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AE-Monitoring for Surface Transport Product (Ships, Trucks and Railway Cars)

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Beside human errors the different technical degradation processes like corrosion and fatigue cracks are the most common reasons for structural failures of all surface transport products like ships, road tankers and railway tank cars. To avoid the failure of these structures, maintenance and inspection have to be carried out on a time span basis. These activities can become time consuming and consequently expensive. Beside this disadvantage a lot of examples exist, where weakened structures (ships, trucks and railway cars) have failed during operation with the result of oil spillage and/or even fatal accidents.

It is necessary to detect and identify evolving defects on time to enable appropriate repair works, which is only possible by permanent monitoring of the structure, which can be used as an important tool in the complete health monitoring of the structure. A real time monitoring to detect cracks as well as corrosion would be possible with Acoustic Emission (AE). The use of this technique for a health monitoring has the disadvantage, that it is also sensitive to process noise and environmental influences. This has to be overcome by the application of logical filtering and data treatment.

For the solution of this problem an EC-funded project (SCP7-GA-2008-218637 "Cost effective fatigue and corrosion monitoring by means of Acoustic Emission on transport products") was launched to develop an overall, innovative strategy for the maintenance and inspection. The project partners, leading companies on their specific field (Acoustic Emission Testing (AT), Non Destructive Testing (NDT), Inspection, Ship Classification, Research, Maintenance and Shipyard) developed together a monitoring concept including a new adapted intrinsically safe AE-equipment for different surface transport products.

The application of the key technology (AT) was adapted for the specific needs and was embedded in clear application rules for proceeding calculations and definition of hot-spots, continuous monitoring, follow-up inspection as far as possible while in-service and preventive inspection and maintenance for ship, trucks and railway cars.

The results of the pre-tests in different laboratories of the partners and validation tests during shipping operations on-board of ships, trucks on road and railway cars in operation show the applicability of the technology. Finally the special developed intrinsically safe AE- equipment will be presented.

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Ключевые слова:

Содержание.

Abstract
Introduction
Project consortium
Pre-test in laboratory
Adaptation and development of measuring equipment
Hot spots concerning fatigue cracks and corrosion
Monitoring test at real structures
Summary
Acknowledgements