June 2016
Thematic Issue 55

Ship Recycling: Reducing Human and Environmental Impacts

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Source: Litehauz. (2013) *Feasibility study for ship dismantling.* Copenhagen: Litehauz. Online: www.basel.int/Portals/4/download.aspx?d=UNEP-CHW-SHIPS-WHITEP-2013ShipDismantlingStudy.English.pdf

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Costs estimated for upgrading ship recycling to environmentally friendly standards

A 2013 study has estimated the costs of upgrading existing ship recycling facilities to more environmentally friendly, and regulatory compliant, standards. The research focuses on alternatives to the 'beaching' method of shipbreaking, widely criticised for its environmental impact and safety record.

Beaching – running end-of-life ships aground on tidal plains for ease of dismantling – has been widely criticised for both its human and environmental record. For example, it has a lack of safeguards to protect against, prevent or contain discharges or emissions of hazardous substances to sea and the surrounding environment.

A medium-sized crude oil tanker is made of around 15 000 tonnes of steel, with a scrap value of around US$ 6 million (€5.38 million). Adding to this the value of recycling of many other components, such as electrical devices and lifesaving equipment, makes recycling end-of-life ships a potentially profitable business.

Partly because of the lack of safeguards, beaching is cheaper and currently more profitable than more environmentally friendly methods of ship recycling. This is a problem that many nations, regulators, organisations and NGOs are working to address, aiming to improve standards.

Dry dock recycling is a costly, but more sustainable, alternative to beaching. This is when the ship is sailed into a dock and the water pumped out, leaving the ship in a dry environment. While it is better for the environment, as there is less pollution to surrounding waters, it is an underused technique because of its cost.

This study, commissioned by the United Nations Environment Programme (UNEP) and published in 2013, attempted to identify cost-effective, environmentally sound alternatives to beaching and to estimate the costs of upgrading other facility types to environmentally sound management standards. The study only considered the upgradability of other methods of recycling (piers and slipways). It did not consider whether upgrading beaching facilities was feasible.

To do this, the study first identified the most current (as of 2012/13) regulations and proposed regulations (and their drivers) for environmentally sound ship recycling. This included, for example, regulations from around the world.

These formed a base for identifying the components of environmentally sound management practice. This included elements such as identification and documentation of hazardous materials, equipment and yard facilities required for safe dismantling and handling of hazardous materials, and the use of quality assurance schemes.

This was followed by a review of currently used ship recycling methods and an assessment of existing recycling nations to identify countries where a suitable 'model' facility might easily be established.

Using all of this information, the researchers examined the costs associated with upgrading each example case of existing non-beaching facility to environmentally sound and safe ship recycling. The costs to upgrade to environmentally sound management were estimated for a model facility depending on its individual circumstances. The main model facilitywas assumed to have a 100 000 LDT (light displacement tonnage, i.e. the weight of water displaced by the ship without cargo, fuel, passengers, crew etc) dismantling capacity per year. To compare upgrade requirements for smaller facilities, a cost analysis for 25 000 LDT and 50 000 LDT was included.

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1.http://ec.europa.eu/environment/waste/ships/list.htm

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Costs estimated for upgrading ship recycling to environmentally friendly standards *(continued)*

The researchers identified four different examples for analysis:

1. Upgrade of existing pier breaking yards: pier breaking takes place in harbours or rivers, often located in sheltered and calm waters, making containment and remediation measures easier and limiting the potential for release or dispersal of hazardous waste. This method is used in yards in the Yangtze in China and in some Turkish yards.
2. Upgrade of existing slipway breaking yards: ships are sailed against the shore or a concrete slipway extending into the sea. The ship is dismantled by removing pieces with a mobile crane onshore, or from barges while dragging the ship up on the shore as it is lightened, providing better opportunities to control spillages.
3. Upgrading an existing basic pier area to compliant pier breaking.
4. Upgrading an existing basic harbour area to slipway breaking.

For each case, the authors also considered the costs associated with different sizes of the facility, capable of handling ships of small, medium and large sizes.

The costs for upgrading were, in the order of large (1000 LDT), medium (50 000 LDT) and small (25 000 LDT) facilities: (Case 1) US$ 9.5 million (€8.52 million), US$ 3.9 million (€3.5 million) and US$ 1.9 million (€1.7 million); and (Case 2) US$ 21 million (€18.84 million), US$ 12.9 million (€ 11.57 million) and US$ 7.5 million (€6.73 million).

Costs for upgrading both basic piers and slipways to environmentally friendly breaking yards were very similar. Case 3, basic piers, which was the most versatile upgrade because it does not place any demands on the site, costed in the region of US$ 23.9 million (€21.44 million), US$ 14.3 million (€12.83 million) and US$ 9.5 million (€8.52 million), depending on size. Basic slipways Case 4 costed in the region of US$ 24.9 million (€22.34 million), US$ 14.8 million (€13.28 million) and US$ 9.7 million (€8.70 million), again depending on size.

The differences in cost between different sizes of facility were almost directly proportional to the amount of concrete for construction/upgrading of facilities and heavy machinery needed. The main concrete costs were in the construction of areas to contain spillages. Other operational measures, of equal importance to the upgrade process, had far less financial impact.

Costs for basic infrastructure, such as access roads, quays and downstream waste processing and handling facilities, were not included in the cost estimates. Ports suitable as Case 1 were identified in areas of India, China and the Dominican Republic. For Case 2, the authors state that a wide range of 'domestically oriented locations' across the world would be suitable for smaller facilities, with a larger site identified in Mumbai, India. Cases 3 and 4 could be applied more or less anywhere in the world where there is an existing port or slipway, the researchers say.

The researchers conclude that the main barriers to a greener ship recycling industry lie in fear of job losses, a lack of strict regulations for ship owners or lenders in the secondhand shipping or scrap trade and problems linked to the selection of ratified ship recycling yards. The forthcoming European List[1] (to be published at the end of 2016) of ship recycling yards will establish a list of ship recycling facilities, both within Europe and the rest of world, which meet the requirements from the new ship recycling regulation.