ENVIRONMENTAL FLOWS AND THE GOVERNANCE OF SHIP SCRAPPING INDUSTRY

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ABSTRACT

The sociology of environmental flow holds that the governance of trans-national environmental problems under the context of globalization can be regarded as the governance of environmental flows. The governance of environmental flows targets both objective flows, which are physical flows like the trans-boundary air pollution, and the social structure, which is governing the physical flows. In this thesis, it was believed that the social structure governing the physical flow was composed of a network that is supported by information flows. In other words, the information flows, which are an important part of the social structure, are governing the physical environmental flows. For testing this idea, we chose the partnership-based ship scrapping cooperation between a Danish shipping company and a Chinese ship scrapping company as our research case. That is to say that we at first presented the social structure governing the cooperation process, and then explained this structure from the angle of information flows so as to illustrate that the cooperation process governance could actually be thought of as a kind of information flow governance.

Key words: information flow, environmental management, hybrid arrangement, the role of state, globalization, ship scrapping.

TABLE OF CONTENTS

THE LIST OF TABLES, FIGURES AND APPENDIXES

ABBREVIATIONS AND ACRONYMS

BC	Basel Convention
CMSA	China Marine Safety Administration
CNGV	Chinese Nation Global Village
CSBA	China Ship Breaking Association
CSBC	Changjiang Ship Breaking Company
CSPC	China Ship Parent Company
CTNEPCP	China-The Netherlands Environmental Protection Cooperation Project
EEIQB	Enter-Exit Inspection and Quarantine Bureau
EMRSBPPPRC	Environmental Management Regulation of Ship Breaking Pollution Prevention of the People's Republic of China
FDB	Frontier Defence Bureau
FDBJ	Frontier Defence Bureau of Jiangyin
IGO	Inter-Governmental Organization
ILO	International Labour Organization
IMO	International Marin Organization
JC	Jiangyin Customs
JEEIQ	Jiangyin Enter-Exit Inspection and Quarantine
JMSAPRC	Jiangyin Marine Safety Administration of People's Republic of China
Maersk	Danish Maersk Shipping Company
MSAPRC	Marine Safety Administration People's Republic of China
NGOs	Non-Governmental Organizations
SEPAC	State Environmental Protection Administration of China
SMSA	Shanghai Marine Safety Administration
TECS	Training and Education of China Ship Recycling
TECSR	Training and Education of China Ship Recycling
WHO	World Health Organization

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This thesis is yours!

CHAPTER ONE INTRODUCTION

1. 1 Background Description

"Ship scrapping industry" perhaps sounds strange for most of us, especially for those who live or work in the inland. However, the industry has actually existed for decades. At the earlier period, the ship breaking was a simple process considered as the extraction of scrap steel for the supply to the steelwork (Andersen 2001). Later on, as the development of economy, it was deemed as an industrialized activity. During the 1970s, the world's ship scrapping industry was primarily located in the United States, Spain, Portugal and Italy**.** By the beginning of the 1980s, the industry had been shifted to Taiwan, South Korea and the People's Republic of China. Since then, nearly all-large commercial vessels have been exported for scrapping. By 1988, ship scrapping emerged on the Indian subcontinent with the beaching scrapping methods. Today, India, Pakistan and Bangladesh dominate the world ship scrapping market, while Vietnam, the Philippines and Thailand are rapidly developing scrapping industries (Gansler 1998).

Today, 92% of all ship scrapping takes place in Asia (Graham-Rowe 2004). If we include the share of ship scrapping industry in other continents, the actual share of this industry in western countries is actually less than 5%. . The vast majority of merchant fleet vessels are scrapped by the intensive use of labour at non-facilitated beaches in these Asian countries where labour is readily available at a very low cost (Andersen 2001). Consequently a lot of environmental problems emerge in these countries such as the pollution of beach and air pollution. As a matter of fact, there are some ship-scrapping facilities in Western countries that could handle some of the load (Graham-Rowe 2004). But as little share of this industry in the West, the main playing field of environmental protection has definitely been fixed to the continent of Asia.

1. 2. Ship Scrapping Problems

As there is no appropriate governance for the industry, some parts of it such as the physical ship scrapping process have been extremely hazardous and dangerous for environment. So far, there has been no widely accepted ship scrapping industry

governance mechanism in the world. The governances of this industry are diverse in countries. Many ship owners chose the countries, who can offer not only a high price to buy their ships for scrapping but also loose environment governance, as their ship scraping destinations. This phenomenon results in that the environment of some countries is being heavily affected.

The ship scrapping industry is usually about the cooperation between a ship owner and a ship scrapping company. The ship owner sells its ship to the ship scrapping company. The ship scrapping company scraps the ship and benefit from selling the steel and components deriving from the scrapped ship. In this cooperation process especially for the physical ship scrapping part, because of improper governance, many problems in relation to the environment occur. Generally, there are three categories of effects (more details see appendix I):

Environmental pollution: The hazardous substances involved during the ship demolishing process may all be harmful to the environment and the health. The pollution stemming from these substances have both short and long terms effects. At present, most of scrapping activities in Asia are happening in the vicinity. In the short term, hazardous materials are often just burned on beach. Harmful fumes are then released directly into the environment-and into the people breathing the air. In the long term, the useful materials such as the asbestos from ships are often removed without any protective equipment and left to dry on the beach. This could pollute the beach and ground water related to the beach by infiltration mainly for the shipyard lying nearby the inland rivers.

Health: As the poor condition in these Asian shipyards in terms of regulation monitoring system, facilities and welfare issue, workers are exposed to negative health affects. Furthermore there is still little data on workers' health issue (Andersen 2001).

By and large, there are three potential threats to workers' health:

Physical potential threats:

- Torch cutting without protection (eye injuries, figure 1)

- Heavy lifting (wear and tear, back injuries, figure 2)
- Noise (hearing defects)

Hazardous substances threats (see also the appendix, in which there are detailed list of substances):

- Chemical effects (PCB, PCV, PAH, tin-organic compounds (TBT), oils and gases)
- Asbestos (figure 3)
- Heavy metals
- Fumes (dust, fume/gas components: dioxins, isocyanides, sculptures)

Figure 1. Lacking personal protection equipment

Figure 2. Heavy labour-intensive work

Figure 3. Asbestos reprocessing (mask provided by cameraman)

(Andersen 2001)

Equipment threats:

Mobile fire extinguishers containing water or sodium bicarbonate: it is unpleasant for breath and could cause respiratory diseases although it is not used often.

Safety:

In most scrapping shipyards, the limited area decides that several operations have to happen within a small area, where a lot of low-cost labors work. Here are some reasons causing the accident in the scrapping shipyard:

- The lack of skills and trainings
- No work plan and standard procedures

- Precautions including the use of personal protective safety equipment (Andersen 2001);
- The lack of facilities or equipments for scrapping

To sum up for this section, there is a lack of standard regulations and welfare measures to govern this industry. This industry is currently carried out mostly in Asian countries, which mostly pay more attention to the economic interests instead of the negative environmental affects. Insufficient managements have made the environmental situation in deep trouble.

1. 3 Ship Scrapping Regulations

In the last two decades, both international and domestic societies have been concerned these environmental problems resulting from the ship scrapping. Many international organizations and governments have been making regulations to regulate the ship scrapping process.

In principle, a ship scrapping cooperation process[1] should obey both the international regulations and government regulations.

- For the international regulations, the ones from the International Maritime Organization (IMO)[2], the International Labor Organization (ILO)[3] and the Basel Convention (BC)[4] are so far considered as the most influential for the ship scrapping business.

[1] See 1.1, the ship scrapping cooperation processes we mention in the thesis are all about the international cooperation process.

[2] The IMO is the smallest agency of the United Nations. The purpose of the organization is 1) to provide governments with cooperation machineries in terms of regulations, techniques and trades 2) encourage and facilitate the adoption of best practices in the field of safety, navigations and marine pollutions.

[3] The ILO is a specialized agency of the United Nations that deals with labour issues such as the health, working condition, and the safety of workers.

[4] The Basel Convention on the Control of Tran boundary Movements of Hazardous Wastes and their Disposal is the most comprehensive global environmental agreement on hazardous and other wastes. The Convention has 169 Parties and aims to protect human health and the environment against the adverse effects resulting from the generation, management, trans-boundary movements and disposal of hazardous and other wastes. The Basel Convention came into force in 1992(BC, 2007).

- For the regulations of government[5], many governments have issued their own ship scrapping regulations since the later 1980s. Any ship scrapping process has to follow the regulations set by the government, which the ship scrapping company is subject to.
- Moreover, we can find, in the new century, the co-operations between state governments in terms of the environmental management of ship scrapping are becoming more and more prevalent such as the set up of the China-The Netherlands Environmental Protection Cooperation Project (CTNEPCP) in 2000, which includes the part of ship scrapping management. Some ship scrapping processes also take these cooperation programs into account when they implement the government environmental regulations.

1. 4. Environmental Flow Governance

The environmental flow governance under the globalization context is a theory based on the sociology of environmental flow. The traditional research of environment flows is mostly about the research of the physical flow of materials such as the energy flow research and the raw materials flow circle research. But for the sociology of environmental flow, it holds the idea that the physical flow of materials and its related social structure are affected by each other. The material structure can, in a manner, define the social dynamics. To the contrast, the social dynamics can also, to a large extent, constrain the material structure. For that reason, the new sociology is not only to research a physical reality of environmental flows but also the social relations and networks that give origin to, or accompany to the flows. Some believe that the new sociology will have huge potentials to be researched. Five reasons[6]can support the point of view:

1) The traditional research of environment flows (ecosystem, nature science, environment flows, and environmental sociology) always pays attention to the

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[5] The case in the thesis is about the cooperation of a Danish company and a Chinese company. For the Danish Company who is the ship owner, they mainly need to follow the international regulations and the regulations of Chinese government because the ship scrapping is actually happening in the location of the Chinese company, where is the core target of environmental management. With this reason, we mention, in the thesis, the regulations of government are definitely about the regulation situation of Chinese government.

[6] The five reasons were concluded according to the book of *Governing Environmental Flows in Global Modernity* made by Mr. Mol .eds.

analysis of physical flows without the analysis of other social issues such as living condition, job losing related to environmental issues.

2) The current analysis about trans-national environmental flows can not escape from the bilateral analysis between the state and the state.
3) There is lack of unified concepts and theory to analyze such environmental problems of globalization.
4) Most of scientists admit the old concepts such as state has out-dated as the effects of globalization. There is a need of a new theory to analyze global issues.
5) Current research results provide scientists in the field of environmental sociology a good base for developing the sociology of environmental flows

The environmental flow is used in this science to indicate the nature of transnational environmental problems under the context of globalization. It includes both physical flows and virtual flows deriving from the analysis of social relations. For our thesis, it is planned to analyze a ship scrapping cooperation case, which is happening under the globalization context, by making use of the flow analysis theory of the new science (More details, see 2.4).

1.5 Objective

To analyze the social structure that is governing the ship scrapping cooperation process between the Changjiang Ship Breaking Company (CSBC) and the Danish Maersk Shipping Company (Maersk) by virtue of the theory of sociology of environmental flow:

- To explain the social structure (stakeholders relations with respect to the cooperation process) by means of the information flow idea (see chapter 2.3.2)
- To analyze the relation between the social structure and the hybrid arrangement based on the explanation of information flow (see chapter 2.3.2)
- To take a stock of the role of state in governing the cooperation process (see chapter 2.3.2)

1.6 Research Questions

In order to achieve the thesis objective, three main questions will be researched.

Question 1: what were the motivations of cooperation for both parties?

Question 2: which kind of social structure is governing the cooperation process?

Sub-questions:

- Which stakeholders are related to the cooperation process?
- How do they govern the cooperation process?

Questions 3: what is the role of Chinese government in governing the cooperation process?

For question 1, through this question we can mainly learn to what extent the globalization plays a role for two parties in choosing a partner. For question 2, two sub-questions are aimed at reflecting the social structure governing process of cooperation. More importantly, the information flow analysis and hybrid arrangement analysis are projected to be finished based on the research of two sub-questions (see 2.4). For question 3, it mirrors one of the objectives directly. In question 2, the state is considered as one of the stakeholders governing the ship scrapping process. Question 2 may have mentioned the role of government but limited and general. The role of Chinese government will be explored separately and specifically (see 2.3.2).

1.7 Thesis Structure

After the introduction chapter, there will be a chapter presenting the theoretical frame of the thesis. In this chapter the main theory and concepts we apply in the thesis will be explained. The main methodology with regards to the thesis will also be given in the end of the chapter. Following this theoretical part, it is chapter 3, in which the related regulation background for a ship scrapping cooperation and the description of a ship scrapping process will be rendered[7]. The core flow analysis of our case is planned to take place in Chapter 4. Meanwhile, accompanying with the flow analysis, the hybrid arrangement concept and the role of state, which are core contents of the environmental flow theory, will also be discussed in this chapter. Subsequent to that, it is chapter 5,

[7] The regulation background provides us with a regulation frame, under which a legal ship scrapping case in China is governed. The description of a ship scrapping process helps us to be clearer about the ship scrapping stages.

where we can find the final conclusion of thesis and some points of views on governing the cooperation, which we sensed through the case analysis, for discussing.

CHAPTER TWO THEORETICAL FRAME

2.1 Background

The sociology of environmental flow is under development. As Arthur P.J. Mol states in the book of "Governing Environmental Flows in Global Modernity" we can also call this sociology "Environmental Sociology to flows". It is a sort of new sociology aimed at dealing with the relation between governance, globalization and state[8]. Global warming, trans-national ship recycling, global food chain management, all these global phenomenon, which is mainly caused by the technology of information communication and transportation, hold different explanations in different sciences. Some in the field of politics consider globalization as the irrelevance of state sovereignty whereas some in the field of economics could consider that as the increasing role of Non-Governmental Organizations (NGOs) or the importance of international regulations. But in the sociology of environmental flow, we see this globalization phenomenon related to environment as "environmental flow".

In this new sociology, the environmental flow is not only about the physical flow of materials, which is mostly researched as main targets by nature or even our current environmental sociology and ecology sciences. It also implies the exploration of the ways in which the physical flows happen. In other words, it also refers to social relations that give origin to, or accompany, the environmental flows (Spaargaren et al. 2006). This thesis will mainly refer to latter aspect of environmental flow.

As the existing sociological and political science literature on environmental governance and global modernity have a rather limited focus and to specify the need for a complementary integrated approach, the sociology calls for the integrated approach to research the governance of environment under the context of globalization (Mol et al.

[8] In the book of Spaargaren, Gert, Arthur P.J.Mol and Hans Bruyninckx, "Governing Environmental Flows in Global Modernity", it points out that most of current globalization researches only focus on the research of bilateral relation such as the relation between state and globalization or governance and globalization. Little literature focuses on the trilateral research of these elements.

2006). The approach consists of two main aspects. Aspect one is about the hybrid arrangement. The role of state is somewhat changing; more and more international stakeholders are being involved in managing domestic environment affairs. The trans-national and multi-actor arrangements in terms of environmental management have been more and more and obvious necessary. We think of this mixed arrangement for governing trans-national environmental problems as a kind of hybrid arrangement. It is believed in the thesis that the hybrid arrangement is (at least partly) the result from the disappearance of traditional definition of space and time and the increasing globalization trend. Aspect two is about the arrangement for global hybrid. It stresses more on the complexity of social and material entities (Spaargaren. et al. 2006). The arrangement for global hybrid becomes necessary because of the social complexity. The arrangement for global hybrid aims to, under globalization context; govern trans-national environmental problems with the involvement of both social aspects and physical aspects. For example, the management of Conservation Park is being called for taking care of the interests of local people instead of the pure conservation of its ecosystem. The sustainable management of environment, which was hailed in the Agenda 21, also stresses the importance of social aspects such health, living welfare and job chances. All together, the hybrid arrangement and the arrangement for global hybrid form the integrated approach of governing the environmental flow under the globalization context. In the book of *Governing Environmental Flows in Global Modernity,* it actually points out that this kind of integrated approach is one of the core contents for the modern environmental flow governance (Mol et al. 2006).

The sociology of environmental flow does not only include new insights about the governance of environment but also some ideals and concepts, which derive from other sciences, in this new sociology. For instance, the network society theory of Castells. M[9] and the global complexity theory of John Urry[10] provide the new sociology with a new

[9] Manuel Castells is a sociologist. He has ever pressed many articles about the forming of new network. The main ideas we derive from Castells are mainly from the article of *the rise of network society, the power of identity*, *end of millennium* (more details in references).

[10] Jone Urry is a sociologist, who supports the idea of environmental flow. But compared to Castells who take the space of flow and the space of place as the research centre, Urry pays more attention to the fluid characteristic and the forming of network. He also has some contributions to the understanding of social complexity. His influential books include *Mobile Sociology*, *Sociology beyond Society,* and *Global Complexity.*

tool to analyze current environmental governance under globalization context. The science of flow, environmental sociology, ecosystem, nature sciences and many other related sciences, which have some research boundaries in the view of sociology of environmental flow, can always contribute to the new science.

2.2 Key Ideas

In this section, two theories, which are regarded as the base of developing the main ideas of the sociology of environmental flow, are firstly given out. After that the main ideas of the sociology are presented. Finally, we end this section with some constrains to the sociology.

