BLUE WATERS

Newsletter

On Marine Environment Security

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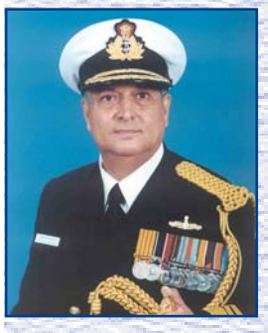
OIL SPILLS

A THREAT TO OUR MARINE ENVIRONMENT

A Publication of the Indian Coast Guard

From the Director General's Desk



The 10th NOS-DCP preparedness meeting which was held on 07 Sep 2007 was an opportunity to interact with members from various participating agencies and discuss contemporary issues related to our disaster contingency planning in case of an oil spill at sea. Oil spill exercises, procurement of Tier – 1 facilities, pollution control equipment for high current water bodies, use of dispersant, preparation of local contingency plan, developing software for combating oil spills, inclusion of new ports under NOS-DCP, declaring A&N island and Lakshdweep Islands as PSSA, oil spill response center at Gulf of Kutch region and legal regime for wreck removal constituted the major part of the discussions. I am happy to note that all stake holders are proactive and are keen to ensure that waters are clean.

One of the most important discussions during the 10th NOS-DCP Meeting was Dredger cum Pollution Response vessel. The role of Dredger cum Pollution vessel in combating oil spill in event of an unforeseen eventuality and use as a dredger in normal times is a very cost effective option for the ports to meet their contingency planning.

We are living in an environment conscious world today and the need to institute stringent and strict measures such as pollution policing in our ports and imposition of penalties on defaulters was never felt so much in the past as it is felt today. A proactive approach by all the ports in this matter will pave a new path in ensuring clean and safe waters around us.

I request all the readers to continue their support to our collective efforts in achieving pollution free clean waters in our marine environment.

RF Contractor
Vice Admiral
Director General
Indian Coast Guard

Editorial

First of all I would like to wish all the readers a very happy New Year from editorial team of Blue Waters.

It is indeed a pleasure to present the IXth volume of the Blue Waters. The Blue Waters has completed eight years and the readership continuous to increase with each volume.

This edition contains an article on dredging–cum-oil recovery vessel. This article provides a brief description on this unique vessel, which can be, used both as dredger in daily use and as oil recovery vessel in case of oil spill contingency. Next article on the fragile flora and fauna of the Andhra Pradesh marine eco-system gives a detailed commentary on the various eco-systems of Andhra Pradesh. The effect of Global warming on this system and the recommendation thereon. In the next article, marine pollution by Hazardous Noxious Substances (HNS) and response has been discussed.

I am sure this issue will be useful to understand the marine environment better.

"Blue Waters" is the one of the pioneer magazines on Marine Environment and is well read among all the stakeholders. Suitable articles from the stakeholders are welcome for publishing. Feedback from our readers will certainly provide impetus to serve our readers with more zeal.

(Shailindraa K Singh)
Commandant
Director (F&E)

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DREDGER –CUM- POLLUTION CONTROL VESSELS

The Dredger-cum-Pollution Control Vessels are in use in Japan quite efficiently. These high-capability trailing suction hopper dredger with oil recovery system are highly advanced and multifunctional.

Special features of these vessels are as follows :-

(a) Capable of highly accurate leveled dredging and a new type drag head.

(b) An environmentally-friendly land discharging system and a high-grade dredge recycling system which promotes both environment protection and dredging efficiency upgrading.

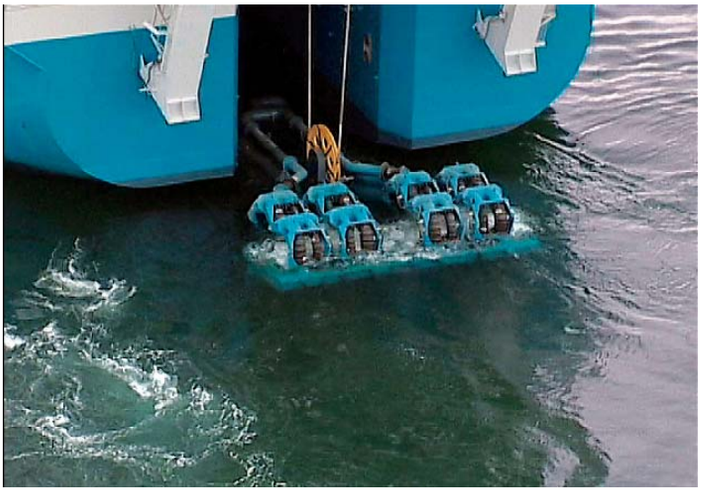
(c) Oil recovery scoop capable of handling low-to high viscosity oil.

(e) Capable of functioning as a disaster control center (Command Platform).

(f) Integrated high-grade automated control system for dredging, land discharge, ship steering, oil recovery and engine room.

Dredging system

The dredging system of vessel is based on adoption of the world's largest-class wide span drag head which



permits high accuracy leveled dredging without left-over, excessive or stripe dredge. A monobloc type drag head has been used to obtain a high leveling effect. With these vessels, the drag head is divided into four sections, making it possible to follow the sea bed undulations. A recycling system that returns the water in top of the mud hold to the drag head has also been adopted to upgrade dredging efficiency. Adoption of the wide span drag head has resulted in a hull layout that can accommodate the aft center drag system. A side drag dredge normally has two drag arm systems, but this dredger has one system equipped with one dredging pump. In addition, this dredger does not operate the discharging pump and the recycling pump simultaneously, enabling the number of pumps to be reduced as the same pump is used for the two purposes. Accordingly, the numbers of dredging pipes and recycling pipes on the drag ladder have been reduced to half, facilitating maintenance. The aft center drag system also has the advantage that the dredged line is shown exactly by the ship's wake, further improving dredging accuracy.

Oil recovery system

With regard to the oil recovery system, effective measures were devised and mounted on this dredger to promote efficiency of oil recovery equipment in rough

seas, collection of floating oil, recovery of high viscosity oil, and others. For oil recovery, a device capable of recovery operation in rough seas with wave height of 2.5 m with whirlpool type oil recovery scoop has been provided. This has following special features :-

(a) Increased height of the suction port.

(b) Increased capacity of the jet water in the lower section of the oil recovery scoop for suction force upgrading.

In order to improve the recovery efficiency, an oil collection system using a water jet is mounted on this ship. Conventionally, the recovery efficiency declines as the oil after entering the recovery equipment flows away under the effect of retreating waves or as the oil accumulated in front of the recovery equipment runs off. This oil collection system with water jet has drastically improved the oil collection performance as effective oil collection is made possible by optimal combination of jet power and direction. This system is extremely simple to operate compared with the conventional oil boom and similar systems, and it is safe in relation to ship navigation as no structure is in contact with the sea water surface. Also, the skipper type high-viscosity oil recovery equipment was developed and is mounted on this dredger, enabling oil to be scooped and recovered by means of a cage.

Disaster control system

These vessels also have a disaster control function. The vessel is provided with a helicopter deck for the purpose of transporting disaster control personnel and emergency materials at the time of large-scale disasters. These vessels also accommodate TV conference and disaster control rooms provided with the latest information and communication technology equipment having audio-visual support functions such as accident information collection, information distribution and accident prevention documentation.

ANDHRA PRADESH MARINE ENVIRONMENT – WAY AHEAD

GP Raj, Dy Inspector General
Commander, Coast Guard Andhra Pradesh
(DHQ-6)

INTRODUCTION

The state of Andhra Pradesh lies between 12° 37' and 19° 54' N latitudes and 76° 46' and 84° 46' E longitudes. The state can be classified into three geographic zones (i) The Coastal plain (ii) The Eastern Ghats and (iii) The Deccan Peninsular plain.

The coastline of Andhra Pradesh is 974km and is located in between 13°24'-19° 54' N Latitudes and 80° 02'-86° 46'E longitudes. The state has an area of 2,75, 068 sq km and a population of 53.55 million. The coastal zone is potentially a rich terrain from the point of view of agriculture, fisheries, commerce and transportation. The coastline is smooth with inundations only in the extreme south and between Godavari and the Krishna delta. The sea is shallow off the coast and there are thirteen non-major small ports and a major premier port at Visakhapatnam. Andhra Pradesh has 14 sanctuaries but does not have any national parks even though this is the biggest of the four southern states. The delta of the two important rivers namely Godavari and Krishna is very fertile. There is a mangrove forest along the estuaries and dry deciduous forest inland. The state has one of the longest lagoons in south Asia, called the Pulicat Lake, having a variety of resident as well as migratory birds. Summers are hot and dry with temperatures shooting up to 46°C while winter temperatures come down to 8-10° C. The Ecologically important areas of Andhra Pradesh includes the coastal lagoon ecosystem of Pulicat Lake in the south and the Mangrove ecosystem of Krishna Delta (Nizampatnam and Machilipatnam), and Coringa at Godavari estuary. The major problems in Andhra coast are erosion, storm surges and coastal pollution.

