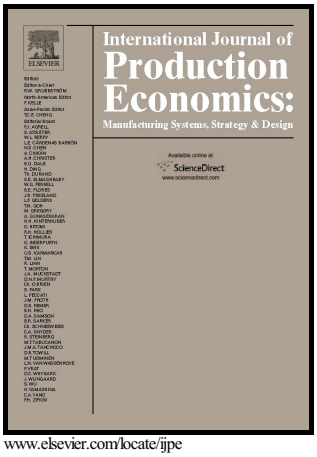

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Simultaneous Reassembly and Procurement Planning in Assemble-to-Order Remanufacturing Systems

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ABSTRACT

Assemble-to-Order (ATO) remanufacturing systems deal with decision-making on the number and type of modules ready for reassembly, while managing a high degree of uncertainty in the quantity of incoming end-of-life products. Remanufacturers who adopt the waste stream system often passively accept an unpredictable amount of collected supply in their systems. Also, they often keep various items in their inventory for future reassembly purposes despite the parts depreciation which leverages part values in the second-hand market. To overcome these challenges, this paper proposes a graph-based optimization model for simultaneous reassembly and procurement planning with the aim of determining the type and number of parts that should be reassembled and procured, considering the market demand for both cores and subassemblies. This study articulates the problem employing a network flow graph and *integer linear programming (ILP)*. In addition, the study suggests two key concepts: (1) disposal point, and (2) reassembly threshold. Considering recycling benefits and holding costs, the disposal point helps remanufacturers make proper decisions on the time that they have to dispose of parts that are stored in their inventory. The reassembly threshold makes remanufacturers recognize a tipping point for