

8<sup>th</sup> International Conference and Exhibition on

# MATERIALS SCIENCE AND ENGINEERING

May 29-31, 2017 Osaka, Japan

## The Mechanism of Mn, Si, Al, O Segregation in FSW of DH36 Steel

Al-moussawi M

Sheffield Hallam University, UK

The recants findings in unpublished work on friction stir welding of DH36 steel carried out at TWI company shows elements segregation of Mn, Si, O, Al when the welding speeds exceeds 500RPM-400 mm/min. The mechanism of this segregation is not fully understood and the presence of Oxygen within this segregated elements is also needs investigation. This work investigate for the first time the elements segregation of DH36 steel by carrying out many heat treatments in within ranges of temperatures 1200-1500 and different cooling rates. Two welding speeds were also used during the welding process, low welding speeds (100mm/min, 200RPM) and high welding speeds (400mm/min, 550RPM). The results showed that segregation is only starting when the temperature exceeds 1400 and the complete segregation of Mn, Si, O, Al is occur at 1450C and also is associated with acicular ferrite formation. It is found also high rotational speeds exceeds 500RPM are causing a local melting at advancing-trailing side. The study is aim to estimate peaks temperatures limits that is not causing segregation by choosing the suitable tool rotational and traverse speeds.

### Biography

Montadhar Almoussawi is a PhD student working on a project about friction stir welding of steel alloys, he is doing modelling and simulation for the process, tool optimisation and many experimental including SEM\_EDS, XRD residual stress analysis and heat treatments. The project aim is to control the welding parameters in order to produce sound welds.

b1045691@my.shu.ac.uk

Notes: