



LAC Automatic Ultrasonic Inspection System for Dismounted Wheel-sets





1. General Introduction

LAC automatic ultrasonic inspection system(hereinafter referred to as LAC system) is used for dismounted wheel sets defects detecting in heavy maintenance line. It is applied for **high-speed train** wheel-sets , **rolling stock** wheel-sets and **locomotive** wheel-sets.





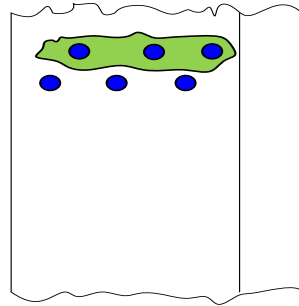
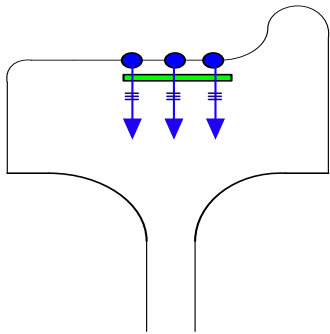
2. Features

- Wheel and axle fatigue defects detection
- Wheel and Axle composed in one unit
- Advanced ultrasonic Phased Array technology
- Automatic system controlling and alarming
- A-Scan real-time monitoring, A/B/C Scan analyzing
- Data inquiry/analysis/comparison management

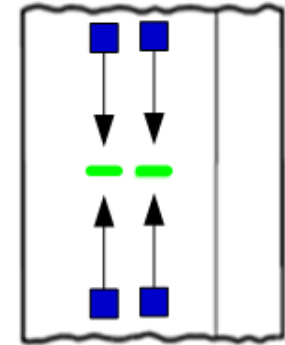
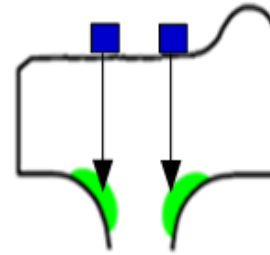


3. Wheel-set Inspection Method

3.1 Wheel Rim Inspection



Circumferential defects



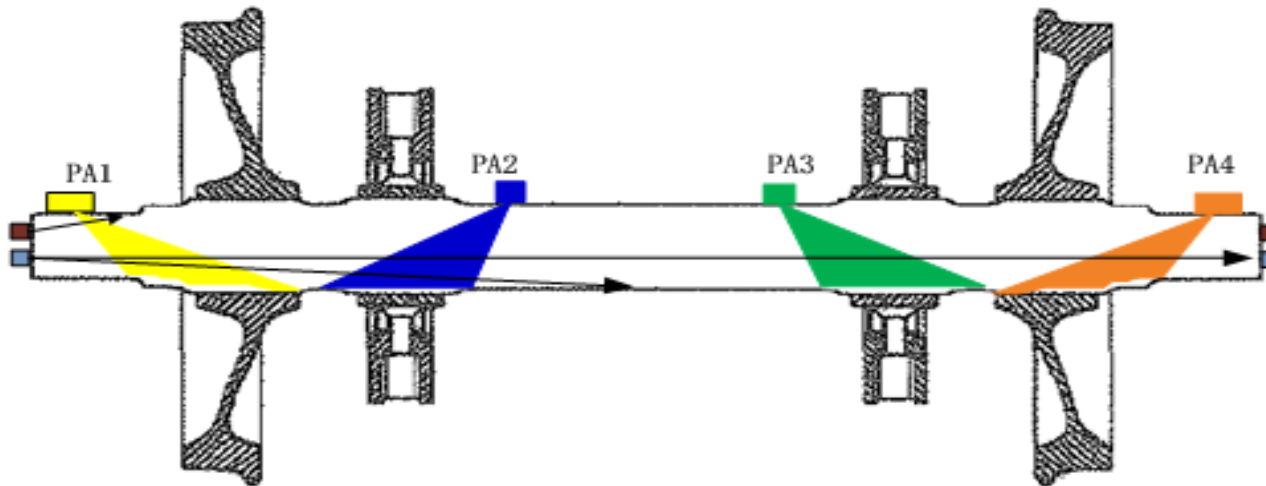
Radial defects

- ✓ Longitudinal wave probes for circumferential defects
- ✓ Transverse wave probes for radial defects



3. Wheel-set Inspection Method

3.2 Axle Inspection



Axle inspection with two brake discs

- ✓ Axle press-fit area coverage with **Phased Array** Probes
- ✓ Compatible with no brake disc and three brake discs

