

安全創意

Safety Innovation & Trials by contractors

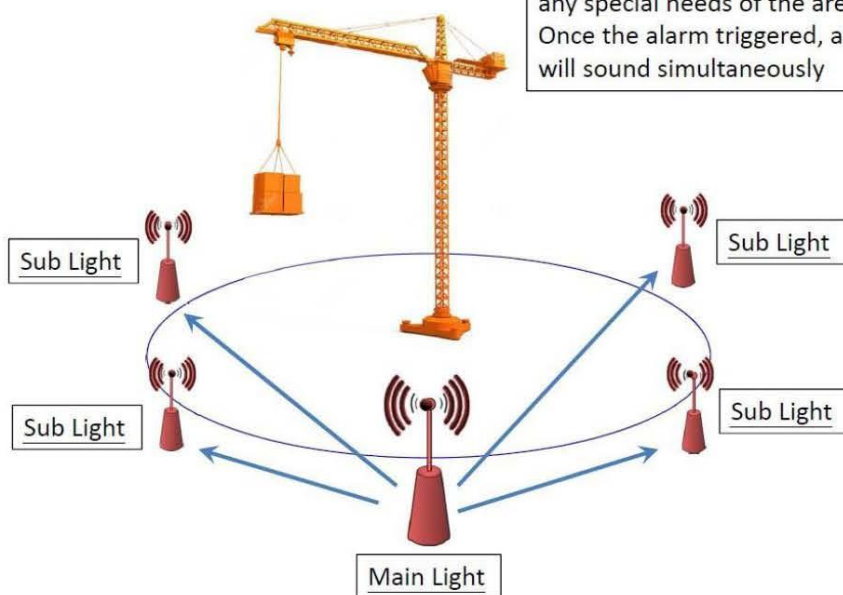
Recommended in HASAS (2013 – 2016Q4)

Safety Innovation 創新工地安全措施

- Latest Communication Technology Tower Crane Lifting Alert System
- 天秤吊運警報系統(新互通技術)



Numerous of sub-alarm lights can be wirelessly connected to suit any special needs of the area. Once the alarm triggered, all lights will sound simultaneously

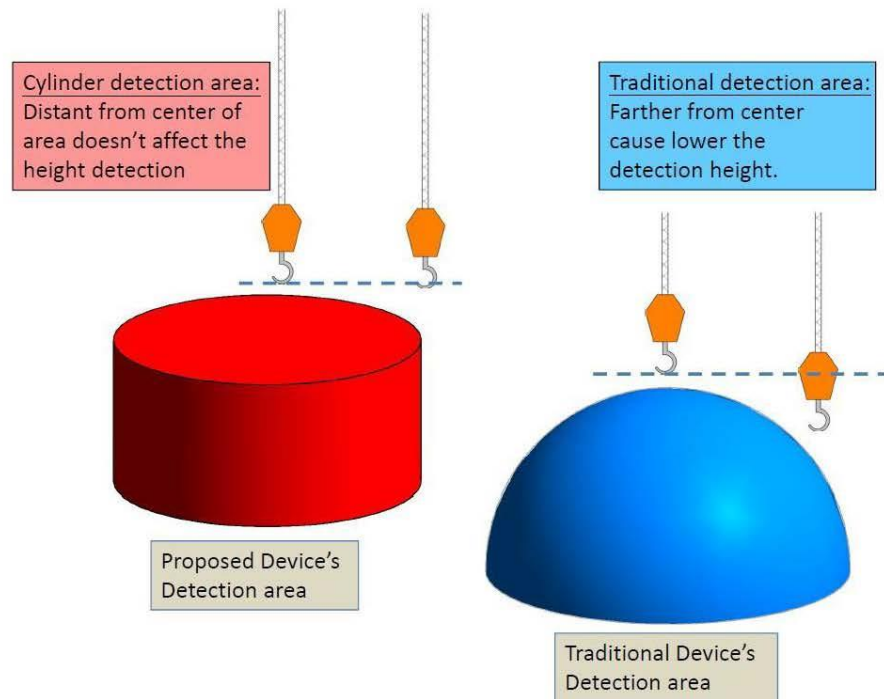


- The installation of Tower Crane Lifting Alert System helps to reduce the risk of tower crane lifting operation in significant level.
- 透過新式通訊設備的天秤吊運警報系統能更有效減低吊運工序的風險。
- When the lifting hook lowering within reaches of the designated height. The height detection device will trigger the alarm(s)
- 當吊鉤下降至進入指定高度的範圍。高度檢測裝置將觸發警報裝置。



