

In connection with Project RAAI

Whole Life Rail Axle Assessment and Improvement Using Ultrasonic Phased Array and Corrosion Inspection Systems

The project has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement No 674231.

The overall objective of the RAAI project is to develop novel NDT solutions for the corrosion assessment and crack detection as well as reliability software for high-cycle variable amplitude corrosion fatigue of rail axles. Currently, the most sensitive non-destructive testing methods for inspection of rail axles are surface inspection methods designed for crack detection (such as MPI, eddy current and ACFM) and these do not typically attempt to measure corrosion. Besides current trend is that axles are withdrawn from service long before their design lives because of suspected corrosion developed on the axle surface. The decision to withdraw from service is taken without the full knowledge of the way in which the failure will result from corrosion, as this requires a crack to initiate and the mechanism for this is unknown.

RAAI aims to develop two novel methods:

1. corrosion assessment
2. phased array ultrasonic.

The first method assesses the effect of corrosion on high-cycle fatigued component such as the axle and evaluates its remnant life thereby improving the sentencing of corroded axles. The second method is specifically for hollow axles of high speed trains and aims to improve the speed of the inspection (by 75%) and improve crack detection reliability (almost 100% with a crack of 2-3 mm depth) without dismantling the wheelset and with minimum time of inspection.

www.raai-project.eu

Registration

by **15 September 2017** via www.dgzfp.de/seminar/esistc24

Fee

Registration Fee 120.00 €

including all workshop activities, workshop material, coffee breaks and lunch. The workshop dinner on 25 Sept. 2017 is not included in the registration fee.

Cancellation

by 31 August 2017: 50 % of participation fee
from 1 September, 2017: no refund possible

Payment

The payment of the participation fee is requested only in EUR and has to be done after receipt of invoice. All payments have to be done before the beginning of the workshop (receipt at DGZfP). Later payments have to be done onsite at the registration desk (cash or by credit card).

Workshop Venue

DGZfP Ausbildung und Training GmbH
Training centre Wittenberge
Schillerplatz 3 | 19322 Wittenberge | Germany

Organisation

German Society for Non-Destructive Testing (DGZfP)
Max-Planck-Str. 6 | 12489 Berlin | Germany
Phone: +49 30 67807-121/123 | Fax: +49 30 67807-129
E-mail: tagungen@dgzfp.de

Meetings

27 September 2017: EU Project RAAI Meeting

Tours

25 September 2017: Tour through DB workshop facilities
26 September 2017: Tour through DGZfP training centre

Hotel Reservation

We have special conditions in some hotels near the venue. Please find a list of hotels on the workshop website www.dgzfp.de/seminar/esistc24.

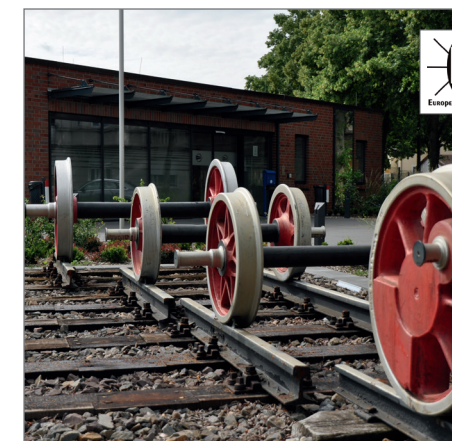


in connection with
the EU Project RAAI



**INVITATION
PROGRAMME**

**ESIS TC24 WORKSHOP:
Integrity of Railway Structures**



25 – 26 September 2017
Wittenberge, Germany

We cordially invite you to attend the ESIS TC24 Workshop 2017. The workshop will provide an opportunity for the wheelset community and interested colleagues to meet up again and to discuss results from the European funded project RAAI as well as other ongoing activities in the field of non-destructive wheelset inspection.

The aim of this workshop is to acquire a deeper understanding of factors influencing the non-destructive wheelset inspection and the reliability of the inspection as well as their interplay in practice.

Furthermore this workshop is an opportunity for us to have an open dialogue between scientists, developers and users in order to advance the field as a whole.

Here is a list of topics that will be discussed during this workshop:

- Advanced methods for wheelset inspections
- Reliability of wheelset inspections
- Corrosion fatigue life estimation
- Image processing
- Evaluation of inspections using POD methods
- Mechanised and automated testing systems
- Live demonstration of demonstrators developed in RAAI project

Join us on a tour through the DB workshop facilities Wittenberge and a tour through DGZfP training centre Wittenberge.

