

Products & solutions: PSI divisions develop highly specialised automotive solution

More than just-in-sequence production



The complexity of logistics and production processes is continually increasing in the automobile industry. PSI-JIS supports sequence-optimised, synchronous production and delivery. Source: Audi

PSI has been developing software for the automotive industry for 20 years. The company's automotive industry competence has now been raised to a new level due to the co-operation of three PSI divisions in developing a just-in-sequence (JIS) solution. The system is programmed in JAVA – one of the first steps in the long-term strategy of the group to ensure platform convergence or hardware independence of all PSI products.

As an industry specialist, PSIPENTA Software Systems GmbH assumes the design work and brings its industry knowledge to the project together with market access. The Polish business division PSI producty i Systemy Informatyczne Sp. z o.o. assumes the programming and implementation

tasks and will boost sales in the eastern European markets. Within the JIS system on the part of the car manufacturer and supplier, Fuzzy Logik Systeme GmbH (F/L/S) uses its Qualicision technology to integrate sequencing optimisation which has been tried and tested in over 30 factories of renowned car manufacturers. A prototype of the solution will be presented on June 9 2011 at PSI Automotive Day in Sinsheim.

Complexity of the automobile added-value chain

The automotive industry is one of the most demanding industries and important growth drivers in Europe. Due to the individualisation of customer requests and therefore the growing influence of end customers,

the complexity of the added-value chain in the automotive industry has increased sharply. High innovation and cost pressure with a simultaneous increase in complexity through market-driven model and variant diversity pose great challenges for the industry. Original Equipment Manufacturers (OEMs) focus on sales and marketing and outsource increasingly large sections of their assembly to suppliers. Within the added-value chain, apart from final assembly, they often only take on the production of components which are particularly important in differentiating their brand. In the supplier industry, Tier 1 suppliers outsource their production in turn to sub-suppliers (Tier 2 suppliers), which results in further branching of the logistics chain. Consequently, the increased pressure on time and flexibility

for the product origination process and therefore also the logistics process affects the suppliers involved and car manufacturers equally.

Just-in-sequence

PSI-JIS is designed specifically for these conditions and supports highly automated, sequence-optimised and synchronous production and delivery from supplier to car manufacturer. In other words, different variants of the same part or pre-configured module are delivered to the car manufacturer's assembly line at the right time in the right sequence and position. Simultaneously, Qualicision technology creates sequences optimally, i.e. production or assembly sequences, on both the supplier and OEM sides. To clarify the logic of just-in-sequence production, compare it with the just-in-time production that has been familiar in the automotive industry since the 1970s. Here, the OEM commissions a large quantity of a part or a variant of the required part at a specific time. But the sequences in production or assembly are not taken into account. These are, however, becoming increasingly important due to the growing diversity of variants, and determine the production and logistics processes definitively. The relevance of this topic is demonstrated by the example of the BMW 3 series, which was produced in so many variants that only two or three identical cars left the plant each year.

Just-in-sequence solves this problem not just by supplying the parts to the conveyor belt at the right time on the basis of a pull principle, but also by providing them to the cars in the right order. To achieve this, the software generates production or delivery orders for exactly ONE specific part at a specific

time, which is also allocated a unique Vehicle Identification Number (VIN) – i.e. allocation to a specific package and sequence number. A total of three call-offs, known as JIS CALLS, are generated by the OEM for the supplier n days, n hours and n minutes before the start of assembly in order to react to configurations by the customer at short notice. The pre-lead time varies according to the distance between the supplier and end customer or production and assembly. Highly automated, with possible connection to an ERP system, the car manufacturer commissions its suppliers with due consideration of the production sequence and thereby saves enormous logistical time and effort.

Optimising sequences

Beyond these standard JIS functions, Qualicision supports sequencing optimisation in production or assembly for the OEM and/or supplier in order to achieve a balanced production flow with

regard to human and machine resources. A situation of this type might be related to preventing employees from being overloaded in their jobs, for example. If an assembly worker deals with three or four fully configured vehicles in succession, a high degree of concentration is required, which is accompanied by fatigue. Logically, this presents an increased risk of error which can be reduced with a more balanced sequence, i.e. fewer stress peaks and a more even, continuous workload. Expressed verbally, one specification of the software could read: When a fully configured car is assembled, the system should optimise the workload so that if possible a car with a simple configuration follows. This requirement for optimal sequences in assembly partially contradicts the requirements of sequences in the paint shop. This section would like to group cars by colour and prefers colours to go from light to dark. This is because fully configured cars, which lead to high workloads in assembly, are mainly dark.