2.2.1 Theoretical Base for Sociology of Environmental Flow

Rapid changes of the world caused by globalization and high technology development has been making more and more sociologists realize the incapacity of current concepts and theories in analyzing social problems such as the role of state and globalization. As Anthony Giddens argued extensively and in detail why nineteenth century sociology—the sociologies of Marx, Weber and Durkheim—was in need of being reformulated and reinterpreted to fit the study of the new constellation of the post-war twentieth century (Mol .et al. 2006). So far many efforts have been made with an attempt to reconstruct sociology. In this thesis, we mainly discuss the efforts made by Manuel Castells and John Urry, whose theories have been widely considered as the research reference of the sociology of environmental flows.

Manuel Castells, who wrote the book of Network Society (1996), claims that the physical meaning of time, space and power used in the old literatures have not been able to analyze the modern society already. Instead, Multi-dimensions of time and space should be recognized as the new feature of timeless time and placeless space in the modern society. He divides the world into different nodal points, which are considered as power containers. The connections or flows such as information, materials of these nodal points compose of a network. For example, the Pearl Delta of China can be seen as a nodal point or power container of the world network (Castells 1996). To some extent, the functions of these nodal points can go far beyond the control of the state. The

power not only means resource, economics, politics but also the access to flows. Those who have more access to the flows will have more power.

He does agree that the elites of state control dominant nodes as they hold more powerful access. In his theory, it says in the information age the urban is no longer delimited to physical contiguity of a local place as it was in the past. Rather, urban centres are constructed through two spaces: the 'space of flows' and the 'space of place(s)' (Castells 1996). The analysis of the space of place and the space of flows is the core, based on which other points of views are gotten. The space of place only limits to the physical and geographical places. It regards the urban experience as a local experience, with people living within the physical contiguity of place, with their historical diversities, identities, and forms of societal interaction (Melchert. et al. 2006). However, the space of flow as a main feature of modern society has been so broad (Melchert. et al. 2006). It concerns the dense exchanges of networks of capital, information, technology, images, etc., stemming from the global, which have become the 'expression of processes dominating our economic, political, and symbolic life' (Castells 1996).

The dynamics of "placeless space and timeless time" should be best way to indicate the feature of the space of flow under the context of globalization. Traditional understanding of time and space are no longer bound together closely. The network-based world has connected the state with unavoidable flows, which make the state not able to have a one hundred percent deterministic right in many fields such as economy. While, during most of human existence, biological time was the prime organizing rhythmic, this changed to clock time in the industrial age and today we live in the age of timeless time (Castells 1996). For the 'timeless time', new information and communication technologies are having the time lost its past meaning. For example, in the past, the consumption of strawberry in Europe always happened in early summer. Consequently, with the traditional time definition, people could only enjoy the food in early summer. But nowadays, as the powerful function of flows, people can taste strawberry at any time because the highly developed technology can fully transport the strawberry from anywhere else of the world to Europe within a planned period, in which the quality of this fruit can be guaranteed. With the example, the old-fashion of time and place is clarified.

There is no end of flow. And these flows are structured by either physical infrastructure or abstract settings like the environmental regulation. The location of (productive) functions, the appropriation of (urban) space and the symbolic representations of space and place are becoming separate issues in the network society (Castells 1996). Urban space becomes socially differentiated while (production) functions can be coordinated beyond physical contiguity (Mol .et al. 2006).

John Urry does have consensus with Castells about the view that the old concepts have been outdated to analyze modern society. Urry developed a series of new ideas with the sake of developing a systematic theory and concept base for modern sociology. Instead of the core analysis of space of place and flow, he pays more attention to the definition of fluid. He suggests that one approaches spatial patterns in three ways or modalities, distinguishing among regions (i.e., objects geographically clustered together), networks (relations between nodes or hubs, stretching across different regions) and finally fluids (spatial patterns determined neither by boundaries nor relations) (Mol .et al. 2006). Among these complicated patterns, flows appear to have many layers and dimension. As he mentioned in the book of global complexity (2003), the current complexity of society has been far beyond the analysis ability of sociology. The crucial role of state and human agency has been abandoned as the things that state, human agent or other objects can be converged into one name called the “actant”. For example, as the complexity of fluid, the role of state has always unpredictable and changeable. Sometimes it plays a role of market whereas it sometimes just a policy implementer. In this aspect, he is more radical than Castells, who admits the dominance role of flows but also agrees that the states that have more access to flows and resources are more powerful. Urry also makes use of chaos, unpredictability and iteration to explain the relation between governance and globalization. That is to say that in the view of him there is no way to control the fluid as the complexity of fluid.

2.2.2 Sociology of Environmental Flow

The essence to develop this new science is largely due to that current environmental sciences, environmental sociology, and nature sciences have little focus on the research of an integrated approach. They either take the material flow as main research targets or simply focus on the relation between institutions and material flows. Even though the

research of environmental flows sometimes includes some social aspect analysis it appears very reluctant. For instance, there is a separate stakeholder analysis part in the environmental system analysis research. But we do not see any more social analysis in other parts of the system analysis such as the impacts analysis of green house gases, which only involve the impacts of gases but not consideration of social factors.

Current environmental sociology has done some work on the research of flows but limited on "additions and withdrawals"[11]. More and more scholars do agree that we need to broaden the research of environmental flow, which mostly focuses on material flows physically. The central unit of analysis should not only include the physical aspects but also the social aspects. The old analysis unit was too narrow to analyze current situations, which are present under the context of globalization network. Old environmental sociology ignored the analysis of abstract flows. Actually, the social flows in terms of institution setting, information exchange or norm consensus decisively affect and constraint the governance of environment (Mol et al. 2006).

First, the sociology of environmental flow thinks that the environmental flow should include both physical and social aspects (Mol et al. 2006). That is to say that it uses the hybrid system to analyze environmental flows. The information setting, norms, and institutions constructing the abstract flows can also be understood as flows. And for the sake of understanding these virtual flows and the mobility of globalization, the "nodes"[12], "scape"[13], and "social network" are supported. The connecting between environmental network and physical environmental flows has been a hot point to be research in the near future of the new science.

Second, the acceptance of new ideas does not mean that the sociology of environmental flow is just a copy of the work made by Urry, Castells or other sociologies supporting

[11] Additions and withdrawals are two forms conceptualized by A. Schnaiberg in his book of "*The Environment from Surplus to Scarcity"*. Most studies on additions and withdrawals focus on social practices of production, consumption, mining, agriculture and the like in terms of how they result in additions and withdrawals and the concomitant changes within the sets of ecosystems making up the material sustenance base to modern societies (Mol .et al, 2006). Further more the search study as the main stream of most sociologists is too limited to static and regional scales.

[12] "Node" means that points connecting flows.
[13] "Scape" can be understood as the physical or abstract infrastructure connecting the nodes of flow.

social reconstruction ideas (Mol et al. 2006). Castells thinks that the development of modern technology has made the human being be able to conquer the limitation of nature. The importance of nature science in the research of sociology is not equal to that of social sciences. For this view, the sociology of environmental flow does not agree. It does support the view of Urry that the nature research and other sciences can have the same account in the research of sociology and always help us to better develop the new science.

Third, technology development is always crucial in understanding and analyzing the sociology of environmental flows. In this sense, it is in line with the idea of Castells and Urry (Mol et al. 2006).

Fourth, the role of human agency has become vague in the hybrid society (Mol et al. 2006). As Urry state that objects, human agent, or technologies can all be called actant. They have the equal importance in this complex society. But new sociology does think that there are always needs for developing strategies to tackle problems however complex the globe network. It is much more positive than the view of Urry, who thinks that it is impossible for human agent to completely steer the network in purpose.

Fifth, a new relation between power, inequality and access has been accepted widely. Power does not always mean politics and capital; it also implies the access to flows (Mol et al. 2006). This notion of 'access to' refers to both direct access as well as the ability to structure the "scapes" and "nodes" to partially influence the fluids in terms of speed, direction, and intensity etc. The sociology of environmental flow does follow this idea. But what is more for the new sociology; it also stresses the research on the conditions for access to flows. It means that why some has more access to flows whilst some does not have easy access. By giving priority of social aspect in researching environmental flows, the conventional research of environmental sociology has been challenged in terms of the relation between power and inequality. Old environmental sociology always put power into additions and withdrawals, which are closely connected to material flows. But under this new theory, the definition of power is much broader; it is also present in social practices. By interpreting environment and nature as attached to flows rather than seeing them only as part of the 'space of place', and by providing an interesting new conceptual framework for analyzing the scapes, nodes,

moorings, networks and fluids determining the dynamics of flows, questions of access to and exclusion from flows make the power-analyses less predetermined and more open in character (Mol .et al, 2006).

Sixth, the role of the environmental state in governing environmental flows is a high profile aspect discussed in the environmental flow sociology. It has been a long time that industrialized countries enjoy their good reputation in protecting their environment. Since the 1960s we have witnessed the rather smooth institutionalization of environmental tasks in state policies and politics, leading to the emergence of the 'environmental state (Mol. et al, 2002) in the 1980s, the ideologies of deregulation and privatization had dominated the debate of scholars. However, from the 1990s, with the influence of globalization, some new debates emerged. Except for the calling for reinventing the environmental state by changing the inner political system such as the participate of public in the political course and the new definition of legitimacy within the boundary of state, the main idea has been that the nature, position and role of the (environmental) state is changing and that we have to look for new concepts to analyze these transformations where they relate to environmental challenges in a global world order (Mol. et al. 2002). To what degree of state transformation will be changed and how relevant the environmental state will be in environmental governance in the global context are still in debate.

The sociology of environmental flows does follow the idea of other environmental studies that the role of state will always remain central in the governance of environment (Mol et al. 2006). Three points to support this view of state importance: One, the environmental management must be implemented by nations in reality. It admits that the restraints of state role under the context of globalization network. But not like the passive view of global complexity from Urry, that is to say that state is irrelevant and unable to deal with the complexity, the sociologists of environmental flow will always think over about the reality reforms and improvements for environmental problems. After all the improvement and governance ideas from the theories formulated by environmentalists should finally rely on the implementation of nations. Two, there is no doubt that there is an overwhelming trend to involve more and more international stakeholders in the management of environment and the role of state is changing. However, when we analyze the relation between the state and the

international actors, many socialist do suggest not to spend more time research the superficial trend of globalization, instead we should pay more attention to the reality in terms of the historical relations between states and the real implication of current international hybrid arrangement (Stevis et al. 2006). In fact, every environmental flow has its own background. Some international institutions that appear to be inexorable to every country in terms of policy making, they are in fact prone to some countries, which historically had tight relations to the origin of these institutions. As long as we slightly have a look at the work politics, it is not hard to find the crucial the US plays in the United Nations. Three, the role of states has been changing, but the state is still the center for the current management of environment. Much evidence illustrates this. For example, a few powerful countries mostly control the main international institutes. Most countries have different environmental rules (Jänicke 2006). Most of industries only focus on the environmental requirement of state. The voice of Southern countries at the international discussions is weak; instead the international arena is dominated by a few states largely. States are much more powerful than the international stakeholders in terms of regulation making and implementation. Perhaps, nobody cares the work of the Word Health Organization (WHO) in Switzerland seriously but they do care the domestic regulation in terms of sanitation or taxation as only states can make them feel pressures.

2.2.3 Constraints of the Sociology of Environmental Flow

The new approach to analyze environmental flows theorizes the relation between state, environment and globalization. But many sociologists admit that it has many constraints in managing environmental problems. If we do not take these constraints into account in the process of environmental governance, power holders could easily use the new theories as a handful tool to better implement their wills (Mol et.al 2006).

One, the new theory should be aware of the research of local places. Most of literature from either Castells or Urry even Appadurai[14] is not produced locally. All researches are

[14] Appadurai, Arjun is a socialist. He thinks that the globalization has covered the real nature that formal colonel entities are still present and exploit the poor colonies. He formulated a series of concepts with the aim of unveiling the really nature such as the use of ethnoscapes, mediascapes, technoscapes and ideoscape.

from a birds-eye view, written from outside, or from above (Gille 2006). Since the new science is mostly developed based on the literature of formal researcher it has unavoidably been produced off ground level.

Two, flows cannot analyze all environmental problems. It is not like what Castells think that the flow dominants the society. Actually flows affect society, but society also constitutes flows. The diversity of geography and settings decides the diversity of environmental governance method. The approach supported by the new sociology can make us less confused to analyze trans-national environmental problems and broaden our mind in environmental governance (Gille 2006). But its too theoretical and general feature strongly put the importance of locality, culture and politics aside.

Three, flows are not uncontrollable; it is surrounded by politics, inequality, and many other social factors. When we pay more attention to flows, we should also realize these external factors. The theory of flow is not universal and feasible in anywhere. In some places, the local culture can also control flow even they know the flow theory.

In order to tackle these problems further statement should be made. That is to say (Gille 2006):

a) A view 'from below', or from concrete, accountable locations
b) To avoid fetishizing the global
c) To avoid a priori favoring the global as the most important level of analysis and scale of action (this is what Tsing (2000) calls globalism)
d) To see globalization as a contested process

A scale-based analysis is well used to tackle some environmental flows under the globalization context (Gille 2006). Many socialists in the research of the sociology of environmental flow do agree that the local culture, tradition, justice should play an equal role with the flows connected to outside. The proper choosing of scale can help better solve problems rather than cybernetic use of environmental flows (Gille 2006). At times the analysis of local culture can be much more important than the analysis of flows to solve problems.

Four, the network structure theory takes a significant account on understanding the environmental flows (Buttel 2006). Nonetheless, the research only focusing on the nodes, which are the several hundred of highlighting cities in the world, ignoring the social and economic relations between states is not a good way to further open the door of the sociology of environmental flows. So the first imperative should is that while there is a need to transcend the shortcomings of the traditional environmental-sociological conception of the environment, a lapse into post-modern paralysis or moving toward a view of the world in which a few dozen or few hundred metropolitan command posts comprise its essence is not a step forward for environmental social science (Buttel 2006). In this manner, he holds the same idea with Mr. Mol and its colleagues that the state plays a crucial role in governing environmental flows and should never be ignored (see 2.2.2).

Five, Buttel thinks that there is still a close relationship between the current social structure in terms of global politics, economy and environment and environmental flows. He makes use of the example of flows Giovanni Arrighi's (1994) under appreciated analysis of the four predominant systemic cycles of accumulation to support his point. Givovanni Arrighi insists that the world is changing and the important role of key states like the US in the world arena is also diminishing. In this respect, he holds the same view with Urry or Castells, who support the network theory. However, he also claims that the world will finally be transformed from the production expansion to global financialization. Arrighi stresses in particular the world historical tendency for hegemonic powers and/or capital to advocate strongly for the desirability of the 'self-adjusting global market,' which in turn tends to lead to 'financialization' and to disorder, instability, and competition from rising hegemony, and hegemonic decline (Buttel 2006)

Arrighi argues that financialization—the shift of accumulation in the direction of trans-boundary rentier relations made possible by global dominance over money capital—has been integral to the decline of all of the systemic cycles of accumulation (Buttel 2006). In this sense, it is absolutely contrasting to the view of many flow researchers, who hold that the world has changed so fast and complex so that the disorder structure dominates the world and no way to understand. So, he suggests "researchers should resist the implication of some flows analyses that notions of social structure and modernity no

longer have any relevance to understanding global socioeconomic and environmental changes.

2.3 Theory Application

The ground making projects (see 2.2.3) support that when we explore the new science we should always think of its interpretations for reality. In this sense, we become curious about the application of the theory of the sociology of environmental flow.

2.3.1 Case Setting up

There are many typical environmental flows under the context of globalization such as ozone layer depletion, global warming or cross-country river management. But, in our thesis, we only choose a partner mode-based ship recycling as our research target. The reasons as follows:

Firstly, comparing with other cross-nation flow issues the ship scrapping under partnership model can better indicate the flow characteristic. It brings the flow theory to the ground. Many flows belong to the scope of environmental flows but they are relatively too abstract to understand. Sometimes it naturally put the research a pressure as its abstractness.

Secondly, the ship recycling under the partnership model composes of all components, which the environmental flow concerns. For example, as globalization, trans-national environmental arrangement becomes more and more common. Ship recycling is not a domestic affair; instead more and more ship owners choose a proper partner abroad as their ship recycling location. The important role of IMO in ship recycling process is a good indication of the importance of hybrid arrangement.

Thirdly, it is interesting to research the role of state in governing the partnership based cooperation process. On one hand, what role the state plays in governing the environmental flows under the globalization context is not settled in the research of the sociology of environmental flow. Sociologists have not achieved a consensus on that point. On the other hand, from time to time the roles of state in managing the well

known cases such as the global warming and ozone depletion are either clarified by international treaties or researched by sociologists as typical environmental flow cases. But for the role of state in governing the partnership based international cooperation case, no so much attention has been paid so far. Thus, it is considered as meaningful to take a stock at the role of state under the partnership-based model. It may provide us with some new insights

2.3.2 Theory Application

In the thesis, we will apply the theory to our case. To be specific, analyzing the social structure governing the ship scrapping cooperation process with the information flow idea is the main point of our analysis. Meanwhile, we will also take stock of whether there are some relations between the integrated approach and our case and what the role the state (Chinese government) plays in the cooperation process. The integrated approach (see 2.1) includes two aspects, which are the hybrid arrangement and the arrangement for global hybrid. It is considered that the ship scrapping cooperation process is just a kind of indication of the arrangement for global hybrid (information communication, safety governance, health governance. etc). So ,in our thesis, to analyze the relation to the integrated approach is mainly to research the relation to the hybrid arrangement.

