# QUALITY IMPROVEMENT OF G-31 DEFECT ON MASTER CYLINDER 2DP PRODUCT USING DEFINE, MEASURE, ANALYZE, IMPROVEMENT, AND CONTROL (DMAIC) METHOD IN GRAVITY DIE-CASTING DEPARTMENT

## UNDERGRADUATE FINAL PROJECT

**Submitted as one of the requirements to obtain Sarjana Teknik**

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# ABSTRACT

To maintain market share, the company guarantees high quality for the products offered to consumers. Master cylinder 2DP is one of the products produced at PT CHN and is one of the products with the highest production volume, but there are also many defects found for this product. In 2023, the total defect ratio of this product is 4.7 percents with the total number of defects is 53,430 pcs of 1,137872 products. To existing this problem, conduct the analyze using DMAIC Method. DMAIC method was chosen because it provides a systematic and data-driven approach to identify problems, analyze the root causes, and implement effective improvements. Pareto diagram is used to determine the highest defect ratio. G-31 defect is the most common type defect found in M/C 2DP production process with the number of defects is 30 percents. SPC calculation is used to assist this research in statistical calculation with P chart attributes. Fish-bone diagram is used to analysis the cause and effect for this problem. Lack skill of new operators (man) and lowering the thickness of core (machine) is main cause that caused this defect. To overcome these problems, improvements were made by standardizing the re-coating process on the core (mold). The trial stage (improvement phase) is already running in five days production. There was a defect reduction from previously 4.7 percent to 3 percent. There was an increase in the sigma value from 3 to 4 after the improvements phase was implemented. If the continuous monitoring is carried out in the long term, the reduction defect will be even more specific (significant) and get the better sigma value.

**Keyword:** Quality Control, Defect Product, DMAIC Method, Master Cylinder Product, DPMO and Sigma Value, Pareto Diagram, Fishbone Diagram.

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| | | |
|---|---|---|
| Six Sigma | : | A data-driven and statistical quality improvement methodology that purpose to reduce process variation and the number of defects to a level of 3.4 defects per million opportunities (DPMO). |
| DMAIC Method | : | The main method in Six Sigma used in industrial manufacturing to improve existing processes (quality) of products and services through five stages: Define, Measure, Analyze, Improve, and Control. |
| Defect | : | Products or process results that do not meet established specifications or quality standards. |
| Master Cylinder | : | Product that produced by Gravity die-casting department. |
| SPC | : | Statistical Process Control, one of the tools in quality control based on statistical data to monitor and control variations in the production process to ensure stability and produce products according to standards. |
| DPMO | : | A statistical measure that shows the number of defects per million opportunities. |
| Sigma Level | : | A process quality performance indicator that shows how far a process is from specification limits; the higher the sigma level, the fewer defects occur. |
| CTQ | : | Critical to quality, the important aspects of a product or process that directly affect customer satisfaction. |
| Fish bone Diagram | : | A root cause analysis tool that describes the relationships between defect-causing factors in the categories of human, machine, method, material, and environment. |
| Pareto Diagram | : | Bar charts are used to identify problems and determine the problem with the highest chart. |