ABSTRACT

This research aims to develop a scheduling model for Inter-Terminal Transport (ITT) that minimizes delay costs while considering emission costs at Northport, Port Klang, Malaysia. ITT is a crucial activity in ports, involving the movement of containers between terminals using trucks (prime movers). However, ITT scheduling efficiency is often hampered by various factors, such as limited truck availability, suboptimal scheduling, and high operational costs, as well as emissions.

This research identifies three primary issues in ITT activities: assignment delays, high operational costs, and excessive emissions. Using a Genetic Algorithm approach, a multi-criteria scheduling model was developed to address these issues. The model considers three main components: ITT job delays, operational penalty costs, and emission penalty costs.

The research findings show that the developed model significantly reduced the number of delayed jobs by 90.43%, delay duration by 97.92%, and overall delay costs by 95.73%. These cost reductions include a 90.43% reduction in penalty costs, a 92.02% reduction in operational costs, and a 97.92% reduction in emission costs. The implementation of this model has a positive impact on operational efficiency at Northport, with significant potential cost savings and contributions to reducing greenhouse gas emissions, aligning with the Green Port policy.

This research concludes that the application of an efficient ITT scheduling model based on Genetic Algorithms provides an effective solution to the challenges faced by ports, particularly in minimizing delay costs and emissions, while enhancing the overall operational performance of the port.

Keywords: ***Inter-Terminal Transport (ITT), ITT Scheduling, Port, Genetic Algorithm, Green Port Ecosystem***