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Marine pollution prevention and response: a possible approach in Mozambique

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MARINE POLLUTION PREVENTION AND RESPONSE
A POSSIBLE APPROACH IN MOZAMBIQUE

By
Eugenio J. Muianga
MOZAMBIQUE

A Dissertation submitted to the World Maritime University in partial fulfilment of the requirements for the award of the:

Degree of Master of Science
in
General Maritime Administration

Year of graduation

1992
DEDICATION

TO MY FATHER,

I KNOW YOU CAN'T SHARE MY JOY!
ACKNOWLEDGEMENTS

In the course of the work of writing this paper, difficulties were various and sometimes even frustrating. Support from my family, friends, my course professor and other distinguished resident and visiting Professors made it possible for me to write this paper. Now, I take this small, but warm hearted space to say thanks to you all.

To my wife Gloria, who always and from so far away, encouraged me through all my academic endeavors, I say thanks darling.

Special heartful thanks are due to my daughters Sonia, Elsie and Vanessa, and my mother Teresa Dimande for having endured the loneliness and pain they suffered during my absence.

To my brother Tomas for his encouragement while away from home.

To my course Professor Ted Sampson, my gratitude for all your guidance, patience and understanding, not only in this work, but throughout my stay at World Maritime University.

My gratitude goes also to C.te J. Ferreira Da Silva from CILPAN, who provided valuable information and co-assessed this paper. Your assistance and encouragement was of great importance in this work.

My thanks to SIDA-Swedish International Development Authority by providing the scholarship, to the Ministry of Transport and Communications of my country for releasing me during the period of my studies at the World Maritime University.
Special thanks to Mr Per Nystedt from Hifab for all support provided. I will keep the memories for my lifetime.

Finally, I am indebted to all who made my stay at the World Maritime University and MALMO enjoyable. My deep and sincere gratitude.

Manongi, we met in Malmo, let’s meet again in the future.
ABSTRACT

Then God commanded, "Let the water below the sky come together in one place, so that the land will appear"—and it was done. He named the land "Earth", and the water which had come together He named "Sea". And God was pleased with what He saw... (Genesis 1:9.)

I believe God would not be pleased if He were to look at the current state of the oceans, with the rivers having become universal sewers that carry away the wastes of the people, and the oceans the ultimate sink for these wastes. The ability of the sea to self-cleanse its environment has been diminishing for some time, due to increasing amounts of wastes and other harmful substances being introduced into it, resulting in the need for human intervention for the protection of the marine environment and life.

Public awareness of marine pollution and its consequences has increased considerably in the past few years, resulting in the development of various measures oriented to marine pollution prevention, control and response. Such awareness winds which have started to blow in Mozambique have not yet produced the desired effects.

This paper discusses the possibility of addressing marine pollution problems in Mozambique, and it is also intended to contribute to the awakening of the Mozambican public’s and authorities’ consciousness of the urgent need for action to meet that end. The question may be asked whether there are expectations of success in this direction. My answer is yes; and it is not just a question of expectations but of assurance, particularly after a pollution incident such as the one which occurred with the Greek tanker "KATINA P" within the Mozambican waters brought to people’s minds the kind of pollution threats the country is exposed to.

It is my wish that readers from other countries in similar situations benefit from the ideas and approach discussed in this paper.
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CHAPTER I

1. INTRODUCTION

1.1. DISSERTATION OBJECTIVES

A Dissertation paper is generally and, in this specific case, a partial fulfillment of the requirements for the award of a degree, but it can also be an instrument directed towards many other objectives.

When I first came to the World Maritime University, my understanding of environmental issues was limited to that of any other ordinary human whose day-to-day life and work goes on without an involvement or close links to environmental problems. In other words, my degree of awareness and seriousness of the implications resulting from damage to the environment were almost nil. In the course of lectures, seminars and other academic activities which I have been exposed to, I started first understanding what environment really stands for and how important it is for nature and human life. When the time came for the choice of dissertation topic, I felt that I was being given a chance to learn more about the subject and maybe even a chance of contributing with my own ideas to the protection of the environment.

Another factor which led me to such a choice was due to the abandoned situation of the marine environment in my home country, a country which possesses a very long coast line and economically relies to a great extent on marine and coastal resources. Therefore I thought that the present paper should be directed towards to two main objectives: the first one being the improvement of my knowledge on marine environmental matters through the process of producing this paper; and the second focusing on the development of a possible basic approach for addressing marine pollution prevention and response issues in Mozambique, my home country, especially
considering the fact that very little or almost nothing has been done in that field. The idea behind the definition of
the main objectives of this paper lies in attempting an
alliance of academic requirements with the practical
usefulness of the paper's ideas in the battle for marine
environment protection against pollution. This is
particularly important in my home country, by orienting to
act as an instrument which contributes to increasing
awareness of the community in general and the authorities in
particular, in the necessity for protecting and preserving
the marine environment. Therefore, among my expectations,
one can see some of the ideas from this paper being adopted
in Mozambique, as part of the process of establishing
mechanisms to address marine environmental matters.
I also wish and believe that the paper will be a contribution
to the existing reading material in the sphere of marine
environment pollution prevention and response, and a point on
which further studies can build.
Also, the approach adopted in this paper may be useful to
others with similar conditions, which may result in another
way of contributing to the global efforts in the protection
and preservation of the oceans.
The paper starts by giving a brief description of Mozambique,
covering geographical location, population, the transport
network, some of its coastal features and the importance of
maritime activity for the country.
The discussion of pollution prevention and response concepts
and ideas, as well as the importance of their appliance, is
covered in the second and third chapters, complemented with
the development of a model for contingency planning concept
application in Mozambique using one of the country's main
ports as a pioneer example in the fourth chapter.
The fifth chapter deals with the internationally agreed
principles in the management of the seas, including the
prevention of marine pollution, the obligations of a coastal
state and related legal requirements.
Finally, chapter six is dedicated to some considerations of the discussion, conclusions and what I feel to be recommendations to address marine pollution prevention and response issues in Mozambique.

1.2. THE TITLE

Marine pollution prevention coordinated efforts of the international maritime community date back to 1954 with the adoption of the International Convention for the Prevention of Pollution of the Sea by OIL (OILPOL 1954). Early technological developments have forced the maritime world to work on the improvement of preventive measures against pollution of the sea not only by oil but also by other substances which when discharged into the sea cause Pollution.

As a result, new international instruments addressing pollution prevention matters have been developed as well as new concepts related to Marine Pollution such as marine pollution response and preparedness, due to a great number of pollution incidents which have occurred and caused serious damage to the marine environment in various parts of the world.

Today, when dealing with marine pollution prevention matters, it is appropriate to consider the response component as an important element in reducing marine pollution. By this means it is possible to fight the effects of pollution incidents with a higher probability of success, maximizing the primary objective of mitigating the pollution effects on the marine environment.

However, it remains clear that much should be done in terms of prevention as response results are unpredictable at best and virtually never allow the restoration of nature to the conditions which existed prior to a pollution incident. Regardless of the extent of efforts expended in environmental restoration, a satisfactory result is rarely achieved.
The choice of the dissertation topic, Marine Environment Protection, was made based on the interest gained in the various lectures concerning Marine Environment Protection and, the Title, "Marine Pollution Prevention and Response", A Possible Approach for Mozambique, was based on the concept of today's forms of addressing marine environment pollution problems.

This being the chosen subject of my project, it is also a result of a will to contribute to the preservation of the environment in general, and the marine environment in my home country, in particular. It is also, comparatively more practical to discuss a subject with a well known scenario as a background, which enables the use of existing problems as examples and to apply exercises to the same scenarios of possible solutions to the pinpointed problems.

I hope that anyone who occasionally will read this paper will criticize it in a constructive way and if so wish, let me know about his/her views which would please me and, as I do intend, contribute to improving it from time to time in the future.
MOZAMBIQUE is a Southern African Country, a former Portuguese colony which obtained its independence in 1975, after approximately 500 years of colonization. The country shares borders with the Republic of South Africa, the Kingdom of Swaziland, the Republics of Zimbabwe, Zambia Malawi and Tanzania in the South, West and North, and is bathed by the Indian Ocean in the East (see Annex 1).

It has a total area of 799,000 square kilometers of which 13,000 km² are inland lakes and rivers and a sea coast which stretches for 2,700 kilometers along the Indian Ocean. The capital is Maputo in the south and the Population is about 14 million, with approximately 45 per cent concentrated along the coast. (1)

The transport sector is an important part of the country’s economy, accounting for 10 to 15 per cent of the National Social Product, being also of vital importance as an earner of foreign exchange. It consists of: (see Annex 2) (2)

* Six main ports of which three-MAPUTO, BEIRA and NACALA—are international ports, and the other three-INHAMBANE, QUELIMANE and PEMBA—are primarily domestic;

* Three non-connected railway systems through the main three Regions of the Country-South, Central and North, each one serving the three international ports respectively, Maputo, Beira and Nacala, and connecting to the neighboring countries of South Africa, Swaziland (the south line), Zimbabwe and Zambia (the central line) and Malawi (through the northern line);

* A road network of about 4,500 kms of asphalted roads, some 500 kms of constructed gravel roads and some 20,000 kms of earth roads;

(1) Maritime National Directorate Statistical Data, Moz./1991
* Seven airports allowing the national airline to interconnect with the capital and the six most important provincial towns of the country;  

* An oil pipeline of 310 kms from Beira Port to the neighboring country of Zimbabwe;  

The main rivers are the Rovuma and Lurio in the north, Zambeze, Pungue and Save in the central part of the country and, Limpopo, Incomati and Maputo in the south all carrying large volumes of sediments which are very important for the marine life in the Continental Shelf. The Continental Shelf area is of about 68,300 km2 with a depth of 200 metres. (3) The coastal zone’s most important habitats consist of estuaries, mangrove forests, coral reefs, seagrass beds, submarine banks, plateaux and rocky reefs which are important for the fisheries resources. Dunes, fringing coral reefs and seashore habitats also exist and they are of great importance as buffers against coastal erosion. (3)  

There are also a number of coastal protected areas which cover a considerable area of the coastal zone and are under a special conservation management regime. Shipping, fisheries, the offshore industry and tourism are the most important Maritime activities of the country.  

All these resources and habitats, which are of great importance for the country’s ecosystems and economy, need proper and efficient conservation and protection measures against pollution for the benefit of the country, in particular, and others which have been sharing the use of the resources from the country’s waters as well as for the global environment sustainability.  

(2) Coastal Transport Studies Report, Moz.-vol 2/April 1989  
(3) IUCN/UNEP 1984 Annual Publication
1.4. BRIEF BACKGROUND OF SHIPPING IN MOZAMBIQUE

The geographical location of Mozambique has privileged this country in the context of sea trade compared with other neighboring nations, a situation which dates back to an era before the Portuguese colonization when the Arabs were the main trading partners in the region. The long coast of the country is also another strategic factor in relation to the neighboring land-locked countries which now are the major users of the three international ports located respectively in the north; the Port of Nacala; in the central region, the Port of Beira and in the south the Port of Maputo.

During the Portuguese colonial domination of the country, shipping was an active area in the transport sector, especially in the north and centre where the biggest agricultural fields were established. In these two regions even river navigation was used to assure the flow of the goods produced inland which could not be easily and cheaply transported by road or rail.

Portuguese shipping companies started establishing branch offices in Mozambique attracted not only by the trade in the country but also by the trade of neighboring states which uniquely moved inbound and outbound through Mozambican ports. The confidence of the Portuguese regarding their perpetual domain in Mozambique led to the adoption of practices in certain activities that sought to protect. Shipping was one of these activities.

Access to shipping knowledge by genuine Mozambicans was not open, and most of those who joined the maritime sector were limited to jobs which did not require complex skills or knowledge, such as deck crew and other similar jobs ashore. In fishing activities, the situation was slightly different although the number of skilled people was also not high, but the level of knowledge compared to other transportation areas was reasonable. The better situation in the fishing area can
be attributed to the fact that fishing has been a traditional activity with less requirements in terms of technical and scientific knowledge, allied to the major need of less skilled labour. It can also be true that the Portuguese administration did not consider fishing as an occupation of great prestige. For this reason, the policies adopted were far different from those adopted for shipping. As result, when Mozambique became independent, it did not have a single officer, even at the lowest level, serving onboard ships or ashore.

The country obtained its independence in 1975 and it had to start from scratch, setting up the most suitable organizational scheme possible. Considering the human resources factor as one of the priorities to be looked at, priority was given to training activities. As a result of this policy, in 1978 the Nautical College was started with various difficulties until 1982, when the Norwegian government agreed to provide financial support to the project. (4)

Agreements with various countries with training facilities in the field were signed and scholarships granted to a considerable number of nationals which joined the maritime sector specially for sea-going personnel. (4)

A Fisheries Training Centre was also established in the Country in 1987 oriented to basic training for fishermen and under supervision of both the State Secretariat for Fisheries and the Maritime Administration. (4) The training of fishing masters or officers for the deep sea fishing vessels is done at the Nautical College followed by specialization in the working process.

The country's fleet in the shipping area is mainly dedicated to coastal and regional shipping, serving eight national main ports, namely: Maputo, Inhambane, Beira, Chinde, Quelimane, Angoche, Nacala and Pemba, and another eight small ports which are; Vilanculos, Macuse, Pebane, Moma, Mocambique, Ibo, (4) Maritime National Directorate Records, Mozambique
Mocimboa da Praia and Palma.
In the region the ports of Dar-Es-Salam in Tanzania, Tamatave in Madagascar and Durban in South Africa are the ones most often called at. Mombassa in Kenya is another port which is also a port of call but not on an ordinary basis.
This coastal fleet is operated by the state owned shipping company NAVIQUE, which was also the only operator for coastal and regional shipping up to 1989/1990 as a result of the centralized planning system previously in place in the country and replaced by the Free Market System embodied in the new constitution which came into force in November 1990.
A large number of small craft dedicated to local traffic along the coast operate in the small ports. This traffic is important because it acts as a feeder to the major ports where cargo can easily reached by the coastal vessels and the cargo brought by the coastal vessels to the localities is also moved by this scale of traffic.
The overall shipping activity in the Country is characterized by the following sectors: (S)

**Family Sector:** This is composed of boats around 6 to 7 metres in length and with a capacity up to approximately 2 tons, mostly sailing boats, in total around 15,000 units. They are used alternately for passenger and goods transportation or fishing depending on the season.

**Light Crafts:** Boats of lengths up to 30 metres and cargo capacity up to 150 tons can be found in this category, being mostly of them built of steel but with some wooden ones. They are normally engine powered with engines up to 300 KW and it is in this category where most of the fishing fleet exists.

