

Executive Summary

Background & Scope

Magna International Inc. (Magna) is a leading global automotive supplier, with 327 manufacturing operations and more than 100 product development, engineering and sales centers in 29 countries. The company's mission is to deliver a superior value to customers through innovative exterior products.

The company has been receiving a significant amount of customer complaints regarding the defects they received. After conducting several interviews with a former employee from Magna, the PIT team is asked to improve the productivity in the production floor as the defect rate is positively proportional to the level of productivity. The goal of this project is to reduce the defect rate by 30% and increase the productivity level by 20% by year of 2020.

Problem Identification & Analysis

In order to better understand client's requirements, the PIT team breaks down the enterprise process into 4 levels, and identifies the boundaries such as suppliers and external customers for the whole project and eventually scopes the project to active grille shutter manufacturing process. The team, with the help from the former Magna employee, maps out the as-is processes and employs a cause-and-effect diagram to identify the root causes -- Poor Molding Layout (15%), Lack of Supervision (35%), and Ineffective Quality Management (40%), which contribute most significantly to low productivity and a high defect rate.

Poor Molding Layout results in a repetitive material transportation. This further leads to a significant transportation waste and time waste. Lack of Supervision is mainly due to an erroneous operation caused by a delayed and unsupervised message. Furthermore, the current inefficient and ineffective inspection system in the assembly line has contributed greatly to the Ineffective Quality Management problem.

Design Solution

To address the repetitive transportation resulted from the poor molding layout, an automated shelf system is introduced to eliminate wastes. This system will reduce repetitive transportation to once daily, which will improve production efficiency as well as saving up time cost.

MIE463 - Integrated System Design, Magna AGS Manufacturing Lean Process

Team 11

For the lack of supervision issue, a real time online working instruction system is introduced to synchronize update information among departments as well as provide an on-time reference for operators' assembly process.

As for the ineffective quality management, a camera monitoring system is installed to facilitate inspecting erroneous operations on time, thus eliminating redundant re-work on finished products, which minimizes manufacturing cycle time as well as enhances production efficiency.

Comparison Analysis

By implementing our recommendations, setup time, productivity, cycle time and defective rates will all be improved. 65% of molding setup time can be reduced after installing the automotive shelf, therefore provide more operation time for molding lines. As a result, the productivity for molding line will be increased. Secondly, the productivity in assembly line will be increased by 37.5% after implementing the online work instruction system. The cycle time will be decreased and the overall efficiency will be increased. Lastly, the implementation of camera monitoring system will enhance the yield quality of total production and reduce the potential failures that shipped to customer sites.

Implementation Plan

Detailed timeline and critical tasks are planned out for the length of one year starting from Jan 1, 2018, by following which it is expected that the project will be successfully implemented and put into operation with improvement, thus the goal of 45% decrease in defect rate and 15% increase in productivity can be achieved by the end of one-year period. This section also summarized key actions, which may contribute to further improvement for the next 3 - 5 years in order to enhance process transformation in the long run. The team has also considered issues regarding personnel behavior in the transformation process, since the success of transformation process indeed rely on the performance alignment of both human and system.