Singapore Institute of Manufacturing Technology
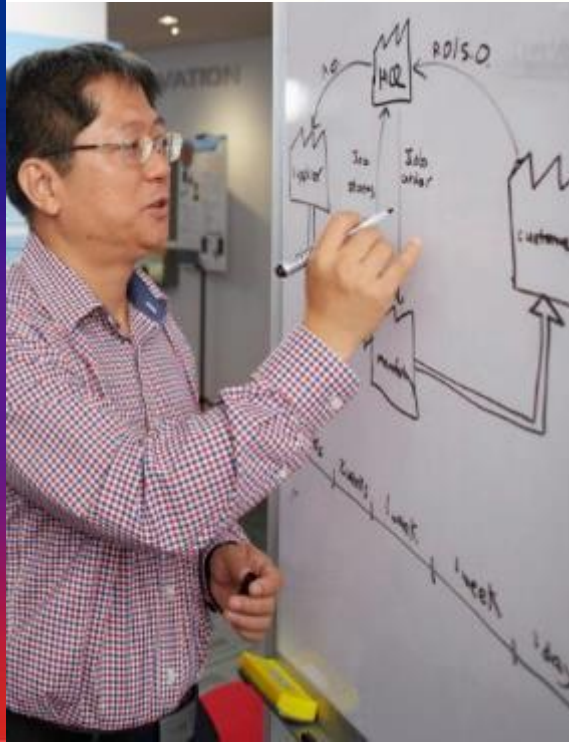SIMTech

for Industry

POWERING BE PRODUCTIVITY WITH OMNI & READY-TO-GO SOLUTIONS

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# About **MPTC**

MPTC was launched in 2011.

Mission
To spur industries towards using manufacturing technologies for productivity, growth and long-term sustainability.

Vision
The innovation partner of industry for productivity and digital transformation journeys.
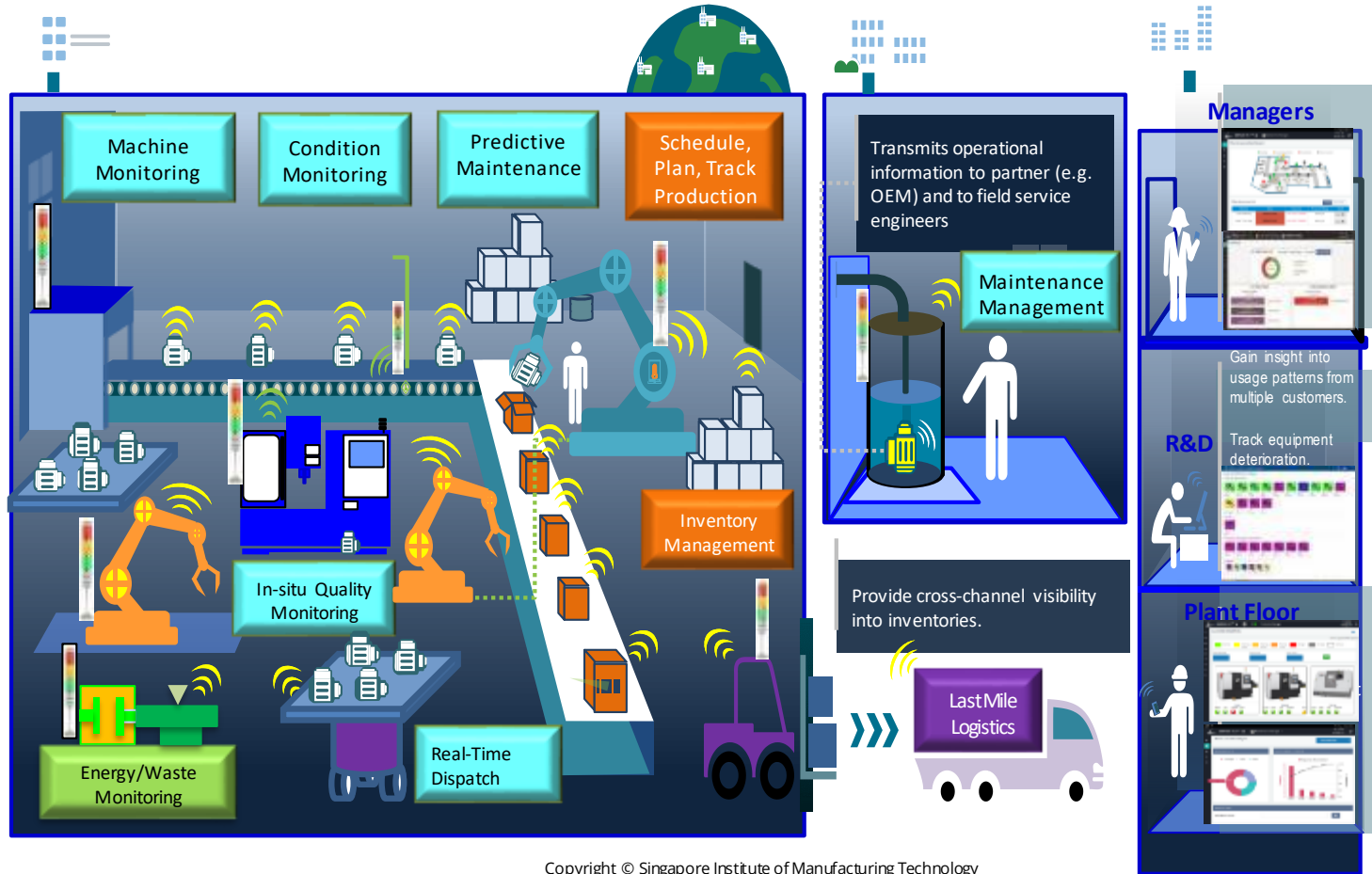
- Discrete final assembly line with smart tooling

