Qualicision® simulation

Anticipating and optimising stressful situations in production processes

The automotive industry is one of the most demanding industries and one of Europe's most important growth drivers. Huge pressure in terms of innovation and costs, combined with a simultaneous increase in complexity and product diversity, has led to the automotive sector playing a pioneering role in the use of sequencing systems. A smooth sequencing process plays a key role in improving the efficiency of production processes in the automotive industry.

To allow targeted detection of short-term discrepancies in ongoing production processes, e.g. faults in material provision, F/L/S Fuzzy Logik Systeme GmbH from Dortmund have developed a new tool for simulating production sequences. The tool helps users to identify the effects of faults on a planned sequence well ahead of time and to actively counter them with temporary modifications to the sequence specifications. The tool can also be used outside the direct production environment, for strategic analysis of...
Dear readers,

For more than five years, customers of the PSI Group have been able to dynamically optimise business processes and adapt the software on which they are based with the support of Qualicision® technology. This technology is used effectively in many sectors and as a result is integrated into an increasing number of PSI solutions.

We have already highlighted how Qualicision® helps to dynamically optimise processes, and the PSI solutions into which it is incorporated, in previous issues of production managers. Qualicision® covers a broad spectrum of process optimisations, ranging from production processes to maintenance and the logistical movement of goods. In our lead article in this issue, we look at Qualicision®-based simulation. Unlike material flow simulation, the new Qualicision® simulation developed by F/L/S Fuzzy Logik Systeme GmbH is based on optimisation principles, and as such is optimisation software that enables stressful situations in processes to be contained and compensated by appropriate calculations.

What’s more, the whole thing is not just theoretical, it is actually being used in the automotive industry, where it is helping to create more balanced production processes. This is enabling costs to be reduced and quality improved.

Also in this issue you will find articles about how PSIwms is being used for just-in-time supply of production and assembly lines at the automotive supplier NEUE Halberg-Guss GmbH and mobile data capture with PSI Pentagemobile at GEA Refrigeration Germany. You will also discover how the PSI Metals Rule Engine enables operational rules for all production processes—from planning, implementation, quality and logistics—to be configured and managed centrally.

I hope you will enjoy an interesting and inspiring read.

Regards,

Dr. Rudolf Felix
Managing Director
F/L/S Fuzzy Logik Systeme GmbH
planned production sequences and simulation of virtual production lines. Due to the individualisation of vehicles, the European automotive market is characterised by a huge degree of product diversity. Customers generally want their vehicles to be customisable and to be able to make changes to the features of their vehicles as late as possible before the start of production. As a result, the ability to incorporate customer requirements into the calculation of sequences as late in the day as possible is a crucial advantage for any manufacturer.

**Qualicision®: Enhanced Fuzzy technology for sound decisions**

With its Qualicision® technology, F/L/S Fuzzy Logik Systeme GmbH has been a successful provider of sequencing solutions for well-known automotive manufacturers for more than 20 years. Qualicision® stands for qualified decision support for optimising business processes. The technology is based on Fuzzy logic that has been extended to complementary effect and helps to incorporate decision-making expertise into business processes in the form of software. Fuzziness in business processes is not only the result of uncertainty regarding the process data used. It also results from the sheer variety of data and interactions between the different options for controlling and optimising these business processes and the process goals; in other words the ‘key performance indicators’ (KPIs). To control and optimise business processes, interactions are recorded in the form of matrices (impact matrices) based on process data. From these impact matrices, a mathematical conflict and compatibility analysis is used to calculate the alternative decisions that should be chosen to achieve the process goals as effectively as possible. In technical terms, a conflict and compatibility analysis allows the so-called combinatorial variety of control options to be managed with a view to the optimisation of KPIs.

**Using Qualicision® technology**

Qualicision® technology is already being used to create production sequences in the body production, paint shop and assembly departments. These sequences are created just a few days before the actual start of production and sent to the affected internal and external suppliers (see optimisation flowchart). To verify these sequences, inventory disturbances could be caused by e.g. a lack of orders (vehicles to be produced) in a particular paint colour, or a shortage of particular seat components. The Qualicision® simulation enables the user to anticipate before the start of production the time at which or the order after which resequencing will be necessary, and what adjustments to the sequence specifications will be required to enable the planned orders to actually be produced.