The information flow analysis is structured in this way. In our case, the cooperation process is composed of by three stages, which are respectively the cooperation initiating stage[15], the physical ship flow process stage and the physical ship scrapping stage. We think that the practical governing of each stage can be seemed as a kind of network governance that is supported by information flows. By this we mean that the practical governance of each stage involves different stakeholders in different ways. The communications of stakeholders in different ways form the information flows of each stage. The information flows form a network governing each stage. For instance, we assume that the CSBC follows the regulation of government in the physical ship

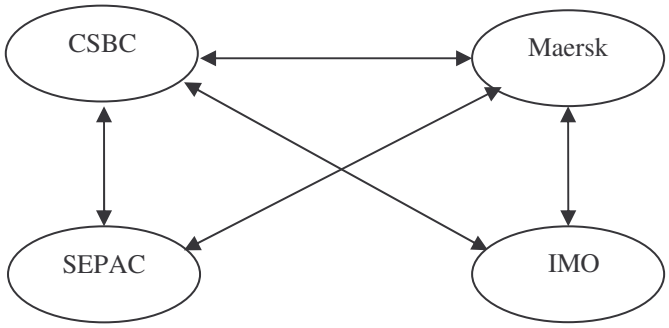
[15] The cooperation initiating stage is the first step of cooperation between the ship owner and the ship scrapper. During this stage, it refers to the work such as how Maersk got known the CSBC and how they made the first contract. After that, ships can be transported by the owner to the ship-scrapping company. We call this the physical ship flow stage. The environmental management as the final stage happens along with the physical scrapping of ships. This stage is considered as the most important aspect of the governance of ship scrapping process.

scrapping stage. In this case, the CSBC as a main stakeholder in the physical ship scrapping stage are connected to the government, which is another stakeholder in the stage, by the means of the environmental regulation. Consequently, according to our idea, the CSBC and government form a kind of information flow with the media of the regulation. Together with other information flows happening to the stage in reality, they finally form a network governing the physical ship scrapping stage. The background of each stage is different so that information flows in each stage are also diverse. It is designed, in the thesis, to make a background description firstly for each stage, which puts in a picture that how the process is being governed in practice by its related stakeholders. And then, respectively, there will be an information flow analysis after the background description in each stage. The information flow analysis is mainly about the identification of information flows happening to each stage.

In follows, it is an assumption-based figure with the aim of indicating how the network formed by information flows is governing each stage. In this figure, we take the physical ship scrapping stage as our assumption target. We assume that, according to the background description of the stage, we got known that this stage refers to such stakeholders: IMO, CSBC, Maersk and the State Environmental Protection Administration of China (SEPAC). And there are four flows formed by the four stakeholders by the means of either regulations or the modern technologies:

- The information flow formed by Maersk and the CSBC by means of the faxing machine and the Internet.
- The information flow formed by the CSBC and the SEPAC by means of the national environmental regulation.
- The information flow formed by Maersk and the SEPAC by means of the national environmental regulation.
- The information flow formed by the CSBC and the IMO by means of the guidelines of IMO. All these three flows form a final network picture.

Figure 2.1 the network governing the physical ship scrapping stage



“ ⟷ ” Means “information flow”

This information flow analysis is planned in chapter 4. As the information analysis can provide us with a good relation structure for stakeholders, we also project the work of analyzing the relation between the cooperation and the hybrid arrangement for each stage and the role of state (Chinese government) in each stage to be done after the information flow analysis of each stage.

- The hybrid arrangement emphasizes the multi-stakeholders governance for the environmental flow (see chapter 2.1). With this feature, we assume that the relation analysis based on the information of the information flow analysis for can be finished by testing whether the cooperation governance is in line with the hybrid arrangement.
- The role of state in the cooperation can be drawn from the analysis of the hybrid arrangement.

2.4 Research Methodology

In short, the literature research and fieldwork based case study form the body of our research methodology.

For chapter 1, which was the introduction, we mainly described the basic background about the ship scrapping and some basic contents such as the thesis objective, which was supposed to appear in the part. For this part, we completed it mainly by the research

of literature. Some basic data and facts like the history of ship scrapping or the basic information of IMO were achieved through the Internet searching whereas some deeper insights such as the impact of ship scrapping on environment were concluded by means of the research of some representative books and journals about the ship scrapping impact.

For chapter 2, which was the part of theoretical frame description, it has been completed according to the relevant literature mainly the books and journals. As we mentioned before, the theory is still under developing. This feature decides that we have to be more cautious when we search literature. Basically the information we stated in this chapter followed such a rule. That is to say that we picked the most reliable literature, which was admitted by both the researcher and supervisors. And then we researched the literature carefully and extracted the useful information, which meant the most important points advocated by the literature, to serve our theory frame.

For chapter 3, the regulation frame and a ship scrapping cooperation process will be introduced. The methods of interviews and the literature research help us to find the regulations related to the process. The participation to the ship scrapping work and the observation of field all tend to be useful for making clear of what a typical ship scrapping process is.

For chapter 4, the information flow analysis will be finished in the order of the practical cooperation process (2.3.2). That is to say that the information flow analysis for the cooperation initiating stage is done firstly. In sequence, it is the information flow analysis for the physical ship flow process stage and the physical ship scrapping stage.

Methods for the background information of each stage:

The information on the cooperation initiating stage, the physical flow process stage and part of the physical ship scrapping stage is achieved by interviews, participation and observations. By finishing the interviews, two different questionnaires (see appendix III and IV) were prepared before we interview the related staff of both parties. It thought here that it is wise to do that because two parties had different working backgrounds.

For example, Maersk as a ship owner could care more the environmental management. But for the CSBC, it could pay more attention to the profit of the cooperation.

The rest information referring to the physical ship scrapping stage is about the investigation of environmental management situation. It will be finished by the method of interview. A new questionnaire for this interview is prepared (see appendix V). It is designed to select 20 persons (see appendix VI) randomly, who are working for the ship breaking in different fields. (Generally there are around at least 200 workers for a ship breaking (20,000 tons ship)). As most of workers in the CSBC are ordinary peasant, who either fear the interview or do not know how to answer the question, from time to time we need to explain the questions in the questionnaire to them in order to get their answers. We are not only interviewing the workers who are working the physical breaking of ships, but also the workers working for the ship breaking process as either a supervisor or a manager of one field such as hot work field. This is because that we want to make the answers more integrated. One question could get different answers when we interview different people, who work at different working places. Further, if we only interview the workers, who mostly have a low education background[16] and have just come to the company for a short time, the whole interview would be turned out to be less persuasive. After finishing the interview, it is a conclusion for the interview, the result of which is presented through a table, which can be found in the environmental management effectiveness part of Chapter 4.

The method for analyzing the relations of stakeholders:

As we planned (see 2.3.2), the relation between our case and the hybrid arrangement and the role of government in governing the cooperation in each stage are also analyzed in each stage after the flow analysis. It is considered that these two kinds of analysis could not be finished without presenting a clear relation structure for related stakeholders. So, we think, in addition to the pure statement for relations, it is necessary to make use of another way to indicate them. Therefore, a matrix model is chosen. A matrix model will be used to indicate the relations and the importance of different actors, who are involved in the cooperation.

[16] In China, the workers for physical ship breaking are usually from the rural areas, where ordinary peasant live. These peasants usually do not have enough education and have a low environmental awareness.

The idea is as follows: in a matrix, the vertical direction is filled in with the main processes happening in the ship breaking process of two parties. The horizontal direction is filled in with the related stakeholders that are involved in the cooperation process. It is clear that the stakeholders all play their roles in the cooperation process. But the accounts of the roles are different. Some may only have a role in one of the processes of the vertical direction. For identifying the accounts that the stakeholders have in each stage, we plan to give stakeholders a mark. In this way, the relations of stakeholder and their relative importance can be clearly perceived.

- "1"- the most important "2"- more important "3"-important "4" less important
- Lower "total mark" means the more important

Table 2.1 the matrix for the relations between stakeholders and the ship breaking cooperation

Stakeholders / stages	A	B	C	D
Cooperation initiating	…	…	…	…
Physical ship flow	…	…	…	…
Physical ship scrapping	…	…	…	…
Total	…	…	…	…

At last, chapter 5 as the last chapter will be finished along with the literature research.

CHAPTER THREE: REGULATION FRAME and A SHIP SCRAPPING COOPERATION PROCESS

3.1 Regulation Frame

A ship scrapping cooperation process is usually subject to both international regulations and domestic regulations. The ship owner is related more to the international regulations whereas the ship scrapping company is linked more to the domestic regulations. Because ship owners need to transport ships to the ship-scrapping yard, during this process, international regulations are more important in governing the trans-boundary issues such as the regulation of BC for tans-boundary solid waste exporting. After transporting the ship to the ship-scrapping yard, two parties of ship scrapping cooperation have to follow domestic environmental regulation. The ship scrapping company is the main implementer of physical ship scrapping and the location of ship scrapping is also the receiver of environmental impacts. For any international ship scrapping cooperation, a ship owner should always obey the regulation of the country, where the ships are scrapped.

International regulations:

The international regulations are mainly about the ones from the Inter-Governmental Organizations (IGO). As the weak regulation monitoring system of IGOs, the regulation implementation situation is very different from place to place.

Among the regulations of IGOs, the regulations of IMO, ILO and BC are the most influential (see 1.3.1). IMO is the most direct IGO at the international level in relation to the environmental management of ship scrapping industry. It has been setting up the ship scrapping guideline (more details, see the appendix) since 2000. This guideline applies to both the ship owners and ship scrapping companies with the aim of leading them scrap ships in an environmentally friendly way. More important, it combines the regulations of ILO and BC in its content. That is to say that for ship owners and ship scrapping companies, when they scrape the ships according to the guideline they already obey the regulations of ILO and BC.

Domestic regulations (China):

In China, the regulations that the ship scrapping is obligatory to obey can be categorized into two kinds. They are routine regulations and environmental regulations.

The routine regulations are set for the governance of the ship scrapping cooperation initiating stage and the physical ship flow stage. When a ship from overseas comes to China Sea and rivers it has to follow the regulation of Marine Safety Administration People's Republic of China (MSAPRC) and the related local marine safety administrations. Additionally a foreign ship entering into China for business should always obey the regulations of its related Enter-Exit Inspection and Quarantine Bureau (EEIQB), Customs and Frontier Defence Bureau (FDB). These regulations are aimed at preventing illegal trade activities. The inspection work of these units will be conducted at the ship-scrapping yard when a ship for scrapping arrives.

Environmental regulations in China are chiefly for the environment governance at the physical ship scrapping stage of ship scrapping cooperation. Heretofore, ship-scrapping companies have to take three kinds of environmental regulations into account when they scrap ships.

First kind is the environmental regulation of ship scrapping of the SEPAC and the related local environmental protection administrations. By and large, the Environmental Management Regulation of Ship Breaking Pollution Prevention of the People's Republic of China (EMRSBPPPRC)[17], which was set in 1988 by the SEPAC, is considered as the priority to obey for ship scrapping companies. The local regulations[18] from local environmental protection administrations mostly overlap with the national ones in terms of the content because local environmental protection administrations do not have enough resources in terms of the technology, personnel and financing to make new environmental regulations for local companies.

Second kind is the cooperation program regulations for the environmental protection between states such as the Sino-Italian Cooperation Program for Environmental

[17] It is updating year by year.

[18] Local environmental protection administrations do not have enough resources in terms of the technology, personnel and financing to make new environmental regulations for local companies.

Protection set in 2001 and the China-The Netherlands Environmental Protection Cooperation Project (CTNEPCP) and The Training and Education of China Ship Recycling (TECSR) set in 2000. As these cooperation programs were initiated by the national government, it is obligatory for companies to implement. This kind of regulations, which largely involve the technological and information exchanges between states, are currently becoming more and more popular as it can provide companies with clear guidelines, which lead them how to do the environmental management in an proper way and follow international regulations.

Third kind is the regulations set by the China Ship Breaking Association (CSBA). The CSBA is a NGO in China, which plays a coordination role between the government and the ship breaking companies. The central government entitles the NGO with a policy, which means that if the ship breaking company, who is their member, reaches their requirements in terms of the environmental management then the CSBA has rights give them a certificate, depending on which companies can get some tax reduction. Because of this reason, although it is a NGO the regulations of it make sense for companies.

3.2 A Ship Scrapping Cooperation Process

It is considered that three main stages dominate a ship scrapping cooperation process (see 2.3.2).

In the cooperation initiating stage, it at first refers to the process of finding a partner for ship owners. Some could find a partner through the introduction of other business partners or by the advertisement of the Internet, TV show. Some could get known a partner mainly through the help of government. Other than finding a partner, the stage also includes the preparation work for the final cooperation contract signing (Price, schedule. eds.) after two partners decide to cooperate. For instance, for the sake of testing the partners' capacity in terms of financing, technology or personnel. Both partners can make the final inspection for each other to check whether their partners are able to reach their cooperation expectation[19]. Meanwhile, both parties also need to

[19] In the cooperation, the ship owner sells its ship to its ship-scrapping partner. And then the ship scrapping company profits from selling the steel and other useful components deriving from the ship of the ship owner. More ships the ship scrapping company scrap, more benefit it can get. The ship scrapping company always expects more ships for scrapping so usually ship owners have the final decision right for

communicate with the related routine regulations makers in order to make a full preparation for the next cooperation stages.

In the physical ship flow stage, a ship owner needs to transport its ship for scrapping to the ship-scrapping yard. The stage usually consists of the sub-stage of pre-delivery (the period from the time when the cooperation contract has been made to the time when ship just arrives at the scrapping yard) and the sub-stage of post-delivery (the period from the time when a ship for scrapping arrives at the yard to time when the physical ship scrapping work begins). For ship owners, if they are from the states, which are members of IGOs, they will have to consider the related regulations of IGOs during the sub-stage of pre-delivery stage. For example, if they follow the guideline of IMO, then they have to do some extra work for their ships such as the preparation of Green Passport[20]. During this stage, the ship scrapping company used to keep close in touch with the ship owner and do the preparation work (ship scrapping equipments and labor arrangement for scrapping) waiting for the arrival of ship

Table 3.1 main tasks of a ship owner and a ship scrapping company in the physical ship flow stage

	Ship owner	Ship scrapping company
Pre-delivery	Regulation following and transporting	Yard maintenance
Post-delivery	Communications with the ship scrapping company	Procedures and communicating with the ship owner

In the physical ship scrapping stage, the physical ship scrapping happens.

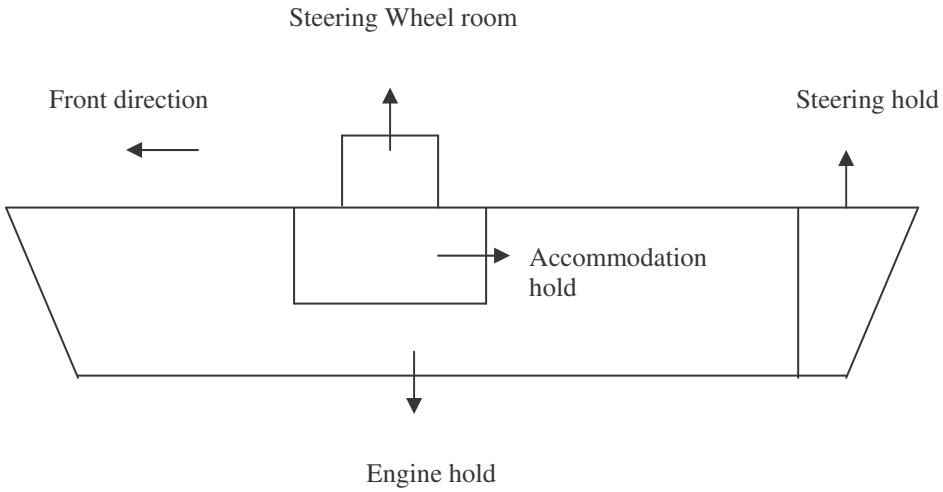
cooperation. The ship scrapping company usually tries to attract more partners and improve their ship scrapping capacity in order to reach the expectation of ship owners.

[20] The Green Passport is a hazardous waste list prepared by the ship owner who is going to break a ship. According to the regulation of IMO, the ship owner has the obligation that making a Green Passport to the ship breaking company when its ships for breaking arrive at the ship breaking yard. The Green Passport can help ship breaking companies break ships in a safer and easier way.

A ship is broken completely refers to two parts' work. Part one is the breaking of ship, which divides the ship into small blocks and put them on beach. Part two is about the final dealing of blocks on beach. According to the introduction of the environmental coordinator and local workers, a 10,000-ton ship needs 1.5 months to be broken completely. The breaking of ship needs one month whereas the final cleaning work needs half month[21].

Part one actually includes four main steps, which are the cleaning of ship, the removal of equipment and the accommodation hold, the steering hold removal, which lies in the back of a ship, and the final breaking of engine hold and bottom board. The order of moving is "from up to down, from outside to inside and from back to front". One important point for ship breaking is that the balance or trimming must be considered carefully. That is to say that the ship is like a balance. When ship-scrapping workers remove a part from the front the same weight part from the back must also be removed. Sometimes this is done separately whereas it is sometimes done simultaneously. Part two is to clean the blocks in order to reach the environmental protection standards such as the isolation of asbestos and toxic metals.

Figure 3.1 Main Ship Profiles related to the breaking work



[21] Miss Liu provided the information in this paragraph. She is the secretary of the manager of CSBC. In addition to facilitate the work of manager, she also helps Mr. Hao, who is the environmental coordinator of CSBC, in managing the environmental protection work.