Andhra Pradesh is endowed with a long coast line with three monsoon fed rivers Godavari, Krishna and Penna flowing into Bay of Bengal, a lake at the extreme south and approximately nineteen rivulets opening into the Sea. This indicates that water is not a problem when compared to other states. The Bay of Bengal pours in loads of fresh water during two monsoon seasons for almost 9 months. Most importantly, all flowing rivers accord sustenance to a host of marine flora and fauna in this conducive marine environment. The water bodies south in Pulicat Lake propagate livelihood of land animals in addition to brackish water beings - in a sense, a rich beholder of bio-diversity. This is not the case with other states. Some states have flowing rivers but due to large number of check dams the water flow into the sea is stopped causing disappearance of breeding opportunities to the marine fauna. Thus natural endowments are bountiful for the state in terms of provisioning of life supporting elements of mother nature.

BAY OF BENGAL FACTS

The signature of cold-core eddies and their role in altering the biological productivity of the Bay of Bengal was examined using two recent sets of hydrographic data collected along the central and western Bay of Bengal during fall (14 September – 12 October, 2002) and spring (12 April – 7 May, 2003) inter-monsoons under the Bay of Bengal Process Studies (BOBPS) programme. Based on the thermohaline structure and the satellite-derived sea-level anomaly maps, nine cyclonic eddies were identified. Out of this, 4 cyclonic eddies – 2 each along the central Bay and along the western boundary – occurred during fall inter monsoon 2002, while 5 occurred – 3 along the central Bay and 2 along the western boundary – during spring inter-monsoon. The eddy depressed the temperature, which varied from 3°C to 7°C at 120 m depth. Maximum depression of temperature was associated with spring-time eddies in the northern Bay, where subsurface stability was low. The reduced water column stability in spring leads to greater eddy-pumping, thereby cooling the water to a greater extent. However, the cyclonic eddies were unable to break the stratification of the top 20m layer, thereby curtailing their effects below this depth during both seasons. Eddy-pumping not only cooled the water column but also enhanced the nutrient concentrations. This in turn increased the biological productivity of the Bay to 1½-2 times. In addition, the subsurface chlorophyll maximum (SCM), which is generally located between 40 and 70 m in fall and 60 and 90 m in spring inter monsoons, shallowed under the influence of the eddies and also enhanced the chlorophyll concentration in the SCM to more than double. Thus, eddy-pumping of nutrients controls the biological productivity of the Bay of Bengal during both the seasons. In the fall inter monsoon, however, the riverine input of nutrients and sediments in the northern Bay also plays a role in altering the biological productivity. This has an overall implication to the basin-wide new production and export flux and, at least partly, resolves the reason for the comparable annual fluxes of organic carbon between the high-productivity Arabian Sea and low-productivity Bay of Bengal.

ECOLOGICALLY IMPORTANT AREAS

Pulicat Lake is located 40 km north of Chennai city and is the second largest brackish water lake in India after Chilka Lake. Geographically the lake is situated in between 13° 24'-13° 43' N latitude and 80°03'- 80 ° 18' E longitudes. The lake is over (above) 60 km in length and 0.2 to 17.5 km in breadth. It has a high water spread area of 460 Km^2 and low water spread area of 250 Km^2. Due to deltaic deposit, the lake is shallow with an average depth of above 1.5 m. The lake is separated from the Bay of Bengal, by an inland spit called the Sriharikota Island. The main source of freshwater is land runoff through three seasonal rivers that open into the lake. They are

Arani at its southern end, Kalanglat its mid-western side and Swarnamukhi at its northern end. Water flows in these rivers only during the monsoon season (October to December). A manmade Buckingham canal that runs parallel to the coast passes through the Pulicat Lake from its southern end and emerges onto the Sriharikota Island. Two islands in the northern part of the lake, Venadu and Irakkam are found on a bed of sub-fossilized shells. The hydrology of the Pulicat Lake is influenced by local climate, the regime of the inflowing river, the Buckingham canal which enters the lake, in addition to effect of the nereidic waters of the Bay of Bengal. An area of 172 km^2 of the lake is an extremely important area for a wide variety of resident and migratory waterfowl, notable pelicans, herons and egrets, storks, flamingos, ducks, shorebirds, gulls and terns. Pulicat is the third most important wetland for migratory shorebirds on the eastern seaboard of India, and is especially important during the spring and autumn migration seasons. The lagoon supports significant populations of *Tachybaptus ruficollis, Pelican us philippensis, seven species of herons* and *egrets, Mycteria leucocephalus, Anastomus osticans, Threskiornis melanocephalus, Plataea leucorodia, dendrocygna javanica* and *Anas poecilorhyncha, P. philippensis and M leucocephalus which* visit the lagoon in large numbers from breeding colonies at neighboring sites. Common passage migratories and winter visitors include *Phoenicopterus rubber, Anser indicus, Tadorna ferruginea, Anas Penelope, A. strepera, A. crecca, A. acuta, A. querquedula, A. clypeata, Aythya ferina,* about 20 species of *shorebirds, Larus brunnicephalus, L, ridibundus, Chlidonias hybrida, Gelochelidon nilotica and Hydroprogne caspia.* The large concentration of greater *flamingos (P. rubera)* occur in the Andhra Pradesh part of the sanctuary, around the islands of Vendadu and Irukka while *Esacus recuruirostris* and *Burhinus oedicnemus* are common residents of the scrub-fringed shores. The area is rich in birds of prey; *Haliaeetus leucogaster breeds,* and *Pandion haliaetus, Circus spp.,* and *Falco pergrinus that* appear in winter.

KRISHNA DELTA

Krishna Delta is located 90 km south southeast of Vijayawada and 50 km south of Machillipatnam. Geographically it is situated between 15° 42'-15° 48' N latitude and 80° 50'- 81 ° 00' E longitudes and it covers an area of 200 sq km. Extensive mangrove forest with a network of narrow channels occur in the delta of the Krishna river. The Krishna divides into three major channels; much of the western part of the delta has been reclaimed for agriculture, and the remaining mangrove forests are concentrated in the eastern portion. The forests are bordered on their landward side by marshy land which is inundated by monsoon run-off in June-October, and dries out completely in April-June. This wetland has an area of ecologically important features such as mangrove, plantation, mud flat, sand bar etc. The area of important wetland classes in Krishna delta are presented in Table A below.

BIO DIVERSITY

Flora

The mangrove vegetation in Krishna mangrove ecosystems encompass from giant forests of *Avicennia officinalis* and *Sonneratia* and the other species include *Avicennia marina Excoeras agallocha, rhizopora apiculata, Bruguiera gymnorrhiza, Ceriops roxburghaina, Aegiceras corniclatum* and *Lumnitzera racemosa.* 32 species of mangrove and mangrove associated plants belonging to 26 genera and 18 families are recorded in Krishna mangrove ecosystem.

Table A

Wetland classes and its area extent of Krishna delta

Sl. No.	Wetland classes	Area in km²
1	Mangroves	105.7
2	Forest	4.2
3	Plantation	3.1
4	Mud flat	75
5	Sandy beach	30.2
6	Aquaculture Ponds	0.4
7	Salt pan	6.5
8	Sand Dunes	14.9
9	Salt Marsh	50.0

Macrobenthos

The macrobenthic animal of Krishna mangrove ecosystems are represented by 15 groups. They are: *Sea anemones, Nemerteans, Polychaetes, Oligochaetes, Mysids, Isopods, Amphipods, Prawns Crabs, Halacarid mites, insect larvae, Univalves, Bivalves, Fish juveniles* & *Sipunculids.* The group polychaetes are represented by 18 species. They are *Phyllodoce castanea, phyllodoce malmgreni, Namalycastis indica, Dendronereis arborifera, Nereis indica, Nereis cricognatha, Nereis sp. Ceratomereis burmensis sp. Nephthys dibranchis, Lumbriconereis simplex, Glycera longipinnis, Laonice cirrata, Magi/ona sp. Capitella sp. Sternaspis scutsts, Streblosoma cespitosa* and *Laonome indica.*

Meiobenthos

Meiobenthos comprises of 12 groups. The *harpacticoid copepoda* was represented by 22 species in Godavari mangrove habitats. The following were observed: *Longipodia weberi, Canuella perplexa, sunaristes sp. Halectinosoma curticorne, Halectinosoma gothiceps, Tachidius disciples, Pseudostenhelia secunda, Stenhelia longifurca, St (D). madrasessis, robertsonia sp. Amphiasdcoides sp. Amiera parvula, Nitocra spin ipes, Phyllopodopsyllus longicaudatus, Stenocopia sp. Enhydrosoma buccholtzi, Enhydrosoma sp. Cletocamptus confluens, Nannops palustris, Limnocletodes behningi, Onychocamptus bengalensis,* and *Quinguelaophonte quinquespinosa .*

