

Application Brief:

STEEL PRODUCTION

MONITORING TRANSFER CAR POSITION

INDUSTRY: Steel Production

APPLICATION: Monitoring transfer car position

SUMMARY: Dimetix DLS and FLS laser distance sensors are the proven choice for position sensing in a variety of industrial applications requiring monitoring of position, level, or size. These sensors have the range, accuracy, and speed to monitor position and motion of guided transfer cars carrying massive loads in a busy steel production environment. Properly integrated, they are also rugged enough to withstand the dust and environmental extremes of a typical steel production facility containing furnaces and various types of transfer mechanisms.

Overview

Challenge

A global steel production facility was experiencing production downtime because the large transfer cars (200 feet in length) used to transport massive, red hot steel plates were overshooting their shuttle positions or colliding with the barrier stops at the end of a rail guided transfer line. The production stoppages were caused by the malfunction of floor mounted microswitches, which were triggered by the transfer cars and positioned at 6 points along a 55-60 foot track.



Solution

To replace the malfunctioning microswitch system, a noncontact distance laser measurement system was designed, installed, and implemented by a local integrator. The replacement system consisted of the following (See application schematic):

- Two Dimetix® FLS-CH10 laser distance sensors enclosed in NEMA 4X rated protective housings

- Corresponding reflective target plates attached to the transfer cars
- A display/controller consisting of a panel mounted serial display and analog transmitter

The lasers used for this application are class II eye safe and measure with a system accuracy of 1 mm. The protective enclosures housing the lasers also included a vortex compressed air cooling system to continuously monitor temperature and cool the inside of the enclosure. The same compressed air stream was passed over a boron silicate glass viewing window with a unique perforated silicon gasket that directs a stream of clean, cool air over both sides of the viewing window. The continuous flow of air over the viewing window maintains the temperature inside and outside the housing and also provides an air purge to prevent dust accumulation.



Results

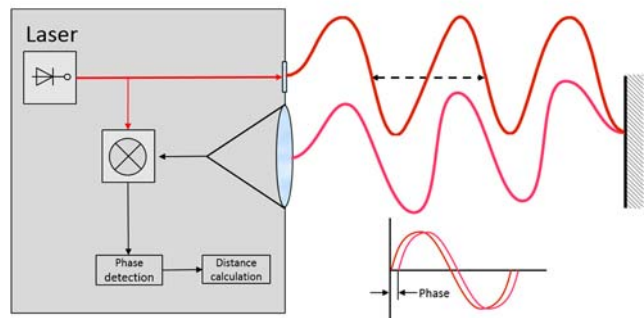
The upgraded laser distance measurement system has been in operation at the facility since 2011 (See application schematic, opposite). As a result of integrating the Dimetix laser sensors on the transfer car system, downtime was practically eliminated and accomplished the following:

- Significantly improved the steel plate transfer process
- Prevented transfer car collisions with the rail stops at the end of the rail guide line
- Eliminated the downtime experienced with the malfunctioning microswitch system
- Permitted system engineers to program variable stop positions

Technology

Dimetix laser distance sensors operate on a principle called phase shift. The laser signal is reflected directly back to the device. This technique provides high accuracy at a significantly lower cost than traditional laser triangulation methods and is generally more accurate than simple time of flight methods. Since the transmit and receive signals

come back straight to the device, the laser can be mounted in tight spaces, making retrofits simpler. The device is also capable of measuring with 1.5 mm accuracy, even up to 500m. Distances over 65m usually require a special reflective plate affixed to the target.



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Steel production facility and laser distance sensor system application schematic. Downtime on the transfer car line was practically eliminated by replacing the faulty floor microswitch system with the integrated Dimetix laser distance sensor system.

