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Introduction- Ship-breaking is a risky, dirty, intensively labour-manipulating and hazardous industry. 'A ship's life lasts for an average of 25 to 30 years after which they are no longer considered safe to sail. Each year between 200 and 600 sea-going ships are dismantled worldwide. A peak is expected in 2010 when around 800 single-hull tankers will have to be phased out' (European Commission Report, 2007). It is only few decades earlier that European countries and the United States had the sole authority of both ship-sailing and ship-breaking around the world. Therefore, they made profits in both ways. During the last two decades, developed countries has lost its sole authority over ship dismantling business because of increasing wage rate, increasing awareness towards global environment, raising safety and health consciousness among workers of developed countries. A report of the European Commission mentioned that 'a worker on demolition site in Bangladesh and India earns just one to two dollars per day, and employers' expenses for safety and health are negligible; while the cost in the Netherlands can be estimated at around $250 per day for a worker in the Netherlands, and $13 in Bulgaria (EU Reports, 2007).

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Role of Ship-breaking Industries in Bangladesh and ILO Guidelines: A Critical Discussion

Morshedul Hoque [α] & Dr. Md Masum Emran [σ]

I. Introduction

Ship-breaking is a risky, dirty, intensively labour-manipulating and hazardous industry. 'A ship's life lasts for an average of 25 to 30 years after which they are no longer considered safe to sail. Each year between 200 and 600 sea-going ships are dismantled worldwide. A peak is expected in 2010 when around 800 single-hull tankers will have to be phased out' (European Commission Report, 2007). It is only few decades earlier that European countries and the United States had the sole authority of both ship-sailing and ship-breaking around the world. Therefore, they made profits in both ways. During the last two decades, developed countries has lost its sole authority over ship dismantling business because of increasing wage rate, increasing awareness towards global environment, raising safety and health consciousness among workers of developed countries. A report of the European Commission mentioned that 'a worker on demolition site in Bangladesh and India earns just one to two dollars per day, and employers' expenses for safety and health are negligible; while the cost in the Netherlands can be estimated at around $250 per day for a worker in the Netherlands, and $13 in Bulgaria (EU Reports, 2007). Lawrence Summers, the Chief Economist of the World Bank in 1992, discussed the economic rationale of migrating dirty industries to developing countries and criticised severely. The Summers' prescription is actually implemented through 'migrating the ship-breaking industry in South Asian countries like Bangladesh, India and Pakistan where more than 90 percent ship-breaking activities around the world take place nowadays'.

a) *Socio-economic Status of Ship-breaking Area in Bangladesh*

We grew up in Chittagong and used to take a rickshaw down the very road, where the ship-breaking yards are, several times a week. To be sure, it is a hard, back-breaking task. But we sometimes wonder when the Westerns get on our high horse about $1 a day, and on children working, how we dare judge! We know nothing about that life and what it takes to survive. The owner or the ship-breaking company spoke correctly when he said, if the kids do not work here they will work somewhere else because they have no other means of living. Our best friend started working when he was 14 because otherwise his siblings would have gone without food. Should he have said, no, just because he was so young and allowed his family to suffer? He worked hard and we are proud of him for his strength and perseverance! And has anyone stopped to think how much $1 a day is worth in the economy of Bangladesh? Sure, here in the States it is nothing. But there it is a fairly normal wage for a day labourer. Our heart breaks for our friends who cannot break out of the poverty that so plague this country, but we will not judge them for what they have to do to survive.

The quotation gives us a bird's eye view of socio-economic conditions of workers around the ship-breaking industry. This is the history of the head of a coin of ship-breaking industry but the tail of the coin is opposite. The ship-importers, ship-breaking contractors, groups related to ship-breaking business are making affluent amount of capital that is quite unimaginable. 'A person's family (anonymous) has become extremely wealthy bringing ships onto these beaches. He pays millions of dollars for each ship and makes profits from the steel he sells' (*Thomas Paino's Corner*, 2006). It is just an example and we know very well the people related with this business have made huge profits only in 20 to 25 years – a one third lifetime of a generation. Is it possible to make this huge amount of wealth in any other country of the world except Bangladesh?

b) *Objectives of the Paper*

The Ship-breaking industry in Bangladesh is a threat for human and environment but it is a necessity for economic development of the country.

