



LZM Automatic Ultrasonic Inspection System for Solid Axles on Train

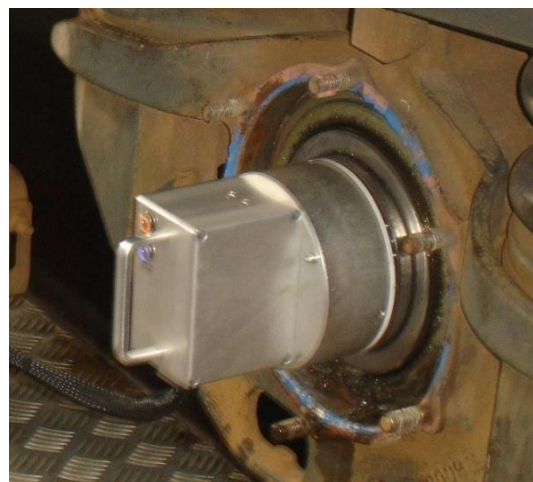




1. General Introduction

LZM Automatic Ultrasonic Inspection System for solid axles on train (herein-after referred to as LZM system) is used for defects detecting in solid axles of locomotives , rolling stocks and metros.

LZM system is widely applied in **locomotive** and **rolling stock** depots.





2. Features

- Automatic on-train axle detection
- Solid axle fatigue cracks and volume defects inspection
- Automatic scanning with **Phased Array** ultrasonic probe
- Compatible for different axle types
- A-Scan real-time monitoring, A/B/C Scan analyzing
- Data inquiry/analyzing/comparison through network



3. Wheel-set Inspection Method

Mode 1



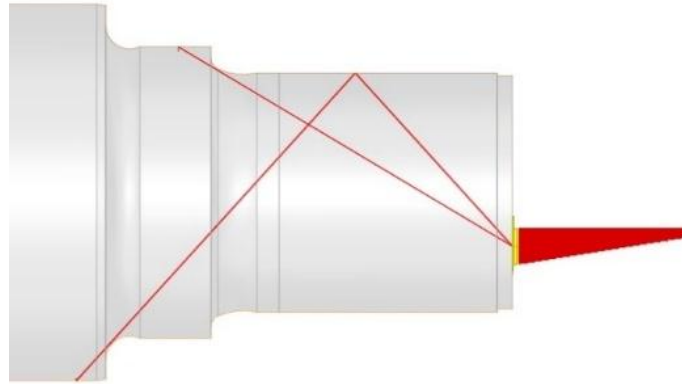
Phased-array probe L-wave scanning

- **Probe:** **phased-array**, end face of axle, both sides
- **Wave mode:** longitudinal wave, -30 degree to +30 degree scanning
- **Coverage part:** journal, press-fit parts, half axle each side
- **Multiple scan:** positive and negative angle, reduce influence of bolt hole



3. Wheel-set Inspection Method

Mode 2



- ✓ Phased array probe S-wave, multiple sound path
- ✓ Decrease blind area to 5mm in the wheel seat corner

