

All the Rumors Are True: How AR Transforms Construction Delivering 9x ROI

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XYZ Reality Founder & CEO |
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What will you learn today?

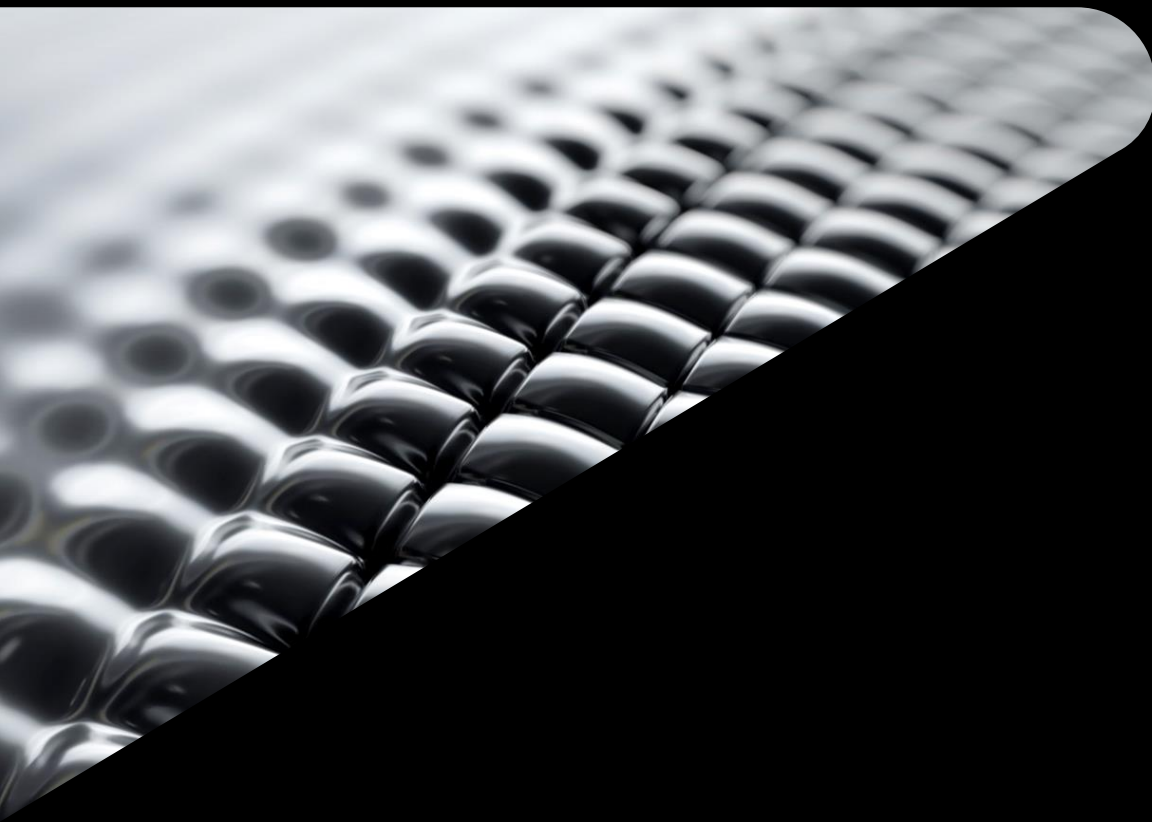
Learning objectives:

Discover current augmented reality for quality (ARQ) workflow processes and learn how to implement better practices.

Learn about overcoming the challenges of eliminating costly rework on complex mission-critical projects.

Learn about key strategies to reduce rework using advanced technology.

Discover the benefits of utilizing Autodesk with augmented reality to support the digitization of projects.



Who are we?

About the presenters



Coral Butler

Group Head of Digitally Enabled
Lean Project Delivery

Responsible for the delivery of
PM Group's Strategic Digital Plan 2025.

Specializes in ConTech and is a
BIM and digital expert. 20 years' experience
in the AEC Industry working on hyper scale
data centre and pharma projects.

Implemented major projects including
BIM 360 and Assemble, a **first-of-its-kind**
Augmented Reality (AR) service and
automated auditing of model content.





INTERNATIONAL

An international project delivery company operating across Europe, the USA and Asia.

More than
3,500

OUR PEOPLE

PM Group is an employee-owned company that manage the design, construction and commissioning of high-tech facilities.

