INTERNATIONAL TOWER CRANES CONFERENCE & RECEPTION

Mohamed Abouelezz
WOLFFKRAN

Derek Bourke
BAM International

A digital approach for successful jobsites and tower cranes optimization

The buildings we create inspire us and reflect who we are as a society

-- unknown --

Burj Khalifa, Dubai, United Arab Emirates

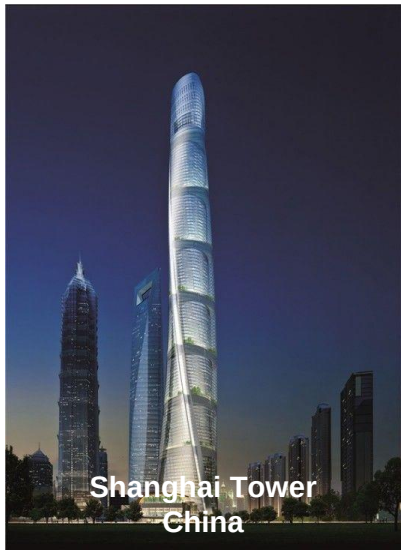
World Trade Center Bahrain

The Shard London, United Kingdom

ACROS, Fukuoka Japan

Bosco Verticale, Milan Italy

Mode Gakuen Cocoon Tower, Tokyo, Japan


Shanghai Tower China

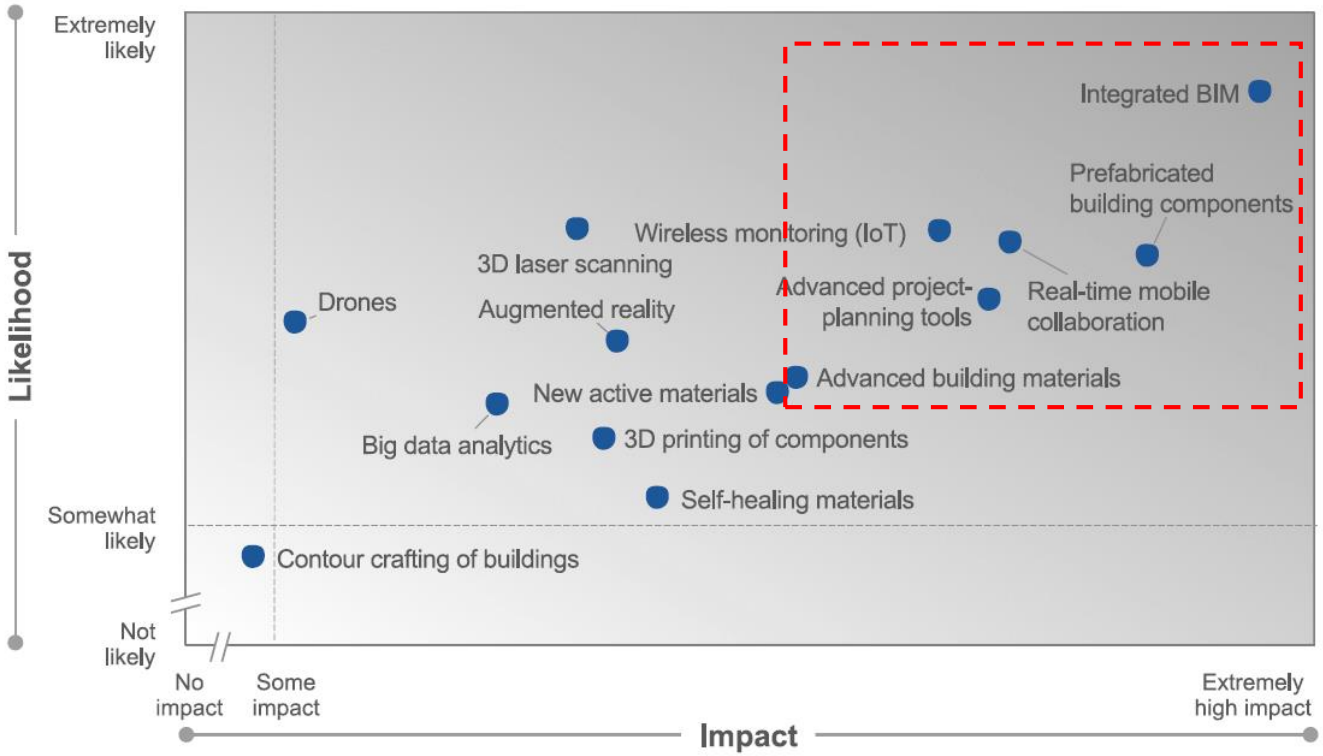
INTERNATIONAL TOWER CRANES CONFERENCE & RECEPTION

WOLFFKRAN

bam

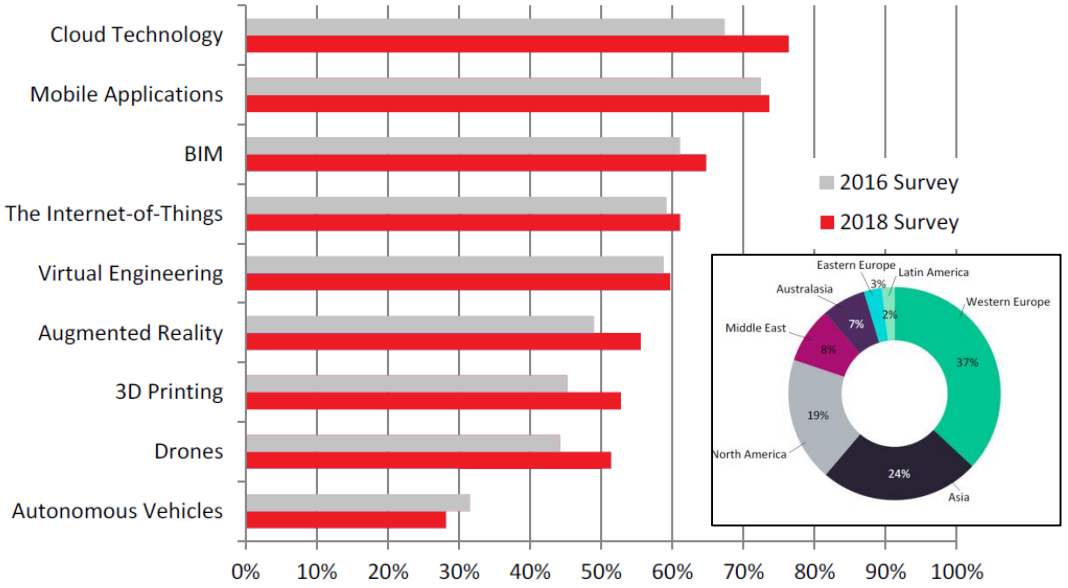
New Technologies in the Construction Industry

