CONTACT INFORMATION:

PETERSON PREDICTIVE MAINTENANCE, LLC
2054 Zachary Dr. • Derby, KS 67037

CHUCK PETERSON
President/CEO
chuck@petersonpredict.com
(620) 727-1347

TAMMY SNOW
Marketing/Scheduling
tammy@petersonpredict.com
(316) 734-1443

Peterson Predictive Maintenance

There is no better time to deal with a problem than before it becomes a problem. And this is what we achieve for our clients again and again. We keep you ahead of the curve.

In predictive maintenance, we use new technologies of Infrared Thermal Imaging and Ultrasound Detection to see and hear things that we as humans could not otherwise see or hear.

Mechanical and electrical systems allowed to run to failure are proven by past history to cost 5 to 7 times more to fix because of the collateral damage that may occur, in addition to unscheduled down time, loss of production, and potential penalties. Leaks that go undetected in your facility silently bleed away thousands of dollars from your bottom line.

Peterson Predictive Maintenance can give you a head start on a potential failure in your operation, saving tremendous costs in down time and otherwise more expensive repairs.

INFRARED THERMAL IMAGING

THE POWER OF WHAT YOU CAN'T SEE

Infrared constitutes an invisible band of radiation at the lower end of the visible light spectrum. Because this radiation shows the temperature of an object, infrared thermal imaging is a process which generates pictures based on differences in temperature. This makes it possible to collect information that would otherwise be undetected by the human eye.

With this technology, Peterson Predictive Maintenance can gather extremely accurate information about the heat signature of an object or environment. This information makes it possible to pinpoint trouble spots and detect areas of potential failure. The infrared thermal images are recorded and can be analyzed many different ways to provide valuable information.

Mechanical Equipment:

- Analyze for faults and decreased efficiency
  - motors, pumps, fans, bearings, compressors, heating elements, humidifiers, etc.
- Detect and verify component stress and fatigue

Electrical Equipment:

- Ensure integrity of electrical installations
- Find faulty components and overheating
- Reduce down-time
- Fire, safety, and insurance compliance

Buildings/Processing Equipment:

- Examine internal properties in walls and pipes
  - building and cool room/oven insulation
  - furnace refractory breakdown and efficiency
  - scale and fluid build-up in composite structures

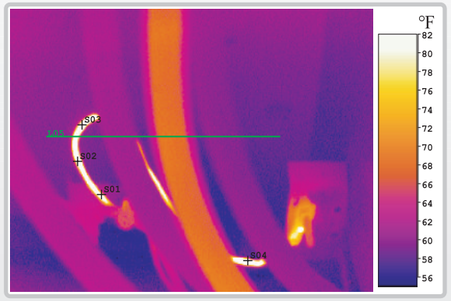
Environmental Assessment:

- Locate ruptured gas and water pipes
- Determine waste water spread
- Monitor pest/fungus spread in plantations

Aerial Applications:

- Pipeline inspection - leak, stress, corrosion, and cracking detection
- Environmental inspections - pollution dumping and thermal dumping of waste water
- High voltage transmission line inspection

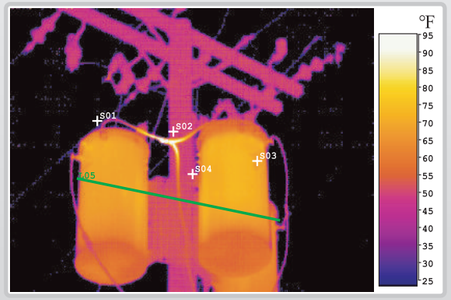
INFRARED THERMAL IMAGE



VISIBLE LIGHT IMAGE

In this image a neutral wire was found to be hot. This is not the norm. A neutral wire should not be hot unless there is a feedback of some kind. This situation needs immediate attention.

INFRARED THERMAL IMAGE



VISIBLE LIGHT IMAGE

These crimped connections between these transformers appear to be loose. They should be checked. A failure here would shut down the entire plant.

