Site Safety Seminar for Capital Works New Works Contracts
新工程合約工地安全講座

11 December 2020 (Friday)

Innovative Site Safety Measures
工地安全創新措施
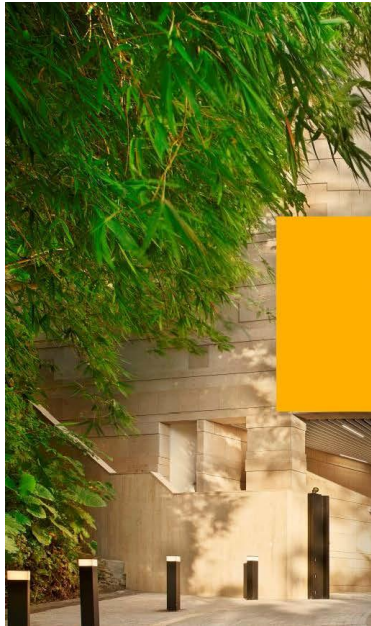
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Construction of Public Housing Development at Tuen Mun Area 54 Site 1&1A
屯門54區 1&1A公營房屋發展計劃

Presented by:
Mr. Jethro Chan 陳駿傑先生
Site Agent 工地代表

智能臉部辨識系統 Facial Recognition System **1**	地盤入閘安排 Site Access Control **1.1**	物料升降機控制 Hoisting Equipment **1.2**
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1.智能臉部辨識系統
Facial Recognition System

智能臉部辨識系統
Facial Recognition System

智能臉部辨識系統**Facial recognition system**，或稱人臉識別系統。特指利用分析比較人臉視覺特徵信息進行身份鑑別的識別技術。

屯門54區 **1&1A**使用人臉識別技術於地盤入閘安排及開士架控制，以取代掌骨機等傳統舊式識別系統。

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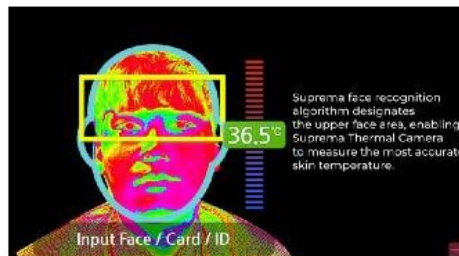安樂工程有限公司

地盤入閘系統

- 智能人面識別系統
- 翼門出入閘機
- 溫度檢測熱像儀

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溫度檢測熱像儀

自動化體溫監控系統，可以檢測皮膚溫度高的工友，在螢幕上顯示溫度，並在檢測到高於標準溫度時發出警報並不准進入地盤範圍。測量溫度識別位置於人臉的上方區域。

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Suprema face recognition algorithm designates the upper face area, enabling Suprema Thermal Camera to measure the most accurate skin temperature.

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地盤入閘安排
Site Access Control

如何使用

- 人面識別系統接駁工人讀卡系統
- 新工友入職時需拍卡以識別工友身份
- 於鏡頭前記錄面容數據
- 每次入閘只需拍卡，望鏡頭，半秒內識別工人面容及量度體溫，如面容不正確，體溫過高便不能進入地盤範圍

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地盤入閘安排
Site Access Control

好處

- 自動化
- 資料準確可靠
- 完全非接觸式
- 記錄即時體溫
- 完整體溫記錄

克服地盤環境能力

- 鏡頭能適應太光及太暗環境
- 熱像儀能持續探測背景溫度，作出調整
- 識別時間快速，應付上下班大量工友同時進出

困難

- 鏡頭不能在直射的陽光下運作
- 人臉上不可以遮蓋，口罩需拉底才可識別
- 建議的環境溫度10°C至35°C，太熱太冷影響準確度

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物料升降機控制
Hoisting Equipment Control

1.2

如何使用

- 進行物料升降機(開士機)訓練時，工友面容識別會記錄於開士架控制面板(Control Panel)。
- 當工友使用開士架控制器，開始電源後，面容識別系統會啟動識別使用者身份，如使用者並沒有上訓練堂，開士架便不會運作。

