Order sequencing in the automobile industry

(Section: Project management and scheduling) [*]

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We describe a new solution approach for order sequencing which reflects the build-to-order strategy of the European automobile industry. Therefore, it has to cope with a daily changing variety of customer orders.

Each order consists of a set of commodities which are implemented while the order sequence passes through a body shop, a paint shop, and an assembly shop. Existing solution approaches do usually focus on the computation of an order sequence optimized to fit the needs of the assembly shop, where the most significant savings can be achieved; an example of a commonly used assembly shop objective is formulated in the well-known goal chasing algorithm.

We propose a solution approach that generalizes known approaches and covers the complete production process. Therefore, objectives for the assembly shop are extended by objectives for the paint shop, of which the reduction of the number of color changes within the enamel booths is the most important.

We give an overview over the practical realities in an automobile plant and derive a deterministic model of the plant and the production process. In particular, this implies means to cope with almost unavoidable manufacturing errors, which cause order delays and lead to a perturbation of the

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intended production sequence. Objectives for the production sequence can be formulated by the use of a prioritized rule set and the observance of given rules is used as a quality measure.

The resulting two-stage solution algorithm has been implemented in cooperation with the Ford Motor Company and is currently successfully used in all plants across Europe. We illustrate its efficiency by computational results on real-world data.