Totally integrated Planning at İsdemir

Hot Savings with Hot Charging

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Dear readers,

Although Industrial Internet is already the hot topic in many industries, the metals industry is currently in something of a self-orientation phase. Have people slept through the beginning of the Fourth Industrial Revolution? A revolution means change in a relatively short time, but the metal industry is characterised by continuous production and long-term investments in plants. Are rapid changes even possible in this environment?

After being the recognised IT partner for the metal industry for many years, PSI has a differentiated view of the initiatives in Industrial Internet. And what about vertical integration? With the full, IT-based integration of all plants, this has already been the norm for several years, particularly in high-wage countries. Smart factories? Even in the near future, a continuous casting plant will not be able to assume the role of a hot rolling mill if necessary. So where will Industrial Internet find a place in the metal industry? In our opinion, the collection, analysis and use of data will have a fundamental effect on the production of the future. Page 6 offers a snapshot of data-driven production. Our presence at the METEC trade fair in Dusseldorf, Germany, expands the topic with the development of a KPI-driven supply chain. The lead article “Hot charging at Erdemir” describes a recent success story in the field of planning.

PSI is working intensively across industry boundaries to develop the future ecosystem of industrial production. With our comprehensive expertise and product portfolio in the fields of logistics, discrete and continuous manufacturing, supply chain excellence and fuzzy logic, we combine all the right ingredients.

Other articles explore how personnel deployment with the PSIpep planning software and the Qualicision® optimisation component is critical to the success of a company, how Alfred Kärcher controls its worldwide spare parts supply with PSIwms and how Keller Lufttechnik uses ERP standard PSIPenta.

Raffael Binder
Marketing Director
PSI Metals
As part of a continuous effort to reduce costs, increasing the ratio for direct and indirect slabs hot charging has become a top priority for most integrated steel mills. Those processes consist in charging casted slabs in the rolling mill’s reheating furnaces while they are still hot, which allows for substantial energy savings as well as reduced inventory and slab handling costs. The integrated steel mill of Erdemir Group at İsdemir started working with PSImetals Planning in 2011 and has achieved great improvements.

The integrated steel mill of İsdemir is located in south east Turkey, nearby the city of İskenderun, and is part of Erdemir Group which is the leading supplier of flat steel in Turkey. Besides İsdemir plant Erdemir runs a second plant at Ereğli. Originally a long steel products manufacturer, İsdemir plant started producing flat steel in 2008, with the acquisition of two continuous slab casters and a hot strip mill with a 3.5 million tons/year hot rolling capacity. In 2010, one year before Go-Live of the new Advanced Planning environment, the hot charge ratio was 5 %. To increase this figure and to materialize countable benefits İsdemir focused on decreased energy consumption in the slab re-heating furnaces, the ability to generate hot strip mill schedules with a lower slab stock level, and a decreased number of slab movements, with a positive impact on crane activity. These measures should finally result in shorter lead times. Erdemir Group and PSI worked out an integrated planning concept that should allow reaching these goals. Today, 4 years after Go-Live of the system, it is worth to have a close look on this project and its success story.

Hot Charging as Philosopher’s Stone
The key objective in this overall production planning optimization was to maximize the slab hot charging ratio between the slab casters and the hot strip mill. Whenever possible, steel producers indeed try minimizing the energy needed to reheat the slabs at their rolling temperature (1200°C) by charging those as hot as possible in the reheating furnaces in front of the mill. This is feasible if the slabs are rolled directly after being casted (direct charging) or within a period of up to 12 hours (hot charging). The gas savings that can be achieved in the furnace allow for substantial cost savings. However hot/direct charging is not always possible as certain steel qualities require a mandatory cooling of the slabs between the casting and the rolling processes. For certain applications, a mandatory scarfing of the slabs is also necessary. On the other hand certain steel qualities may require mandatory hot charging; these steel qualities need to be charged as soon as possible after the slabs are produced.

Pull-Push is the key
Increasing the hot charge ratio is not possible by only focusing on the iso-
lated schedules of caster and hot strip mill. Therefore PSI hot charging solution combines the midterm horizon (up to 4 weeks) with short term schedules (up to 3 days).

On the midterm horizon a daily flow plan is built to find the best trade-off between service performance, throughput maximization and inventory levels minimization, while also calculating optimized rolling diameter campaigns at the wire rod mill. These results are provided as targets to an order scheduling process, which generates rough cross-line schedules at order and piece granularity over the upcoming 4 weeks. This process allows simulating the expected production dates for each order on each line, expected completion dates, and expected inventory levels.

High level technical constraints that can generate due date dispersion for periods larger than a few days, such as backup roll campaigns at the hot strip mill, or section campaigns at the billet casters are also taken into account at this stage. Furthermore, the schedules of certain lines need to be highly synchronized. In particular, billet casters need to properly feed the wire rod mill campaigns and the slab casters schedules need to be synchronized to the hot strip mill schedule to maximize hot charging opportunities.

