Dr Anand Hiremath (GMS): "South Asian countries recycle over 92% of end-of-life ships"

Defending the beaching method of ship recycling

GMS lead coordinator manager, Responsible Ship Recycling Program, Dr Anand Hiremath, argues that criticism of the beaching method of ship recycling in South Asian yards is not warranted

Over the last decade, numerous articles have highlighted how the beaching method of ship recycling in South Asian yards results in 'dirty, toxic and dangerous scrapping' with 'dire working and living conditions for workers'. Many proponents of this view vehemently oppose the beaching of ships for recycling in South Asian countries. These institutions conclude that *poor working conditions, with no infrastructure, low wages, compromised labour rights and environmental standards*, are the only reason why end-of-life ships fetch more money when sold to recycling yards operating in the Indian sub-continent when compared with recycling yards in Europe and Turkey.

In the last four years, nearly 80 ship recycling yards in India (out of 120 working yards) have achieved Statements of Compliance (SoC) with the Hong Kong Convention by various IACS class societies – including ClassNK, IR Class, Lloyd's Register, and RINA. In addition, a yard in Chattogram, Bangladesh has become the first to achieve a SoC by ClassNK (in January 2020), having first achieved a RINA SoC in 2017.

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To encourage growth among India's ship recycling sector, in November 2019 the Government of India acceded to the Hong Kong Convention for Safe and Environmentally Sound Recycling of Ships and became the only South Asian country and major ship recycling destination to take such a step.

Additionally, major blue-chip shipowners, including Maersk, China Navigation, Teekay, Transocean, MOL, NYK, and several other major Japanese and Norwegian owners have visited and vetted yards in Alang. They have determined that Indian yards are a viable destination to recycle their end-of-life tonnage.

"The ship recycling yards in South Asia not only boost their respective local economies, but also create direct job opportunities"

Twenty Indian ship recycling yards have submitted applications to the European Commission to audit their recycling facilities for inclusion in the EU's list of approved ship recycling yards; several of these yards are currently undergoing EU-audits. This demonstrates that they must have passed the preliminary requirements to merit a possible inclusion under the EU Ship Recycling Regulation (EUSRR).

Ship recycling yard owners have made massive investments to upgrade their recycling facilities, including: 100% impervious floors with drainage systems; heavy-lift cranes; yard- and vessel-specific training for workers; and the development and implementation of Ship Recycling Facility Plans and Ship Recycling Plans (as per IMO's guidelines in Resolutions MEPC.210(63) and MEPC.196(62)).

Tremendous Improvements

The institutions that have been critical of South Asia's yards have remained blind to the tremendous improvements that have taken place. Such large-scale development cannot be shrugged-off with baseless statements that the beaching method is toxic, or with incorrect statements that all yards in South Asia are the same, irrespective of their level of advancement.

There can only be two logical reasons for this criticism: the critics view these certificates as being not good enough and believe that the yards continue to operate in the same manner as they were operating before obtaining their HKC certification; or in the minds of the critics, the Hong Kong Convention may be an inadequate standard to regulate the recycling of ships.

In response to the first point, it would be unwise to question the integrity and professionalism of reputed classification societies with IACS memberships. Regarding the second point, it is true that critics of the beaching method are also critics of the Hong Kong Convention because it does not ban the beaching of vessels.

Nevertheless, it should be remembered that the Hong Kong Convention was developed by many countries under the aegis of IMO, a United Nations Specialised Agency. IMO decided that banning the beaching method (which is currently used for over 92% of recycled tonnage) would be wrong as well as counterproductive.

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It is important to explore the reasons why South Asian countries recycle over 92% of end-of-life ships.

The value of end-of-life ships varies from country to country, as it depends on the availability and demand of downstream markets for the products derived from a vessel. The main products of ship recycling include ferrous scrap, non-ferrous scrap, and machinery. In some cases, residual fuel on-board also adds to the value. The value of the recoverable ferrous scrap largely determines the price which can be offered to a shipowner. Scrap steel is traded at different prices in different countries and it is the major factor which dictates the variation in the price offered by the various recycling locations. The major use of scrap steel in every recycling country is in steel making. However, the technology used differs among counties.

The two main steel-making processes are: (1) production from iron ore in a blast furnace-basic oxygen furnace (BF-BOF), which also uses some amount of scrap steel during the refining process; and (2) production from scrap steel in an electric arc furnace (EAF)/or induction furnace (IF). Globally, around 75% of new steel is produced by the BOF method, while the remaining 25% is produced by the EAF method.

According to The National Institution for Transforming India (NITI Aayog): "Recycling of one tonne of scrap saves 1.1 tonne of iron ore, 06-0.7 tonne of coking coal and around 0.2-0.3 tonne of fluxes. Specific energy consumption for production of steel through BF-BOF (primary) and EAF and IF (secondary routes) is 14 MJ/Kg and 11.7 MJ/ Kg, respectively. Thus, it leads to savings in energy by 16-17%. It also reduces the water consumption and GHG emission by 40% and 58% respectively."

NITI Aayog states: "Local factors dictate the scrap steel pricing, which eventually leads to lower overall offer prices for end-of-life ships. Interestingly, amongst the major ship recycling nations, the percentage BF-BOF/EAF-IF mix in 2019 showed contrasting results. For example, in India, BF-BOF route caters to around 45% of India's steel making whereas the remaining 55% is through EAF & IF route."

