Development of a shopfloor planning and scheduling system for hybrid job shops

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One of the research themes of the Production and Operations Management Group at the University of Twente concerns the development of a complete shopfloor planning and scheduling system for hybrid job shops. The term 'hybrid job shop' refers to a production system where jobs may have different routings and where each operation is performed in a (complex) workcell instead of just on a single machine. Such a workcell may be a set of parallel machines or even a Flexible Manufacturing Cell with additional fixture and cutting tool capacity constraints (leading to multi-resource scheduling problems). Jobs may be clustered in family structures (according to similar set-up characteristics). Parts of the job shop may operate in different shift modes. The most important objective to be met will be the timely delivery of jobs (subject to internally set or externally determined due-dates).

The system developed so far is based on experiences in several metal cutting parts manufacturing shops; prototypes of several modules have been developed in cooperation with, and are tested in various companies in the Netherlands. In this talk we present the basic structure of the scheduling system, which has a highly modular structure and is based on decomposition principles. An example of a (really existing) application site will be presented. Information and implementation aspects are briefly reviewed. In subsequent talks (Meester, Schutten and Van de Velde) details on the algorithms developed for several modules will be presented.