More notably, along with the ship scrapping process in the stage, the environmental regulations that we introduced in 3.1 become functional. As different ship owners hold different environmental ideas, the communications between the ship owner and the ship scrapping company in terms of the environmental management are different. For the ones with high environmental awareness, the communication between two partners could be more frequent and closed. Some ship owners even set their own environmental requirements, which are even stricter than the ones set by IGOs and government, for its partners in order to get their ships scrapping in an environmentally friendly way. But, for some, to the contrast, they could ignore the environment management communication because they only care the economic interest.

CHPATER FOUR: THE COOPERATION OF CSBC AND MAERSK AND THE FLOW ANALYSIS

4.1 Background

The case in the thesis is about the ship breaking cooperation of two companies, which are Maersk and the CSBC.

Maersk:

Maersk is a Danish company. It is, at present, the largest shipping company in the world (China shipping 2006). More than 500 ships are serving for its shipping business. Recently Maersk has heavily been concerned about its environmental problems caused by its old ship scrapping. According to the introduction of Mr. Blankestijn[22], it has been making efforts to create a leading role in the field of environmental protection in order to fit the trend and requirements of globalization.

The CSBC:

The CSBC lies in Jiangyin of China. At present, the company has been one of the most advanced ship breaking companies in Asia in terms of environmental protection behaviour and ship breaking equipment (CSC 2007)**.** So far, they have been capable of breaking three to four 50.000 tonnage ships simultaneously. The CSBC believes that the high concerns on protecting environment can help them attract more and more partners in the near future. They have been awarded with "Safety Work Unit" by the local government as their good environmental protection behaviour (CSC 2007).

Currently, the two companies have set up a permanent ship-breaking cooperation mechanism.

4.2 Motivation

[22] Mr. Blankestijn (Tom Peter Blankestijn) is the manager responsible for the ship breaking business in Maersk. He is the main contact person between the CSBC and Maersk.

For Maersk: it is not necessary to finish every ship business such as the ship purchasing and breaking industry on its own even though it is the largest shipping company. They need some partners to finish the whole ship life from cradle to grave. Ship breaking, which may be considered as the final step putting a ship into grave, is certainly concerned by Maersk as very important. Before 2000, they sold ships to Turkey, Brazil and Guangzhou of China. However, a sudden event happened to them in 2000 reminding Maersk to really concern more the environmental protection. The event actually happened in Guangzhou of China. Maersk used to sell some old ships to a ship-scrapping yard in the city as they could provide Maersk with a good price[23]. At that time, Maersk did not really care about the environmental pollution caused the ship breaking process. For the shipyard, they also did not hold sufficient mechanism and facilities to protect the environment. So the pollution situation at the yard was very serious. The serious environmental pollution and low protection awareness drew the attention of the Greenpeace. Some members of Greenpeace had traced one of the ships of Maersk into the ship-scrapping yard in Guangzhou of China in 2000. The poor condition of environmental protection surprised the Greenpeace. So the members stood at the entrance of the yard stopping Maersk's ships from entering into the yard. This sudden event made the cooperation of two companies fall into impasse for a quiet long time. Especially for Maersk, which was a famous international company highly caring their reputation, they were deeply influenced by this event so as to they decided to choose a new partner. After a flexuous choosing process, they finally chose the CSBC as their new partner in China. According to Mr. Blankestijn, there were chiefly two motivations for Maersk to choose the CSBC.

First, the high environmental protection awareness and the complete environmental protection regulation system of Chinese government[24] made Maersk believe that to choose the CSBC as its partner could make their environmental protection plan become into reality more easily. The SEPAC was willing to cooperate with them in terms of ship breaking environmental protection. They very supported the proposal of Maersk

[23] Maersk as a ship owner sells its ships to ship breaking companies. Ship breaking companies break ships and get benefits from selling steel and components of ships. Generally the price of ship is around 400 dollars per ton. But for our case, the price is around 250 dollar per ton.

[24] No every country holds high environmental protection awareness and a proper environmental protection regulation system. In some developing countries, the work of government has been too full so that they are not able to tackle the ship scrapping problems such as Bangladesh.

for the environmental protection of ship breaking industry. In this case they provided Maersk with a lot of convenience. For example, they helped Maersk to know which Chinese ship breaking companies had enough ability to comply with their requirements in terms of the environmental protection. They also helped them to achieve procedures, which Maersk should have if they wanted to break ships in China without violating the environmental laws.

Secondly, the hard and soft[25] conditions of CSBC in terms of the environmental protection made Maersk believe that the CSBC was able to achieve their environmental protection requirement. For the hard condition, the advanced ship breaking facilities were the best among the ones of the ship yards that Maersk had ever researched. For the soft condition, the whole company had a clear thought, which was to protect environment was a good approach to make the company become more prosperous in the near future. The CSBC was very willing to follow the proposal of Maersk. For instance, Maersk wanted to have training program each year to help workers work in an environmental way. In this case, the CSBC promised Maersk to offer special classrooms and facilities for the training of environmental protection.

For the CSBC: it was urgently looking for agents as it was still a small company in 2000 and needed more partners to develop their own company. Although Maersk set some environmental protection requirements, some of which were stricter than the ones of government, they were still very keen to cooperate with Maersk. There were mainly three motivations for the CSBC. Here we concluded three motivations of CSBC for the cooperation based on the interview with Mr. Hao[26].

First, the cooperation could bring them more financial benefits. The CSBC had more investment in improving their hard and soft conditions than others. Higher input means a lower price for the ship owner. Generally ship scrapping companies purchase the ship according to dollar per ton. In India and Sri Lanka, ship-scrapping companies can give out a price of 400-500 dollars per ton. But the CSBC can only offer around 250 dollars per ton) to purchase old ships of Maersk. Otherwise the cost was too huge to offset their

[25] Hard and soft conditions are about facilities of ship scrapping (hard condition) and the environmental management mechanism (soft condition).
[26] Mr. Hao (Hao Qingjun) is the environmental coordinator of the CSBC, who is responsible for the management of environment.

environmental input. Many ship owners preferred to sell ships to India because they offered higher prices for owners. But Maersk wanted to play a leading role in the international environmental protection arena. They cared more about the environmental protection. Under this background, the two companies got a consensus. Maersk agreed to sell their ships with the price of around 250 dollars per ton. What was more; Maersk was willing to offer the CSBC with ten dollars more as a kind of subsidy for the environmental management. With this price and the environmental subsidy, they could get good financial benefits, with which the CSBC enlarged the productivity year by year. Currently, they are using number one and two docks. There are still two larger docks named number three and four under construction.

Second, the CSBC staff could also get free training of environmental management from Maersk. By this process, they could improve their environmental management capacity in order to get more development space in markets. The mechanism of environmental management could be improved. The staff could be educated to know more about how to protect environment. In this sense, CSBC was fully willing to cooperate with Maersk.

Third, the CSBC thought that the first cooperation with Maersk could help them to achieve a permanent cooperation relation with Maersk. For the CSBC, they considered the cooperation of Maersk as their development chance, catching which could lead the further development. The cooperation was a starting point of their long-term cooperation. If the first cooperation went well, the following cooperation would definitely bring the CSBC more prosperity. CSBC surely realized this point. So at the beginning of cooperation, although the CSBC needed to invest a lot in terms of the environmental management in order to satisfy Maersk they were still positive to cooperate with Maersk because the benefits in the long term were very substantial.

Table 4.1 Motivations for the cooperation of Maersk and CSBC

	1	2	3
Maersk	Energy saving	Environmental protection	
CSBC	Financial benefit	Free training	Long term cooperation

4.3 The Analysis of Cooperation

We think that the information flow can clearly reflect the cooperation process. From the cooperation initiating to the physical ship flow until the physical ship scrapping, all these stages are, de facto, covered by information exchanges or flows. Without these flows, the cooperation cannot proceed.

4.3.1 The Analysis in the Cooperation Initiating Stage

Process description:

The cooperation between two parties was achieved in this way. After the Guangzhou event (see chapter 4.2) in 2000, Maersk decided to choose a more environmentally friendly partner as soon as possible in order to remedy their mistakes in the past, which impacted their international reputation. At that time, the China Ship Parent Company (CSPC) governed the ship breaking industry in China[27]. The CSPC thought that they were responsible for this even as they did not pay attention to the management of environment. Further, to cooperate with Maersk could bring the ship breaking industry more development opportunities. They did not want to lose the partner in China. So the CSPC introduced some other relatively better ship breaking companies of China to Maersk. With this introduction, Maersk got touched with the CSBC for the first time.

[27] The CSPC was a unit for the management of the whole ship industry in China including the ship breaking industry. It had some branches in different areas of China. The Guangzhou event belonged to the administrative scale of the branch of Southeast area. The CSPC was subject to the National Asset Committee of China (NACC), which was a unit responsible for the management of huge state-owned enterprises in China. However the NACC had been canceled by the central government in 2000. Accordingly, the CSPC had disappeared as well.

By a series of researching and comparing with other ship breaking companies, Maersk thought that the CSBC was the most appropriate one among their research targets (see 4.2) and finally made the first contract with the CSBC.

The information flow analysis:

In this stage, we can see that government (especially the CSPC); Greenpeace and the two parties were clearly involved directly and visibly. However, there were also some other invisible stakeholders playing an indirect role for the cooperation. They were the IMO, ILO and Basel BC. The information flows between these stakeholders covered this stage. We can analyze these flows in the order of time.

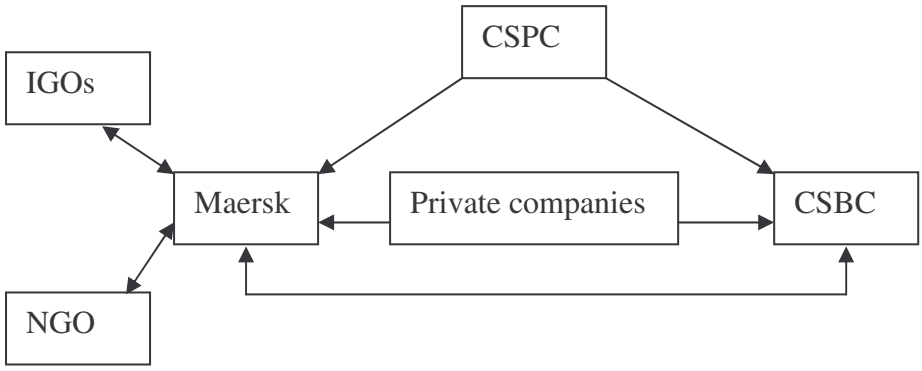
At first, the Guangzhou event caused the first important information flow between Maersk and Greenpeace in the stage. The event transmitted a piece of important information to Maersk, which was the importance of environmental protection. In this flow, the Greenpeace played a central role. However, there was also another invisible and indirect information flow happened to Maersk. The connection of stakeholders in this flow was also invisible. As we introduced in Chapter 3.2, the international reputation was much more important for Maersk. At the international level, in the view of Maersk, the evaluation of IMO, ILO and BC as seemed as a main indication of their reputation. As a matter of fact, Maersk as the biggest shipping company was well known by these organizations. The event was in fact known by these organizations very soon after it happened. Thus, Maersk felt a kind of invisible and indirect pressure from IGOs, so the three organizations at the international level actually played a role in forming the cooperation.

Then, the second information flow between Maersk and the CSBC was formed by the CSPC. The initial communication between parties was actually through the CSPC, which can be seen as the media connecting the flow of two parties. The CSPC transmitted the information on the CSPC to Maersk. In the mean while, it also introduced Maersk to the CSBC. The CSPC was the most important stakeholder in helping two parties to know each other.

At last, the two parties began to communicate so as to form information flows between two parties. We here just mention two most important flows. One was the direct information flow between two parties through the means such as the faxing machine, telephone and Internet. By this kind of information flow they got known the situation of each other and made specific arrangements for their cooperation. For example, some environmental requirements set by Maersk were out of the ability of the CSBC to reach. They could communicate with Maersk directly by e-mail or telephone to make the problem solved. Another was the indirect information flow between two parties through the third parties. The CSBC employed a Beijing consultancy company called Zhonghuan Greenland to draft its first contract whereas Maersk also had a long-term cooperation company in Hong Kong who was responsible for the drafting of contract with the CSBC and the pricing setting. So in this way, the information flow for the first contract was finished by the transmission of two private companies.

Hence, for the stage, the role of stakeholder in different information flows constantly changed as time passed. At the beginning, the NGO and IGOs were the most important for changing the environmental protection idea of Maersk. After that, the government became crucial because it was the main media connecting the first information flow between two parties. Finally at the parities level, modern technologies, private companies appeared to be more important for the communication of two parties.

Figure 4.1 the information flows in the stage of cooperation initiating



The relation with the hybrid arrangement:

It is clear that the protest of Greenpeace and the pressure of IGOs resulted in the changing of partner for Maersk. Although the Greenpeace as a NGO and the IGOs do not have direct relations in terms of the regulation compliance with Maersk, Maersk was still affected by them. One of the most important reasons is that Maersk did not want to lose its global reputation, which could affect their business opportunities under the globalization context. For the government, it did help Maersk to get a new partner. More important, the positive behavior of government even became one of the motivations for Maersk to cooperate with the CSBC (see 4.2). Here is a matrix we conclude based on the extent of the role these stakeholders played in the stage:

Table 4.2 the marks stakeholders got in the cooperation initiating stage

Stakeholders / Stage	IGOs	NGOs	Government	Two parties
Cooperation initiating	2	1	3	2

"1"- the most important "2"- more important "3"-important "4" less important

The role of state:

In this stage, the government (mainly about the national and local governments and its sub-departments like SEPAC and CSPC) introduced the CSBC to Maersk. Maersk[28] thinks that the government is the most reliable and encouraging for foreign companies. The government plays an important role in coordinating the relation between domestic companies and overseas companies. But at the same time, we find that the Greenpeace and the IGOs played more important roles in the stage (see table 4.1).

4.3.2 The Analysis in the Physical Ship Flow Stage

Process description:

[28] According to the interview with Mr. Blankestijn (Tom Peter Blankestijn) is the manager responsible for the ship breaking business in Maersk. He is the main contact person between the CSBC and Maersk.

In the pre-delivery sub-stage:

When ships for scrapping are in service: The head office of Maersk is mainly busy with making a work plan for the crew on board to prepare for the last voyage. The work plan includes a list of hazard materials on board (Green Passport[29]). After getting this work plan, the crews will work based on the plan for the cleaning of ship holds and the marking of hazardous materials. At the same time, the head office of CSBC has to work for the work plan for the following work.

When ships for scrapping are serving for the last time: The head office of Maersk is to guarantee the cleaning of ship. By this we mean that they need to finally check whether the ship cleaning and marking have reached what they expected. Further, they also need to know weather there are still extra dangerous materials or other objects on board. The head office of CSBC is mainly doing the procedure work, which refers to the procedures from the Jiangyin Maritime Safety Administration of the People's Republic of China (JMSAPRC), the Frontier Defence Bureau of Jiangyin (FDBJ),) the Jiangyin Customs (JC) and the Jiangyin Enter-Exit Inspection and Quarantine (JEEIQ). The procedures they make from these units are just a pre-preparation because the ship is still working for Maersk for the last time and not checked by these units. Apart from the work for these units, the head office of CSBC also needs to communicate with the"Zhonghuan Greenland" in order to get an old ship importing certificate. At the same time, workers of CSBC are working for the preparation of yard, facilities.

When ships for scrapping are on the way to the ship scrapping yard: The ships of Maersk finish its last round stage in Shanghai or Jiangyin (Maersk has a proxy, who works for Maersk for the procedures that Maersk should have when its ship enters into the sea area of China from the public sea. The main procedure is to get passports from marine safety bureaus of different levels. For example, when a ship enters into the China Sea area firstly, it needs to inform the China Marine Safety Administration (CMSA). Only with their permit and the leading of pilot sent by the administration, can

[29] The Green Passport is a hazardous waste list prepared by the ship owner who is going to break a ship. According to the regulation of IMO, the ship owner has the obligation that making a Green Passport to the ship breaking company when its ships for breaking arrive at the ship breaking yard. The Green Passport can help ship breaking companies break ships in a safer and easier way.

they enter into the China Sea area. And then when it enters into the river belonging to the Shanghai Marine Safety Administration (SMSA), they also need to experience the same process. That is to say that they need to inform the SMSA. And then only with the permit and the leading of pilot sent by the SMSA, can they enter into the river. In this way, they can finally enter into Jiangyin CSBC scrapping yard.) When they arrive in Shanghai or Jiangyin, the head office of CSBC will send workers to go to Shanghai or Jiangyin to meet the ship from Maersk and lead the ship to their ship-scrapping yard. The checking work of all units will proceed when a ship from Maersk arrives at the yard. If everything has reached their check standard, then they will give the CSBC relative certificates, without which the CSBC is not allowed to break ships.

In the post-delivery sub-stage:

For Maersk: the head office is to set a representative to the CSBC to monitor and supervise the ship scrapping process. The representative representing Maersk works at the yard as the start of the physical ship scrapping. There is no business of crews of Maersk any more. For the CSBC: during this stage, the head office of the company, on one hand, needs to communicate with Maersk about the post-delivery stage work such as the payment of ship and the work plan of CSBC. On the other hand they really need to get the certificate of local customs[30]. By this we mean that the local customs needs to check the ship carefully. If they think that the ship has reached their standard they will give them a certificate. Without the certificate of customs, it is not allowed to start breaking.

