



'OCEANS AND LAKES'

INTERUNIVERSITY MASTER OF SCIENCE IN MARINE AND LACUSTRINE SCIENCE AND MANAGEMENT



European Ship Recycling Regulation: can we make a difference towards safe and environmentally sound practices?

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June 2019

Thesis submitted in partial fulfillment for master's degree in Marine and Lacustrine Science and Management

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Abstract

Substandard practices in the ship recycling industry, mainly based in South Asia, have a negative impact on the health and safety of workers and on the environment. Since international legislation has either failed to effectively regulate ship recycling (Basel Convention) or has not entered into force yet (Hong Kong convention) the European Union has decided to regulate ship recycling and to already implement parts of the Hong Kong Convention. Regulation No. 1257/2013 on ship recycling (EU SRR) has entered into force the 31st of December 2018. This study used a literature review and expert interviews with 6 different stakeholders to investigate this Regulation; the measures that are included, its possible drawbacks and possible future developments.

Experts see the EU SRR as a major improvement compared to prior legislation. It consists of two important measures to regulate ship recycling. The Inventory of Hazardous Materials (IHM) will be obligatory for all ships flying an EU flag and all ships visiting EU ports. According to experts this will facilitate better recycling of these ships and is an improvement, although it is questionable whether all ship owners that visit EU ports will meet the 2020 deadline for having an IHM for their ships. Moreover, it is stressed that assuring the quality of the IHM's is a challenge. The second measure is a list of EU approved ship recycling facilities, to which EU flagged ships are limited for recycling. It is possible for both EU located and 3rd country facilities to be included in the list, if they fulfill the requirements that are set by the EU. In this way it is possible for the EU to regulate recycling facilities worldwide, which experts deem important.

One of the goals of the EU SRR is to facilitate early ratification of the Hong Kong convention and thus support a global regulation. Although all experts agree that the shipping industry should ideally be regulated globally, opinions differ on whether the Hong Kong Convention is the right way forward as the EU SRR sets higher standards.

Some challenges for the EU SRR have been identified by this study. Firstly, not all ships worldwide fall under this regulation, and ships can easily reflag from an EU flag to circumvent the regulation. Although the capacity of the current EU list is sufficient, the geographical distribution of facilities worldwide can be improved, but this is not a condition under the EU SRR. A major concern is the proper enforcement of the regulation within the EU member states, to stop EU flagged ships from going to substandard recycling facilities. Lastly, it is unclear what role beaching facilities shall have under the EU SRR and there is no agreement on the future of the beaching method overall

For future development of the Regulation it is important to close the loophole that exists through reflagging of ships. Possible solutions for this are the inclusion of a financial incentive or a change of the jurisdiction under which ship recycling is regulated. Next to that, in the long term, more effort should be put into regulating the proper design of ships to facilitate safe and environmentally sound recycling. Lastly, experts state that a change of mindset amongst stakeholders is key to truly change substandard practices.

It can be concluded that the EU SRR is a step forward, but improvements are still necessary to truly develop a clean and safe ship recycling industry.

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List of abbreviations

COP	Conference of the Parties
DG ENV	Directorate-General for Environment
ECSA	European Community Shipowners Associations
EMSA	European Maritime Safety Agency
EU	European Union
EU SRR	European Ship Recycling Regulation (No. 1257/2013)
EU WSR	European Waste Shipment Regulation (No. 1013/2006)
HKC	Hong Kong International Convention for the Safe and Environmentally Sound Recycling of Ships
IHM	Inventory of Hazardous Materials
ILO	International Labour Organization
IMO	International Maritime Organization
ISRA	International Ship Recycling Association
LDT	Light Displacement Tonnes
MEPC	Marine Environment Protection Committee
MFA	Material Flow Analysis
NGO	Non-governmental Organization
OECD	Organization for Economic Co-operation and Development

1. Introduction

Ship recycling¹ facilitates the reuse of valuable materials from ships that are not operational anymore. Up to 98% of the weight of ships can be reused (Jain, Pruyn, & Hopman, 2013) mainly consisting of steel and iron (Sujauddin et al., 2017). This reduces the environmental pressures associated with the mining industry (Neşer et al., 2012). The ship recycling industry is well established with the first record of a ship sold for scrapping dating back to 1838 in the Netherlands (Goodwin, 2005). During the industrial revolution, recycling processes became more mechanized and regulated and therefore more expensive (Rabbi & Rahman, 2017). To maximize profit margins the ship recycling business shifted from Western developed countries towards Southern Asia from the 1980s onwards (Rabbi & Rahman, 2017).

Nowadays, India, Bangladesh and Pakistan process the great majority of all end-of-life ships. In 2018 they were responsible for 70% of all 744 disposed vessels, amounting for 90.4% of all light displacement tonnage (LDT)² (NGO Shipbreaking Platform, 2019a). The industry provides the countries with iron scrap as well as, predominantly unskilled, employment (Kutub, Falgunee, Nawfee, & Rabby, 2017). In Bangladesh ship dismantling accounts for more than half of the raw materials required for their steel production (Sujauddin et al., 2017) and respectively 50.000, 40.000 and 6.000 workers are directly involved in Bangladeshi-, Indian- and Pakistani yards (Rabbi & Rahman, 2017; Shah, Hussain, & Hussain, 2017; Shahnawaz, 2017). The ship recycling industry is economically greatly relevant in these South Asian countries.

1.1 The impact of ship recycling

Current recycling facilities in South Asia mainly use the open beaching method (Figure 1), where end-of-life ships are sailed onto the beach at high tide and processed on the intertidal mudflat (Rahman, 2017). Ships contain different hazardous materials, such as asbestos, tributyl tin, polychlorinated biphenyls, heavy metals, oil residues and ozone depleting substances (Du et al., 2018; Hiremath, Pandey, & Asolekar, 2016; Iftikhar, Mubarik, & Nergis, 2015; Muralidhar, Ahasan, & Khan, 2017). During open beach recycling most of these hazardous materials are released into the coastal environment (S. Barua et al., 2018) and additional pollutants arise from processes like plate cutting and the burning of wastes (Hiremath et al., 2016; Rahman, 2017).

Research has shown heavy metal contamination levels to exceed international standards³ for drinking water and reach levels of up to 12 times higher in beach sediments compared to control sites without ship recycling activities (Alam et al., 2018; Kibria et al., 2016; Siddiquee et al., 2012). Crude oil can reach 16-54 times higher concentrations near ship recycling facilities (Gosai et al., 2018) and plastic contamination at the beaches is high (Reddy et al., 2006). Biodiversity near yards is lowered, especially the primary production⁴ can reach undetectable levels, while bacteria take over and reach high abundances (Tewari et al., 2001).

¹ Ship recycling is interchangeably called shipbreaking, ship scrapping, ship demolishing or ship dismantling.

² LDT: the light displacement tonnage is the weight of a ship excluding the cargo, passengers, fuel, water, ballast, stores, passengers and crew.

³ The limits for drinking water quality as set by the World Health Organization.

⁴ Photosynthesis by organisms such as algae, using light as a source of energy.

Barua & Rahman (2017) found a lowered abundance and diversity of sedimentary organisms near facilities. Pollution from ship recycling can also threaten different ecosystem services such as coastal protection and fisheries. Coastal protection by mangrove trees has been reduced by the areal development of facilities (Abdullah et al., 2013). Next to that, fisheries have seen a decline due to impacts of the recycling industry. For different species in India a decline in catch of 50 up to a 100% has been recorded since the start of ship recycling activities (Demaria, 2010).



Figure 1: open beaching practices in Bangladesh (Studio Fasching, 2017)

The standards on occupational health and safety are low in the beaching facilities. Recycling ships is a complex business and the use of mechanized- and protective equipment is limited (Hiremath et al., 2016; Rahman, 2017). Moreover, existing training programmes for employees are containing major gaps such as a lack of awareness on hazardous materials and the handling of these materials, a lack of use of proper protective equipment and a lack of first aid training and environmental awareness (Gunbeyaz, Kurt, & Turan, 2018). Accidents in the working environment are common; on average every worker has 3.26 accidents⁵ per month (Misra, 2018). The Non-Governmental Organization (NGO) Shipbreaking Platform (2019c) documented 35 fatal accidents in South Asian recycling yards in 2018. Workers in the beaching facilities are also exposed to the hazardous materials in the yards. A higher occurrence of lung cancer linked to asbestos exposure was shown in multiple studies (Muralidhar et al., 2017; Wu et al., 2014). Eye- and respiratory issues as well as skin problems that occur amongst a majority of the workers might be linked to exposure to different chemicals (Hossain et al., 2008; Sikder et al., 2016). Apart from these health issues, a study by Kutub et al. (2017) showed that only one fifth of the workers get overtime paid even though the majority has to support a family. These occupational issues lead to a high turnover in employees: 32% of the employees quit within 2 years and 89% leaves before working 10 years in the beaching facilities (Hossain et al., 2008).

⁵ Accidents range from cuts and burns to losing limbs and fatal accidents.