We have visited the ship-breaking yards of Chittagong and were horrified at the conditions in which these people work. Sadly, we were taken there as though it were a tourist attraction. Unfortunately, these yards are listed as tourist attractions in very well known travel guides. People are quite aware of these yards. They exist in many other countries as well, Bangladesh being only one of many. The steel provided by these ships literally builds the country and banning the practice altogether would greatly jeopardize the economy. We only hope more awareness will be brought to these yards and that health and environmental regulations will be enforced.

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We do not want to jeopardise the economy by banning ship-breaking activities, imposing some strict environmental rules and regulations, which are done currently by some non-government organisations working in Bangladesh. In our view, abiding by all strict environmental restrictions regarding this industry would be a luxury for a poor economy. It would break down overall economic development and make the economy more dependent on foreign aid, which would have much worse impact than the present environmental degradation impact. Our first objective is, therefore, arguing and finding out the necessity of ship-breaking activities in Bangladesh.

There is no doubt that ship demolition activities is the most hazardous, dirty and risky job and it imposes huge threats to the health of human being and environment. Workers in this sector might suffer long-term diseases and the quality of soil, water, air and sea resources must be deteriorated by its chemical, mechanical wastages. We would like to briefly identify the consequences of ship-braking activities on workers and the nature.

Thirdly, we would like to discuss critically the guidelines of the International Labour Organisation (ILO) for safety and health of ship-breaking workers; to identify its drawbacks; and to provide a suitable suggestion to make it more effective. Moreover, our objective is also to provide some policy ideas that could be considered by the policy makers for mitigating the negative consequences of the activities in Bangladesh and other countries.

We want to organise the paper as follows: Section 2 covers contributions of ship-breaking industry in economic development. Section 3 deals with its consequences on human, environment, and natural resources, while section 4 discusses a critical discussion on guidelines of the ILO entitled 'Safety and Health in Ship-breaking: Guidelines in all Asian Countries and Turkey 2004, Geneva' and some suggestions for mitigating its bad consequences and the last section goes for conclusions.

II. Contributions of Ship-breaking Industry

We want to start our discussion with the contributions of ship-breaking industry in the economic development of Bangladesh – a country, poor in economic condition but rich in total population.

a) Infrastructural Mine of Bangladesh

The ship-breaking industry is used to be called the 'floating steel mine' of Bangladesh that has no natural ore mine. Around 80 to 90 percent raw materials (scrap iron) of the country's steel production comes solely from this industry. The rest of the 10 to 20 percent comes from direct import, which needs huge foreign currency. Bangladesh requires more than 8 million tons of steel per year for its construction activities and only the ship-breaking industry provides more than 7 million tons. In December 2007 fines' ore price per metric ton was $185, which implies that Bangladesh would have to spend $1.3 billion only for last year's infrastructural development, which is around 25 percent of the last year's development budget of Bangladesh and 10 percent of the total import expenditure of this country. We would therefore like to call the ship-breaking industry as an 'Infrastructural Mine' of Bangladesh.

b) Largest Recycler of the World

The industry is not only an infrastructural mine, but also the largest recycler of the world. An old, out-dated ship is a liability of its owner if it is not dismantled. This industry has made it possible by purchasing old, out-dated ships that were previously a liability, are now an asset of the international shipping company. Moreover, around 97 percent materials of a ship are either recycled or resold to a third party. The ten miles long roadside shops provide kitchen items, toilet items, bed-room furniture, drawing-room furniture, all types of metallic products; scrap copper, bronze, aluminium, electric cable, life jacket, lifeboat, boiler, propeller, power generator, careen and what not. Nothing goes to waste. Urchin children collect even the last drop of oil drips from the ship tankers on the earth and reuse for cleaning different items. The industry is, therefore, recycling the world garbage and saving the world's natural resources.

