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Central Control Element for Industry 4.0

Industry 4.0 is usually only associated with conventional machine and plant engineering applications; in other words, production-related activities. That said, the smart factory provides many benefits for the process industry, including digital integration of all industrial facilities and processes. Furthermore, implementation is quite straightforward when using a Manufacturing Execution System (MES) as the central control element.

Many factories used in the process of producing food and beverages are constantly being expanded and updated. Most of the machine and plant manufacturers involved in these projects spurn standard solutions, instead opting to use unique operating and control systems for their own specific units. This is the reason why factories offer neither a common database nor a continuous flow of data. Furthermore, in many processing companies, business planning is not linked in any way to operational procedures. Orders are therefore still issued on sheets of paper that are subsequently transferred from one processing station to the next. As such, supervisors are unable to monitor the entire production process or guarantee its plant-wide control.

What does a smart factory look like?

Transforming a traditional factory into a smart factory results in significant changes to the way it operates. In the future, business processes will respond dynamically to changes in the market, while production techniques adapt automatically to ensure an appropriate balance between cost, quality and environmental impact. Production technology will adapt to specific customer needs, identify and eliminate bottlenecks and control plant throughput automatically.

This goal - true to the vision of Industry 4.0 - is achieved by vertically coupling technical and commercial business processes and horizontally linking processes and systems along the value-added chain. Viewed from a production standpoint, it is not just the company departments that are interconnected – from initial order to outbound logistics – but additionally also the company's systems to those of its suppliers and buyers. Processes can therefore be controlled and improved across the entire plant. Production becomes completely transparent from start to finish, providing the ideal platform for sound commercial and technical decisions. The smart factory additionally enables companies to identify and satisfy individual customer needs, as even the smallest batch size can be produced economically.

Integration of heterogeneous systems via MES

This vision can be brought to life with a correspondingly adapted Manufacturing Execution System (MES), such as ProLeiT's Plant Integrate IT. It horizontally integrates the heterogeneous information technology of the individual production plants and vertically links the operational production level to commercial business processes. Needless to say, companies profit directly from a plant-wide database. The more systems that automatically exchange information, the greater the added value for the operator. The many benefits include dynamic order management and the opportunity to develop and improve plant-wide recipes, as well as being able to trace production data. By displaying the interrelations between production data, the MES is the ideal solution for all supervisors.

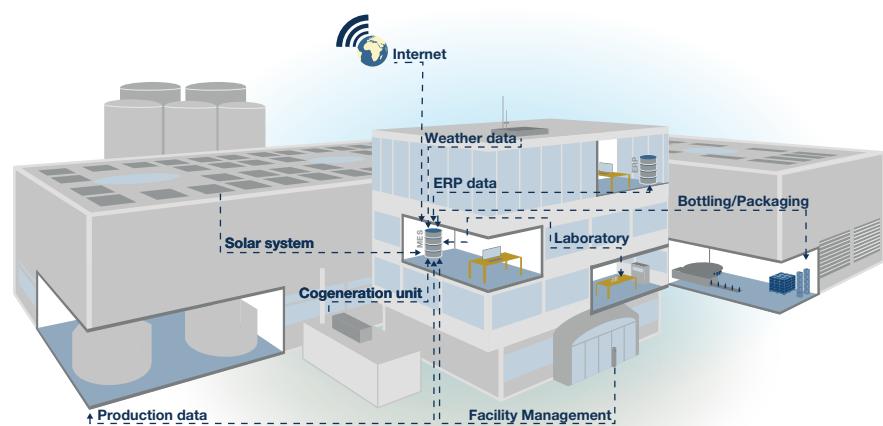
The MES accepts production orders from the ERP system, translates them into individual orders before adapting them to the respective processing station and plant requirements. The substructures, for instance, register the order processing status, such as the processing steps and duration, the level of consumption and

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possible faults. The MES summarises information from all the sub-processes and then processes the data before feeding it back to the ERP system. In other words, only the actual order has to be defined in the ERP system. How the product is actually generated and filled is not controlled by the ERP system but by the dynamic order management of the MES. It can also merge several ERP orders so as to organise production



When used as the central control element, MES ensures all smart factory data is held at a central location.