49
years

EXPERTISE

Working for the world's leading pharma, food, data centre and medical technology companies.



PROVEN

An excellent track record in the advanced manufacturing and energy sectors.



David Mitchell

Founder & CEO,

Over 20 years in AEC industry,
previously a digital construction manager.

Worked on some of Europe's largest projects including: The Shard, Battersea power station and hyper-scale data centres.

Recognized for his innovation in construction, David is on a mission to eliminate rework and enable 3D building.



XYZTM

BUILD IT RIGHT, FIRST TIME



ON A MISSION

Eliminating rework with the world's most accurate Augmented Reality (AR) headset, the Atom.

66
Experts

GROWING TEAM

Leading experts from all over the world empower construction teams to build it right, first time.



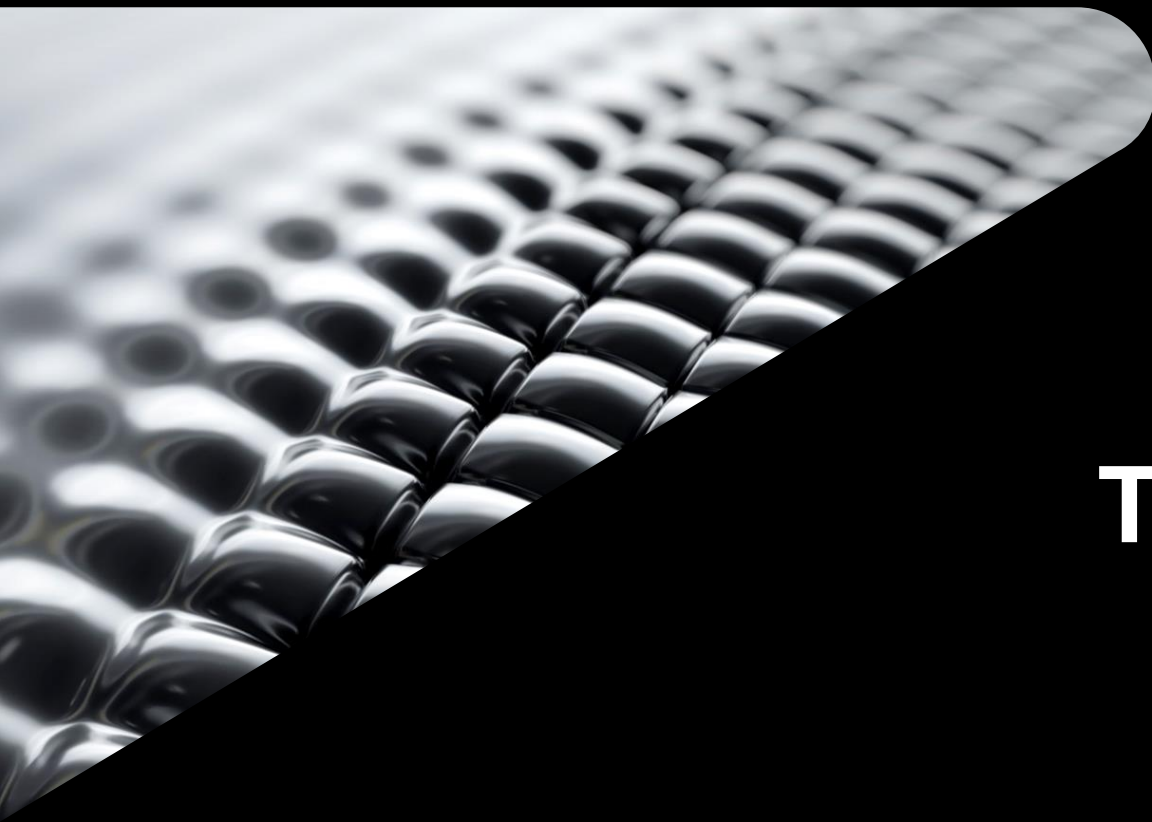
DEPLOYMENT

Deployed across the globe, XYZ is revolutionizing the industry, enabling proactive processes.



AWARDS

Multi award-winning company focused on making the lives of all construction workers easier



The Problem...

A Tale as Old as Time...



