

Metallographic investigation and failure analysis

NORNER is an independent innovation and technology centre with high expertise in microscopy techniques, metallographic failure analysis and investigations

Industrial Impact

Our industry as well as society is dependant on high reliability and durability of metal components and constructions. This involves a wide range of requirements to be fulfilled.

Unfortunately, these components do break or fail from time to time. Component failures in the industry and society can represent huge costs in repair, replacement, down time and involvement of personnel.

Norner has the competence, equipment and resources required to investigate product and material failures, document the reasons for it and provide conclusive reports with suggested solutions.

Our specialised microscopy lab support a wide range of industries ranging from polymer industries, process plants, offshore to solar industry and appraisers.

Norner Services

Material failure analysis

In order to provide appropriate conclusions from our analysis we have a dedicated team with long experience in the field of microscopy techniques and failure analysis.

Correct investigation techniques and careful sample preparation is important in order to explain why components fail.

Product documentation

We carry out investigations to document the quality of products. This might be as a follow up from a failure analyses made earlier, or directly with new products or customers who need verification of their products.

Quality improvement Product improvement Seminars and training

Norner Confidence

We strive to achieve a close cooperation with our customers in order to facilitate a good flow of information. Any information regarding the product, its production and use is vital for the investigations and conclusions we provide. In this way we have a high focus on meeting our customer needs.

Our material failure expert team deliver conclusive reports where the documentation through high quality pictures have priority combined with other analytical information.

Norner's three business areas reflect our value chain approach:

Scientific Laboratories Applied Research Plastic Solutions

Norner is approved according to ISO 9001:2008.



Our Insight

Failure categories

We can analyse and identify different failure modes in metallic materials like:

- Carburization / decarburization
- Stress relaxation cracking
- Stress corrosion cracking
- Fatigue
- Corrosion fatigue
- Overload
- Hydrogen embrittlement
- Sigma phase embrittlement
- Creep damage
- Dealloying
- Liquid metal embrittlement

Laboratory regulations

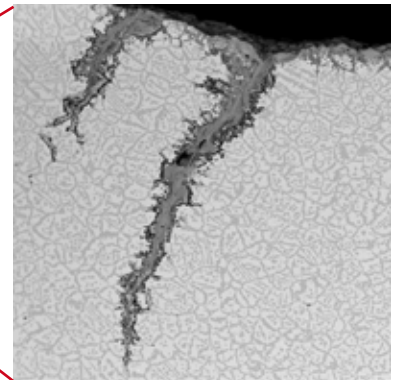
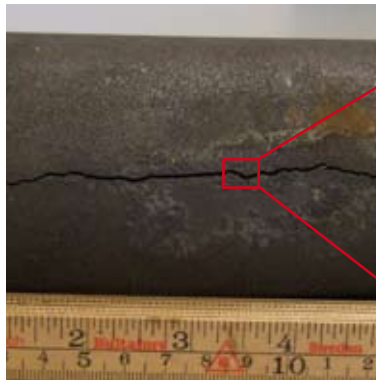
Norner operates more than 300 approved test methods in line with international standards and is ISO9001 certified.

Way of working

- Gather necessary information
- Receive relevant samples
- Start the task on macro level
- Investigate further at micro or nano level
- Smart use of supportive techniques
- Draw conclusions and give recommendations

Project example

Cracker furnace tube failed due to carburization. Carburization was confirmed by both macroetching and by metallographic techniques.



Our Facilities

- Discotom and Buehler metallographic precision saws.
- Grinding and polishing equipment.
- Etching benches
- Hardness measurement tools
- Leica Photo microscope
- Leica MZ APO Stereo microscope
- Leica DM 600M and several other light microscopes
- Scanning Electron Microscope (Phillips XL30 ESEM)
- EDAX sapphire element detection and quantification
- Image analysing tools
- Collaboration with partners for extended mechanical and chemical testing

