



## DHI CASE STORY

## HELPING A BRAZILIAN PORT TERMINAL STAY IN BUSINESS

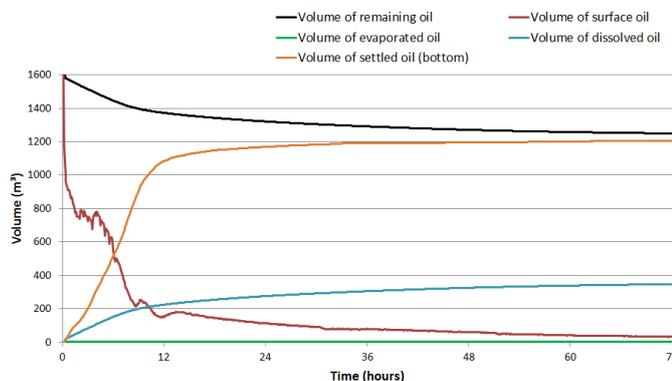
### Oil spill modelling aids renewal of port terminal operating license

Brazilian law requires all port terminals – operating under national jurisdiction – to be equipped with an Emergency Plan to deal with possible oil pollution incidents. If a port operator fails to have a government-approved Emergency Plan, his licence is not renewed. Our client – a port terminal operator – was in need of such an Emergency Plan. To support the Plan, we conducted an in-depth numerical oil spill modelling study. Based on our studies and contingency plans, our client submitted the Emergency Plan to the government for approval. The Plan was approved and the license was renewed. As a result, our client's port operations are not hampered in any way and operations continue as usual.

#### BE READY TO DEAL WITH OIL POLLUTION – BRAZIL

Brazilian legislation requires that port terminals operating in waters under national jurisdiction have an Emergency Plan for oil pollution incidents. As part of the Plan, an analysis of the effects of oil pollution incidents on the safety of life and the environment should be performed. These studies should take into account the sensitivity of the areas likely to be affected and the likelihood of occurrence. According to the legislation, the determination of these exposed areas and their probabilities of being hit by the oil must be conducted via mathematical modelling.

As such, our client – who is a port terminal operator – needed to develop an Emergency Plan and have it approved by the government. If they failed to do so, the government would not renew their operational license, causing their operations to come to a standstill. Total financial losses would follow until renewal of the license.



Volume balance of the spilled oil as a function of the weathering processes.

#### SUMMARY

##### CLIENT

Port operator

##### CHALLENGE

- Legal requirement of all port terminal operators within the Brazilian jurisdiction to develop an Emergency Plan for oil pollution incidents
- Requirement of detailed oil spill modelling to support the Emergency Plan
- Evident lack of adequate data to model possible oil spill scenarios in the area
- Risk of operational licence not being renewed by the authorities, in case of failure to possess an approved Emergency Plan

##### SOLUTION

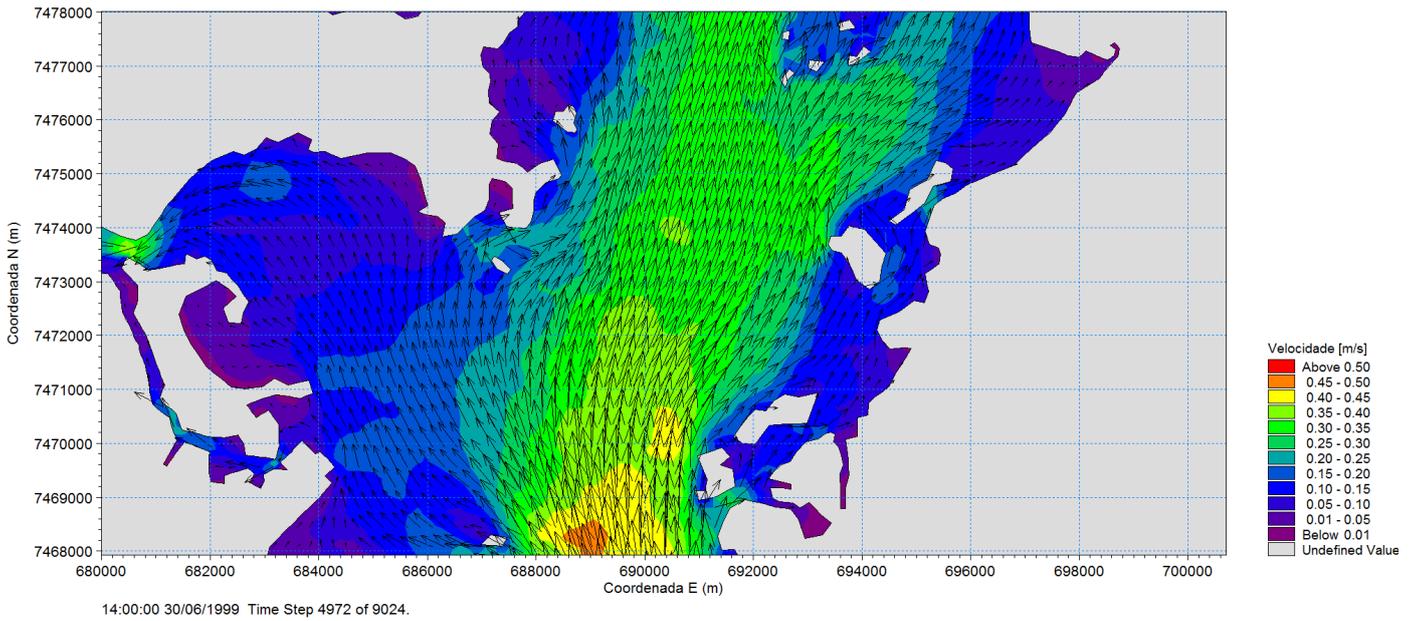
Detailed numerical oil spill modelling to support the Emergency Plan