ADDITIONAL APPLICATIONS:

- Thermal heat loss inspections
- Moisture contamination evaluations
- Concrete integrity inspections
- Concrete water heated floor inspections
- Flat roof leak detection
- Power generation generator inspections
- Power plant boiler flue gas leak detection
- Substation electrical inspections
- Overhead Electrical Distribution Systems
- Electric motor inspections
- Mechanical bearing inspections
- Cold storage cooling losses
- Refinery process evaluation
- Heat exchanger
- Furnace inspections
- Flame propagation explosion analysis
- HVAC equipment evaluation
- Pest infestation inspections

...and many more

ULTRASOUND DETECTION

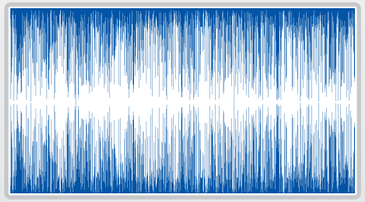
LISTENING TO THE HIDDEN DETAILS

Ultrasound is composed of high-frequency sound waves above the range of human hearing. Predictive maintenance uses airborne/structure-borne ultrasound technology which senses frequencies ranging from 20 to 100 kilohertz. These are electronically translated down into the audible range where operators hear the sound through headphones, as well as view it as intensity increments on a meter or display panel.

All manufacturing, process, and electrical equipment produces a broad range of sounds when operating. The high-frequency ultrasonic components of that noise are extremely short wave and tend to be fairly directional and localized. As a result, it is easy to isolate these signals from the background clamor and so pinpoint their physical source. Furthermore, as changes begin to occur in equipment, the subtle nature of ultrasound allows you to detect these potential warning signals early, before something fails.

With ultrasound detection, Peterson Predictive Maintenance can determine not only the condition of components or systems that may be hidden from view, but also establish a trend in its sound signature to determine potential failure. Because of the remarkable accuracy of this technology, this is possible even in extremely noisy environments.

BAD BEARING

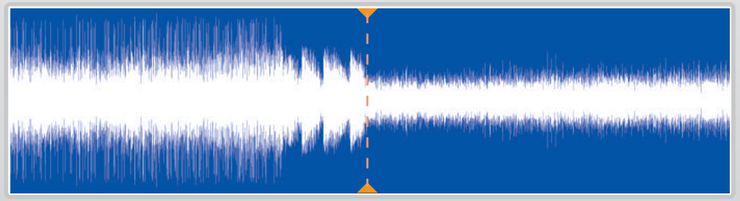


The tonal quality of a bad bearing varies depending on the problem. It is often marked by popping or cracking noise.

GOOD BEARING

A good bearing that is lubricated properly should sound smooth and even, almost like air escaping from a leak.

NEVER OVERLUBRICATE A BEARING AGAIN



It is common in many scheduled maintenance programs to inadvertently overlubricate a bearing, and shorten its lifespan in the process. With ultrasound detection, it is possible to not only predict and verify when a bearing is needing greased, but also tell precisely when it is properly lubricated. Note the overlay on the sound file waveform above. This shows when the bearing has received exactly the right amount of lubrication.

JUST FIXING LEAKS...

Sunflower Manufacturing in Beloit, KS builds a wide array of farm implements. Peterson Predictive Maintenance, upon ultrasound inspection of their plant, was able to locate 56 leaks that had gone undetected, including compressed air and argon. After tagging and documenting each leak, it was possible to show a potential savings of over $146,000 per year upon their repair.

Mechanical Equipment:

Mechanical equipment produces a "normal" sound signature when operating effectively. As components begin to fail, a change in the original sonic signature occurs. Using ultrasound detection, this change can be noted as a shift in intensity or change in sound quality - heard through headphones and recorded for further analysis.

Ultrasound also has huge benefits in condition-based lubrication programs for bearings. Contrary to a time-based schedule, bearings are regularly tested and lubricated precisely when and to what extent they need. This saves both time and money, while eliminating detrimental overlubrication.

Electrical Equipment:

For electrical inspection, ultrasound detection can be performed on all voltages: low, medium and high, in open or enclosed equipment. The advantage of being able to hear while scanning enables inspectors to quickly identity electrical anomalies such as arcing, tracking and corona.

Leak Detection:

Leakage can occur in liquid or gas systems. The greatest advantage of ultrasonic detection is that it can be used in a variety of leak situations since it is sound sensitive and not "gas" specific. Because of its accuracy, it is possible to find the exact spot of a leak, even quantifying it so that repairs can be prioritized.

Whether compressed air, steam, or any other industrial gases - Peterson Predictive Maintenance can provide highly accurate information about the size (volume) of a leak as well as its cost to your company.