



USAID
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Ha Long Bay boat waste collection and treatment

Final Report



INTERNATIONAL UNION FOR CONSERVATION OF NATURE



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INTRODUCTION

There are approximately 500 boats cruising through the bay waters, of which about 300 are day-boat and 200 are overnight-boats. In this report, bay waters refers to the three bays: Ha Long, Bai Tu Long and Lan Ha.

Many of the boats that operate in the bay can be compared to floating hotels and thus generate lots of waste: both solid waste and waste water but also air pollutants (black fumes) and noise pollution. **Waste water includes black water (toilet waste), grey water (wastewater from sinks, baths, showers and laundry) and bilge water (oily water that accumulates in the lowest part of a ship).**

Hereafter, we identify and recommend concrete solutions to collect and treat waste water from such cruise boats and remove floating waste from the bay's water. Indeed, it is necessary to implement active and concrete measures in order to address the decreasing environmental quality of the Ha Long Bay and restore the unique natural beauty of this important tourist location and World Heritage Site.

CONCLUSIONS

In order to tackle the pollution, a waste management system should be established, investment in mobile cleaning boats should be called for and appropriate ports, equipment and a training program for cruise company staff and crew should be implemented, as well as a regular briefing of cruise passengers about the impacts of pollution on the bay.

At the same time, regulations relative to cruise companies **and port** waste management must be issued and strict enforcement of all directives must be carried out on a regular basis. Corrective actions should be taken to address non-compliance cases. Most importantly, a cleaning company should be designated and given full authority to carry out the cleaning work with appropriate resources and should be accountable for their performance and achievement of targets.

LEGAL FRAMEWORK

One of the major international agreements relevant to cruise ship pollution is the **International Convention for the Prevention of Pollution from Ships**, also known as MARPOL 73/78, or simply **MARPOL**. Six Annexes of the Convention cover various sources of pollution from ships and provide a framework for international objectives.

MARPOL 73/78 is one of the most important international marine environmental conventions. It was developed by the International Maritime Organization in an effort to minimize pollution of the oceans and seas. The objective of this convention is to preserve the marine environment in an attempt to completely eliminate pollution by oil and other harmful substances.

As of 2015, 152 states are party to the convention, including Vietnam. All ships flagged under countries that are signatories to MARPOL are subject to its requirements, regardless of where they sail and member nations are responsible for vessels registered under their respective nationalities.

All vessels, installations and ports should comply with a range of environmental regulations to ensure the sustainable use and protection of the seas, oceans and waterways for future generations.

PORT REQUIREMENTS RELATIVE TO WASTE

There are requirements upon ports and marinas, just as there are for vessels, to comply with a range of environmental regulations to ensure the sustainable use and protection of the seas, especially sensitive marine areas. Ports are hot spots for spills of oil and other pollutants.

The government has an obligation to ensure that ports provide adequate facilities for the disposal of various waste products generated aboard ships. This obligation arises under MARPOL 73/78.

Port waste retention facilities

Marine protection rules (**MARPOL**) require the operators of ports to provide waste retention facilities and services for the transfer of waste from ships.

Following a first assessment it is evident there are no port equipment relative to waste management, for instance no waste storage facilities, no port waste management plans and no waste treatment.

As stated in the **Grant Thornton** report:

“Concerning grey waters, most cruise boats are equipped with sufficient storage facilities; however, there is no collection point for this grey water, which renders cruise boats' efforts in transferring grey water back to the land almost pointless, since this water cannot be properly handled and the vessels are forced to discharge into the bay.” (**Grant Thornton report, September 2015**).

Neither ports (Tuan Chau, Hon Gai) are properly equipped and no Waste Management plan exists. Ports should be brought up to standard and take an active role in environmental protection through environmental management plans.

The implementation of an environmental management plan starts with adequate training of ports personnel and staff, but also awareness and information of all port users whether professionals (merchants, restaurant owners and staff, cruise operators, tourism workers) or individuals (residents, tourists and locals).

Port staff training is of prime importance in order to integrate environment concerns into daily port activities but also to ensure a pedagogical watch for the various port users.

Concrete steps to be taken are:

- Clear commitment from port operator to engage into environmental management
- Environmental impact analysis of all port activities including all port users
- Set up of environmental management manual and plan, with identified steps to minimize environmental impacts
- Education and training of all port staff and personnel, awareness of port users relative to environmental impact of ports, boats and human activities

BOAT EQUIPMENT RELATIVE TO WASTE

Some boats **(250 as a rough estimation)** need to be equipped with waste water holding tanks and necessary connections to allow waste water pumping, and with bilge water filters.

Most day-boats release heavy black fumes and create high noise levels, which are the symptoms of bad engine maintenance. A well-maintained engine does not produce such pollution. Solutions are well-known and easy to implement from a technical standpoint. Also, proper engine maintenance should be mandatory with an enforcement system in place, which is far from being the case today.

