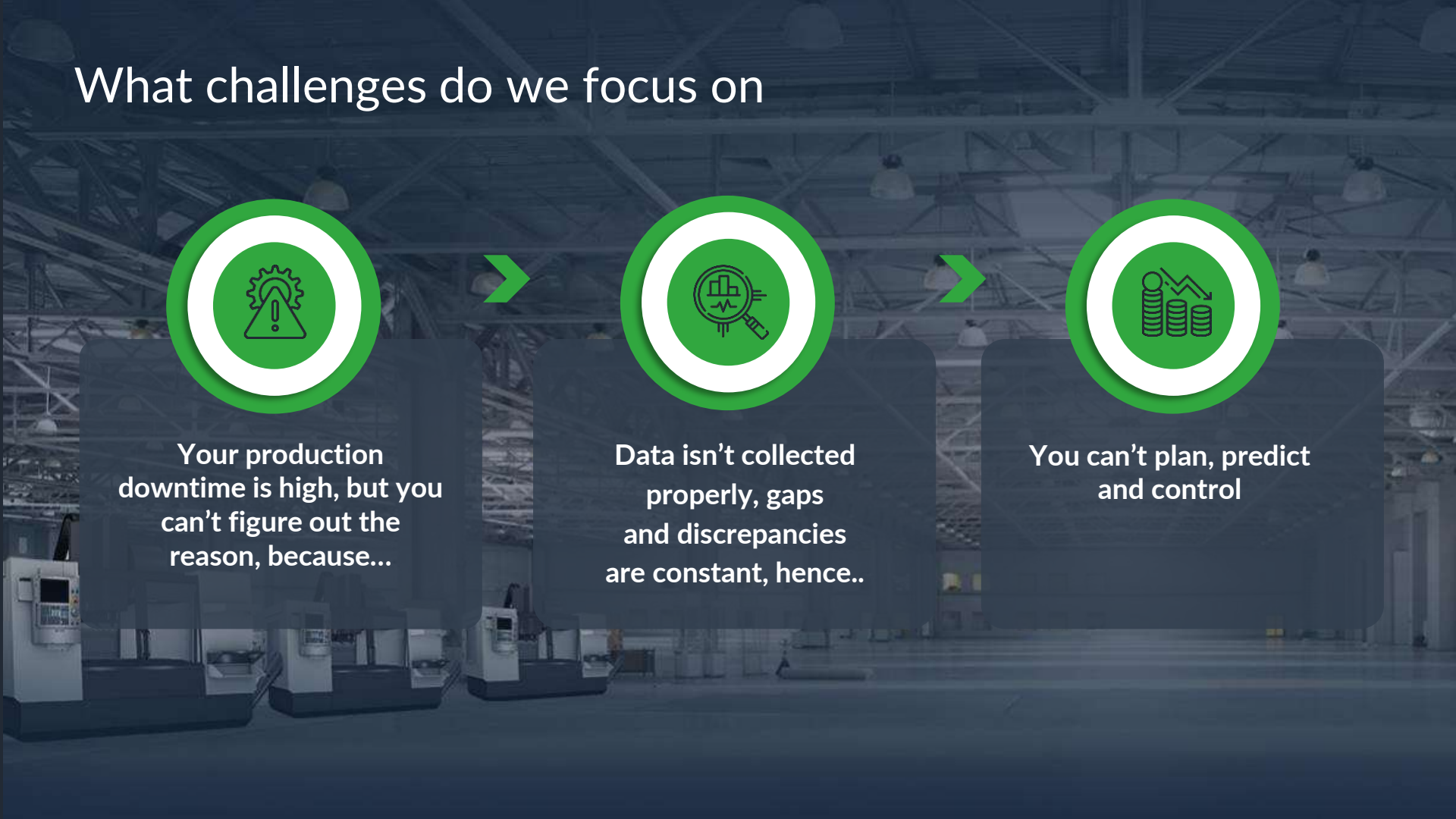
MDCplus:
From downtime to uptime

Improving Machining Performance

www.mdcplus.fi

What challenges do we focus on



Your production downtime is high, but you can't figure out the reason, because...

Data isn't collected properly, gaps and discrepancies are constant, hence..

You can't plan, predict and control

MDCplus: automated, real-time production process control and management

450+
PROJECTS

25 000
MACHINES CONNECTED

25+
COUNTRIES

25+
PARTNERS

6
YEARS

INDUSTRIES

Aerospace
Automotive
Precision machining
Heavy industry
Machine tools
Marine
Turbines and Pistons
Home appliances
Railway components
Mining factories and
CNC machines
Refineries
Pipes

Levels of digitalization

To advanced methods of equipment technical condition prediction

3

To automation of business processes based on real data

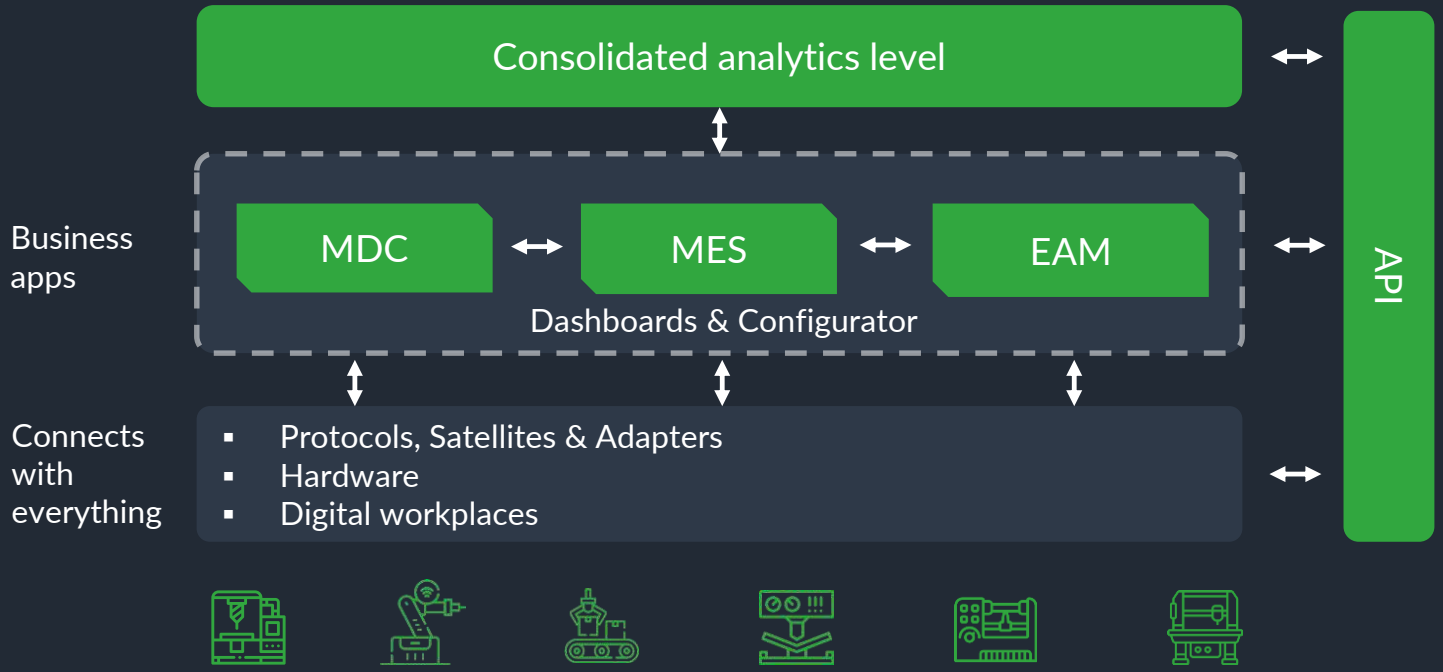
2

To an automated production data management environment

1

From manual data collection

MDCplus consist of



MDC – platform for data collection from any equipment in production

- Connection of any type of equipment
- Control of equipment operation modes
- Organization of digital automated workplaces
- NC program management
- Notifications
- BI Dashboards