Finally, the detailed scheduling process aims at generating optimal detailed schedules at piece level for each production line for the next shifts up to 3 days, considering all the lines technical constraints such as grade transitions, width jumps, etc., and trying to respect the target order production dates received from order scheduling. The output of this process consists in schedules ready to be sent to production.

The key to success is the identification of hot-charging opportunities on the midterm horizon through a pull-push synchronization of casting and rolling schedules.

Map the daily business

In the mid-term horizon, the objective is to try identifying future hot charging opportunities based on the order book demand, and to prepare synchronized HSM and casters rough schedules accordingly. The detailed scheduling on the short term horizon will then try to concretize these opportunities based on the actual production lines and material situation. Both midterm and shortterm layers are updated on a daily basis based on the latest production situation. Therefore the planning department of İsdemir loads every day the production order book for the upcoming months into the planning system, as well as the work in progress (WIP) stock units in front of each line (i.e. all existing slabs, billets, coils) and the planned line downtimes. Those dynamic inputs are uploaded from the production execution system in place at İsdemir, named UYS, on a snapshot basis (every night, or on demand), and the initial stock units have been previously assigned to production orders.

It starts with a pull...

In the midterm horizon İsdemir starts by generating an ideal HSM sequence, the ‘pull’ run, which will:

- Identify groups of orders for making hot charge coffins
- Minimize due date dispersion to find the best timing for hot charge coffins
- Not take into account casters limitations

As a result of the HSM pull run, a maximized number of hot charge coffins have been scheduled.

It should be noted that at this stage the number of WIP slabs is not sufficient to build a midterm HSM program covering 3 to 4 weeks, and since caster sequences haven’t been created yet not many forecasted slabs are available to complete the HSM sequence (only those corresponding to the frozen ‘running production’ sequences at the casters). To address this, the slab yard population is completed by generating virtual slabs.

The next step is to pull these ideal HSM requirements to the casters, and try generating caster sequences that fulfill them at best, while considering casting scheduling restrictions.

This means that the local due dates for caster scheduling will correspond to the hot charging needs of the HSM, thus maximizing the chances to realize the identified hot charging opportunities of the pull run. It is important to note that the original order...
due dates have of course been considered as part of the HSM pull run constraints, but there exist a trade-off between satisfying the due dates of individual orders and the order grouping into hot charge coffins.

...and goes on with a push.

Since the casting limitations have now also to be taken into account, it is probable that not all hot charging coffins can be fed exactly as required by the pull run. This is why the HSM schedule will be finally re-calculated in a ‘push’ run, this time considering only real slabs and the forecasted slabs from the casters. At this stage, the previously created virtual slabs have been deleted. By definition, the virtual slabs were directly available for scheduling; however the forecasted slabs have a precise arrival time based on the casting schedules. A particularity of the HSM push run is that it tries keeping the coffins selected during the pull run, but will now re-optimize the sequencing and filling of those coffins with the forecasted slabs instead of the virtual ones.

In the short term horizon, the planner must prepare casters and mill schedules for the upcoming shifts, up to 3 days. Once planned, the short term schedules will be released to UYS. Hence, the sequences must be more detailed than the rough schedules generated at the order scheduling level, considering the full set of technical constraints, such as specific jump transitions between slabs. Some detailed constraints are indeed not considered within the midterm optimization for performance reasons, as well as due to the fact that the exact production order and material picture is uncertain beyond the next few days. However, the goal is of course to materialize in the short term the hot charge coffin opportunities that have been identified within the higher planning level.

The hot charging optimization in the short term is done in a pure push mode: at first, optimized caster sequences are generated, considering the imposed mould campaigns and tundishes for hot charging. In a second step, the planner generates a short term HSM sequence. The coffin selection is not done automatically at this stage, but manually by the planner. By default, the coffin selected by the midterm push run is proposed; however, the planner may select another coffin depending on the actual situation at the caster. Indeed, especially for hot charge coffins, it is critical to verify if the short term caster sequence can provide in time the necessary forecasted slabs to fill the coffin.

The propagation of forecasted slabs from the casters sequences to the stock in front of the HSM is at this stage directly handled by İsdemir’s UYS. As soon as the slabs are effectively casted and come into existence, UYS is also responsible to transform those forecasted slabs into real slabs.

Pull-Push = Win-Win

Five years after the implementation of hot charging optimization at İsdemir based on PSI metals solution, the customer could gain the following benefits:

- Decreased energy consumption in the slab re-heating furnaces
- Ability to generate hot strip mill schedules with a lower slab stock level;
- Decreased number of slab movements, with a positive impact on crane activity;
- Improved throughput (economies of scale);
- Shorter lead times.

