



## The FEKOR concept – We solved the planning problem Artificial decision making

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### Summary

#### What is FEKOR?

FEKOR is a planning system established by tetys GmbH & Co. KG tailored to manufacturing companies. It enables their planners and procurement managers to initiate all processes necessary to complete customer orders as requested. FEKOR covers both, the material management, i.e. planning and supply of materials and finished products, as well as the production planning i.e. planning the processes on the shop floor.

The first goal of FEKOR is to optimize the production plan in such way, that all delivery goals are met and, if not avoidable, deadline overruns are kept to a minimum. The second goal is to minimize production costs. In competing situations, on time delivery is prioritized.

## Common planning philosophies

In addition to commercial functions such as controlling, cost accounting and balancing ERP systems also offer so-called production planning and control systems (PPS), promising a significant increase in productivity. However, thus far those systems could not live up to these expectations causing widespread disappointment with the PPS components of ERP systems.

One reason the PPS systems commonly used today cannot, or only insufficiently, be employed to plan essential processes within a company is that they are too sluggish in their handling. They cannot provide a sufficient basis to make quick, informed decisions at short notice.

## Breakdown into rough and detailed planning

As there have been no further developments within this area in recent years, most companies have outsourced their essential planning functions, especially those needed for day-to-day business to other systems. Initially, the resulting control consoles were only used as graphic display instruments to visualize the planning information from the PPS systems. With time and growing user requirements more and more functionality was transferred from the original PPS systems to the newly established production control centres. The situation today can be best described as follows:

- The PPS/ERP systems, which have usually been installed at considerable expense, are now only used to provide a rough internal planning.
- The detailed planning of work processes within the production is increasingly being transferred to the production control centres.
- Although they can only provide planning on a rough level, the management and disposition of materials is still handle by the PPS/ERP systems.

This set-up holds two substantial flaws:

1. The negligence of important specifics within the detailed planning leads to rough planning outcomes within the PPS/ERP system, which can no longer be realized in the subsequent detailed planning.
2. Separating the materials management, which is handled by the PPS/ERP system, from the production planning, which is handled by the control centre, causes the two systems to work independently from each other at best or in the worst case even against each other. Those conflicts occur because the allocation of materials and components is not properly coordinated with the quick decision-making and short reaction times needed in the production planning / on the shop floor.

On the one hand this causes disruptions in the internal processes as required materials cannot be provided on time. On the other hand, materials are often ordered too early, unnecessarily tying up storage space and additional capital. This is often most evident in the case of packaging material.

The poor alignment of the PPS/ERP systems with the production control centres commonly used today will most likely lead to even more planning functionality being transferred from the PPS/ERP systems to the production control centres in the future.

## KANBAN and Co.

In addition to the developments in the PPS/ERP systems and production control centres, an abundance of planning philosophies and methods have been developed and distributed in recent years, some of which are used with the aid of EDP.

KANBAN, JIT (Just in Time), OPT or BOA (load-dependent order control) are just a few examples to mention here.

All of these philosophy have in common that at their time they were hyped as the ultimate solution to the internal planning problem, however they were replaced by the next philosophy soon thereafter. The reason none of these solution lived up to the expectation becomes apparent when considering that they all focus on only one specific aspect of the planning, disregarding all others.

Even though the so-called „lean“ philosophy is not a planning philosophy as such, it has caused considerable disruption in internal planning. In particular, the creation of distinct areas of responsibility and the simultaneous layering of personnel hierarchies associated with „lean“ gave the impression, that the planning as a whole could also be divided and distributed to the different responsibility areas. This often lead to the assumption that it would be possible to forgo higher-level planning entirely. However, on the contrary the planning and coordination effort between the individual areas tends to increase, when compared to conventional planning. This is due to the fact, that after all the individual plans within an individual area of responsibility have to be coordinated with the individual plans of the other areas. Additionally, the old-established principles regarding resource availability and the dependencies of the individual production levels of a multi-level production system still persist. Therefore it comes as no surprise that within a very short time the „lean“ philosophy has already passed its prime.

To conclude, the widely-used combination of PPS/ERP systems and an increasing number of production control centres does not yet provide a suitable and permanent solution to the planning needs of manufacturing companies.

Similarly the fast-changing planning philosophies do not offer a universal solution to the planning problems of manufacturing companies either.

The few and unsuccessful attempts to control the internal supply chain redirected the focus towards establishing good relationships with the customers and the suppliers.

## The FEKOR concept

### Goals

In contrast to most other planning systems, FEKOR does not pursue secondary goals, such as reducing processing time or minimizing stockkeeping. Within the scope of internal planning FEKOR is dedicated to the inherent company goals which are:

1. **Adherence to delivery schedules**, or in case of delivery from storage, maintaining the ability to deliver.
2. Maximizing business profits. However, since the internal planning usually has no influence on sales revenue, profit maximization in this case is synonymous with **minimizing costs**.

In general, adherence to delivery schedules (or maintaining delivery capacity) takes priority over minimizing costs.

In a best case scenario, secondary goals, such as minimizing the number of set-ups or reducing processing times, lead to similar results. However, in the worst case scenario they oppose company goals.

## Modelling of the plant operation

In order to work towards these company goals, the planning system needs to be familiar with all operational processes within the plant. FEKOR offers the unique possibility to model even the most complex structures of internal processes, thus making them accessible to planning.

Defining resources, identifying alternative strategies in conflict situations, taking into account dependencies of several individual production orders and including the entire material management are the defining qualities of FEKOR. Due to the realistic portrayal of the plant and internal processes the plans derived in FEKOR can be implemented in the real life work environment.

## Artificial decision making

The system can only accurately show the outcome of a specific planning activity if all necessary or conditional calculations can be done within the system. Are all necessary pieces of information available within such a system it is possible to effortlessly make well-founded decision in terms of artificial intelligence even for the most intricate planning questions.

This will be briefly illustrated using the example of a common net requirement reversal: If a customer cancels their order, this simultaneously means certain assemblies and, if applicable, individual parts or raw materials no longer have to be procured or provided. Using today's conventional procedure the procurement manager has to wait for the next net requirement reversal initiated by the planning system, which usually does not happen until the next day. Only then can he decide whether to cancel the order for the involved assemblies as well or to maintain it due to an alternative demand. Using this procedure the overall effects of such a cancellation will not be apparent immediately.

Relating to the example described above, FEKOR automatically takes over this check and decides according to the specifications the procurement manager has put into the FEKOR system previously. The consequence calculation within FEKOR directly shows the planner that in this case, for example workplace capacity has been freed up, as the assembly order can be dispensed with too.

## Summary

Using FEKOR the weaknesses and disadvantages of commonly used planning systems today can be eliminated:

- FEKOR does not only support the planning, but also the actual company goals, namely on-time and cost-minimal delivery to the customer.
- The planning made by FEKOR can be implemented in real life, as the operational processes in the plant are modelled to the minutest detail.
- The high processing speed of FEKOR allows for it to be used to determine necessary planning measures at any point in time, even during workstation or production tool failures.
- FEKOR takes over the planning of all aspects necessary for the internal order processing; it combines material management and production planning thus specifically ensuring the essential alignment of these two key areas of focus.