Investigating the potential for reuse, remanufacturing and recycling of Marine Assets

ACS Marine Risk Control Ltd. And The University of Strathclyde

A Scottish Institute for Remanufacture Case Study

Oceanic potential

In an industry with a relatively low uptake of reuse and reconditioning practices, ACS Marine Risk Control Ltd, a sister company of ACS Physical Risk Control Ltd, wanted to understand the potential of introducing an end of life re-X strategy to the marine world. If viable, they were also interested in establishing robust processes for determining the value of these activities thus allowing informed decisions to be made.

When a marine asset comes to the end of its useful life, opportunities to reuse, repair, remanufacture and recycle the majority of the materials, equipment and parts arise. However, to date, these opportunities have not been fully exploited. This is primarily attributed to the owner and recycler of the asset not being fully aware of its contents and potential value.

Generators waiting for a buyer in a ship recycling yard in Bangladesh, demonstrating the current destiny of end-of-life equipment from ships.

The main aim of the project was to create a methodology for the identification and valuation of equipment and materials on marine assets with the potential for reuse, remanufacturing and recycling. It was also of interest as to whether such a methodology could be carried out in tandem with the Inventory of Hazardous Materials (IHM) - a mandatory survey identifying and quantifying hazardous materials on ships and offshore assets.

The main thought process here was to attempt to add 'value' to a survey process which is normally seen as a 'cost' to the asset owner (i.e. to evaluate the re-X assets as well as the unwelcome hazardous materials).

Approach

This research began by identifying typical marine products, parts and materials which could be reused, remanufactured, and recycled. This resulted in a database of over 350 items with pictorial representations and a short description for easy reference.

The next step was conducted through a series of workshops with ACS Marine and experts from the remanufacturing and maritime industries, facilitated by researchers at the University of Strathclyde, to determine which of these products, parts, and materials had the largest potential for pushing up the waste hierarchy. A shortlist of 20 items was identified and fully analysed, with a further output of the workshops being the development of a robust process methodology for identifying onboard items and determining their potential value.

Using the ISO9001 and Lloyds accredited standard operating procedures in ACS Marine's IHM service, an inclusive survey methodology was developed to combine the existing IHM survey and the new re-X approach developed through the project. This was then tested through a case study onboard an operational ferry to validate the approach and make recommendations for improvement.

Benefits to ACS Marine

Accessing matched funding from the Scottish Institute for Remanufacture enabled ACS Marine to collaborate with experts from the Dept. of Naval Architecture, Ocean and Marine Engineering at the University of Strathclyde to develop a unique and innovative service of identifying opportunities for reuse and remanufacturing on board marine assets. The business believes that using the outputs from the project will set them apart from competitors and solidify ACS Marine's position as a market leader within this sector. Through the publicity of being involved in an SIR funded project, a number of business opportunities have arisen which have originated from an interest in the reuse and remanufacturing of marine equipment.

Benefits to the Marine Industry

Adoption of the process methodologies developed through this project could result in a step change in circular economy practices in the Marine industry, by;

- increasing in the percentage of materials and products from marine assets being reused in the repair and recycling periods of an asset's lifecycle
- helping to 'sell' the benefits of a circular economy approach to the marine industries by giving asset owners the ability to accurately calculate the value of remanufacturing activities
- increasing the number of accurate IHMs being produced which in turn decreases the number of ship recycling/repair workers being exposed to hazardous materials
- assisting in increasing the sustainability of shipping and oil & gas operations
- providing design feedback to the manufacturers and suppliers of marine equipment and materials to improve design for remanufacturing opportunities
- promoting Scotland's circular economy and remanufacturing credentials and expertise in international marine sectors

It is hoped that the methodologies created can provide the foundations of a new survey process that can become the industry standard in surveying on board marine assets for materials and products with the potential to be of continued value through reuse, remanufacturing and recycling.