- Modular digital solution with complete digital thread

- Digital Transformation & Innovation Training/ Mentoring
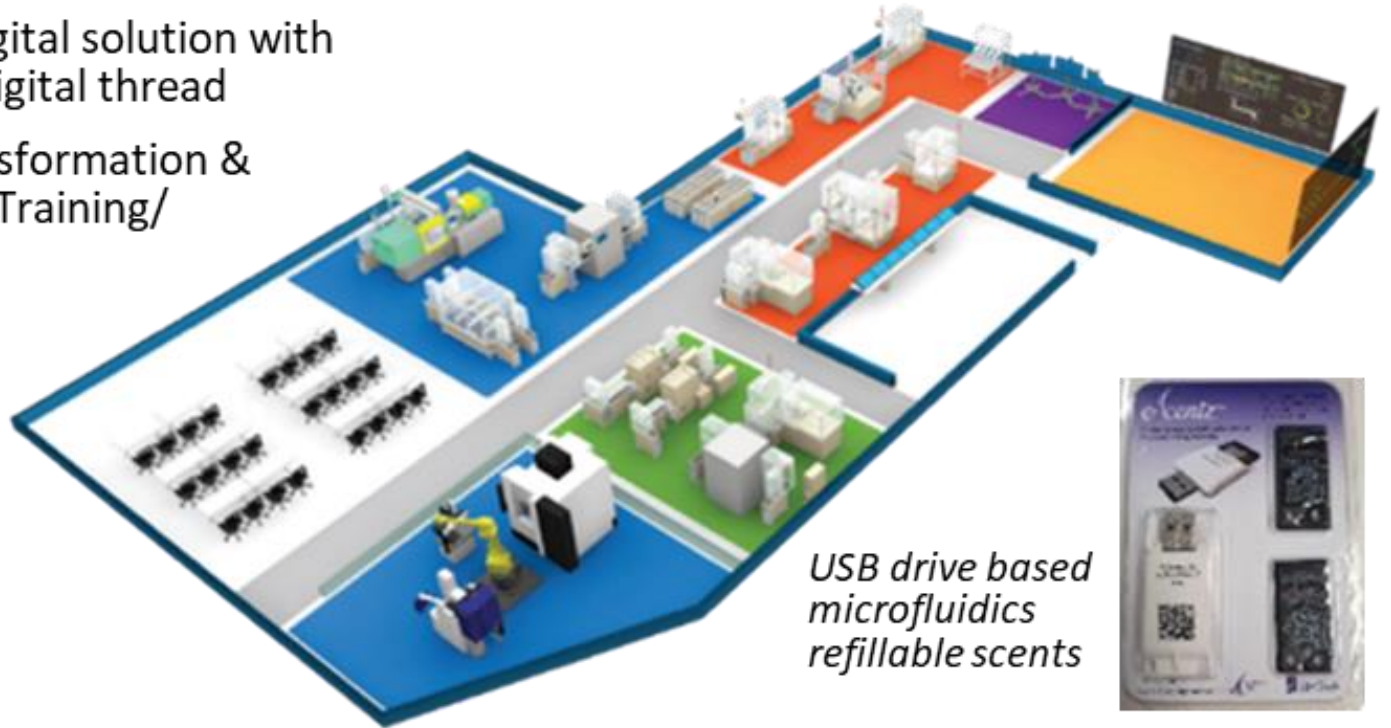
USB drive based microfluidics refillable scents

