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.

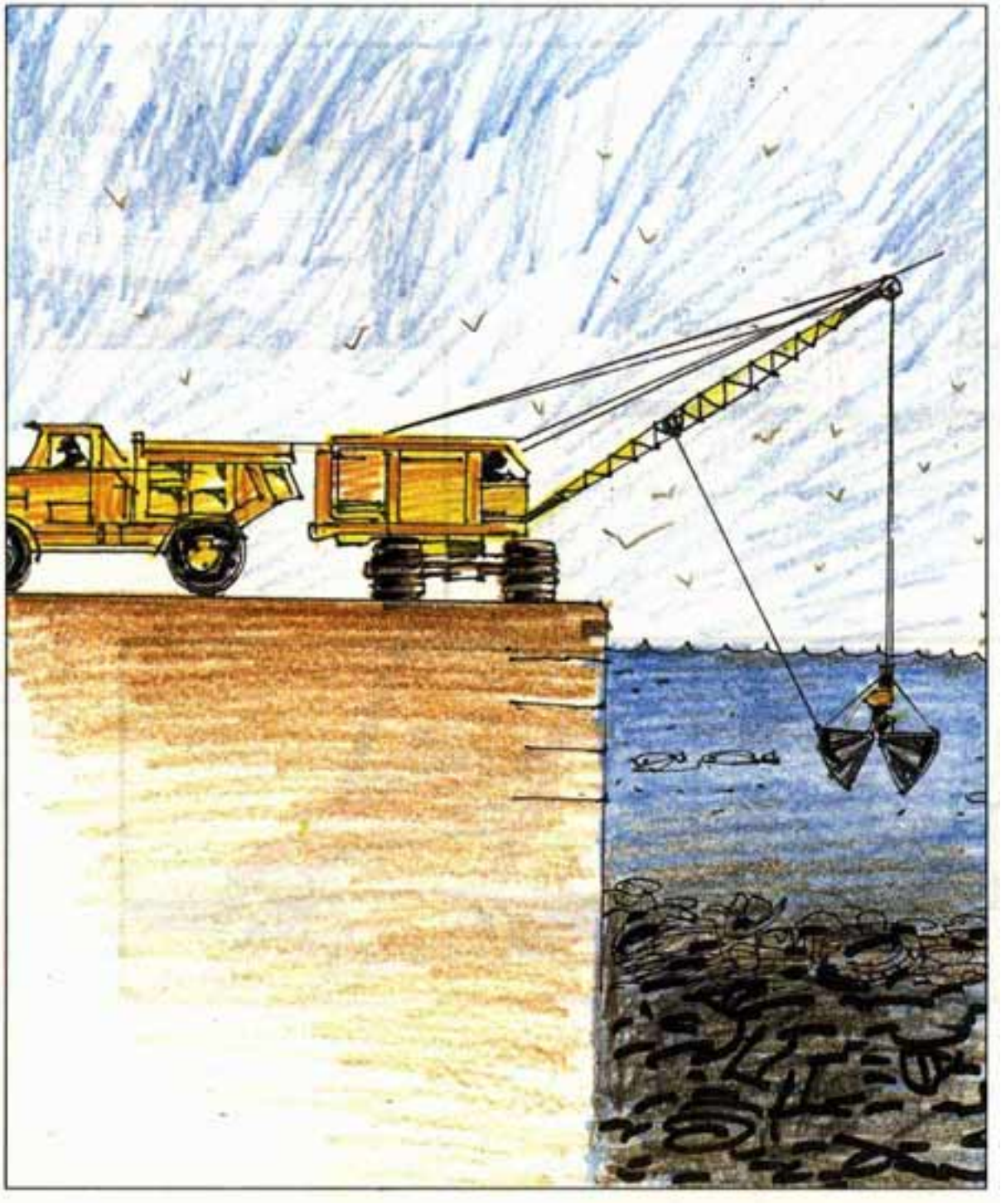
The problem is exacerbated by sewage and other effluents flowing into the harbour, as well as also by naturally occurring phenomena like siltation, growth of seaweed and inflow of flotsam. Besides causing environmental degradation, such pollution seriously affects fish quality when the fish is washed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