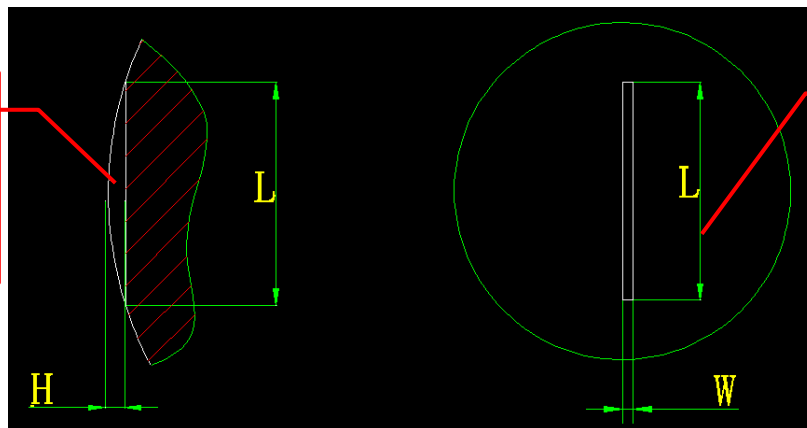
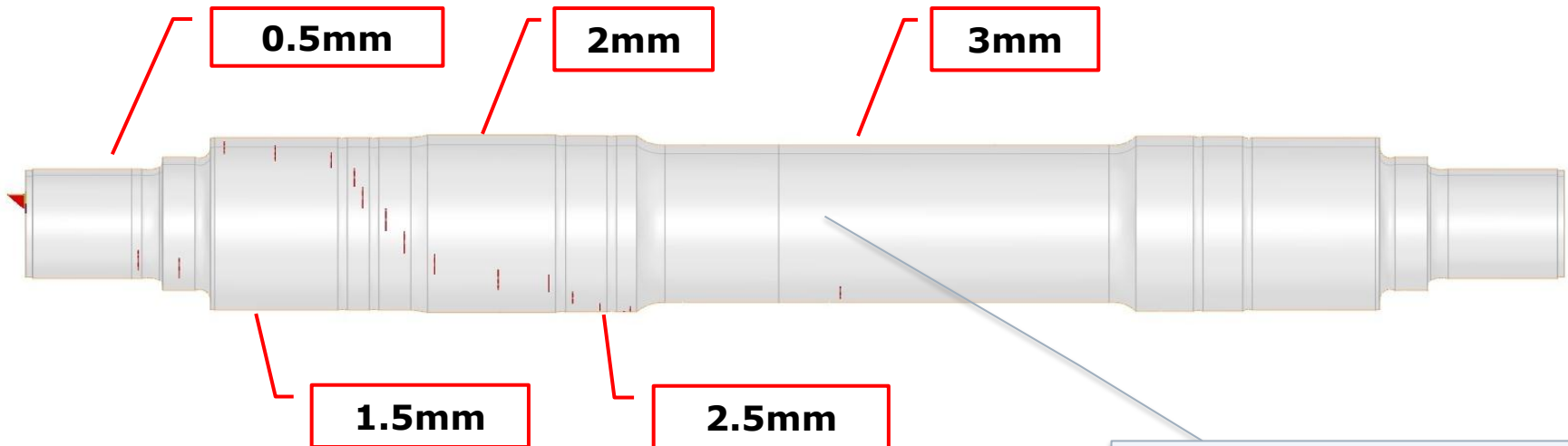
Mode 3



Material evaluation: Phased-array 0 degree L-wave sound transmission



4. Detectable Defect

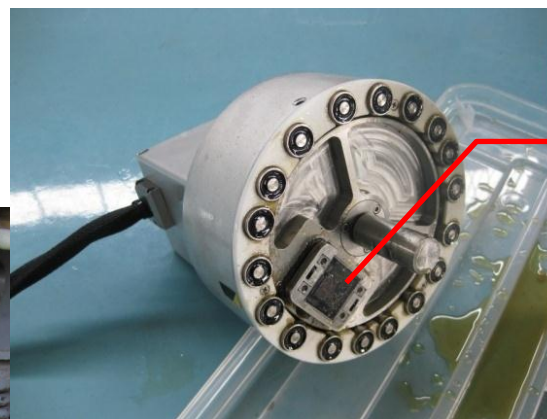


Remark:

