



TRANSCENDENCE C-SMART

# C-SMART賦能智慧建築安全

講者

**余奕宗 Edmond Yu**

海宏技術有限公司 - 助理科技研發總監

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



- 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**。



- 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。



**E)** 



系統 

培訓



- 當時C-SMART已符合75%的需求

**100% 滿足4S要求的系統**

**Digital Permit-to-work 電子工作許可**  
數字化流程管理,實現無紙化安全  
Digital process management, achieving paperless safety, security, data sharing, and cost saving  
CITF 認證

**Personnel Bluetooth 人員藍牙定位**  
位置追蹤 人員安全守護  
Location tracking, personnel safety protection

**C-SMART-Confined Space Monitoring System 密閉空間氣體**  
十種氣體檢測 支持離線使用  
10 gas detection, support off-line use  
產品認證書可查  
產品認證書可查

**C-SMART Centralized Safety Management Platform 智慧安全中央管理平臺**  
即時全面掌握工地安全資訊  
Immediate availability of comprehensive site safety information  
CITF 認證

**鎖 (4G版)**  
符合4S標準智能鎖  
Intelligent lock meets the 4S standard  
低功耗 低功耗  
Low power consumption and meets the 4S standard

**碰撞預防系統**  
安全 安全  
Safety, Safety Assured

**充電 (LoRaWAN)**  
打造安全工地  
Workers Registration safety

# 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



Digital Permit-to-work  
電子工作許

數位化流程管理,實現無紙化,安  
全, security, data sharing, and cost



Personnel Bluetooth F  
人員藍牙定位

位置追蹤, 人員安全守護



C SMART-Confined Spa  
Monitoring System  
密閉空間氣體

十種氣體檢測, 支持離線使  
用



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)

丁造符合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

n Prevention System  
防碰撞系統

Ind Spots, Safety Assured

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

K  
充 (LoRaWAN)

丁造安全工地  
workers Registration  
safety

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

4S應用

# Smart Safety和4S方案



TRANSCENDENCE



C-SMART

## 香港服務項目

60+

組織結構

- 中國建築工程 (香港) 有限公司
  - CIC 建築與議會
    - SETC
  - 建築公司
    - BIZ 發展新香港醫院(Site B)
    - BLL 九龍聖馬利醫院重建項目
    - BLV 威利斯精王醫院重建計劃第二期(第一階段)
    - BLW 新德新香港醫院(Site A)
    - BID 廣華醫院重建一期
    - BLV 華星醫院重建計劃(第一期)
    - BTV 設計及建造香港漢中醫院及政府中國特利中心
  - 城市項目
    - 機城公司
  - 海峽殖民地有限公司
    - TCL
  - STP-4W
  - 基礎公司
    - FEM 藍冠地皮出單及基礎工程
    - FET 將軍澳中區醫院新址中心基礎工程
    - FDO 馬鞍山路及近醫院第一期地基及地基工程
    - FET 填上第一期公營房屋發展計劃的地基工程
    - FEVS 自由田12期及聯興徑基礎工程-填土林
    - FEV 自由田12期及聯興徑基礎工程
    - FEK 自由田平康路計劃12及13期工程
    - FEW 大埔漢路路及基礎工程
    - FEO 全港醫院基礎工程
  - 土庫公司