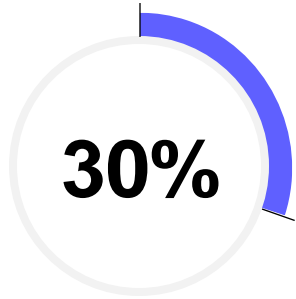
Journey

- Inconsistent translation of 3D design to actual construction
- No absolute root cause data that could be trusted as unpolluted
- Construction blaming design quality
- Design blaming lack of construction feedback at the right time.
- Impact on schedule due to rework in the field or redesign to accommodate field errors
- Impact on cost due to rework in the field or redesign to accommodate field errors
- Loss of confidence in project and delivery team.



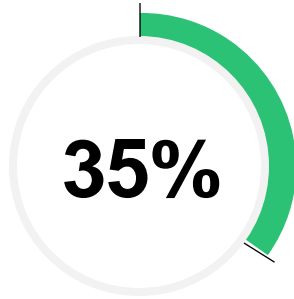
We realized
we are not alone!

The things this industry doesn't talk about...



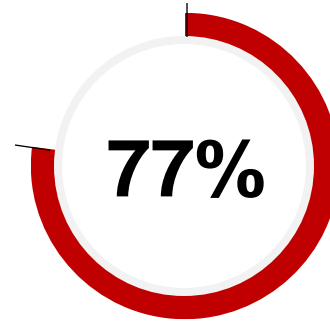
REWORK

A staggering 30% of construction activity is **actually rework**.



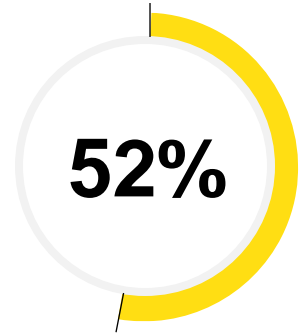
TIME

35% of people spend over **14 hours per week** looking for project information, conflict resolution, and dealing with mistakes.



