

SENSITIVITY IMPROVED BY HALF COUPLING OF TWO COILS IN EDDY CURRENT TESTING

Qiuping Ma¹, Guiyun Tian¹, Bin Gao¹, Changrong Yang¹, Gaige Ru¹

¹School of Automation Engineering, University of Electronic Science and Technology of China, China

Sensitivity refers to the ability of the probe changes with defects, which is an important performance index in the field of eddy current testing and attracts significant attention from researchers. In conventional eddy current probes with two coaxial coils weakening the sensitivity due to the indirect energy coupling. For enhancing this performance, numerical simulations and experiments of the new structure on the half coupling probes are studied. Generally, probes in single direction such as vertical or horizontal cause much attention. In this paper, coils combine two dimensions of vertical and horizontal directions have been considered. This new structure aims at the eccentric distance of two coaxial coils and half coupling refers to the horizontal staggered placement of two coils in the vertical direction. Results show that half coupling mode at nearly 50% eccentric position can greatly boost inspection sensitivity and contain more information of defects characteristic at a certain vertical distance. For other features of the proposed structure, the deeper defects inspecting comparison of different kind of coil type also has been carried out. It shows the proposed half coupling structure has a good capability for deep defects inspection. In addition, the comparison the sensitivity on lift off distance between other type probes have been conducted. It indicates that the proposed structure has the highest sensitivity as the lift-off increase. Keywords: sensitivity, half coupling, eccentric position, eddy current testing