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Cyber Physical Production System

Machine Monitoring

Condition Monitoring

Predictive Maintenance

Schedule, Plan, Track Production

Transmits operational information to partner (e.g. OEM) and to field service engineers

Maintenance Management

In-situ Quality Monitoring

Inventory Management

Energy/Waste Monitoring

Real-Time Dispatch

Provide cross-channel visibility into inventories.

Last Mile Logistics

Managers

Gain insight into usage patterns from multiple customers.

Track equipment deterioration.

R&D

Plant Floor

for Industry

Digital Manufacturing - Key Competencies & Research Areas

Digitalisation

- **Digital Transformation** of companies with Learn-Practice-Implementation approach
- **Manufacturing Control Tower™** as an open-platform that enables a ubiquitous and complete digital thread across all levels of a business to support sense & response manufacturing through CPPS (Cyber-Physical Production System)

Supply Chain

- **Last Mile Logistics Management**, incl. job assignment & sequencing, and vehicle routing
- **Supply Chain Track & Trace** with immutable traceability and E2E capability
- **Supply & Demand Planning**, incl. demand forecasting, multi-objective inventory control (optimization), multi-site order planning & allocation

Enterprise

- **Production Planning & Scheduling** for high uncertainty and high-mix low-volume manufacturing environment
- **Predictive Enterprise Decision Support**, incl. spatio-temporal prediction, system modelling and simulation for manufacturing system design and risk management
- **Business Process Automation**, incl. digitization of documents and business processes

Shopfloor

- **Predictive Maintenance**, incl. predictive models for equipment degradation process, anomaly detection and remaining useful life prediction
- **IoT Enabled Equipment Connectivity**, incl. brownfield connectivity, OEE and machine performance analysis
- **Predictive Quality,** incl. quality prediction and visibility of real-time yield
- **Shopfloor Tracking & Execution**, incl. localization techniques for optimal dispatching of work orders and material handling

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Ready-to-Go Digital Technologies for Built Environment