Current technological challenges facing tower crane manufacturer's



Source: Future of Construction Survey; World Economic Forum and The Boston Consulting Group

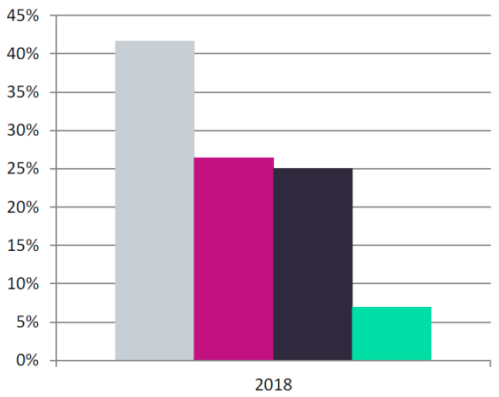
Investment Intentions in New Construction Technologies
(% of total, 2016 and 2018 surveys)



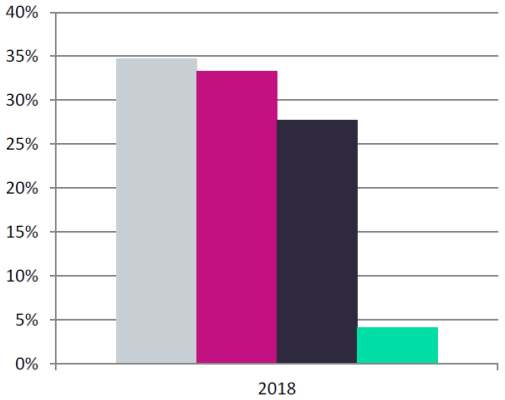
Source: GlobaData

New Technologies in the Construction Industry

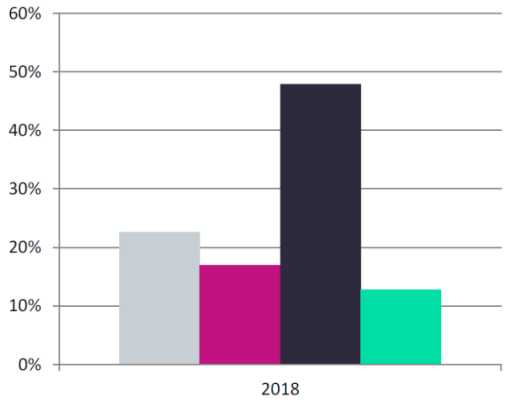
Drones



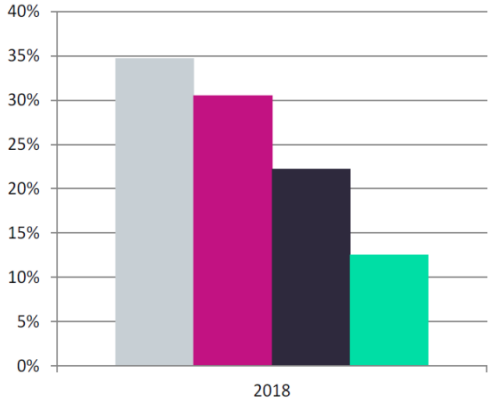
Internet of Things (IoT)

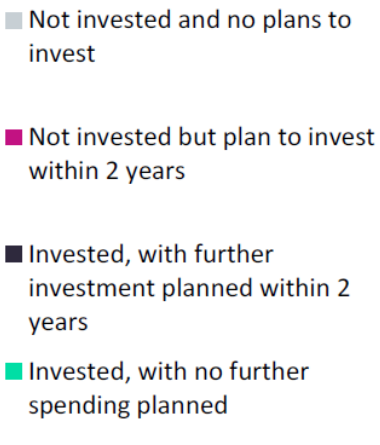


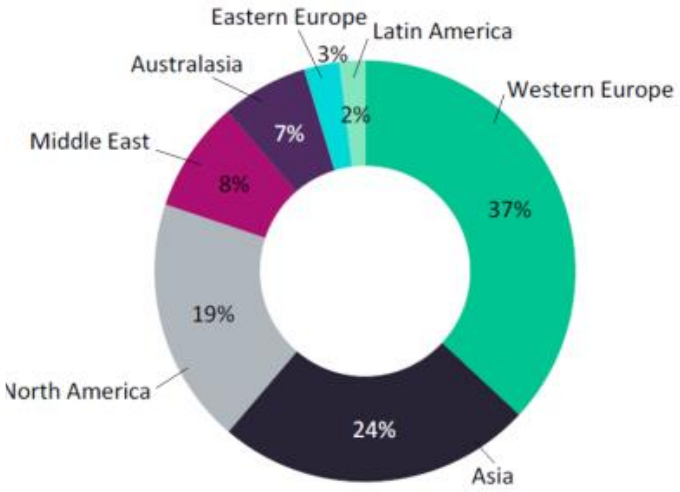
BIM



3D printing







source: GlobalData

The world's first fully functional 3D-printed building in Dubai

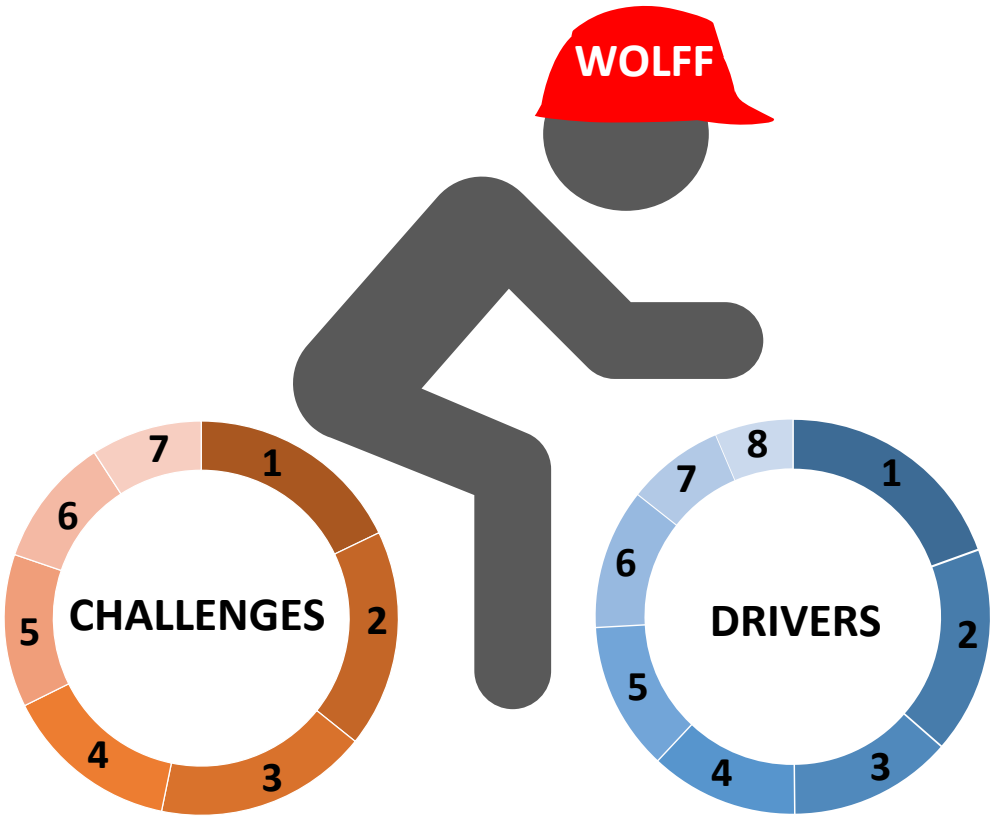
INTERNATIONAL TOWER CRANES CONFERENCE & RECEPTION