##### VALUE

- Accurate and timely preparation of the Emergency Plan based on the oil spill modelling
- Renewed license awarded to the client
- Operations can continue as usual

##### LOCATION / COUNTRY

Guanabara Bay, Rio de Janeiro, Brazil



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 Modeled current field inside Guanabara Bay on a typical flood tide condition. The hydrodynamics was the basis for the simulation of the oil spill scenarios.

**WE CONDUCT AN IN-DEPTH OIL SPILL MODELLING FOR THE FIRST TIME IN BRAZIL**

In response to our client’s requirements, we conducted an in-depth oil spill modelling study for them.

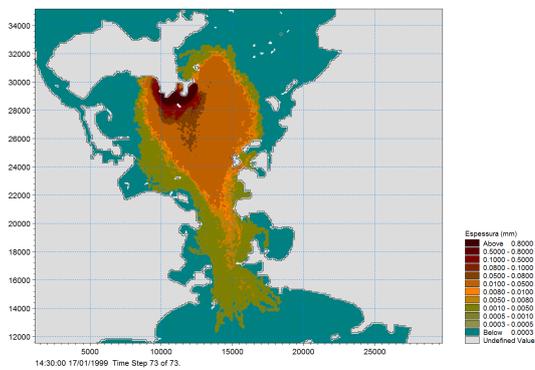
We used the hydrodynamic and oil dispersion modules of our MIKE by DHI modelling software to simulate different scenarios of accidental oil spills within the bay. The hydrodynamic module providing the currents in the area is essential for obtaining accurate predictions of the oil spill. The model was calibrated against water levels from a tidal station located inside the bay.

We considered typical summer and winter MetOcean conditions in the region to determine the probabilities of occurrence of the oil pollution incidents for both seasons. In addition, we established specific wind and tide conditions in order to create critical scenarios. These scenarios would predict the arrival of the oil into environmentally sensitive areas and/or provide the greatest displacement of the spill.

**EMERGENCY PLAN TO LICENSE RENEWAL – OUR CLIENT’S GOAL IS MET**

Based on the results of the numerical modelling study, it was possible to plan contingency operations in case of oil incidents in the terminal. An independent consultancy company developed the Emergency Plan for our client, with the results of our simulations and analyses as the basis for the Plan. In due course, INEA – the Environmental Agency of the state of Rio de Janeiro – approved the Emergency Plan and renewed our client’s port terminal operating license.

Our study supported the development of a single Emergency Plan and this was a success in itself. It not only helped the Plan get approved and the license renewed, but also made it more reliable and effective. Studies like this make it possible for port operators to combine different types of oils, origins and characteristics of the spill with realistic MetOcean conditions. This in turn helps to produce more reliable predictions of consequences, empowering them to plan actions for all kinds of situations.



Track of the spilled oil at the end of the simulation for a critical scenario. The contingency planning was prepared based on the results of the oil spill model.

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