Technology	Purpose	Benefits	Authorised Partners
1. eDataLogger+	Use Android tablets to replace paper forms	• Go paperless • Data exportable to Excel for further analysis	WSI Laboratory Pte Ltd Brightree Pte Ltd EPRO Systems (S) Pte Ltd
2. Workflow Mobile (wfMobile)	Empower end user to built custom workflows using Excel Templates and execute via any mobile phone	• Digitalise workflows • Enforce SOP • APIs to export data to external systems	WSI Laboratory Pte Ltd Brightree Pte Ltd EPRO Systems (S) Pte Ltd
3. Inventory Tracking System (ITS) 4. Collection & Delivery Management System (CDMS)	Leverage on RFID, barcode and mobile devices to facilitate tracking, handover & stocktaking of assets/inventory	• Provide visibility and traceability of assets/inventory • Alert impending calibration/safety expiry dates	SATO Asia Pacific Pte Ltd Tunity Technologies Pte Ltd A-Tech Training & Consultancy Bridged Pte Ltd Skyfy Technology Pte Ltd SmartComm Electronics Pte Ltd
5. Maintenance Management System (MMS)	Digitalise entire maintenance /repair operations from planning, to execution, to report generation & analysis	• Visibility of all maintenance & repair operations • Minimise cost & lead time	ASTrio Pte Ltd
6. Manpower Scheduling System (MSS)	Auto-generate manpower schedule to match multi-role staff to multi-tasks	• Fast generation esp. for last minute changes • What if analysis	Ncode Consultant Pte Ltd

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CREATING GROWTH, ENHANCING LIVES

CREATING GROWTH, ENHANCING LIVES

✓ Digitizing Paper Forms

✓ Data Collection

✓ Report Generation

✓ 中文 & English

all in one app

1. eDataLogger+

Generate high quality reports

Create smart report without writing a single line of code

One tap to generate high quality report

Keep working, keep synchronized from any place, any device

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eDataLogger+

Examples

1. **Supplier and service provider for vehicle mounted equipment such as cranes, hooklifts and garbage containers.**
   - Implement eDatalogger to digitise truck service reports, container inspection checklist, new truck pre-delivery checklist and material usage log.
   - 50% reduction in cycle time for inspection procedure. 50% time reduction for pre-delivery check for new truck's installation

Digitalised truck service report

Digitalised new truck pre-delivery checklist

2. **Shifting service provider for general trucking and heavy haulage transportation.**
   - Implement eDatalogger to digitise delivery order and HR documents.
   - 33% time reduction in the submission of delivery records and billing to customers.

Digitalised delivery order

eDataLogger on-site mentoring sessions

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2. wfMOBILE™
for Creating Custom Mobile Workflows App

Teaching the workflow engine

- Users / Roles
- Workflow Steps / GUI
- Data lists
- Checklist Forms

Loader

Intelligent wfMOBILE™ Engine

1. CONFIGURE
Configure using Excel Templates

2. TEACH
Load excel templates into Workflow Engine

wfMOBILE Apps

3. LAUNCH
Launch workflow apps on mobile device

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CREATING GROWTH, ENHANCING LIVES
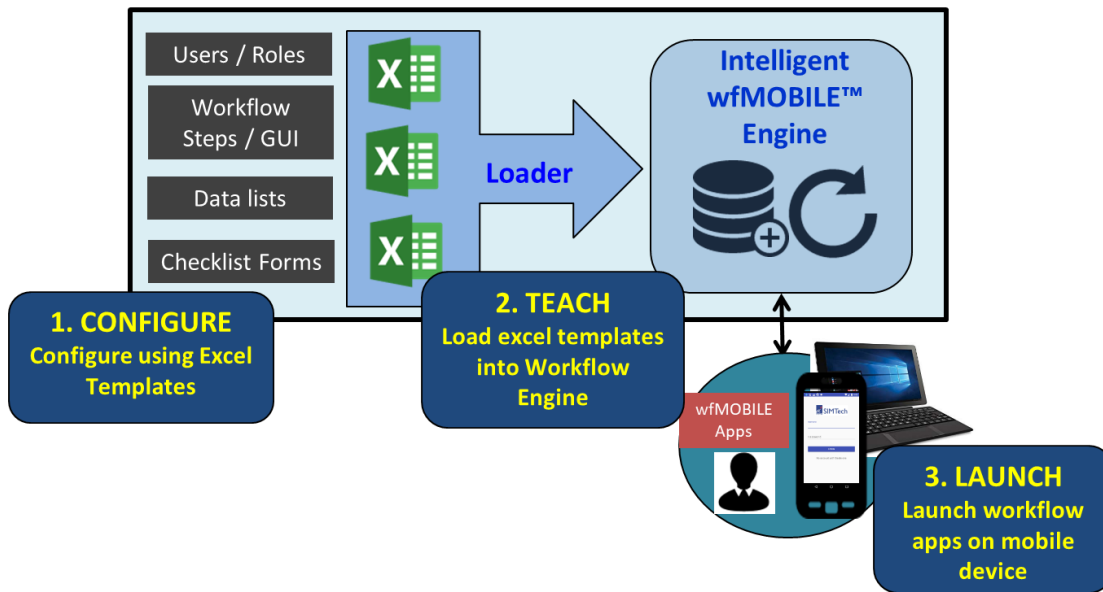
Success Story: Digital Workflow Automation for Maincon Construction Company

