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Glass container production in the digital era

Ulas Topal discusses how glass manufacturing/ processing challenges are being faced in the digital era.

To improve business effectiveness, the only lever for glass manufacturers before digitalisation was to modify manufacturing settings: IS machine settings, inspection machines and quality device parameters. Nowadays, with progressive digitalisation, connected objects and Industry 4.0 becoming standard, glass manufacturers have the challenge to manage the data coming from various sources as batch plant, furnaces, feeders, IS machines, lehrs, inspection machines, sensors, devices, palletising robots etc.

A digital solution to improve global performance exists, a Manufacturing Execution System dedicated to the hollow glass industry, integrating all production-relevant applications and activities that enable company-wide communication and co-ordination. By the exchange of information and data between all sectors of the plant, production requirements can be met efficiently and an increase in performance and production quality achieved.

A dashboard with real-time information about production in the plants of the same glass manufacturing group is a key to increased productivity. It is not just a question of displaying key performance indicators; it is also the ability to help managers take the correct decision at the right moment, with an intelligent and flexible solution.

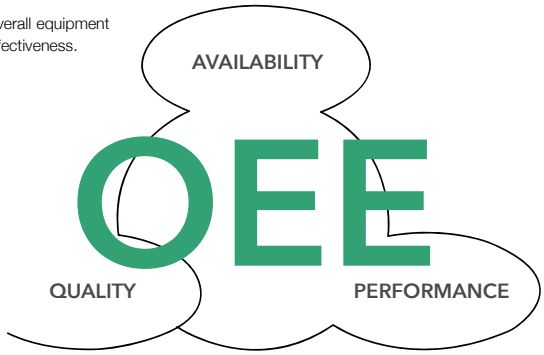
In a continuous improvement approach, dashboards can be set to point out specific topics to highlight for a specific period. It could be a goal for the coming month to concentrate the team on reducing line over finish defects. Create a specific indicator showing the rejects for this specific defect for the whole plant and check day by day how instructions are carried out efficiently.

At the beginning is data

Glass manufacturers have to collect, record, extract, exchange and display data coming from all over the plant. So far, all these actions were performed using papers and record books.

Example of Industry 4.0.

Overall equipment effectiveness.



Ulas Topal presenting this paper at the 41st ASEAN Glass Conference.

PLC for data acquisition.

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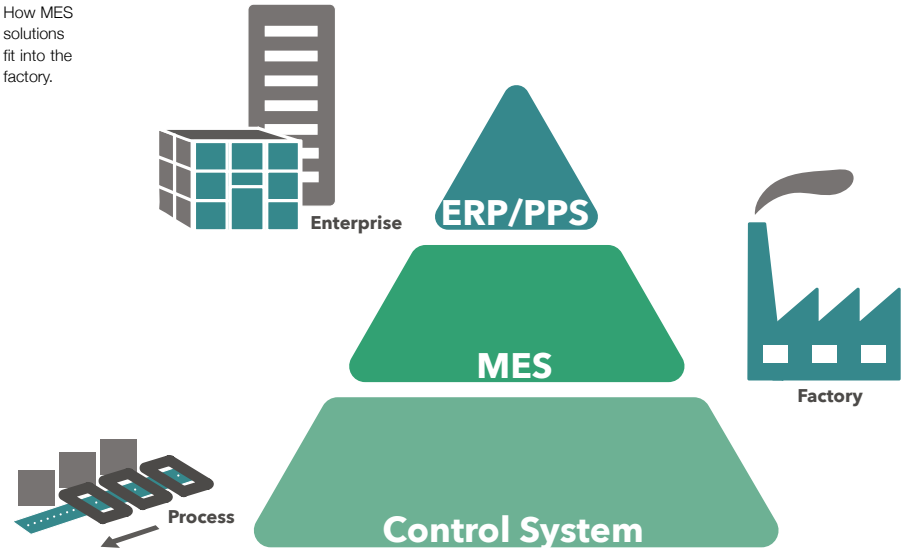
How MES solutions fit into the factory.



The latest available technologies included in Industry 4.0 are: Online information platform, mobility, Internet of Things, artificial intelligence, big data and social media etc.

For a factory or system to be considered Industry 4.0, it must include: Interoperability (machines, devices, sensors and people that connect and communicate with one another), information transparency (the systems create a virtual copy of the physical world through sensor data in order to contextualise information), technical assistance (both the ability of the systems to support humans in making decisions and solving problems and the ability to assist humans with tasks that are too difficult or unsafe for humans) and decentralised decision-making (the ability of cyber-physical systems to make simple decisions on their own and become as autonomous as possible).

MES (Manufacturing Execution Systems) are at the heart of the digital revolution for glass manufacturers, as they allow data collection (information coming from devices and machines), data display (on monitors, tablets, smartphones), data extraction (for analysis) and data exchange (with ERP systems and external reporting systems).

Example of Industry 4.0: The ERP of the factory or the group is sending pallet numbers to the SIL system and the SILPallet Audit gives the status of the pallet: OK or Blocked and sends back the information to the ERP. The pallets could also be managed by the SILPallet Audit and then sent to the ERP. This is the philosophy of communication.

Future data needs

Glass manufacturers must communicate on their requirements. For example, they have information about rejections from inspection machines but do they require rejections from the IS machine?

All equipment can be connected, including batch plant, furnaces, feeders, IS machines, lehrs, inspection machines, sensors and palletising robots. The strategic issue now is to lead software innovation.

Software innovation

To help glass manufacturers to increase their competitiveness with Industry 4.0, software developers have to work through collaborative innovation. It is essential to place manufacturers at the centre of discussion, listen to their requirements and make developments through active collaboration.

Future challenges

Flexibility and mobility - managers should not wait for information but information must go directly to managers. They need to follow up plant performances in real-time on mobile devices, while operators must be flexible on line using line information systems. Stronger analysis can dramatically improve product development.

The information displayed by MES helps operators and managers to take preventive and corrective actions in order to improve supplies, energy management, line efficiency, quality levels, costs and finally, Overall Equipment Effectiveness (OEE).

The digital era represents a revolution for managers and for operators. Thanks to the digital solution, operators are no longer linked to their terminal. For example, a quality controller can follow up setouts on the production line, working on a smart device with a full web application, managing quality controls.

Inter-operability of a digital solution with ERP and other integrated systems of the plant is also a key factor for time saving and traceability of production data. Vertech' helps glass manufacturers to face the big challenges they are currently confronted by, reducing customer risks and meeting customer expectations with a state-of-the-art digital MES solution, based on 20 years of experience in hollow glass production. ●

The 41st ASEAN Glass Conference attracted approximately 300 delegates.

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