FESASIBILITY STUDY ON THE IMPLEMENTATION OF STRATEGY AND MODERN POLICY ENVIRONMENT MANAGEMENT IN NAVAL AND PORT ACTIVITIES OF THE DANUBE–BLACK SEA CANAL

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Abstract. One of the priority issues in case of accidental or operational oil spill and oil residues is implementing procedures to limit and fight pollution. In these circumstances the phenomenon of pollution issues associated with such an accident has a very complex character, which puts very difficult issues that require high purchasing costs. The paper integrates these policies and strategies in a plan of intervention in case of oil pollution on the Danube–Black sea canal and particularly in the area of confluence with the sea, especially in case of inaccessible areas because of the buff. The aim of the plan is to establish a support mechanism, in which the competent authorities will cooperate to coordinate the intervention actions in accidental pollution cases on the Danube–Black sea canal, affects or may affect port areas, banks, the territorial sea and economic zones.

Keywords: the Danube–Black sea canal, oil pollution, contingency plan.

AIMS AND BACKGROUND

The Danube–Black sea canal in maritime activity and inland waterway transport plays an important role in the integration of the internal market supporting values of geographical position of Romania as a transit zone. The opportunity created by the Danube–Black sea canal, Danube river and Black sea coast may occupy a key position for attracting international flows of goods in relations between Europe and other continents. By putting into operation of the Rhin–Main–Danube canal (1992) has provided a direct link between water of the Constanta port and the Rotterdam port. The advantage of this main route lies in the fact that this canal enters directly in the Constanta port, falling from the south-east of it, which ensures real development perspectives. In this context ecological approach of these activities involves analysing the current situation recorded on the national plan and the need to align the activities of shipping and transportation sector including port related services supplied to ships and goods to the European standards. Contradiction between environment and economic activity specific to naval transport is manifested through more extensive and ecological disasters whose marks can not be stopped

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by costly actions to establish the natural wealth integrity. When a decision is taken to collect or attempt to protect a sensitive area, a quick reaction is essential. In the same way very important is the rapid removal of oil contained. Considering the causes and effects leading to environment pollution, it is necessary and should be required to establish national and international laws, which impose restrictions and measures that can firm practical actions necessary, so that both transport and operation goods by sea, river and inland waterway can be performed safely. Pollution by petroleum products and oil spread is recognised as one of the major threats to the marine environment of the Black sea and the Danube–Black sea canal. The risk associated with heavy traffic assesses to coordinate all intervention resources in case of emergency. It is necessary to develop an integrated monitoring of aquatic environment in terms of chemical, biological, ecotoxicological at the Danube–Black sea canal level with the expected effects of the biodiversity aquatic protection and conservation of water quality as a resource.

ENVIRONMENTAL IMPACT ASSESSMENT FOR THE SHIPPING INDUSTRY ACTIVITIES ON THE DANUBE–BLACK SEA CANAL

Environmental Impact Assessment for the shipping industry activities carried on the Danube–Black sea canal reveals that the damage expansion caused by the oil spills does not always reflect the quantity of oil spilled. A small amount in a sensitive area can cause considerable damage in comparison with a large amount spilled in a less sensitive area. Restoring normal balance of the aquatic environment after a pollution, can take, in extreme cases, many years. In case of a navigable canal or a river the cleaning is even more difficult due to action in restricted area and a large spread area. From this perspective this paper proposes a guide for implementation a contingency plan to combat in a quickly way the oil spilled on the Danube–Black sea canal. International practice shows that in this field a plan like this must have attached some essential details regarding the evolution of oil spill\(^1,2\). The processes that determine the slick evolution are dispersion, evaporation, oil in water emulsion, photooxidation, biodegradation, sedimentary, and the movement of the oil slick on the water surface. These processes lead to some changes in time on oil spill characteristics and the product quantity remained on the water surface. In these view the hydro-meteorological conditions can evaluate the existing quantity properties and petroleum products remained at a given moment in the aquatic environment. The transformation will be treated so that it can be put into visibility (percentage) qualitative and quantitative changes that occur in the structure of oil slick accidentally discharged into the aquatic environment. In this way it is convenient to classify in 4 main groups the most frequently transported types of hydrocarbons, depending on their density, to determine their persistence on the water surface from the first hours after the oil spilled. The plan
must be fully in this regard in the way that does not require additional information from other sources on the oil film which would cause delays in applying the techniques of intervention.

