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Optimization Model for Identification of Assembly Alternatives of Large-Scale, Make-to-Order Products

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Abstract : Assembling large-scale products, such as airplanes, locomotives, or wind turbines, involves frequent process interruptions induced by e.g. delayed material deliveries or missing availability of resources. This leads to a negative impact on the logistical performance of a producer of xxl-products. In industrial practice, in case of interruptions, the identification, evaluation and eventually the selection of an alternative order of assembly activities (‘assembly alternative’) leads to an enormous challenge, especially if an optimized logistical decision should be reached. Therefore, in this paper, an innovative, optimization model for the identification of assembly alternatives that addresses the given problem is presented. It describes make-to-order, large-scale product assembly processes as a resource constrained project scheduling (RCPS) problem which follows given restrictions in practice. For the evaluation of the assembly alternative, a cost-based definition of the logistical objectives (delivery reliability, inventory, make-span and workload) is presented.

Keywords : assembly scheduling, large-scale products, make-to-order, optimization, rescheduling
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