Company: Maincon Construction Pte Ltd

Objective:
- SIMTech wfMOBILE ™ Technology will be applied for Construction application in the following areas:
  - a) Purchasing workflow (Site & Office)
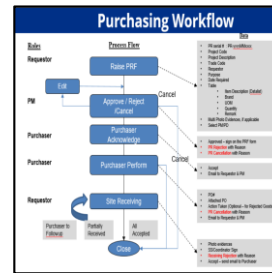 - b) Sub-contract Payment workflow

SIMTech Contributions
- Workflow consulting and configuration of Service Request workflow for Training Management Workflow
- wfMOBILE ™ apps training and installation at Azure server

Value Capture
- Reduction of cycle time for PR approval from about 3 hours to 1 hour
- Frequency of rework required due to incorrect entry of PR items is reduced from 3.5 times to 1 time per month
- Mean time between failure of equipment is improved from 1 day to 3 days
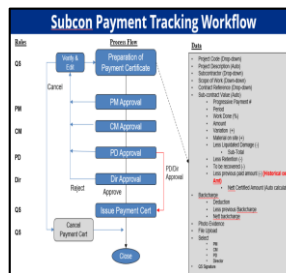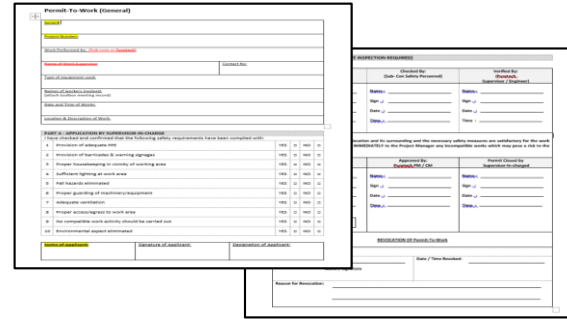- Automated subcon payment flow which captures phase payment & history

a) <u>BEFORE - Manual PR form</u>

a) <u>BEFORE - Manual Subcon payment form (Excel-based)</u>

b) <u>AFTER - PR Workflow</u>

b) <u>AFTER – Subcon payment flow</u>

Success Story: Digital Workflow Automation for Construction Engineering

Company: Maincon Specialist in Mechanical & Electrical Services

Objective:

SIMTech wfMOBILE ™ Technology is used for application in the following :

    a) Permit-to-work forms digitalisation
- [General ePTW, Confined Space ePTW, Excavation ePTW, Demolition ePTW, Hotwork ePTW, Lifting ePTW, Working at Height ePTW]

    b) Purchase Request signoff workflow
    c) Project documents reminder workflow

SIMTech Contributions

- Workflow consulting and configuration of Service Request workflow for Training Management Workflow
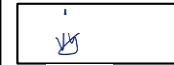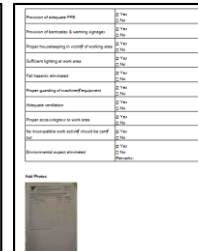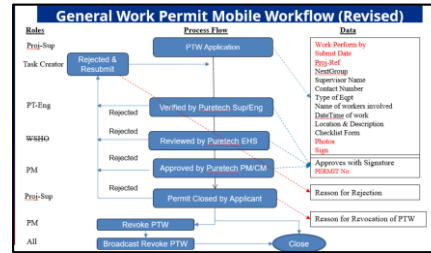- wfMOBILE ™ apps training and installation at Azure server

