

# STRATEGIC DIGITALIZATION FOR SMARTER PROJECT MANAGEMENT

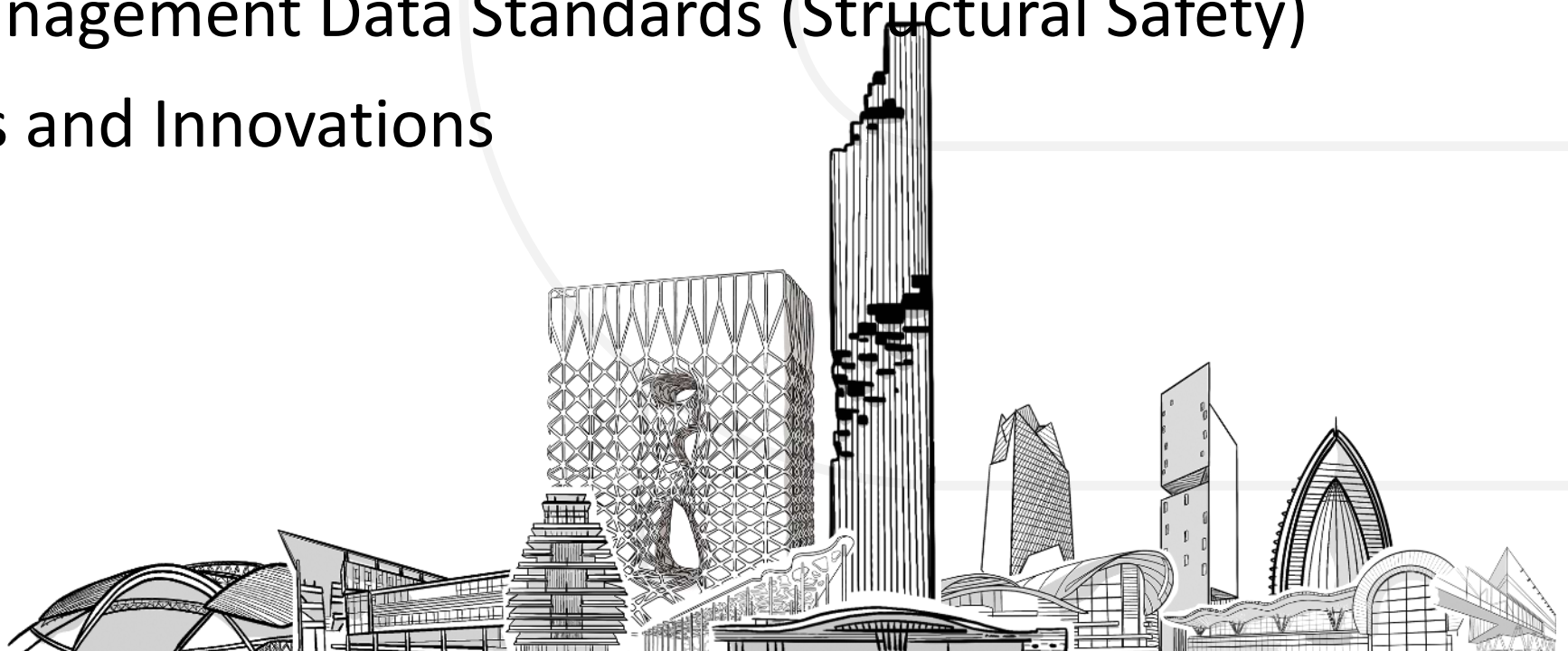
**Khor Yew Chai**  
**Dragages Singapore Pte Ltd**

22 May 2025

*"Harnessing data from Ops Tech enabled inspections for  
Business Impact"*

# **Agenda**

- 1.** Introduction – DSPL Journey towards Digitalisation
- 2.** Implementation of Site Management Platform - Dalux
- 3.** BCA Site Management Data Standards (Structural Safety)
- 4.** Future Plans and Innovations