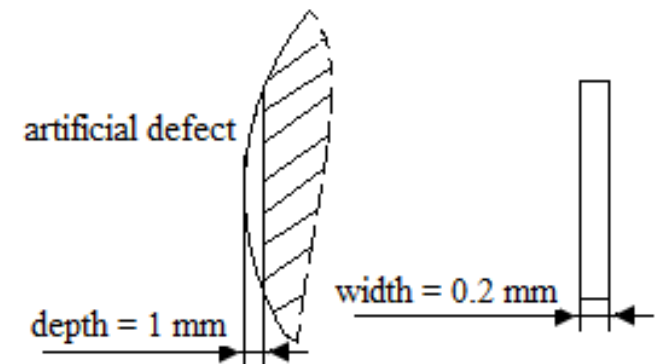


4. Detectable Defect

- Wheel rim: $\geq 2\text{mm}$ FBH (UT probe dead zone: $\leq 5\text{mm}$)
- Transverse crack at journal: 0.5mm depth
- Transverse crack at wheel seat and brake seat: 1mm depth
- Full axle penetrating detecting for material checking

Remark:

Axle artificial transverse crack is made by electric motor driven(EMD) saw cut.





5. System Composition-System Hardware

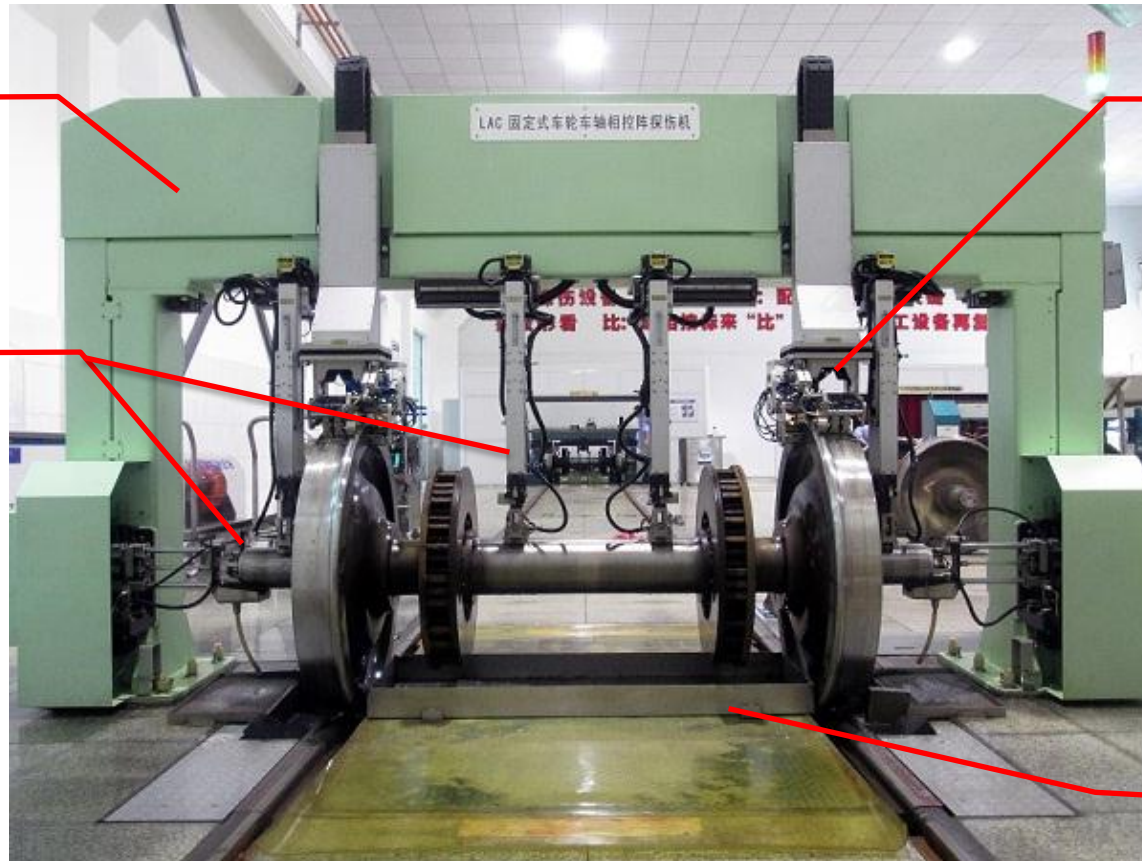
Frame

Axle inspection unit

Wheel inspection unit

Electrical control cabinet

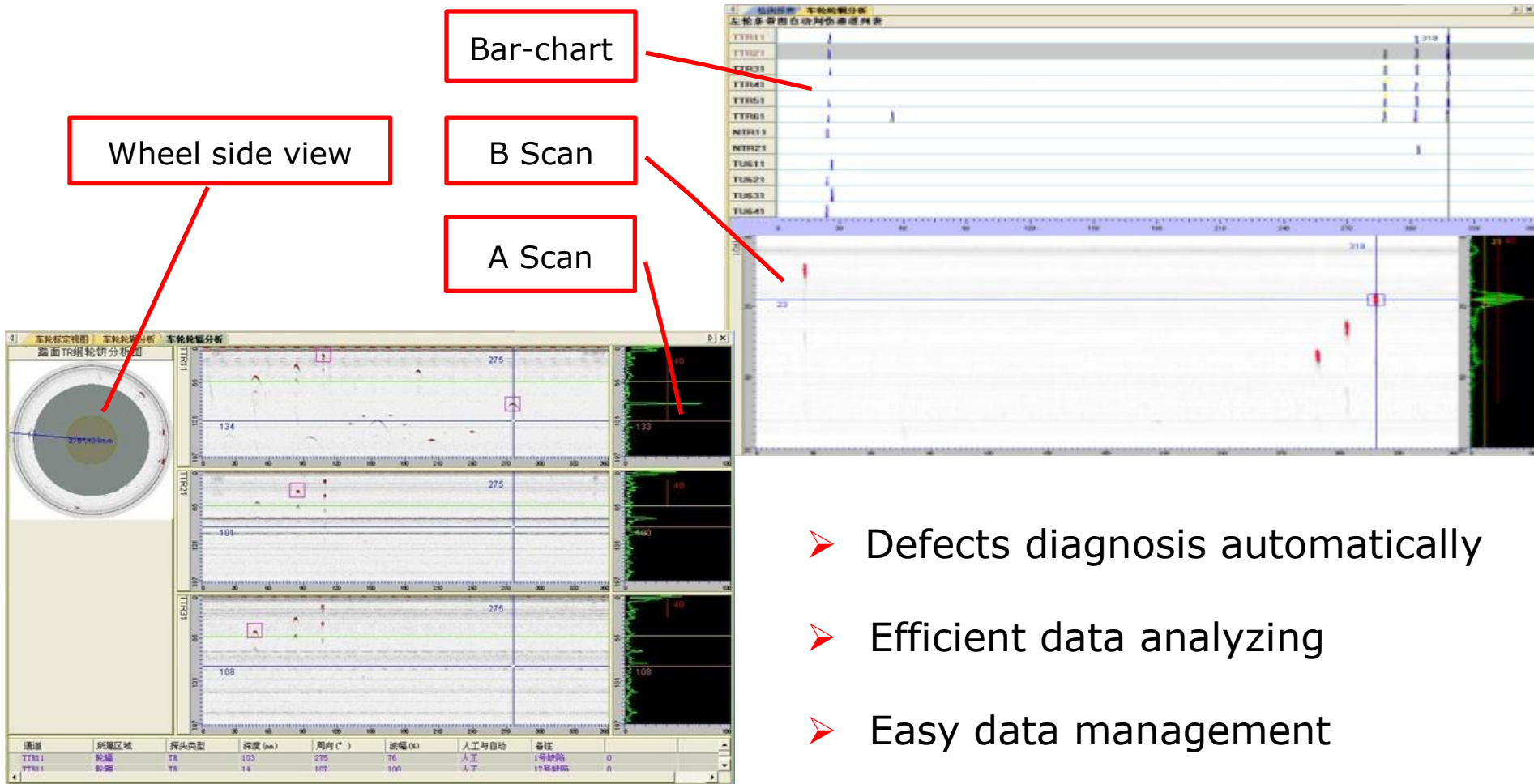
Rotating unit



LAC System for wheel and axial in one unit

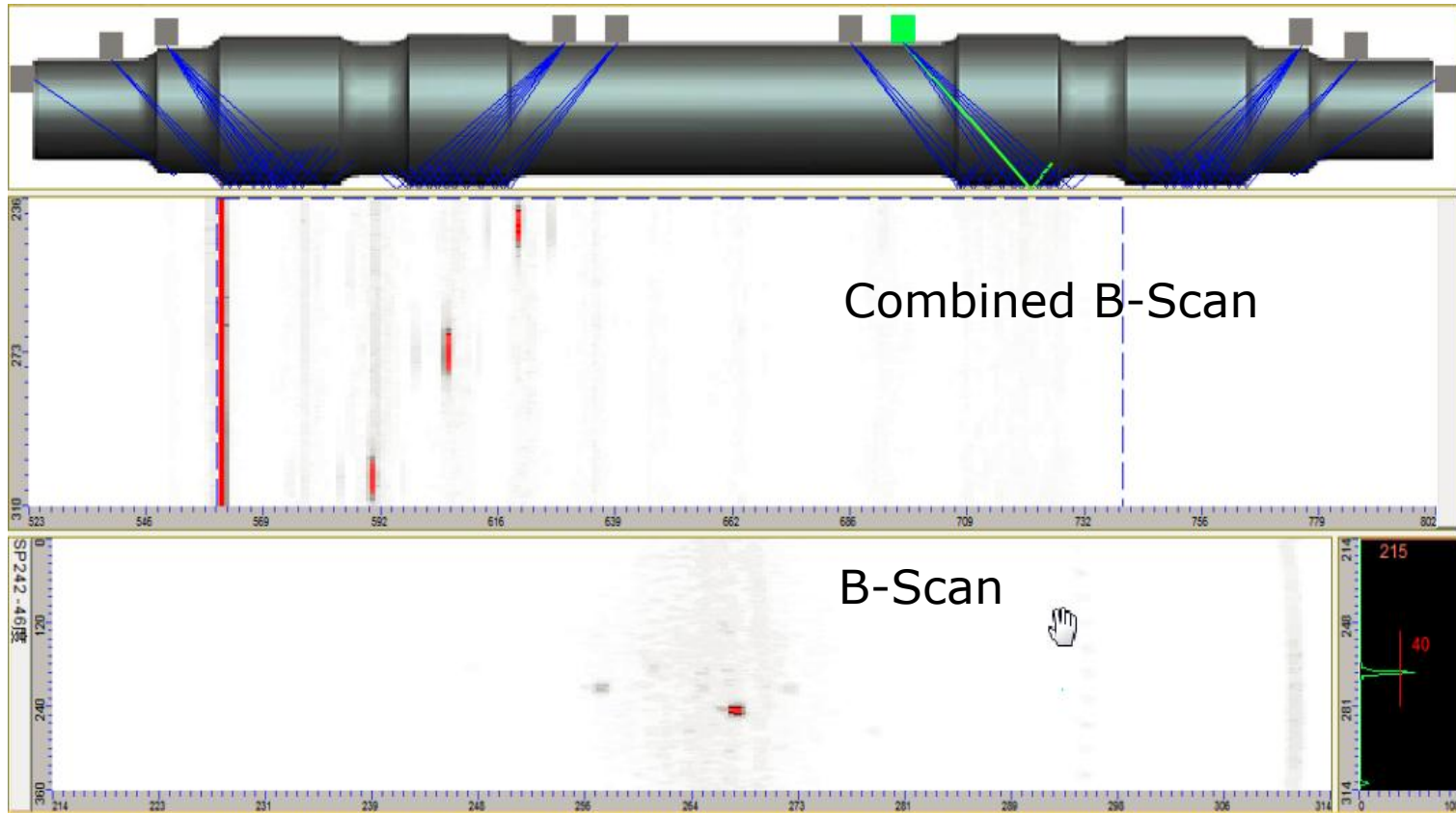


5. System Composition-System Software





5. System Composition-System Software



Axle analyzing



5. System Composition-Compatible Configuration



System for wheel inspection



