



Employee assembles the Mercedes-Star. Daimler AG uses a new method for long-term demand-capacity planning.

## Methodical Forecasting

**SOFTWARE** Consistent demand capacity management far into the future – Daimler has realized this for their car production.

Established globalization with central planning is the way the Daimler AG in Stuttgart is pursuing under its global growth strategy 2020. For that flexibility in sales is an indispensable prerequisite. In the face of ever-increasing competition and an ever-increasing variety of products, this flexibility must be protected by a validated, consistent and transparent capacity planning at all levels of the product and the value chain. Sales planning and production – including parts requirements planning – should be coordinated in a time horizon of two to three years.

“There is now a transparency, a validity that we did not have before. In the past, the experience and the resulting assessment were crucial for demand and parts requirements planning. Now we can make a consistent statement that applies to all: product development, sales and suppliers,” explains Jürgen Hirzel, who is the head of program and capacity management at Daimler. His department verifies

that the necessary capacity is available in terms of materials and resources for the number of passenger cars Daimler plans to build the worldwide each year.

The program and capacity management department is the central instance for requesting and collecting planning information from various departments and divisions worldwide. It consolidates demands on all product levels, calculates the component requirements based on this information, and performs continuous demand capacity balancing at all levels including the parts.

The manager adds: “We consolidate the relevant information to bring together sales planning and production plan. The central questions we ask ourselves are: Can we actually build the vehicles that are to be sold according to sales plan? In which vehicle plant (assembly line)? With what power-trains (engines, transmissions and axles) and with which components we source also source from external suppliers, dependent on the model?”

The big challenge is the correct dimensioning of the capacity due to sales forecasts of vehicles, their variants and optional equipment. How do you configure capacities in such a way that planning and subsequent course of business are as close to each other as possible? This requires forecasts reaching two to three years into the future: the production facilities internally and at suppliers must be prepared accordingly. Also the demand forecast for parts and components built by external suppliers should extend to two to three years.

Requests for demand-capacity studies come from different departments such as purchasing and internal logistics. Every day, the company is facing this subject during operations. If a supplier does not deliver enough parts leading to a bottleneck situation, then it may have been caused by an inaccurate capacity planning due among other things. Excess capacity is not possible for reasons of profitability in the global competition.

### Old method replaced

Program and capacity management is continuously working on shaping the best possible process for volume planning and control. The common method used for a long time relied on the knowledge and experience of employees in production and sales; suppliers were also involved. But it was not standardized and did not calculate consistently down to the part level to

validate the values. This created a danger that different personal experiences led to strongly divergent assessments. Inconsistencies and major fuzziness in capacity planning could not be excluded.

“We saw a variety of reasons to act. Primarily, it was the growing product complexity with differentiated parts lists and the global increase of our company locations. There were also business requirements, cost considerations and the need to include market forecasts in the process. We decided to develop a method by which we can make validated statements. The basis was to be the systematic collection and analysis of all data regarding vehicle models and options such as product description, bill of material, market forecast and sales,” says Hirzel to describe the initial situation and objectives.

## Pragmatic approach

Daimler first developed ideas and approaches and got Flexis AG involved, a specialist for process optimization and information systems in the automotive industry. The jointly agreed upon approach with a multi-stage model was pragmatic. A basic version was already available in 2011. It allowed employees to familiarize themselves with the system and to adapt processes and practice them. Feedback from the daily use optimized the system step by step. End of 2012, Daimler increased the forecast quality significantly once again – and uses the system since the beginning of 2013 in productive operation.

“The whole project was a very exciting task for us, because the product variance is very large – larger than in other IT projects, where we deal with part demand cal-

culations with and without orders,” said Robin Hornung, CEO of Flexis Consult GmbH. The idea of the underlying solution is simple: The capacity dimensioning and planning for a longer planning horizon does not require the same level of detail such as order-related capacity planning, but a less granular information density. Less information is necessary to dimension certain resources, facilities and plants properly. However, most manufacturing companies can only determine part demand if both the bill of material is available as fully specified orders. Today the



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bill of material is only applied to an order. Usually the orders extend only over a time horizon of one year.

The method developed by Flexis AG is to perform the planning independent of orders but based on all information available in the company. Thus, even in the longer time horizon, where there are no orders yet, part and component demand can be derived. In addition, part demand is not only calculated, but also classified, depending on the quality of the input variables.

“As a result, an IT system to derive part demand (BEST) was created together with a business process, to be the basis for veri-

fying input data and to develop a forecast for vehicles, options, and product documentation. The first major added value is that we can check the plausibility of the input variables now. From this we then derive further indicators,” adds Michael Eisele, who led the project at Daimler. “BEST” gets its information from systems for vehicle planning, option planning and product documentation. By default, each demand request must be responded to within five working days. With each change of relevant input data, the system incrementally recalculates the values, so that the run times are small.

“The experts in our team can view the requested values in the system at any time. It is important that the planner brings his expertise to verify the information provided by the system,” says manager Hirzel. The system is centrally managed in Stuttgart. There also the planning of worldwide capacities and the demand transmission external suppliers are run. 25 to 30 employees are working with the system. First, they calculate the complete production program with 1.x million vehicles over two years. Secondly, they create the plans for certain models.

The method developed at Daimler using the Flexis solution combines the engineering bill of material with the requests of sales in such a way, that there is no room anymore for individual interpretation of the forecast. The next step is already clear: “We want to extend the achieved optimization into upstream areas,” says Hirzel. “The goal is to make the system more and more accessible and useful for more divisions and also for suppliers.”

Matthias Pieringer