

TERMOVIZIJA U PREVENTIVNOM ODRŽAVANJU MALIH HIDROELEKTRANA

INFRARED THERMOGRAPHY IN PREVENTIVE MAINTENANCE OF SMALL HYDROPOWER PLANTS

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Introduction

- small hydropower plants (10 MW)
- micro hydropower plants (100 kW)

- preserving the existing natural resources,
- protecting the environment from greenhouses gas (GHG) emissions



Infrared thermography

- modern methods for measuring
- methods to storage and data analysis, their comparison and online monitoring in the field of electricity distribution and control of power plants enables the creation of technical, exploitation and organizational preconditions for improving the energy efficiency of networks of all voltage levels
- prevention of failures
- reducing energy losses
- detect warming of bearings, poor generators connections, transformers, switches, adders and other key elements of power plants, ensuring timely intervention and thus reducing the number of failures



Equipment for infrared thermography measurements

Camera Wohler IK 21

- LCD screen diagonal of 10.2
- a memory PC card

Flir E8



Diagnosis of the state of equipment MHE in Serbia

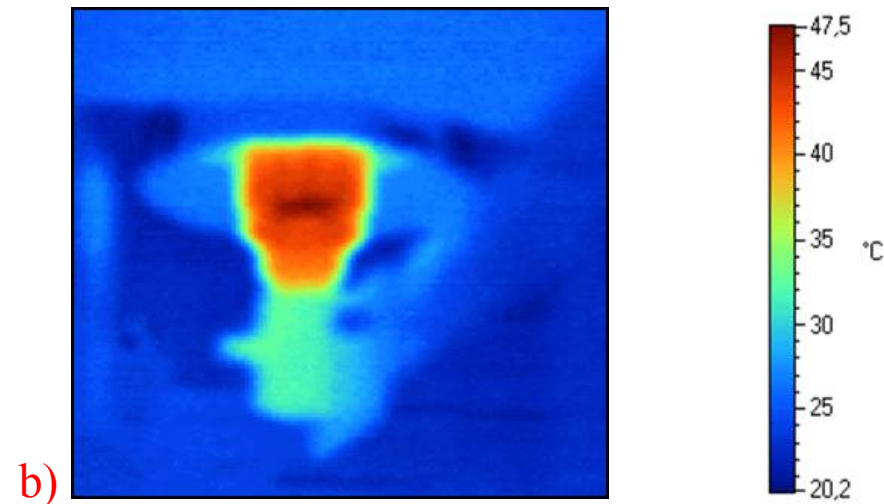
For more facilities MHE were conducted thermal imaging in order to diagnose the state of the equipment, to mechanical, and electrical.

Accompanied by all the bearings of rotating elements, dams, generators, water elements, power factor compensation and protection.

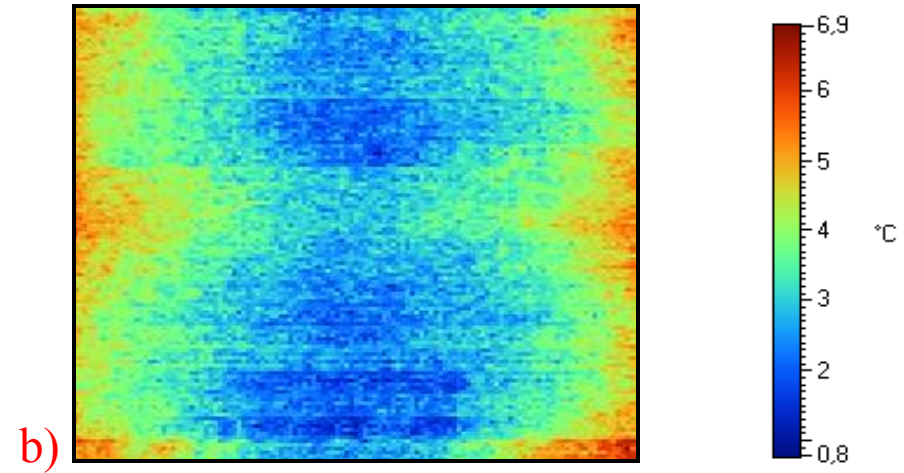
Practically on all objects discovered are potentially dangerous places. Here are some typical examples.



