ABSTRACT

A Major challenge for the present manufacturing concerns that are exporting their products worldwide is to minimize their cost of production and manufacturing. Productivity engineering principles are hence treated as an essential requirement in the export-oriented units. To enhance the product quality and customer service, effective productivity techniques are ultimately to be adopted efficiently throughout the manufacturing enterprise. Therefore, analysis, optimization, measurement and monitoring of all the resources utilization are very much necessary.

Reducing the material cost, machining cost, assembly cost and labour cost ultimately minimizes the total cost of the product. Process analysis and productivity optimization throughout the manufacturing enterprise calls for the implementations of effective productivity engineering principles by the management. While considering productivity improvement, the complexity of the process and products at various stages make the issue a serious one. Multiple processes and products further make the productivity measurement and monitoring techniques more complex. Since raw materials are different, with the involvement of more machines, the seriousness of the problem further increases. In this present research, productivity engineering principles are analyzed and optimized to focus on these issues. To achieve the
minimum cost of the product or service. Data analysis and OR techniques are adopted to determine distinctly the most probable productivity improvement for the process optimization.

Based on the analysis of the selected products, in three export-oriented units, situated in Coimbatore, South India, the productivity engineering techniques were subjected to validation studies. Swaging process was analyzed for deployment in the manufacturing of textile spindles for its productivity improvement. It was further extended to design a swaging process setup to conduct various trials in the manufacture of spindle blade and aluminum plug of textile spindles.

Swaging process, when compared to conventional machining processes, yielded substantial productivity improvement up to 38.14% in the manufacture of textile spindle components along with increase in their service lives. Simplex method of analysis of the OR technique was tried out in the machining of textile components, doffer and carding cylinders. The best option of minimum cost of machining in the manufacture of doffer and carding cylinders was optimized for productivity improvement from 47.2 to 96% on machining. Regression analysis and analysis of variance methods were applied for optimization of productivity of turbo motor coils to minimize their cutting losses from 7 to 4% of the imported silver-added copper coils, which is around Rs.15 lakhs.
Even though, awareness for process optimization and to reduce the total cost of the products was very much little, the investigations and trials were conducted successfully due to the progressive nature of the manufacturing companies. This research indicated that productivity engineering principles and techniques are practically compatible to yield improvements and thereby to realize success. The reactions of the customers are further assessed by exporting pilot batches to enable them to check and give feedback about the product performance. Analysis of their feedback resulted in confirming the practical compatibility of techniques adopted during manufacture.