W=1mm;
H=0.5mm, 1mm,
1.5mm, 2mm, 2.5mm,
3mm at different
location



5. System Composition-System Hardware



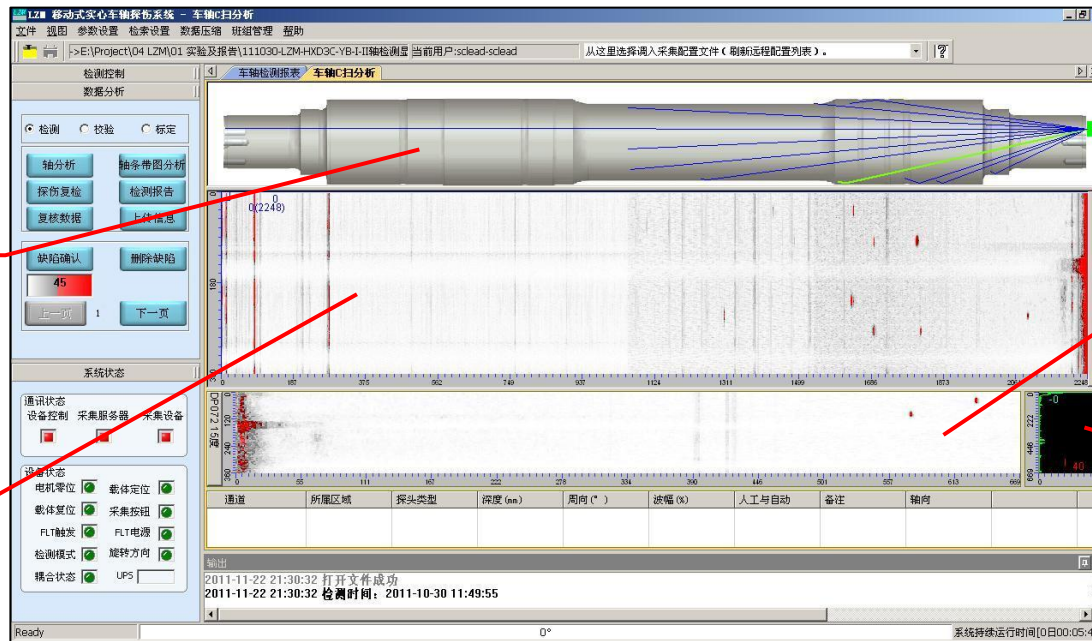
**Phased array
probe**

**Ultrasonic
scanner**

Mobile trolley



5. System Composition-System Software



Beam
indication

B-SCAN

Combined
B-SCAN

A-SCAN

- Defects diagnosis automatically
- Efficient data analyzing
- Easy data management



