Pollution: A major Threat to Life and Health of the workers of Alang Ship Breaking Industry.

Address

Prin. Dr. RAJESH R. MODI

Smt. S.I.PATEL IPCOWALA COLLEGE OF COMMERCE,

Danti Road,

PETLAD Dist. ANAND GUJARAT (INDIA)

Pin: 388 450

94 26 76 31 39

(1) INTRODUCTION

Industrial pollution has been long being causing the degradation of the environment degradation around us, affecting the water we use, the air we breathe and the soil we live on. But of these, pollution of water is the most serious threat today for the human habitation. A part from health hazards, which indirectly affect labour productivity, polluted water also affects the fertility of land, Crop production suffers due to contaminated irrigation water discharged from both surface sources and the, groundwater, as well.

Air is polluted largely by atmospheric discharges from fossil fuel combustion and from toxic chemicals from industrial production. Not only do the emission of gases and other factors like chlorofluorocarbons (CFCs) are responsible for stratospheric ozone depletion, but the phenomena like global warming can also trigger global climatic changes. 1

Risks to health and safety comprise one aspect to our lives that we would all like to eliminate. With reference to Alang ship breaking industry, even if we set out to provide a risk free working condition, our efforts would be would be constrained by our economics resources.2

Today 94% trade of the international trade is carried out through cargo ships. The load is carried throe carrier-ships like oil tanker, bulk carrier etc. 1955 million goods and other things are carried through the fleet of ships. The maximum life of these ships is twenty years.

Alang ship breaking industry began the activity to of breaking ships, on 13.feb,1982. If the activity of ship breaking increases up to 10 lakh ton every year, it will reduce the burden of steel Authority of India which spends considerable amount of money on Billet heavy joints & production of plates, and it will save Rs 190 crore every year. It will also save the expenditure incurred on bringing plates of ships and raw material of iron. And, this will save Rs 44 crore.

At present, the strength of the workers working at Alang ship breaking industry is approximately 35000. more over the causal workers in the ancillary trade and industry, which have grown aroundthe major ship breaking industry, are about 1 lakh, getting employment directly and indirectly from the Alang ship breaking activity. Borne in mind. The labourers getting work through contractors.

(2) Significance of the study:

To determine the actual value of the worker's risks and health hazards involved with the labour activities carried ant in the Alang ship breaking industry. To analyses and examine the disparity between the legalized, compensatory tools norms proposed has the government of India /the ILO and the actual implementation of the same in the breaking industry. It is observed that the insurance benefits offered to the labourers in the industry are not only insufficient but no legal norms are followed in this most important procedure. Because of these cadres governance, the society/ worker suffer in innumerable ways in matters of their short term injuries/ long term health deterioration/ life risks/ the loss occurred due to the pollution spread to air/land/water. Here, I would like to adjust and legal/actual norms for the same are introduced in the industry.

(3) Origin of the research problem:

Environmental problem can be classified in many ways and so can policy instruments proposed and implemented as their solutions. The complete unavailability of drinking water, the pollution of air/ land adds to the health and safety hazards for the laboures/ managers. **According to the GMB report, the pollution levels are negligible because just 5% of the total ship load contains polluted material.** But a single ship usually carries a minimum load of 10,000 tones (approx). in this case the hazardous lot emitted has single ship comes to at least 500 tones, Because five percent made up of non –ferrous metal components, paints and coatings, insulation and sealing material, electric cabin walls, decorative tilling, floor coverings

that must be dealt with. These materials are often hazardous waste. In cargo vessel weighing 10,000 tones, this five percent equals 500 tones.

These would tend to differ in terms of their chemical content and the values they yield for gross pollution their chemical content and the values they yield for gross pollution parameters like biological- oxygen demand (BOD), chemical-oxygen demand (DO), suspended solids (SS), dissolved solids(DS),pH, etc.

Which have become havens for ship breaking activity? But, so far, the acute and medium-to –long term impact of ship breaking on the health of workers and local residents has aroused scare and interest.

(4) Interdisciplinary relevance Health hazards / medical problems.

Asbestos dust causes formation of scar-like tissue resulting in permanent breathing difficulties. in the long run, cancer of the lungs and the thin membrane surrounding these organs may result. Lead accumulates in the blood and bones after inhalation or ingestion. It can causes anemia and the toxic effects can cause damage to the nervous system and to the kidneys. Chromium contained in some chrome-based chemicals can cause eczema and respiratory disease and even cancer to the people exposed to dusts and fumes, including cancer of lung.