Safety Innovation 創新工地安全措施

- Latest Communication Technology Tower Crane Lifting Alert System
- 天秤吊運警報系統(新互通技術)

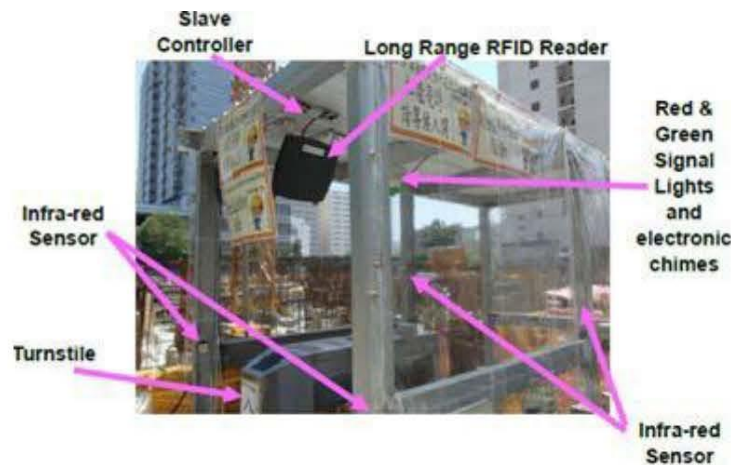


- Adopt digital pressure chips in both alarm lights and the sensor to detect the relative altitude of the tower crane to the earth's surface in real-time
- 透過電子壓力晶片和感應器計算即時地面與天秤吊鉤之相對高度
- Cylinder detection area, the height detection doesn't affect by horizontal distant from center
- 圓柱體偵測範圍，偵測高度不受平面半徑所影響

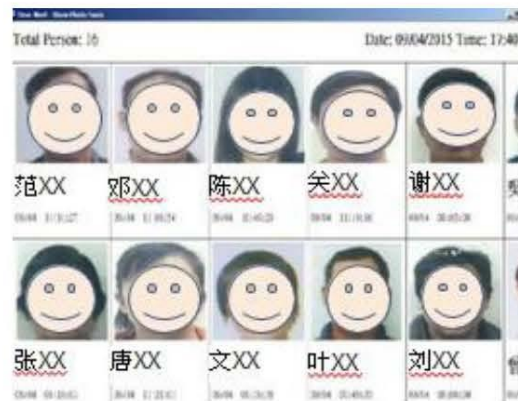
Safety Innovation 創新工地安全措施

RFID Contactless Access Monitoring & Recording System

RFID無接觸進出監察及記錄系統



Real time
list of
workers
still inside
the work
areas



- A long range RFID reader and two sets of infra-red sensors were installed to detect the RFID tags on the safety helmet.
- 透過長距離的RFID讀取器及兩組紅外線感應器，用以偵測貼在安全帽上的RFID標籤
- The system stores the real time records in the computer system and prevents unauthorized access.
- 系統儲存進出記錄於電腦系統，並防止非授權者進入

Safety Innovation 創新工地安全措施 (RFID)

Lifting Warning System of Tower Crane 天秤吊運警報系統



- RFID tag stuck on the hook. Antennas and processors were installed in the lifting zones.
- 吊鉤上安裝RFID標籤、天線及處理器安裝于吊運區
- Antennas emit signal to the coverage of 15 meters above ground. RFID tag enters the coverage of the signal, the alarm and buzzer will be triggered.
- 天線發射信號到地面以上15米的覆蓋範圍。RFID標籤進入信號的覆蓋範圍時，觸動警報器和蜂鳴器

Safety Innovation 創新工地安全措施 (RFID)

RFID Applied to Mobile Plants and Workers for Safety

RFID安全應用 - 移動機械及工人



- Plant Permit (with RFID chip) provided the accessibility for all relevant information of mobile plants, authorized operators and workers
- 機械許可證(裝上RFID晶片)
，透過手機讀取流動式機械、機手及工人的資料
- Can widely apply on different plants. Check updated information easily.
- 可廣泛應用於不同的機械。
很容易地檢查最新的資料

Safety Innovation 創新工地安全措施 (RFID)

