An Application to Project Management to Minimize Fabric Printing Processing Time

H.A.T. Gunarathne[1] and W.B. Daundesekara[2*]

[1]*Department of Physical Sciences, Rajarata University, Mihintale, Sri Lanka*
[2]*Department of Mathematics, University of Peradeniya, Peradeniya, Sri Lanka*

By considering the competition occurring in today's industries, it is necessary to have diverse product lines that can be manufactured and delivered to the customer in the minimum possible time. One way to improve the time efficiency of a manufacturing process is by reducing the time required to change one manufactured product to another which is known as changeover reduction. In this research, we focus on a fabric printing production plant located in Sri Lanka. Currently, the fabric printing company loses daily availability because of the time consumed for changeover is unacceptable. Therefore, the objective of this research is to facilitate decision making and thereby to reduce the changeover time in the printing machine. We also focus on determining the minimum project completion time and estimating possibilities for the activities to be critical and finally finding a technique to make the changeover within the minimum time. To achieve this, one of the most popular project management tools known as Critical Path Method (CPM) is used. CPM manages the time necessary to perform the activities of the project and identifies which activities are critical and noncritical. Here, the time required for each activity is considered to be deterministic. But the time taken for these activities is uncertain and follows a triangular distribution. To rectify this problem, in the next step, another project management tool known as Program Evaluation and Review Technique (PERT) is used. Furthermore, simulation technique is applied to minimize the error in the time duration estimations of the activities. From the results of the analysis, it can be concluded that certain activities in the process are critical in delaying the printing process. Also, the findings of the simulation reveal that certain noncritical activities have a little possibility of being critical. Hence, it is recommended to the management to take extra precautionary measures on these noncritical activities as well.

Keywords: Changeover, Critical path method, Model, Program evaluation and review technique, Simulation