Molluscs

Molluscs are represented by 23 species belonging to 29 genera and 14 families. They are:

Univalves*: Neria chameleon, Neritina depress; Littorina scabra, L. melanostoma, L.intermediate; Assiminea brevicula; Cerithidae fluviatilis,* C. *decollate, Telescopium telescopium, Terebralia palustris;* and *Onchidium verruculatum.*

Bivalves: *Anadara granosa; Perna viridis; Plancenta; Meretrix casta, Katelysia opima; Tellina ala* and *Solen sp.*

Prawns

18 species of prawns belonging to 8 genera and 3 families occur here. The genus Metapenaeus is represented by 5 species by the *genera Penaeus* and *Macrobrachium.*

Crabs

11 species of crabs belonging to 10 genera and 3 family were recorded. They include: *Scylla serrata, Portunus pelagic us, Charybdis cruciata, Uca dussumieri Macropthalmus crinitus, Pachygrapsus sp. Varuna, litterata, Sesarma oceanica, Sesarma quadrata, Metopograpsus messor* and *Grapsus strigous.*

Finfish

106 finfish species belonging to 78 genera and 52 famillies were present. *Mullets (mugi/ cephalus, Liza melanoptera, Valamugil cunnessius), Croackers (Dendrophysa resselli), indian shads (Hi/sa ilisha) catfish (Arius cae latus), grunters (Pomadasya hasta), Perches (Lates calcarifer), Pomfrets (Pampus argentitus), goatfish (Upeneus sulphureus)* and *eels (Anguill bicolor).*

Birds

The following species of birds are seen in Krishna mangrove ecosystem. *Podiceps ruficollis, Pelican us philippensis, Anhinga rufa, Palacrocorax niger, Ardea cinerea, Egretta sp. Ardeola greylil, Ibis leucocephalus, Pseudibis papillosa, Anser indicus* and *Anas sp.*

GODAVARI ECOSYSTEM

Coringa

The Godavari divides into two major tributaries at Dawaliswaram. The Godavari joins the sea at Coringa above 53 km upstream from Vrudha. The tidal channels are deep and usually U-shaped in cross section with steep banks and tidal creeks originate from these channels. Such creeks criss-cross the mangrove swamps. The mangroves are the Gautami's gift and they grow on muddy flats formed due to silting activity spread over many centuries. The estuary meets the sea at Coringa. Geographically it is located between 16° 27'-16° 59' N latitude and 82° 10'- 82° 22' E longitudes and it covers an area of 235 sq krn. A complex of mangrove swamps and coastal lagoons form the Coringa Wildlife sanctuary, in the northeastern part of the Godavari Delta. Table below shows the areas of various wetland classes of Coringa.

Table B

Various wetland classes and its areal extent of Coringa

Sl. No.	Wetland classes	Area in km²
1	Mangroves	171.4
2	Plantation	10.63
3	Mud flat	48.4
4	Sandy beach	20.8
5	Aquaculture Ponds	2.8
6	Salt pan	0.05
7	Sand Dunes	14.9

Biodiversity

The mangrove vegetation in Godavari mangrove ecosystems encompass from giant forests of *Avicennia officinalis* and *Sonneratia* and the other species include *Avicennia marina Excoeras agallocha, rhizopora apiculata, Bruguiera gymnorrhiza, Ceriops roxburghaina, Aegiceras corniclatum and Lumnitzera racemosa. 32* species of mangrove and mangrove associated plants belonging to 26 genera and 18 families are recorded in Godavari mangrove ecosystem.

Flora

Zooplankton

Godavari mangrove ecosystem has 27 groups of zooplanktons.

MARITIME ZONES

Territorial Waters

An area of 12 nautical miles from the coast into the Sea is declared as territorial waters and India claims the sovereign right over this area where laws of the land are applicable. This land/area TERRITORIAL WATERS

can be utilised by the maritime province, in this case the State Government, for the purpose as good as the land. Probably this area will be useful for extension of the city limits for living.

Contiguous Zone

A sea area of 24 nautical miles from the coast is nominated as Contiguous Zone where few laws are applicable like sanitation laws, fiscal and immigration laws.

Continental Shelf

Sea bed area upto 350 mtrs can be exploited by the maritime province economically in the form of mining, drilling and other explorations. There are nine offshore rigs operating off KG Basin.

Exclusive Economic Zone

Sea area of 200 nautical miles can be reaped economically by fishing and other similar activity.

IMPACT ARGUMENTS

The Pulicat Bird sanctuary, which attracts flamingos and many other exotic water birds, now faces a threat from shrimp farms which have sprung up in the region. Migratory birds, that arrive from as far as the Arctic region, may now have to look for new places. The Pulicat Lake is ideal for aquaculture as the water from the pond could be readily mixed with fresh water. They also find it convenient to let the effluents into the lake, which will harm the natural feed of birds. The floodlights and the roaring of diesel engines and motor pumps have shattered the tranquility essential for a bird sanctuary. More than 1000 acres of wetland on the eastern part of the Pulicat Lake have been used for shrimp farming. This activity not only affects the Pulicat bird sanctuary, but also the livelihood security of the 30,000 fishermen in this area, apart from 20,000 agricultural laborers, for whom fishing is an off-season economic activity. The potential socio-economic impact of aquaculture development in lagoon is significant and far-reaching. Thus the flora and fauna of this lake ecosystem are presently being disturbed by both natural and anthropogenic factors and need immediate conservation measures.

The Godavari mangrove ecosystem, like other biotopes, has been experiencing the human-impact in the form of resource utilization and resource alteration / modification. The utilization of mangrove resources has reached the stage of indiscriminate exploitation (e.g.) excessive deforestation, injudicious harvesting of juveniles and over seining of mangrove water for fish and shellfish seeds for aquaculture practice. Further, the current boom of aquaculture practice in brackish water habitats and expansion of agriculture in the hinterland have led to increased encroachment on the landward margin of the forests, and overgrazing by cattle from neighbouring villages is becoming a problem. The proposed construction of a new road from Nagayalanka town to Nagayalanka lighthouse would involve the destruction of some of the mangrove forest.

Industrialisation of coastal corridor and chemical industries spewing their waste into sea is also seen as a threat to the pristine marine environment, in the near future.

FISHING INDUSTRY IMPACT ON MARINE ENVIRONMENT

Fishery resources replenish themselves within the natural environment. Fishing activities, if conducted on a suitable scale within the limits of the reproductive cycles of nature, should be sustainable with regard to the fishery resources. In fact, fishery activities can actually serve to increase the growth rate of the fish by what is known as the "thinning-out effect (reduction of density effect)". However, when excessively large "fishing intensity" is applied to a certain resource over an extended period of time, the natural ecological balance breaks down and the resources will sooner or later be exhausted.

Bottom trawling, gill netting without scientific application will degrade the marine environment beyond repair. Depletion of natural resources in EAST ASIA is a known fact from which we need to learn.

Turtle Excluder Devices when used would spare the turtles from dying in large number especially during Oct-Jan - their nesting season.

Regulation of fishing for improving security, responsible exploitation of marine resources would go a long way in safe guarding national interests.

IMPACT OF GLOBAL WARMING

Coastal areas and cities like Mumbai and Chennai will be the first to feel the impact of global warming, which is bound to hit Indian economy, and environment badly, if the climate change predictions of the UN panel (IPCC), released recently, comes true. India could lose as much as 09 percent of its GDP, largely from events like submergence of low-lying coastal areas. A report by the Indira Gandhi Institute of Development Research, Mumbai, has put the quantum of loss at a staggering 9 percent, but several studies predict direct (dire) consequences like flooding as well as fall in agricultural productivity. Rice yields could fall by as much as 40 percent as sowing seasons and consequently, growth period of the crops, change.

The direct impact of this change in climate is seen to be far worse. About 7.1 million people in India would be affected by submergence of coastal lands if temperatures rise by 2 degree Celsius. The economic loss, quite naturally, would be high in urban zones such as Mumbai and Chennai. Studies conclude that Mumbai alone could suffer loses up to $48 billion due to projected submergence.

To accentuate the problem, urban sprawls, reeling under the impact of climate change, will also have to cater to migration of poor marginal farmers from submerged rural areas, further straining the damaged infrastructure in Coastal cities. Wheat yields, too, would get wiped out substantially, raising costs of grain and hitting overall GDP growth. Farmers would be hit as farm level incomes could be affected by as much as 25 percent if temperatures change by a mere 2 to 3 percent. The latest UN report pegs the temperature change by the end of the century at 4.5 percent.

Climate change and an increasing population could trigger a global food crisis in the next half century as countries struggle for fertile land to grow crops and rear animals. In many countries, a combination of poor farming practices and deforestation will be exacerbated by climate change to steadily degrade soil fertility, leaving vast areas unsuitable for crops or grazing. Competition over sparse resources may lead to conflicts and environmental destruction. Policy changes that result in improved conservation of soil and vegetation, and restoration of degraded land, are fundamental to humanity's future livelihood. This is an urgent task as the quality of land for food production, as well as water storage, is fundamental to future peace. Securing food and reducing poverty can have a strong impact on efforts to curb the flow of people, environmental refugees, inside countries as well as across national borders. There will be greater pressure on humans to innovate and create resources to meet the challenges.