The reduced energy consumption is directly linked to the gas savings at the reheating furnace, that could be achieved thanks to a higher hot charging ratio (hot slabs require substantially less reheating to reach their rolling temperature). The shorter lead times and reduced slab movements, as well as the possibility to work with a globally lower slab inventory are explained by the fact that hot slabs recently casted are just stored in a specific area of the slab yard for a short period of time, and less slabs need to be taken from the cold part of the yard. Finally, charging already hot slabs in the reheating furnace allows throughput gains by working at a faster furnace pace.

FACT BOX (FROM 2011 TO 2013):

- Hot and direct charging ratio increased from 5% to 54%;
- Average slab charging temperature increased from 430°C to 586°C;
- Overall reheating furnace energy consumption was reduced from 316.1 kcal/tonne to 245.7 kcal/tonne.
- 80% time savings for line schedulers
- 13 million Dollar cost savings

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User report: PSI\textit{penta} in use at Keller Lufttechnik

A standard that can be tailored

An ERP standard system should map as many company processes as possible. At Keller Lufttechnik in Kirchheim unter Teck, Germany, they also place particular value on the openness and flexibility of the long-standing system, the latest version of which is also significantly more user-friendly.

In December 2013, the European Commission adopted a “package of measures for clean air in Europe”, in which they defined air quality targets to preserve human health and sensitive ecosystems. Keller Lufttechnik GmbH + Co. KG has been following this principle since 1903. From its beginnings as a construction plumbing company, it has today become a global specialist in capturing and separating air pollutants and limiting emissions, and develops and constructs tailor-made exhaust systems, filters and components. The right solution is available for every process, with different separation technologies such as dry, wet, and emulsion and oil mist separation. Customers come from virtually all sectors, including the chemicals, pharmaceuticals and food industries, as well as the automotive, plastics and recycling industries. Services range from initial plant design, installation and commissioning through to after-sales. Now in its fourth generation, the family-run business has engineering offices and service points throughout Germany. There are also subsidiaries in China, Switzerland and the United States, three licensees and eleven overseas representatives. In 2014, the company achieved a turnover of 53 million with 345 employees.

First choice proves itself

The first ERP system was launched at Keller in 1998. After a rigorous selection process, the company installed the ERP standard system PSI\textit{penta} following a unanimous vote of the management board and representatives of all departments. “We started out with Version 3.0.4 and used this until 2004. We then migrated to Version 6.0.3 following a complete redesign with new order structures, before updating our software to the latest version, Version 8.2, at the beginning of 2014,” says Martin Steis, ERP System Administrator and Coordinator, summarising the company’s ERP history.

After eight years, it was clear to the management that an upgrade was necessary for technological reasons. It was imperative, however, that the Keller system should be ready for use at the start of 2014, with new hardware and software. “We created a mini set of specifications, and also invited other companies to bid. However, we quickly came to the conclusion that PSI\textit{PENTA} was still the right choice for us,” Steis explains. From the outset, it was important that the new version operated in the same way as the replaced version. For this reason, no new modules were introduced and the old customisations were linked to the standard system. The integration of VBA ran smoothly.

Continuing with the tried and tested

The new software includes features such as a contact management function for Purchasing. Steis himself had programmed this function for the old version. “We would have had to tailor the new module to some other program. In view of the large number of orders we process, we simply wouldn’t have had the time,” says the ERP Coordinator. Another tool that was copied over was the Complaint Management tool.

 PSI\textit{penta} has its own Oracle database, and we integrate our spreadsheets into this. This
means that I don’t have to use a different database when programming interfaces,” explains Steis. “This database makes migration practical. I make my own spreadsheets, link them to specific key fields and have my own interface.”

The whole project was therefore successfully implemented as an IT project. There was no downtime, and no training was required as the employees were very quickly able to find their way around the new version. As a result, key users were not unduly burdened and did not have to spend time away from their departments to take part in an IT project. Over the course of the project, an ERP competence team was formed from this core project team, which acted as a central, cross-departmental platform to discuss, assess, and prioritise operational and strategic IT issues. The team is headed by Steis and meets once a month to discuss business-related problems and challenges, and new programming. “We therefore have an IPA in miniature,” Steis explains, describing his team.

IPA is the independent representative for all PSIagenta user interests, operating in regional work groups and meeting once a year at a multi-day event.

I only log the details of what I want to see. For example, if someone accidentally changes a drawing number, this is logged and it’s relatively quick to determine where the error is.

“Above all, we appreciate the openness and flexibility of PSIagenta, and with VBA integration, we have a powerful scripting engine,” says the system administrator. “We simply enjoy the luxury of being able to do a lot of the programming ourselves, which we can then include in the migration.” For Steis, this means even greater efficiency and speed, as well as fewer errors—which is why openness and flexibility are significant benefits of the PSIagenta solution. He also emphasises the role of his software partner as a service provider, and praises the support hotline in particular. “In terms of functionality and security of investment, we believe that PSIagenta has been the right system and the right partner since 1998.”