c) Second Highest Taxpayer in Chittagong Division

After the Chittagong Port of Bangladesh, ship-breaking industry is the second largest revenue-contributing industry in Chittagong Division. Each year the industry pays directly more than $150 million in government exchequer through import duty, yards tax, land tax, sales tax and other forms of fees. The ship-product reselling business groups also indirectly contribute more than $50 million in the government exchequer through income tax, sales tax, municipality tax and others.

d) The Largest Single Job Zone after CEPZ

The industry employs more than 30 thousand unskilled, illiterate, manual workers directly to perform different activities of breaking a ship. Indirectly, ship-breaking industry and reselling businesses of ship-materials jointly employ more than 250,000 workers round the year. The technological state in ship-breaking yards is highly labour-intensive and 100 percent contract-based. Around 98 percent of the work forces in scrapping yards are illiterate and has a lack of formal training, and there is no worker welfare union.

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III. Consequences of Ship-breaking Industry

Ship dismantling activities are considered as 'dirty and dangerous' (an ILO Discussion Paper). Moreover, diseases related to long-term infection attack the workers of this industry because of the industry depots' huge amount of hazardous paints containing lead, cadmium, organ tins, arsenic, zinc, chromium, sealants containing printed circuit boards, asbestos and several types of oils. We therefore should give priority on the consequences of safety and health of the workers in this industry.

a) Safety and Health of Workers

The workers in this industry are very vulnerable and deprived by the ship breakers. They are the least paid among the world's risky and hazardous industries. It is fact that Bangladesh, unlike India, does not even require "gas-free-for-hot-work" certification in practice to operate a ship-breaking firm. So the cost of dismantling ship in Bangladesh is lower than any other countries; and for the high frequency of lethal explosions at the dismantling yards, compensation cost is less in Bangladesh. The Basel Convention – 2006 reported that more than 400 workers had been killed and 6,000 seriously injured over the last 20 years. It implies that on average 20 workers died in a year. At this point, we would like to provide with a relevant statistics of occupational accidents in the garment industry – the largest exporting industry in Bangladesh. In February and March 2006, there were four unexpected accidents occurred in the garment sector that caused 115 lives of workers and 257 serious injuries. Studies show that most of the labour-intensive industries like garment, leather, construction, cement etc. are health hazardous industries like ship-breaking industry. When a manual worker can work in any garment industry, tannery industry or construction industry, why cannot he or she work in ship dismantling industry? The economic theory of wage tells us that the higher the job hazard, the higher the risk premium. The difference between ship-breaking and the other industries is that the former does not take any initiative to mitigate health hazards, to raise health safety and to compensate sufficiently to the victims but the others do a bit. In fact, we would like to introduce exact risk premium in this industry but not to close down the industry.

b) Impacts on Biodiversity

There is no doubt that the ship breaking activities tremendously affect the biodiversity of Bangladesh. Does it not affect biodiversity of any other area of the world rather than Bangladesh? The answer is, yes, it does; and it varies in different degrees of precautionary measures adopted in the area where the activities are taking place. Hossain (2006) gives detail consequences on biodiversity due to ship-breaking activities in Bangladesh.

The ship breaking activities contaminate the coastal soil and sea water environment and thus impair ecological settings by discharging ammonia, burned oil spillage, floatable grease balls and metal rust (iron) and various other disposable refuse materials together with high turbidity of sea water. The high pH of seawater and soil observed may be due to the addition of ammonia, oils and lubricants. …oil spilling may cause serious damage by reduction of light intensity, inhibiting the exchange of oxygen and carbon dioxide across the air-sea water interface, and by acute toxicity. As a result the growth and abundance of marine organisms especially plankton and fishes may seriously be affected. …..

Pollution caused by ship breaking activities severely hampers the primary productivity. Oil floating over vast area inhibits light penetration reduces photosynthesis. ……..