**Qualicision® simulation process**

Qualicision® simulation is used offline as an additional tool alongside the online production systems. This enables both the planner and the controller to draw on current production data or expected production data and to use the simulation to analyse and create future production sequences without directly influencing the online production process. When the program is launched, the orders to be sequenced and the inventory data including additions are imported. The optimisation specifications are then imported or created by the user. They can be based on technical restrictions, for example that the spacing between two orders involving 6-cylinder diesel engines should be at least four orders (vehicles), or quantity specifications...
e.g. “Add 100 orders (vehicles) with all-wheel drive into the sequence”. The user can control the relative importance of the individual optimisation specifications by assigning priorities on a scale of 0 to 100. The simulation can then be performed based on the input data to calculate sequences for one or more assembly lines (AL) (simulation process, step 3). The simulation fills an internal virtual warehouse and issues orders from the virtual warehouse to the virtual assembly lines based on the optimisation specifications. The interaction between a virtual issue of an order to an assembly line and a virtual receipt of an additional order results in changes to the currently available inventory, which means that after each individual step the simulation encounters a changed situation and selects the optimum next order for the sequence to be created. Graphical displays show the user the inventory and the utilisation of the assembly lines (see Analysis of process KPIs graphic). The conflict and compatibility analysis (see CC analysis graphic) is a key tool for analysing the sequences created for the individual assembly lines. The conflict and compatibility analysis indicates which optimisation specifications are in conflict with one another (cells shaded red) and are very difficult or impossible to meet. In the next step, the user can adjust the optimisation specifications to create a better, more homogeneous sequence. Once the optimisation specifications have been adjusted based on the conflict and compatibility analysis, the simulation is restarted. This step is repeated until the required KPIs are achieved (see Simulation process graphic, step 4). The result of the simulation is that optimisation specifications are determined that take into account the current inventory situation, compensate for any disturbances as far as possible and achieve the desired process KPIs. These optimisation specifications are then transferred to the simulation in the productive system, so that stable, harmonised production can be achieved.

**Strategic simulation**

Another aspect of the Qualicision® simulation tool is its ability to carry...
out a strategic analysis of production sequences. The strategic analysis enables planned future optimisation settings to be simulated, for example resulting from the start of series production of a new vehicle and the associated technical restrictions. In the results of the conflict and compatibility analysis for the simulation, the optimisation settings that are frequently in conflict are indicated in colour. By analysing this information, the production planner can establish a long-term view of whether appropriate infrastructure measures or additional resources can help to mitigate or eliminate the conflict. The Qualicision® simulation can also be incorporated into a simulation of the flow of materials. For example, a simulation of the flow of materials enhanced with Qualicision® can verify the interaction of non-homogeneous stock location areas (direct access combined with storage lanes) in advance of a physical implementation. As the optimisation specifications are defined by the user in the Qualicision® simulation, upstream areas such as the paint shop or body production can be incorporated into the simulation for the optimisation calculation. The Qualicision® simulation concept is currently being used to optimise sequences in the automotive industry. However, it can be applied equally effectively to other production processes.

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Interview: New management at PSI Logistics

Continuing on successful paths

Since the end of September, Dr.-Ing. Giovanni Prestifilippo (43) and Sascha Tepuric (41) have taken over as managing directors at PSI Logistics GmbH. Alongside this change of management, the wholly-owned PSI subsidiary has also reorganised its corporate structure. In an interview with “production manager” the new management explain the current positioning of PSI Logistics.

production manager: Dr. Prestifilippo, the new management has reorganised the corporate structure. What does this mean for PSI Logistics customers?

G. Prestifilippo: Initially, there is no direct impact on our customers. It primarily concerns internal assignments and directions. The aim is to make better use of synergies in future product development and project management.

S. Tepuric: We wouldn’t put it quite like that. By merging the existing five competence centres into just two divisions, we have simplified the internal structure of our competences. The two divisions will now be concentrating on expertise in the warehousing segment at our Aschaffenburg, Hamburg and Moscow sites, and on transportation in Dortmund.

Our customers will still have a direct line to their designated contacts for their projects. However, particularly in product development we are looking to develop some new approaches with a stronger customer focus.

Is PSI Logistics working on development of new standard software?

G. Prestifilippo: No, that’s not necessary. With our standard products PSIglobal, PSIoms, PSIems and PIairport we already offer an extensive product range for logistics. That will not change. Rather than new products, we will be looking at new and enhanced
Applications and solutions tailored to specific markets, based on the potential optimisations from the existing modules.

Can you give us any specific examples?

G. Prestifilippo: Specific examples I could mention would include the areas of shipping costs and tender management—two major current issues in transportation. The high demand for the corresponding automation and optimisation modules from the PSI tms transport management system and the PSIglobal planning, control and optimisation system for logistics networks shows us that there is a definite demand for this kind of solution in the market. We will be working harder on communicating the long-term optimisation potential that these modules offer in practice, and to make sure that these modules, as well as the other standard systems, will be more adaptable to customer requirements in the future. Alongside this, we are actively developing additional features for all systems that will further optimise users' operational processes.

S. Tepuric: Or course. In the new release of PSI tms, which will be available from the spring of 2014, as well as the usual technical updates we will be offering users new process variations and strategies for more efficient, more optimised core processes. These new features can be enabled by configuration, a system that has been successfully used with PSI tms for more than ten years.

How do you generate these new solutions for optimising operation?

S. Tepuric: As well as the highly standardised yet hugely flexible system core, when it comes to tailoring a system for particularly complex requirements, we benefit from the expertise and technology transfer within the PSI Group. For example, we have solvers who monitor several strategies concurrently to come up with the optimum solution, so that the final percentage points of efficiency from multi-million pound investments in conveyor technology can be fully utilised. Methods like this are becoming increasingly important in our logistics solutions. Based on experience from these initially very specialised developments, we are constantly generating new solutions for operations that are being incorporated into the standard system and bringing further increases in our customers' productivity. We believe that there is no other supplier in the market that can currently supply such a wide range of technology.

