

## **Crack inspection by cube structure sensor with circular surge eddy current scan**

Huang Gang<sup>1</sup>, Li Luming<sup>2</sup>

<sup>1</sup>Department of mechanical engineering, Tsinghua Univ., Beijing, P.R.China <sup>2</sup>School of aerospace, Tsinghua Univ., Beijing, P.R.China

### Abstract

A new kind of excitation signal called surge eddy current was researched and used to inspect the crack under pollution such as oil, mud and so on. The surge eddy current is transformed from traditional pulsed current into an instant high energy current. It is beneficial for penetration and sensitivity of inspection. The sensor structure is also an important factor in magnetic method testing. A cube ferrite core was used and three copper threads were winded in three directions on same core. The surge eddy current flows into the thread one after another. In this scan model, one is the input source and others are pick-up signals, the experiments show that it is a sensitive method to inspect the crack and it could inspect the crack in 3-dimesion with tiny volume. Besides, it reduces the miss inspection in 2- dimension plane effectively.

Key words: cube sensor, surge eddy current, 3-dimension inspection, energy points, scan model