20161006 HKIBIM EMSD

Background

- EMSD
  - Over 4,000 staff
- Operate & maintain over 5,000:
  - Government and Municipal buildings;
  - Hospitals etc.








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- What are the potential benefits of applying BIM to
  - asset management (AM)
  - building operation & maintenance (O&M)

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Architecture for EMSD BIM-AM System

conversion

BIM Desktop / Mobile Interface

(Visual integration & Data exchange)

AM System

Enhanced integration implemented by EMSD

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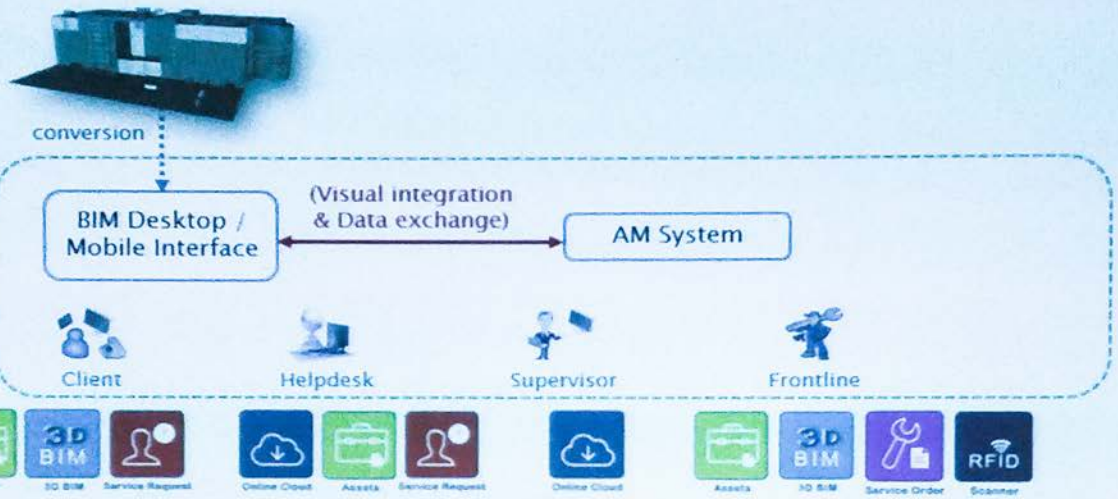
Architecture for EMSD BIM-AM System



Enhanced integration implemented by EMSD

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Outline

- EMSD BIM-AM System
  - Retrospective BIM model construction
  - System architecture illustrated by showcases
    - HVAC showcase (1.fault reporting, 2.pre-diagnosis, 3.on-site repairing)
- Way forward

HVAC Showcase – Fault Reporting

Suppose the Client feels the Lecture Theatre is a bit hot despite having adjusted the air-conditioning to a lower temperature. She suspects something wrong with the air-conditioning system.

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HVAC Showcase – Fault Reporting

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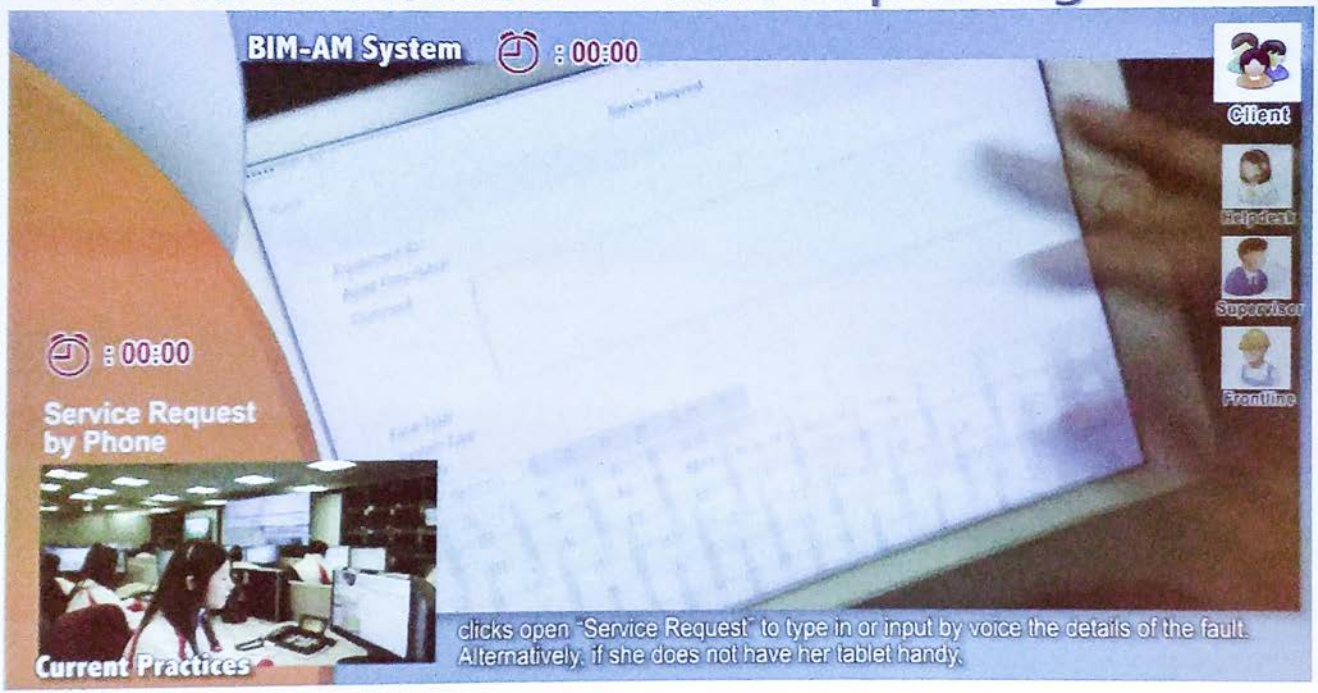
HVAC Showcase – Fault Reporting



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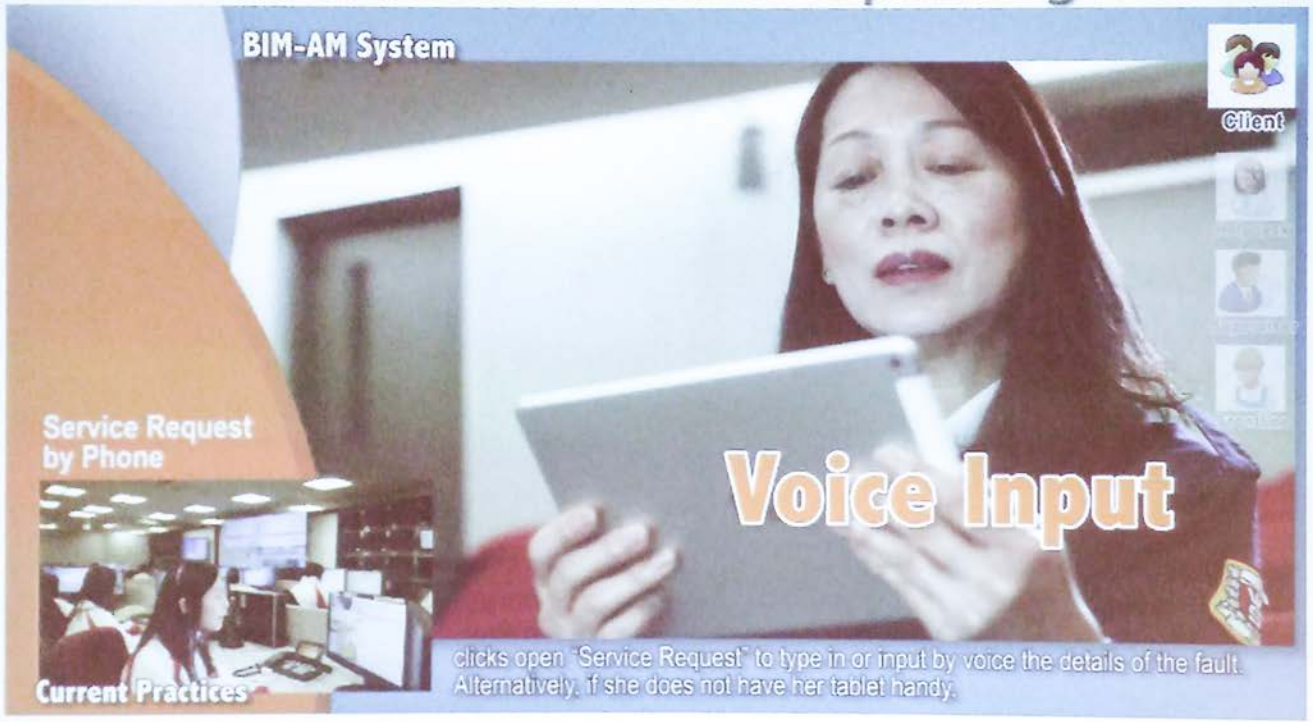
HVAC Showcase – Fault Reporting



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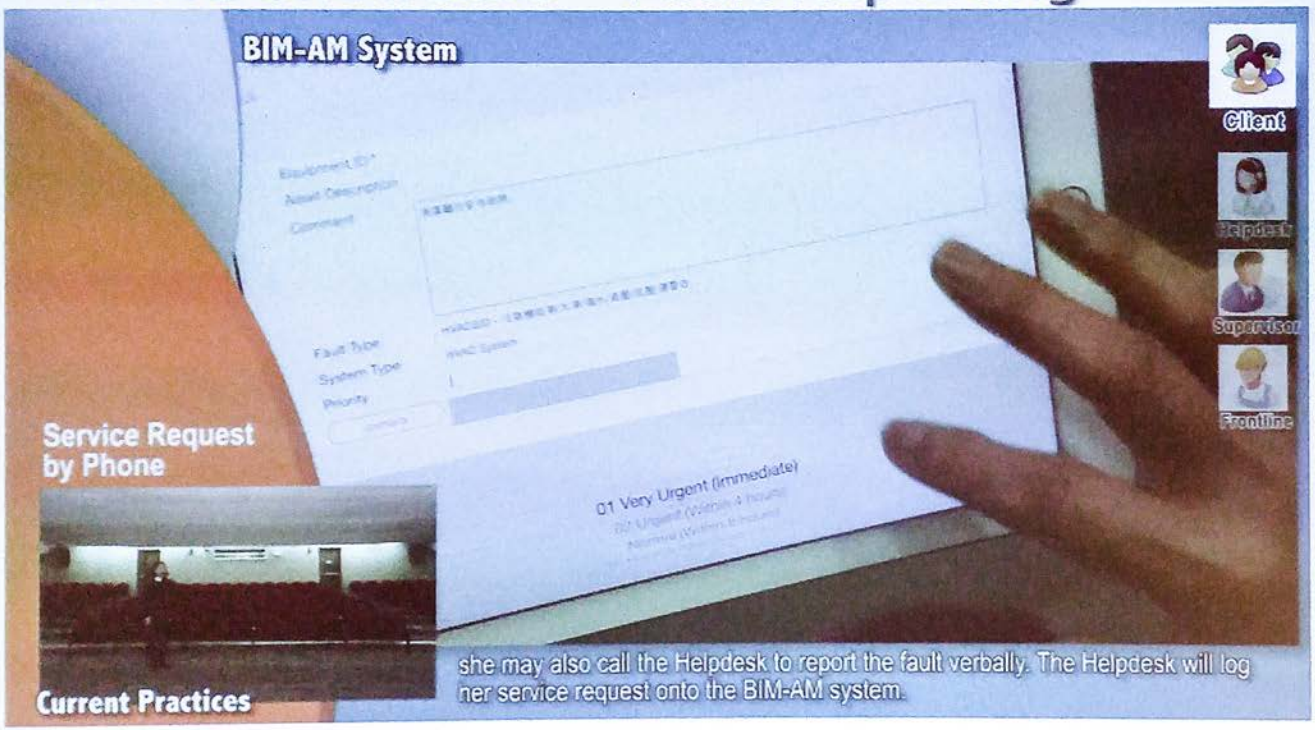

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HVAC Showcase – Fault Reporting

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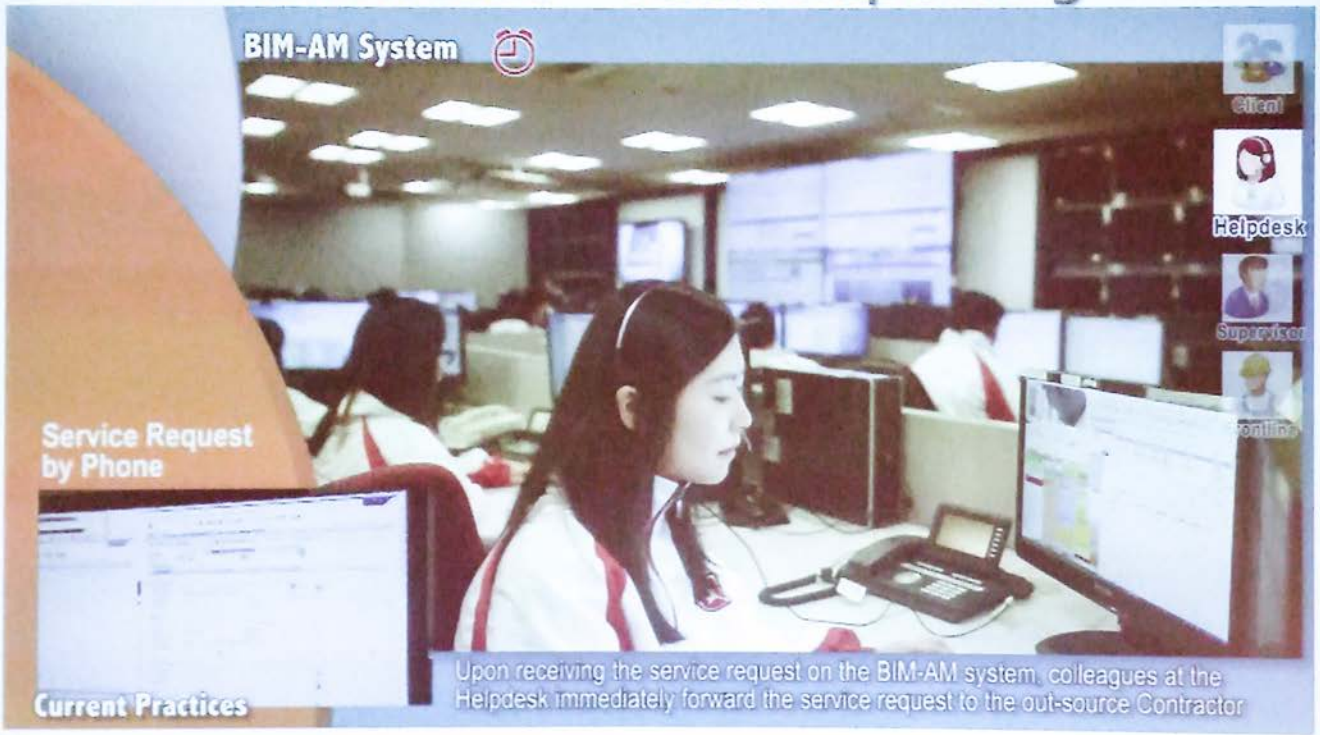

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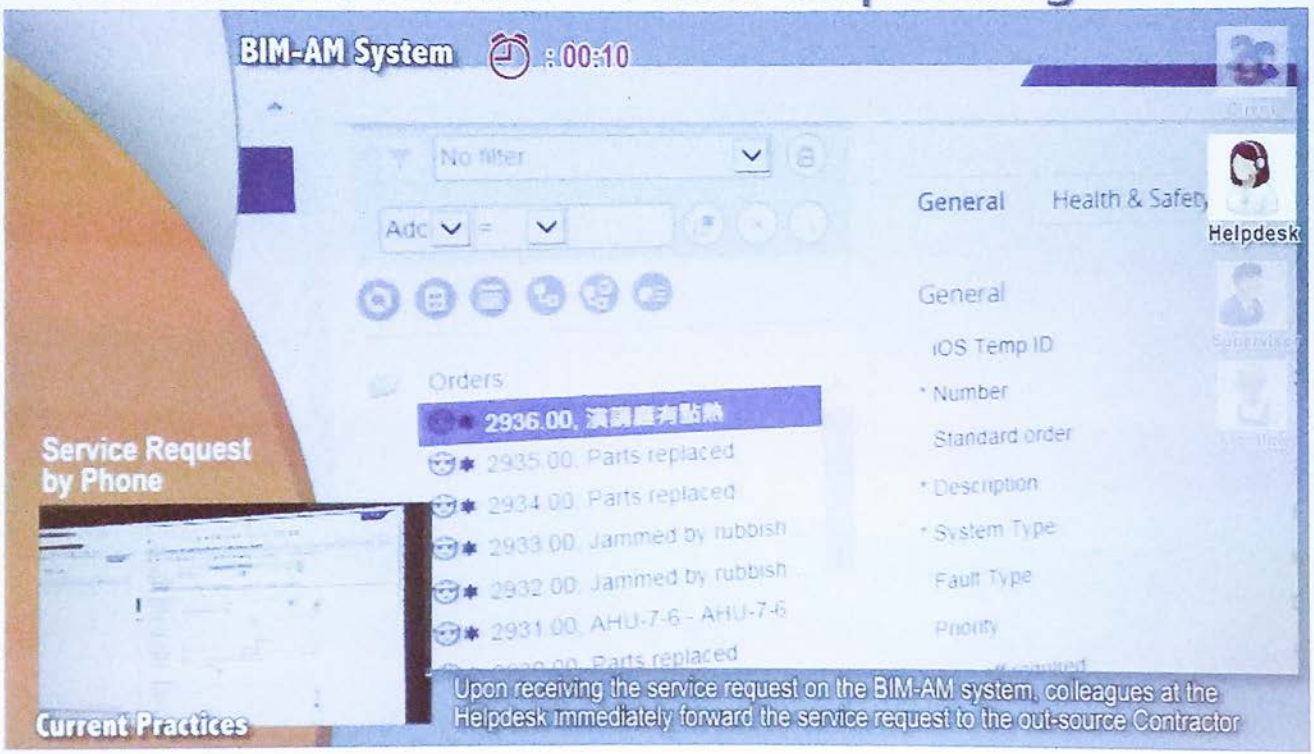

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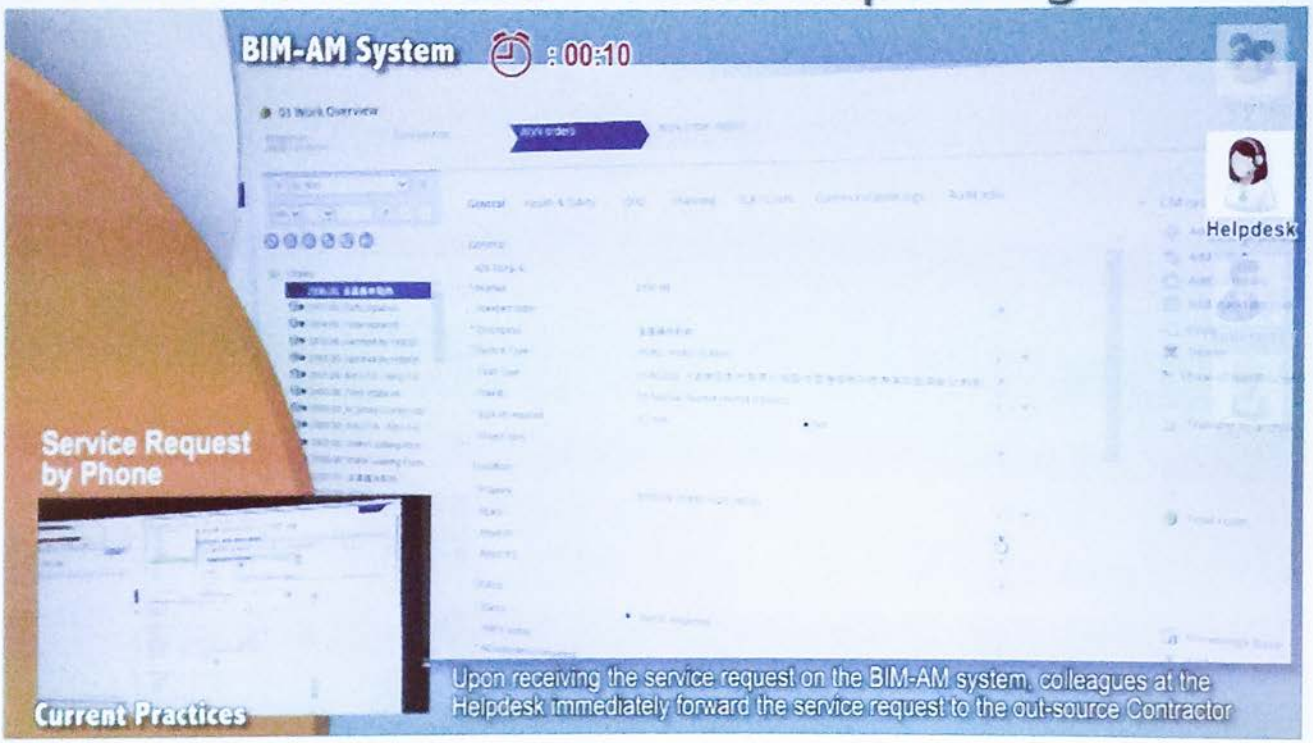

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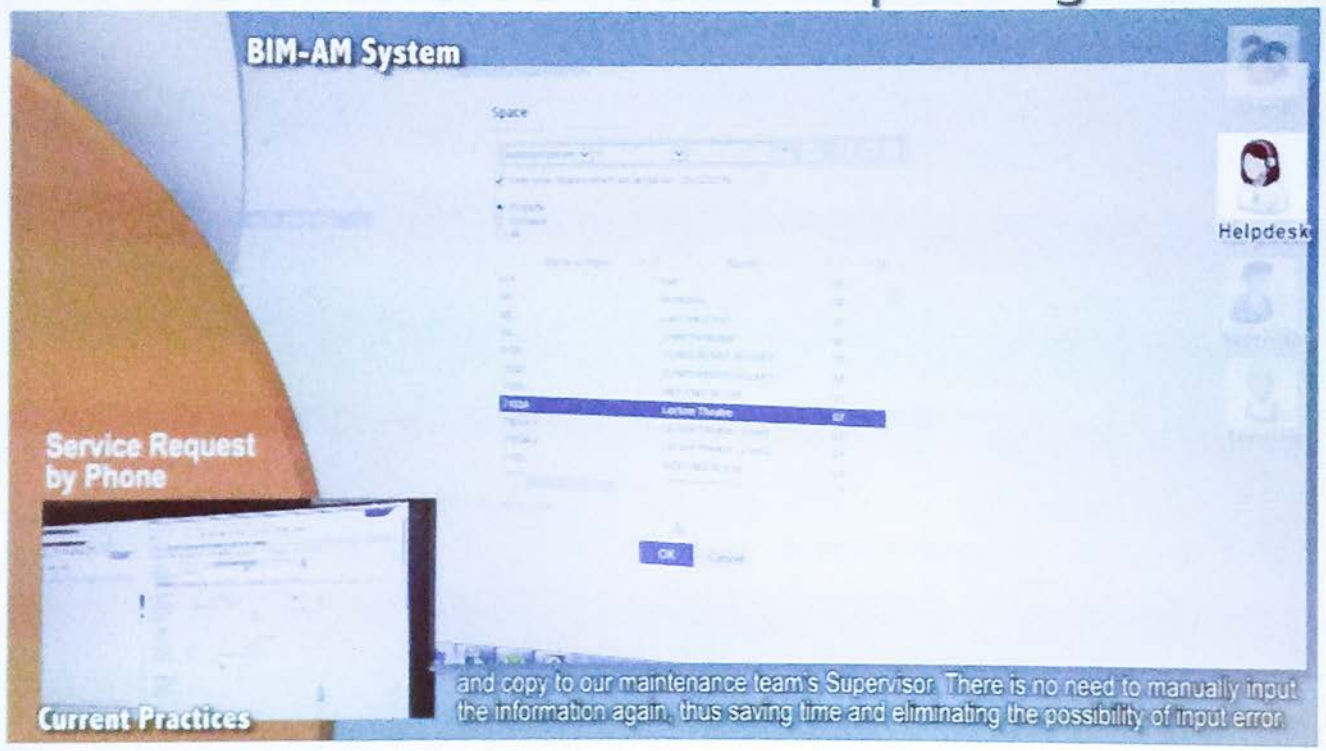

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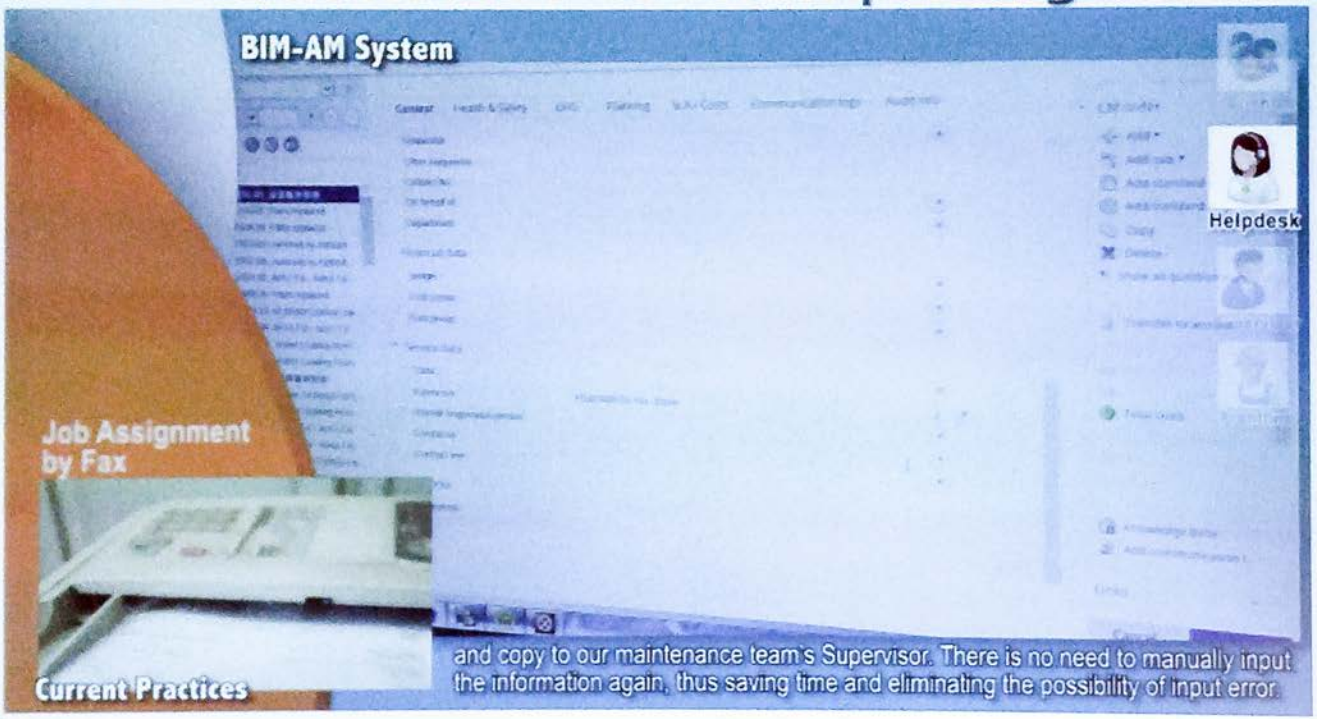
HVAC Showcase – Fault Reporting