Value Capture

- Reduction of cycle time for ePTW approval from 30 mins to 15 mins (50% improvement)
- Document reminder workflow helps to remind project managers on document due dates, enhancing the delivery of project document delivery dates and expecting to reduce from 30 to zero out 100 documents generated per project
- With the ePTW, the time taken to prepare for audit will be reduced from 3 days to 1 day (67% improvement)

a) BEFORE – Paper-based PTW

b) AFTER - ePTW Workflow

General Work Permit Mobile Workflow (Revised)

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1. RFID Inventory Tracking System

Productivity Indicator	Expected Improvement
Locating & search item	50 – 80%
Stock taking	30 – 60%
Asset auditing	30 – 80%
Check in/out	30 – 50%
Item track & trace	50 – 80%
Improve asset utilisation	20 – 30%

- Item identification & management
- Inventory level alert
- Check in/out management
- Stock taking
- Search & locating
- Reporting

Notebook

Wi-Fi/GPRS/3G

RFID/Barcode Reader

Inventory Items/Assets

for Industry

3. Inventory Tracking System

Examples

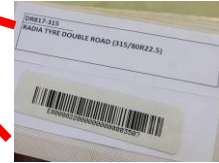**A Civil Engineering firm specialising in Earthworks**

- Reduced **66%** time spent on monthly stock taking from 6 to 2 days for vehicle spare part inventory
- Reduced **33%** people needed for monthly stock taking from 3 to 2 persons
- Improved management and visibility of spare part inventory

Stocktaking
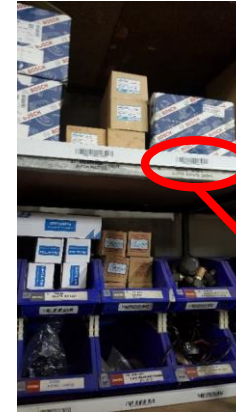
Tagged Inventory

RFID Tag

A Stone and Tile specialist

- Improved their cycle time of 50% from 2 to 1 hour, total saving of 2 hours per day
- Estimated search time of 95% reduction, total saving of 5 hours per day

2. Collection & Delivery Management System

Collection, Delivery & Management System

Picking Location

5. Attach Tag to item. Scan tag with smartphone

6. Register tag information by smartphone. (Destination, Schedule, Items, photo etc)

7. Check items by referring to tag information via server. Submit picking up time of the item to the server

1. Request delivery task

2. Received delivery task

Sender

Server Sharing information in real time

- Check information in real time
- Monitoring

4. Confirm delivery task

Driver

3. Assign job

8. Driver drives to the destination

Seller, Vendor/Supplier

11. Acknowledged

Receiver

9. Verify goods accordingly. Scan tag to submit delivery time and location to the server

10. Goods delivered

Workflow Overview

BENEFITS

✓ Driver location and capacity tracking
✓ Quick place searching and navigation
✓ Optimal task execution
✓ Easy and fast reporting
✓ Information intelligence
✓ Collection and delivery verification
✓ Minimise product loss and wrong delivery

Productivity Indicator	Expected Improvement
Reduce costs	20%
Save time & effort	20%
Increase reliability	20 – 30%

