Testing Small Diameter Copper Rod & Wire During Drawing

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Eddy current instrument with encircling test coil in a holding and guiding mechanism for inline testing during production.

A turn-key eddy current test system has been installed at a large copper rod and wire producer in China. The system is fully integrated with the company's production line and the quality of each coil of wire is accurately graded, allowing the manufacturer to match the coil quality with a specific customer's needs and applications.

The system features **Magnetic Analysis Corp.'s (MAC®)** eddy current MultiMac® instrument operating with an XJH.160 encircling test coil. Working with a local firm, **Ningbo NewDev Optoelectronic Technology Co., Ltd.**, a self-enclosed structure and mechanisms were designed to guide and firmly hold the 2.6 to 3.0 mm diameter product as it moves through the test.

High speed lines, which run at up to 22 mps as this one does, can have substantial vibration creating "noise", which interferes with the test. The Ningbo guiding and holding mechanisms, combined with the MultiMac's filters and digital processors prevented the vibration from creating problems with the test as well as ensuring smooth progress of the product through the production line. This was accomplished without the manufacturer having to deal with designing a supporting structure and guidance mechanism themselves.

MAC and Ningbo NewDev provided a solution to the company's problem of how to manage introducing this important test into their production line.

This system was designed to fit in a small space after annealing and before the tensioning and coiling processes. As the wire exits the annealing process, it enters the Ningbo enclosure, passes under a guide roll and is fed through a bushing into the eddy current test coil. From there it continues through another bushing and passes over another guide roll before exiting the enclosure. The

MultiMac® eddy current tester and Ningbo NewDev Optoelectronic Technology Co.'s enclosure and guidance mechanism for testing rod or wire during production.

MultiMac® eddy current blue test coil in holding and guiding mechanism from Ningbo NewDev Optoelectronic Technology Co., for testing rod or wire during production.

wire then goes through the tensioning and coiling processes to become a finished coil.

The test detects typical small surface defects such as scratches, cracks and pin holes. For testing small copper rod, a similar eddy current test using a larger diameter coil and guidance mechanisms could be designed for installation further upstream.

The other important feature of this installation is the MAC grading software, which allows the producer to accurately and easily grade each segment or coil of wire. In general, this kind of wire and rod production does not include paint markers. The line just keeps running nonstop and producing coils that are ready to ship.

By having the eddy current tester grade the product as it goes through, rod or wire intended for each segment (defined in metric or English) or an entire coil, can be characterized, based on specific threshold gates. The customer can specify the number and type of defects for each grade level and configure reports. Each type of defect is detected by a specific gate in the instrument and is counted in a separate counter, up to 24 defects.

At the end of a shift or day, the grade data for each segment or coil tested can be reported and each coil can be tagged with a unique coil ID and grade.

Reports including coil ID, grade, date, time, production line, test instrument and total defect count for each designated type are provided in a CSV file, easily interfaced with customer databases.

Surface defects as well as inclusions, when a MID test is included can be detected and categorized. Learn more at the Magnetic Analysis website.

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Company Profile:
Magnetic Analysis Corp. (MAC®) *provides instruments, systems and solutions that are recognized the world over as a key resource for nondestructive testing (NDT). At the core of our comprehensive portfolio of NDT options are Eddy Current (ECT), Magnetic Flux Leakage (MFL) and Ultrasonic (UT & PAUT) testing equipment and systems. Engineers working with manufacturing and production teams routinely rely on MAC's 90+ years of experience and world-wide Field Staff to select the optimum NDT system to inspect their tube and pipe, bar, rod, wire, cable, billets and parts. Partnering with them, we develop a test system that is the best one to meet both their specifications and their internal needs. Our reputation for high-caliber performance and reliability is recognized throughout the Oil Country Tube and Pipe (OCTG), Heat Exchanger Tube, Petrochemical/Nuclear, Medical and Automotive Industries.* ***www.mac-ndt.com***