

Methods and solutions for front face in-service inspection of Solid Axles with portable Phased Array UT technology

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Solid axles for rails, shafts of turbines in power plants or general-purpose rotary components under high payloads and torques are subject to crack propagation due to fatigue, fretting corrosion and ballast impact, propagating from the external surface down into the axle body. To minimize the risk of critical failures an interval-based inspection plan is required. NDT surface methods (for instance MT) are commonly applied but they require wheels, brake disks, motor gears, bearings and others to be disassembled from the axles. UT method can detect surface fatigue cracks by propagating the UT signals from one accessible surface through the test object. In the case of rails the lateral surface is normally covered with thick protecting coating, resulting in not ideal surface conditions impacting the POD. In addition space constraints between components (e.g. wheels, brake disk or blades) and limited accessibility may still require a partial or even total disassembly. Applying Phased Array technologies from the front face of the test object improves flexibility and the POD while it reduces the maintenance and inspection efforts significantly. The aim of the paper is to evaluate and present methods and solutions with the help of portable UT Phased Array equipment in combination with a dedicated scanner.