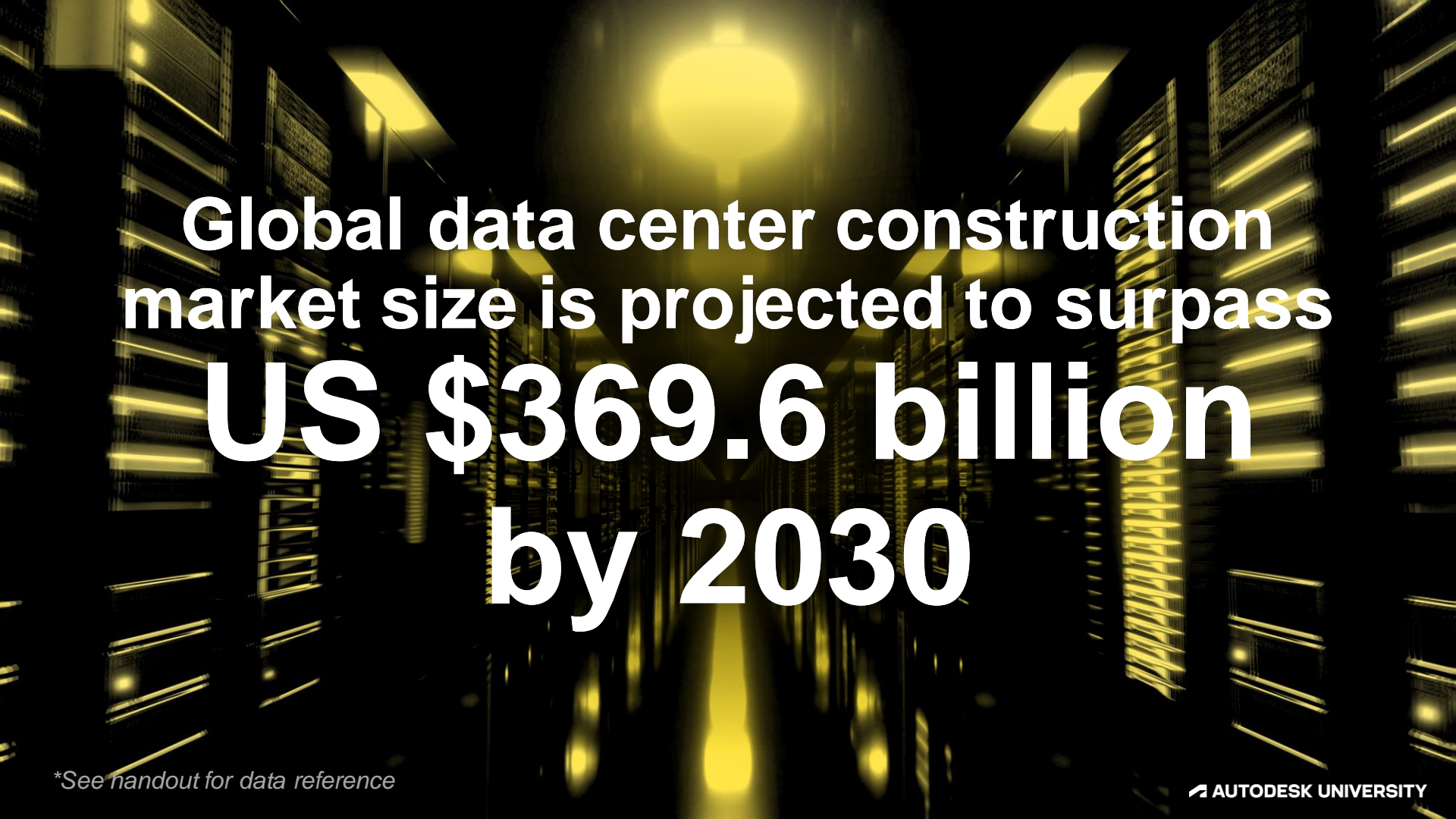
DELAYS

77% of megaprojects are **at least 40% late**.



COMMUNICATION

52% of rework takes place because of **poor project data and miscommunication**.



**Global data center construction
market size is projected to surpass
US \$369.6 billion
by 2030**

**See handout for data reference*

**Rework could cost the
data center industry
US \$23.9 billion
If change is not adopted.**

**See handout for data reference*

The hunt for a solution...

We tried Laser Scanning

We previously implemented laser scanning to **verify design**
vs. install to satisfy EOR requirements

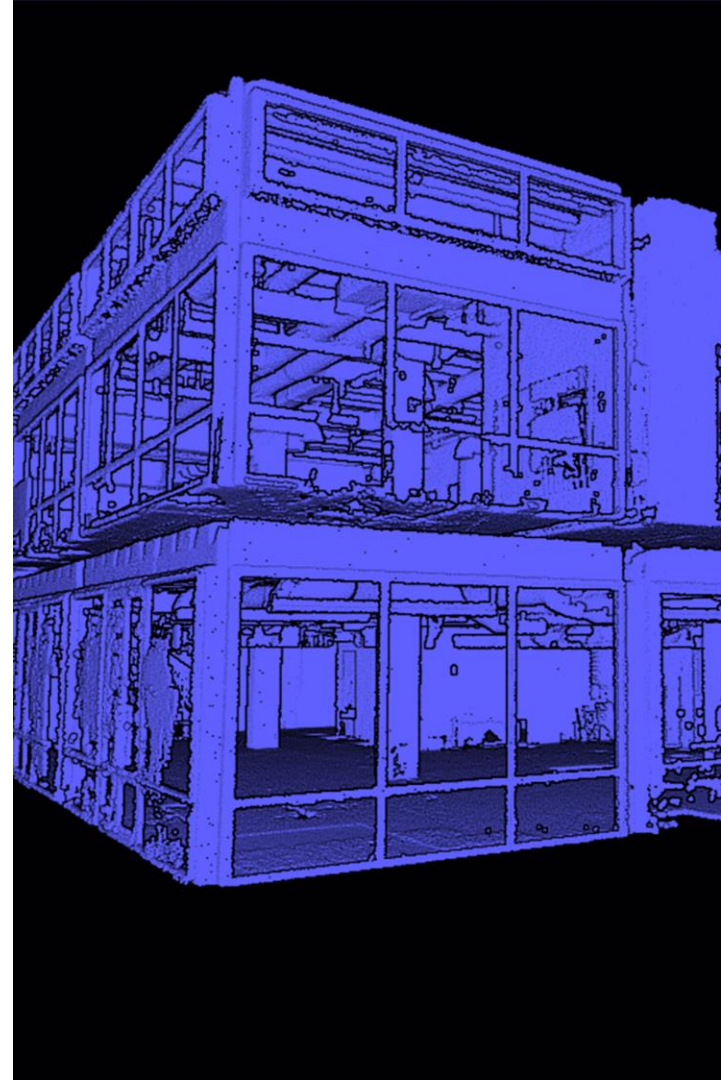
THE PROBLEM PM GROUP FACED WITH LASER SCANNING ON HYPER SCALE PROJECTS:

TOO LABOR
INTENSIVE

POINT CLOUD
MANAGEMENT

SURVEY NOISE
& AREA ACCESS

REACTIVE
PROCESS



What we need from technology

Managing huge data sets and models requires new technologies that allow us to be more **proactive**, **reduce rework** during construction and **improve communications** with the project team and clients.

