

Land Ladle Safety System Automated Torpedo Car Refractory Monitoring

Integrated steel mills use torpedo cars to transport molten metal from the blast furnace.

Each car has a torpedo shaped ladle and can carry up to 250 tons of liquid metal. The ladle is lined with refractory brick to keep the contents liquid and protect the outer steel shell.

The volatility and erosive nature of molten metal make monitoring the torpedo car's refractory lining a vital maintenance function.

The consequences of a breakout are considerable, in terms of safety and cost. A single breakout can cost US\$250,000 or more.

The Land Ladle Safety System, which uses a Landscan Infrared Linescanner, produces highly detailed thermal profiles of each side of the car from a short distance. This enables the Ladle Safety System to view very small surface details.

As each car passes a measurement station, ID tags on the car provide car number and temperature data to the monitoring software.

An image file is automatically saved for each side of every car with that information.

The Ladle Safety System can monitor up to 14 user defined zones of interest along the length of the car side.

Each zone has an associated alarm contact which can be used to alert operators to take remedial action.

Benefits of the Land Torpedo Car Measurement System

- Avoidance of a breakout and its consequences – time, material, labour and costs
- Automated process – saves cost and man time
- Historical thermal image database of both sides of every car
- Increased safety
- Reduction in refractory re-line cost: By having more runs between re-lines and the ability to do partial re-lines
- Improved confidence in refractory condition and safety of cars
- Planned refractory re-line maintenance schedule

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instruments international

Infrared Temperature Measurement

Land Instruments International • Dronfield S18 1DJ • England • Tel: (01246) 417691 • Fax: (01246) 410585
Email: infrared.sales@landinst.com • Internet: www.landinst.com

Land Instruments International • 10 Friends Lane • Newtown, PA 18940-1804 • U.S.A. • Tel: (215) 504-8000
Fax: (215) 504-0879 • Email: irsales@landinstruments.net • Internet: www.landinstruments.net

France
Land Instruments Sarl
Tel: (1) 34 62 05 45 • Fax: (1) 30 56 51 12
Email: commercial@landinst.fr

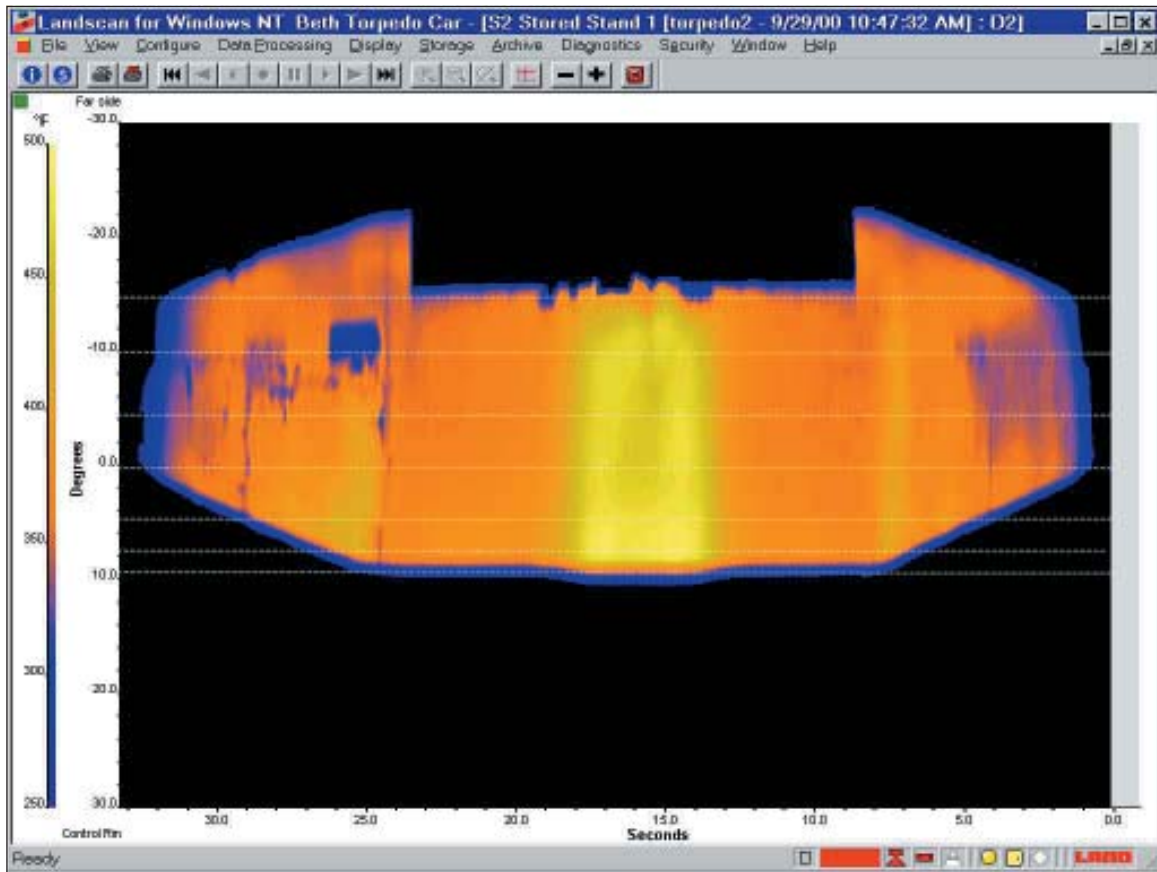
Japan
Land KK
Tel: 06 6330 5153 • Fax: 06 6330 5338
Email: ikeland@silver.ocn.ne.jp

Germany
Land Instruments GmbH
Tel: 02171/7673-0 • Fax: 02171/7673-9
Email: infrarot@landinst.de

Spain
Land Instruments International
Tel: 91 630 0791 • Fax: 91 630 2918
Email: land-infrared@landinst.es

Italy
Land Instruments Srl
Tel: 02/99040423 • Fax: 02/99040418
Email: infrared@landinst.it

Mexico
Land Instruments International
Tel: 52 55 9171 1466 • Fax: 52 55 9171 1477
Email: ventas@landinstruments.net



Thermal profile of a torpedo car showing measurement zones

Specifications

Land Ladle Safety System

Temperature Range:	100 to 500°C/200 to 900°F
Scan Speed:	50Hz
Analog Outputs:	6 zones, 4 to 20mA, isolated (options for additional outputs)
Scanner Window	Sapphire, heat and scratch resistant
Air Purge:	110V powered air purge. Unit helps to keep optics clear of dust and dirt
Transponder Reader:	Car ID information on each Torpedo Car
Software:	Files automatically saved for each car side with correct ID. Extensive database and archive capability
Alarms:	14 zone alarms – alert operators to developing problems