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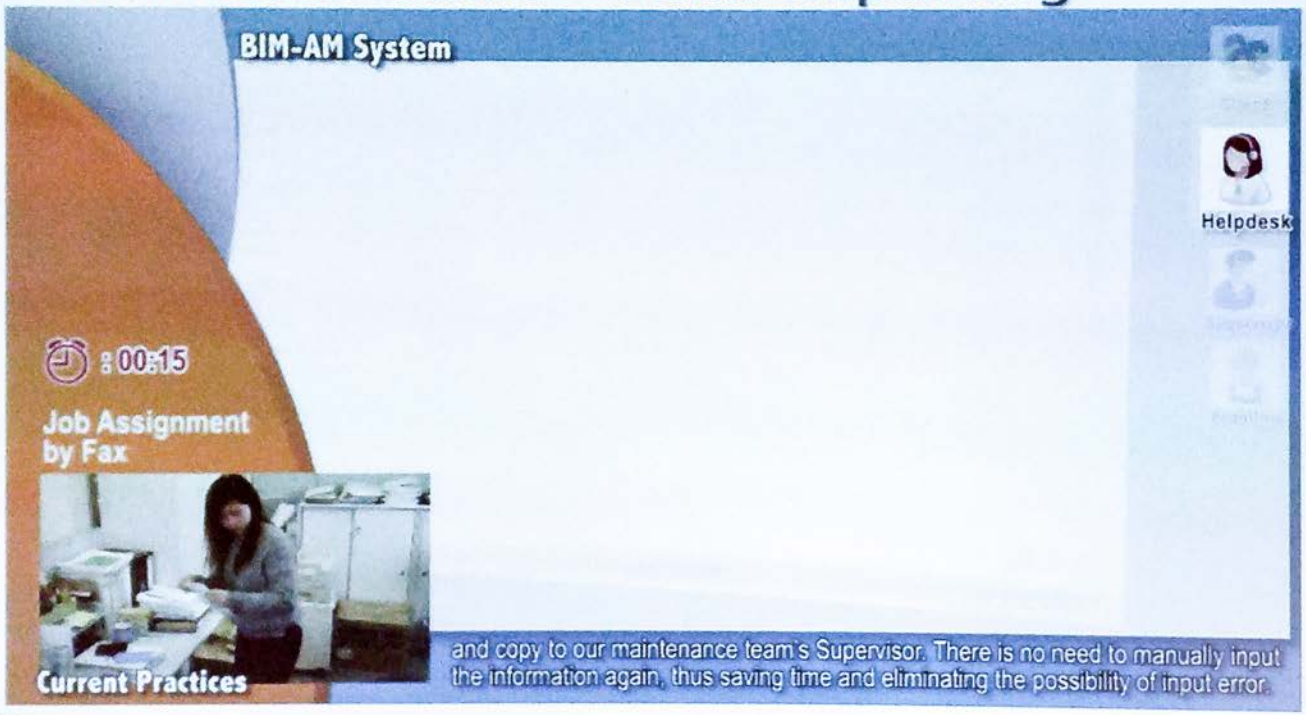
HVAC Showcase – Fault Reporting



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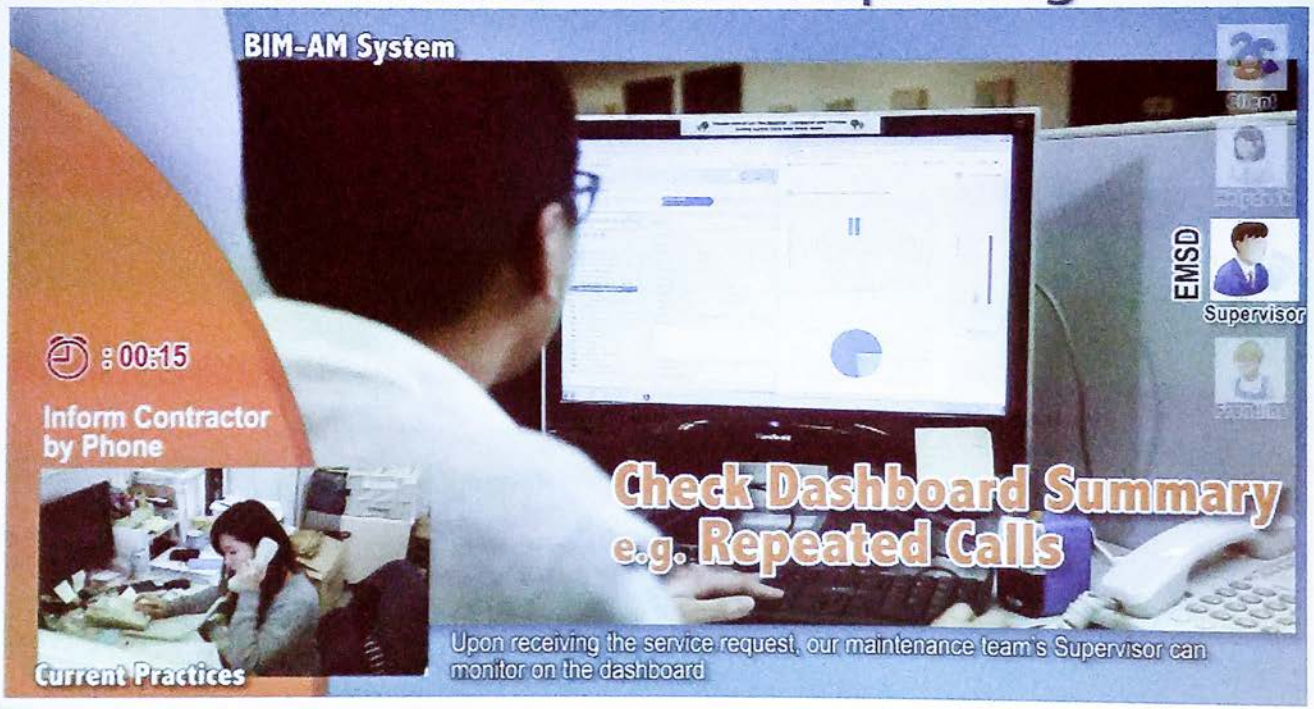
HVAC Showcase – Fault Reporting



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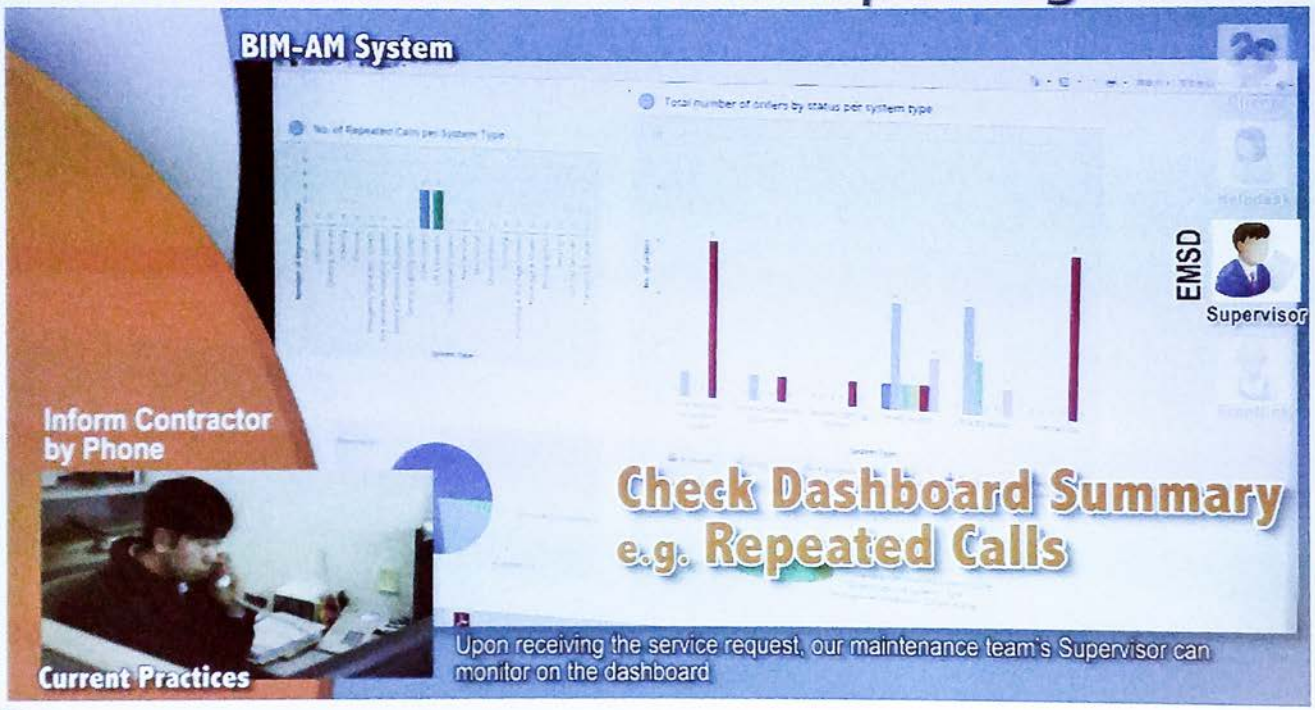

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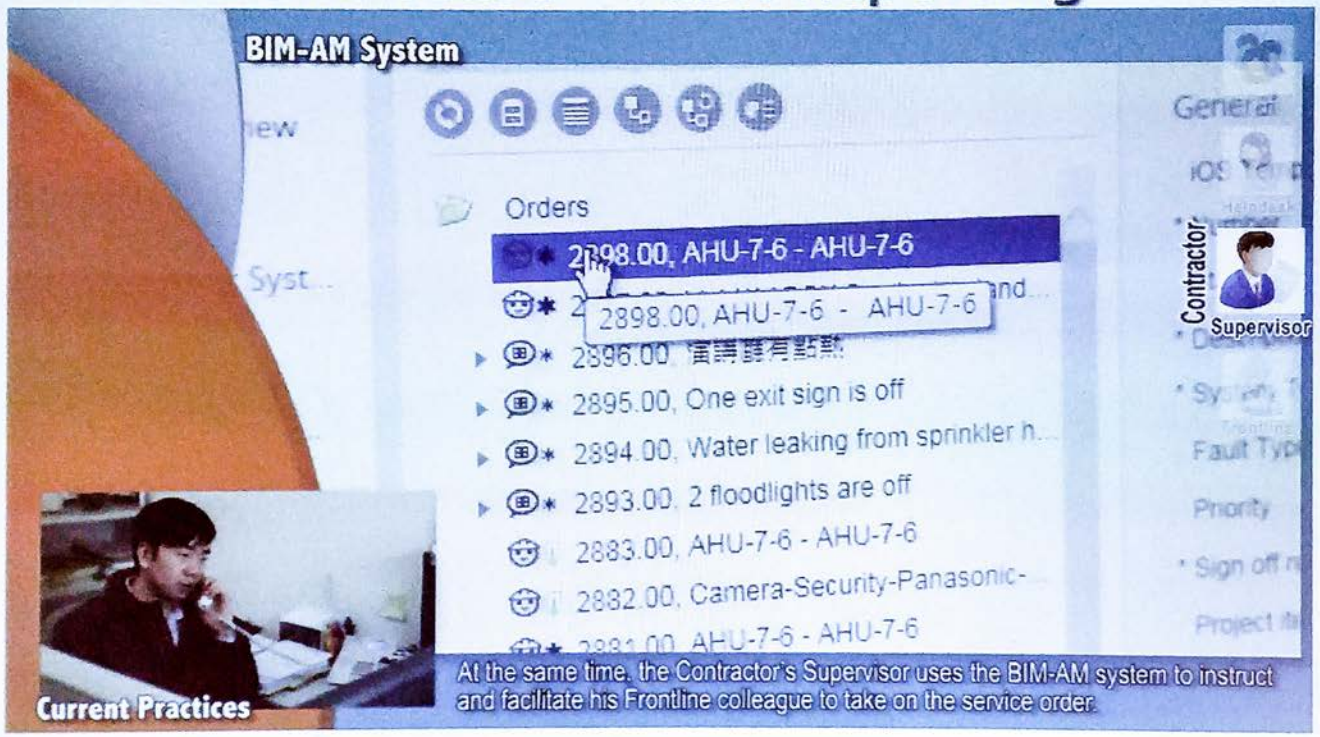

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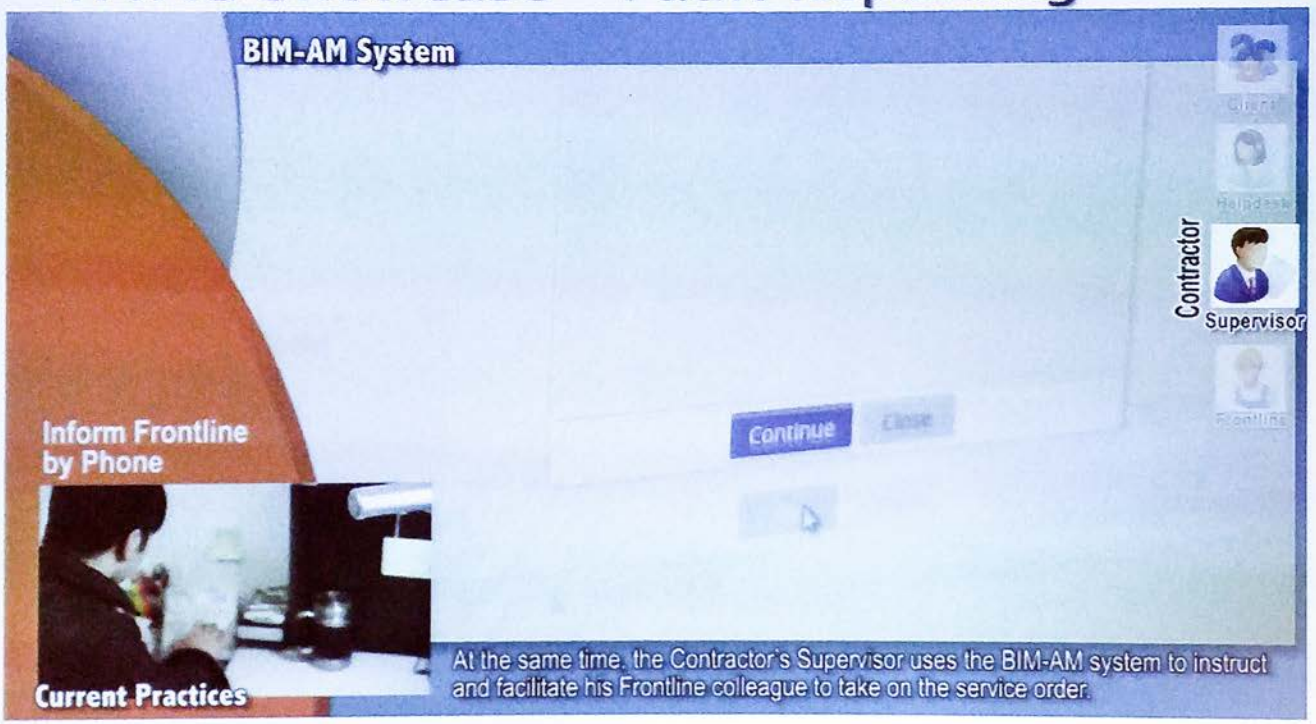

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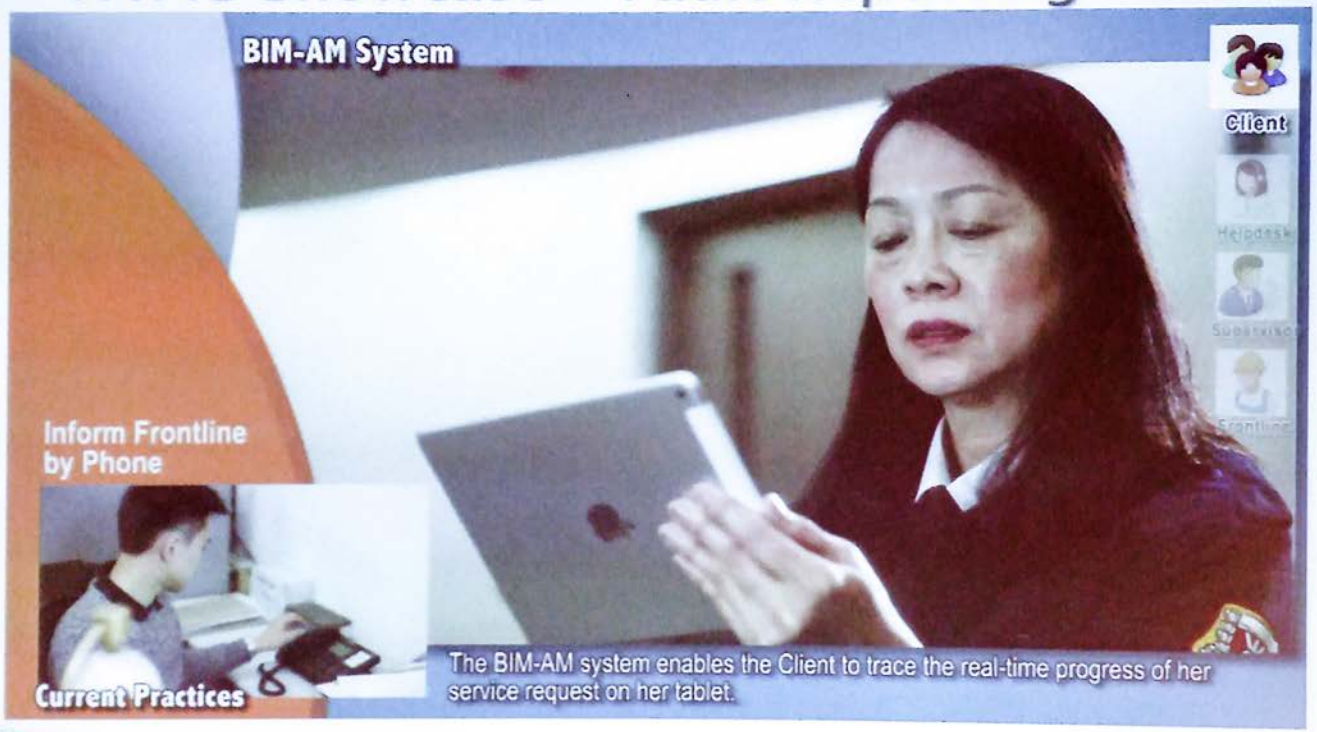

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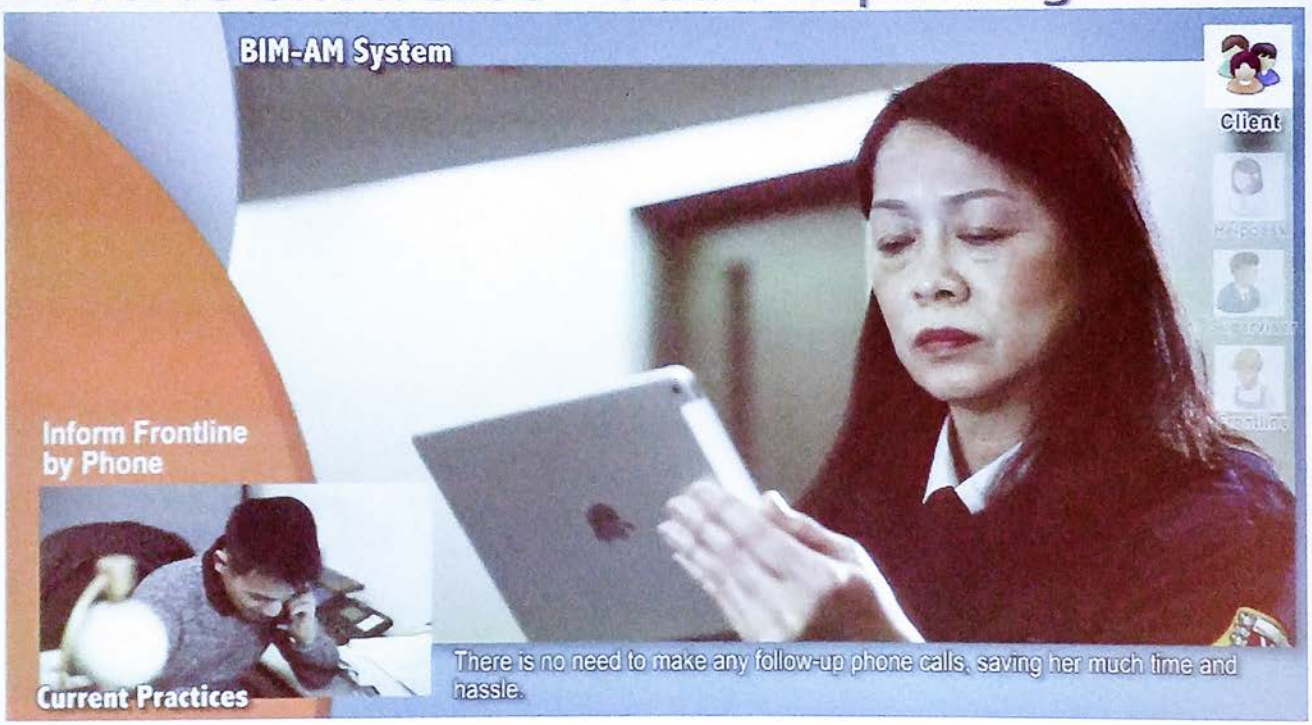

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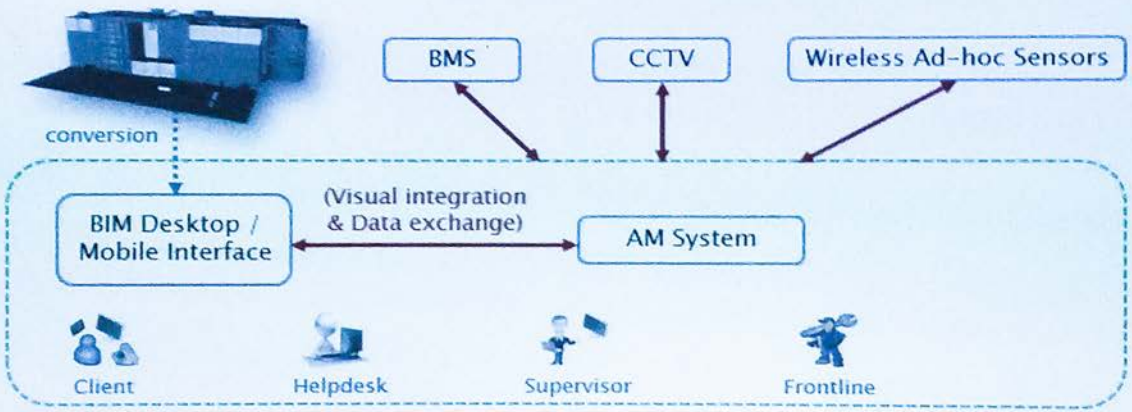
Architecture for EMSD BIM-AM System



Enhanced integration implemented by EMSD

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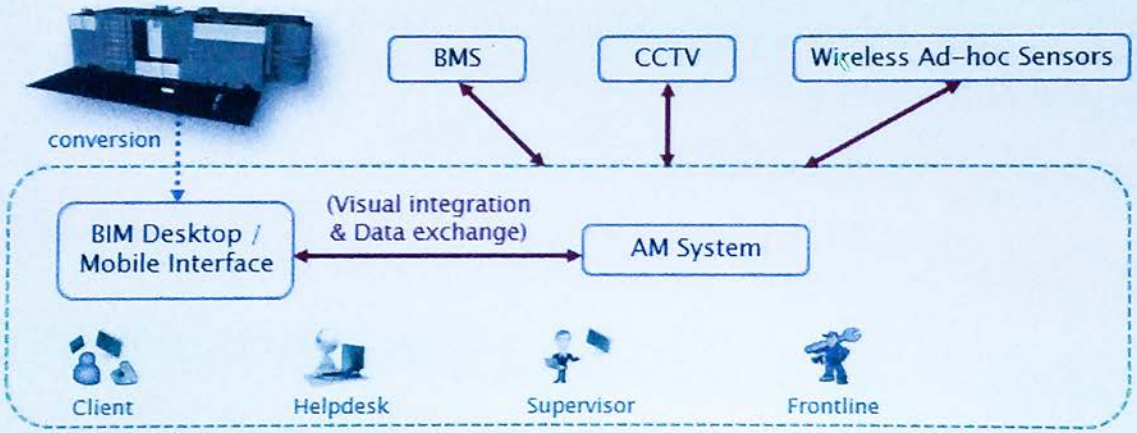