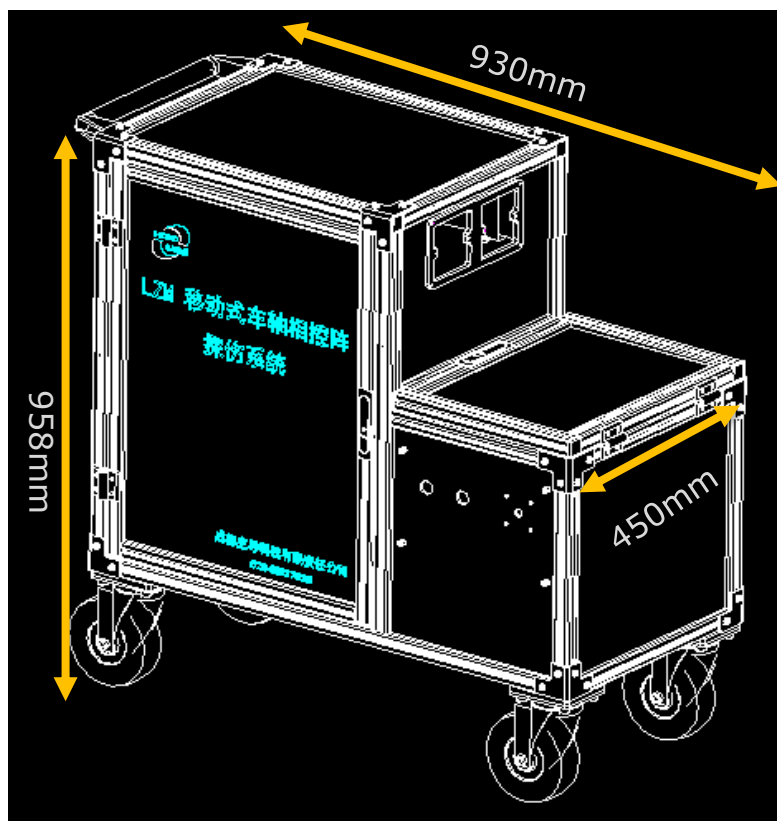
6. Technical Specification



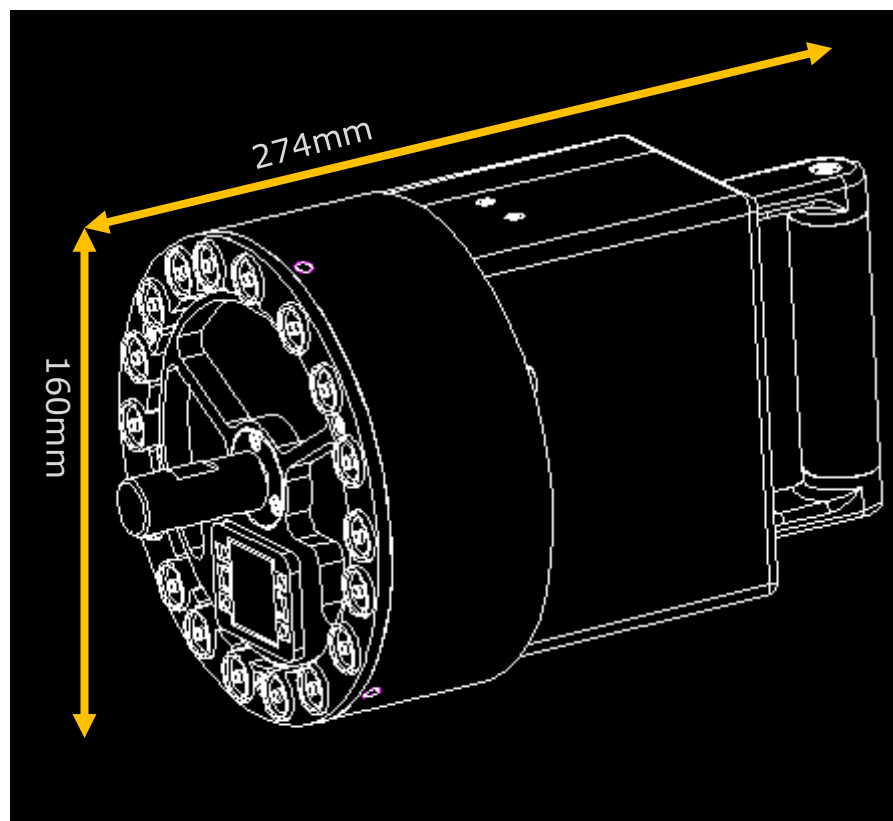
- Adapt to different diameters of solid axle journals
- Scanner weight: less than 3kg
- Inspection time: <2 minutes/side
- Equipment area: 0.93m × 0.43m
- Battery capacity: ≥2 hours



6. Technical Specification-System Layout



Mobile trolley



Scanner



7. Application

Axle-on-train Inspection



Beijing



Chongqing



Shenyang

Axle-dismounted Inspection



Beijing



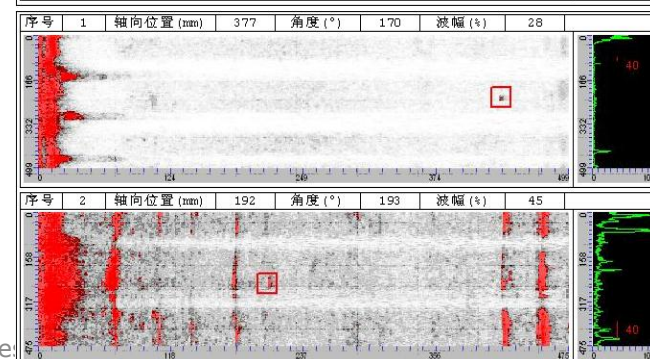
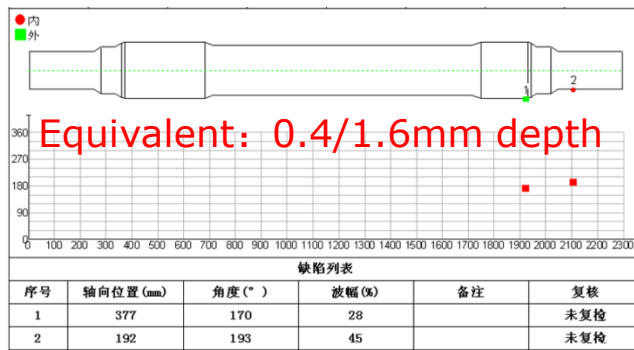
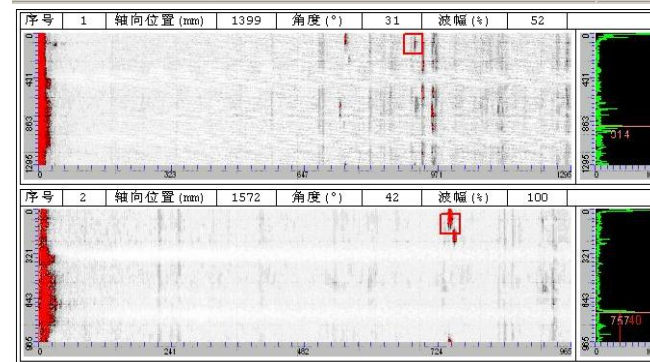
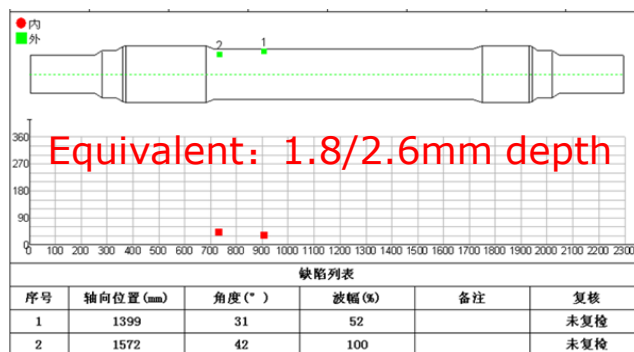
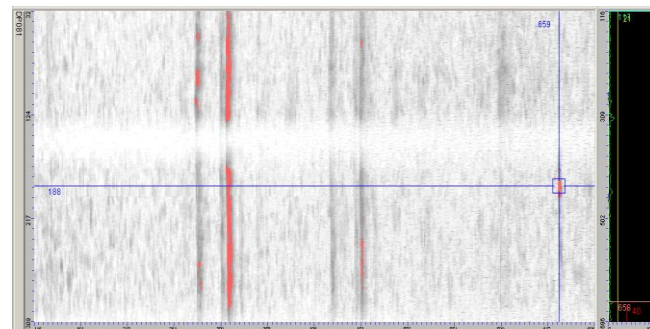
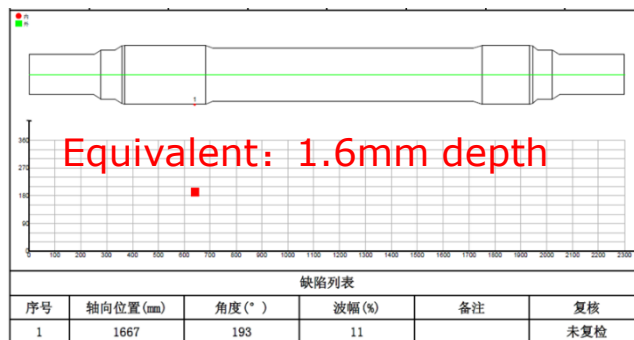
Tianjin

