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An Integrated Approach for Maintenance Planning by Considering Human Factors: Application to a Petrochemical Plant

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Abstract

In this paper a novel approach is presented for maintenance planning by considering grouping strategy and human factors. The proposed approach describes various steps from system configuration to maintenance plan review. In previous studies, it has been shown that grouping maintenance activities would reduce total maintenance cost by saving set-up costs. In order to model a more realistic situation, work complexity is incorporated to the model. Also, a special attention is paid to human factors during maintenance planning to investigate whether human error would be increased by performing various activities at the same period. It is shown fatigue and time pressure have impact on the preferred maintenance plan. Consecutive maintenance grouping approach is compared with two well-known meta-heuristic algorithms including genetic algorithm and simulated annealing. In order to show the applicability of the proposed approach a petrochemical plant in Iran is selected as a case study. According to the results of the case study, however from theoretical point of view, consecutive maintenance grouping is not capable of handling variable setup cost and work complexity, it could be used for generating initial solution for meta-heuristic algorithms to improve the quality of final solution.

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