

# ELECTRICAL THERMOGRAPHY FOR PREDICTIVE MAINTENANCE

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## EXTENDED ABSTRACT

Thermography has evolved into one of the most valuable diagnostic tools used for predictive maintenance. In this paper, an advanced infrared imaging system was used to show the advantages and applications of thermal imaging for improving electrical system reliability; is a nondestructive evaluation technique that monitors the target temperature change.

Predictive maintenance applications for thermography are numerous. Thermographic systems are commonly used for electrical inspections. As electrical connections become loose, there is a resistance to current that can cause an increase in temperature. This increased temperature can then cause components to fail, potentially resulting in unplanned outages and injuries. In addition, the efficiency of an electrical grid becomes low prior to failure, thus energy is spent generating heat, causing unnecessary losses. If left unchecked, heat can rise to a point that connections melt and break the circuit; as a result, fires may occur.

Besides loose connections, electrical systems suffer from load imbalances, corrosion, and increase in impedance to current. Thermography can quickly locate hot spots, determine the severity of the problem, and help establish the time frame in which the equipment should be repaired.

Additionally, outdoor components, substations, switchgear, transformers, and outdoor circuit breakers can be inspected quickly and efficiently with thermal imaging.

Another benefit of thermography is the ability to perform inspections while electrical systems are under load.

Thermography is very useful when inspecting indoor components such as motor control centers, breaker panels, disconnect switches, and transformers.

In order to illustrate the use of electrical thermography two cases were considered: an electric motor and a charging pump, both located at Turnu Nord (Arad) deposit. An ultra-portable IR MobIR® M4 Thermal Camera was used with big-camera power which provides outstanding thermal imaging of the highest quality.

The life of electrical components and materials is drastically reduced as temperatures are increased.

Inspections take less time than repairs, especially if done with a thermal imager.

Temperature is by far the most measured quantity in any industrial environment. For these reasons, monitoring the thermal operating condition of electrical and electromechanical equipment is considered to be key to increasing operational reliability.

By detecting anomalies often invisible to the naked eye, thermography allows corrective action before costly system failures occur.

The analysis of the thermographic images requires experience and training to interpret the image correctly.

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