Although these negative environmental and social impacts are associated with the current ship recycling industry, recycling is still the best way to deal with end-of-life ships. Both scuttling, where ships are deliberately sunk as artificial reefs, and permanent storage after the operational phase are not seen as realistic scenarios on a large scale (Argüello Moncayo, 2016; Devault, Beilvert, & Winterton, 2017). Suitable alternative recycling methods to the open beaching method do exist. Slipway⁶-, alongside⁷- and dry dock⁸ recycling techniques are already used in China, Turkey and Western facilities, albeit at a smaller scale than open beaching (Choi et al., 2016). They are generally accepted to have higher environmental and occupational standards than open beaching (S. Barua et al., 2018; Choi et al., 2016; Pastorelli, 2014). Beaching has also been called a ‘substandard method’, meaning that it is unable to adhere to international and local regulations due to inherent environmental and worker safety and health problems, while the other three are seen as ‘standard methods’ (Barua et al., 2018; Barua & Rahman, 2017; Choi et al., 2016). Barua et al. (2018) ranked all recycling methods as following from least to most environmentally impacting: dry dock, alongside, slipway, open beaching. Although all four methods can be profitable, beaching can yield 7 times more revenue (Choi et al., 2016; Sarraf et al., 2010) because of lower costs for labor, operation and infrastructure and because less costs are made in the handling of hazardous materials (S. Barua et al., 2018; Choi et al., 2016; Du et al., 2017). As the decision to sell end-of-life ships is purely driven by economic motives, ship owners often chose the more profitable beaching yards, although the negative impacts are clearly documented (NGO Shipbreaking Platform, 2019a; Schøyen, Burki, & Kurian, 2017).

1.2 Legislative framework

The highly competitive ship recycling market prevents ship recycling nations to set and enforce strict national legislation which might threaten their economic gains (Bhattacharjee, 2009; Cairns, 2017). To overcome this international legislation has been developed as an incentive to change current substandard practices. The negative impacts of ship recycling practices were already recognized during the 1980s, which led to the first legal action taking place in the late 1990s (Devault et al., 2017).

1.2.1 Basel Convention

The first convention that can be applied to ship recycling practices is the Basel Convention on the Control of Transboundary Movements of Hazardous Wastes and their Disposal (1989). It currently has 187 signatory parties (Basel Convention, 2017) and can thus be seen as a successful convention overall. The Basel Convention has three objectives which are (1) minimizing the amount of hazardous wastes, (2) promoting local management of wastes and (3) promoting environmentally sound management and disposal of wastes. It puts stringent rules on the transboundary trade of hazardous wastes, including the polluter pays principle and requiring a Prior Informed Consent before any export takes place. In 1994 the Ban Amendment was added to the convention, prohibiting any export of hazardous wastes from

⁶ Slipway recycling: the ship is pulled onto a concrete slipway and cut into pieces starting at the bow while gradually hauling the ship further onto the slipway. It is also called the ‘landing method’.

⁷ Alongside recycling: the ship lies moored along a quay and cranes gradually take off the upper part until the vessel can be taken out of the water.

⁸ Dry dock recycling: ship is brought into an enclosure which is pumped dry whereafter dismantling takes place mechanically.

OECD⁹ to non-OECD countries. It will become applicable if two third of the parties of 1995 ratify the amendment. Currently 2 parties are missing for the Ban Amendment to enter into force (Basel Convention, n.d.).

The applicability of the Basel Convention to ships has been under a lot of discussion. End-of-life ships can be recognized as waste when the owner has the intention to dispose the ship and thus fall under the regulation of the Basel Convention (Matz-Lück, 2010), this view is also supported by the Conference of the Parties (COP) of the Basel Convention (Conference of the Parties, 2004). However, according to the shipping industry a ship only become waste when it ceases to operate in the marine environment and is being dismantled (Moen, 2008). Even if the Basel Convention is applied to end-of-life ships another issue arises. Wastes under the convention are managed under the jurisdiction of the exporting state. However if the intention to sell a ship is made on the seas outside coastal jurisdiction, there is no exporting state (Bhattacharjee, 2009). The parties to the Basel Convention developed Technical Guidelines for the Environmentally Sound Management of the Full and Partial Dismantling of Ships (2002) to give more specific guidelines for ship recycling, but these are voluntary. Altogether the Basel Convention can be concluded as unsuccessful for regulating ship recycling.

1.2.2 The Hong Kong Convention

The International Maritime Organization (IMO) has also been active on the subject of ship recycling. In 2003 they adopted the IMO Guidelines on Ship Recycling, urging ship owners to voluntarily make efforts towards more environmentally sound and safe ship recycling. The guidelines included a 'green passport' in which ship owners can document all hazardous substances on board to facilitate easier recycling.

The Marine Environment Protection Committee (MEPC) of the IMO requested the development of a legally binding instrument to complement the guidelines. In 2009 the Hong Kong International Convention for the Safe and Environmentally Sound Recycling of Ships (HKC) was adopted. This convention was set up by the IMO in cooperation with the International Labor Organization (ILO) and the Conference of Parties to the Basel Convention. It has three complementary goals: (1) designing the ships life cycle to facilitate safe and sustainable recycling, (2) operating recycling facilities in a safe and environmentally sound manner and (3) ensuring compliance to these goals by setting up ways of enforcement. To fulfill these objectives some concrete responsibilities are in place. Ship owners are required to provide an Inventory of Hazardous Materials (IHM) throughout the life of the ships and are restricted for the use of certain materials within the construction and during repairs. Ship recycling facilities must provide a ship recycling plan for each ship they dismantle and arrange training and protective equipment for employees. The main jurisdiction lies on flag states for enforcement of the ships and on recycling states for enforcement of the facilities. Ship owners must inform the flag state before dismantling takes place to get a 'ready to recycle' certificate for the ship. Prior informed consent between the flag state country and the importing state is not necessary, which is a weakness compared to the Basel Convention (Bhattacharjee, 2009; Fang, Maximo & Meija, 2012). Both flag- and port states can carry out inspections onboard ships for their IHM or ready to recycle documents. Enforcement of recycling facilities is only

⁹ OECD: Organization for Economic Co-operation and Development.

carried out by the recycling state itself which conflicts with their economic interests in the ship recycling industry (Fang, Maximo & Meija, 2012).

The HKC has not entered into force and is awaiting the ratification of a minimum of 15 states, representing at least 40% of the global merchant shipping volume and a representing a combined recycling volume of at least 3% of their tonnage. Currently it is ratified by 12 states representing 28.82% of the world tonnage (International Maritime Organization, 2019). None of the major recycling states (India, Bangladesh, Pakistan) have ratified the convention.

Different weaknesses of the HKC can already be identified prior to its entering into force. The polluter pays principle, that was the basis for the Basel Convention, has not been included in the HKC; thereby limiting the responsibility of ship owners (Fang, Maximo & Meija, 2012). Recycling yards are required to make improvements and will become more expensive (Matz-Lück, 2010). Ships can still be recycled at non-party recycling facilities, in countries who are not a signatory party of the HKC, which will be more economically attractive and thus undermine the convention (Bhattacharjee, 2009).

The convention is rather focused on procedures such as certificates and authorizations, instead of giving clear obligations (Matz-Lück, 2010). This decreases the effectiveness by not setting definite goals. For example, prohibiting or phasing out beaching is not included and neither are any requirements for waste management taken into account (Bhattacharjee, 2009; Chang, Wang, & Durak, 2010; Mishra, 2018). Furthermore, a system based on certification is often less effective because it is prone to corruption and it is specifically complicated in the case of ships where a global ship-registration system is lacking (Chang et al., 2010; Matz-Lück, 2010).

1.2.3 Regulatory difficulties

Developing and enforcing effective regulation for ship recycling is difficult because of two complexities. Firstly, the sale of end-of-life vessels is often arranged by middlemen or so called 'cash buyers'. They buy a ship and resell them to a recycling facility and intermediate 80% of these end-of-life sales (Alcaidea, Piniella, & Rodríguez-Díaza, 2016). This makes regulating the ship recycling more complex, as the original ship owner is not responsible for the ship anymore the moment it is sold to the cash buyer (Mikelis, 2019).

Another method to decrease the transparency of the sale of an end-of-life ship is a change of flag. So called 'flags of convenience' are flag states with open registry, which are often less stringent (Sonak, Sonak, & Giriyan, 2008). For some countries, like Panama and Liberia the number of ships that register before dismantling account for 50% of the total fleet (Alcaidea et al., 2016). Moreover, when ships are sold to a cash buyer, they often also change flags (Alcaidea et al., 2016).

1.3 The role of the European Union

Approximately 40% of all ships worldwide are under European (EU) beneficial ownership¹⁰, although only 20% are registered under and EU flag (Transport & Environment & NGO Shipbreaking Platform, 2018). This shows the big role the EU plays in the shipping industry. The number of EU flagged ships further declines when you only consider end-of-life ships and

¹⁰ European beneficial ownership: the owner of the ship or the person gaining the benefits of the ship is based in the EU.

accounts for approximately 10% of the total amount of recycled ships (Transport & Environment & NGO Shipbreaking Platform, 2018). Between 2013 and 2017 EU flagged recycling of ships amounted for 588.000 LDT while the ships that changed flags less than one year before dismantling amounted for another 432.000 LDT (European Maritime Safety Agency, 2018).

The EU has historically been actively involved on the subject of ship dismantling (Galley, 2014). Since 2006 the EU regulates the ship recycling industry through Regulation No 1013/2006 on shipments of waste, which is also called the Waste Shipment Regulation (WSR). This Regulation is based on the Basel Convention and includes the Ban Amendment, thus enforcing within the EU the prohibition on export of waste from OECD to non-OECD countries. This means that end-of-life ships must be recycled within the EU. Although the WSR has been in force for 13 years now the application has been limited; only ten court cases were ruled under the Regulation, with varying results¹¹. It is overall deemed an unsuccessful Regulation for changing the bad practices in the ship recycling industry.