# Introduction – DSPL

## Journey towards

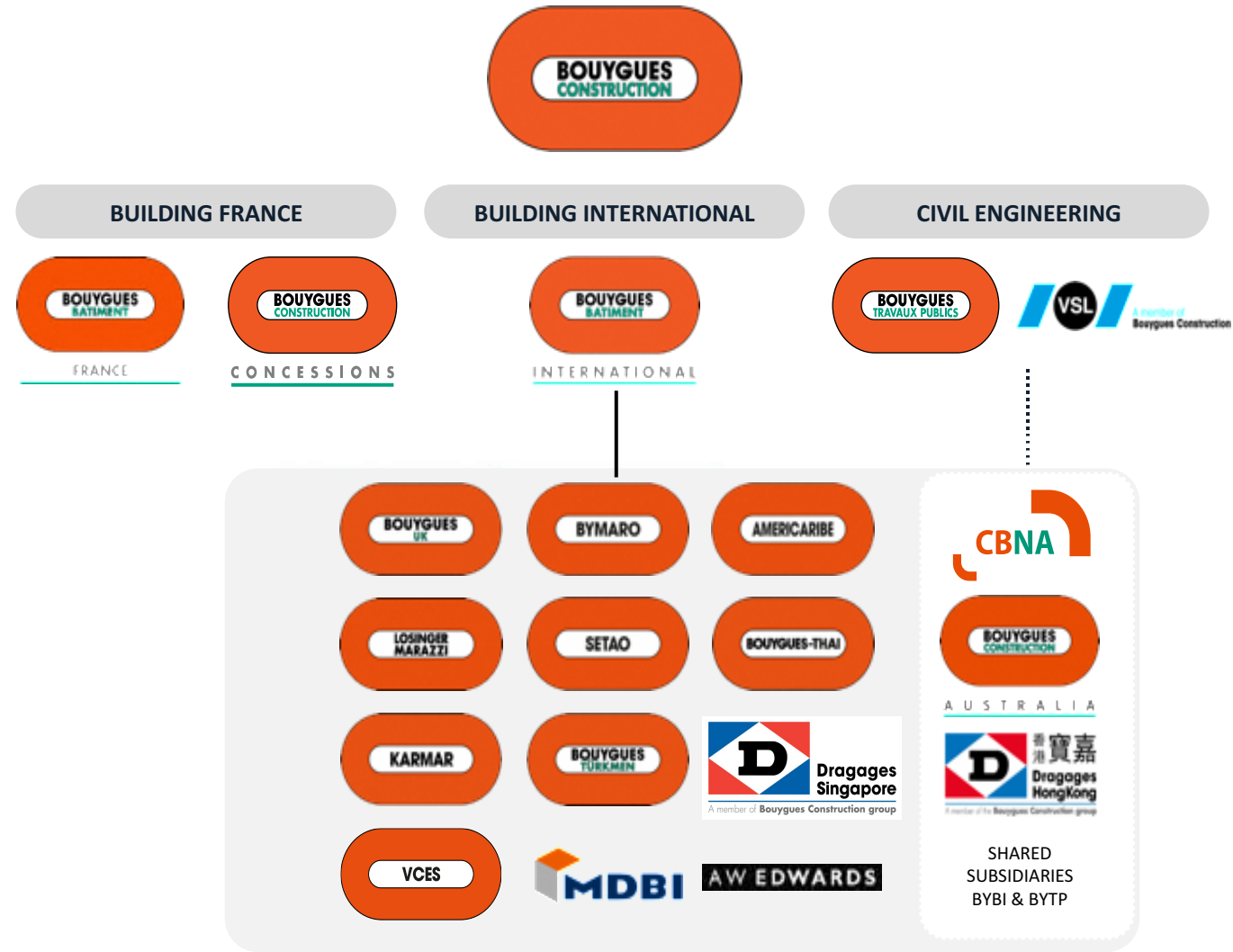
## Digitalisation

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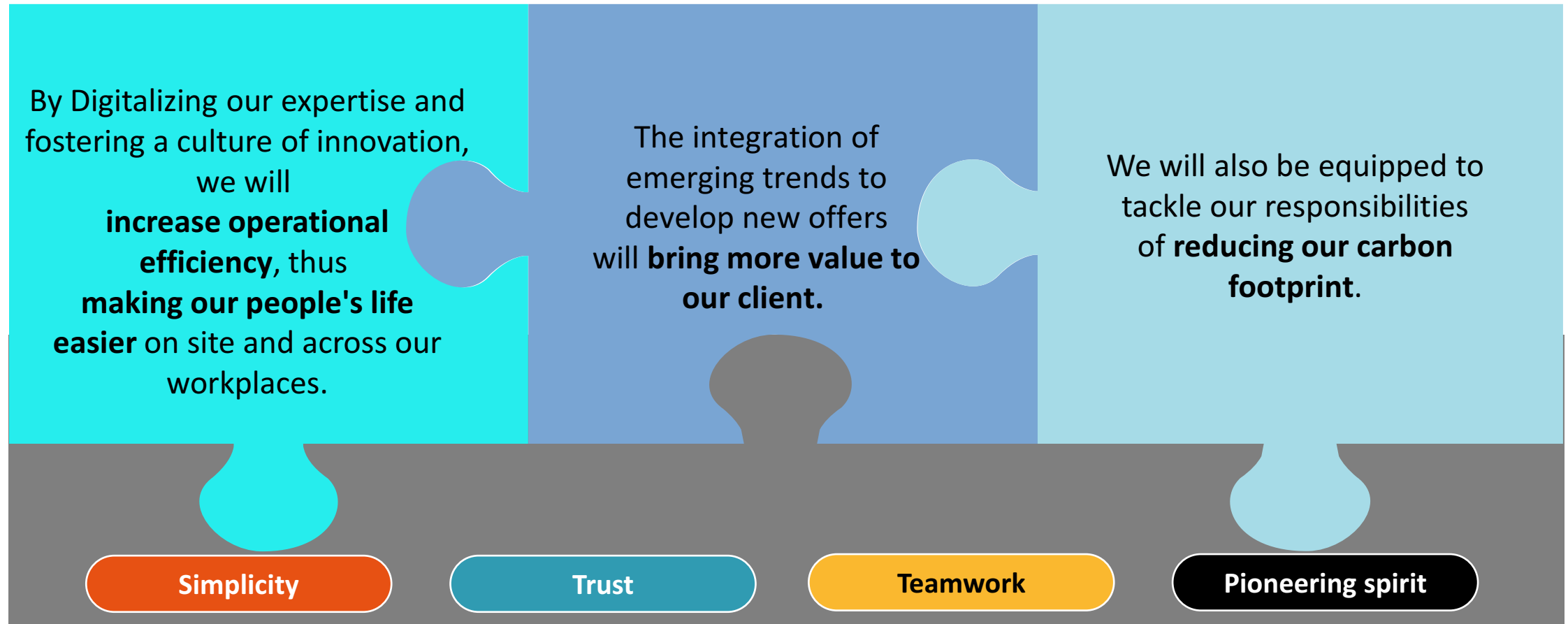


# Who we are

- We are a part of a globally-respected network of construction-related companies in **Bouygues Construction**
- A pioneer of innovation in Singapore for more than 33 years driven by the greatest mission – **BUILDING FOR LIFE**



# Our Vision behind digitalising operations





# Our Vision behind digitalising operations

By Digitalizing our expertise and fostering a culture of innovation, we will **increase operational efficiency**, thus **making our people's life easier** on site and across our workplaces.



**Simplicity**


- ✓ Simple
- ✓ Practical
- ✓ Ensure seamless flow of data during construction

# INTERNAL DIGITAL TOOLS

Operations		Planning	<input checked="" type="checkbox"/> Primavera <input checked="" type="checkbox"/> MS project <input checked="" type="checkbox"/> Synchro
		2D Drawings	<input checked="" type="checkbox"/> Autocad
		3D Modeling	<input checked="" type="checkbox"/> Revit, Sketchup
		BIM Coordination	<input checked="" type="checkbox"/> Navisworks <input checked="" type="checkbox"/> Enscape <input checked="" type="checkbox"/> Dalux
		Common Data Environment	<input checked="" type="checkbox"/> Dalux <input checked="" type="checkbox"/> Novade <input checked="" type="checkbox"/> SharePoint
		360° Viewer / Geo-tagging of photos	<input checked="" type="checkbox"/> Dalux
		Lean working methods	<input checked="" type="checkbox"/> Ubikey <input checked="" type="checkbox"/> Obeya
		Power consumption management	<input checked="" type="checkbox"/> SmartImpulse
		External communication platform	<input checked="" type="checkbox"/> WhatsApp



## Corporate & Administration

	Finance	<input checked="" type="checkbox"/> SAP / Edifice
	HR Management / Payroll	<input checked="" type="checkbox"/> Global HR <input checked="" type="checkbox"/> Unit4 HRIS
	Purchasing	<input checked="" type="checkbox"/> Pablo <input checked="" type="checkbox"/> HAPlus <input checked="" type="checkbox"/> SAP
	Sub-contractors Payment management	<input checked="" type="checkbox"/> SAP / Edifice
	Expense Claim	<input checked="" type="checkbox"/> Concur

Data		Reporting needs	PowerBI
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\*\*\* Currently used in Singapore

# INTERNAL DIGITAL TOOLS

Operations		BIM Coordination	<input checked="" type="checkbox"/> Navisworks <input checked="" type="checkbox"/> Enscape <input checked="" type="checkbox"/> Dalux
		Common Data Environment	<input checked="" type="checkbox"/> Dalux <input checked="" type="checkbox"/> Novade <input checked="" type="checkbox"/> SharePoint
		360° Viewer / Geo-tagging of photos	<input checked="" type="checkbox"/> Dalux



# Implementation of Site Management Platform

- Dalux



2



# Dalux at a Glance

- An **all-in-one BIM Software** that is user friendly and available on any device at site
- A cloud-based system that provides a **single platform for real-time communication** and **collaboration** between stakeholders, ensuring that everyone has access to the latest information and updates.
- Off-line application: pre-downloaded updated information in the app

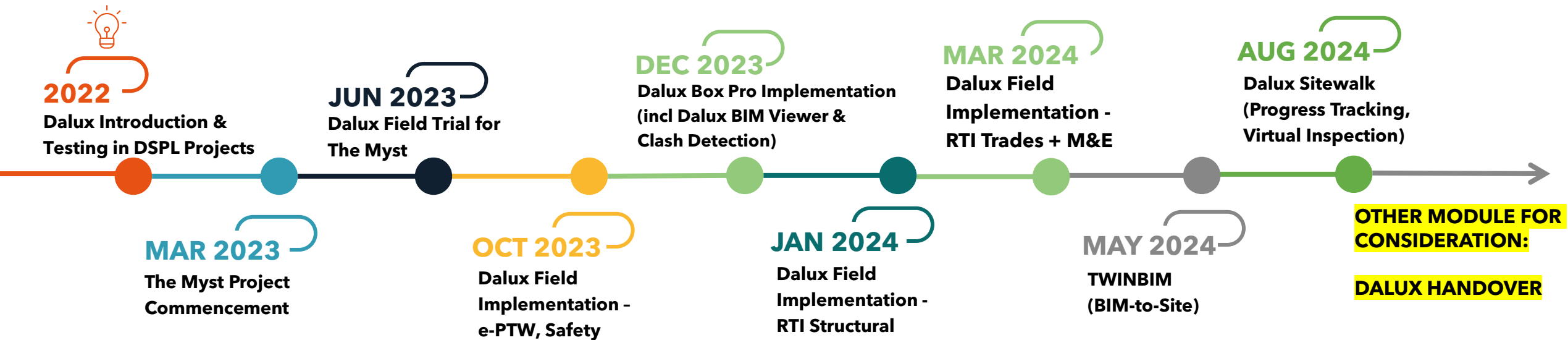
- **Design and Engineering Data (BIM Model)**



- **Site Progress and Milestone Data**
- **Quality Control and Inspection Data**

**\*\*Environmental Impact & Sustainability Data – SmartImpulse + PowerBI**

# Dalux Implementation Timeline @ The Myst



\*\*\* Resource Development, Trial & Staff Training in between

# Overview of Processes

How did we start? 3 simple steps

THE MYST (Field+Box)

THE MYST (Field+Box)

DSPL ADMIN

DSPL ADMIN

Back to project

Settings

Users

Locations

Field

Work packages

Box

Owners Portal

Project setup

Settings

Help

+ Add work package

Show details

Print

Creates

Responds

> [EHS] Permit to Work (PTW) - CSCG, CSC

> [EHS] Permit to Work (PTW) - CWP, CWP Precast

> Hold point checklists

[S] WPTW General Works

[S] WPTW HOT WORK

[S] WPTW WAH >2m

▶ PART I. APPLICATION DETAILS: Applicant (Su...

FIELD - C&S - CWP

▶ PART II.a PERMIT VERIFICATION (By: Enginee...

FIELD - C&S - DSPL Engineer (PTW)

▶ PART II.b PERMIT EVALUATION (By: Safety As...

FIELD - DSPL Safety

▶ PART III. PERMIT APPROVAL (Only by Authori...

