



C-SMART賦能智慧建築安全

講者

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余奕宗先生，擁有20年IT開發經驗，專注項目管理、諮詢服務和軟件交付。2020年加入海宏，成功開發C-SMART，改革信息儀表板為互動平台，並在多個工地部署。作為開發負責人，負責全方位軟硬件開發、設計、諮詢、項目管理、和培訓等。



余奕宗先生

助理科技研發總監

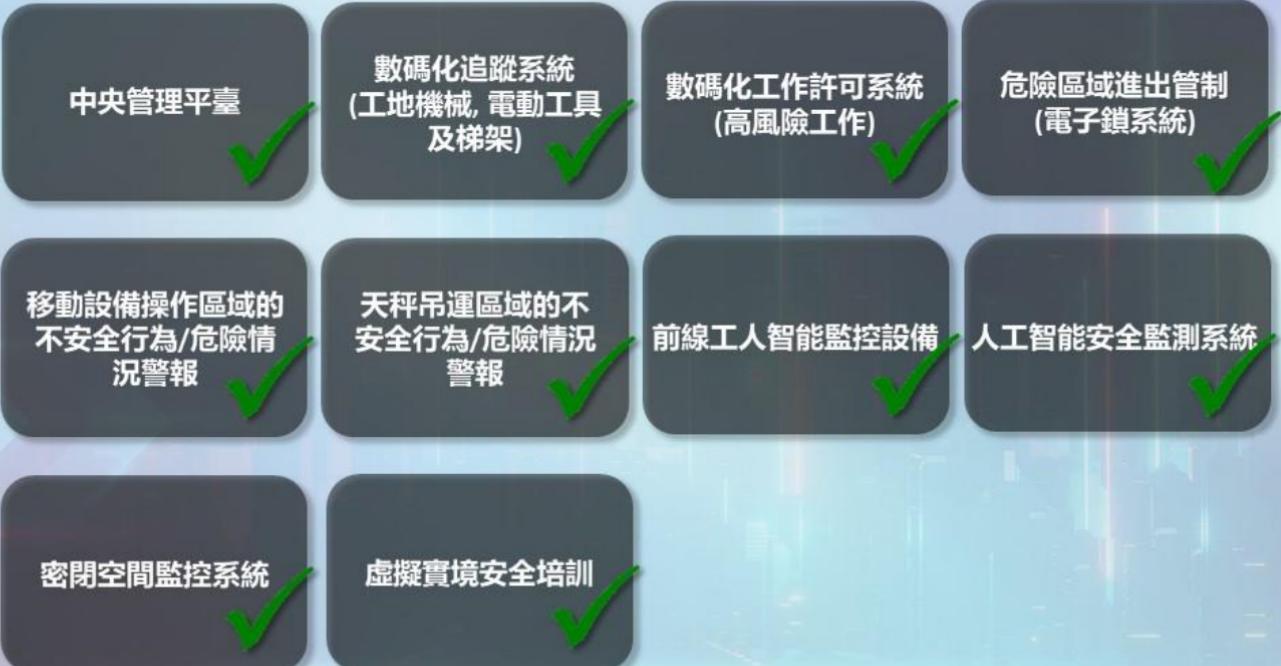
創新科技應用

- 海宏技術全面致力於數碼化施工管理，利用最新技術推動產業的全面變革。在**高層領導的大力支持**下，公司率先開展創新的數碼化措施，優化工作流程，提高生產力，並帶來更高的效率。
- 尤其在**安全方面**，公司**持續投放資源**於科技發展及安全管理方法的「推陳出新」，並不斷推出改善政策，加強安全文化。



符合政府要求

- 當時C-SMART已符合75%的需求
- C-SMART快速響應並全力投入資源於科技開發，於同年10月，滿足4S全部要求。



符合政府要求

- 當時C-SMART已符合
75%的需求



Smart Safety和4S方案

截至2024年6月，除4S外，C-SMART Smart Safety還具備其他功能 (暫稱4S+之功能)

4S和4S+之功能模組合共18個

全景視頻監控



網絡廣播系統



防火監控系統



AR鷹眼系統



安全巡查系統



天秤安全管理系統



安全之星系統



高支模鐵架監測系統



TRANSCENDENCE | C-SMART

Digital Permit-to-work
電子工作許

Digital process management,实现无纸化,安
Digital process management, act
security, data sharing, and cost si