RECOMMENDATIONS

Marine Environment is not taught in any of the educational institutions. Only Marine Biology/Zoology are particularly studied but holistic marine environment is not found in any curriculum. Awareness is the first step towards the right direction.

There is a need to control fishery production through management measures such as seeds, as also improving fishing ports and fish markets with better cold storage and freezing facilities, and more effective transportation and distribution systems.

We have the bad habit of not addressing disaster management at the grass root level. We wait for another

agency to conduct magic rescue be it search and rescue at sea or oil spill response. It is always a good idea to make own arrangements for worst case scenarios or have an understanding with agencies providing such service along with a contingency plan.

HAZARDOUS NOXIOUS SUBSTANCES

The volume of chemicals transported by sea is increasing but remains significantly lower than the seaborne trade in oil. In addition, spills of bunker fuel from all types of ships are at least as likely to occur as loss of cargo oil from a tanker. Consequently, chemical spills occur at a much lower frequency than spills of oil. However, the consequence of a chemical spill can be more wide reaching than that of oil and there is growing international awareness of the need for safe and effective contingency arrangements for chemical spills. The wide variety of chemicals transported, their varying physical and chemical properties, the different ways in which they behave in the environment and the potential for effects on human health mean that response to chemical spills is not as straightforward as for oil.

A Hazardous and Noxious Substance is a term used to describe a substance *other than oil* which, if introduced into the marine environment is likely to create hazards to human health, to harm living resources and marine life, to damage amenities or to interfere with other legitimate uses of the sea.

Whether a substance is classed as hazardous or noxious is largely determined by its inclusion in one or more lists found in a number of IMO Conventions and Codes (see Table 1) designed to ensure maritime safety and prevention of pollution. If the chemical transported has one or more of the following properties, it is likely to be considered as a 'hazardous and noxious substance'. (Radioactive and infectious substances are outside the scope of the HNS regime.)

Flammable
Explosive
Toxic
Corrosive
Reactive

Table 1

Example of IMO Conventions and Codes providing HNS lists

Material	Conventions & Codes
Bulk Liquids	Chapter 17 of International Code for the Construction and Equipment of ships Carrying Dangerous Chemicals in Bulk (IBC Code)
Gases	Chapter 19 of International Code for the construction and Equipment of ships Carrying Liquefied Gases in Bulk (ICG Code)
Solids in Bulk	Appendix 9 of Code of Safe Practice for Solid Bulk Cargoes (BC Code) if also covered by IMDG Code in packaged form
Packaged Goods	International Maritime Dangerous Code (IMDG Code)

Manufacturers of Hazardous and Noxious Substances typically provide Material Safety Data Sheets (MSDS), which summarise the specific hazards associated with each substance. Over time these will be replaced by Safety Data Sheets (SDS) under the UN Globally Harmonized System of Classification and Labelling of Chemicals (GHS). GHS classifies chemicals by the types of hazard they represent and proposes harmonized hazard communication by consistent labelling and safety data sheets. It aims at ensuring that information on physical hazards and toxicity from chemicals is available to enhance the protection of human health and the environment during the handling, transport and use of these chemicals.

MSDS and SDS both follow the same format and provide the following information :

1. Identification
2. Hazard(s) identification
3. Composition/ingredients
4. First aid measures
5. Fire fighting measures
6. Accidental release measures
7. Handling and storage
8. Exposure controls/personal protection
9. Physical & chemical properties
10. Stability & reactivity
11. Toxicological information
12. Ecological information
13. Disposal considerations
14. Transport information
15. Regulatory information
16. Other information

The effects of a chemical lost into the marine environment depend on a number of factors such as the toxicity of the material, the quantities involved and resulting concentrations in the water column, the length of time are exposed to that concentration and the sensitivity of the organisms to the particular chemical. Dilution is brought about by water movement due to tidal flow, ocean currents and turbulent diffusion but even if the concentration is below what would be considered lethal, sub-lethal concentrations can still lead to longer term impacts. Chemically-induced stress can reduce the overall ability of the organism to reproduce, grow, feed or otherwise function normally. The characteristics of some chemicals, particularly metals and some organic compounds, can result in the **bio-accumulation** of these materials. Sessile marine organisms that filter seawater for food, such as shellfish, are particularly vulnerable to this phenomenon. **Bio-magnification** may follow if the materials pass up the food chain.

GESAMP

The effects of chemicals on the marine environment have been summarised by GESAMP (the Group of Experts on Scientific Aspects of Marine Environmental Protection), an advisory body to the United Nations established in 1969. GESAMP comprises experts, drawn from a wide range of relevant disciplines, but who act in their individual capacity. GESAMP has published a Hazard Evaluation of Substances Transported by Ships for the most commonly transported chemicals. The properties of the chemicals have been evaluated in relation to a number of predefined effects should any of the listed chemicals be spilt at sea :

1. Bioaccumulation
2. Biodegradation
3. Acute and chronic toxicity on marine organisms
4. Long term health effects on humans
5. Effects on marine wildlife, and on benthic habitats
6. Effect on other marine resources

MARPOL

The MARPOL Convention is the main international convention covering prevention of pollution from the shipping industry. Within MARPOL are two annexes that are directly relevant to HNS :

Annex II

MARPOL Annex II contains regulations for *bulk liquid* cargos that may cause environmental pollution if lost at sea. Within the annex are four categories that are graded depending on the hazard the bulk liquid presents to marine resources, human health and amenities.

Category X – liquid substances which are deemed to present a *major hazard* to either marine resources or human health, and therefore justify the prohibition of the discharge into the marine environment.

Category Y – liquid substances which are deemed to present a *hazard* to either marine resources or human

health or cause harm to amenities or other uses of the sea and therefore justify a limitation on the quality and quantity of the discharge into the marine environment.

Category Z – liquid substances which are deemed to present a *minor hazard* to either marine resources or human health and therefore justify less stringent restrictions on the quality and quantity of the discharge into the marine environment.

Category OS – these "other substances" are deemed to fall outside of categories X, Y, and Z and are deemed to present *no harm* to marine resources, human health, amenities or other uses of the marine environment.

Annex III

Annex III deals with the provisions for the prevention of pollution by harmful substances carried by seas in packaged form. As part of these regulations, any compounds that are environmentally harmful (known as marine pollutants) must be clearly marked and labelled as a 'marine pollutant" to distinguish them from less harmful cargos.

"Marine Pollution" symbol

Physical Behaviour

When chemicals are spilt, they behave in a number of different ways. It is important to understand this behaviour, not only so that human health and safety implications are recognised but also to decide on the most effective response.

In simple terms, a substance behaves in one or more of five ways when spilt:

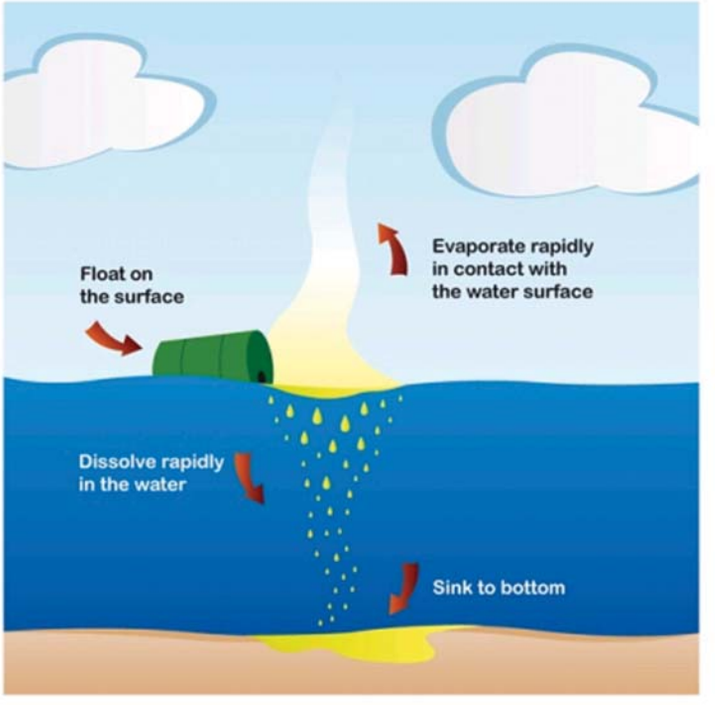
(a) Dissolve

(b) Evaporate

(c) Float

(d) Gas

(e) Sink



Processes that can act on a chemical spilt into the marine environment

Classifying the substances depending on the properties they exhibit when released into the marine environment is a useful response tool. The 'fate' of a substance is determined by the properties of volatility, solubility and density and in turn, the nature of the hazard presented by the substance (toxicity, flammability, reactivity, explosive, corrosive, etc). It also defines the most appropriate technique in dealing with it, e.g. it may be possible to contain and recover a chemical classed as a "floater" using a boom.