FIELD - C&S - DSPL Authorized Manager

▶ PART IV.a PERMIT VALIDITY ON MONDAY (BY...

FIELD - C&S - CWP

▶ Daily Checklist Review - Monday (By Safety A...

FIELD - DSPL Safety

▶ PART IV.b PERMIT VALIDITY ON TUESDAY (BY...

FIELD - C&S - CWP

▶ Daily Checklist Review - Tuesday (By Safety A...

FIELD - DSPL Safety

▶ PART IV.c PERMIT VALIDITY ON WEDNESDAY ...

FIELD - C&S - CWP

▶ Daily Checklist Review - Wednesday (By Safet...

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FIELD - DSPL Safety

▶ PART IV.c PERMIT VALIDITY ON WEDNESDAY ...

FIELD - C&S - CWP

▶ Daily Checklist Review - Wednesday (By Safet...

Workflows set-up in Dalux Field

Search

Search

Prefix	Version
CRF-TRIAL	0.4
MPR	0.3
PTRA-TRIAL	0.7
PTRA-TRIAL WORKER	0.3
DWAH	0.4
EXC	0.4
COL	0.3
HTP	0.3
I&MR	0.2
LIFTING	0.3
P&E (30)-	0.6
P&E (29.1)-	0.5
P&E (29.2)-	0.2
P&E (29.3)-	0.5
PIR	0.2
QPA	0.2
SV	0.3
SIR	0.2
SP	0.2
SIR	0.2
STOP & GO	0.14

QES Forms /  
Hold Point Checklist

Strategic Digitalization for Smarter Project Management

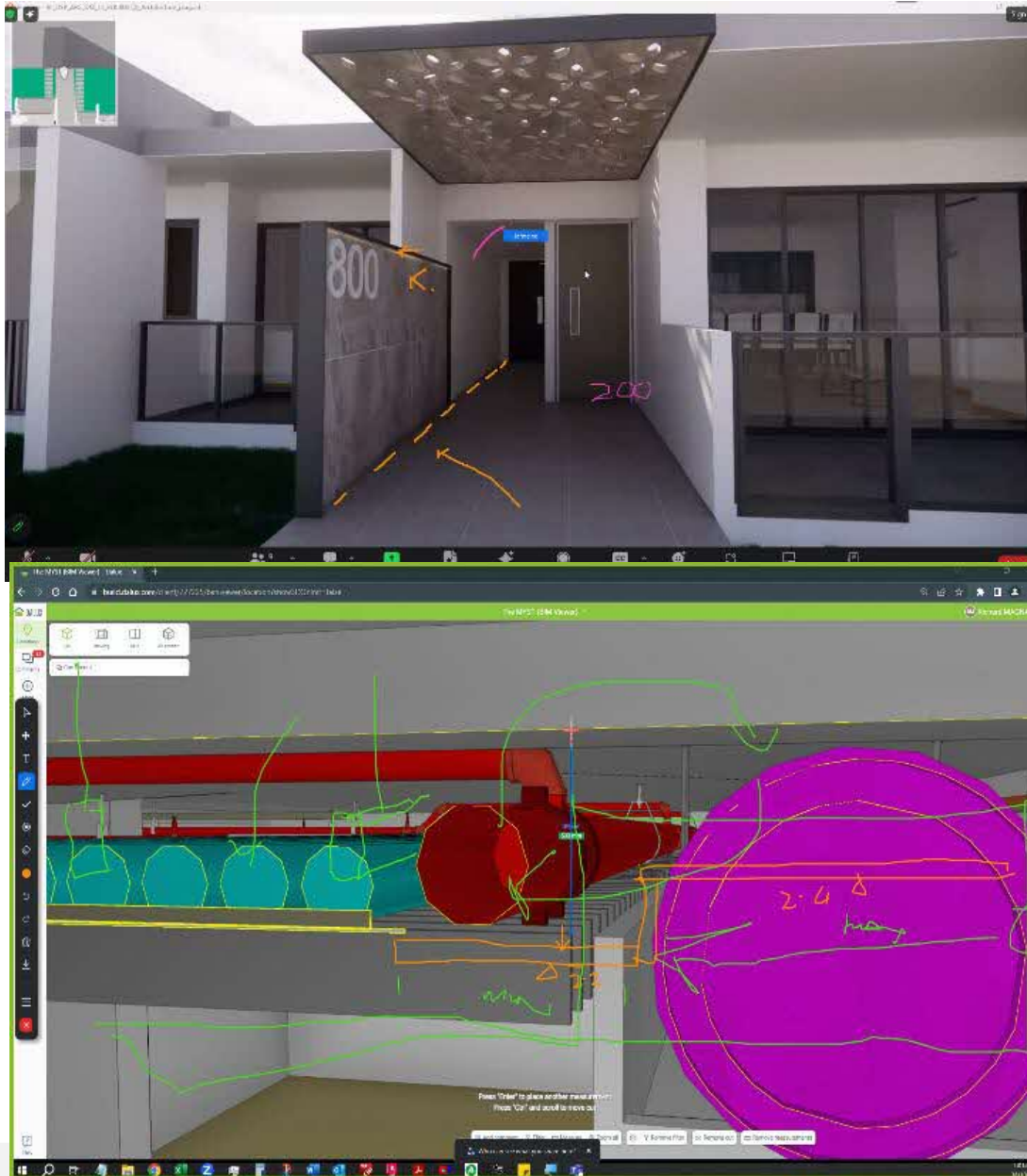
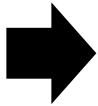
# DALUX INTEGRATION – DESIGN & ENGINEERING DATA

## Design Intent

Autocad  
dwg+  
PDF files

## 3D Models

Revit  
2023



## Coordination

### Enscape

#### ICE (Integrated Concurrent Engineering)

- Big Room
- Review of Virtual Mock-up
- Physical or virtual (Zoom / Teams) attendance
- Comment issues and on the spot
- Design Freeze

## Clash Detection

### Dalux

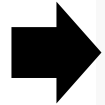
- Revised model uploaded in Dalux
- Coordination with all parties



# DALUX INTEGRATION – DESIGN & ENGINEERING DATA

## Documentation

### Box



- RFI (Request for Information)
- RFC (Request for Clarification)

# DALUX INTEGRATION – DESIGN & ENGINEERING DATA

## Documentation Box

✓ Complete review    ✓ Complete remaining reviews

Submittals > 01ARC200 SD\_UNIT WALL SETTING OUT PLAN > 01ARC200\_Block 800 Unit Wall Setting Out In review

Submit files  
Project planning manager

Review  
BOX PRO - ADDP; BOX PRO - CONSULTANT (ID) - SUJ...

Approve  
Project planning manager

**Files** 9

- BT\_DSP\_A+\_SD\_TS\_++\_257\_.pdf.pdf  
Unit Type C2 (2nd to 23rd Storey)
- BT\_DSP\_A+\_SD\_TS\_++\_261\_.pdf.pdf  
Unit Type C1 (2nd to 23rd Storey)
- BT\_DSP\_A+\_SD\_TS\_++\_269\_.pdf.pdf  
Unit Type C4/5a (2nd to 23rd Storey)
- BT\_DSP\_A+\_SD\_TS\_++\_273\_.pdf.pdf  
Unit Type C2 (2nd to 23rd Storey)
- BT\_DSP\_A+\_SD\_TS\_++\_277\_.pdf.pdf  
Unit Type B1 (2nd to 23rd Storey)
- BT\_DSP\_A+\_SD\_TS\_++\_281\_.pdf.pdf  
Unit Type B1a (2nd to 23rd Storey)
- BT\_DSP\_A+\_SD\_TS\_++\_285\_.pdf.pdf  
Unit Type C3/4 (2nd to 23rd Storey)
- BT\_DSP\_A+\_SD\_TS\_++\_289\_.pdf.pdf  
Unit Type B33(M) (2nd to 23rd Storey)
- BT\_DSP\_A+\_SD\_TS\_01\_260\_.pdf.pdf  
Unit Type B2(g) (1st Storey)

**Information**

Review deadline Apr 16 2024

Submission dead... Mar 25 2024

Spec. section

Description Unit Wall Setting Out for Block 800 Revision A

Spec. subsection

Package 01ARC200 - SD\_UNIT WALL SETTING OUT PLAN

Target folder Files\01 - ARCHITECT...