Enhanced integration implemented by EMSD

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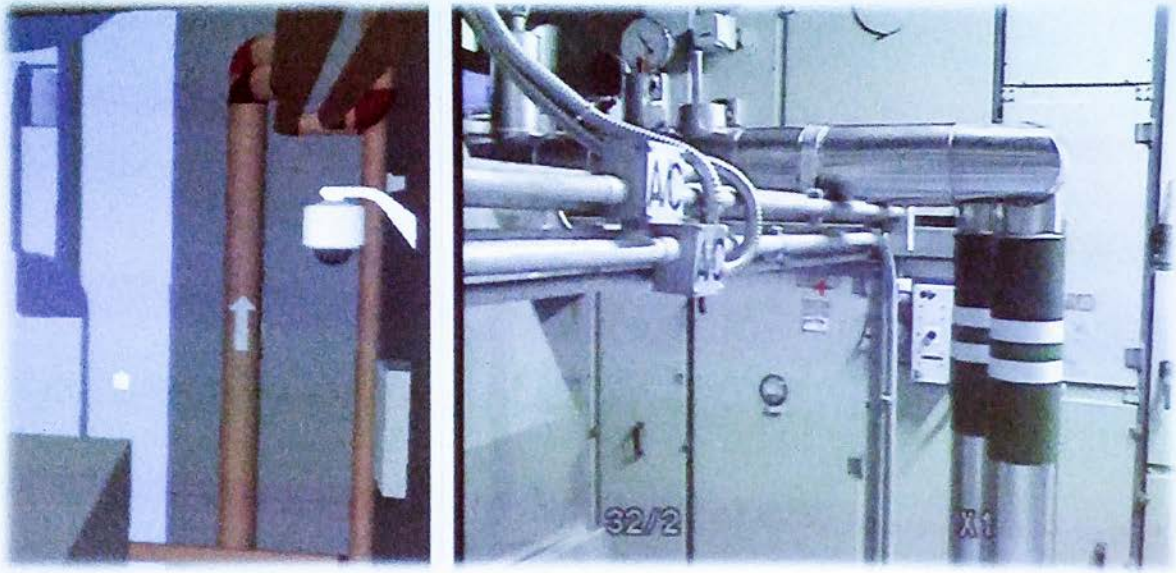
Interfacing with CCTV System for pre-diagnosis



Integrating with Building Management System (BMS) for pre-diagnosis

	1029820	03/03/2016 17:31	53.016	DAHU706.MA.H	MA Humidity
	1029821	03/03/2016 17:31	0	DAHU706.EW.S	Energy Wheel Status
	1029822	03/03/2016 17:31	0	DAHU706.EW.O	Energy Wheel Trip
	1029823	03/03/2016 17:31	1.61	DAHU706.FA.DS	FA Damper Status
	1029824	03/03/2016 17:31	0	DAHU706.FA.F	FA Flowrate
	1029825	03/03/2016 17:31	58.6	DAHU706.FA.ENTH	FA Enthapy
	1029826	03/03/2016 17:31	21.68	DAHU706.FA.T	FA Tempertaure
	1029827	03/03/2016 17:31	51.5	DAHU706.FA.H	FA Humidity
	1029828	03/03/2016 17:31	0	DAHU706.FA.PD	FA Filter Alarm
	1029829	03/03/2016 17:31	100	VAV7F_57FDS	VAV Damper Status
	1029830	03/03/2016 17:31	0	VAV7F_57FLW	VAV Flowrate
	1029831	03/03/2016 17:31	22.13	VAV7F_57RMT	VAV Rm Temp
	1029832	03/03/2016 17:31	38.13	VAV7F_58FDS	VAV Damper Status
	1029833	03/03/2016 17:31	44	VAV7F_58FLW	VAV Flowrate
	1029834	03/03/2016 17:31	22.75	VAV7F_58RMT	VAV Rm Temp
	1029835	03/03/2016 17:31	38.13	VAV7F_55FDS	VAV Damper Status
	1029836	03/03/2016 17:31	0	VAV7F_55FLW	VAV Flowrate
	1029837	03/03/2016 17:31	25.65	VAV7F_55RMT	VAV Rm Temp
	1029838	03/03/2016 17:31	100	VAV7F_56FDS	VAV Damper Status
	1029839	03/03/2016 17:31	16	VAV7F_56FLW	VAV Flowrate
	1029840	03/03/2016 17:31	22.4	VAV7F_56RMT	VAV Rm Temp
	1029748	03/03/2016 17:30	25.5	DAHU706.TSP2	Return Temp Set PT (EMSD)

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Integrating with wireless ad-hoc devices for condition monitoring

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HVAC Showcase – Off-site Pre-diagnosis

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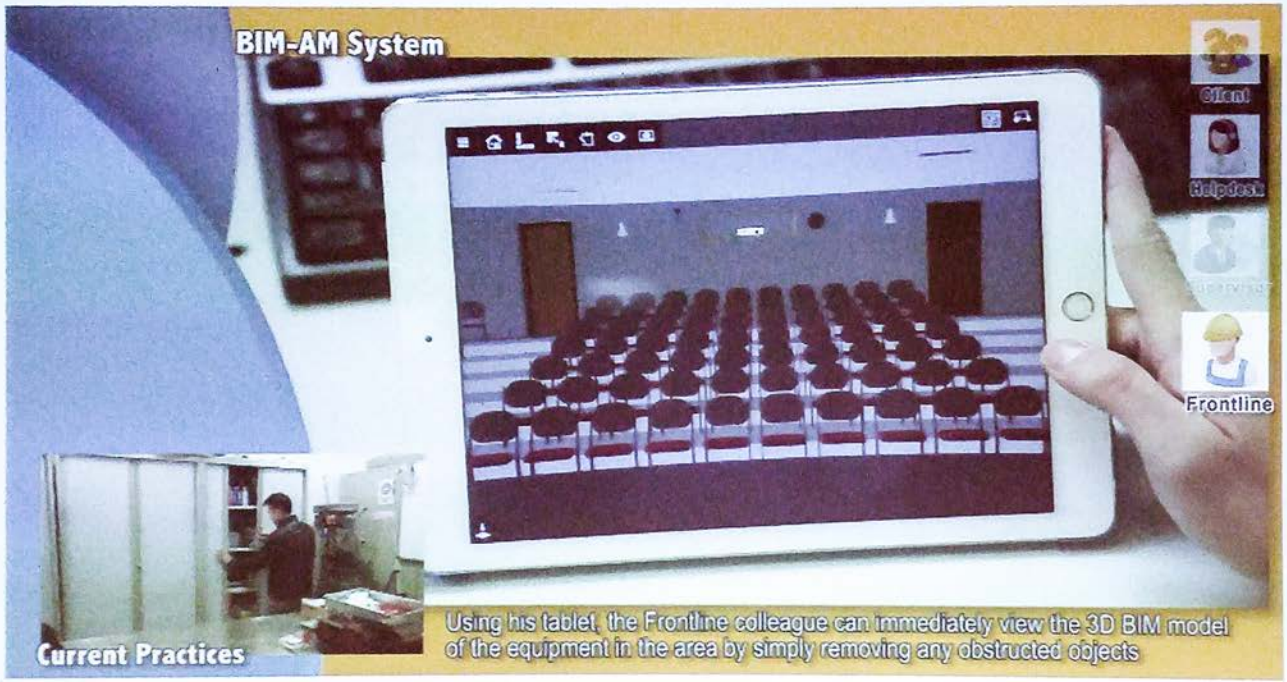
HVAC Showcase – Off-site Pre-diagnosis



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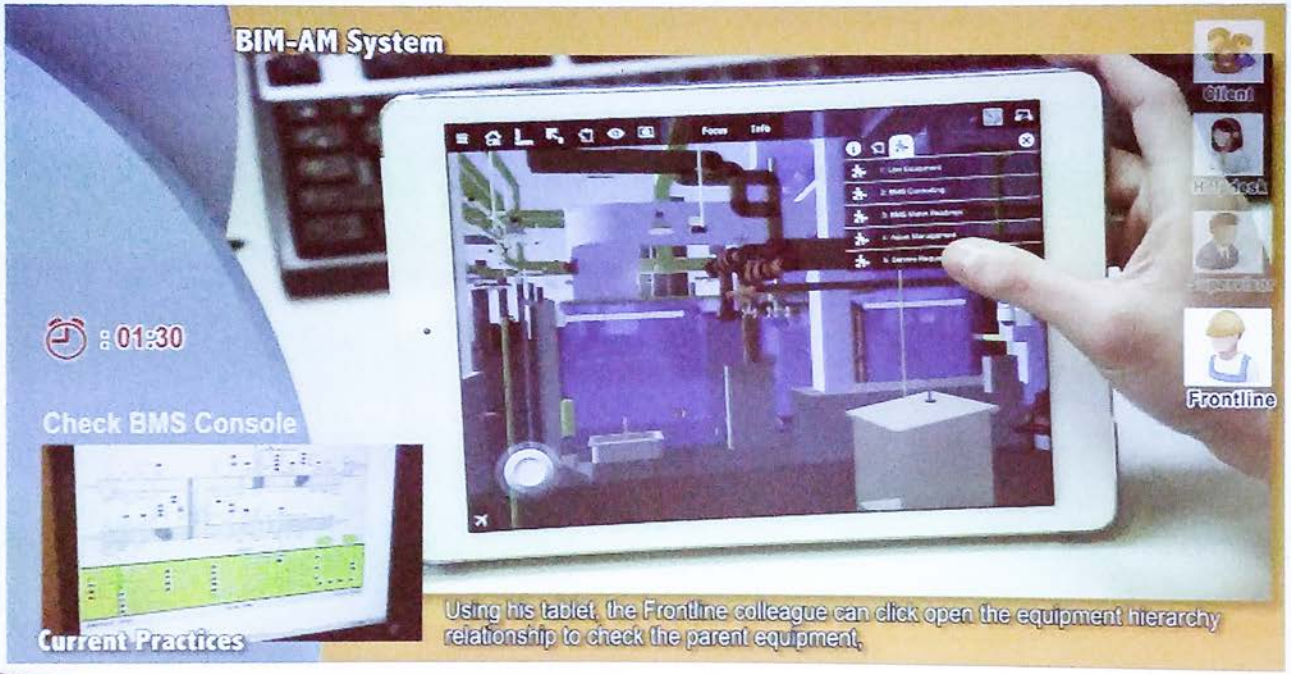

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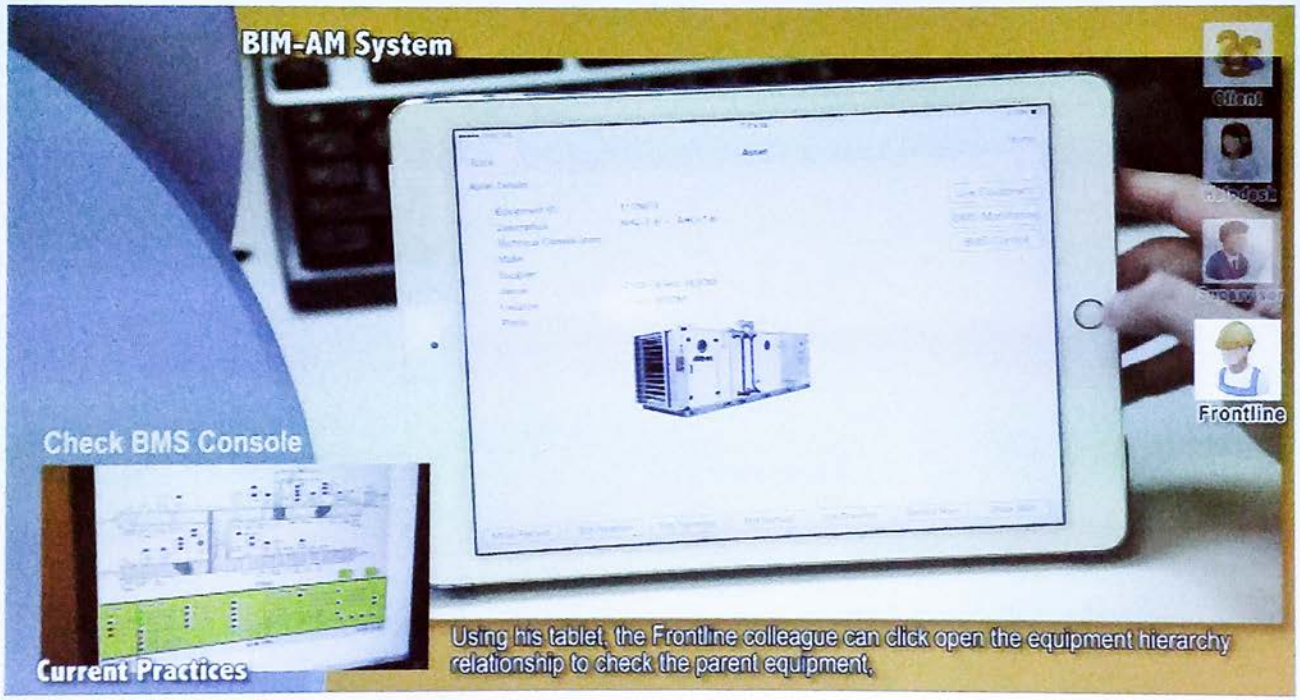

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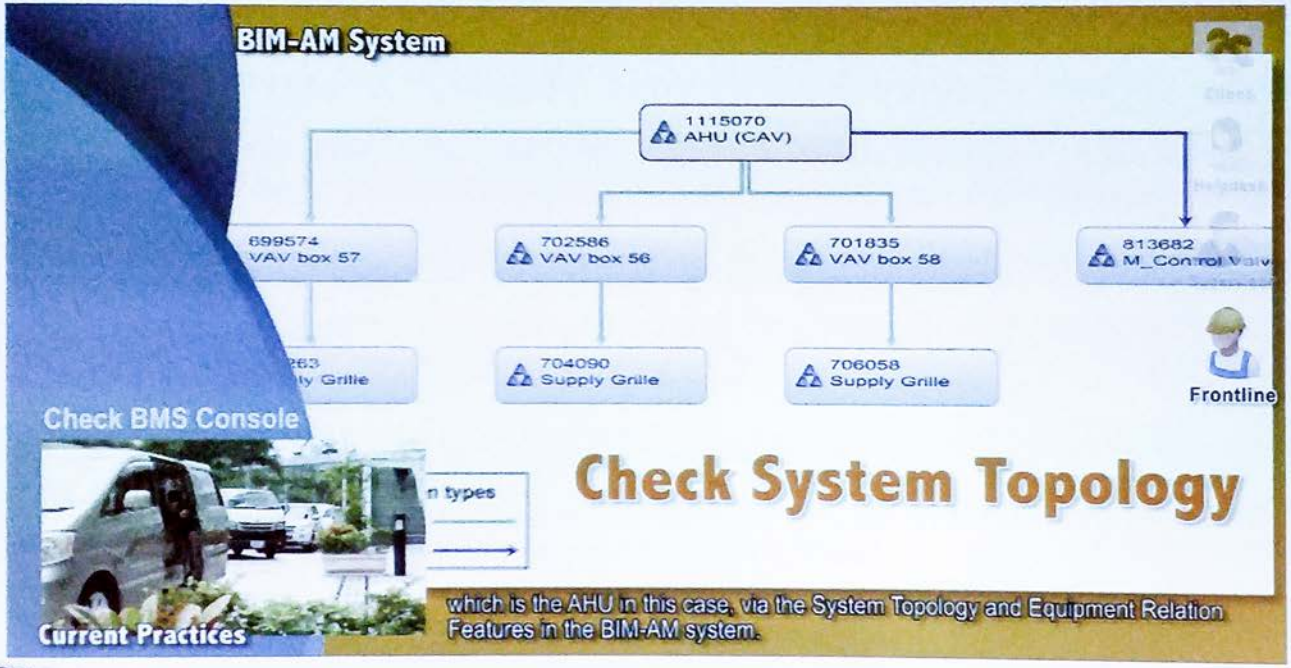

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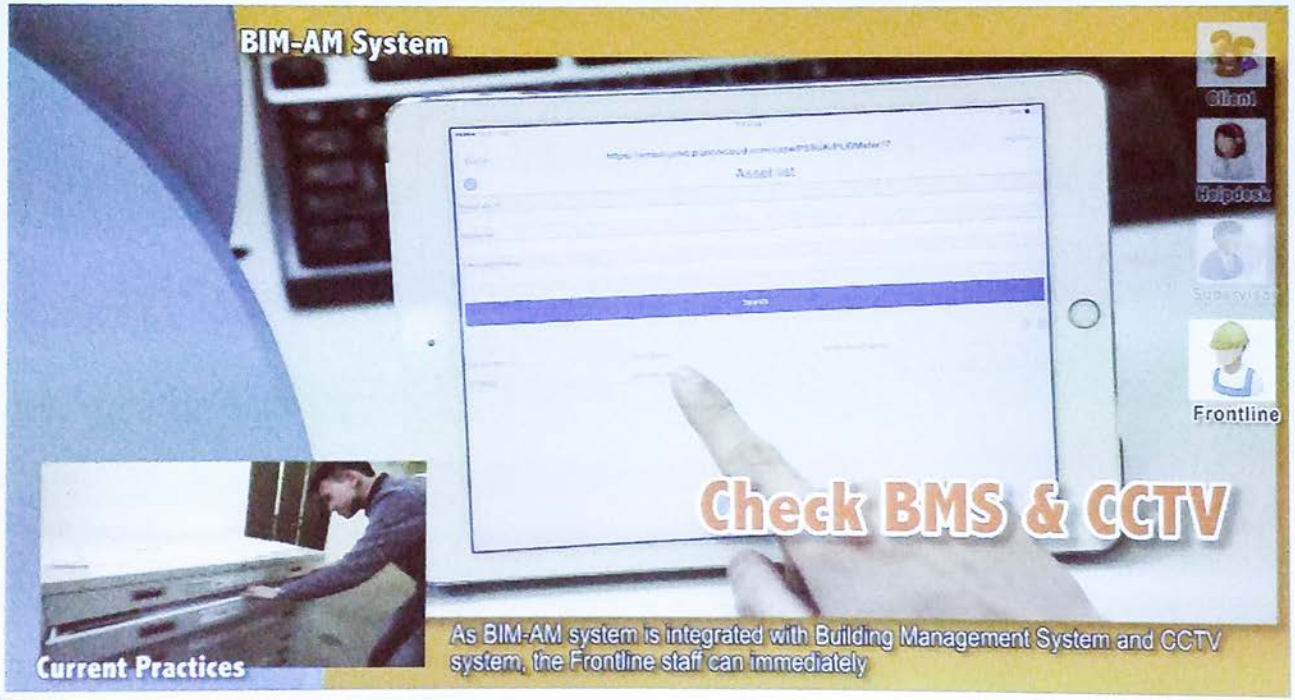

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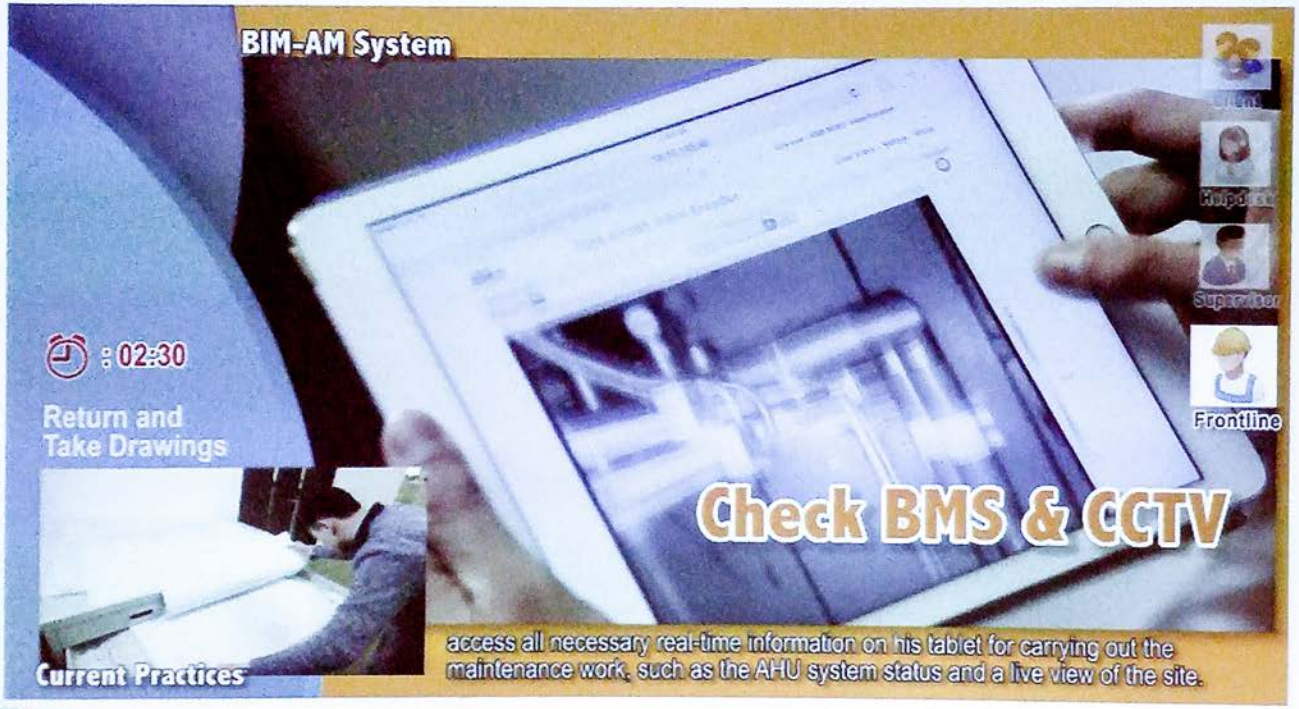

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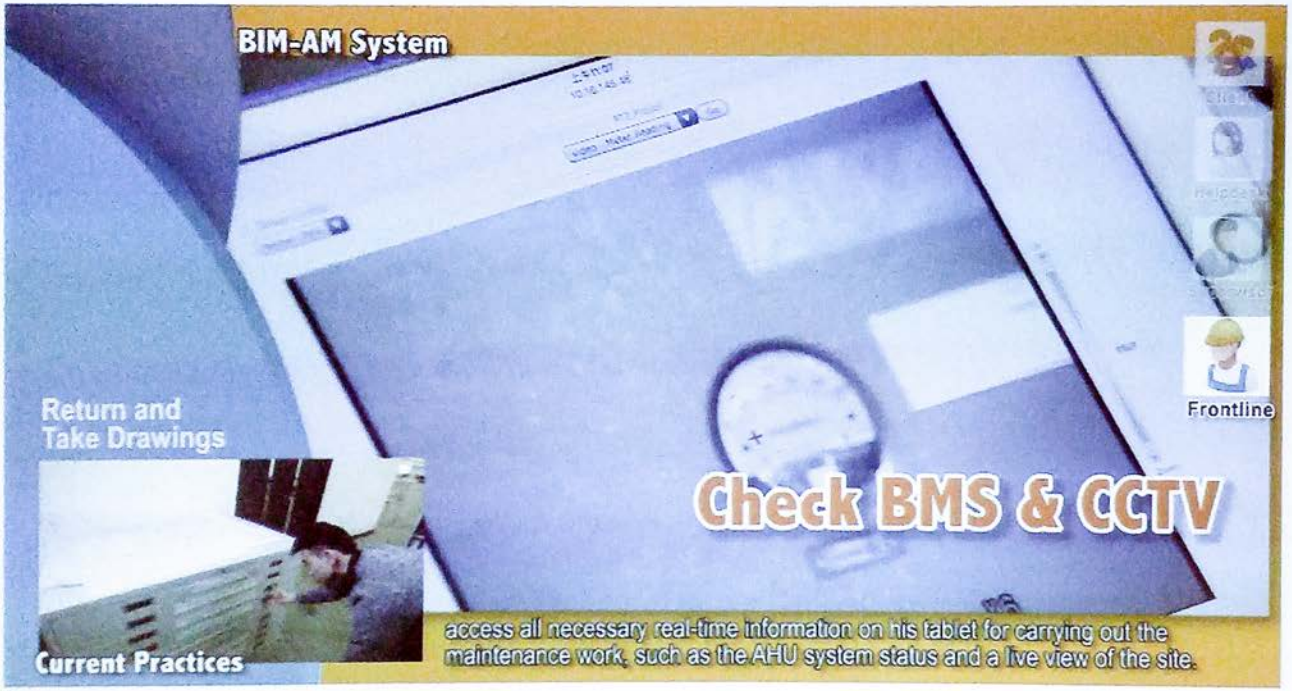

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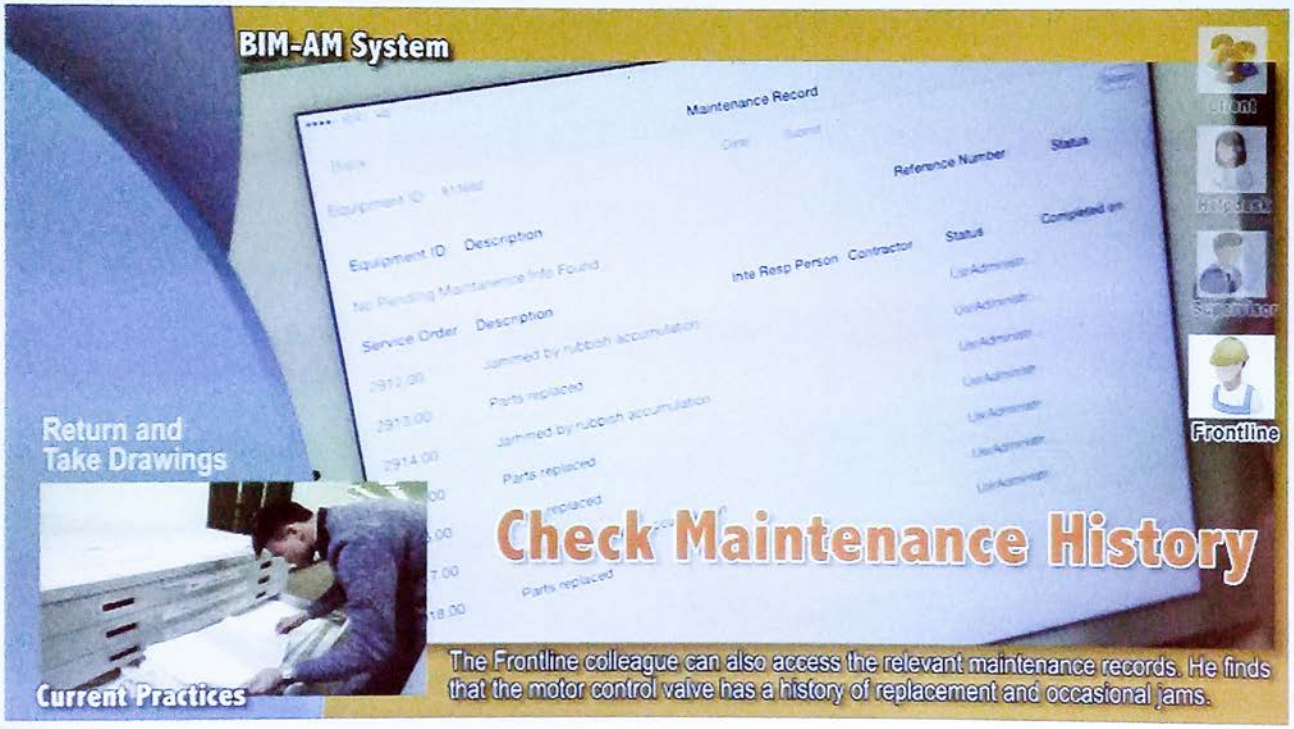

