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# GUIDELINES FOR CLEANER FISHERY HARBOURS



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Cleaner Fishery Harbours

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## **Guidelines for Cleaner Fishery Harbours**

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his booklet is the result of a felt need to educate those involved with fishery harbours on the typical pollutants that degrade the environment, including harbour waters, and how to mitigate the problem.

The work on Cleaner Fishery Harbours undertaken by the Bay of Bengal Programme (BOBP) has been sponsored by the International Maritime Organization (IMO).

The Bay of Bengal Programme (BOBP) is a multiagency regional fisheries programme which covers seven countries around the Bay of Bengal – Bangladesh, India, Indonesia, Malaysia, Maldives, Sri Lanka and Thailand. The Programme plays a catalytic and consultative role: it develops, demonstrates and promotes new technologies, methodologies and ideas to help improve the conditions of small-scale fisherfolk communities in member countries. The BOBP is sponsored by the governments of Denmark, Sweden and the United Kingdom, and also by UNDP (United Nations Development Programme). The main executing agency is the FAO (Food and Agriculture Organization of the United Nations).

The International Maritime Organization under its Global Programme for the Protection of the Marine Environment concentrates on activities of a catalytic nature, designed to support national and regional action to enhance marine environment protection.

This document has not been cleared by the governments concerned or by the FAO.

September 1993

# PREFACE

centre engaged in the trade and handling of an edible commodity in bulk must necessarily be, it would be imagined, sanitary. The fact, however, is that, in the majority of cases in the developing world, fishery harbours are dirty and unhygienic. There are many reasons for this:

- Overcrowding,
- Lack of facilities, and, often,
- Lack of a cleanliness ethic among the users.

Fishery harbours have been created at enormous costs, paying due attention to the specifications for civil construction, site location and size. However, the special attention needed to ensure

- adequate water supply,
- the proper management of liquid and solid wastes, and
- the availability of shoreside sanitary facilities

is very often missing. The cost of correcting the sanitation problem 'after the fact' can be very high, but the possible-economic loss to the fish trade due to poor fish quality and the threat to public health warrants action to maintain clean harbours, even at this high cost.

This booklet is about pollution of the fishery harbour environment. It is meant for



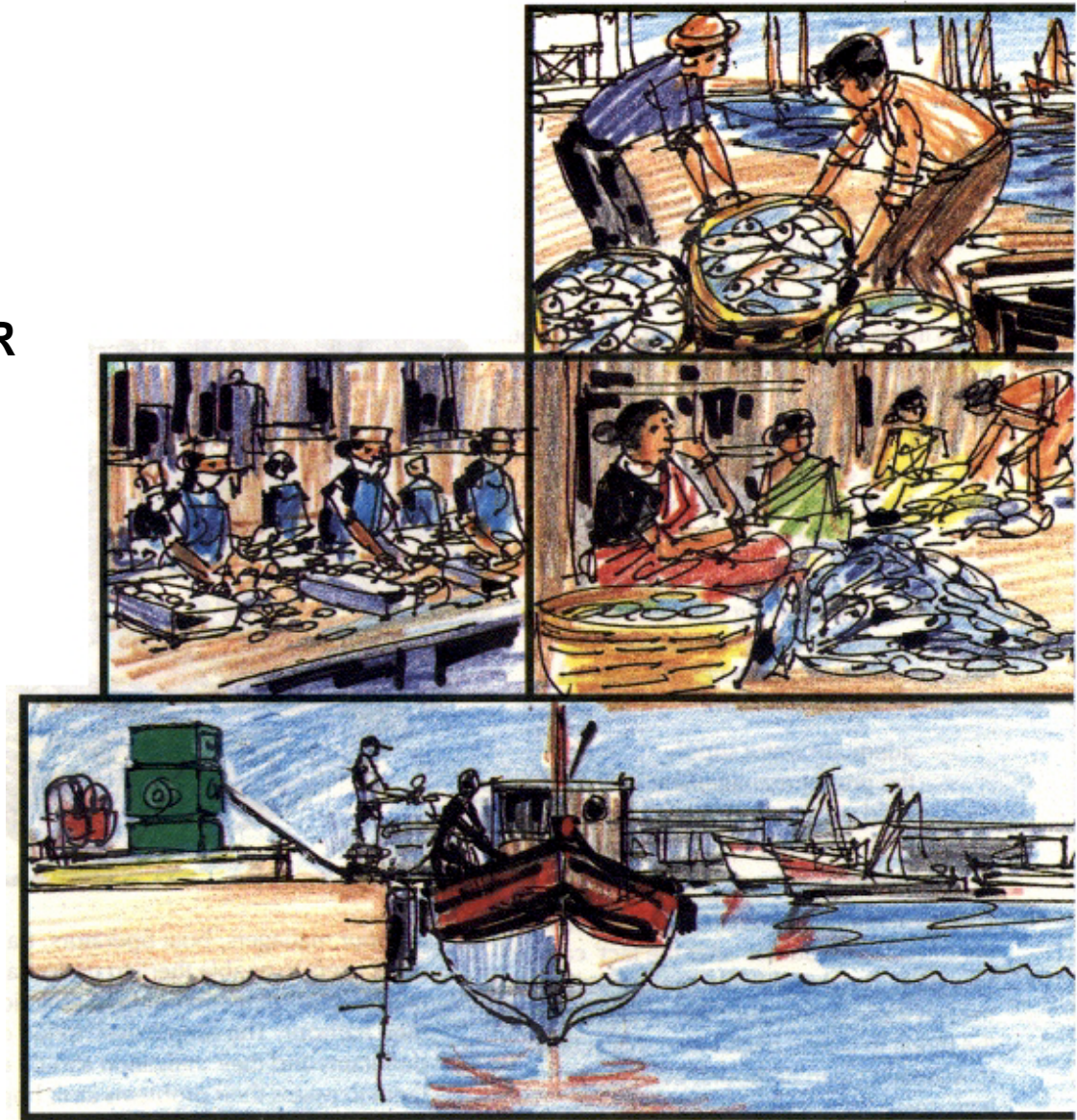
harbour managers, boat operators, traders and other users to enable them to understand the many factors that contribute to pollution of their harbour. The simple description of the pollutants and their mitigation should enable them to assess their problems and, hopefully, initiate community action and, perhaps, get the authorities concerned to take appropriate steps to deal with the situation.

