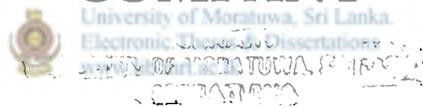




University of Moratuwa
Sri Lanka

THE EFFICIENCY STUDY OF AN AUTOMATED SYSTEM - THE CASE OF A SRI LANKAN TYRE MANUFACTURING COMPANY



Master of Science in Operational Research

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Department of Mathematics

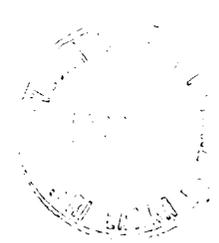
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A.J.Y.A. SAMANTHIKA

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Thesis

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This thesis was submitted to the department of Mathematics of the University of Moratuwa is a partial fulfillment of the requirements for the degree of Master of Science

Department of Mathematics

University of Moratuwa

Sri Lanka

August 2005

Declaration

The work presented in this thesis in part or whole has not been submitted for any other academic qualification at any institution.

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Abstract

This research is done to investigate the practical applications of Computer Simulation to analyze and solve frequently met problem areas in a tyre manufacturing factory. Automated solid tyre production line of Loadstar (Pvt.) Ltd. at Midigama factory was one such selected production line for this Research.

The identified problem areas were, **queue formation for unloading cured tyres in oven lines** and resulted **production output delays** due to same reason and also due to other various reasons such as **poor production planning and delay in producing raw tyres** etc.

After an initial system study with the help of the production staff, I analyzed the above mentioned problem and discussed how to avoid those. Introduction of the 'Promdel' (Production Simulation Package) to build a computer simulation model for this problem area was experienced in this research as a smart proactive problem solving tool. And also, I introduced a better production - scheduling method for this process, using Heuristic method to replace the then used poor production planning method.

With these changes, the result was; a provision of an easy proactive problem solving tool to try and find out the best allocation of ovens to get the least queue formation **at the computer screen** to select the best possible array with an easy monitoring facility, before it is performed in real world at the production floor. So, **Simulation** was experienced as a smart replacement for a tedious; or rather irreversible, rigid,

outdated, hit-or -miss procedure which left out at the end with no choice other than bearing up the very expensive loss of rejects and low outputs. **A comparatively convenient way to allocate the available resources for an optimum increase of the productivity was the result of this exercise.**

'Promodel' is one of the available simulation packages in the market today and for the study we used a student version of it. Expensive commercial versions may consist with more facilities for modeling to customize more closure to the practical needs of the organization. A wide survey of latest verities is advisable before an investment to buy a commercial version.

Report consists with other suggestions to avoid the observed bottle necks at the press and the ways and means to improve and strengthen the supply chain of raw tyres also. Changes at the stage of factory wise or line wise allocation of the orders, line lay-out changes, and visual sign system to improve communication through out the supply chain of raw tyre production etc. are discussed in detail at the report.

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