Pneumatic Impact Treatment

PIT *the „Anti Aging“ method for your production equipment…*








**…significantly reducing costs caused by damage,
repairs and loss of production**

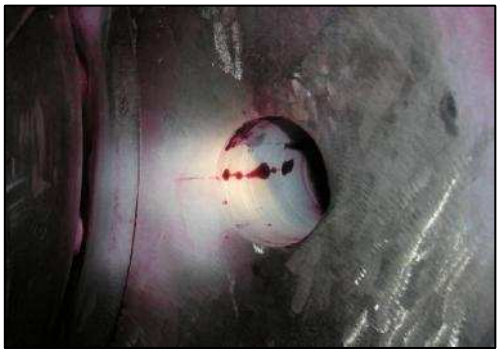
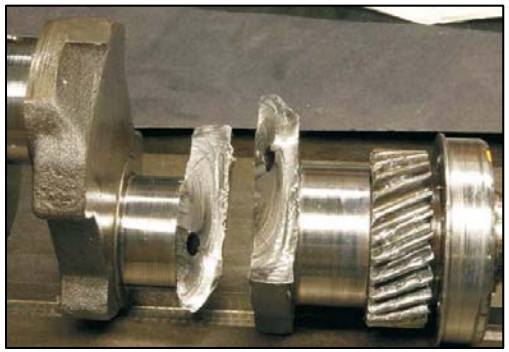
Fatigue damage

PITEC GmbH




Dynamic Loads

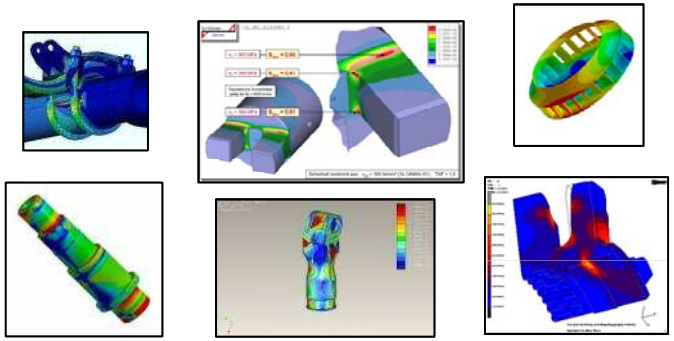
will cause fatigue damage as soon as the structures calculated lifetime or number of load cycles is exceeded .


The cause

Crack initiation will start often on the weakest spot of a structure.
The reason: presence of residual tensile stresses and/or notch effect.

1.

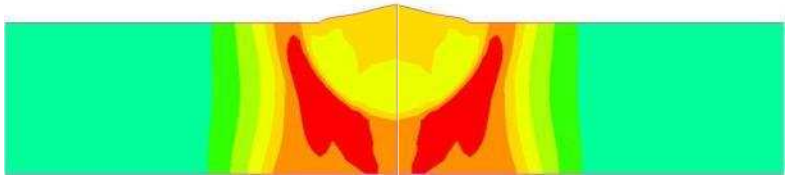


or

Examples of initiation areas are:
- damage caused by clamps
- damage caused by rolling / forging
- Rigid transitions
- sides of drilling holes, etc.

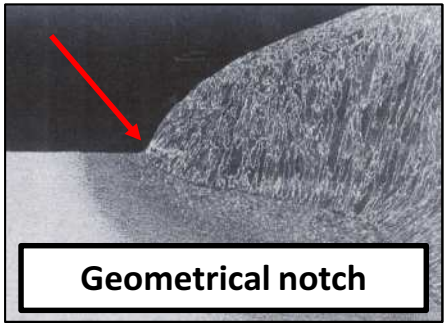
Welds will be particularly sensitive because of the presence of both factors!

2.



