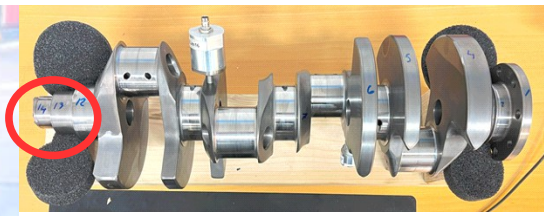
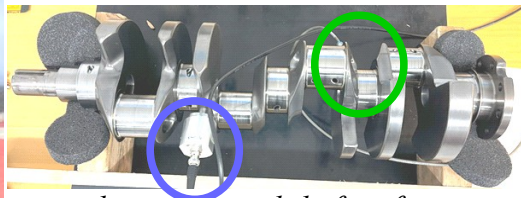
Application example :

Non-destructive inspection : Crankshaft

NAW®-inspection of Crankshaft:



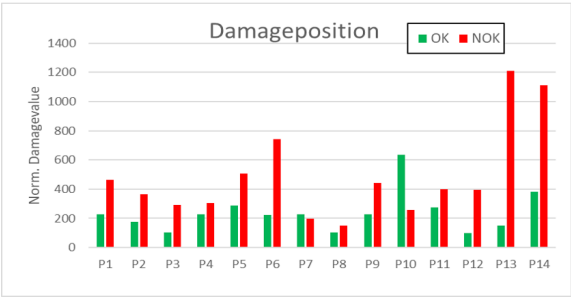
broken crankshaft (red ring)



undamaged crankshaft, reference

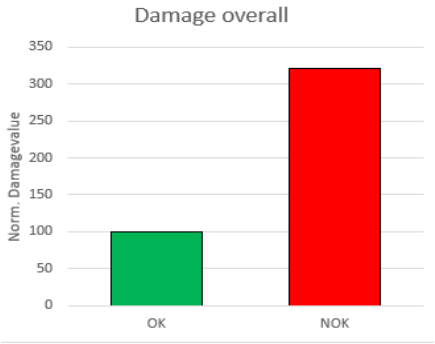
A Pro Mod dragracing car produces 3-5000hp to run a quarter mile in 5 seconds. Johan Svenssons Pontiac Firebird -68 is equipped with a supercharged 526 cui (8.6 liters) hemi V8 running on methanol competing in the Swedish racing class Top Doorslammer.

A 5 second race requires preparation. To handle cost and time preparing inspecting state of engine parts such as the crankshaft before a race is essential having the engine in a known good condition. One inspection method to check health of engine parts is NAW®-inspection (Non-linear Acoustic Waves) locating and estimating severity of buried cracks.



In above positiongraph every bar represents the blue marked P1-P14 inspection points seen on the crankshafts at the top images with its damagevalue. Red bars is damagevalue for the known defect crankshaft (NOK) comparing each inspection point to a known good crankshaft, green bars (OK).

When NAW®-inspecting a crankshaft sound is transmitted with a sender (blue ring) through the part to a receiver (green ring). Damages inside the part responds to the transmitted energy pulses and reveal their location and severity. A severe damage as a buried crack generates a high amplitude response and is calculated into a “damage value” to visualize the result. A higher damage value indicates a larger damage.



Inspecting the whole volume of the crankshaft, a global damagevalue for the complete crankshaft comparing good with defect part can be displayed in one simple graph.

Inspecting a crankshaft requires about 5 minutes with NAW®-inspection, the sensors can be clamped on to the object. The result is a “damage value”, a calculation of the total amount of damage in the part that determines whether the crankshaft can be used again or not. If inspecting same crankshaft regularly a damage progression can be calculated estimating remaining service life of the crankshaft.

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