**Coastal Shipping:** It has been a monopoly of the state owned company NAVIQUE which operates about 14 Coastal Ships both Dry Cargo and Tankers. A new service operating in passenger

*(S) Coastal Transport Studies Report, Moz.—vol 2/April 1989*
and cargo was introduced in the last four years on an experimental basis and exploited by a daughter company of Navique named TRANSMARITIMA.

Deep Sea Fishing Vessels: These vessels predominantly operate in the range of 40 to 60 metres in length with an average tonnage of about 800 tons. The majority of the vessels are shrimp trawlers and fishing/processing plant vessels operated on a joint venture basis with foreign companies or under fishing agreements. The reason behind that may lie in the profitability of shrimp products in the international market.

International Shipping: As mentioned before, the country does not operate its own international fleet and the imports and exports of the country itself and of the neighboring countries served by Mozambican ports are carried by foreign ships.

The present status of shipping in Mozambique is not yet satisfactory and a lot has to be done. Weaknesses of a various nature are evident in the sector caused mostly by lack of enough qualified manpower, limited access to applicable modern techniques, plus other internal constraints of a political nature which influence, in a global sense, the country's economic growth.
CHAPTER II

NEED OF MARINE POLLUTION PREVENTION & RESPONSE ORGANIZATION

OVERVIEW

"For many years it was believed that the Oceans were so vast that no amount of waste which humans could generate could have other than negligible impact on them". (6)

The oceans cover approximately 70 percent of the Earth's surface and they play a very important role in maintenance of the life-support systems of the planet. They provide protein, an important element for the humans; and they also provide Transportation routes, Energy and Recreation, as well as acting as Buffers against Ecological Deterioration.

The intentional dumping of waste and other Harmful substances into the Sea, added to the effects of shipping and offshore accidents has for many years caused serious damage to the Oceans' Life and Environment by what is defined as Marine Pollution.

Most of the Marine pollutants reach the seas from land-based sources, shipping activities and other Maritime activities which involve a multitude of substances which vary in their potential harm to the marine life and environment in general. Despite the world's awareness of the harmful effects of marine pollution, it still lacks effective global prevention and control measures due to a variety of reasons. Compounding the difficulty of developing effective programs are the diversity of potential pollution sources, the diversity of conditions of a specific area or region, severe economical constraints, a sometimes hostile attitude of the industrial sector, and the limited education of the people in general towards environmental preservation and conservation.

(6) Paul L. Bishop/Marine Pollution & Its Control
If for developed countries the major problem is that of the numerous amounts of harmful waste generated from the industrial activity which is a problem to deal with, in the developing countries the lack of knowledge, technology and resources necessary to effectively address marine pollution problems are the major factors which prevent them from acting effectively for the protection of the marine environment. It is also a fact that some individuals still believe that the Oceans are so vast that there is no amount of waste capable of creating any kind of problem and, in this line of thinking, the Seas of the developing countries are seen, by some developed nations, as ideal disposal sites of harmful waste generated in developed countries. The excuse for such practice is that industrial activity in these countries does not generate any dangerous waste due to its low level of development and, if the developed countries have been generating much more waste than what they can cope with, why not dumping it in virgin Oceans. It is encouraging to know that some developed countries are very much conscious of their obligations in the global conservation of the common environment, by having established mechanisms of dealing with industrial generated waste in such a way that it poses less risk to the environment. An important element to bear in mind is that when serious environmental problems arise in developing countries the ability and capabilities necessary to face the situation are not there while in developed countries, because they possess the technology, the know-how and the resources, they may be better prepared.
2.1. DEFINITIONS AND OBJECTIVES

The International Maritime Community has taken various actions to address the Marine Pollution problems through the IMO—International Maritime Organization and other International groups by Regions or common interests, covering various areas through which the marine environment can be preserved without hampering the development and normal performance of the maritime activities.

Among the actions taken, relevance can be given to a diversity of International Cooperation Instruments (Conventions) dealing with various aspects related to the protection of the marine environment, which can be broken down as follows:


The main objective of these International instruments is to promote cooperation among the Maritime Countries in particular and the world community in general, plus the harmonization of standards in the field of Marine Pollution Prevention, Control and Combating.

Aiming the achievement of the goals described above with emphasis to the harmonization of standards which is a key element for successful cooperation, it was felt that development of common definitions in the various concepts developed in the field of Marine Pollution is needed, which also facilitates cooperation and exchange of experiences with a common interpretation of phenomena and concepts. Starting from the concept of Pollution several definitions can be found, but one of particular usefulness and perhaps the most suitable to the phenomenon is found in UNCLOS 1982.
It defines Marine Pollution as being "The introduction by man, directly or indirectly, of substances or energy to the Marine Environment, including estuaries, which results or is likely to result in such deleterious effects as harm to living resources and marine life, hazards to human health, hindrance to marine activities, including fishing and other legitimate uses of the sea, impairment of quality for use of sea water and reduction of amenities". (7) Forms of Pollution are numerous but the most known and with major impact and frequency are the following: (8)

- Accidental and Operational Oil inputs from Shipping and Offshore Oil Platforms;

- Accidental and Operational discharges of Industrial Harmful Substances from Shore Based Industries or/and When transported by sea;

- Dumping into the Sea of Waste of diverse kind from various sources (offshore & shore based);

- River runoff discharges into the Sea;

- Rain fall (pollutants in the Air);

Among the above forms of pollution to the Oceans, it can be seen that some are possible to control and others not. It can also be understood that control processes vary from place to place depending on the availability of resources, know-how, awareness and sensitivity about Environmental concerns.

The Preventive measures developed by the Maritime community, being a result of the concern on the Marine Environment degradation, were set with the objective of reducing to the (7) United Nations Convention On Law Of The Sea 1982/Art. 1-4 (8) Paul L. Bishop/Marine Pollution & Its Control
maximum possible extent the occurrence of accidents with potential possibilities of causing pollution to the sea. The achievement of good levels of Safety with great contribution to the improvement of prevention against pollution takes a large and diverse set of actions which are embodied in the various conventions, protocols, regulations and guidelines mentioned above as part of the International Maritime Community's efforts to protect and preserve the marine environment. However, their implementation in practical terms still requires more to be done, to achieve effectiveness, one of the key aspects to be taken into account is their dissemination, adoption and implementation in the global world community. A complement to pollution prevention is Pollution Response. It is a fact that preventive measures are never enough although they may employ the best practices. The most developed safety devices, with the highest standards, which have shown the best results, when tested can have failures. Marine pollution response can be regarded as an additional needed preventive concept to assure mitigating action when the ordinary safety systems fail and an accident occurs. The main idea is that while pollution prevention is intended to reduce pollution incidents to the maximum extent, pollution response and preparedness is intended to minimize the effects of pollution in cases where the incident could not be avoided. One key element can be considered as the heart of this concept - The Contingency Plan. To be aware of the possibility of accidents occurring, to be prepared to face such accidents by means of appropriate Equipment and Trained Personnel can become useless if an operational plan for action does not exist.
2.1.1. Advantages Of A Marine Pollution Prevention And Response Set Up

Despite the concept of marine pollution prevention having been developed and applied to a great extent in most of the maritime nations around the world, especially in those with a large involvement in the shipping trade, it can still be found that in some other countries such practice is far behind the minimum of its required application, resulting in abandonment of marine environmental problems.

As mentioned previously, in the developing countries the major barrier is lack of awareness about environmental protection importance and the consequences of degradation. Unfortunately, that is the case in Mozambique, my home country.

In most maritime administrations in the maritime nations, it is common to find organizational schemes which cover almost all the key areas related to maritime activities with the necessary emergency arrangements, particularly those related to Safety of Life at Sea, such as:- Search and Rescue and Fire Fighting.

Some MARAD organizations also include a department or section responsible for marine pollution matters, but often their work is limited to the development or drafting of regulations related to the field which, most of the time are passed through the country's legislative body and then forgotten, and very little is done in practical terms to enhance the pollution prevention and/or pollution fighting mechanisms. That is the practice in Mozambique, and also the case of some individuals who manage to find a way of persuading the leadership to give clearance for some actions to be taken, but most of the time, those actions do not have continuity due to a defective organizational arrangement. A marine pollution prevention and response set up is a must for any country with a sea coast, even if its imports of oil products and other dangerous substances are seemingly insignificant.
and, because an accident from a neighboring country or from shipping transiting in the region can result in a pollution case.

There is a consensus amongst writers concerned with marine pollution that the principle of prevention of pollution incidents is the essence of marine environment protection programs. The principle is well supported and easily agreed with because in most fields where the consequences of an accident are grave, prevention has proved to be safe and more cost effective than remedy.

In this regard, establishment of an organization responsible for marine pollution prevention and response is of great importance, as it offers and generally translates into a number of advantages, such as:

- Getting the users of the sea to understand that the protection of the marine environment is a challenge to be shared by the entire maritime community;

- Getting the same users to understand that by protecting the environment of the sea, the profitability derived from it will last much longer;

- Legislation and related marine environmental protective regulations become effective when a responsible body exists to offer enforcement;

- Assuring that all development programs related to the maritime area incorporate an environmental impact assessment component that addresses effective preventive measures;

- Opening possibilities for cooperation with similar organizations at regional and global international levels in matters related to the field, a vital component for the improvement of methods, attainment of assistance both for daily operations and in emergency situations;
- Establishing contacts with relevant institutions regarding technological advances and transfer, training of staff, and gathering information about on-going activities in relation to fields around the world;

- Facilitating communications with the decision makers which ensure preparedness in case of marine pollution incidents, an essential element in the response concept.

It is a known fact that, no matter what field, anything which is to be done in the form of a task, if an organizational set up is not in place the attempt will lead nowhere, which in other words means that a start point of a serious activity is the establishment of the working mechanism which enables one to define the objectives, the timing, the resources needed and the follow up or assessment system.
2.2. TODAY'S SITUATION IN MOZAMBIQUE

The coastline of Mozambique is about 2,700 kms with a coastal zone ecologically sensitive where estuaries, beach and coral reefs provide major habitats for plants and animals. This coastal zone is today under threat from pollution, both sea and land-based, due to an increase in maritime activities and rapid growth of population concentration along the coast. While shipping activity is of great importance to the country's economy, it also represents a potential threat to the marine and coastal environment, particularly when the activity is carried out without the necessary applicable and protective measures concerning prevention against pollution. Risk surveillance of the coastal waters and control of the exploitation of marine and coastal resources are tasks which require establishment of a state of readiness by means of an adequate marine environmental protection organizational arrangement which today does not exist in the country.

The coastal zone is characterized by a variety of ecosystems and habitats of valuable species, marine and coastal protected areas which merit an immediate conservation action, again not in place at the present moment.

The country possesses the following Marine and Coastal protected areas: (9)

Marine Protected Areas

- **BAZARUTO National Park**
  Principal interests: -Turtles, Dungongs, Coral Reefs;

- **INHACA ISLANDS and PORTUGUESE Marine Reserve**
  Principal interests: -Coral Reefs, Seagrass Beds, Mangroves, Turtles, Dungongs and Dunes;

(9) IUCN/UNEP Pamfllet, 1984
Coastal Protected Areas

-INHACA ISLANDS and PORTUGUESE Land Reserve
Principal interests: Dunes, Dunes Forests, Coastal Shrubland;

-MARROMEU Special Reserve
Principal interests: Zambezi River Delta and Associated Habitats, Mangroves, Coastal Grassland;

-POMENE Reserve
Principal interests: Estuary, Mangroves, Dungongs, Turtles, Dunes, Dune Forest, Coastal Grassland;

-MAPUTO Special Reserve
Principal interests: Brackish Lagoons, Salinas, Dunes, Turtles, Mangroves, Dune Forest, Swamp Forest;

-BAIXO PINDA Forest Reserve
Principal interests: Maritime Forest.

The management of the coastal protected areas have been the subject of some attention probably because of being land based, which makes access easier compared to the marine protected areas where very little or almost nothing has been done.

The deltas of the main rivers along the coast are generally sensitive areas with great importance in the development of fisheries resources, particularly shrimp, crabs, lobsters and other Cretaceous species. These species have been practically abandoned to their own luck concerning protection against pollution when considering the present legal and regulatory framework in that sphere, which is weak and merely formal.

The fisheries sector, although its set up includes a
Fisheries Inspection Department, the work done in operational terms is insignificant and the few cases of fishing regulation violation detected have been a result of occasional checks mostly by the MARAD side.

The existing maritime policy makes a very superficial reference to the marine environment protection aspects which can be interpreted as an indicator of the degree of concern by the authorities in environmental issues.

It is true that the overall maritime legislation actually in place in the country needs to be updated, but comparatively the marine environmental area is the one requiring an urgent response in legislative terms, due to the risky situation of the marine environment in Mozambique.

Some studies regarding shipping development have been carried out including environmental references, but they have been more concentrated in shipping and also the few references made in these studies have never been subject to an attempt at putting them together for a possible practical application. There are no regulations addressing the control of oily mixtures discharged from ships; the ports are not provided with reception facilities for the discharge of tank washings, ballasting mixtures and other contaminated water. The urban centres along the coast do not have treatment sewage plants and the sewage is directly discharged into the sea without any control.

The majority of the river beds in the country are ideal for agricultural activity. Chemical products used as fertilizers end up in the rivers and are consequently discharged at sea as part of river runoff; again there are no control mechanisms in place to prevent such practices.

The industrial activity, while not highly developed, also contributes with an input of chemicals, especially from river beds, due to their association with agricultural activities. Two main reasons lie behind the above enumerated prejudicial practices to the environment. One is the already mentioned problem connected to the inadequate legislation.
regarding the protection of the marine environment. The existing legislation dates back to the colonial period (10) and is limited to an enunciation of general principles which should have been supported by detailed operational regulations. However these were never drawn up, even though the task was assigned to MARAD according to the decree. The second reason is related to lack of awareness and sensibility in the country about the consequences which can result from environmental degradation.

However, it is clear that a coastal country like Mozambique, with a long coast and a large number of big rivers where shipping is an integral part of the nation's economy, cannot keep on ignoring environmental problems; the need to actively address the protection of the marine environment is urgent. The level of the threat to the marine and coastal resources, which does not result solely from internal sources, (the traffic in the Mozambique Channel represents a potential threat) is high.

If pollution prevention measures are not urgently developed and put in place, the country may face catastrophic, longlasting pollution problems in the future.

2.3. MARINE POLLUTION PROBLEMS, PAST AND PRESENT

In the history of shipping, Mozambique has not faced pollution problems of large impact. An assumption could be made that for this reason pollution prevention matters have never been seriously addressed.