Phytoplankton is the primary food producers of the aquatic habitat and plays an important role in the food chain. Phytoplankton is generally considered to be the best index of the biological productivity. Phytoplankton makes their food by photosynthesis using solar light. Phytoplankton suffers from the reduction of light intensity, beneath an oil film, which inhibits photosynthesis.

Drifting small floating animals in the water body are collectively known as zooplanktons on which the whole aquatic life depends directly or indirectly. They are largely governed by the interactions of a number of physical, chemical and biological conditions of the ocean. As zooplanktons are very sensitive to the optimum condition, the coastal pollution due to ship-breaking activities may have profound effects on its survival and occurrence.

The bottom living organisms – the benthos play an important role in the food chain (as food of fish) especially in the intertidal zone and it is also well recognized that the richest fisheries of the world are closely related to the benthic community. The abundance and distribution of benthos is influenced by soil properties as well as on the organic matter retained in the soil – the relatively low occurrence of benthos in the intertidal zone of the ship-breaking area of Chittagong (Siddiquee, 2004).

The fishery resources of the area seems to be affected by the ship-breaking activities as revealed by increased fishing efforts, reduced species diversity, increased amount of trash fish ……..it was revealed that the following fish species were not available in the catch. To make concrete assessment about the status of threatened, endangered and extinct species of that area, it needs further research.

We would strongly support all of his comments regarding biodiversity if we were marine biologists. We are positive economists and always try to justify any

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impact of an action by evaluating static cost-benefit and inter-temporal cost-benefit analyses. We would like to evaluate the environmental consequences based either on 'Hedonic Price Method' or on 'Willingness to Pay Method' not based on 'Dose Response Method'. We have yet not found any research using one of these techniques to evaluate the environmental consequences of ship-dismantling activities in Bangladesh. In our view, the opportunity cost of giving up this industrial activity from Bangladesh to protect our biodiversity would be a luxurious decision for a poor country. Actually we need to mitigate the environmental consequences as much as possible. Conceiving this objective, we would like to suggest introducing and implementing the following policies strictly at an earliest convenience.

IV. A Critical Discussion on the ILO Guideline

Reducing health hazards, fatality and injury should be the prime objective of a policy maker if he likes to promote ship-breaking activity in any particular area like Bangladesh. Our objective, therefore, should go to improve occupational safety and health in this industry in such a way that would not make the industry less competitive among the world along with the workers would not be deprived like present time. We should always consider the socio-economic conditions of our unskilled and manual labour force as well as their opportunity cost and the supply elasticity of this labour force.

The International Labour Organization (ILO) has developed a policy report entitled 'Safety and Health in Ship-Breaking: Guidelines for Asian Countries and Turkey – 2004' in Geneva and advised to implement this guideline in all Asian countries where ship-breaking activities have become prospective industries. The fundamental objective of this guideline is to uphold occupational health and safety (OHS) in this industry. Not almost all Asian countries have followed the OHS rules and regulations from the very beginning of their operations, the activities in this industry involve huge occupational risks and health hazards. We therefore need some specific policy guidelines to protect workers in this industry. We appreciate the ILO initiative. The guideline is very innovative, effective and necessary for the workers in this industry, and all stakeholders in this industry have reached consensus while developing this report. Unfortunately, one serious issue, according to our view, is missing in the whole guideline that has made it a worthless piece of policy instruments.

a) Introducing Workers' Registration System

The missing issue in the 'Safety and Health in Ship-Breaking: Guidelines for Asian Countries and Turkey – 2004' is that there is no clause regarding the hiring policy of a worker. A licensed ship-breaking contractor can hire any daily worker who is looking for an unskilled and manual job without keeping any record of the worker's identification even they do not need to write the name of a hired worker in any register or official notebook. To the best of our knowledge, there is no suitable way of tracking a worker's identification in ship-breaking industry in Bangladesh, and no authority is still concerned about the issue and the ILO did so without having any clause in its guideline. In any other industry even in Bangladesh, which needs to hire unskilled, manual and day labour like garment, construction, mining, tannery and jute industries a worker requires to submit at least a photo and to fill up an identity form covering the name and permanent address to get the job. The exception, we have seen, only in ship-breaking industry where no registration system is required for hiring a worker. This provision of recruiting workers gives several types of benefits to the employer, such as avoiding minimum wage rate and benefits, evading tax, employing child labour etc. We would like to explain how this limitation makes all objectives in the guidelines ineffective and blundered. In the following section of this paper, we would like to argue logically and clause by clause the importance of worker registration system for implementing 'Safety and Health in Ship-Breaking: Guidelines for Asian Countries and Turkey – 2004' more effectively.