The classification system covers gases, liquids and solids. HNS showing similar behaviour in water can be grouped together and classified into the following

12 groups on the basis of the five behavioural characteristics – See Table 3. However, it is important to be aware that this system only classifies chemicals according to their major property/properties relevant to spill response and a chemical may also exhibit other properties e.g. Benzene is classed according to its major property (evaporator) but it is also soluble to a certain extent and so this too may need to be considered.

Table 3

The European Classification System for chemicals

Property Group		Properties
G	Gas	Evaporate immediately
GD	Gas/Dissolver	Evaporate immediately
E	Evaporator	Float, evaporate rapidly
ED	Evaporator/ Dissolver	Evaporate rapidly, dissolve
FE	Floater/Evaporator	Float / evaporate
FED	Floater/Evaporator/ Dissolver	Float, Evaporate Dissolve
F	Floater	Float
FD	Floater/Dissolver	Float, Dissolve
DE	Dissolver/ evaporator	Dissolve rapidly, evaporate
D	Dissolver	Dissolve Rapidly
SD	Sinker/dissolver	Dissolve Rapidly
S	Sinker	Sink

Chemical Response Strategies

Once the main physical and chemical properties, and hence the behaviour of a spilt substance are known and the likely impacts to human health and marine resources have been taken into account, a suitable response can be considered. A brief summary of potential response techniques for the different groups of chemicals is given below. However, the response strategy eventually implemented will also be largely dependant on the specific circumstances of the incident.

Gas & Evaporators - The release of a gas or chemical substance evaporating under the weather conditions prevailing at the time have the potential to generate large vapour clouds that might be toxic or form an explosive mixture with air. As a result, there may be potential health and safety implications for the vessel crew, responders and population nearby.

In order to plan a response, it is important to know how the gas or vapour will behave and the likely trajectory of the hazardous cloud. Relevant computer modeling of the spreading of airborne contaminants is likely to help to forecast the movement and fate of the plume as it disperses. Appropriate safety zones can then be put into place as necessary and the public advised as appropriate.

Issuing advice to the public to remain indoors for a short period may be given by the authorities. If the chemical is of a flammable nature, then all ignition sources must be eliminated. Techniques such as trying to "knock down" a water-soluble vapour cloud or trying to stop or deflect it using water sprays are other measures that may be available to responders. In such incidents occurring

near populations, the fire brigade are likely to have the commanding role in the response.

In any case, responders must wear the appropriate Personal Protective Equipment (PPE) and response / monitoring crafts must be adequately designed should they need to enter the hazardous atmosphere.

Chemicals that dissolve – A dissolving chemical will form a growing 'plume' of decreasing concentration in the water and eventually dilute. It is important to monitor the concentrations in the water to track the movement of the chemical and therefore to predict any hazard that may arise to the environment, fisheries, fresh water intakes, recreational areas, etc. Again, relevant computer models can give useful indications on the likely fate of the substance.

The ability to contain and recover dissolved chemicals is extremely limited. Providing means to accelerate the natural processes of dispersion and dilution may be the only way to respond to such chemicals. Some dissolved chemical plumes may, in theory, be neutralised, oxidised, flocculated or reduced by the application of other chemicals. However, careful assessment of feasibility and expected efficiency in an open environment as well as approval of the relevant authorities is usually required before this response method is employed.

Chemicals that float - Chemicals that float will spread under the effect of gravity to form a slick in a similar way to oil. However, unlike oil they may not be visible on the water. Nevertheless, in some cases remote sensing techniques may be employed to detect and monitor floating materials.

Floating chemicals can be low or high viscosity liquids, or may even be solid. If the spilt chemical has a high vapour pressure it may evaporate quickly and form a gas cloud above the slick. In such cases air quality monitoring is usually undertaken to assess fire, explosion and toxicity risks.

It may be possible to consider deploying booms to contain and control the movement of substances over the water surface. Skimmers and other oil spill response equipment may also be used to recover the material from the surface of the water. However, it is important to make sure, prior to use, that the spilt chemical will not react with the equipment by taking into account the chemical's reactivity. Alternatively, emergency responders may have fire-fighting or suppressant foams that can be applied to reduce the evaporation and the risk of fire/ explosions.

Again, responders must wear the appropriate Personal Protective Equipment and response / monitoring crafts must be adequately designed should they need to enter a hazardous atmosphere.

Chemicals that sink – Chemicals that sink have the potential to contaminate the seabed, and sometimes to persist in the sediment. The response to sunken chemicals may, therefore, need to consider the recovery of the chemical and any heavily contaminated sediment. Careful attention will also need to be paid to the removal and disposal of these contaminated sediments.

In shallow waters, mechanical dredgers and pump/ vacuum devices may be used to recover sunken substances. The use of submersibles and remotely controlled underwater cameras may identify and recover chemicals on the seabed.

Bioaccumulation refers to the build up of a substance within a living organism, or certain tissues of a living organism, due to the rate of uptake of that substance being greater than the rate of elimination by metabolic transfer or excretion. The term tends to be associated with certain lipid-soluble organic chemicals that are not readily metabolized by living organisms such as pesticides (e.g. DDT) and organometallic compounds such as methyl mercury and tetra-ethyl lead (TEL).

Biomagnification refers to the sequential build up of a bioaccumulative substance up the food chain through predation. Typically the highest concentrations of the substance are found with the tissues of the top predators within the food chain.

IMO NEWS

NEW INTERNATIONAL TREATY ON WRECK REMOVAL ADOPTED IN NAIROBI

A new international convention on wreck removal has been adopted in Kenya. The Nairobi International Convention on the Removal of Wrecks, 2007, will provide the legal basis for States to remove, or have removed, shipwrecks that may have the potential to affect adversely the safety of lives, goods and property at sea, as well as the marine environment. The Convention was adopted by a five-day Diplomatic Conference - held from 14 to 18 May, 2007 in the United Nations Office at Nairobi (UNON).

The Convention will fill a gap in the existing international legal framework by providing the first set of uniform international rules aimed at ensuring the prompt and effective removal of wrecks located beyond the territorial sea. The new Convention also includes an optional clause enabling States Parties to apply certain provisions to their territory, including their territorial sea.

Convention details

The new Convention provides a sound legal basis for coastal States to remove, or have removed, from their coastlines, wrecks which pose a hazard to the safety of navigation or to the marine and coastal environments, or both. It will make ship owners financially liable and require them to take out insurance or provide other financial security to cover the costs of wreck removal. It will also provide States with a right of direct action against insurers.

Articles in the Convention cover :

- Reporting and locating ships and wrecks - covering the reporting of casualties to the nearest coastal State; warnings to mariners and coastal States about the wreck; and action by the coastal State to locate the ship or wreck;
- Criteria for determining the hazard posed by wrecks, including depth of water above the wreck, proximity of shipping routes, traffic density and frequency, type of traffic and vulnerability of port facilities. Environmental criteria such as damage likely to result from the release into the marine environment of cargo or oil are also included;
- Measures to facilitate the removal of wrecks, including rights and obligations to remove hazardous ships and wrecks - which sets out when the ship owner is responsible for removing the wreck and when a State may intervene;
- Liability of the owner for the costs of locating, marking and removing ships and wrecks - the registered ship owner is required to maintain compulsory insurance or other financial security to cover liability under the convention; and
- Settlement of disputes.

NEW INTERNATIONAL RULES ALLOW STORAGE OF CO_2 UNDER THE SEABED

Storage of Carbon Dioxide (CO_2) under the seabed in now permitted, under amendments to the 1996 Protocol to the Convention on the Prevention of Marine Pollution by Dumping of Wastes and other matter, 1972 (London Protocol).

The amendments regulate the sequestration of CO_2 streams from CO_2 capture processes in sub-seabed geological formations, for permanent isolation, thereby creating a basis in international environmental law to regulate this practice. It is likely that this option would apply to large point sources of CO_2 emissions, including power plants using fossil fuels, steel works and fuel processing plants.

Sequestration of CO_2 streams is intended to be part of a suite of measures to tackle the challenge of climatic change and ocean acidification, including, first and foremost, the need to further develop and use low carbon forms of energy and conservation measures to reduce emissions.

Wastes or other matter which may be considered for dumping

Annexure 1 to the 1996 Protocol lists the following wastes or other matter which may be considered for dumping :-

- Dredged material Sewage sludge
- Fish waste, or material resulting from industrial fish processing operations
- Vessels and platforms or other man-made structures at sea
- Inert, inorganic geological material
- Organic material of natural origin
- Bulky items primarily comprising iron, steel, concrete and similarly unharmful materials for which the concern is physical intact, and limited to those circumstances where such wastes are generated at locations, such as small islands with isolated communities, having no practicable access to disposal options other than dumping; and
- CO_2 streams from CO_2 capture processes for sequestration.