**Attachments** 9

- BT\_DSP\_A+\_SD\_TS\_++\_277\_.dwg.dwg
- BT\_DSP\_A+\_SD\_TS\_++\_281\_.dwg.dwg
- BT\_DSP\_A+\_SD\_TS\_++\_285\_.dwg.dwg
- BT\_DSP\_A+\_SD\_TS\_01\_260\_.dwg.dwg
- BT\_DSP\_A+\_SD\_TS\_++\_289\_.dwg.dwg
- BT\_DSP\_A+\_SD\_TS\_++\_257\_.dwg.dwg

**History**

- ✓ Submittal submitted and sent to review  
LOURDES GARCES, 2 days ago
- 9 files uploaded  
LOURDES GARCES, 2 days ago
- ▶ Sent to submitter  
LOURDES GARCES, 2 days ago
- + Submittal created  
LOURDES GARCES, 2 days ago  
01ARC200\_Block 800 Unit Wall Settl...

## Working / Shop Drawing Review

- Reviewer notified thru e-mail with clickable link of the workflow
- Cad File
- PDF
- BIM Model

## OFFICE



**DALUX BOX**

**Design & Engineering  
Data**



## SITE



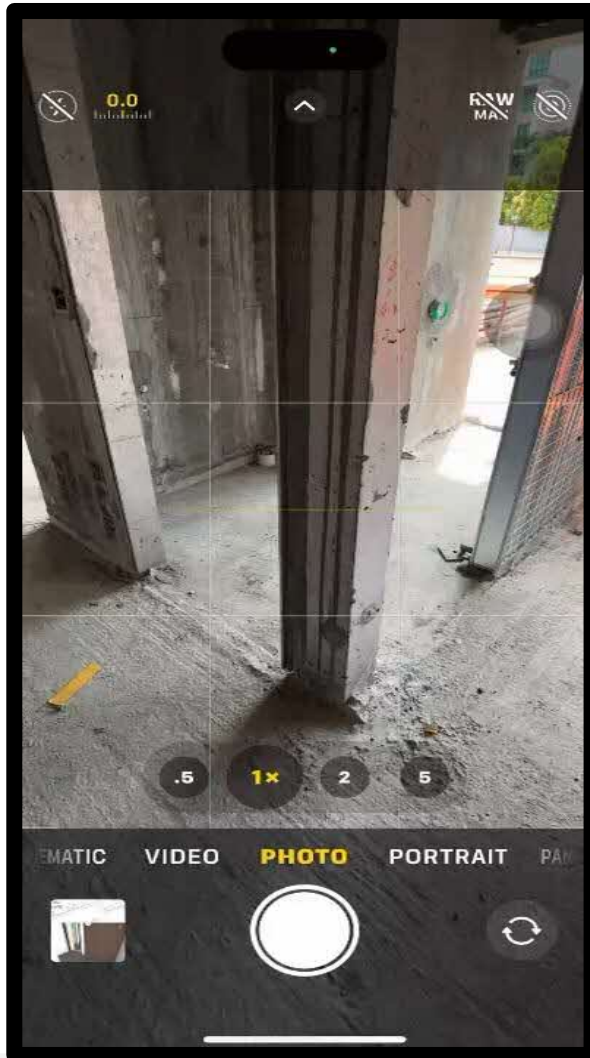
**DALUX FIELD**

**Site Progress and  
Milestone Data  
Quality Control and  
Inspection Data**

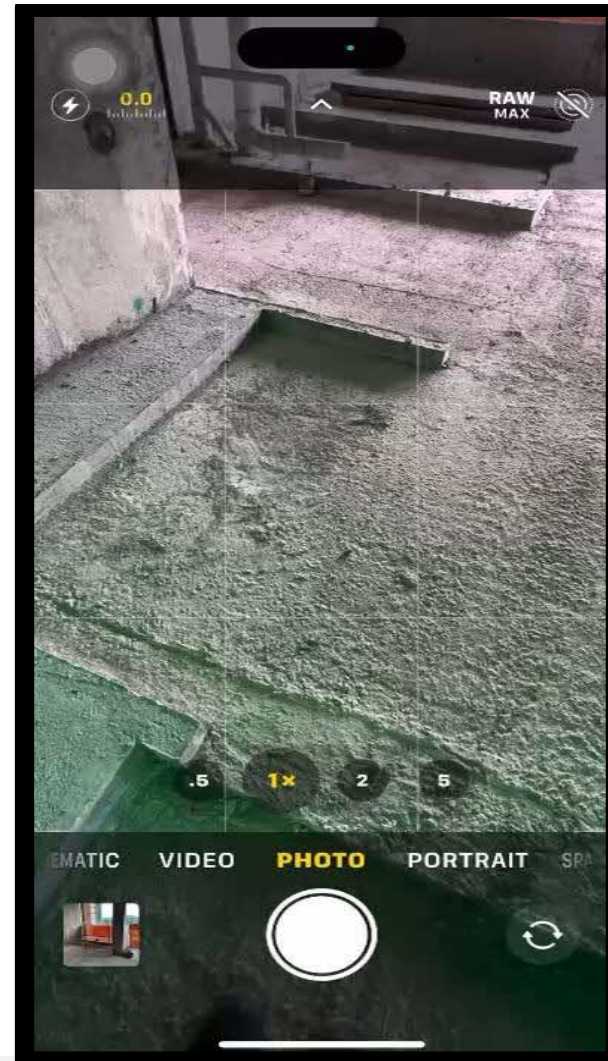
# DALUX TWINBIM

The Augmented Reality (AR) feature where a model can be shown as an overlay on the real on-site location.  
No set-up required and feature is always activated in mobile application

## Assigning Task in real time



## Visualization of future works



## Site Casting vs Drawing





# DALUX SITEWALK (PROGRESS REPORTING / VISUAL INSPECTION)

## REALITY CAPTURE & PROGRESS | SITEWALK

### Visual Inspection

- ✓ Construction progressive reporting available for off-site staff
- ✓ Raise non-conformities reports / issues directly on the photos.





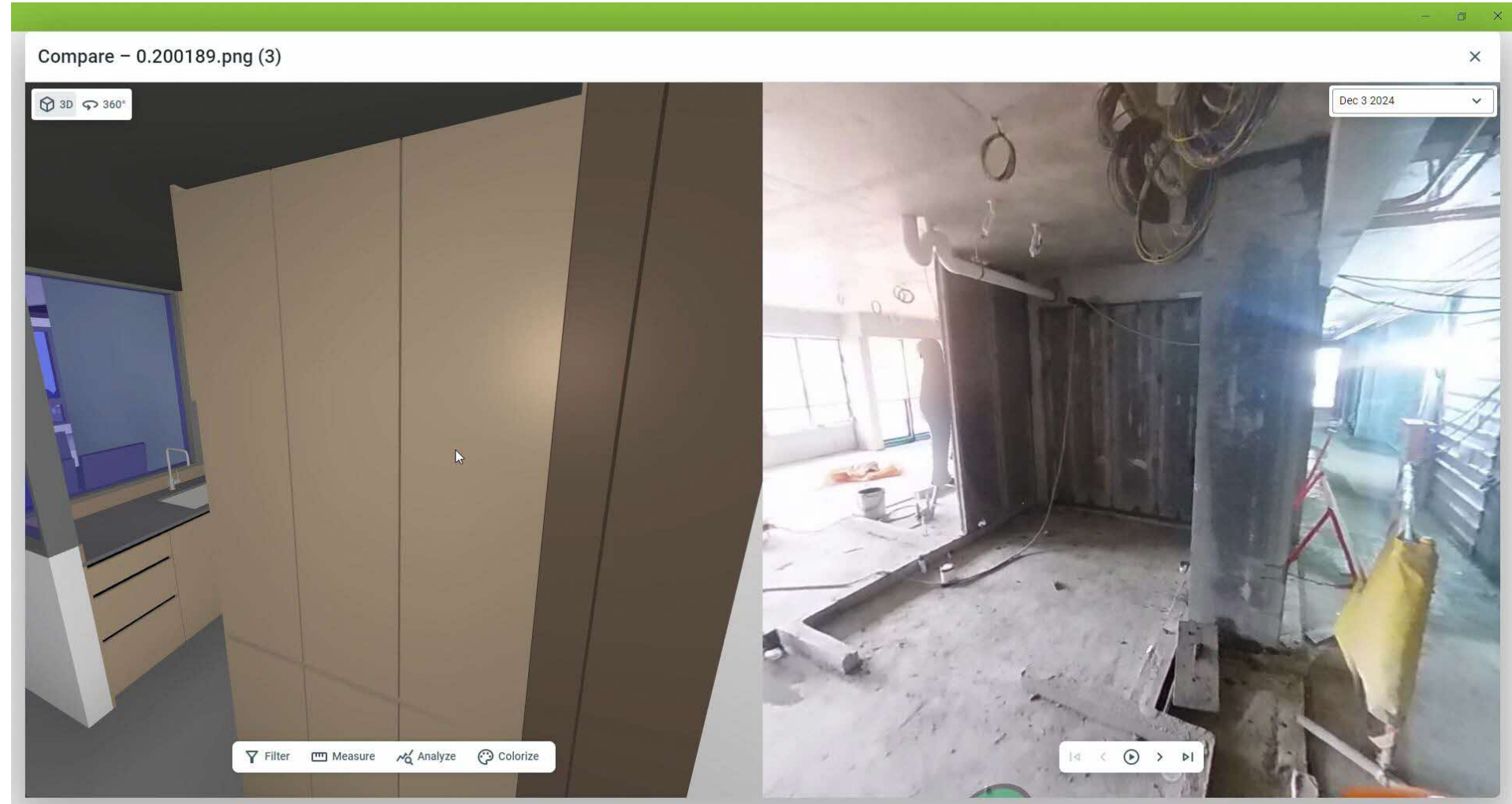
# DALUX SITEWALK (SITE TO BIM)