b) Shortcomings of the ILO Guidelines

The clause 3.8.2 (b) says the contractors must be registered or licensed but there is no provision of registering new workers in the profession. Using this loophole, contractors take advantages by not reporting occupational injury or fatality of workers and also not paying minimum amount of compensation to the victims. In Bangladesh, most of the ship-importing and ship-breaking firms have same proprietors with different trade names and licenses. If sometimes the ship-importing firms and ship-breaking contractors happen to be different they also prioritise their business relations and overlook most of the required rules in the guidelines making some negotiation between them to get rid of penalty or compensation for casualties and to uphold their business reputations.

The clause 4.3.1(e) says that before starting work, employers or contractors should review safety and health conditions of the working place by analysing previous data. The employers or contractors have never performed this data analysis yet because most of the workers do not have any registration with their employers or contractors. The employers or contractors hire most of the workers as daily basis so that they need not to keep health data for the workers as well as not to pay any health care facilities or compensation to this casual labour force. Since labourers start working on the daily basis, they are not aware of the health hazards of the working place and not used to with the safety instruments for doing the assigned jobs. Casual workers

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therefore want to work without using any safety tools knowing that if some accidents happen they would not get any financial compensations, or insurance benefits from the employers or contractors and even they would not be entitled to receive any legal support from the government police service or any institutional body. Only some lump-sum compensation the victims receive on humanitarian ground by the request of fellow workers if the employer would be very much philanthropic.

The clauses 4.3.2 and 4.4.1 emphasize initial review and data analysis to develop systematic process of safety measure and occupational safety and health (OSH) policy in the ship-breaking industry but both would be hopeless until workers would not register themselves with a contractor or a ship-breaking firm. As a profit maximizing labour-contracting or ship-breaking firm it always tries to minimize production costs by exploiting its workers if there is any scope. Recruiting unregistered daily workers gives them opportunities to exploit labourers where in Bangladesh, the wage-elasticity of unskilled labour supply is infinite.

The clause 4.4.1 is the guidance for prevention and protection of reducing hazards, which is a fixed cost both for ship-importing firms and for ship-breaking contractors. Since the ship-importing and ship-dismantling firms in Bangladesh are small capitalists and their major share of capital comes from bank loans, they are not capable of bearing the huge amount of fixed costs to adopt necessary measures of reducing hazards. They therefore prefer to pay lump-sum compensation than to adopt prevention and protection measures. These fixed costs are much higher than the lump-sum compensation cost which needs not to be paid for each accident. If any international funding agency or ship-exporting company supports them to bear a part of these fixed costs this policy guideline could possibly be implemented. Had the protective measures been mentioned in clause 4.4.3 (d), it could have been implemented if the workers were registered with either a contracting-firm or a ship-importing firm.

Section 4.6 clause 4.6.1 (a), (b), (c) and (d) discuss about the emergency preparedness, protections and safety measures, which are possible to be introduced only if the workers are registered as permanent workers in this industry. It is feasible to the employers to provide all these necessary trainings to a permanent worker not to a casual daily labourer.

Reporting, recording and notification of work-related injuries and diseases, ill health and incidences are discussed in section – 5 by clauses 5.1.2 (a), (b), (c), (d) and (e), and clauses 5.1.3 (a), (b), (c), (d), (e) and (f). All these clauses are easy to be implemented by the regular supervision of monitoring authority when the workers are registered. Otherwise employers would be reluctant to introduce any of these provisions because of their own spending.