High residual tensile stresses shown in red

and



Geometrical notch

Additional costs

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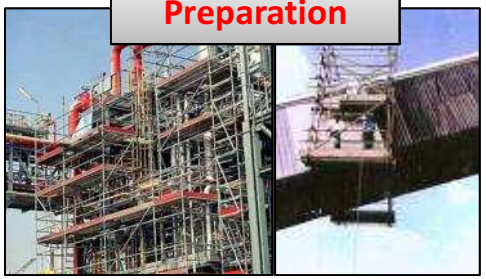
Failure analyses

Preparation

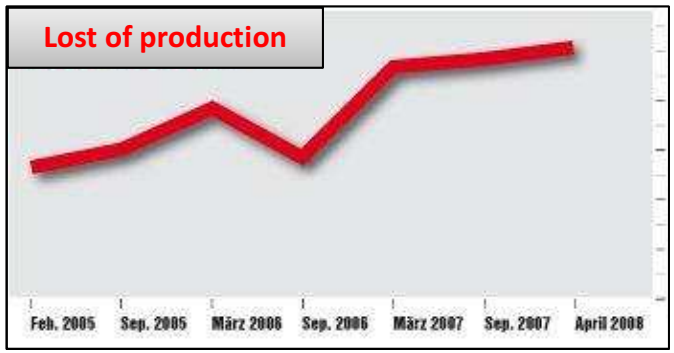


Disassembly

€

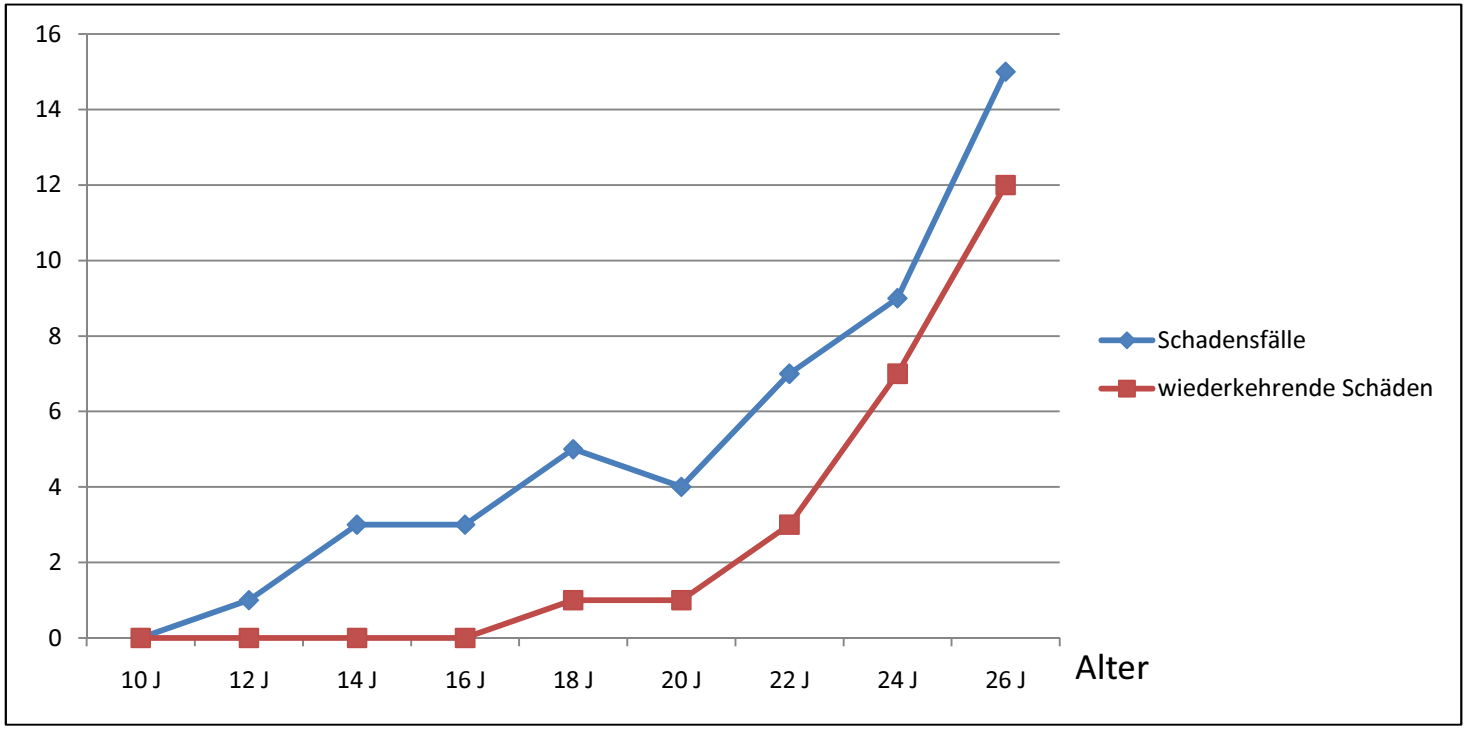
Repair

Lost of production



…the problem becomes bigger and bigger:

- often new cracks will arise on similar location shortly after repairing the present fatigue cracks.
  - Until recently preventive treatment was not possible
- because of executed weld repairs more tensile stresses and geometrical notches will be present in the structure. Therefore the interval between the initiation of new cracks will be shortened.



Pneumatic Impact Treatment…

PITEC GmbH

…has proven to multiply the structures fatigue life. Because of that it will reduce the number of repairs and/or extend the interval between separate repairs, even when a preventive treatment is executed on a structure almost at the end of his calculated lifetime.

Every prevented failure / damage will immediately increase the availability and liability of your installation and will save you money and annoyance.