MDC

MDCplus is able to collect data from almost every type of equipment

- Time-saving
- No additional hardware needed

Industry standard: Modbus, OPC, MTConnect

Hardware support

Satellites, Adapters, Testing, Integration

FIND & CHECK YOUR PROTOCOL

CNCs

FANUC SIEMENS Mazak HEIDENHAIN MITSUBISHI ELECTRIC HAAS Haas F1 Team brother Sodick OKUMA Bystronic

PLCs

Allen-Bradley PHOENIX CONTACT DELTA MOXA ifm SIEMENS OMRON Schneider Electric BECKHOFF

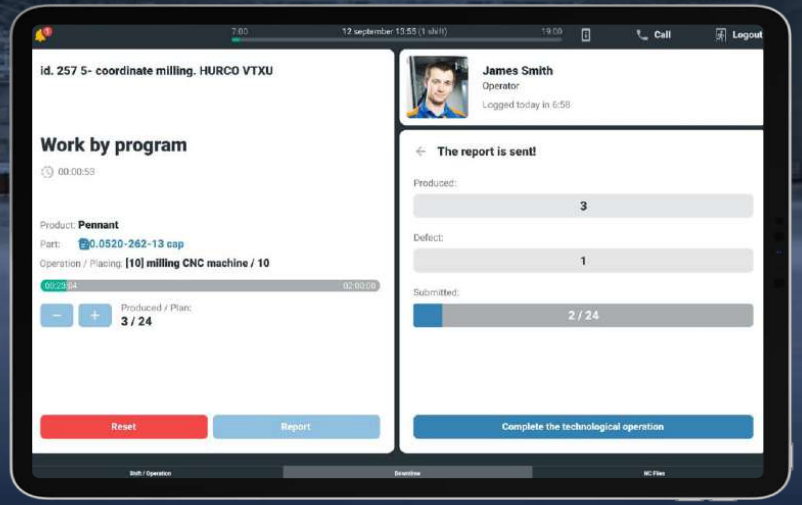
Robots

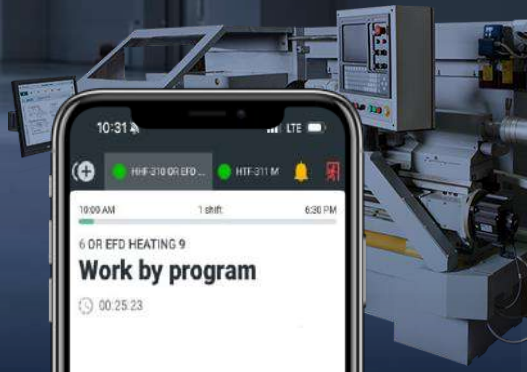
KUKA FANUC

Standard protocols

OPC UA MTCONNECT OPC DA

How it looks for the operators





IMP (Individual monitoring panel) is a web application designed for interaction between the machine operator and the MDCplus

- Can be installed on a tablet or a smartphone
- The IMP device connected to the machine allows the operator to register, download programs, view documentation

What can you do with the data received?

Estimation and control of production load

Reduction of emergency downtime

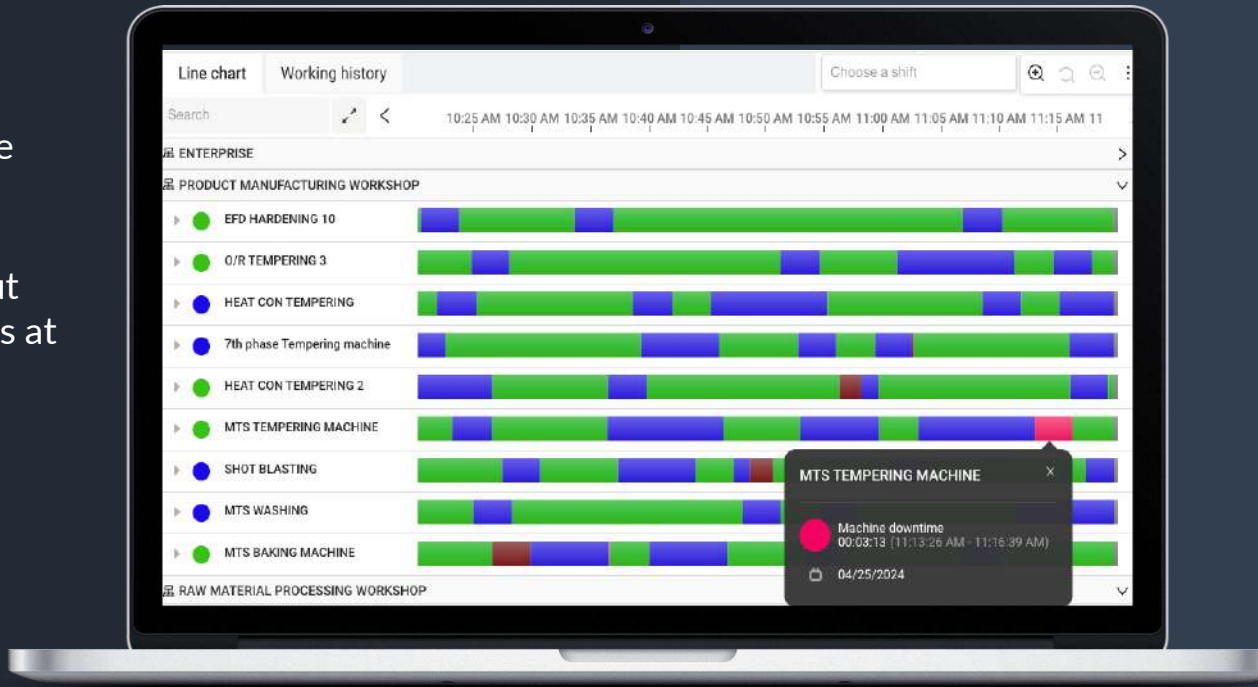
Accident and downtime notifications

Control of technological modes

Control energy consumption

Real-time equipment control

- Machine status and downtime reasons with real-time link to the workforce
- Notifications of employees about emergencies and other situations at production facilities
- Equipment operating history