PSI-Automotive Solutions to the next level



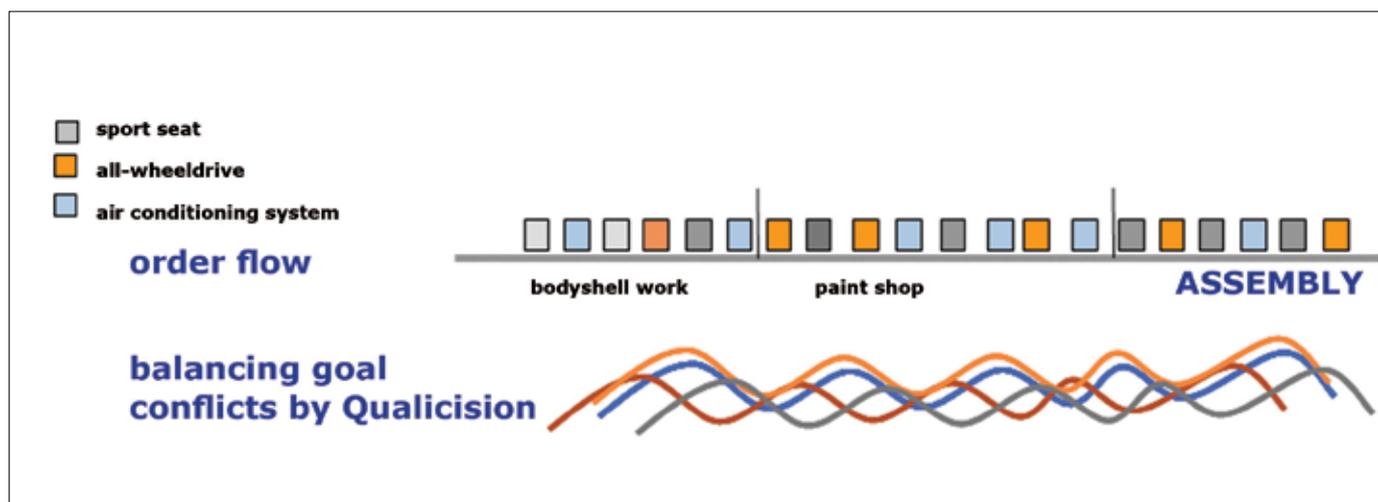
PSI Automotive Day

09-June-2011

Auto & Technik Museum Sinsheim

www.psi.de/automotiveday





1000 orders per day lead to a barely conceivable number of possible order sequences. Qualicision neutralises a wide variety of implicit goal conflicts between the individual technical and economic conditions in production both within the assembly, preliminary building works and paint shop sections and beyond these areas, thus creating an optimised order flow. Source: F/L/S

The complexity in sequencing which arises for the OEM with regard to the number of possible combinations is more than the human mind can imagine, even with extensive professional knowledge. In addition to assembly and the paint shop, this also affects preliminary building works. This section also has its own optimisation goals regarding order sequences, which are established from the perspective of the resources found there, such as welding robots or feed cartridges etc.

Harmonising contradictions

From the point of view of suppliers who have to operate the complex sequences that arise in the JIS environment, their own production sequences also have requirements. These in turn must comply with the technical and economic requirements of a supplier. With Qualicision, these sequences can be calculated in a similar way. However, because of the diversity in production processes, these do not generally conform to the sequencing requirements of the recipient OEMs. As both sequencing types are calculated

by the same software, the supplier is able to harmonise the contradiction between its own production sequencing requirements and those of the OEM. To create such optimised sequences, Qualicision must include in sequencing all measures affected by changes after the options freeze, which is sometimes at short notice. Examples of these include detailed time planning, internal scheduling and co-ordination of suppliers. Qualicision ensures re-optimisation of planning as soon as possible in the event of a problem and its subsequent resolution. The system therefore adapts planning and execution so that it does not conflict with the range of possible variants. This flexibility is possible because the approach to human thinking and action has been adapted in Qualicision and transferred to IT. In a situation, decisions on sequences are made rapidly using clear parameters and heuristics.

Standards for greater security

PSI-JIS is designed as a standard which forms the basis for different industry-standard project solutions.

The program synchronises all relevant, commercial data via a standardised interface with an Enterprise Resource Planning (ERP) system, preferably PSIPenta. These include e.g. master or planning data. Communication is via EDI using the data protocols VDA, EDIFACT or ODETTE. In the event of an interruption in communication, an independent, standardised emergency concept is activated. The software creates maximum transparency in the assembly and manufacturing process for both the OEM and the supplier. This allows the supplier to give the car manufacturer information on the status of any order at any time. 



► Information

Contact: Ulrike Fuchs
 Marketing Communications
 PSIPENTA Software Systems GmbH
 Telephone: +49 30 2801-2029
 Fax: +49 30 2801-1042
 Email: ufuchs@psipenta.de
 Internet: www.psipenta.com