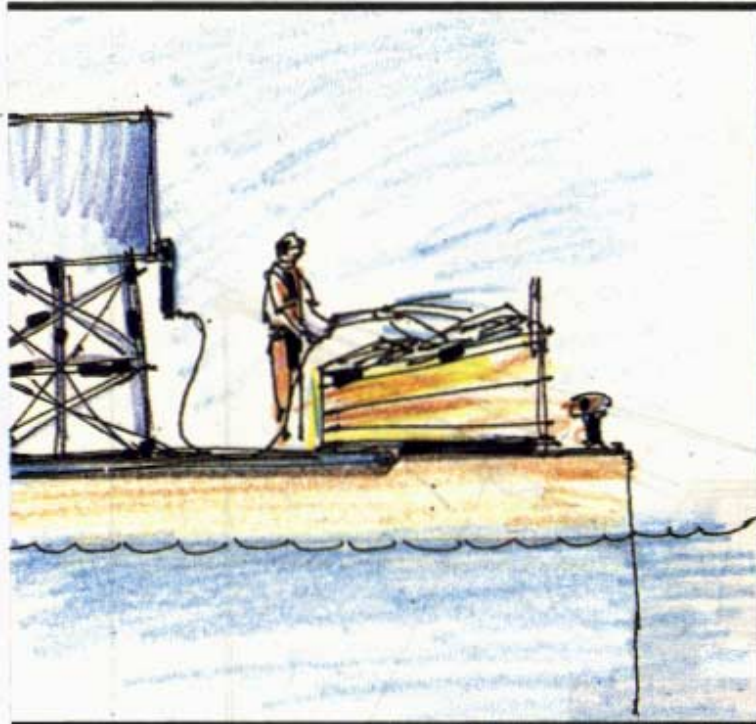
## THE ROLE OF THE FISHERY HARBOUR

**A** fishery harbour is a complex of facilities that enables the proper execution of most of those activities which are related to the catching of fish and its consumption.

The fishery harbour is a centre of many activities, such as

- Handling, processing, and marketing of fish,
- Providing fuel and freshwater supplies,
- Supplying ice, and
- Offering boat supplies and repair facilities.





Where small beachable boats landing small quantities of fish are used, only modest facilities for cleaning, sorting, selling and storage may be required. However, as the fishing vessels become larger and the landed quantities increase, the need arises for

- Quicker unloading operations,
- More selective product handling,
- Improved distribution facilities,
- More sophisticated vessel supply services,
- Better maintenance and repair facilities for vessels and equipment, and
- Improved shelter.

# MAINTENANCE

**A** fishery harbour, no matter what size, generally requires periodic maintenance to keep it functioning properly. Nearly all activities, such as fish landings, fish marketing, processing, bunkering, boat supplies, boat cleaning and repairs, generate pollutants and, if the infrastructure to handle them is inadequate, the port environment and harbour water quality suffers.