There have been some oil discharges from ships engaged in tank washing or deballasting in the Mozambique Channel. These have reached the coast but without serious consequences being reported. A few pollution threats arose from accidents that occurred in South African waters having the possibility to reach the Mozambican coast. While these has been reported in the past, serious problems or consequences were not identified.

In the shipping sphere there were no records of serious oil spills or other kinds of pollution from accidents, until April this year (1992) when a Greek tanker ran aground to the south of the Mozambican coast, with 66,000 (sixty six thousands) tons of heavy fuel oil cargo. (11)

The ship, named "KATINA P", spilled around 150 tons of oil just after the grounding and more oil came out of the ship's tanks a few days later when it sank after breaking up into two parts. At the time the ship sank, the amount of slicked oil was of about 2,000 tons with more oil expected to come out, as the attempted transfer of the cargo from it into another tanker failed to be executed because "KATINA P" sank before the area chosen for such operation was reached (12).

The spill seriously affected the following areas in the Maputo Bay and surroundings: contamination of the beaches, mangrove forests in the estuaries of Incomati and Maputo rivers with more damage reported in relation to Incomati; shrimp habitats in the Maputo Bay; to a lesser degree, the overall fishing activity in the Maputo Bay and surroundings.

In two of the three major ports (Maputo and Beira) there are ship repair facilities which have created some pollution problems which can be associated with shipping activity, with oil, oil mixtures and removed materials from ship hull shot blasting being the principal pollutants. Municipal waste, particularly urban sewage, can be considered as being one of the major pollution sources, especially if it is recognized that the majority of the country's urban centres are located in the coastal area.

The sewage and other kind of wastes from these urban areas is discharged into the sea without treatment due to the non-existence of sewage/garbage treatment facilities. Until the last ten or fifteen years it has been possible to live with such a situation, but more recently health problems have occurred which are probably related to the free discharge of untreated sewage into the sea. It is believed that diseases have been contracted through bathing near the beaches, and from fishing product consumption.

The conclusion is that something has to be done. In certain areas near river mouths after heavy rains, fish species have disappeared for some time, in other cases dead fish have been seen. Even without scientific tests to determine the exact cause of the phenomenon, an association with river runoff flow was made. In the south, where most of the cases occurred and where the rivers flow from neighboring South Africa with rather developed industries, an association with discharge of harmful substances in the rivers from the South African side might have contributed to the death of the fish when such substances reached Mozambican seas.
2.4. POTENTIAL SOURCES OF MARINE POLLUTION

It can be surprising to speak about potential marine pollution sources in a country like Mozambique with a very small fleet, undeveloped industry both onshore and offshore, but the fact is that the country does have pollution problems, which if not properly addressed may be of serious consequences in the near future.

If the present potential pollution sources are of great concern, the future trends are of greater concern because of the perspective of an active offshore industry, development of shipping activity and domestic shore based industry, all large generators of pollution in the sea.

2.4.1. Pollution From Shipping

As mentioned before Mozambique possesses a very small fleet with the major part of it dedicated to fishing activities. The transport sector is dominated by coastal domestic shipping with the state owned shipping company NAVIQUE as the operator of the cargo fleet. A daughter company of Navique, TRANSMARITIMA, started operating passenger coastal ships some five years ago with chartered ships on an experimental basis. Small shipowners exist along the coast operating local traffic vessels within the group of small and light craft and their significance in terms of pollution is not to be considered as a large contributor, although some of the vessels are engine powered.

The major polluters are the coastal vessels, fishing vessels, the ships from international traffic calling at Mozambican ports and the activities related to shipping, such as ship repair activity, oil handling and storage with their pumping and piping systems.

Considering various polluting substances in the shipping sphere, oil is the most predominant. Most of the oil finds its way into the sea discharged in the form of oil mixtures.
generated from ships' machinery spaces, tank washing, deballasting operations and leaks from bunkering installations. In addition to that, pollution from shipping accidents and ruptures in oil pipelines or ordinary distribution pipes have to be considered, which in most cases are of major proportions in terms of effects. Garbage from ships and dangerous substances carried onboard, which are an insignificant amount, are other pollutants to take into account.

2.4.2. Municipal Waste

The geographical location of Mozambique with its long coast and tremendous economic potential in the coastal area has built up a large population concentration in that area. The distribution of urban centres in the country is a live example of the above statement; eight cities and fourteen villages are along the coast. The urban sewage of all these urban centres is discharged into the ocean as it is generated, meaning that no treatment process is carried out before the sewage reaches the sea.

These discharges are through an installed piping system which was designed in a period when environmental concerns were not seriously taken into account in urban planning and also the concept of vast seas able to take any amount of waste at the time might have supported the design philosophy. Furthermore the population of these urban centres was less than half of today's figures, which is also a point to consider in quantitative terms of the amount of generated sewage. Deliberate dumping of garbage, barbecuing and feasting in the beaches or surrounding areas takes a large amount of garbage which keeps on growing each and every day with no care at all.

Processing industries established in the urban centres contribute with a portion of municipal polluting substances, which in most cases get mixed with the ordinary urban sewage
mainly due to lack of rules about the disposal procedures of this industrial waste.

2.4.3. Agricultural Pollution Source

The agricultural sector in the country is relatively organized. When a serious situation arises in this sector, in most cases action is taken to address it. The river beds in most of the major rivers of the country are ideal for agriculture and the best crops in the country are from such areas. Marine pollution from agricultural activities occurs through water streams which collect the pollutants onshore and bring them into the sea. The main pollutants from this source are chemical products used as fertilizers and they end up in the water streams because of the irrigation diversion of the streams which get back to the main stream by many different ways.

It is certain that if the maritime sector approaches the agricultural sector with the purpose of working together in the control of the pollution of rivers, which would help to prevent marine pollution from agricultural, there would be a positive response from the agriculture sector and something could be done.
2.5. CHRONIC POLLUTION SOURCES

Pollution originating from this category may not be of significant impact in the short term, but it is to be seriously considered from a long term perspective. It is one of the most difficult kinds of pollution to deal with because of difficult detection. If scientific methods are not applied to its control, very few possibilities are offered for any action towards its effective monitoring.

In the case of Mozambique, two kinds of chronic pollution can be considered: river runoff and precipitation.

Mozambique has a considerable number of rivers and some stretching for long distances from other countries, crossing Mozambique and ending in the sea. River runoff with various kinds of inputs can be a serious pollution problem if control and monitoring activities are taking place.

In the control aspects of chronic pollution sources, while river runoff can be controlled, the same does not happen with precipitation, the reason why it cannot be considered in operational terms for the situation of Mozambique. Concerning the relevant chronic pollution source, (River Runoff), some considerations are made in the previous section (2.4.3.), which deals with pollution problems from agricultural sources.
CHAPTER III

A MARINE POLLUTION PREVENTION AND RESPONSE ORGANIZATIONAL SET UP

OVERVIEW

Each country has a global socio-economic development policy from which sectorial policies are developed based on the objectives assigned to respective ministries, in such a way that the areas of major importance or defined as priorities are given the necessary and appropriate attention. The sectorial policies containing the guidelines for a sector’s objectives influence the organizational arrangement of the sector, with a view to making it suitable for the goals to be achieved.

Thus, an organization’s existence is dictated by the set of objectives which require an executing or implementing body, thus an organizational set up is needed. In this line of thinking, the outline or design of an organizational structure of an agency or any other executive body has to have its roots in the established objectives. The objectives are defined based on the problems in the sector in question. In addition, definitions of other important factors such as: the organization’s functions and scope of activity, manning in its various aspects, operational means both hardware and software, and also the essential legislative and regulatory mechanisms is required. It can also generally be said that if certain issues do not form part of the agenda of priorities of the country’s government, they are most of the time neglected.
3.1. ORGANIZATIONAL STRUCTURE

The Maritime Administration in Mozambique is organized under the Ministry of Transport and Communications, which is also in charge of the Ports and Railways, Road Transport, Civil Aviation, Telecommunications, Post and Meteorology. Defined as a strategic transport sector due to security problems in the country, the present level of development of maritime industry in Mozambique does not reflect the attributed definition. The limited attention to the sector particularly during the first five years after the country’s independence can be one of a number of reasons. This situation has led to a rather slow and oscillating development of the maritime sector in comparison with other sectors. This is reflected in the various activities defined for the maritime sector and particularly noticeable in the level of manpower development. Obviously, progress is very limited in the absence of a qualified labour force. In organizational terms, the main areas of activity of the Mozambican MARAD are as follows (see annex 3) : (13)

- Administration Inspection,
- Maritime Safety Administration,
- Shipping & Inland Transport,
- Maritime Personnel, and
- Planning and Budget.

In addition to the above central departments, there are three autonomous agencies within MARAD, namely:

- The National Institute of Hydrography & Navigation,
- The Nautical School, and
- The Maritime Improvements Brigade,

(13) National Maritime Directorate/Internal regulations,
Mozambique, 1990
MARAD has twenty three local offices along the coast of which ten are level "A" and the other thirteen are grouped in two lower levels "B" and "C". These local offices are the maritime authorities in their areas of jurisdiction and they report to the local government through the Provincial Directorate of Transport and Communications. They also perform in their areas the activities assigned to them by MARAD head office to which they also report. The Maritime Safety Administration Department is the most important and most active area within the administration. It is composed of three sections: Inspection of Ships, Registration of Ships and Search and Rescue. Marine environmental matters are dealt with by the Search and Rescue section, the least active section of the department.

The environment, today, is a concern for most of the world community and the trend is for it to become of global world concern. This makes it increasingly important for a country like Mozambique to step out from its spectator’s position and include environmental issues in its agenda of priorities. In the case of the Maritime sector, changes in its organizational structure are deemed urgently necessary so the marine environment can be protected from pollution, assuring a positive prospective future. The changes can take place in a three stage schedule as follows:

Stage I:
Create a Marine Pollution Prevention and Response Section accommodated within the Maritime Safety Administration Department, organized in three sub-sections for pollution prevention, pollution response and research and information. The first sub-section should deal with regulatory and legislative promulgation, as well as implementation and monitoring of the applicable laws and regulations. The second should concentrate on the practical or operational
aspects, such as pollution combating, environment restoration and recovery activities and other practical related tasks. The third and last subsection should serve as the scientific branch of the organization, gathering information, and providing monitoring, processing and management functions. The proposed Maritime Safety Administration department organizational diagram is shown in annex 4. The above stage would require a minimum of two years from its establishment before the following stage could start.

-Stage II:

Conversion of Marine Pollution Prevention and Response Section into a department, with the respective sub-sections also being upgraded to sections. Establishment of two working units under Research and Information, namely, a marine laboratory and a computerized Data Processing Unit. Establishment of regional working teams or units along the country's coast, as a move towards a national global organizational establishment. The proposed organizational structure for this stage is shown in annex 5. The time schedule for the implementation stage is estimated to be a minimum of four years, which can be extended if so required on the assumption that major organizational activities, training of staff and implementation of possible cooperation programs will commence during this stage.
Stage III:

This stage, which could be entitled the "settlement stage", should be dedicated to the consolidation of the achievements made during the two previous stages. That is, the organization should be established throughout the country, strengthening connections with international counterparts and assuming the global command and control of the environmental pollution prevention and response network. During this stage it is anticipated that substantial work with the internationally agreed instruments (conventions and similar agreements) is to take place, as well as an active participation in global and regional marine environment related events/activities.
3.2. FUNCTIONS AND RESPONSIBILITIES

An individual with an assigned task needs to know what the task is about, so that abilities and capabilities can be assessed based on task requirements. In an organization where individuals with diverse social, educational and cultural backgrounds must work together, the definition of the task is essential. Without this, one risks an end result of total chaos.

The functions and responsibilities of an organization can be described as the guidelines for an organization’s work. In essence they define the magnitude and scope of the work. For a marine pollution prevention and response organization, the functions can be listed as follows: (14)

- Exercise the statutory powers given by law, pertaining to marine pollution prevention and response matters;

- Superintend and coordinate marine pollution prevention and response activities, as statutorily mandated;

- Conduct inquiries and investigations into pollution accidents in coordination and cooperation with other related and/or concerned entities;

- Deal with prevention, control and combat of marine pollution;

- Advise in the formulation of Maritime Policy, in the specific issues related to marine pollution prevention and response;

- Draft national legislation and regulations on marine pollution prevention and response;

(14)Maritime Administration lectures by prof. P.S. Vanchiswar

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-Advise on the country’s participation in international relevant events pertaining to marine environmental protection;

In the sphere of responsibilities, the following can be listed:

-Implement marine pollution prevention and response policy aspects, as part of global maritime policy implementation;

-Ensure the application and enforcement of national laws and regulations on marine pollution prevention and response;

-Coordinate marine pollution prevention and control activities as well as combating operations;

-Manage marine and coastal protected areas and propose new designated areas where and when deemed necessary;

-Participate in global/regional international activities and events concerning marine pollution prevention and response, aimed at the improvement and efficacy of applicable measures for the country;

-Develop and implement plans and programs for the training of staff.
3.3. LEGISLATIVE CONSIDERATIONS

As mentioned in previous chapters, the absence of effective and updated maritime legislation in Mozambique is one of the major problems of the maritime sector, and marine environment protection is not an obvious exception. The legislation actually in force for the maritime sector dates back to the colonial period. Some decrees have been promulgated after the country's independence, but are of minor importance as active legal instruments. The consequences of non-existence of solid legal instruments to deal with complex maritime activities are varied. The most relevant are the following:

- Deficient exercise of the statutory powers by the Maritime Administration in Safety of Navigation and Life at Sea, Marine Pollution Prevention and other related matters;

- Deficient implementation of government policies, targeted for the maritime industry, due to lack of the necessary support of an effective legal regime;

- Lack of efficient legal back-up for management and control of the country's marine resources in its Exclusive Economic Zone;

- Ineffective participation in international maritime developments which results in minimal application of international legal standards.

Some attempts to update maritime legislation have been made, but have been unsuccessful due to inadequate manpower qualified in legal matters. It also a fact that Mozambique has not been using fully and effectively opportunities for cooperation offered by international organizations. This situation is a result of organizational weaknesses,
improper allocation of resources and improvisation. The development of the maritime activity depends heavily on legislation, which gives guidance and power to assigned officials to surely perform their tasks. Effective legislation is equally important for industry to clearly know the legal boundaries of their activities.

3.4. FUNDING MECHANISMS

In developing countries one of the major problems in addressing marine pollution issues is the financial component which is essential in any activity. It is easy to understand that in countries with problems like starvation, epidemics, droughts and floods the government's attention tends to be absorbed by the above if compared to issues like marine environmental protection. Therefore, when decisions are made in budget allocation, priority is given to the basic social problems and relevant development programs with the consequent sacrifice of other areas. Because the other areas have problems, there is a need to look for alternative funding solutions in an attempt to prevent additional problems that could arise due to complete negligence in adopting preventive measures for cases such as the marine environment.