Technological modes deviations analysis

Controlled parameters

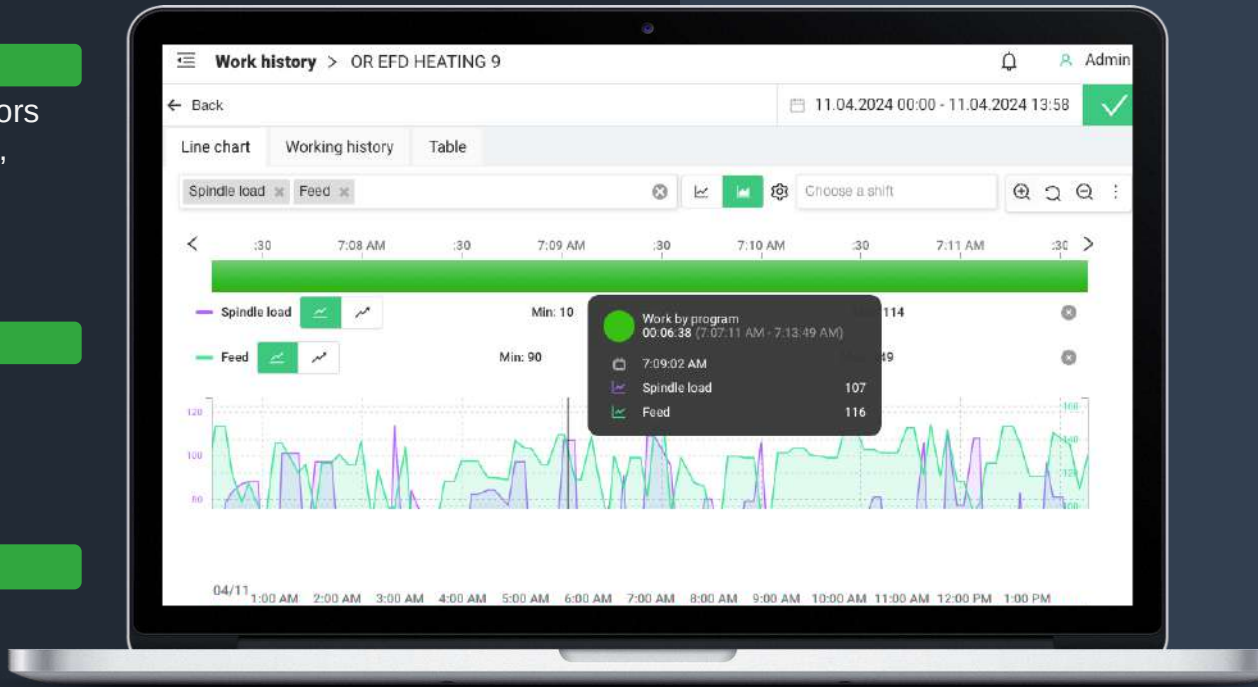
Feed, spindle speed, JOG correctors (%), spindle load, spindle speed, temperature, vibration etc.

Setting of deviation values

Controlled parameters

Sending notifications

Email, SMS, In-app notifications



Key performance indicators

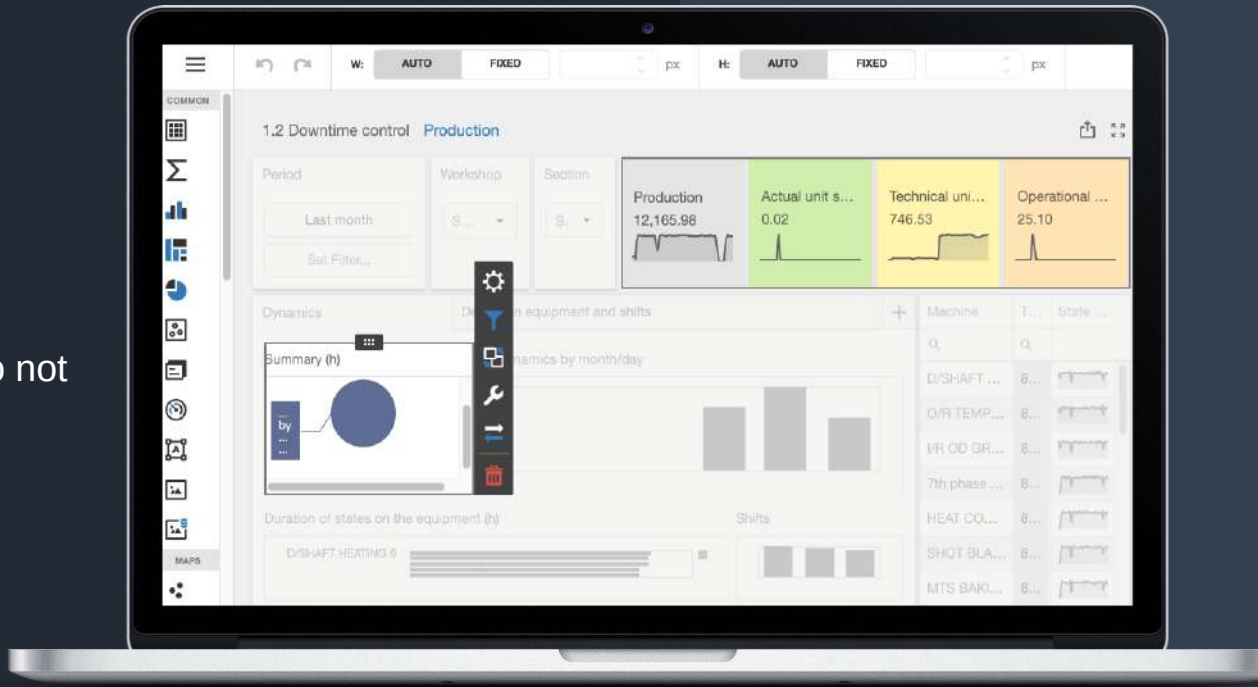
- The online monitoring solution of MDCplus Cloud tracks KPI, OEE, etc.
- You can react quickly to the situation and make the required decisions

NC program management

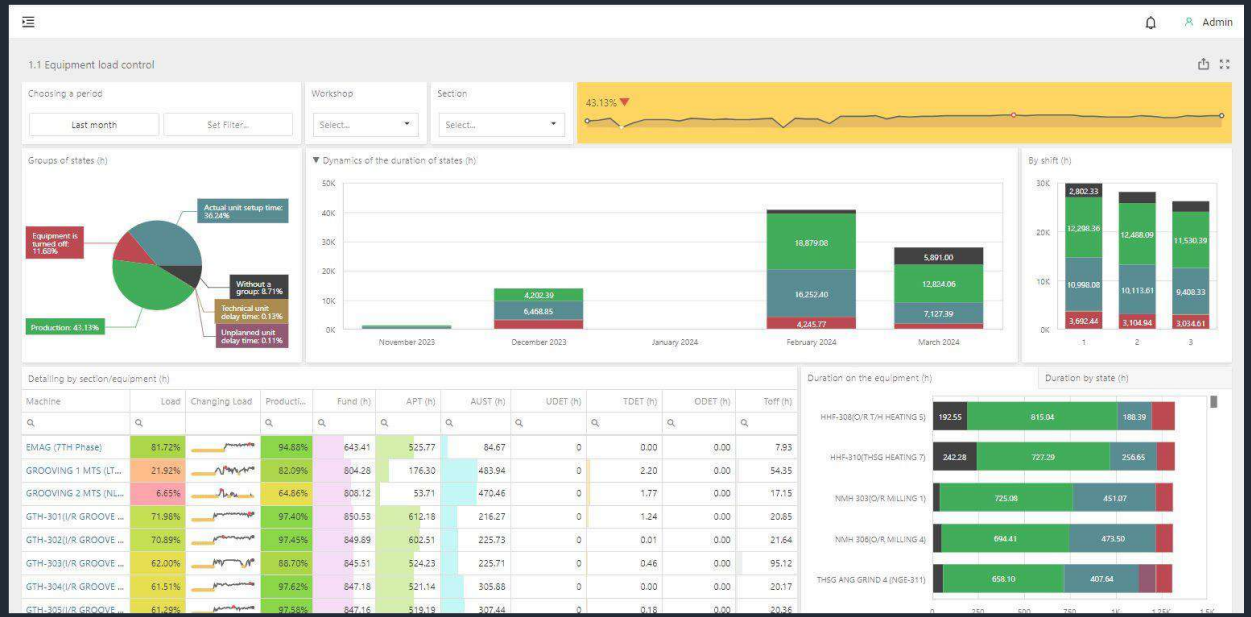
- Storage of programs based on relations with products, assemblies and parts according to the design composition
- Program transfer control
- Automatic transfer to machines
- Comparison of the executed program with the original ones
- Analysis of program implementation