Is the customer a partner in development?

S. Tepuric: That is normally the case, as it brings us closer to our customers. But with our new pilot customer concept, PSI Logistics is going one step further. In the future, we will be working more intensively with pilot customers on innovative solution requirements. We incorporate new solutions and features geared towards their operations and processes directly into the standard system. We offer pilot customers attractive terms for their involvement in this practical development in real-life operation.

Is this also a model for the other three PSI Logistics products?

G. Prestifilippo: Yes, this is a tried and tested model. The tender and shipping cost management modules we mentioned will be brought to market using similar steps. We will continue down this successful path.

Dr. Prestifilippo, Mr. Tepuric, thank you for this informative interview.

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Product report: Real-time planning and control in production supported by social media

IT trend: ERP + social media = Social ERP

Markets are undergoing a constant process of development and, as a result of new technical possibilities, modern products and services and rapidly changing competitive conditions and customer requirements, are becoming increasingly dynamic. A company can only survive and improve its market position in the long term if it can manage to overcome these challenges.

The market for ERP systems is not exempt from this. Products from different suppliers often have a very similar range of functions. Current trends in managing business processes in ERP systems include the increased use of mobile solutions, easy handling of big data, transferring applications to Cloud, options for real-time planning and control in production, linking specialist systems using automated, standardised interfaces and, last but not least, integrating social media components into business software.

In the future, ERP systems will need to be capable of evaluating and processing huge volumes of bundled data, and of providing this information for all decision-making processes. Real time planning and control in production and linking specialist IT systems are issues that play a role in the trend towards Industry 4.0.

Social media as a part of business processes

Many ERP suppliers have an individual understanding of, and solutions for social ERP. It all starts when companies integrate social media activities into their everyday business and into their business processes. A company that actively uses social media channels and looks to them for real-time links with their customers, partners or suppliers, and processes the information gained within the company, is already operating social ERP. However, the development process continues, and individual social media applications are being selectively integrated directly into the ERP system.

Nevertheless, alongside the many benefits there are a number of challenges to be overcome. Chief amongst these is the different user behaviour in ERP systems and in the area of social media. ERP systems have a strict and fixed role assignment, with little freedom for individual users. By contrast, in the social media environment almost anyone can publish and use content, posts and comments. This raises issues in relation to how to handle the security risk if certain data is disseminated outside the boundaries of the company.

Companies who want to use Social ERP need clear guidelines for use of social media components. It has to be clearly communicated to users that there is a difference between private and business use. Another issue is storing and processing the new data volumes generated.

Social ERP with PSIPenta

PSIPENTA Software Systems GmbH is one of the first ERP suppliers to respond to the Social ERP trend. Back in 2007, PSIPenta DokuWiki was integrated into the ERP system, a help system based on Wikimedia. It gives users access to a comprehensive platform for expertise.

An online knowledge forum established in 2011 was developed into the PSIng.org online community in 2012. PSIng.org is a closed community. Only active customers have access. They can make direct contact with other customers or our employees, discuss problem issues in topic groups or set up working groups to develop their ideas.

From PSIPenta Version 8.3 all users will have central access to PSIng.org from the software client. This is linked to direct access to the PSIPENTA service portal. This support and tracking system gives all users the opportunity to report incidents that occur in their work on the system and to monitor progress. The next step planned is an integrated e-learning platform.

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User report: Just-in-time supply

Intelligent IT for hot iron at NEUE Halberg-Guss GmbH

The automotive supplier NEUE Halberg-Guss GmbH is using the PSIwms warehouse management system from PSI Logistics GmbH for just-in-time supply of its in-house production and assembly lines in Leipzig. The new IT system with the integrated Transport Control forklift control system has been implemented during ongoing operation and manages, controls and optimises the entire warehousing process in two automatic warehouses, along with the linked conveyor technology.

NEUE Halberg-Guss GmbH, Leipzig, is one of Europe’s leading suppliers in the automotive sector. Their product range covers everything from cylinder crankcases to cast iron cylinder heads and cast crankshafts for cars and trucks. With an increase in orders for production of the 1.9 litre TDI engine block for Volkswagen, increasing warehouse and production capacities was not the only challenge facing Halberg-Guss. The outdated IT system from 1999 was no longer fit for purpose either. The contract for a new Warehouse Management System was awarded to PSI Logistics GmbH. André Schollbach, IT Manager at NEUE Halberg-Guss GmbH, explains the choice: “PSI Logistics offered the process expertise we needed and gave assurances about smooth, timely implementation, but also provided the future viability of an established standard system and the opportunity for us to collaborate with a reliable long-term partner.”

