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Assembly Line Balancing for Multi-Model, Small Lot Systems

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Abstract: A survey is conducted on the recent advancements in the literature of Assembly Line Balancing Problems (ALBPs). From the time of Henry Ford, several developments were made to assembly systems. Assembly lines were modified from straight line models to highly flexible systems with parallel operating stations, mixed and multi model assembly lines, U-shaped lines, un-paced assembly lines with intermediate buffers, etc. But, for almost all the instances of reconfiguring assembly lines, decision makers should treat ALBPs as crucial decision problems and address them. The objective of addressing these ALBPs will be to distribute the complete workload for producing a unit of product within workstations available in the assembly line. Because ALBPs have been identified by researchers as falling into the class of combinatorial optimization problems, many deterministic and heuristic methods have been proposed and developed over the past 4-5 decades. The survey highlights that many ALBP solution approaches, such as new heuristics and multi mixed models, still require further investigation. This survey highlights the gaps between proposed approaches by researchers and problems that are addressed in manufacturing industries to enhance managerial capability to improve productivity.

Keywords: Manufacturing, Product Assembly, Assembly Lines, Assembly Line Balancing Problems, Combinatorial Optimization