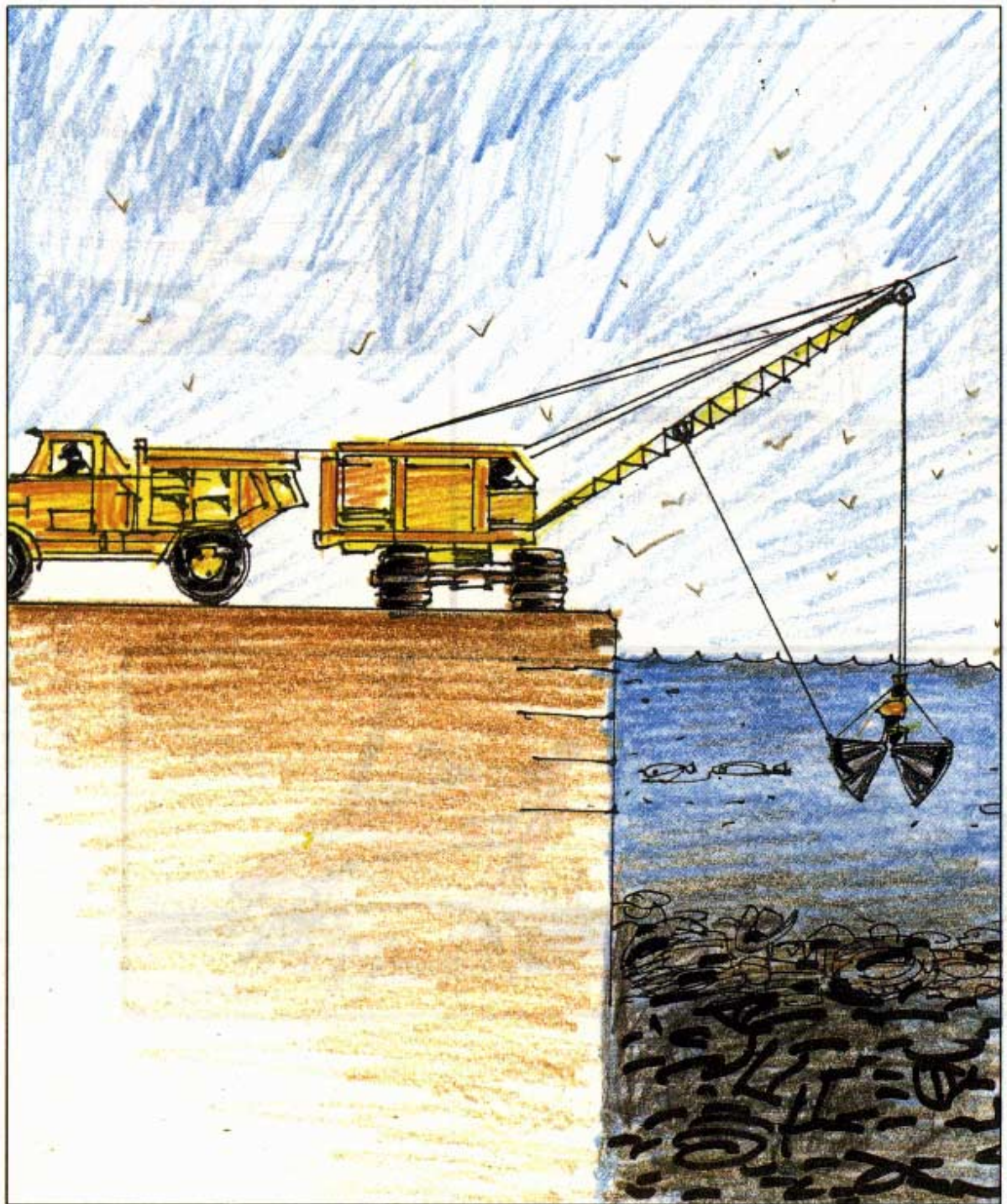
The problem is exacerbated by sewage and other effluents flowing into the harbour, as well as also by naturally occurring phenomena like siltation, growth of seaweed and inflow of flotsam. Besides causing environmental degradation, such pollution seriously affects fish quality when the fish is washed in polluted harbour waters.

## Natural phenomena and Their Mitigation

**Siltation:** If a harbour lies on a sandy coast, it may be prone to periodic siltation. Many harbours are also situated near mouths of rivers and in estuaries and may receive large amounts of erosional deposits from rivers. Maintenance dredging is, then, the only remedy. However, dredging is a costly operation and disposal of dredge spoils may result in adverse environmental impacts, such as

- Turbidity,
- Habitat destruction, and
- Water quality deterioration.

Productive use of dredge spoil, e.g. landfill, must be carefully evaluated.



