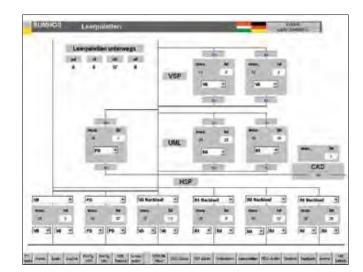# Engine conveyor systems are optimized with zenon.

For Audi Hungary based in Györ, COPA-DATA's integrated software solution zenon, offered additional potential for optimizing its Engine conveyor systems: now zenon's smooth flow of information enables more efficient operations.

The Audi brand stands for progressive design, serious environmental protection and trend-setting technology, in short: "Innovation through technology". The Hungarian Audi plant in Györ, with more than 500 employees, is part of this success story. Founded in 1993, the Hungarian plant manufactures up to 6,500 engines a day, starting with four, six and eight cylinders; all the way to ten cylinders and special custom made engines. All in all, Audi Gyor manufactures 1.9 million engines every year for use throughout the entire corporation including Audi, Volkswagen, Seat and Skoda. This success is made possible through sophisticated production and plant technology.

EFFICIENT INFORMATION FLOW ENABLES SMOOTH TRANSPORTATION

In order to ensure the continued success story at the Audi's Gyor plant, the engine conveyor systems were earmarked for further expansion. The plant management decided to extend and optimize the facility by adding storage and automatic sorting mechanisms. The finished engines are transferred to the conveyor systems at dispatch stations on transport pallets. Audi wanted to improve this process so that important additional data like pallet number, engine number, engine type, reception station, dispatch station and other parameters could be submitted to the control system. Deploying COPA-DATA's zenon software enabled them to do this.

The engines that have been dispatched from different locations in the plant are first buffered and sent to a pre-storage location where a rough sorting by engine type and reception station is done. From the pre-storage, the engines are transferred to a circulating store where the main sorting with ABC analysis takes place. From here, the engines are forwarded to the appropriate main storage location. The Gyor facility currently has two main storage locations and two reception stations. Because the reception station is already defined when the engines are dispatched, the delivery to the reception station or the main storage location happens safely and easily.

In the reception station the engines are pulled out of the main storage location

in blocks and then prepared for further transport. Additionally, the conveyor system has a reception station before the main storage locations. This way engines can, on demand, be pulled out of the circulating conveyer and sent directly to the desired dispatch location through a highway. This happens, for example, with custom made engines.

AUDI HAS THE PERFECT SOLUTION: ZENON

For an automated facility of Audi Gyor's size, it is important to apply a control software solution that allows status and operating information to be visualized in a central location. The visualization software zenon has been successfully put to use at Audi to help deliver the current improvement projects. The project managers had already decided to use COPA-DATA's zenon software for the visualization of the SKID facilities in Ingolstadt, Germany, as Johann Mayr, member of the Audi Ingolstadt´s planning group in electrical engineering explains: "We found a specialist for Industrial Automation in COPA-DATA. Their professionalism, from the planning phase all the way to implementation, has convinced us that with COPA-DATA we are relying on the right partner. The performance of the software confirms this again and again in each project. Together, we managed to create an innovative and safe engine conveyor system."

There are a number of critical requirements the software solution had to meet:

▸ Runtime redundancy had to be guaranteed
▸ Guaranteed system stability
▸ Extensive alarm management with apropriate alarm statistics
▸ A clear depiction of the project structure
▸ Extensive and flexible user administration
▸ It was also important to have a universal solution, from the single work-station through to the Intranet.

