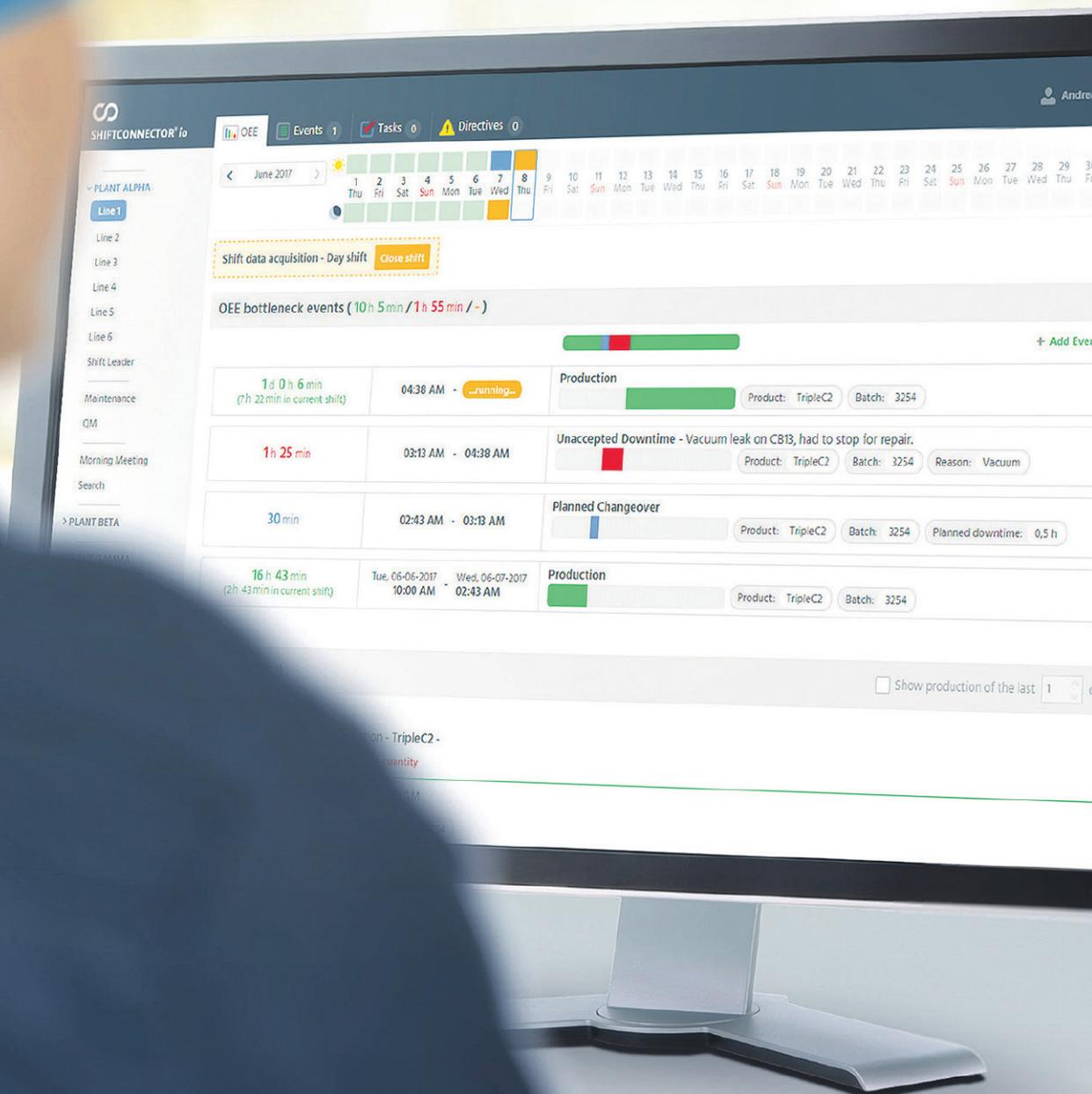


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# People Empowerment and Digitization for better OEE

**Chemical specialties manufacturer Budenheim and Industry 4.0 software vendor eschbach explain why OEE must be owned by the shop floor teams**

In the process industry, the optimal use of the assets can have decisive influence on operating results. Process engineers and plant managers often find themselves in a sandwich position. Corporate management requires accurate figures on losses or unused production capacity. At the same time, the continuous improvement of the process with shop floor teams must be driven forward.