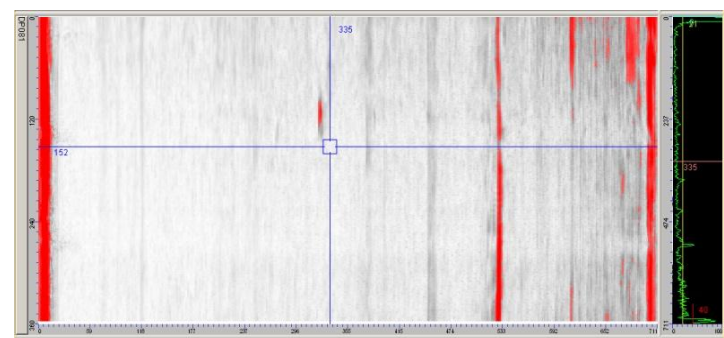
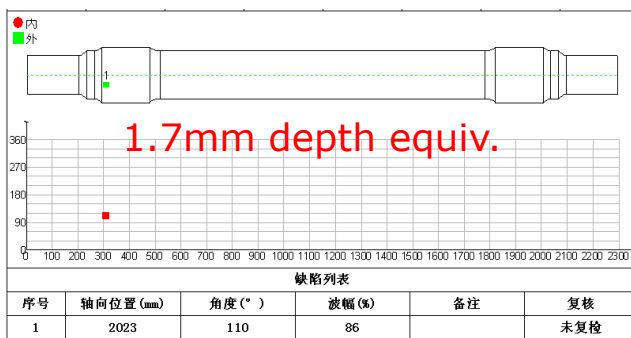
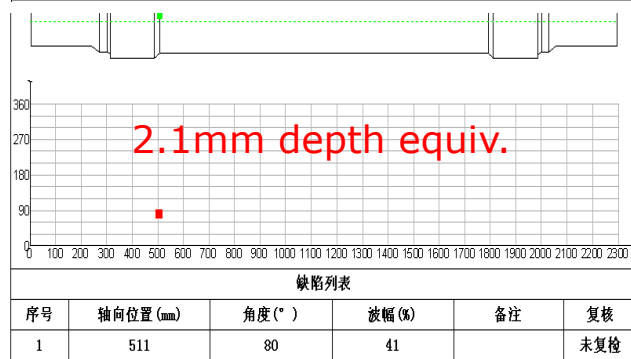
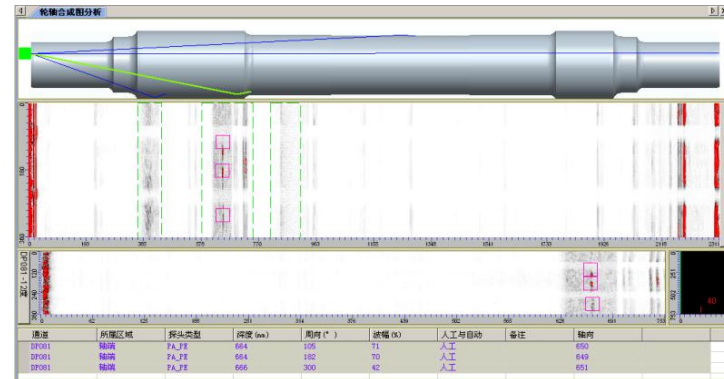
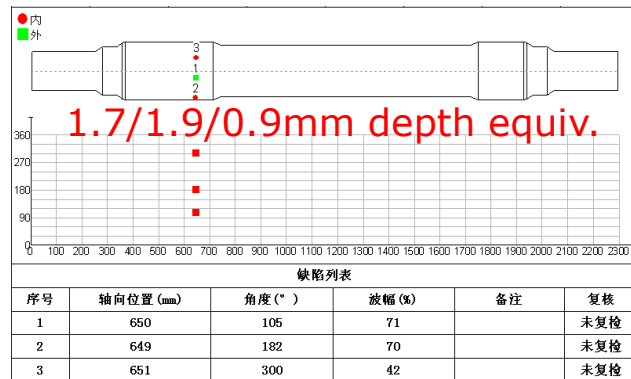