SHIPS TO CARRY EMERGENCY PLANS TO DEAL WITH HNS

From 14 Jun 07, ships must carry a pollution emergency plan to deal specifically with incidents involving hazardous and noxious substances, such as chemicals.

The new rule is included in the Protocol of Preparedness, Response and Co-operations to Pollution incidents by Hazardous and Noxious Substances (OPRC-HNS Protocol), of 2000, which entered into force on 14 Jun 07. The OPRC-HNS Protocol defines HNS as substances other than oil, which, if introduced into the marine environment, have the potential to create hazards to human health, to harm living resources and marine life, to damage amenities or to interfere with other legitimate uses of the sea.

The OPRC-HNS Protocol was adopted in 2000, to expand the scope of the 1990 International Convention on Oil Pollution Preparedness, Response and Co-operation (OPRC Convention 1990), which entered into force on 13 May 1995.

Ships flying the flag of a party to the Protocol are required to carry a shipboard pollution emergency plan to deal specifically with incidents involving HNS. Seaports and offshore units, floating production and related facilities within the party's jurisdiction must also have similar arrangements, which must be

coordinated with national systems for responding promptly and effectively to HNS pollution incidents.

States, which are party to the OPRC-HNS Protocol, are required to establish a national system for responding to HNS, including a designated national authority, a national operational contact point and a national contingency plan. This needs to be backstopped by a minimum level of response equipment, communications plans, regular training and exercises.

States must also provide assistance, to the extent possible and feasible, to other States in the event of a pollution emergency. There is a provision for the reimbursement of any assistance provided. States should also try to conclude bilateral or multilateral agreements for preparedness for and response to pollution incidents involving HNS.

CONSEQUENTIAL AMENDMENTS TO THE IBC CODE

An amended International Bulk Chemical Code (IBC Code) reflecting the changes to MARPOL Annex II, also entered into force on 1 January 2007. The amendments incorporate revisions to the categorization of certain products relating to their properties as potential marine pollutants, as well as revisions to ship type and carriage requirements following their evaluation by the Evaluation of Hazardous Substances Working Group.

Ships constructed after 1986 carrying substances identified in chapter 17 of the IBC Code must follow the requirements for design, construction, equipment and operation of ships contained in the Code.

REPORTS

WORLD WATCH

OIL SPILL BY MSC NAPOLI

On 18 January 2007 the MSC Napoli, a Panama container vessel built in 1991, was headed west in the English Channel en route to South Africa. In a force ten storm the vessel experienced structural failure leading the Captain to order the crew to abandon ship. She was transporting 2,394 containers, carrying nearly 42,000 tonnes of merchandise, of which some 1,700 tonnes were classed as hazardous substances (explosives, flammable gases, liquids and solids, oxidants, toxic substances, corrosive materials...). In her bunkers, she held 3,000 tonnes of heavy fuel oil.

The crew was lifted from a life raft by a UK search and rescue crew who reported waves of forty feet above the underlying swell. Its hull damaged, the ship was subject to pitch, yaw and hogging and in the face of the prevailing storm was facing north.

The risks in staying in the path of the storm included the Napoli breaking up and losing containers. The wreckage of the vessel and its containers would have risked collisions with tanker, cargo and passenger vessels using the channel, endangering life and the environment. To reduce these risks the vessel had to be towed away from the prevailing storm, to the east and into shallower, calmer, sheltered waters en route to its intended destination at Portland.

The decision was taken by SOSRep (Secretary of States Representative) to tow the vessel to a refuge and to examine its condition in calm seas and in daylight. This led to the vessel being held in Lyme Bay.

This inspection revealed damage that was more severe than had at first been thought. At this time it was clear that an attempt to have moved the vessel further or to have risked exposure to the prevailing storm would have had disastrous consequences.

Operations to remove oil from the vessel were conducted and some 3,800 tons of oil was successfully pumped out and secured. The total spillage was about 200 tons.

The ship's owners undertook to manage and pay for the on and off shore recovery and clean up operations.

COSCO BUSAN

On the morning of Wednesday 7 November 2007 at around 8:30 am, the container ship M/V Cosco Busan collided with one of the towers of San Francisco Bay Bridge in California. The crash resulted in a 100-foot gash in the hull of the vessel, causing around 50,000 gallons of heavy fuel oil (IFO 380) to leak out into San Francisco Bay. The reason for the accident is as yet unknown.

The Governor of California, Arnold Schwarzenegger, proclaimed a State of Emergency upon his visit to the area on 11 November so as to ensure that all the necessary resources were made available as quickly as possible. On the water, skimmers and booms have been deployed to contain and recover the oil. On the shore, a large number of beaches was cleaned.

Several birds were found dead and wildlife recovery teams have been mobilised.

BLACK SEA STORM

On 10 and 11 November 2007 a severe storm hit the Kerch Strait, located between Ukraine in the west and Russia in the east and linking the Sea of Azov (in the

north) to the Black Sea (in the south). Winds of over 110 km/h caused waves over 5 metres high in a sea where the depth varies from 7 to 12 metres.

Many vessels ignored the Ukranian severe weather warning and found themselves in very rare sea and weather conditions for this region.

These conditions caused serious damage to around ten vessels, most of which were anchored. At least six sailors are known to have died and many others went missing.

On 11 November 2007, four vessels sank in the Kerch Strait.

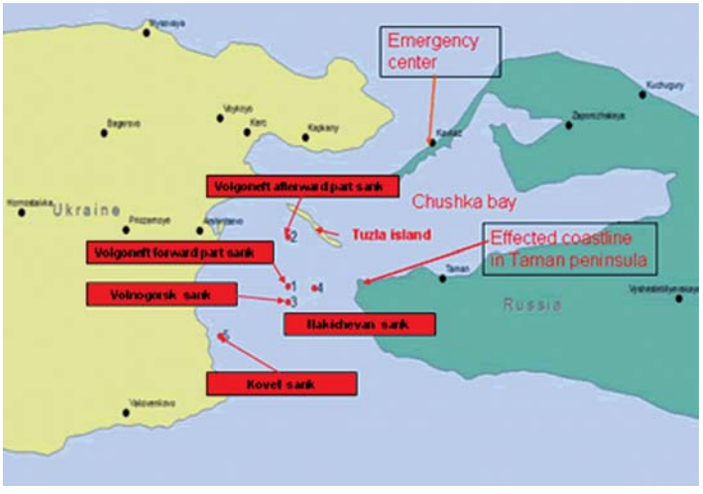
- The Russian tanker "Volgoneft-139" broke in two whilst carrying 3,500 tonnes of fuel oil. A spill of about 1,300 tonnes came from the tanks of the back part of the tanker "Volgoneft-139" and the 1,000 tonnes of oil that remained onboard were pumped out before the vessel was towed to Kavkaz Harbour. Slight residual leakage from the grounded front part was reported, where about 1000 tonnes of oil remained onboard.

- The Russian vessel "Volnogorsk" was ship-wrecked and now lies at a depth of 10.6 m with 2,500 tonnes of sulphur on board. There is no observed leakage of diesel oil.

- The Russian vessel "Nahichevan" sank to a depth of 9.5 m with 2,400 tonnes of sulphur on board.

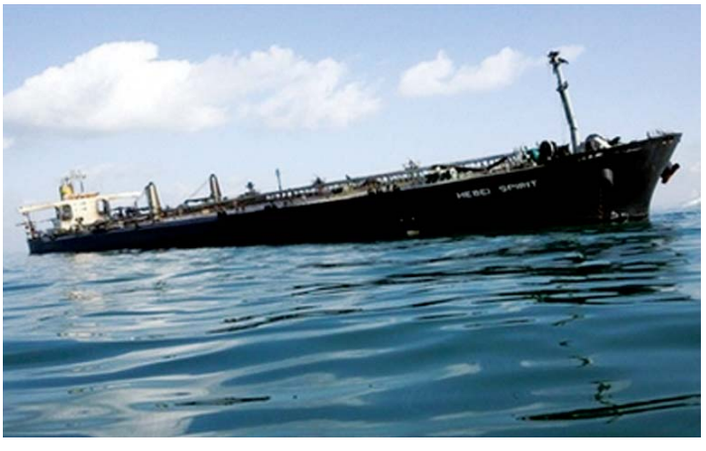
- The Russian vessel "Kovel" sank almost in the middle of the channel with 2,100 tonnes of sulphur onboard and drifted to near the Ukrainian shoreline. It is now at a depth of 9.3 m. Divers surveying the wreck observed a slight fuel leak due to the destruction of the engine compartment.

The total amount of oil spilt was estimated at 1,300 tonnes of heavy fuel oil, 2.3 tonnes of oil lubricants, 25 tonnes of marine diesel fuel oil and 5.5 tonnes of heating oil.