We have the **expertise** and the **processes**, now **we need technology that is:**



Ultimately delivers value in schedule, quality, safety and turnover.



































AR was identified as the solution

Augmented Reality (AR) fulfils all our requirements, it enables:

- Ease of use
- Millimeter accurate real-time validation of works
- Quick, precise results
- Seamless integration with our Construction Management Platform – BIM 360
- Compliments our quality and safety process & ethos
- Proactive Process.

We looked at the market for AR solutions:

AR SOLUTION	SYSTEM	ACCURACY	MODEL SIZES	LOCATIONS	PROACTIVE?
 SpectAR	 Hololens II	20 - 50mm For every 1m	500MB (Hololens)	 Indoors Only* ²	 Proactive Reactive
 Trimble XR10	 Hololens II	20 - 50mm For every 2m	500MB (Hololens)	 Indoors Only* ²	 Proactive Reactive
 XYZ Reality	 ATOM	<5mm	16GB	 Indoors & Outdoors	 Proactive Reactive
 vGIS	 Hololens II Tablets	20 - 50mm For every 1m	500MB (Hololens) 500MB (Tablet)* ¹	 Outdoors Only	 Proactive Reactive

AR SOLUTION	SYSTEM	ACCURACY	MODEL SIZES	LOCATIONS	PROACTIVE?
 VisualLive	 Hololens II Tablets	20 - 50mm For every 1m	500MB (Hololens) 500MB (Tablet)* ¹	 Indoors Only* ²	 Proactive Reactive
 GAMMA AR	 Tablet	50+mm	500MB (Tablet)* ¹	 Indoors Only* ²	 Proactive Reactive
 Dalux TwinBIM	 Tablet	50+mm	500MB (Tablet)* ¹	 Indoors Only* ²	 Proactive Reactive
 Laser Scanners	 Laser Scanner	<10mm	N/A	 Indoors Only* ²	 Proactive Reactive



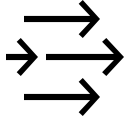
Introducing

ATOM



WHY THE ATOM?





Proactive, verified, assisted set out approach with trade partners



Quicker than traditional laser scanning methods.



High level of **accuracy** removes the need for constant laser scanning with significant cost and labor savings.