Universität Stuttgart Germany

stw

TU Graz

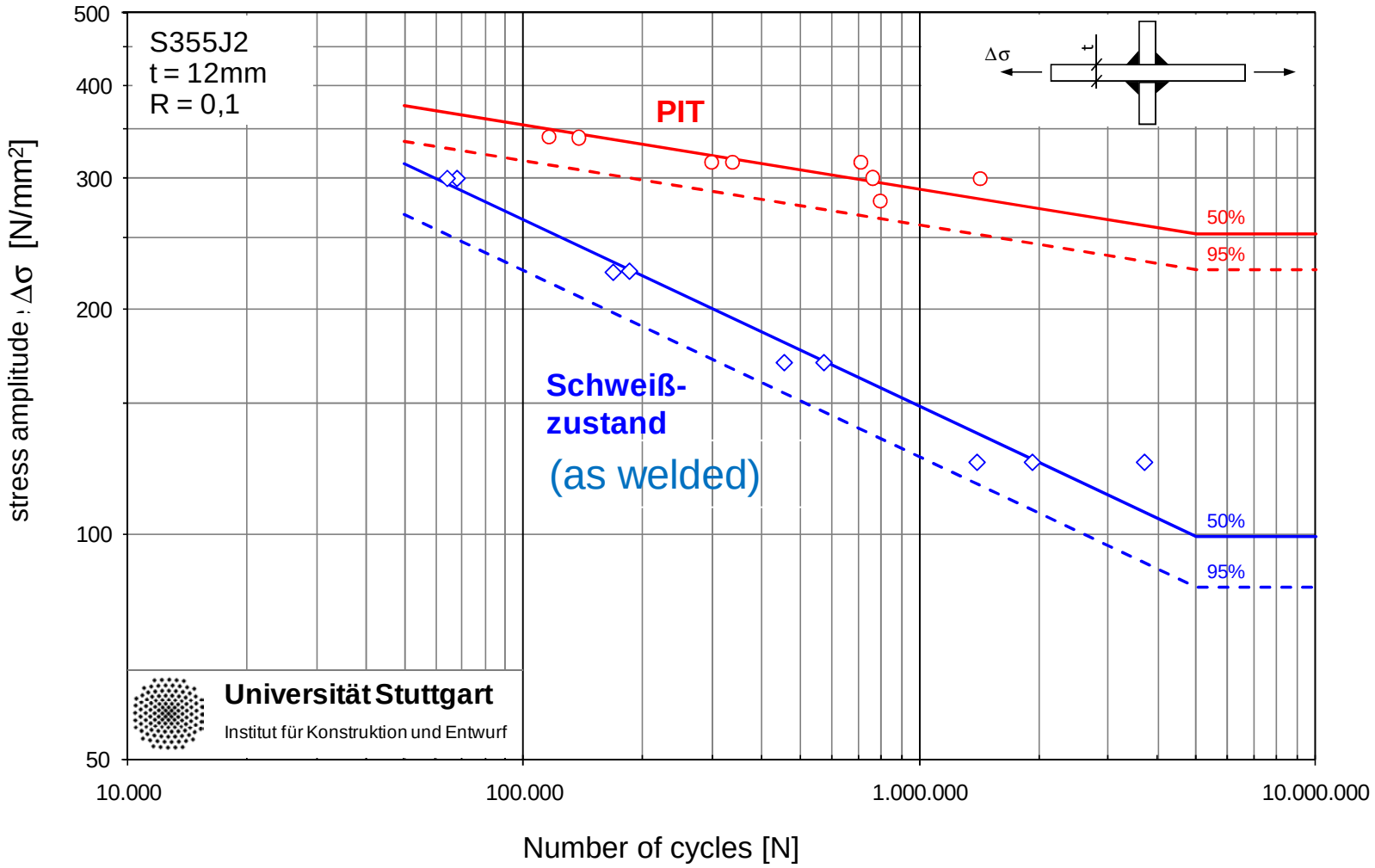
GSI SLV Duisburg

IMA DRESDEN

TÜV SÜD

The SN-curve

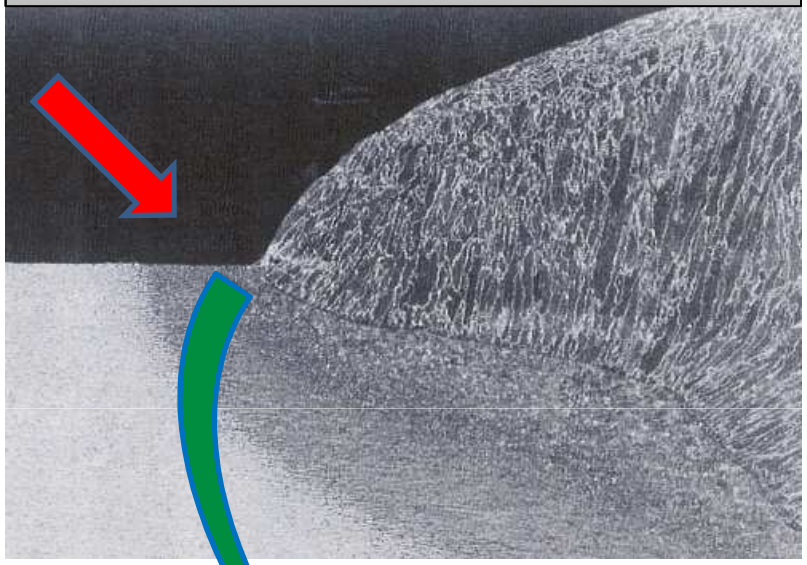
cross joint S355 R = 0,1



24.03.2009, HPG

Improvement of the weld geometry

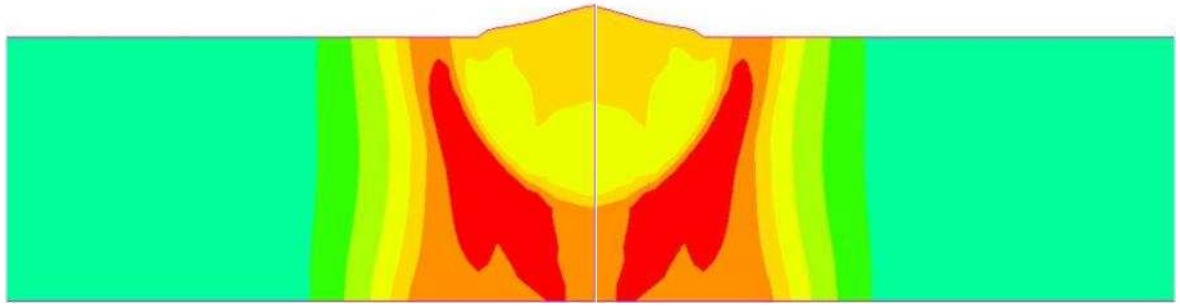
Geometric notch at the weld toe



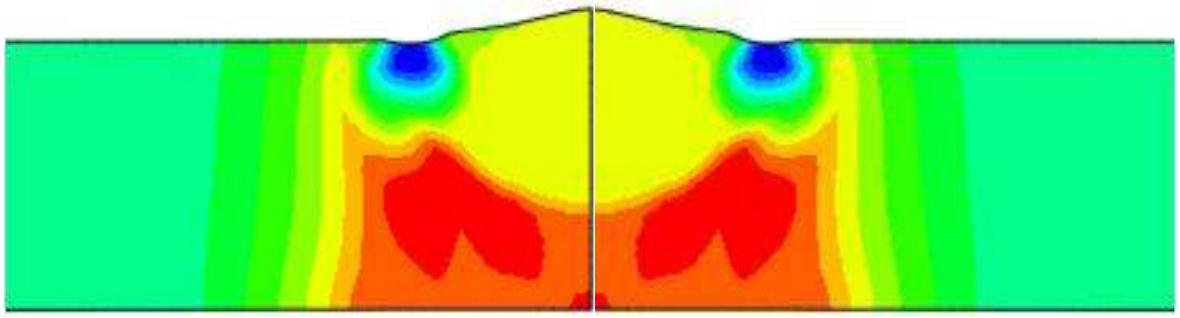
By PIT Improved
transition area at the weld toe

Introducing high compressive residual stresses

Weld connection with residual tensile stresses after welding



Weld connection with by PIT introduced compressive stresses



Technical advantages are ...

- **Significant enhancement of the fatigue life**
- **Almost duplication of the fatigue strength**
- **Possibility to save material (weight) up to 40%**
- **Enhancing the equipments or structures availability**
- **Reliability improvement**
- **Reduction of distortion caused by welding**
- **Increasing surface hardness**
- **Prevention of stress corrosion cracking**

PIT Weld-Line System 10

An artificial muscle, a new development of FESTO, is driven by way of compressed air. These motions are transferred as hammering movements on one or more pins.

By separate control of the frequency and pressure the impact intensity can be adjust to a optimum for the particular material in order to achieve the maximum effect.

- **compact design for best accessibility**
- **integrated lighting for the workspace**
- **Fine adjustment by separate control of frequency and pressure**
- **4 individual programmable frequency steps**
- **Pin assortment for customized applications**
- **air cooling of the pins**
- **very low vibration level, approx. 5 m/s²**
- **can by applied in confined spaces (hand-held unit 24 V)**

Services of PITEC GmbH:

PITEC GmbH

Consultation, Project Management & Execution

I. Professional failure management in case of failures caused by fatigue.

II. Realisation of material / weight saving because of the PIT - effect

III. Installation and/or construction maintenance preventative & corrective PIT treatment

Education and distribution of PIT Systems

PIT Reference: Maintenance

Dillinger Hütte increases the availability and reliability of their installations through a good combination of corrective and preventive PIT treatment

