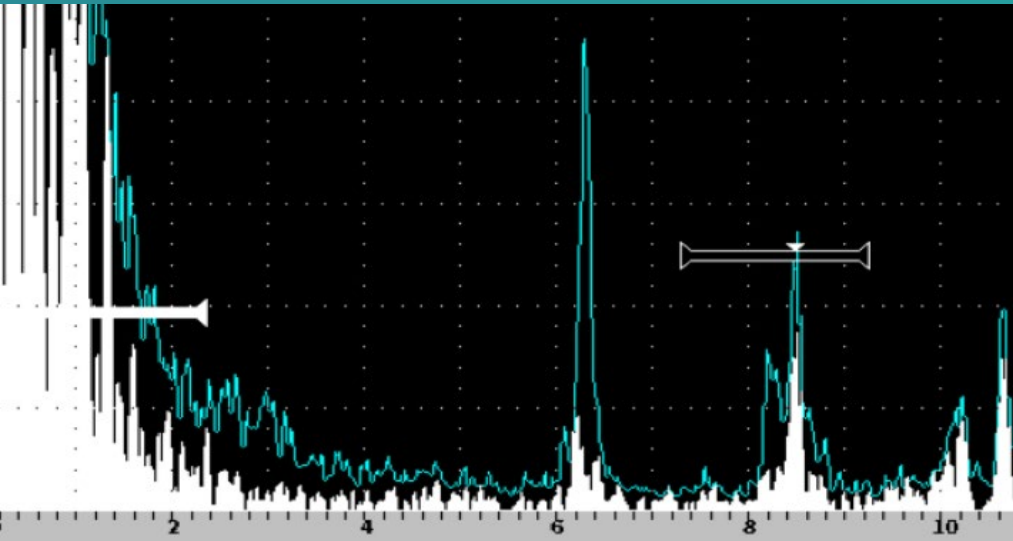


RAILWAY SLEEPER BEARER FASTENER HOUSING INSPECTION: ULTRASONIC INSPECTION OF SAFETY-CRITICAL RAILWAY ASSETS



IMPROVING SAFETY BY VERIFYING THE INTEGRITY OF SAFETY-CRITICAL RAILWAY COMPONENTS

The MTC has developed an ultrasonic inspection technique that enables the detailed inspection of rail sleeper bearer fastener housings for the first time, ensuring their structural integrity, thus, improving passenger safety and satisfying mandated regulatory requirements.



The work completed by the MTC has enabled the development of a critical inspection capability for Network Rail, which has since been adopted to ensure the continued safe operation of their network.

Dr Joshua Elliott, M&NDT Technology Manager, MTC



THE CHALLENGE

Rail fastener housings are vital within railway lines as they ensure the rail is strongly secured in place along a route. Following the Rail Accident Investigation Branch (RAIB) investigation into the Eastleigh derailment, it was found that the cause of the incident was several RT60 fastener housings which had fractured and then failed.

Prior to this investigation, no inspection techniques had been developed for these types of fasteners, and one of the key recommendations of the RAIB report was that this gap in capability was addressed by Network Rail.

A fast, inexpensive and effective in-situ inspection process for detecting internal fractures within RT60 fastener housings was therefore urgently required to both satisfy regulatory requirements and improve safety.

A COLLABORATIVE APPROACH

- ▶ The MTC developed an ultrasonic inspection capability to effectively inspect RT60 fastener housings for internal cracking, which has been validated both in the laboratory and in on-site trials on live assets.
- ▶ A custom probe holder was designed and 3D printed to enable repeatable and ergonomic access to the critical areas of the fasteners to facilitate easy in-situ inspection in challenging rail-side conditions.
- ▶ This cheap and fast inspection solution has been adopted by Network Rail and will be introduced into their routine inspection activities.

THE OUTCOME

- ▶ An ultrasonic inspection technique, utilising a custom 3D printed probe holder, was developed by the MTC and to detect fracture defects within RT60 fastener housing components.
- ▶ Inspection performance established in laboratory testing was validated via multiple on-site trials on live Network Rail assets.
- ▶ The ultrasonic inspection process is fast and does not require further specialist training for Network Rail's Non-Destructive Testing engineers.

BENEFITS TO THE CLIENT

- ▶ This inspection process allows for RT60 fastener housing components to be tested for fracture defects effectively for the first time.
- ▶ The inspection process has been adopted by Network Rail and will be rolled out within their business, allowing for the structural integrity of these components to be assessed.
- ▶ This improves rail structural integrity validation therefore improving safety, reducing the risk of future derailments and allowing Network Rail to satisfy a key RAIB regulatory recommendation.

Through a targeted selection process the MTC have helped identify an NDT solution to identify where hidden defects are present in a critical component. Their work has been instrumental in finding an effective solution quickly and efficiently.

Phil Winship, Principal Engineer, Asset Enhancements Team, Network Rail