OIL SPILL OFF SEOUL

A crane barge owned by Samsung Heavy Industries being towed by a tug collided with Hong Kong registered VLCC *Hebei Spirit*, carrying 260,000 tonnes of crude oil on 07 Dec 07. The tanker was at anchor when incident occurred near the Port of



Daejeon off the coast of Taean in the yellow Sea.The barge was floating free after the cable linking it to the tug snapped in the rough seas.

The collision punctured three of the five tanks aboard resulted in leakage of approx 10,800 tonnes of oil. The spill occurred near Mallipo Beach, considered to be one of South Korea's most beautiful and popular beaches. The region affected by the spill is home to one of Asia's largest wetland areas, used by migratory birds, and also contains a national maritime park and 445 sea farms.

It was initially believed the oil spill would not spread due to the cold winter temperatures. However, unseasonably warm weather, combined with strong waves and unexpected wind directions, resulted in the spill expanding beyond initial expectations. On 09 Dec 07 it was reported that the oil slick was already 33 km long and 10 m wide and 10 cm thick in some areas.

The Government of RoK declared a state of disaster on the first day of the incident and immediately launched an emergency operation. The Government of RoK sought advice from the European Commission-United Nations rapid assessment team on a range of issues including: efficient clean-up procedures, environmental mitigation measures, as well as minimizing economic losses and long-term restoration.

NORTH SEA OIL SPILL NORWAY

Around 4,000 m^3 of crude oil were spilt into the North Sea at Statfjord, a offshore oil platform, some 200 km west of the city of Bergen in Norway on 12 Dec 07. Statfjord oil field is one of the largest Norwegian oil fields and is located near the border between British and Norwegian.

Statfjord A Platform

The company Statoil Hydro, operating the Statfjord oilfield, mobilised 8 vessels to observe and monitor the oil slick. A surveillance aircraft and two coast guard vessels were also mobilised. Four oil spill response vessels were deployed to neutralise the spill. All the vessels were equipped with booms and skimmers provided by the Norwegian Clean Seas Association for Operating Companies (NOFO). Two of the vessels were also equipped with dispersant spraying means. Statoil Hydro decided not to disperse because of the natural dispersion of this crude oil predicted by behaviour modelling.

Additionally, a vessel with a ROV (Remote Operating Vehicle) on board was mobilised to examine the loading buoy and oil hose. Extensive flights by surveillance aircraft were made available by the NCA (Norwegian Coastal Administration. Over flights by helicopters carried out on 13 and 14 December by the Norwegian Institute for Nature Research observed many birds but no dead birds were reported.

INDIA WATCH

OIL SPILL OFF JAKHAU

On, 15 Oct 07, at about 0300 hours, MV Star Leikanger while at anchorage in position 11 NM SW off Mitha port light was rammed by aft side bollard of barge Dhan Lakshmi of M/s Good Earth Maritime Ltd, Jakhau. The barge was transferring cargo to mother vessel when this incident happened. This resulted in a hole of 20 cms x 03 cms long with 01 cm opening approximately 2.5 m above waterline on the port side aft fuel oil storage tank of the merchant vessel and subsequent spillage of 13.9 MT fuel oil into the sea. The leakage was arrested at 0630 hours. Coast Guard units were deployed for monitoring the oil spill. Minor oil traces and oil slick broke thin streaks without any traces of oil sheen. The oil film was observed and major portion of the oil has already dissipated leaving thinly spaced oil traces.

EVENTS

SAGAR MANTHAN IV

Major oil spill response exercise was conducted off Sikka, Gulf of Kutchh on 09-10 Apr 07 by Coast Guard Region (West). The aim of the exercise was to simulate major oil spill so as to establish and validate the procedures for activating the allocated responsibilities to various Governmental and resource agencies as laid down in the NOSDCP. One of the other aim was to evaluate synergy of ICG and resource agencies. Pollution Response

capabilities and to check completeness of gears and verify its ops status, the communication procedures and its effectiveness were also checked.

The exercise was conducted in two phases i.e Table Top exercise and Mock Drill. A total of 45 representatives from resource agencies, Govt organizations and from CG participated in table top exercise. The mock drill conducted simultaneously at five different locations of resource agencies in Gulf of Kutch. Five resource agencies were tasked for the pollution response exercise in their respective area of operation.

OIL SPILL RESPONSE EXERCISE OFF KAKINADA

Coast Guard Region (East) conducted major oil spill response exercise off Kakinada on 22 Aug 07 for all the stakeholders of east coast.

10TH NATIONAL OIL SPILL DISASTER CONTINGENCY PLAN AND PREPAREDNESS MEETING - 2007

The 10th annual National Oil Spill Disaster Contingency Plan (NOS-DCP) and preparedness meeting was held at Vigyan Bhavan, New Delhi on 07 Sep 07. Director General Indian Coast Guard Vice Admiral RF Contractor, AVSM, NM chaired the meeting. A total of 75 delegates from ports, oil handling/ resource agencies and various Govt organisations participated in the meeting.

The important issues discussed and deliberated upon during the meeting included the major oil spill exercise, procurement of Tier-1 facilities, procurement of pollution control equipment for high current water

bodies, use of dispersant, preparation of Local Contingency Plan, software for combating oil spills, procurement of pollution control vessels for ports, inclusion of new ports under NOSDCP, designation of Andaman & Nicobar Islands and Lakshadweep Islands as Particularly Sensitive Sea Area (PSSA), oil spill response centre at Gulf of Kutch region and legal regime for wreck removal etc. The issue regarding the use of oil cess was discussed in detail wherein the Director Ports, Ministry of Shipping, Road Transport and Highways requested the ports to have Tier-I facilities in place and any hold up in this regard to be intimated to Ministry for assistance. The meeting lauded the efforts of Coast Guard, Oil Industry Safety Directorate (OISD) and Ministry of Shipping, Road Transport & Highways for conducting the audit of Tier-1 facilities by resource agencies and ports efficiently. The forum also decided that henceforth the meeting will be held biannually.

There were five presentations arranged for the benefit of the members during the meeting. The first presentation was on "Pollution Control Vessels for Ports" by Director (Fisheries & Environment) highlighting the dual role pollution control vessels. The second presentation was on "Environment Risk Analysis - An Overview" by Miss Swetha Bhati, IIT Delhi (for Professor Manju Mohan, IIT Delhi). The presentation discussed the study required to conduct risk analysis and the various factors required to be analysed for

conducting risk analysis were also discussed. The third presentation was on "Oil Spill Disaster Management on East Coast" by Commandant Sharad Sharma, Oi/C Pollution Response Team (East). The presentation highlighted the sensitive and important areas in the East coast, sources of pollution, resources for pollution response, human resource and training and issues related to NOSDCP. The fourth presentation was on "Regulatory & Legislative Mechanism to Prevent & Control Marine Pollution Due to Oil and other Noxious Substances" by Shri M Subba Rao, Director in MoEF. The presentation highlighted the issues related to marine pollution and national as well as international laws and conventions to prevent and control the marine pollution from sea-based and land-based activities. The last presentation on "Marine Pollution Response Activities on West Coast" by Commandant SD Sonak, Dy Oi/C Pollution Response Team (West) discussed the marine accidents on the west coast, joint inspections carried out on west coast and training profile of PRT (W).

The conference ended with a commitment to positioning of Tier-1 facilities in a time bound manner by all stakeholders and institutionalisation of strict legal regime for pollution in Indian waters.

INTERNATIONAL COASTAL CLEANUP DAY - 2007

The Indian Coast Guard is the lead agency in coordinating International Coastal Cleanup every year. This year Coast Guard organised ICC-2007 event in India to mark the occasion of International Coastal Cleanup day on 16 Sep 07 under the aegis of United Nations Environmental Programme (UNEP) -South Asia Cooperative Environment Programme as part of regional environmental programme on marine litter activity. Personnel from Coast Guard and their families, military/para military services, Police, Schools, Colleges, Educational Institutes, State /Central and NGO's took part all over the West, East and Andaman Nicobar Island coasts and made the occasion a grand success.