Martin Steis
ERP System Administrator and Coordinator
Keller Lufttechnik GmbH + Co. KG

Luxury ERP
Steis stresses in particular the usability of Version 8: “PSIagenta has become easier to use and more user-friendly. The Speed button is one example of this.” This button allows users to jump from one object to a destination object via several other objects—i.e. from the item straight to a BOM item. Users can scroll faster and navigate backwards and forwards. Another useful module for Steis is the data history, which logs changes. “This history is also very easy to customise, so

Keller Lufttechnik is a global specialist in capturing and separating air pollutants and limiting emissions.

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User report: Ready for shipping in 30 minutes with PSIwms

Alfred Kärcher controls its global spare parts supply

Cleaning equipment manufacturer Alfred Kärcher GmbH & Co. KG consolidated its worldwide spare parts supply at a logistics centre in Obersontheim, Germany. Controlled and coordinated by the PSIwms warehouse management system, order picking efficiency was tripled at the new logistics centre.

With 10,600 employees worldwide in around 100 companies and a turnover of more than two billion euro, Alfred Kärcher GmbH & Co. KG, with its head office in Winnenden in south-west Germany, is the leading international manufacturer of cleaning equipment and systems. Spare parts for dealers and Kärcher branches worldwide have been supplied from Obersontheim, near Crailsheim, since 1994. 60,000 different spare parts and 5000 accessories are stored there in a new logistics centre that went into operation in 2013. With carefully designed material flows, the latest automation systems and an intelligent warehouse management system, Kärcher was almost able to triple order picking in the new logistics centre in comparison with previous processes.

Automated picking processes
Kärcher has established six product-specific warehouse areas with special picking strategies for rapid response times and order picking, and the processes are largely automated. PSIwms forms the IT backbone for inventory management and administration, and for managing the complex intralogistics processes, warehousing and order production strategies. The warehouse management system coordinates the picking processes and replenishment, calculates and issues the respective work orders to the downstream device controllers, forklift trucks and IT subsystems, and ultimately ensures that batches are consolidated in a timely manner.

Fully automated high-rack warehouse
In addition to the old high-rack warehouse (HRW), whose 8000 loading spaces are now used as a replenishment depot, a fully automated, five-aisle HRW was established with 15,400 pallet spaces and an eight-aisle automatic small parts warehouse (ASPW) with 85,000 container spaces. A block warehouse with 6500 loading spaces was also built for picking medium-sized items from pallets and pallet cages. There is also a special picking system with a further 130 loading spaces for storing and picking fast-moving items. A further feature is a two-lane, shuttle-serviced consolidation buffer with 5400 container spaces, which is where container-type order items are combined.

The 25 forklift trucks in the logistics centre receive their transport orders from the integrated Transport Control forklift truck guidance system in PSIwms. Fast-moving items that are not suitable for containers are moved to the block warehouse, which is designed for automated full-pallet handling, and then moved to the new high-rack warehouse. The
WMS guides container-type goods receipts to repacking stations. Goods receipts with container-type items to replenish the ASPW are transported as full pallets to a handover rack in front of the old HRW by forklift truck. Following final confirmation of the storage processes, the items are recorded as available stock in PSI wms.

14,000 order items ready for shipment in 30 minutes
The performance of the IT system is demonstrated by the order picking system, where 14,000 order items are picked each day in the spare parts warehouse. All items should be ready for shipping within 30 minutes. The rapid picking times are designed around the specific departure and cut-off times of the courier and general cargo shipments, which transport around 75 percent of Kärcher’s picked volume.

“Once an order is received, PSI wms automatically splits the order so that order items can be picked simultaneously in all storage areas,” says Christian Welter, Project Manager at PSI Logistics. “To ensure items are delivered on time, PSI wms back-calculates the picking times and triggers coordinated order picking on time.”

Full pallets and large quantities are moved out of the new HRW and the block warehouse. PSI wms moves the pallets to the picking spaces to enable picking of boxed goods and C and D-items. The IT system also controls the display specifications for picking.

Picking small parts with PSI wms
Most of the order items are small-part items. Around 70 percent of these are picked from the ASPW at eight picking centres. Again, the picking process uses the display specifications set by PSI wms. The target containers are transported to the packing area or the automatic shuttle buffer stock via conveyor technology. The ASPW picks are consolidated with fast-moving items, and are picked in Obersontheim from the wide-aisle warehouse and a semi-automated row of racks. The picking process in the wide-aisle warehouse is supported by a pick-by-voice system whose application software is linked to PSI wms. PSI wms directs the seven mobile picking units through the picking aisles via the best routes. Employees pick other fast-moving items using two semi-automated picking scaffolds, and can pick up to 24 orders simultaneously. The WMS transfers the picking orders to the control system of the picking scaffold. All order containers are consolidated in the shuttle buffer and moved out to 24 packing stations to be shipped on time and sequenced according to the orders. At the same time, the Case Calculation function in PSI wms determines the optimum cardboard packaging. The IT system then triggers printing of delivery notes. The shipping boxes are transported through a strapping system by a conveyor belt, which automatically guides them to the terminals after the label codes have been scanned. Each day, 4000 packages leave the Kärcher logistics centre in Obersontheim, which means that Kärcher has exceeded the targets it set following plant automation.