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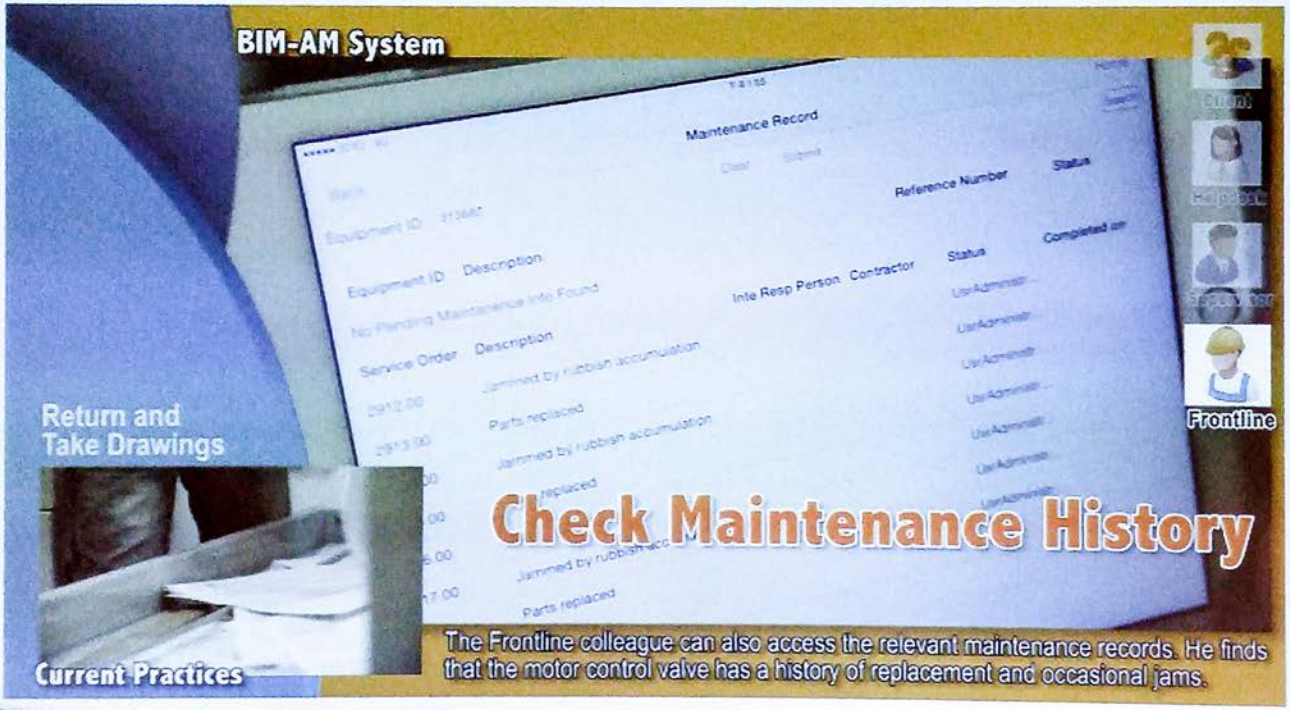

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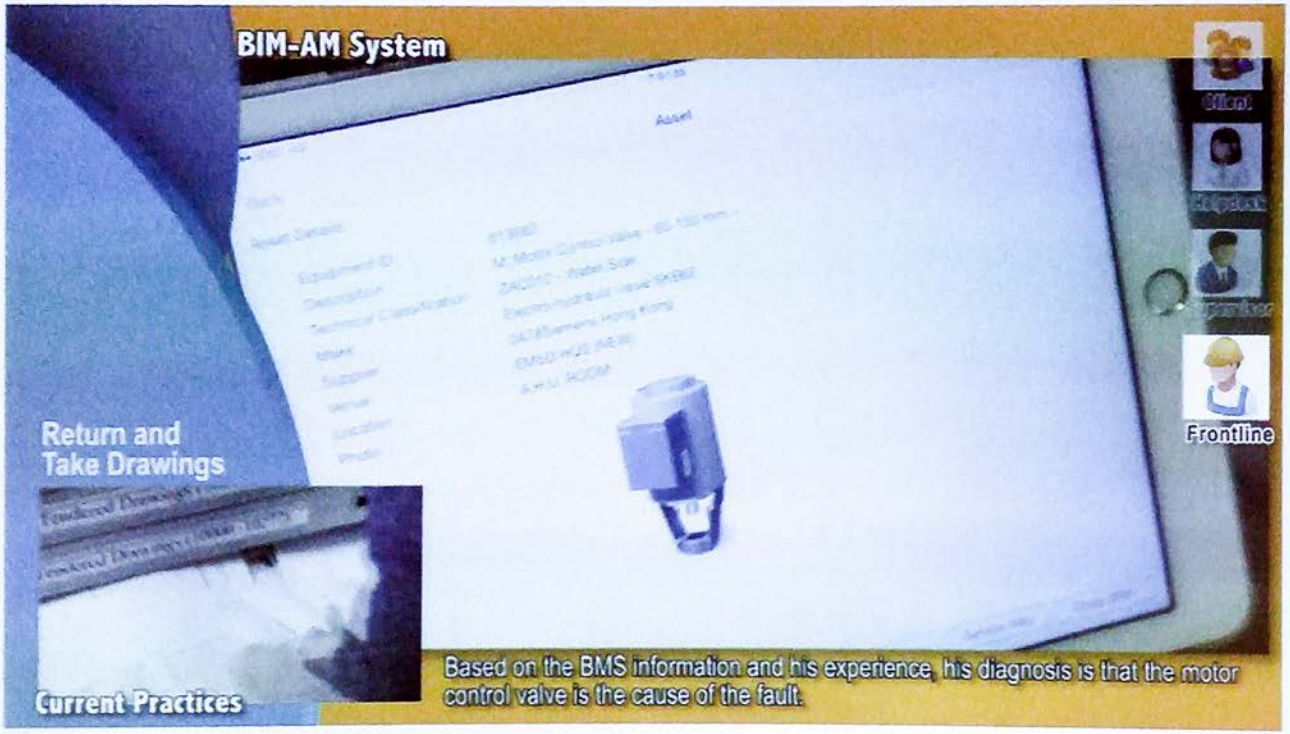

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HVAC Showcase – Off-site Pre-diagnosis

- Ease of identifying fault location & faulty equipment
  - By BIM visualization and system topology

HVAC Showcase – Off-site Pre-diagnosis

- Ease of identifying fault location & faulty equipment
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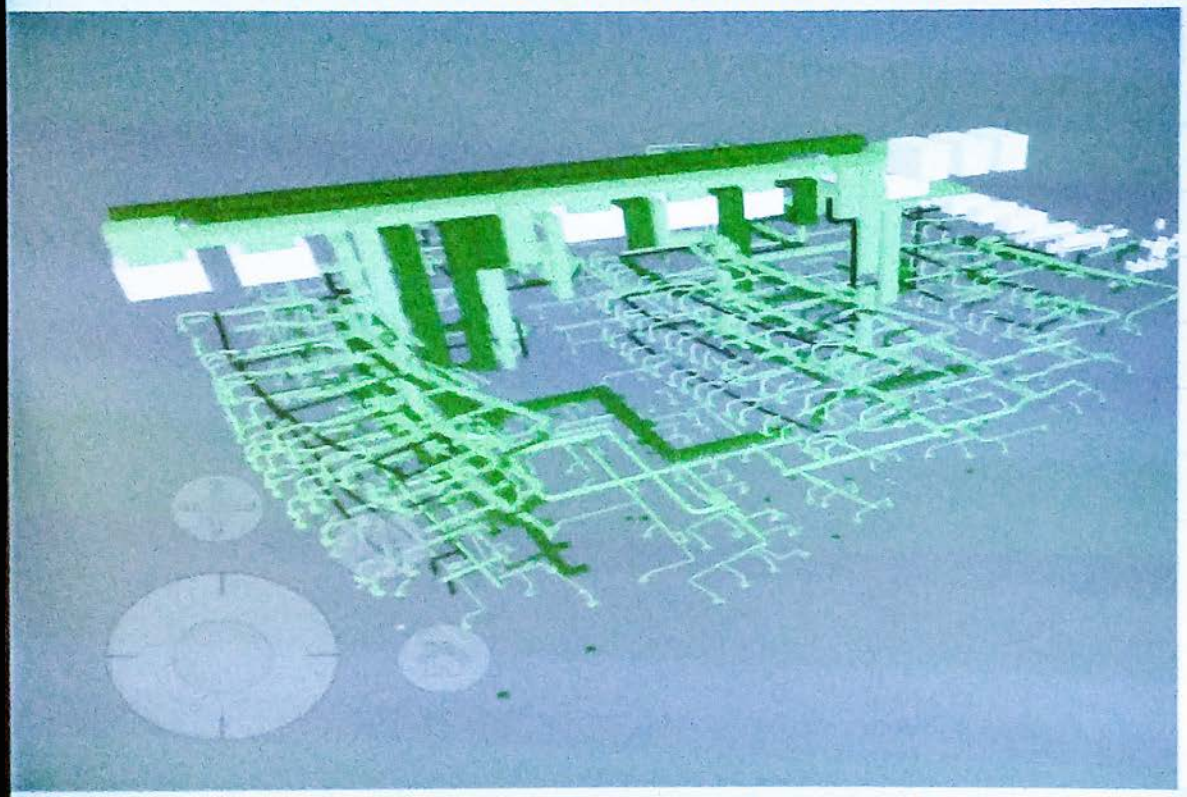
As-built BIM & MEP BIM Models handovered from Design & Construction stage



Models

Oakwood_Architectural

Oakwood_Electrical

Oakwood_Fire_Protection

Oakwood_HVAC

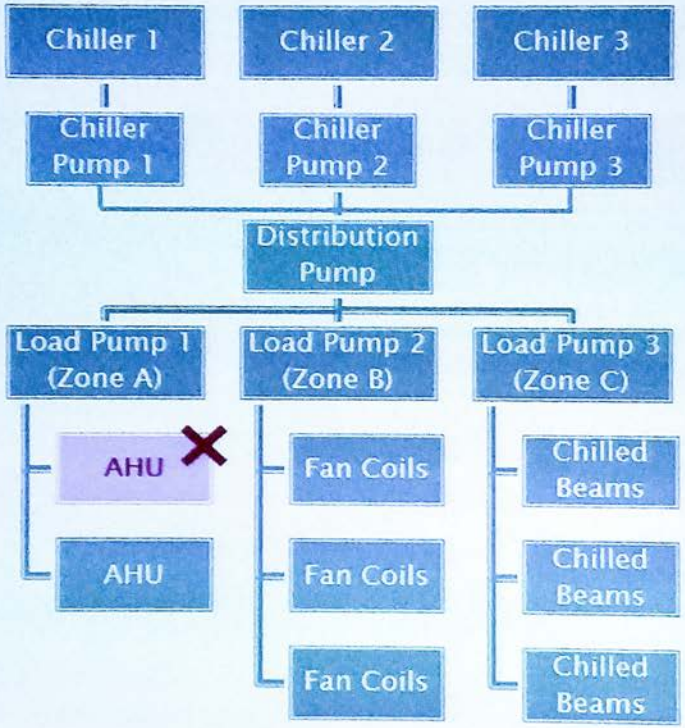
Oakwood_Plumbing

Oakwood_Structural

Ground

17

System Topology visualizing the asset relationships within a particular system



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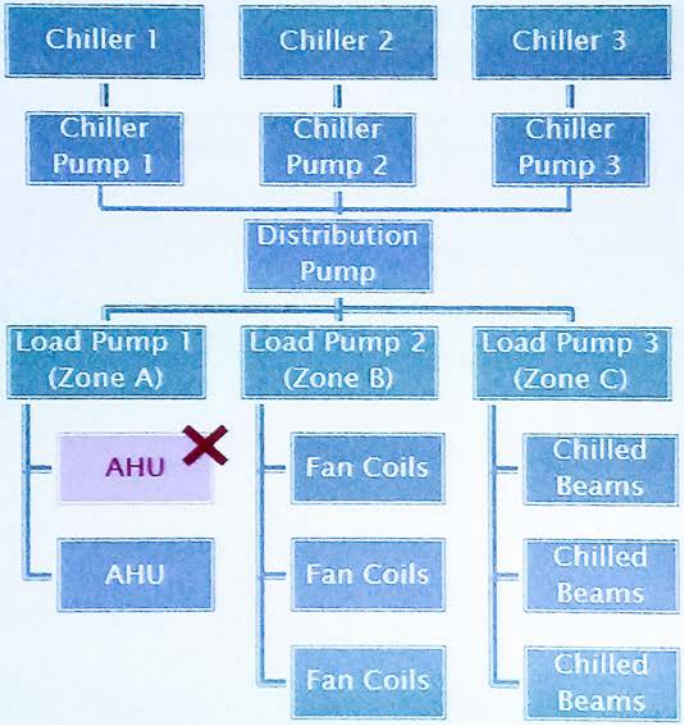
System Topology visualizing the asset relationships within a particular system



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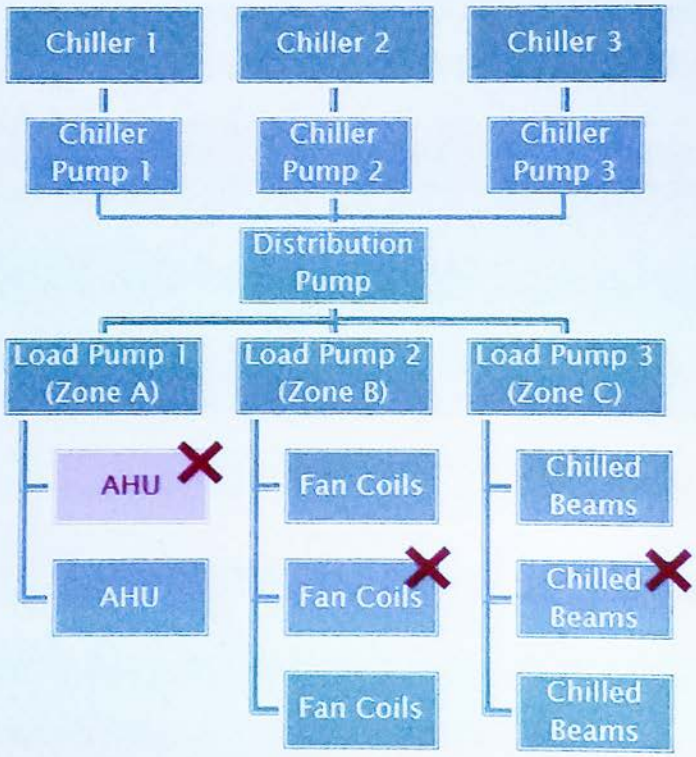

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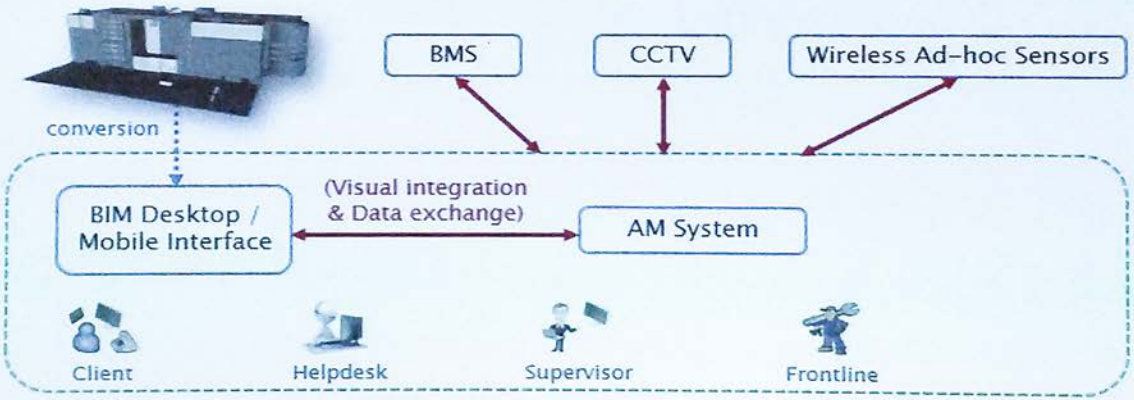
Architecture for EMSD BIM-AM System



Enhanced integration implemented by EMSD

Integrating with RFID scanning tool for locating fixed assets

Back | RFID Scanning | +Scanner

1128-HK-001008 2.3.0 3.6.0 | Battery 87%

29 | Scan | Search By ID

Equipment ID	Description	Location	System Type	Signal
1204721	Exit Sign 1	Zone 3A, 3A (Lect...	LVSB	65 %
699574	VAV box 57	Zone 3A, 3A (Lect...	HVAC	62 %
000258	AHU supply 1.4 - 2.8 m3/s	Zone 1, LOBBY	HVAC	57 %
1181403	TV Monitor at 7th Floor	Zone 2, Common...	GE	54 %
000244	Airco Unit	Ahu Room, Ahu R...	HVAC	53 %
000243	Emergency lighting decentrally fed	Zone 2, Common...	LIGHT	51 %
959953	Sprinkler Head (3)	Zone 2, Common...	FSI	48 %

20

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Integrating with RFID scanning tool for locating fixed assets

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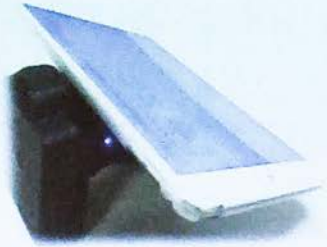

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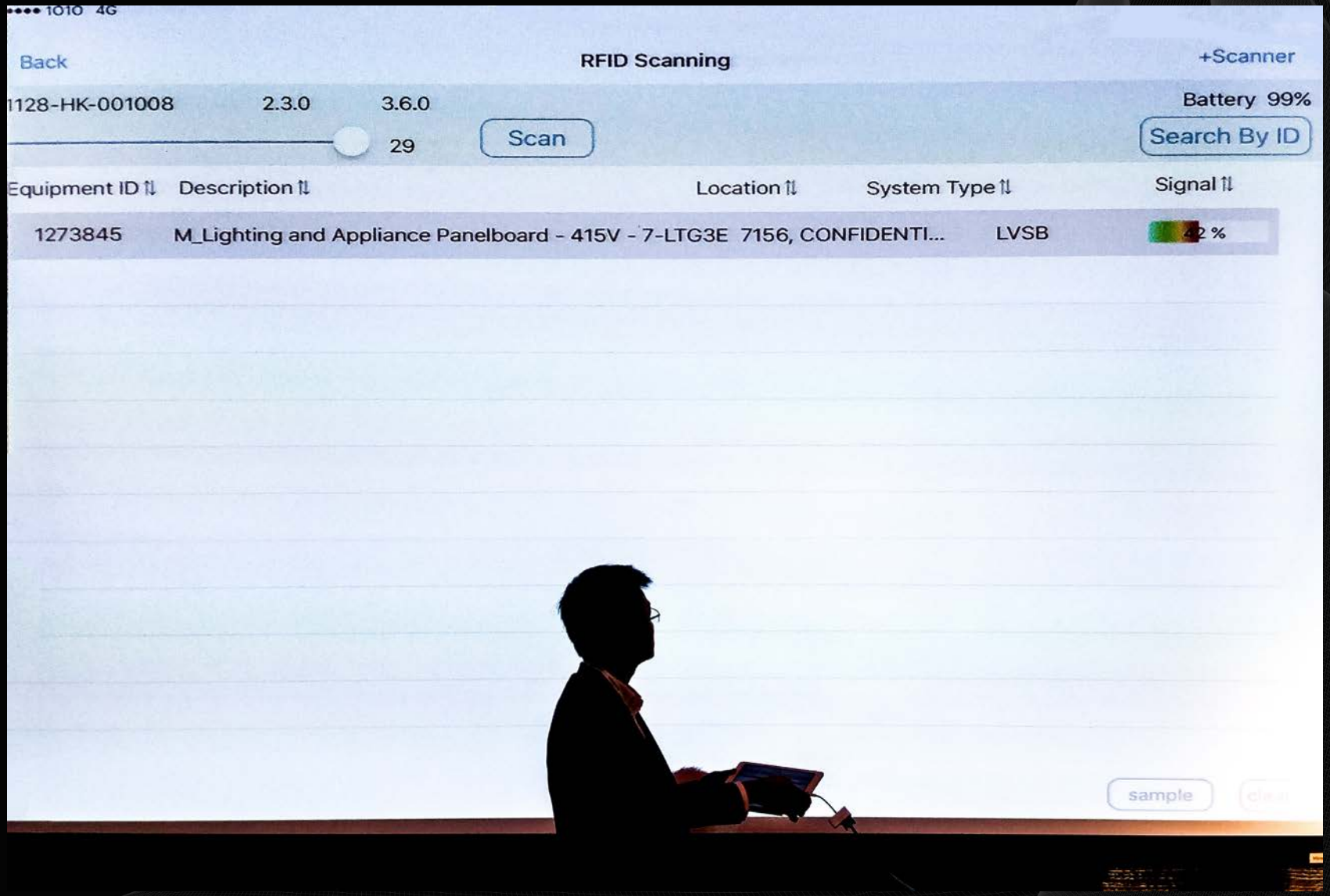
Zone 2: Common...
LIGHT
Zone 2: Common...
FSI
ABCD0025
EMSTF
機電工程署
EMSD
2016
DATE
6th October, 2016 (Thursday)
TIME
8:45 a.m. - 5:00 p.m.
VENUE
Royal Plaza Hotel
Conference - Grand Ballroom, Lev
Lunch - La Scala, Level 2
HKIBIM
Annual
Conference
2016


HKIBIM
Annual Con
2016
DATE
6th October, 2016 (Thursday)
TIME
8:45 a.m. - 5:00 p.m.
VENUE
Royal Plaza Hotel
Conference - Grand Ballroom, Lev
Lunch - La Scala, Level 2
HKIBIM
Annual
Conference
2016


Location
System Type
Signal
Appliance Panelboard - 415V - 7-LTG3E
7156, CONFIDENTI...
LVSB
sample
clear
HKIBIM
nference
Royal Plaza Hotel
HKIBIM


Back
RFID Scanning
+Scanner
1128-HK-001008
2.3.0
3.6.0
Battery 99%
29
Scan
Search By ID
Equipment ID
Description
Location
System Type
Signal
1273845
M_Lighting and Appliance Panelboard - 415V - 7-LTG3E
7156, CONFIDENTI...
LVSB
42 %
sample

Back

Asset Details

Equipment ID	1273845
Description	M_Lighting and Appliance Panelboard - 4...
Technical Classification	
Make	Federal
Supplier	EXC000004Wenden Engineering Service...
Venue	EMSD HQS (NEW)
Location	CONFIDENTIAL REGISTRY
Photo	

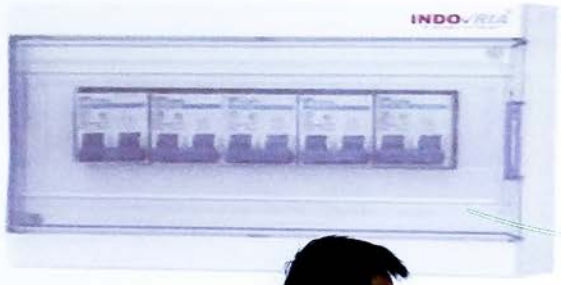
Additional Attribute(s)

Mtce Record | Eqt Relation | Sys Topology | Sys Drawing | Service Req | Show BIM

Back

Asset Details

Equipment ID	1273845
Description	M_Lighting and Appliance Panelboard - 4...
Technical Classification	
Make	Federal
Supplier	EXC000004Wenden Engineering Service...
Venue	EMSD HQS (NEW)
Location	CONFIDENTIAL REGISTRY
Photo	



Additional Attribute(s

Mtce Record | Eqt Relation | Sys Topology | Drawing | Service Req | Show BIM

HVAC Showcase – On-site Repair

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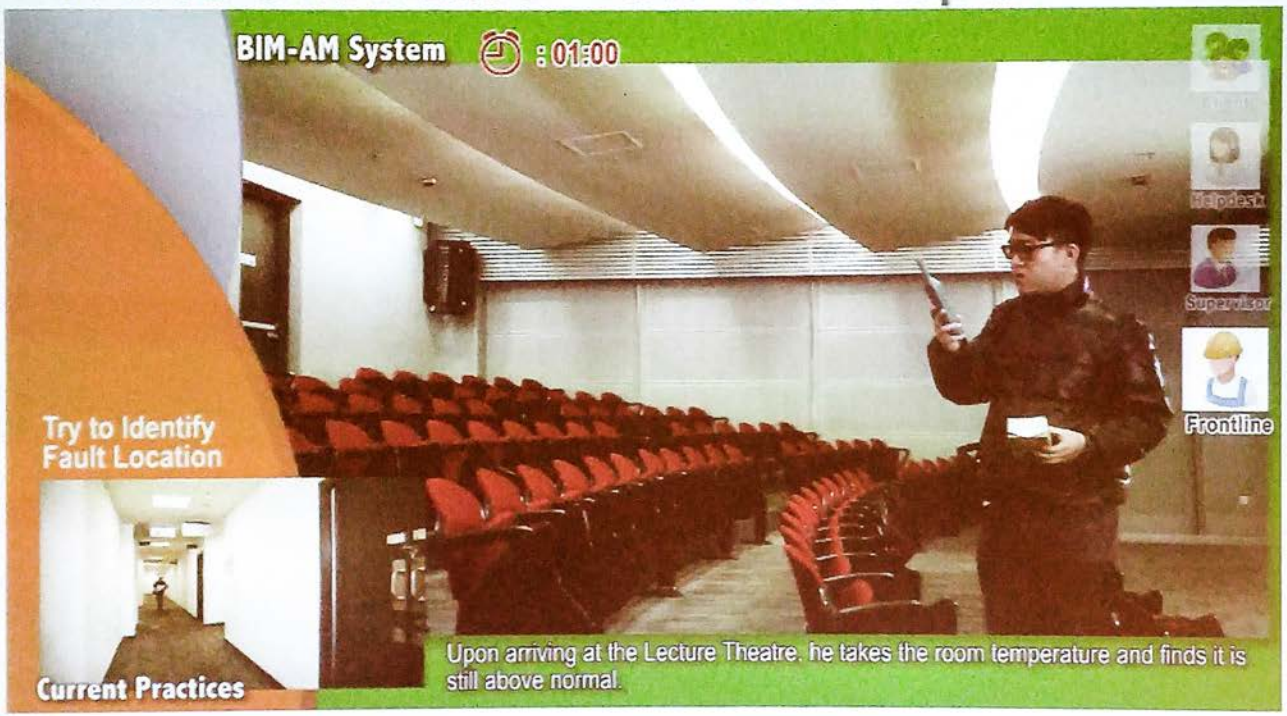
HVAC Showcase – On-site Repair