Dashboard editor

- Builder on the web without programming skills
- Creating your own dashboards
- Changing embedded analytics
- Creating additional fields that do not exist in the MDCplus
- BI to ERP, MES, EAM etc.



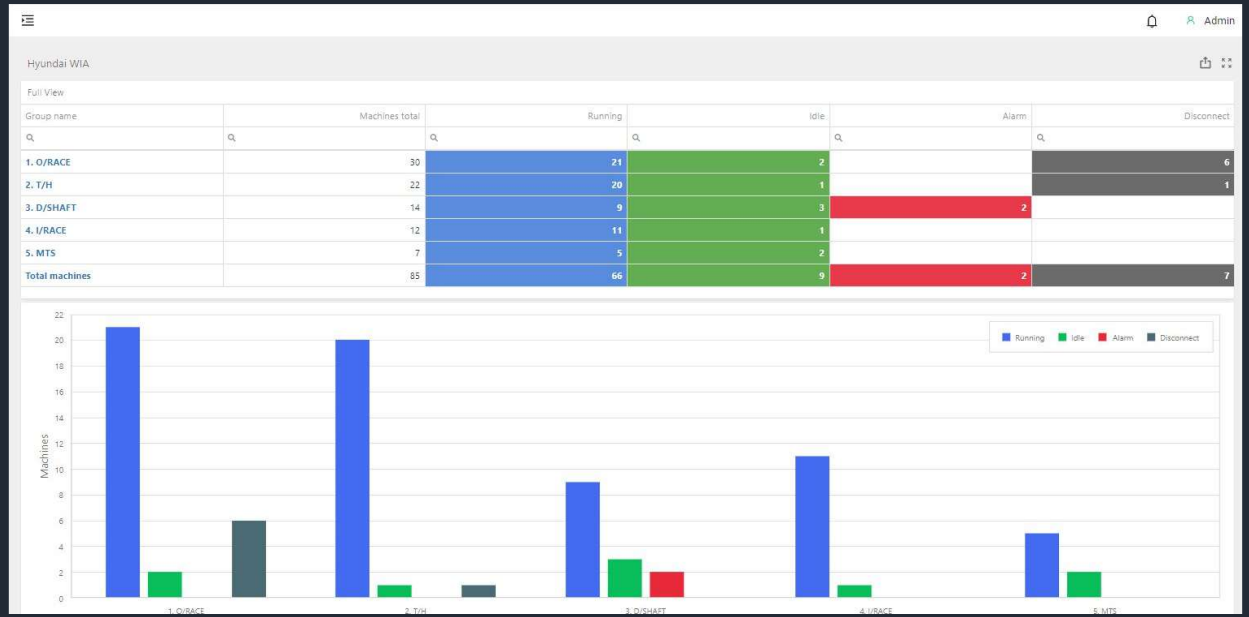
Example of the dashboard: equipment load control



Dashboard provides information on production time detail and serves as a tool for finding problem areas.

The dashboard displays information on the percentage ratio of analytical state groups with the possibility of detailing these groups, the dynamics of their changes in the context of days/shifts/machines, summary information on the duration of the particular state on equipment.

Example of the dashboard: equipment load control



Custom dashboard has been created to display real-time summary information on the statuses of all equipment in the enterprise.

- The information is presented in tabular form and as a bar chart.
- The equipment is divided into separate groups according to the customer's preferences.
- Information is being updated in real time.
- A click on the Group name redirects to the monitoring page of this group.

3D editor

- Display of information on the equipment (name, current status, operator, product/part/operation being manufactured, planned number of parts according to the shift order and currently manufactured parts).

MES – production monitoring

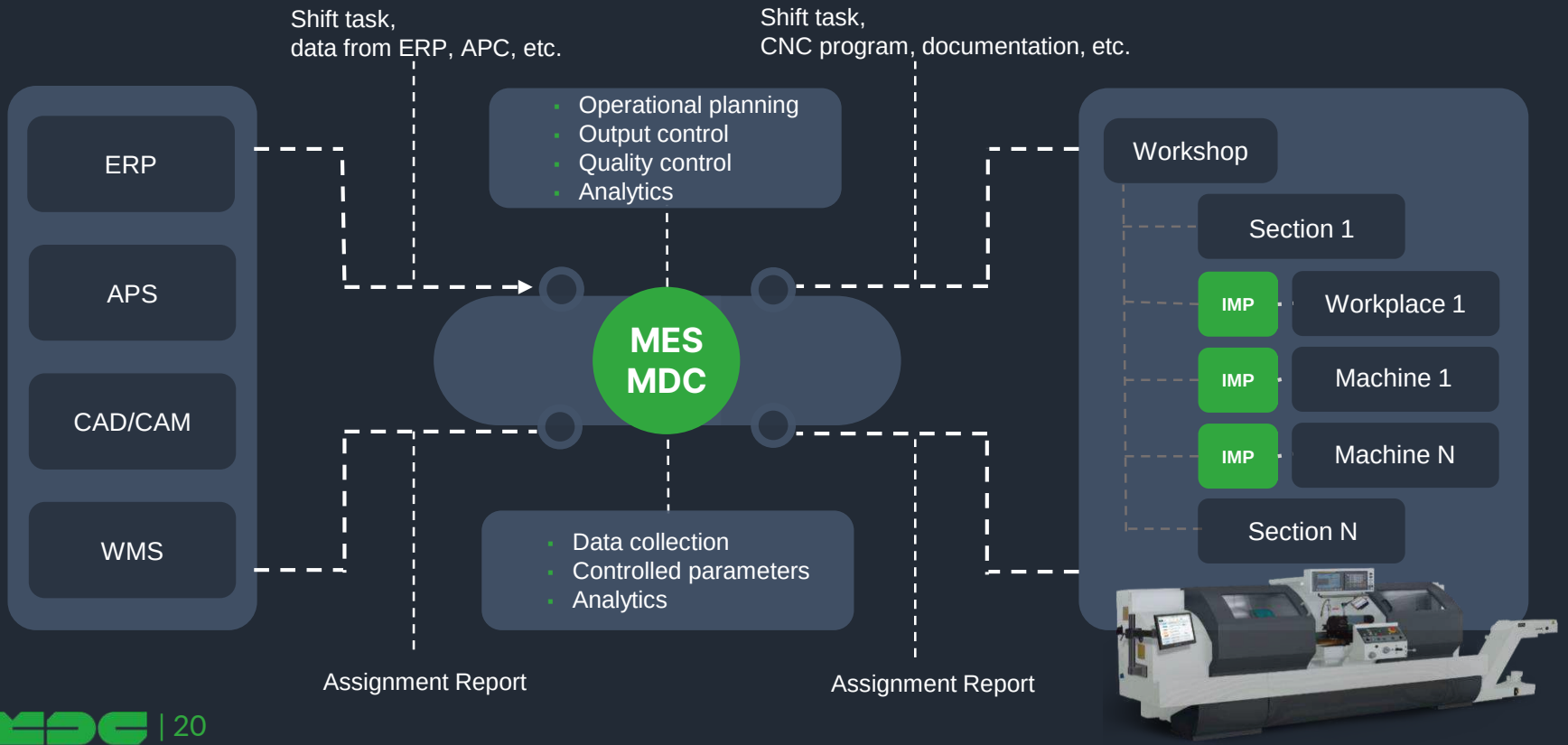
- Display of the real situation in production
- Tracking the completion of shift tasks
- Automatic creation of route sheets
- Operative planning
- Material warehouse
- Analytical reports