3.4.1. Day to Day Operation

For the ordinary functioning of the organization, some accommodation in the state budget allocation needs to be made for the maritime sector for the coverage of expenses, such as personnel salaries and basic working expenses. It may be questioned how the government can raise such funds, given the financial constraints already mentioned and the large number of basic problems which must solved. The experience of Portugal may not be ideal, but it has proved to work in practical terms.
In Portugal, environmental matters are the responsibility of various organs, with a coordinating body which is the Ministry of Environment and Natural Resources. For the marine environment, the Navy is globally in charge while the harbour and port areas are under the responsibility of the respective Port Administrations.

The Port of Sines seems to be the best example of a Port Administration dealing seriously with pollution prevention and response. In that port, the marine pollution prevention and response funding mechanism is arranged as follows: (15)

- The Port Administration assigns a budget to the Security Department which deals with pollution prevention and combating;

- The Port Administration derives income from collection of fines applicable to polluters, services and expertise rendered to other entities, and these funds are then allocated to pollution prevention activities;

- In appliance of the principle "Polluter Pays", all clean up expenses resulting from a pollution accident are covered by the polluter;

The arrangement described above appears to have applications in Mozambique, with some modifications in administrative details of a practical nature.

It would require development of appropriate regulations and an organizational set up which can ensure its effective implementation. Some of the modifications would include the appliance of the system not only by the port administrations but also by the national globally responsible body. In addition, the funds collected from fines to polluters, services and any other

(15) Port of Sines Security Rules & Instructions for Naviga...
legally collected income now channelled to the public treasury require subsequent allocation to the annual budget for marine pollution prevention and response.

3.4.2. Emergency Situations

As in most countries, the government's budget has an allocation of a sum designated for national emergencies or disasters. This is practiced in Mozambique. For the particular case of developing countries, among which Mozambique must be counted, the above mentioned emergency allocation sum is insignificant and consequently unable to even provide for the situations to which it is allocated. Therefore, international assistance has been the most reliable solution in the case of emergencies. During the oil spill which occurred recently along the Mozambican coast (April 1992), input in assistance was seen from the international community, a major contribution to the national sources. For accidents which are not of the magnitude of a national disaster, the use of the government's budget for emergencies does not apply, therefore other solutions have to be adopted. The Greek approach through HELMEPA (Hellenic Marine Environment Protection Association) in addressing marine environmental protection matters appears to be one of the most efficacious among many that have been examined. It provides an approach with good possibilities for effective application and the prospects for good results in Mozambique, even if shipping is not yet a strong activity in the country. The HELMEPA approach of acting as a "non-profit" organization allows the generation of financial resources from membership fees, contributions from individuals and organizations on a voluntary basis. The activities of major concern which benefit from its funding resources are public awareness campaigns, beach clean up initiatives, emergency pollution response actions and

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environmental recovery programs. (16) Another possible funding system which may be applicable for Mozambique is the adoption of the "Polluter Pays" principle, which states that "Shipowners and Operators responsible for Oil Spills are deemed jointly and severally, liable for meeting all removal costs". (17) A modification in the appliance of the above concept can be considered by means of enlarging its scope in pollution sources, by making it applicable to pollution by potential sources instead of being limited only to actual Oil Spills.

3.4.3. Research Projects

For a nation on its first steps of setting up an environmental organization, research programs are of great importance. They are needed to define appropriate preventive measures, technical solutions or methods of work, choice of removal and clean-up means and techniques. They are particularly beneficial in evaluating potential clean-up procedures to avoid the use of products and methods which may have short run benefits, but may cause significant environmental disturbances and harmful effects in the long term.

Once more, the problem in implementing a program is strongly dependent on the availability of financial resources, especially since research activities normally imply high costs. For developing countries this high cost frequently precludes the ability to carry out such activities. Therefore, the scientific activities associated with marine investigation, establishment of investigation facilities, management of marine and coastal protected areas, pollution monitoring and control have to be accommodated in specific projects with funding solutions from cooperative programs.

(16) HELMEPA Annual Report, 1990
(17) USA OPA 90; Title I-Section 1008
There are positive prospects of obtaining such financial assistance if the projects are developed in a serious and comprehensive way. In Mozambique, fisheries represent a strong segment of the economic sector, particularly as an earner of foreign exchange for the country. A financial contribution from this sector, to support marine research programs, is most certainly in the country's best interest.

3.5. MANNING

The human element is a key factor in any activity. In developed countries the most common problems related to manpower have their origin in the cost of labour rather than in the availability of qualified labour. In developing countries the major constraint is the scarcity of qualified manpower. Quantity and cost could be considered an asset. The manning of an organization requires selection of personnel with the right qualifications, appropriate abilities and motivation as basic parameters. In Mozambique, as in other developing countries, the manning of a maritime organization is a complex issue. In the specific case of Mozambique, the maritime sector has limited qualified manpower which creates problems such as: poor quality of the sector's work, scarce recruitment sources, weak training inputs due to low level of development of the sector's activity, and scarce alternative recruitment solutions (foreign labour) due to financial constraints among others. The problems faced by the country in the manpower sphere cannot be taken as an excuse for passive attitudes, instead, efforts must be made to minimize the negative impact of such problems.
3.5.1. Recruitment Sources

As pointed out above, qualified manpower scarcity in the Mozambican maritime industry is a major problem, and equally or more difficult will be the problem to find personnel qualified for the manning of a marine pollution and response organization. The Maritime Administration departments and dependent institutions, shipping companies, port administrations, the Navy, Nautical Sports Association or clubs, fishing companies and related institutions, maritime training institutions are the ideal areas of recruitment where personnel with a maritime background or at least notions can be found. The point is will these sources be willing to release some of their personnel for their assignment in an environmental organization? The answer is difficult to predict. Other sources of recruitment to consider are those without direct links with the sea, such as the ordinary educational institutions (high schools, technical colleges, the university), oil companies operating in the country, offshore industry related companies, ministries like Justice, Foreign Affairs, Mineral Resources, Public Works and Health. Personnel recruited from most of these sources would require training not only in pollution prevention matters, but also in basic notions of the working environment and maritime activities. Technical assistance within cooperative programs is another important source with a particular advantage of enhancement of work quality by foreign qualified labour input.

3.5.2. Training

As stated in section 3.1., progress is limited in the absence of qualified manpower. This makes training a very important element in any organization because it is through training that personnel qualifications are upgraded to the required
standards. If a look is taken at the latest developments in the world in regard to training, continuous improvements can be found in the methods, techniques and facilities. Training became an essential element also for highly qualified people as a result of fast development in technology, implying changes in working methods, philosophies and concepts, which require constant knowledge updating and diversification. For an activity like pollution prevention in the case of Mozambique, four types of training are to be considered. The first type can be defined as basic training to be designed for personnel without any notion of marine environmental matters. The second type is that to be designed for groups of personnel having a basic knowledge of the activities or for personnel who will specialize in specific areas such as the scientific activities. The third type is that designed as part of the maritime training curriculum for seafarers, (18) and the fourth type is that designed for specialized information and/or updating in the form of seminars, conferences and workshops. (18)

Coming to the implementation aspects, the first type of training, which requires specific facilities and equipment, can be carried out in cooperation with other countries having training facilities and capabilities in place as a starting point. A later development would provide for organizing the same courses inside the country. For the second type, the training can be carried out on a day-by-day working basis in the country, by applying the "on-the-job training" method, and also abroad as well in courses promoted within cooperation programs or by specialized training institutions. The method to be adopted for the third type of training can be based on more participation in seminars, conferences, workshops and other similar events related to the activity.
It must be noted that shipping companies, the fisheries, port administrations, shiprepair yards, oil companies, offshore industry operators, the Navy, tourism and other players in the country's maritime activity must all be involved if success is expected.

Another measure which would enhance the country's training capabilities would be to have the maritime specialized training institutions not limiting their action to seafarers, but extending it to other maritime personnel who can benefit highly from training in such institutions, and in important matters related to shipping, which is the case of the Marine Pollution Prevention and Response.
3.6. INTERNATIONAL COOPERATION

Cooperation, in its literal sense, means to work or act together for a common purpose and for mutual benefit. The differences in levels of development have brought changes in the practical application of that concept, as the less developed world cannot offer what the developed world is able to offer on an equal basis. Therefore, the genuine appliance of cooperation has been facing serious difficulties, and a great deal of questioning.

Taking its original spirit, international cooperation can be in bilateral or multilateral forms. When dealing with issues like the environment, cooperation is an essential tool, as a threat to the environment in a single country can most likely become a threat to other countries. It is also essential because the harm to the environment has no boundaries.

In the specific case of the marine environment, IMD has been encouraging cooperation in various forms, developing recommendations on the best possible ways of effective cooperation and providing assistance where and when necessary and possible.

The OPRC convention 1990 of IMD is an example among others, in which cooperation aspects in pollution prevention and response are emphasized. Article 7.1 of the convention states that "Parties agree that, subject to their capabilities and availability of relevant resources, they will cooperate and provide advisory services, technical support and equipment for the purpose of responding to an oil pollution incident, when the severity of such incident so justifies, upon the request of any Party affected or likely to be affected." Mozambique is a member of IMD and that membership incurs responsibilities for the country, but it also opens the possibility of benefits from the cooperation mechanisms offered by the organization.
3.6.1. Global Level

The UN has created specialized agencies in various fields as a way of fostering global cooperation among nations. Dealing with environmental issues in global terms UNEP (United Nations Environment Programme) exists, and for the marine environment, IMO through the MEPC (Marine Environment Protection Committee). To ensure that fruitful work is carried out by a marine pollution prevention and response organization, a country is wise to access as much as may be possible from the cooperative benefits which are offered by the international community. This can only be achieved by means of more active and effective participation in the international marine pollution prevention and response activities. This is what is required for Mozambique to do:

- Create a strong base in the start up of a marine pollution prevention and response organization;

- Access the best applicable standards in the field;

- Maintain contact and close links with the world maritime community, aimed at the improvement of applicable standards in environmental activities; and

- Improve the knowledge and skills of the national workforce by exchanging experiences with counterparts from other countries.

Cooperation with other organizations outside the UN system, which are actively involved in marine environmental matters, is to be considered. Examples of organizations include: the International Ocean Institute, the Intergovernmental Oceanographic Commission (of UNESCO), and the International Centre for Ocean Development.
3.6.2. Regional Level

The nature of marine environment problems, characterized by difficult control, particularly in emergency situations, requires combined efforts and joint use of resources so that harm to the environment can be mitigated. Regional cooperation in environmental issues has been encouraged and has proved to be effective; no wonder it has been widely applied in most regions of the world. There are a number of examples of marine environmental protection regional cooperation in both bilateral and multilateral forms: the Canada/USA Agreement 1973 (19), Caribbean/USA agreement (19), Convention for the Protection of the Mediterranean Sea against Pollution-Barcelona 1976 (20), Convention for the Co-operation in the Protection and Development of the Marine and Coastal Environment of West, and Central African Region, Abidjan 1981 (20), among many others.

The geographical location of Mozambique in relation to the sea is economically strategic but highly threatened by marine pollution, particularly from shipping. Neighboring countries along the coastal side are the Republic of Tanzania in the north, South Africa in the south and Madagascar and the Comoros Islands on seaward side. This group of countries are the ideal partners for cooperation with Mozambique in environmental matters, particularly targeting pollution prevention, control and response aspects.

Bilateral agreements, especially with countries sharing borders with Mozambique (Tanzania and South Africa), in pollution prevention and combating activities are of great importance. In the case of a pollution incident which reaches the shoreline along the border areas shared with

(19) USA Oil Spill Contingency Planning, Report To The President, October 1980/pg. 31
(20) CILPAN Record of Marine Environment Protection Agreements
these two countries, clean-up operations can be easily carried out along those areas without the risk of raising conflicts of boundary violation. It can also provide a coordinated scheme for monitoring and controlling pollution incidents which may occur in the surroundings of the boundary areas. On-going regional cooperation actions in which Mozambique is participating must be given more support and the advantages of such actions derived as much as possible. As an example, the "Maritime Safety Support for SADCC (Southern Africa Development & Cooperation Commission) Countries" project can be mentioned. The project, funded by Norway and with IMO as the Executive Agency, is aiming to provide the SATCC (Technical Unit on Transport and Communications of SADCC) and the SADCC countries' maritime administrations with field-based technical advice on duties, responsibilities and functions of maritime safety administration, and to assist them in the analysis, adoption and implementation of global maritime regulations and standards incorporated in IMO conventions, codes and recommendations on Maritime Safety, Marine Pollution Prevention and Response, and related aspects of Shipping and Ports. The expected end of the project is that policy and regulatory obstacles in the region will have been identified, maritime safety strategy clearly defined, appropriate institutional frameworks elaborated, and Human and Financial requirements identified, so that policy-making capacity and institutional frameworks to adopt and implement international regulations and standards in the Maritime field can be strengthened. (21)

(21) Maritime Safety Support for SADCC Countries project;
Project No. SADCC/NOR/IMO/01, 1992
CHAPTER IV

A PROPOSAL FOR CONTINGENCY PLANNING USING "MAPUTO PORT" AS MODEL EXAMPLE OF AN IN-HOUSE APPROACH

GENERAL

The contingency planning concept, has been a common practice for some time, providing a logical, methodical approach for response to a variety of emergency situations. It has not been extensively applied for marine environment pollution response until a number of developed countries adapted the concept for their pollution response schemes.

The USA, one of the pioneer nations in the adoption of national contingency planning for addressing marine pollution incidents, established its first NCP in 1968 and promulgated it as a Federal Regulation in 1973. (22)

The introduction of the Contingency Planning concept into the IMO global cooperation for marine pollution response was made with the adoption of the OPRC Convention 1990 (Oil Pollution Preparedness and Response), in which most contingency planning concepts are incorporated.

The application of the concept by maritime nations holds a number of distinct advantages for marine pollution response, the most relevant being:

a) Organization of government or country resources to effectively respond to Marine Pollution Incidents;

b) Establishment of a strategy for emergency response to marine pollution, both ashore and at sea;

c) Creation of national cooperation mechanisms among various (22) The National Response Team/USA, Annual Rep.—NCP 91, pg.4
agencies concerned with the protection of the marine environment, by joining efforts and resources for a rational use;

d) Creation of stocks of equipment and materials necessary to respond to marine pollution incidents;

e) Fostering regional cooperation in marine pollution response by means of Regional Agreements and joint contingency plans;

f) Establishment of national and regional training arrangements in marine pollution response, aimed at personnel readiness and standardization of pollution combating procedures, methods and techniques.

