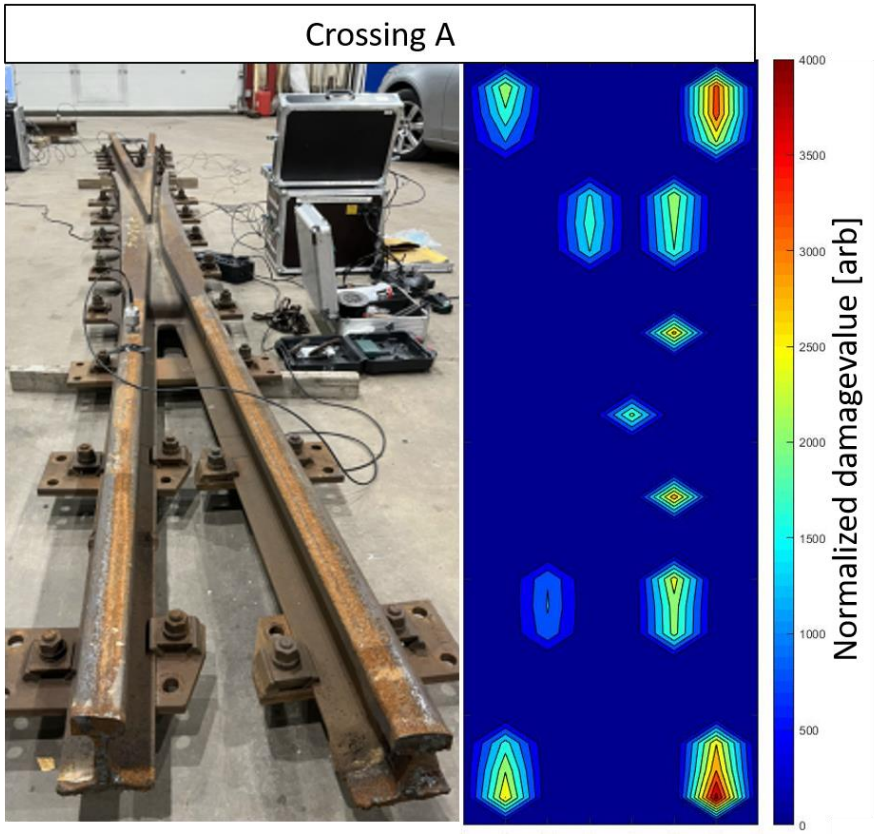
NAW®-inspection of manganese crossings

This letter shows an example of using NAW®-inspection detecting damages in manganese crossings.

Rail exposed to high load and to high intensity needs to withstand wear, why certain components like crossings are manufactured in manganese steel. The grain size in manganese steel makes conventional ultrasonic inspection, difficult or even impossible. This work displays the success using NAW®-inspection detecting damages in manganese crossings.

Two manganese crossing are examined and compared its damage status. One of the manganese crossings (crossing A) has been in use for a long period of time with high load and high intensity of passings while the other (crossing B) has only been in use for a short period of time with low exposure to load and intensity of passings. Welds connecting from the manganese crossing to the surrounding rail (INOX-welds) are also included in the inspection.

The results are shown relatively to the severity of the damagevalues. Blue colour indicates low damagevalues and red colour indicates severe damagevalues. Displayed below are each manganese crossing with its distribution of damagevalue. The crossing A, exposed to high load and high intensity of passings, has degraded status in terms of presence of cracks, fatigue progression and ultimately the strength in the manganese crossing, areas indicated in yellow, orange and red.

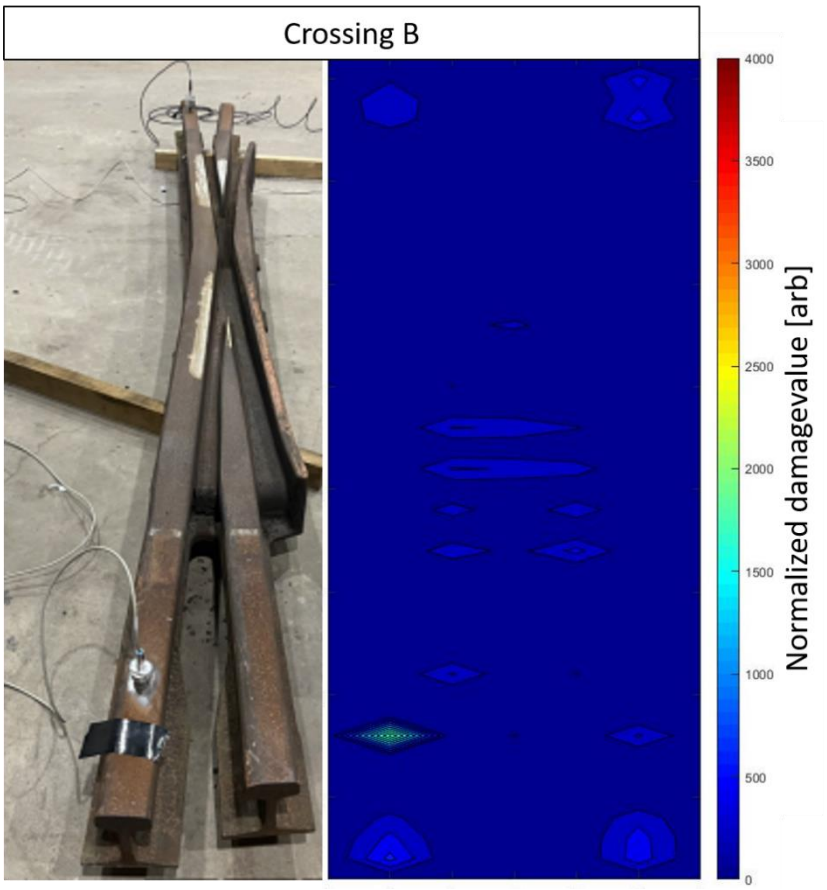


Application example:

Non-destructive inspection: Manganese crossing

One sensor acts as transducer and another sensor acts as receiver. Using the nonlinear behaviour of the cracks a damage level for every inspection point is calculated. The result is called damagevalue. The greater damage in the object results in a greater damagevalue. During inspection, an impulse is simultaneously excited according to a predetermined schedule. By exciting some of the waves locally, localization of cracks can be performed.

Crossing B exposed to low load and low intensity of passings show low damagevalues in general with only one inspection point of elevated damagevalue.



This example displays the possibility of using NAW®-inspection provided from Acoustic Agree, to inspect and control the status on manganese crossings. Using NAW®-inspection it is possible inspecting manganese crossing and further determinate status of damage and predict maintenance preventing accidents.

Already in 2006, the company Acoustic Agree AB was started. The company has been industrializing nonlinear acoustic techniques for non-destructive testing and evaluation. Among other fields of using the NAW®-inspection technology are hydro power plants, nuclear power plants and petrochemical plants. This technology is used determine actual damage status of several critical components. Equipment ranging from sensors, signal conditioning, amplifier and software, are since 2006 inhouse designed and built for the specific needs to perform these nonlinear acoustic inspections.