Multi-site implementation in four months

After a four-month implementation project during ongoing operations, PSIwms has been controlling the complex warehouse processes and ensuring timely production supply at the foundry in Leipzig since February 2013. The processes between production and shipping at the foundry require the operation of multiple warehouses. The IT Manager explains: “The key thing we wanted was transparent mapping of our stocks and processes across two warehouses. This cuts costs and simplifies system management. The system also supports continuous process optimisation.” The multi-site function in PSIwms guarantees that all processes between production and the two warehouses are controlled smoothly.

Optimised transport routes with forklift control system

The processes leading up to completion of the cylinder heads, crankshafts and crankcases at Halberg-Guss are extremely complex. Sand moulds, known as sand cores, are used to cast the engine components. They fill up what will subsequently be the spaces in the parts. Sand cores are produced on demand and stored in an intermediate storage area on pallets sorted by type.

The Transport Control (forklift control system) module in PSIwms is responsible for route optimised control of transportation from production and between the warehouses. The transport jobs generated in PSIwms are sent wirelessly to mobile data terminals (MDTs) on the three industrial trucks used at Halberg-Guss. The forklift trucks pick up the pallets holding the prepared sand cores and transfer them to the conveyor system. This takes the pallets to the rack feeders in the automatic two-
lane intermediate core storage area. A total of 288 storage spaces are available here for storing the sand cores.

**Sequenced issue for picking**

To cast the vehicle components, several different sand cores have to be combined to create each assembly. This picking is carried out on three assembly lines. To this end, PSIwms generates just-in-time issue jobs for the rack feeders in the intermediate core storage area. If required, PSIwms can also sequence these issues. At unloading points, the forklift trucks pick up the pallets and deliver them to the assembly lines as specified by Transport Control in PSIwms.

Controlled by the Warehouse Management System, four employees per assembly line pick the sand cores for casting and combine them into assemblies. Finally, the pretreated assemblies are fed through a special drying kiln to prepare them for casting, before they are stored in a five-lane final core storage area with 540 pallet storage spaces until they are called off by the foundry.

For just-in-time production supply, a conveyor system lift transports the assemblies from the final core storage area to the foundry. “PSIwms is responsible for the process control for supplying the casting systems, based on various strategies such as item-specific cooling times and the completeness of core sets,” explains Schollbach. When specifying the issue sequence, PSIwms factors optimised utilisation of the conveyor system into the calculations. A key highlight is that when storing the items, PSIwms distributes them redundantly to the storage spaces in the warehouse lanes in such a way that access to the correct item is guaranteed in other lanes even if there is a fault in one of the lanes.

**Goal achieved: Zero-error strategy for internal processes**

Due to the harsh environmental and production conditions in the foundry, the entire material flow was previously carried out without direct identification. Therefore, NEUE Halberg-Guss is planning to use a special, robust ID system tailored to the requirements of the foundry. The future system solution can easily be integrated into PSIwms as part of a further upgrade.

Within a few weeks of replacing the old system it was apparent that PSIwms was doing an excellent job of achieving the company's primary goal—a zero-error strategy for internal processes. “The warehouse and automation control are much more stable than they used to be,” summarises Schollberg. “With PSIwms we have also significantly optimised transparency across the two warehouses, multiple production and storage stages, our internal transport processes and production planning. PSIwms is a future-proof system that can quickly be adapted to changing processes and the introduction of new technologies. To date, with the results from sequenced, just-in-time and on-demand core set picking, and from assembly and production supply, PSIwms has met all of our expectations.”

**NEUE Halberg-Guss GmbH**

1983–86: Establishment of foundry

1986: Start of production

1987: First licensed production (VW engine blocks for Wartburg and Trabant)

1993: Privatisation of former GDR state-owned company by Halberg Guss GmbH, Saarbrücken

2005: Start of production of engine blocks for trucks and commercial vehicles

**Number of employees:** > 500

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User report: Modernised production processes at GEA Refrigeration Germany

Maintaining an overview with mobile data collection

An increasing number of companies collect their data where it actually arises. As a component of shop-floor data collection, the PSIpenta/Mobile module for mobile data collection from PSIPENTA Software Systems GmbH can be completely integrated into the customer's existing ERP system processes. It has enabled employees at GEA Refrigeration Germany in Berlin to modernise and reorganise their production processes.

Refrigeration is required in many situations—to keep food fresh, to create a pleasant climate in office buildings and even to create snow in the desert. This can be done using screw or piston compressors, cooling compressors, liquid chilling units, heat pumps or chillers. The GEA Group is one of the world’s largest suppliers of machines and process technology, particularly for the food and energy sectors. Their chillers currently cool numerous distribution and logistics centres for all major discounters and air-condition airports and indoor ski slopes in the desert.

Series production of one-off products

As one of PSIPENTA Software Systems GmbH’s very first customers, the company introduced the PIUSS-O production planning system back in the autumn of 1993, enabling bills of materials for plant engineering to be managed. “It helped us hugely in organising a modern production process and staying competitive,” says system manager Anja Ritter. At the end of the 1990s, GEA Refrigeration Germany switched to the successor ERP system PSIpenta.