As mentioned in the concept's objectives, contingency plans are applicable at national and regional levels and with a trend toward applicability at the Global level.

Contingency plans also find applicability on board ships, in offshore oil/gas installations, ports and in industrial installations involved with activities which pose a threat to the marine environment.

In this Chapter, a Port is chosen as a model of a contingency planning application in Mozambique. The reasons for such approach are:

-Mozambique is now in the phase of putting together ideas in how to address marine environmental problems;

-the country possesses a very long coast, but is not capable financially of implementing pollution preventive and response measures on a large scale;

-the ports are the most relevant points of origin of pollution incidents, thus, deserving special attention and
priority in the establishment of marine pollution combating mechanisms;

-the limitations in other resources, such as qualified manpower, represent additional major constraints.

The intent is to build up a model, experiment with its application in one of the ports and use the experimental process to make the necessary adjustments and corrections that will bring the model up to the desired standard. Afterwards, implementation in other ports and working units can take place with adjustments according to each Port’s specific conditions, culminating in the establishment of a National Contingency Plan. The Port of Maputo is chosen due to its location in the Capital City and status as the major Mozambican port. In Maputo there is relatively easy access to information, resources and skilled personnel. Furthermore, the decision makers are also located here in the country’s main city.
4.1. PURPOSE AND SCOPE OF PLAN

The Port of Maputo is located in the Bay of the same name, (with three rivers, Incomati, Matola and Maputo, running into the Bay) in the south of Mozambique. (See annex 10) It is a multi-purpose port composed of general cargo berths, a container terminal, specialized steel terminal, fruit terminal, bulk coal terminal, oil terminal, passenger terminal, fishing port, navy base and nautical sports facilities. (See annex 11)

Inside the bay there are two public beaches, one in the city and another on the far side of the Bay, in Catembe Village. In the surroundings of the oil terminal there is an oil refinery and a cement factory among other industrial processing installations. Two ship repair facilities are established within the port premises. One has a dry dock of 90 metres in length and a slipway for small craft repairs which can handle vessels up to 30 metres. The other facility operates a floating dock on the far side of the bay.

The level of pollution in the port can be described as "high", not surprisingly since there are no pollution prevention measures in place.

The purpose of this plan is to enable the Port Administration to quickly and effectively respond to Marine Pollution Incidents at sea and ashore, within its area of jurisdiction and also to provide the procedures for initiating the Port Administration Comprehensive Plan for Marine Pollution Incidents.

4.1.1. Coverage And Potential Incidents

In this port oil is the primary potential pollutant, originating mostly from shipping related activities. Compared to oil, the amount of other harmful substances handled in the port is relatively insignificant.

The following activities are considered to be related to
shipping; ship repair and maintenance, oil terminal operations, oil piping maintenance and cargo handling operations. Thus, all pollution incidents resulting from these activities must be considered.

For the purpose of marine pollution response, the plan covers incidents occurring within the jurisdiction of the Port Administration. In this context, the area of jurisdiction is defined as the port operational premises (berths, terminals, jetties and the manoeuvring area), beaches, ship repair installations, fisheries terminal, nautical sports facilities inside the Maputo Bay and the approaches to the port. On the shore side, all port operational spaces in particular extending for a minimum distance of 1 kilometer from the base line would be considered as part of the jurisdictional spaces of the port. A limited distance regarding the three rivers should be under the responsibility of the Port for the purpose of pollution response as well. The final delimitation must be established by competent authorities.

4.1.2. Pollution Scenarios

The Pollution Scenarios are selected based on the location of potential threats in the port area and with the pollution incidents ranked from the least harmful impact to the most harmful with a bigger impact.

Class "A" Incidents

Up to 10 tones of crude or fuel oil spills or other substances with a corresponding amount/extent of harm, within the area of port jurisdiction.

Class "B" Incidents

From 10 to 10,000 tones of crude or fuel oil spills or other substances with a corresponding amount/extent of
harm, within the area of port jurisdiction.

**Class "C" Incidents**

More than 10,000 tones of crude or fuel oil spills or other substances with a corresponding amount/extent of harm, within the area of port jurisdiction.

Spills of relatively smaller size occurring in sensitive areas or areas of difficult incident control within the port jurisdiction may be included in higher classes, "B" or "C", depending on the characteristics and degree of sensitiveness of the particular area. A more accurate field investigation is required for the definition of such areas.

**4.2. COMMUNICATIONS**

In practical application, pollution response operations involve large numbers of people who have to coordinate multiple actions. Thus, the communications component is a vital part of a contingency plan. Those chosen to be supervisors, having local knowledge of the port area, can not properly perform in an incident response without effective communication with the on-scene coordinator, one of the reasons why communications have to be provided. Radio communication has proven, up to now, to be the most practical system. However, the radio equipment must operate as an integrated system. The communication system must employ a common communication language or codes to ensure its effectiveness. For the purpose of the contingency plan, a communications centre and system should be specified to provide the necessary support for response operations. The port communications centre and system must be brought up to established standards, specifications and requirements, in terms of equipment, operational procedures and personnel. Communication links with other agencies and/or organizations
concerned or dealing with marine environmental matters, have to be established for quick dissemination of alert information. As a minimum this should include the MARAD, Fire Brigade, and the Navy which are specifically involved with incident response operations.

4.2.1. Alert Procedures

The purpose of laying down alert procedures is to ensure that whenever a pollution spill is detected, it is immediately communicated to the right people who can initiate a quick response.

Internal Alert; (23); (See Annex 7, Alert Flow chart)

a) Port employees observing an oil spill or the input of other harmful substances into the water, within the area of jurisdiction of the Port Administration or in neighboring vicinities, must immediately notify their supervisor;

b) The supervisor must notify the department manager responsible for the area concerned, and confirm the spill, its cause and basic nature;

c) The department manager must notify the port general manager, providing a preliminary assessment of the severity of the spill;

d) The general manager will categorize the spill; and

(23) Concept From EXXON Corporation/Trafaria CP, Lisbon
d.1. Mobilize the port incident response team unless the incident is of such minor proportions that it can be controlled by the on-site staff in the area; 
d.2. Inform the Maritime Administration general director of the occurrence, the severity and the level of response to the incident, indicating if it is being controlled by the port IRT or on-scene staff at the affected area; and 
d.3. Ask the Maritime Administration general director to mobilize support from its own sources and/or external, if the nature of incident so requires. Subsequently, the Maritime Administration Incident Response coordinator should take charge of the incident combating coordination.

**External Alert:**

The supervisor or department manager, after having notified his superior in the chain of command, will notify, as appropriate, the outside agencies concerned with marine pollution prevention and response. Every notification to outside agencies must also be communicated to the port general manager.
TYPE OF INFORMATION IN ALERT PROCEDURES

Description

<table>
<thead>
<tr>
<th>Description</th>
<th>Information Needed</th>
</tr>
</thead>
<tbody>
<tr>
<td>a) Location and source ...........</td>
<td>Latitude &amp; Longitude or of</td>
</tr>
<tr>
<td>of spill</td>
<td>Installation's address;</td>
</tr>
<tr>
<td>b) Time spill occurred ...........</td>
<td>In GMT;</td>
</tr>
<tr>
<td>c) Type of spill ..................</td>
<td>Fuel, Crude, etc.</td>
</tr>
<tr>
<td>d) Estimated amount ...............</td>
<td>In metric tons;</td>
</tr>
<tr>
<td>e) Extent of slick ................</td>
<td>Length and breadth in metres, geographic</td>
</tr>
<tr>
<td></td>
<td>limits and estimated thickness when</td>
</tr>
<tr>
<td></td>
<td>possible;</td>
</tr>
<tr>
<td>f) Movement of slick .............</td>
<td>Direction and speed in knots;</td>
</tr>
<tr>
<td>g) Wind and current ..............</td>
<td>Direction and speed in knots;</td>
</tr>
<tr>
<td>h) Action taken ..................</td>
<td>Secure the source, eliminate</td>
</tr>
<tr>
<td></td>
<td>the potential, containment,</td>
</tr>
<tr>
<td></td>
<td>recovery, equipment used;</td>
</tr>
<tr>
<td>i) Contact names and .............</td>
<td>Personnel supervising control/combat of</td>
</tr>
<tr>
<td></td>
<td>dealing with spills;</td>
</tr>
<tr>
<td>j) Location of control ...........</td>
<td>Port, beach, etc. centre</td>
</tr>
<tr>
<td>k) Other Agencies notified .......</td>
<td>MARAD, Navy, etc.</td>
</tr>
<tr>
<td>l) Name &amp; tel. NO of .............</td>
<td>Full name, position,</td>
</tr>
<tr>
<td></td>
<td>nominated IRC</td>
</tr>
<tr>
<td>m) General area affected ........</td>
<td>Harbour, beach, at sea, etc.</td>
</tr>
<tr>
<td></td>
<td>by spill</td>
</tr>
<tr>
<td>n) Resources at risk .............</td>
<td>Protection. measures for</td>
</tr>
<tr>
<td></td>
<td>sensitive areas under incident threat;</td>
</tr>
<tr>
<td>o) Initial contact ...............</td>
<td>First level notified;</td>
</tr>
<tr>
<td>p) Notification time and date</td>
<td></td>
</tr>
</tbody>
</table>

(24) Model from EXXON Corporation/Trafaria CP, Lisbon
4.2.2. Communications Centre & System

For the purpose of the contingency plan, the Port Administration shall designate a communications centre from where the alert information is disseminated and the operational communications are coordinated as well. There must be a communication system designed to address the diverse communication requirements of responding to pollution incidents. The system must follow established standards for maritime communications and specific frequencies must be designated in advance and approved by the relevant authorities. The port staff dealing with spills have to be familiarized with the communications procedures, methods and codes if any, as well as with the communication system's operational mechanisms.

4.2.3. Communication Equipment

For an effective communication system, standardization in equipment and technology is required. For the purpose of the contingency plan, the equipment must have compatible operational frequency bands with appropriate ranges that cover the area of jurisdiction of the port. Autonomous power supply units for the equipment are recommended (portable generators) for situations which may take place in remote areas without main power lines and as an alternative measure in the event of power failures.
4.3. RESPONSE ORGANIZATION

4.3.1. General

In any activity involving a variety of individuals and organizations, there is a need to define the specific tasks and the chain of command.

In a contingency plan, the main areas by tasks are:

- Coordination: Commanding incident strategy and directing on-scene response activities;

- Communications: Ensuring the operational information exchange among the various participating groups or individuals;

- Record Keeping: Recording pollution incident response activities for future reference and analysis;

- Public Affairs: Communicating with the media and with the public in general;

- Technical Advisory Services: Providing technical information and evaluations as inputs to strategic and tactical response decisions;

- Tracking/Surveillance: Monitoring and predicting the movement of the slick;

- Claims/Legal Advisory: Dealing with claims and all other legal matters related to the spill and provisions of the contingency plan;

- Liaison With Government: Maintaining contact with and advising the government on spill development;
- **Safety/Security:** Providing for the health and safety of response workers and ensuring public security by controlling access to the spill area;

- **Administration/Finance:** Providing funding for implementation of contingency plan activities and recording application or expenditures of both human and equipment resources, managing response finances and overseeing all administrative activities;

- **Logistics:** Mobilizing, managing and controlling the movement and placement of equipment and material; and

- **Working Teams:** Providing the direct hands-on implementation of spill response operations.

These tasks are mostly applicable in class "B" and "C" incidents and the proposed contingency plan organization chart is shown in annex 8. The working teams must be established in the various sectors of port activity and in such a way that they can deal with small spills, but also prepared for a specific task in the global contingency plan. The chain of command for an incident response must be as follows:

- **Port General Manager**

  *Incident Commander. In charge of incidents of classes "B" and "C";*

- **Port Department Manager**

  *Initially in charge of class "B" and "C" incidents prior to arrival of the general manager;*
- Local Supervisor
  * Responsible for class "A" incidents, unless abnormal situations arise;

- Team Leader
  * Responsible for Working Team coordination and liaison with the on-scene coordinator or incident commander;

- Working Teams
  * Composed of port staff. Direct participation in the response operation;

A proposed organizational chart for incident response is found in annex 9.

4.3.2. Levels of Responsibility

Whenever an incident is reported, actions to control, contain, remove and clean-up the spill are to be immediately taken. Every effort should be made to stop the spill at its source.

The responsibility for these critical actions lies with the employees at the site, moving to higher levels of port management depending on the proportions of the spill. The ability of site staff to control a spill and the predicted extent of damage from a spill determine the level which will assume responsibility for response actions. The ranking in levels of responsibility according to the type/size of the spill is as described above in the chain of command and with the proposed organizational chart shown in annex 9.

The key positions to be considered are those of the general manager, department manager and local supervisor, positions which have coordination responsibilities. Note that the general manager and department manager can delegate responsibility to on-scene coordinator, if the situation so permits after incident evaluation.
4.3.3. Safety and Safe Operations

An incident response involves contact with harmful substances which makes safety a high priority for all individuals involved. Specific and clear safety instructions have to be developed and incorporated in the contingency plan operational procedures.

To ensure safe operations, safety measures for pollution response activities at sea have to be established and safety requirements when dealing with harmful substances must be applied as well. A safety specialist/adviser has to be appointed with the main task of laying down a comprehensive set of safety procedures for incident response operations. These should cover removal and clean-up operations, handling of equipment, material and recovered substances as well as storage and disposal of recovered substances. Rules concerning restrictions of access to areas affected by a spill also need to be developed and applied where and when required. Training in safety and security aspects related to pollution incident response must be developed and implemented for all individuals organized to respond to spills under the contingency plan. Training should be provided as part of incident response simulation exercises on a periodical basis. Safety equipment for response operations must be made available and personnel must be instructed in its use.
4.4. RISK ASSESSMENT

4.4.1. Coastal Features

The coastal zone of Mozambique is characterized by its variety of ecosystems with estuaries, mangrove forests, coral reefs, seagrass beds, submarine banks, plateaux and rocky reefs, as the most common and important habitats particularly for fisheries. The Maputo Bay can be similarly described. Predominant high tidal ranges during autumn and spring (waves around 5 to 7 metres), and the associated strong currents and winds, can pose great difficulties in recovery and/or clean-up operations. This requires the development of special measures for spill containment and recovery.

The inner part of the bay is affected insignificantly by strong currents and winds during the above mentioned seasons. However, with a southerly wind, the working conditions can quickly become extremely difficult in such a way that activities like fishing, hydrographic surveys or dredging must be temporarily halted.