TRANSCENDENCE | C-SMART

Personnel Bluetooth F
人員藍牙定位

位置追踪 人員安全守護
Location tracking, personnel safe

TRANSCENDENCE | C-SMART

C SMART-Confinement Spa
密閉空間氣體

十種氣體檢測 支持離線使
10 gas detection, support off-line us

TRANSCENDENCE | C-SMART

C-SMART Centralized Safety
Management Platform

智慧安全中央管理平台

即時全面掌握工地安全資訊

Immediate availability of comprehensive site safety information



100%
符合4S要求
100% compliance with 4S requirements

CK
鎖 (4G版)
Collision Prevention System
防撞系統

即時符合4S標準智能鎖
power consumption and it meets the 4S standard

100%
符合4S要求
100% compliance with 4S requirements

CK
充 (LoRaWAN版)
充電安全工地
Workers Registration Safety

即時充電
power consumption and it meets the 4S standard

100%
符合4S要求
100% compliance with 4S requirements

CK
充 (LoRaWAN版)
充電安全工地
Workers Registration Safety

Smart Safety和4S方案

■ 香港服務項目

60+



C-SMART 工程管理數字平台

25°C

60+ 香港本地項目使用

組織結構

- 中鐵建機工程（香港）有限公司
 - CIC 建造有限公司
 - SETC
- 鐵建公司
 - BLZ 補修新港隧道工程 (Site B)
 - BLU 九龍型母嬰中心重建項目
 - BLV 范吉斯總王爺隧道計劃第二期(第一階段)
 - BLW 航博新角色營隊 (Site A)
 - BLI 長華邨熟食連一期
 - BLY 基層供應防災重建計劃 (第1期)
 - BTY 計劃及建造兩棟中醫診所及政府中醫檢測中心
- 葛氏項目
- 機械公司
- 海在技術有限公司
 - TCL
 - STP-HV
- 基礎公司
 - FEU 施上路一期公屋專屋發展計劃的地基工程
 - FEU 施華洛中型電信數據中心基礎工程
 - EDO 丹斯利頭及南葵涌第一期公屋地盤工程
 - FEU 施上路一期公屋專屋發展計劃的地基工程
 - FEV 白田邨12期及葵涌南避難中心地基工程
 - FEV 白田邨12期及葵涌南避難中心地基工程
 - FEW 白田邨重建計劃12至13期工程
 - FEW 大浦頭路西基礎工程
 - FEG 公基華基地盤工程
- 土木公司

4S功能簡介

4S功能簡介

用於工人和前線現場人員的智能監控設備

實時動態管理

透過3種設備，準確監測工人在不同指定區域的移動，即時捕捉和在平台上可視化勞動力的即時數量和位置，以及分包商的分佈。

- 全面的工人管理解決方案
- 提供了過去10天的工人數量、按年齡、性別、分包商和工種分佈的詳細資訊
- 使用長距離被動式RFID標籤將每位工人與其安全帽配對，與普通安全帽相比，使用智慧安全帽無需額外的步驟
- BLE iBeacon將持續廣播訊號，電池壽命達2年

SmartChip可以自動與SmartWatch連接，提供更全面和強大的功能

- 健康監測：心率、血壓、體溫、步數
- 支持SOS、昏迷、中暑、碰撞等警報
- 與SmartChip同步，不限於固定用戶





First, install the Smart Chip on the safety helmet

用於工人和前線現場人員的智能監控設備

實時動態管理

- 提供實時定位和監控工人的健康數據, 如心率、血壓、體溫等。
- 支援緊急SOS功能, 工人在遇險或身體不適時可輕鬆觸發SOS警報。
- 即時推送通知至行動應用程式和C-SMART中央管理平台。



實時

提等
支
SC
即

中國建築 | C-SMART | 傳統 | 交互 | 計劃 CEP 元朗防洪壩及明渠改

27°C | 戶外人員定位2.0 | 99+

人員管理 | 在場工人數 111 | 佩戴人數 101 | 今日報警數 0

標識區域

MiC/MCC 5人 5%

MDC 35人 35%

YLBPS (大泵房) 53人 52%

NULLAH (含外圍) 0人 0%

YLNPS (小泵房) 0人 0%

鐵場 0人 0%

其他區域 8人 8%

近期警報記錄

警報類型 | 開始日期 | 結束日期

警報數據

警報類型統計

健康數據... 36.84% (停滯提醒)

停滯提醒 52.63% (停滯提醒)

SOS警報 10.53% (SOS警報)