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News: Data as the Basis for Industrial Internet

Hot Furnaces and Cool Chips

The fourth industrial revolution is not a new topic these days, even in a conservative sector like the steel industry. Producers and trade associations are outlining their ideas, while suppliers from plant engineering and IT are also sharing their vision of an Integrated Industry. So which concepts for the future project can (or could) be implemented in the harsh world of hot furnaces?

To find out, we visited Karl König at the voestalpine Stahl GmbH steel company in Linz. König has worked at the Austrian steel producer for many years and, since 2010, has been the head of the “electrical and automation technology committee” at „Stahlinstitute VDEh“, the technical and scientific organization representing the steel industry in Germany. He and his committee have been working intensively on the issue of Industrial Internet and its importance for the steel industry. They are due to publish recommendations for members by the end of 2016. The Internet of Things, virtualization and smart manufacturing are the buzzwords behind the idea, and none of the major players in IT or plant engineering tire of coming up with their own smart concepts. But is it all just a big marketing bubble?

“It’s about production and nothing else”, König elaborates. “I’ve been working at voestalpine since 1974 and started dealing with automation early on. I’ve been involved in the issue of material monitoring since day one.” In metal production, huge varieties of finished products are manufactured from a single liquid raw material. At each stage of the process, the number of product varieties increases. „Before a sheet or coil is finally produced, there are a huge number of operations between the individual stages. This process is what makes production monitoring so unique and difficult,” König explains. It’s a familiar problem that people are now attempting to solve with modern IT. It does not take long before the term „big data“ comes up. „We already have to deal with a huge volume of data. The challenge is to link it in a meaningful way“, says König.

Big Data—quality from quantity
“Production systems are extremely expensive to buy and they are only profitable with a certain level of utilization. In addition, steel production and processing are characterized by variations in quality”, König continues. This is precisely the challenge that the German manufacturer Saarstahl is trying to resolve.1 In conjunction with partners from research and business, Saarstahl’s “iPRODICT” research project is aiming to create a system that can detect possible faults in production before they occur. All the data generated in the production process is analyzed to identify patterns, which in turn trigger an automated response in the event of variations in quality. In about three years, we will see whether big data can actually deliver the quality improvements people are hoping for.

Smart Factory—Information in flux
At the Düsseldorf steel conference, Stefan Meißner from Salzgitter Flachstahl explained that he believes that the real-time availability of any information across all levels represents a major opportunity for the steel industry.2

The production information will be provided continuously to the operational and administrative levels (“bottom up”). Conversely, administrative requirements will be fed through automatically to the production systems (“top down”). Meißner believes that information should not only flow smoothly within a company—it is also important to connect other parties involved in the value chain, such as logistics service providers, suppliers and customers, to the global smart factory network. So should we use cool chips to control hot furnaces? Here, Karl König from voestalpine is sensing impetus from a completely different direction. “It’s all about transparency.
At present, producers only pass on as much information as is absolutely necessary, but customers are interested in getting much more detail. While people already work closely with customers in research partnerships, a genuine information culture is still lacking in day-to-day business in the industry. The mental walls need to be torn down before the global network can become a reality.

Automated control: selective potential

According to Stefan Meißner from Salzgitter Flachstahl, there is the potential for major savings in areas such as intelligent power supply networks or a standby mode for production systems. This is where plant engineers come in. Intelligent, automatically controlled smart maintenance could make plant maintenance significantly easier. The idea is that smart maintenance plants automatically notify service personnel of current faults and any scheduled maintenance work. Plants and their operating status are fully mapped in the Internet of Things and allow intervention with worldwide availability. But is this a pipe dream? “Definitely not”, says König. Plant engineers are already bashing down the doors of his VDEh technical committee with their latest solutions. However, steel producers first want to come up with an independent picture of Industrial Internet and its applicability to their sector. Only then will the real discussions begin.

PSI Metals is paying very close attention to industry initiatives and believes that it is in a great position for Industrial Internet. Jörg Hackmann, Head of Product Management in the Metals division, believes that intelligent material that routes itself through hot furnaces and Industrial Internet: With its integrated database PSI metals today already offers the required basis. production is only possible where the external physical influences in the production process allow it, for example in the area of multi-location material logistics. Hackmann expects the real breakthrough for the metal industry to be big data, and he is fully behind the manufacturers’ approach.