WOLFFKRAN

bam

Drivers and Challenges to New technology in the construction Industry

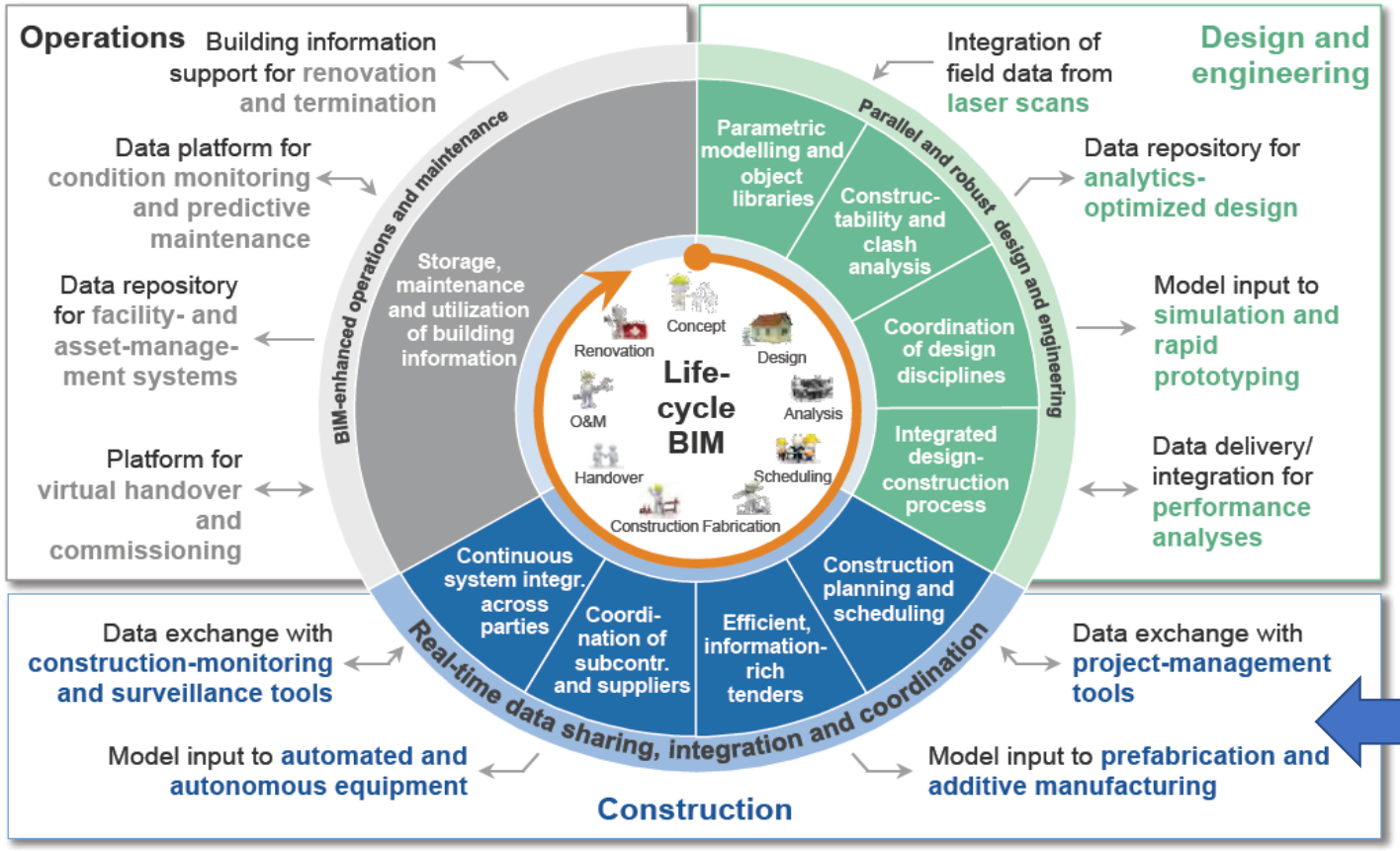
1. Cost
2. Limited ROI on the short term
3. Lack of sufficient skilled labor
4. Resistance of workers to adapt
5. Lack of financial resources
6. Lack of new technology awareness
7. Regulatory uncertainty



Drivers and challenges to investment in new technology
(% of total, respondents selecting up to three barriers), 2018
Data source: GlobalData

1. Improved productivity
2. Greater competitiveness
3. Improved ability to win contracts
4. Reduced construction costs
5. Faster construction time
6. Improved communication
7. Reduced material waste
8. Reduced delays

