Spot-on Flaw Identification

Hard-Spot Detection for Heavy Plates

THE CHALLENGE

Non-destructive testing methodologies are required for reliable quality control in the steel manufacturing and processing industries. The hardness of steel nowadays represents an important overall quality feature which must be monitored during each critical phase of the manufacturing process.
A heavy steel plate manufacturer approached ROSEN with the challenge of developing an inspection system for the testing of heavy plates for hard spots, i.e. localized hardness increases in the steel. Furthermore, the customer required that the inspection system be fully integrated into the operator's production cycle.

OUR SOLUTION

The solution consisted of an inspection trolley situated with an electro-magnetic testing unit. Inspection data is collected by means of a statistical approach, meaning that the data is gathered from the magnetic hysteresis cycling through the steel plate. The data collected embraces both the micro-magnetic and micro-structural properties of the steel and allows for the determination of a variety of different magnetic parameters. This information is correlated to different material properties or stress, therefore providing accurate details on the local hardness distribution of the steel.

The testing approach is comprised of the following analysis techniques:

- Upper Harmonics
- Incremental Permeability Signal Analysis
- Eddy Current Analysis

The mobile hard spot detection system consists of different components which help to ensure smooth operation:

- Sensor array, comprised of two staggered rows, each with 4 sensors, providing full coverage.
- Tracking system with encoder/odometer unit, to follow-up the distance travelled on the plate.
- Electronics for data acquisition and signal conversion.
- Robust tablet PC for data evaluation and analysis.

Each trolley includes a user-friendly software package to ease the procedures involving preparation and operation. The software package provides a simple layout of the calibration procedure and a live visualization of the measurement results as the trolley moves over the heavy plates.

YOUR BENEFITS

- Light weight trolley design for easy handling
- Long term stability allowing 24 hrs/day operation
- Easy calibration for OK/not OK distinction
- Reduced wheel distance for minimizing untested area
- Digital and analog I/O optional

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