For Turkey, it was approximately 30% steel making through BF-BOF and the remaining 70% through EAF and IF. Turkey has 24 electric arc furnace mill plants (EAF), five induction furnace plants and three BOF plants. "Because of the Turkish steel industry's heavy reliance on EAF, the country is the world's largest scrap importer by volume. In 2018, Turkey imported a total of 20.7 Mt of material. Overall, Turkey was the recipient of around 22.4% of total world scrap exports".

Higher imports

These numbers clearly show the higher imports of scrap steel into Turkey and how they contribute to the local factors that dictate the scrap steel price, which eventually leads to lower overall offer prices for end-of-life ships.

To compare South Asian countries with Turkey, it is important to understand that when a ship is recycled in countries like India, Bangladesh and Pakistan, the irregular pieces of steel obtained are earmarked as melting scrap, which is fed into EAFs. This type of steel scrap is only about 15-20% of the total weight of the ship's steel. The remaining 70-75% is derived in the form of plates, profiles, beams, girders, and angle bars which are generally re-rolled in South Asia and sold at a premium when compared to melting scrap. However, this is not the case in Turkey, where most of the scrap steel is considered as melting scrap. The re-rolling process is simpler and less energy consuming and that is why re-rolled steel products fetch more money than the melting scrap.

The ship recycling yards in South Asia not only boost their respective local economies, but also create direct job opportunities to over 15,000 people and indirect opportunities to over 500,000 people (source: *Gujarat Maritime Board*). The ship recycling industry in South Asia is associated with a huge downstream market for second-hand goods, such as furniture, machinery, joinery, electrical equipment, household appliances, home décor, paints and hardware items.

"Critics of South Asia's yards have remained blind to the tremendous improvements that have taken place there"

This supports industrial ecology and industrial symbiosis, as the output from ship recycling yards are utilised as inputs to small-scale industries working to refurbish items which are eventually traded in the second-hand market. All this is in addition to the steel re-rolling mills and steel melting mills which utilise ferrous scrap from end-of-life ships to produce steel goods such as bars, ingots, pipes and plates. The entire localised industry that has developed due to ship recycling yards is a major boost to the local economy, as it assists in the flourishing trade of second-hand goods, ferrous scrap, and non-ferrous scrap.

To compare the labour and hazardous waste(s) management costs for yards in Turkey and India, consider the recycling of a 10,000 light displacement tonnage (ldt) container ship. A typical 10,000 ltd container vessel will have about a 5% weight loss due to corrosion, loss during recycling, as well as wear and tear over the operational period of the vessel. In addition, nearly 0.5% non-ferrous, 4% machineries and 0.5% reusables (like furniture and fixtures) are recovered by recycling; the remaining 90% is ferrous. In the case of South Asian countries, nearly 75% of the remaining 90% ferrous goes to re-rolling mills as steel plates, including direct use of steel plates to make flanges, girders, and pipes; 15% of the remaining 90% goes for melting, which includes irregular size scrap. In the case of Turkey and other EU recycling yards, most of the remaining 90% ferrous goes directly for melting and a fraction of it goes for re-rolling.

The daily wages paid to laborers is prescribed by the respective recycling country, based on the socio-economic conditions of the country. The prescribed wage in South Asian countries for unskilled labour is between US$4/day and US$6/day. Wages in Turkey are US$16/day to US$17/day for unskilled laborers. The difference of US$12/day equates to US$36,000/month (considering 100 workers per yard with paid leave).

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For recycling of a 10,000 ldt container vessel in Turkish yards, which takes about four months to completely recycle, these wages add up to US$144,000. This means US$15/ldt of additional costs on wages when compared to recycling the same vessel in sub-continent countries.

Looking at the environmental costs, the removal and disposal of each tonne of asbestos costs US$800 in Turkey, whereas in India it costs US$300 (as the waste disposal facility is owned by the Government of Gujarat). Considering 10 tonnes of asbestos for a given vessel (a higher value), it costs about US$8,000 for disposal in Turkey. Disposal of paint chips generated during the recycling cost US$500/tonne in Turkey, whereas in India it costs about US$200/tonne.

In summary, we can consider US$150,000 as the environmental cost, or waste management costs, in Turkey for all types of waste identified in an Inventory of Hazardous Materials (IHM), developed as per IMO's Resolution MEPC.269(68) guidelines. This adds up to an additional US$15/ldt for hazardous waste management, if recycled in Turkey when compared to India.

The higher cost of wages and hazardous waste management are not necessarily related to a higher quality of work. For example, heavy metal contamination levels at the coast of Aliaga (Turkey) ship recycling zone exceed the prescribed limits and are considered heavily polluted.

Including labour and hazardous waste management costs, Turkey should offer US$30/ldt to US$35/ldt less than the price offered in India (or any South Asian recycling country). But Turkey consistently offers US$90/ldt to US$160/ldt less than India (or any South Asian recycling country) as the value of steel generated from recycling is less when compared with South Asian countries. The European ship recycling yards offer even lower prices – US$200/ldt to US$300/ldt less than the sub-continent.

All the factors discussed and the significant improvements undertaken by South Asian recycling facilities over the last few years should be acknowledged and appreciated by the global maritime community, rather than criticised and demeaned because of the use of beaching as a method of docking/grounding/landing ships for recycling.

The contribution of the ship recycling industry towards sustainability is immense; it helps decarbonise the atmosphere.

To conclude, irresponsible recycling is possible across all methods of recycling. However, to associate such practices only with a particular region, or a particular method of recycling, is incorrect. The landing method practiced in Turkey is really not different to the beaching method practiced in South Asian countries. What matters is how a given ship is recycled safely and in an environmentally sound manner after beaching or landing.

This article is adapted from the series of Thought Leadership pieces **published by GMS on its website**.

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