好處

- 準確記錄每位使用者使用資料
- 有效防止胡亂使用及未經批准下傳用

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2. 流動應用程式
APP for Safety Management

流動應用程式
APP for Safety Management

是一個數碼平台支援流動應用程式及網頁平台。

屯門54區 1&1A使用Novade於安全管理之上，以取代舊式巡查記錄及工作許可証申請。

工作許可證
Permit to Work

本地盤現時已設立工作許可證

密閉空間工作許可證

貨車吊機工作許可證

熱工序許可證

使用梯子的工作許可證

吊船工作許可證

升降機槽內工作許可證

安全・我的習慣
SAFETY MY HABIT

升降機槽內工作許可證
Work Inside Lift Shaft   2.1

許可證申請 (分判負責人) → 確認簽發 (前線管工) → 檢視已簽發許可證 (管理人員)

確認註銷 (前線管工) ← 註銷許可證 (分判負責人) ←

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申請

1. 分判負責人開啟流動應用程式, 填寫許可證申請.

2. 首先選擇基本資料, 如座數, 樓層, 高底 Zone等(預設).

3. 申請主版會彈出, 填寫詳細內容及日期時間等.

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4. 選擇詳述工作(預設).

5. 選擇分判名稱(預設).

6. 選擇負責管工(預設).

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7. 程式下半部會顯示於升降機槽內工作,可預見危害.

8. 依據可預見危害, 分判負責人需於已預備安全措施 (Safety Precautions Taken) 加上"√", 如沒有足夠安全措施, 程式不會繼續.

9. 提交現場環境照片; 工人穿著合適個人防護裝備照片或閘照片. 照片必需現場拍攝.

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批核

1. 當區管工親身到工作現場批核許可證.

2. 現場拍攝環境照片上傳及簽署.

3. 完成批核, 即場借取鎖匙.

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檢視

1. 管理人員可於App檢視已簽發許可證.

2. 查核許可證細節.

3. 隨時匯出報告

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1. 當天完工後分判負責人撤銷許可證. 附加撤銷所需照片

2. 由當區管工確認撤消許可證. 確保所有工人已安全離開工作位置 及 工作環境已妥善清理.

密閉空間工作許可證

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工作許可證
Permit to Work

2.1

好處 👍

- 有效及快速進行工作許可証申請，預設選項，省卻文字輸入。
- 提交資料準確，易於檢視。
- 提升申請及批核透明度，所有持份者都可實時監察所有工作許可證申請。
- 提升前線員工機動性，於地盤位置都可處理許可証申請。
- 有效識別工人身份，並確保其資格證書都在有效期內。
- 識別裝備，查看證書及確保狀態良好。
- 加強問責制，透過程序直接批核並簽署。
- 管理層可實時掌握所有高危工作情況。

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數據分析

- 透過Dashborad，管理人員可即時監察許可證所有數據。
- 有效分析申請記錄
  - 那座申請最多
  - 那位分判記錄最齊
  - 那位前線參與度最高
  - 那位工人牌照將近過期

■ 已簽發 ■ 已撤離/註銷 ■ 被拒絕 ■ 被撤回
■ Other

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總結
Conclusion

創新措施用於安全管理：

更易更方便安全管理

➢ 資料準確可靠易於檢視
➢ 記錄即時及完整
➢ 有效及快速進行
➢ 提升透明度，可實時監察
➢ 提升前線員工機動性
➢ 有效識別使用者身份

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THANKS!