Lifecycle BIM and beyond

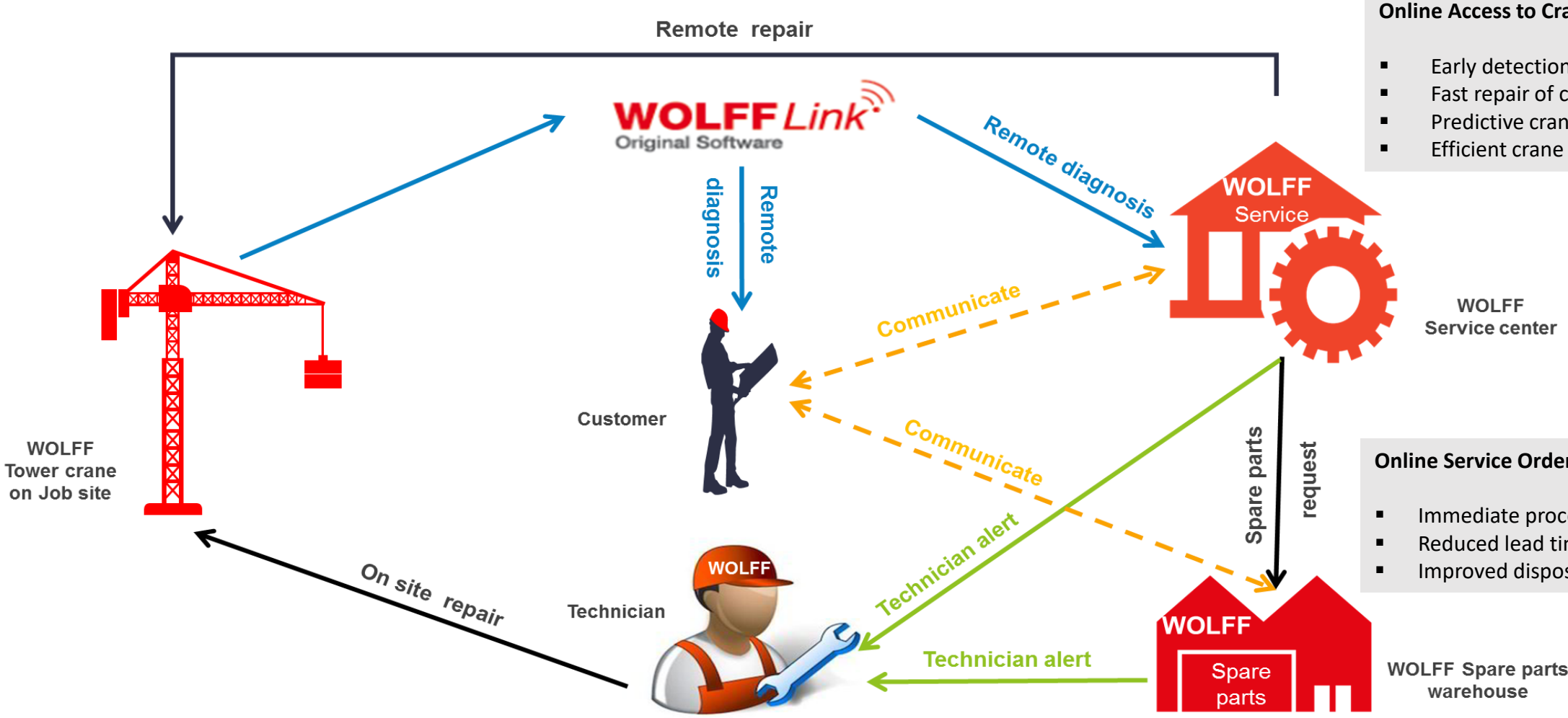


Source: Boston consulting group

Digitalization of tower crane maintenance and operation

- Digital maintenance system
- Failure Diagnosis system
- Online monitoring system

The digitalization of service process



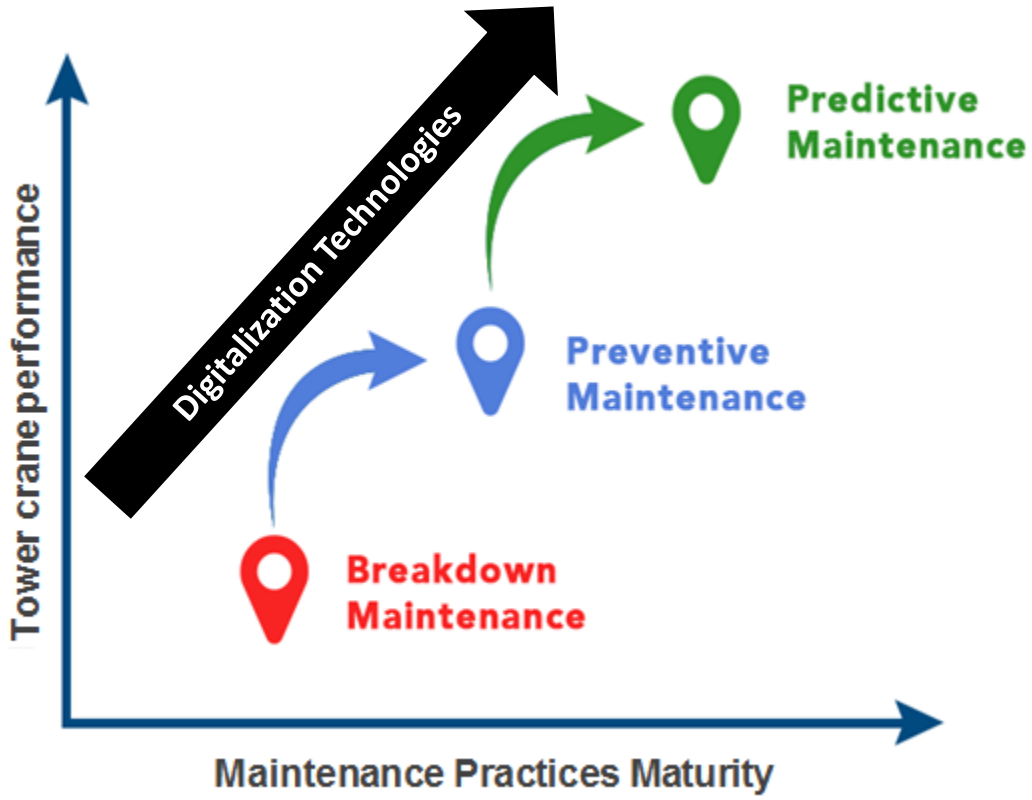
Online Access to Crane Data

- Early detection of crane failure
- Fast repair of cranes on site
- Predictive crane maintenance
- Efficient crane fleet administration

Online Service Order Processing

- Immediate processing of service orders
- Reduced lead times
- Improved disposition of spare parts

Digitalization technologies and the evolution of tower crane maintenance



3. PREDICTIVE

Predictive maintenance services is based on monitoring the operating condition of the tower crane and can predict the life time of the machine or component by means of data analysis and improves reliability. Predictive maintenance services are triggered by the operating condition and a series of perceptive activities.

