Presentation of potential topic Master thesis

22.11.2023

TIME

TECHNOLOGIE-INSTITUT FÜR
METALL & ENGINEERING GMBH

Company information

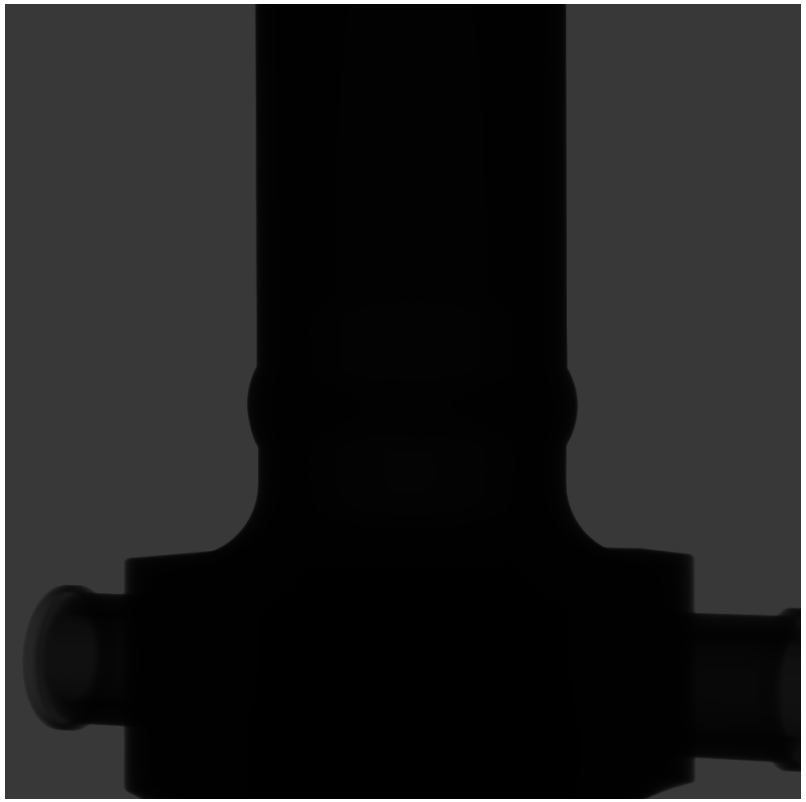
- Company: Tube-Tec Rohrverformungstechnik GmbH
  - Produces pipes for the aviation industry and others
  - Approx. 160 employees
  - Based in Nistertal (approx. 30min drive from TIME)

Initial situation

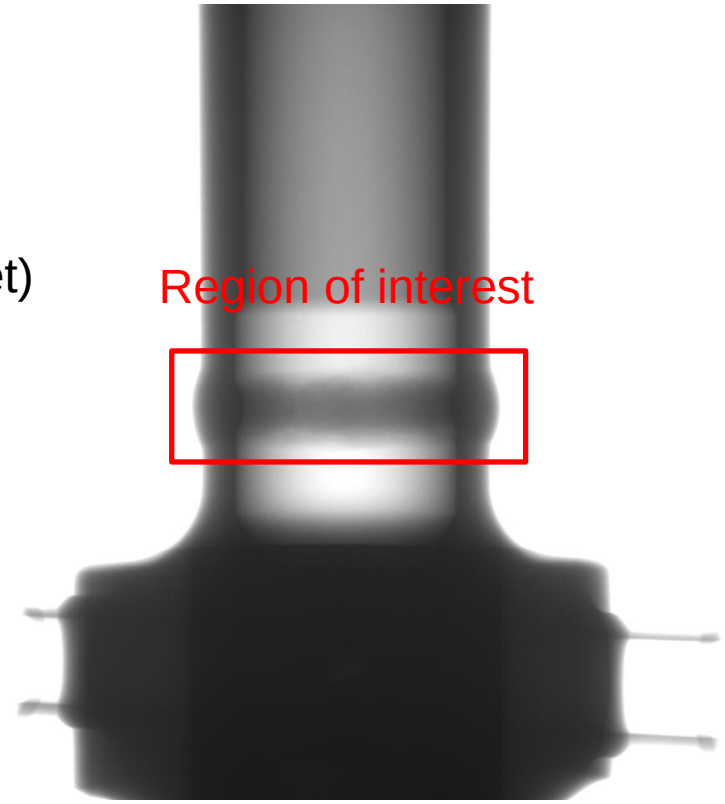
- Pipe system with 14 welds
- 100% inspection by X-ray
  - X-ray system from GE in the company
- X-rays are taken after every weld. The next weld is only carried out after the test has been passed.
- X-ray images are currently produced and analyzed manually

Initial situation

- X-ray images are exported as a tif file

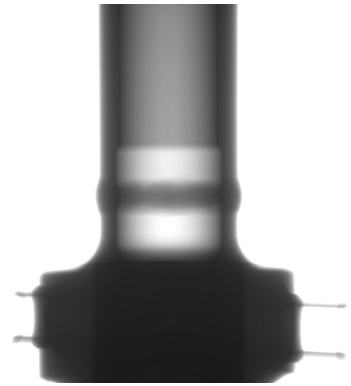


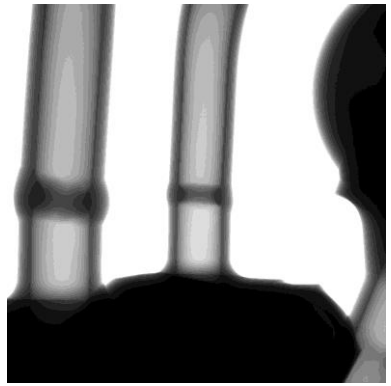
Application of a filter integrated
in the GE software (company secret)