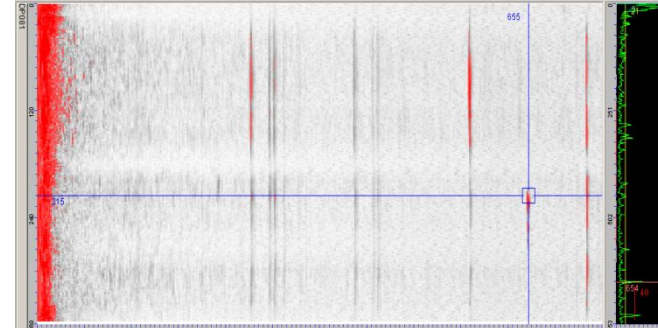
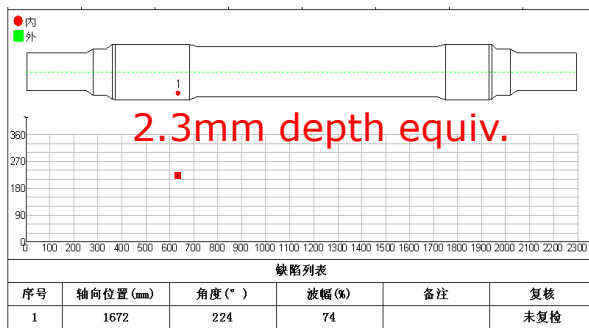
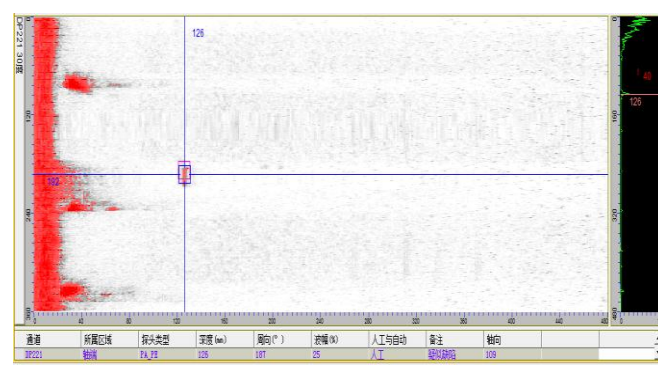
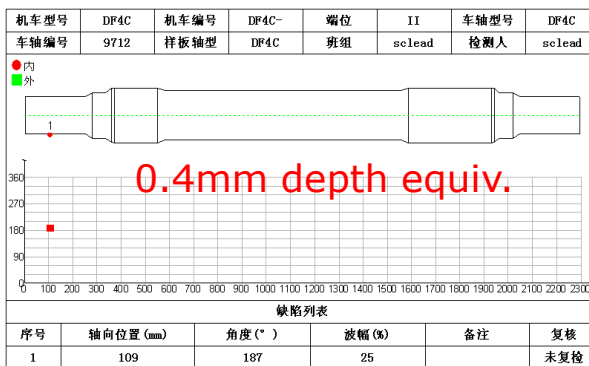
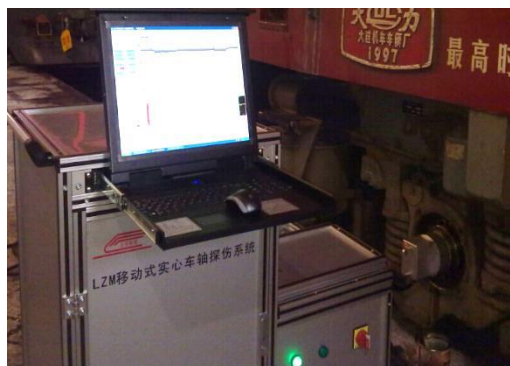
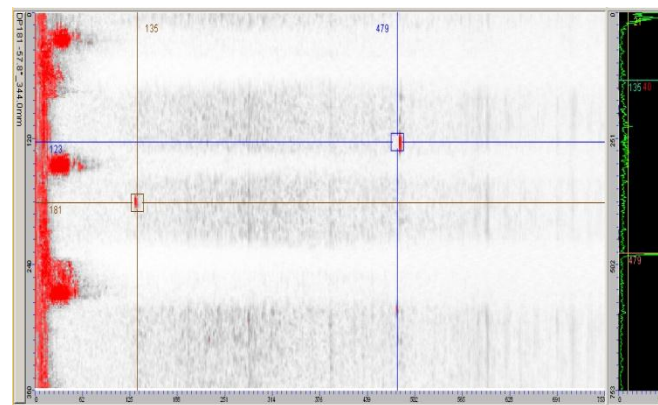
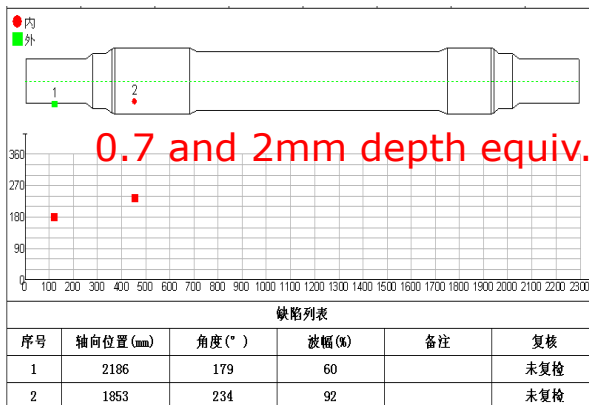
Lanzhou



