

Quality Improvement of the Sand Moulding Process in Foundries Using Six Sigma Technique

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Abstract : The sand casting process involves pattern making, mould making, metal pouring and shake out. Every step in the sand moulding process is very critical for production of good quality castings. However, waste generated during the sand moulding operation and lack of quality are matters that influences performance inefficiencies and lack of competitiveness in South African foundries. Defects produced from the sand moulding process are only visible in the final product (casting) which results in increased number of scrap, reduced sales and increases cost in the foundry. The purpose of this Research is to propose six sigma technique (DMAIC, Define, Measure, Analyze, Improve and Control) intervention in sand moulding foundries and to reduce variation caused by deficiencies in the sand moulding process in South African foundries. Its objective is to create sustainability and enhance productivity in the South African foundry industry. Six sigma is a data driven method to process improvement that aims to eliminate variation in business processes using statistical control methods. Six sigma focuses on business performance improvement through quality initiative using the seven basic tools of quality by Ishikawa. The objectives of six sigma are to eliminate features that affects productivity, profit and meeting customers' demands. Six sigma has become one of the most important tools/techniques for attaining competitive advantage. Competitive advantage for sand casting foundries in South Africa means improved plant maintenance processes, improved product quality and proper utilization of resources especially scarce resources. Defects such as sand inclusion, Flashes and sand burn on were some of the defects that were identified as resulting from the sand moulding process inefficiencies using six sigma technique. The courses were we found to be wrong design of the mould due to the pattern used and poor ramming of the moulding sand in a foundry. Six sigma tools such as the voice of customer, the Fishbone, the voice of the process and process mapping were used to define the problem in the foundry and to outline the critical to quality elements. The SIPOC (Supplier Input Process Output Customer) Diagram was also employed to ensure that the material and process parameters were achieved to ensure quality improvement in a foundry. The process capability of the sand moulding process was measured to understand the current performance to enable improvement. The Expected results of this research are; reduced sand moulding process variation, increased productivity and competitive advantage.

Keywords : defects, foundries, quality improvement, sand moulding, six sigma (DMAIC)

Conference Title : ICFTSMCP 2018 : International Conference on Foundry Technology, Special Moulding and Casting Processes

Conference Location : Zurich, Switzerland

Conference Dates : January 15-16, 2018