Proximity Warning System for Excavator

挖土機的接近警報系統



- Installed RFID receiver on the excavator (2 sides and the back) and issued RFID tags for personnel who needed to enter danger zone
- 分別安裝RFID接收器在挖土機(兩面及機尾)及晶片於進入危險區域人士的安全帽上
- Alerted the operators when any personnel entered enter zone within 2 m
- 當有人進入危險區域兩米範圍，發出訊號提醒操作員

Safety Innovation 創新工地安全措施 (RFID)

Eye on Project: Mon-Plant 機械監察系統



- Setting up of RFID receivers at speed limited areas, one pair on both sides. Attach RFID tags to the plant/operators' helmet. Calculate the speed between 2 points.
- 一對RFID接收器設置在限速區的兩側，安裝RFID標籤於機械/操作員的頭盔。計算2點之間的速度。
- A push message for speeding would be prompted to the site management staff immediately. System provides record and data analysis.
- 超速的提示訊息能夠即時發送給 工地管理人員，系統提供記錄和 資料分析

創新工地安全措施

Safety Innovation

- Mobile Alarming Device for Lifting Operations
- 流動式吊運警告設備



創新工地安全措施 Safety Innovation

- **‘Mobile Alarming Device for Lifting Operations’**
- Detect movement in lifting zone and trigger alarm system
- The sensor can sensing up to 110 degree and sensing distance up to 15 meter

- **流動式吊運警告設備**
- 感應吊運區內的移動物及發出警號
- 能感應110角度及15米距離



創新工地安全措施

Safety Innovation

- **‘Automatic Power Cut off Device for Electricity Distribution Board’**
- Provide alarm, flash and siren if triggered
- Requires REW to rest if triggered
- Do not affect emergency lighting

- **自動斷電系統**
- 電箱如被干擾將會發出警報、閃燈及響號
- 經干擾的電箱須由註冊電工重置
- 不影響緊急照明



創新工地安全措施

Safety Innovation

- ‘Smart Card Control System and Interlock Beneath Seat for Forklift Truck’
- Ensure authorized control of forklift truck
- Prevent unintended movement without driver in position

- 叉式鏟車智慧卡系統及坐位感應互鎖
- 確保所有鏟車是受權操作
- 防止鏟車于無人駕駛下移動



Safety Innovation 創新工地安全措施

- Unpiloted Concrete Skip
- 遙控混凝土載鬥



- This device allow workers to control the switch of concrete skip at a remote area instead of manual operation. The CCTV was installed to monitor the concreting process.
- 透過遙控系統取代傳統人手控制落石矢方法，並透過監察鏡頭監察落石矢的情況。
- This device improve the safety working procedures in concreting process in order to reduce the risk in work at height
- 遙控控制系統改善於落石矢時的安全施工程式，有效減低工人高空工作的風險。



Safety Innovation 創新工地安全措施

Interlock guarding for Bar Bending Machine

屈鐵機互鎖式保護罩



- A foot switch control and an interlock guard were installed on a bar bending machine.
- 屈鐵機上安裝了一組腳踏式開關及互鎖式護罩
- The device isolates the power supply if not guarded and hence eliminates the chance of trapping hazard.
- 設備在護罩沒有啟動時截斷電源，從而避免夾傷危害
- 30 seconds automatic timer to eliminate the chance of interlock switch intervention
- 30秒自動時間器防止互鎖式護罩受到干預

創新工地安全措施

Safety Innovation

- ‘Rebar Bending Machine Angle Indicator’
- Angle indicator shows the rebar's bending angle.
- Avoid striking and trapping

- 屈鐵機角度顯示器
- 具有角度顯示屈鐵角度
- 防止被鐵支撞擊或夾到



90°藍燈亮著



180°紅燈亮著



視線位元置



轉向提示及守則



Safety Innovation 創新工地安全措施

Sound Insulation and Dustproof Protection Guard for Abrasive Cutter

界口碟機隔音及防塵護罩

- Reduce the noise by 6 to 8dB(A) and dust by over 100ppm when using the protective device (claimed by the contractor)
- 減少6 – 8 分貝(A)的噪音及100 ppm 的粉塵濃度 (資料由承建商提供)



創新工地安全措施

Safety Innovation

- **‘Audio Visual Alarm System for Detecting Height of Material Trucks’**
- Detects trucks’ height by means of sensors
- With audio and visual alarm system to avoid collision