Three rivers (Incomati, Maputo and Matola) join the sea through the bay, with their estuaries being important habitats for shrimp and other crustaceans. The protection of these species is of vital economic importance.

4.4.2. Spill Movement Prediction

The movement of sea water in a cyclical pattern results from the regular and continuous change of the sea level, or tidal fluctuations. When a pollution incident occurs, in most cases the substance spilled lies on the water surface, moving together with the water.

In the Maputo Bay, a slick movement can be influenced by factors such as tide, current speed and direction as well as wind speed and direction. For spill movement prediction, hydrographic methods or techniques in the calculation of
current speed and influencing factors like wind and tide characteristics, are recommended to be applied. The National Hydrography and Navigation Institute-INAHINA, is the Agency responsible for the monitoring of such sea elements and possesses the needed knowledge, capabilities and qualified personnel. As such, it the recommended agency from which the Port Administration should seek for cooperation for projecting spill movement. Another alternative, less reliable compared to INAHINA, is the Port Pilotage Centre. Given this centre’s day-to-day working environment and knowledge about the bay, port approaches and port entrance channel, plus their constant use of tide and other meteorological data in their work, it can also provide good and reasonably reliable spill movement predictions.

4.4.3. Spill Surveillance

Spill surveillance is an action aimed at tracking the spill from the point where it occurred for the purpose of response operation planning.

Based on the experiences of other countries where the contingency planning concept has been applied, spill surveillance is best made by aircraft or helicopters, providing what is called air surveillance.

In Maputo, aircraft resources can be mobilized from:

- TTA: the Airline Company which operates medium and small aircraft and helicopters;

- LAM: Mozambique Airline, the country’s main airline which also operates small aircraft on a charter basis; and

- Maputo Air Force Base: Mainly helicopters can obtained from this source.
These three sources are the most reliable and are devoted to public and national interests. However, assistance can also be obtained from other sources, mostly companies based in Maputo and which own small aircraft or helicopters for their private use, namely:

- EDM: Mozambican Electricity Company,
- EMOCHA: Mozambican Tea Company,
- LOMACO: Lonro-Mozambique Agricultural Company, and
- MAGMA: Mozambican Mining Company.
4.5. RESPONSE METHODS

4.5.1. General Overview

Every sea coast has its own characteristics, therefore spill recovery and clean-up methods vary from place to place and the method chosen must be adaptable to the conditions of the affected place. Certain methods can bring with them the potential for additional severe problems for the environment. As an example, beach cleaning due to sand movement during the cleaning operation can bring up erosion problems to the shoreline. In most cases, additional harm results from human error in the assessment of the incident's impact as well as in choosing the appropriate recovery and clean-up method. For this reason it may be advisable in certain circumstances to minimize the aggressive actions of shoreline clean-up when uncertainties remain about the possible future reaction of the environment to such an operation.

4.5.2. Response Actions

When a pollution incident occurs the most common actions undertaken are to secure the source, reduce the potential, containment, dispersal, recovery, clean-up and restoration. Each action may be applied on a case-by-case basis, the choice depending on spill evaluation, the assessment of the possible impact of individual response actions, the physical conditions in the affected area, and the natural resources at risk. The containment, recovery and clean-up actions are practicable in calm waters, without strong currents. For the case of Maputo Port, this approach would be recommended and practicable. Although, as mentioned before, during autumn, spring and sometimes summer, some difficulties could be encountered due to prevailing winds or river outflows. This approach is also environmentally friendly, making it an
approach of first choice. Dispersant spraying, a method not considered especially friendly to the environment in shallow waters, has not been widely used in many countries due to reluctance of the authorities to allow its use. One of the disadvantages of this method is that the spilled substance remains in the water posing a risk of harm to marine resources, particularly those on the sea-bed. For Maputo Port such a method is not recommended due to the threat it would pose to estuaries, mangrove forests and other sensitive habitats inside the bay. Shoreline clean-up and restoration must be considered when spills reach the coastline. It should be carried out only where found absolutely necessary and when the gain anticipated would outweigh the environmental harm sustained from the physical operations. Problems with erosion are already of great concern along the Mozambican coast and any activity which might aggravate this problem must be carefully considered.

4.6. MANPOWER AND EQUIPMENT

A contingency plan, as a tool for pollution preparedness and response, obviously requires resources for its practical implementation. While the resources needed are many and varied, two basic types of resources are considered to be essential. These are: manpower and equipment.

The plan in this paper is specifically concerned with a particular port. Thus, the port administration is responsible for raising the necessary resources to implement the plan. However, other agencies/companies locally based and concerned with environmental protection matters or involved in activities in the port which may endanger the marine environment, should also contribute resources toward the plan. This is the case with Maritime Administration, the Navy, petroleum companies, and shiprepair yards, among others. Forms of contribution do not have to be on a permanent basis and the contribution scheme can be
established considering each case individually. The extent of involvement in port activity and/or degree of responsibility in marine environment protection should govern the level of participation or contribution. Of course, those who are willing to have their contribution as a permanent and effective part of the contingency plan, should not be denied the opportunity to do so.

4.6.1. From The Port

MANPOWER

The Port of Maputo employs a large number of people assigned to various activities. For the purpose of the contingency plan, a selection of appropriate staff should be carried out at various levels within the port administration organization. For the coordination and supervisory tasks of the plan, the port management staff have to be appointed to fill the positions. Thus, the general manager would serve as incident commander. The spill response coordinator and on-scene commander should come from department managers (preferably from operational departments). Team leaders of working teams should be selected from the sectorial supervisors also preferably from operational activities. Specific incident support tasks such as public affairs, claims/legal advisory services, government liaison, safety/security, technical advisory services, and administration/finance should be filled based on staff members' skills in relation to each task. Cooperation with outside agencies can be looked at regarding areas such as technical advisory services and spill tracking/surveillance, provided that the people selected have a good knowledge of the Maputo Bay and their sphere of activity has a close connection with the port.
EQUIPMENT

At the present, Maputo Port does not possess any spill response equipment, besides general purpose equipment used in the port activity which can easily be integrated in spill response operations. This would include, for example, equipment such as tug boats, mooring and pilot boats, fire fighting equipment, excavators, dumpers, and pumps.

The need to establish a stock of marine pollution response equipment is to ensure that in the event of occurrence of an incident within the area of port jurisdiction, minimum required means are in place for response action. It is of course, also important to make sure that the quantities and types of equipment in stock guarantee effectiveness in response to the possible kinds of incidents which are assumed to occur within the area. Taking the characteristics of the port into consideration, the need for equipment can be described as follows:

a) Containment Booms
   - Harbour Booms—not less than 1000 (one thousand) metres;
   - Coastal Booms—not less than 1200 (twelve hundreds) metres;

b) Skimmers
   - Small size—not less than 2 (two) units;
   - Medium size—not less than 2 (two) units;

c) Oleophilic Absorbents—not less than 400 (four hundreds) Kg;

d) Workboats
   - Specialized Spill recovery boat—20 (two) units;

Note: The tug boats, mooring and pilot boats can be mobilized when required, thus, minimizing heavy investments in large a number of workboats, the same applying to other existing equipment in the port which
can be integrated in the plan when needed. Detailed specifications of the equipment and material listed above require further study which is better done as part of the procurement process, with initial assessment assistance from those more knowledgeable in spill response equipment.

4.6.2. From the Maritime Authority

The Maritime Administration, as the ultimate and globally responsible agency for the marine environment protection, has particular interest in assuring that the effects of pollution incidents occurring within the national waters are minimized. The Maritime Administration must employ personnel with knowledge in the sphere of pollution prevention. The Maritime Administration may also possess resources in the form of equipment which, if required, can be made available to combat spills wherever they occur.

Previously, the Maritime Administration, similar to Maputo Port, had no spill response capability. After the recent accident of the Greek ship "Katina P" in Mozambican waters, a considerable amount of clean-up and recovery equipment was donated to the country and put under MARAD responsibility. Therefore MARAD resources (manpower and equipment) located in Maputo should be included in the Maputo Port contingency plan as "stand by" resources. A particular field in which the Maritime Administration could also most effectively contribute to the plan is in providing technical advisory services. This means, if the port feels it is necessary, it could approach the Maritime Administration with a proposed agreement that would make available the expertise within the Maritime Administration. In this particular aspect the Maritime Administration input would have to provide for a full and effective assignment of personnel to support the contingency plan.

(25) Lloyd's List/April 23 rd, 1992-Casualty Report
4.6.3. From Other Sources

Public agencies established in Maputo City, particularly those concerned with public welfare such as the City Council, Health Department and related institutions, and the Fire Brigade, constitute sources of resources which can be included in the plan. A designation of resources to "stand by" status allows their mobilization to be determined by the type, size and other characteristics of each incident. The City Council, through its Urban Hygiene Department, is most valuable to be relied upon in case of shoreline clean-up and restoration operations. Furthermore, it could provide for the storage and treatment of recovered polluting substances.

The Health Department and related institutions have a great role in pollution incidents. They can determine the health measures to be taken to protect both the personnel involved in the response operation and the city’s population in general.

It is also the Health sector's responsibility to carry out analysis of the sea-food products, determine if restrictions in their consumption are required, and, in affirmative cases, monitor the situation until the measures can be lifted. As mentioned in previous chapters, companies/agencies with activities which endanger the environment in the area of jurisdiction of the port administration, are to be held responsible for incidents resulting from their activities. In any incident occurring in the area mentioned above, the aforesaid companies/agencies should be ready to provide assistance in manpower and other resources to the contingency plan, if so required. A scheme for each contribution should be established by the port administration. Particular benefits may be derived from petroleum companies, the refinery and the shiprepair yards. As generators of a potential threat to the port area's marine environment, these entities should already have resources available which could be included in the port contingency plan. If not already
provided, these entities should be required to provide the resources necessary to respond to the risks which they pose to the environment. The availability of such resources for other environmental emergencies should be made mandatory. National coastal ships, fishing vessels, Navy vessels and other vessels if in the port when an incident occurs, should also be ready to provide assistance if the proportions and type of incident so require. Relevant to the need for air surveillance and slick tracking, the sources listed in 4.4.3. of this chapter, should be approached to develop agreements that would make their resources available and accessible, when required, for incident response operations as part of the port contingency plan.

4.7. INCIDENT CLASSIFICATION (26)

The main objective of classifying the incidents is to easily define the levels of intervention of each category of incident. The factors considered in the classification are: the size of the spill, the type, extent of harm and possible damage to the environment, atmospheric/sea conditions, such as wind, rain, current and tide and spill location as well. The classification sequence is from the small incidents up to the bigger ones, within the range of possible size and types of incidents which can occur in the Maputo Bay.

4.7.1. Class "A" Incident

This class comprises small incidents with spills up to 10 tons of crude/fuel oil or other corresponding substances, in areas where control, containment, recovery and/or clean-up can be easily carried out. The definition of the areas, as previously mentioned, requires a field investigation. In field investigation aspects such as prevailing atmospheric and sea conditions in the area should be considered and

(26) Principle from EXXON Corporation/Trafaria CP; Lisbon
parameters defined. The range of spills have to be those which can be controlled by the site staff or working team assigned to the area where they occurred and at maximum, with intervention of a department manager.

4.7.2. Class "B" Incidents

This class of incidents comprises spills between 10 (ten) and 10,000 tons of crude/fuel oil or other corresponding substances, within port jurisdiction. Once again, it is important that working conditions in the case of a response operation having to be carried out are reasonably acceptable, with the parameters to be defined when field investigation is carried out. This class of incident may require assistance from outside agencies/companies, a factor to be considered in incident evaluation, alert procedures and response mobilization.

4.7.2. Class "C" Incident

The major pollution incidents within the area of jurisdiction of the port are in this class. It covers spills of more than 10,000 tons of crude/fuel oil or other corresponding substances, occurring within the port jurisdiction. Incidents occurring in the vicinity of the area of port jurisdiction may become part of this class of incident depending on the atmospheric and sea conditions, an aspect to be considered in the development of final alert procedures. For this incident category, assistance from outside agencies/companies is most likely to be required, and maybe from outside the country also.
CHAPTER V

COASTAL STATE OBLIGATIONS
AND LEGAL REQUIREMENTS

5.1. GLOBAL CONCEPT

The oceans are a potential source of resources of great benefit to mankind. Such resources require management for their conservation and protection against overexploitation and pollution.

Sound management of marine resources necessarily has to be supported by legislation and regulations. These have to be developed, implemented and enforced by the designated governmental agencies, a task for each and every coastal state including Mozambique.

Being a coastal state has great advantages, but it also carries a number of obligations and responsibilities before the world community in general and the country's population in particular. Sovereign rights within the territorial sea, the exclusive economic zone and on the continental shelf can only be exercised effectively if a proper legal regime is drawn up, promulgated and implemented. Global co-operation instruments with regard to coastal states rights and duties within their national waters have been developed, aiming at the establishment of international common standards in the legislative sphere of management of the seas. The Law Of The Sea Convention in its 1982 version is one of the most comprehensive international instruments dealing with the legal regime and other principles of management of the oceans in various spheres of activity. The most common activities, such as shipping and fishing, are covered as well as the most complex such as exploration and exploitation of marine mineral resources including deep sea mining.

Delimitation of the boundaries of various zones in the national waters of each coastal state facilitates the control
of activities at sea, strengthens the country’s position in
the management of marine resources, and plays a key role in
the development of agreements and contractual concessions for
the exploration and exploitation of such resources. For the
coastal states it also provides the necessary powers for law
enforcement within the delimited areas by giving clear
territorial limits, avoiding or minimizing conflicts among
neighboring countries and others which are occasional users
of the country’s waters. Development of mechanisms that aim
to provide safety within the national waters, prevention of
marine pollution and establishment of measures to protect the
marine living and non-living resources, without prejudice to
the development of maritime activities, are some of the tasks
that each coastal state has to consider. A basis for
developing the mechanisms to achieve the above objectives was
created in form of international conventions, with UNCLOS
1982, SOLAS 1974/78 and MARPOL 1973/78 being the most
relevant.

5.2. COASTAL STATE OBLIGATIONS

Coming to the specific aspect of coastal state obligations,
the scope is seen to be quite wide, but in this paper
consideration is narrowed to the environmental aspects. The
safety and protection of coastal and marine life as support
areas are examined due to their close links with
environmental problems.

