E1-04: Corrosion and deposit evaluation in pipes by radiography

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Piping is the most common way of transporting liquids and gases for industrial purposes and use of such piping has been rapidly increasing in the past as a result of industrial development. Piping used for transporting liquids and gases under high temperature are covered with thick insulating material for conservation of heat. Corrosion that can occur on the inside and outside surfaces of the pipes will reduce the effective thickness of the pipe walls. Deposits inside the pipe surface will result in either reducing or completely blocking the flow through the pipes. Therefore, it is essential to monitor such pipes to detect changes in the wall thickness and presence of deposits inside the pipes.

The objective of this paper is to evaluate the effectiveness of using Tangential Radiography to measure the wall thickness of non-insulated pipes.

The Tangential Radiography Method has been used in determining loss of pipe wall in non-insulated straight pipes. The outer diameter inner diameter and the wall thickness of pipes were measured using an Ultrasonic thickness gauge for comparison. A series of radiographs were taken using an X-ray source at different source to film distances (SFD), energies, and exposure times.

Each film was viewed using an illuminator and the apparent pipe outer diameter, inner diameter and wall thickness were measured. The data was analysed to determine the parameters for the most accurate results.

Tangential Radiographic Technique can be used to accurately measure inner and outer diameters and wall thickness of pipes. Variation of the accuracy of the measurements with SFD, exposure time and film type has to be further ivestigated.