On the Potential use of Acoustic Emission Testing to Control Composite Tanks in Service Conditions

Salah RAMADAN*, Slah YAACOUBI, Daniel CHAUVEAU,
*Institut de Soudure Enseignement et Recherche, 57970 Yutz, France
e-mail: s.ramadan@institutdesoudure.com, phone: +33 3 8288 7952, fax: + 33 3 8259 8645

Abstract:
Composite materials have important advantages compared to metallic materials, and provide many functional advantages: high mechanical strength, lightness, etc. Thanks to their mechanical properties, these materials found many structural applications in aerospace, aeronautical, transport and civil engineering industries, and infrastructural applications in tanks storage, high pressure cylinders and pipelines. In spite of their mechanical properties, some flaws affect their durability in operating condition, and then reduce their functionality. In service conditions, the control of the evolution of these defects is the key point to ensure the reliability of composite materials. In this context, the identification of the early stages of damages by a method of Non-Destructive Testing (NDT) is required to guarantee the safety and the use of these materials. To assess this problem, the NDT by Acoustic Emission (AE) has been proved well adapted for this topic. Promising results dealing with the application of AE to identify the early indicators of flaws in composite tanks, in different experimental conditions, will be presented.

Keywords: Acoustic Emission (AE), Composite tanks, defects monitoring