Since the WSR was recognized as incapable of regulating the ship recycling industry (Mikelis, 2019) and the HKC is not in force yet, the EU decided to set up a new regulation, seeking to implement the HKC. In 2013 Regulation No 1257/2013 on ship recycling, also called the EU Ship Recycling Regulation (EU SRR) was adopted, which will be described in detail in chapter 3. Recently, at the 31st of December 2018 the Regulation has come into force.

In the above described framework this study will attempt to answer the following research questions:

'How does European Regulation No 1257/2013 on Ship Recycling promote safe and environmentally sound ship recycling?'

Sub questions:

- What measures does the EU SRR provide to tackle negative impacts of ship recycling?
- What are possible drawbacks of the EU SRR and how could these be improved?
- What will be the future developments of ship recycling and what role will the EU SRR play?

¹¹ Successful cases: Sandrien (2002), Sea Beirut (2003), Otopan (2007), Clemenceau (2013).
Cases that were fined in retrospective: Seatrade (2018), HMS Laurence (2019).
Unsuccessful cases: Riky (2005), Blue Lady (2007).
Ongoing cases: Harrier (2017), FPOS North Sea Producer (2016).

2. Methodology

2.1 Literature review

A literature review was executed concerning legislation on ship recycling in general¹² and the European Union Regulation No 1257/2013, also called the EU Ship Recycling Regulation (EU SRR), in specific. All relevant international legislation currently in place, scientific peer-reviewed literature about these legislations, books and jurisprudence have been identified and analyzed. Google scholar was used to collect scientific literature from 2010 onwards, using the following keywords: 'Ship recycling' 'Ship breaking', 'Ship dismantling', 'Ship scrapping', 'European ship recycling', 'Ship recycling regulation', 'Design ship recycling', 'Inventory of hazardous materials ships', 'European list ship recycling', 'Hong Kong convention', 'Capacity ship recycling', 'polluter pays ship recycling', and combinations of these keywords. Moreover, literature cited in the retrieved articles was also studied.

Since the EU SRR has only become applicable recently, at the 31th of December 2018, a knowledge gap exists on the impact of these recent developments. More precisely there is no comprehensive overview of the perspectives of the different stakeholders on the application of the Regulation.

2.2 Expert interviews

To fill the knowledge gap that exists when considering only published literature, supplementary data was collected through the conduct of expert interviews. The purpose of the interviews was to gain an in-depth understanding on the present situation of the EU SRR, its challenges and its prospects, and to compare this to the data found in literature.

The choice was made to conduct semi-structured interviews, as opposed to questionnaire surveys, to allow a more in-depth and open approach. Interviews allow a more comfortable and free atmosphere in which the interviewer has the ability to ask additional questions (Bogner, Littig, & Menz, 2009; Seale, 2011). Sensitive topics can be discussed more easily in a face to face conversation than in a questionnaire survey. Furthermore chances are smaller that participation for an interview is refused than for a survey (Bogner et al., 2009; Seale, 2011). A possible threat for interviews that must be considered is the 'interview bias', where the interviewer influences the answers that are given. Since experts have knowledge-based opinions and are used to defend their ideas the chances for an 'interview bias' are small (Bogner et al., 2009).

Other studies concerning ship recycling, in China and Norway, used a similar approach (Du et al., 2017; Schøyen et al., 2017) and showed the suitability of this method to study this subject.

2.2.1 Semi structured interviews

Semi structured interviews are in between a strictly structured and a non-directive interview method (Adams, 2015). They are also called focus interview, in depth interviewing or qualitative interviewing (Adams, 2015). Standard questions are taken up in an interview guide and asked in each interview, but additional questions can be asked during the interview if

¹² See 'Ship recycling – state of the art literature review', Bernike van Werven, February 2019.

interesting topics come up. A semi structured methodology is a good option for interviews dealing with policy interfaces as these are complex topics (Louise Barriball & While, 1994). By using a semi structured interview methodology it can be identified what dimensions of the topic are seen as most important by the respondents and what specific opinions they have on these topics (Flick et al., 2007).

A disadvantage of semi-structured interviews is that these interviews are time consuming and labor intensive, and thus limit the number of respondents that can be interviewed within the timeframe of this research. They also require a high level of background knowledge from the interviewer (Adams, 2015).

The interview guide that was used for this research can be found in Appendix 1 and consists of four parts. An introduction to start the interview and built a good ambiance and three parts with questions about ‘The impact of the EU SRR’, ‘EU SRR shortcomings’ and ‘EU SRR improvements and future development’. Asking similar questions in each interview allows for comparison between different interviewees (Louise Barriball & While, 1994).

2.2.2 Interview preparation

To cover different views on the implementation of the EU SRR, different stakeholder groups have been interviewed. This is especially important when interviewing experts because they are not neutral but are all involved in -potentially conflictual- power relationships (Meuser & Nagel, 2009). To counteract a bias based on viewpoint it is crucial to involve counter experts. Specifically for studying policies the stakeholders responsible for development, implementation and control of the Regulation should be interviewed (Meuser & Nagel, 2009) The relevant stakeholder groups for the EU SRR were identified as the following:

- policy makers
- ship owners
- operators of ship recycling facilities
- police enforcers
- supporting businesses
- non-governmental organizations (NGO)

The scope was limited to EU member states to ensure the possibility for face-to-face interviews. For sampling of the respondents ‘key informant sampling’ was used to target key people that are knowledgeable about the EU SRR (Young et al., 2018). The focus was put on high level or representative organizations to cover as many parties a possible. The organizations that were contacted can be found in Table 1.

Table 1: Contacted organizations and their involvement in the EU SRR

Organization	Stakeholder role
European Commission Directorate-General for Environment (DG ENV)	Development of the Regulation
European Community Shipowners Association (ECSA)	Implementation of the Regulation
International Ship Recycling Association (ISRA)	Implementation of the Regulation
Dutch ministry on Infrastructure, Environment and Transport	Control of the Regulation
Port of Rotterdam environmental police	Control of the Regulation
Sea2Cradle Ltd.	Support of implementation
NGO Shipbreaking Platform	Support of development, implementation and control.

All approached respondents agreed to participate in the interviews except for the Dutch Ministry, as they did not see themselves fit to answer questions concerning the EU SRR. To assure ethical interviewing all respondents were informed about confidentiality and given the option to see the report before publication. All participation took place voluntary.

A pilot interview with one of the stakeholders was conducted to test the interview guide, on content and on the time used. Some additional questions were added after the pilot interview.

2.2.3 Data collection

All interviews were taken between the 14th of March and the 15th of April 2019 and lasted between 32 and 48 minutes. This falls well within the advised maximum of one hour for interviews, to prevent interview fatigue (Adams, 2015).

The interviews were all carried out face-to-face. Five were conducted in English and one in Dutch, due to limited English proficiency of the respondent. Data was collected through audio recording which was afterwards typed out and, if necessary, translated to English.

When all the interviews were concluded additional questions that arose during the data analysis were posed via email.

2.2.4 Qualitative data analyses

The collected data was analyzed qualitatively through a qualitative content analyses using a coding strategy adopted from Young et al. (2018). All statements made during the interviews were extracted from the text and served as the 'initial codes'. These initial codes were categorized on different themes linked to the EU SRR, such as the scope or a specific measure. A grounded theory was used to identify relevant themes; they emerged from the raw data (Young et al., 2018). Afterwards the categorized codes were merged into final codes, to find statements that were supported by multiple of the interviewed experts.

The anonymized analyzed dataset can be requested from the author via ResearchGate.

3 Results: EU Ship Recycling Regulation

In this chapter the findings of the expert interviews are presented. To secure confidentiality of the respondent's statements are not linked to particular experts. As the asked questions arose from the regulation itself and the literature review, the results are sometimes supported by background information from literature (mainly information extracted from the Regulation itself). These parts can be easily distinguished, as they are in italic.

There is a general agreement amongst experts that we need to recycle in a safe and environmentally sound manner and that substandard recycling facilities should be phased out. The EU Ship Recycling Regulation (SRR) is on this account seen as a major improvement although, according to one expert, the full success of the instrument can only be evident later, once it is implemented. It is seen as an improvement by the respondents because it allows to work on ship recycling issues in a broader context and because it sets high standards and has clear technical guidelines, for example on downstream waste management and labor rights. Some respondents did point out that although the Regulation is a major improvement the possibility to circumvent will make it less effective. This will be described in more detail in chapter 3.7.

3.1 Scope

The EU SRR is limited because it only applies to EU flagged ships, as described in article 2. This is seen as a problem by four out of six respondents. More specifically, the police officer interviewed has observed that a lot of end-of-life ships leaving for recycling do not fly an EU flag and thus are not falling under the jurisdiction of the EU SRR. One measure, the requirement for an Inventory of Hazardous Materials (IHM) also applies to ships flying a non-EU flag, in that case the scope is limited to ships that visit EU ports. This will be further described in chapter 3.3.

Next to the limitation to EU flagged ships the Regulation also does not apply to 'any warships, naval auxiliary, or other ships owned or operated by a state and used, for the time being, only on government non-commercial service', 'ships less than 500 gross tonnage' and 'ships operating throughout their life only in waters subject to the sovereignty or jurisdiction of the Member State whose flag the ship is flying' (article 2). None of the respondents mention that this part of the scope could be an issue. It is even stated that the smaller ships don't need to be regulated by the EU SRR as they cannot be transported overseas to non-compliant recycling facilities. Furthermore, the compliance of ships not falling under the Regulation is stimulated in the preamble of the EU SRR: 'Member States are encouraged to ensure that ships excluded from the scope of this Regulation act in a manner that is consistent with this Regulation'.

