

Development of an in-service NDT system for storage tanks

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The large storage tank is one of the major infrastructures. Once a leak occurs, it often causes environmental pollution and even catastrophic accidents. In the early years, the method of emptying tanks and cutting plates for defects inspection was adopted to avoid leakage. However, there exist some deficiencies such as large blindness, long downtime and high cost. Since there are many problems in the traditional testing, inspection without emptying the tank and without stopping production is a more suitable technical means to ensure the safe operation of the tank. An in-service non-destructive testing (NDT) system for storage tanks without emptying is developed in this paper, which mainly includes sensors, the signal processing module, the crawling module, the crane and control module et. al. The sensors, signal processing module and crawling module need to be placed into the tank from the roof man-hole by the crane, while the control module is located outside the tank. The sensor can realize the combined inspection of magnetic field leakage (MFL) and electromagnetic acoustic transducer (EMAT). The laboratory experiments indicate that the system can realize in-service inspection of the corrosion defects on the bottom and works well in water. The new testing system will overcome the shortage of off-line service inspection methods that emptying and cleaning tanks are needed before inspection and environmental risks are involved. These research works guarantee the safe operation of storage tanks and provide an alternative NDT system for storages related industrial projects