

SUCCESS STORY

THYSSENKRUPP PRESTA AG

**Global production of a world market leader –
how to successfully get the future underway**

The automobile of the future drives completely autonomously, communicates with its environment by itself, makes independent decisions and, thanks to intelligent integrated components, continuously adapts its driving behavior to the prevailing conditions. This ensures that the driver gets safely from A to B - with minimum consumption of resources. Although systems today are not quite as advanced, modern automotive engineering has already integrated many of the necessary functions and concepts into existing automobiles. Today, premium models are valued for their independent parking and autonomous driving features.

The situation is similar with networked, fully automated production, where all participants, people as well as machines, communicate directly with each other. This ensures that industrially manufactured products are produced on demand. Self-learning processes minimize costs while ensuring consistently high quality – and that in a global economy with a large number of dispersed manufacturing locations.

The manufacturing sector is also right on track, as demonstrated by the example of the production of steering systems at ThyssenKrupp Presta AG. ThyssenKrupp Presta is one of the world's most successful manufacturers of steering systems and a technology leader in the field of cold forming. At twelve manufacturing sites, components are manufactured and steering systems assembled in approximately 1,100 production plants. The efficient operation of global production requires lean but fully automated data management to the greatest extent possible.

One factor of success is the ability to exploit the enormous volume of production data for the ongoing and consistent optimization of the production process. "Competitive advantages are created through innovative and efficient products, but also with innovative and efficient production," states Harald Preiner, Head of Manufacturing Technics. "Controlling manufacturing processes more effectively remains an ongoing task. Be it faster ramp-ups, reducing the causes of malfunctions and reject parts or increasing machine availability: This allows productivity increases to be achieved which lower costs while maintaining the same

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Harald Preiner
Head of Manufacturing Technics
ThyssenKrupp Presta AG

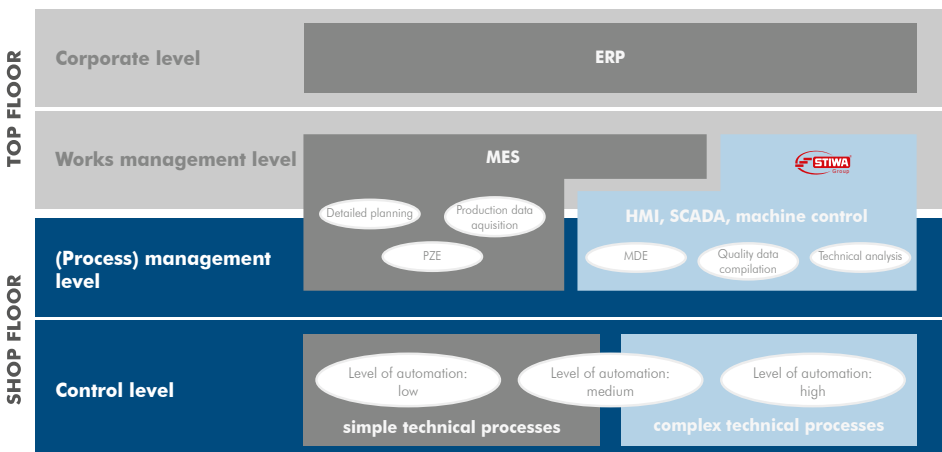


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Indispensable basis: Efficient data management

In all processes, data are of fundamental importance. For this reason, efficient data and process management, which allows for archiving as required by law and, with standard interfaces, ensures a continuous process and data flows across locations, plays a decisive role.

On the basis of machine, operating and quality data, the machine control station AMS ZPoint-CI (HMI, SCADA), the analysis software AMS LTA-CI as well as the quality data solution AMS QDA-CI by STIWA make a significant contribution to automated data management as well as to the ongoing optimization of global production at Thyssen Krupp Presta. „Our partnership, which was began almost 20



When it comes to the architecture of ThyssenKrupp Presta Manufacturing Software, the STIWA Group plays an essential role: from the signal to ERP, and from manufacturing to assembly.

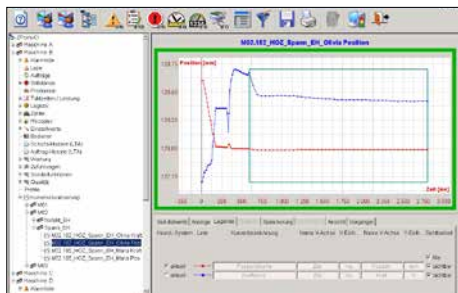


years ago, ensures that we always keep up with the times, and that everyone is an innovation leader in their own field," enthuses Alexander Meisinger, who is responsible for the distribution of software and support of ThyssenKrupp Presta at STIWA.