[30] We mentioned the units would begin to check the ship and gave the CSBC certificates, without which it was not allowed to start breaking. Here we mention the certifying work again from the JC because the work of JC will take longer time than the others'. The procedure is also more complex than others'. And the certificate of JC will be the final and most important one for the CSBC. So it needs quiet work to be done the head office.

Table 4.3 Main tasks of Maersk in two stages

Pre-delivery	Head Office	Crew
Ships still in service	*Work plan*	*Ship cleaning and hazardous materials marking*
Ships during the last service	*Ship Checking*	*Ship Checking*
Ships on its way to ship scrapping yard	*Communicating with the CSBC and government*	*Last Cleaning and Checking*
Post-delivery	*Sending a representative to the CSBC*	*Going home*

Table 4.4 Main tasks for CSBC at two stages

Pre-delivery	Head Office	Workers
Ships still in service	*Work plan*	*Yard maintenance*
Ships during the last service	*Procedures*	*Maintenance*
Ships on its way to ship scrapping yard	*The certificate of ship importing*	*Pre-preparation of facilities and yard*
Post-delivery	*Coordination and management*	*Final preparation for breaking*

The information flow analysis:

It is clear that the physical ship flow involves many information flows.

In the pre-delivery sub-stage (see table 4.3 and 4.4):

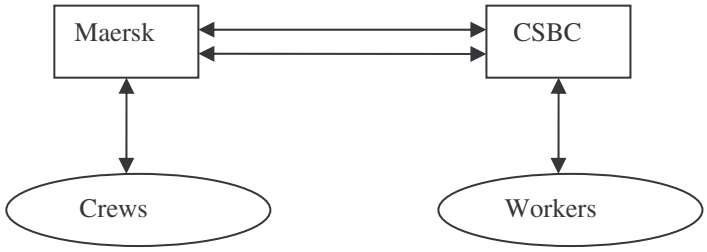
In the period, when a ship is still in service:

Firstly, there are two internal (within Maersk or CSBC) information flows. That is to say that Maersk needs to make a work plan firstly for itself and its crews. A work plan is a whole guideline leading them to finish the whole process. In this case, the communication of Maersk and its crews forms an internal information flow. The CSBC also needs to make a work plan leading it and crews to complete the whole ship breaking process. And in the same way, the CSBC and its workers also need to communicate so as to form another information flow. Without the two flows, the preparation work such as the preparation of green passport and the maintenance of shipyard cannot be done by crews and workers of both parties, who need specific information to lead them to work.

Secondly, there are also two external (between Maersk and the CSBC) information flows. One is the information flow between the two parties for the ship structure plot. Maersk needs to provide the CSBC with a structure plot of the ship, depending on which the CSBC can make a specific plan for scrapping. Mostly, the CSBC needs to communicate with Maersk in order to make the structure clear because the CSBC could make some mistakes in their plan as they are not as familiar as Maersk with the structure of each ship. Another one is the information flow between two parties for the work plan. As we introduced in the last paragraph, both parties need to prepare a work plan for its crews or workers. But for the CSBC, the work plan that they have to prepare in the period not only includes the plan for its workers but also for Maersk. The CSBC needs to make a proper plan for scrapping the ship according to the structure plot offered by Maersk. If Maersk thinks that the plan has some problems, then both parties need to discuss for further improvement. The communication of two flows is partly finished by two parties directly by modern technologies such as faxing machines and the Internet. The rest part of communication for two flows is usually done through the

two private companies (see 4.3.1). By communicating in the two ways, they can get final consensus based on the agreement of both parties, for a ship.

Figure 4.2 information flows for the period when a ship is still in service:

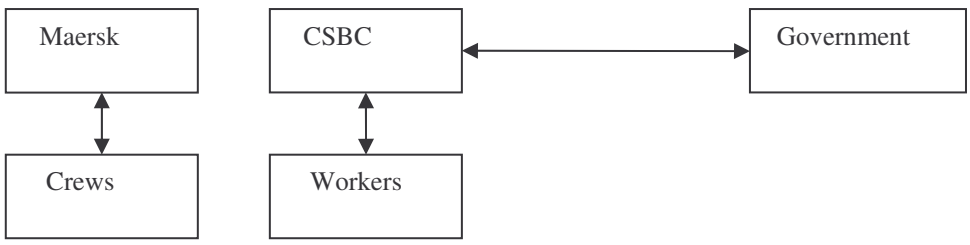


In the period when a ship makes its last service:

Clearly, two internal information flows are happening to both parties. Maersk needs to communicate with its crews to guarantee the preparation work done like the cleaning of ship holds and the marking of hazardous wastes. The CSBC needs to check their yard preparation situation and communicate with workers to guarantee that every thing is being done in a correct way.

Apart from two internal flows, the most important flow in this period is the information flow between the CSBC and the Chinese government. We mean that during this time the CSBC needs to communicate with the different units of government including the JEEIQ, the JC, the FDBJ and the JMSAPRC. Through communicating with these units, on one hand, they can get normal procedures, which are indispensable for the ship-breaking yard. On the other hand, the communication can make the units come to the shipyard to inspect a ship on time according the work plan of both parties.

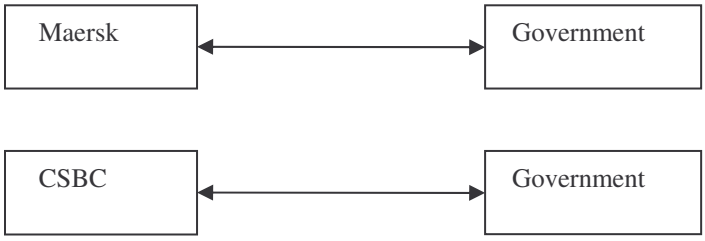
Figure 4.3 information flows for the period when a ship makes its last service



In the period when a ship is on the way to the ship-scrapping yard:

Mainly, two information flows dominate the period, which are the information flow between Maersk and the Chinese government (Marine safety bureaus of different levels) and the flow between the CSBC and the JC. If a ship of Maersk wants to come to China, they firstly have to get the permission of the Chinese government (see the process description part of 3.4). So it is unavoidable for Maersk to communicate with them. This kind of communication is usually finished by a proxy employed by Maersk in China. The direct communication between the CSBC and the JC is for the final certificate. The certificate is vital for the breaking of ships. In other words, without the information flow between the CSBC and the JC, the ship breaking process can not be finished on time.

Figure 4.4 the information flows for the period when a ship is on the way to the ship-scrapping yard



In the post-delivery sub-stage (see table 4.2 and 4.3):

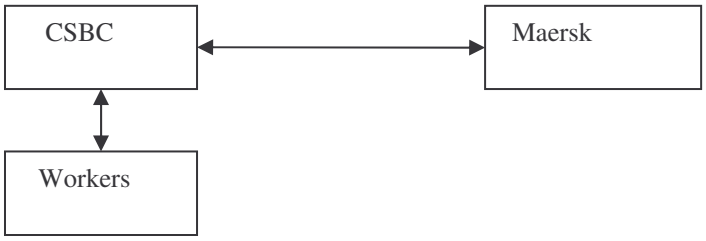
Based on the information we derived from the survey, we conclude two kinds of information flows in this stage.

First kind of information flow is about the communication between two parties. Maersk concerns the ongoing situation in CSBC. They have a representative in the CSBC working for monitoring and supervising the following ship breaking process. The ongoing breaking situation is reported by the representative to Maersk on the daily base. Addition to the communication through the representative, both parties also communicate by modern technologies. For example, when there is a part of ship structure plot, which the CSBC does not understand technologically, the CSBC will tell

this to the representative or phone the head office of Maersk directly to get a correct suggestion.

The second kind of information flow is about the internal communication of CSBC. Workers need to be supervised before they start break a ship. In this case, the head office of CSBC and workers form an internal flow teaching workers how to do the final preparation for breaking a ship. Usually this kind of communication is obtained through meetings, regular checks and supervising, broadcasting, slogans, and direct talks with workers.

Figure 4.5 information flows in the post-delivery sub-stage



The relation with the hybrid arrangement:

There are two points attracting us when we think of the connection between the hybrid arrangement and our case. First, it is about the preparation of Green passport during the period when the ship is still in service. This procedure is one of the most important regulations make by the IMO. So in our case, two parties do follow the regulation of IMO. In other words, IMO has, to some extent, governed the cooperation of two parties. Second, the transportation of ship from Maersk to the ship scrapping yard must follow the regulation of BC. If the ship transported to the ship scrapping can not reach the requirement of BC, then the local units such as JC will stop the cooperation from proceeding. From two points, we sense that IGOs do join the cooperation. And some regulations of them have become routine regulations for companies. Under the context of globalization, these regulations appear to dominate the international cooperation at the international level.

Here is the matrix we conclude based on the extent of the role these stakeholders played in the stage:

Table 4.5The marks stakeholders got in the physical ship flow stage

Stakeholders / stage	IGOs	NGOs	Government	Two parties
Physical ship flow stage	3	4	2	1

"1"- the most important "2"- more important "3"-important "4" less important

The role of state:

In the stage, the state becomes necessary because of the basic procedures. We think that this kind of procedure function, which belongs to the privilege of state, is still very decisive for the international cooperation under the globalization context. The state holds the power to make the international cooperation happen in a legally bounded way. For example, the JC plays a role, which can guarantee no drug trade in the cooperation. Without the procedure of JC, these kinds of problems could happen. Moreover, it is observed that the implementation of IGO regulations also depends on the state. For example, the JC partly undertakes the task of checking whether the cooperation has reached the requirement of BC.

4.3.3 The Analysis in the Physical Ship Scrapping Stage

The environmental management, which happens in the physical ship scrapping stage, is the core of the cooperation of both parties. So it is also the core of our flow analysis. In this part, the information flow analysis is projected to be finished in two perspectives, which are respectively the environmental regulation that is related to the physical ship scrapping process and the environmental management, which is mostly completed by two parties.

- The perspective of environmental regulation:

Regulation description:

For Maersk[31]: Maersk wants to have a positive international image in the field of environmental protection. Usually it is prone to take stricter regulations than the countries where they sell ships for breaking. For the cooperation of two parties, Maersk thinks that the regulations from the Chinese government (mainly the SEPAC, environmental administrations of local governments) are the base for making the environmental regulation for the CSBC. Further, Maersk is prone to take the international rules set by the IGOs (IMO, ILO and BC) and the voices from NGOs (Greenpeace) into account. Therefore, in reality, the regulation made by Maersk is stricter than that of the Chinese government. In the opinion of Maersk, the implementation of global rules is more crucial than that of local regulations because the local government can monitor the local regulation implementation situation, but there is no clear monitoring system for these global organizations. If they themselves ignore the importance of these global rules then it will be very easy to lose their global image so that the Guangzhou event would happen again.

For the CSBC: the CSBC mainly follows the regulation set by Maersk, the environmental regulation of Chinese government and some regulations and requirements set by the IGOs (IMO, ILO and BC) and NGOs (the Chinese Nation Global Village (CNGV), the Greenpeace, and the CSC).

For the regulations set by Maersk, there is a Training and Education of China Ship Recycling program (TECSR) in the China-The Netherlands Environmental Protection Cooperation Project (CTNEPCP). The training materials are renewed year by year (From 2001-2006). And most of the regulation set by Maersk is from the training materials. To follow the regulation set by Maersk can be understood as to follow the training program.

[31] The information on the regulation implementation situation of Maersk is from the interview with Mr. Blankestijn (Tom Peter Blankestijn)

For the regulations of Chinese government, it includes the regulation from national level and local levels. The EMRSBPPPRC (see chapter 3), which was set in 1988 by the SEPAC, is the main regulation that the CSBC follows at the national level. As the personnel and financial capacity of local government are limited, it is too costly to set up a series of formal regulations, which are in line with the national and international ones, the rules are just the copy and excerpts of national rules in the field of ship scrapping. So it generally takes a less account for the CSBC in the process of environmental rules implementation.

For the regulation from IGOs and NGOs, they actually pay limited attention them[32]. But they do follow the regulations set by the CSBA (see 3.1)[33].

Table 4.6 Environmental regulations governing the cooperation

	Government	IGOs	NGOs	Maersk
Regulations	The EMRSBPPPRC, the regulation of CSBA and local regulations	Some regulations from the IMO, ILO and BC	The regulation of CSBA, some from other NGOs	Training and Education of China Ship Recycling (TECSR)

To conclude, the regulation of Maersk in terms of the environmental protection is the implementation base of the environmental management of CSBC. The regulation of

32 The IMO, GREENPEACE, ILO and the CNGV all ever came to inspect this company. These visits to some extent reminded the CSBC to pay attention to these organizations because the following of the regulations and requirements from IGOs and NGOs could be a good propaganda for attracting more partners according to the introduction of the manager of CSBC .

33 The CSBA is a NGO in China, which plays a coordination role between the government and the ship breaking companies. The central government entitles the NGO with a policy, which means that if the ship breaking company, who is their member, reaches their requirements in terms of the environmental management, then the CSBA has rights give them a certificate, depending on which the company get some taxes to the government cut. This is also why the CSBC is willing to join the organization and follow their regulation.

Maersk, de facto, consists of the regulations of other stakeholders. When the CSBC implements the regulation of Maersk the regulations from other stakeholders are, de facto, already obeyed. A higher level[34] determines less strict as they do not consider specific situations, instead they have to consider the common characteristics in order to get a set of really feasible regulations for all ship breaking companies. What is more, Maersk is their benefit giver. And the representative of Maersk in the CSBC reports the ship breaking situation to Maersk every day (a kind of strict monitoring mechanism set by Maersk). So this kind of communication determines that CSBC has to follow the rules set by Maersk as their regulation implementing priority.

The information flow analysis for the environmental regulation of the cooperation:

It is not hard to find that there are some information flows crossing the stakeholders like the two partners, the government and IGOs. This information flows are all connected to stakeholders by the regulation. In this sense, we conclude two types of information flow for this section.

Flow type one is the information flow between Maersk and the CSBC. The media connecting two parties is mainly the training program[35] initiated by Maersk. Through this kind of communication, the information of regulations can be transmitted to staff of CSBC more effectively. As we stated in the last section, the regulation set by Maersk is the most important for the implementation of environment regulation of CSBC. Consequently, the information flow by the training program becomes the most dominated one governing the environment management of CSBC in the perspective of environmental regulation

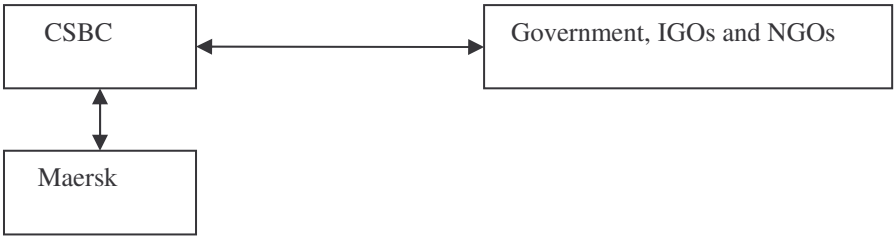
Flow type two is the information flows covering the CSBC and other stakeholders including the government, IGOs and NGOs. If we follow the same way that we consider the regulation set by stakeholders as the media connecting stakeholders, then these

[34] Local stakeholders like the local government are at the lower level. The national stakeholders like the SEPAC are at the low level, the international stakeholders like the IMO are at the high level.

[35] The training program was initiated by Maersk at the beginning of the first cooperation as a pre-condition to cooperate with the CSBC. Maersk wanted to train the staff of CSBC in order to make their requirements fulfilled better and increase the environmental protection skill and awareness of workers. Most of regulations set by Maersk can be found in the materials of the training program. It is currently held once per year.

flows between the CSBC and other stakeholders are connected by the regulations from the stakeholders. Nevertheless, in respect that the power of stakeholders is different the flows connecting them are also different. as the CSBC fully considers the regulations of CSBA as important the information flow connecting the CSBC and the CSBA is relatively more powerful than the others, which have some influences on the CSBC but limited and indirect because the CSBC does not have much direct interest from them.

Figure 4.6 the information flows in the perspective of environmental regulation in the stage of physical ship scrapping



The relation with the hybrid arrangement:

Totally, the CSBC seems the regulation set by Maersk as the most important. But it is also indicated that Maersk does involve the regulation of state government and IGOs when it makes its own regulations. For instance, the TECSR materials are made mostly according to the CTNEPCP. Further, the CSBA as a NGO also affects the regulation implementation of the cooperation especially for the CSBC. Consequently, it can be easily concluded that, from the perspective of environmental regulation for the cooperation, the government has not been the only regulation source. In our case, the regulations from IGOs and NGOs have already become compulsory for companies to implement.

Here is the matrix we conclude based on the extent of the role these stakeholders played in the stage:

Table 4.7 the marks stakeholders got in the perspective of environmental regulation in the physical ship scrapping stage

stakeholders / stage	IGOs	NGOs	Government	Two parties
The environmental regulation perspective	2	3	2	1

"1"- the most important "2"- more important "3"-important "4" less important

The role of state:

If we analyze the regulations being implemented by two parties, it will be easy to get that the government is still the main regulation source, and the role of state in the perspective of environmental regulation is irreplaceable and remains central. Three characters can support our opinion for the role of state.

One, the environmental management process is proceeding strictly based on the requirements of Maersk, which is[36] partly made according to the regulations of the EMRSBPPPRC. And through our survey it is found that the regulations of state are being made with the consideration of international rules as the state has been more and more concerned about the international "scapes"[37], which to some degree affect the further economic development of countries under the globalization context.