XYZ

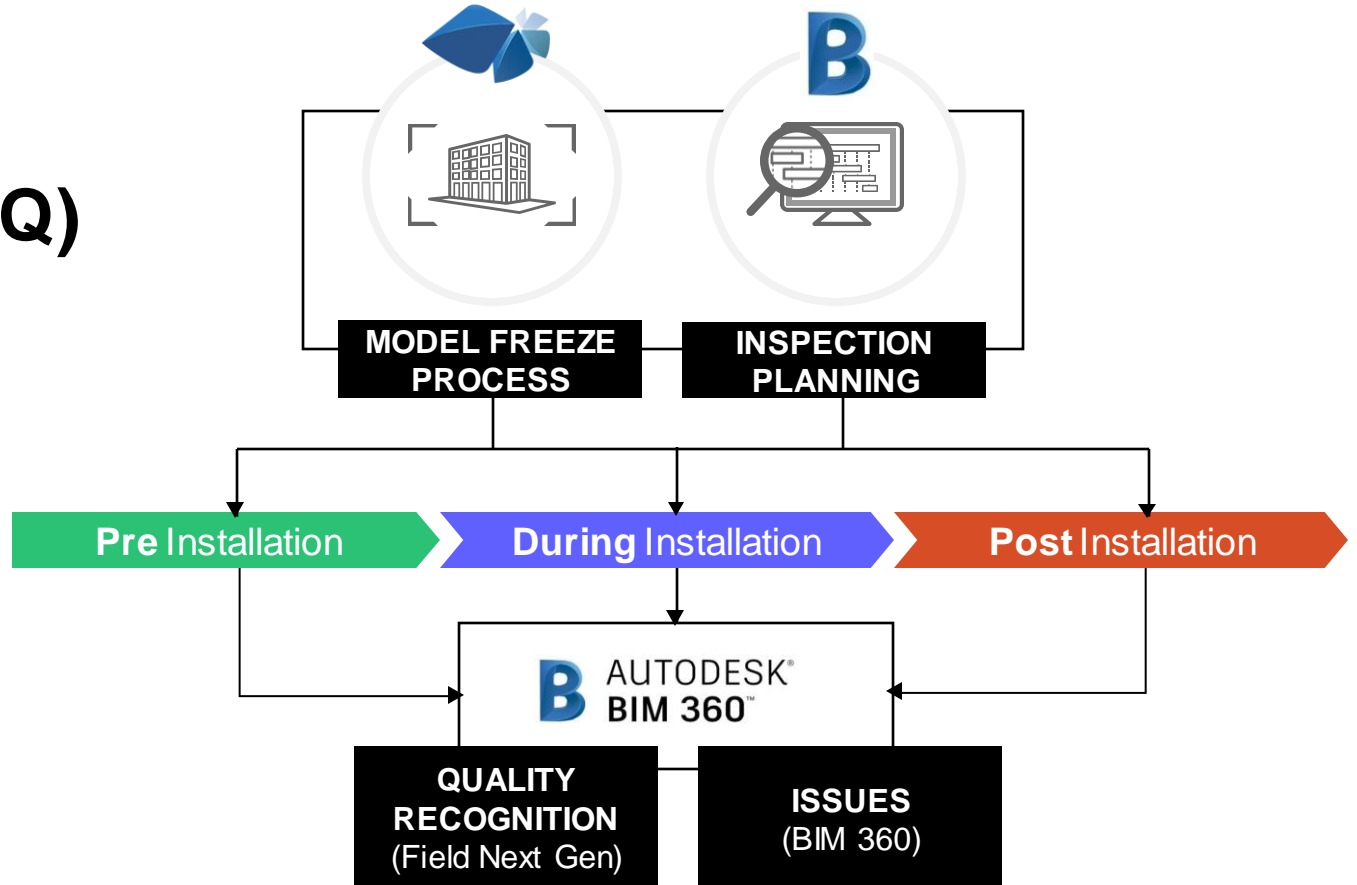




What happened in deployment?

Plugging new tech into our processes.

