

Using Sap In Production Planning & Control For Automotive Manufacturing

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Abstract: - The paper presents the authors’ concern regarding the creation of a structured PP&C model which will be able, with the help of SAP, to increase the performances in the field of auto components fabrication. The conceiving, realization and implementation of a PP&C system such as this one in a company which produces auto components, with more than one branch in different countries, has led to an increase of profit and a dramatic decrease of errors in the informational flux.

Key-Words: - SAP/R3, PP&C, OEM, EDI, ERP

1 Introduction

The increasing globalization of world markets reflects the base changes of the next decade, especially in the automobile industry. The killer competition which began in the middle 90’s between the giants in automobile and automobile parts construction has known an increasing escalation and will consolidate itself round the year 2015, according to a study made by The Fraunhofer Institute.

After this consolidation the only ones who will be able to survive will be the big OEMs (original equipment manufacturer) and the suppliers who will be able to perceive, analyze, respond to the market’s signals and to accordingly adapt to them.

As you can see from figure 1, between 2000 and 2015 the tendency of moving the tasks towards the suppliers is differentiated. If in the field of electronics one can see practically no change, the entire car body and car body components spectrum task falls on the suppliers. This represents a huge opportunity for the car body modifiers still on the market, but in the same time an equally big challenge strategically, financially and logistically. This development brings not only big risks for the suppliers, but also the chance for a stronger participation in the value creation process.

So we conclude that the both the suppliers and demanders of services will participate more and more to the design process as well as to the production one, resulting an increase of their sales by 100% till 2015.

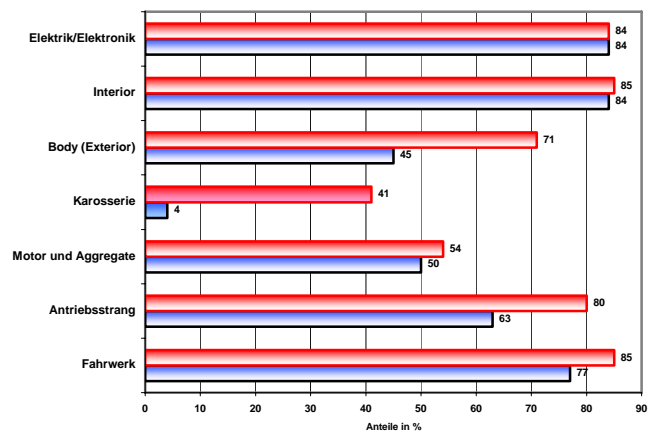


Fig. 1, Tendency of moving the task

For the logistics between construction and development, implicitly for the deliveries to be JUST IN TIME, the network between suppliers and producers must be denser and denser.

The information exchange through paper edited documents will soon belong to the past as it is being replaced by on line data transfer. Electronic recordings will gather documentary evidence regarding the production related processes and at the same time will assure the recording in the components’ life cycle of all afferent registering, recording demanded by the quality department.

All of this has as purpose the reduction-elimination of qualitative shortcomings and wrong deliveries, the reduction of rejects and the closing on the NO MISTAKES strategy.

In the production department, the production and quality stage is being determined by scanners and sent on line to the central data base.

2 Production planning&control

Production Planning and Control (PP&C) is a process that comprises the performance of some critical; functions on either side, viz., planning as well as control. See figure 2.

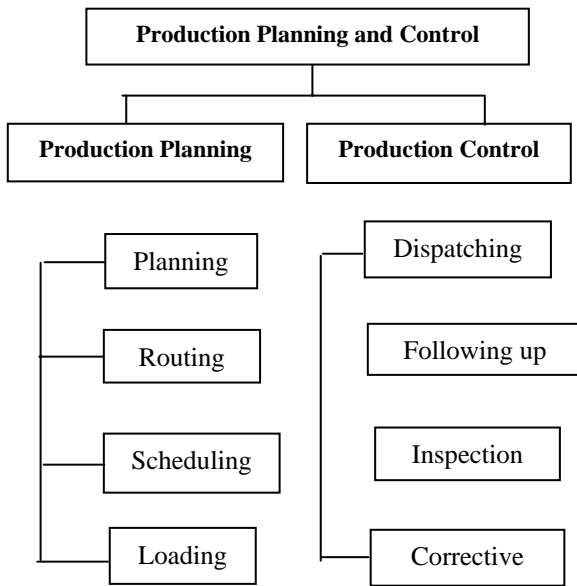


Fig. 2, PP&C Process

Production planning may be defined as the technique of foreseeing every step in a long series of separate operations, each step to be taken at the right time and in the right place and each operation to be performed in maximum efficiency. It helps entrepreneur to work out the quantity of material manpower, machine and money requires for producing predetermined level of output in given period of time.