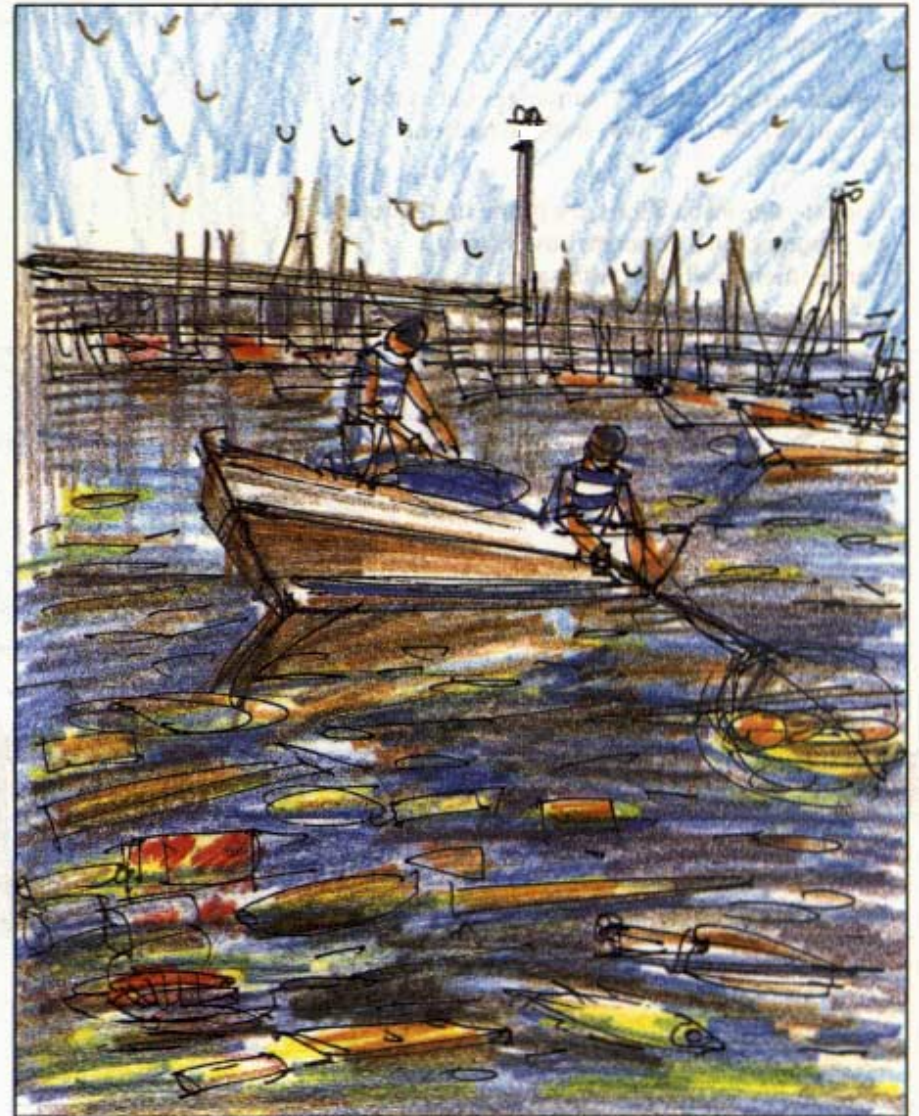
**Seaweed** occurs in two different ways:

- It may be indigenous to the area where the shelter is located, or
- It may be brought in by wind and currents.

Decomposed seaweed encourages algae and seagrass growth. Periodic dredging to rid the area of seaweed may be needed to prevent fresh weed from growing.



**Flotsam:** In addition to dead seaweed, flotsam, consisting of junk timber and other rubbish, may be brought down a river or brought in from the sea. Cleaning up flotsam by garbage collection boats is, perhaps, the only solution if floating debris cannot be prevented from entering the harbour.



# Control of Man-made Pollutants

**Spilt diesel fuel:** Diesel fuel can be supplied to boats in many ways. It may be available from

- A quayside pump;
- A floating station;
- Portable plastic cans;
- Quayside bunkering points; and even
- Carts.

Leaking-hoses and careless handling result in spills that invariably find their way into the harbour waters.

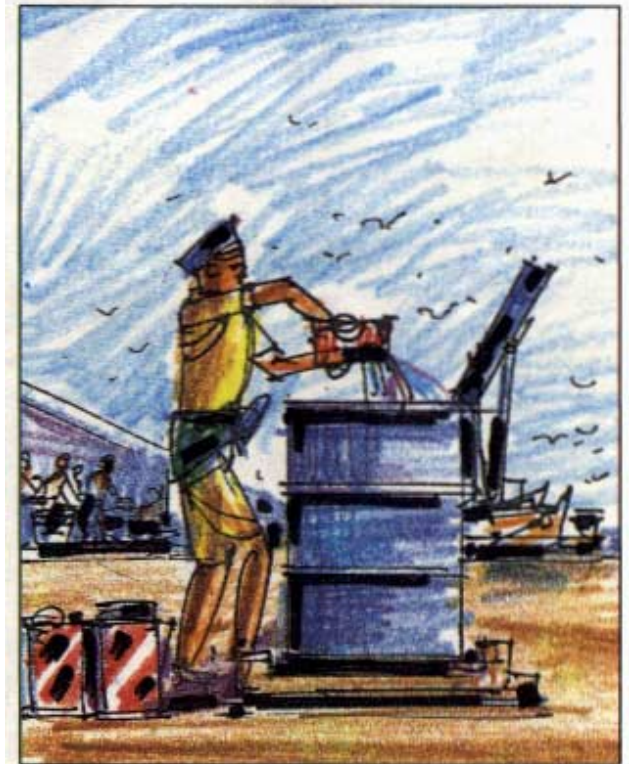
- \* For quayside installations, the pump unit should be mounted on a concrete base having a containment wall filled with sand.

- \* Fuel hoses should be of oil-resistant quality and the delivery fittings should be sturdy.
- \* If refuelling is done using plastic cans, a small hand-pump must be used and care should be taken to avoid spills into harbour waters.
- \* Sand buckets should be placed near supply points to soak up any spilt fuel.

**Oily waste:** Dumping of used engine oil and pumping of oily bilge water into harbour waters is very often the cause for oil pollution in harbours. While such actions should be prohibited by enforcing quayside regulations, the harbour should provide suitable reception facilities.

- \* Used engine oil can be collected in shore-based tanks having simple gauze filters to separate solids.
- \* Bilge water should be collected from vessels and stored in shore-based tanks that permit separation of oil from the water.