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HVAC Showcase – On-site Repair

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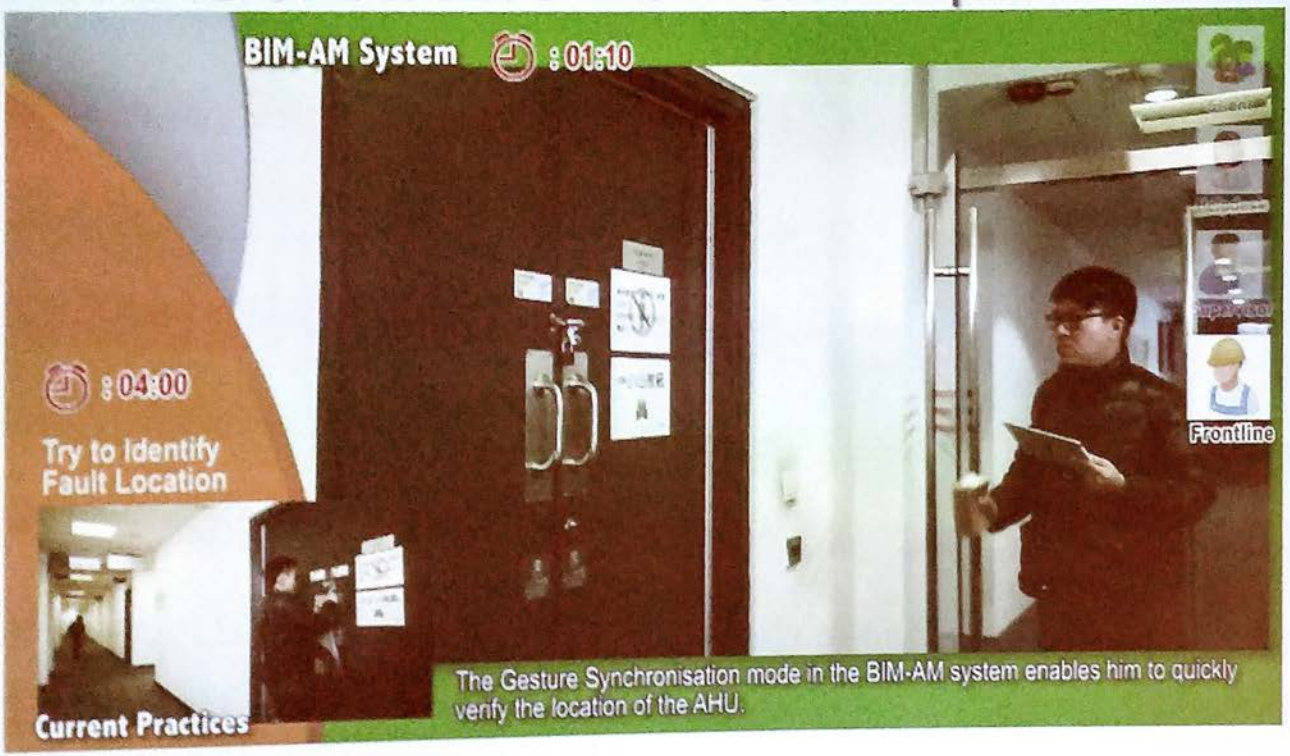

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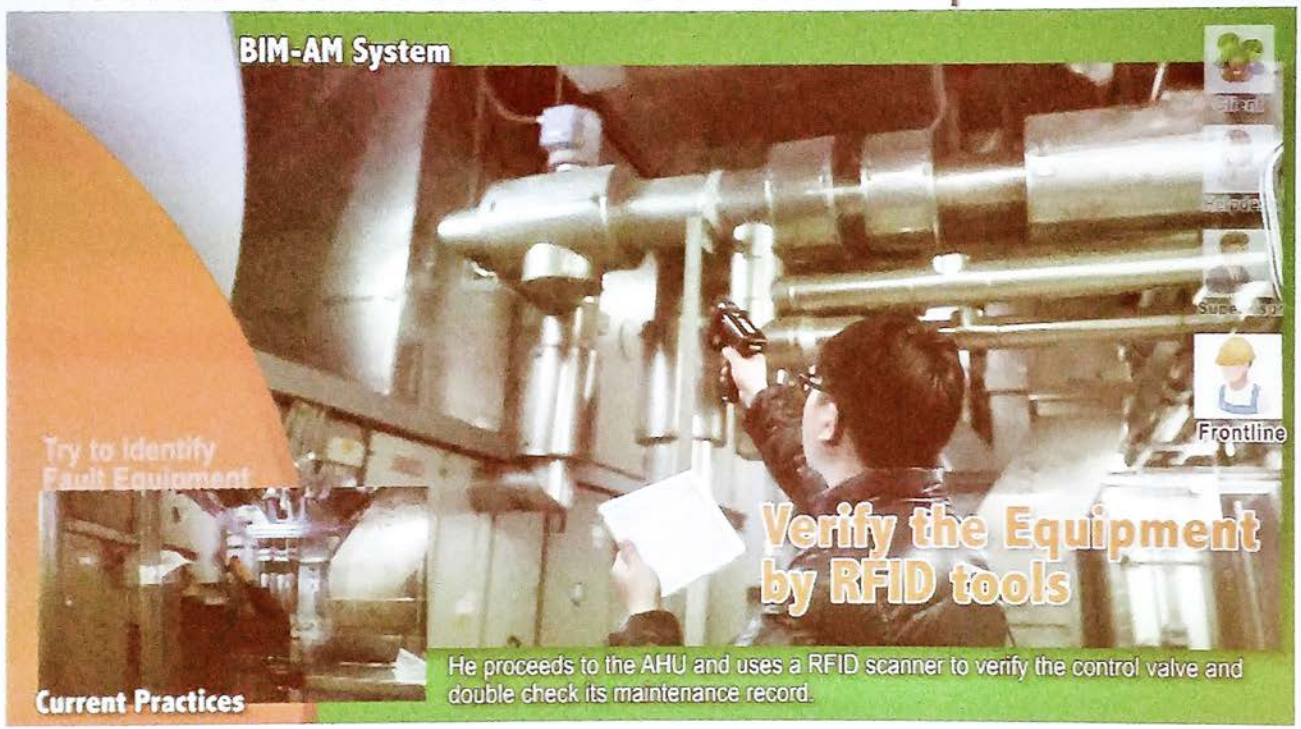

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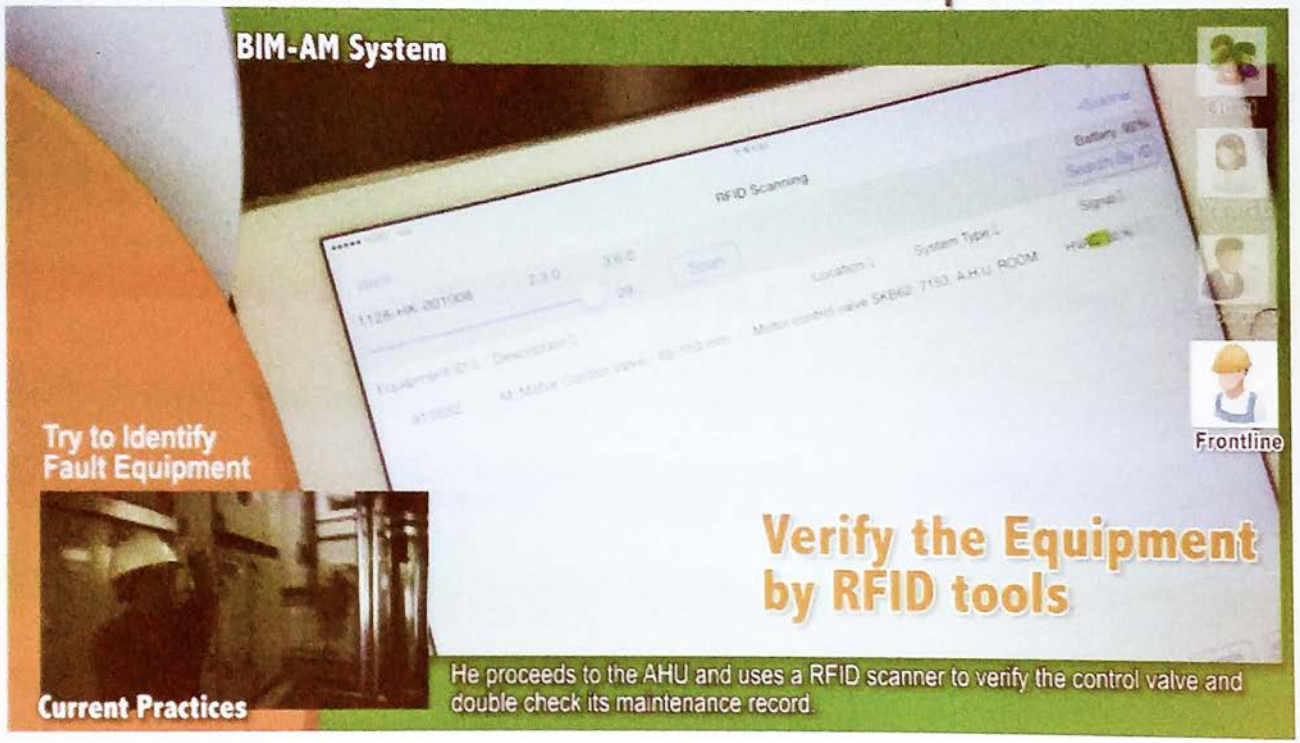
HVAC Showcase – On-site Repair



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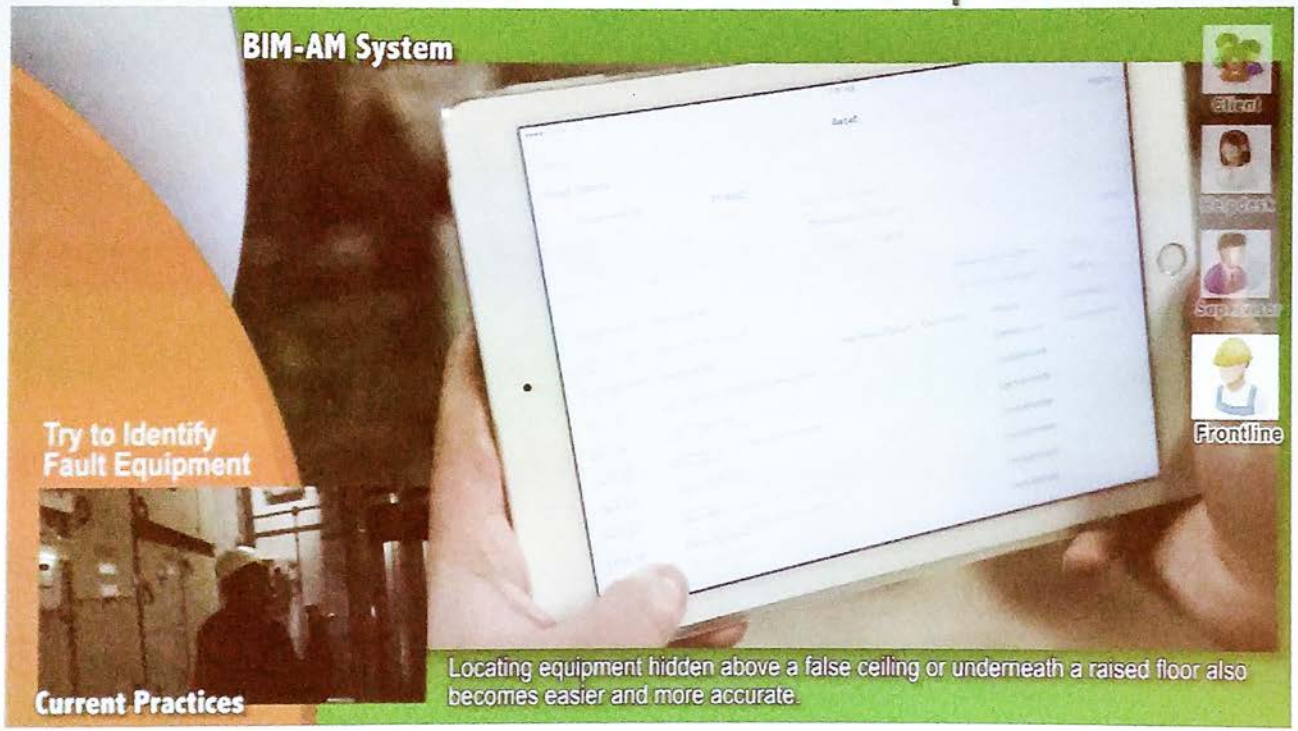
HVAC Showcase – On-site Repair



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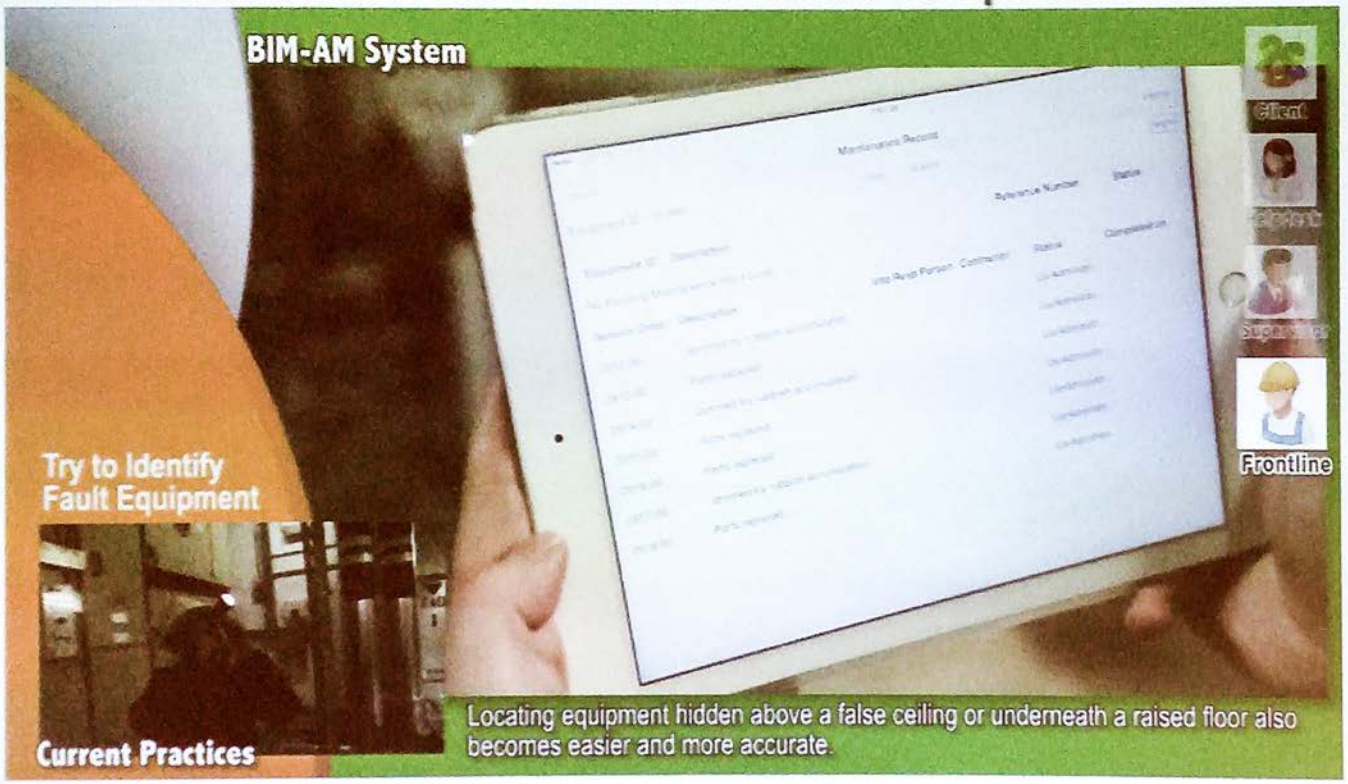
HVAC Showcase – On-site Repair



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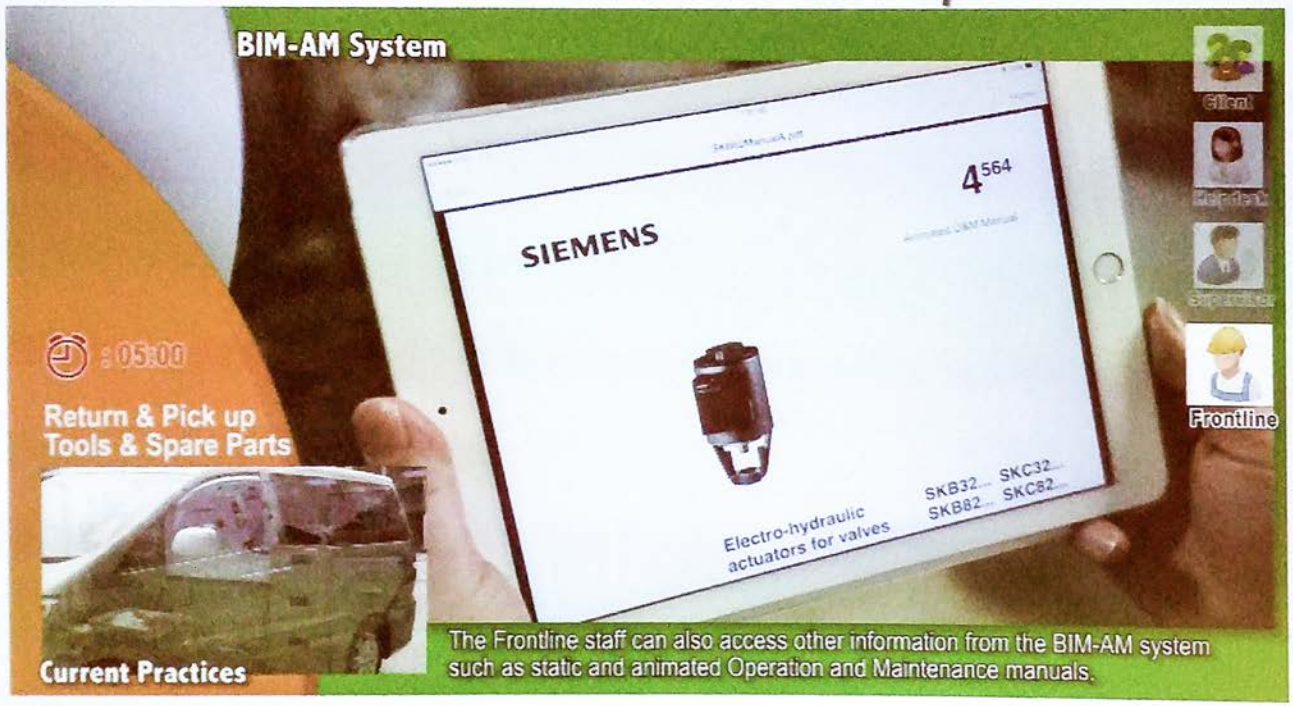
HVAC Showcase – On-site Repair



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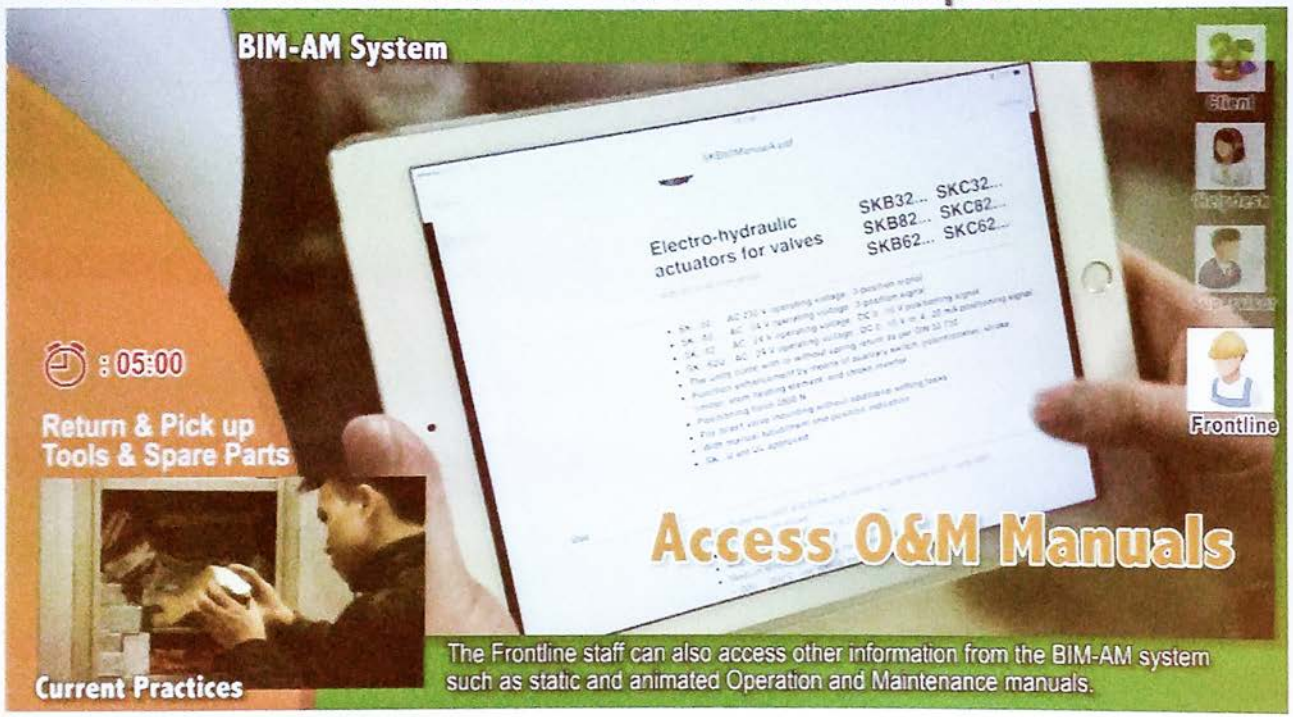
HVAC Showcase – On-site Repair



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HVAC Showcase – On-site Repair

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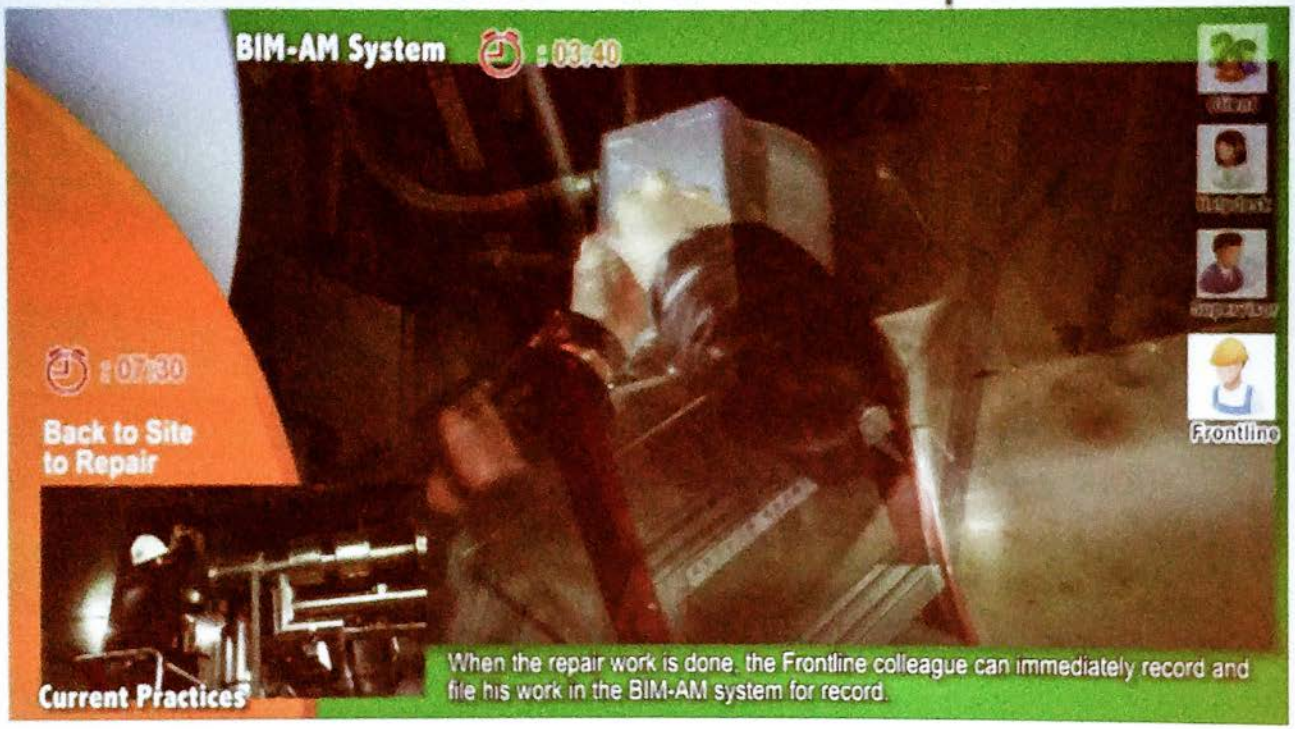
HVAC Showcase – On-site Repair