Today, the key task of the ERP system is adapting work order bills of materials to the customer plant. “We produce 22 different compressors and maintain more than 1600 basic data bills of materials,” says Anja Ritter. Some of them contain more than 500 different parts, making them so complex that they include up to ten different sub-levels. And because no two compressors are the same, this data has to be individually adapted to the relevant order. “Although our assemblies have a modular design, we have so many individual features that we can genuinely talk about series production of one-off products,” Anja Ritter explains. “Particularly for purchase order proposals, we need to be able to rely on the fact that the basic data is accurately maintained.” And that is where the production-based PSIpenta planning system shows its strengths compared to other ERP systems. “It would be really difficult manage so many variations in SAP,” the system manager says. PSIpenta has SAP interfaces such as HR-PDC and PP-PDC, which make it easy to carry out stock and production planning in PSIpenta and then transfer the orders back to SAP after completion. “This production basis is the key strength of PSIpenta.”

For order processing, sales use a custom product configurator, which contains bills of materials transferred from PSIpenta. This creates an initial rough configuration, which is then fed back into PSIpenta. After order acknowledgement, the order is assigned a production
feedback number, the designer completes the details of the bill of materials and passes it on to production planning. Purchasing and production planning agree when the order is fed in and produced. “We assemble our compressors in one to two days, but for large cast parts and engines in particular we need a lead time of between six weeks and six months,” says Anja Ritter.

Mobile barcode scanners supply information

Since the introduction of PSI\textsuperscript{pent}a shop-floor data collection (SFDC), barcode scanners have been connected in the various departments. “Posting the goods directly upon receipt makes things considerably easier,” says Anja Ritter. It makes assignment of parts quicker and more reliable and reduces the risk of mix-ups. The data is collected, analysed and archived both online and offline using the PSI\textsuperscript{pent}a/Mobile module. The key point is collecting data where it occurs—in goods received and in the warehouse,” says Anja Ritter. The barcode scanners are located in a holder on the forklift truck, are connected to the ERP system via WLAN and can retrieve information anywhere in the plant. “We still post combined issues directly in the system, as this has proved to be faster than individual postings at the storage locations via WLAN,” explains Anja Ritter. The warehouse manager runs through the individual lines of the bill of materials, collects the parts in several pallet cages and transports them to the corresponding assembly locations. The data is automatically buffered when it leaves the network and synchronised when it re-enters the network. This means that the warehouse manager always has an up-to-date overview of stocks and material movements. The scanner displays item numbers and routings, and answers questions about who is using what quantity of which items in an assembly. This is done using a report based on the feedback number.

Outlook

In future, SFDC will provide up-to-date information about the production status in terms of production orders, work stations or machines. PSI\textsuperscript{pent}a/SFDC supports this by recording all events that are relevant to the progress of the order and operational cost accounting. Based on the feedback number and the production routing, it can also display the material provision process. “With the introduction of the SFDC system, we now have a better idea of which processes we can optimise,” says Anja Ritter. “Previously, we posted target hours equal to actual hours in compressor assembly. This system gives us a more accurate basis for calculations for special designs.”

Next on the agenda for the refrigeration specialists is the introduction of a production control centre and linking the machines to the SFDC system. This will enable the exact machine hours to be recorded, providing a better overview of the production process and opening the door to a new production control system.

GEA Group

GEA Group AG is one of the largest system suppliers for the food processing industry.

Headquarters: Düsseldorf
Employees: 24,550
Turnover (2012): EUR 5.7 billion

GEA Refrigeration Technologies division

- The world’s leading manufacturer of screw compressors and refrigeration systems for the food industry
- 1994: Incorporation into the GEA Group
- 1999: Acquisition of Ilka Mafa Kältemaschinenbau GmbH (production of piston and screw compressor liquid cooling units)
- Headquarters: Bochum
- Turnover: EUR 695 million

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There were a huge number of applications and various stand-alone software solutions, custom developments and Microsoft Office applications, but there was no link between the different systems. Likewise, there was no link to the PSIPENTA Software Systems GmbH ERP system that was being used. The aim of the project was to implement a fully linked and integrated CAQ system to eliminate stand-alone solutions and to enable future customer requirements to be met with all relevant modules. A link to the PSI-penta ERP system was an absolute must. It was also essential to meet the requirements from the TS 16949 standard.

After comparing the functionalities, visiting the company, and comparing the costs, the quality management solution from IBS AG was chosen in 2010.

Gradual implementation

The system was implemented gradually. At the beginning of 2011, implementation of the complaints management module began. During the first and second quarters of 2011, the focus was on writing test plans for in-production tests, goods receipt checks and prototype tests, with the first measured values recorded from the third quarter of 2011. In 2012 the focus switched to the audit module and test equipment management. At present, the following modules are in use on more than 200 PCs and terminals at NAF:

Complaints management: This tool has been used very intensively since its implementation at NAF. All internal and external complaints and complaint costs are recorded. A fully integrated action management system across all modules guarantees on-time, prioritised processing by the employees responsible. The comprehensive integrated evaluation and analysis options provide optimum support for continuous improvements in quality and productivity.