System for axle inspection

✓ Compatible system for inspection on wheel or axle or both

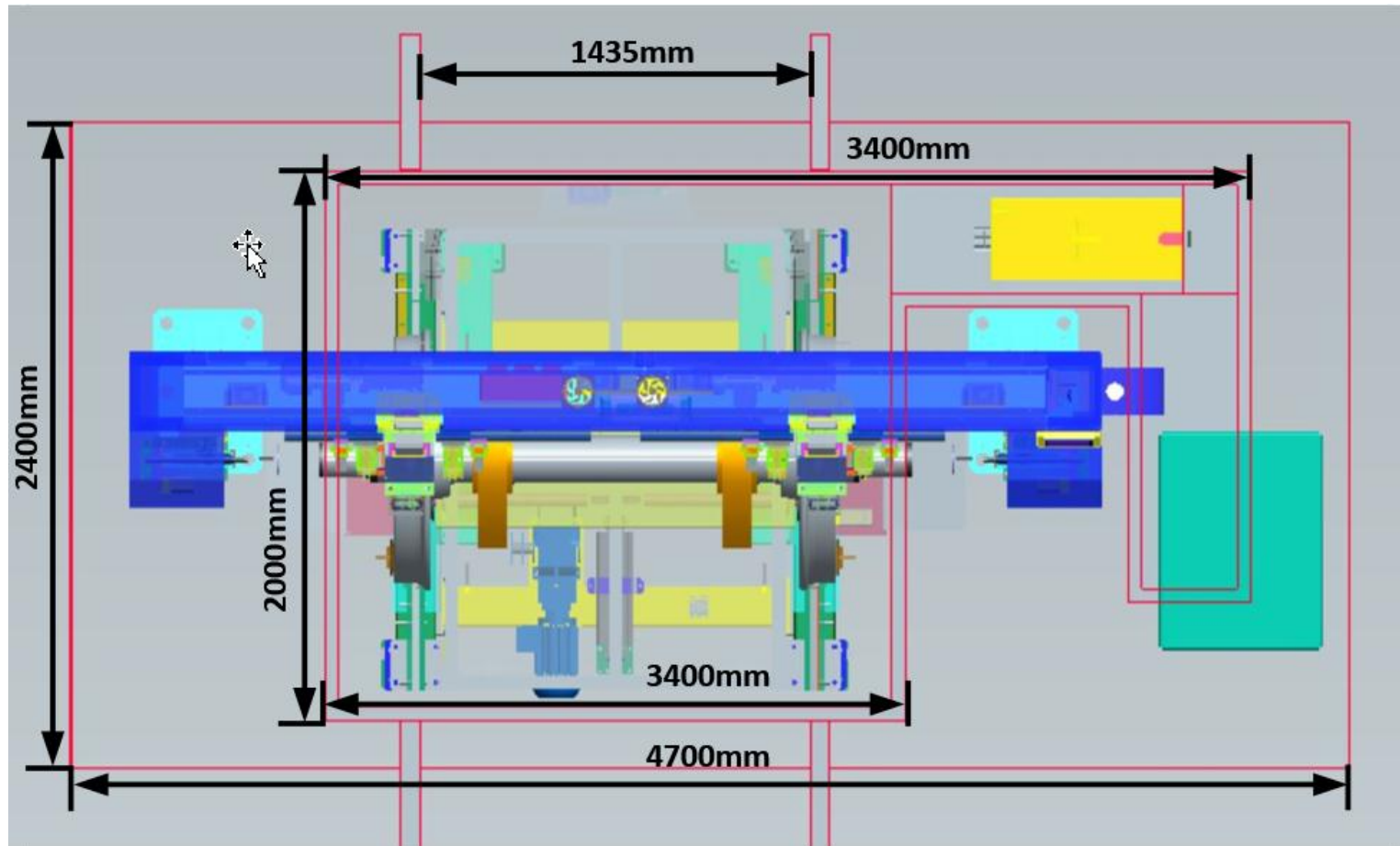


6. Technical Specification

- Inspection time: ≤ 5 minutes per wheel-set
- Equipment area: $3\text{m (rail direction)} \times 4\text{m}$
- Compressed air: 6 bar, 10L/min
- Coupling water: 2.5 bar, 5-40°C
- Ground connection: grounding resistance $\leq 4\Omega$



6. Technical Specification-System Layout





