

Energy Saving Study of Mass Rapid Transit by Optimal Train Coasting Operation

Authors : Artiya Sopharak, Tosaphol Ratniyomchai, Thanatchai Kulworawanichpong

Abstract : This paper presents an energy-saving study of Mass Rapid Transit (MRT) using an optimal train coasting operation. For the dynamic train movement with four modes of operation, including accelerating mode, constant speed or cruising mode, coasting mode, and braking mode are considered in this study. The acceleration rate, the deceleration rate, and the starting coasting point are taken into account the optimal train speed profile during coasting mode with considering the energy saving and acceptable travel time comparison to the based case with no coasting operation. In this study, the mathematical method as a Quadratic Search Method (QDS) is conducted to carry out the optimization problem. A single train of MRT services between two stations with a distance of 2 km and a maximum speed of 80 km/h is taken to be the case study. Regarding the coasting mode operation, the results show that the longer distance of coasting mode, the less energy consumption in cruising mode and the less braking energy. On the other hand, the shorter distance of coasting mode, the more energy consumption in cruising mode and the more braking energy.

Keywords : energy saving, coasting mode, mass rapid transit, quadratic search method

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