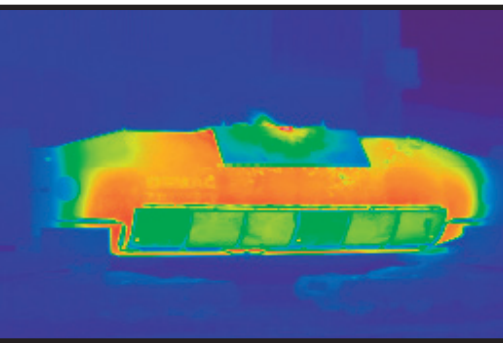


TORPEDO LADLE MANAGEMENT

"Optimised insulation inspection by thermographic monitoring of ladles"



Measuring object: Torpedo ladle



Thermal image (thermogram) in software

The task

The so-called torpedo ladles used in steel mills to transport liquid iron alloys must meet many stringent requirements. One major criterion for transfer between the melt shop and downstream shops is to have a good insulation against the metal which is up to 1,400°C. The lining is therefore made of refractory materials, but these are subjected to heavy strain and wear due to the permanent filling and emptying of molten iron. With a view to preventing critical breakthroughs due to damaged insulation, weak points in the torpedo ladle lining must be detected early. Otherwise this will lead to time-consuming downtimes with costly clean-up and repair work and the risk of personnel injury.

Thermal imaging systems are excellently suited to inspect the condition of the ladles, enabling you to detect critical points by means of hot-spots on the outside shell. Measurements with handheld thermographic cameras, which have been used sporadically so far, do not guarantee a 100% inspection. In contrast, deploying a stationary system will enable you to implement an effective management system using a downstream database.

Our solution

Stand-alone thermal imaging system with hot-spot alarming and ladle management features:

- High camera resolution of 320 by 240 pixels minimum, temperature measuring range from 0 to 500°C
- Analysis of temperature data in specific regions of interest (ROIs) of the thermal image, and automatic locating of hottest spot (weak point in insulation)
- Recording thermal imagery for torpedo car monitoring and storage of data for continual comparison of car condition (car management)
- Parameterisation of characteristic measured values (e.g. maximum temperature) for configuration of threshold values for visual and/or audible alarm signalling
- Installation of camera system in an industrial weather-proof casing for outdoors installation and 24/7 operation
- Interfacing of all system components via TCP/IP protocols for industrial data transfer

Data analysis



- Thermographic monitoring of a torpedo car vs. time
- Identification of a weak spot in the bricklining using a thermal image with grey colour wedge and alarm isotherms



Filled torpedo car



Re-heat station