GROUNDING & SINKING INCIDENTS OF MERCHANT VESSELS IN INDIAN WATERS – JAN 07 – 31 DEC 07

S. No.	Date of Incident	Name of Vessel	Flag	Area of Incident	Nature of Incident
01	24.01.07	MSV Soni	Indian	Off North Brother Island, A & N Islands	Grounding
02	24.03.07	MT Jagpreet	Indian	Haldia Port, West Bengal	Grounding
03	08.04.07	MT Punita	Indian	Paradip Port, Orissa	Grounding
04	26.05.07	MV Mariam Trans	Sierra Leone	Off Porbandar, Gujarat	Sinking
05	26.05.07	Barge-05	Indian	Off Adam's Bridge, Tamil Nadu	Grounding
06	04.06.07	Tug Akash	Indian	Off Dwarka, Gujarat	Sinking
07	22.06.07	Tug Winpo and Barge ASL 300	Indian	Off Cannanore, Kerala	Sinking
08	23.06.07	MV Den Den	Eritrea	Off New Mangalore Port, Karnataka	Grounding
09	24.06.07	Tug Krishna I & Krishna II	Indian	Off Khanderi, Mumbai	Grounding
10	25.06.07	MV Sujaa-III	Panama	Off Porbandar, Gujarat	Grounding
11	25.06.07	MV Arcadia Progress	Indian	Off Porbandar, Gujarat	Grounding
12	26.06.07	MV Sea Glory	Iraq	Off Jakhau, Gujarat	Grounding
13	29.06.07	Jalparee-I	Indian	Off Paradip, Orissa	Sinking
14	30.06.07	MV Maria S	Panama	Off Kochi, Kerala	Sinking
15	30.06.07	MV Ronga	Panama	Muldwarka, Gujarat	Grounding
16	04.07.07	MV Clinker Carrier	Panama	Off Mumbai	Sinking
17	05.07.07	MV Vernal Grace	Panama	Off Budge Budge, West Bengal	Grounding
18	09.07.06	Samudra Suraksha-10	Indian	Off Mumbai	Sinking

S. No.	Date of Incident	Name of Vessel	Flag	Area of Incident	Nature of Incident
19	13.07.07	MV Rajapur-I	—	Off Budge Budge, West Bengal	Grounding
20	03.08.07	Barge BB-1142	Bangladesh	Off Nayachara Island, West Bengal	Sinking
21	05.09.07	MV Chang Le Men	St Vincent	Off New Mangalore Port, Karnataka	Grounding
22	29.9.07	MV Vien Dong 2	Vietnam	Off Car Nicobar Islands, A&N Islands	Grounding
23	16.10.07	Mv Geradu Empire	Male	Off Kanyakumari, Tamil Nadu	Sinking
24	20.10.07	Tug ASL Pinto	Singapore	Off Yanam Beach, Kakinada, Andhra Pradesh	Sinking
25	08.11.07	MSV Lakshadweep	India	Off New Mangalore, Karnataka	Sinking
26	16.11.07	MT Ratna Shalini	India	Kochi Channel, Kerala	Grounding
27	20.11.07	Tug Jasmine-I	India	Off Pondicherry, Pondicherry	Grounding
28	25.11.07	Barge Transmer-8	India	South of Chennai Port, Tamil Nadu	Grounding
29	14.12.07	Barge Aadya-I	India	Off Adam's Bridge, Tamil Nadu	Grounding
30	18.12.07	Tug Sumangla	India	South of Velankanni, Tamil Nadu	Grounding

MINOR & MAJOR OIL SPILLS IN INDIAN WATERS (SINCE 1982)

S. No.	Date	Qty and Type of Spill (Tonnes)	Location	Spilled by
01	1982	Not Assessed	West Coast	Sagar Vikas
02	24/10/88	1000	Bombay Harbour	Lajpat Rai
03	1989	Not Assessed	West Coast	SEDCO 252
04	1989	5500/Diesel Oil	795 nm SW of Bombay	MT Puppy
05	04/8/1989	Not Assessed	Bombay Harbour	ONGC Tanker
06	29/8/1989	Not Assessed	Saurashtra coast	Merchant ship
07	29/8/1989	Not Assessed	Bombay Harbour	Unknown
08	22/3/1990	Not Assessed	NW of Cochin	Merchant Ship
09	07/9/1991	692/FO	Gulf of Mannar	MT Jayabola
10	14/11/1991	40000/Crude	Bombay High	MT Zakir Hussain
11	22/2/1992	Tanker wash	40 NM S of New Moore Is	Unknown
12	2/4/1992	1000/Crude	54 NM west of Kochi	MT Homi Bhabha
13	16/8/1992	1060/SKO	Madras Harbour	MT Albert Ekka
14	17/11/1992	300/FO	Bombay Harbour	MV Moon River
15	21/1/1993	40000	Off Nicobar Islands	Maersk Navigator
16	28/3/1993	NK/Crude	Off Narsapur	ONGC shore rig at Kumarada
17	29/4/1993	110/Crude	Bombay Harbour	MT Nand Shivchand
18	10/5/1993	90/FO	Bhavnagar	MV Celelia
19	17/5/1993	6000/Crude	Bombay High	BHN Riser pipe rupture
20	02/8/1993	260/FO	Off New Mangalore	MV Challenge
21	01/10/1993	90/Crude	Cochin Harbour	MT Nand Shiv Chand
22	12/5/1994	1600/Crude	Off Sacromento Pt.	Innovative-1
23	12/5/1994	Not Assessed/FO	360 NM SW of Porbandar	MV Stolidi
24	05/6/1994	1025/Crude	Off Aguada Lt	MV Sea Transporter
25	20/7/1994	100/FO	Bombay Harbour	MV Maharshi Dayanand
26	27/11/1994	288/HO	Off Madras	MV Sagar
27	26/3/1995	200/Diesel	Off Vizag	Dredger Mandovi-2
28	24/9/1995	Not Assessed/FO	Off Dwaka	MC Pearl
29	13/11/1995	Tanker wash	Eliot beach,Madras	Unknown
30	21/5/1996	370 FO	Hooghly River	MV Prem Tista
31	16/6/1996	120 /FO	Off Prongs, Mumbai	MV Tupi Buzios
32	18/6/1996	132 /FO	Off Bandra, Mumbai	MV Zhen Don
33	18/6/1996	128 /FO	Off Karanja, Mumbai	MV Indian Prosperity
34	23/6/1996	110/FO	Off Worli, Mumbai	MV Romanska

S. No.	Date	Qty and Type of Spill (Tonnes)	Location	Spilled by
35	16/8/1996	124/FO	Malabar Coast	MV Al-Hadi
36	25/1/1997	Tank wash	Kakinada Coast	Unknown
37	19/6/1997	210/FO	Off Prongs Lt, Mumbai	MV Arcadia Pride
38	19/6/1997	Not Assessed	Hooghly river	MV Green Opal
39	14/9/1997	Naptha, DieselPetrol	Vizag	HPC refinery
40	02/8/1997	70/FO	Off Mumbai	MV Sea Empress
41	10/3/1998	Gas leak	Bombay High	Drill Rig Noble
42	12/5/1998	Gas Leak	Bombay High	Bombay High platform
43	01/6/1998	20/Crude	Off Vadinar	Vadinar,SBM
44	09/6/1998	Not Assessed	Off Porbandar	Ocean Barge
45	09/6/1998	Not Assessed	Off Veraval	Ocean Pacific
46	08/7/1999	500/FO	Mul Dwarka	MV Pacific Acadian
47	19/7/2000	Not Assessed	Off Sagar Island	MV Prime Value
48	8/9/2000	Not Assessed	Off Fort Aguada	MV River Princess
49	17/12/2000	1/FO	Bombay Harbour	MV STonnesewall Jackson
50	08/6/2001	Not Assessed	Vadinar Gulf of kutch	Not known
51	10/7/2001	1305/Diesel Oil	Hooghly river	MV Lucnam
52	23/09/2002	Not Assessed	Off Pt Calimare 220 NM	MV HIDERBAHY
53	29/04/2003	2000 Ltrs of Arab light crude oil	O5 miles off Kochi	MT BR AMBEDKAR
54	09/05/2003	2000/Naphtha	Mumbai harbour (sw of west Colaba Pt.)	MT UPCO_III
55	18/05/2003	145/FFO	Off Haldia	MV SEGITEGA BIRU
56	10/08/2003	300/Crude Oil	ONGC Rig (BHN)	URAN Pipe Line
57	28/02/2004	01/Crude Oil	36 inches ONGC pipe line at MPT Oil Jetty (Tata Jetty -OPL PIRPAU)	During Cruide oil trasfer from Jawahar Dweep to ONGC -Trombay through 36 ' pipe
58	01/10/2004	500 to 600 Ltrs	Berth – MPT – 8 Goa	During oil transfer
59	23/03/2005	110	Off Goa (Aguada Lt)	MV Maritime Wisdom off Aguada Lt.
60	27/07/2005	80	Fire taken place on oil platform off Bombay high	BHN Platform Bombay High
61	30/08/2005	08	Sunken Ship off Tuticorin	MV IIDA
62	21/04/2006	90	Sunken Ship off Goa	INS Prahar
63	06/05/2006	Minor spill (less than 100 ltrs)	Sunken Tug off Pt. Calimer Tamilnadu	DCI Tug-IV
64	30/05/2006	70 tons of Furnace Fuel Oil	Grounded off Karawar Port	MV Ocean Seraya
65	14/08/2006	4500	Outside Indian EEZ near A&N Islands	MV Bright Artemis & MV Amar
66	15/10/07	13.9/FO	Off Jakhau	MV Star Leikanger & barge Dhan Lakshmi due to collision
67	17/10/07	Not assessed	S Yanam Beach, Kakinada	Oil drifted to shore from oil rigs

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... the updates will continue ...