## REALITY CAPTURE & PROGRESS | SITEWALK

### Visual Inspection

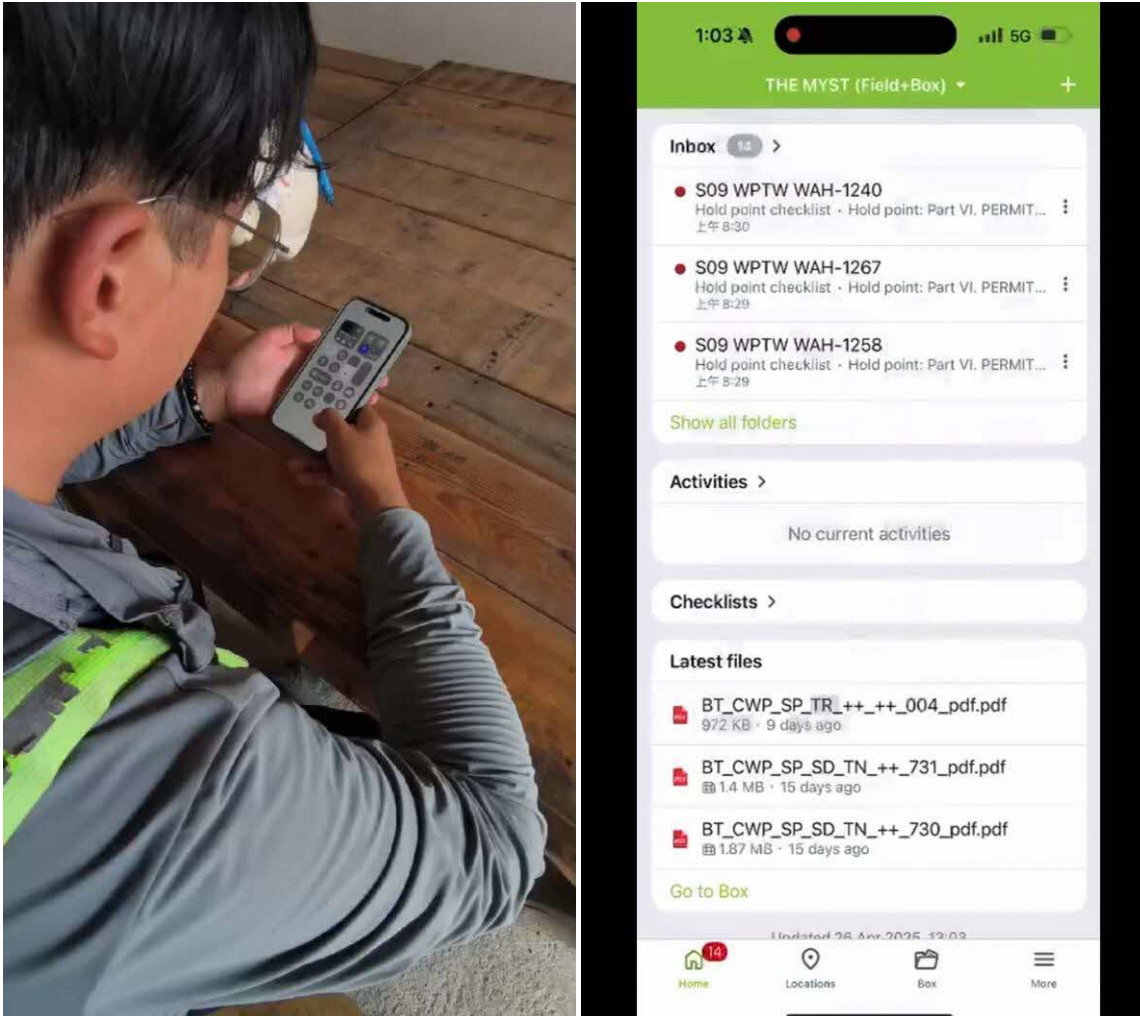
✓ Highlight any potential discrepancies, and ensure construction is progressing in line with the design.

- Hide
- Continuous Sectioning
- Measure (length, area, height) +- 2mm
- Colorize

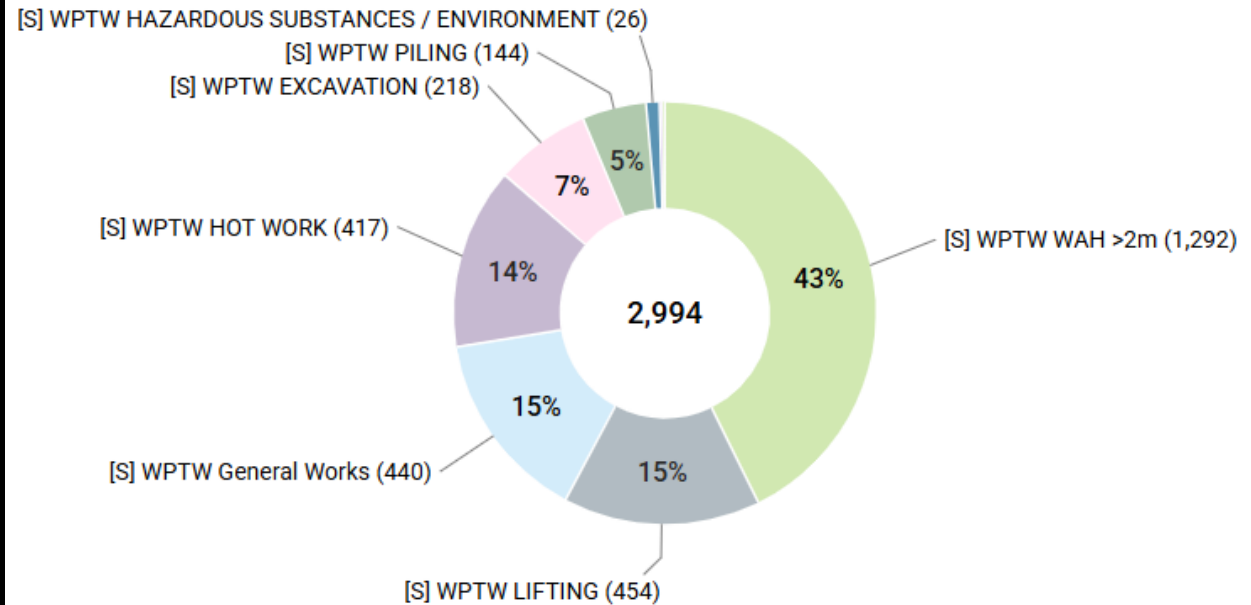


# WORKPLACE SAFETY – e-PTW

- ✓ **Digital Forms** created for Permit to Work where Hold Points are mandatory verification steps that must be approved for the form to continue to the next step
- ✓ Submission can be done via mobile application