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Here is the footage from

Site Safety Seminar for Capital Works New Works Contracts

which was held on 11 December 2020

The speaker is Mr. Jethro CHAN

Site Agent of Able Engineering Company Limited

His presentation topic is

Innovative Site Safety Measures

Hello

I am Jethro Chan from Able Engineering Holdings Ltd

Thanks for the Housing Authority for letting us share

our site safety experiences today

Our site is the Tuen Mun Area 54 Site 1 & 1A

public housing development project

of which I am the representative

Please allow me to introduce to you

the innovative site safety measures we have been using

Today I am going to particularly focus on two projects

The first one is a facial recognition system

and the second one is a mobile app

which is the safety system we are currently using

To begin our Facial Recognition System

is a kind of technology that uses the special features of

human faces to recognise and distinguish between people

Our site uses this recognition system

for site access control and material hoist equipment control

This system has replaced traditional recognition systems

such as the handkey biometric palm reader

These are the turnstiles that we are now using

We have three of them which comprise certain components

The first is a smartcard system

The second is a camera and display

The third is the facial recognition system

Due to the pandemic we have added a temperature monitor

And just a few words about it

it automatically detects people's body temperature

so it can detect the temperature of our workers' skin

If it detects a high temperature

the worker will not be allowed to enter the site

This system focuses on the face and forehead so it can detect

the body temperature even when a safety helmet is worn

And now we will talk about how this turnstile works

First connect the smartcard machine on the turnstile

to our facial recognition system

A new worker first taps his card on the first day of work

so that the system recognises his identity

He needs to turn left and right before the camera

so that the system can record the facial data

After that he just needs to tap the card every time and

looks at the camera for half a second

the system will detect his face and temperature

If the facial features do not match the record or

the temperature is too high then the worker cannot enter

What are the advantages of this system?

First of all it is automatic and we do not have to

measure or record body temperature manually

Its data is very accurate

Except tapping the card the whole process is contactless

As our entrance gates are wing type instead of the turnstile type

basically workers can enter the site without touching anything

The system can also tell you your body temperature

and this data is recorded and saved onto our system

What issues that the system is facing? The site environment
After all construction sites are different from offices
The cameras can cope with very bright or dark environments
and the temperature monitor will automatically adjust
according to the background temperature
Also the system responds quickly in the morning or evening
workers can enter or leave the site without having to queue
Now let us talk about the challenges
The camera cannot work when sunlight is shining into its lens
so if the sun is shining directly onto the lens in an open space
then the camera will not work
As you may have guessed
the facial recognition system cannot work for a covered face
you have to pull down or remove your mask for this check
Also its accuracy may be affected if it is too cold or too hot
Now I will talk about using the facial recognition system
in controlling the material hoist
Just now Mr Fong mentioned our work in his presentation
We have been using this all along
We agree that it is very useful so let me show you its use
During induction training of workers for material hoists
we record the worker's facial data in the control panel
When the worker borrows the control key to turn on the hoist
the system will try to recognise his face
If the worker has not gone through the training
the material hoist will not be operable
What are the advantages of this system?
First we will have accurate records of
whom has operated this material hoist
Second it stops the hoist from being misused
and it also stops workers from
lending it to others without authorisation
which they used to by just passing around keys or smartcards
This facial recognition check prevents this from happening
Next I am going to introduce our app for safety management
We devised this app in collaboration with a firm called Novade
Here you can see the app appearance on my phone
It is a digital platform supporting mobile apps and websites

so we can view this on a web browser on a PC machine too

We use this in safety management replacing our old paper-based

inspection records and applications for Permit-to-Work

You can see there are three options on the screen

The first is 'Action'