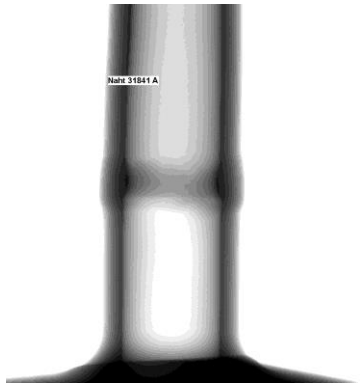


Initial situation

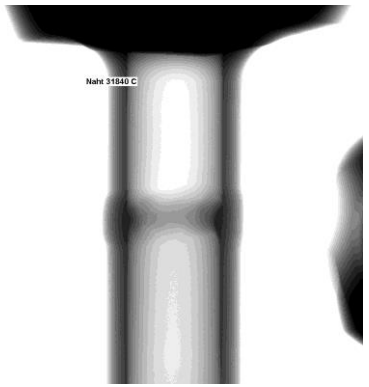
- Overview of the different weld seam positions on the pipe

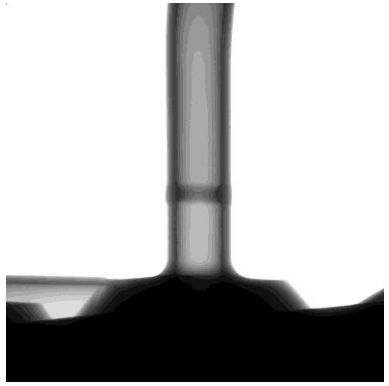








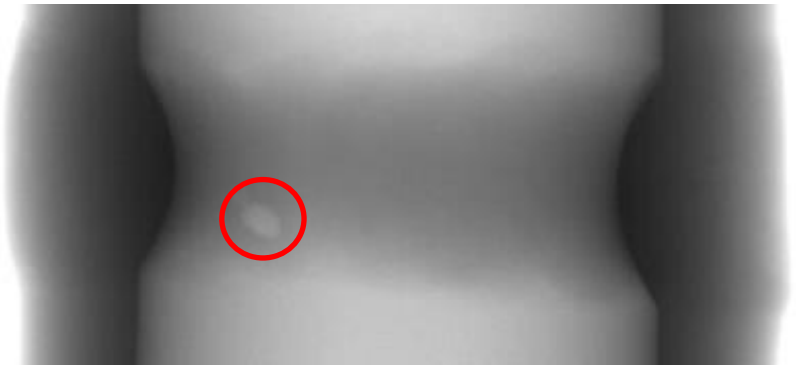





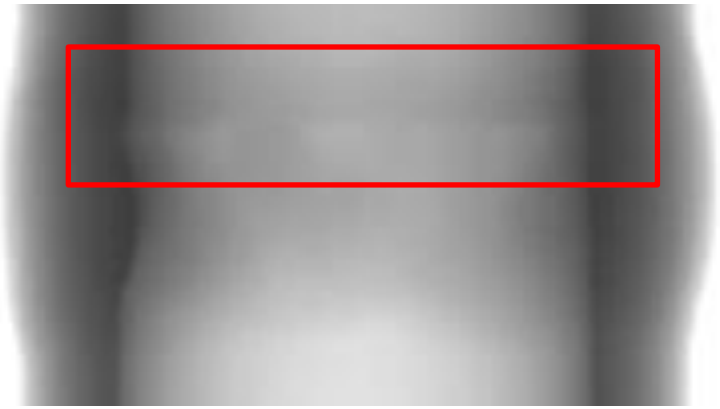
Initial situation – possible errors

Binding error (defect number 401)

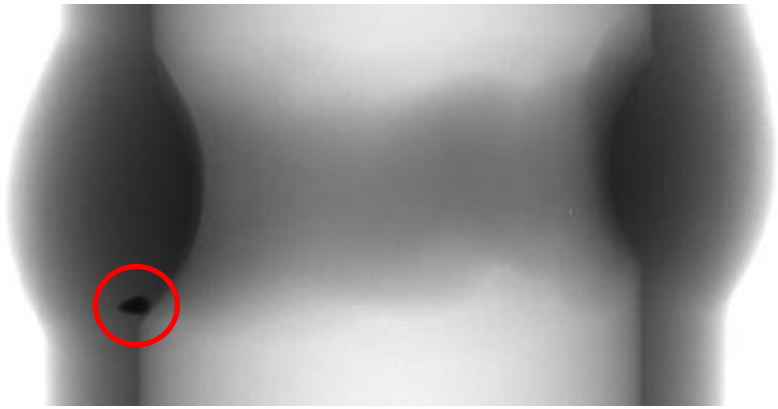
Pore (defect number 2011)



Insufficient welding (defect number 402)



Tungsten inclusion (defect number 3041)



Main tasks of the Master's thesis

- Examine and apply different filters to the tif files
- Setting up a data pipeline to provide the images for processing in an AI
- Research, implementation and analysis of different AI algorithms for the detection of the four error types.
- Selection of the best algorithm(s) and complete implementation
- Written elaboration and presentation of the results as well as documentation of the created code

The entire work is to be implemented using the Python programming language and the Pytorch AI framework as well as other freely available libraries.

Next steps

- Would you like to work on the topic?
- Clarification of what is needed for/from the university by you
- Getting to know you and TubeTec
- Selection of a start date