## Types of Permit to Work and Visualization for tracking



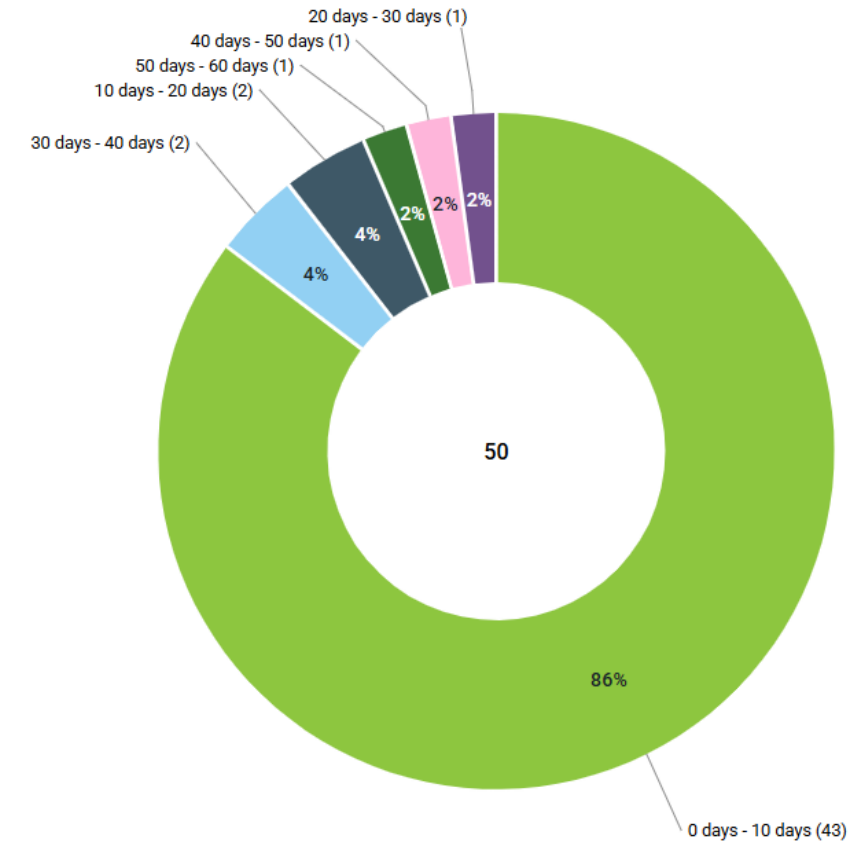
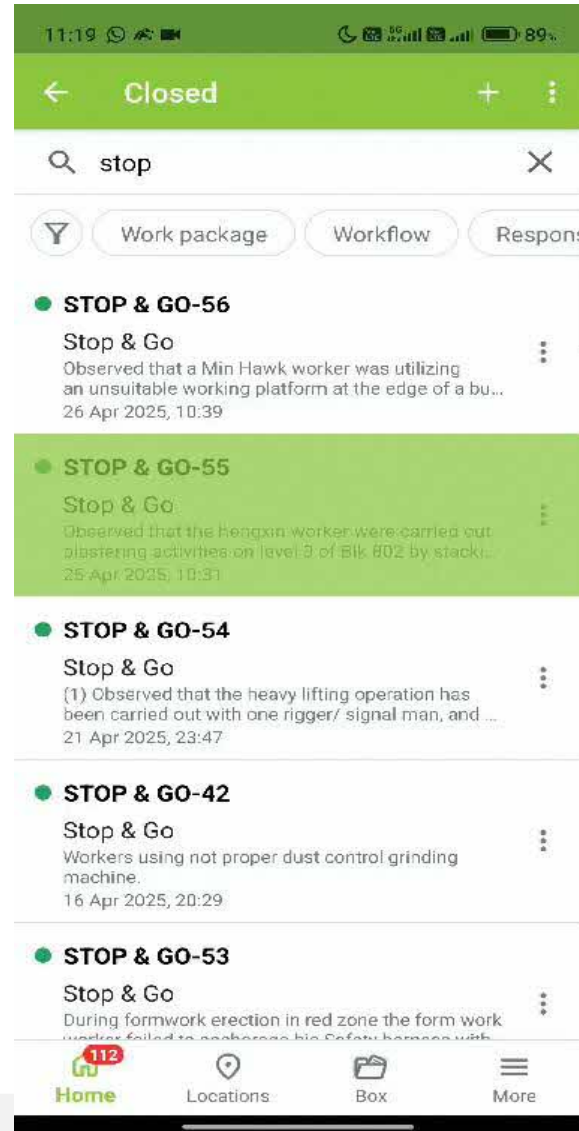
# WORKPLACE SAFETY – STOP & GO

## STOP

- Procedure to prevent the occurrence of any potential injury or incident by formally stopping a task or activity immediately upon detection of a major risk during its execution or operation

## GO

- Come out of safe work procedure immediately to address the issue
- Validated by Safety Officer, PM (PD for serious issue and the person involve.

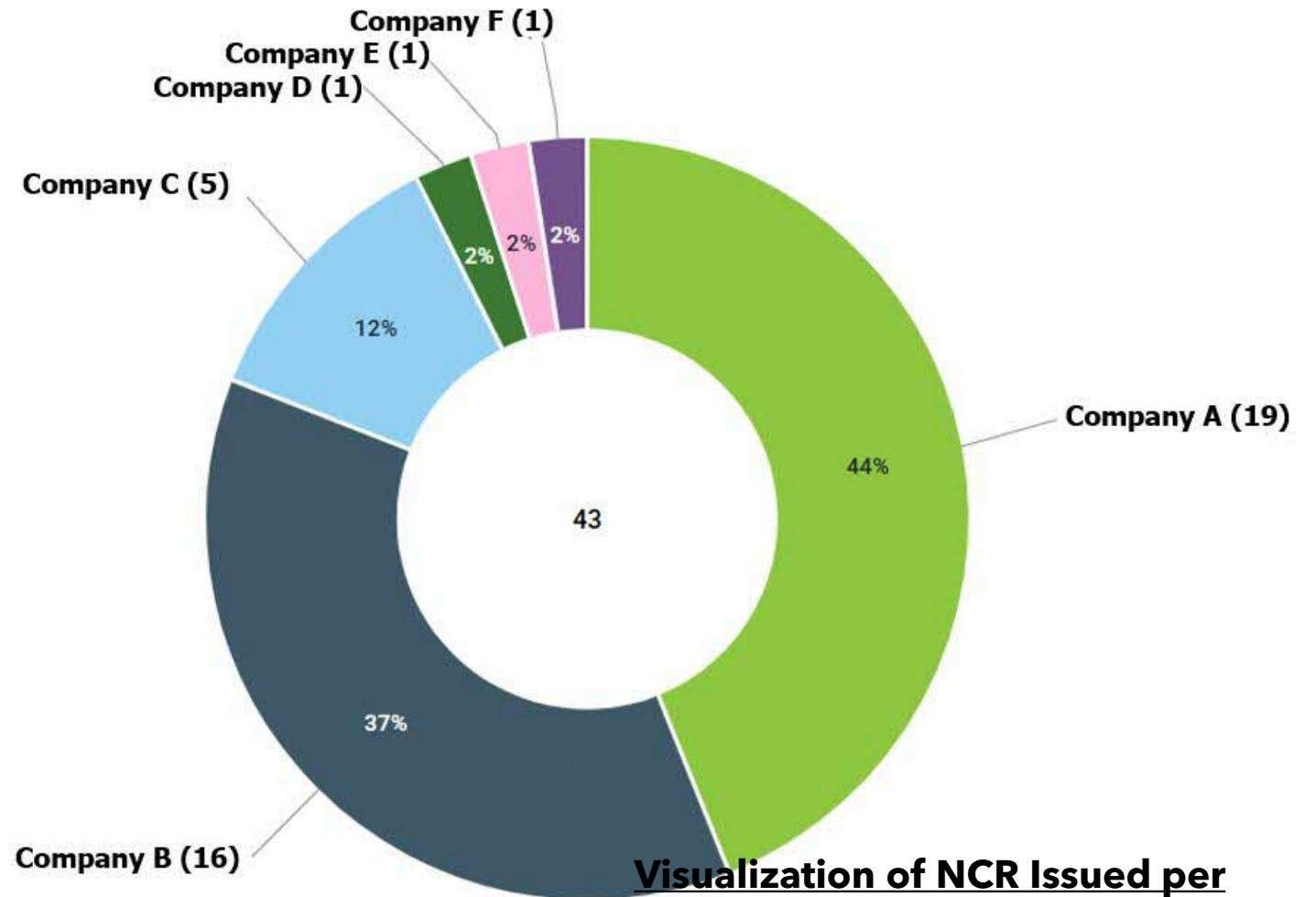


**Issued Stop & Go with their Resolution time**

# QUALITY INSPECTION & CHECKLISTS

## TASKS | NON-CONFORMANCE REPORT (NCR)

- ✓ “Assign” option will send automatic notification via email to responsible person. Historical changes and actions is also recorded.
- ✓ Types of Non-Conformance
  - Quality – Test Results outside boundaries of acceptance criteria & Installation not in accordance with drawings & specs
  - Environmental – Pollution, breach in law & regulations and Protection measures not fulfilled
  - Safety – Infringements on HSE