Once the entrepreneur has taken the decisions regarding the product design and production processes and system, his next task is to take steps for production planning and control, as this function is essentially required for efficient and economical production. One of the major problems of small scale enterprises is that of low productivity small scale industries can utilize natural resources, which are otherwise lying.

Manufacturing planning and control address decisions on the acquisition, utilization and allocation of production resources to satisfy customer requirements in the most efficient and effective way.

Typical decisions include work force level, production lot sizes, assignment of overtime and sequencing of production runs. Optimization models are widely applicable for providing decision support in this context.

3 Use SAP in automotive manufacturing

The ERP systems, for example the SAP/R3 offers the user the possibility to find out, depending on the network in which he operates (specifically oriented on a certain process) and regardless of the moment of the logistic process of generation, the qualitative stage and the present stage of fabrication of a certain component/part.

This informational advantage is not only for the suppliers to beneficiate, but also the clients, as the relation between the two is tighter and tighter.

As a result the big producers (the OEMs) will be faster implicated in the generating process.

For a correct SAP application generation in the BRANDL Company, the grid presented in figure 3 has been generated.

The SAP/R3 internet network connectivity offers the following advantages to the firm producing auto parts:

1. A single SAP/R3 system installation in a single location will suffice, meaning that the license and coordination are centralized.
2. The data visualize, refresh, delete and processing wrights are centrally controlled by the HQ. The transactions are centrally supervised, and the unwanted ones are being tracked and eliminated. Data saving from all the locations on the globe is being centralized in Germany, where physical data are available. The global system administration is being done centrally, meaning that qualified staff support is only required once.
3. Global access to the central data base allows the access of independent SAP/R3 subsystems as well as the coordination between them. For data synchronization, the access on the main server is being cut off for a determined amount of time (1-2 hours). This way a comparison of data is being done because the required actions weren't able to be done simultaneously.
4. The central administration of global data as well as their refreshing and comparison in the Germany data base permit their handling at any time.

As it was demonstrated, the network system which ties together different locations brings many advantages over the locally implemented system.

The platform offers information not only regarding the cash flow status but also the possibility to see at any time the stage of data and tasks development.

The SAP/R3 system is based on two main data units. In the fields of bookkeeping and controlling, these would be called the account field and cost centers; and in the logistics and planning fields, the material base.

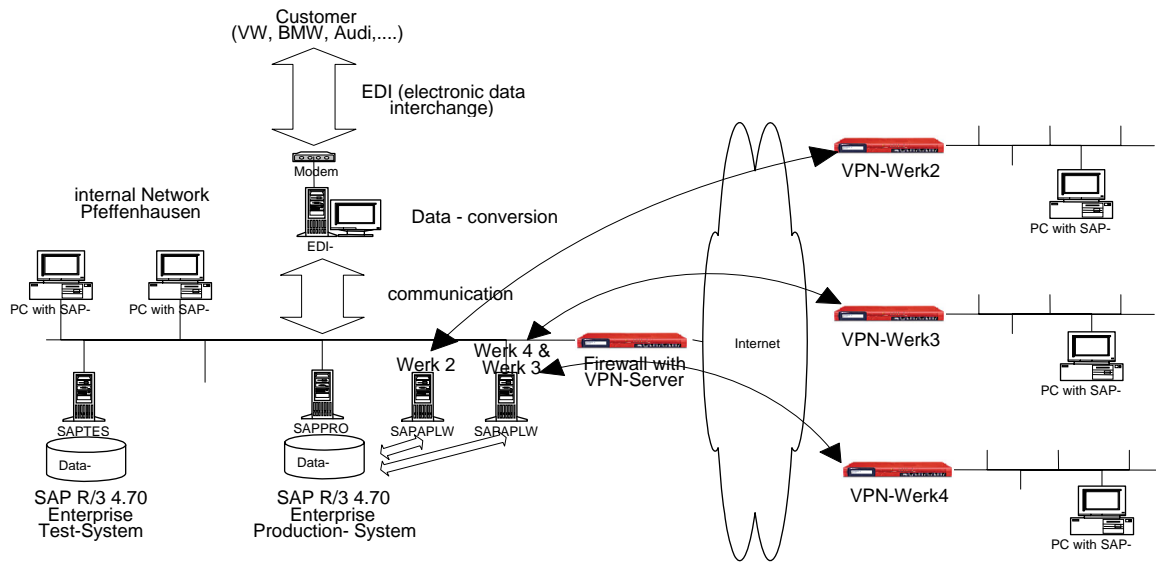


Fig.3, Company networking

In figure 4 we can observe the various views of the material base's startup window.