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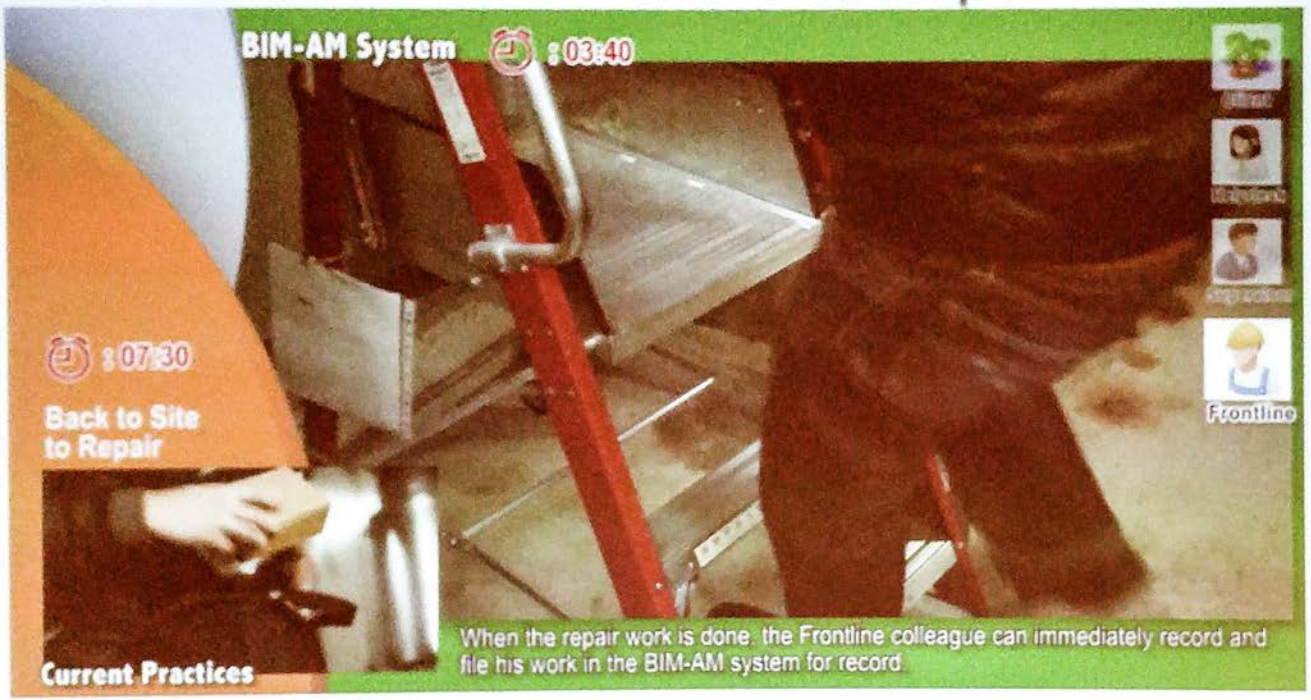
HVAC Showcase – On-site Repair



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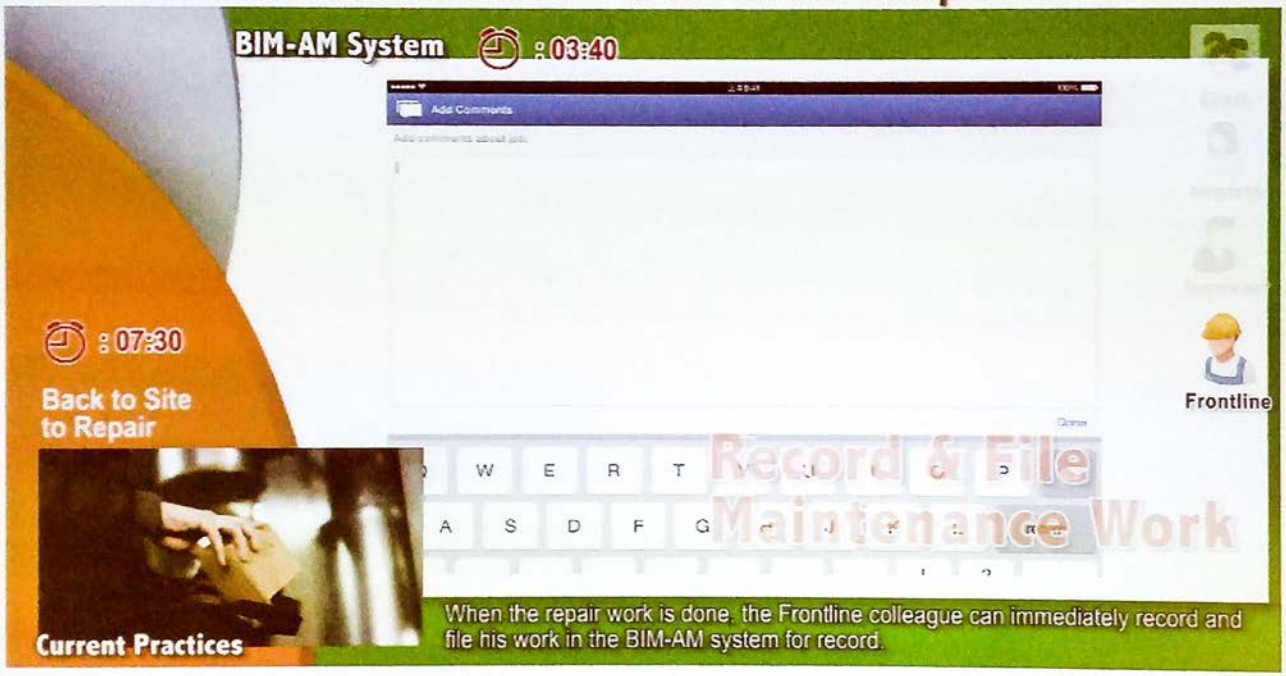

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HVAC Showcase – On-site Repair

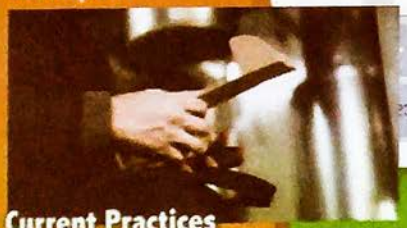
BIM-AM System : 03:40

Add Comments

Frontline

: 07:30

Back to Site to Repair



Current Practices

Record & File Maintenance Work

When the repair work is done, the Frontline colleague can immediately record and file his work in the BIM-AM system for record.

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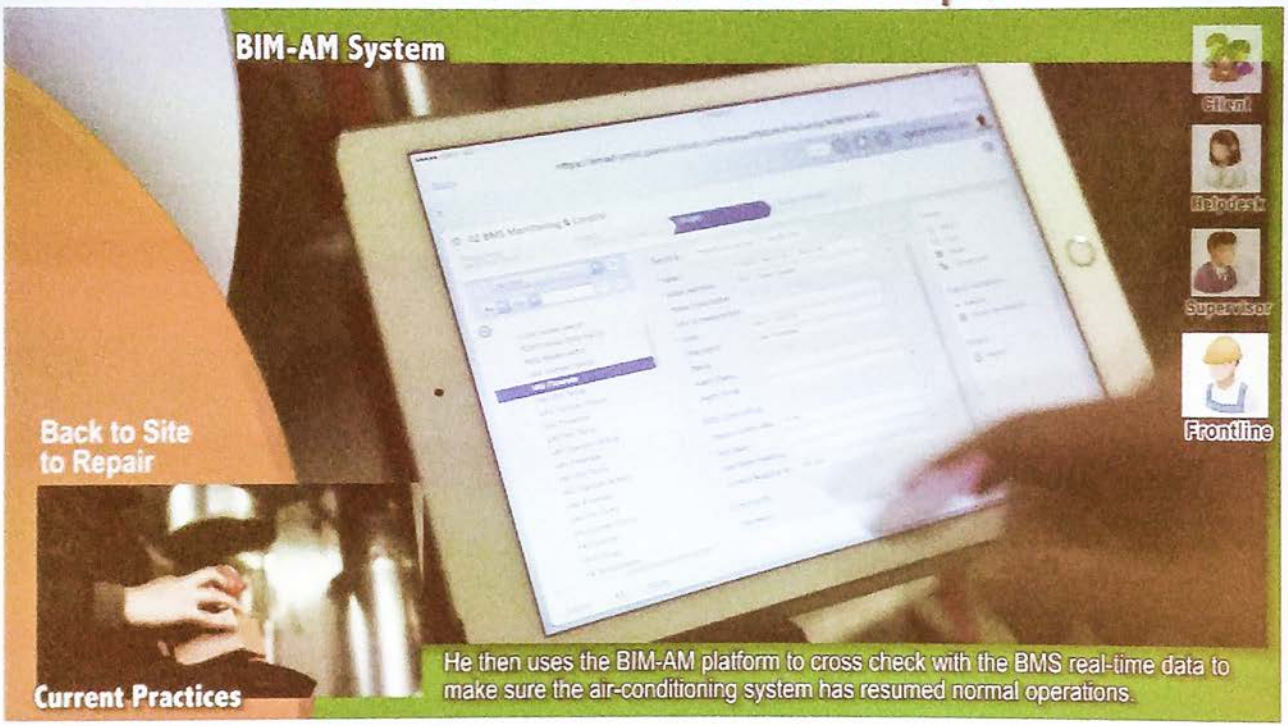
HVAC Showcase – On-site Repair



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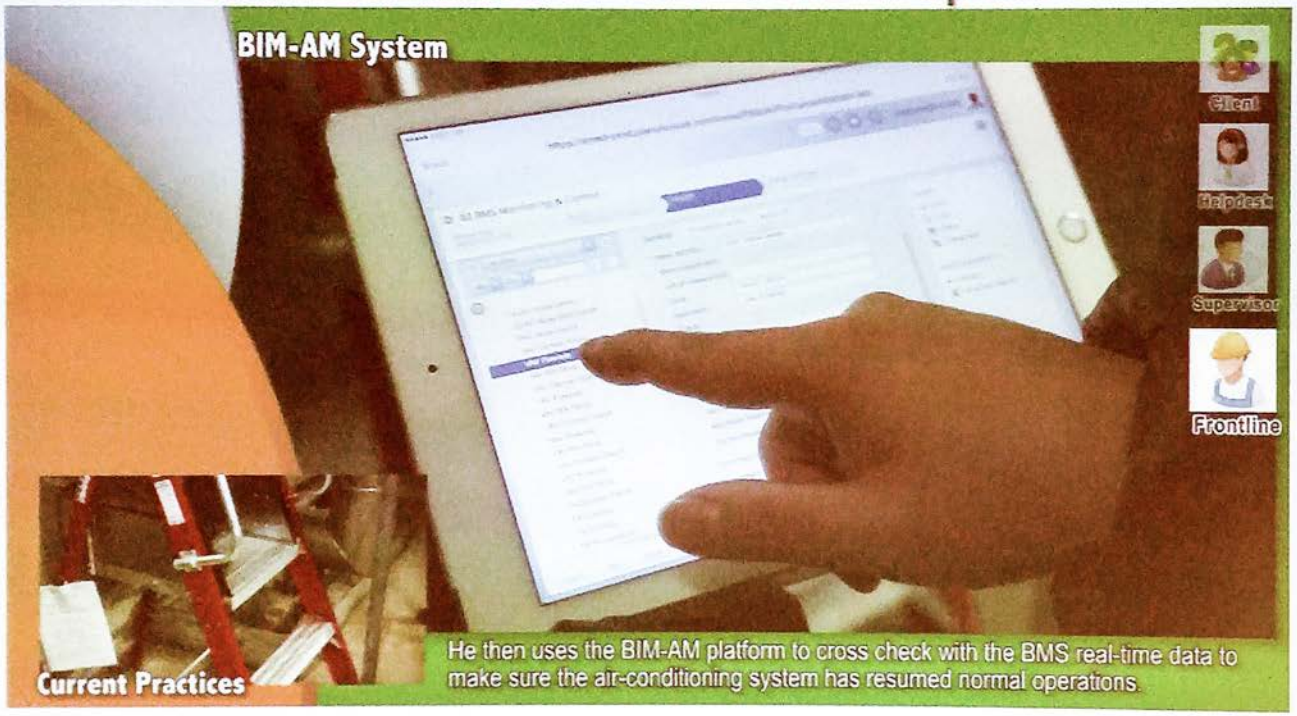
HVAC Showcase – On-site Repair



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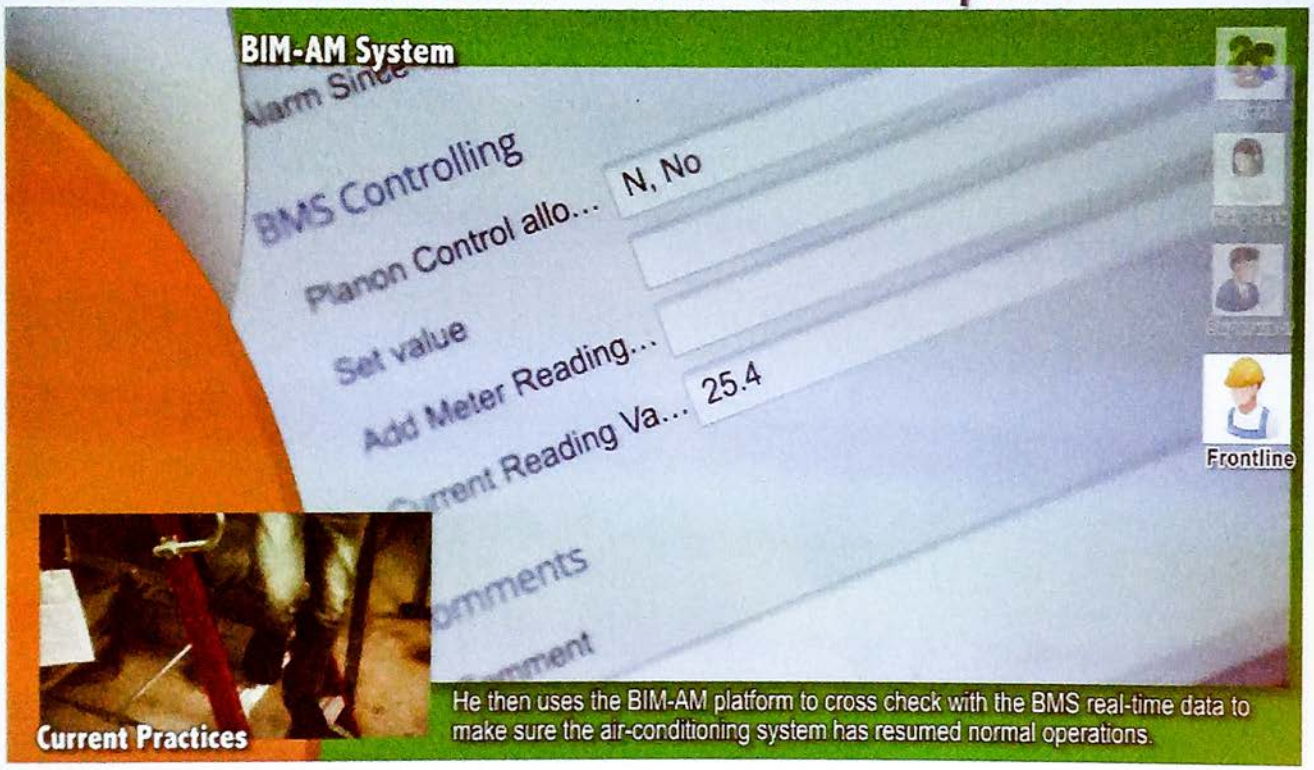
HVAC Showcase – On-site Repair



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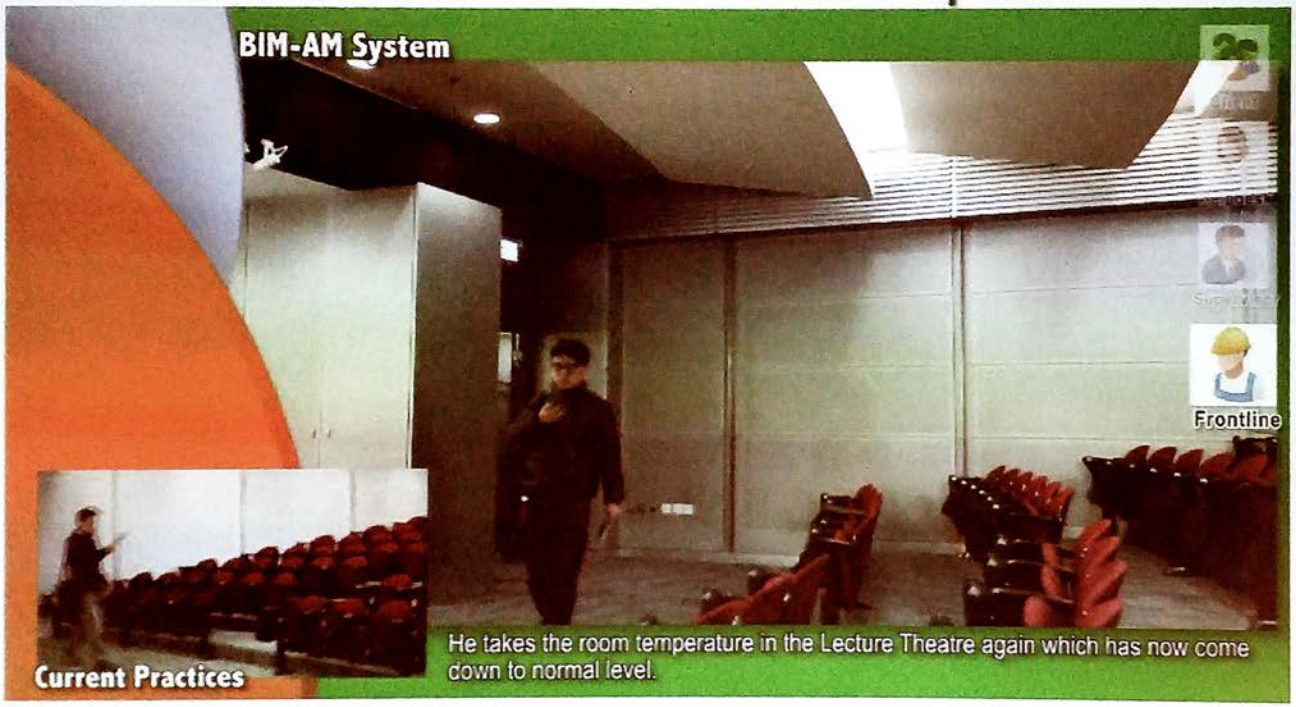
HVAC Showcase – On-site Repair



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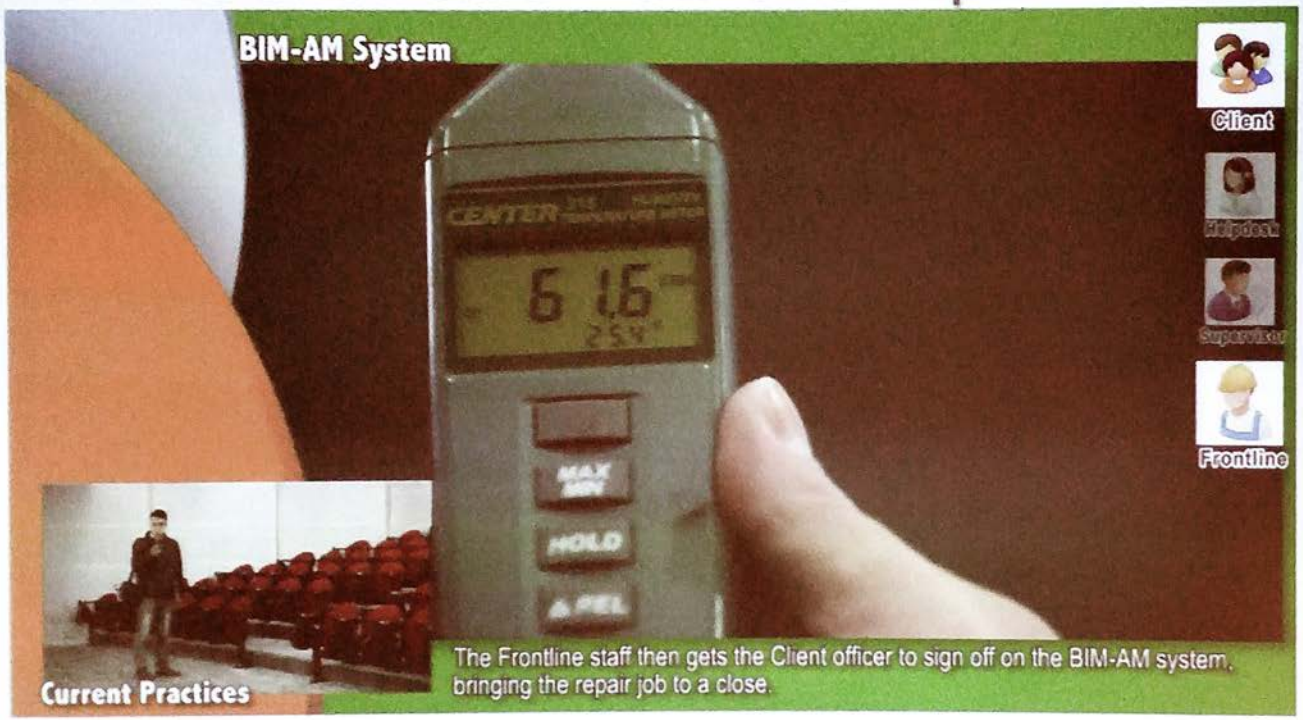
HVAC Showcase – On-site Repair



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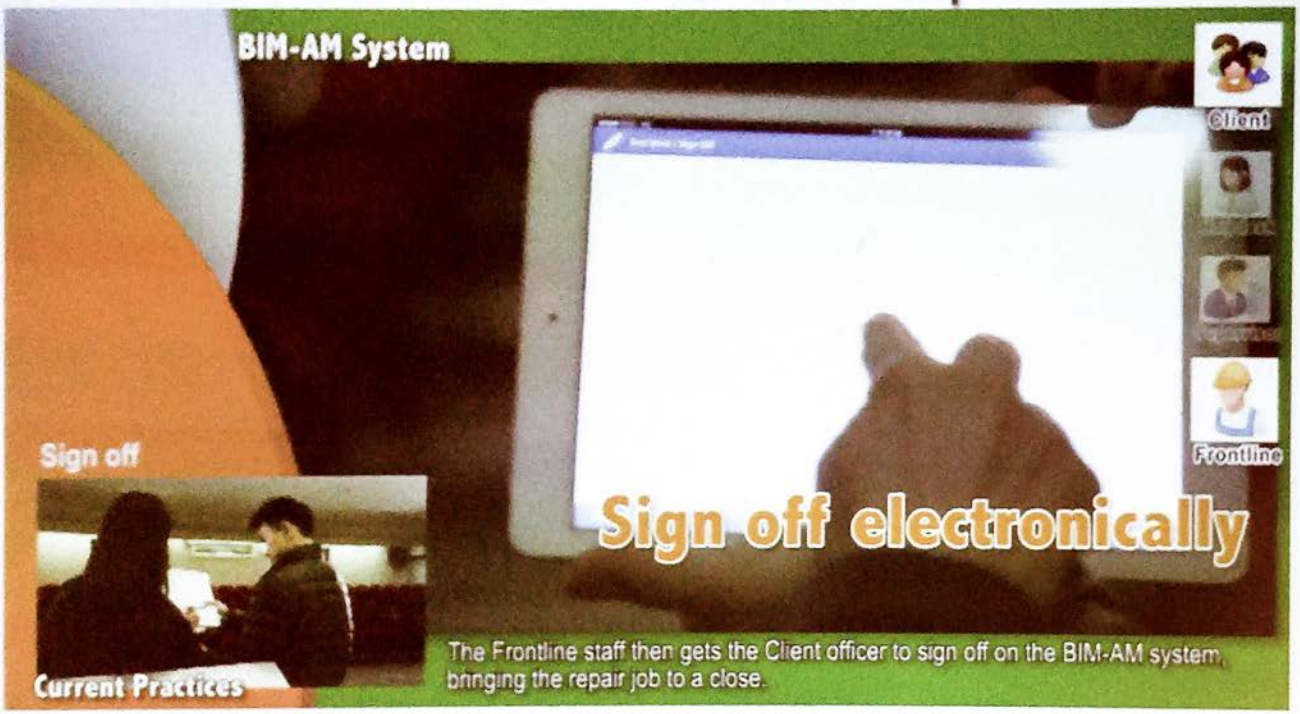
HVAC Showcase – On-site Repair



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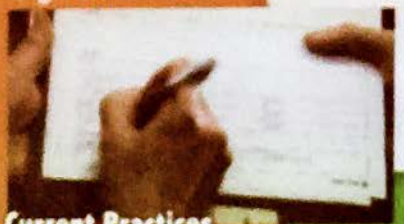
HVAC Showcase - On-site Repair

BIM-AM System

Client Helpdesk Supervisor Frontline

Sign off



Current Practices

The Client, the Helpdesk and the Supervisors on both our maintenance team and Contractor side can also immediately know from BIM-AM system