MES

Goals and objectives

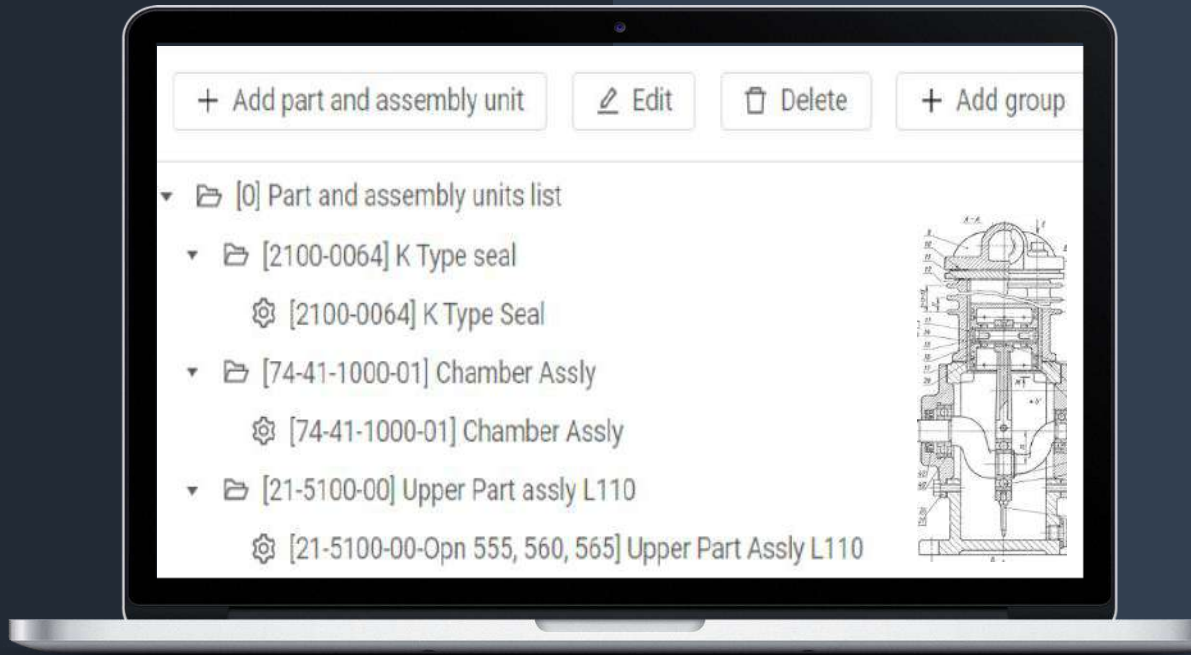
- Creation of the digital database of all products manufactured by the company, as well as the technology of their production
- Creation and management of production orders
- Release of products on time
- Producing the required quantity of products of appropriate quality

MES
integrates with ERP planning



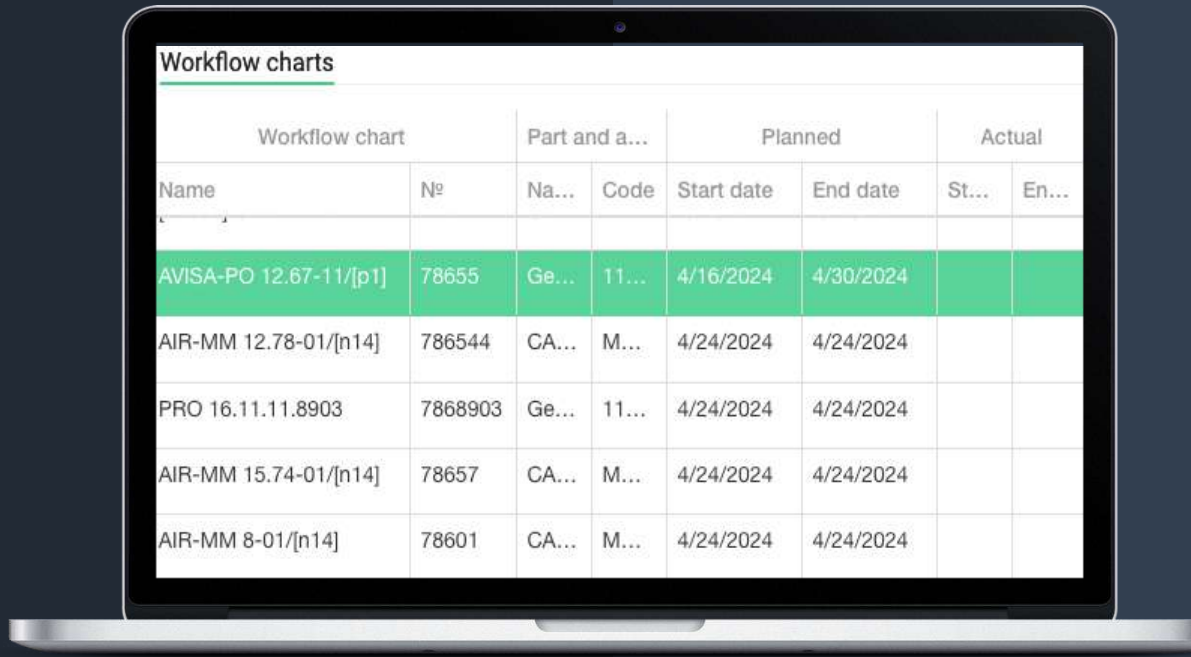
Part and assembly units directory

- Maintain hierarchical structure of Part and assembly units directory
- Automatic and manual rationing of technical operations
- Digital documentation