C-SMART 工程管理數字平台

25°C

60+ 香港本地項目使用



4S應用

# 4S功能簡介



TRANSCENDENCE



C-SMART

# 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。

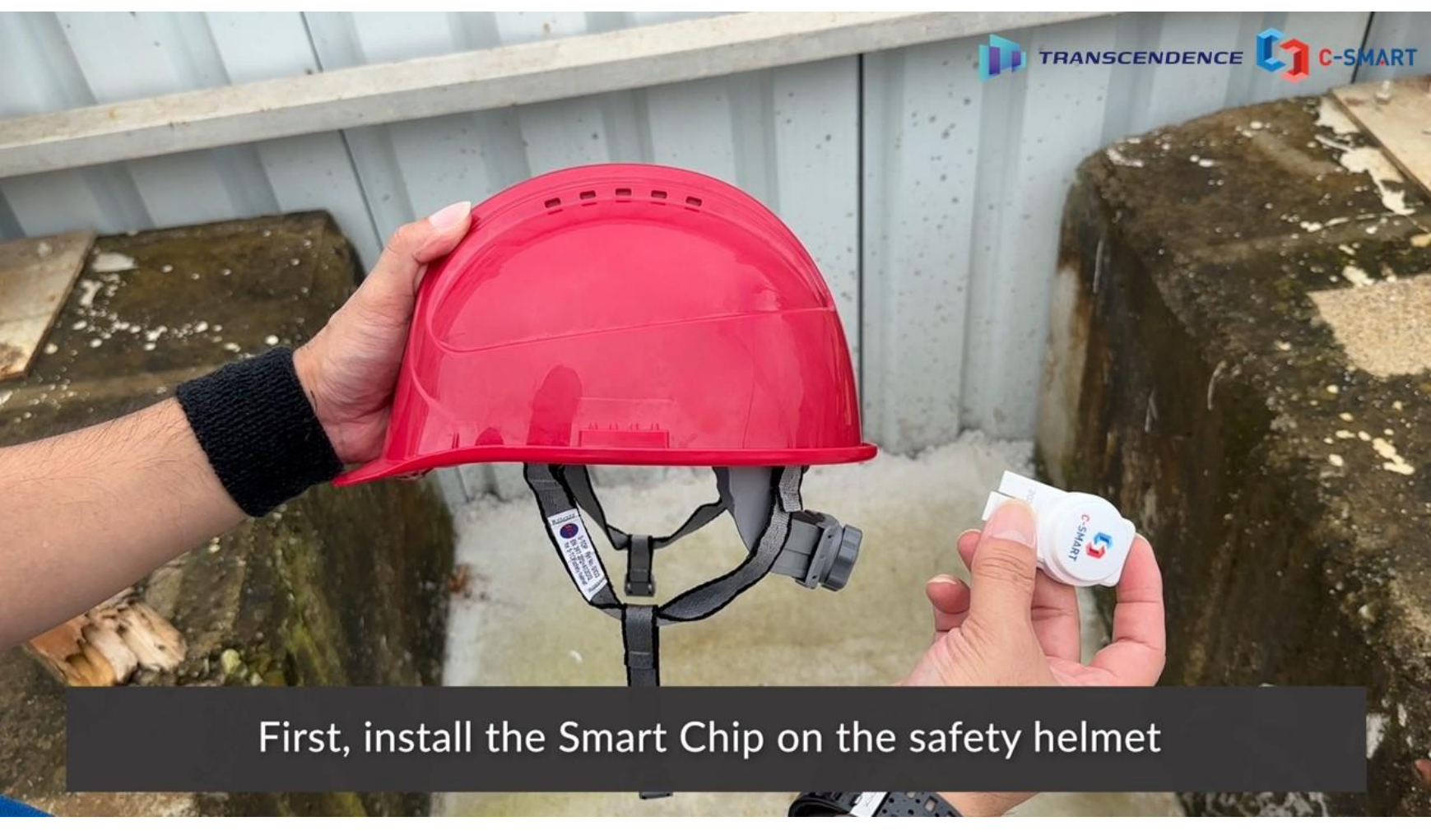
- 全面的工人管理解決方案
- 提供了過去10天的工人數量、按年齡、性別、分包商和工種分佈的詳細資訊
- 使用長距離被動式RFID標籤將每位工人與其安全帽配對，與普通安全帽相比，使用智慧安全帽無需額外的步驟
- BLE iBeacon將持續廣播訊號，電池壽命達2年

