zenon – the link in the pearl necklace

Production control based on the pearl necklace principle

zenon®

Content

Short production cycles, diversity of variants, outstanding productivity and utilization - these are the challenges of automotive production. To gain all this, manufacturers are applying the "pearl necklace principle". The HMI/SCADA solution forms the optimal technological basis for companies to implement this production principle and achieve a consistent production.

Production control based on the pearl necklace principle

A crucial success factor in automobile production is a flexible production and capacity management, in order to manage model diversity and guarantee the customer individualized production. Automotive companies need to apply lean, flexible processes to remain competitive and future-oriented. A consistent software platform is the prerequisite for a transparent supply chain which completely covers all processes.

Production principle pearl necklace

The production sequence is a huge challenge for automotive companies today. Model and type diversity calls for a flexible production, optimal sequencing as well as the individual provision of parts and components from suppliers. A production principle, which is widely used in the automotive industry is known as "just in sequence" or "pearl necklace". Here, the moment the order is received the sequence in which the individual automobiles will be produced is determined.

The pearl necklace describes the clearly defined process of each individual production step in the various technology fields from the shell to the paintwork right through to the assembly using the according material flow. This production principle thus always guarantees

The pearl necklace principle - an overview of advantages
- optimal planning basis
- consistent process control from order receipt to final assembly and distribution
- improved delivery reliability
- lower procurement costs, cost-effective production
- top in flexibility
- efficient logistic handling
- close connection to suppliers
- limited stock
- economical capacity utilization
- greater degree of added value
- short processing time
- minimum downtime in the case of malfunction

that at any step of the production all the automobile parts are available in the correct sequence. This improves processing time as well as utilization of the production and production logistics, allows for minimum stock requirements and ensures material supply at any time. Ultimately the production principle pearl necklace optimizes the entire value chain of an automobile manufacturer.

Build integrated complete solutions together

COPA-DATA`s consistent software package zenon has been successfully implemented for many years in the automotive industry and is optimized for the complex requirements of automobile production. The HMI/SCADA specialist supports - together with its partners - automotive manufacturers in creating a tailor-made solution for their production. Well known manufacturers such as Audi, BMW, Daimler, Ford and Volkswagen trust COPA-DATA`s industry expertise and technological know-how. zenon is an important part of the production cycle and the entire supply chain for these companies.

Customize the control and operation of the production cycle with zenon

zenon supports automobile manufacturers to design their production processes more efficiently and to implement these transparently. Thanks to the continuous operation at all hierarchical production levels, the material flow is controlled in an optimal sequence throughout the production and the maximum utilization of production capacities are guaranteed. The software furthermore delivers all relevant figures to the employees and the management, thus offering a basis to quickly and flexibly adapt the current production if necessary and reveal further possibilities for improvement in automotive manufacturing.
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Open and consistent operating system for the production

Openness and interface diversity are indispensable when efficiently shaping the production process according to the "pearl necklace principle". This guarantees a smooth production. Access to information on current conditions and figures must be guaranteed at all times. Being an openly designed software zenon guarantees a quick and efficient connection to any hardware and software: zenon has over 300 communication protocols and integrated standard interfaces such as OPC DA, OPC UA, SQL, ODBC, SNMP, Modbus RTU/TCP, etc. Thus users can freely choose which hardware they would like to use and integrate it to the production system. zenon ensures that all relevant information is consistently available. The network concept which is integrated in zenon allows for network-wide distribution of this data.

From the production process to the SAP application

To guarantee consistent production processes the HMI/SCADA software must be completely integrated into the entire supply chain. This also requires a connection to the ERP and MES systems. Besides the horizontal integration in the production facilities and machines, zenon offers the possibility of vertical information exchange: The HMI/SCADA solution enables all relevant data from the production process to be consistently and securely passed on to other systems such as standard business or planning software. For this purpose COPA-DATA has created an interface from SAP to the industry leading ERP system. SAP has certified this ERP interface in zenon. The interface enables the seamless integration of the application. Automotive manufacturers gain a complete overview of all processes - from the order receipt to production and logistics, right through to the distribution. You can profit from the direct, bidirectional communication between the ERP application and zenon: Thus, zenon sends reports of all relevant processes to SAP R/3 and takes over control directions from the SAP application. zenon in turn processes the incoming control commands. The SAP application therefore gains direct access to the process level: The transferred values can trigger off software actions which are then reported back to zenon in the form of control commands . Both systems are continuously exchanging information and control commands via this bidirectional communication. Upon completion of a production phase or a production cycle the management system has already received the updated data and can, for example, initiate further downstream logistic processes.