Two, the TECSR is subject to the CTNEPCP. Maersk is a member of the project. And the training program material is partly from the TECSR. The training and education materials proposed by the state can affect the training program of Maersk because Maersk wants to be compatible with the state in terms of the regulation.

Three, besides the monitoring work done by Maersk; the government takes a largest account in monitoring the regulation implementation situation. It is supported in the thesis that among the regulation implementation monitoring systems the stakeholders such as the IMO and Greenpeace hold less power in monitoring the regulation

[36] It changes yearly according to the new regulations of state and IGOs.
[37] This is about the international institution settings under the globalization context.

implementation situation than the state as the monitoring systems of them are not as complete as the government. In our case, the IMO, Greenpeace, ILO and the CNGV all came to inspect this company. These visits to some extent reminded the CSBC to pay attention to international regulations because the following of the regulations and requirements from IGOs and NGOs could be a good propaganda for attracting more business opportunities. But in reality, with the introduction of the manager of CSBC, the kind of simple snap visit just holds some symbolic meanings. The implementation of the regulations from the IGOs or NGO is not because of their monitoring systems. The globalization and business opportunities are mostly the main driving force for implementing the regulations of IGOs or NGO.

- From the perspective of environmental management:

Environmental management situation description:

For Maersk: its role is to monitor the process of environmental management and help the CSBC to improve their environmental management.

For the CSBC: according to the regulations that the CSBC follows, CSBC divides their environmental management work into three parts, which are the environment pollution prevention (water, soil and air), the health and safety.

In environmental pollution prevention field, in every year's training materials, there are clearly explanations about everything, which could cause environmental impact such as the breaking of refrigerant, insulation and oil-fouled ballast. On one hand, CSBC strictly follow the standard procedures, they got from the training program. For example, they make use of special gas for hot work in order to diminish the pollution of air and the risk of worker's health. The vulcanizing of soil can prevent the soil from polluting by oil penetrating. A special incineration plant incinerates the oil-fouled soil. The river water polluted by ship breaking process is led to a wastewater treatment plant, and then it can be led to the Yangtze River again. On the other hand, in order to get know what is going on and whether the CSBC is breaking ships in an environmentally friendly way, the representative of Maersk in CSBC has to hand in a daily report as well as a conclusion report per week to the headquarter of Maersk.

In the health field, the CSBC owns advanced facilities protecting workers from getting deceases when they are breaking ships. For example, the isolation room of clothes, which workers used for breaking asbestos, the mask and glove, which used for breaking the engine holder. Workers that experienced the ship breaking are organized periodically to go to hospital for the health examination. There is also a small clinic inside the company for the need of emergency. Additionally, they also care the workers' accommodation, diet. The workers are mostly from the nearby village, so they live in their own home without worrying about the poor living condition. Workers have a free lunch in the company, in which it always includes un-limited fish and pork.

In the safety field, where is the most concerned for the company as the rules set by the national government are really strict. One person dies; the company has to be shut down firstly to pursue the reason of death. Two persons die; the representative in law of the company has to undertake the legal responsibility. In order to guarantee the safety of workers, there are always at least two people on each ship especially inspecting the safety situation of workers. Furthermore, there are some other measures. For instance, the safety meeting is held in the morning of every day. The safety slogan can be found anywhere in the yard.

Table 4.8 Measures to tackle health, safety and environmental problems

	Health	Safety	Physical environment
Measures	Good Diet, accommodation, Good facilities, and advanced health protection facilities	High awareness and specific management	Strict rule-implementing

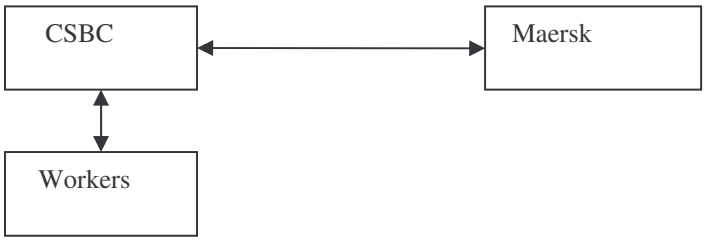
The information flow analysis:

There are two types of flows happening in the process of environmental management.

First type: it is the information flow between Maersk and the CSBC. That is to say that Maersk monitors and supervises the environmental management of CSBC through the representative in the CSBC.

Second type: this type of information flow is the flow between the head office of CSBC and workers of CSBC. To be specific, in the field of health, the head office communicate with workers through the health examination, field supervising, diet arrangement and accommodation arrangement. Each aspect can be a means connecting the head office of CSBC and work so as to structure a flow. In the way, for the field of safety, the head office of CSBC communicates with workers by the slogans, field supervisors and morning meetings. In the field of physical environment, the supervisors working on the field with workers become the means connecting the head office and workers. They supervise the daily work for workers according to the training program. For example, they monitor and supervise workers to clear the engine holders in a right way in order to avoid the polluting of river water. If any error happens, the supervisors will stop them immediately. So depending on this type of direct communication with workers, the regulation for physical environment protection can be accurately implemented.

Figure 4.7 information flows in the perspective of environmental management in the stage of physical ship scrapping



The relation with the hybrid arrangement:

Two parties manage the environmental according to the work plans that they made in previous stage. It is considered that no clear features for the hybrid arrangement can be observed except one. The CBCA as a domestic NGO often monitors the environmental management and offers some suggestions to the management. If there is any sense for the hybrid arrangement, it would be the joining management of NGO in the stage of physical ship scraping stage.

Here is a matrix we conclude based on the extent of the role these stakeholders played in the stage:

Table 4.9 the marks stakeholders got in the perspective of environmental management in the physical ship scrapping stage

Stakeholders / stage	IGOs	NGOs	Government	Two parties
The environmental management perspective	4	3	2[38]	1

"1"- the most important "2"-the more important "3"-important "4" less important

The role of state:

[38] In the environmental management process of physical ship scrapping stage, we do not see the role of state in the flow analysis. However, it here is considered as more important than the roles of IGOs and NGOs. There are two reasons. One is that compared with the IGOs and NGOs, who do not have complete monitoring system, the state monitors the environmental management very frequently. This results in a kind of pressure forcing the CSBC to behavior as carefully as possible. Two is that although the environmental management is mainly implementing the regulations set by Maersk, some regulations from Maersk are actually aimed at reminding the CSBC to follow the regulation of state. For example, one regulation of Maersk is "to obey the local water pollution regulation". In this case, the state is still the final source of regulation. The behavior of state can definitely affect the environmental management content because Maersk sets its regulations, to some extent, according to the regulations set by the state.

In the practical management process, the government according to the regulation will check the environmental management situation frequently in order to guarantee the prevention of pollutions such as the water pollution and air pollution (monitoring). Moreover, when the cooperation meets some problems, government become the first place for both parties to turn to. For example, when the ship scrapping noise affects the work of neighbours, the government usually takes the responsibility of coordinating the relation between two parties and it neighbours.

4.4 The Effectiveness for Environmental Management

In this section, the effectiveness of the practical environmental management in the physical ship scrapping stage is researched from two angles, which are the view of Maersk, the view of CSBC.

4.4.1 The View of Maersk

Maersk[39] thinks that the current result that their cooperation achieved in terms of the environmental management is acceptable and they are also optimistic for the future development. But meanwhile there are some problems, which have not reached their expectation and need to be improved. They mainly concern the following seven aspects:

- One, there is no systematic health examination file for every worker. Workers working for physical ship breaking are often changeable. Every year, most of workers will leave the company, consequently a large part of new workers come to the company. In this case, the health examination becomes very disorderly; there is no consistent and clear record for every worker. It is very hard to really guarantee whether workers' health has been affected during their working time or not. It is also a problem for two parties to really master their worker's health situation.

- Two, the training program arrangement and the workers' awareness need to be improved. Still, as most of workers just come to the company for the first time every year. They did not really take part in the training program. In consequence,

[39] The opinions of Maersk we present in this section are the result from the interview with Mr. Blankestijn and Mr. Wang.

they lacked environmental protection knowledge and awareness.

- Three, the incineration oven needs to be improved in terms of technology. The CSBC has built an incineration plant for the burning of polluted soil and other garbage. However, as the ships for breaking do not come to the company continuously, the incineration oven just works periodically. Further, as the technological reason, the putting of garbage into the oven must be periodically as well. That is to say that when we put half ton of garbage into the oven, we must close the oven door. Until it is burnt completely, we can open the door for the next burning. The reason is that if we put garbage into the oven continuously the door accordingly has to be opened continuously. In this case, it can not guarantee the high temperature of the inside of oven as heat runs out as the open of door. As a result, garbage from the yard has to be stored near the oven waiting for burning. The storing of garbage outside the plant is like a land filling, which causes many environmental problems such as the soil pollution and air pollution.

- Four, the cutting of steel from ships involves the burning of paint, which causes the pollution of air. Generally, the surface of ships is covered by paint like the hails. When it is broken, the paint does not need to be cleaned. It can maintain on steel. However, sometimes, hot work workers need to cut the steel into some pieces in order to put them in order. The cuttings of steel needs to burn paint fouling on steel, which contains toxic chemicals and definitely pollutes air.

- Five, the insulation work should be improved. Insulation is, in the ship-breaking industry, about the cleaning of the foam fouling on the hold wall of ships, which functions as the temperature maintainer. In CSBC, the cleaning work of foam is mostly done by hand, which consumes time and affects the health of workers. There are some new devices that can help workers clean the foam in a easy way, however it is unrealistic for CSBC as they are too costly. It maintains a problem in the near future for them. That is to say that how to find a easy and cheap way to clean the foam of ships.

- Six, the social recycling system is lagging the whole efficiency of ship breaking

industry. This problem is not for the CSBC but for the whole society of China. At present, there is no perfect waste recycling system in China. Most of the waste coming from ship breaking cannot be dealt with in a perfect way. If we want to make the ship breaking industry more efficient in terms of environmental protection, the whole social recycling system is supposed to be improved at the same time. Depending on the CSBC only, they cannot do it in a perfect way as its limited financial and technical capacity.

- Seven, the oil maintaining in engine pipes after the cleaning of shipyard results in the secondary pollution when it arrives in a new place. The engine hold in a ship is the most difficult part for ship breaking industry to deal with, as it is full of oil and gas, which can easily cause explosions. When the engine with pipes is put on beach it can be rinsed by water. However, some parts cannot be cleaning completely and still contain a lot of oil. When these parts are sold to other buyers, who do not own as good as what the CSBC has in terms of environmental protection, the pollution of oil in the parts can not be prevented, so the secondary pollution is caused. The current question is how to invent a way that can make oil in engine pipe cleaned completely in order not to cause secondary pollution.

4.4.2 The View of CSBC

The CSBC[40] is satisfied with the current result and very optimistic for the future cooperation. But through the communication with Maersk during the past, they also realize the problems and are willing to diminish them. They think they have at least achieved great success in two fields.

One, they have got the trust of Maersk, which is the biggest success for them. During the past cooperation, no very serious problem happened to the cooperation. As the information flow was so frequent between two parties that Maersk knew what was happening everyday. When they had a ship in CSBC for breaking, everything happened during the cooperation process was almost within both sides' expectation. Every ship

[40] The opinions of CSBC are based on the interview with Mr. Li, who is the manager of CSBC.

was broken on time without causing any extra affair for their environmental management.

Two, the whole environmental management system was improved significantly during the cooperation duration. They set up a good health examination system to guarantee the health of workers such good diet and periodical health examination. As their high attention to the safety, since the beginning of the cooperation, there has been no death record for the CSBC. The physical environmental protection work has been improved to a large scale in respect that they purchased a number of modern and environmental friendly facilities for breaking ships.

4.4.3 The Environmental Management Situation Survey

We did an environmental management situation survey for the workers working for two parties. It is believed that this survey partly reflects the effectiveness views especially the ones of Maersk. The survey was implemented by asking workers to answer the questions of a questionnaire randomly (more details, see the methodology part of chapter 2.4). And the questions were mainly about the environment, health and safety aspects.

Table 4.10 the survey for the environmental management situation

Questions	Results		
1. Which environmental, healthy, and safety risks, are related to your work?	60%(12) (do not care and know nothing)	20 %(4) (some soil, air and water pollutions.)	20 %(4) (very specific and right answers.)
2 Do you suffer any physical consequences from these environmental, health or safety risks at this moment?	80% (16) (no)	20%(4)(small injuries like the injuries of fingers)	
3. What, do you know, are the measures the company is taking to prevent the environmental risks?	70% (14)(no idea)	20%(4)(partly know)	10%(2)(very specific and right answers)
4. What, do you know, are the measures the company is taking to prevent the health risks?	80%(16) (no idea)	20%(4)(very right answers)	
5. What, do you know, are the measures the company is taking to prevent these safety risks?	100%(20) (specific and right answers)		
6. Are you satisfied with these efforts and your current working condition?	100%(20)(Yes)		
7. Have the measure taken to prevent environmental, health and safety risks changed since 200, when the partnership with Maersk started?	70%(14)(no idea)	30%(6)(Big improvement)	
8. Are there any differences in measures and rules when the Maersk-ships are scrapped then when a ship from another company is scrapped?	70%(14) (no idea)	25%(5)(no difference)	5%(1) (yes)

For question one, two, three, four, seven and eight, the answers to them present a common character, which is that most of the interviewees have no idea about the questions. We conclude the following five points to explain this kind of result.

- One is that some workers just worked for the CSBC for a short time without experiencing the training program.
- Two is that most of workers there have a very low education background. Some of them even did not go to school. It was very hard to communicate with them for the environmental management.
- Three, they lacked environmental awareness as they always mentioned that as long as the got paid nothing else to worry about.
- Four, workers always suspected the motivation of interviewer. They thought that their answer to the questionnaire could affect the image of CSBC. Or if they answered my question they would probably take a risk of being fired as they could release some information that the CSBC wanted to keep as a secret.
- Five, some workers could answer the questions because they all worked as supervisors or managers.

For question five, which is whether they know any measure the company is taking to prevent these safety risks. The answer was that 100% of them were able to name many measures rapidly. For the interviewees, who had supervising work, they knew the answer without much doubt. But for the rest, they knew the measures; we need to do an explanation.

- From the angle of workers, they did care the safety, which is the most influential for them and easiest to understand as what the slogans say, “Without safety, without anything”.
- From the angel of company, the government has set so strict regulations that we mentioned before for the safety standard that they has to pay 100% attention to the prevention of safety risk. For instance, the safety meeting must be organized every morning with all workers’ participation.
- From the angel of Maersk, workers safety is always one issue they are highly concerned about as they follow the ILO. So with these reasons, it is no doubt the safety issue is really cared by everybody in the company.

Question six, which is about the satisfaction of these efforts and the current working condition, the answer was still “Yes, we are satisfied” with 100% rate.

- For some, they pointed out that if they were not satisfied with the company, they would give up their job.
- For the rest, they are working for the company and satisfied with the current results in terms of the environmental management. However, most of them also pointed out that there were some problems in terms of the environmental management. But they were optimistic for the future of CSBC.

To sum up for the effectiveness of environmental management, the current results that both parties achieved in the past cooperation in terms of the environmental management were acceptable. But both parties are also clear that there are still some problems for their environmental management. Among these problems, the environmental protection awareness of workers in CSBC is very low and seems to have become the most urgent problem for both parties to tackle in the near future.

CHAPTER FIVE CONLCUSION AND DISCUSSION

This chapter is planned to echo the research questions in chapter 1 and conclude the analysis work we did in chapter 4. Accompanying the conclusions, some opinions we sensed over the research process are also intended to be mentioned for discussing.

5.1 The Ship Scrapping Cooperation and the Information Flow Analysis

The motivation of cooperation:

For Maersk, the Guangzhou event made them realize the importance of environmental protection. Consequently, they decided to cancel the cooperation relation with Guangzhou. After that, Maersk began to get touch with the CSBC. As we stated, two motivations made Maersk choose the CSBC.

- To choose a Chinese company can save much energy on communicating with officials and getting procedures.
- The hard and soft conditions of CSBC in terms of the environmental protection made Maersk believe that the CSBC was able to achieve their environmental protection requirement.

For the CSBC, more ships for scrapping mean more profits. The cooperation with Maersk can at least bring them the following benefits:

- More profits.
- Better environmental management experiences.
- Long-term cooperation chance with Maersk.

The exploration of the cooperation motivation may, in our opinion, help us understand how to achieve a cooperation partnership for the ship scrapping companies under the globalization context. Through the motivation analysis of our case, three striking points at least make sense in understanding how to achieve a cooperation partnership.

Firstly, globalization has made the ship scrapping industry turn into a kind of globalized industry. That is to say that the communication of ship scrapping partners is not being affected by the traditional time and space (see chapter 2.2.1). Mostly the ship scrapping cooperation is about the cooperation of two countries (92% business in Asia).. For our case, Maersk did not think of the distance effect as a problem when it chose its partner because it thought that the modern technologies in terms of transportation and communication have been able to make them choose partners without any worry about the problem caused by distance (traditional space and time).

Secondly, the improvement of soft and hard conditions is the core for a ship scrapping to attract more partners. The price of purchasing ships from ship owner will not be the most attractive point for ship owners to choose a partner. Under the globalization context, ship owners especially for the world famous ones like Maersk begin to take care of the environmental affects caused their scrapped ships. For these ship owners, the benefit from selling their ships to the scrapping companies is not the most important; they care more about the environmental management situation of a ship scrapping company. Better facilities and environmental management mean more chances to cooperation with world famous ship owners.