A profit-maximizing firm would never like to spend any additional cost for its workers if there is an abundant supply of unskilled, needy and illiterate labour force like Bangladesh. We must bind them to follow this guideline by introducing the policy of hiring registered workers in this industry. One might say that this policy would adversely affect the huge unemployed workers but our argument is – although it might make recruiting process a little bit time consuming, that it should come into effect for safety and health security of the labour force, which is not unusual all over the world.

c) Some Policy Guidelines for Facing Environmental Consequences

The above pros and cons of the industry suggest us to go in favour of its existence in Bangladesh. We do believe that Bangladesh is the only country in Asia which badly needs the existence of this industry at least for the next two more decades. The other large scale ship-breaking countries like India, Pakistan and China – all have natural ore mine. These countries can therefore impose ban on ship-breaking industry or follow strict rules of protecting environmental degradation. That is why they are sometimes more liberal than Bangladesh. Moreover, since the oceanic world is interconnected, one country polluting its sea area can disseminate the neighbouring area, which is impossible to be protected from its effects. Thus, even if we are giving up these industrial activities from our country, we will not be able to secure our marine resources from the danger of water contamination done by adjacent countries. However, we would lose a potential source of our economic development.

One might get us wrong and can keep us out of this conference of environmental awareness. But we would ask for a chance to explain our view to mitigate world's environmental problems generated from this industry and simultaneously to improve socio-economic conditions of a poor country like Bangladesh.

Most vessels contain large amounts of hazardous materials, such as asbestos (in particular if built before the 1980s), oils and oil sludge, PCBs (polychlorinated biphenyls), and heavy metals in paints and equipments. So when sent for dismantling, these ships represent one of the major streams of hazardous waste from industrialized countries to the developing world. In 2004, a study for the Commission (DG TREN) estimated that oil sludge from end-of-life ships alone will total between 400,000 and 1.3 million tonnes per year until 2015. Of the hazardous waste in dismantling facilities every year, asbestos will amount to 1,000 – 3,000 tonnes, TBT 170 – 540 tonnes and environmentally harmful paints 6,000 – 20,000 tonnes. (*GREEN PAPER on better ship-dismantling,* Commission Commission of the European Communities, Brussels, 2007)

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What will an old, out-dated ship owner (usually from a developed country) do with his liability? Should it be possible to keep all old vessels in museum? After making a huge amount of profit, the old ship turns into garbage as well as a burden for the owner and that is why the owner needs to pay some cost to shift his burden to somebody else and to remove this garbage from his territory as we do as an owner of a household. This is formally called 'Pollutant Pay System'. It is highly expensive to do in the premises of the developed world, so poor Asian countries could be the only destination for recycling the developed world's garbage. However, we the poor countries badly need to use this garbage as the fertilizer in our economic development. So we are buying their garbage, removing their burden, making their business more profitable abiding by their set of rules and regulations, otherwise being criticized. If the Asian countries and Turkey made an alliance and we would not have bought this garbage anymore, how would it have been possible for these old vessel owners to remove their garbage and clean their air and water? We therefore would like to say that we the poor Asian world and the developed Western world, do not have the beggar and donor relationship, rather we are development partners for each other. So we need to cooperate each other for the betterment of both of our environment and our future. What should we do for saving our environment?

d) Creating Fund for Green Ship-Breaking

The International Waste Shipment Law and the Basel Convention defines a ship as a waste if has not been properly emptied and imposes ban on dismantling if it is not pre-cleaned. Therefore, the owner of these waste ships is unable to dismantle in the EU water territories, hence tries to dismantle in Asian countries where rules are not too strong. To implement the rules strictly through all over the world, the Basel Convention – 2006 proposed that 'a future EU maritime policy should support initiatives at the international level to achieve binding minimum standards on ship-recycling and promote the establishment of clean recycling facilities'. (*GREEN PAPER on better ship-dismantling,* Commission of the European Communities, Brussels, 2007)