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

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

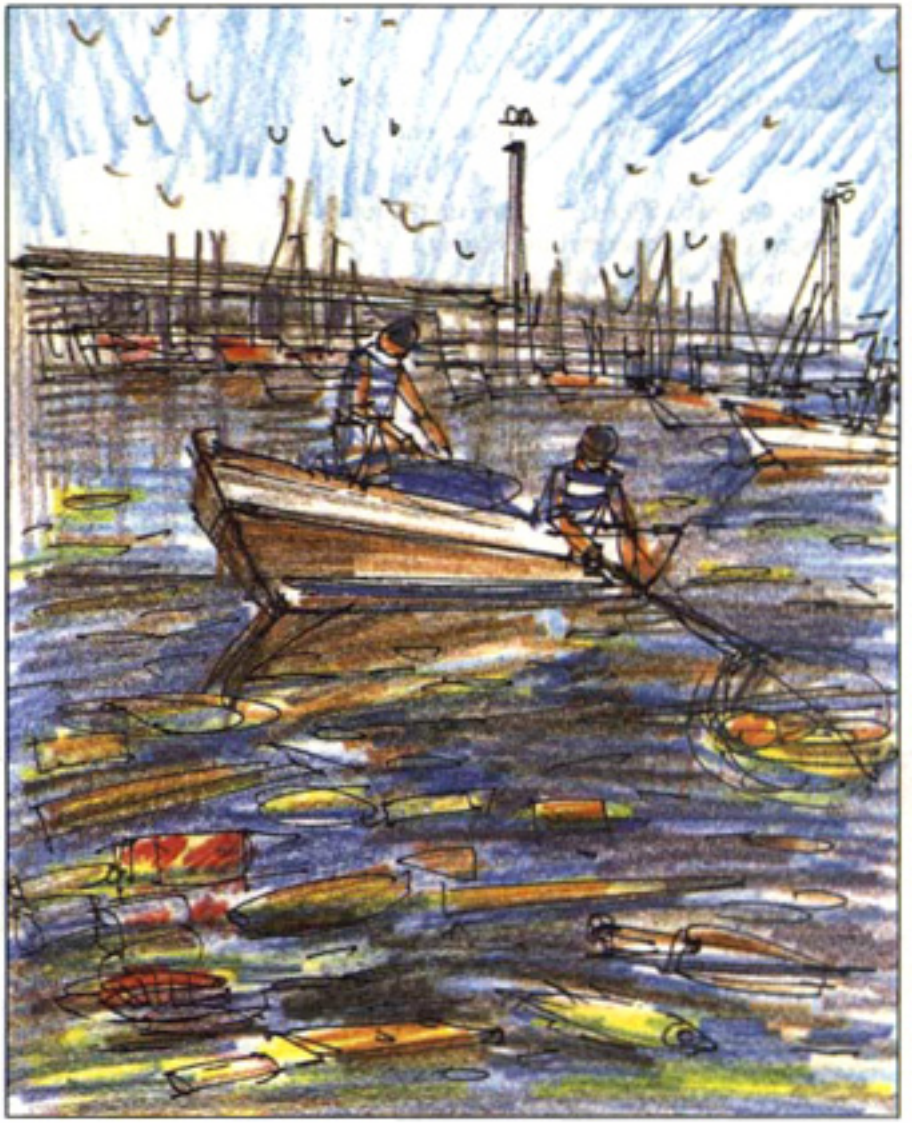


Seaweed occurs in two different ways:

- 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.