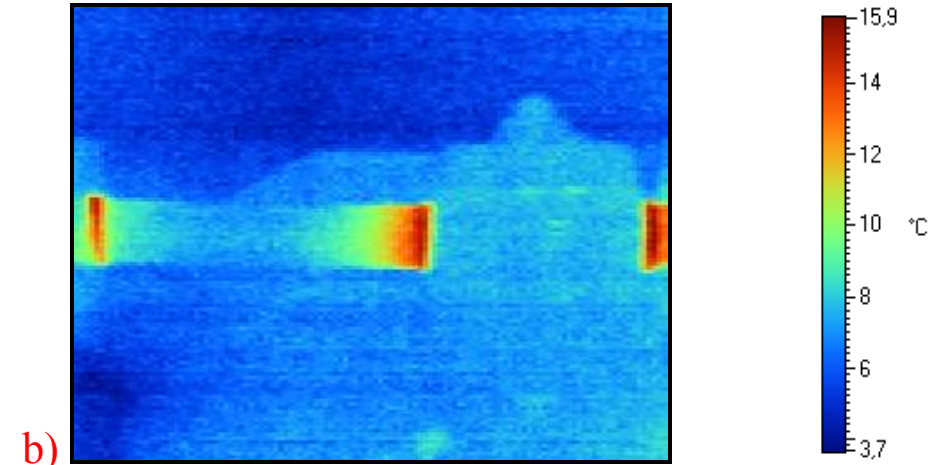
Tesile pulleyn



Water gate



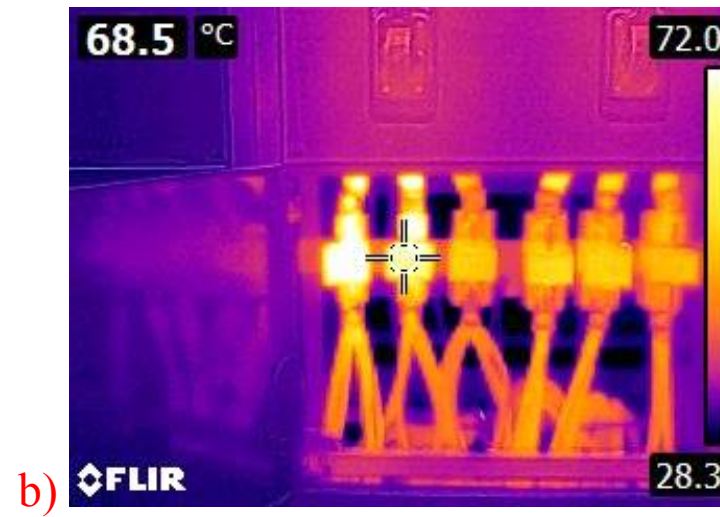
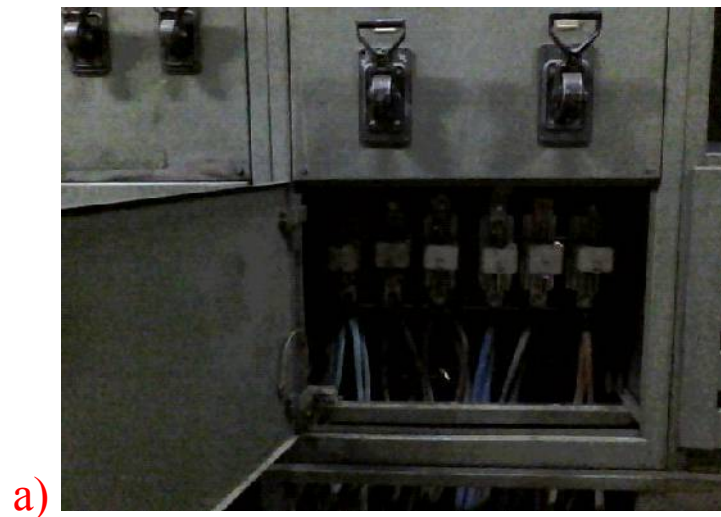
Direct transmission turbine - generator



Contactors



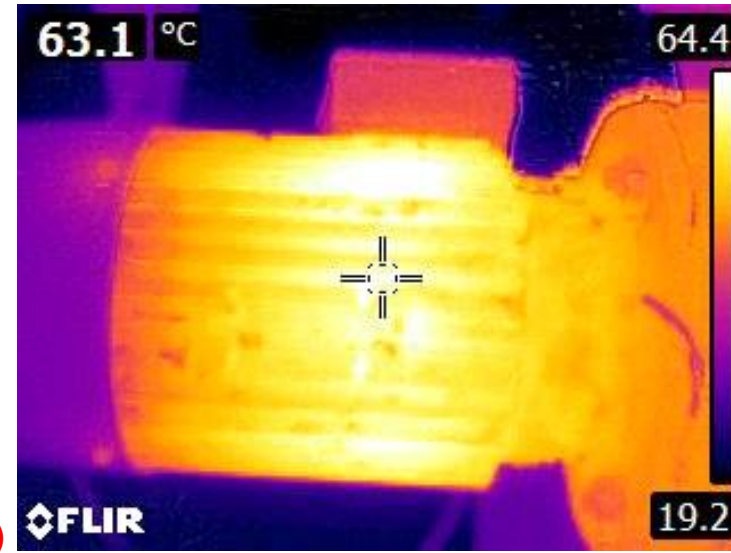
Overloaded fuses



Asynchronous generator



a)



b)



Conclusion

Thermography is a very powerful technology for surveillance, diagnostics, preventive maintenance and management of various technological processes.

It is shown that, physically very complex process of infrared thermography can with the help of relatively simple and not so expensive equipment, applied to real systems such as mini hydro power plants.

In addition, analysis of recent results recording, enabled the detection of numerous deficiencies and potentially very dangerous places at almost all facilities. On that basis has been taken the necessary measures in order to prevent serious breakdowns or accidents.