PIT Reference: Maintenance

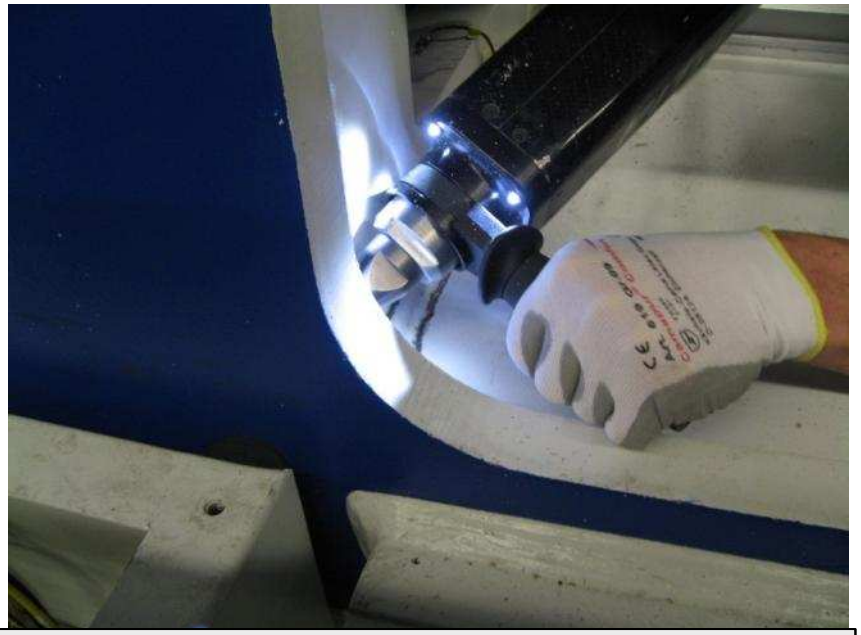
BOMBARDIER is certainly one of the most famous manufacturers of rail vehicles.

Because of the companies experience they offers their clients also services in the area of accident repairs and modernization of existing vehicles. This includes the durability of executed repairs and extending the lifetime of the vehicles.

We are pleased that now the PIT technology as well can contribute here.

PIT Reference:
Punching- and Nibbling machine

- Trumpf has loaded a machine foundation in a test facility till first fatigue cracks arise
- After repair welding all welds are treated by way of PIT
- Also other possible „Hot-Spots“ were preventive PIT treated
- afterwards the foundation again is loaded in the test facility



This results in an about 1,6x longer fatigue life compared to an untreated new structure
Trumpf these days is applying PIT during new building in order to improve the already excellent quality furthermore!

PIT reference:
Tumble drier

Enhancing the structures Fatigue life by way of corrective treatment of repair welds and preventive treatment of further Hot Spots.

PIT Reference:
Maintenance of a press

PITEC GmbH

SCHULER GRUPPE

Treatment of a press in a truck manufacturing plant near Lyon:

- **Fa. Schuler applied 2 new bearing plates with a diameter of 950 mm by way of welding**
- **PITEC afterwards replaced the residual tensile stresses by introducing compressive stresses**

PIT Reference:
Retrofitting of the "Gschnitztal" bridge (Brennerpas)