Andreas Eschbach,  
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Adding to the complexity are shift operations with constantly changing teams that lead to challenges in communication, in assessing the causes of losses, in building standardized practices, and in enforcing and monitoring improvements. At this point, digital solutions on the MES layer build the bridge to operations enforcement and can become a highly valuable solution for increasing plant efficiency.

## Introducing OEE as a Key Enabler

When searching for suitable measurement criteria for plant effectiveness, a key enabler, OEE (Overall Equipment Effectiveness) comes into focus. OEE is a key performance indicator introduced by the Japan Institute of Plant Maintenance. It allows to measure how effectively a manufacturing

plant is utilized. The OEE methodology can be used to show both productivity and loss-

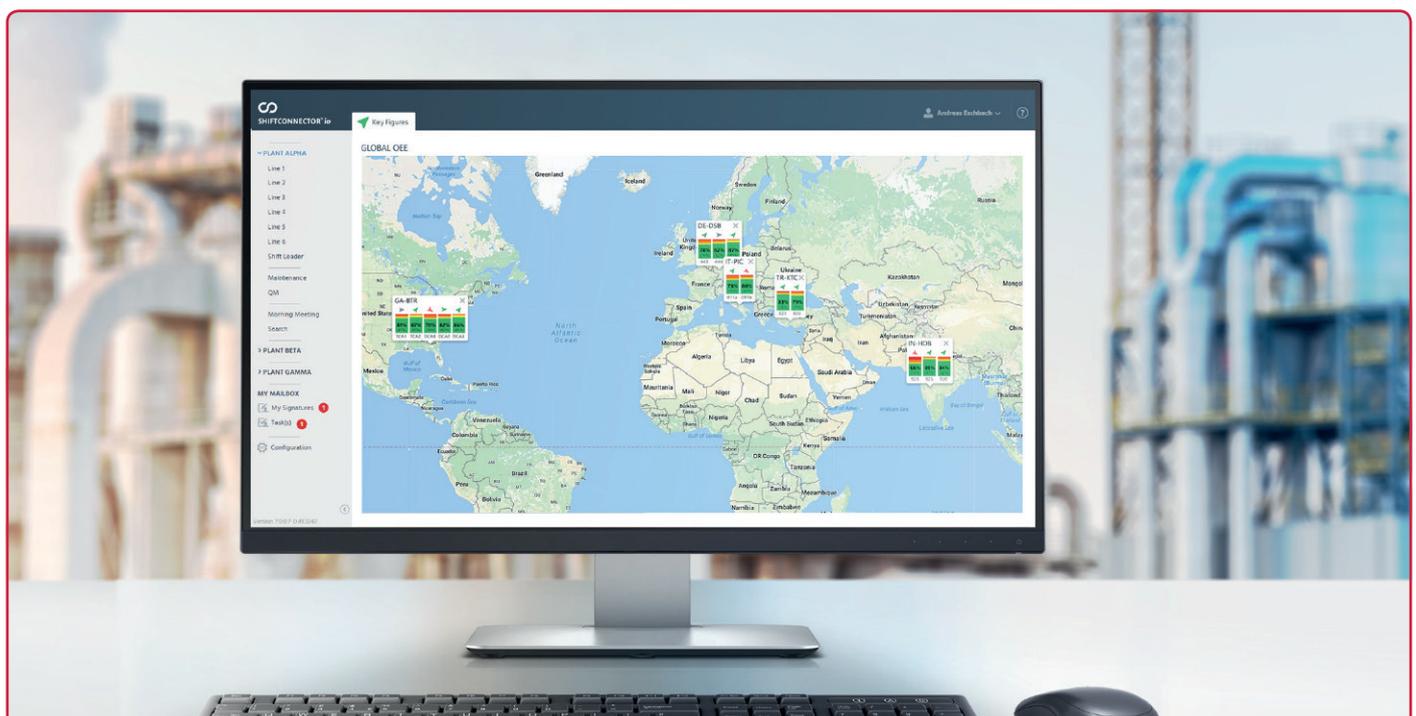
*The interest in OEE is high, but in many production plants a suitable solution is missing.*