Augmented Reality for Quality (ARQ) workflow

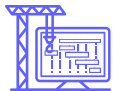


Seamless Integration

with BIM 360



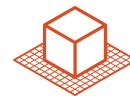
**CONTEXT OF MM
ACCURACY**



**WORKFLOW
MANAGEMENT**



**ON-SITE
VISIBILITY**



**FEDERATED
MODEL**



**ISSUE
MANAGEMENT**

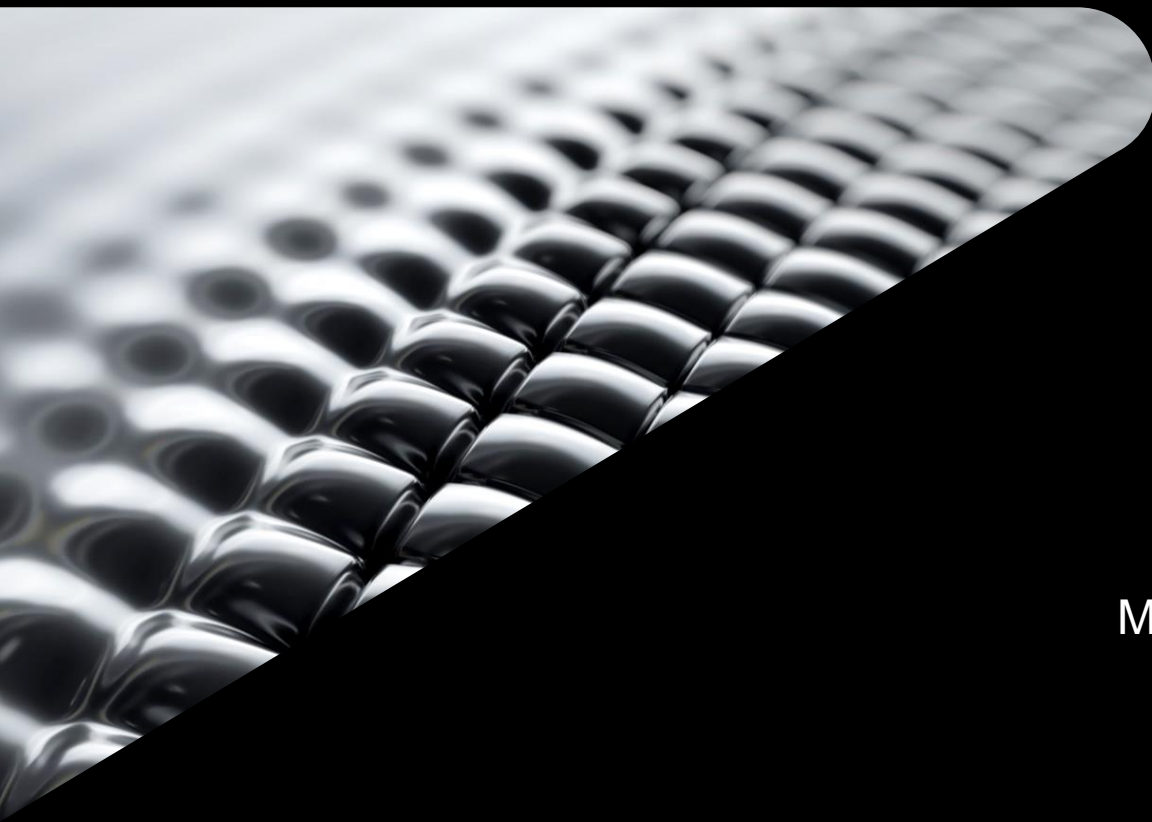


**INCREASED
PRODUCTIVITY**



**DYNAMIC
WORKING**





A data driven approach

Making informed project decisions

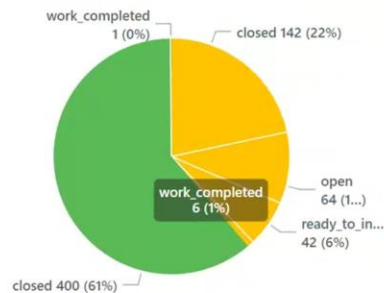
ARQ Summary

Selector



Validations vs Discrepancies

● Discrepancy ● Validation



61%

Surveys right at first time

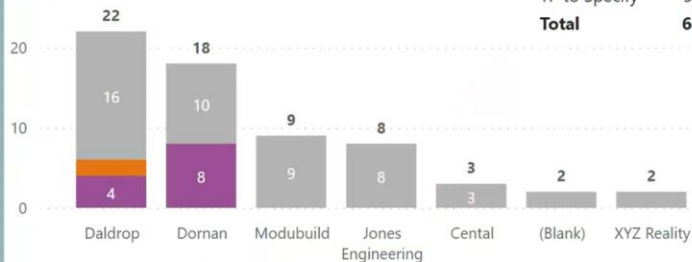
39%

TP work checked is found to have discrepancies

Open Discrepancies

Open Discrepancies Resolution by Company

● Model Update ● Rework ● TP to Specify



Model Update 12
Rework 2
TP to Specify 50
Total 64

Filters

Status

- ☐ closed
- ☐ open
- ☐ ready_to_inspect

Stage of Discovery

- ☐ (Blank)
- ☐ During Installation
- ☐ Post Installation

Contract Pack Lead

All

Takt Zone Lead

All

Location

All

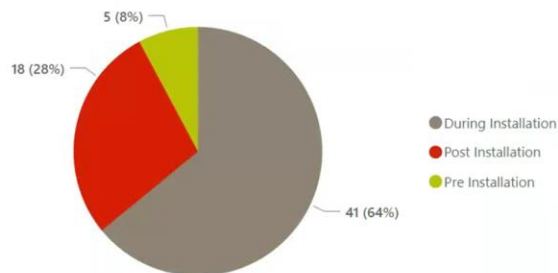
Takt Zone Lead

All

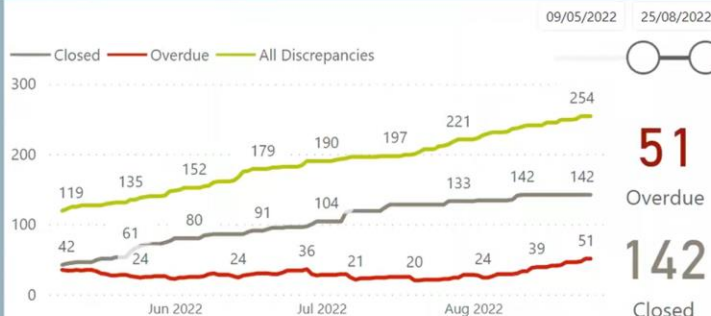
All

All

Discrepancies found at Stage of Inspection



Discrepancies Progress



51

Overdue

142

Closed

ARQ Summary

Selector

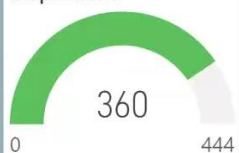


Inspections

360

COMPLETED

Completed/Total
Inspections



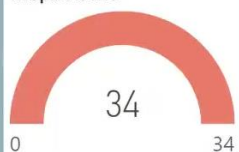
34

OVERDUE

(Blank)

SCHEDULED

Overdue/Scheduled
Inspections

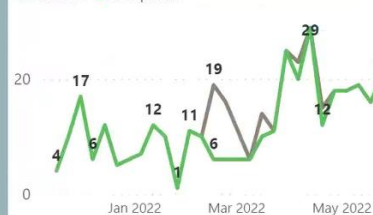


50

NOT SCHEDULED

Planned vs Completed Inspections

● Planned ● Completed



Inspections Location

TAKT Zone Completed Finish Date

500-0M-080	120	15/08/2022
500-00-030	38	16/12/2022
500-00-010	28	19/10/2022
500-00-110	27	13/10/2022
500-00-020	20	06/01/2022
500-0M-070	20	
500-00-100	15	09/11/2022
500-00-130	14	
500-00-050	10	24/08/2022
500-00-060	10	01/09/2022
500-0M-010	10	
500-0M-030	10	
500-0M-150	9	
500-0M-090	8	
Off-Site	6	
500-00-120	3	02/12/2022
500-00-140	3	09/09/2022
500-00-30	3	
500-00-040	2	10/11/2022
500-0M-020	1	
500-0M-060	1	