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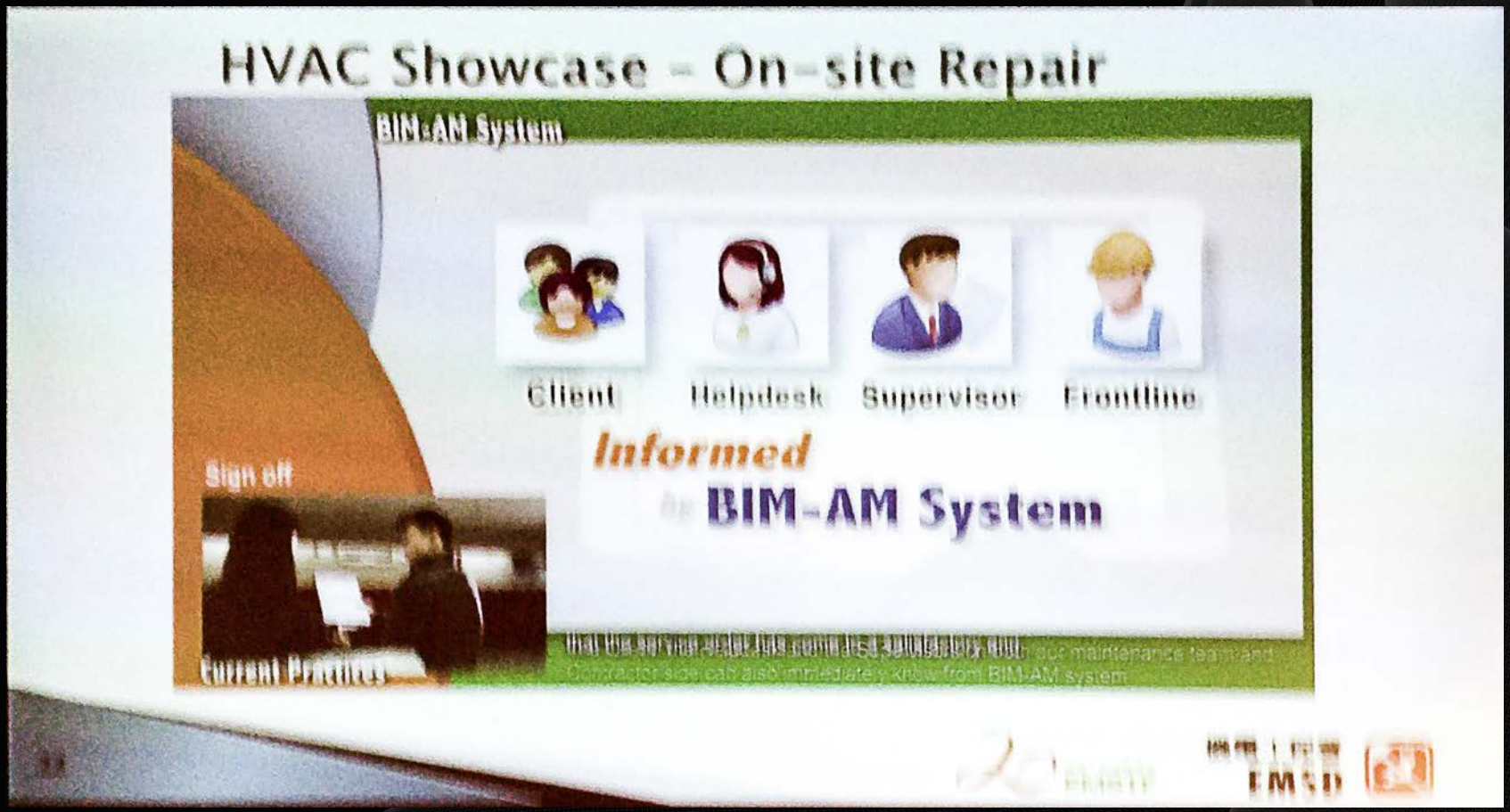
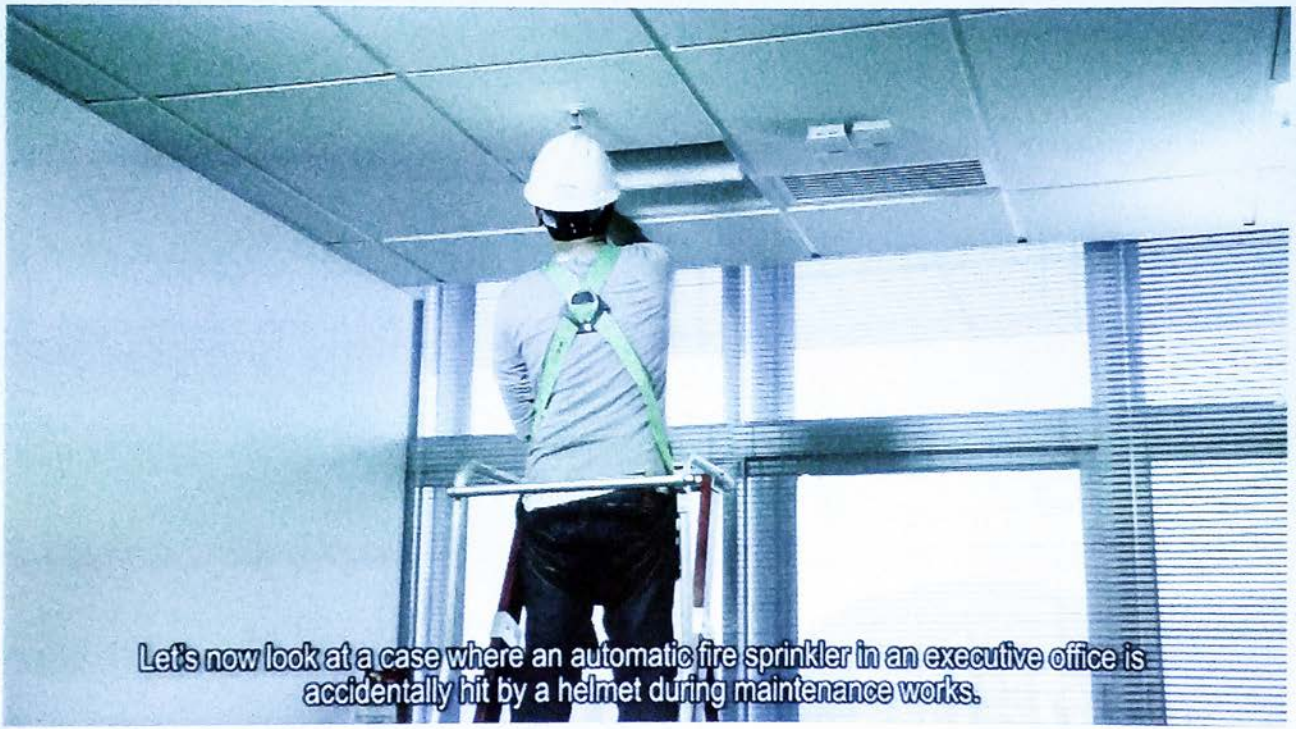

HVAC Showcase - On-site Repair
BIM-AM System
Client
Helpdesk
Supervisor
Frontline
Informed
BIM-AM System
Sign off
Current Practice

Incident Handling



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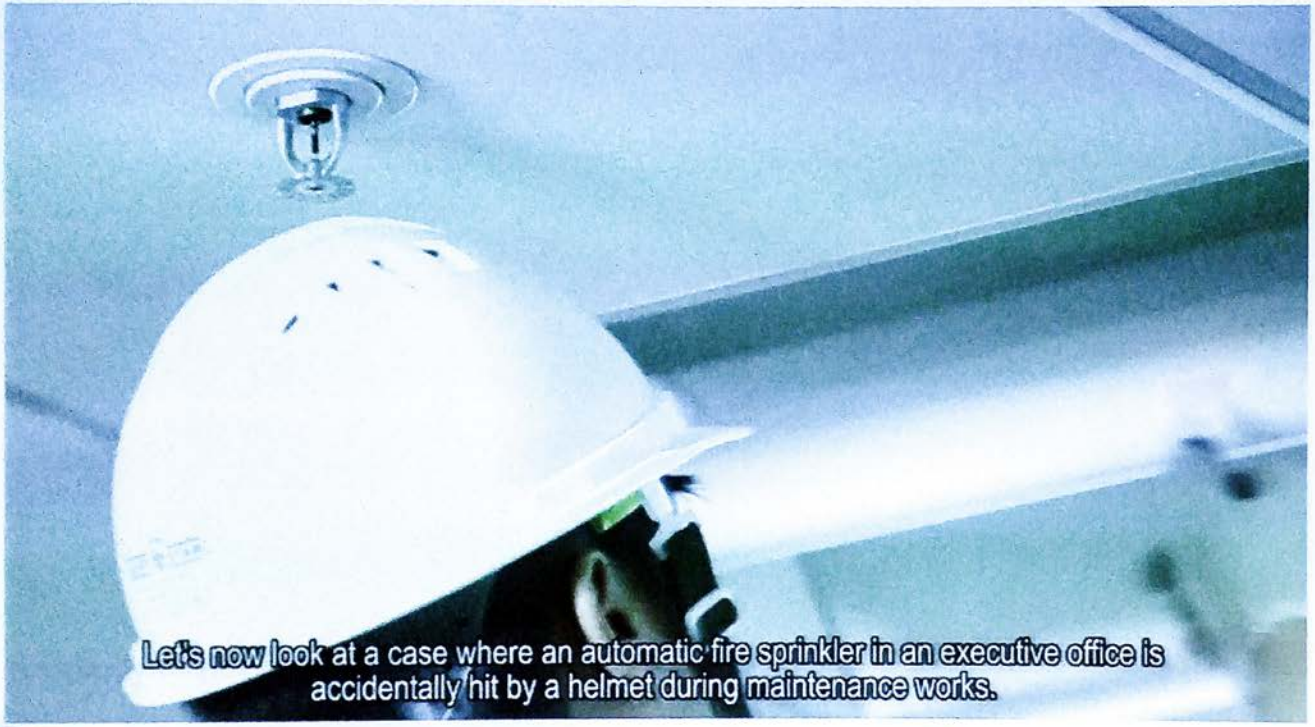
Incident Handling



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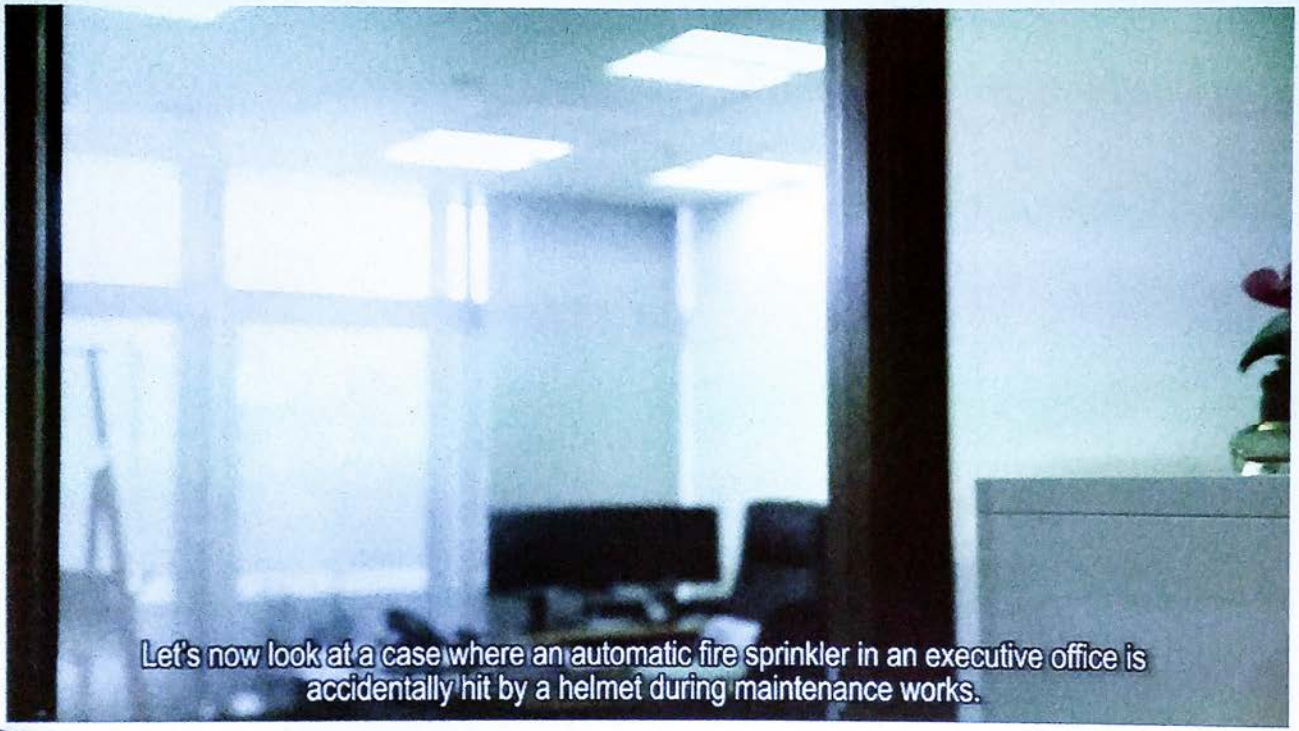
Incident Handling



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Incident Handling

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Incident Handling

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Incident Handling

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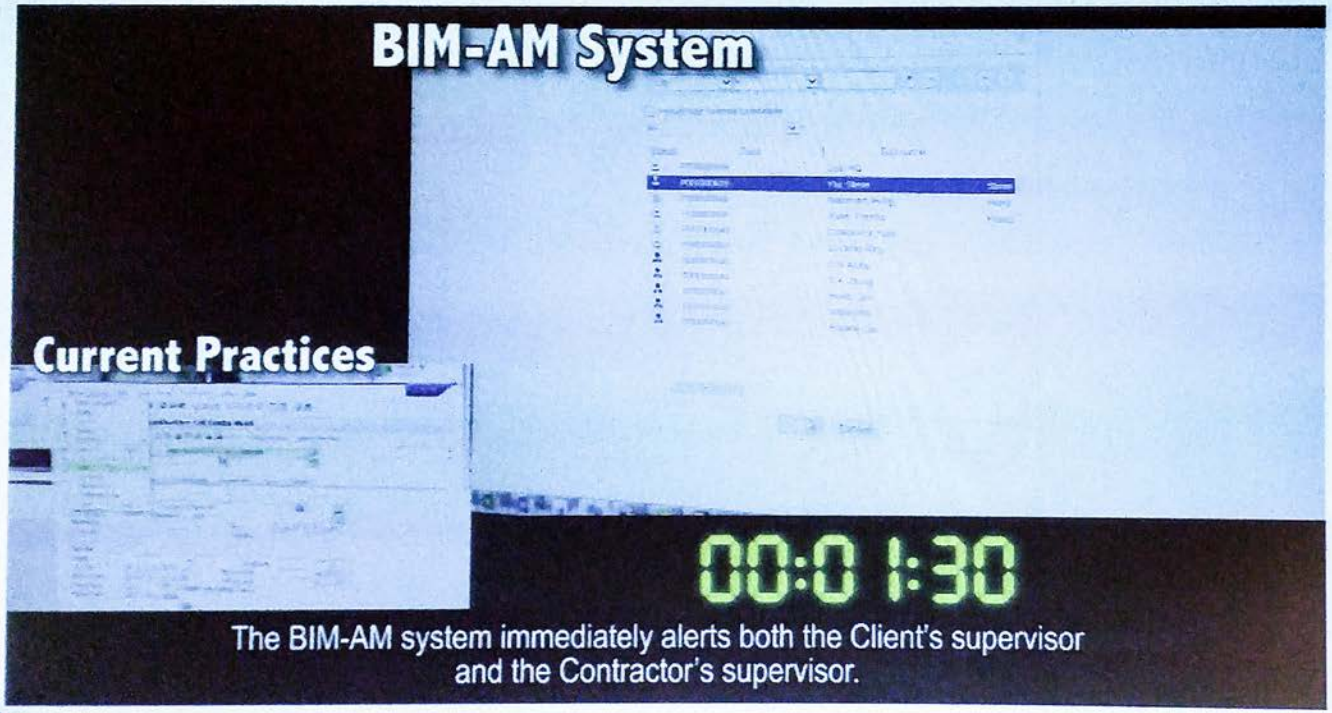
Incident Handling



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Incident Handling

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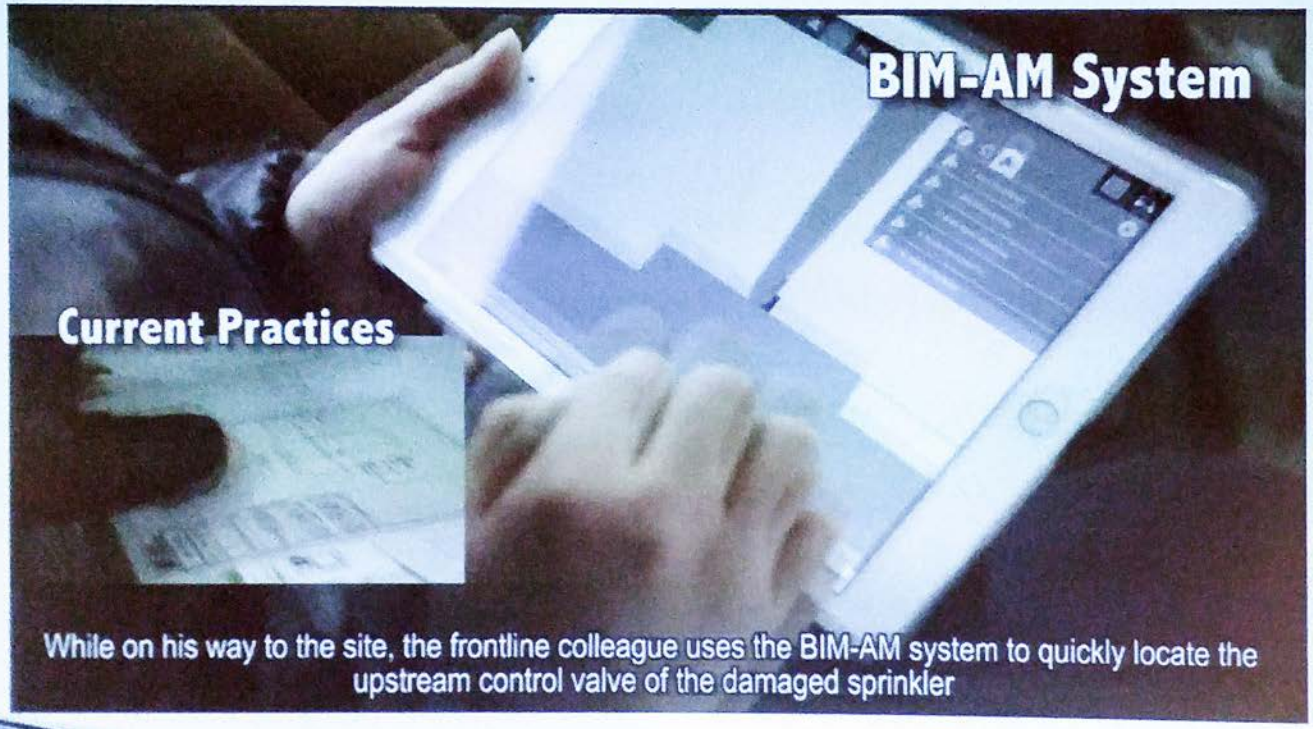
Incident Handling



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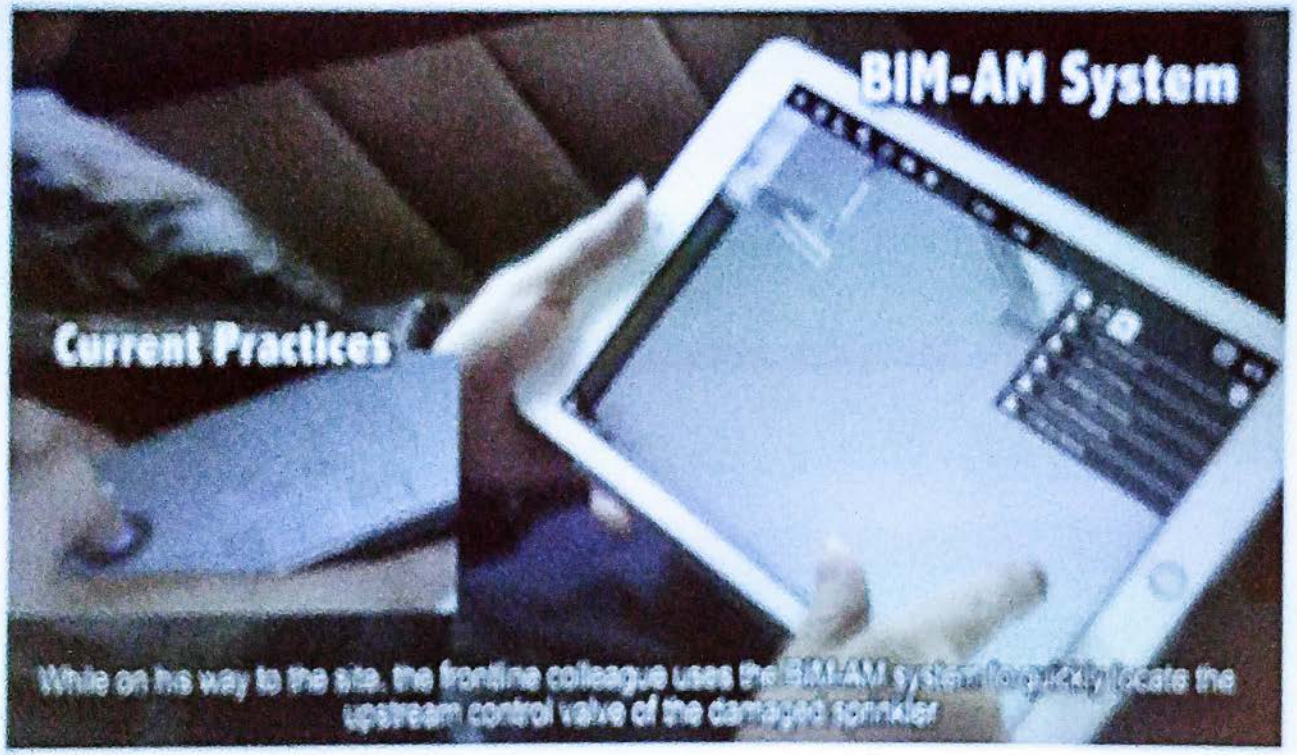
Incident Handling



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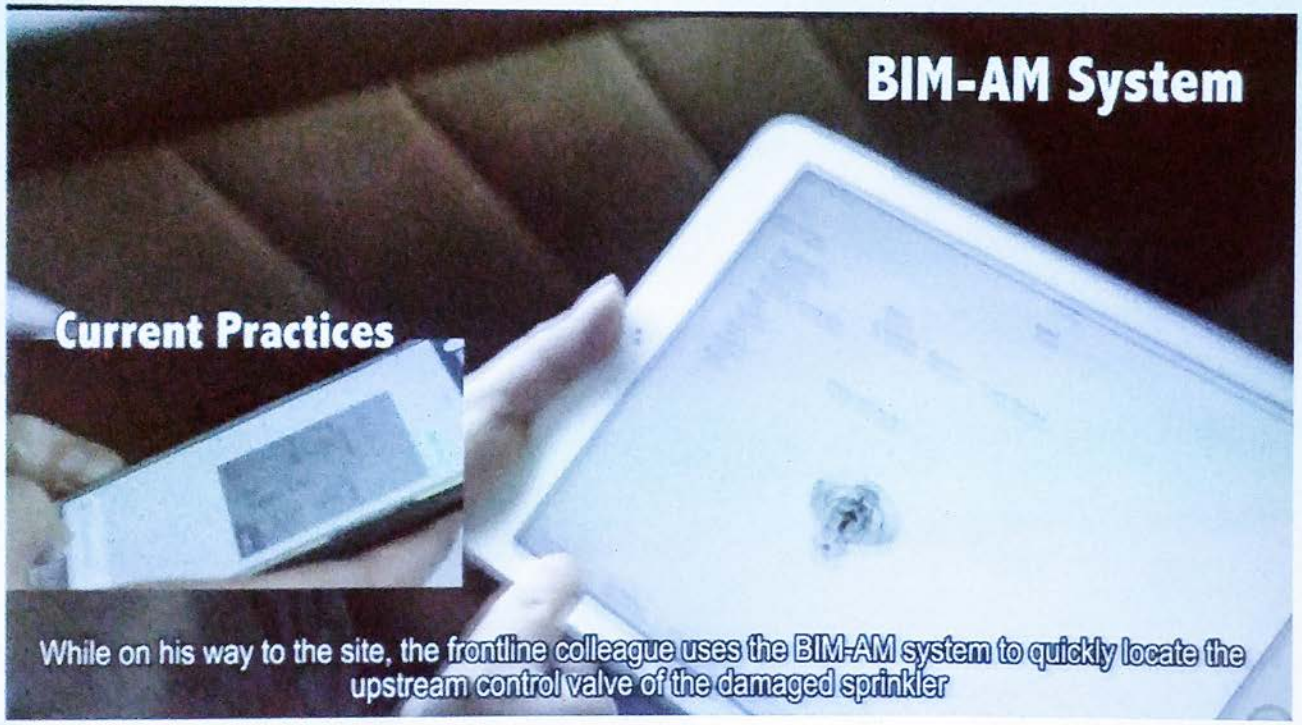
EMSD

Incident Handling



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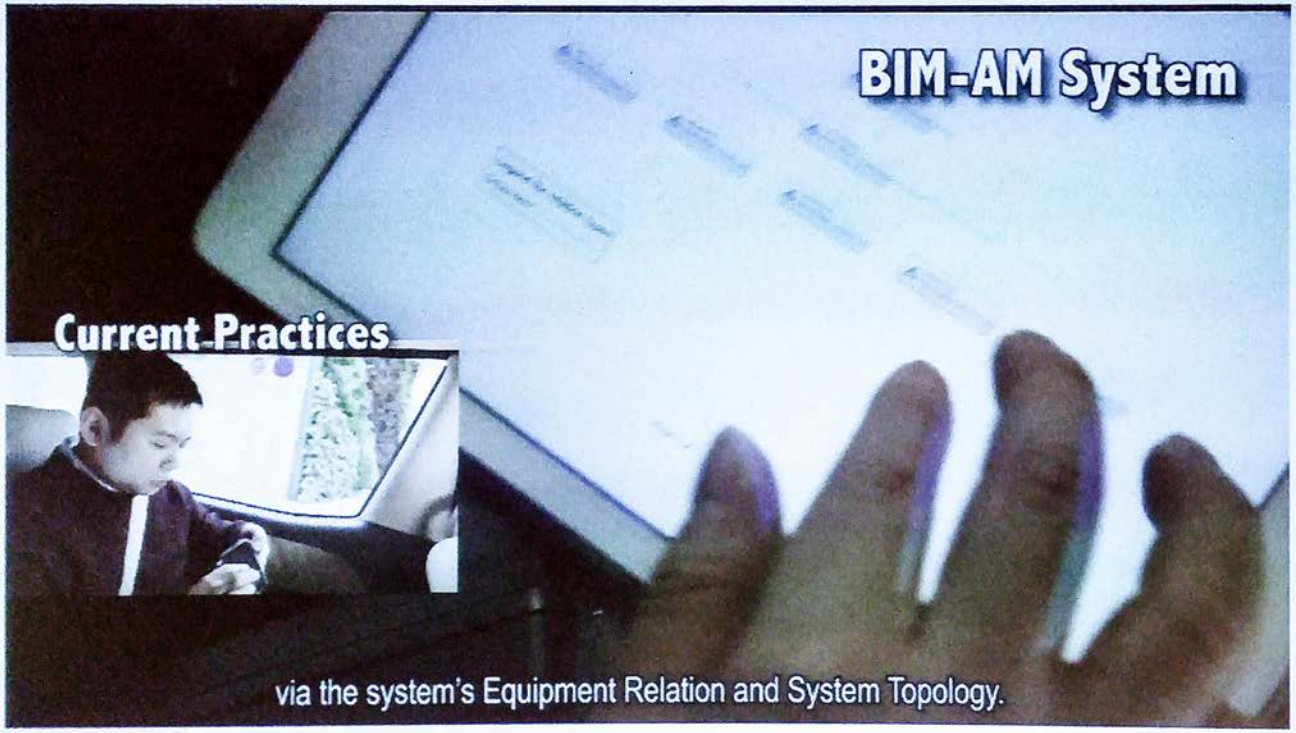
Incident Handling