Zero-fault strategy as reality

Given that decisions can currently only be made after the production process (i.e. too late), the ability to make multicriteria decisions while a process is ongoing could be the “killer app” of Industrial Internet in the metals sector. The key is to integrate data from planning, logistics and smart devices in the relevant areas of the plant into the overall process control system. Linking plant status information with material related historic and planned process data enables indicators of variations to be identified, thus paving the way for proactive production control. “This helps our customers to make a zero-fault strategy a reality—avoiding faults instead of correcting them, as quality variations remain the biggest trouble spot in production”, Hackmann explains. An integrated data basis, such as that provided by PSI metals, is the ideal framework. Whether it is comprehensive production monitoring or integrated energy management, it is already a reality in the PSI portfolio. I think the “Industrial Internet ready” label is a very good description of our current solutions. PSI platform strategy also provides the perfect foundation. The issue is important to our customers and we will support them to the best of our ability in implementing it,” concludes an optimistic Hackmann.

1 Saarbrücker Zeitung, 01/29/2015
2 Presentation: „Einführung in das Thema Industrie 4.0 – Informationstechnische Vernetzung als Zukunftspotential“ (“Introduction to Industrial Internet—Future Potential of IT Networking”) at STAHL 2014, Düsseldorf

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Product report: PSIpep 7.0 powered by Qualicision®

Staff planning as a key success factor

The optimal deployment of human resources is crucial to the success of a company. Workforce planning is therefore a key challenge. Amongst other things, it is important to plan according to demand, take qualifications into account, and respect employee needs and contracts while minimising the overall costs. For this purpose the well-established optimisation component Qualicision® was integrated into the new version 7.0 of the PSIpep planning software.

Current challenges faced by all industries include resource efficiency and demographic change, and personnel management has therefore become of central importance. The forward-looking, demand-based personnel planning of the established PSIpep software enables far-reaching standardisation of personnel planning processes—both for short-term planning on a daily basis and for long-term, utilisation-based strategic budget and capacity planning. Planning of the permanent workforce and temporary workers is on the one hand based on the anticipated workload and on the other hand on individual deployment options, contracts and the expectations of employees.

Operational and strategic workforce planning

Operational workforce planning with PSIpep is based on previously determined personnel requirements for each period and work area. Demand is broken down to individual employees and shifts. The shift or team leader can find all the relevant information in an interactive planning table. Coordinating the required workforce capacities with the available pool of employees creates planning transparency and allows potential bottlenecks or idle times to be identified early so that appropriate action can be taken at the right time.

In particular, forward-looking personnel planning as part of management and controlling focuses on long-term budget and capacity planning with a planning horizon based on quarterly or fiscal year requirements. This is based on demand forecasts. Reconciling the personnel available in the future with the expected demand curve allows managers to identify how many temporary workers will be needed in each case. Recurring shortages of specific skills can lead to the introduction of recruitment or training measures at an early stage. Furthermore, long-term capacity planning in PSIpep includes demand-orientated shift and holiday planning, and evaluates the development of the flexitime accounts of the permanent workforce and the expected wage costs.

Automated planning with Qualicision®

A whole range of conditions must be taken into account, both in operational and long-term workforce planning. In addition to varying demand, these conditions include the respective availability of employees in accordance with attendance and absence patterns, skills profiles, contractual agreements and other conditions. Various criteria determine the quality of a plan. For example, in addition to quantitative factors such as costs, distances covered or the efficient use of tools, qualitative aspects such as the rolling distribution of tasks and individual scheduling preferences also play a role. Other planning objectives may be to minimise deviations from the long-term plan in the event of short-term rescheduling. This is where Qualicision® comes into its own—an optimisation component that allows automatic scheduling while taking into account multiple criteria in PSIpep. A target function can be assigned to each criterion in order to describe which characteristics are to be evaluated and how. For example, exceeding the daily target time by 10% could still be deemed acceptable, while overshooting the weekly working time by the same amount is unacceptable. Users can control the relative weighting of criteria themselves using a slider. The planning result is illustrated in a radar chart to give an impression of how well each of the criteria
it is often found that the objectives are completely contradictory—for example, demand for high employee availability versus efficient utilisation. For Qualicision®-based optimisations, interactions are derived from the process data in the form of impact matrices. Based on this, the actions that are best suited to achieving all of the planning objectives are then determined using a mathematical conflict and compatibility analysis. In technical terms, this analysis makes the combinatory variety of KPI control options manageable.

This allows the software to make qualified and targeted decisions.

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**Data Driven Production - Primary Metals and Industrial Internet**

Visit PSI at METEC!
16.-20. June 2015, Messe Düsseldorf
Make an appointment and receive your free ticket voucher. Please scan the QR-code.

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PSIpep with Qualicision® integration.