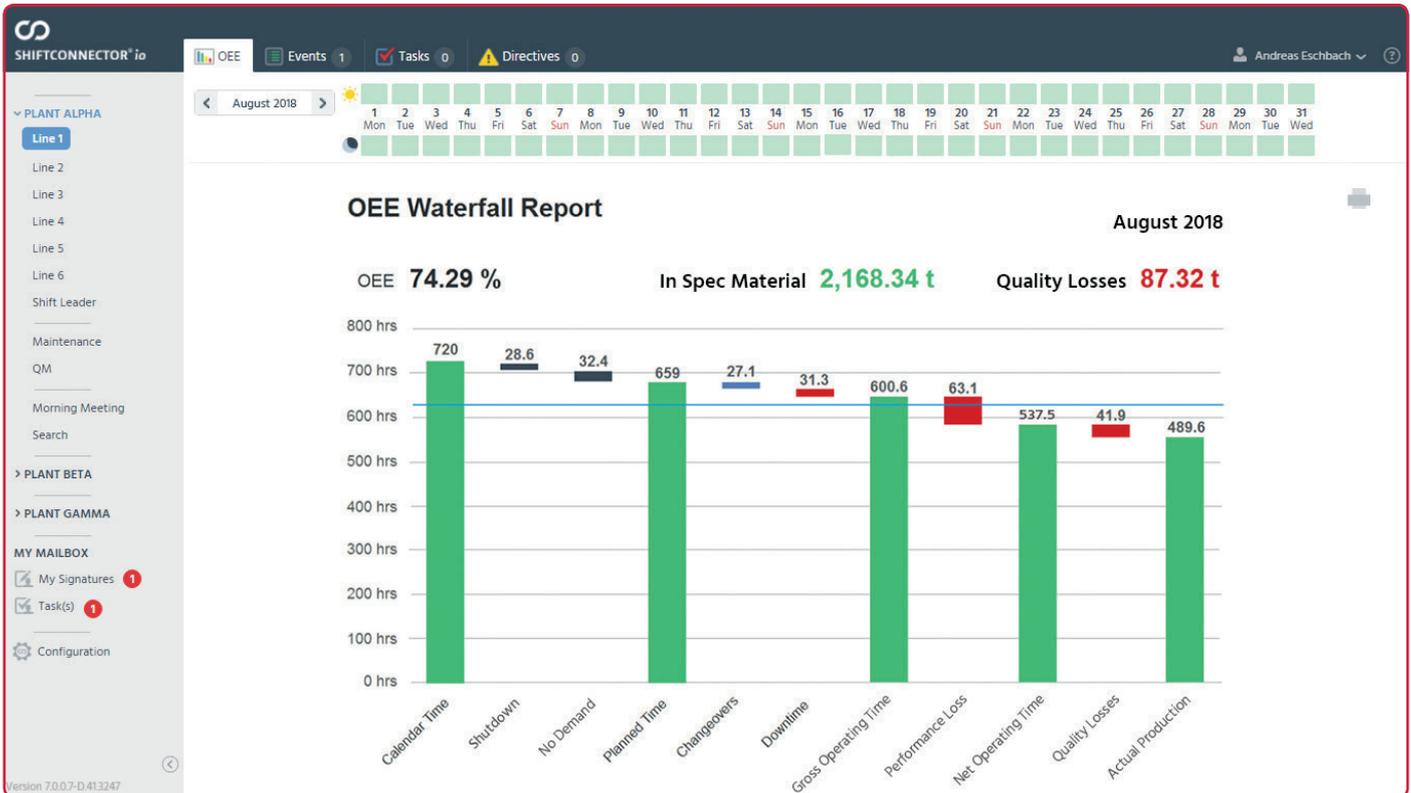
ses at a single glance.