Oil from both these tanks can be periodically sold for recycling.



**Solid waste:** The inadequate management of solid waste is perhaps the most important reason for visible pollution of the harbour environment.

The two most important elements of solid waste management are:

- Adequate reception facilities, and
- Suitable disposal methods.

Typical solid wastes encountered in a harbour environment are discarded litter like,

- Used batteries,
- Oil cans,
- Paint cans,
- Broken fish containers,
- Plastic bags,
- Plastic buckets,
- Wire ropes,
- Chains,

- Paper,
- Bottles,
- Tyre fenders,
- Pieces of nets,
- Food waste,
- Trashfish, and
- Fish offal.

**Collection and disposal:** Suitable garbage bins made of concrete, plastic or made from old truck tyres and NOT from steel – like old oil drums, which corrode quickly – should be deployed in adequate numbers at appropriate locations. These bins should permit easy transfer into the collection vehicles.

Floating litter within the confines of the harbour should be collected by a small collection boat using scoopnets.

Ideally, the garbage should be segregated into

- Dry waste,
- Wet waste, and
- Toxic waste.

Dry waste, like scraps of paper, plastic, metal, glass etc., can be recycled.

Wet waste, like food waste, fish and fish offal, can be composted or buried in pits.

Toxic waste should be disposed of safely by the municipality.

Solid waste is most commonly disposed of as landfill or for land reclamation. But uncontrolled dumping of solid waste can lead to pollution of ground and surface water due to leaching of trace metals. Another method of disposal is incineration, but this is likely to be expensive when the moisture content of the refuse is high.

Harbour authorities cannot handle waste management by themselves, unless their efforts are complemented by the users of the harbour. Promotion of the cleanliness ethic by creating an AWARENESS among the public should receive high priority in any fishery harbour.



**Liquid waste:** Some typical liquid wastes that pollute a harbour are

- Sewage from sanitary facilities,
- Waste water from fish cleaning operations,
- Outfalls from processing plants,
- Galley waste from boats,
- Deck and fish-hold washings, and
- Laundry discharges.

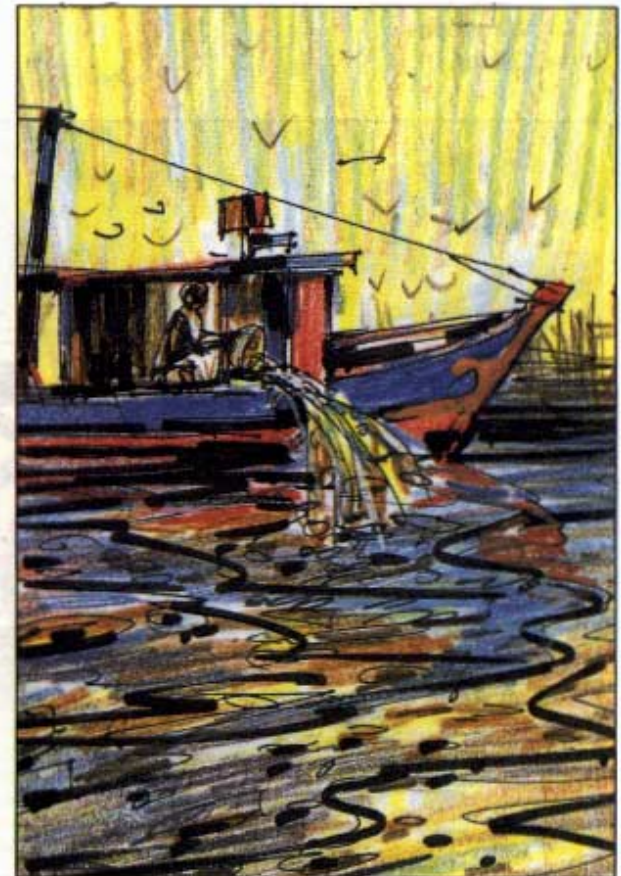
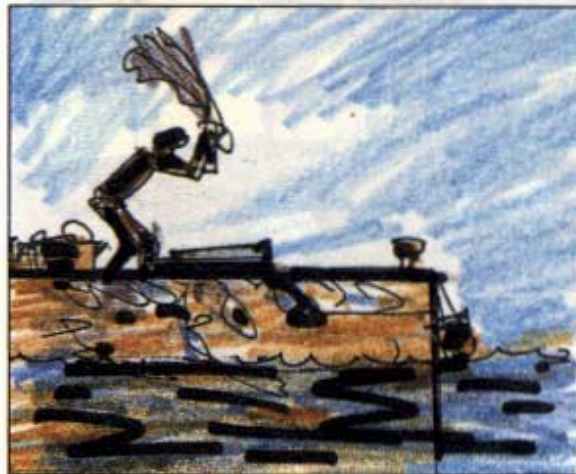
In addition,

- effluents from shore-based industries, and
  - human waste from settlements upstream
- add to the pollution load in some harbours.