- **貨車高度警報系統**
- 利用感應器量度貨車高度
- 利用聲音及圖像警報預防碰撞



Safety Innovation 創新工地安全措施

Advanced Grouting System 新式灌漿系統



- Cement was direct pumped into the tank by pump truck. Cement grout could be mixed up by the grout mixer which controlled by the operator in the independent control room. Cement grout will be pumped out from the grouting station directly.
- 泵車直接泵水泥進罐，操作員在獨立控制室控制混合器攪拌英泥漿。完成後，英泥漿將直接泵出
- Eliminated the hazards from manual handling operations, dust and contact with moving parts of the mixer.
- 消除來自體力處理操作、塵埃及攪拌器危險部份的危害

Safety Innovation 創新工地安全措施

Aluminum Working Platform for Bamboo Scaffold

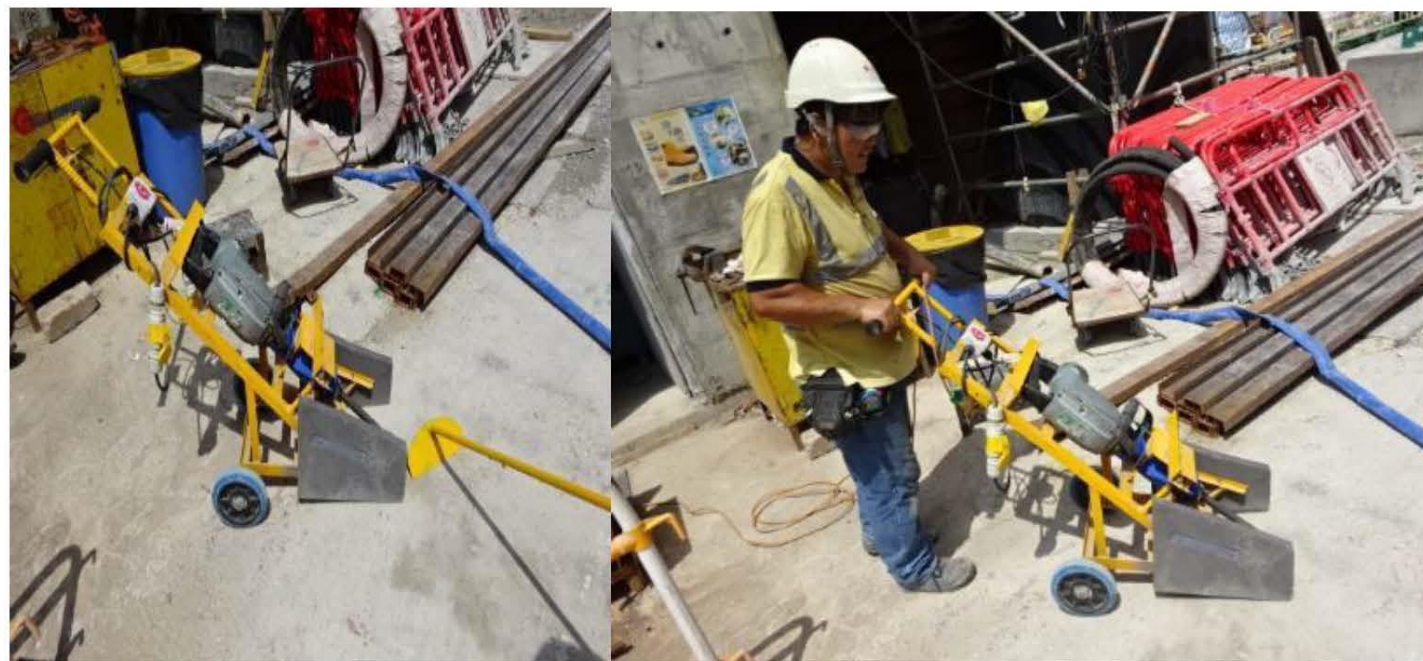
竹棚架的鋁制工作平臺



- Reduced the weight of working platform in bamboo scaffold
- 減少竹棚架上工作平臺的重量
- Components could be installed and managed easily
- 部件設計易於管理及安裝
- Provision of safe and standardized working platform
- 提供安全及標準的工作平臺

創新工地安全措施 Safety Innovation

- Semi-automatic Breaker Rack
- 半自動電炮支架



創新工地安全措施 Safety Innovation

- **‘Semi-automatic Breaker Rack’**
- Reduce manual handling operation
- Safe on/off switch equipped
- Angle adjustment

- **半自動電炮支架**
- 減低體力處理操作
- 設有安全開/停機掣
- 角度調校



創新工地安全措施

Safety Innovation

- **‘Interlock Device for Tower Crane Hook’**
- Tailor-made latch with interlock
- Opening of a hook that can only be unlocked manually
- Prevent slip of lifting gear