3.2 Design

The installation of certain hazardous materials (Annex 1 list) in ships is prohibited under article 4 of the EU SSR. Half of the respondents' state that improvements can be made in the design of ships to facilitate the recycling phase. Thereby it is said that both the exclusion of any hazardous materials and the construction for easier processing of end-of-life ships can be a way forward.

During the interviews better design was not seen as a priority issue for the EU SRR to cover. In the future the EU SRR can have a role in green design¹³, but the first focus should be to ensure that the Regulation will work as it is now, according to two experts. Moreover, they state that if we further regulate the design phase, more responsibilities should be put on ship builders. Other important factors for green design that were identified by the respondents are the investments that can be made by ship owners and the possibility to improve communication between yards that built ships and yards that recycle ships. Inclusion of the Inventory of Hazardous Materials (IHM) is seen as a good start for regulating the design phase.

3.3 Inventory of Hazardous Materials

The first measure that the EU SRR introduces in article 5 is the Inventory of Hazardous Materials (IHM). Since the Regulation applies to all new ship, these ships must carry an IHM on board identifying all the hazardous materials described in Annex 2, their location and approximate quantity. All existing EU flagged ships and non-EU flagged ships that visit EU ports shall also carry an IHM as of the 31st December 2020, broadening the scope of the EU SRR.

All interviewed experts see the IHM as an important measure, which will help facilitate proper recycling. One stakeholder even sees it as the most effective measure in the EU SRR and it is especially effective because it will also apply to non-EU flagged ships. It is also stated that the IHM can help authorities prove that hazardous wastes are on board. One expert notes that it can be enforced well, because port state control can check that each ship has an IHM on board. It is also stressed by one expert that it is important that ships that have proper IHM's are also available for substandard recycling facilities as it can help them higher their standards.

Four out of six respondents indicate that ship owners are not prepared for the 2020 deadline, when existing ships and ships flying a non-EU flag have to carry an IHM. A high percentage of the fleet is still lacking an IHM. Currently it is estimated by the experts that only 3 to 4 thousand of the potentially affected 30 thousand vessels have an IHM on board. *If ships do not have an IHM on board at the deadline there will be sanctions in place. Port state control can warn, detain, dismiss or exclude vessels from the ports or offshore terminals.*

A last topic of importance that was identified by two experts was the importance of reliable IHM's. Expectations were stated; only a minority of the IHM will be properly constructed due to a lack of expertise.

3.4 European list of ship recycling facilities

The second substantive measure that is included in the EU SRR is the application of an EU list of ship recycling facilities. Article 6(2)(a) describes that owners of ships with an EU flag can only recycle their ships in the listed facilities that have been approved by the European Commission. To be included in the list, these facilities need to comply with the standards set by the Regulation described in article 13, such as to operate from built structures and to provide safety measures and training for workers to prevent health risks. Requirements are also included on downstream waste management; yards must only transfer their waste to

¹³ Green design: design that facilitates safe and environmentally sound recycling.

authorized waste management facilities. Ship recycling facilities within the EU can be approved by their Member States (article 14) while 3rd country ship recycling facilities are audited by the European Commission (article 15).

The EU list is seen as an important market differentiator by two experts. It gives approved yards exclusive access to EU flagged vessels. Two respondents state that the EU SRR is an improvement compared to the Waste Shipment Regulation (WSR) because it has the possibility to include 3rd country facilities beyond OECD countries and can regulate these facilities. It is stressed that the EU does not oblige facilities to apply but encourages them to higher their standards. Currently three out of the 26 shipyards that are part of the EU list are located outside the EU; two in Turkey and one in the United States of America. According to two experts it is important that more 3rd country facilities are included in the list in the future. However, two other experts point out that the EU should only include proper facilities on the list. Currently, according to one expert, the European Commission is doing their work well and applies the criteria and the technical requirements strictly. It is seen by another respondent that the EU list has incentivized dozens of yards to bring their operations and infrastructures up to higher standards. According to our experts, yards set inclusion on the EU list as their main goal. Turkish yards that have been approved and are now part of the list are also observed as very proud to have an EU approved yard.

It is stated that ship recycling facilities in South Asia that use beaching methods can also apply for inclusion on the list and are not excluded on beforehand. When the interviews took place, the EU Commission had received 28 applications from ship recycling facilities outside the EU and 14 of these applications came from Indian facilities. These yards are checked and inspected case by case on their compliance with the requirements. *Two site inspection reports of Indian facilities have been published¹⁴.* They have not been approved, but aren't rejected either, as is stressed by three experts; the application procedure is not finalized yet. However, it is also stated by one respondent that since the EU SRR does not talk about rejection, the non-approval can be seen as a 'rejection for the moment' since the application is a permanently open process. It is also noted by the experts that Indian yards are not the only yards that haven't been approved yet, several Turkish yards are also seen as non-compliant with the EU requirements. On the other hand, facilities in Turkey are a good option because of their economic situation.

Four Chinese facilities also applied to be included in the EU list. However, since the China ban on waste import in 2017 China does not accept end-of-life ships (General Office of the State Council, 2017) and these applications have been put on hold. Four experts name the ban as a negative development for the EU SRR, because they have a lot of suitable facilities that could be included in the EU list.

The opinion of experts concerning the level of compliance by ship recycling facilities located within the EU differ strongly. While one respondent states that the Regulation did not aim to regulate facilities located within the EU and this is also not necessary as sufficient local legislation is in place, two other stakeholders state that some facilities located in the EU don't perform at the required level due to a lack of experience amongst auditors. According to one stakeholder 50% of the facilities on the EU list that are located in the EU should not have been approved, for different reasons such as a lack of containment or controlled recycling or because safety and health standards are not in order. It is however also stated by one expert

¹⁴ The site inspection reports can be found online: <http://ec.europa.eu/environment/waste/ships/list.htm>

that currently the most active yards in the EU are in Denmark, Norway, the United Kingdom, Belgium, the Netherlands, Spain and France where the standards are relatively high.

3.4.1. Open beaching facilities

As described, 14 South Asian ‘open beaching’ facilities have applied for the EU list. The role of these facilities is a hot topic amongst the interviewed experts. One expert states that for recycling in a safe and environmentally sound manner it doesn’t matter if the ship is on the water or on sand since the ship itself works as a built structure. Moreover, blocks that are taken from the ship can be directly put on a concrete floor. Another expert states it can be more challenging for beaching facilities to fulfill the requirements of the Regulation, but it is probably not impossible. Three experts state that beaching yards should not be included in the EU list because they don’t apply high scrapping standards. Multiple reasons are given as to why it can be challenging for South Asian yards to comply with the EU SRR.

One expert states that beaches are not ‘*designed, constructed and operated to be a recycling facility (as is described in article 13(1)(b))*’ it is merely a beach. *Article 13(1)(f) requires facilities to ‘prevent adverse effects on human health’.* Three experts describe the situation; at the beaching yards there are no hospitals in the proximity and labor rights are limited as there are no trade unions. It is stated that there is child labor in facilities in the South Asian sub-continent and employees are working for more than 70 hours per week. Moreover, workers have to work overtime, work under extremely hazardous conditions and have no proper protective equipment. Beaching is also not a controlled method when it comes to safety as the ‘gravity method’ is used. One expert states that workers in the beaching industry are not employed but exploited. According to two experts’ improvements of the labor conditions are made, but for inclusion on the EU list the working conditions are still too poor and should be further improved.

Facilities are required to prevent ‘adverse effects on the environment, including the demonstration of the control of any leakage, in particular in intertidal zones’ (article 13(1)(f)). According to three stakeholders, there is no containment when the open beaching method is used; parts fall onto the beach and are washed away with the tide. When large blocks are cut off the ship the inside of the ship also comes under tidal influences. And even if all the blocks are processed on concrete floors, during cutting pollution ends up on the beach and is taken away with the tide.

Hazardous materials have to be managed only on impermeable floors and may not be released into the environment, as described in article 13(1)(g)(i). It is stated that beaching yards use some concrete surfaces as impermeable floors, but this is not sufficient. It is also challenging for these facilities to have effective drainage systems according to one expert. *The downstream waste management is regulated under the EU SRR in article 13(1)(g)(ii); ‘waste is documented and only transferred to waste management facilities authorized to deal with their treatment’.* Four experts indicate problems in India when it comes to downstream waste management. For example, there is a lack of proper facilities to handle asbestos.

One expert also states that South Asia should melt the scrap steel instead of rerolling it, to make higher quality steel. It is summarized by two experts as the following: beach scrapping can be improved, but inherent problems are linked to the beaching method and only if beaching yards can exclude the environmental effects in the intertidal zone they might be part of the EU list. As written before, not all experts agree with these statements.

It is stated by three experts that alternatives for open beaching are available, also in South Asia. There are many empty harbors and old yards that could be used for ship recycling. Moreover, not all facilities on a beach use a beaching method. For example, in Turkey there are yards where everything takes place on a concrete surface with a drainage system. Even in South Asia there are plenty of facilities built on concrete floors or platforms. These are also developed outside of the three main countries (India, Bangladesh, Pakistan) and can be found for example in Oman.

It is pointed out by one expert that if the traditional facilities in India and other South Asian countries are not included in the list they will turn their back on the EU. If substandard ships cannot get EU ships, which have an IHM and are easier recycled, they will stop the ongoing improvements.

However, so far, the experience with Indian applications for the list is seen as positive and they seem very interested to be included in the list. They are not turning their back on the EU.