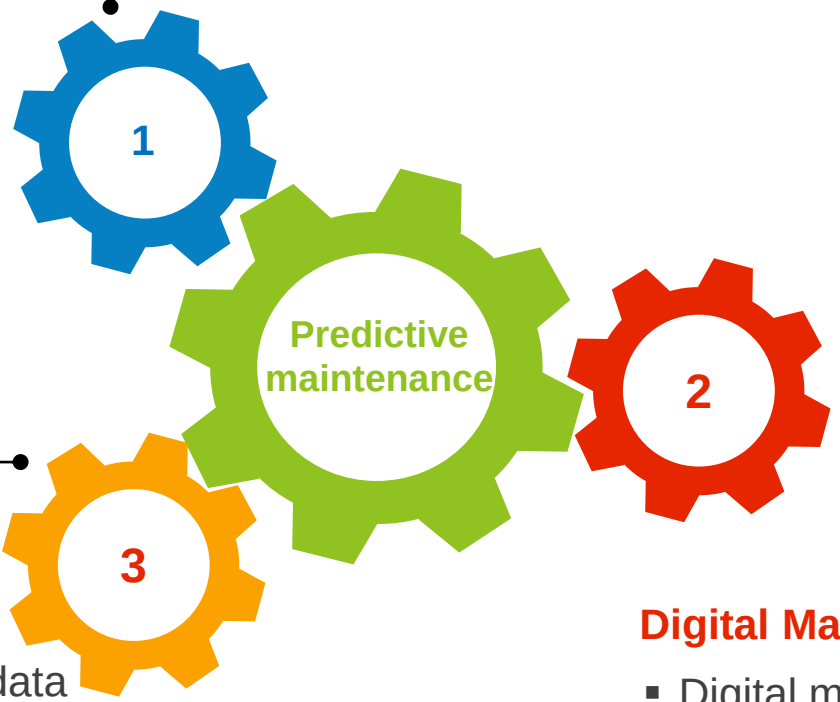
2. PREVENTIVE

Preventive maintenance services can minimize downtime, correct historical errors and reduce the inventory cost of work in process. Preventive maintenance services are triggered by scheduling a series of periodic reactive activities based on tower crane maintenance manuals.

1. BREAKDOWN

Breakdown tower crane maintenance services are triggered by machine or components failure, a series of random reactive activities, such as repair and replacement.

Predictive tower crane maintenance



Failure Diagnosis System

- Tower crane error message
- Failure diagnosis and notification
- Error history

Online monitoring System

- Monitor and collect real-time operation data
- Life cycle evaluation
- Evaluate crane utilization
- Slewing range limitation

Digital Maintenance System

- Digital maintenance plan
- Maintenance records and traceability
- Ease of accessibility and share of information

BAMs Digital Construction Site Management System

INTERNATIONAL TOWER CRANES CONFERENCE & RECEPTION

WOLFFKRAN

bam

Museum of the Future, Dubai
BAM International and BAM Ireland

Tower cranes: 2 x WOLFF 355B & 1 x WOLFF 8033.20

INTERNATIONAL TOWER CRANES CONFERENCE & RECEPTION

WOLFFKRAN

bam

INTERNATIONAL TOWER CRANES CONFERENCE & RECEPTION

WOLFFKRAN

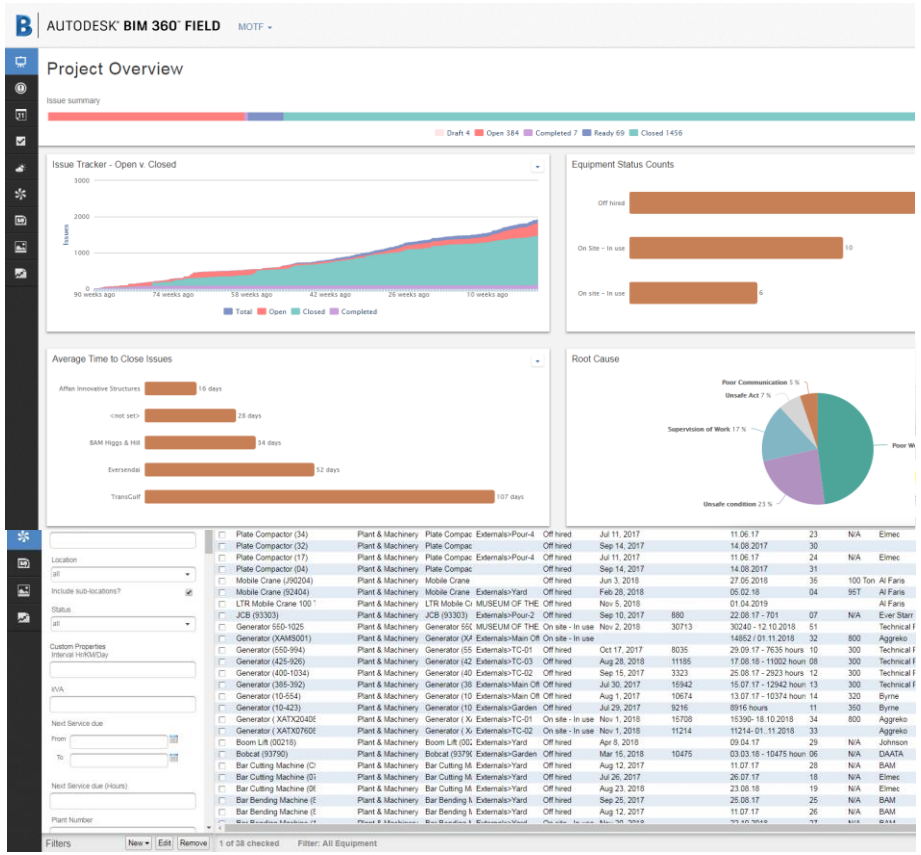
bam

Functional Overview

BIM 360 Field - Mobile app

1. iPad app
2. Syncs with Web
3. Operates offline
4. View and capture information in the field