7. Application



high-speed train application



heavy-haul locomotive application

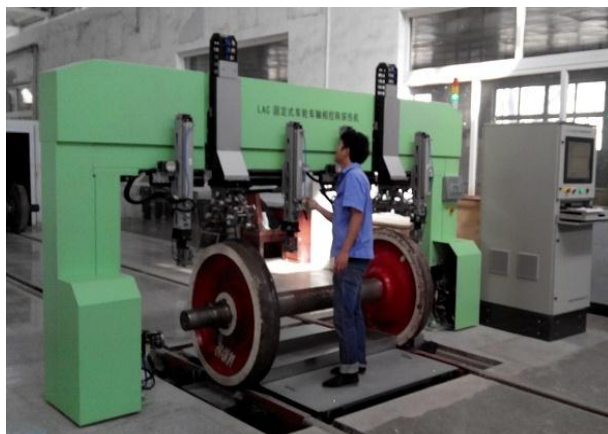
✓ More than 30 sets of applications for high-speed train, rolling stock, and locomotive depots



7. Application-Rolling Stock



Chengdu



Beijing



Harbin



Guangzhou



Hohhot



Xi'an



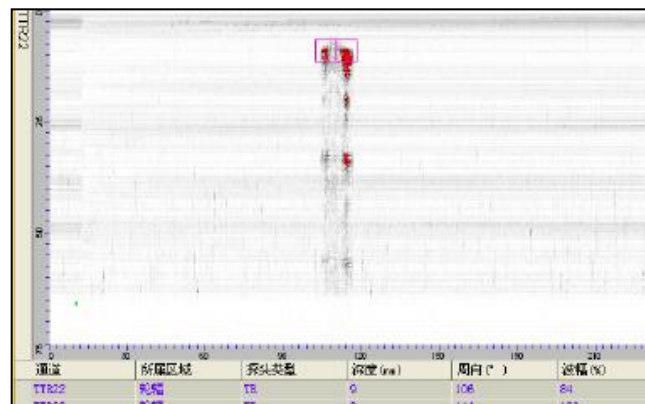
7. Application-High-speed train and locomotive



