

*QUALITY FAILURE ANALYSIS AND QUALITY
IMPROVEMENT METHODS IN SMALL AND
MEDIUM MANUFACTURING COMPANIES*

(A case Study of Shamco Industries Limited)

NGUGI JOSEPH CHEGE

*Thesis Submitted in Partial Fulfillment Of the Requirements
For the award of Masters of Science Degree in Industrial
Engineering and Management of Dedan Kimathi
University of Technology*

AUGUST 2017

**QUALITY FAILURE ANALYSIS AND QUALITY
IMPROVEMENT METHODS IN SMALL AND MEDIUM
MANUFACTURING COMPANIES**

(A case study of Shamco Industries Limited)

BY

NGUGI JOSEPH CHEGE

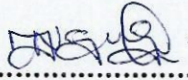
**Thesis submitted in partial fulfillment of the requirements for the award of
Masters of Science Degree in Industrial Engineering and Management of Dedan
Kimathi University of Technology.**

DEDAN KIMATHI UNIVERSITY LIBRARY

AUGUST 2017

DECLARATION

This thesis is my original work and has not been presented in any university/ institution for a degree or consideration of any certification

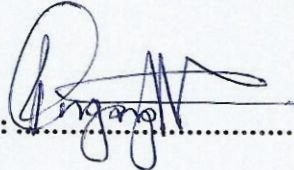
Signature  Date 6/3/2017

Name: JOSEPH CHEGE NGUGI

Registration No: E221-003-011/2012

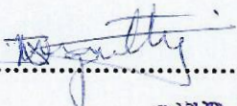
SUPERVISORS' APPROVAL

We confirm that the work reported in this thesis was carried out by the candidate under our supervision as university supervisors

Signature:  Date: 6/3/2017

1. Prof. Peter N. Muchiri

School of engineering, Dedan Kimathi University of Technology

Signature:  Date: 3/03/2017

2. Dr. Joseph Muguthu

DEDAN KIMATHI UNIVERSITY LIBRARY

Department of mechanical and manufacturing engineering, Kenyatta University

ABSTRACT

Quality is one of the strategic goals for any manufacturing companies to satisfy the customers' needs. Moreover, managing quality supports differentiation, low cost and response strategies to enjoy the competitive advantage. The modern global market demands that products produced and services rendered meet certain quality standards. However, many small and medium manufacturing organizations in Kenya fail to satisfy the needs of the customers for not being attentive to quality improvement. As a result many customers return the manufactured products for reworking or completely reject them. The organizations in return incur losses due to these problems which keep on recurring and therefore fail to compete well in the market. The occurrence of these quality problems are as a result of lack of quality management improvement methods. This study therefore analyzed quality failures and established quality improvement methods that are needed in steel furniture manufacturing companies to solve the identified quality problems. This will ensure that the manufactured steel furniture attract customers and enjoy fair competition in the market.

The study adopted a case study methodology in shamco a steel furniture manufacturing company in Nairobi Kenya. Both primary and secondary data were used from the year 2014-2016. The primary data collected included the severity, occurrence and detect ability of the defects identified by the customers. The methods used to collect the primary data were interviews and brainstorming. 11 participants were drawn from the four departments after conducting a survey based on their responsibilities in the departments and their knowledge on quality matters. They were clustered in six groups. In the data analysis Failure Mode and Effect Analysis (FMEA) was applied to prioritize the defects through risk priority numbers (RPN). Root cause analysis was carried out for each defect and cause and effect diagrams (ishikawa diagrams) were used on the basis of machines, workers, materials and process. Pareto analysis was used to distinguish major causes from trivial ones.

The study established that the most critical defects included breaking of welding joints, scratches, unbalanced ground instability, chipping and faint paint just to name a few. The study found that their really existed critical defects which affected quality. The root causes of these defects were as a result of workers with a response of 35%, process had a response of 30%, materials had a response of 24% and machines had a response of 11% of the participants. After establishing the defects and their root causes, practical solutions to minimize or eliminate each of these causes were established.

This research contributed to knowledge of practice by giving crucial practical remedial methods of which some have been implemented with positive results. The success of the improvement methods is highly dependent on the support from the top management through resource allocation, involvement of the employees through commitment. suppliers and any other stakeholder in the manufacturing process through dissemination of correct information.