

## **ABSTRACT**

In welding standards, there is not limit on the number of times that welding repair can be done on the same spot. However, it is widely practiced to limit the repairs to two times at the same spot. This is due to possibility of microstructure degradation as result from repeating heat input in the welding process.

The purpose of this project is to study and examine the consequences of repeated weld repair; the weld repair will be repeated four times on the same spot. These weld repairs were done on SA 516 Grade 70 plates using shielded metal arc welding (SMAW) for welding and normal grinding for gouging the defects area. The resultant properties will be based on toughness evaluation of the weld plate and microstructure degradation of the weld.

The weld joint design is prepared according to the AWS and ASME standards and specifications. After the first weld, the original weld seam (OWS) will be obtained. OWS and parent material will be inspected based on the three features; microstructure behavior, mechanical properties and elements distribution. The defect spot will be gouged and weld repair will be made to obtain first weld seam repair (1WR) and this is repeated for three times. Inspection data will be recorded to compare the differences between all the five weld seams.

The results show that the toughness of the weld decreases and the grain size of the microstructure on the HAZ increase as number of weld repair increases in relation with the number of weld repair.

Thus, repeated weld repairs do show some degradation in terms of mechanical properties and microstructure behavior. Further study could be conducted to characterize these changes.