Under Indian law, the imports of toxic waste from **OECD** (Organization for Economic Co-operation and Development) countries and ship breaking work in tidal ocean zones are prohibited, but the use of asbestos is not yet banned.

In 1998 , Green peace international NGO, working in the field of environment, sent investigators to the wold's largest scrapping site for ocean going ships in Alang ,where they witnessed appalling worker condition and mass environmental pollution: Workers were routinely removing carcinogenic asbestos with their bare hands; toxic materials being dumped in the sea or on nearby agricultural land ; workers torch –cutting ship into small pieces, inhaling the toxic fumes of lead paints .Green peace laboratory

analysis of seawater, sediment and soil samples from around Alang and proof of the above.

(5) OBJECTIVES OF THE STUDY

(1) Assessing degree of land, water pollution caused by the industry in and around Alang.

(2)Compensating earnings differentials for job risks involved in the industry and to a monetary value of them.

(3) Analyze the effect of compensation benefits on wage levels and on wage premier for labour.

(4)*To assess the implicit rate of time preference that workers reveal through their willingness to incur death-risks on the job.*

6 Research Methodologies

Coverage (Size of Sample):

A total of Nine hundred twenty ASSBY worker are covered in the study and the same is shown in the table 1

	Place	**Number of ASSBY** **Worker selected**	**No of Plots selected**
1	**ASSBY Plot worker no of plot 182**	920 (Per plots 10 workers selected)	92 (Total No of plots 50%)
*	**Total**	**920**	**92**

Keeping view, the limited resources of time and money needed for carrying out the field work and distance to be covered by the researcher and one

assistant, to sample of Nine hundred twenty ASSBY workers. The Selection of the sample is restricted at gainfully ASBY, working in ASBY.

7 DATA COLLECTION

Information is of mainly two kinds. One is the primary information and the other is the secondary information.

❖ **Primary Information**

The primary information is one in which the researcher himself with his own search or observation collects the information or he may collect information through his own selected persons. This information can be obtained in the following two ways.

❖ **Direct search: -**

In this method the researcher himself visits his field of work, takes direct interview and collects information by questioner.

Question method

❖ It is a method in which the information is collected at limited cost limited time from a very large field of work.

❖ ***DATA ANALYSES***

The entire data will be concluded and computer S.P.P.S. & STATA, E-VIEW programme processed.

THE QUANTITY OF WASTE GENERATED IN SHIP BREAKING:

In 1995, the Research Foundation for Science, Technology and Natural Resource Policy filed a written petition in the Supreme Court of India via file no 657 against the Union of India and others. Thereafter the Gujarat Maritime Board prepared a list of materials generated as waste from 348 ships demolished at Alang.

Table presents the amount of waste in each ship.

Hazardous materials	Tone per annum	Ships

Asbestos	175	Non-hazardous	Tone per Annum
Glass-wool	2,000	Fiberglass	40
Rubber	40	Iron scales	900
Rexene	50	Cardboard and packing	35
Plastics and cables	20	Glass	175
Sludge residue	800	Municipal solid waste for landfill	5,000
Contaminated materials	200	Cement tiles	10,000
Total	3,355	Total	16,150

TYPES OF ENVIRONMENTAL POLLUTION

- **Health and the environment**

The following provides an initial insight into potential threats to health and to the environment in relation to scrapping caused by the presence of hazardous substances.

- **PCB – Polychlorinated biphenyl**

PCBs (polychlorinated organic compounds containing two benzene rings) Exposure to PCBs has been associated with a variety of adverse health problems.

PCBs have been linked to cancer, liver damage, reproductive impairments and immune system damage. Exposure has also been linked to behavioral damage and neurological damage.

- **PVC (Polyvinyl chloride)**

PVC is used in a wide variety of products for different applications and commonly found in cables, floor coverings and plastic devices of different types. PVC contains more than 50 per cent chlorine. When burnt,

combustion products of extreme complexity are produced consisting of several hundred compounds. The combustion of PVC produces large quantities of hydrogen chloride gas. If inhaled, this can react with water vapors and humidity and form hydrochloric acid in the lungs. A fluid build-up leading to possible ulceration of the respiratory tract can be the result. In addition, the burning of PVC products produces carbon monoxide, dioxins and chlorinated furans. Dioxins are among the most toxic substances known. Some congeners are toxic at concentrations below 10- 12 g m3 in air..

- **PAHs (Polycyclic aromatic hydrocarbons)**

PAHs can be formed by incomplete decomposition of any organic material containing carbon and hydrogen, e.g. oil products and residues. The combustion of oil may also lead to the formation of PAHs.

The biological degradation of PAHs decreases normally with increasing molecular weight (more difficult to break down PAHs with increasing number of benzene rings).

They are persistent and have well-documented serious long-term effects both from the environmental and from a health perspective.

- **TBT (Tributyltin)**

TBT is an organ metallic substance that can have effects at very low concentrations – sub nanogram quantities per liter. These are mostly related to impose, e.g. in gastropods and thereby the balance in the ecosystem. TBT is therefore considered to be one of the most serious toxic compounds in the aquatic environment. Its use is now strictly controlled in most parts of the world. However, it is still the most commonly used anti-fouling product and will continue its dominance until the International Maritime Organization

- **(IMO) TBT ban is in place (2008).**

TBT, which is one of the active components in anti-foulings (used to reduce ship resistance by preventing hull fouling), has been found to be extremely

toxic to various aquatic organisms, particularly to larva and the juvenile stage of oysters and fish. It has also been found that TBT accumulates in the sediment and bio accumulates in molluscs.

Elevated TBT concentrations have been established in the vicinity of ship repairing facilities and elevated values can be expected at the scrapping sites. In a study looking at the distribution of TBT in Asian waters, the highest values were found in areas with high shipping activity.

- **Oils – Hydrocarbons**

Hydrocarbons such as crude oil and refined petroleum products are complex substances consisting of numerous different compounds. Alkenes and aromatic hydrocarbons are the main classes of hydrocarbons in crude oil, where the former have low toxicity and the latter include environmentally harmful polycyclic aromatic hydrocarbons (PAHs). Also other hydrocarbon components in the crude oil, e.g. alkylated phenols and declines can have detrimental effects on the marine environment and human health.

- **Asbestos**

Asbestos-containing material (ACM) may be found in thermal system insulation and on surfacing materials. Some other applications may also be found. When ACM deteriorates or is disturbed, asbestos breaks up into very fine fibers that can remain suspended in the air for long periods and possibly inhaled by workers and operators at the facility or by people living nearby. The most dangerous asbestos fibers are invisible. Once they are inhaled, the fibers can remain and accumulate in the lungs. Breathing high levels of asbestos fibers can lead to an increased risk of lung cancer, mesothelioma (a cancer of the chest and abdominal linings), and asbestosis (irreversible lung scarring that can be fatal). Symptoms of these diseases do not show up until many years after exposure. Most people with asbestos-related diseases have been exposed to elevated concentrations in connection with their work.

- **Heavy metals**

Metals of concern associated with the ship-breaking industry are toxic heavy metals such as lead **(Pb), mercury (Hg) and cadmium (Cd).** These are biologically non-essential metals that can cause harm to human health and/or ecological systems. Other metals in the breaking industry are iron **(Fe) alloys (steel), aluminum and zinc (Zn).** The metals can be found in many products onboard a vessel in varying quantities. Steel on the one hand is present in very large quantities, while mercury in most cases only occurs in very small amounts (in paints, batteries and instrumentation). A study measuring airborne metal concentrations in ten steel foundries, 15 iron foundries, and 11 copper alloy foundries, showed that exposure to lead, copper and zinc may represent a serious health hazard. Mercury (Hg) is a toxic heavy metal and a persistent, bio accumulative pollutant that affects the nervous system. On board ships, mercury can be found in thermometers, electrical switches, level switches and light fittings. Accidental spills of mercury can lead to dangerous mercury exposure. Consumption of contaminated fish is also an important route of mercury exposure. Mercury must be handled as hazardous waste according to national regulations. Lead (Pb) is toxic, and is found in batteries, paints and in components in motors, generators, piping, cables and others. The deleterious effects of lead upon human health have been commonly known for a long time. Young children are most vulnerable to its toxic effects. Long-term exposure to even low levels can cause irreversible learning difficulties, mental retardation and delayed neurological and physical development. In adults, exposure to lead affects primarily the peripheral nervous system and can cause impairment of hearing, vision, and muscle coordination. Lead also damages the blood vessels, kidneys, heart and the reproductive system.

Copper (Cu) is an essential trace metal which is widely used in the transmission of electricity, paint, alloys and pipe work. Elevated copper levels have been detected in marine organisms but the effect of accumulated levels is uncertain. Copper is highly toxic.