3.4.2 Capacity and geographical distribution

The capacity of the EU list of ship recycling facilities has been discussed extensively before it became applicable. The aim was set to reach a capacity of 2.5 million LDT before applying the Regulation, but if this was not met it would still enter into force on the 31st of December 2018, as has happened. The current capacity of the EU list is 1.72 million LDT (Commission implementing decision, 2018). Especially ship owners have shared their concerns about the ship recycling capacity¹⁵.

Even though it has been widely discussed in literature, currently none of the experts opposes that there is enough capacity on the EU list. According to multiple experts, the capacity concerns were taken seriously and analyses took place by the European Maritime Safety Agency (European Maritime Safety Agency, 2018) and by the NGO Shipbreaking Platform in cooperation with Transport & Environment (Transport & Environment & NGO Shipbreaking Platform, 2018). Both have concluded that there was more than enough recycling capacity in the ship yards on the EU list to handle the supply of end-of-life EU flagged ships, as is stressed by three different experts. Four out of six experts directly state that the capacity of the current list is sufficient. It is stressed by one expert that it will also suffice for big ships. Moreover, based on the past 5 years data on end-of-life EU flagged vessels the capacity is even 3 times more than what is required. Furthermore, it is stressed by two experts that the actual recycling capacity of the EU list is higher than the historical recycling capacity that is described in the list. Facilities have been underperforming because they did not receive enough ships for recycling.

It is expected by five out of six experts that the capacity of the EU list will grow further as new ship recyclers will enter the market of sustainable recycling when the business is growing. For example, yards that now focus on building or repairing ships could also include work on recycling ships.

Some challenges for the future capacity of the EU list have been identified by the respondents. Two experts state that due to a high increase in ship building 25 years ago there will be a steep rise of end-of-life ships. Between 2025 and 2027 the current EU list will not be

¹⁵ The concern of ship owners can be seen from different news articles, such as: <https://www.ecsa.eu/press-releases/ecsa-asks-more-capacity-eu-ship-recycling-list>

sufficient, and the beaches alone won't fulfill the needs either. However, taking into account the prospected growth of the capacity of the EU list, capacity will not be a problem in the future either.

Other challenges on capacity could arise; if all EU owned ships would need to be recycled in EU listed facilities, or if we, in the long-term, process all ships worldwide under safe and environmentally sound conditions.

Next to the total capacity of the EU list the 'geographical distribution' is also important, according to two experts. We need a list that includes ship recycling facilities worldwide. Currently there are no facilities included in Asia, which is not helped by the waste import ban of China (2017). This is stated as important by one stakeholder because if vessels that don't enter EU ports during their operational life have to be recycled in EU facilities this costs a lot of time and energy. Moreover, for small non-oceangoing ships it is not viable to be transported to the EU. Put even stronger, it is said that the EU SRR will fail if it only includes EU and Turkish facilities in the list of approved facilities.

However, firstly, geographical distribution of the EU list is not a condition under the Regulation as pointed out by two respondents. Secondly, as stated by three experts, the geographic distribution is not an issue for ships. Vessels have left EU waters to be dismantled in South Asian ship yards in the past, so it is not inconceivable to see them make the journey the other way around. Moreover, ship owners are still able to sell their ships to the closest ship recycling facility and they can plan their trades at the end-of-life phase accordingly.

For the transportation of rigs geographical distribution might be more important as they are more difficult and delicate to transport when towed. However, it is also stated that, if necessary, end-of-life rigs can be lifted on ships for long distance transports although this is costlier.

3.4.3 The 'comma issue'

The requirements for facilities which want to be included in the list are in general very clear. However, one point of interpretation is still under discussion amongst experts. This is also called the 'comma issue'. The linguistic versions of article 13(1)(g)(i) differ. In the English version of the EU SRR it speaks of 'handling of hazardous materials, and of waste generated during the ship recycling process, only on impermeable floors with effective drainage systems' while for example the Dutch version only talks of handling of hazardous materials in this article and not of 'other waste generated during the process. The English version thus sets more strict requirements than the Dutch version, which could lead to different levels of implementation, as stated by three experts.

Both the explanation on how this arose, and the perceived solutions are differing among experts. Three experts state that errors were made during the translation phase while one expert states that after agreement on the EU SRR an adviser added the part between the commas ('and of waste generated during the ship recycling process') intending to only clarify that both hazardous materials and hazardous wastes should be handled as described, but as an indirect consequence changed the entire interpretation of the article.

It is stated that currently the European Commission is only looking at the handling of hazardous materials on impermeable floors and not all materials. During a review of the EU SRR this issue can be revisited and settled. One expert stresses that English is the mother text and that other translations should correct this. Another expert says that every EU language has the same importance. It is also pointed out that following the precautionary principle all

waste, both hazardous and non-hazardous, should be dealt with in containment, as they are difficult to separate.

Lastly, two experts state that the importance of the comma 'issue' is exaggerated, as it is a mere translational issue and the current interpretation of the article has been settled already a long time ago.

3.6 Hong Kong Convention

One of the aims of the EU SRR is to facilitate the early ratification of the International Hong Kong Convention (HKC) from 2009. Different measures included in the HKC, such as the Inventory of Hazardous Materials (IHM), are mirrored in the EU SRR and have thus now become applicable. The EU SRR also includes additional measures and requirements.

According to four out of five experts the EU SRR sets higher standards than the HKC and is a stronger instrument. They state that the standards that were set by the HKC were deemed too low, or even below acceptable, and outdated since its adoption ten years ago. They indicate that the EU SRR is different from the HKC; it puts stricter requirements on the ship recycling facilities, such as the inclusion of downstream waste management and its inspections on yards are carried out by a 3rd party instead of putting all responsibility on recycling states and flag states. However, an advantage of the HKC compared to the EU SRR, as indicated by one expert, is that it sets a global standard that all facilities worldwide can meet, provided the right mindset, investments and training.

The expert opinions on whether the HKC should enter into force and what effect this could have differ strongly. Two experts state that the aim of the EU SRR to facilitate the entering into force of the HKC is important or even a main priority. One of them states that the entering into force of the HKC is a necessary step before being able to adjust it to give more control on health, safety and environment. According to a third expert, member states should ratify the HKC but apply the same rules to it as those that are in the EU SRR. A fourth expert states that the entering into force of the HKC would be an extremely negative development. Although the EU SRR is a stand-alone legal instrument it would be impacted when the HKC would enter into force and will be evaluated (*as described in article 30(2)*). However, if Indian yards will fulfill the requirements of the EU SRR and become part of the EU list before the HKC enters into force the differences are expected to be less relevant, by one stakeholder. The encouragement of the EU SRR for South Asian yards to be involved in the sustainable recycling industry is a positive development. This can increase the chances for these countries to ratify the HKC.

Two experts state that there is currently a momentum for ratification of the HKC, which can be at least partially attributed to the EU SRR. When the EU SRR was adopted no country had ratified the HKC and now even big recycling nations such as China and India are having a closer look at it. If China and India will ratify the HKC it can enter into force. However, the current ban on import of waste, including end-of-life ships, that is in place in China prevents them from ratifying. It is noted by one respondent that the EU SRR has also pushed EU member states, such as the Netherlands and Germany, to ratify the HKC. Even though this momentum exists, the prospects for the HKC are rather unclear and it will probably take a minimum of 3 to 5 years before it will enter into force. It is also stated that if exclusion of South Asian yards under the SRR is merely because of political reasons or because they are in the intertidal zone,

this would endanger ratification of the HKC as for ratification of the HKC the improvement and inclusion of South Asian yards is a key factor.

Lastly, the importance of a global instrument to regulate a globally operating industry is stressed by two experts. An EU regulation cannot regulate all ships worldwide. However, it remains questionable whether the HKC is the way to go and in the absence of a global instrument the EU SRR does play an important role as a driver for changes.

3.7 Reflagging

Since the scope of the EU SRR is limited to EU flagged ships (article 2(1)), third country ships don't have to recycle their ships in an EU approved facility¹⁶. The legal possibility to flag out of the EU SRR, is recognized by all experts and seen as a way to circumvent the Regulation. If ship owners change their ships registry from the EU to a third country, they don't fall under the jurisdiction of the EU SRR anymore. Half the experts state that the circumvention through reflagging is the weak link of the Regulation.

Five out of six respondents expect that there will be an increase in ships flagging out because of the recent adoption of the EU SRR, because it is less costly to reflag a ship than to follow the requirements set under the Regulation. Reflagging only takes a few thousand dollars and a few hours, while it is estimated that recycling at a non-approved yard can lead to a financial gain of up to five million dollars¹⁷.

According to one expert it is an infringement on the EU SRR when ships flag out and there is a link to the intention to discard the vessel. Enforcement practitioners can investigate the decision-making procedure leading to a change of registration. However, this approach of enforcement is not stated in the EU SRR.

Different solutions are put forward to tackle the issue of circumvention. One expert states that presently there are discussions ongoing to give fishing vessels a unique number to increase traceability. These kinds of numbers could also be used for jurisdiction of the Regulation on ship recycling. Another option to solve the issue of reflagging would be if open registry flag states would require higher standards, but the EU unfortunately does not have a direct control on this.

3.7.1 Financial incentive – the ship recycling license

The most well-known initiative to deal with out flagging is the inclusion of a financial incentive within the EU SRR. Since the start of the EU SRR the European Commission has written a report on the feasibility of a financial instrument (2016) as was required under article 29 of the EU SRR. It was then concluded that a ship recycling license is the most suitable measure thus far investigated. Ship owners would have to purchase a license when entering EU ports and the capital invested in this license will be paid back when the ship is sent to an EU approved recycling facility. However, in the report by the European Commission it was also decided that no financial incentive would be adopted before the Regulation was implemented and reassessed to confirm the need for this additional measure.

