CERTIFICATE

Date:-_____

This is to certify that report entitled **"Effect of heat treatment and current on weldability of cast iron"** by **Mr. Pradeep Tewari** is the requirement of the partial fulfilment for the award of Degree of **Master of Technology (M.Tech.)** in **Production Engineering** at **Delhi Technological University**. This work was completed under my supervision and guidance. He has completed his work with utmost sincerity and diligence. The work embodied in this project has not been submitted for the award of any other degree to the best of my knowledge.

Prof. VIPIN

(Professor)

Department of Mechanical Engg.

DTU, Delhi

ACKNOWLEDGEMENT

To achieve success in any work, guidance plays an important role. It makes us put right amount of energy in the right direction and at right time to obtain the desired result. I express my sincere gratitude to my guide **Dr. VIPIN,** Professor, Mechanical Engineering Department for giving valuable guidance during the course of this work, for his ever encouraging and timely moral support. He sometimes took tough stand to make me work hard. It was very necessary at that point of time. I learnt various things from him academically as well as behavioural which will guide me throughout my life.

I am thankful to **Dr. NAVEEN KUMAR**, Professor and Head, Mechanical Engineering Department, Delhi Technological University, for his encouragement and inspiration for execution of the this work. I express my feelings of thanks to the entire faculty and staff, Department of Mechanical Engineering, Delhi Technological University, Delhi for their help, inspiration and moral support.

I would like to thank Mr Tek Chand , Mr Omprakash, Mr Vinay, Mr. Deshraj, Mr. Mahesh Bharadwaj and other lab assistants for helping me throughout my project. Also I sincerely thank Nano Science Department for helping me in microscopy and other areas.

Finally I thank Almighty or the super natural power for giving me enormous power to sustain the failures and for again igniting the spark.

PRADEEP TEWARI

(Roll No. 2K11/PIE/13)

ABSTRACT

This study was carried out to know the effects of heat treatment on mechanical properties of cast iron and effect of change in current. Shielded metal arc welding is a process of joining two pieces with generation of arc**.** The arc is generated to develop heat to melt the material. Thin metal rod is used in the process known as electrode .It also works as a filler material.

Cast iron is a material which is difficult to be welded. It has high carbon content. The effects of heat treatment are seen by measuring and comparing the values of tensile strength, hardness, microstructure, rupture energy. Further the effect of change in current on the properties is analysed. The electrode used in this study is of cast iron.

The reason of choosing cast iron electrode was its application in the real work field and cost. An ordinary worker cannot afford the costly electrodes. Also as this type of welding is done to repair the parts it is not feasible to use costly electrodes.

By comparing the results one can see the effects of heat treatment. The tests chosen for the effects are hardness, tensile testing, microstructure and impact test. Microstructure test tells the phases present in the different zones and justifies the variation in the properties.

CONTENTS

LIST OF FIGURES

LIST OF TABLES

Table 4.10 *Hardness values of heat treated specimen with 140 A current*