Direct connection for industrial operation

The direct connection of the SCADA level to the ERP system offers numerous advantages: The connection between SAP applications to zenon completely integrates all business and production processes. Companies therefore gain a complete overview from request processing to production and logistics right through to the distribution. Current information on operation and production processes are clear and quick to retrieve. Individual response to daily demands and functional design of production are therefore easy to implement as well. An example is the optimized resource planning thanks to the acknowledgement in real time. The connection of the SAP application with zenon enables intervention in the target and active process design, such as in manufacturing. Those responsible for the production and managers can quickly detect any changes and react in line with the market.

Success story Audi Motor factor Györ

Today Audi Hungary is a success story for the tightly meshed interplay of all processes from the production to the business level. In cooperation with COPA-DATA, SAP AG and Prozesstechnik Kropf GmbH, the automotive manufacturer has created a bidirectional data exchange between the process level and the SAP application. It was the goal to improve the coordination between the transport preparation and distribution to create a perfect chain of events.

zenon thus addresses, via a RFC interface (RFC = Remote Function Call), tailor-made for Audi Hungary, a programmed function block in the SAP system which conveys special pre-defined data. This data transfer is based on three principle steps: In the first step the sequencing is communicated: Upon arrival of the motors at the receiving office zenon registers these motors to the SAP ERP system. In the second step the data exchange to the according stock movement of the motors takes place: The motors are now handled as "in stock". In the third step the data from the SAP ERP system are visualized in zenon: If a motor, which is intended for sequence production runs through the handling system a request is sent to the ERP system. As a result a prioritization for dispatch to the customer is in the SAP system and zenon receives the user relevant data - storage space, frame number, pallet ID, position number on the palette, hanger type. This data is then shown at the acceptance point of the acceptance station and gives the user the necessary instructions for the required transport handling of the motors. "This economical use of our motor conveyor systems allows for a tremendous reduction in time and costs and reduces logistical efforts to a minimum. We have shorter processing times, less stock and can deliver more quickly", adds Balász Balogh.

Build bridges with zenon

Audi Hungaria Motor Kft., a 100% subsidiary of Audi AG, manufactures four, five, six, eight, ten and twelve cylinder motors, as well as some tailor-made motors for Audi. Furthermore the company also supplies the Volkswagen, Seat, Skoda and Lamborghini brands. In Győr, 6,500 motors are produced on a daily average, and these five days a week. A total of **1.883.757(2010: 1.648.030) motors** in the 2011 fiscal year. The motor production and testing as well as the assembly are supported by modern conveyor technology and efficient transport handling.

This was gradually set up in the Audi factory in Győr as early as 2005 in order to optimize the 5km long conveyer with zenon. Since then the software enables visualization of all status and operating information from a central location. Sequences are traceable with the recording of important data such as pallet number, motor number (serial number), motor type and stock rotation (= feeding point and discharge end). This gives a better overview of the entire plant. Even then it was already suggested that a bridge be built between the SAP ERP system and the process control system. "Because of the missing data exchange between zenon and the SAP system we could not fully coordinate the transport preparation with the actual removal operations. It was impossible to prepare the motors in exactly those amount and type constellations with which the end customer needed them", explains Balasz Balogh responsible for the motor handling at Audi in Győr at the time of this project, "With a production of around 350 different motor types at the Győr location one can kind of imagine how much storage space is needed for the interim storage."

You have questions or would like more information?

Our experts from the Competence Center Automotive are happy to assist. Please contact us at the following email address: automotive@copadata.de.

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