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PSIpep with Qualicision® integration.
Event: Review of CeBIT & Hannover Messe trade fair

Successful spring trade fairs for PSIPENTA

Traditionally, PSIPENTA Software Systems GmbH sets up its stands twice in the halls of the Deutsche Messe centre in Hanover in March and April—first to present its products and ideas at CeBIT and then to attract interested parties and build and maintain business relationships at the world’s largest industry trade fair, HANNOVER MESSE.

Peter Dibbern, Head of Business Development, summarises the spring trade fairs as follows: “The two big spring trade fairs represent a sales peak for us every year, and are a great way for interested parties and customers to get to know our new products live. The good visitor figures also vindicate our decision to have a continued presence at the classic trade fairs, and demonstrate that trade fairs are still going strong despite those who have previously written them off.”

Digitisation of production
The theme of this year’s CeBIT was “d!conomy”, focusing on the rapid digitisation of all sectors of the economy and society. More than 3300 companies from over 70 countries presented their products and services. Overall, some 221,000 trade visitors, journalists and delegates made their way through the former trade fair grounds over the five exhibition days.

New momentum
The HANNOVER MESSE is generating new momentum, both on an economic and political level, particularly with its guiding theme of “Integrated Industry—Join the Network”. The digitisation of industrial production, the collaboration of man and machine, innovative supply solutions and intelligent energy systems attracted more than 220,000 visitors to the trade fair. 6500 companies from 70 countries presented solutions for the production and energy systems of the future.

Smart factory scenarios
PSIPENTA presented practical approaches for implementing smart factories at both fairs. Scenarios ranged from the ergonomic interface of PSI'penta Version 9.0 (prototype), which simplifies the increasingly complex functionality of the Fourth Industrial Revolution and makes it more manageable for users, to visualisation possibilities in manufacturing, through to concrete Industrial Internet applications.

At the HANNOVER MESSE, PSIPENTA was selected as an official partner of the Industrial Internet Guided Tour with its three smart fac-
Manager PRODUCTION 2/2015

Progress using SCADA technology (Supervisory Control and Data Acquisition) for gathering and analysing real-time data and mobile processing. The solution also allows preventive measures to be defined for ensuring the operational readiness of equipment and production operation.

Presentation of PSI Cloud
PSIPENTA also used CeBIT as an opportunity to present the PSI Cloud in conjunction with myOpenFactory and to enter into a distribution partnership with Portolan. In future, PSIpenta customers will be able to network, even across organizational boundaries, via the PSI Cloud. The coordination platform myOpenFactory, which uses numerous current communication standards, forms the technological basis. Purchasing and sales processes across the value chain are supported. PSIPENTA provides a special adapter for this application in the ERP client. If required, the PSI Cloud can also be extended to additional customers and vendors who are already represented on the myOpenFactory platform. The offer is currently being presented at regional customer events (IPAs).

Agreement signed between Portolan and PSIPENTA
PORTOLAN EVM is a software producer and specialist for the Financial Accounting, Asset Management, Group Consolidation and Controlling modules, and will now begin selling PSIpenta/ERP as an integrated complete package.

Corporate clients come from larger SMEs, in the automotive and mechanical engineering sectors in particular.

The systems are widely used in the IBM midrange market, and are available worldwide in 17 languages and in 25 national versions.

Joachim Närk and Alfred M. Keseberg seal the partnership.
News: The new edition of “industrie 4.0 magazin”

Driving the Fourth Industrial Revolution forward together

In the second edition of the “industrie 4.0 magazin”, PSIPENTA Software Systems GmbH, together with industry partners, informs readers about existing and future concepts surrounding the shape and implementation of Industrial Internet.

Companies from industry, IT and research all play an equal role in helping to implement an integrated production process—not least because comprehensive and smooth production across the various stages of the value chain requires solutions that have been developed together hand in hand. In addition to the Group-wide solutions provided by PSI, “industrie 4.0 magazin” also includes contributions from partners in industry and research.

The Institute for Industrial Management at RWTH Aachen University stresses that companies gain a decisive competitive advantage through integrated improvements in productivity based on the intelligent use of data via software solutions.

PSIPENTA partner INTEC International GmbH, with its modern machine data recording system, forms an important link between manufacturing and information processing and utilisation.

The world’s leading manufacturer of valve, measurement and control systems, GEMÜ Gebr. Apparatebau GmbH & Co. KG demonstrates the importance of IT from the perspective of a manufacturing company. However, there are also critical voices that point out the fundamental change in direction of the economy brought about by Industrial Internet.

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**22. Aachener ERP Tage**

**Industrie 4.0 - Digital veredelte Auftragsabwicklung**


Find out about Industrial Internet and ERP in practice.

PSIPENTA, Stand MS3.
News: Multimodal procurement and distribution networks

Honda optimises Logistic operations with PSIglobal

Honda Motor Europe Logistics NV located in Gent, Belgium, has purchased the product PSIglobal from PSI Logistics GmbH. The logistic company of the Honda Group uses this standard system for strategic planning, controlling and optimising logistics networks to check and streamline its multimodal procurement and distribution networks for the European motorcycle market.