Test planning: As a central component of the quality management solution, the test criteria for all of the company’s quality-related activities are defined here. In addition to detailed test instructions, pictures or documents can be added to the individual test steps.

Test equipment management: Test equipment management enables all test equipment to be managed and its performance verified. Test equipment due for calibration can conveniently be filtered out and calibrated using the assigned test plans. Test equipment performance can be calculated using method 1 (repeat precision) and method 2 (comparison precision).

Goods receipt check and supplier evaluation: In goods received, the quality of bought-in parts is monitored. The results of the tests, which are obtained using spot checks and dynamic sampling, provide the basis for the supplier assessment. This increases transparency in terms of the quality rating of products and suppliers and supports selection of the correct business partners.

In-production testing (SPC): This module is used to optimise the management of production processes. Faults are identified in good time and their causes eliminated. NAF places a huge

Responsibility for production and delivery of perfect quality products ultimately lies with each individual employee. A definite sense of responsibility among employees, combined with a flexible and integrated quality management system—such as our CAQ=QSYS system from IBS AG—is the perfect way to guarantee quality production for our customers every day.

Dr. Siegfried Effenberger
Quality Manager, NAF AG
emphasis on the automation of processes. Infringements of tolerance limits lead to the automatic generation of a complaint with a problem-solving measure. Warning and intervention limits can be defined or calculated for SPC monitoring in series production. Assignment of test equipment ensures and verifies that only calibrated test equipment is used for the tests.

Prototype test: Prototype test report creation provides a convenient method of producing, evaluating and managing the reports required by the VDA and QS-9000. At NAF, prototype testing is carried out for both bought-in parts and for end products produced in-house.

Audit management: Using the audit module reduces the amount of administration work by reusing identical sets of questions, while also making it easier to identify weaknesses using simple analyses and listings. The audit management module also provides convenient monitoring and handling of measures.

NAF carries out several supplier, internal process, system and product audits every year. There are also customer and certification audits according to ISO 9001 and ISO 14001.

Test reports: This module supports test certification for non-specific and specific tests complying with DIN EN 10204. The manufacturer’s certificate, test report and acceptance certificate are automatically created and issued.

Link to ERP system: Data exchange with the PSIPenta ERP system fully integrates quality management into operational processes and creates consistency. Data is automatically synchronised, which reduces administration work and avoids redundant data storage.

For more than 50 years, axles and gearboxes for the construction, forestry and agricultural sectors have been produced at Neunkirchen am Brand in Bavaria. (Fig. 1) Assembly of an external part. (Fig. 2)

Benefits and synergies

Consistent use of the IBS quality management system has enabled extensive efficiency gains to be achieved in all areas. All customer requirements, as well as other requirements from certifications, are met and documented. Today, the complaint processes including communication with suppliers and customers has been considerably improved. To date, the biggest successes for NAF since implementation of the IBS CAQ system have been an award as “Supplier of the Year 2012” and a prize for innovation from key customers.

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Interview: The new PSImetals graphical user interface

Modern, configurable and standardised individuality

In the more than 40 years that software has been used to support operational processes, the operability and visualisation requirements for the user interface between a human and the computer have fundamentally changed. On the hardware side, this interface still involves a screen, mouse and keypad in most business applications. However, with every technological innovation, whether it is the world of 3D gaming, or the spread of smartphones and tablets, the demands for visualising data in software and for data access itself have been growing. PSImetals has a new graphical user interface, providing significantly improved user-friendliness in terms of visualisation, flexibility and data access for all modules. “production manager” interviewed Jörg Hackmann, Head of Product Management at PSI Metals GmbH.

production manager: For many software users, user-friendliness is primarily something they “feel”. Their experience with software has a positive or negative connotation. Is it possible to define this?

J. Hackmann: Looking at the ISO standard helps. User-friendliness or usability of software describes the extent to which it is fit for purpose, and enables a user to carry out their duties effectively, efficiently and satisfactorily using the software. For developing PSImetals this means that as a software supplier we can incorporate our many years of knowledge of business and production processes in the metals industry, but also need to keep the user and their specific tasks in mind at all times. The result of doing this is that our knowledge will be reflected in the navigation and configuration, as well as in the design of the graphical user interfaces of our software. We call this “Metals Usability” and it is exactly what we want our customers to judge us by.

What role does the look of the software play?

J. Hackmann: An important one. The first impression our customers get when they use our software is a visual one. They see screens and dialog boxes on their screens and want to be able to use them to do their job. Our software has to enable them to do that easily, quickly and in an enjoyable way. PSI has developed a new graphical user interface (GUI) that standardises the appearance and operation of all PSI applications, while incorporating the very latest demands in terms of software ergonomics. You can see the results for yourself: A tidier design with clear, reserved colours, in a modern yet timeless overall look. A good balance between something unique and distinctively recognisable as PSI, but at the same time retaining established operating standards. For example, the new PSImetals GUI contains a menu bar with graphic icons and the ability to colour data depending on the context, exactly as in the latest Office applications.

Let’s focus on graphics. How important are graphical representations for your customers?

