DIGITAL FACTORY

COMPAS
Supporting Your Success

EFFICIENTLY MANAGED PRODUCTION COMES® OEE

The **COMES** Manufacturing Information System provides you with accurate monitoring, control, and evaluation of production, as well as real-time improvement of its efficiency.

EFFECTIVE MANAGEMENT OF YOUR PRODUCTION

COMES OEE is the function area continuously developed within the COMES MES/MOM system, intended for accurate production monitoring and digital evaluation of the efficiency of machines/lines in manufacturing plants. Easy implementation, administration and use are important characteristics of the COMES web-based system. The COMES OEE encompasses all the most common key production indicators (KPIs) - **OEE, TEEP, SMED, MTTR, MTBF, Uptime**. COMES OEE provides real-time information for the needs of the production team's decision-making, effective reduction of production losses, and motivating workers towards better performance. For managers it serves to simplify optimization and production management. COMES OEE is developed as part of the **COMES Digital Factory** solution within the vision of Industry 4.0.

OEE – Overall Equipment Effectiveness is the most commonly used KPI statistic in manufacturing management. It exposes production losses caused by downtimes/repairs or machine breakdowns - **AVAILABILITY**, losses in utilization of nominal equipment capacity/lower production rate - **PERFORMANCE**, and losses due to product quality issues/non-conformity/defects - **QUALITY**.

- Production scheduling and shift calendar with COMES APS
- Data acquisition from machines and equipment, production status visualization
- Operator terminal interface on the shop floor
- Evaluation of equipment effectiveness - OEE and other KPIs
- Digital documentation for production
- Escalation of production statuses and losses
- Open communication interfaces
- User configuration and management of production data

MODULAR MANUFACTURING EXECUTION SYSTEM **COMES®**

PRECISE/EXACT DATA

Automatic as well as manual collection of manufacturing data from machines.

COMES OEE enables automatic data collection from manufacturing equipment, tailored to their technical and communication capabilities, potentially by additional hardware. Communication can be one-way or bidirectional using standard communication protocols such as OPC-UA, OPC-DA, EUROMAP, using databases, files, digital, or analog signals.

COMES OEE can automatically or manually gather production data through user interaction via terminal interfaces, for instance, categorizing downtimes and product non-conformities. All information is automatically stored in the COMES system database.

FOR OEE EVALUATION, THE MOST COMMONLY COLLECTED VALUES ARE:

- Equipment operation information
- Number of produced items
- Technological parameters of quality

REPORTING

Production statistics and key performance indicators (KPIs, OEE).

COMES OEE contains user-configurable output statistics/protocols, and additional statistics can be added according to user requirements. Standard COMES OEE protocols encompass all displays of production data and basic production statistics.

OVERVIEW OF IN BUILT STATISTICS/REPORTS:

- Production protocols
- Downtimes
- Non-conformities/defects
- Pareto charts showing main loss causes
- OEE, TEEP, MTTR, MTBF protocols
- Shift reports
- Dashboards

PRODUCTION SCHEDULE

A production schedule created by a production planning manager with feedback.

COMES OEE evaluates the actual state of production in relation to the current production schedule, which can either be imported from an external planning system or created directly within the COMES OEE through a work queue for individual production equipment. Displaying and editing the production schedule are provided users with the Gantt charts.

PRODUCTION SCHEDULING BY COMES® OEE INCLUDES THE FOLLOWING FUNCTIONALITIES:

- Setting of all production parameters
- Synchronization of the production plan with the shift calendar
- Inserting individual production orders into the production schedule
- Calculating the production duration based on the quantity of pieces and production nominal times
- Automatic shift of all scheduled production orders when a new order is inserted.
- Evaluation of the actual plan status based on real-time data

DOCUMENTATION

Documentation for digital production.

COMES OEE supports for digital documents and its directing towards user terminal at workplaces. The documentation can exist in various formats, including images, PDF documents, videos, as well as Microsoft Word and Excel formats. The documentation is versioned within the system, and users are automatically notified of any new production-related documents.

This feature ensures that up-to-date and relevant documentation is readily accessible to operators and workers at their workplaces, contributing to enhanced efficiency and accuracy in production processes.