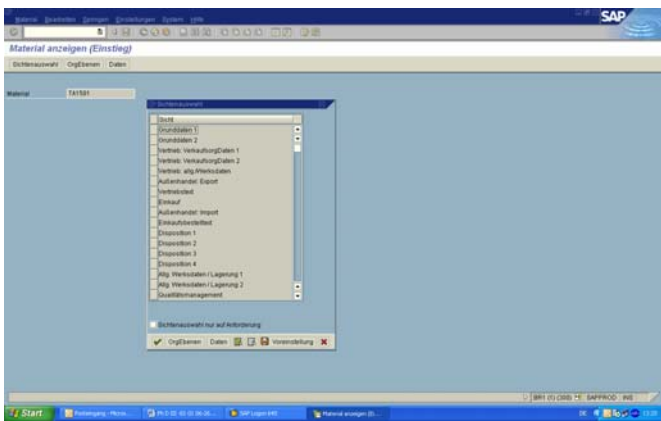


Fig. 4, Material data base

Before using a material in a chain of processes, buying, processing, wrapping and delivering, the data from the data base must be processed. As it is clear to see, the SAP/R3 system offers a multitude of fields along the way of a material's processing, and that is why it is recommended to be taken into consideration only the fields that rely to the automotive field, for the studied case.

In the automotive field, as far as the customer relationship is regarded, the IT system comes to their aid allowing them to put in the demands on line. Unlike the IT sector, where the customer orders units depending on the requirements and performances, the automotive sector holds a strong relationship regarding the order and delivery, a one on one report with the customers.

Based on the early planning for the following 6 month, the producers' need for semi fabricates and raw material emerges, parts which they guide directly to the clients. The data are being introduced using EDI-Manager (Electronic Data Interchange) – represented in figure 5 -, held a period of time and then distributed to the other SAP systems.

Object ID	Sender	Receiver	Datatype	Status
211091	VW4495	SAP_BR1300	IC_C2FP	ready
211092	VW4495	SAP_BR1300	IC_C2FP	ready
211093	VW4495	SAP_BR1300	IC_C2FP	ready
211094	VW4495	SAP_BR1300	IC_C2FP	ready
211095	VW4495	SAP_BR1300	IC_C2FP	ready
211096	VW4495	SAP_BR1300	IC_C2FP	ready
211097	VW4495	SAP_BR1300	IC_C2FP	ready
211098	VW4495	SAP_BR1300	IC_C2FP	ready
211099	VW4495	SAP_BR1300	IC_C2FP	ready
211100	VW4495	SAP_BR1300	IC_C2FP	ready
211101	VW4495	SAP_BR1300	IC_C2FP	ready
211102	VW4495	SAP_BR1300	IC_C2FP	ready
211103	VW4495	SAP_BR1300	IC_C2FP	ready
211104	VW4495	SAP_BR1300	IC_C2FP	ready
211105	VW4495	SAP_BR1300	IC_C2FP	ready
211106	VW4495	SAP_BR1300	IC_C2FP	ready
211107	VW4495	SAP_BR1300	IC_C2FP	ready
211108	VW4495	SAP_BR1300	IC_C2FP	ready
211109	VW4495	SAP_BR1300	IC_C2FP	ready
211110	VW4495	SAP_BR1300	IC_C2FP	ready
211111	VW4495	SAP_BR1300	IC_C2FP	ready
211112	VW4495	SAP_BR1300	IC_C2FP	ready
211113	VW4495	SAP_BR1300	IC_C2FP	ready
211114	VW4495	SAP_BR1300	IC_C2FP	ready
211115	VW4495	SAP_BR1300	IC_C2FP	ready
211116	VW4495	SAP_BR1300	IC_C2FP	ready
211117	VW4495	SAP_BR1300	IC_C2FP	ready
211118	VW4495	SAP_BR1300	IC_C2FP	ready
211119	VW4495	SAP_BR1300	IC_C2FP	ready
211120	VW4495	SAP_BR1300	IC_C2FP	ready
211121	VW4495	SAP_BR1300	IC_C2FP	ready
211122	VW4495	SAP_BR1300	IC_C2FP	ready
211123	VW4495	SAP_BR1300	IC_C2FP	ready
211124	VW4495	SAP_BR1300	IC_C2FP	ready
211125	VW4495	SAP_BR1300	IC_C2FP	ready
211126	VW4495	SAP_BR1300	IC_C2FP	ready
211127	VW4495	SAP_BR1300	IC_C2FP	ready
211128	VW4495	SAP_BR1300	IC_C2FP	ready
211129	VW4495	SAP_BR1300	IC_C2FP	ready
211130	VW4495	SAP_BR1300	IC_C2FP	ready