The uniform control terminal AMS ZPoint-CI has made worldwide production more transparent. Continuous visualization - from the signal to the warehouse - makes deviations in production immediately visible. Processes can be easily monitored and controlled. Key figures (e.g. OEE, TEEP) are clearly displayed and help to minimize machine failures and malfunctions, set-up times, idle times and down-times, reduced speeds, quality and start-up losses.

AMS LTA-CI ensures further technical analyses as a basis for making sound decisions. With – interactive – detailed analyses, machine standstills, cycle time overruns, and much more besides, can be precisely diagnosed.

By automating the complete recording and documentation of all quality and process-relevant data, AMS QDA-CI is a guarantee of quality and ensures compliance with legal regulations. The availability of quality data across locations results



Optimizing global production with the machine control station AMS ZPoint-CI - the decisive interface to the machine level. ○

in cost savings, plausibility and a greater ability to provide information and act.

„By applying STIWA solutions, we were able to shorten the start-up times until reaching the target figures of the machines by 15-20 %. At the same time, we were able to increase our OEE by an average of 10 %," states Harald Preiner, thus summing up the cooperation in figures. „By consistently gearing the processes towards Industry 4.0, we are ensuring further optimization together with STIWA. Self-learning processes are an important step in this regard."

Self-learning processes - not only people acquire further knowledge

The effects of self-learning processes on production can be easily explained. If production is not carried out lower hall temperatures in the morning can lead to different machine results than with higher temperatures in the afternoon. In order to reduce the reject rate in such cases, manual interventions on the machines are imperative.

Adaptive production within the framework of controlled processes considerably reduces the need for manual intervention. If environmental factors have been identified and the process is designed to react to them, this automatically has a positive effect on production. This includes, for instance, all measured values and tolerance values of pre-products. Online quality assurance during production, process monitoring integrated in the machine, the timely acquisition and evaluation of measured data along with systematic quality data management represent further necessary conditions.

If the data of all pre-products can be accessed, this data is semantically unique and if the model is known, automatic corrections can be made.



With our shop floor IT, we have been compressing production data into useful information using STIWA solutions for a long time.

David Kasprzak, Team Leader
Production-IT Manufacturing Technics
ThyssenKrupp Presta AG

In this way, tolerances in preliminary processes can be opened while ensuring consistent quality of the end products, and the need for reworking or fault tracing is reduced.

Harald Preiner comments on this as follows: "Thanks to M2M, such optimizations are no longer just theory at our company. We have already realized these approaches on various machines as the data flow can be controlled across locations with the help of the control station AMS ZPoint-CI."

Data as a source of added value: From data to documentation and reports on data mining

The capacity of data carriers has grown so rapidly that storing an annual volume of approximately 19 TB is no longer a problem. The challenge is to make efficient use of the enormous, largely compressed data volume, and to find everything of importance straight away. Legal and regulatory specifications impose stringent requirements. Especially in the case of faults - everyone is familiar with manufacturer recalls - documentation is crucial. What was manufactured and where? What type of machines are involved? Which quality data are available? Are individual products, whole batches or entire series affected?



Christoph Primetzhofer (Application Technics STIWA Group) & David Kasprzak (Team Leader Production-IT Manufacturing Technics)

“Process documentation and verifiable product quality are akin to ‘life insurance’ in our industry,” says Harald Preiner. „Thanks to STIWA, we are able to provide answers. At any time, for any product and for any location worldwide - and that going back 15 years.”

The use of the data goes far beyond documentation and verification obligations. Without analyses and statistical evaluations, the systematic optimization of the processes, which the company has been pursuing for years, would be unthinkable. “The data acquisition integrated in the machine allows us to determine the causes of malfunctions, rejects and downtimes in detail for each machine,” explains Harald Preiner. “This creates a globally unique data base that can be used for analyses across plants.”

Following automated recording, all information on the manufacturing processes is available for processing, networking and analysis as a unified, uncompressed data base - in near real time.

Process values can be collected as com-

plete force/displacement curves during the entire process and used for zones, envelopes, target windows and angle evaluations. This not only enables global production analyses, but also optimization within the framework of Industry 4.0 initiatives.

„With data mining, we are going one step further. Building on the data base, we are developing networks in order to analyze the defect images, identify dependencies and localize interference factors,” comments David Kasprzak, Team Leader Production-IT Manufacturing Technics, when describing the planning. “The analyses are increasingly focused on the ‘future’. This enables us to act proactively.”