Honda Motor Europe Logistics NV has been working with a leased version of PSIglobal since mid-2014. The functional scope of the standard system in daily operations was convincing. A range of applications in the software are used to expose the existing European Logistics network (inbound and outbound) in all its details. The software reveals opportunities in terms of service and cost which afterwards can be touched and further investigated in practice. The existing functional scope was used for, among other things, analysing existing ship/road procurement network and modelling and checking optimising alternatives. Due to the positive experiences in previous months and being convinced that the modelling capabilities can contribute to further logistics improvement, Honda decided to continue working with the software.

With its scenario technology and the integrated analysis methods PSIglobal allows modelling, checking, and optimisation of multimodal supply chain networks and logistics processes as well as the identification of key indicators and sensitivities. The model based approach calculates the optimum number and location of sites and optimises transport structures in order to reduce transport costs. Mathematical models allow the integration of predicted volumes and staff cost developments into the planning in order to calibrate the network accordingly. Within the last two years alone, a large number of leading brand manufacturers has selected PSIglobal for their logistics optimisations and thus, has optimised more than 100 million transport orders.

Honda Group optimises multimodal procurement and distribution networks for the European motorcycle market.

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Software for Logistics Networks

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PSI increases new orders, sales and EBIT

The PSI Group obtained 6% higher sales of 43.2 million Euros in the first quarter of 2015. The EBIT improved by 4% to 2.2 million Euros, the group net result increased by 18% to 1.4 million Euros. New orders improved by 11% to 62 million Euros, the order book volume on 31 March 2015 was, with 139 million Euros, 8% above the value for the previous year.

Production Management
Sales in Production Management in the first three months were, with 21.6 million Euros, 14% above the figure for the previous year. The EBIT increased by 50% to 1.5 million Euros, despite ongoing investments in the software for raw material extraction until the end of year. The steel industry is still in a bear market and it is not yet clear, whether early cyclical orders before year end could secure the annual target of the PSI metals business. In particular, the market for fracking and pipeline tubes, which is of importance for PSI, has to cope with an oil-price-induced slump. Orders from the aluminium industry, which currently enjoys a boom driven by the lightweight manufacturing initiative in the US, could compensate that effect. The automotive/mechanical engineering and logistics businesses were able to significantly improve their results in a recovering home market.

Energy Management
Energy Management attained 2% higher sales of 15.6 million Euros in the first quarter. The EBIT for the segment increased slightly compared to the previous year to 0.84 million Euros. The electrical energy business was able to once again increase its new orders; the oil and gas business won an additional contract in Russia and continued its strong performance of the previous years despite the tight market situation.

Infrastructure Management
In Infrastructure Management, sales decreased by 10% to 6.0 million Euros, primarily due to the still poor development in Southeast Asia. The EBIT for the segment therefore dropped to 0.2 million Euros. The public transportation business in Germany developed still positively. In Poland PSI expects important contracts in the energy segment in the second quarter.

The number of employees in the group increased to 1,718 on 31 March 2015 as a result of the takeover of Broner Metals completed in November 2014.

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Long-standing Broner Senior Managers join Management team

Effective March 30th, 2015, the long-standing Broner Senior Managers Mark Ferguson, Director of Sales and Tim Gedrych, Director of Delivery will take on the responsibility of Broner Metals Ltd., Watford, and be in charge of the operational management of the company.

In addition Tim McAlpine continues as Director Product and Methodology, Julie Clements as Director of Customer Service and Chelliah Selvasathan as Director of Finance. Former CEO and Managing Director of Broner Metals David Mushin will remain available as an advisor for some months. Sven Busch and Detlef Schmitz, joint Managing Directors of the PSI Metals GmbH will take on the responsibility for the strategic management of Broner Metals.
Research project: econnect Germany

Networking of Smart Home and Smart Grid

As part of the national research project econnect Germany, the STA-WAG (the Aachen municipal utility company) and its partners, amongst PSI AG, have launched a field trial involving electric vehicles in ten private households in September 2014.

This field trial brings together the complex structures of intelligent networks and the various parties involved in the energy sector under real-world conditions, using the example of electro mobility. The ICT controls the data flow between the energy generator, the consumer and the network operator.

PSIcontrol with enhanced functions
Therefore, it is absolutely essential to shift this load to off-peak hours and spread it over time. For network security it is necessary to monitor the charging operations using control technology and to intervene where necessary. The load created by charging stations and electric vehicles is communicated to the STAWAG control system using an open interface and, when combined with other master data, allows monitoring and control.

The data entry in the PSIcontrol system has been extended and appropriate monitoring functions have been implemented so that violation of voltage bands and exceeding of maximum load and maximum current values are continuously monitored.

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EVENTS

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