Taguchi Robust Design for Optimal Setting of Process Wastes Parameters in an Automotive Parts Manufacturing Company

Authors : Charles Chikwendu Okpala, Christopher Chukwutoo Ihueze

Abstract : As a technique that reduces variation in a product by lessening the sensitivity of the design to sources of variation, rather than by controlling their sources, Taguchi Robust Design entails the designing of ideal goods, by developing a product that has minimal variance in its characteristics and also meets the desired exact performance. This paper examined the concept of the manufacturing approach and its application to brake pad product of an automotive parts manufacturing company. Although the firm claimed that only defects, excess inventory, and over-production were the few wastes that grossly affect their productivity and profitability, a careful study and analysis of their manufacturing processes with the application of Single Minute Exchange of Dies (SMED) tool showed that the waste of waiting is the fourth waste that bedevils the firm. The selection of the Taguchi L9 orthogonal array which is based on the four parameters and the three levels of variation for each parameter revealed that with a range of 2.17, that waiting is the major waste that the company must reduce in order to continue to be viable. Also, to enhance the company's throughput and profitability, the wastes of over-production, excess inventory, and defects with ranges of 2.01, 1.46, and 0.82, ranking second, third, and fourth respectively must also be reduced to the barest minimum. After proposing -33.84 as the highest optimum Signal-to-Noise ratio to be maintained for the waste of waiting, the paper advocated for the adoption of all the tools and techniques of Lean Production System (LPS), and Continuous Improvement (CI), and concluded by recommending SMED in order to drastically reduce set up time which leads to unnecessary waiting.

Keywords : lean production system, single minute exchange of dies, signal to noise ratio, Taguchi robust design, waste **Conference Title :** ICEIT 2019 : International Conference on Industrial Engineering and Information Technology **Conference Location :** Miami, United States **Conference Dates :** March 11-12, 2019

1