

## **INTRODUCTION**

The principal aim of the proposal was to produce a basic project in standard format for an antipollution boat. The vessel is suitable to operate in the Mediterranean sea though should also be usefully applied in those countries which have interests to protect the sea from oil spill and other forms of pollution.

Though efforts have been made to co-ordinate the interaction in Mediterranean sea, the lack of a study or project to improve common technical devices to combat oil spill was generally lamented.

In the aim of the applicants was to obtain a basic project developed under IEC support and subsidiary to disseminated in all interested countries, without any direct profit.

## **RESULTS**

### **The vessel**

The vessel has been designed essentially for the service protection of coast and sea environment, in particular the Mediterranean, for the sea pollution prevention and combating, including activities of observation, defence and assistance for the sea fauna (birds, cetaceans, turtles). In the feasibility study, efficiency of single hull configuration or catamaran have been examined.

The vessel project has been based on the main requirements scheduled by the *Grant Agreement*, and main characteristics result as follows:

- Overall length 37,70 m
- Breadth moulded 10,00 m
- Main deck height 4,50 m
- Light displacement draught 2,50 m
- Loaded draught 3,50 m
- Gross tonnage 410 GT
- Rec-oil capacity 210 m<sup>3</sup>
- Free deck area 105 m<sup>2</sup>
- Power supply N. 3 d/generators of 800 kW - 690 V 50 Hz
- Propulsion N. 2 azimuthal thrusters driven by electric motors
- Propulsion power N. 2 x 1000 kW
- Transversal propulsion N. 1 bow thruster driven by electric motor (150 kW)

- **Range (patrolling service) 2.500 miles**
- **Maximal speed 15 knots**
- **Capability of dealing with large oil spills**
- **Proper system of recovery and stocking**
- **Good stability and manoeuvrability**
- **Flexible propulsion system, adequate both to approach speed (12 ÷ 15 knots), patrolling speed (8 ÷ 10 knots) and reduced operative speed (1 ÷ 5 knots)**

**A superstructure will contain accommodations and engine casing. The bridge on top the superstructure will be provided with a large glazing window to allow perfect external visibility. The structure will be accessible from the internal staircase and from the forecastle deck through a stairway and landing.**

**Main peculiarities of the vessel meet the following operative profiles:**

- **Coastal patrolling service (prevailing activity in time terms, to be carried out at reduced speed, around 8 ÷ 10 knots)**
- **Reaching the area where the pollution has had place, at the maximum possible speed (15 knots)**
- **Removal of polluting substances, at the minimum speed possible (0.7 ÷ 1.0 knots)**
- **Recovery of polluting oils removed from the sea surface**
- **Heating system for the rec-oil tanks**
- **Removal of solid materials from the sea surface**
- **Sea monitoring, physical-chemical data collection, relief of samples and chemical analysis**
- **Assistance to the sea fauna (turtles, cetaceans etc.)**
- **Rescuing service and assistance at sea**
- **Fire-fighting service**

### **The operating systems**

#### **➤ Oil polluting substances removal system**

**Structural skimmers on each side, with conveyance through lateral configuration provided by booms connected to arms rotating outboard at 90°. The system allows a pretty large front of attack (24 m) of the slicks for most frequent situations of limited spills, with manoeuvrability facilitated by mechanisation. It offers flexibility of use by means of three different interchangeable modules, one with rotating brushes, another with discs, the third provided with a pit with a vertically moving gate and submersed pump.**

Besides the structural system, in case of large spills or in the necessity to operate on larger fronts, it's possible to form a configuration with the offshore booms connected to proper rods placed on both sides and towed by a tender.

➤ **Polluting solids removal system**

For cases of macro-pollution from solids or for the recovery of large bodies, dangerous for the navigation, the vessel is equipped with a hydraulic bucket movable by means of the crane. The use of the bucket also allows, on the occurrence, the recovery of large quantities of bituminous substances, accumulated by the booms on the vessel's side.

➤ **Dispersants sprinkling system**

This system, provided of an adjustable capacity metering pump for proportioning the dispersant for the formation of a mixture with sea water, give the reliability of the metering pump in matters of fine regulation and proportioning consistency. A good mixing between the two fluids is guaranteed by the interposition of a proper swirl barrel in the point of injection of the dispersant on the waterline. The sprinkling is carried out by the two arms of the skimmer system (not equipped with booms and with portholes closed); on each arm runs a pipe provided with sprinkling nozzles and connected to the system through a cut-off cock.

➤ **Tender**

The ship is provided with a service boat of fibreglass, particularly dedicated to the towage and control of the booms in recovery configuration. For this purpose the boat has nautical characteristics and power (95 kW) adequate for the towage of 200 m of heavy duty booms. The moving from onboard to sea and vice-versa is carried out by rotation overturning cranes, such to allow operations even with heeling of 25°.

The boat is equipped with a large forward basket, with hydraulically driven turnover, for the recovery of polluting solids in low depths or in support to the main vessel, and is provided with a small monitor for the mechanic dispersion of iridescence or to favour the mixing in the sea of chemical dispersants sprinkled by the main vessel.

➤ **Installations for monitoring**

Suitable rooms for laboratory, office and installation of refrigerators and freezers for the samples are dedicated on board. Instrumentation equipment will be defined according to the search typology for which the vessel will be purposed.

The area for the relief of samples (water, plankton and sediments) and for the moving of multiparametric probes is equipped with a pneumatically driven movable crane, placed on the first upperdeck under the

bridge's wing. This positioning allows efficient operation even in the case of rain. For relief of samples by means of heavy machinery, corers or box-corers, is planned the use of the main crane.

Proper hooking systems on deck allow the embarkation of a movable laboratory container ISO 10.

➤ Installations and equipment for the safeguard, assistance and recovery of sea animals

On the basis of experiences and according to what is suggested by specific handbooks have been predisposed installations and equipments for the safeguard, assistance and recovery of sea animals, including inflatable pools to be filled with sea water for keeping the animals wet.

Some innovative systems have been examined for the assistance to sea birds that have come in contact with oil spills.

➤ Fire-fighting system

Remote controlled fire-fighting monitors are installed both at the right and the left of the bridge top roof, supplied by external passing manifolds. Fire-fighting water is supplied by two pumps, driven by the main engines, of 600 m<sup>3</sup>/h (capacity) at 120 m (head).

