Optimum Planning and Scheduling of Repetitive Construction Projects Using Multi-Objective Cuckoo Search Algorithm

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Submitted by
Saraa Naseer Kadhim Alasadi
University Number: 20074441

Supervised by
M. P. Saka
(Professor)
University of Bahrain
Kingdom of Bahrain
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Abstract

Most of the construction projects such as infrastructure systems and housing projects are repetitive in nature. Therefore it becomes very important to schedule their work in such a way that continuity of their work will not be disturbed with interruptions. In scheduling construction projects, time and cost are two important coupled factors that affect the whole project. Shortening project duration results in increase in the project cost. It is apparent that an optimum balance is required to be determined between these two project objectives. In this study multi-objective optimization model for resource utilization is developed for planning and scheduling of repetitive construction projects. The model minimizes concurrently the project duration and project cost. The model obtains set of Pareto-optimal solutions that represent the trade-off between project duration and project cost. Project manager will be able to select one of the solutions depending on a quantitative assessment of the trade-off between time and cost that satisfies the requirements of the project under consideration. Cuckoo search algorithm which one of the recent and efficient meta-heuristic optimization technique inspired by the behaviour of self-organized systems. Specifically, the cuckoo search (CS) is a numerical optimization algorithm was inspired by the obligate brood parasitism of some cuckoo species when they lay their eggs in the nests of birds from other species -host birds-.

A Case study will be conducted based on a housing project in Bahrain to demonstrate and validate the algorithm then the results and findings are reported.