BIM 360 Field – Web based application

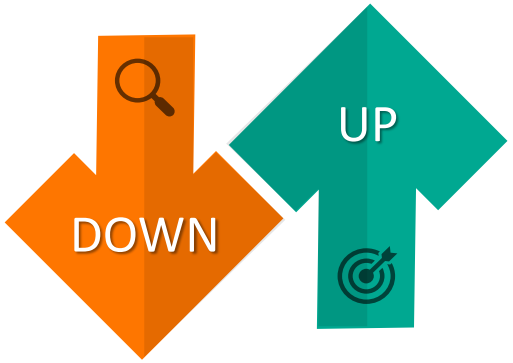


1. Web based accessible on any device
2. Permissions: Sub-contractor, Architect Client
3. Real time data
4. Reporting

Objectives for using Digital Field Management

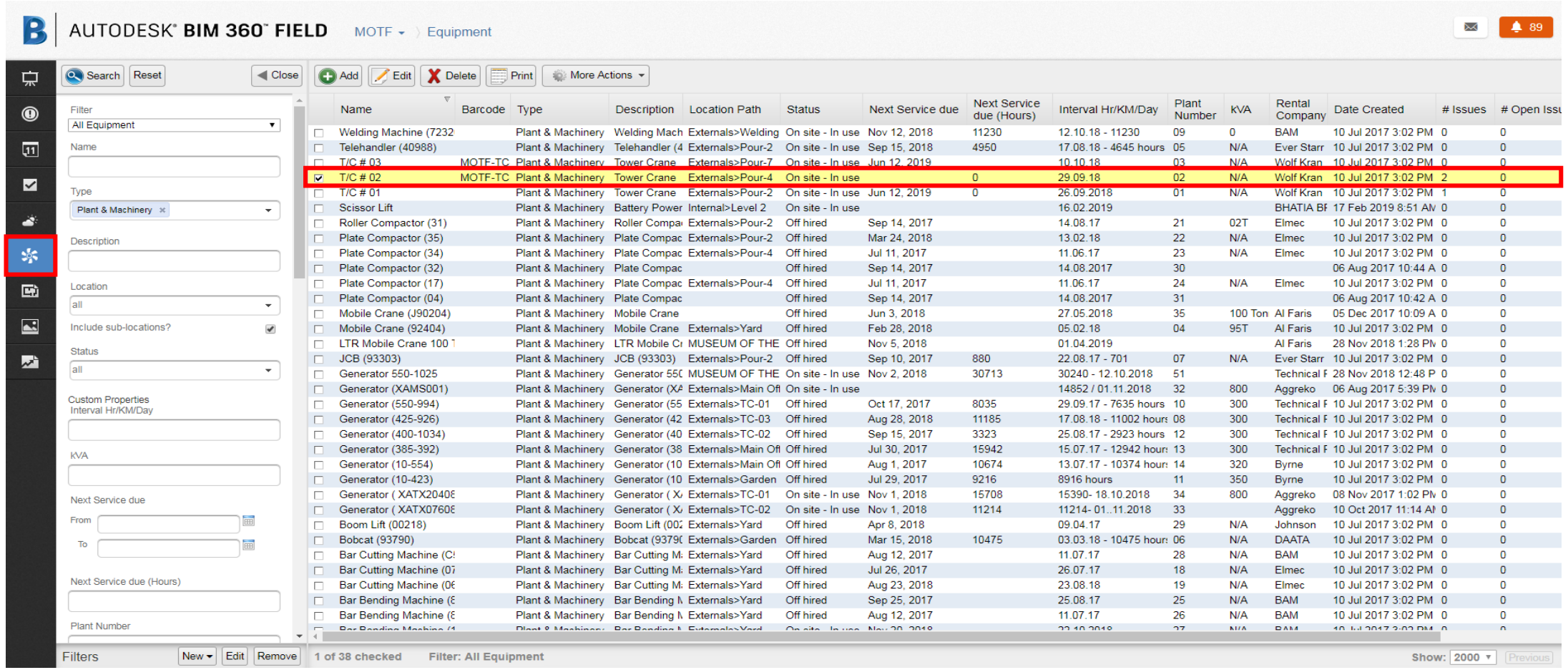
PAPER BASE CHAOS

vs