ASSESSMENT OF POLLUTION SITUATIONS AND INTERVENTION CHARACTERISTICS

Regardless of how efficient it would be the forecasting model of oil slick evolution in the aquatic environment (the authors refer here to any incident or accident recorded in the interference area of the Danube–Black sea canal with the sea, but also on the Danube river) it must be permanently monitored. This monitoring should be done from the air, land or from a ship. Experience has shown that it is important an advance preparation of a monitoring plan (including aerial observation) to contain a map at a closer scale supported by available information to improve predictability of this phenomenon. Proof of oil pollution is necessary to determine the damage or costs. Sometimes it is easy to determine the charges involving pollution by taking oil occasionally from suspected source in the polluted area. It is not always possible for a potential plaintiff to procure a reference sample from suspected source, but an analysis of pollutant samples can sometimes be a sufficient evidence to indicate the probable source. With oil processes knowledge occurring in time with informations on wind and currents may deduct the approximate position where discharge took place. Following informations about the film should be an assessment of the danger that it may have and then make a decision for an enterprise shares. Factors considered in assessing the danger include:

– size of oil film and the likelihood dispersion in several oil film;
– the type of oil physical and chemical characteristics;
– hydro-meteorological conditions (the direction of atmospheric currents, water temperature, water current direction);
– oil film heading towards shore;
– the probability of moving oil film;
– risk areas.

The depollution intervention to be immediate, the emergence of any traces of oil pollution is necessary a general stategy to determine and correct the state of pollution that has changed and affected sensitive areas and possible steps that might be valid in preventing or reducing damages. Responsibilities on the side, after an oil spill may be to national authorities, to the polluter or those who have apply an emergency plan. They may have different views on how to implement a depollution plan. For an efficient and correct application of techniques this paper shows the intervention mode based of a contingency plan.
It is very important the criteria of choice of how the intervention should be applied on the basis of a contingency plan, because in this way those involved can take a quick and right decisions in case of oil pollution.

TECHNICAL SOLUTIONS FOR SOLVING THE PROBLEM OF PREVENTION AND POLLUTION CONTROL

The maximum share – in connection with the accidental or aware oil spill and/or oil residues is the way this is removed, which puts very difficult problems that require large expenditures and investments. The main purpose of the paper is to determinate technical solutions needed to resolve the prevention and control of pollution issues. These solutions are provided in a contingency plan in case of oil pollution on the Danube–Black sea canal, particularly in the key areas like canal locks, ports and the confluence area of the canal with the Black sea. The disadvantage of these river areas consists in the weight intervention or even impossibility of intervention, because of relief conditions specific to these areas of the rugged shore. It is important that the plans to include a clear structure on the pollutant type and the manner by which it can be removed. Selecting intervention techniques depends on the requirements and conditions prevailing, as must be taken into consideration the availability, safety, the ease with which it handles and last but not least associated costs. The experience of companies and institutions specialised on this issues allowed us, based on quantitative and qualitative assessments, substantiations of recommendation on the equipment and technologies used which are represented by oil recovery, floating dams, skimmers, chemical dispersion, absorbents\textsuperscript{1,2}. The oil recovery may be placed on any type of ship and it does not need to be a special arrangement to act against oil film, these systems may be permanent, classical or flexible. Universal skimmer represents a multifunctional cleaner (used in various places) and is designed for multiple types of cleaning operations. The skimmer is very small but extremely robust and easily to manage and at the same time easily to transported by rail, air or road. Thanks to years of practice and testing system now has a wide area of operation for cleaning oil slick. Universal skimmer is intended for clean the oil films with a ‘mother ship’ working independently in ports, rivers, navigable canals, beach areas (the oil residue can be loaded on the ship and can be used as fuel for other equipment).

Using the normal form of arms in shape of V can clean between 10–100 m. A big advantage of floating booms regarding storage and oil transportation is easiness to bulge. The nonsubmerge property is due to immerse party and floating disc with foam. Dams do not require floating valves, pumps or line, being ideal for oil pollution advertisements on navigable canals or rivers. Where access is difficult, hydrocarbons will be removed using buckets, hand shovel and other simple equipment. Manual recovery of large quantities of very viscous oil prod-
ucts and/or oil mixed with debris, where hydrogliders are not able to depart, can be done using a mechanical equipment non-specialised. When it reaches the final stages of cleaning is appropriate to use absorbats or dispersions to help remove thin films of hydrocarbons from inaccessible places. The application is manually, if a large-scale is used to help with special devices. Although it is preferable a full protection of navigable canal as the water may be too deep or the currents too strong to achieve this. In case of an intervention, downstream is the right area to search, taking into account the need for access way of collector ship for removal of oil collected. If oil is not removed with the same rate that reached upstream, it will accumulate and move towards the centre where the water currents are strong and could shave oil under collector barriers. If speed of the currents is unknown, they can be estimated by timing the movement of objects floating on a known distance. To limit the oil film in a certain portion in the navigable Danube–Black sea canal, a solution that would be advantageous is two-section collector barriers to be installed in the steps on different sides.