Fig. 5, EDI module

From EDI-Manager to SAP/R3, the information is being routed through IDOCS (Intermediate Documents); IDOCS are part of the SAP/R3 environment. In SAP/R3 orders are being composed and deliveries are being generated. IDOCS not only processes data, but also generates information regarding exact data concerning the events that will take place in the receiver's space. Once created, the EDI connections between the OEM and supplier represent a strong bond due to the fact that

these are point to point connections. Organizing a company depends essentially on its importance and on the types of the manufactured products. It is believed that the resources of a factory are organized on a structure determined by its functions. The main four elements of the factory are:

- The *product* - end result of the manufacturing process can be a tangible good or service;
- The *supply* - total amount of a good or service available for purchase;
- The *costumers* - a person, company, or other entity which buys goods and services produced by another person, company, or other entity;
- The *resources* - a person, asset, material, or capital which can be used to accomplish a goal, equipment, people, assets (money).

The necessity of phase analyzing and developing has great importance in the lifecycle of a product, having consequences on costs, quality and the delivery terms.

In the framework of the automobile industry one will not be interested in the long term planning for the most detailed pieces, for example different equipment characteristics of the automobile, like colour, motor capacity, etc. Moreover, considering that a category would comprise for instance 30.000 units one would like to ask how many, for example left and right B-Pillars, to be fabricated. These necessities create themselves so-called secondary-necessaries, that will appear in the list with the beneath presented construction groups and raw materials. The term PP&C is used to describe the way the informational systems are used for planning, supervising and controlling the life cycle processes of the product, starting with the collection of the data (the order) and ending with the products delivery, considering in the mean time the quality aspects given by the placement and the capacity.

4 Conclusion

For the car industry, progress and flexibility represent the keys for success. Cutting down the costs concerning the organization of the manufacture and production is the major claim of the current world of automobiles. Production Planning and Control - PP&C occupies an important place in this flux of information and materials. Throughout this paper, the most important features of SAP/R3- an instrument of development PP&C for a company in the automobile area will be briefly described. The spectrum of applications offered by SAP/R3 covers all the marketing and management modules known by this time. The circuit of manufacture controlling starts with the aperture and release of the order and ends with the manufacture of the product itself. The performances are defined for a particular order. In this way, the outputs of products are being

registered from the economical and technical point of view and the resulted materials are being inventoried on their value and quantity.

The PS isn't a MRP development, but a module in the production planning, which completes the PP&C module. If the development of the standard production processes, like mass production, is represented through the PP, the production of individual commands is supervised in return through the Project Management systems.

The paper presents a part of the research and preoccupation of the collective of the "Manufacturing Science" regarding the PP&C and using SAP program in the context of a modern production system.

Also, using the PLM concept it was possible to realize the car components, under the circumstances of high quality and low costs.

References:

- [1] L. Heilig, S. Karch, R. Pfennig, and C. Hofmann *SAP NetWeaver Master Data Management*, ISBN 1-59229-131-1, SAP Press, 2007.
- [2] I. Bondrea, H. Hermann, *10th International Research /Expert Conference "Trends in the Development of Machinery and Associated Technology" TMT 2006, Barcelona-Lloret de Mar, Spain, 2006.*
- [3] R. Möhrlein, *SAP/R3-Projektsystem*, Prentice Hall 2000.
- [4] S. Kohlhoff, *Produktentwicklung mit SAP in der Automobilindustrie*, Galileo Press, 2006.
- [5] J.B. ReVelle, *Manufacturing handbook of best practices*, ISBN 1-57444-300-3 CRC Press, 2002.
- [6] M. G. Shields, *E-Business and ERP: Rapid Implementation and Project Planning*, ISBN 978-0471406778 Wiley Publisher, 2001.
- [7] *** SAP/R3, *User Guide*, 2006