

Development of underwater laser cutting technology for offshore decommissioning applications

A. Khan¹, F. Collis²

1- TWI Ltd., Granta Park, Gt. Abington, Cambs. CB21 6AL, U.K.

2- UCS, Inverurie Business Park, Aberdeen, AB51 0ZJ, U.K.

ali.khan@twi.co.uk

There are more than 1500 registered offshore installations in the North Sea. The average age of North Sea installation is 25 years. The UK Continental Shelf as the oldest average asset base, and currently there are 245 assets which are over 30 years old. Energy Act 2008 requires that a large proportion of the infrastructure will need to be decommissioned in the next 30 years. According to Department of Energy & Climate Change (DECC), the North Sea infrastructure requiring decommissioning includes circa 600 fixed steel structures and >3,000 pipelines, potentially providing substantial decommissioning opportunities for years to come. There is currently a selection of different Subsea Cutting Methods which could be effectively utilised for Decommissioning in the North Sea. Three main competing technologies for decommissioning subsea structures are abrasive water jet, diamond wire cutting and plasma arc cutting. However, in order to couple with varied geometries and thicknesses, a single tool with flexible functionality (ease of remote deployment, operation and maintenance) and capability to cut both from outside-in and inside-out would be considered highly desirable. Fibre delivered laser beam cutting has the potential to deliver these benefits by means of cutting safer, cheaper and faster.

In this work we report some early results for underwater laser cutting of 50mm thickness C-Mn steel using a 10kW fibre laser source, with plans to develop the technology for subsea decommissioning applications at depths of 200m.