

A Multi-Objective Gate Assignment Model Based on Airport Terminal Configuration

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Abstract : Assigning aircrafts' activities to appropriate gates is one the most challenging issues in airport authorities' multiple criteria decision making. The potential financial loss due to imbalances of demand and supply in congested airports, higher occupation rates of gates, and the existing restrictions to expand facilities provide further evidence for the need for an optimal supply allocation. Passengers walking distance, towing movements, extra fuel consumption (as a result of awaiting longer to taxi when taxi conflicts happen at the apron area), etc. are the major traditional components involved in GAP models. In particular, the total cost associated with gate assignment problem highly depends on the airport terminal layout. The study herein presents a well-elaborated literature review on the topic focusing on major concerns, applicable variables and objectives, as well as proposing a three-objective mathematical model for the gate assignment problem. The model has been tested under different concourse layouts in order to check its performance in different scenarios. Results revealed that terminal layout pattern is a significant parameter in airport and that the proposed model is capable of dealing with key constraints and objectives, which supports its practical usability for future decision making tools. Potential solution techniques were also suggested in this study for future works.

Keywords : airport management, terminal layout, gate assignment problem, mathematical modeling

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