OEE also calculates KPIs (Key Performance Indicators) which are set points for operations that can detail major performance levels, such as throughput, upti-

me, and equipment-specific activity. All losses are categorized in an OEE system by percentage availability, speed and quality. Once properly recorded, the OEE data can be used not only for the typical waterfall diagram but also for various other evaluations, from monthly produced, to planned comparisons, to detailed lists of the biggest performance killers.

“We have been successfully using OEE in pilot areas for some time based on a database solution we developed ourselves in order to test the benefits of such an application.” says Iris Schnell, Lean Six Sigma Black Belt at Budenheim, a global specialty chemicals manufacturer with worldwide production sites and sales offices. “Since we were convinced that the data and context would provide us with more insight, we wanted to take the next





Shiftconnector combines all loss information and calculates a plant-specific OEE key figure at the end of the month. At the same time, the software uses the underlying data for a variety of visual reports that help to accurately track loss reasons.

step and combine our shift log books and the OEE reporting with a professional, interface-capable solution and roll it out to all production areas. This combination was primarily intended to support the daily work of our production managers, who previously invested a lot of time for recording data and searching through files and spreadsheets. We wanted to be able to retrieve an overview of past and upcoming incidents, productions and malfunctions in a matter of seconds. The software had to be well structured, intuitive and, of course, it had to fit into our system landscape. We didn't want a 'measuring tool', but a real 'support tool'." says Armin Horn, who was largely involved in the introduction of the software as operations manager at the time and now supports the tool and its further development as a system administrator.

### Business Intelligence Falls Short

The implementation of a loss reporting system is not an easy task. „The interest in OEE is quite high in the entire process industry, but many production companies lack a feasible approach“ says Andreas Eschbach, founder and managing director of eschbach GmbH. Based on his project experience, the main driver for implementing an OEE solution is typically for reporting. This is the reason why business intelligence platforms are

often evaluated in the first step towards implementing process improvements. Although these tools are powerful when it comes to visualizing performance, there is one crucial issue. „Many manufacturing companies place visual reporting at the top of their requirements list, but the real challenge is quite different,“ adds Andreas Eschbach. „Conclusive data must come

*The production employees are not integrated enough into the performance measurement and its documentation.*

into the reports from somewhere. The information of process historian servers alone is not sufficient. This machine data forms the basis for enriching it with the valuable knowledge of the employees in production.“

### Enable Agile Problem-Solving

Plant operators are the pilots of complex and often highly automated processes. They are in contact with the system

around the clock. „If Operators analyze a situation thoroughly and make the right decisions at the right moment in time, it can make a substantial difference to the business KPIs.“ says Iris Schnell.

In this context, the employees at the production level, from the plant operator to the shift supervisor to the process engineer, must be fully integrated into the continuous improvement process. Tools for measuring and reporting plant efficiency must not only be implemented for plant managers and corporate management, but extend to the entire functional workforce. The solution must also provide detailed, real-time information to the shop floor, so that decisions can be made quickly and in an agile way. Information could include, for example, a report of the biggest causes of loss, and a searchable history of all losses in recent years. “We decided for using a shift log book solution with integrated OEE functionality called ‘Shiftconnector’. The software fully integrates with our shift teams’ routines and gives our shop floor people the full picture of what happens at the plant. Other functions, like plant maintenance, can also access the data, which is an enormous advantage for analyzing failures and determining the right measures. Since additional functions such as planning, QA, materials development, and controlling can also access the data in Shiftconnector, we could improve cross department

communication as well. At the same time, the solution can be standardized across plants and production lines to feed reports for corporate level stakeholders.” says Iris Schnell.