CREATING GROWTH, ENHANCING LIVES

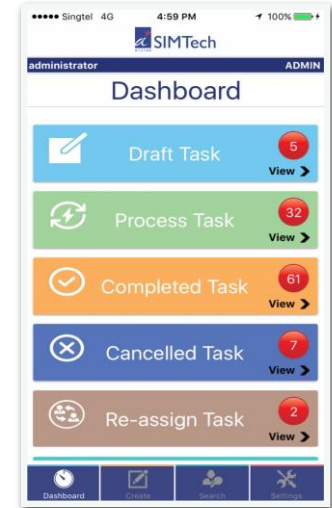for Industry

4. Collection & Delivery Management System

Examples

A Car Rental Company

- Improve their daily delivery and collection task management and monitoring effort by 33.33% from 3 man-hour to 2 man-hour.
- Increased delivery process visibility, tracking, efficiency and accuracy.

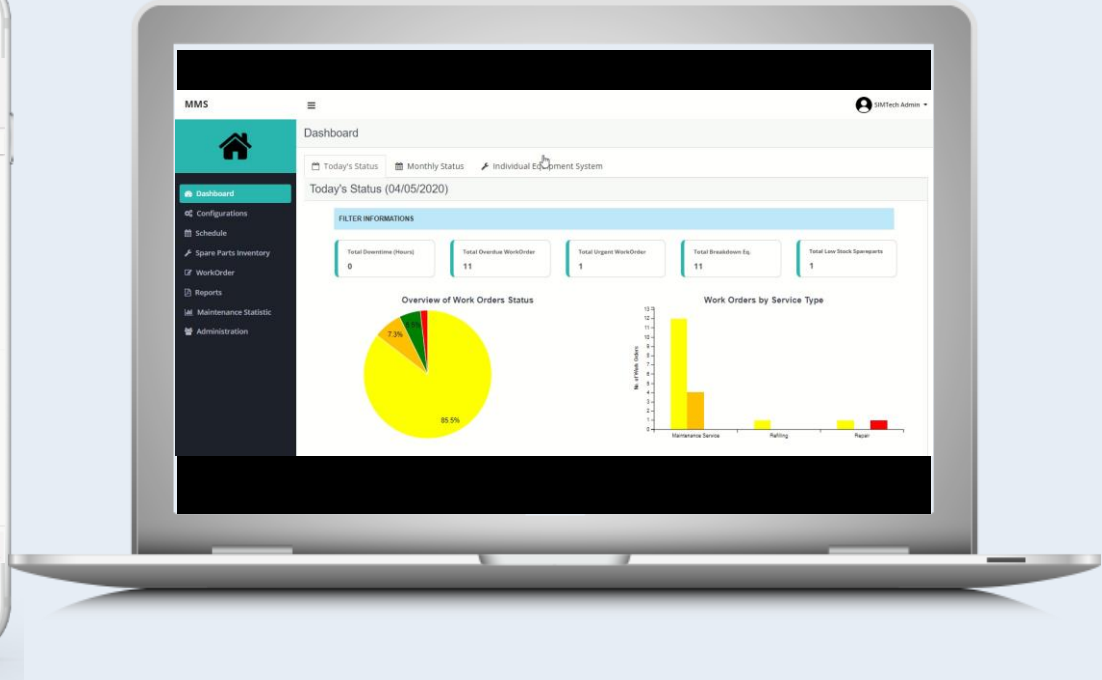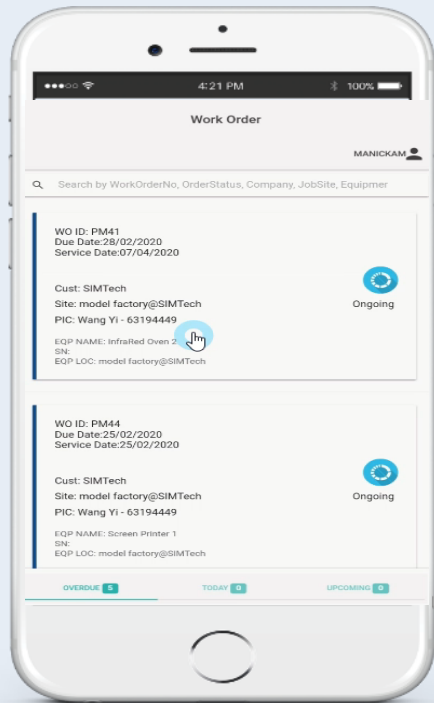Training Session

