

## **A new way to identify Lack of Sidewall Fusion in single-V butt welded steel plates**

T M R Tennakoon<sup>\*1</sup> and N Munasinghe<sup>2</sup>

<sup>1</sup> *Atomic Energy Authority, 60/460, Baseline Road, Orugodawatta, Wellampitiya*

<sup>2</sup> *Department of Materials Engineering, Faculty of Engineering, University of Moratuwa, Moratuwa*

Non-Destructive Ultrasonic Testing is a method to detect defects in materials without destroying it. Out of various Ultrasonic Testing applications detection of defects in butt welded steel plates has a prime impotency.

The most common defects that are possible to occur in single-V butt welded steel plates are Cracks, Porosity, Slag, Lack of Inter-run Fusion and Lack of Sidewall Fusion. Among these defects Lack of Sidewall Fusion has a preferred location in the fusion face between parent metal and weld metal. In conventional Ultrasonic Testing methods this defect is identified by drawing the weld configuration using parameters such as Stand-Off Distance

(distance from weld center line to the index point of the ultrasound probe-SOD), flaw depth, probe angle and material thickness.

The objective of this work is to introduce a new method to identify Lack of Sidewall Fusion from other types of defects by deriving mathematical equations for Stand-Off Distance using, beam path length, probe angle and the material thickness.

Tests were carried out for 22 Lack of Sidewall Fusion defects in single-V butt welded steel plates having 15mm thickness and experimental values of Stand-Off Distances measured using the conventional method were compared with the values of Stand-Off Distances computed using the newly derived equations.

The results show that the value of Stand-Off Distance obtained from the newly derived equations is almost similar to that of the same measured using conventional methods. These new equations to determine Stand-Off Distance can be easily used in software tools to identify defects in single-V butt welded steel plates.