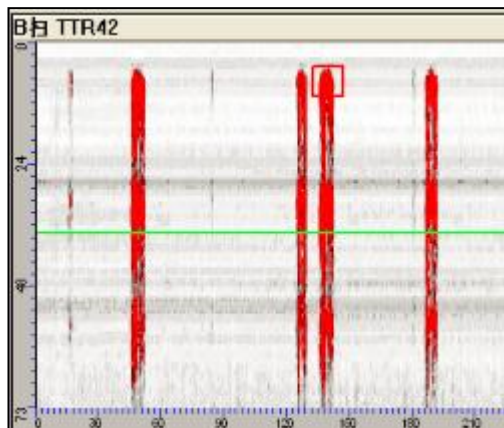
✓ Application on wheel-set of high-speed trains and locomotives from
Siemens/Bombardier/Alstom/Kawasaki/GE/TOSHIBA and so on



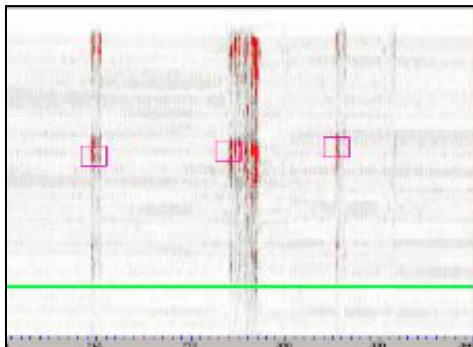
8. Typical Defect Cases



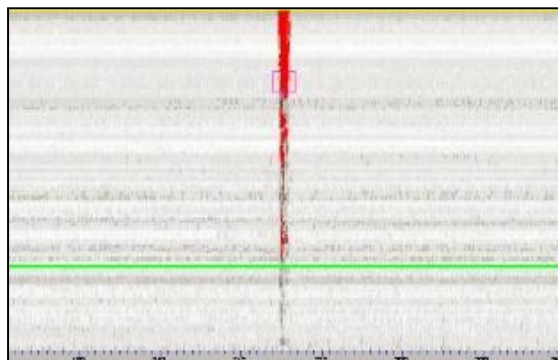
Crack with 88mm length and 25mm width, 10mm under the tread



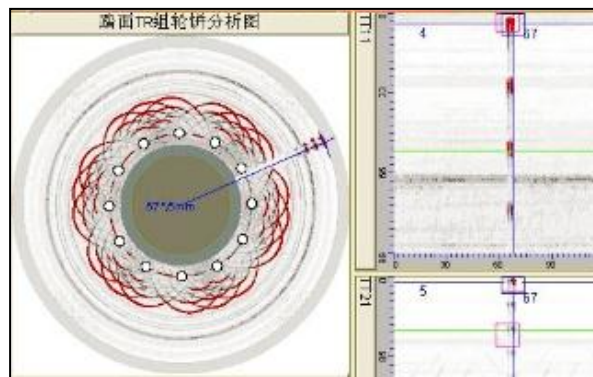
Crack with 120mm length and 28mm width, 3mm under the tread



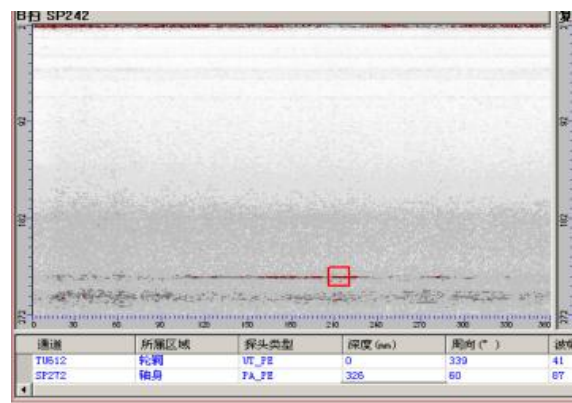
3 Cracks detected in one wheel rim



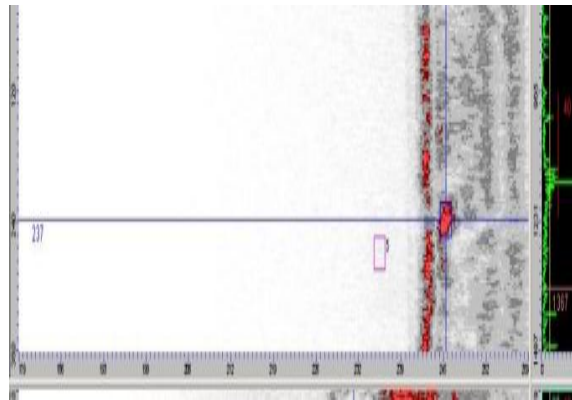
Crack detected in wheel rim



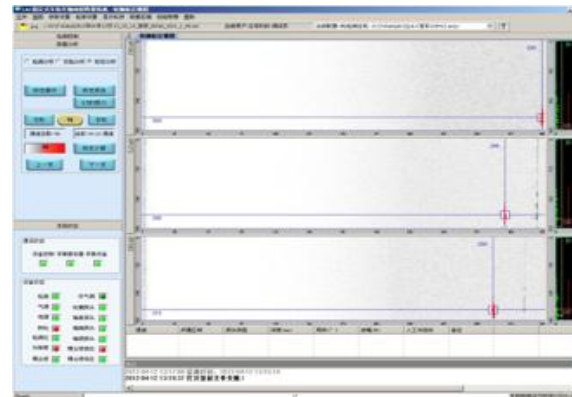
Crack detected in wheel rim of high-speed train