¹⁶ Ships flying the flag of a third country are however required to have an Inventory of Hazardous Materials on board when visiting an EU port, starting in 2020

¹⁷ This is a rough approximation, precise numbers are dependent on ship size, type and conditions of the recycling- and steel market.

One expert stressed the importance of the inclusion of a financial incentive in the EU SRR. It would make ship owners think twice before sending their ships to non-approved yards. Furthermore, this respondent states that the money that would be set aside and not paid back could be used to support facilities that want to improve or enlarge their capacity. Moreover, through including a ship recycling license the scope of the EU SRR would be enlarged to include all ships visiting EU ports and would cover up to 60% of the entire world fleet.

Two other experts are less enthusiastic about the inclusion of a financial incentive. They think it is not the way forward because it would lead to a lot of bureaucracy and the money set aside would not be sufficient to change the behavior of ship owners. The last two experts follow the report of the European Commission and state that before discussing the inclusion of any financial incentive we need to see how the Regulation works as it is now. We can still come back to it in a future review of the Regulation.

3.8 Stakeholder responsibilities

One of the founding principles of the Basel Convention (1989) was the ‘polluter pays’ principle, meaning that the person responsible for the waste has to pay for its management. According to different studies, the EU SRR deviates from this principle and does not put enough responsibilities on the ship owners (Argüello Moncayo, 2016; Karim, 2017; Pastorelli, 2014; Yujuico, 2014). The burden for the proper recycling is put on the recycling facilities which are often located in developing countries (Karim, 2017).

However, the majority of the interviewed experts, including stakeholders linked to the recycling facilities, did not agree with this view. They stated that ship owners contribute to yard investments afterwards, when the facility becomes more expensive. This is a sufficient obligation especially as the investments by the yards are not substantial; ‘a bit of concrete and cranes.’ Especially when substandard facilities are phased out and there is a level playing field for standard facilities ship owners don’t have a choice and will have to pay for sustainable and safe recycling.

In general, it is stated by one expert that the EU SRR puts responsibilities only on parties involved in shipping (flag state, ship owners, recycling state, port state), which is an improvement compared to the WSR, where the exporting state was involved. Ship owners are required to have an IHM on board of their ships and bring their ships to facilities included on the EU list and on the other hand recyclers must fulfil strict requirements to access EU flagged ships. This is seen as a good balance between those two stakeholders. It is stressed by one expert that all stakeholders should work together and that if ship owners are interested in having South Asian yards included in the EU list they should help them with advice and guidance but also with financial support. Although there is no specific mechanism designed to facilitate this cooperation, it should be self-evident, according to this expert. Already now, ship owners are involved in the facilities where they recycle their ships. One possible risk is pointed out by a respondent: ship owners are forced to abandon these facilities and stop pushing them for higher standards. In the past this expert has seen that standards decline quickly when ship owners are not involved anymore.

One expert does agree that there is an imbalance between responsibilities for ship owners and recyclers, because the obligation for ship owners to recycle in an approved yard is easily circumvented and thus a non-obligation. According to this expert the polluter pays

principle could be properly implemented through inclusion of a financial incentive, as described in chapter 3.7.

3.9 Enforcement

EU member states are responsible for enforcement of the Regulation, as described in article 22. They have to ensure that the provisions of the EU SRR are properly applied and that both ship owners, and recycling facilities located in the member state, follow their legal obligations. According to two experts, if the penalties set on companies circumventing the rules are sufficient and chances to be caught are high enough shipping companies might change their behavior. Enforcement of the EU SRR is very important, as is stressed by four respondents.

According to one stakeholder, end-of-life ships can be identified by multiple factors such as; they don't fully fill their fuel tanks, there is a crew change, the interior of the ship is emptied or when someone on the ship informs the police. To observe infringements, member states should have enough capacity for enforcement on these files. According to two experts the capacity is currently very different between different countries and overall too low. For example, in the Netherlands approximately 10 detectives work on these files, only part-time. Moreover, there is no homogenous situation within the EU when it comes to enforcement, some countries are more focused on migration issues and don't want to put capacity and resources on the enforcement of the EU SRR.

Cooperation between member states is key for enforcement of the transboundary ship recycling industry. For example, when a ship is suspected in the Netherlands and a research is started and the ship moves to Belgium the Dutch police loses many of their competences. Therefore, it is important that information is shared between countries, preferably in an early stage to prevent the ship to leave to a non-approved facility. Two experts agree that we need better international cooperation between member states and that the EU should support this development.

In general, three experts think it will be difficult for member states to properly enforce the EU SRR.

3.10 Future development of the EU SRR

During the interviews some general statements were made on the future developments of the ship recycling industry. All experts agree that substandard facilities should be phased out. As a long-term goal two experts see the ship recycling evolve towards an industry exclusively taking place in dry docks. Two other experts stress that to truly change the ship recycling industry we need a change of mindset.

3.10.1 Review of the EU SSR

A review of the EU SRR is foreseen in article 30 and will take place either 18 months prior to the entry into force date of the HKC or five years after the date of application of the EU SRR.

A future review could look into several issues such as the inclusion of a financial incentive, the extension of the scope, inclusion of vessels sailing under EU ownership and alignment with the HKC. According to one expert it is impossible to decide now what should be discussed in a

future review. Only after seeing the strengths and weaknesses of the implemented Regulation the sources of the weaknesses can be found and solved. According to another stakeholder, the introduction of a financial incentive is known to be the most logical step ahead to close the existing loopholes, but next to that the standards should also be tightened.

When it comes to changing the jurisdiction, opinions differ. According to one expert it is important for proper regulation to involve the flag state who have the competence to enforce a ship, also when it is sailing on the high seas. This way there is no circumvention possible through decision making on the high seas, as was the case under the WSR. Another stakeholder states that bad practices won't be changed if we keep regulating based on flag because ship owners can easily change flag. According to this expert we should regulate ship recycling through beneficial ownership¹⁸. However, it is stated by another respondent that even if we would regulate the ship owners through beneficial ownership they could also move and thus circumvent the EU SRR.

New articles on the use of energy in the process of recycling could also be included when a review takes place; to reduce the amount of energy used in facilities or to require the use of green energy. Future jurisprudence can help show additional drawbacks or weaknesses that should be addressed in a review.

3.10.2 Global role of the EU

The EU currently has a global role and a global impact on ship recycling through the EU SRR. Through the inclusion of 3rd countries facilities and through the obligation for all ships visiting EU ports to carry an Inventory of Hazardous Materials. According to one expert the impact of the Regulation could be enlarged further through inclusion of a financial incentive. Two stakeholders state that the EU is carrying out their role on a global level very well. The EU should continue to have a leading role in ship recycling and be a driving force for improvements. In the future we do need more capacity and we should incentivize more yards to apply for the EU list.

The global role the EU has by pushing their member states to ratify the HKC is also acknowledged. It is also stated that the EU, as a group of countries, can have a big role in the future on a global level by pushing for a review of the HKC when it enters into force.

¹⁸ See footnote 10.

4. Discussion

Different important statements were made by experts, which were discussed in chapter 3. Whether these statements are supported by literature will be the subject of this chapter, with a main focus on the improvements the experts indicated.

The statement that sustainable recycling of ships is important and that it is a challenge, is underwritten many times in literature (Du et al., 2018; Alcaide, Rodríguez-Díaz & Piniella, 2017; Ribeiro & Molenaar, 2015). Thus, researchers and experts from different stakeholder groups have found agreement on this. Alcaide et al. (2017) surveyed 65 experts from different fields concerning ship recycling and of those 29% assessed the state of the ship recycling industry as 'good' and only 16% judge it as 'very poor'. This does not fit with our results or with the general statements in literature. However according to Alcaide their respondents' explanatory notes still showed that they viewed the current practices as poor and they did agree that substandard yards should be eliminated.

It was found that the EU SRR is seen as a major improvement, this is supported by Alcaide et al. (2017). Moreover, they state that facilitation and implementation of international rules, as done through the EU SRR, are key elements for changing the recycling industry. Ship owners have been observed to adapt to the EU SRR as seen in the literature; already 5 ships with an EU flag were sent for recycling in yards from the EU list (NGO Shipbreaking Platform, 2019c).

Ribeiro (2015) also states that the new Regulation is a step forward in the development of international regulation for ship recycling. However, although some gradual changes are already going on (Alcaide, Rodríguez-Díaz & Piniella, 2017) the impact of the Regulation is still unclear (Ribeiro & Molenaar, 2015).

Although in our results experts stated that one of the major weaknesses of the EU SRR is the limited scope that only includes EU flagged vessels, Alcaide et al. (2017) found that the limitation to vessels larger than 500 GT is the major weakness. However, Galley (2014) states that those small ships include a lot of non-ocean-going ships and their percentage of the entire fleet will only amount to approximately 1% of the world tonnage, which fits with the results we found on the little risk of small ships to be recycled in non-approved South Asian yards. Moreover, the exclusion of ships smaller than 500 GT is seen as common practice (Matz-Lück, 2010). The exclusion of 'any warships, naval auxiliary, or other ships owned or operated by a state and used, for the time being, only on government non-commercial service' (article 2 EU SRR) was already used in article 32 of the well accepted United Nations Law of the Sea (UNCLOS) from 1982.