J. Hackmann: That depends on the operating context. Our customers,

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It is important to our customers that the appearance of their PSImetals application can be easily and individually configured without the need for any programming work.

Jörg Hackmann
Head of Product Management
PSI Metals GmbH

for example in planning or in a production plant, are confronted with complex decisions every day, and these are often affected by a wide variety of influencing factors. Graphical representations make sense whenever they make it easier for the user to make decisions or perform analyses, or even to enable them to identify discrepancies more quickly. Therefore, in the new
PSImetals GUI it is possible to display additional graphical information in two or three-dimensional form, alongside information in lists or tables. We provide graphics in PSImetals whenever they support intuitive operation by the user. As an end in itself, just because they look good, they are less useful.

What is “Metals Usability” all about?

J. Hackmann: It is important to our customers that the display of their PSImetals application can be independently and individually configured without the need for any programming work. The window structure in the new PSImetals GUI is so flexible that any user can decide for themselves what data they want to see, where, how and in what form. The user can create a custom PSImetals view depending on their role and authorisation. However, Metals Usability also means that the underlying user concept is the same for all PSImetals components. Whether we are talking about visualisation, configuration or the authorisation concept, all components use the same interface and the same navigation principle. If the view of the data is the same, this naturally simplifies decision-making processes, particularly if information is available immediately in the relevant location. This expectation has been increasingly prevalent since the spread of smartphones and tablets. The new PSImetals GUI provides a basis for this. We already support mobile solutions, e.g. in logistics, as they are most in demand due to the large number of distributed users in warehouses and on vehicles. A further milestone will be the web capability of PSImetals, which will allow users to access PSImetals data from any device regardless of the system. Requirements such as optimised displays on small screens, browser-compatible access and easy integration of external devices such as cameras, printers, scanners etc. will be met. The new PSImetals GUI is designed to cope with a mobile future.

New PSImetals GUI: Better processing of information with additional graphics.

Free and demand-based compilation of information.

How relevant are mobile solutions in the industrial environment?

J. Hackmann: They are a must for the future. In offices, warehouses or on a plant, decisions can be made more quickly when plants are distributed around the world, as is often the case for our customers.

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Central rule management: Common goals, common rules

To enable companies to optimise their production processes automatically as far as possible by using software, knowledge of operational procedures in terms of the processes involved and the technological conditions first need to be defined so that automated processing is possible. Defining rules specifies which activities are initiated by the software in what production situations and under what conditions. The central Rule Engine in PSImetals enables operating rules for all production processes involved—from planning and execution to quality and logistics—to be configured and managed centrally.

Central rule management ensures that technological process expertise, which is often used across numerous areas of production, is managed in an identical form. For example, taking into account varying thickness specifications in the material to be rolled is not just relevant during production, but also plays an important role in creating sequences in the line programs. This ensures from day one that what is being planned is technically feasible for production and can actually be executed.

Defining complex operational expertise in simple terms

Describing operational procedures, requirements and constraints in the form of rules is an important element of every PSImetals configuration and in adapting the solution to customer-specific conditions. With its Rule Engine, PSImetals provides a system that allows central configuration of the operational decision-making logic for all processes involved, in terms of technological requirements and empirical operational values. Within this Rule Engine, the rule editor is the common component for defining, maintaining and applying rules and decision data across all PSImetals modules.

Configurable rule management

Within the rule editor, rules are managed in catalogues, which in turn have a hierarchical structure. These catalogues specify which rule is valid for which areas. For example, all systems in the plant are created in a hierarchy with higher- and lower-level structures (e.g. plant, hot area, cold area, finishing etc.). The nature of the hierarchy is freely selectable. For example, rules that are accordingly relevant for planning and implementation, e.g. the structure of a rolling sequence after a change of roller and decision on which material comes at which position with what quality, can be assigned using a tree structure according to the areas where they are applicable. Rules themselves are defined based on attributes specified in the PSImetals factory model and are detailed in the form of parameters, categories, transitions or filters, to map the necessary decision-making logic. A catalogue can contain different rules or even other catalogues. How a rule is applied may differ from one catalogue to another. The lower in a hierarchy a rule is assigned, the more restricted its area of use.

Managing the same rules in the same way

Central rule management makes it easier to handle those rules that are used in multiple areas. This is illustrated by the following examples:

For an optimised material allocation it is important to know from the planning perspective what dimensions and properties a material to be produced has to have in order to combine...
similar customer products into one efficiently combined work order. During production, by using the same allocation rules, allocation changes can be done quickly and efficiently. The situation is similar for line program rules for the individual systems, which have to intervene in planning and in operational changes at plant level.

Specialist knowledge accessible from anywhere

Central rule management also simplifies interaction of rules from different areas, e.g. when setting up the rolling sequence after a change of roller. Quality rules define the qualitative requirements for a material to be produced. Production rules, meanwhile, contain the knowledge about the way in which rollers are worn during the rolling process and the impact it has to the surface quality of the rolled material as a result. Planning rules need to incorporate both types of information, as for creating sequences in the rolling program it is vital to know at which position in a sequence an order shall be produced so that the reduction in surface quality after a particular number of rolling operations can be taken into account, and by this achieve the required quality.