Thirdly, a ship scrapping company should keep a good relationship with its related government in both informal way and formal way. In our case, the government played a crucial in the process of choosing a partner for Maersk. Formally, the responsibility of government helped Maersk to get in touch with the CSBC, and the help of government, which saved the energy of Maersk in getting procedures, was one of the most important motivations for Maersk to cooperate with the CSBC. Informally, actually the CSBC kept a very good relation with the CSPC[41]. When the CSPC introduced ship scrapping companies to Maersk, the CSBC was put on the top of the list. And the CSPC would like to help the CSBC more than other ship scrapping companies.

The social structure in the cooperation process for two partners:

[41] Mr. Yan, who ever worked in the CSPC, introduced the CSBC to Maersk with full energy. He left CSPC in 2000. He is currently one of the managers in CSBC.

This section aims at concluding the research question of what kind of social structure is governing the cooperation process. In combination with the information flow analysis, the social structure is formed by the information flows, so the conclusion of social structure is to conclusion of information flows.

In the stage of cooperation initiating: with the indirect affect of Greenpeace and the IGOs, Maersk got a new partner with the help of CSPC. And finally Maersk made the first contract with the CSBC through the internal communications, which were finished either by modern technologies or by the third parties.

We concluded that three kinds of communications or information flows formed the network governing this stage.

- The information flow between Maersk and the Greenpeace by the media of Guangzhou event.
- The information flow between Maersk and CSBC by the help of the CSPC.
- The information flow between Maersk and the CSPC by modern technologies or the third parties.

In the stage of physical ship flow:

For the pre-delivery sub-stage: When ships are in service, both parties need to make their work plans and give orders to their crews or workers. When ships are serving for the last time, Maersk needs to communicate with its crews in order to guarantee the work plan for ship scrapping is fulfilled on time. The CSBC at this time, on one hand, needs to arrange tasks for its workers. On the other had, it also needs to communicate with government to get the procedures. When ships are on the way to the ship scrapping yard, both parties still need to communicate with government with the aim of getting the ship for scrapping arrive on time.

For the post-delivery sub-stage: Maersk needs to send a representative to the CSBC for monitoring and supervising the following ship scrapping work. The CSBC has to make the final communication with its workers for the final preparation of ship scrapping.

In this stage, many information flows can be found. And if we overlook them, it will be complicated network. However, after the analysis, all of these information flows can be categorized into five kinds of information flows, which are dominating this stage.

- The information flow between Maersk and its crews for preparation work on board.
- The information flow between the CSBC and its workers for the preparation work on the ship yard.
- The information flow between two parties by either modern technologies or representatives or the third parties for making the work plan.
- The information flow between Maersk and Chinese government for routine procedures.
- The information flow between the CSBC and Chinese government for routine procedures.

In the stage of physical ship scrapping:

From the perspective of environmental regulation: the ship scrapping partnership model decides that the ship scrapping company is the main regulation implementer of the cooperation. For our case, Maersk sets its own regulations (the training program) for the CSBC. Additionally, the CSBC also needs to implement the regulation of government and CSBA (A NGO). But for the CSBC, the most important regulation standard is for the ones set by Maersk.

Based on the information above, it is summaries that the environmental regulation perspective can be explained by two kinds of information flows.

- The information flow between Maersk and the CSBC by the media of the regulation.
- The information flow between the CSBC and the IGOs, government, and NGOs by the media of the regulation.

From the perspective of environmental management: it is clear that during this practical environmental management, Maersk predominantly communicates with the CSBC in order to know the ongoing process of ship scrapping and supervising the work of

CSBC. For CSBC, they need to have frequently internal communications with its workers to guarantee the well going of environmental management.

In our views, these activities can be expressed by two kinds of information flows:

- The information flow between Maersk and the CSBC through the representative.
- The information flow between the CSBC and its workers through the usual ways such as meetings, slogans and field supervisors.

All in all, it is supposed that the whole network governing the whole three stages of cooperation is mainly composed of the information flows that we concluded above. And it is thought that the research of these information flows have articulated the social structure related to the cooperation.

5.2 The Relation between the Ship Scrapping Cooperation and the hybrid arrangement

It is found that except for the routine governance from government and two parties, the roles of IGOs and NGOs are also significant in governing the cooperation.

- Greenpeace and the IGOs indirectly affected the decision of Maersk that they needed to look for an environmental friendly partner.
- The IGOs, to some extent, are governing the stage of physical ship flow.
- During the environmental management, the regulation of CSBA[42] has become obligatory to be implemented.

For identifying the roles of these IGOs and NGOs in governing the cooperation, an integrated matrix is projected according to the analysis results in chapter 4.

[42] It is a NGO.

Table 5.1 the roles of stakeholders in governing the cooperation

Stakeholders / Stages	IGOs	NGOs	Government	Two parties
Cooperation initiating	2	1	3	2
Physical ship flow	3	4	2	1
Environmental Regulation perspective in the physical ship scrapping stage	2	3	2	1
Environmental management perspective in the physical ship scrapping stage	4	3	2	1
Total	11	11	9	5

"1"- the most important "2"- more important "3"-important "4" less important

Lower "total mark" means the more important.

Clearly, the two companies are really the most important in governing the cooperation process. IGOs and NGOs are playing less important role than the government because government and the two parties mostly implement the practical environmental management. However, if we compare the mark (5) that the two parties got with the marks that IGOs (11), NGOs (11) and the government (9) got, we will find that the two parties are much more crucial than other stakeholders in governing the cooperation process. More significantly, the mark of government (9) is nearly equal to the ones of IGOs (11) and NGOs (11). And in the stage of cooperation initiating, the marks of IGOs (2) and NGOs (1) are even higher than the government (3). This implies that the roles of

IGOs and NGOs have been an essential part of the ship scrapping cooperation governance.

To conclude the work of this section, the globalization makes the ship scrapping cooperation is concerned about the environmental issue. And it is thought in this thesis that the traditional way that the ship scrapping cooperation process was governed by government and companies has been diminishing. As a substitute, the hybrid arrangement appears to be taking more and more account in the governance of cooperation. For our case, it is more like a mixture between the tradition and the integrated approach. In other words, we can not only find the sign of the old governance mode that the ship scrapping cooperation process is governed by state and companies, but also the sign of the hybrid arrangement. On one hand, the government and the two companies are still the most important two stakeholders in governing the cooperation process. In this sense, our case is still governed under the traditional model. On the other hand, the roles of IGOs and NGOs have become an essential part of the governance of our case. During our research, it was found that in order to fit the globalization trend the government has take the environmental regulations of some IGOs into account when it is making its domestic environmental regulations. Furthermore some NGOs like the CSBA also take some accounts in governing our case. In this sense, we conclude that there is a sign of the hybrid arrangement in our case. But this kind of arrangement is very limited because most of IGOs and IGOs do not have an authoritative regulation monitoring and implementing system.

5.3 The Role of State

The role of state in our case:

In light of the analysis in terms of the role of state in Chapter 3, it becomes noticeable that the state takes a large account in governing the cooperation. Its functions are concluded as follows:

- Help Maersk get a new partner.
- Set up state regulations and monitor the regulation implementation situation.

- The regulations of state have largely influenced the regulation content set by Maersk.
- Support the work of NGOs (like the CSBA supported by government in terms of policy)
- Coordinate the relations between two parties and other stakeholders.
- Set up regulations to reconcile the regulations from IGOs.

The outlook for the role of state:

Although the globalization has considerably affected the state in terms of policy making and some IGOs and NGOs are taking parting in the governance of the industry in a direct or indirect way, the state still keeps central in the network governing the ship scrapping industry.

For illustrating our point of view, we number three reasons:

Firstly, nowadays, there is a lack of proper guideline to implement for the ship scrapping industry in the worldwide[43]. The state takes a larger account in governing the ship scrapping industry than the IGOs and NGOs. The state is a constitution-bounded stakeholder and owns the complete regulation monitoring system and enough resources such as personnel and financing to govern the industry. Most of regulations related to the industry are either from the state or made according to the regulation state. Further, the IGOs are composed of the stat members and most NGOs related to the industry are supported by state by means of diverse ways such as financing or policy.

Secondly, the state undertakes the coordination work between companies and other stakeholder. When companies need help, the state is usually considered as the first choice to turn to. In comparison with other stakeholders, the state is the only one who is able to provide this kind of help in reality. For example, when Maersk wants to find a new partner, they can easily get access to government for help. But it is unrealistic to ask for help from the IMO who does not have the kind of obligation.

[43] Although there are some like the guideline (see appendix II) from the IMO, they are very voluntary and imperfect in terms of the regulation enforcement.

Thirdly, the behaviour of state in terms of environmental management can affect the environmental management of ship scrapping industry significantly. The ship scrapping industry follows such a rule that the cooperation always consider the regulations set by the state, where the ship scrapping yard belongs to, as the basic ones they are supposed to obey. An environmental friendly state, in principle, sets more regulations and programs for preventing environment from polluting. To the contrast, some countries that are more cash-oriented could set up more loose regulation settings to attract business partners. For example, European countries have mostly set up strict regulation for ship scrapping. We can hardly find any pollution case caused by the ship scrapping in Europe. But in India or Sir Lank, where they do care the business profit, there are not so many strict environmental regulation systems for ship scrapping industry. With this reason, the ship scrapping companies there do not need to invest much for their environmental management so that the ship scrapping companies are able to offer ship owners higher prices. In this way, they may attract more ships for scrapping, but the environment is seriously harmed.

Hence, as we insisted, the state is being affected by the trend of globalization, but still at the centre of network governing the ship scrapping industry.

5.4 Reflections over the Thesis

At last, we would like to end the thesis with six personal reflections, which we sensed over the thesis research process.

Reflections on the thesis content:

Firstly, if we did two contrast partnership-based ship scrapping cases to research in our thesis, more insights about the industry would be found. Our case was about a kind of cooperation, in which the ship owner and ship scrapping company did concern the environmental protection. If we also mentioned one case, in which the ship owner and the ship scrapping did ignore the environmental protection, then we could compare the cases so as to get more insights in terms of motivation and the social structure analysis.

Secondly, the information flow idea was not defined very exactly. We did not really make an unambiguous explanation for the information flow definition. In this case, it is easy to confuse readers when they identify which flows belong to the information flow.

Reflections on the theory application:

Firstly, the information flow is just one angle to understand the flow. There are also many other angles helping us understand the flows governing the ship scrapping cooperation process such as the technology flow and regulation flow. Even for the angle of information flow, the flows analyzed in the thesis were not the only ones governing the cooperation. It can be explained by more specific information flows.

Secondly, the hybrid arrangement has not really been recognized by the ship scrapping industry. The hybrid arrangement is a good way to arrange the governance of environmental flow under the globalization context. However, it is still a kind of theoretical definition. It is caused naturally by the globalization. The stakeholders of a hybrid arrangement do not actually know they are working for this kind of arrangement. It is sensed that it would be more meaningful if we work out a way to have the theory definition down to the earth. We call for the reality significance of the hybrid arrangement. This implies that, instead of letting the hybrid arrangement develop naturally along with the globalization, it is supposed to make the meaning of the hybrid arrangement understood by the stakeholders including the states, IGOs and others so that more concrete and effective efforts can be made for the hybrid arrangement.

Thirdly, the globalization has made the state change their regulations at times in order to reconcile with the globalization trend. The state does not want to get isolated and lagged. In our case, the Chinese does work for the changing of regulations, the cooperation with other countries. They want to get more integrated with the world so that the country can catch up with the step of globalization.

Reflections on the ship scrapping industry:

Firstly, the ship scrapping cooperation has been internationalized. Modern information and travelling technologies make the communication of ship owners; ship scrapping

companies, IGOs and other stakeholders easier. The limitation of space and time has been diminishing. The current fact that more than 90% of ship scrapping task is finished in Asia illustrates that ship owners do no think of the time and space as barriers for cooperation when they choose a partner for scrapping their ships.

Secondly, some multi-national shipping companies do care their reputation in the worldwide. And the reputation can largely affect the decision on the environmental protection. In our case, Maersk, who did not take care of this issue so much, changed its environmental protection idea after the intervention of Greenpeace because they did not want to lost their reputation. For Maersk, the financial benefit is less important than their reputation.

Thirdly, some shipping companies with high environmental awareness[44] have made some ship scrapping companies believe that a good environmental management system can make their business more promising. In our case, the CSBC has achieved the cooperation contracts of several other shipping companies because of its relatively better environmental management system. The CSBC insists that to improve their environmental management system is always one of the most important working fields and a good environmental management system can bring them with more business chances.

Fourthly, a complete solid waste recycling social system can be a good choice to partly solve the environmental problems caused by the ship scrapping industry. In our case, both parties are very eager to contribute more to the building of a complete solid waste recycling social system. It has been a common sense for both parties that the better and cheaper environmental management can only be achieved by relying on a relatively perfect social recycling system. As a single ship breaking company, it is not efficient to deal with the ship breaking on their own. Some environmental problems are unavoidable as the limited financing and technology condition. For example, as there is currently no proper technology that can clean oil pipes from ship engines completely

[44] Currently most of ship owners still choose the ship-scrapping partner based on the price. However, there is a trend that more and more companies are becoming cautious about the environmental effect caused by the ship scrapping activities. The ship scrapping companies who offer a lower price but better environmental management system are getting more and more popular. The ship scrapping companies who offer a higher price but worse environmental management system are losing their partners.

some oil has to be left inside the oil pipe, which could cause the secondary pollution when others use these pipes. If the ship scrapping company sets up a research program to solve this problem it is too costly to do. To cooperate with other research institutes is no doubt a better choice.

In the near future, two parties hope that they can have more opportunities to cooperate with other social stakeholders (More information flow connections) such as the scientific institutes especially in the field of waste recycling to govern the ship breaking process.

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APPENDIXES:

Appendix I The overview of the hazardous substances:

PCB-Polychlorinated biphenyl

PCBs (polychlorinated organic compounds containing two benzene rings) are highly toxic. It can be bio-accumulated in the environment from a long time. It may mainly be found from glue, plastics, sealing materials and cable insulations of ships. The exposure to PCBs could cause adverse health problems. It has been linked to cancer, liver damage, reproductive impairments and immune system damage. According to the latest research, it can also be linked to the behavioral damage and neurological damage of human beings.

Incomplete incineration of PCBs can produce di-benzofuraner/dioxin, which are very toxic. It will damage the air and cause respiratory diseases of humans seriously.

PVC-Polyvinyl chloride

PVC, which contains more than 50% chlorine, can be found in cables, floor coverings and plastic devices of different types. When it is burnt, combustion products of extreme complexity are produced consisting of several hundred compounds (Andersen 2001). The hydrogen chloride gas from PVC product combustion, if inhaled by us, can react with water vapors and hydrochloric acid forms inside our body, subsequently the ulceration of the respiratory tract can happen. In addition, the burning of PVC products on beach can produce carbon monoxide, dioxins and chlorinated furans. Dioxins are among the most toxic substances known. Some congeners are toxic at concentrations below $10^{-12}g/m^3$ in air (Andersen 2001).

A study shows in Taiwan that an environmental problem was caused by open air combustion of discarded electric cords and cables, sheathed in polyviny1 chloride (PVC), in a special waste metal retrieval area (Andersen 2001). The result of the combustion was severe.

Dioxins and furans are two of the most toxic products known because the dose that can cause disease is lower than that for any other man-made chemical(Andersen 2001). They are related to the cause of cancer and birth defects. These highly toxic substances are either inhaled directly or deposited on soil, water and in crops and thereby threatening the food chain (Andersen 2001).

PAHs (Polycyclic aromatic hydrocarbons)

PAHs are composed of two or more benzene rings, approximately 250 different PAH compounds are known (Andersen 2001). PAH compounds are the largest single class of carcinogens known today. PAHs can be formed by incomplete decomposition of any organic material containing carbon and hydrogen such as oil products and residues on ships. The residues from ship scrapping could contain oil. When these residues are burned the oil combustion on the residues can lead the formation of PAHs.

PAHs are very difficult to be decomposed. Once it is formed, there will be a persistent and serious long-terms effect for both human health and environment.

TBT (Tributyltin)

TBT is an organ metallic substance that can have effects at very low concentrations – sub anagram quantities per litre (Andersen 2001). 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) (Andersen 2001).

TBT, which is one of the active components in anti-fouling (used to reduce ship resistance by preventing hull fouling), has been found to be extremely toxic (Andersen 2001). The scrapping of ships with rare hands or without proper protection can result in lethal effects to our health. It also affects the balance of maritime eco-system as the toxic substances can kill many aquatic lives such oyster.

Oils – Hydrocarbons

Hydrocarbons such as crude oil and refined petroleum products are complex substances consisting of numerous different compounds (Andersen 2001). Alkanes 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) (Andersen 2001).

For non-oil tankers there is no problem relevant to the oils, nevertheless for the oil tankers there is always a potential danger in sea or on ashore. In sea on hulled tankers often leak oil to the sea killing aquatic animals and destroying the eco-system. On ashore, when such ships are scrapped, the oils sticking to the ship is always hard to be shred off. Especially for the oils residues sticking to the materials, which are going to burnt on beach, it is extremely harmful for air to burn them that include aromatic hydrocarbons.