For example records of our safety checks

Permit-to-Work (PTW) and some safety forms

Just to mention some of the PTWs used on our site right now

they cover six areas

the first is working in confined spaces

the second is PTW for lifting operations of lorry-mounted cranes

the third is for using ladders

We also have PTW for lift shafts for working inside life shafts

Finally we have the Hot Work Permit and

one for using suspended working platforms

I will use applying for a PTW for lift shaft work as an example

First the sub-contractor's person-in-charge

needs to apply for a PTW using the app

Frontline staff are then responsible for signing and issuing it

Management can access the app at any time to see

PTWs that have been issued or applied for

In particular on the day after the job is completed

the sub-contractor's person-in-charge needs to cancel this PTW

and a frontline staff has to confirm the cancellation too

Later I will talk about the importance of cancellation

and confirmation of cancellation

But first let us talk about applications

Very simply speaking

the sub-contractor's person-in-charge is our administrator

He has to use the app to choose which PTWs to apply for

Then input some basic information

such as which block or building

Then input some basic information

such as which block or building

which floor whether it is a high-level or low-level zone

All of these are pre-set

Then fill in some information such as the date and time

the job description the company and the foreman in charge

These three fields are pre-set

so you do not have to input a lot of text and

the process is not complicated either

You have to select what jobs you are doing inside the lift shaft

which sub-contractor company do you come from?

then select the foreman-in-charge from names contacted before

select the foreman who is in charge of approvals

In the second half of the application you will be shown

some foreseeable hazards inside the lift shaft

Examples shown here cover falling objects fall from height

insufficient lighting or electric shock

All of these are recorded and saved

Based on these hazards

the subcontractor can put into place certain safety precautions

or preventative measures

Inside the lift shaft

there must be a suitable working platform and CSSR-Form 5

as well as independent lifeline

Workers must wear personal protection equipment such as

safety harness fall arrestor safety helmet and hand straps

The application cannot be processed until all of these are ticked

A photo taken and submitted on site is required

Workers must wear their personal protective equipment properly

Most importantly the app requires you to take photos on site

and you cannot just upload existing photos from your phone

So the system reinforces authenticity of information

The worker you saw just now

he had to put on all his personal protective equipment

take the photo and upload it in the app

The next stage is approval

Likewise the foremen must do the approval on site

They have to take photos there to prove that

the worker has put on all his personal protective equipment

and he has to check that the equipment is in good order

At the same time he has to sign

After approval he can lend the key to the administrator

In the 'Review' section

our managers can log in the app at any time to know

which applications have been submitted or approved today

At the same time we can see the details of each application

such as which block floor or worker in question

We can also pick out an individual report to review it

As for cancellation

At the end of the work day the foreman has to cancel this PTW

and take photos on site too

The importance of cancellation is to ensure that all workers

have left the work site safely

and that the site has been properly cleaned and tidied up

We have to take photos of the site

to show what the environment is like at the end of the day

This is a sample of the PTW for working in confined spaces

We can put photos of some of the PTWs of our workers

as well as the gas monitor or

some of the equipment used in confined spaces onto the app

so that everyone can see and understand the situation clearly

What are the advantages of this PTW? First processing of

applications for PTW becomes very effectively and quickly

Many stuff has been pre-set saving the input of much text

The submitted data is accurate as they are standardised options

We can avoid inaccurate data entry

The transparency of the application process is also enhanced

All stakeholders meaning our colleagues have installed the app

and they can all see the information pertaining to each PTW

The app has also improved flexibility

as workers can apply for or process their PTW anywhere on site

It also effectively recognises the identity of each worker

and we can check his PTWs or certificates easily

We can also see if the equipment is in good condition

Another advantage is that the system reinforces accountability

It requires the foreman to approve and sign the PTW directly

so it shows which colleague is responsible for each item

The management team can also get a good picture

of such high-risk activities in real time

Basically once I log in this app

I can know which block is our worker working in the lift shaft

or where they are doing lifting operations or hot work

When I go back to the office I can turn on my computer

and look at the dashboard

How can this dashboard help us?

It helps us with data analysis

we can see which block on site has the most applications

which contractor has got the neatest and most complete records

which frontline worker has been most involved

We can even see which workers' permits are about to expire

So to briefly conclude we have been using

these innovative measures for safety management

It helps us build an accurate and easy-to-understand data bank

Our records are instant and comprehensive

and the data is effectively and quickly processed

There is not too much administrative work

and transparency is enhanced too

because we can monitor the situation in real time

workers also enjoy more flexibility

The system also easily recognises the user's identity

whether they are workers or contractors

Finally in conclusion

these measures enhance the ease and convenience

of site safety management

That is all for my sharing today

Thank you everyone