ISSN: 1391-8796
Proceedings of 9th Ruhuna International Science & Technology Conference
University of Ruhuna, Matara, Sri Lanka
January 19, 2022

# A linear programming model to optimize the apparel production process during the Covid-19 pandemic

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Besides the fact that the apparel industry is a major contributor to the Sri Lankan economy, it has been adversely affected by the sudden health regulations imposed by the Government to mitigate the outbreak of the Covid-19. Although the garment factories followed a well-established production process, Covid-19 pandemic forced a re-design of the production line, which is considered to be the backbone of any production plant. Due to the imposed health regulations, the factories were compelled to reduce the employee capacity by at least 50% in order to maintain the social distancing within the plants. This caused the factories to operate on a fewer number of production lines which led to reduction of productivity. As a result, the factories failed to meet the market demand and consequently lost customer satisfaction. Therefore, the objective of this study was to develop a decision-making tool to generate optimal production schedules adhering to the imposed health restrictions. Initially, a literature survey was conducted to lay down the foundation for the study and subsequently, to acquire ground-level information, a series of interviews with the work-study teams in the plants was conducted. Next, a generalized linear programming model was formulated to generate optimal production line schedules to increase the efficiency and profitability of manufacturing plants. Finally, to test the performance of the formulated model, it was applied to a garment factory of a prominent garment chain in Sri Lanka. The optimal production schedule recommended by the model achieves higher productivity gaining, customer satisfaction and the profit.

**Keywords:** Linear programming model, Covid-19 pandemic, Apparel industry, Production line scheduling

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