OEE Analyser

Increase your Manufacturing Efficiency

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Overview

Measured data and key performance indicators are essential premises for the optimisation of production systems relating to costs, quality and flexibility. Otherwise it is difficult to find out the potentials and the reasons of losses which affect the operating performance.

OEE (Overall Equipment Effectiveness) offers transparency of the actual utilisation of your machines and the potentials of improvements. The OEE method delivers plain information, facilitates the internal communication and contributes to a better understanding of production processes.

With the OEE Analser you will implement the OEE method quickly and without any appreciable effort. The automated mode of operation generates accurate results and key performance indicators.

With the OEE Analyser you will:

- Increase your productivity sustainably
- Improve the quality
- Reduce downtimes of machines
- Raise your manufacturing capacity
- Keep your production schedules reliably
- Decrease the production costs
- Manage your improvement projects efficiently
- Train and qualify your personnel

In discrete or continuous manufacturing processes, the OEE Analyser may be used for machines, production, assembly or packaging lines, machining centers, batch processes, etc.

At any time, you may request the analysis and reports on your desktop PC and check the development in your shop floor. The system handling is intuitive and simple. Your operators are informed about the current shift performance and may react promptly if required.

In numerous enterprises, the OEE Analyser is an integrated part of the process optimisation and continuous improvement organisation. The tool has contributed definitely to raise the company's success after a short time.

The product has a multilingual user interface and uses databases like Oracle or SQL-Server. Optionally it may be linked to existing ERP or MES (Manufacturing Execution System) systems.

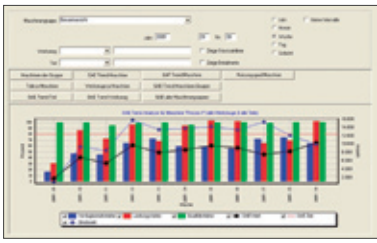
Scope of functions

- Continuous calculation of OEE and TEEP
- OEE/TEEP trend with productivity parameters
- Analysis of downtimes (reason, duration, frequency)
- Analysis of scrap/rework
- Analysis of different products or tools on a machine
- Evaluation of processing and setting-up times
- Technical and organisational availability
- Analysis of correlations
- Machine benchmark
- Current machine status
- Historic machine status

The OEE trend of a machine shows the availability, performance and quality grades to recognize any weakness at a glance. For further information, you may click on a bar to call detailed evaluations of downtimes or scrap by reason and frequency.

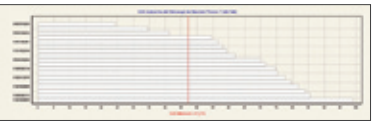
The TEEP trend additionally includes the utilisation grade, which considers planned downtimes as well as stoppages not in the responsibility of the production team.

Machine terminal

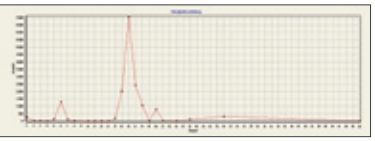


Productivity trend (OEE)

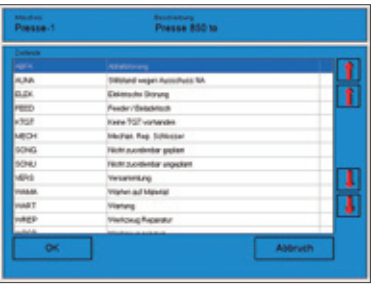
Downtime analysis



Product analysis



Evaluation of processing times



Downtime confirmation on machine terminal

For machines, where several products are processed or different tools are used, the productivity of products or tools is evaluated. The product or tool related productivity range is used to optimise the workspace of machines. For systematic improvements, product or tool specific downtime and scrap analysis are provided. The productivity of a particular product, produced on different machines, is compared and displayed accordingly.

Comparable machines may be combined in machine groups. For each machine group, an OEE target value may be defined. The machine benchmark may be selected for an user-defined period and shows the deviation of each machine with reference to the target value.

The frequency distribution of processing and setting-up times on a specific machine documents the stability of the process and is used to adjust the planned setting-up and processing times, which generally are considered for the calculation and pricing. You also recognise the need of optimisation and standardisation of the setting –up procedure. These evaluations are available for a selected product or tool as well.

The main target of maintenance is to assure the technical availability of machines. For that, the OEE Analyser compares the technical availability trend with the service grade to find out the machine specific optimum. For the production planning and logistics, the organisational availability of machines is an important feedback and key figure.

The OEE Analyser offers additional reports and statistics to support the technical controlling, the process engineering and the quality control.