Clear interaction of the rules cited here as examples is only possible with a central rule management in the PSImetals Rule Engine. In addition to consistent and standardised management of rules in terms of their structure, parameters and descriptions, it is also possible, for example to refer to compliance with other rules within a rule. PSImetals automatically checks existing rules for compliance and generates warning messages if a referenced rule is deleted or moved.

Continuous process improvements

Users can change rules as required at any time. For example, properties can be adapted or process conditions added or deleted. Likewise, the applicability of a rule (e.g. changes to storage areas in logistics or adoption of casting sequence rules for a new caster) can be changed simply by moving it within the catalogue hierarchy.

The version management function for rules is particularly useful if a large number of users are simultaneously working on a PSImetals system. Based on the version number of a rule, the system automatically checks that the latest valid version is being applied. The status management also ensures that the system can only apply approved rules. The PSImetals Rule Engine is provided in the PSImetals factory model repository. This central management of operational knowledge by using standardised rule management meets the requirements for the “single source of truth” concept and provides a basis for smooth running of automated planning and production processes.

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Event: PSIPENTA provides insight into development laboratory

27. IPA annual conference looks to the future

With the theme “Values, efficiency and the future!”, Managing Director Alfred M. Keseberg launched this year’s annual conference of the interest group of PSI:penta users (IPA). Following the major release of PSI:penta Version 8.3 with its new Supply Chain Management module, discussions now turned to the “Twenty20” release strategy. The focus was on the different migration paths to later releases, and a look at the PSI Java development laboratory. Other topics included the extended functions and features available in the PSIng community.

The pilot customer for the new Supply Chain Management (SCM) module is Läpple, which was awarded the “Com- petence Customer Award” this year. “We are thrilled with this award,” says Hans-Peter Rudolph, IT Project Manager at Läpple. He adds: “PSI:penta ultimately plays a key role in our IT strategy.” Of course, the increasing internationalisation of the customer base was a topic discussed at the annual conference. Jürgen Brunner, CIO of Grenzebach, presented his global multi-site installation: “PSI:penta's UNICODE capability enabled us to roll out to the Far East. We have now fully integrated our Shanghai and Jiashan locations into our IT landscape.” The company currently has 360 employees in China. This independent interest group of PSI:penta users (Unabhängige Interessengemeinschaft der PSI:penta Anwender–IPA) is organised into regional working groups and technical working groups, who meet up once a year at the conference. Alongside customers, some of PSIPENTA's strategic partners were also in attendance and presented their solutions at a special exhibition. With more than 250 people in attendance, the response was excellent, and satisfaction with the event is best summed up by Joachim Klein, the Head of Strategic Production Planning at Liebherr, a newcomer to the user group who simply said “I’ll definitely be coming again!”

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2014
SEASON’S GREETINGS

We wish you happy holidays and a prosperous New Year 2014.
Logistics order from Latin America

Avon subsidiary in Bolivia won over by logistics optimisation software

PSI Logistics GmbH was contracted by the Bolivian subsidiary of US cosmetics group Avon Products Inc. to implement a new logistics optimisation module of the warehouse management system PSI wms. Bolivia is the tenth country in Latin America to use PSI's optimisation module.

The implementation of the new optimisation module in the national distribution centre in Santa Cruz was completed in August 2013 and considerably reduces process costs by an efficient load distribution in the areas of picking and shipping as well as stock transfer and replenishment. The software controls for example the optimum order-related supply of warehouse channels as well as the best-possible storage location and express-line assignment while considering all relevant factors. This provides the perfect basis, amongst others, for the rapid and flexible completion of orders within the group's three-week campaign strategy. The continuous guidance of the staff throughout all processes and along optimised routes ensures increased efficiency and a high level of service thanks to reliable order picking.

The optimisation modules of the warehouse management system PSI wms form an integrated software solution for cost reduction and increased efficiency for intra-logistics processes in varying layouts. A total savings potential of up to 25 per cent can be achieved with this PSI software. The current order placed by the Latin American subsidiary marks the first-time use of the optimisation modules of the warehouse management system PSI wms in Bolivia. The Avon Group uses the software of PSI Logistics in a total of 25 subsidiaries for standardising both warehouse processes in distribution centres and its sales model.

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Events calendar

25/02–27/02  LogiMAT  PSI Logistics  www.logimat-messe.de
            Stuttgart, Germany  Exhibitor

10/03–14/03  CeBIT  PSI Logistics  www.cebit.de/home
            Hanover, Germany  Exhibitor

07/04 – 08/04  European Steel Technology  PSI Logistics  www.ats-ffa.org/estad-jsi/index.htm
              & Application Days  Exhibitor
              Paris, France

07/04 –11/04  Hannover Messe  PSIFENTA  www.hannovermesse.de/home
              Hanover, Germany  Exhibitor

Find out about all of the PSI Group events at: www.psi.de/en/events