Dissertation Report

on

"Optimization of the Total Cost Incurred in Warranty Policy"

Submitted in partial fulfillment of the requirements for the obtainment of degree of

Master of Technology

In

Industrial Engineering

by

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2013PIE5123

Under the Supervision of

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Jawahar Lal Nehru Marg, Jaipur-302017(Rajasthan)

CERTIFICATE

This is to certify that the Dissertation titled **"Optimization of the Total Cost Incurred in Warranty Policy"** that is being submitted by VISHAL**,** M.Tech (2013PIE5123) requirement for partial fulfillment of award of the degree of **Master of Technology, Industrial Engineering,** Malaviya National Institute of Technology Jaipur is found to be satisfactory and is hereby approved for submission.

Place: Jaipur

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CANDIDATE'S DECLARATION

I hereby certify that following work which is being presented in the dissertation entitled **"Optimization of the Total Cost Incurred in Warranty Policy"** in the partial fulfillment of requirement for award of the degree of Master of technology (M.Tech.) and submitted in **Department of Mechanical Engineering** of Malaviya National Institute of Technology Jaipur is an authentic record of my own work carried out by me during a period from July 2014 to June 2015 under the supervision of **Doctor Gopal Agarwal,** Professor, Department of Mechanical Engineering, Malaviya National Institute of Technology Jaipur.

The matter presented in this dissertation embodies the result my own work and studies carried out and has not been submitted anywhere else.

Date: **Vishal**

                                                                                               2013PIE5123

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ABSTRACT

In general, a warranty is an obligation attached to products that requires the manufacturers to provide compensation for customer (buyer) according to the warranty terms when the warranted products fail to perform their intended functions [56]. A warranty is important to the manufacturer as well as the customer of any commercial product since it provides protection to both parties. As for the customer, a warranty provides a resource for dealing with items that fail due to the uncertainty of the product's performance and unreliable products. For the manufacturer, it provides protection since the warranty terms explicitly limit the responsibility of a manufacturer in terms of both time and type of product failure. Because of the role of the warranty, manufacturers have developed various types of warranty policy to grab the interest of the customers. However, manufacturers cannot extend the warranty period without limit and maximize warranty benefits because of the cost related to it.

Many researchers have investigated on the topic of warranty modelling and policy and expanded their studies of warranty in various different conditions, i.e., maintenance policies. In this dissertation, I focus on the developments of warranty cost models with various maintenance policies as well as the warranty. First, the role, concept and other factors of the warranty policies, are introduced. I conduct the literature review and present the selected mathematical background that will be used throughout the dissertation.

I focus on the warranty cost analysis including repairable products with a given warranty period using the induction method. I combine maintenance policies and several warranty policies such as failure repair/replacement warranty, pro rata warranty and combination warranty into the cost analysis. Additionally, I investigate the maintenance policies with warranty period and post warranty period based on two dimensions such as failure times and repair times. Hence I provide assessment to what should be the optimal warranty policy for a product.

CONTENT

LIST OF FIGURES