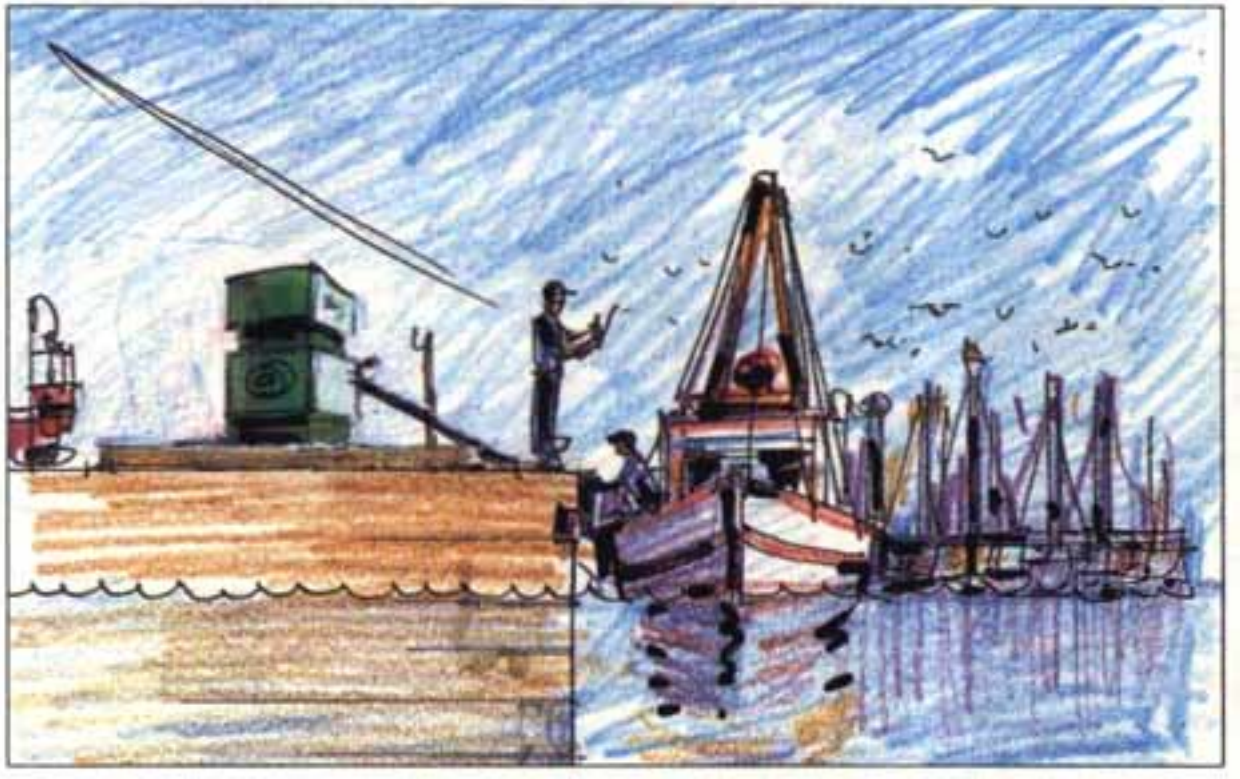
Leaking-hoses and careless handling result in spills that invariably find their way into the harbour waters.

* 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 9hould provide suitable reception facilities.

* Used engine oil can becollected 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,

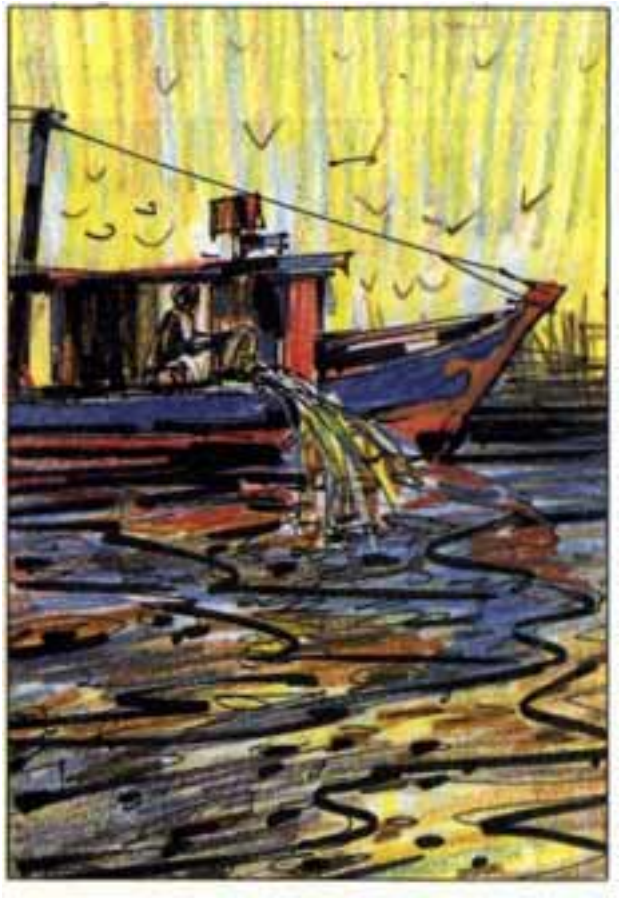
- effluents from shore-based industries, and
- human waste from settlements upstream

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 pollutingthe 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.