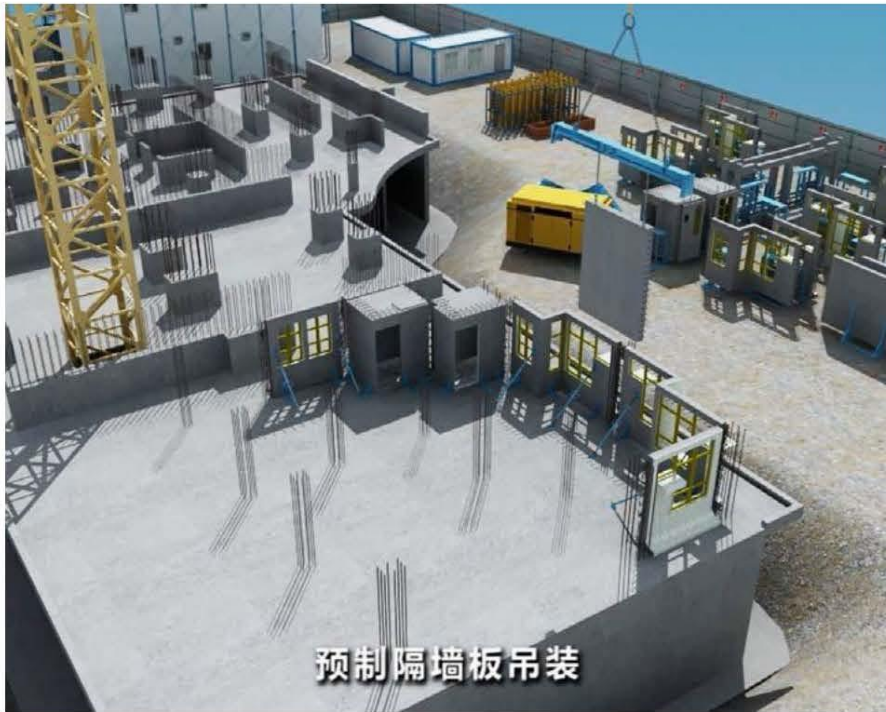
- 互鎖式吊鉤
- 訂制的吊鉤設有互鎖
- 吊鉤必須由人手解開
- 防止起重裝置松脫



Safety Innovation 創新工地安全措施 (BIM)

Demonstration of Precast Element Storage, Lifting and Installation Works

預製件的存放、吊運及安裝示範



- Outlined the storage and installation of various types of precast units.
- 描繪不同類型預制件的存放及安裝
- Facilitated the communication in relevant personnel by the visualized and dynamic presentation
- 促進各級相關人士的溝通

Safety Innovation 創新工地安全措施

- BIM video for specific safety training – Lifting Safety



- Introduce the lifting plan and de rating chart of lorry crane
- 介紹貨車式起重機吊運計劃及降額圖
- Provide training materials regarding the lifting safety of lorry crane
- 提供關於貨車式起重機的吊運安全培訓材料
- Improve the safety awareness and mindset of crane operators and signalmen
- 提高操作員與訊號員安全意識

創新工地安全措施 Safety Innovation

- **‘Building Information Modeling (BIM) Safety Training’**
- Better understanding of related working procedures through safety training
- Better experience and effective way of explanation of method statement and foreseeable risk and hazard

- **把建造資訊模型(BIM)應用在安全訓練**
- 于安全訓練時更易學習及掌握相關工序要求
- 有效解釋及領略施工方案及可能預見的風險及危害

Picture.5



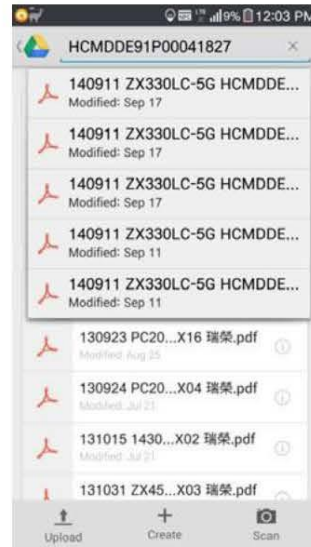
Picture.6



Safety Innovation 創新工地安全措施

Instant Validation of All Plants and Equipment through Cloud Technology

應用雲端科技核實機械設備



- Be promptly assessable for records, certificates and operators' licenses for all equipment by mobile devices after uploaded in Google drive
- 能夠透過流動裝置及雲端，迅速地檢查所有機械設備的記錄、證書及操作證
- Facilitate the management control of all equipment and plants without extra cost
- 促進所有機械設備的管理而不需要額外開支