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。

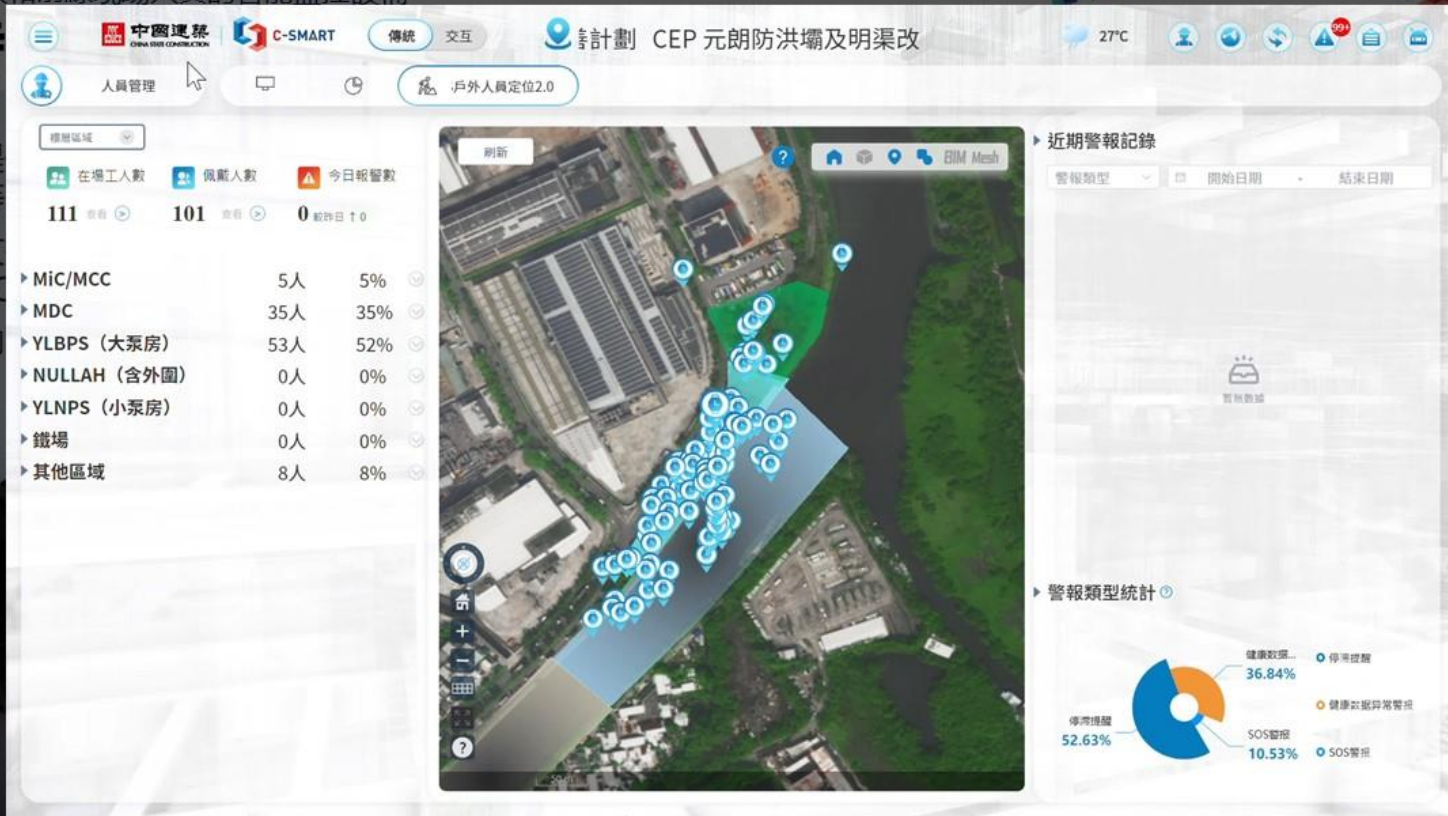




用於工人和前線現場人員的智能監控設備

實時

- 提等
- 支SC
- 即



收到通知





# 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)