

1.2.9. EDDY CURRENT TOOLS FOR EDUCATION AND INNOVATION

Mook G., Simonin J., Otto-von-Guericke-University Magdeburg, Germany

Eddy currents (EC) are able to investigate the near-surface region of components for different kinds of anomalies very efficiently. No couplant is needed and the inspection speed is very high. Unfortunately, the signal generation in EC-technique is hard to understand. In contrary to x-rays or ultrasonics no obvious shadow models or echo phenomena can explain it.

To overcome this drawback and to make EC technique more popular an education tool was developed making the signal generation more transparent. The tool consists of two parts:

- Easy to handle interactive computer simulation of the basic effects of EC pick-up probes: lift-off, conductivity, frequency, surface defects and hidden defects. A virtual probe can be moved over an object and the signals are shown in the normalized impedance plane.

- All-digital EC instrument with USB interface. Transparent probes give an insight into their inner construction. They are easy to handle and produce evident signals of typical defects on real test objects provided together with the instrument. The all-digital signal processing makes the instrument affordable to give every student its own instrument.

The instrument allows learning surface crack inspection, inspection for hidden defects, material sorting and wall or layering thickness assessment. For experienced inspectors it opens the chance to optimize multi-frequency settings and different types of filtering in x-y- and y-t-mode. The system generates EC protocols not wasting time for hand-writing and drawing.

For teachers the tool offers new opportunities to demonstrate an EC instrument using common data projectors and to switch between the lecture material and the instrument operation “on the flight”.