BUSITEMA UNIVERSITY
Pursuing Excellence

P.O. Box 236, Tororo, Uganda
Gen: +256 - 45 444 8838
Fax: +256 - 45 4436517
Email: info@adm.busitema.ac.ug
www.busitema.ac.ug

FACULTY OF ENGINEERING

DEPARTMENT OF TEXTILE AND GINNING ENGINEERING

FINAL YEAR PROJECT

DEVELOPMENT OF A RELIABILITY CENTERED MAINTENANCE BASED EARLY WARNING SYSTEM FOR A ZINSER 660 SPEED FRAME MACHINE.

COMPILED BY:

OCITI INNOCENT OLUR

BU/UG/2016/1725

Email: innociti@gmail.com

SUPERVISORS: MR. KASEDDE ALLAN

DR.NIBIKORA ILDEPHONSE

A REPORT SUBMITTED TO THE DEPARTMENT OF TEXTILE AND GINNING ENGINEERING FOR THE AWARD OF BACHELORS DEGREE IN TEXTILE ENGINEERING

ABSTRACT

One third of all maintenance costs are wasted as a result of unnecessary or improper maintenance activities since unlike production and manufacturing problems, maintenance receives little attention, which explains why the productivity of textile machineries like the speed frame machine suffers due to high end breaks which are mainly as a result of the tendency of the flyer to vibrate during production which stems from anomalies of parts like the bolster pinions, gears, the flyer spindle pinions and rolling bearings. To tackle this issue, this paper proposes a Reliability Centered maintenance based Early Warning System for a Zinser 660 speed frame machine. One of the most powerful algorithmic tools for vibration analysis is the time synchronous average (TSA).

Time synchronous averaging is a signal processing technique that extracts periodic waveforms from noisy data. The TSA is well suited for gearbox analysis, where it allows the vibration signature of the gear under analysis to be separated from other gears and noise sources in the gearbox that are not synchronous with that gear. With this, it is easier to distinguish between a healthy and unhealthy speed frame machine by inspecting the waveform thus giving the maintenance crew ample time to decide on the maintenance strategy to solve that specific anomaly.

The decision on whether to recommend this Early Warning System will be based on performing a cost benefit analysis of implementing the system.

Keywords: Reliability Centered Maintenance; Zinser 660 speed frame machine; Early Warning Systems; Time Synchronous Averaging.

DECLARATION

I OCITI INNOCENT OLUR, a student of Busitema University in the Department of Textile and Ginning Engineering hereby confirm and certify that the information in this project proposal report is an original account of what I paraphrased after reading several research papers in the field of reliability engineering, Textile machineries (speed frame machine) and early warning systems.

Signature: ...……

Date: ……...

APPROVAL

This project proposal report has been submitted for examination with the approval of the following supervisors.

Signature: …….

Date: ……

Mr. Kasedde Allan

Signature ……....

Date……

Dr. Nibikora Ildephonse

Table of Contents

TABLE OF FIGURES

LIST OF ACRONYMS

RCM	Reliability Centered Maintenance
EWS	Early Warning Systems
PCA	Principal Component Analysis
CSV	Comma Separated Values
PM	Preventive Maintenance
RTF	Run-to-failure
Nytil	Southern Range Nyanza Industries Limited
ISO	International Organization for Standardization
SOM	Self Organizing Maps

SVM	Support Vector Machines
TC	Technical Committee
OQS	Oil Quality Sensors
HP	Hewlett-Packard
MATLAB	Matrix Laboratory
TSA	Time Synchronous Averaging
CBA	Cost benefit analysis
CBR	Cost benefit ratio