Total 360 06/01/2022

Discrepancies

254

DISCREPACIES

142

CLOSED

64

OPEN

42

READY TO REINSPECT

Open Discrepancies

Ground Floor - Open Discrep



First Floor - Open Discrepancies



Filters

Status

- ☐ closed
- ☐ open
- ☐ ready_to_inspect

Stage of Discovery

- ☐ (Blank)
- ☐ During Installation
- ☐ Post Installation

Contract Pack Lead

All

Takt Zone Lead

All

Location

All

Takt Zone Lead

All

All

All

This enables:

VISIBILITY

Greater visibility and transparency across teams (on-site and in office) of any errors/required rework.

STREAMLINED

Streamlined workflows – create, visualize and manage issues and tasks, and instantly assign them to project stakeholders in BIM 360.

INFORMATION

Superior information flow – remove the need for laser scanning which takes up to 2 weeks to get results, with AR get data in minutes and feed this back to teams.

PROACTIVE

Remove reactive approaches and enable **proactive processes**.

Build it right, first time

The emphasis on
Right First Time
no longer sits just with construction.
We are forcing the culture change all
the way back to Design.

Design Right First Time.
Build Right First Time.

As-Designed
=
Constructed

As-Designed
=
As-Built

Return on Investment



\$400m Mission critical project

**owner verified data*



SINCE FIRST DEPLOYMENT

489 EARLY ISSUES IDENTIFIED AND RECTIFIED



A NEW WAY OF WORKING

0 LASER SCANNING REQUIRED

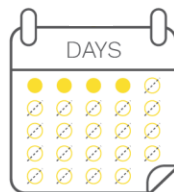
Validate in 3D throughout eliminating the need for scanning



NO DESIGN AS-BUILT OVERHEADS

3-6 MONTH REDUCTION

Built right, first time means Construction model = As-Built model!



PROJECTED SPEED UP OF PROJECT HANDOVER

20 DAYS SAVED

On project hand over

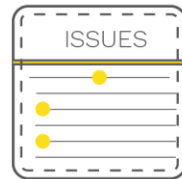
Return on Investment



\$150m Pharma project

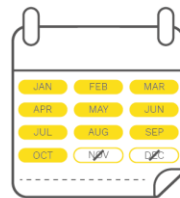


700 INSPECTIONS
IN PROJECT



SINCE DEPLOYMENT

273 ISSUES &
DISCREPANCY



1-2 MONTH
AS-BUILT
REDUCTION

Built right, first time!

**owner verified data*

What's next?

Be a part of the culture change.





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