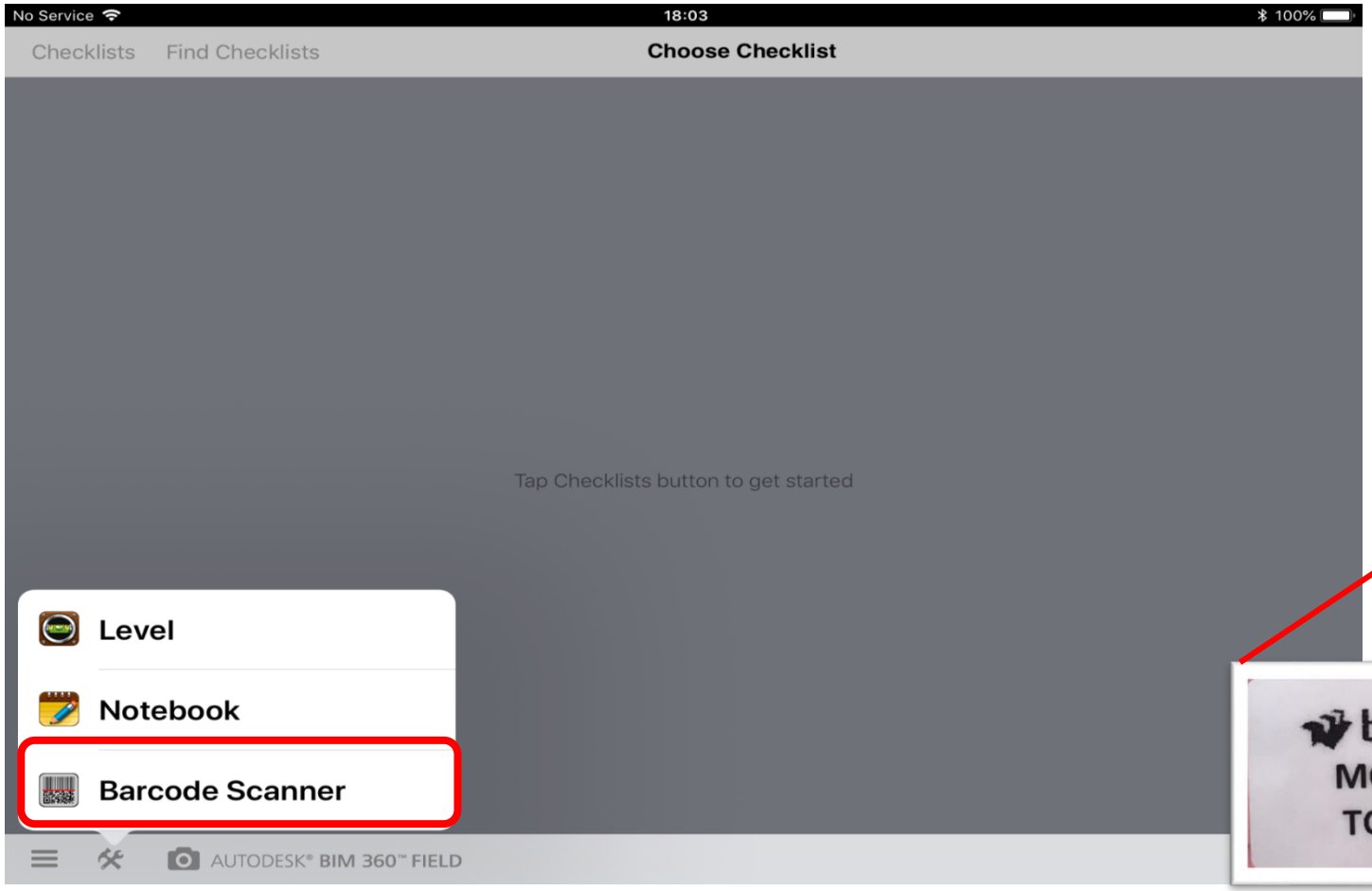


DIGITAL MANAGED ORDER

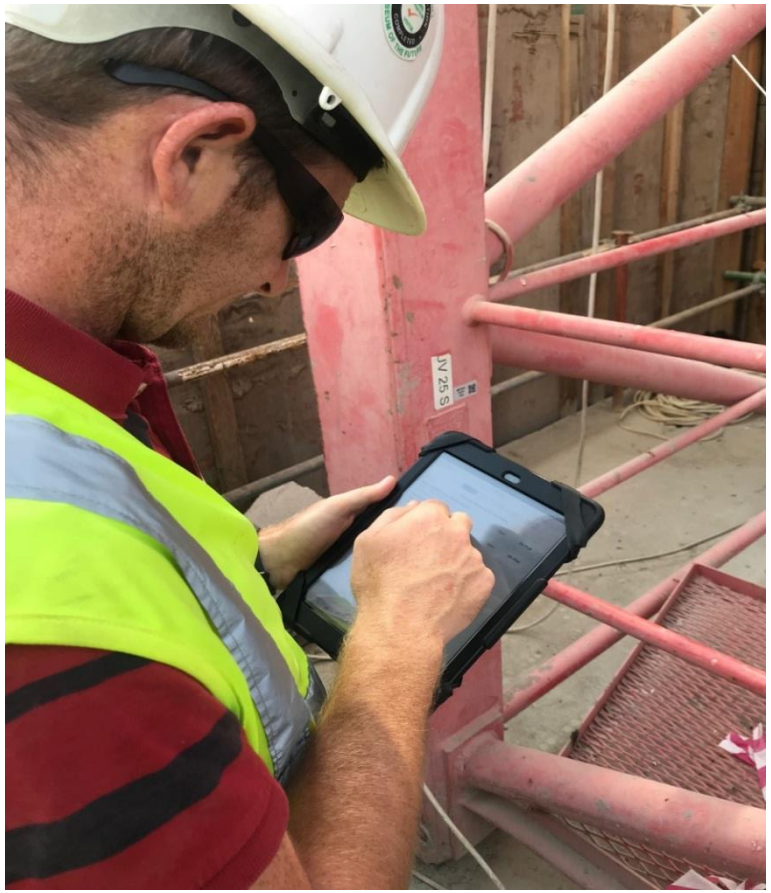
Manage Plant & Machinery

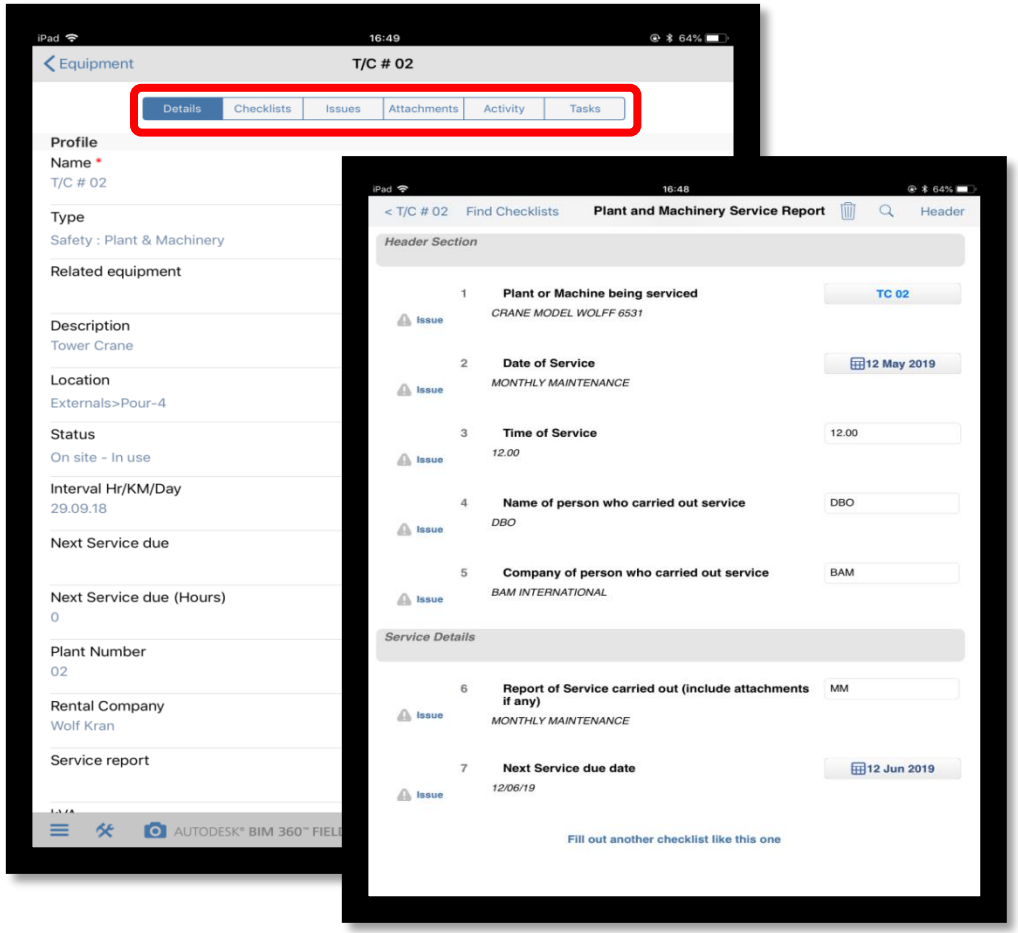


Field Management – Checklists Using iPad with QR Code



Field Management – Checklists Using iPad with QR Code