The lack of control, regulation enforcement, remedial action follow-up are definitely weak points and part of the current problem.

VOLUME OF WASTE (FIRST APPROXIMATION)

The wide range of boat sizes in terms of capacity and services offered makes it difficult to produce meaningful waste volume figures, however, inputs received from cruise operators indicate that:

- Solid waste produced per passenger on day boat: 1 kg
- Solid waste produced per passenger per day on overnight boat: 3 kg
- Waste water (grey and black) per passenger on day boat: 20 liters
- Waste water (grey and black) per passenger per day on overnight boat: 250 liters
- Bilge waters: Only boat inspections could lead to accurate figures, as this depends on engine maintenance (leaks), boat hull material and maintenance. It has to be noted that according to data from the VN register, day boats are equipped with bilge tank of 50 liters

(Source: Ship Department, Vietnam Register, address: 18 Pham Hung Str., Tu Liem Dist., Ha Noi City, Vietnam).

CURRENT ISSUES resulting from discussions with stakeholders and own assessment

- No Waste Management plan (ports, cruise operators)
- No objectives nor goals relative to pollution control or waste management
- No accountability and nobody seems to be in charge
- No investment made in appropriate and efficient equipment to clean the bay
- No appropriate port equipment (waste storage and treatment) and environmental management plans
- No existing training programs on environmental protection and waste management to bring boat
- and port staff, crew, managers and directors up to standard

CURRENT WASTE COLLECTION AND ON-SHORE TRANSFER PROCESSES



Cleaning boat in Halong bay collecting floating waste (2016)

Cruise operator manager comments:

“Currently, in Tuan Chau there is no supply of water cleaning or waste collection so some of the local people help crews to collect garbage and exchange it or recycle the waste for money.”

“The problem is that environmental protection is never a main priority of Ha Long Bay Management. So as you see in the photos, there is a “waste station” where the locals and crews meet to transfer the waste, but in terrible way. It’s actually very hard for them, because they have no proper waste station, only layers of rock. Some local people have broken their legs due to difficult conditions... in windy, rainy conditions it is not easy for them.”

Tuan Chau is a very modern wharf, however, they do not care about the environment so much. So there is no proper waste station so far. I know many crews will choose to flush the dirty water or garbage directly into the water... it happens everywhere in Ha Long, Bai Tu Long and Cat Ba.”



Cruise boat solid waste transfer by tender boat on-shore Tuan Chau port



Cruise boat Solid waste transfer on-shore Tuan Chau port - waste collection

TUAN CHAU PORT



Solid waste storage in Tuan Chau port area (2016)

SOLUTIONS AND RECOMMENDATIONS FOR WASTE COLLECTION AND TREATMENT

A fleet of cleaning boats equipped with the necessary waste and oil recovery systems will collect waste waters (black, grey and bilge) and solid waste from the cruise boats and then transfer the waste on-shore in dedicated ports areas. The ports should be equipped to collect and store the incoming waste and treat the waste waters locally.

The treated waters could then be re-used for various purposes like public garden watering, pier and boat cleaning.

As an example, the ECOTANK company, based in the French Riviera, has developed specific cleaning boats and implemented waste recovery solutions in major Mediterranean bays and port waters. **See more details and photos in the Annex section**, with a list of services performed by the Ecotank boats.

ESTIMATED BUDGET: USD 3.1 million

Marine collection

A fleet of between 8 and 12 cleaning boats should be put into service.

Estimated budget (CAPEX): USD 1.2 million

Port equipment

Estimated budget (CAPEX): USD 600,000

On-land waste water treatment stations (installed in port area)

Estimated budget (CAPEX): USD 800,000

Cruise boat equipment

Estimated budget (CAPEX): USD 500,000

Those solutions are technically proven, efficient and financially feasible. **Budgets are reasonable** and represent only a small fraction (15%) of **the 2015** income of USD 20 million collected by the HLBMD from cruise visitors and even a smaller portion of the estimated budgets for the pollution mitigation from the “Quang Ninh Environmental Master Planning”, aiming to achieve good environmental practices around the bay.

PORT EQUIPMENT INFORMATION

Various equipment is required to be installed in the ports, especially waste storage products according to waste categories. Food waste composting units can also be installed, along with incineration devices, as required by the port waste management plan (to be created). The waste water treatment units should be positioned in appropriate port area, ideally at a distance of 25 meters from the Ecotank barge locations.

See attached PDF file on port management plan (French version)



Tuan Chau island general view and day-boat port

ANNEXES

ECOTANK Presentation

ECOTANK was created in 2011 by yachting professionals to offer waste water management solutions in the marine and boating world. The maritime law recognizes the environmental damage resulting from the uncontrolled dumping of used water and ECOTANK has developed services for boat owners/operators and marina officials, making compliance simple and affordable.

