BIM applications in delivering project objectives including safety, cost, efficiency, etc. :
 - To explore more BIM application in site safety enhancement
 - Sharing with other stakeholders to develop **safer, smarter and greener** practices for future projects



Safer ✓

Smarter ✓

Greener ✓

Thank you