Because the plant in Györ, Hungary, is an international Audi location, the language switch between German and Hungarian had to be guaranteed as well. The zenon software by COPA-DATA met all of these requirements: "The flexibility of zenon allows us to meet our requirements in a quick and uncomplicated manner", adds Johann Mayr.
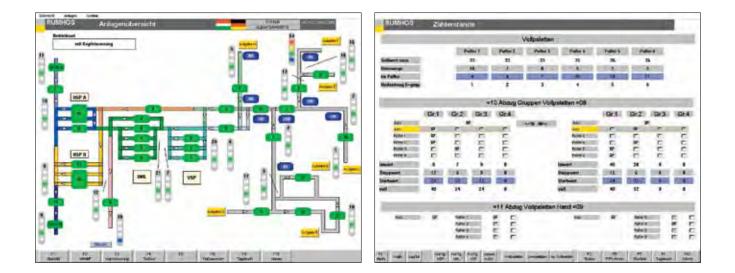
EVERYTHING AT ONE GLANCE – FROM ANY-WHERE IN THE FACILITY

The individual components of the solution were deployed at numerous locations across the plant. The visualization has a Runtime server and a Standby server,

which are located in different areas of the plant for fire protection. The additional web server enables the depiction of the visualization on the Intranet. Two single workstation displays have been set up on the plant floor in the engine handling and maintenance offices. The receiving locations have a total of eight zenon Client displays at their disposal.

"Each employee today has access to all relevant information, in a fast and reliable way, which is critical in a manufacturing facility for competitiveness and success." says Zoltan Ponty, Head of engine handling at Audi Györ.

ELIMINATING SOURCES OF ERROR AND OPTIMIZING OPERATIONS

In order to avoid sources of error in the future and to make the conveyor systems even more efficient, alarms have to be analyzed regularly and systematically. If an error has occurred, an alarm is immediately forwarded to maintenance by Message Control via SMS and e-mail. This helps to keep the reaction time as short as possible. zenon's Industrial Performance Analyzer allows for a statistical analysis of errors. This tool displays frequently occurring errors in a transparent manner

and detects weak points in the facility. Additionally, the sophisticated monitor administration helps to make the Maintenance team's work a lot easier: the process pictures are split between two monitors. This way, the user can have an overview picture displayed on one monitor and a detailed picture on the other monitor.

INCREASED TRANSPARENCY ALLOWS FOR FASTER DECISION-MAKING

The visualization of the plant encompasses the elements for display and input, as well as tablular displays of the occupancy of individual transport channels and storage locations. Together with COPA-DATA, the project team at Audi Gyor generated several status pictures that depicted the current condition of the individual transport channels through the use of symbolic elements. One of the conditions depicted was the direction the conveyer was moving. Additionally, the project-team created pictures that allow the setting and visualization of parameters for the facility, such as modes of operation or storage properties.

In order to generate these tables, Audi Györ uses the IEC 61131-3 programming system, straton. straton is able to take over the complex calculations and regulations for process control and automation from the zenon Software . This embedded control system, or soft-PLC, is fully integrated with zenon in order to make engineering as easy as possible. The variable has to be created once only and is then available in both systems.

The occupancy of the conveyor systems at Audi Hungary is displayed in the control application by individual FIFO-components. These data components include the pallet numbers that are currently on the conveyor. As it's not enough to just display the pallet numbers, straton ensures that each pallet number is assigned the respective pallet parameters such as engine number, type, reception station, dispatch station, etc.
Up to 40 parameters per dispatched pallet can be retrieved. straton generates output strings that show the engines on a conveyer with all the additional information in individual pictures, either in groups or sorted.

DIRECT AND QUICK PAY-BACK THANKS TO ZENON

For Audi Gyor the visualization of the entire engine conveyor system creates more transparency than ever. Each engine's path can be followed over the individual conveyers through to the storage location through the sorting facility all the way to the receiving location. This path can be corrected and redirected on demand. This enables constant checking and optimization of the sorting mechanisms. From the display terminals, the workers in the reception station can see exactly which engines will be received next and can make preparations for their receipt. The detailed alarm administration ensures more security and shorter reaction times in the case of a breakdown. High reliability is guaranteed by the redundant configuration of the system.

Thanks to the visualization of the facility, Audi Gyor today has a clear overview of the status and features of the engines, as well as all required actual and target values. The project managers Johann Mayr and Zoltan Ponty have already experienced the benefits: "zenon enables us to use our engine conveyor systems in an economical way. This year we have benefited from increased transparency and optimized operations. With the deployment of zenon we were able to respond to the growing requirements on us and a constant need to increase efficiency."