OVERVIEW OF DIGITAL DOCUMENTATION:

- Assignment to workstations, orders, products, or general groups
- Notifications of new document versions directly at workstations
- Evidence of employees familiarized with the documentation
- Reduction of paper-based documentation
- History of changes of production documentation
- Set up of document validity, rules, and viewing permissions

ESCALATION

Current information to solve situations in production.

COMES OEE is equipped with an escalation system that allows users to set escalation rules: sequence of escalated persons, their response time, frequency of escalation repetitions. Escalation is communicated through notifications (by email, SMS, applications, smartphones), alerting users to a production issue or potential production loss. Users have the option to acknowledge the escalation and its solution.

COMES ESCALATES, FOR INSTANCE, THE FOLLOWING PRODUCTION STATES/REQUESTS:

- Calling on an authorized worker to the workplace
- Occurrence of a machine downtime or prolonged machine inactivity
- Escalating scrap rates on a machine
- Decreasing production cycle time
- Request for machine maintenance
- End-of-shift results

COMES OEE TERMINALS

Intuitive operator interface.

COMES OEE provides users with a touch-enabled terminal interface for displaying data and enabling the operator's tasks at the production equipment. It dynamically adjusts to the screen resolution and can be configured for a specific workplace/machine or even for multiple machines. The terminal can be equipped with attendance card readers, barcode/QR/RFID code scanners, and printers. The screens are designed with a focus on easy and user-friendly navigation, with the option to switch to different languages (such as English, etc.).

Mobile interface for smartphones and tablets. The same functionality as on fixed terminals is available.

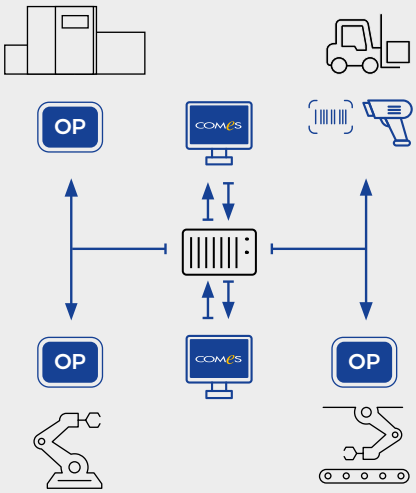
FUNCTIONS OF COMES TERMINALS INCLUDE:

- Operators login
- Display of shift schedule and its progress
- Classification of downtimes, performance losses, defects/non-conformities
- Reporting production results in pieces or packages
- Initiating escalation - calling a supervisor, maintenance, or other support
- Displaying production documentation
- Printing labels and tags for packaging
- Submitting maintenance requests for equipment

COMES SYSTEM ARCHITECTURE

Microsoft® IT platform and web user interface.

COMES OEE is one of the function areas within the COMES MES/MOM system. The entire system is developed on the Microsoft® IT platform with a client-server architecture, providing data security and protection, accessibility by a web user interface, and the utilization of smart mobile devices as well as an option use COMES as a service (SAAS) from a cloud. An important advantage is also the minimum hardware requirements and system administration alowing the configuration changes by the system run.



PRODUCTION MONITORING

Production status generated in real-time.

COMES OEE provide users with in-built statistics for visualization of the current production. It informs production team with current shift results and provides management with an overview of the production status without the need for physical presence on the shop floor. The most commonly displayed information includes staff prezence on the shop floor, statuses of individual machines and technologies, parameters of running production, numbers of produced and defective pieces and production losses. The overviews and Andon displays can be configured according to customer requirements.

AUTOMOTIVE

MECHANICAL ENGINEERING AND ROBOTICS

FOOD & BEVERAGE

PHARMACEUTICS AND COSMETICS

COMES system is utilized across various industries, including the automotive, mechanical engineering, plastics and rubber production and construction element manufacturing. Excellent functionality provides users in batch and batch-related industries: food, chemical, pharmaceutical, cosmetic and medical products manufacturing. COMES OEE can be integrated with other COMES function areas such as COMES APS for production planning and scheduling, COMES WMS for internal plant logistics including traceability of production, and COMES Maintenance for maintenance process management. To support flexible serial manufacturing, the COMES MOM concept is available, and for continuous and batch processes, COMES OEE can be integrated with COMES Historian and COMES Batch modules.

The COMES Digital Factory is a solution that incorporates the functionality of all COMES functional areas, built on the principles of system integration and comprehensive production digitization.

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