**Visualization of NCR Issued per Responsible Company**

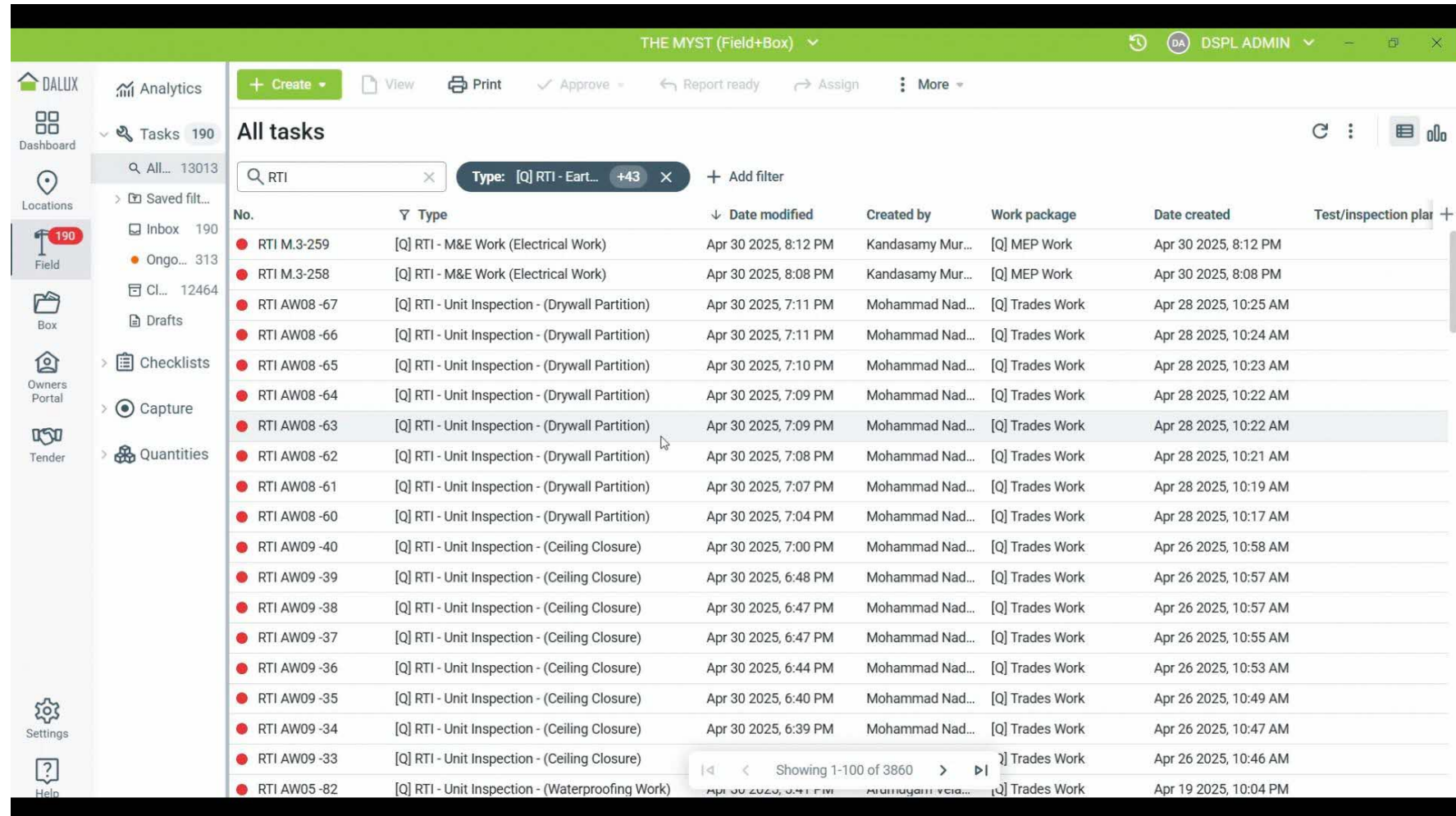


# QUALITY INSPECTION & CHECKLISTS

## REQUEST TO INSPECT

- ✓ Notification
  - Mobile app
  - E-mail
- ✓ RTI's linkable to the 3D or 2D elements on the Model.
- ✓ Reduced hardcopies significantly
- ✓ Type of Trades
- ✓ Issued to Project Partners

### RTI Interactive Visual and customizable filtering for monitoring



THE MYST (Field+Box) | DSPL ADMIN

+ Create | View | Print | Approve | Report ready | Assign | More

All tasks

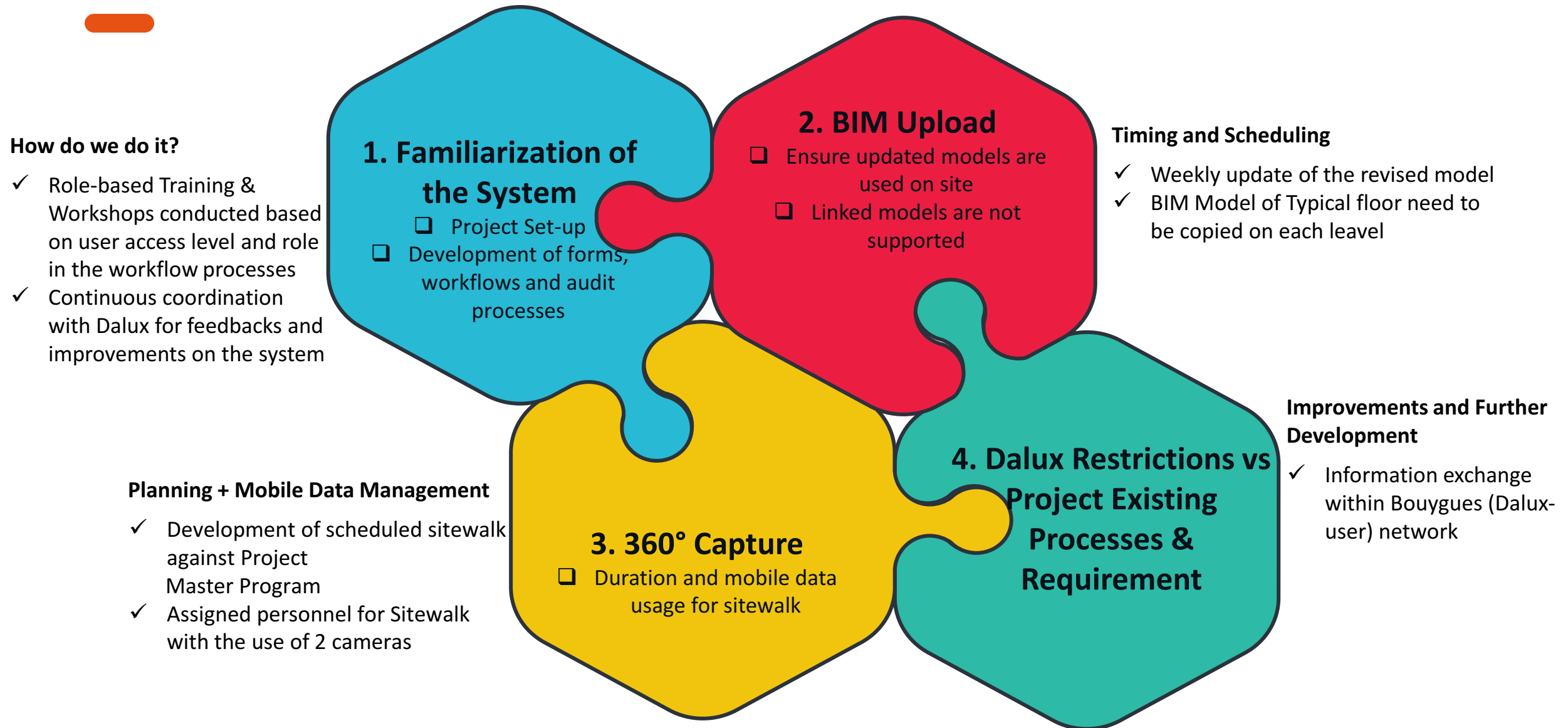
Search: RTI | Type: [Q] RTI - Eart... +43 | Add filter

