

SAFE H POWER - Continuous monitoring systems for the SAFE storage, distribution and usage of Hydrogen Power for transport

H₂ is the most promising replacement fuel for road transport due to its abundance, efficiency, low carbon footprint and the absence of other harmful emissions. Until recently, the cost of fuel cell technology was a significant barrier for the mass production of hydrogen vehicles but not anymore due to the US advancements in the field. However, the mass producers of hydrogen vehicles will need to convince customers of their safety in order for the mass markets of hydrogen power to take off. The development of efficient safety assurance systems for hydrogen storage will define the lead players of the transport and energy fields in the immediate future.

The SMEs participating in this project have anticipated the problem with hydrogen tank safety and propose a new technology which will be able to inspect the material of the tanks, detect any defects that could lead to rupture or cracking and warn of the immediate danger before an accident occurs. SAFE H POWER will develop a system based on the combined use of neutron radiography and acoustic emission (AE) monitoring. The goal of the SAFE H POWER system is the reliable and cost effective continuous monitoring of the integrity of hydrogen storage tanks at central depots, service stations and on vehicles i.e. at every point of hydrogen storage.

Project Objective

This project aims to address the need for safe hydrogen storage tanks by developing innovative technology which will be able to monitor the creation and growth of fatigue cracks and will provide the capability to intervene before major accidents occur.

This will be a significant improvement on existing hydrogen monitoring technologies based on gas sensing technology which can only detect leaks arising in the vicinity of a sensor so that total area coverage of a hydrogen vessel would be both impractical and far too expensive. Moreover, gas sensing technologies do not detect defects which could potentially cause catastrophic rupture without causing prior leakage of gas as a symptom.

SAFE H POWER will develop this innovative system by accomplishing the following tasks:

- 1) Development of a low cost AE sensor attached to hydrogen storage tank of a vehicle for continuous monitoring.
- 2) Development of a higher level AE system for continuous monitoring of hydrogen storage tanks installed at service stations and production plants.
- 3) Development of a portable tangential neutron radiography system for total imaging of metal tank structures at all points.

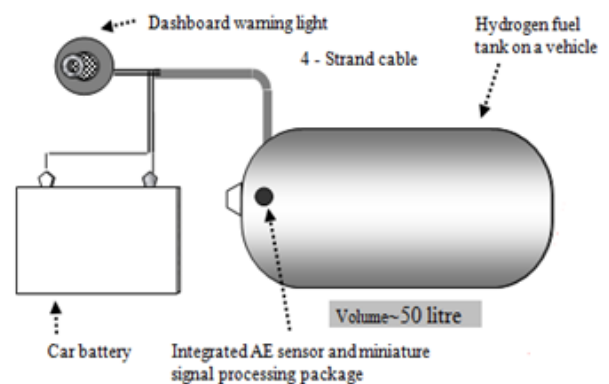


Figure 1 SAFE H POWER concept for vehicle tanks

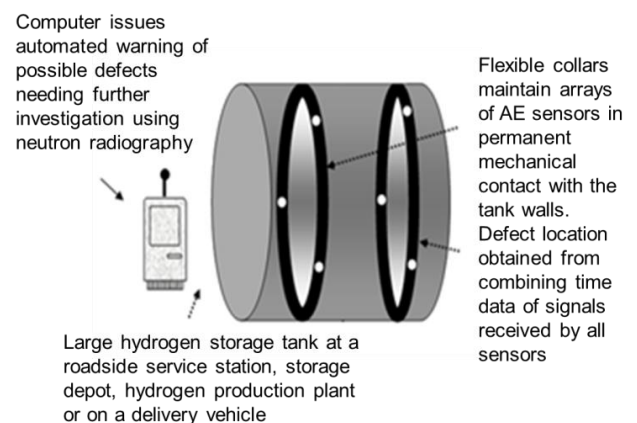


Figure 2 SAFE H POWER concept for storage tanks

For further information, please visit the project website at www.safehpower.eu

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