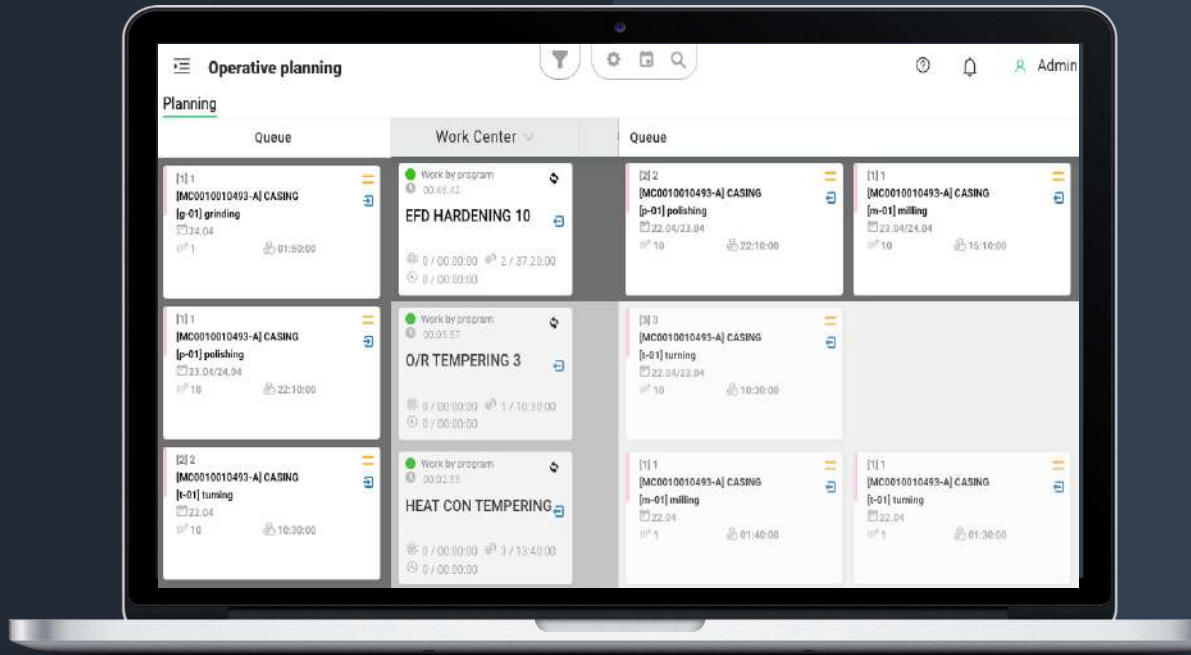
Workflow charts

- Workflow charts management
- Barcoding and traceability
- Work history
- Plan-to-fact detailing
- Automatic generation of shift tasks



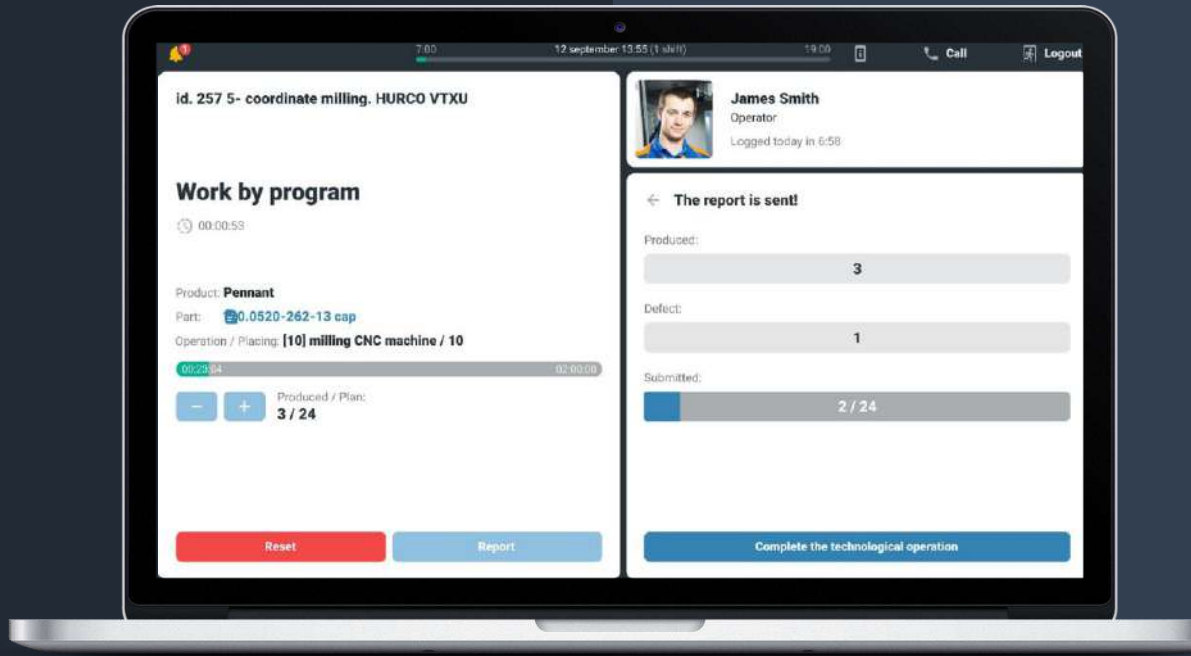
Operative planning

- Task management
- Equipment load control
- Operational change of plans
- Calculation of production release dates
- Customized interface



Digital workplaces

- Digital tasks
- Information on the fact of work on tasks
- Digital documentation in the workplace
- Fixation of defects with the possibility of detailing
- Implementation report



EAM – enterprise asset management

- Unified equipment base
- Materials and spare parts warehouse
- Interactive service cards
- Work planning
- Mobile EAM
- Analytical reports

EAM

Work planning

Service programs

1. Work schedule
2. Equipment runtime
3. Technical diagnostics

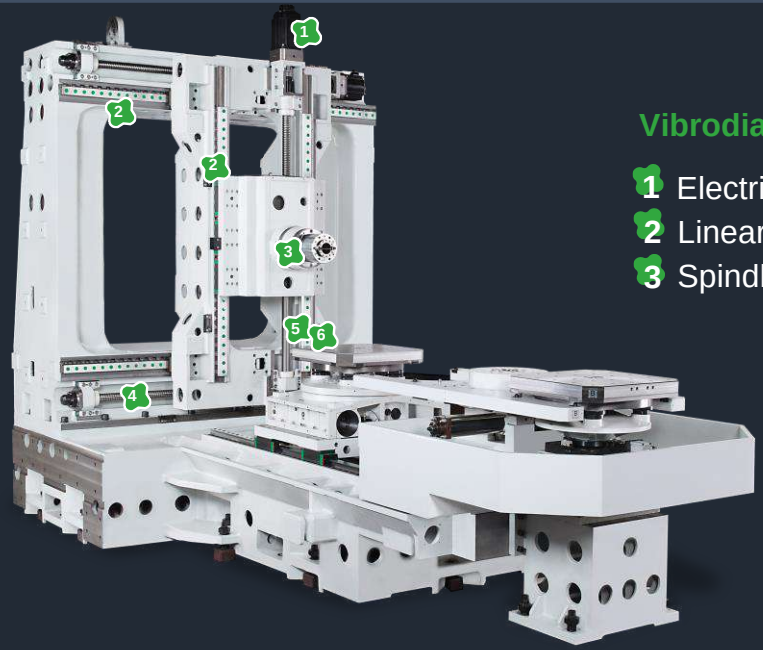
Plan

PLANNING

- Calendar and budget
- Long-term and operational
- Automated and manual
- Resource reservation
- Coordination of works
- Monitoring and notification
- Accounting of actual and planned equipment load

Vibrodiagnostics – Tool for moving to predictive analysis of equipment condition

Vibrodiagnostics – the method of equipment technical condition control based on the analysis of the dynamics of its vibration parameters



Vibrodiagnostics allows you to monitor the condition of:

1. Electric motors
2. Linear guides
3. Spindle
4. Ball screw gear
5. Rolling bearings
6. Rolling bearings in linear axes

Vibration control allows:

- Monitoring of critical machine components
- Crash protection for spindle
- Predict accidents
- Plan EAM
- Process analysis

400+ global implementations with 25 000 machines connected

USE CASES

Enrichment of operational planning and creation of shop floor dashboards

Task

- To seamlessly integrate real-time data from machines their MES system for enhanced operational planning.