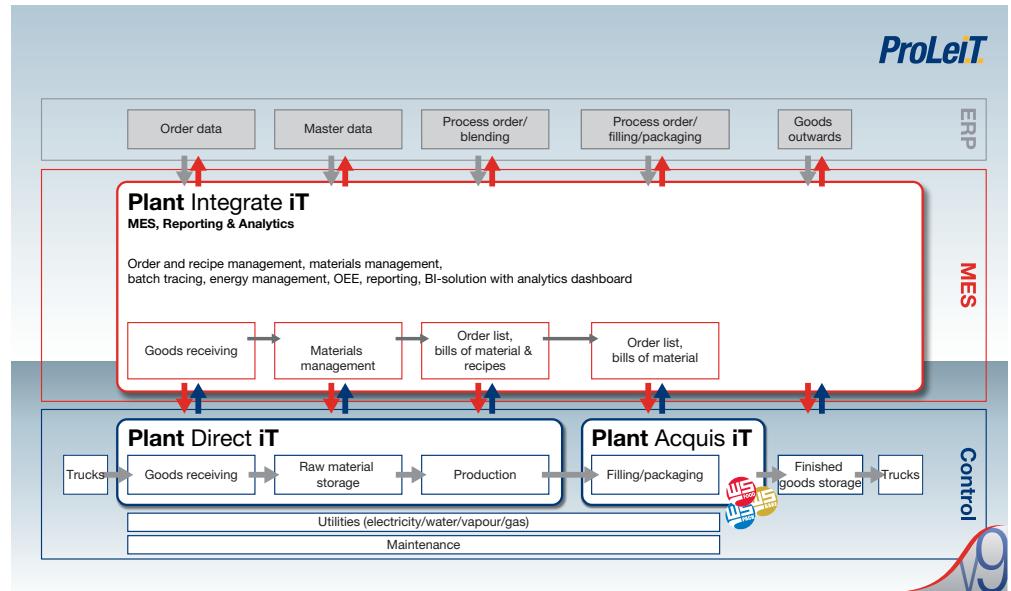
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more efficiently and effectively. Since the MES spans all areas of production, it forms the central database and source of information for all the systems and users involved.

Online integration of the laboratory in the MES allows laboratory and shift managers to monitor specifications in real-time and to intervene promptly whenever necessary. The monitoring and recording of data helps companies to constantly optimise recipes. During production, the MES ensures the regular taking of samples, thus guaranteeing a constant high level of quality. If deviations occur, the quality manager can immediately identify the respective item, stop delivery and, if necessary, start recalling the products. The precise recording of material data for every single order enables batch tracking throughout the entire production process. Long-term archiving ensures production process data remains available for analysis many years into the future and protects the company against potential claims for compensation.

Big data analysis via dashboards

Freely configurable dashboards ensure a clear overview of all the collected production data. Recorded and archived data can be filtered according to various criteria, including time period, order, customer, product, batch, location and energy consumption, as well as interlinked and presented in real time. In many cases, interrelations become apparent that would otherwise be invisible, as the data is either unavailable or stored at various locations in different departments. In addition, supervisors can respond faster to any deviations and monitor the effort and outlay required for each order in real time.



Plant Integrate iT MES analyses information from various sections of the company and adapts production accordingly; thus making production more effective, efficient and sustainable.

MES is no longer an inflexible system

In the current debate on the implementation of Industry 4.0, the MES is sometimes viewed as an inflexible system in which production routes are specified one dimensionally. Conversely, production structures within the smart factory are not determined from the start. Instead, configuration rules are defined and used to automatically develop an appropriate structure for the specific case at hand. A look at the current options offered by Plant Integrate iT shows that the MES can already meet the majority of these requirements. The MES is extremely adaptable and its

reputation as an inflexible system is clearly no longer justified.

Integrating plant sections using the MES is a crucial step towards changing a traditional factory into an intelligent one. While articles on Industry 4.0 portray the characteristics of the smart factory as a vision of tomorrow's manufacturing, operators of an integrated factory can already profit from its many advantages today. This applies, in particular, to companies whose production plants have been operating for decades and have a heterogeneous IT structure. The integrated systems and improved data analysis guarantee operators a unique competitive edge.