The harbour should provide reception facilities for large vessels to discharge their sewage. Better still, adequate shore facilities should be provided to eliminate the use of on board toilets when vessels are moored alongside the quay. Where flush toilets are not feasible due to shortage of running water, improved ventilated pit latrines and composting toilets should be provided.

In a well-flushed marine environment, biodegradable pollutants like sewage may be assimilated with perhaps little ecological harm. Estuaries, or other confined waterbodies, with poor flushing are, however, susceptible to oxygen depletion. Viruses and pathogens in sewage exert potentially adverse effects on public health.

For the protection of public health, several governments and international health organizations have recommended a variety of guidelines of standards for fecal coliform bacteria contamination of seawater as this is a good indicator of the presence of human waste and the viruses and pathogens associated with it. Persistent pollutants, like heavy metals and some organic compounds, lead to long-term buildup of harmful levels in sediments and benthic biota.



**Collection and disposal:** Effluents from both the fish handling area and sanitary facilities should be pretreated in a 'septic tank' prior to dumping into a soakaway, which is the simplest way to dump effluent into the ground. There is, however, a great risk of polluting the groundwater if the soakaways are too close to groundwater supply. Soakaways cannot be used where clay is present.

Septic tanks are rectangular chambers with two or three separate compartments that are usually buried below ground level and which receive polluted waters from the fish handling areas and sanitary facilities (toilets). After coarse screening through a basket sump, the effluent is retained

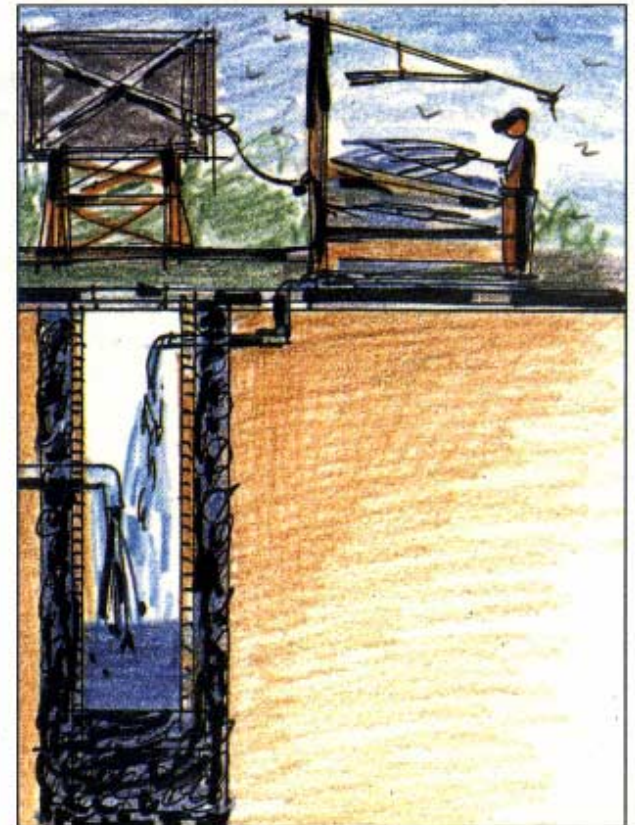
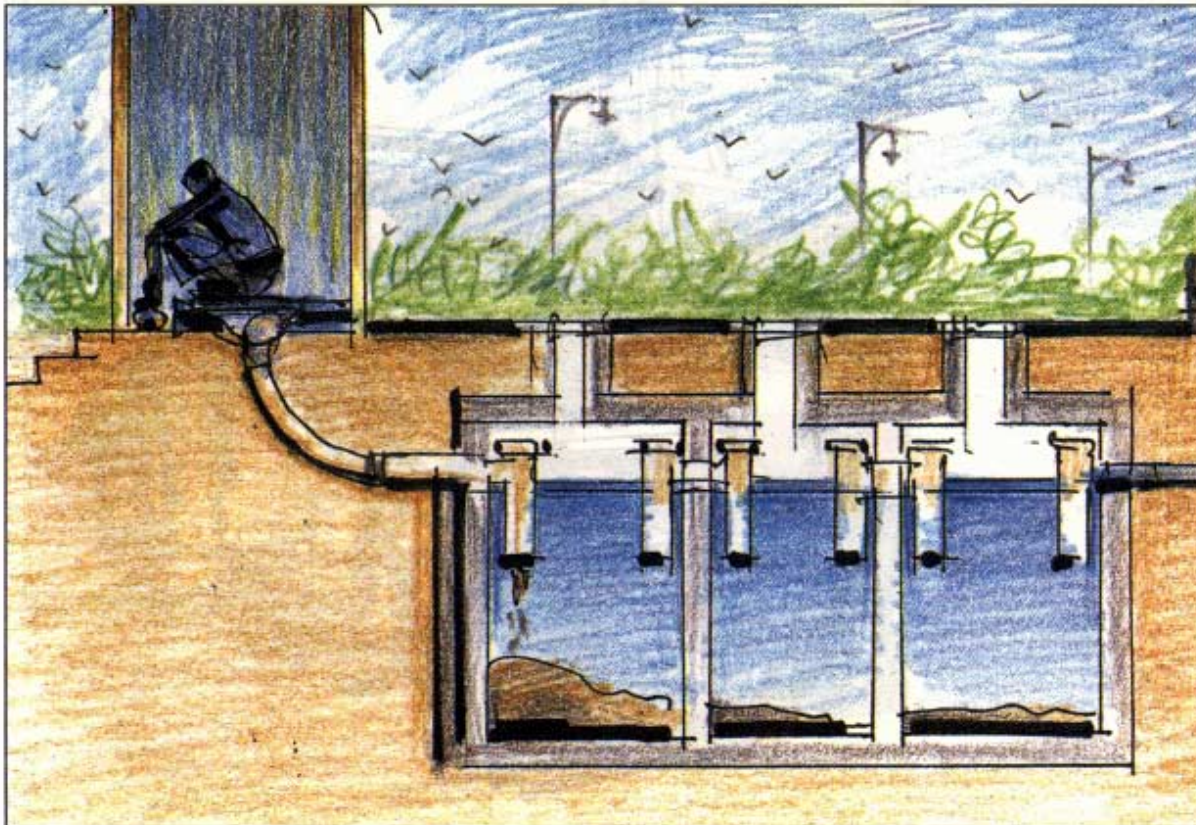
in the compartments for 1-3 days. During this period, the solids in suspension settle to the bottom of the tank where they are attacked and digested by bacteria. To start the biological process in a septic tank, a piece of rotten meat should be dropped in the first chamber.