Asbestos

Asbestos-containing material (ACM) can be found in the thermal system insulation and on surfacing materials of ships. When ACM is disturbed, asbestos will break up into very fine fibres that can remain suspended in air for long periods. It is really possible to be inhaled by workers and operators at the facility or by people living nearby the shipyard. The most dangerous asbestos fibres are invisible. Once they are inhaled, the fibres can remain and accumulate in the lungs. Breathing high levels of asbestos fibres 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) (Andersen 2001). Signs of these diseases do not appear until many years after exposure.

Heavy metals

Metals related to the ship-breaking industry are toxic heavy metals such as lead (Pb), mercury (Hg) and cadmium (Cd). Basically these metals are harmful for both human health and eco-system. In addition to these heavy metals, the others in the ship scrapping process are iron (Fe) alloys (steel), aluminium and zinc (Zn). The metals can be found everywhere on ships. 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) (Andersen 2001). The introduction of these heavy and non-heavy metals is as follows:

Mercury (Hg), a toxic heavy metal, can bio-accumulate in cells persistently. It is extremely harmful for nerves system. On board ships, mercury can be found in thermometers, electrical switches, level switches and light fittings (Andersen 2001). In the short term there may no have significant effects, however in the long terms as the mercury accumulates in body it will have a fatal effects on health.

Lead (Pb) is toxic, and is found in batteries, paints and in components in motors, generators, piping, cables and others (Andersen 2001). For workers, long-term exposure to lead can cause the impairment of hearing, vision, and muscle coordination. Lead also damages the blood vessels, kidneys, heart and the reproductive system (Andersen 2001). A study from a ship-scrapping yard in Taiwan showed that the workers involved with steel cutting have higher lead values in blood and urine than the dockworkers. The study involved 140 oxyacetylene torch metal burners and 21 dockworkers without direct lead exposure as the control group (Andersen 2001). Additionally, Lead chromate (present in paint pigments) is considered as a substance causing cancer. It may also affect the development of fertilizers. So the improper disposal of batteries and paints containing lead can cause a threat to health and our environment.

Copper (Cu) is an essential trace metal used in cables, paint, alloys and some pipe work.. Copper is highly toxic. It can accumulate in body cells and be found from urine. But the affect still remains uncertain so far (Andersen 2001).

Zinc (Zn) can be found in large quantities at scrapping sites. It is mainly from the usage of anodes of batteries. There is a possibility that dissolved impurities in zinc anodes such as Cadmium (Cd) and Pb can have an adverse effect on the environment (Andersen 2001).

Aluminium (Al) is present in large amounts in anodes like zinc. But it does not have much adverse affect to our health and environment.

Iron (steel) does not a problem to human health. However, scrap steel will contain an amount of paint products. When this steel is put in furnace the emission to the air of the steel may contain toxic gases coming from such Pb compounds.

Other substances

Isocyanines often appear in processes such as spray-painting. The exposure of this material can cause respiratory diseases such as asthma. The exposure levels likely to be generated by ship scrapping activities are unknown (Andersen 2001).

Sulphuric acid is corrosive and can cause serious burns to skin and eyes. However, if batteries are damaged and leaked, the accumulation of sulphuric acid will be significant to the ground water and air.

Radioactive materials may be present on board a ship in liquid level indicators, smoke detectors or emergency signs (Andersen 2001).Any disposal of radioactive materials could involve the radiation exposure to workers.

Ballast tank sediments include viruses and bacteria that can threat both human health and to the environment. The discharge of ballast water sediments could cause the outbreak of cholera epidemics.

Equipments used:

Mobile fire extinguishers containing water or sodium bicarbonate: it is unpleasant for breath and could cause respiratory diseases although it is not used often.

Appendix II The guideline description issued by the IMO for the ship scrapping industry

The guidelines are composed of ten sections, which are the introduction, the application, the definitions, identification of potentially hazardous materials, green passport, procedures for new ships related to ship recycling, procedures for existing

ships related to sip recycling, preparations for ship recycling, role of stakeholders and other bodies, technical co-operation.

Section one (the introduction): it points out that the ship recycling is one important principle of sustainability, and the best option of expired ships (20-25 years). It also demonstrates that the guidelines are clear, but how to implement it effectively will lie with other stakeholders such as ship owner and ship scrapping companies. These Guidelines accept that the obligation for environmental and worker protection in ship recycling facilities must rest with the recycling facility itself, with the regulatory authorities of the country in which the recycling facility operates and the efforts of other stakeholders. There is a need to develop the implementation regulation of the guidelines.

These Guidelines are aimed to:

- Encourage the ship recycling as the best way to dispose expired ships
- Provide guidance in the field of the preparation of ships for recycling and minimising the use of potentially hazardous materials and waste generation during ships' operating life;
- Strengthen inter-agency co-operation; and encourage all stakeholders to address the issue of ship recycling.

Section two (the application): it clearly indicates that the guidelines were not lonely and complementary to other guidelines and conventions such as Basel Convention on the Control of Trans-boundary Movements of Hazardous Wastes and their Disposal focusing on issues related to ship recycling facilities and the guideline of International Labour Organization on the working conditions of ship scrapping facilities.

Section three (the definitions): it refers to some definitions, which are usually used in the guidelines such as what the ship owner is and what the new ship is. More details are in the appendix 1 (the thesis appendix 1)

Section four (identification of potentially hazardous materials): it provides us with two categories of hazardous waste source. One is about potential sources of concern, another one is about Items on ships that may potentially contain substances of concern.

Potential sources of concern that should be addressed:

- Fuel, lubricants, and coolants;
- Floatable materials (e.g., plastics, Styrofoam insulation);
- Materials possibly containing PCBs such as wiring insulation;
- Sludge;
- Harmful aquatic organisms in ballast water; and, currently (on older ships)
- Asbestos used as insulation material and in accommodation panelling.

Items on ships that may potentially contain substances of concern include:

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- Electrical equipment (e.g., transformers, batteries, accumulators);
- Coolers;
- Scrubbers;
- Separators;
- Heat exchangers;
- Storage facilities for production and other chemicals;
- Tanks, diesel tanks including bulk storage tanks;
- Stored solvents, and other chemical stocks;
- Paints;
- Electrical cabling installed before 1975 (plastic covering may contain PCBs);
- Sacrificial anodes;
- Fire extinguishing and fire fighting equipment;
- Piping, valves and fittings;
- Pumps and compressors;
- Engines and generators;
- Oil sumps;
- Hydraulic systems; and
- Light fittings and fixtures

Section five (green passport): the introduction is green passport, which is used to facilitate the disposal of potential hazardous waste in ships. How to make a passport and what the passport is like can be found in detail in the appendix 1.

Section six (procedures for new ships related to ship recycling): this section explains what the new ships should do to the ship recycling. As our research target is for the expired ships, the section will not be used.

Section seven (procedures for existing ships related to sip recycling): there are three points ship owner should do. Firstly, the preparation of the Green Passport, secondly, they should try to minimize the use of the potentially hazardous substances. Thirdly, it is to minimize the production of hazardous waste in ships.

Section eight (preparations for ship recycling): it states that how the ship last owner should mainly do before deliver the ship to the facility. It includes three steps:

- Step 1: the selection of ship scrapping yard. There are clear requirements in the section telling the ship owner how to select them. For instance, the implementation of Basal Convention rules and the guideline of ILO should be a main assessment standard for local shipyards. If they follow this, it is possible to cooperate. Vice versa.

- Step 2: the ship delivery. It should include three stages: the registration of ship scrapping contract, the last voyage to the ship scrapping yard referring to last voyage insurance, and the cancelling of the registration when it arrives at the yard.

- Step3: what the ship owner should do to avoid any safety, environment, and health problems before its ships arrive at the shipyard. For example, the guideline clearly points out that how to make a work plan for the ship recycling. (See appendix 1)

Section nine (role of stakeholders and other bodies): This section encourages the ship recycling related administrations and organizations to set up more incentive mechanisms, depending on which the ship recycling industry can run in a better way. It states the functions of some main stakeholders and bodies related to ship recycling and call for the further cooperation of different stakeholders in terms of funding and technology.

Table 1 the functions of stakeholders and main bodies

Flag ship state	Promoting the appliance of obligatory guidelines
Port state	Checking the ships in ports in terms of international maritime regulations compliance
Recycling state	Enforce the guidelines to guarantee no effect on safety, healthy and environment. Prompt the development of
Basel Convention	Provide the Technical Guidelines for the Environmentally Sound Management and Full and Partial Dismantling of
International Labour	Provide Guidelines on Safety and Health in Ship breaking as the complement of Basel Convention and IMO
The London Convention	regulating the ship disposal issues like ship placement on seabed and ship abandonment issues
The ship recycling industry	main implementing body of ship recycling
Other stakeholders	MO encourages them to contribute their efforts to the process of ship recycling.

Section ten (TECHNICAL CO-OPERATION): to encourage the cooperation between organizations and states in terms of recycling technologies and funding

Guideline appendix introduction:

There are five appendixes attached in the guidelines of IMO.

- Appendix one: LIST OF HAZARDOUS WASTES AND SUBSTANCES THAT ARE RELEVANT TO SHIP RECYCLING

It consists of three tables:

Table 1: Wastes and substances that may be inherent in the ship structure
Table 2: Wastes and substances that may be on board the ship
Table 3: Waste components that are relevant to ship recycling and which are not included in List A in the Basel Convention

To attention: these tables derive from the Basel Convention as a reference to formulate the hazardous materials list related the ship scrapping. (See the section four of the content introduction of guidelines) and is not part of the Green Passport.

- Appendix two: POTENTIALLY HAZARDOUS MATERIALS WHICH MAY BE ON BOARD SHIPSDELIVERED TO RECYCLING FACILITIES

It includes A and B:

A. Operational Substances and Consumables
B. Toxic Materials (as part of the ship's structure)

To attention: This list is intended to be used for the identification of potentially hazardous materials on board ships (see sections 4, 6 and 7) and is not part of the Green Passport. It derives from the "industry Code of Practice on Ship Recycling, August 2001".

- Appendix three: INVENTORY OF POTENTIALLY HAZARDOUS MATERIALS ON BOARD

It includes part A, part B and part C.

Part A: potential wastes and materials in ship's structure and equipment
Part B: operationally generated waste from ship
Part C: stores (gases, chemicals and other package items)

To attention: the inventory derives from the Annex 2 to the .Industry Code of Practice on Ship Recycling, August 2001. More importantly the inventory is a main part of the Green Passport. More details can be found in section 5 of the thesis appendix 1.

- Appendix four: LIST OF PRINCIPLES FOR HOT WORK[45] ON BOARD ALL TYPES OF SHIPS

To attention: the list derives from the Annex to MSC/Circ.1084 .Principles for hot work on board all types of ships. The citation of the appendix is aimed to provide a clear guidance with all stakeholders associated with hot work especially for the manager and workers who are in charge of hot work.

- Appendix five: RECOMMENDATIONS FOR ENTERING ENCLOSEDSPACES ABOARD SHIPS

To attention: this appendix makes a contribution to the safety of workers, who need to enter into enclosed spaces aboard ships, where are extremely dangerous. The content of the appendix derives from the annex to IMO Assembly resolution A.864 (20).

Appendix III The questionnaire for the interview with the staff of Maersk

1. Motivation

1.1 Why did you decide to work with other partners for ship breaking?

1.2 What do you want to achieve by working together with others in ship breaking?

1.3 Why did you want to cooperate with the Chinese company?

2. Stakeholder Analysis

2.1Which stakeholders were involved in the process partnership forming? (For example: NGOs, Government, and civil society

2.2 Which stakeholders are being involved in the pre-delivery stage of ship breaking?

2.3 Which stakeholders are being involved in the post-delivery stage of ship breaking?

2.4 Which stakeholders outside of this partnership are important in ship scrapping?

3. Environmental Flows

3.1 Except for the physical flow of ships, are there any other communications such as the humans, information exchange?

3.2 How do your ships flow between the two sites?

[45] Hot work means any work requiring the use of electric arc or gas welding equipment, cutting burner equipment or other forms of naked flame, as well as heating or spark generating tools, regardless of where it is carried out on board a ship.

Pre-delivery	Head Office	Crew
Ships still in service		
Ships during last round stage		
Ships on its way to recycled-shipyard		
Post-delivery		

3.3 How did you communicate with each other before partnership?

3.4 How did you communicate with each other after partnership?

3.5 How do other flows going on?

3.6 What actors involved along the each flow process and the role each played in it?

4. Regulations

4.1What are the rules you follow at the state level for ship scrapping?

4.2 What are the rules you follow at the international level for ship scrapping?

4.3 How do you understand the relation between the two levels in terms of regulation implementation?

4.4 Which one has the most influence on the ship scrapping process?

International regulations: why

Or State regulations: why

Or regulation from partnership: why

4.5 What do you think of the role of IMO or other International actors for ship scrapping?

4.6 What do you think of the role of state regulations for ship scrapping?

4.7 Is there any monitor in system to monitor your regulation-implementing situation?

5. Effectiveness

5.1 How do you take other social affects into your considerations such as worker's health and the pollution of local air?

5.2 Are you contending with the results?

5.3 What do you think of your current partnership situation?

5.4 Have you achieved your goals in this partnership?

5.5 Is everything happened during the cooperation process is within your expectation?

Yes

No (What is you didn't expect?)

Appendix IV The questionnaire for the interview with the CSBC

1. Motivation

1.1 Why did you decide to cooperate with the Maersk? (They have more requirements in terms of environmental protection)

1.2 What do you want to achieve by working together with the Maresk?

2. Stakeholder Analysis

2.1Which stakeholders were involved in the process partnership forming? (For example: NGOs, Government, and civil society)

2.2 Which stakeholders are being involved in the pre-delivery stage of ship breaking?

2.3 Which stakeholders are being involved in the post-delivery stage of ship breaking?

2.4 Which stakeholders outside of this partnership are important in ship scrapping process? (More specific, for example, what is the role of NGOs in the ship scrapping Process?)

3. Environmental Flows

3.1 Except for the physical flow of ships, are there any other communications such as the humans, information exchange between you and the Maresk?

3.2 How do your ships flow between the two sites?

Pre-delivery	Head Office	Crew
Ships still in service		
Ships during last round stage		
Ships on its way to recycled-shipyard		
Post-delivery		

3.3 How did you communicate with each other before partnership?

3.4 How did you communicate with each other after partnership?

3.5 How do other flows go on?

3.6 What actors involved along the each flow process and the role each played in it?

4. Effectiveness

4.1 Are you contending with the results?

4.2 What do you think of your current partnership situation?

4.3 Have you achieved your goals in this partnership?

4.4 Is everything happened during the cooperation process is within your expectation?

Yes……

No (What is you didn't expect?)……

5. Regulations

5.1 What are the rules you follow at the local and state level for ship scrapping?

5.2 What are the rules you follow at the international level for ship scrapping?

5.3 How do you understand the relations of different levels in terms of the regulation implementation?

5.4 Which one has the most influence on the ship scrapping process?

International regulations: why……

Or State regulations: why……

Or regulation from partnership: why…….

5.5 What do you think of the role of IMO or other International actors for ship scrapping?

5.6 What do you think of the role of state regulations for ship scrapping?

5.7 Is there any monitor in system to monitor your regulation-implementing situation?

6. Environmental Management

6.1How do you take environmental effects into your considerations? (Such as worker's health, safety and the pollution of local environment?)

Yes: which aspects? ……

No: Why

6.2 How do you deal with these aspects respectively?

6.2.1 What measures are you taking mainly for each aspect?

6.2.2 How about the results? And are you satisfied with the current results in terms of the environmental protection?

6.3 What do you think of the role of regulations from local, national and international levels in terms of the environmental protection? And Why?

Appendix V The survey for the situation of environmental management at the CSBC

1. What is your job?

1.1 What tasks or activities does this job entail?

2. Which environmental risks are related to your work?

2.1 Which health risks are related to your work?

2.2 Which safety risks are related to your work?

2.3 Do you suffer any physical consequences from these environmental, health or safety risks at this moment?

3. What, do you know, are the measures the companies are taking to prevent these environmental risks?

4. What, do you know, are the measures the companies are taking to prevent these health risks?

5. What, do you know, are the measures the companies are taking to prevent these safety risks?

6. Are you satisfied with these efforts and your current working condition?

Yes……

No: why…….

7. Have the measure taken to prevent environmental, health and safety risks changed since 2001, when the partnership with Maersk started?

8. Are there any differences in measures and rules when the Maersk-ships are scrapped then when a ship from another company is scrapped?

Appendix VI The interviewee list for the survey of environmental management situation at CSBC

Surname	Gender	Age	Working field
Zhang	Male	60	Steel rope breaking and making
Zhou	Male	38	Ship breaking monitoring and supervising
Liu	Male	42	Steel rope breaking and making
Wang	Male	27	Steel cutting(hot work)
Wang	Male	40	Steel cutting(hot work)
Zhang	Male	42	Steel carrying
Wu	Male	52	Oil fouled soil collection
Zhao	Male	29	Steel cutting (hot work)
Li	Male	43	Crane driver
Hao	Male	37	Safety supervisor
Ai	Male	35	Steel rope breaking and making
Yao	Male	50	Steel rope breaking and making
Liu	Male	40	Yard cleaning
Hu	Female	49	Hot work fuel supplier
Tang	Male	60	Steel cutting(hot work)
Ding	Female	27	Company Secretary
Wang	Male	40	Ship breaking supevisor
Liu	Male	36	Steel cutting (hot work)
Yang	Male	45	Osbesto room cartaker
Jing	Male	60	Wastewater treatment plant