

Evaluation of Techniques for Compression of Ultrasonic Data

Terrill Massey¹, Mark Dennis¹, George Connolly¹, James Neale¹

¹Nuclear Sector, Electric Power Research Institute, USA

NDE has experienced rapid technological improvements in the past few decades leading to the creation of larger NDE datasets. Larger datasets translate into slow data transfer speeds and under sampling for instruments to keep pace which can negatively impact NDE results which are necessary for asset management. This research explores ultrasonic data compression with minimal loss to ultrasonic signals. Minimal loss means minimal change to the ultrasonic testing (UT) signal. In this research, quantitative analysis has been performed to characterize the loss due to compression. The main objective of this research was to perform a feasibility study on the compression and decompression (that is compressed sensing) for Non-Destructive Evaluation (NDE) Data, specifically UT, to support efficiency and reliability for the industry. Classical and deep learning(machine learning) compression/decompression techniques were explored in this study. Benefits of UT data compression include increased data transfer speeds between UT transducers and the storage device and reduced data file storage. These benefits could lead to lower cost UT instruments that require less sophisticated hardware for data transfer and allow for faster scan speeds for UT data collection. These benefits could also lead to less power requirements needed for data transfer in wireless UT applications that may be battery powered.