

Innovative ultrasonic testing technology guarantees higher sensitivity for production testing of railway wheels

Andreas Knam¹, Thomas Schwender²

¹Industrial Diagnostics, ROSEN Group, Germany, ²Non Destructive Testing, Fraunhofer Institute for Nondestructive Testing IZFP, Germany

Railway wheels are exposed to high dynamic stress. For this reason, they need to be subjected to non-destructive testing during the manufacturing process with the aim of detecting production related material flaws. In accordance with the current state of technology, the testing is carried out using automated inspection systems with a guaranteed sensitivity of FBH 1 mm and a dead zone of 5 mm beneath the test surface. Nowadays, testing systems increasingly require the detection of FHB 0.5 mm in the rim and an inspection time of less than 60 seconds. To detect minor defects, it is necessary to increase the test sensitivity. Established inspection systems are limited and can't fulfill the new requirements. The use of innovative inspection methods, data processing and evaluation concepts are necessary to solve this challenge. This fact increases the requirements for ultrasonic inspection. To allow optimum coverage of the prescribed inspection areas and enable flexible configuration of the inspection technology with regard to the wide range of different wheel geometries, phased array probes are used for the inspection of the wheel rim and wheel hub. In order to guarantee an inspection sensitivity of FBH 0.5 mm (for Rim Inspection) over material thicknesses of up to 150 mm, the sound field must be focusable over the entire inspection range. To solve this problem, dynamic depth focusing and dynamic apertures are used.