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AN AHP APPROACH FOR COMPARAING MULTI CRITERIA ASSEMBLY LINE BALANCING HEURISTICS

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ABSTRACT

Assembly line balancing often has significant impact on performance of manufacturing systems, and is usually a multiple-objective problem. The focus of this paper has been on Simple Assembly Line Balancing Problem (SALBP). In this paper, Assembly Line Balancing (ALB) is formulated as a multiple criteria problem where several easily quantifiable criteria (objectives) and constraints are defined. Objective criteria include Number of stations; Line Efficiency, Smoothness Index, and Line Time are calculated by using five Immediate Update First Fit (IUFF) heuristics.. Basic definitions and properties of Multi Criteria Decision Making (MCDM) for ALB are outlined and then an interactive MCDM approach Analytical Hierarchy Process (AHP) is developed for solving the Multi Criteria-ALB problem. An example is solved and computational experiments are reported. The motivation for development of the method, based on a case study of Assembly Process of ABS Motor is discussed.

KEYWORDS: Simple Assembly Line Balancing (SALB), Analytical Hierarchy Process (AHP), Pair wise Comparison Scale, Smoothness Index