Scope

The customer is a manufacturer of steel railroad rails has a customer requiring 100% inspection by magnetic methods. The previous method was to test the rails with magnetic flux. This requires a large amount of time and personnel to complete.

A system was required that could test the rails online at production speed of up to 200 feet per minute.

The system must be capable of detecting linear surface discontinuities (oriented parallel to the longitudinal axis of the rail) 0.020 inch deep x 4.0 inches long (which can be made 1.0 inch, if desired) x 0.010 inch wide on the bottom of the rail base.

Solution implemented

The final solution to this problem required a custom probe and test fixture connected to a MIZ®-27CT and an industrial PC. The industrial PC controlled the test fixture and was designed to communicate with the master data storage system of the plant. The probe array was compiled of 16 test probes wired into groups of 4 driver-pickup probes.

Results, including graphics

Project has lead to successful sale and customer is discussing upgrading system to inspect entire rail profile.

Benefits

- The system was able to eliminate the need for a number of inspectors for that job.
- It increased the accuracy of the inspection by replacing a subjective inspection with an objective analysis.
- The system was able to supply detailed inspection reports.
- Flaws were detected in the rails that were missed in the manual inspections.
- The plant throughput was dramatically increased.

Challenges

- The environment where the system was installed is very dirty.
- The rails are moved around the plant using mag-lift cranes which leave residual magnetic fields in the rails.
- The test location was immediately upstream of a UT test station with its pools of coupling fluids pouring off the rails.
- The plant is designed to create a number of different rail types with varying dimensions. The test system needed to be designed to inspect different base widths.

Rails moving at production speed have lateral displacement of ±1 inch and up to 1 inch in vertical movement.

Other Uses

Any applications involving long or continuous products such as bars, tubes, and wires could use a similar test setup.