If the fishing shelter is large enough to warrant the construction of a septic tank, the whole drainage system should, preferably, be run on freshwater and not seawater. Unlike seawater, freshwater will keep the septic tank working at maximum efficiency, ensuring that the effluent leaving the septic tank is as unpolluting as possible.

Use of seawater to flush toilets and carry municipal waste may be an important option where water conservation is important.

Discharge of primary treated sewage outside the harbour requires careful consideration in the siting of outfalls to take advantage of areas with greater flushing and which contain less sensitive ecosystems.

Recycling of treated effluent for agricultural and irrigational lands and the rearing of fish in sewage-fed ponds have been successful in India.



# PORT MANAGEMENT AND REGULATIONS

**The** common types of fishery harbour operational systems are:

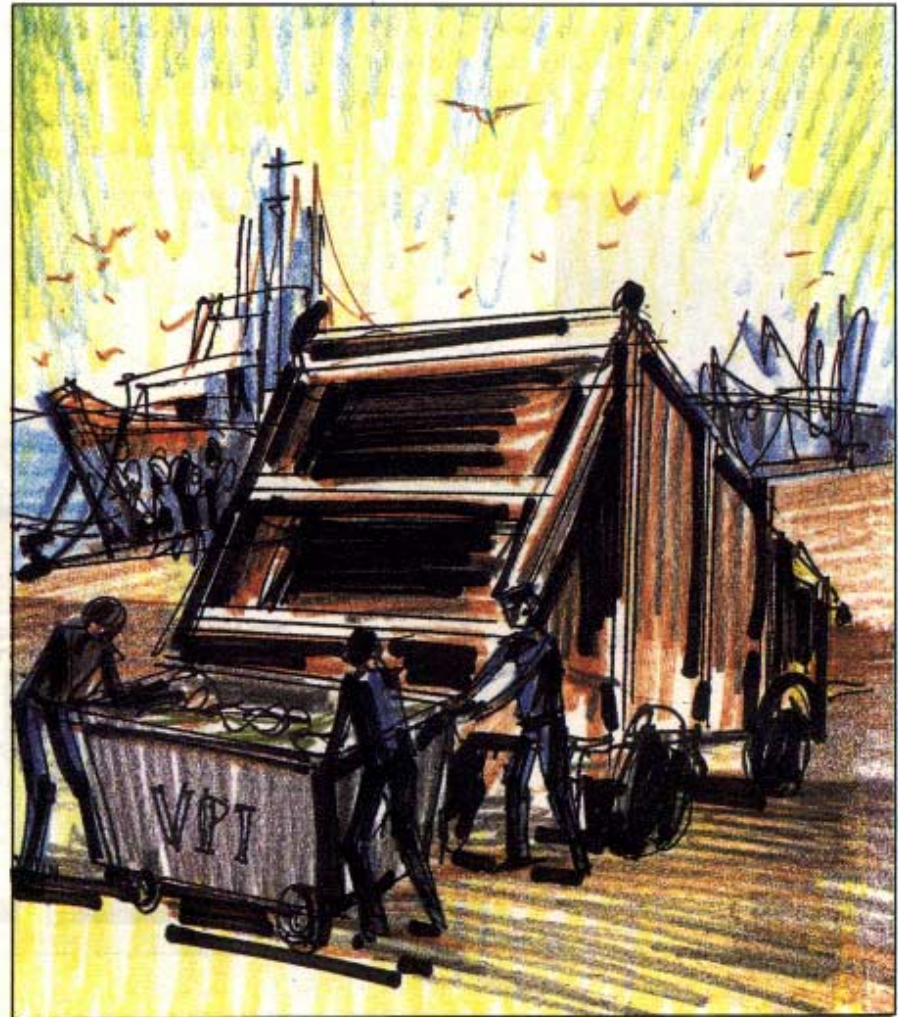
- Privately owned, where the ownership is held by a single person, company or group of companies.
- Municipally owned, where the harbours are governed by committees or boards of members drawn from the various groups of the municipal council as well as from, sometimes, the users of the harbour. In some cases, the operation of the harbour is farmed out to private companies on a management contract.
- State owned, where the operation is controlled by the local or state government represented by an elected or nominated body of members representing interested organizations and harbour users.
- Nationally owned, where the harbours are controlled and operated by a central ministry through a national organization responsible for mercantile trade facilities.