Zinc (Zn) is handled in large quantities at scrapping sites, mainly due to widespread usage in anodes. There is a possibility that dissolved impurities

in zinc anodes such as Cadmium (Cd) and Pb can have an adverse effect on the environment. However, the concentrations in the anodes are relatively low compared to the total amount of zinc. Aluminum (Al) is present in large amounts in anodes but does in this form not represent any acute pollution or toxic source of major concern.

- **Other substances**

Isocyanides are often used in processes such as spray-painting and polyurethane coating. Occupational exposure can cause respiratory diseases such as asthma. Sulphuric acid is corrosive and can cause severe burns (skin/eyes).

Radioactive material may be present on board a ship in liquid level indicators, smoke detectors or emergency signs. These sources generate low-level radioactive waste, but handling and disposal of such waste is usually strictly regulated. Ionizing radiation is hazardous to human health and the environment and can cause severe forms of cancer and/or damage to genetic material endangering future generations. Any release of radioactive material could increase the radiation exposure to the population and must therefore be avoided.

Ballast tank sediments constitute a large amount of organisms including viruses and bacteria that can be a threat to both human health and to the environment. The discharge of ballast water sediments has previously been connected to the outbreak of cholera epidemics.

Consequences of Pollution in Shipbreaking

Unprotected handlings of the identified toxic substances have long been known to cause a wide range of complaints. For example:

1. Asbestos dust causes formation of scar-like tissue resulting in permanent breathing difficulties (asbestosis). In the longer term, cancer of the lungs and of the thin membrane surrounding these organs (mesothelioma) may result.

2. Lead accumulates in the blood and bones after inhalation or ingestion. It can cause anemia and is toxic to the nervous system and to the kidneys.
3. Arsenic exposure can result in lung, skin, intestinal, kidney, liver and bladder cancers. It can also cause damage to blood vessels. Inflammation of nervous tissue caused by arsenic can result in loss of feeling or paralysis. Disfiguring growths may also appear on the skin of exposed humans.
4. Chromium contained in some chrome-based chemicals (in the form of chromates) can cause eczema and respiratory disease in people exposed to dusts and fumes, including cancer of the lung.
5. Organ tins (TBT, TBTO and TBTCL) arc nerve toxins that accumulate in the blood, liver, kidneys and brain. TBTO is acutely poisonous, and is also geotaxis. In shellfish, organ tins affect the endocrine (hormone-producing) system causing damage to reproduction.
6. PAHs (polycyclic-aromatic hydrocarbon compounds) can cause various cancers including cancer of the lung and of the scrotum. Some PAHs can combine with genetic material (DNA) causing cell damage and mutations. Exposure can also suppress the immune system.
7. Dioxins are potent carcinogens and suppressors of the immune system and are accumulated in body fat tissue. In addition, they are suspected of prenatal and postnatal effects on the nervous system of children. In animal studies they have been shown to reduce sperm production.

❖ **Summary – Occupational safety, health and environmental concerns**

As has been demonstrated above, ship scrapping in its current state represents a serious threat to the safety and health of the workers engaged. Its impact on the environment is considerable.

Scrapping is undertaken in developing countries which are heavily dependent on primary industries (agriculture and fisheries). There are obvious conflicts of interests between these and ship scrapping.

Environmental concerns are first and foremost related to the harmful substances involved and the lack of containment allowing toxins to enter the environment and the food chain. There are no data available on the long-term effects on the environment. The nature of the scrapping sites (large inter-tidal zone) allow tidal wash-out and hence, immediate effects may be avoided on the shore. However, a decline in fisheries has been claimed in some of these areas.

Worker safety is suffering from serious inadequacies in almost all respects. These deficiencies are obvious at all steps of the process and include non- or insufficient planning, training, personal protection equipment, facilities, etc. Accident reporting is non-existent or unreliable.

Standards for workers' health are not adhered to. There are no or limited emergency medical facilities. Long-term monitoring of workers' health is non-existent. Apart from the nature of the work, i.e. heavy labour causing wear-and-tear-related defects, the long-term exposure to harmful substances is likely to have severe effects on life expectancy.

- **New initiatives**

The industry is to some extent recognizing its failure to apply any kind of standards and there are some initiatives aiming for changes. The most promising current activities associated with the development of ship scrapping as an industry, may be illustrated by emerging initiatives:

An Australian ship scrapping project led by Australian Steel and a number of big backers (Deutsche Bank, AMEC, ABB, etc.). However, this has been three years in the planning and a number of site selections have been rejected, other sites have been selected and the project team would consider a suitable opportunity in Europe.

