

Thermographical examinations of engine rooms

Thermographical cameras can locate all excessively hot spots on engines and are also very efficient in the examination of electrical installations. Gard News takes a look at this useful safety tool.

HOT SPOTS IN THE ENGINE ROOM

As much as two thirds of all fires on board ships start in the engine room, and the larger part of these are initiated by oil reaching a surface of a temperature above the auto-ignition point of the oil. For most oils such a critical temperature is just above 250°C. SOLAS regulations therefore require insulation of all hot surfaces with a temperature above 220°C, providing a "comfort zone" between the two figures.¹ Even if the insulation of an exhaust channel is of a good appearance, there may be hidden inadequately insulated areas and smaller open hot spots which could start a fire if in contact with oil. To determine how hot a particular surface is, one may use the old-fashioned wax crayons or a surface contact thermometer. These are inexpensive means, but not likely to assist in finding concealed hot areas.

A more modern tool is the so-called "Lasertracers", laser-based infrared heat tracers, which cost from USD 200 to 500. This tool is quite effective if used correctly, but as it measures the heat radiation from the object, the operator has to estimate the rate of reflection or emissivity. Also, as the instrument measures the average temperature of an area from a distance, it may be difficult to detect the exact temperature of the hottest spot without knowing the effect of average areas. Carefully examining all items of an engine room with such a tool will be very time-consuming.

The best method to examine a full engine room for hot spots and hot surfaces is to have a thermographical examination carried out; a thermophotographical examination to be exact. The hand-held camera, using infrared technology, has already been in use for some years in shore-based industries. Following many fires in Norwegian wooden farm buildings and the loss of livestock and equipment, insurance companies started to ask for thermographical examinations of the electric installations before accepting to provide cover. Another use, typical for Norwegian needs, is to have private houses examined for quality of built-in thermic insulation.

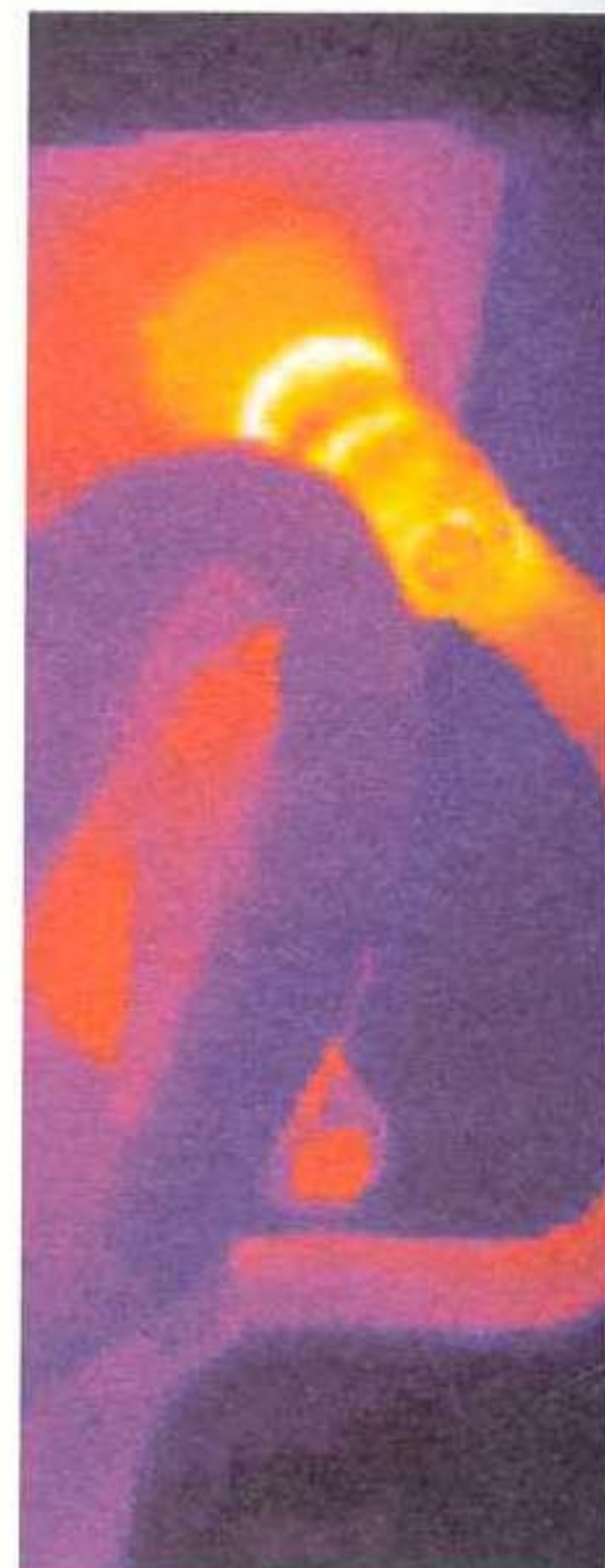
THERMOGRAPHICAL TECHNOLOGY APPLIED TO SHIPPING

The shipping industry has been slow to pick up this new technology. Class societies are aware of the equipment and may have some guidance on its usage, but have not made such examinations an obligation. We believe, however, that, as the usefulness of this tool is discovered by the industry, and as public demands for safer ships continue to increase, it is just a question of time before

flag states or class authorities start to ask for such examinations, as a part of Special Survey or Safety Construction Survey requirements, at least for vessels above a certain age. First in line would be vessels for which a fire in the engine room would have the most serious consequences, like older passenger vessels for instance. The price of advanced equipment is around USD 30,000-50,000, so not many owners are buying it. Less expensive cameras are also on the market, including a model costing USD 12,000, which is also said to be robust enough to be used by firemen searching for persons to be rescued. That is another use of the technology: to locate people in the smoke of a fire, by searching for 37°C. Advanced firemen helmets are even available with built-in infrared viewer.

On board a vessel the thermographical camera will locate all excessively hot spots on the engines, exhaust lines, boilers, incinerators, etc., but it is also very efficient in the examination of electrical installations. Weak couplings, risks of short circuit, etc., will be located by

¹ See article "New fire safety regulations in the engine room" in this issue of Gard News.



Detail of fire pump electric terminal box and corresponding thermophotograph.