

Abstract

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Aspects of AE Attenuation in Steel Pipes in Different Internal-External Environments

The current paper follows from earlier work on the propagation of acoustic emission (AE) in pipelines; addresses, in particular, the effects of the internal; external environment. Specifically, experiments have been carried out on a 5.5 m length of pipe with; without water inside; with various external environments chosen to simulate burial with various levels of soil saturation. The AE signature of a simulated source was recorded at various distances along the pipe with various environments; the data were analysed in the time; frequency domains to isolate the effect of interfaces on the distortion of propagating AE waves. It is shown that AE transmission is affected markedly by both the internal; the external environments, but that some components of the wave are affected less than others. A simple attenuation model is presented, which takes into account the losses at the interfaces; this suggests that much of the attenuation is attributable to waves moving in the body of the pipe wall rather than on its surface. The findings will be of value in the practical detection; location of active defects in pipes, where the internal; external environments may vary. One might expect a source to generate a particular time-frequency signature; it is of interest to know how much this source signature will become distorted when sensed at some distance.