8. Typical Defect Cases









9.Recommendation Letters from Customers

“LZM 移动式车轴相控阵探伤系统”

用户使用报告

“LZM 移动式车轴相控阵探伤系统”（以下简称“LZM 系统”或“LZM 设备”）是由成都主导科技有限责任公司成功引进德国技术研制的相控阵超声波探伤检测系统，该系统在我段进行了现场实车检测试用。我段先后对 HX₁C、HX₃C、SS3、SS7C 等型号实车车轴进行了检测，并对 SS1、SS3、SS3B、SS7C、HX₃C 等型号样板车轴进行了校验，通过率达到 100%。试用期间，LZM 设备未出现设备故障，检测流程运行正常，运动机构动作灵活，探头载体定位精准，探头工作平稳。

经过在我段的运用证明，该系统自动化程度高，稳定、可靠，能准确检测并定位实心车轴各部位的缺陷，防止因人为因素导致的漏检，设备人机界面显示形象直观，提高了车轴的在线检测效率，减轻了操作员劳动强度，具有较高的现场实用价值。

建议，进一步收集和研发各种缺陷特征数据，更科学、更准确地判定有关探伤缺陷门限值。

重庆机务段技术科
2012 年 1 月 4 日

Chongqing

“LZM 移动式车轴相控阵探伤系统”

用户使用报告

“LZM 移动式车轴相控阵探伤系统”（以下简称“LZM 系统”）是由成都主导科技有限责任公司成功引进德国先进技术研制的一套针对实心车轴中、小修程，即在不落轮对，只拆轴端盖的情况下，对车轴卸荷槽、轮座、齿轮座、抱轴颈、轴身处实现全覆盖超声检测及透声检测。该设备采用了国际先进的相控阵超声检测技术，具有探伤检测区域覆盖广、兼容各型实心车轴、自动化程度高、检测速度快、操作简便等特点。

2011 年 12 月至今，LZM 系统在我段进行了样板轴校验和现场实车检测，在线检测 DF11、DF10、DF4A、SS8 等型号车轴百余次，系统对现有样板轴校验通过率达到 100%。试用期间，LZM 系统检测出轴号为 4399327 2004 12 22 的 SS8 型落轮车轴齿端的轮座外侧缺陷和轴号为邯 2 93-493 的 DF4 车轴齿端轴裂缺陷。