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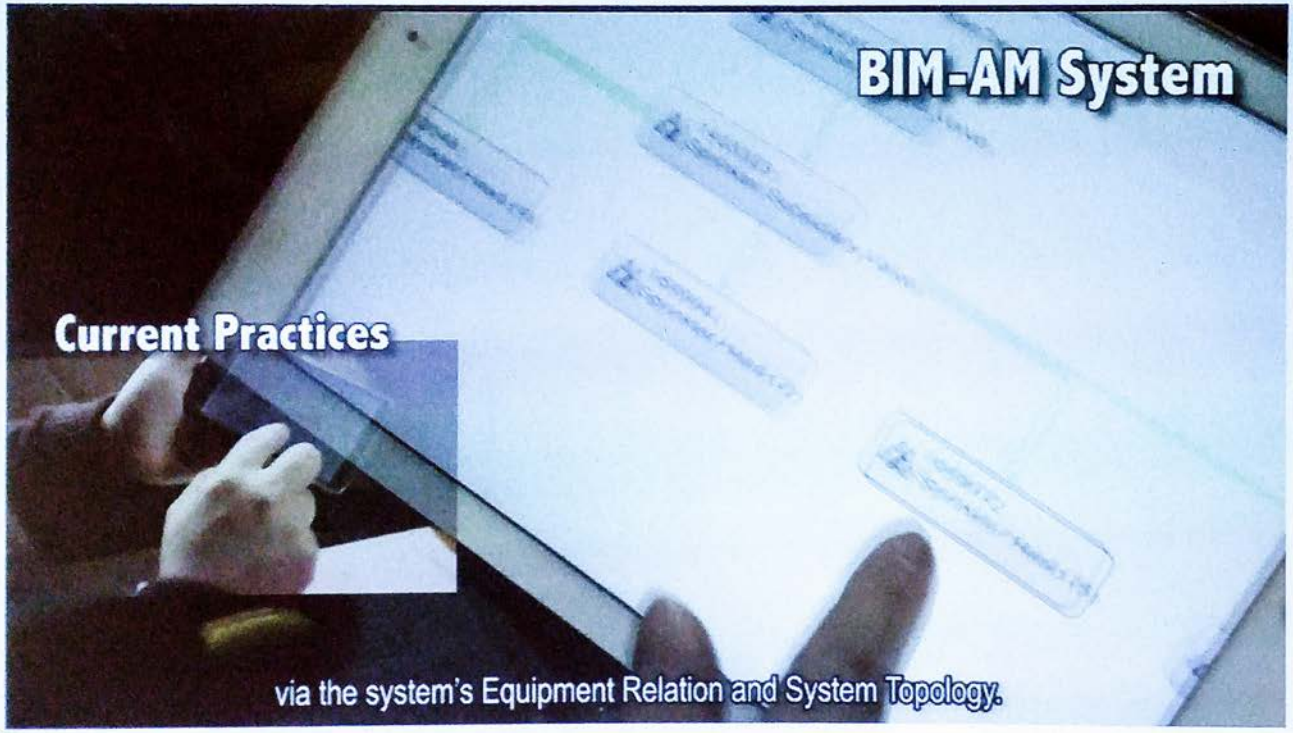
Incident Handling



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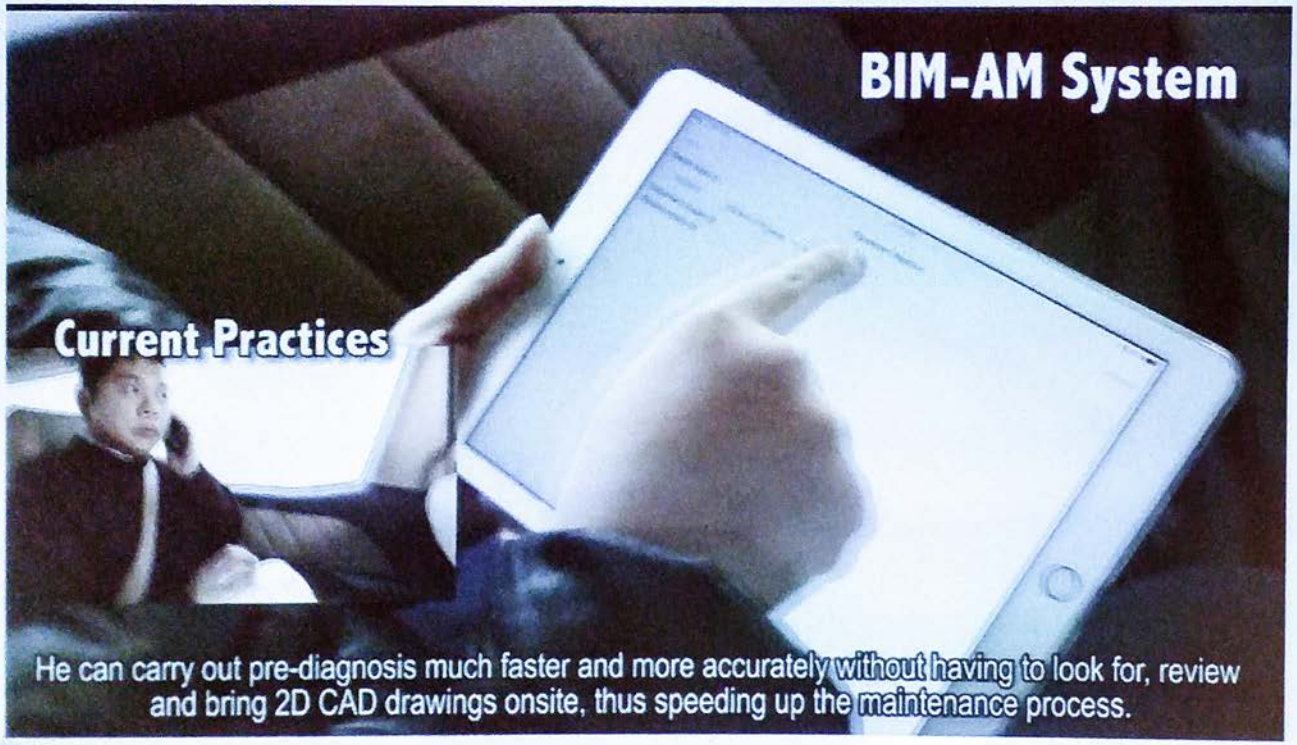

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Incident Handling

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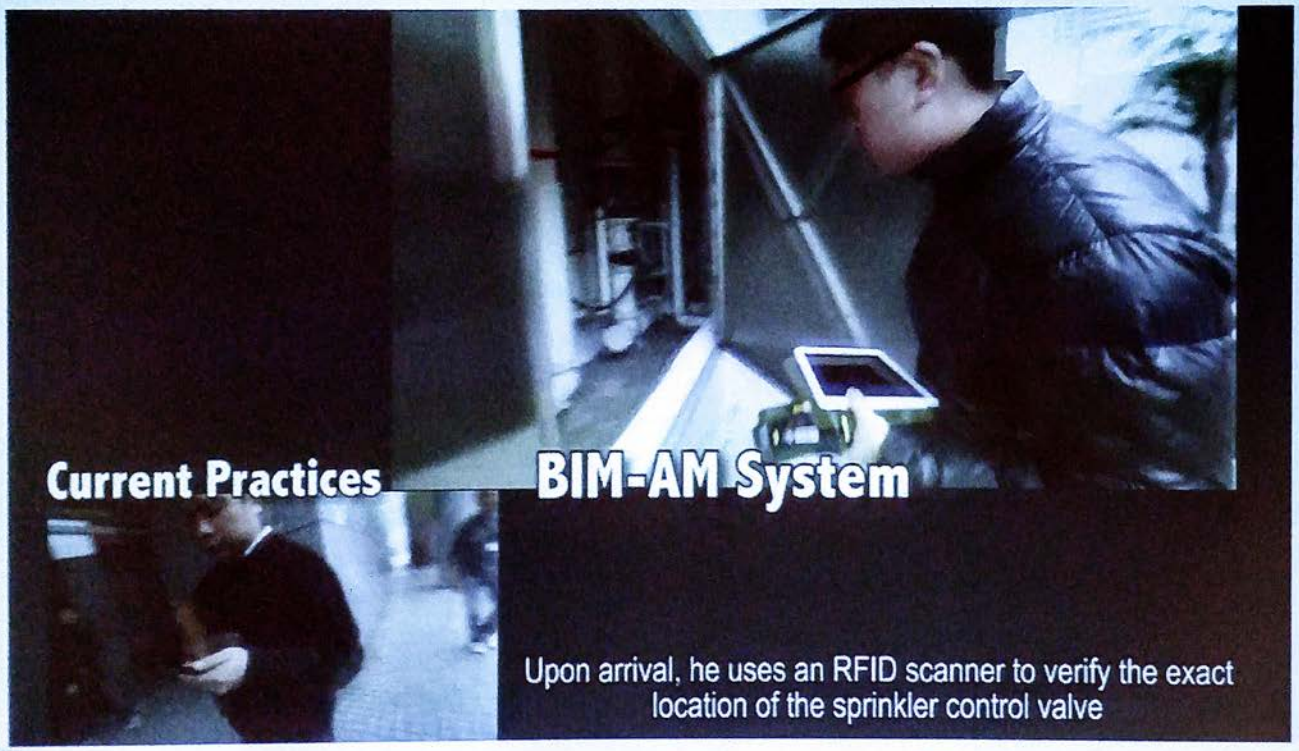
機電工程署 EMSD

Incident Handling



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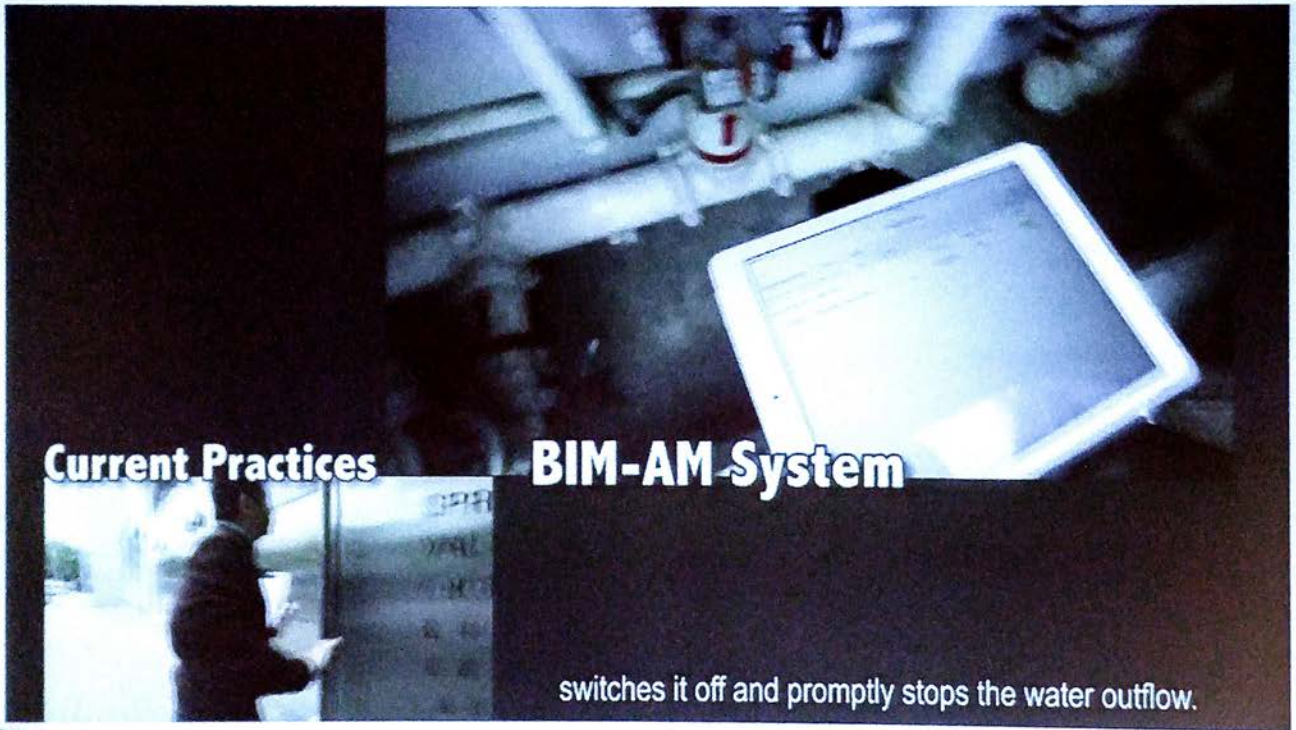
Incident Handling



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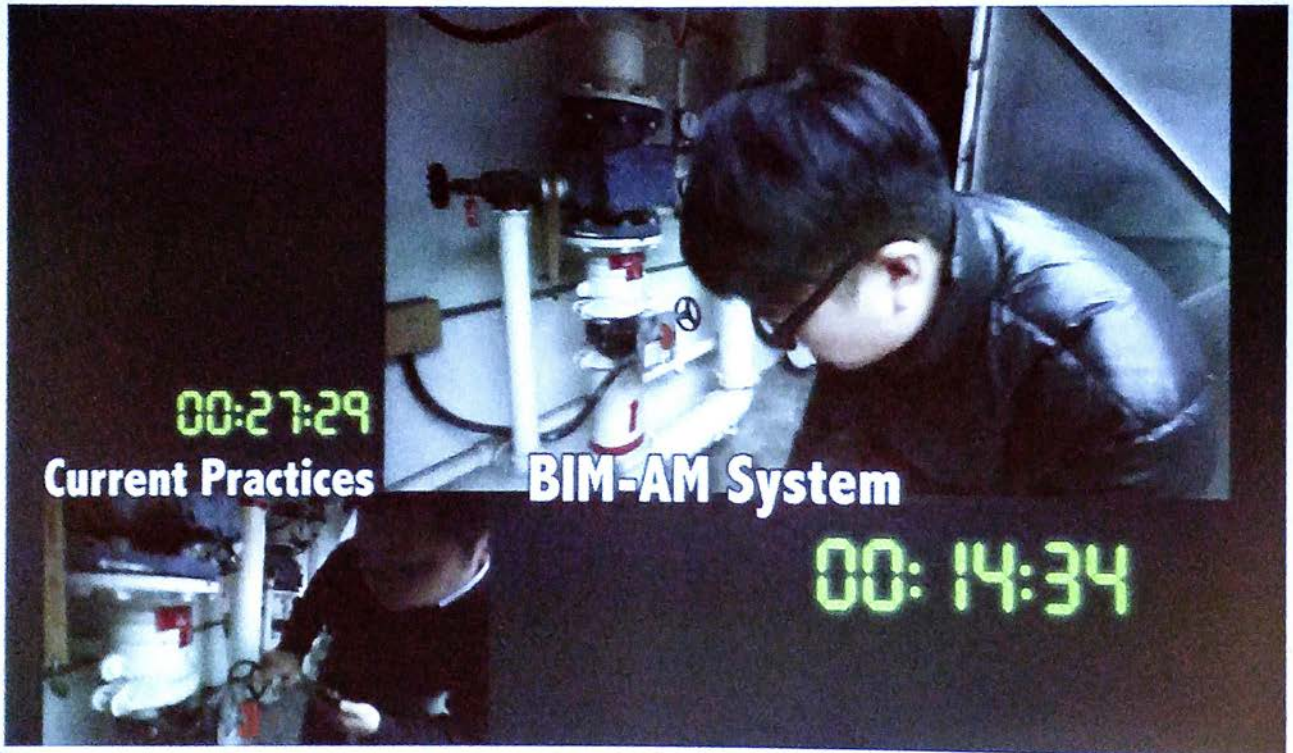
Incident Handling



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Incident Handling

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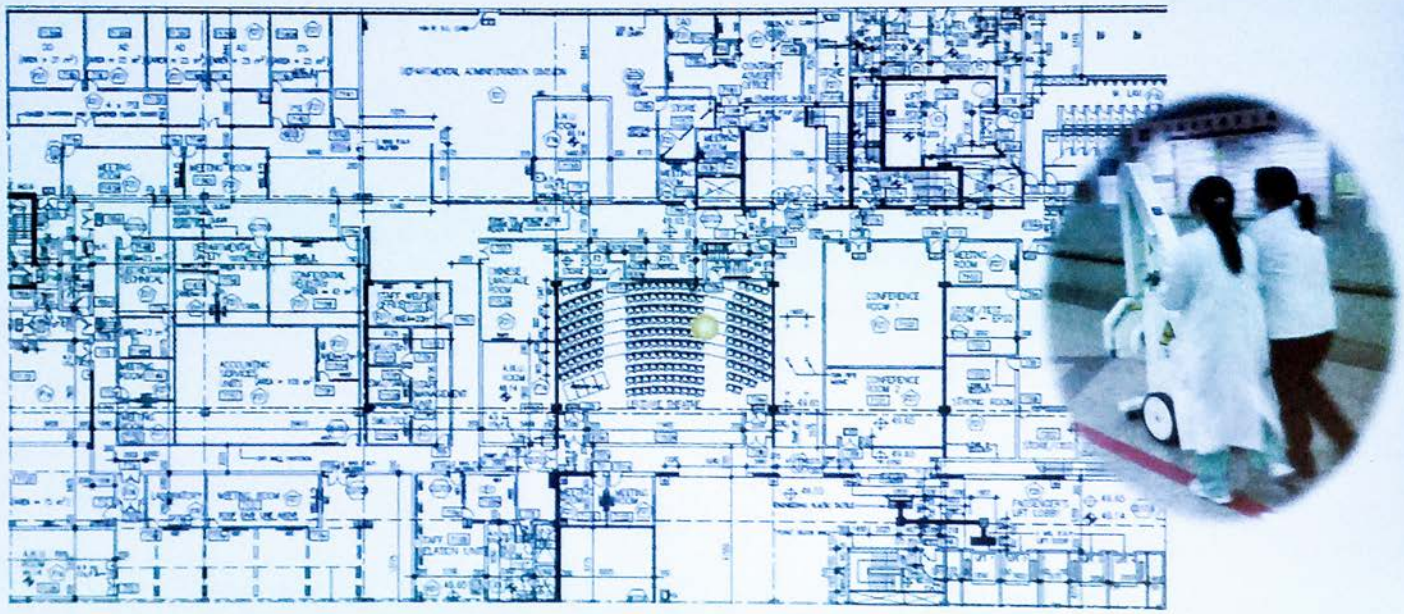
Interfacing with Real Time Location System (RTLS) for locating movable assets



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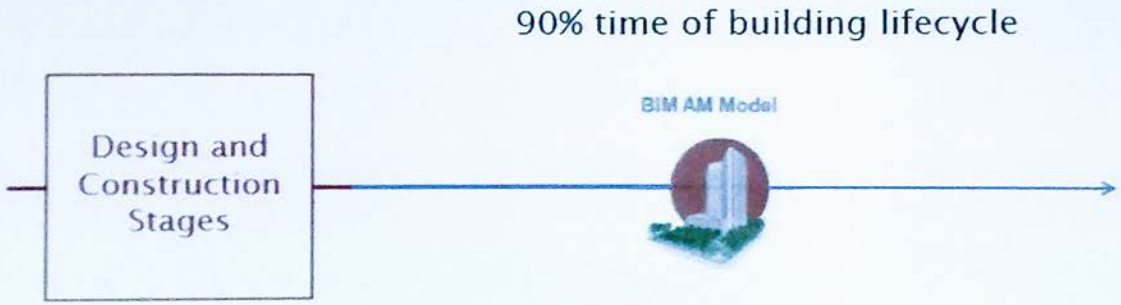
Outline

- EMSD BIM-AM System
  - Retrospective BIM model construction
  - System architecture illustrated by showcases
- Way forward
  - Drawing standard
  - Contractor submission guidelines
  - 5 Centre of Excellence (CoE) sites for BIM-AM
  - Integrating with Geographic Information System (GIS)
  - Smart glasses (Augmented Reality)

Way Forward

- How to adopt BIM for building asset management (AM) & operation & maintenance (O&M)?
  - Early coordination at design & construction stages



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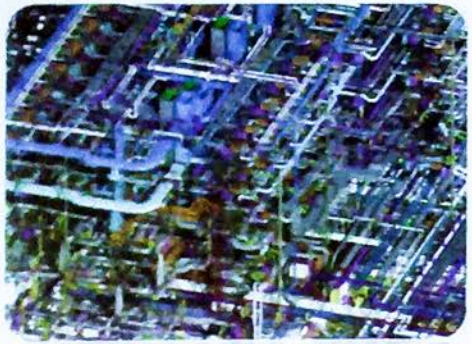
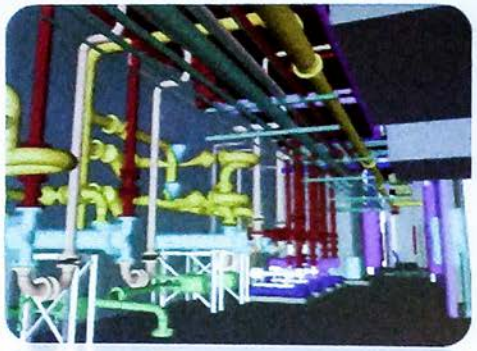
Way Forward

- Drawing standards

Way Forward

- Drawing standards
  - Colour scheme





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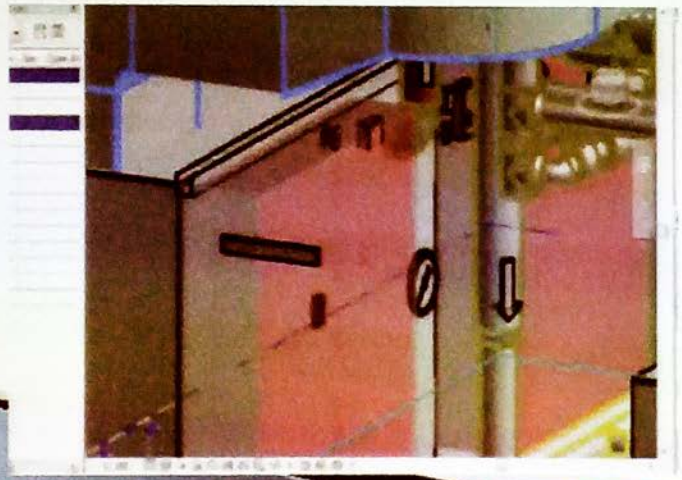
Way Forward

- Drawing standards
  - Colour scheme
  - Separation of MEP subsystems in BIM model

Way Forward

- Drawing standards
  - Colour scheme
  - Separation of MEP subsystems in BIM model
  - Visualization of maintenance clearance



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Way Forward

- Drawing standards
  - Colour scheme
  - Separation of MEP subsystems in BIM model
  - Visualization of maintenance clearance

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Way Forward

- Contractor submission guidelines

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Way Forward

- Contractor submission guidelines
  - Asset information requirement using EMSD standardized asset templates

1. LVSB
2. Emergency Generator Set
3. UPS
4. Lift
5. Escalator
6. Burglar Alarm and Security System
7. Broadcast Reception System
8. HVAC Installation
9. Electronics Timing & Display Installation
10. Audio Electronics Installation
11. Video Electronics Installation
12. Radio Electronics Installation

Equipment No.	Equipment type	Parent Equipment 1	Associated Equipment 1	BIM GUID	RFID No.	Switchgear No.	Type of Circuit	Rating (A)	Make
123456	Switchgear (ACB)					6N1	Incomer	3200	Ellison
123457	Switchgear (MCCB)					6N2	Sub-main (Normal)	400	Merlin Gerin
123458	Switchgear (MCCB)					6N3	Sub-main (Normal)	800	Merlin Gerin

Way Forward

- Contractor submission guidelines
  - Asset information requirement using EMSD standardized asset templates
    - E.g. asset relationship (parent-child / associated)

Equipment No	Equipment type	Parent Equipment 1	Associated Equipment 1	BIM GUID	RFID No.	Switchgear No.	Type of Circuit	Rating (A)	Make
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123457	Switchgear (MCCB)					6N2	Sub-main (Normal)	400	Merlin Gerin
123458	Switchgear (MCCB)					6N3	Sub-main (Normal)	800	Merlin Gerin

Way Forward

- Contractor submission guidelines
  - Asset information requirement using EMSD standardized asset templates
    - E.g. asset relationship (parent-child / associated)
    - E.g. RFID tagging requirements, e.g. critical assets

Equipment No.	Equipment type	Parent Equipment 1	Associated Equipment 1	BIM GUID	RFID No.	Switchgear No.	Type of Circuit	Rating (A)	Make
123456	Switchgear (ACB)					6N1	Incomer	3200	Ellison
123457	Switchgear (MCCB)					6N2	Sub-main Normal	400	Merlin Gerin
123458	Switchgear (MCCB)					6N3	Sub-main Normal	800	Merlin Gerin

Way Forward

- To establish 5 Centre of Excellence (CoE) sites in EMSD for internal promotion of BIM-AM application in O&M

Way Forward

- Integrating with GIS for a holistic geographic interface for easy management of venues maintained under BIM-AM System

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• Peter Koncz
supporting organisations:
ALLGAIN
enzyme.
GRAPHISOFT
HKIBIM
Annual Conferen
2016
DATE
6th October, 2016 (Thursd
TIME
8:45 a.m. - 5:00 p.m.
VENUE
Royal Plaza Hotel
Conference - Grand Ball
Lunch - La Scala, Level 2
HKIBIM
Annual
Conference
2016


esentation
HKIBIM
Annual Conferenc
2016
DATE
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TIME
8:45 a.m. - 5:00 p.m.
VENUE
Royal Plaza Hotel
Conference - Grand Ba
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HKIBIM
Annual
Conference
2016

Thank you !