Please find additional information on our websites

<http://www.dgzfp.de/seminar/esisc24> and
<http://esisc24.mecc.polimi.it>.

Looking forward to seeing you in Wittenberge.



Dipl.-Ing. Thomas Heckel
Federal Institute for
Materials Research and
Testing (BAM)



Dr.-Ing. Matthias Purschke
German Society for
Non-Destructive Testing

Session 1

Chair: S. Beretta, Politecnico di Milano, Italy

- 1 How reliable are the results of my NDT process?**
10:00 **A scientific answer to a practical everyday question**
D. Kanzler¹
¹ Applied Validation of NDT, Berlin, Germany
- 2 Evaluation of the Ultrasonic Inspection of Hollow Axles by the POD Method**
10:30 **Axles by the POD Method**
A. Zoëga¹, J.H. Kurz¹
¹ DB Systemtechnik, Brandenburg-Kirchmöser, Germany
- 3 Inspection Interval Software for Railway Axles**
11:00 **U. Völz¹, H. Beier²**
¹ arXes-tolina, Dresden, Germany; ² arXes-tolina, Berlin, Germany
- 4 Risks and Benefits of the Inspection of Hollow Railway Axles**
11:30 **M. Bertovic¹**
¹ BAM, Berlin, Germany
- 12:00 Lunch

Session 2

Chair: T. Heckel, BAM, Berlin, Germany

- 5 Cold rolling as a prevention of corrosion-fatigue damage propagation**
13:00 **S. Beretta¹, S. Cantini², S. Cervello², D. Regazzi²**
¹ Politecnico di Milano, Italy; ² Lucchini RS, Lovere, Italy
- 6 Data Collection for Corrosion Fatigue Life Estimation**
13:30 **J. Rudlin¹, R. Archer², S. Beretta³, J. Syeda¹, D. Panggabean¹**
¹ TWI, Cambridge, UK; ² Applied Inspection, Glasgow, UK; ³ Politecnico di Milano, Italy
- 7 Image Processing and Deep Learning Possibilities for Detection of Small Cracks within Corrosion**
14:00 **J. Syeda¹, J. Rudlin¹**
¹ TWI, Cambridge, UK
- 8 POD trials to produce Reliability Data for Inspection of Hollow Axles**
14:30 **U. Völz¹, M. Carboni²**
¹ arXes-tolina, Dresden, Germany; ² Politecnico di Milano, Italy
- 15:00 Break
- 15:30 **Visit to DB workshop facilities**
- 18:30 Workshop Dinner at Restaurant „Alte Ölmühle“ (at your own expense)

Session 3

Chair: J. Rudlin, TWI, Cambridge, UK

- 9 Increasing the Sensitivity of Ultrasonic Phased Array Wheelset Axle Inspection by Using Signal Processing**
09:00 **T. Heckel¹, R. Boehm¹, T. Beggerow², W. Spruch²**
¹ BAM, Berlin, Germany; ² Büro für Technische Diagnostik, Brandenburg, Germany
- 10 Online-Monitoring of Hollow Axles using Ultrasound**
09:30 **J. Prager¹**
¹ BAM, Berlin, Germany
- 11 Automated Testing Systems for Ultrasonic Testing of Railway Axles by ARXES-TOLINA**
10:00 **U. Völz¹, H. Beier²**
¹ arXes-tolina, Dresden, Germany; ² arXes-tolina, Berlin, Germany
- 10:30 Break

Session 4

Chair: U. Völz, arXes-tolina, Dresden, Germany

- 12 Cone type Phased Array Design for High Speed Hollow Axle Inspection**
11:00 **T. Heckel¹, R. Boehm¹**
¹ BAM, Berlin, Germany
- 13 Axle inspection and reclamation by polishing out light corrosion (particularly in respect of highly stressed wheelseat transitional radii), conducted whilst the wheelsets are fitted to the vehicle**
11:30 **R. Archer¹**
¹ Applied Inspection, Glasgow, UK
- 14 Use of MAPOD to produce Inspection Reliability Data for Inspection of Hollow Axles**
12:00 **D. Panggabean¹, U. Völz², C. Schneider¹**
¹ TWI, Cambridge, UK; ² arXes-tolina, Dresden, Germany
- 12:30 Lunch
- afterwards: • RAAI workshop
• Tour through DGZfP training centre