Crack detected under axle brake disc



Crack detected under axle wheel seat



Crack detected under axle brake disc



9.Recommendation Letters from Customers

传 真 电 报

拟稿：谢敏 审核：熊贵民 签发：杨剑群

主送：成都主导科技有限责任公司

表 扬 信

成都主导科技有限责任公司：

2012年9月29日，利用贵公司安装在我厂的LAC固定式车轮车轴超声波探伤机，现场操作人员对轴号RD3A-35634轮对进行检测时，出现缺陷报警，经确认在轮辋踏面以下10mm处存在大面积周向裂纹，圆周方向长约88mm，轴向长约25mm。最后我厂对该轮进行了镟修，证明了该当量缺陷的真实存在，及时防止了轮对安全事故的发生。

LAC探伤机落实了铁道部设备配备采用“先进、成熟、经济、适用、可靠”的原则，设备性能能满足检修工艺要求。在现场安装调试方面，贵公司制定了详细的施工组织方案，内容具体、责任到人、节点明确、措施得力，体现了贵公司先进的管理水平，为实现“以设备保工艺、以工艺保质量、以质量保安全”奠定良好的基础。LAC探伤机投用后，贵公司安排专人驻守，主动掌握设备信息，配合我方进行设备使用维护，确保设备技术状态良好，为检修生产提供设备保证。

希望贵公司总结前期好的做法，精益求精，继续为轮轴安全提供坚实的设备和保障技术支持。



Guangzhou

2015/5/14

LAC 固定式车轮车轴相控阵探伤机

用户使用报告

“LAC 固定式车轮车轴相控阵探伤机”（以下简称“LAC 探伤机”）针对铁路车辆车轮车轴超声波探伤应用开发，满足运装客货【2009】493号文、铁运【2007】98号文及《新轮规》的探伤工艺要求，是适用于客车A2~A4修程和货车段修及厂修修程的新一代基于相控阵技术车轮车轴一体化探伤机。

“LAC 探伤机”由成都主导科技、西南交大无损检测研究中心与成都铁路局联合开发，“LAC 探伤机”先进、成熟、经济、适用、可靠，采用了国内外先进的相控阵超声检测、自动控制、多种检测视图联合分析和车轮车轴一体化设计等技术，具有探伤检测区域覆盖广、缺陷检测能力强、自动化程度高、能够自动兼容各型车辆轮轴检测、操作简便等特点。

“LAC 探伤机”于2012年3月在成都车辆段现场安装并投入运用，检测流水线上所有轮对，并与既有探伤设备和人工探伤结果进行比对。设备累计检测各型实车轮对5834条，发现各级各类车轮车轴缺陷55例，均通过手工探伤复核确认，无缺陷漏报误报。其中检出缺陷入厂处理17例，未超限跟踪监控38例。“LAC 探伤机”运用至今运行稳定可靠，其检测流程顺畅，功能指标正常，满足现场实际探伤需求。

经过运用证明，该设备自动化程度高、检测能力强、系统稳定性和可靠性高，能准确检测车轮车轴缺陷，提高了轮对的检测效率，减轻了操作人员的工作强度，具有很高的经济适用价值，能有效保障车辆轮对运行安全。



Chengdu

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LAC 固定式车轮车轴相控阵探伤机

用户使用报告

“LAC 固定式车轮车轴相控阵探伤机”（以下简称“LAC 探伤机”）针对铁路车辆车轮车轴超声波探伤应用开发，满足铁总运【2013】191号文《铁路客车轮轴组装检修及管理规则》的探伤工艺要求，适用于客车A2~A4修程和货车段修及厂修，是新一代基于相控阵技术车轮车轴一体化探伤机。

“LAC 探伤机”先进、成熟、经济、适用、可靠，采用了国内外先进的相控阵超声检测、自动控制、多种检测视图联合分析和车轮车轴一体化设计等技术，具有探伤检测区域覆盖广、缺陷检测能力强、自动化程度高、能够自动兼容各型车辆轮轴检测、操作简便等特点。