CDMS App

5. **MAINTENANCE MANAGEMENT SYSTEM (**INTEGRATED WEB AND MOBILE SOLUTIONS)

5. Maintenance Management System (MMS)

Case Studies

Manufacturer of Asphalt Mixing Plants
- 75% reduction in effort for report generation
- 6% reduction in missed work orders (from 8% to 2%)
- 50% improvement in work process efficiency

Mixing Machine

MMS Backend Web-App

MMS Android App

A Roller Shutter Door Manufacturer
- 33% more efficient administration manpower (3 staff to 2)
- 50% time saved for planning and reporting of maintenance activity from 4 hours/week to 2 hours/week
- 46% reduction of errors from 15% to 8%

Roller Doors

MMS Android and Wed App

6. Digitalization and Automation of Manpower Scheduling & Tracking Process

BEFORE

AFTER

Demand Fluctuation

Various Skillsets

Labour Availability Constraints

24/7 Operation
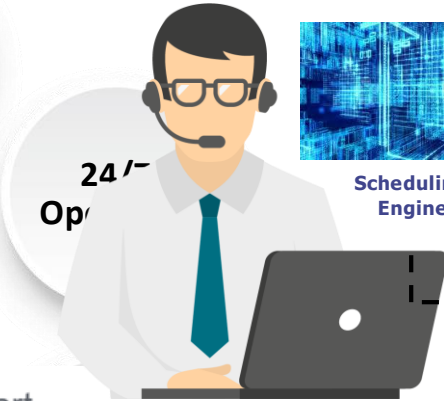
Scheduling Engine

Web-based Application

LOADING CHART

Gantt Chart

Show | 1 Week ▼ | 06/01/2019 📅 | ◀ PREVIOUS | ▶ NEXT | Filter By | Overall ▼

Sun-6

| | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 |

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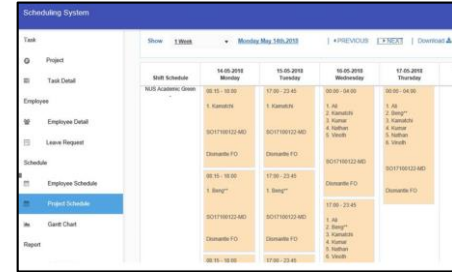Agnes-

Albert-

Alex-

Althea-

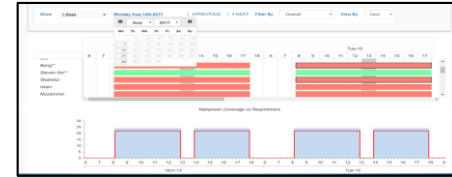Alvin-

6. Manpower Scheduling System

Case Studies

An Engineering Services Company

- 50% reduction in manpower scheduling efforts
- 20% improvement in customer service level through optimizing manpower allocation (from 70% to 90%)
- 99% improvement in project tracking & visibility (manual vs dashboard for project coverage & costing)
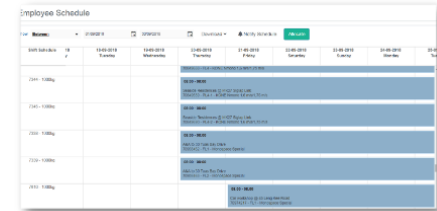

Manpower allocation for project

Manpower coverage vs requirement by Skill set

An Equipment Rental Company

> **Hoist (as Employee):**
> - **Load Capacity (as skill set)**
> - **Certification validity period**
> - **Maintenance, Overhaul status**

- 70% reduction in manpower scheduling efforts
- 20% improvement in hoist utilisation

Optimal Hoist Deployment Schedule

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