# Non-linear ultrasonic for structural damage assessment: Approach at CSIR-National Metallurgical Laboratory

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## Abstract

CSIR-NML has been active for the last two decades on structural health monitoring and remaining life assessment of materials in the power plant, petrochemicals and steel industries through both microstructure and mechanical property evaluation as well as non-destructive evaluation (NDE). Over the years, CSIR-NML is pursuing focused application oriented research in NDE for diverse components like aerospace, defence, power and steel sectors. Need based development of NDE sensors and techniques for specialised applications are also the integral part of the activities.

In recent years, realising the potential of Non-linear ultrasonic (NLU) for the assessment of progression of damage in structural materials, CSIR-NML has initiated activities in the area of NLU from 2006 onwards. Applications of NLU to assess the most prominent damages in industrial components like fatigue, corrosion and creep are one of the niche research areas of CSIR-NML. An attempt has also been initiated to develop damage predictive model based on NLU parameter.

NML has also developed globally the first portable, site worthy NLU device (**Ultraβ**) that can be used to monitor the damage of in-service structural components.

This presentation will highlight our activities on fatigue, corrosion pit and creep damage evaluation using the developed portable NLU device.