

■ 논문요약문1

논문제목	Accelerated dynamic programming algorithms for a car resequencing problem in automotive paint shops
게재정보	Applied Mathematical Modeling, vol64, 2018
개요	<p>In this paper, a car resequencing problem (CRP) for automotive paint shops is considered, whereby a set of cars conveyed from an upstream shop to one of the multiple conveyors is retrieved sequentially before the painting operation. The aim of the CRP is to find a car retrieval sequence that minimizes the sequence-dependent changeover cost, which is the cost that is incurred when two consecutive cars do not share the same color.</p>
연구결과	<p>In this paper, we considered a car resequencing problem (CRP) in automotive paint shops and proposed accelerated dynamic programming (ADP) algorithms to solve it efficiently. Our study contributes to the literature by developing efficient exact and heuristic algorithms that can be applied to both the NC and GC types of problems. In particular, we addressed the GC-type problem and provided extensive computational results for the first time with exact solution methods. The main principle of our algorithms is the incorporation of effective lower- and upper-bounding techniques in the standard dynamic programming framework to reduce the size of the search space and thereby reduce the computational time. Through computational experiments on a wide range of random instances, we showed that the proposed algorithms significantly reduce computational effort, outperformed the relevant existing algorithms, and are therefore more practically applicable. Our results show that well-tailored exact algorithms can be more efficient than meta-heuristic algorithms which are usually motivated by the theoretical complexity of NP-hard optimization problems.</p>
활용분야 및 기대효과	<ul style="list-style-type: none"> - 완성차 조립 공정에서의 도장공정 효율화 - 순서의존적인 셋업이 존재하는 제조 및 물류 산업에서의 공정 최적화