Abstract

Greater metropolitan area rail transit networks operate hundreds of trains daily transporting millions of people. In rail networks, trains use transit units called rakes (for example, electric multiple units, EMUs) to transport people. A rake can be used multiple times on different trains. From an operator's standpoint, it is important to utilize the rakes in an optimal or efficient manner. In this thesis, an attempt has been made to solve the problem of optimum rake assignment. A linear integer programming model is developed for this purpose. Rakes also need to go for maintenance periodically. Hence, ideally optimum rake assignment should consider assignment to trains and for maintenance simultaneously. Apart from this, in any rail network, trains sometime run off-schedule. Hence, it is necessary to check the performance of the optimum rake assignment obtained from the proposed model against schedule compliance. An algorithm that measures schedule compliance of the system is also developed. Further, ways to improve schedule compliance while optimally assigning rakes are also discussed.

Keywords: Rake Assignment, Integer Programming