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## Application of ACO algorithm in the management of safe and optimal design and equipment of urban workshops

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### Abstract

In order to design public and private spaces in cities, urban architects are looking for the implementation of simple and new systems to increase safety in construction sites. Providing suitable physical infrastructure in urban workshops that can guarantee the health and safety of workers, the urban environment and the efficiency of workshop performance is one of the important challenges in designing and equipping construction sites in a safe city. This research has been done with the aim of improving the safety and efficiency of urban workshops using the ant colony optimization algorithm. The research method is descriptive and exploratory and is a case study type. The ant theory algorithm uses a structured solution to solve the problems of workshop arrangement over time, which is done by using heuristic information based on the cost of flow and the cost of movement in different time frames. This algorithm works by determining the dominant relationship between the answers, which is the key parameter for the search algorithm. In order to achieve the final optimal results, a case study is used to verify the proposed model, which can be realized by assuming appropriate parameters. In the case study of the urban construction workshop, 4 scenarios were determined for safe equipment, and the most optimal design, scenario number 1, was concluded to be the best case for the arrangement of dynamic facilities, considering the minimum cost of 2496.

**Key words:** Safe equipment, Algorithm, Ant colony, Optimization, Urban workshops

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