CONTINGENCY PLAN

Communities located near the Danube–Black sea canal may be affected by an oil spill. In the same context a number of organisations will have to accomplish and other tasks besides combat and limiting due to the effects of pollution. European and international practice in this area (we have spanish experience in ‘Prestige’ ship case or french experience in ‘Erika’ ship case) shows that it is wise for the first part of the plan to include the general strategy to combat oil overflows, and for the second part to contain the operational procedure to be followed when a discharge takes place.

Foundations ability response plan is specific to local infrastructure, such as a port or an oil terminal or an exposed area with overflow risk. These local plans can be a part of a wider plans, even at national level. National plans may in turn be integrated into regional response arrangements covering two or more neighbouring countries (for example for maritime Danube – Romania and Bulgaria). The strategy segment of the plan should define the responsibilities and rational policy for the operational plan which is essentially an action checklist with pointers to information sources. Cleaning strategy should be determined according to overflow risk assessment, the hierarchy of priorities and resources with risks. Responsibility for the control of hydrocarbons discharges, usually an incumbent government agencies (in our case Romanian Navigabile Canals Administration) to deal with fluvial sector. Normally the best solution is that the coordination to be centralised under a single organisation which has full responsibility to the operation. For fluvial area this is not possible (responsibilities being divided between the concerned parties: Romanian, Bulgarian and Serbian). On the other hand, several organisations are
involved in the plan and in pollution limitation. In this regard the central structure
must initiate the procedure for coordination responsibilities. In major discharge
cases, the coordinator of field commander will delegate control operations – in
case of minor spills, roles may combine. There may be delays in customs formal-
ties and the plan must provide speedy resolution of the formalities in the case of
states when necessary personnel and equipment to be brought into the country. The
contingency plan may include procedures for collaboration with other stakeholders
such as government authorities and organisations not implicated directly in combat
operations, but interested in certain points of overflows view. For example, ports
operators, industrial targets (including here nuclear power station in Cernavoda)
groups of environmental protection and other government departments. Tempor-
ary storage sites and disposal routes for oily wastes must be agreed in advance.
Locations close to the areas of risk suitable for temporary storage of oil and oily
residues have to be identified. The disposal options should be discussed and a deci-
sion made taking into account the environmental considerations of each method
and the probable costs of transport and disposal. Details of the disposal methods
selected should be annexed to the operational plan. Training programmes should be
tried at all levels, including ship personnel and management of intervention teams
from shore. The exercises carried out ensure that procedures are established and
functioning and the personnel is familiar with the techniques of intervention. A oil
spill provides the best opportunity for improving the plan feasibility. The events
should be reviewed immediately after the cleaning operation has been completed
and the plan was revised based on the experience learned. The plan should provide
for the various response options to be considered:

- If no key resources are threatened, no response may be necessary beyond
  monitoring the movement and behaviour of the slick;
- If is not possible any method protection or if the resources have already been
  affected, it must be determined the priority areas for cleaning;
- Select the necessary equipment and manpower required and determine
  availability and location.

Arrangements should be included in the plan for placing manpower and equip-
ment on stand-by. Equipment may be loaded into vehicles ready for dispatch and
paperwork completed before the actual mobilisation order is given.

At the end stage of the cleansing, this section of the plan should provide
for:

- Locating communications/command post as close to the scene of the spill
  as possible, ensuring that the entire area affected by the spill is within reach by
  radio or telephone;
- Ensuring that supervisory staff has the necessary radio equipment and is fa-
  miliar with communications procedures, telephone, telex and telefax numbers,
  radio frequencies and call signs.
Training programmes should be developed at all levels including personnel in charge of boats and shore clean-up parties. Regular exercises will ensure that contingency arrangements function properly and that all those likely to be involved in a spill become fully familiar with their particular responsibilities².

CONCLUSIONS

Experience in shipping and port field of the Danube–Black sea canal, shows that so far a systemic approach to technical and managerial problems specific to a pollution has not been made. An analysis has never been made from the point of economically, socially and ecologically view emphasising an environmental impact associated with these activities. For these reasons the study of possible incidents that may cause pollution by oil from the Danube canal to the Black sea area and its confluence with the sea should be permanent as a necessity in the context of the relaunch of the European naval transport on inland waterway. In this regard the proposal of a plan to combat and interfere in case of emergency (contingency plan) becomes a necessity. Because the structures of a project like this at institutional level (the authors refer here to Romanian Navigabile Canals Administration, Romanian Naval Authority, the Ministry of Transport, etc.) are on incipient stage this paper can represent a solid base of departure for a theoretical and practical approach to complex problems in a contingency plan, in case of pollution of the Danube–Black sea canal. Technical and economic problems specific to the field analysed in this paper, in line with performance-enhancing environment associated will lead not only to prosperity areas and regions bordering the Danube–Black sea canal but also to the European integration standards of the whole transport system on inland waterways.

REFERENCES


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