4.1 Green design

Our experts stressed the importance of design for recycling, but also stated that this is not a key role for the EU SRR to play now. In literature we can also find that for proper recycling more attention should be paid on the green design¹⁹ and construction of ships instead of only focusing on cost and quality (Du et al., 2018; Liberacki, 2018). In some other industries such as the automobile industry 'design for recycling' is already used (Du et al., 2018).

¹⁹ See footnote 13.

In our results it was found that the Inventory of Hazardous Materials (IHM) is a good start for green design; ship builders must take into account the recycling phase. The IHM can contribute to appropriate handling of the hazardous materials, since recyclers know when they will be exposed to these materials (Soares & Santos, 2014). The IHM of the EU SRR requires two additional substances compared to the HKC (Moncayo, 2016; Mikelis, 2019) but makes no substantial difference and could have been more strict in the regulation of hazardous substances (Ribeiro & Molenaar, 2015). Next to this, as was also concluded from the expert interviews, the proper construction of IHM's can be a problem. This issue has also been addressed by the European Maritime Safety Agency (2016); in their study on the development of IHM's they call for the need for more qualitative and reliable IHM's.

Some additional steps towards green recycling have been identified in literature. If all the materials on board are documented, instead of only listing the hazardous materials, the planning of the recycling process can be improved (Jain, Pruyn & Hopman, 2016; Soares & Santos, 2014). Waste and resources can be better managed, thereby reducing the costs of proper recycling (Jain, Pruyn & Hopman, 2018). A useful tool therefore would be the Material Flow Analysis (MFA), where all materials on board are documented (Jain, Pruyn & Hopman, 2017).

Apart from the materials on board, the method of construction also impacts the possibilities for proper recycling. If we apply a modular building system in ship building it can be more easily taken apart and reused (Liberacki, 2018). According to Mckenna et al. (2012) the main focus should lay on the manner in which ship recycling activities are carried out.

The EU SRR can play a bigger role when it comes to green design by proactively supporting the substitution of hazardous materials and regulating the prohibition on these substances (Ribeiro & Molenaar, 2015). When it comes to specific measures, such as the MFA, researchers do not make the link to the EU SRR. This might be because these named measures are still novel (Jain et al., 2018). However, it can be interesting to follow these developments and see how they can be integrated in the EU SRR.

4.2 Regulating facilities worldwide

Although the interviewed experts for this study were over all satisfied with the standards that are set by the EU for yards to be included in the EU list, in literature some recommendations for stricter or more specific requirements are proposed. Du et al. (2018) states that 'more specific, practicable and easy-to-regulate' measurements are not developed sufficiently. For example, for proper asbestos regulation a maximum air-density for asbestos fibers should be included. Alcaide et al. (2017) found in his survey with 65 respondents that the current EU SRR does not have sufficient concepts on how to manage toxic wastes. Moreover, the respondents on this survey stated that to guarantee compliance with the set requirements experts need to inspect the facilities which won't work well in practice.

4.2.1 To beach or not to beach

The respondents from Alcaide et al. (2017) stated that 'beaching should be gradually phased out', which is in accordance with the view of most of our interviewed experts. According to Moncayo (2016) beaching is not allowed under the EU SRR, since there is no use of 'built structures'. Ribeiro et al. (2015) adds that beaching facilities cannot meet the specific conditions set by the EU SRR concerning downstream waste management. Mikelis (2019) adds

that the comma's that were added in article 13 of the English text ('comma issue') can be concluded as 'a way of the EU SRR to sneakily ban beaching', as it is impossible to handle all waste on impermeable floors using the open beaching method.

It was stated during the interviews that even in South Asia many facilities are constructed and operating on concrete floors. This is also shown by the report of ECSA (2019) about the progress of Indian ship recycling facilities, who found that some facilities make use of impermeable floors.

4.2.2 A growing list

Concerning the capacity of the EU list, different views can be found in literature while our experts agreed that the capacity is not an issue currently. Galley (2014) stated that the EU does not have sufficient capacity, especially to recycle large ships. The survey of Alcaide et al. (2017) also found statements amongst respondents on the insufficient capacity of the EU, which could be solved through inclusion of 3rd country facilities. As mentioned before, studies by Transport & Environment and the NGO Shipbreaking Platform (2018) and the European Maritime Safety Agency (2018) showed that the capacity of the current EU list is sufficient. The growth of the EU list, that is expected by our experts, can be supported by the current plans for development of environmental friendly ship recycling facilities both in Brazil and in Indonesia (Ocampo & Pereira, 2019; Sunaryo & Pahalatua, 2015). If these facilities would be included in the EU list this could also contribute to a better geographical distribution. Already a new draft of a Commission Implementing decision for the EU list of ship recycling facilities exists, including eight new facilities²⁰, showing moreover that the list is a 'living' and ever-growing document.

4.3 A global regulation

The importance of a global regulation to regulate a globally operating industry was underwritten by our experts. This is supported by survey respondents who state that the HKC should enter into force as soon as possible as it is the only way to tackle unsound ship recycling (Alcaide, Rodríguez-Díaz & Piniella, 2017). Moreover, setting a global minimum standard is the only way forward to improve ship recycling practices (Mikelis, 2019).

However, our experts also questioned the standards that are set by the HKC. This is supported by Ribeiro et al. (2015); the EU SRR provides stricter requirements than the HKC and the HKC failed to regulate downstream waste management. It is also seen that the early implementation of the HKC within the EU is a favorable development (Alcaide, Rodríguez-Díaz & Piniella, 2017).

It was stated by the experts in this study that the HKC is not expected to enter into force in the near future and will take at least 3-5 years, although there is a momentum for ratification. This was supported in the recent IMO seminar about the early entry into force of the HKC. The interest of the major shipbreaking countries (India, Bangladesh and Pakistan) to ratify the HKC was shown, but indeed, this won't be implemented earlier than 2023 (Gunton, 2019).

²⁰ Of which 2 in Denmark, 5 in Norway and 1 in Turkey.

4.4 Circumvention

The issue of reflagging, which was recognized by the interviewed experts, is also supported by literature. Chances are that ships will reflag to evade the Regulation, especially if the EU list will exclude beaching facilities (Alcaide, Rodríguez-Díaz & Piniella, 2017; Mikelis, 2019). Already three months after the Regulation became applicable the first seven cases of end-of-life reflagging of EU flagged ships before recycling at a non-approved yard have been recorded (NGO Shipbreaking Platform, 2019b). However, shipping companies that wish to preserve a green image risk to damage this if they actively circumvent the EU SRR (Alcaide, Rodríguez-Díaz & Piniella, 2017).

Cash buyers, who buy end of life ships and sell them to recycling yards, are not included in the EU SRR and none of the experts seemed concerned about the role they play. However, when a ship goes for recycling and is sold to a cash buyer the responsibility for the ship is also transferred (Mikelis, 2019). The original Regulation proposal included an extended responsibility for ship owners up until six months after the ship was sold, but this has not been included in the final regulation (Ribeiro & Molenaar, 2015).

The use of a ship recycling fund might be a suitable way to cope with the possibilities for circumvention. The respondents of Alcaide et al. (2017) stated that a financial incentive can balance the price difference between sustainable and substandard recycling. Moreover, it would fit the 'polluter pays' principle, forcing ship owners to pay for the proper recycling. The fund can also support facilities to improve their standards (Ribeiro & Molenaar, 2015).

4.5 The polluter pays

The expert opinions are contrary to the arguments often found in literature, about the deviation from the 'polluter pays' principle in the EU SRR, as described in chapter 3.8 (Moncayo, 2016; Karim, 2017; Pastorelli, 2014; Ribeiro & Molenaar, 2015; Yujuico, 2014). However, literature that supports the views of the majority of the interviewed experts exists as well. Mikelis (2019) states that the investments of facilities will be covered by the lesser payment for end-of-life ships and are thus indirectly paid for by the so called polluters, which are the ship owners.

Nonetheless, some further steps can be taken by ship owners to ensure safe and environmentally sound recycling and support of yards. Ship owners can start a fund to support improvements in recycling facilities (Du et al., 2018). Interviews with Norwegian ship owners have shown that they are willing to contribute to the investments that recycling industry has to make (Schøyen et al., 2017). Furthermore ship owners can cooperate with the yards to formulate the Ship Recycling Facility Plan (article 7), especially on details on how to dismantle ships and on how to use the IHM (Du et al., 2018). The IHM is very helpful for planning proper recycling and is paid for by the ship owners, following the polluter pays principle (Soares & Santos, 2014). Lastly, the responsibilities for ship owners can be enlarged through inclusion of Corporate Social Responsibility (CSR); companies commit to move towards responsible recycling which provides them with a market advantage (Mikelis, 2019).

4.6 Towards better enforcement

Proper enforcement of the EU SRR is seen as an important challenge by the interviewed experts. This view is supported by literature. The surveyed respondents of Alcaide et al. (2017) stress the importance of strong enforcement and specific training of officials. Moreover, they state that there is no homogenous quality level for enforcement amongst different EU member states. According to Ribeiro et al. (2015) the enforcement measures included in the EU SRR are rather weak and not specific enough. Minimum financial penalties should be included for infringements of the Regulation, setting a standard for all member states (Ribeiro & Molenaar, 2015). Currently it is the responsibility of the member states to set up proper regulations for enforcement. A strict inspection regime could also assure that the ships staff takes better care of the ship when it comes to cleaning the engine room bilges (Soares & Santos, 2014).