Bangladesh needs to take this advantage by raising an environmental awareness 'Fund for Green Ship-breaking'. The 'Fund for Green Ship-breaking' organisation could be constituted with 19 member executive body – (a) Four representatives – each coming from the International Labour Organization, the United Nations Environmental Program, the International Maritime Organization, and the United Nations Development Program. (b) Five government representatives – each coming from Bangladesh, India, Pakistan, China and Turkey. (c) Five representatives – each representing these countries' ship-breakers association. (d) Five representatives – each representing five major ship-seller countries around the world. All representatives must have expertise on the relevant field. The 'Fund for Green Ship-breaking' would be created by the following ways of contributions:

1. The vessel owner would pay the total cleaning cost of an old ship into this fund.
2. The four international organizations would jointly contribute the same amount of fund for making the earth green. It would not be a burden for the international organizations. It is their contribution for sustainable development of the world.

The fund would be allocated and monitored annually among the ship-breaking countries according to the proportion of the number of ships each country dismantles every year. The more ships a country dismantles, the more funds it receives. The 'Fund for Green Ship-breaking' organization would set up cleaning and dismantling criteria and also monitor the ship-breaking countries' activities. If some country needs financial support to develop necessary technological facilities, this organization would grant sufficient loans at minimum service charges, directly to the government of that country to develop only those particular technological facilities, not any other services at all. The ship-breaking firms hire the necessary service facilities from their own country's resources. In 2003, the UNDP granted $1.2 million for ship-breaking purpose in Bangladesh for the safe and environment friendly ship-recycling project (The New Nation, 19 November 2003). The project had been completed by 2006 but we can undoubtedly say that not too much change could have been made with the help of this huge grant. That is why we suggest creating 'Fund for Green Ship-breaking' that would only be used for technical project development to increase the country's feasibility of "safe and environment friendly ship-recycling".

e) Developing Green Forest Belt Recycling Area

In Bangladesh, ship-breaking recycling area is situated at the coastal area of Chittagong, which is 10 miles long. The area is very much suitable for developing forest belt as well. Actually, in early twentieth century, it was covered by mangrove forests. The ship-breaking activities and urbanization process destroyed all these renewable resources. The government of Bangladesh could take an initiative to develop a 'Green Forest Belt' in this area. It would not be expensive for the government because it has allocated ship-breaking plots for each firm working in this industrial sector. The government could impose a rule that each ship-breaking firm must cultivate a 'Green Forest Belt' area of twenty metres width at the front of each firm except the access road by the ship-breakers' at own cost; otherwise the firm would not get either recycling permit

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or the plot. If the Bangladesh government could successfully implement the law, the area would have become the best 'Green Forest Belt Recycling Area' in the world. Moreover, it would mitigate air pollution resulted from ship-breaking in the surrounding area, which indirectly improves the health standard of the working people in this industry and its neighbourhood.

f) Establish Green Ship Recycling Research Cell

It is essential to establish a 'Green Ship-Recycling Research' cell near the ship-breaking area. The Bangladesh Ship-Breakers' Association with the cooperation of different international environmental awareness institutions would finance this research cell. The primary objective of this research would be collecting, maintaining and analyzing ship-breaking related data of the whole industry. These data must cover workers' safety and health conditions, wages and fringe benefits, production and value additions, environment and natural resources' information. The cell must have at least one research expert in each of these sections. Any national and international scholars interested to work on this field must be patronized and encouraged. The government of Bangladesh and the Bangladesh Ship-Breakers' Association must offer at least four post-graduate level scholarships to research in this area.

V. Conclusions

Operating ship-breaking activities is a dirty way of developing Bangladesh by sacrificing huge amount human and environmental costs and by depriving future generations. It is the responsibility of current generation to provide higher level of income to future generations. Current generation must develop future human resources by investing higher amount of money on education and training of future generation. Current generation should also create renewable resources for future generation at least the amount of non-renewable resources this generation has exploited. Keeping these three goals in mind, we tried to highlight four policy measures viz. introducing workers' registration policy, creating fund for green ship-breaking, developing green forest belt and establishing green ship-breaking research institution to mitigate bad human and environmental consequences of this industrial operation in Bangladesh.

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