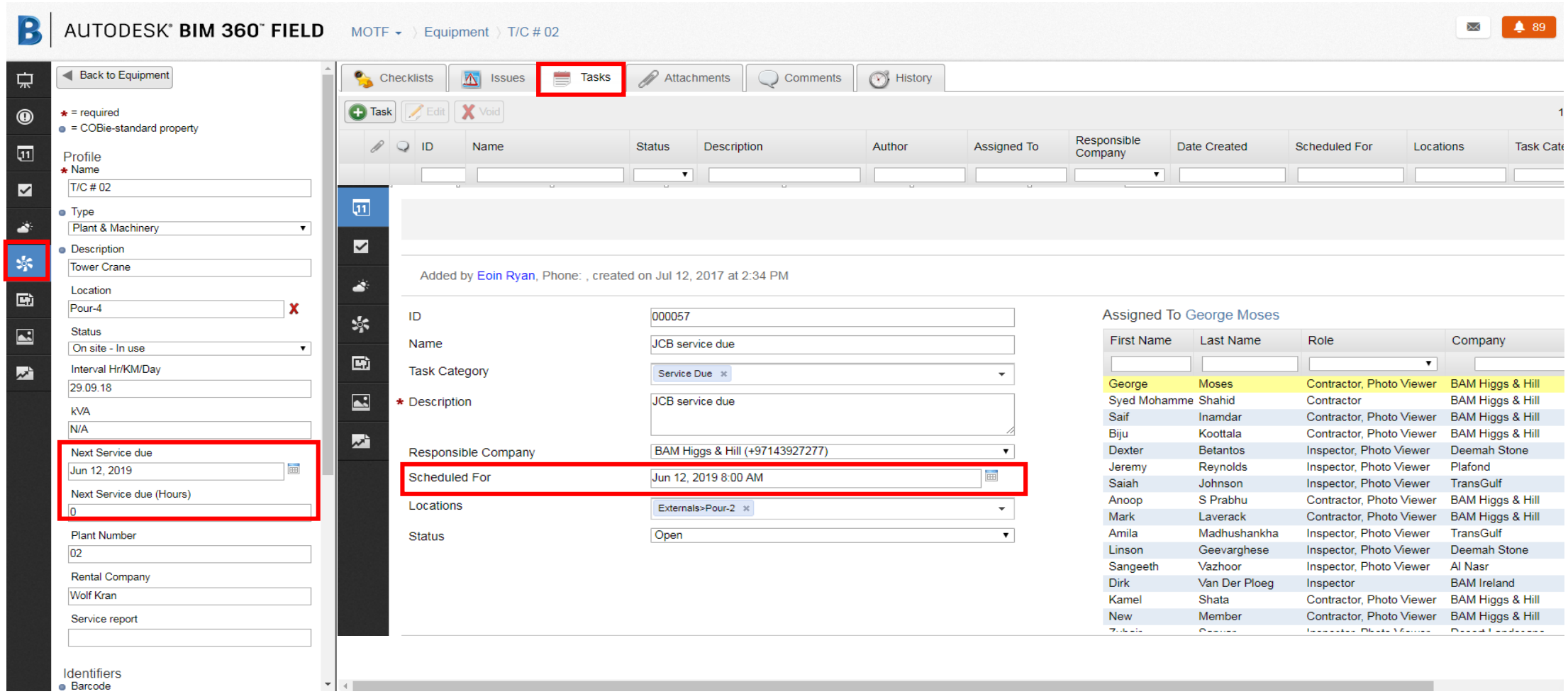


INTERNATIONAL TOWER CRANES CONFERENCE & RECEPTION

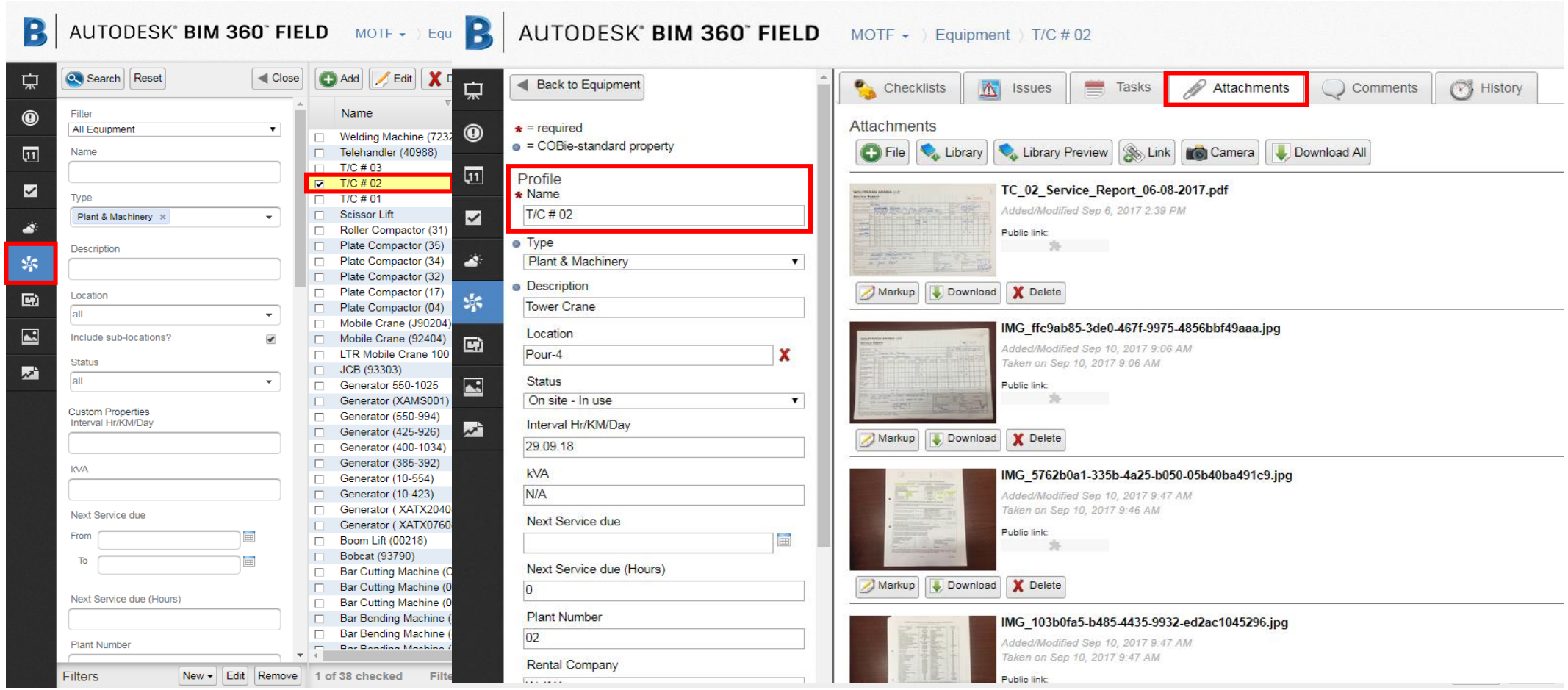
WOLFFKRAN

bam

Create Tasks – Reminders - Alerts



Full Service History Digitally Recorded



Thank you for your attention!

INTERNATIONAL TOWER CRANES CONFERENCE & RECEPTION

WOLFFKRAN

bam