創新工地安全措施 Safety Innovation

- **‘InspectGo App’**
- Inspection by using checklist and photos
- Information can be shared immediately to the project management and other staff by email or instant messaging apps
- Both PC and handheld accessible



- InspectGo 程式

- 進行巡視時以列表及拍照片作紀錄
- 能即時以電郵及短訊通知管理層及有關員工
- 電腦及手提裝置適用



創新工地安全措施

Safety Innovation

- ‘Construction Management System’
- electronic portable devices (smart phones) and operated with tailor-made “Apps”.
- The system enhances the effectiveness, efficiency and reliability of the SMS (Safety Management System) implementation.

- 施工管理系統
- 使用可攜式電子設備如智能手機
- 度身制定〈應用程式〉操作
- 增強系統的有效性，效率和可靠性



Construction of Public Rental Housing Development at Hung Shui Kiu Area 13 Phases 1 and 2



Construction Management System

- Conduct record and monitor within site:
 - Safety Inspection
 - Provide Safety Training
 - Plant/ Machinery identification
 - Worker Records
 - Instant Information Sharing on site
 - Emergency Situation
- 監察和記錄工地現場情況：
 - 安全查核記錄
 - 提供安全培訓
 - 裝置/機械狀況記錄
 - 工人工作/培訓記錄
 - 即時共用/發放緊急情況信息

於吊運閘板及工字鐵時嘗試使用遙距開關控制之吊具，以減少使用吊人籠。

Trial application of spring grip clip with remote control for lifting sheetpiles and H piles to minimize the use of man-carrying cage.



Safety Innovation 創新工地安全措施

- Virtual Reality Training
- 虛擬實境訓練



- Combining the use of BIM and Virtual Reality (VR) technology, creating realistic hazardous situation for workers' training.
- 透過結合BIM及虛擬實境技術，製造出真實危機情況用作工人訓練用途
- Using BIM to simulate five hazardous situations and potential consequences (Electrocution, Falling object, Fall of person, Drown and Collapse of lifting appliance)
- 透過BIM模擬出五種危險情況(觸電, 物件高處墮下, 人體下墮, 遇溺, 及起重機械倒塌)



Safety Innovation 創新工地安全措施

- Extendable Ladder
- 伸縮梯

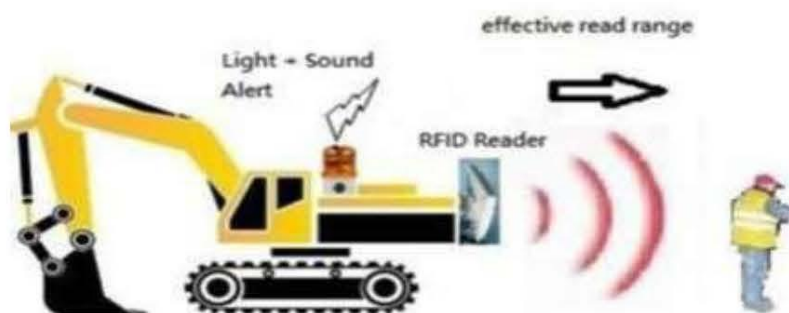


- The ladder can accommodate different height of Reverse Circulation Drill (RCD) working platform and provide a safe access to the workers and to minimize the lifting arrangement
- 可根據不同高度的鑽樁機，提供安全上落通道和減少吊運梯子的次數
- The ladder can reduce multiple sizes of ladder kept on site to accommodate different heights and save the storage spaces in congested site
- 可減少工地內儲存不同尺寸梯子的數目



Safety Innovation 創新工地安全措施

- RFID Fatal Zone Alert System
- 危險區域警報系統



- This system using RFID technology which installed at the rear of the excavator. Another RFID chip pasted on the helmet of the workers. If any worker entered the fatal zone (within 2m away from the excavator), the visual & audio warning system will be triggered and alert to the excavator operator and workers.
- 透過射頻識別技術，將RFID讀卡器安裝在挖泥機及將RFID標籤貼在工人安全帽上，當工人進入挖泥機的危險區域內(約機尾2米範圍)，便會發出閃燈及警報聲音，警告及提醒挖泥機手及工人。