The United Nations Convention on Law of the Sea is a
comprehensive instrument in matters pertaining to rights and
duties of coastal states in regard to maritime activities.
The convention embodies a global framework for environmental
law, providing a mechanism for accommodating uses and
interests of the oceans in an environmentally sustainable
manner. The fundamental obligation of coastal states in
relation to the world’s marine environment is stated in
article 192 as follows: "States have the obligation to
protect and preserve the marine environment" (26). Articles 193 and 194 of the convention elaborate further on aspects related to a state's rights in the exploitation of their natural resources. They also address the integration of national economic interests and the obligation to respect the global interest in the protection and preservation of the marine environment. In addition, measures to prevent, reduce and control pollution of the marine environment are set forth. Coastal states are also called, in UNCLOS 82, to co-operate on a regional and global basis in the pursuit of the achievement of environmentally sustainable development. With that concern in mind the convention states that: "States shall co-operate on a global basis and, as appropriate, on a regional basis, directly or through competent international organizations, in formulating and elaborating international rules, standards and recommended practices and procedures consistent with this convention, for the protection and preservation of the marine environment, taking into account characteristic regional features". (27)

Mozambique is a signatory state of UNCLOS 82 but has not ratified it yet. The country has applied a considerable number of the conventions' provisions, particularly the aspects relating to the delimitation of boundaries and the various zones in the national waters. Weaknesses in the effective implementation of the adopted aspects are due to lack of monitoring, control and enforcement mechanisms and means. Such means are simply not in place.

The country's economic problems, which are allied to natural calamities and 17 years of civil war, are the main reasons why the above issues have not been properly addressed. In the belief of positive changes in the national political scenarios resulting from the global political changes, an increasing awareness of the danger of environmental

(26) UNCLOS 1982/Article 192
(27) UNCLOS 1982/Article 197
deterioration is anticipated. This, along with the goodwill of some countries in providing assistance for environmental programs, makes it possible that some space can be created for the establishment of the necessary mechanisms to effectively apply the convention's principles. In this context, ratification of the convention becomes a possibility. This could strengthen the country's legal framework before the world community in matters relating to maritime activities; and it could enhance co-operation prospects with other nations that have a sound legal regime. Effective control and management of marine resources, their protection and preservation for more economic achievements, require the application of global developed standards. These are a critical part of a coastal state's obligations in the global management of the seas and within each country's national waters. The fact that Mozambique is also an IMO member state places more demands on the country's government, particularly in the area of marine environmental protection. Therefore, all possible efforts should be made to meet international obligations.
5.3. LEGISLATION

Legislation is a set of legal instruments in the form of laws passed by a government or state, establishing principles concerning a particular situation or issue. (28) In today's world, legislation has became an extremely important element of any country. In general, it provides for the legal status and/or boundaries related to an activity, a specific situation or thing, which can be of a social, political or economic nature. It is also a basic tool in cooperation among nations by establishing the concepts, principles, standards and other related aspects forming the regulatory basis.

In a complex activity, as in the case of maritime industry, legislation is of extensive and great importance. Its tendency to be mostly governed by international conventions is due to its international characteristics which result in the need for common practices and procedures aimed at facilitating its development. The existence of IMO and its work has been a living example of the world maritime community's willingness to harmonize standards, practices, procedures and legal mechanisms for the benefit of the industry in particular and mankind in general.

The increasing need to combine efforts to protect the marine environment against pollution, requires development and adoption of solid national and international legal instruments. Without such legislation, very little can be done in the protection and preservation of the seas.

5.3.1. Present Situation

Marine environment legislation in Mozambique, as with other economic and social activities, began prior to the country's independence (1975).

(28) Extract from Collins English Dictionary/pg.327

78.
Under the country's first constitution approved in 1975, article 79 states that "any law or its provision, adopted prior to independence will remain valid as long as it does not harm the interest and policy of the Republic of Mozambique". (29) Therefore, most of the legislation published during Portuguese colonial administration is still valid in the country. Basic environmental provisions were made in the new constitution of November 1990. However, specific legislation for the prevention and control of marine pollution does not exist. Colonial legislation in the maritime field which is still in force, is outdated; the same applies to the environmental aspects. The existing maritime laws dealing with or relating to marine environmental protection are: (30)

* Decree-Law NO. 45082 of 1963.06.21, making the use of an oil recorder book compulsory on-board ships;

* Decree-Law NO. 45604 of 1964.04.22, establishing the mechanisms for solving problems raised by nuclear ships in Portuguese waters or its ports (Mozambique was a Portuguese territory at that time);

* Decree NO. 495 of 1973.10.06, dealing with the prohibition of disposal, dumping or discharge at sea, ports, rivers and lakes, of oil or oily mixtures.

In the sphere of international conventions related to marine pollution, only OILPOL 1965 was ratified by Portugal (decree no. 495/73 of 1973.10.06), and this was the only international instrument in force in Mozambique prior to independence.

(29) Article 79 of the Constitution of Mozambique/June 1975
(30) Maritime National Directorate records, Mozambique

The updating of national maritime legislation is underway but is at a very early stage. The process has faced a number of difficulties. These range from problems of a limited number of qualified personnel assigned to its reformulation, to a lack of support from some agencies involved with maritime activities and industry. Internationally, after the country's independence, a few IMO conventions have been ratified by Mozambique as follows:

- International Maritime Organization Convention (in January 1979);

- International Convention on Standards for Training and Certification and Watchkeeping 78 (in 1985);

- Collision Regulations 72 (in 1991);

- International Convention on Tonnage Measurement 69 (in 1991); and


Provisions of the United Nations Convention on Law of the Sea 1982, as mentioned before in this chapter, have been applied particularly in the delimitation of boundaries, the continental shelf, the exclusive economic zone and the territorial sea within the national waters.

5.3.2. Future Requirements

Mozambique has revised the global social, political and economic principles adopted in the early days of the country's independence. The outcome of such revisions are summarized in a new constitution that came into force in November 1990.
The main aspects of the changes embodied in the new basic law are:

- **Political:** Adoption of a multi-party political system for a more effective democratic system;

- **Economical:** Adoption of the "Free Market Economy" principle to replace the "centralized economy planning" system adopted after independence;

- **Social:** Effective appliance of the "freedom of speech" and "freedom of association" principles, as a result of the change in the political orientation policy.

The effective implementation of the above listed principles requires a stronger legal regime to ensure harmonized development of the country's economy in general and the maritime industry in particular.

In the light of the above described developments, the role of the government and its executive agencies face new challenges. While in the previous system there was a direct involvement of the government sector in almost everything in the country's life, today the government's role is mostly to concentrate on the development of economic policies, planning guidance and monitoring, legislating/regulating and monitoring of the implementation of these measures. Therefore, perspectives for a much more serious approach to the development of comprehensive legislation in many areas seem to be promising.

The general increasing awareness of environmental concerns has also brought some encouraging outcomes in the country. A National Commission on the Environment has been created and it has commenced involvement in international events related to global environmental problems. This involvement, while an essential element, requires a back up from other internal actions. Environmental legislation is
a basic starting point as it provides the legal guidance which ensures effective application of international standards.

With the ongoing process of updating maritime legislation, incorporation of the provisions of IMO conventions dealing with marine pollution prevention and response would create the necessary foundations for the ratification of these same conventions. This would enable the country to look at the development of its maritime industry in an environmentally sustainable atmosphere.

In the legislation development process, consultations with representatives of various sectors of maritime activity, in the form of a legislation drafting commission, would be beneficial to the final result.
5.4. IMO CONVENTIONS AND GUIDELINES

Mozambique became an IMO member with the ratification of the organization’s convention in January 1979, binding the country to the organization’s principles. Among the various obligations of member states, one is to implement international standards in the maritime field. IMO also encourages member states to adopt the organization’s resolutions, recommendations and guidelines in addition to aspects covered in the adopted conventions. The force of existing IMO conventions dealing with the protection of the marine environment are various. Some are in force and others await the required number of ratifications to come into force. In the group of those already in force, the following can be found:

-International Convention for the Prevention of Pollution of the Sea by Oil 1954 (OILPOL 1954), superseded by the International Convention for the Prevention of Pollution from Ships, 1973/78 (MARPOL 1973/78, focused on pollution prevention from shipping);

-International Convention relating to Intervention on the High Seas in Cases of Oil Pollution Casualties, 1969/73;

-International Convention on Civil Liability for Oil Pollution Damage, 1969/76 (CLC 1969/76);

-International Convention on the Establishment of an International Fund for Compensation for Oil Pollution Damage, 1971 (FUND 1971), which deals with Compensation for Oil Pollution Damages; and

-Convention on the Prevention of Marine Pollution by Dumping of Wastes and Other Matters, 1972 (LDC 1972), which is not an IMO convention but IMO is the depository of the
convention. It deals with Prevention of Marine Pollution from Dumping of Wastes.

The group of instruments not yet in force is mostly composed of protocols to the above listed conventions plus the International Convention on Oil Pollution Preparedness, Response and Co-operation, 1990 (OPRC 1990).

If some of the conventions contain provisions not easily implemented in some developing countries (Mozambique included), it is also true that a start must be made somewhere and the sooner the better. In most cases the start is the most difficult step and, after it has been taken, the process goes forward and improvements to the desired levels come about.

IMO has developed various measures to assist member states in the establishment of National, Regional and Global mechanisms for the protection of the marine environment. As additional support, guidelines for implementing the organization's conventions have been provided, such as the IMO Global Programme For The Protection Of The Marine Environment, reviewed in 1988-1989 and with a focus on assistance to developing countries, which pursue the following main philosophical aspects: (31)

* "Priority in developing the human dimension of national capacities for the protection of the marine environment. Thus an emphasis on training";

* "Maximum utilization of local expertise from the region. Therefore, activities are closely related to local problems. External expertise is used when conditions request it";

* "Priority in assisting developing countries";

(31) Lecture Notes from MR. Ignacio Vergara from IMO/May 1991
* "Supporting the development and strengthening of a legal and institutional framework for integrated management of coastal resources in developing countries. This facilitates the protection and the use of these resources, and the establishment of limits when reaching a sustainable level";

* "A Problem-Oriented approach and focus on the management of risks, allowing the identification of trends to be monitored and rectified in view of their negative impact on the marine environment, coastal resources, and coastal settlements depending heavily on them";

* "An Anticipation and Prevention approach, in which the programme supports and triggers activities on subjects to become critical in the short-term, for slowing the deterioration of the marine environment";

* "Promotion for development of regional strategies oriented to the optimization of national and regional efforts in the protection of the marine environment".

It is conclusive, from the above philosophy, that particular emphasis is given to co-operation among member state governments at global and regional levels, and also to assistance to the least developed countries. Access to these programme by Mozambique would be of great benefit to the country's efforts concerning marine pollution prevention, by providing a clear guide on how to address issues such as coastal management, marine and coastal "protected areas" management, as well as general issues related to marine pollution prevention and response, based on IMO standards. An effective implementation of IMO standards would enhance the prospects of obtaining assistance both from the IMO Technical Cooperation Division and bilateral cooperation partners.
CHAPTER VI

CONCLUSIONS AND RECOMMENDATIONS

6.1. FINAL CONSIDERATIONS

The world commission on Environment and Development produced its report "Our Common Future", presented to the UN General Assembly in 1987 which recognizes the central role of the oceans in its statement that sustainable development, if not survival itself, depends upon significant advances in the management of the oceans. One of the main conclusions contained in the report is that "In essence, sustainable development is a process of change in which the exploitation of resources, the direction of investments, the orientation of technological development, and institutional change are all in harmony and enhance both current and future potential to meet human needs and aspirations". (32)

For developed countries the change in policy and adoption of "sustainable" practices means fundamental changes, but they have the benefit of development experience, knowledge, technology and an already developed and established infrastructure, which enables them to make the adjustments to meet sustainability.

The same does not happen in developing countries, particularly in the least developed ones. For some of those, the issue is not development nor sustainable development but survival, as in the case of Mozambique, a country devastated by a civil war and droughts.

Because it is also a fact that "Poor people are forced to overuse environmental resources to survive from day to day, and their impoverishment of their environment further impoverishes them, making their survival ever more difficult.

and uncertain" (33), governments and communities of these developing countries are called to join the global efforts oriented to the protection and preservation of the world’s environment.

In previous chapters of this paper, the environmental situation of Mozambique has been described with particular focus on the marine side. Also some ideas about the way environmental issues have been addressed in other parts of the world are discussed, with a few examples given on particular aspects which have special applicability for Mozambique.

Theories and concepts that are applied worldwide in the prevention of marine pollution and response have been central to the emphasis on this paper. Therefore, IMO instruments (conventions) and concepts, and other similar UN documents were mostly used by the author, as the fundamental sources of information and reference material to produce this paper. The advantage of IMO instruments and UN documents is derived from their underlying principles of serving the world community despite geographical location, cultural differences, levels of development, and social and political systems.

Some concepts from other countries with possible application in developing countries, and particularly in Mozambique were also discussed and models used as examples of how marine pollution and response issues can be addressed, in light of the principle of learning from experiences of others. Portugal, because of several similarities with Mozambique in institutional, legal and administrative systems was the country from which substantial information was collected and used in this paper.

(33) Our Common Future Report, part I-1.A Threatened Future/pg. 27
6.2. RECOMMENDATIONS

Considering the state of the marine environment in Mozambique as recently as two years ago, and considering also that very little has occurred in terms of development, any recommendations must be of a basic nature, if an effective approach is to be designed for a country that intends to take the very first steps.

As discussed in chapter two, it is vital to define the problem before thinking of how to address it. There is a very common saying in shipping circles, which states that "If you don’t know where to go, any course can take you there", meaning that not identifying the problem from which a plan and strategy can be developed is the same as taking a walk in the dark.

The present problem is marine pollution and the suggested approach to addressing it is a method for prevention and response.

Chapter three of this paper discusses aspects concerned with the way the problem is going to be addressed, which means defining the problem’s stand point, the way to go about it and how far to go, as well as the time which can tentatively be allocated to each phase.

Organizational considerations come next, where the problem is broken down into small particular aspects in the form of tasks, their distribution and working strategy description along with the individual’s job description.

Finally, setting of minimum requirements to deal with the problem is done, forming the basic required conditions to address the problem in practical terms.
POLICY

The present Maritime Policy in Mozambique presents various weaknesses, one of them being the minimal attention that the marine environment receives. Policy is a general guide in which a sector's objectives are expressed and their level of importance and order of priority are defined. Therefore, there is a need to revise the Mozambican maritime policy to adjust it to present maritime industry development perspectives and trends. In such an adjusted policy, the economic interests and needs for environmental preservation must find harmonized accommodation. A clear definition of objectives and goals in environmental issues has to be made so that, all subsequent steps and actions to be taken will not be hampered due to uncertainties. The policy must also state the level of ambition intended, scope of cooperation and coordination with other agencies dealing with environmental matters, aiming at maximization of achievements and avoidance of duplication of efforts.