2013年11月，两套“LAC 探伤机”先后在北京车辆段现场安装并投入运用，截至2014年3月，设备累计检测各型实车轮对800余条，检出2例轮辋内部缺陷及1例车轴缺陷。“LAC 探伤机”运用至今运行稳定可靠，其检测流程顺畅，功能指标正常，满足现场实际探伤需求。

通过现场运用证明，“LAC 探伤机”自动化程度高，检测能力强，系统稳定性和可靠性高，能够准确检测车轮车轴缺陷，提高了轮对的检测效率，减轻了操作人员的工作强度，具有很高的经济适用价值，能有效保障车辆轮对的运行安全。

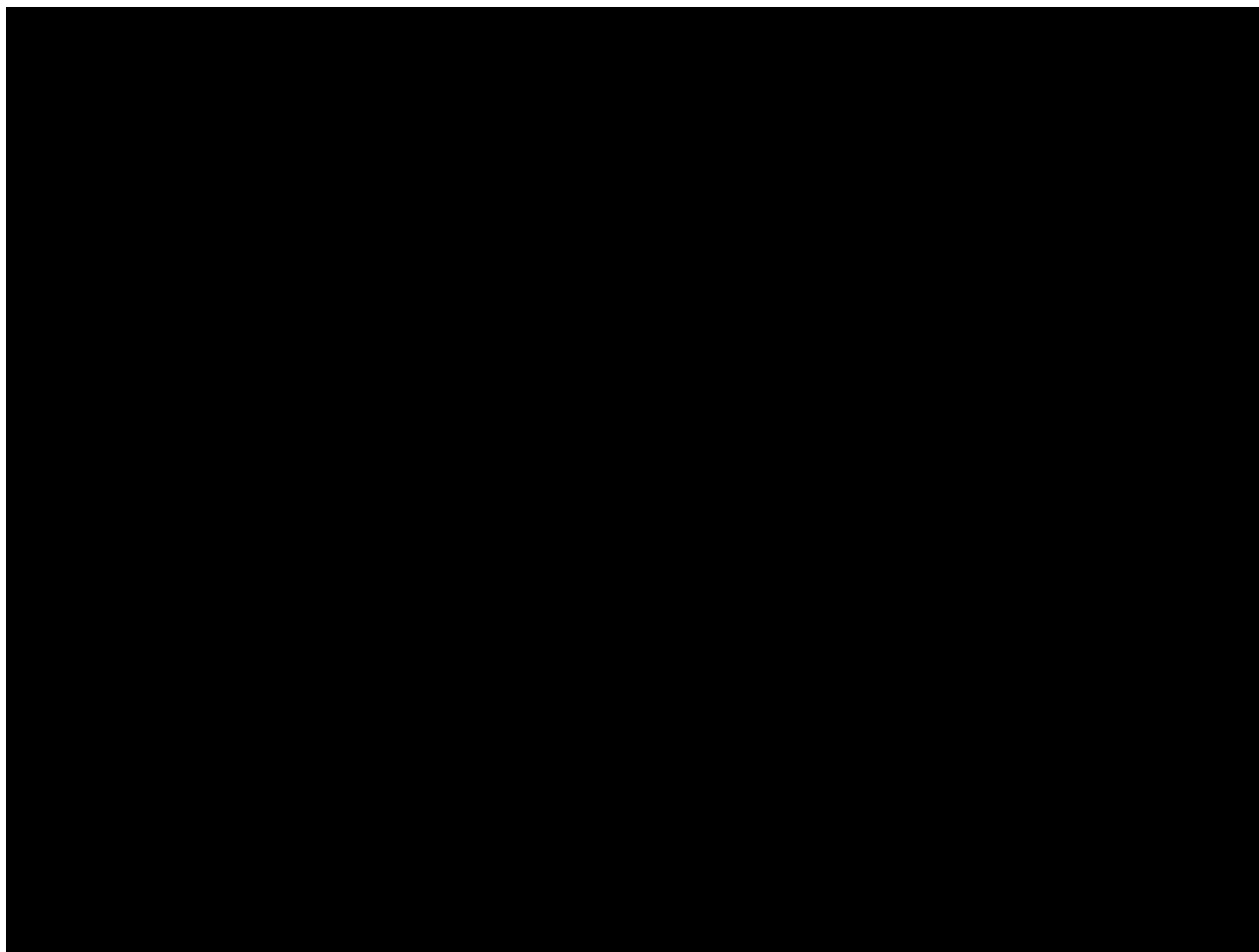


Beijing

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10.Video Introduction





Please contact us



Chengdu Lead Science & Technology Co.,Ltd.

Tel: +86 28 61315190

Fax: +86 28 87078400

E-mail: info@sclead.com

Website: <http://www.sclead.com>

**Addr: No.45 Section A Jiaolong Industry Port, Qingyang District,
Chengdu, China 610091**