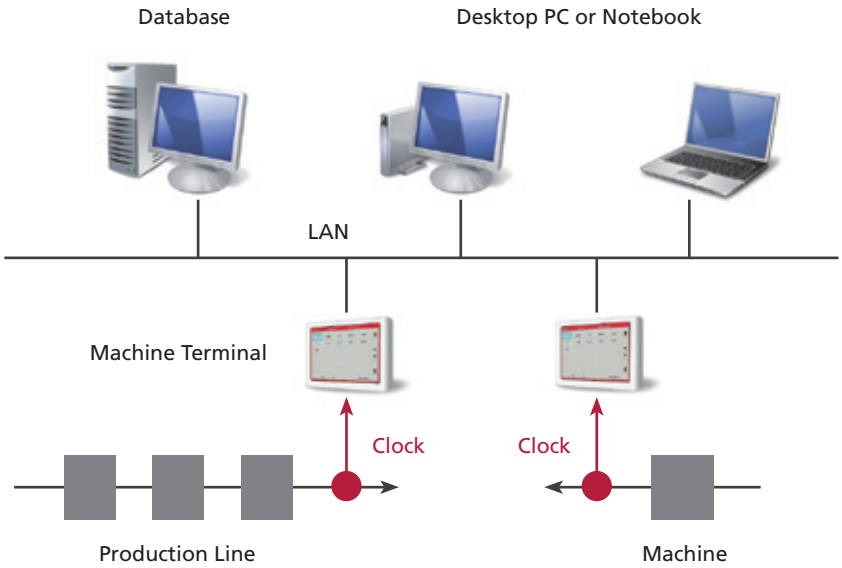
System configuration

Basic data and production results are managed in a database (MS SQL-Server, Oracle) on the server PC. Via network, the user may call analysis and reports on his desktop PC.

The production cycle (clock) is acquired either from a controller (PLC), from a signal generator or from any existing MES. The easiest method is to use a digital signal (24V) from the PLC.

The machine terminal is used to reason downtimes (selection list, no input) and to register current products or built-in tools. If available, downtime reasons may be collected from the PLC. No manual input is required in that case.

The machine terminal is a Panel PC, Industrial PC or Office PC (protected in a rack) running Windows. A touch screen offers easy operation without keyboard and mouse.



Operation method

The positioning of the production cycle derives from the material flow. For machines with short processing times, one signal (machine clock or throughput) is used. For machines with longer processing times (e.g. machining centers), a 2 signal method is used.

For production lines without material buffer it is sufficient to collect the cycle at one position (normally exit side). The stoppage of a station will lead to the stoppage of the whole line. The downtimes should be defined by station and reason to recognise the bottleneck of the line.

For production lines with material buffer the production cycle is acquired for each line section. This is also necessary in the case of material by-pass or combinations.

The operator selects the current product or built-in tool on the machine terminal. The specific set values will be activated for operation and monitoring.

The effective production cycle is acquired and monitored permanently. As long as the cycle meets the set processing time, the machine remains in production status and the produced quantity is determined. In the case of timeout, the machine status changes to downtime. The end of downtime and change to production status occurs with the next cycle. This conception calculates production and stoppage times exactly and automatically.

If the OEE Analyser detects a stoppage, the operator is requested to reason the downtime using a predefined selection list on the machine terminal. If no reason is entered, the downtime is kept as undefined and may be reasoned later. During the downtime, the operator may change the reason (e.g. tool breakage – setting-up).

In the case of frequent and short stoppages, a minimum stoppage time for the operator's confirmation may be defined. Short stoppages needn't to be reasoned and are evaluated in reports.

If the machine controller is able to detect scrap or parts for rework, the quantity may be collected by an additional signal. Otherwise scrap is reported by the operator. He selects the reason in a predefined list and enters the quantity.

OEE Management

On demand we offer coordinated services around the product. Based on the analysis and results you may take adequate measures to achieve improvements and cost reduction. We support you and your team in the definition, planning and performance by means of personnel training and coaching. Our experience guarantees an efficient and rapid procedure.

Preparation:

- Definition of project and targets
- Coordination of resources, budget and schedule
- Training of personnel

OEE Evaluation:

- Validation of results
- Structured problem analysis
- Methods of cause analysis
- Definition and validation of measures

Implementation
(depending of OEE results):

- Continuous improvement organisation
- Optimisation of production control
- Introduction of TPM
- Quality control
- Reducing of setting-up times
- Training and qualification

Personnel training

Analysis of setting-up

Visualisation

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