No.	Type	Date modified	Created by	Work package	Date created	Test/inspection plan
RTI M.3-259	[Q] RTI - M&E Work (Electrical Work)	Apr 30 2025, 8:12 PM	Kandasamy Mur...	[Q] MEP Work	Apr 30 2025, 8:12 PM	
RTI M.3-258	[Q] RTI - M&E Work (Electrical Work)	Apr 30 2025, 8:08 PM	Kandasamy Mur...	[Q] MEP Work	Apr 30 2025, 8:08 PM	
RTI AW08 -67	[Q] RTI - Unit Inspection - (Drywall Partition)	Apr 30 2025, 7:11 PM	Mohammad Nad...	[Q] Trades Work	Apr 28 2025, 10:25 AM	
RTI AW08 -66	[Q] RTI - Unit Inspection - (Drywall Partition)	Apr 30 2025, 7:11 PM	Mohammad Nad...	[Q] Trades Work	Apr 28 2025, 10:24 AM	
RTI AW08 -65	[Q] RTI - Unit Inspection - (Drywall Partition)	Apr 30 2025, 7:10 PM	Mohammad Nad...	[Q] Trades Work	Apr 28 2025, 10:23 AM	
RTI AW08 -64	[Q] RTI - Unit Inspection - (Drywall Partition)	Apr 30 2025, 7:09 PM	Mohammad Nad...	[Q] Trades Work	Apr 28 2025, 10:22 AM	
RTI AW08 -63	[Q] RTI - Unit Inspection - (Drywall Partition)	Apr 30 2025, 7:09 PM	Mohammad Nad...	[Q] Trades Work	Apr 28 2025, 10:22 AM	
RTI AW08 -62	[Q] RTI - Unit Inspection - (Drywall Partition)	Apr 30 2025, 7:08 PM	Mohammad Nad...	[Q] Trades Work	Apr 28 2025, 10:21 AM	
RTI AW08 -61	[Q] RTI - Unit Inspection - (Drywall Partition)	Apr 30 2025, 7:07 PM	Mohammad Nad...	[Q] Trades Work	Apr 28 2025, 10:19 AM	
RTI AW08 -60	[Q] RTI - Unit Inspection - (Drywall Partition)	Apr 30 2025, 7:04 PM	Mohammad Nad...	[Q] Trades Work	Apr 28 2025, 10:17 AM	
RTI AW09 -40	[Q] RTI - Unit Inspection - (Ceiling Closure)	Apr 30 2025, 7:00 PM	Mohammad Nad...	[Q] Trades Work	Apr 26 2025, 10:58 AM	
RTI AW09 -39	[Q] RTI - Unit Inspection - (Ceiling Closure)	Apr 30 2025, 6:48 PM	Mohammad Nad...	[Q] Trades Work	Apr 26 2025, 10:57 AM	
RTI AW09 -38	[Q] RTI - Unit Inspection - (Ceiling Closure)	Apr 30 2025, 6:47 PM	Mohammad Nad...	[Q] Trades Work	Apr 26 2025, 10:57 AM	
RTI AW09 -37	[Q] RTI - Unit Inspection - (Ceiling Closure)	Apr 30 2025, 6:47 PM	Mohammad Nad...	[Q] Trades Work	Apr 26 2025, 10:55 AM	
RTI AW09 -36	[Q] RTI - Unit Inspection - (Ceiling Closure)	Apr 30 2025, 6:44 PM	Mohammad Nad...	[Q] Trades Work	Apr 26 2025, 10:53 AM	
RTI AW09 -35	[Q] RTI - Unit Inspection - (Ceiling Closure)	Apr 30 2025, 6:40 PM	Mohammad Nad...	[Q] Trades Work	Apr 26 2025, 10:49 AM	
RTI AW09 -34	[Q] RTI - Unit Inspection - (Ceiling Closure)	Apr 30 2025, 6:39 PM	Mohammad Nad...	[Q] Trades Work	Apr 26 2025, 10:47 AM	
RTI AW09 -33	[Q] RTI - Unit Inspection - (Ceiling Closure)			[Q] Trades Work	Apr 26 2025, 10:46 AM	
RTI AW05 -82	[Q] RTI - Unit Inspection - (Waterproofing Work)			[Q] Trades Work	Apr 19 2025, 10:04 PM	

Showing 1-100 of 3860



# CHALLENGES AND SOLUTION IN DALUX IMPLEMENTATION



# BCA Site Management Data Standards (Structural Safety)



3



# BCA Site Management Data Standards

## Structured Data Format Requirements to be kept in SMP

(A) Structured Data		Required (Compulsory datasets for project)
A1	QP/SS Attendance Record	B1
A2	Site Investigation Report	B2
A3	Pile Load Test	B3
A4	Piling Installation Record	B4
A5	Instrumentation and Monitoring	B5
A6	ERSS Annex C-1: Site Inspection and Approval Records	B6
A7	Annex D: Certification of Monitoring Building Settlement	B7
A8	Concrete Cube Test Results	B8
A9	Steel Strength Test Results	B9
A10	Generic Notification Module	B10
A11	Site Progress	
A12	MET Test Results (finger joint, delamination, bending, and shear test)	

Table 1: List of required data

\*Documents are issued by BCA and will be required to be kept on SMP for project's duration

Test Reports conducted by External Parties

- ☐ Instrumentation & Monitoring
- ☐ Concrete Cube Test Results
- ☐ Steel Strength Test Results
- ☐ Pile Load Test Report

❖ Lab Testers using their standard format

Records kept by Builder

- ☐ Site Investigation Report
- ☐ Piling Installation Record
- ☐ Site Progress
- ☐ ERSS Annex C-1: Site inspection & Approval Records (if applicable)

❖ Formats from Site Management Data Standards except ERSS Annex C-1

Records kept by RE / QP

- ☐ QP/SS Attendance Record
- ☐ Annex D : Certification of Monitoring Building Settlement

❖ Formats from Site Management Data Standards except ERSS Annex C-1

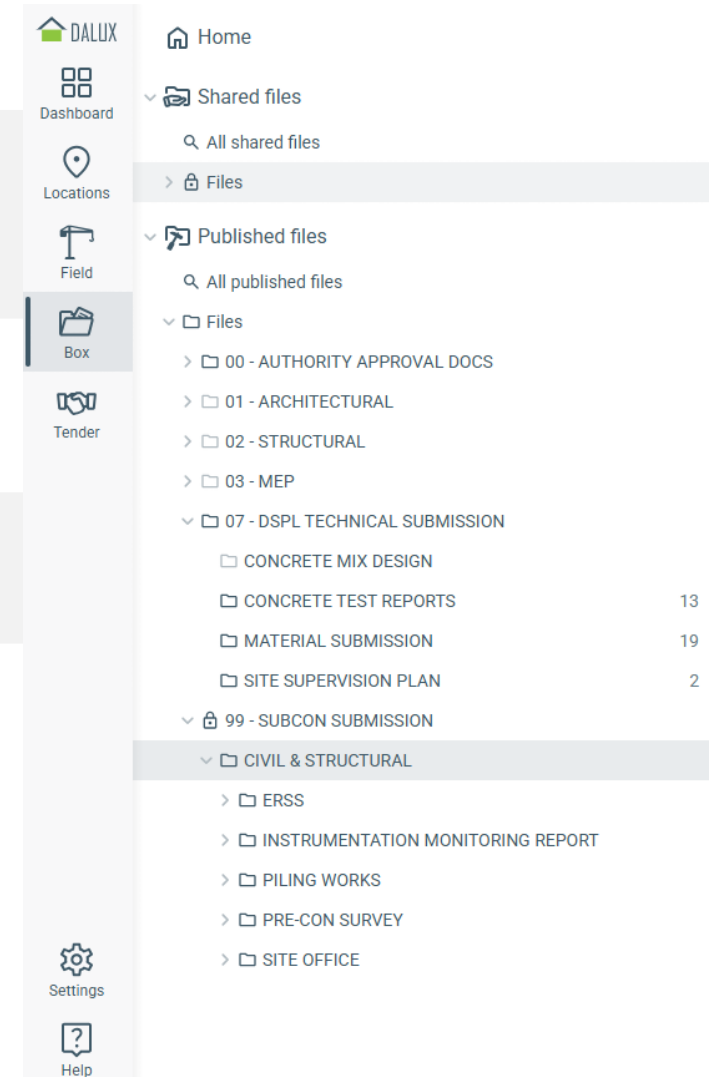
# BCA Workflow and Report Management

Structured Data Set  
Screensharing of  
Documents with  
RE/RTO based on  
requirements

- Web-based access given to BCA, QPs directly
- Dalux provided Foldering System shared to BCA Officer for checking / validation

Site Inspection by  
BCA Officer  
Conducted with RE  
& DSPL

Scheduling done after review of documents as above



# Future Plans and Innovation



4





# FUTURE PLANS FOR BETTER SITE MANAGEMENT CONTROL

## SITE ENVIRONMENTAL MANAGEMENT MONITORING



- 360° acoustic camera to identify the noise source and facilitate complaint investigation
- Alert from system can help proactively avoid potential nuisance

# THANK YOU

Contact  
Email  
Number

[www.bouygues-construction.com](http://www.bouygues-construction.com)

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