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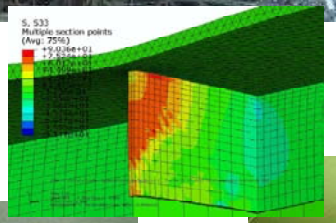
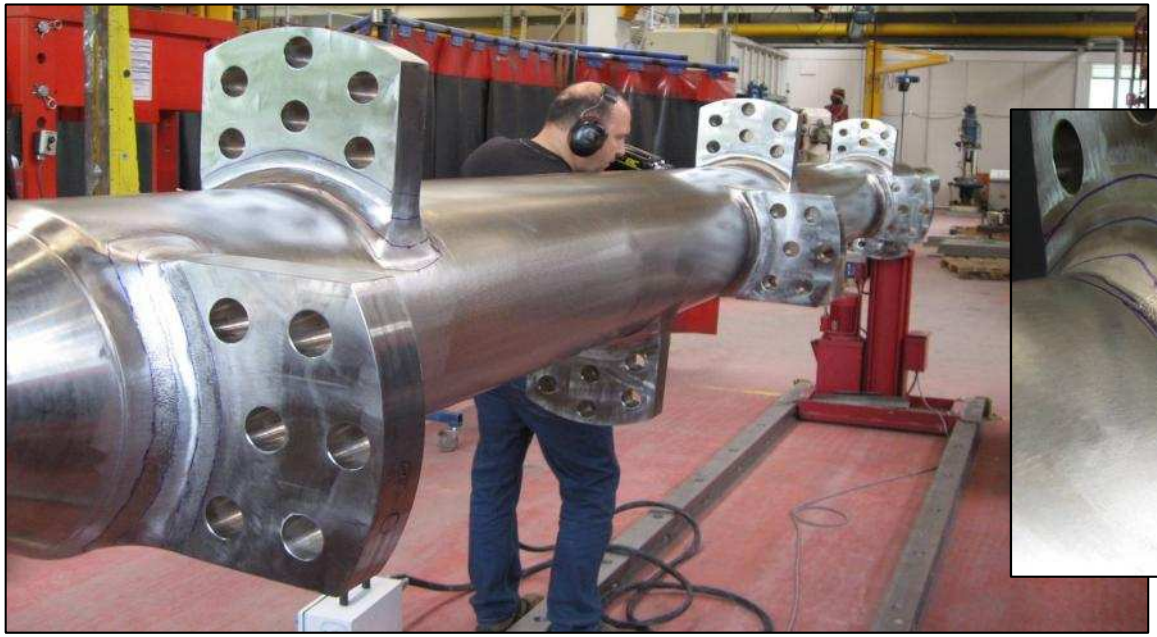
After scientific investigation of the PIT effect by the Technical University of Graz a preventive PIT treatment is advised and executed on all the repaired welds in this highway



PIT Reference:
Mixing shaft made of Duplex Stainless Steel

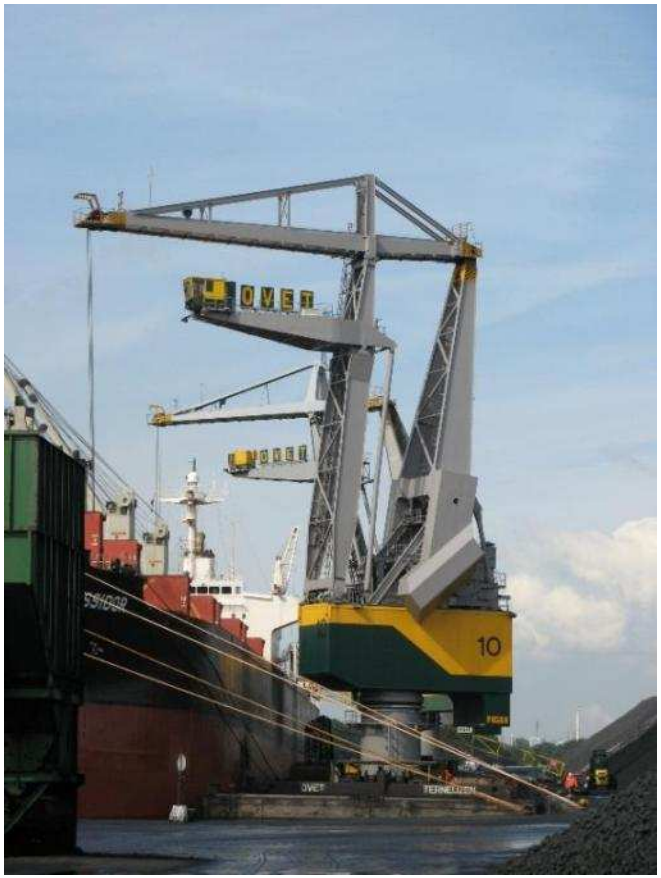
PIT-treatment of a mixer shaft / axle in Duplex
in order to improve ist fatigue life

EKATO



PIT Reference:
Reparation of a port crane

PIT-Treatment of weld seams in the cranes monopole after repairing present fatigue cracks as well as preventative treatment of all other welds without cracks.



OVET B.V.
Quality in bulk

…thank you for your attention!

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