

Sudan University of Science and Technology

College of Graduate Studies and
Scientific Research

Using Ultrasonic Testing in Determining the
Degree of Symmetry of a Steel Slab

استخدام اختبار الموجات فوق الصوتية في تحديد درجة
التماثل في شريحة من الصلب

This is Submitted Requirements for Master
of Science in Nuclear Physics

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2012

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Dedication

To My Little family and friends

Acknowledgement

I would like to express my gratitude to Dr. Awad Wida'a Musa deputy dean of faculty of science of Sudan University of science and technology for his enlightening suggestions and his wise and patient guidance which eventually made it possible and enabled me to accomplish this research. I am also grateful to Dr. Abdu El rahman El hassan Mohamed Osman Association –professor solid state physics department in collage of science of Sudan University of Science and technology and Dr. Ibrahim Hassan Hassan in physics department who assisted me in the accomplishment of this task. My deep thanks also to all my lecturers and staff in the department of physics in Sudan University of Science and technology. I would like also to thank the librarian in petroleum training centre and Sudan atomic energy commission. I send special thanks to Salih Abdu Elhaleem Salih NDT technician in Sudan Atomic energy commission who gave my valuable assistance during the experiment. Special thanks to all member of my family and to my friends. Finally, I would like to thank every person who assisted me directly or indirectly whose names are not mentioned here.

List of tables

- Table 1-1 velocities of sound in some common materials (cm 10) .
- Table 4-1 explain the different between the readings of ultrasonic and vernier.

الخلاصة

إن هذا البحثي وضح بطريقة علمية دور وأهمية الكشف غير الإتلافي في ضبط الجودة للمنتجات الصناعية أثناء مراحل الإنتاج مما يوفر وقتاً وعمالة وتكلفة في عمليات الصيانة . يستخدم في الكشف عن عيوب أنابيب النفط والغاز الطبيعي وناقلات النفط والطائرات والسفن والمركبات الفضائية والغواصات وقياس سمك القطعة الحديدية والسبائك.

يتألف الكشف غير الإتلاف من الكشف البسيط إلى المعقد ويشمل الكشف النظري البسيط للعيوب السطحية واختبار السائل النفاذ المستخدم في انفصالات وعيوب المواد غير المسامية واختبار الجسيمات المغناطيسية للمواد سهلة التمغنط واختبار التيارات الدوامية لعيوب المواد رقيقة السمكة واختبارات الكشف الإشعاعي للعيوب العميقة وتستخدم فيها الأشعة السينية وأشعة جاما وتتطلب محاذير سلامة صحية واختبار الموجات فوق السمعية ذات المقدرة العالية على النفاذ والتي تصل إلى حوالي 6 إلى 7 أمتار في الصلب أو الفولاذ وتفوق بقية أنواع الكشف غير الاتلافي من حيث الدقة والسلامة الصحية لمستخدميها .

Abstract

This work aims at explaining scientifically that Non-destructive testing plays an important role in the quality control of a product. It is used during all the stages of manufacturing of the products. It decreases the cost of the product by reducing scrap and conserving materials, labor and energy. NDT is used for detecting the leakage in pipelines for oil and natural gas, oil tankers, aero planes, aero space, measuring the thickness of steel and alloys. The methods of NDT range from the simple to the complicated. The visual inspection is used for surface imperfections, liquid penetrate testing can be used for detection of open-to-surface discontinuities in a non-porous material. Magnetic particle testing is used for materials which can be easily magnetized, eddy current testing is widely used to detect surface flaws and to measure thin walls from one surface only. Radiographic testing is used for the detection of internal leakages in many different material using x-rays or gamma rays. The leakages ultrasonic testing which has a superior penetrating power than radiographic testing and can detect leakage deep in the test specimen in range of 6 to 7 meters of steel. It is quite sensitive to small leakages and allows the precise determination of the location and size of the defects. Ultrasonic testing Peaceful technique NDT detection.

Problem of The Research

The presence of industrial and commercial products not in conformity
With sudanease and international standards .

Objective of The Research

This work is explain the advantages of ultrasonic compared to another Types of NDT method , visual testing , liquid penetrant testing , Magnetic particle testing, eddy current testing, radiographic testing.

Abbreviation

No	Abbreviation	Meaning
1	NDT	Non-destructive testing
2	VT	Visual testing
3	LT	Liquid testing
4	MT	Magnetic particle testing
5	PT	Penetrant testing
6	ET	Eddy current testing
7	RT	Radiographic testing
8	ARS	Acute radiation syndrome
9	UT	Ultrasonic Testing
10	CRT	Cathode Ray Tube

Chapter One

Introduction, Basic Principles of Non Destructive Testing

Chapter Two

Types of NDT Methods

Chapter Three

Ultrasonic Testing

Chapter Four

Experiment (Measurement of Steel Slap Using
Ultrasonic Testing)