Whatever the type of ownership, there is no doubt that harbour pollution is a matter of serious concern and there is a pressing need to control it by

- Proper waste management,
- Appropriate regulations, and
- User education.

To ensure that regulations are complied with, it is necessary for the harbour authorities to provide adequate reception and disposal facilities for

- Garbage,
- Oily wastes,
- Grey water, and
- Sewage from boats,



besides providing shoreside facilities for

- Sanitary purposes, and
- Cleaning of fish.

Regulations to control pollution from boats are slowly being standardized internationally.

The IMO has laid down the International Convention for the Prevention of Pollution from Ships (MARPOL). This is being ratified by individual nations and applies to all ships of over 200 t gross, or any ship certified to carry more than ten passengers. Smaller boats are covered by the International Standards Organization (ISO).



## What is MARPOL?

The keystone of IMO's marine environment protection regulatory structure is the International Convention for the Prevention of Pollution from Ships and its related Protocol known world-wide as MARPOL 73/78. This is the most ambitious international treaty, covering marine pollution, ever adopted. It deals not only with oil but also with

- Noxious liquid substances carried in bulk (e.g. hazardous chemicals),
- Harmful substances carried in packages, and
- Sewage and garbage.



SAVE OUR SEAS!



# The main elements of MARPOL 73/78

- \* Discharge into the sea of oil and chemicals, sewage and garbage necessary in the normal operation of ships strictly limited and prohibited in particularly environmentally-sensitive sea areas (e.g. Mediterranean Sea, Black Sea, Baltic Sea, Red Sea and the Gulf area, and Gulf of Aden).
- \* Establishment of shore-based reception facilities for oil and chemical residues, garbage and sewage.
- \* Strict ship construction and equipment standards which minimize to the extent practicable the release of oil and chemicals in case of an accident.
- \* Mandatory provision for ship inspections and surveys to ensure compliance with international standards.
- \* Incidents involving oil and other harmful substances must be reported without delay.
- \* Co-operation between Governments in the detection of violations and enforcements of the rules.
- \* Rapid 'tacit amendment' procedures to take account of changes in technology and international seaborne trade.
- \* Promotion of technical co-operation.

The main objective of this Convention is to reduce to a minimum and, in certain instances, prohibit the operational discharge of marine pollutants from ships through

- the establishment of operational discharge criteria and procedures, and
- construction and equipment standards.

In addition, ship design features are introduced to minimize the outflow of oil in the event of an accident.

The Convention is implemented by nations through the promulgation of national legislation and regulations which affect ships which fly their flags and use their ports and coastal waters.

By such means, nations give real effect to the provision of MARPOL 73/78 and provide a regime whereby violations of the international rules and standards are prohibited and punished with sufficient severity to discourage future violations.

Amongst the several pollution issues covered by the MARPOL Protocol, the one most commonly found in the developing countries relates to the disposal of garbage and sewage.

Persistent forms of garbage, in particular, plastics — including synthetic ropes, fishing nets and plastic bags — are now widely recognized as posing a severe threat to the marine environment

and, in particular, to marine mammals. Annex V of MARPOL 73/78 therefore prohibits the disposal of plastics in the sea from ships as well as from offshore platforms. Such waste must be retained on board for discharge at port reception facilities unless reduced to ash by incineration.

The disposal of other types of garbage is subject to a range of requirements, from total prohibition in special areas (e.g. Mediterranean, Baltic, Black and Red Seas, and the Gulf area) to permitted disposal from 3 to 25 miles offshore.

Sewage discharge from ships is prohibited under Annex IV of MARPOL 73/78 except under special conditions, such as through a sewage treatment plant and while the ship is proceeding more than 12 miles from land.

All the Annexes of MARPOL 73/78, with one exception (Annex III — Noxious Substances in Packaged Form), make provision whereby Governments undertake to provide facilities at ports and terminals for the reception of oily and chemical wastes or cargo residues, garbage and sewage, adequate to meet the needs of the ships using them and without causing undue delay to the vessels.

# PUBLIC AWARENESS

Waste management options are limited by the lack of financial resources. The problem of such unpopular measures as levying taxes often compels authorities to make waste management a low priority in the hierarchy of harbour management issues.

This is where public awareness and education can prove vital, as the limited financial resources can be compensated for by prompt people's action to control waste buildup.

Public awareness and concern may also pressurize decision-makers to initiate waste management programmes.

- Cleanliness drives organized periodically,
- Visual aids like posters, and
- Signs encouraging the cleanliness ethic are some of the components of an awareness campaign that may initiate community action.



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