Moreover, the experts stressed the importance of collaboration between member states for enforcement of the Regulation. There are no mechanisms in place yet in the EU to facilitate this collaboration on enforcement of the EU SRR. However, on other topics, such as organized crimes, cross-border cooperation is organized (European Commission, 2019), this could be an example for enforcement of the EU SRR.

4.7 The way forward

Some recommendations were made by experts for future improvement of the EU SRR. The stated necessity for a change of mentality is supported by Alcaide et al. (2017) who also supports the prospects of moving away from the beaching techniques. However, the transition from beaching to dry docks is expected to take more than 10 years (Alcaide, Rodríguez-Díaz & Piniella, 2017). The importance of including a financial incentive is also underwritten in literature (Alcaide, Rodríguez-Díaz & Piniella, 2017; Ribeiro & Molenaar, 2015). For the long term perspective it is furthermore important to establish a stronger relation between recycling and design of ships (Soares & Santos, 2014) as is also described in chapter 3.2 and 4.1. Ribeiro et al. (2015) states that pre-cleaning of hazardous materials should be included in the EU SRR as an obligation for ship owners.

4.8 Reflection on the methodology

The use of semi structured face-to-face interviews with experts was successful. Especially the inclusion of counter experts has proven to be of value, since counter experts often had differing opinions on topics, or different topics that they deemed as important. It is important that the respondents all have a similar level of knowledge on the interview topics, to make the data of different interviews comparable. Therefore, it is best to avoid interviewing both the tertiary sector and people working in the field that apply the Regulation, as the second group has more specific knowledge.

Since new information and topics of interest came up during the interview it might be useful to make more extensive use of pilot interviews with different stakeholder groups. It was observed that respondents react more openly and detailed in face-to-face interviews than in the follow-up questions that were asked via email and telephone, showing the advantage of face-to-face interviewing.

Concerning the type of questions that were asked, both the open-ended and specific questions were useful. The first to see the topics that are deemed most important by experts

and the second to get a deeper understanding about the respondent's views. Moreover, it was seen that in follow-up questions new topics of interest could come up. For example, no respondent talked about enforcement when asked about weaknesses of the Regulation, but the majority of the respondents stated that enforcement is a weakness when asked their opinion about it directly.

The use of the coding strategy, as proposed by Young et al. (2018) was very helpful to assure transparency and consistency during the data analysis.

4.9 Future research

Some topics for future research were identified based on the expert interviews and the comparison with literature:

- The scope of this study was limited to the EU, but it can be interesting to include stakeholders outside of the EU, such as South Asian ship recycling facilities and 3rd country ship owners. These are also (indirectly) affected by the Regulation and can impact the success of the Regulation.
- Currently, a lot of uncertainties arise linked to the enforcement of the Regulation, which should be studied more in detail; how will the regulation be implemented at a member state level these coming years and will it be properly enforced? Specifically, it would be interesting to look at cooperation and communication between countries to enable effective enforcement.
- Circumvention through reflagging was discussed in detail during the interviews. But the role of 'cash buyers' in circumventing the regulation remains unclear and could be studied more extensively.
- It was stated in the interviews that ship owners that are using substandard ship recycling facilities push these facilities to improve their standards. The EU SRR could decrease this positive impact, as EU flagged ships are not allowed to be recycled in substandard facilities anymore. Whether the ship owners truly have this positive impact and what impact the EU SRR can have on this mechanism has to be further studied.
- There is a momentum for countries to ratify the HKC, on which the different stakeholders have differing opinions. Research should provide more detail on whether the entry into force of the HKC is a positive development and how this will affect the EU SRR.

5. Conclusion

The European Regulation No 1257/2013 on ship recycling promotes safe and environmentally sound ship recycling and is a major improvement compared to earlier regulations such as the EU WSR and the Basel convention and can help to phase out substandard facilities. It seeks to regulate not only EU flagged ships and EU recycling facilities but also ships sailing other flags through the IHM and facilities outside the EU through the EU list of approved facilities. Thereby it is a major step forward that the Regulation includes downstream waste management requirements and that inspections of yards are executed by the European Commission to assure thorough inspection.

Some challenges for the EU SRR have also been identified. The major weakness of the Regulation is the easy circumvention through reflagging of vessels to non-EU flags. Different possible solutions are available to deal with this, such as the financial incentive, but no agreement on the usefulness of such an instrument is found. Secondly, the enforcement of the Regulation remains a major challenge. The capacity for enforcement has to be enlarged and the cooperation between member states must be improved. Thirdly, it is a challenge to assure that all ship owners will have a proper IHM before 2020. Lastly, it is unclear what role beaching facilities shall have under the EU SRR and there is no agreement on the future of the beaching method overall.

For future development of the Regulation some points of attention are suggested, although these were not unanimously agreed upon. The jurisdiction under which ship recycling is now regulated, the flag state, could be changed to beneficial ownership to extend the scope. Requirements on ship recycling facilities should be more stringent, including articles on energy use. On the long term it is important to put more effort into green design of ships for recycling and improving the connections between ship building and recycling. Moreover, it is important to put energy into a change in mentality amongst stakeholders

The EU SRR is a regional instrument. Therefore, it can influence the global standards and try to improve the ship recycling practices, but it cannot set a global standard. For regulating the international ship recycling industry, a global regulation would be the most effective instrument. However, there is no agreement on the suitability of the HKC to fulfill this purpose.

The EU SRR is a step forward, but improvements are still necessary to truly develop a clean and safe ship recycling industry.

6. Acknowledgements

I would like to thank my promoter Frank Maes and my co-promoter Jean Hugé, for their feedback and support in this research and the writing of this thesis report.

Next to that I am particularly grateful for the Oceans and Lakes master's programme and specifically want to thank the Oceans and Lakes secretariat for their encouragement and support.

Lastly, my special thanks goes out to all the respondents that have cooperated in the interviews, that is; DG ENV, ECSA, ISRA, the police of Rotterdam, NGO Shipbreaking Platform and Sea2Cradle. For confidentiality reasons they can't be named more specifically, but I am particularly grateful for their cooperation.

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Appendix

Interview Guide: EU Regulation No 1257/2013 (Ship Recycling Regulation)

Date: March/April 2019

Student: Bernike van Werven

Respondents: policymakers, ship owners, recycling facilities, NGOs, supporting business

INTRODUCTION

Purpose of the research: analyze the view of different stakeholder groups on the EU Regulation No 1257/2013 (EU SRR), its impact, its shortcomings and its future development.

Data processing: analyze interviews through qualitative coding, mapping the common and diverting ideas from the different stakeholder groups.

Confidentiality: I will not use any personal names or quotes within my report but would like to use the name of the organization or at least the function of the stakeholder group for the analysis.

[Ask permission to record]

Start Recorder

Okay, (name of respondent), thank you for letting me record this, let's start the interview.

Q1: Can you shortly describe your role within the ship recycling industry and how you are involved with the EU SRR?

THE IMPACT OF THE EU SRR

Q2: In your opinion, is the entry into force of the EU SRR a major improvement a minor improvement or not an improvement, compared to prior legislation?

- Why is that?

Q3: What impact do you expect the EU SRR to have the coming years?

- At a local (EU/countries) and a global level?
- What is the most important and effective measure included?
- Are the included measures sufficient to ensure safe and environmentally sound recycling?
- Is the scope sufficient?

Q4: The EU SRR is aimed to facilitate early ratification of the Hong Kong Convention. However, it can also be argued that the EU regulation is undermining international cooperation. What is your opinion on this?

EU SRR SHORTCOMINGS

Q5: Does the EU SRR have any drawbacks or possible negative effects?

- Which ones?
- At a local and a global level?
- On a short (now) and longer (10 yrs.) timescale?
- Economic/social/environmental?

Q6: What might be possible barriers for the successful implementation of the EU SRR?

- Long term and short term?

If not mentioned within the answer of Q5, include Q6-8

Q7: Opinions differ between stakeholders, concerning the capacity of EU approved ship recycling facilities. What is your opinion on this subject?

- What is your opinion on the geographical distribution of the capacity included in the EU list?

Q8: Indian recycling facilities have applied for the EU list but have not been approved yet. How do you think this should develop?

- Facilities located within the EU undergo a different process than 3rd countries facilities, do you think this is stringent enough?

Q9: Already before the EU SRR was in place, often EU-flagged end of life ships changed flag to avoid EU legislations. How do you think this influences the success of the EU SRR?

- How will it develop? Do you expect more ships to flag out?
- Should this problem be solved? If so, how?

Q10: Both ship-owners and recycling facilities are carrying responsibilities under the EU SRR, in your opinion, are these responsibilities shared equally?

- The polluter pays principle and prior informed consent (Basel Convention) are not included in the EU SRR, what is your opinion about this?
- If unbalanced responsibilities, how could we change this?

Q11: A large responsibility lies at the member states, for enforcement of the regulation, do you think it can be properly enforced?

EU SRR IMPROVEMENTS AND FUTURE DEVELOPMENT

Q12: In 5 years there will be a review on the EU SRR, what do you hope to see after this review?

Q13: What role do you think the EU should have on a global level regarding ship recycling regulation?

- What advice would you give to policymakers, concerning the regulation?

Q14: What future development of the EU SRR do you aim for?

- Inclusion of a financial incentive?
- Design for safe and environmentally sound recycling?

Wrap up: is there anything else you would like to add/discuss? You can also email me afterwards in case you want to add anything or have new ideas. Also, could I contact you with additional questions if these would arise in further interviews or during the analysis?

[Stop recorder]

Send email of thanks afterwards. Send report when finished.