Ultrasound Analysis for Condition Monitoring

Applications of Ultrasound Detection for Various Industrial Equipment

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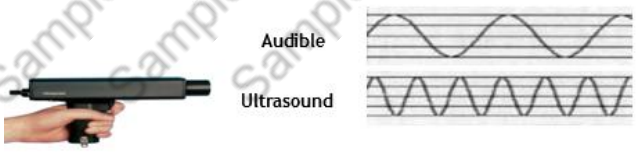
CONTENTS

INTRODUCTION TO ULTRASOUND TECHNIQUE

What is Ultrasound?
Ultrasound is cyclic sound pressure with a frequency greater than the upper limit of human hearing, excess of 20,000 cycles (hertz) per second (20KHZ).

So, by definition, ultrasound is totally undetectable by human ears unless aided by instruments capable of translating ultrasound to audible sound. In the marketplace, these instruments are commonly known as ultrasonic detectors and have been used for various maintenance related functions for over 25 years.

Ultrasonic is a predictive maintenance technique and one of the non-destructive testing tools that used in the field of industry to detect early & hidden equipment failures.



What is the Different between Ultrasonic & Vibration?

Vibration is a low frequency method that can detect bearing failures and the reason of this failure.

Ultrasonic is a high frequency vibration method (ultrasonic vibration) that can detect the degrees of bearing failures & wears, it can also detect the lubrication problems of the bearing.

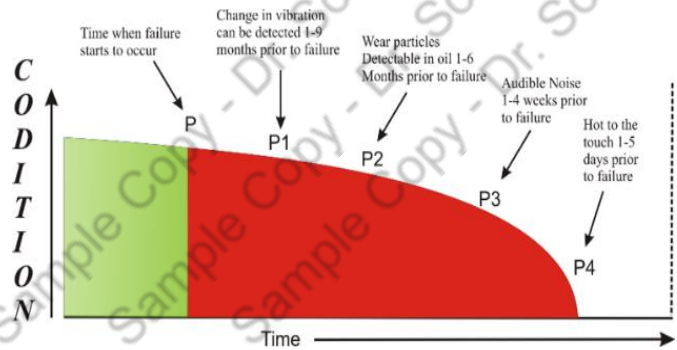
One of the most advantages of using ultrasonic over vibration, is that ultrasonic can reveal the lubrication problems and provide a very early warning of bearing faults.

The very early detection of bearing failure using ultrasound can save a lot of money and equipment life; preventing unexpected plant stop and loss of productivity.

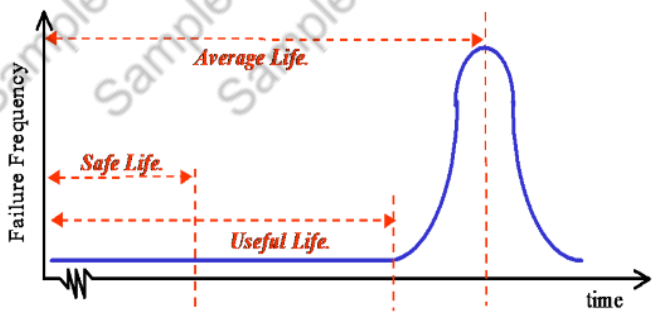
Ultrasound should be a part of any predictive maintenance planning program.

Type of fault	Vibration	Temp	Oil
Out of balance	xxx	----	----
Misalignment	xxx	x	----
Damage of bearing	xxx	xx	x
Damage of gear box	xxx	x	xx
Belt problems	xx	----	----
Motor problems	xx	x	----
Mechanical looseness	xxx	x	x
Resonance	xxx	----	----

Vibration VS Thermography VS Oil Analysis



Stages at which failure occurs.

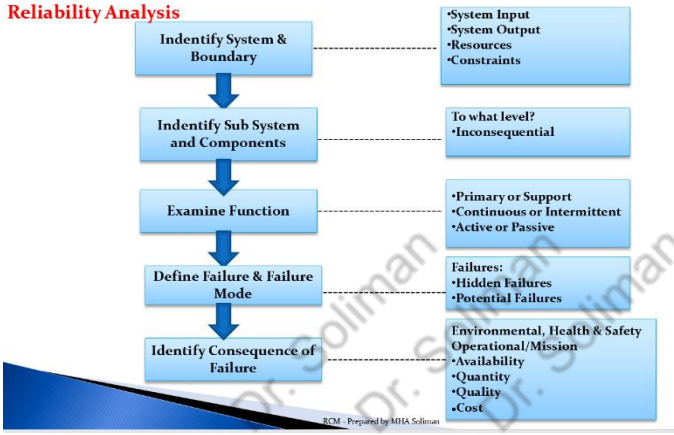


Determines equipment life time and its parts changing frequency.

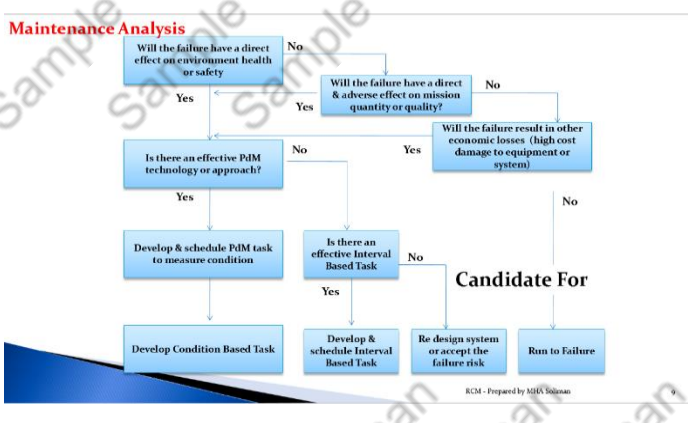
Predictive Maintenance Embraced by Plant Maintenance

Technique / Application	Pumps	Electric Motors	Diesel Generators	Condensers	Heavy Equipment/ Crane	Circuit Breakers	Valves	Heat Exchangers	Electrical Systems	Transformers	Tank Piping
VIB Analysis	•	•	•		•						
Oil Analysis	•	•	•		•					•	
Wear Analysis	•	•	•		•						
IR Analysis	•	•	•	•	•	•	•	•	•	•	
Ultrasound	•	•	•	•		•	•	•	•	•	
Non-Destructive testing (Thickness)				•			•			•	
Visual Inspection	•	•	•	•	•	•	•	•	•	•	•
Motor Current Analysis		•									

Should we run an expensive diagnosis for all systems and equipment in the plant?



Reliability analysis provide a guidance for where, when, and how to apply condition monitoring.



Reliability analysis

OVERVIEW ON THE INSTRUMENT

1. Ultrasound Detector

Lightweight and portable, ultrasonic translators are often used to inspect a wide variety of equipment. Some helpful accessories are supplied with the instrument too.

This is called Ultraprobe, available in different type for wide range of uses.