刷新 | ? | BIM Mesh

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收到通知

如何有效使用4S工具

如何有效使用4S工具

如何有效使用4S工具

網絡

呼籲工地保
障公有網絡



文化

主動培訓及
改變習慣



機制

建立檢查或
認證機制



規範

樹立4S為必
須品的規範
如安全帽、
反光衣



用心

用心使用
把4S融入工地



4S應用效益



智慧安全方案
SMART SAFETY



千人意外率下降



0 致命事故

• 千人意外率由2021年至2023年期間，大幅降低 **17%**



中央管理平台

數據整合與分析

- **預測性維護** - 運用設備運作資料，預測故障發生並提前進行維護，降低設備停運風險。
- **安全隱患識別** - 結合多源數據挖掘安全隱患，制定針對性的預防措施。
- 透過對大量數據的全面分析應用，可以大幅**提升工地的安全、效率和管理水平**，推動整個建築行業的數位轉型。



THANK YOU

This is a clip from the 31 July 2024 recording of the

Hong Kong Housing Authority

“Safety Forum 2024 for Works and Property Management Services”

The speaker on stage is Mr Edmond Yu

Assistant IT Development Director, Transcendence Company Limited

His topic is

“C-SMART : Empowering Smart Safety”

(00:23)

Hello everyone, I am Edmond Yu

Today I will briefly introduce our self-developed C-SMART system

and how it can enhance safety on construction sites

Several years ago

we began digitalising project management

We applied various technologies, including artificial intelligence

Information and communication technology, IoT, mobile applications

and Building Information Modelling

Together, these elements form the C-SMART system

Our system covers seven areas: man, machine, material, method, environments

Additionally, we incorporate two unique features of Hong Kong

which are progress management and construction robotics

By integrating everything into a single platform

we have created our C-SMART system

Today we'll focus on the safety aspect

As Ms Jackie Wong mentioned earlier

the Smart Site Safety System consists of ten areas

When the Development Bureau issued this technical circular

we already met over 70% of the requirements

By October of the same year, we had fully met all of them

And we did not stop there

Building on the Smart Site Safety System

we have developed advanced features for the system

We now have over 18 different projects

and more than 60 platforms in Hong Kong

have adopted our Smart Site Safety System

As everyone knows

the first batch of Smart Site Safety System labelling was awarded the day before yesterday

Nearly one-third of construction sites

have successfully obtained the Smart Site Safety System labelling

and our application success rate is also at 100%

How can technology assist construction sites

One aspect of the Smart Site Safety System

is the monitoring of workers and frontline staff

We use wireless RFID and Bluetooth technology

to track workers' locations

On the workers' safety helmets, we install a Bluetooth smart chip

We then set up beacons across the site

to constantly receive signals and enable location tracking

Here is a simple demonstration

The whole process is very straightforward

Just install the smart chip to the safety helmet

When workers enter the construction site

they experience a seamless process

They do not need to remove their safety helmets to check in

Their identity is synchronised with the smart chip
allowing us to know
who the worker is from any location on the site

We also extend this to a smartwatch
The watch not only shows their real-time location
but also collects health data
such as heart rate, blood pressure and body temperature
In addition, there is an emergency alert feature
When a worker feels unwell or is in danger
they can press a button on their smartwatch
which will send a distress signal to the platform

But if the worker has already lost consciousness
how can they press the button?
The smartwatch can also detect unconsciousness
The data or distress signals mentioned earlier
are instantly uploaded to the platform
and also sent to the safety officer
or manager's mobile application
enabling immediate rescue

Due to time constraint today
I had originally prepared a video to showcase our platform
If anyone is interested
you can visit the exhibition hall across the way
where we have a booth
for a more detailed introduction
In fact, many companies already have similar technologies

but how can we use them effectively

How can we enhance the Smart Site Safety System

and optimise its performance

We focus on a few key points

First is network

Since all functions of the Smart Site Safety System

require data to be uploaded to a centralised management platform

or a reliable network is essential on-site

We must ensure that the construction site has a strong network connection

Second is culture

How to train workers and frontline staff

to adopt new technology, and change their habits

Third is setting mechanisms

We must conduct more inspections

to ensure that all tools within the Smart Site Safety System

are operating in optimal condition

Next is regulation

Just like safety helmets and reflective vests

making the Smart Site Safety System

a mandatory requirement on construction sites

Finally, it is about commitment

This is somewhat abstract

but how can we train

or cultivate the mindset of workers

to use these tools thoughtfully and effectively

If we can achieve these five aspects

the Smart Site Safety System can significantly enhance its effectiveness

That concludes today's presentation
Let me tell you
over the past three years
using the Smart Site Safety System
has reduced accident rate per 1000 workers by 17%
So please do not hesitate
and adopt the Smart Site Safety System today
Thank you
Thank you for watching
(05:34)