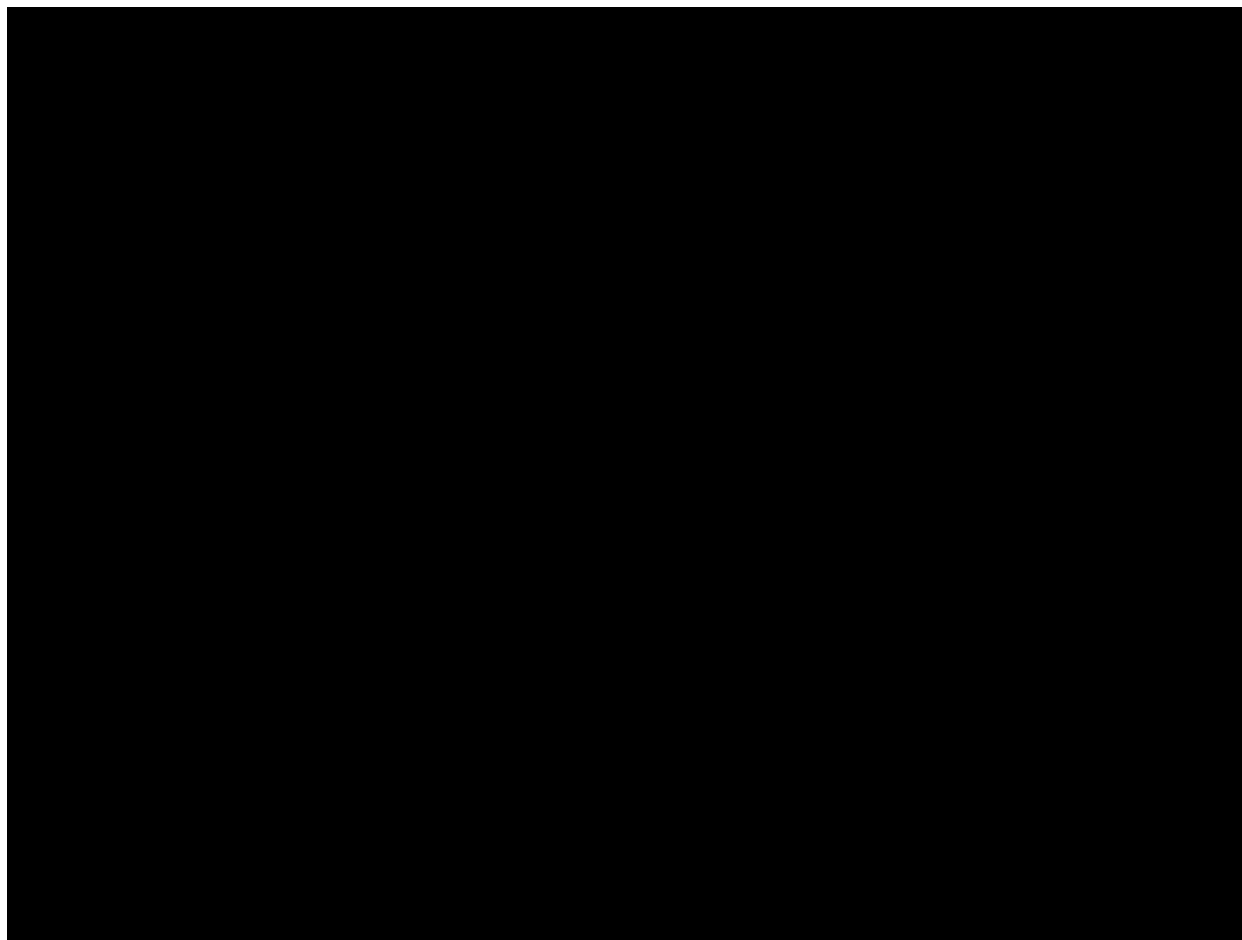
LZM 系统试运至今未出现任何设备故障，检测流程运行正常，运动机构动作灵活，经过在我段的运用证明，LZM 系统自动化程度高、稳定、可靠，不仅对样板轴缺陷检出率为 100%，而且可以有效地进行实车检测，检出缺陷有较高的信噪比，提高了车轴的在线检测效率，减轻了操作员劳动强度，具有很高的经济适用价值，能够有效地保障机车车轴的运行安全。

北京机务段技术科
2012 年 3 月 13 日
技术信息科

Beijing



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**

