Improving the Productivity in Drum Brake Assembly Line Using Lean and DMAIC Methodology

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Abstract:
In today's competitive world dealing with declining profit margins and satisfying customers with high quality product present major challenges to manufacturing industries. Due to steady growth of automobiles, demand for auto components is increasing subsequently. In particular, productivity improvement is becoming everyday watch word across auto component sector. This study focuses to improve the productivity of carousal brake assembly line by reducing cycle time and rejections.

In this work, improving the productivity by 22% in the selected assembly line was considered as target. Planned and actual production data was collected from July 2012 to September 2012. In the next step, reasons for limited productivity were identified using Ishikawa diagram and Pareto analysis. Further, operation cycle time was calculated using time and motion study. Accordingly factors contributing to high cycle time were eliminated by differentiating added value and non-value added activities through work measurement study. In parallel, defects in wheel cylinder assembly line were reduced using DMAIC methodology. In addition, Shainin tools like product/process search, paired comparison and multi-vari analysis were used for further analysis. As a result, key process inputs and critical responses were identified, analysed and validated.

From the secured results, overall cycle time reduced from 64 seconds to 47 seconds. Consequently hourly production increased from 46 to 62 numbers. In addition the defect rate in wheel cylinder assembly line reduced significantly. By this study, productivity of the line increased by 26%. Lastly, suggestion for introducing returnable plastic bin in logistics and layout change to reduce the travel time of the back plate is recommended.