Pepper Maintenance®
The Hottest Name in Reliability!

Specializing in Reliability-Centered Maintenance

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Level II Thermographer
Category II Vibration Analyst
Certified in Precision Alignment /
Balancing
SMRP Member

2019 IAOM Sandusky, OH
Traditional Failure Curve

I-P-F Curve

2019 IAOM Sandusky, OH
The Tools to Reliability:

**Infrared Thermography**
- Discover electrical resistance problems
- Discover electrical overloads
- Discover power circuit imbalance
- Discover mechanical problems

**Vibration Analysis**
- Discover bearing wear & alignment
- Complements Infrared Thermography

**Laser Alignment**
- Give equipment the best chance

**Ultrasonic Services**
- Airborne electrical inspections
- Compressed air system leak surveys
- Bearing Lubrication

**Motion Amplification**
- Visual Vibration and movement

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WHAT IS THERMOGRAPHY?

Thermography is the use of infrared radiation sensing equipment that can detect conditions which are not visible to the human eye.
IR Applications

- Mechanical Issues
- Electrical Issues
- Steam Leaks
- Roof Issues
- Abnormal heat flow

Bad Substation Connection

Steam Trap

Bad Motor Starter Connection

Roof Heat Loss

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Main Incoming Utility Supply

- If the main power supply is not reliable, facility power is not reliable
Main Electrical and MCC Rooms

- Main incoming 3-phase splitter box connections
- Connection temperatures over 212 degrees F. noted
Main Electrical and MCC Rooms

- Main incoming 400 amp switch
- Current imbalance was noted
Equipment Control Panels

- Variable speed DC drive unit
- Lubrication and alignment should be checked. Also check to ensure proper bearings are installed.
- The elevator was shutdown and the interior belt was found rubbing and then aligned BEFORE more damage occurred
The bearing temperature should be monitored until the situation can be investigated further.
Introduction To Vibration Analysis

What is vibration?
It is the movement present in all rotating equipment. Both destructive and non-destructive movement. Not all vibration is a problem.

Vibration analysis is a natural diagnostic tool for equipment which turns all sources of vibration into a graph format. This allows us to detect faults early...thus managing the way we prepare for equipment maintenance.
Vibration Analysis Applications:

- Imbalance – Static, Dynamic, Coupled
- Misalignment – Offset, Angular, Shaft, Bearings, Belts, Gears, etc.
- Looseness – Structural, Internal Components, Machine Feet, Belts, etc.
- Electrical – AC Motor Rotors, Stators, DC Drives, VFD’s, etc.
- Rolling Element Bearings – Cage, Races (Outer & Inner), Rollers, etc.
- Gears – All types...Many Issues: Cracked/Broken Teeth, HTF, etc.
- Flow Issues – Blades/Vanes/Cavitations, etc.
- Bent Shafts
- Resonance
- Eccentricity, etc.
Vibration Analysis

Pit 1 Dust Ctrl - mtr-ode - Horizontal - Vel Spec 12000 CPM "Vel Freq 24000 800L"
4/29/2009 10:51:00 AM

motor:25hp@1740 rpm

Fan Speed
Motor Speed

O/All 0.639 in/s 0-pk

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Precision Alignment

• Give equipment the best start on life
• Ensure the most effective transfer of power
• Reduce stress on bearings and seals
• Increase life on belts and sheaves
Precision Alignment

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Find Problems BEFORE Failure Occurs

Reliability Based Maintenance
QUESTIONS?

THANK YOU!

2019 IAOM Sandusky, OH