#### Manual Entry of Loss Data

Not all OEE data needs to come from the process itself. Ancillary ‘edge’ device input, like sensor data, can be perfectly processed with the data management capabilities of a process historian system. Availability or speed losses can be extracted in real-time from various data points of the plant and saved as events, from which the OEE KPI can then be calculated. However, loss data which is captured in this way has insufficient depth of information and is often too abstract to derive relevant knowledge for the continuous improvement process. For example, it can be hard to retrace whether a loss in speed was actually an equipment problem, or whether some test batches of a new product with a longer runtime were produced to make best use of the assets during times of low market demand. There needs to be more context added to the data. Iris Schnell adds that “Sometimes sensors can also provide misleading information. For example, the data from a flow meter will not be suitable to distinguish production and cleaning operations at the bottleneck in a reliable manner if the plant’s control systems are not fully integrated.”

Production employees are an untapped source that needs to become part of the performance measurement and documentation process. Their information can provide context to loss events, downtime events, and even minor stoppages. „The documentation of the losses makes information go straight from the hand to the brain.“ says Iris Schnell. “The reflection of events when writing down losses is therefore an important ritual. However, this also requires an open-minded culture of learning and a constructive mindset.” The pursuit of fully automated recording of losses from sensor data can not only cause information gaps in the data, it also misses important details that can be

contributed by the plant operator and the shift teams. By adding the context of ‘people’ to OEE, you gain important nuances in the analysis of what, why and where OEE losses occur.

#### Creating Simplicity and Clarity

Once you have added the ‘people’ factor to your OEE practice, there’s still the issue of building a system that is optimized for usability. Traditional operations software for determining plant effectiveness is optimized to serve a wide variety of stakeholders. However, a decisive factor for success at the production level is whether plant operators and shift supervisors have been sufficiently taken into account. „Three clicks for choosing the reason for a loss can already be too much,“ says Veit Hora, Product Manager at eschbach. „The quality of data will go down if the user experience does not compare to their favorite smartphone app.“

Ease of use does not only include the design of the OEE software’s user interface; it is also a question of simplicity in the loss accounting methodology. For example, the design of the reason tree for losses should be agreed with representatives from the manufacturing operations teams so that there is no doubt or confusion when a loss is accounted for.

Especially in complex, multi-purpose plants, it can be meaningful to distinguish normal process variations from relevant special causes, so that significant deviations from norm are quickly identified and rectified. The OEE software can do this with a suitable algorithm. „The aim is to draw attention to the critical issues first, to start where the leverage and payback are the greatest „, adds Veit Hora.

#### Adding Digitization to the Team

Continuous Improvement is like a team sport with different positions. The roles working together on the shop floor can create a better impact if they work together smoothly. At this point, digitization unleashes a lot of potential. „In our many years of consulting experience for

manufacturing operations, we know that interfaces are worth their weight in gold,“ says Andreas Eschbach. „Nobody wants to learn five different software programs just to complete one single task.“

On the MES layer, an OEE solution can integrate relevant data from process control systems as well as the planning and ERP software into a single dashboard. This creates the necessary real-time operations transparency required to monitor production targets and deviations. When posting losses, serious problems can ideally be escalated directly into the morning meeting, while equipment issues can be sent directly to the CMMS system as maintenance order. The ideal OEE solution integrates all relevant people and systems for continuously increasing plant efficiency.

#### The Wrap Up

People and technology are two critical factors in implementing, and sustaining, an OEE solution that will fit both the way you and your plant work. Having a fully automated solution oftentimes ignores the critical insight that your people can provide, giving you context and details that may be overlooked.

Making the system intuitive and easy to use is one way to foster adoption and use. Offering your users interfaces that are familiar, and are presented on their device of choice, ensures full participation and a stronger likelihood of continuous use.

Lastly, adding digitization—integration to key systems and solutions that exist in your plant today—builds your infrastructure for further improvements and insights, and makes your OEE initiative a foundational element in improving your plant operations.

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## About Eschbach

Based in Germany, with U.S. operations in Boston, eschbach develops software for interactive management, transparent communication and documentation. Our solutions provide a new level of networking in manufacturing operations. The

company’s award-winning Shiftconnector® solution is used worldwide by leading production and supply companies such as Bayer and DuPont.

**For more information about eschbach, visit [eschbach.com](http://eschbach.com)**