Solution

- ✓ Increased Overall Equipment Effectiveness (OEE)
- ✓ Identify and document reasons for equipment downtime
- ✓ We provided crucial insights into energy consumption
- ✓ The enhancement of their equipment workload planning
- ✓ Complimenting the client's existing technological ecosystem

Result

- ✓ Developed Protocols for retrieving data from Mitsubishi Q series controllers.
- ✓ Custom dashboard has been created to display real-time summary information on the statuses of all equipment at the enterprise.

Machines connected:
92

Equipment type:
CNC, Fanuc, Siemens

Project value

- Complimenting the client's existing technological ecosystem. They had their own application tailored for operators, but our product seamlessly integrated with it, offering an expanded toolset and enriched user experience. This synergy between our solutions empowered the operators with more robust tools, making their daily tasks more intuitive and efficient

Higher production performance for Singapore engineering services company

Mencast
PARTNER PERFECT

Task

- Improve quantifiable performance measurement, planning and delivery performance
- Build an open, analytical culture to focus on issues that offset the numbers

Solution

- ✓ Performance tracking with digital solution to compare with the snapshot observation
- ✓ Create performance dialogue sessions to improve material and labour utilization

Machines connected:
32

Equipment type:
CNC, Mazak, DMG, Makino, Leadwell

27%
Machine utilization improvement

EUR 500 000
increase in annual profit per 22 machines within 2 months

Implementation of IIoT and AI solutions for the aerospace enterprise

GODREJ & BOYCE

Task

- Connection of a real-time equipment monitoring system to meet modern requirements of economically efficient and environmentally friendly production
- Implementation of AI solutions for predictive maintenance and tool wear prediction

Solution

- ✓ Monitoring of energy consumption costs and maintenance costs
- ✓ Monitoring of key KPIs and parameters (including requested data for AI)

Result

- ✓ Reduced energy costs - annual savings of €200,000 for 20 machines
- ✓ 30% Machine utilization improvement
- ✓ Removing the OEE performance indicator according to ISO22400-2 2014
- ✓ Implementation of the predictive maintenance model is a step towards cost-effective production

Machines connected:
22

Equipment type:
CNC, Heidenhain, Sinumerik, Haas, Bystronic, LVD

30%
Machine utilization improvement

EUR 200 000
Effect of implementation in the first 3-5 months (20 machines)

Efficiency improvement on the Machine Building Enterprise in Ukraine

Company

MAGMA Ukraine – European machine building enterprise

- Production: spare parts, custom built equipment, handling equipment
- Industries: metallurgical, mining and coke industries, sea and river ports

Task

To decrease COVID-19 pandemic effect and keep completion for strategically important orders on-time

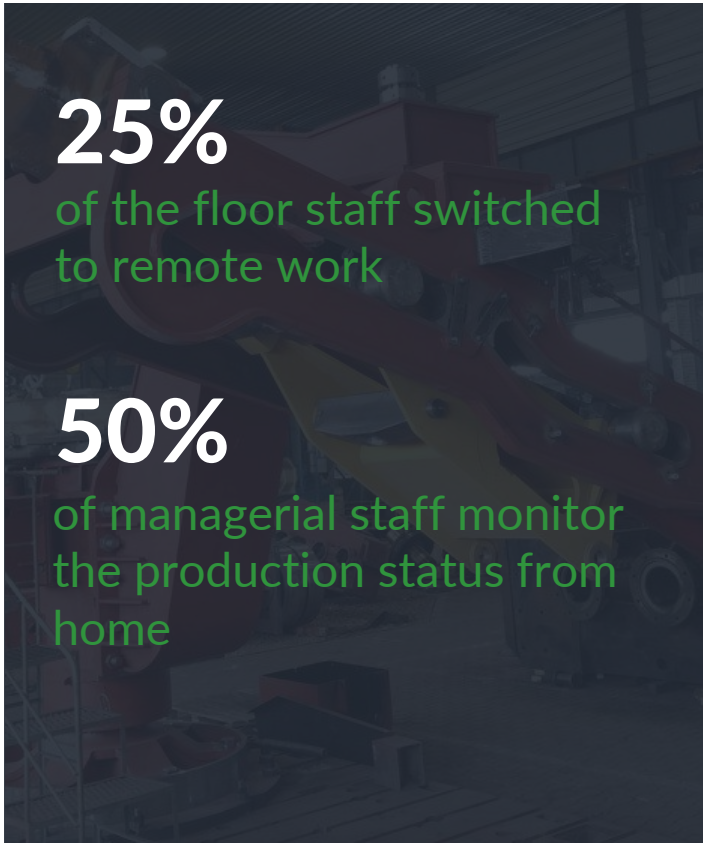
Solution

- ✓ MAGMA's management evaluated the equipment workload for strategically important orders
- ✓ Tasks were redistributed among equipment and personnel
- ✓ Some of the machines were completely stopped, remaining machines were loaded to approach 100% capacity

Result

- ✓ >25% of the floor staff could be released from the workshop and sent home to work remotely
- ✓ 50% of the managerial staff continue to monitor the status of order fulfillment online from home

Magma LLC was able to prioritise and redistribute orders within their factory based on the urgency while turning off some of the machines and freeing up the staff accordingly



Capacity planning enhancement for the Gear manufacturing company

Task

- Higher production efficiency due to the order portfolio growth and expansion of the business geography
- Higher transparency of production business processes
- Detection of equipment downtime and recording of the operating time

Solution

- ✓ Connectivity with CNC, legacy machines. Wide acceptance for heterogeneous machines
- ✓ Improvements in capacity planning (the production is not mass and based on specific orders).
- ✓ Organization of the storage and transfer of the NC program to the machines
- ✓ Machine tool allows to produce a greater number of parts by increasing availability time for machines.

Result

- ✓ 30% - availability time improvement
- ✓ 27% - organizational downtime decrease
- ✓ Less than **3 Months before** The Return Of Investment (ROI)

Machines connected:
101

Equipment type:
Machines with CNC - Fanuc, HAAS, Siemens, REISHAUER, PLC and Legacy machines

30%
Availability Ratio increase

27%
Organizational downtime decrease

Project complexity

- The main issue was connecting heterogeneous machines using the unified platform to understand the effective load of each machine. The management could not effectively influence this situation due to the opacity of the production information model and capacity planning

Improving enterprise efficiency in heavy industry

HYUNDAI ENGINEERING CO., LTD.