To recommend such a step might appear to be an interference with political affairs, but without a change in policy there is little hope that any step towards the achievement of the sustainable development objective will be successful.

ORGANIZATION

In chapter three of this paper, a description of the organizational arrangement of the maritime sector in Mozambique is made, as well as provisions for inclusion of marine environmental protection interests. A description is also made as to how the present organizational scheme negatively influences marine pollution prevention activities, which are minimal at best.

The recent incident with the Greek tanker m/v "KATINA P" caught the country totally unprepared. There was not even a
minimal environmental organization or program which could be adapted to address the spill, and improvisation had to be applied. A question could be raised concerning the "efficiency and effectiveness of the proposed solution". For the situation of Mozambique, the "three phase" organizational scheme developed in chapter three is offered as one possible solution for consideration. It can be applied as proposed or serve as a basis for discussion to consider alternative approaches. It must be emphasized, however, that introduction of organizational changes is urgently needed for the sake of protection and preservation of the marine and coastal environment. Assets vital to the country's economy and elements critical to the global ecological system are at risk.

The contingency planning concept, as a pollution response tool, is an extremely valuable instrument and relatively easy to implement. The crucial part in applying this tool is the co-ordination element.

Application of contingency planning in Mozambique could be of tremendous advantage and benefit to the country in preventing and responding to pollution incidents. Its implementation could follow the principle discussed and proposed in chapter four, starting with the main ports and gradually implementing it in other ports. Meanwhile, the MARAD at a central level could carry out consultations with the industry, interested parties and other agencies/organizations willing or obliged to contribute to the protection of the marine environment, aimed at the establishment of a National Contingency Plan. It is, therefore, recommended that a working group is established with the following terms of reference:

- Drafting of a "Work Plan" for the start up of a marine pollution prevention and response organization;

- Identification of needs and specific requirements towards the establishment of such an organization;
- Identification of national available resources both human and material, which can be counted as useful for the organization's establishment, and looking into the prospects for foreign assistance;

- Provision of the necessary input in the on-going process of updating of maritime legislation, particularly regarding marine pollution prevention and response aspects.

**LEGISLATION**

Policy, organization and any other change which can be made in the line of properly addressing environmental issues has necessarily to be backed-up by laws and regulations to achieve effectiveness. For the various parties in the maritime industry it is also of great importance to have clear and logical legal mechanisms, so that their activities are performed without the fear of being affected by arbitrary regulatory procedures. The on-going reformulation of the maritime legislation needs an additional input. More people from the agencies and industry operating in the maritime sector should be involved. Such additional input could be made through the establishment of a legislation drafting commission as suggested in chapter five of this paper, which appears also to be an effective solution when laws must be drafted for a complex activity that affects may competing interests. Actions aimed at promoting IMO conventions in general, and those dealing with marine environmental protection in particular, are recommended to be taken, focused on the potential benefits for the various maritime industry interests. This could be seen as a preparatory activity for the ratification of the conventions. Seminars and workshops to elevate awareness of the important issues might be seen as the most applicable forms of achieving this end.
6.3. CONCLUSION

The seas, which provide food, transportation, entertainment and many other benefits, have suffered from shipping and land-based sources that inject polluting materials into their environment.

The previous belief of humans that the seas could take any amount of waste without negative effects or alterations prevailed for a long period of time. Then certain phenomena began to occur. Disappearance of fish species and other marine animals in certain regions, and contaminated waters on beaches and in river estuaries are some examples of polluting effects that awakened the human consciousness to marine environmental problems.

Today, the world is facing potential problems of global warming and sea level rise, resulting from environmental pollution. The world community, realizing the seriousness of global environmental degradation, started taking actions aimed at protection and preservation in many different ways, but all towards the same objective. Some of the most recent and important developments concerning environmental matters can be listed as follows: adoption of the United Nations Convention on Law of the Sea in 1982, the establishment in 1983 of the World Commission on Environment and Development, and the outcome of its work in the form of a report in 1987, and the World Conference on Environment and Development of Rio De Janeiro-Brazil in 1992.

Specifically in the marine environmental sphere, international conventions dealing with the issue have been adopted and the existing ones amended in order to improve their efficacy.

These are the cases of MARPOL 73 adoption of its Protocol in 1978, the adoption of the London Dumping Convention in 1972, adoption of the protocols of 76 and 84 to CLC, the Fund protocols of 76 and 84, the adoption of the OPRC in 1990 and the recent amendments to MARPOL 73/78 on tanker ship design.
introducing the double-hull and mid-deck concepts adopted in March 1992.

Many other events have taken place at the global and regional levels or through the initiative of industry or non-governmental organizations, with the same objective, that is the strengthening of mechanisms for marine pollution prevention and response. Actions by single countries have also been recorded, mostly ignited by pollution incidents that occurred in some of the countries' waters. Accidents such as the "Argo Merchant" in 1976, "Amoco Cadiz" in 1978, and "Exxon Valdez" in 1989 are some of the major recent marine pollution spills which shocked the world maritime community and led to actions taken by some of the countries in the marine environmental field.

The USA's example, just to mention one, is the adoption of the OPA 90 (Oil Pollution Act of 1990) which incorporates provisions, some of which are controversial in the shipping industry.

This paper discusses a few aspects in the field of marine environment, based on concepts and approaches already developed and being applied in other countries, in the hope that some can be adapted to the benefit of Mozambique. The first chapter deals with introductory aspects, the author's country in brief and an overview on the shipping activity of the country.

The discussion of marine pollution prevention and response concepts and other related ideas is developed in chapters two and three, as well as the author's views on their applicability in Mozambique, their advantages and benefits. A model example of a contingency planning approach in response to marine pollution incidents is developed in the fourth chapter, with the example of the Port of Maputo, one of the Mozambican major ports. The idea behind the strategy chosen in the paper was to avoid the build-up of a national plan in the very first stage of the application of the concept within a country having no previous experience or
arrangement for marine pollution response. This would carry the risk of becoming a very costly mistake.

Chapter five is dedicated to a discussion of international principles for the management of the oceans in the areas of coastal and national waters, as well as the applied legal regime.

This paper is intended to be, as mentioned in section 1.2., a contribution to the public’s and authorities’ awareness of the importance of marine pollution prevention in Mozambique, but not limited to that. It can also be a practical instrument in addressing marine pollution prevention and response problems, or a basis for discussion of alternatives of how to approach marine pollution problems in the country. The possibility of the paper’s ideas being of any use in Mozambique depends on the government’s policy and definition of priorities. However, it is worth the effort to exploit the chance, in the hope that the Mozambican coastal and marine environment and thereby the Mozambican people will benefit.
The Transport System
EXISTING MARITIME ADMINISTRATION ORGANIZATIONAL STRUCTURE DIAGRAM

MARITIME NATIONAL DIRECTORATE

MARITIME SAFETY ADMINISTRATION DEPARTMENT
PLANNING AND BUDGETING DEPARTMENT
SHIPPING & INLAND TRANSPORT DEPARTMENT
MARITIME PERSONNEL DEPARTMENT
MARITIME ADMINISTRATION INSPECTION

NAT. HYDROGRAPHIC AND NAVIGATION INSTITUTE
NAUTICAL COLLEGE
MARITIME IMPROVEMENTS BRIGADE
PROPOSED MARITIME SAFETY ADMINISTRATION DEPARTMENT ORGANIZATIONAL STRUCTURE DIAGRAM

MARITIME SAFETY ADMINISTRATION DEPARTMENT

INSPECTION OF SHIPS SECTION

REGISTRATION OF SHIPS SECTION

SEARCH & RESCUE SECTION

MARINE POLLUTION PREVENTION & RESPONSE SECTION

POLLUTION PREVENTION SUB-SECTION

POLLUTION RESPONSE SUB-SECTION

SEARCH & INFORMATION SUB-SECTION
PROPOSED MARINE POLLUTION PREVENTION & RESPONSE DEPARTMENT ORGANIZATIONAL STRUCTURE DIAGRAM

MARINE POLLUTION PREVENTION & RESPONSE DEPART.
PROPOSED MARITIME ADMINISTRATION ORGANIZATIONAL STRUCTURE DIAGRAM

MARITIME NATIONAL DIRECTORATE

- MARITIME SAFETY ADMINISTRATION DEPARTMENT
- PLANNING AND BUDGETING DEPARTMENT
- SHIPPING & INLAND TRANSPORT DEPARTMENT
- MARITIME PERSONNEL DEPARTMENT
- MARITIME ADMINISTRATION INSPECTION

- NAT. HYDROGRAPHIC AND NAVIGATION INSTITUTE
- NAUTICAL COLLEGE
- MARITIME IMPROVEMENTS BRIGADE

- MARINE POLLUTION PREVENTION & RESPONSE DEPART.
- POLLUTION PREVENTION SECTION
- POLLUTION RESPONSE SECTION
- RESEARCH & INFORMATION SECTION

Annex 6
MAPUTO PORT CONTINGENCY PLAN
ALERT PROCEDURES FLOW CHART

SPILL DETECTION

IMMEDIATE SUPERVISOR

EXTERNAL WARNING

CALLS FOR THE RESPONSE PLAN

GENERAL MANAGER

SPILL RESPONSE CONTACTS MARAD

EJM/92/e
MAPUTO PORT CONTINGENCY PLAN

ORGANIZATIONAL CHART

SPILL RESPONSE COORDINATOR

INCIDENT COMMANDER

RECORD KEEPING

ON-SCENE COMMANDER

TECHNICAL ADVISOR

TRACKING & SURVEILLANCE

CLAIMS LEGAL ADVISOR

GOVERNMENT LIAISON

SAFETY & SECURITY

PUBLIC AFFAIRS

ADMINISTRATION & FINANCE

WORKING TEAMS

EJM/92/f
GENERAL INCIDENT RESPONSE
ORGANIZATIONAL CHART

Class "B" & "C" Incidents

PORT
GENERAL
MANAGER

Class "B" & "C" Incidents-Initial

PORT
DEPARTMENT
MANAGER

Class "A" Incidents

LOCAL
SUPERVISOR

Working Teams

PORT STAFF
Annex 10

Chart of the Maputo Bay
Chart of the Maputo Port

LEGEND
A- Refinery
b- Oil terminal
c- Mineral handling terminal
d- Steel terminal
e- Container terminal
f- General cargo berths
g- Fishing terminal
h- Shiprepair yard/passenger terminal
i- Public beach/passenger terminal
j- Shiprepair facility-floating dock
l- Public beach
m- Artesanal fishing landing site
7 to 17- Navigation aids
BIBLIOGRAPHY

J. Wardley Smith, 1983 : The Control of Oil Pollution
Graham & Trotman Publishers.

Paul L. Bishop, 1983 : Marine Pollution & Its Control
Mcgraw-Hill, Inc.

Environmental Impact Assessment: Sewage Treatment Plant for
Port Said;
UNEP Regional Seas Reports &

Sebastian A. Gerlach, 1981 : Marine Pollution
Springer-Verlag Berlin
Heidelberg.

R. B. Clarck, 1986/89 : Marine Pollution
Oxford University Press, New York.

Virginia K. Tippic/Dana R. Kester: Impact of Marine Pollution
on Society

Richard A. Kenchington, 1990: Managing Marine Environment
Taylor & Francis.

Our Common Future : The World Commission on Environment and
Development Report/Thirteenth Editon 1991
Oxford University Press, New York
Toronto.

Response to Marine Oil Spills: The International Tanker Owners
Pollution Federation Ltd, 1987
Esso Portuguesa, S.A.: Oil Spill Contingency Plan, Part 2
Trafaria Terminal/Port of Lisbon.


Oil Spill Contingency Planning: A Report to the President October 1990/USA From Samuel K. Skinner Secretary, Department of Transportation and William K. Reilly Administrator, Environmental Protection Agency Prepared by The National Response Team.

REFERENCES

(1) Maritime National Directorate Statistical Data, Mozambique/1991;
(2) Coastal Transport Studies Report, Mozambique—Volume 2 April 1989;
(3) IUCN/UNEP Pamphlet, 1984;
(4) Maritime National Directorate Records, Mozambique;
(6) Paul L. Bishop, Marine Pollution and its Control (WMU Library);
(7) United Nations Convention on Law Of the Sea 1982, Article 1/paragraph 4 (WMU Library);
(8) Paul L. Bishop, Marine Pollution and its Control (WMU Library);
(9) IUCN/UNEP Pamphlet, 1984
(10) Decree no. 495/73, Mozambique Official Bulletin October 20, 1973
(11) Lloyds List/April 19, 1992 (WMU Library);
(12) Lloyds List/April 27, 1992 (WMU Library);
(13) Maritime National Directorate Internal Regulations, Mozambique 1990;
(14) Maritime Administration Lectures: Notes by Professor P.S. Vanchiswar, 1st & 2nd Semesters;
(16) HELMEPA Annual Report, 1990;
(17) USA Oil Pollution Act, Title I/Section 1008;
(18) IMO Strategy in the Protection of the Marine Environment August 1989/Training & Training Rationale;
(19) USA Oil Spill Contingency Planning, Report to the President/October 1990;
(20) CILFAN Record of Marine Environment Protection Agreements/On-the-Job Training, Portugal March 1992;
(22) The National Response Team Annual Report, USA/NCP 1991;
(23) Exxon Corporation/Trafaria Contingency Plan-Lisbon On-the-Job Training, Portugal/March 1992;
(24) Exxon Corporation/Trafaria Contingency Plan-Lisbon On-the-Job Training, Portugal/March 1992;
(25) Lloyds List/April 23, 1992-Casualty Report;
(28) Collins English Dictionary;
(31) Lecture Notes from Professor Ignacio Vergara from IMO, May 1991;
(33) Our Common Future Report, part I-1. A Threatened Future;
ABREVIATIONS

-CILPAN: "Centro Internacional de Luta Contra a Poluição do Atlântico Nordeste" (International Centre of Pollution Combating for Northeast Atlantic);

-CLC: International Convention on Civil Liability for Oil Pollution Damage;

-COLREG: Collision Regulations;

-CP: Contingency Plan;

-EEZ: Exclusive Economic Zone;

-ESID: Ecologically Sustainable Industrial Development;

-HELMEPA: Hellenic Marine Environment Protection Association;

-IMO: International Maritime Organization;

-INAHINA: Instituto Nacional de Hidrografia e Navegação;

-IRC: Incident Response Coordinator;

-LL: Load Lines Convention;

-MARAD: Maritime Administration;

-MARPOL: International Convention on Prevention of Marine Pollution by Oil;

-MOZ: Mozambique;

-NAVIQUE: Empresa Mocambicana de Navegação;