The Ecotank boats are multi-function boats that can be equipped to collect waste water, floating waste, oil and are also able to perform fire-fighting tasks, to name a few. On-shore waste water treatment units are installed in appropriate port areas to treat the collected waste water.

Cruise boats waste water collection and treatment/floating waste collection

ECOTANK barges allow easy and efficient recovery of **liquid waste (waste waters, bilge water, engine oil) and solid waste from boats or floating villages**. They also deliver immediate and effective action in case of accidental pollution or fire.



ECOTANK cleaning boats



ECOTANK boats and fleet

ECOTANK's boat fleet has been custom designed to facilitate the removal of all types of waste from tourist boats and yachts. Almost silent, the boats are able to service yachts in port or at anchor. Far more flexible than lorries, far more convenient than using fixed pumping stations, they are highly maneuverable service platforms and carry all the necessary fittings to connect to any kind of boat.

Equipped with their own energy supply they can autonomously pump. The Ecotank boats can navigate open seas to reach tourist boats at anchor (overnight spots). They also operate in port reaching the areas other service providers are unable to reach such as finger quays, temporary docks or restricted areas.

The boat hulls have been purpose designed and built with aluminium hulls. The vessels are fully equipped. A boat pumps up to 300 litres per minute and can carry an average of 4 m³ of waste water. **Equipped with forward net, collection of floating waste and selective sorting in dedicated waste containers is an easy process, allowing to clean large marine areas and port waters.**

ECOTANK services for boats and ports

ECOTANK services were designed to assist all actors involved in the marine sector to be environmentally responsible.

When you have guests aboard, the ECOTANK barge is dispatched to your location whether in port or at anchor.

The silent boats will come alongside with no intrusion on your guests' privacy. ECOTANK offer quiet and odourless pumping of your tanks along with other important services, like fuel filtration (see below).

After a busy season, it is the right time to catch up with maintenance projects. The boats have the machinery and capability to assist with those jobs of cleaning and disinfecting black and grey tanks

and bilges tanks. The crew can help you prepare for your annual inspections by emptying, cleaning and disinfecting the fuel tanks. Also fuel filtration services are proposed using centrifugal separator .

ECOTANK services

Fuel filtration and tank cleaning

Centrifugal separators and coalescence 0.5 microns

Destruction of bilge water, oil and fuel

Pumping and cleaning of bilge and tanks

Black, grey, fresh water, sludge, oil & fuel

Steam cleaning

Degreasing your engines, generators, bilges.

Disinfect your tanks, bathrooms, galley, hammam & jacuzzi

The above services are designed to keep your engines and associated devices in perfect working order, and the net result is a much prolonged engine life and lower maintenance costs.

Options

The Ecotank barge can also be equipped with fire-fighting devices and oil skimmer to remove oily layers and address fuel contamination of surface waters (open sea, bay, ports).

ECOTANK References

Prestigious clients rely on Ecotank expertise and services to keep their waters clean:



*Ecotank boat pumping system
The Ports of Nice, Cannes, Monaco, Saint-Tropez*

Waste Water Treatment Units

The BIOCON systems are one of the most effective marine sewage treatment systems; they can be installed on-shore in containerized ECOTANK units or alternatively on floating pontoons.

See attached PDF file for information on Biocon product range.

FASEP (Fonds d'Aides au Secteur Privé)

**See below comments from the Head of FASEP department , Ministry of Finance, France
Ministère des Finances et des Comptes publics | Ministère de l'Économie, de l'Industrie et
du Numérique**

- Details on demonstrator operations should be given, involvement of the public sector (Ha Long bay management department, Quang Ninh authorities) must be outlined and detailed.
- Technical explanations should be given about technologies of treatment station and use of recycled waters.
- Co-financing or clear involvement of the authorities should be assessed and reported

A first committee has given positive feedback on the FASEP project involving Ecotank solutions, however a second committee is awaiting more details relative to Ha Long authorities support and financing participation to the program and inputs relative to the operations of the Ecotank boat in Ha Long Bay.

A letter has been issued by the Quang Ninh PC showing support to the Ecotank solution and FASEP program, although there are no clear commitments to engage into an overall solution, which requires among other things capital investment, waste management program for the ports. Without a clear willingness of the local authorities to implement an overall solutions with Ecotank cleaning boats, the FASEP demonstrator program will not receive final approval.

The next LD3 meeting will be an appropriate event to discuss and review authorities **engagement and willingness to go forward with the proposed solutions.**

Typical cruise itinerary of overnight boat in Ha Long Bay



Cruise itinerary of overnight boat

List of organisations interviewed

The following organizations have been met to discuss the subject matter and get their views on the situation.

Bhaya cruise - SM Gray Line - Paradise cruise - ANNAM Junks - Oriental sails - Indochina-Junks - Tuan Chau port

Grant Thornton - VINPEARL.



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Fishing boats in Ha Long Bay © IUCN Viet Nam