Task

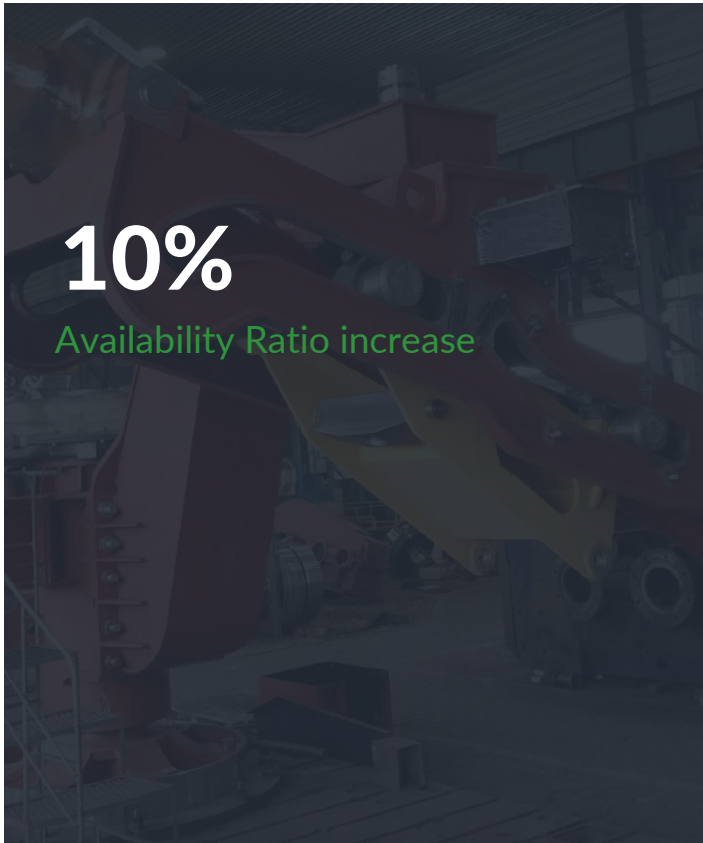
- Improvement and modernization of the production process in order to improve product quality and increase competitiveness
- Introduction of modern process control and management systems

Solution

- ✓ MDCplus is connected to 17 CNC machines from different manufacturers in a single system
- ✓ A complex that monitors the work of the entire machine park and production personnel of the enterprise. The complex analyzes the received data and provides reports on production efficiency

Result

- ✓ 10% Machine utilization improvement
- ✓ Creating conditions for maximizing the efficient use of equipment
- ✓ Process control and downtime management
- ✓ A system of notifications based on violations of the technological mode was created



Machines connected:
17

Equipment type:
Fanuc, DMG-Sinumerik, Mazak

Real-time monitoring and MES integration

A KOMAX GROUP COMPANY

Task

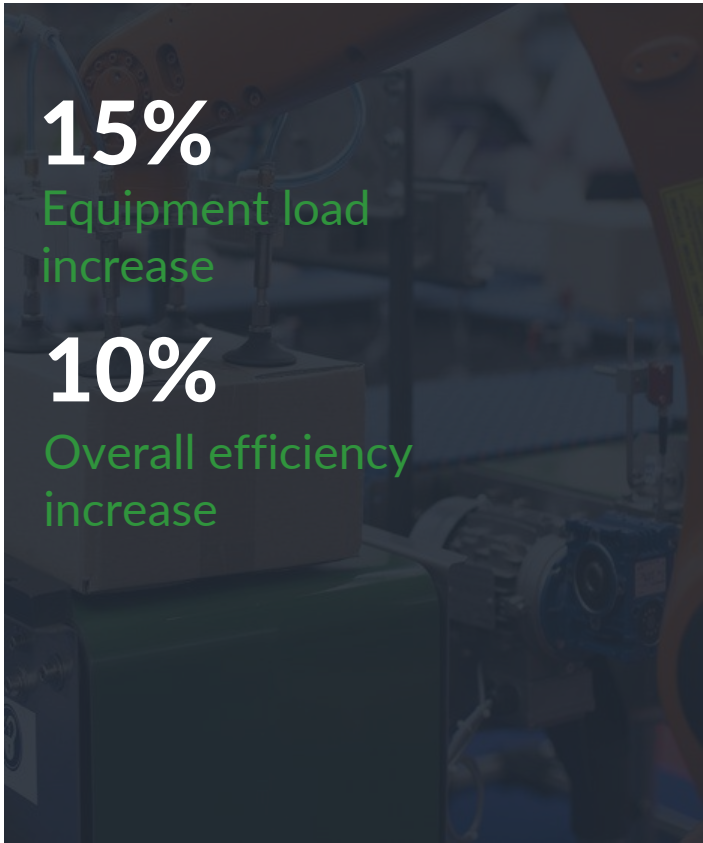
- Remove the human factor during the reports generation
- Measure equipment utilization
- Compare equipment utilization by shifts
- Integrate with MES system

Result

- ✓ Reports on machines utilization
- ✓ Reports on machine-wise and total downtimes
- ✓ The number of produced parts is calculated
- ✓ Part production time values are calculated
- ✓ TSK decided to deploy MDCplus to 5 production sites.

Machines connected:
14

Equipment type:
Machines with NC : Fanuc, Haas



Efficiency improvement on the Machine Building Enterprise

HT LASER

Task

- Monitoring of CNC machines and laser equipment
- Control of plan execution
- Finding bottlenecks in production processes

Solution

- ✓ Creation of workplaces to determine the causes of downtime
- ✓ Customize analytics to find bottlenecks in production processes

Result

- ✓ Tracking of equipment operation without the influence of "human factor", including deviations from set operating modes
- ✓ Reports on equipment utilization are generated in order to analyze and identify bottlenecks
- ✓ Process control and downtime management

Machines connected:
22

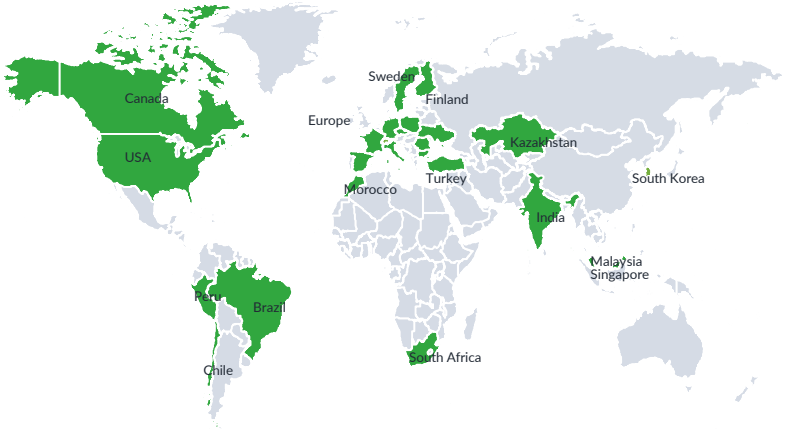
Equipment type:
CNC, Fanuc, Heidenhain, Siemens

About MDCPlus

474 enterprises

25+ countries

25+ partners



MDCPlus has a presence in regions (Local office or partnership channel)

Entrepreneurial Company of the Year in the AI-based Solutions for Process Industries

X2

THE TOP-10 BEST IOTWC
2 YEARS IN THE ROW
2018, 19. Heat Treatment AI, Artificial Lift

BUSINESS TRANSFORMATION AWARD 2019
Efficient and Economic Manufacturing with MDCplus"

IoT Award 2020
IOT COMPANY OF THE YEAR
The best IoT Platform,
The best IIoT Solution for heavy industries

MEMBER OF THE INDUSTRIAL INTERNET CONSORTIUM

TOP SUPPLY CHAIN MANAGEMENT
Technology Companies In Europe 2020

Don’t miss out Industry 4.0!

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