The development/opening of a new ship demolition yard at Pipanav in India has been planned with Japanese help – most notably loans for 85 per cent of the project cost. This is a dock-based facility comprising two very large docks (700m x 60m) which are being equipped to be more environmentally friendly and less hazardous than the nearby beaching facilities at Alang. The design capacity of this facility is eight VLCCs per year. The facility may be opened in 2001. A similar project in Egypt was initiated in 1998 with Japanese funding. It is believed that the latter was the originator but it did not materialize and was moved to an alternative site. Finally, the recent announcement by P&O Nedlloyd on cooperation with a Chinese facility including upgrading to enable it to meet international standards indicates a growing concern also among shipowners. It should be noted that recent initiatives at existing sites on occupational safety and health issues have been announced including the establishing of waste reception facilities and medical centers.

Reference:

- OECD, "Regulatory Issues."
- IMO website, "Single hull oil tanker phase out." <http://www.IMO.org/home.asp.> Website of IMO. (29 May 2005 and 15 May 2006).
- IMO, "Single hull."
- EC-DG TREN, "Oil Tanker Phase Out and the Ship Scrapping Industry."
- de Gennaro, Michael A., "Oil Pollution Liability."
- *Greenpeace* website, <http://www.greenpeace.org/india> (9 May 2005 and 15May 2006).
- Kofi Asante-Duah, and Imre Nagy, Forum "A Paradigm of International Environmental Law: (2001): 779-786.

- ShreyasiJha, “Linkages between trade liberalization and environmental policy: Evidence from India.” (Ph. D. diss., University of North Carolina at Chapel Hill, 2004), 17.

- ShreyasiJha, “Linkages.”

- Anthony P. D’Costa, *The Global Restructuring of the Steel Industry: Innovations,institutions and industrial change*. (London: Routledge, 1999)146.

- UNEP, “Breaking more than ships.”

- M. Srinivasa Reddy et al., “Modeling energy content…” 2.

- UNEP, “Breaking.”

- TakakoMorita,“N.I.M.B.Y.Syndrome.”

- EC-DG TREN, “Oil Tanker Phase Out and the Ship Scrapping Industry.”

- McDonough and Braungart, *Cradle to Cradle*.

- McDonough and Braungart, *Cradle to Cradle*.

- Paul Hawken, “A Declaration of Sustainability.” in *Environmental Philosophy:From Animal Rights to Radical Ecology*, eds. Michael Zimmerman et al. 4thEd. (NewJersey: Pearson Prentice Hall, 2005) 421.

- Kim Barker, “India ship scrap yard has that sinking feeling; Declining business over environmental concerns illustrates nation’s economic shift.” *Chicago Times*, Apr. 28, 2006, Chicago final edition. News.; Miranda Kennedy, “Dead ships, toxic business.” *American Public Media. NPR Market Place*. <http//marketplace.publicradio.org/shows/2006/05/05/PM200605056. html>(5 May 2006).
    - Asante-Duah, Kofi and Nagy, Imre. Forum. “A Paradigm of International Environmental Law: The Case for Controlling the Transboundary Movements of Hazardous Wastes.” *Environmental Management* 27, no. 6 (2001): 779-786. Reflects ideas of McDonough and Braungart that we should be “designing products with regard to their environmental effects throughout the life cycle; controlling the effects of raw material processing; and minimizing the effects of new developments.”

    - D’Costa, Anthony P. *The Global Restructuring of the Steel Industry: Innovations,institutions and industrial change*. London: Routledge, 1999. Complex book writtenby an international comparativist who “explains how and why the steel industry has shifted from advanced capitalist countries to late industrializing countries.” Provides

information on the steel industry and how scrap fits into the economy of India. 228.

- de Gennaro, Michael A., “Oil Pollution Liability and Control Under International Maritime Law: Market Incentives as an Alternative to Government Regulation.”

- *Vanderbilt Journal of Transnational Law* 37 (2004): 265-298. Legal “Note” that“argues…the solution to oil pollution control…(is) pollution trading permits,” as opposed to inadequately punishing polluters after the fact. Discusses difficulty with trying to regulate “a common-pool resource… (like) the ocean.” Speaks to complicated issues of international law and the sea.

- Eliasson, Johnny. “Banning TBT-based paints”. *Materials Performance*. 40, no. 10 (2001): 8. Opinion article about TBT (as an anti-fouling agent) and concerns for shipping if it is banned because there is just not a better alternative currently being produced.