Communication across all levels - with M2M towards Industry 4.0

While M2M is usually perceived as machine-to-machine communication, Harald Preiner is taking it one step further: “It is about making sure that everyone communicates with each other. In addition to transferring information on the products across machines and plants, ‘speechless’ components such as steel

are also designed to communicate with the machine. With an identifier - its origin, its destination, its intended use - each product is included in the communication process.” This information allows the current situation to be optimally dealt with, and significantly increases the possibilities for both automation and self-learning processes. Here, too, ThyssenKrupp Presta has already successfully put a number of initial projects into practice. In cooperation with STIWA, a regulated process was implemented for an assembly module consisting of several feed assemblies and manufactured at various locations in Europe and China. Since the same parts are integrated in a variety of end products, but both the end product and the components are subject to frequent changes, the revision status must be checked in detail for each part before assembly. Although there is no 1:1 relationship, information on the assemblies produced during pre-assembly had to be available in good time for testing. Due to the long transport route, transferring part of the data synchronously proved to be a challenge. The solution enables the transmission of data which can be configured as required. Thus, in addition to information on the revision status, other measured values of feed assemblies are also transmitted. The regulated process thus makes it possible to use the measured values of the previous production steps and of the parts for the process steps of the final assembly.

To distribute the data across locations, the Workpiece Data Storage module of AMS ZPoint-CI was used, which ensures that parts data are transported synchronously to the flow of goods. This also allowed the problem of semantic standardization across various systems and machines to be solved. The product, which was developed in cooperation of ThyssenKrupp Presta and STIWA, is now available as standard software.



Robert Schossleitner, who is responsible for Industry 4.0 at STIWA, comments on this as follows: "As no relationship between the source and target machine is required other than the transport of information, the software is of interest to several customers. Changes made to individual machines do not necessarily affect the remaining machines. The PLC programmer does not have to worry about the transport and distribution of the data. The advantages of this neutral approach to solving M2M tasks have been impressively confirmed in practice at ThyssenKrupp Presta."

With regard to Industry 4.0, ThyssenKrupp Presta is just as strongly positioned as in the area of innovative steering systems thanks to its long-standing partnership with STIWA. In addition to vertical integration - from the machine signal to the ERP system - horizontal integration - from manufacturing to final assembly - also provides for a largely continuous overall system. With the use of data as a source of added value, innovative concepts were also implemented together with the automation partner. But it is well known that, given the enormous costs and competitive pressure in the industry, every standstill means a step back. David Kasprzak thus summarizes the current state of affairs: "With our shop floor

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 ThyssenKrupp Presta AG

IT, we have been compressing production data into useful information using STIWA solutions for a long time." "The next steps have already been defined. We will expand horizontal integration at the process level and realize further MES tasks. While not everything has been fully planned yet, one thing is certain today: The STIWA Group will remain a strategic partner for automation and manufacturing software," predicts Harald Preiner with regard to the future development of production at ThyssenKrupp Presta.



Scope of services of the solution components

- Complete recording and visualization of machine and operating data as well as process data
- KPI cockpit and detailed OEE analysis according to VDI 3423 and parameterizable reports
- M2M communication across machines and plants
- Standardized communication between machines & machine control station
- Order management at the machine and expandable standard HMI
- Management of the production parameters, set-points and limit values
- Forwarding of machine error messages to smart devices
- Semantically unambiguous data base as a basis for data mining and predictive maintenance



ABOUT THYSSENKRUPP PRESTA AG

ThyssenKrupp Presta is one of the world's most successful manufacturers of steering systems and a technology leader in the field of cold forming.

For many years, technological leadership has underpinned ThyssenKrupp Presta's strong position as an innovative partner to the international automotive industry.

At twelve manufacturing sites, components are manufactured and steering systems assembled in approximately 1,100 production plants. As a result of highly automated production with internal manufacturing technology, cost advantages can even be achieved in high-wage countries.

www.thyssenkrupp-presta.com

! ABOUT STIWA

Optimized production through networked processes

Ensuring enhanced quality and more stable processes while simultaneously reducing cycle times: This is the aim of STIWA Manufacturing Software, which enables a significant increase in the performance of production resources and entire plants by means of detailed technical analyses. Thus, processes in production become controllable - worldwide.

STIWA is one of the world's leading specialists in the field of high-performance automation. The three strategic business areas are Automation, Automotive Supplier Production, and Software. The family-owned enterprise headquartered in Attnang-Puchheim employs more than 2,200 members of staff in four countries and achieved a turnover of 260 million euros in the financial year 2019/2020.



Increasing quality, output and availability: Efficient manufacturing and optimized processes by means of the analysis software Analysis-CI of STIWA Manufacturing Software



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