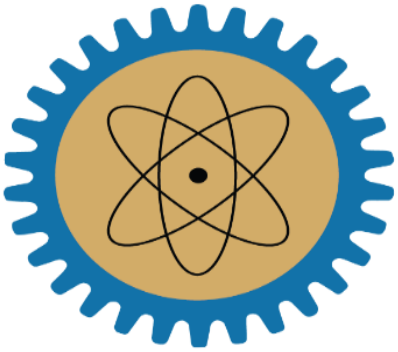

BUSITEMA UNIVERSITY

Pursuing Excellence

FACULTY OF ENGINEERING

DEPARTMENT OF POLYMER, TEXTILE AND INDUSTRIAL ENGINEERING.

FINAL YEAR PROJECT PROPOSAL

MODELLING OF TENSILE STRENGTH OF STAINLESS-STEEL AT HIGH TEMPERATURES USING ANN AND ANFIS

BY

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AND

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This final year project proposal is submitted to the department of Polymer, Textile and Industrial Engineering in partial fulfillment of the requirement for the award of the degree of Bachelor of Science in Polymer, Textile and Industrial Engineering of Busitema University

July, 2022

ACKNOWLWEDGEMENT

We would like to acknowledge, recognize and appreciate our dear intellectual supervisors (Dr. Nibikora Iidiphonse, Mr. Tigalan Dan and Mr. Musiime Godias) for the guidance, advise and support they rendered while carrying out the project research. We also would like to appreciate our parents and the almighty God by whose ability we managed to accomplish the project research through the great potential he placed in us by which we believe that we shall be able to carry out the different segments of the research.

DEDICATION

We dedicate this project to our fellow enthusiasts in the field of polymer, textiles, materials and industrial engineering, our fellow classmates, family members and whoever has contributed their efforts throughout our Bachelors course.

DECLARATION

SSERWANGA EDIRISA and **TUKAMUSHABA OLIVA**, clearly declare that the contents in this report are original to the best of my knowledge and that the report has never been submitted to any institution or university for the award of any degree or diploma and am the true author of the report.

SSERWANGA EDIRISA

Signature: .....

Date: 15/06/2023

TUKAMUSHABA OLIVA

Signature: .....

Date: 15/06/2023

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APPROVAL

This is to certify that project research of Sserwanga Edirisa and Tukamushaba Oliva was under my supervision and it is ready for submission to the dean of faculty engineering of Busitema University with our approval.

Main Supervisor

DR NIBIKORA HILDEPHONSE

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Date.....18th/05/23

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1. CHAPTER ONE: INTRODUCTION

BACKGROUND

Stainless steel has gained the world of material applications ever since its introduction to the material world in 1913. Harry Brearley introduced the first form of stainless steel which had the composition of 12.8% chromium and the rest being iron. Further research about stainless steel later led to discovery of more and more manufacturing processes and chemical composition (Iron: chromium: carbon: nickel: silicon: molybdenum) ratios that can be used to modify and manipulate properties of the material. This led to discovery of a series of stainless steels ranging from martensitic stainless steel to the present 410 stainless steel. Currently there are more than 100 grades of stainless steel falling in four general group i.e., austenitic, ferritic, austenitic and duplex stainless steel. Stainless steel has gained momentum in materials world because of its unique properties like, good recyclability, very high corrosion resistance, long service life, non-rusting character and many more. One of the main applications of stain steel is applications at high temperatures since it has a very low oxidation power, non-rusting, high thermo stability, high tensile strength and high melting point. (Of, 2003; Hosford, 2010).

High temperature materials are those that serve at temperatures above 540°C and are classified into authentic super alloys, refractory metals, ceramics, metal matrix composites and graphite composites. (Venables, 2010). Stainless steel is categorized under high temperature material under the authentic super alloys cause of their high thermo stability at very high temperatures. (Nicholls, 2014). Martensitic stainless steels contain the good composition ratios that give them suitable properties to be used at high temperatures above 500°C. Ferritic stainless steels have properties that make them applicable in applications bellow 500°C. Duplex stainless steels can be applied in high temperature applications of both austenite and ferritic stainless steels since it has a metallurgical structure with both phases. (Cobb, 1999). Stainless steel finds high temperature applications making aircraft jet engines, lighting devices, industrial gas turbines, furnaces, nuclear reactors and many more. (Marichamy and Babu, 2019). In all high temperature applications of stainless steel, the material is always subjected to stresses due to the work being done by the material. This effect brought scientists' attention to make more analysis of the mechanical properties of stainless steel at high temperature in order to optimize

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