

Optimal ship berthing strategies to reduce tugboat fuel consumption
VASILIKO TERMINAL SERVICES (VTS)
<http://vtsvasilikoterminal.com/>

Company Description:

VTS specializes on marine services (towage, pilotage, mooring) and other services such as oil spill response with customers both from the private and the public sector. Using Cyprus as its base, VTS provides services across the Eastern Mediterranean. VTS' tugboats are ocean going, meaning that they have the ability to undertake both coastal and offshore towage. VTS offers specialised services to clients who require reliable marine operations within Cypriot waters, supporting at the same time the burgeoning offshore energy industry in the Eastern Mediterranean.

- Assistance during heavy lift operation
- Rig moves and support
- Support to FPSOs
- Barge towage

Challenge Description:

VTS maintains 3 tugboats operating mainly in 1 terminal (Jetty) with 4 Berths available located about 1.5 km away from the shore (exposed in open sea waters). For every berthing and unberthing operation two tugboats are always used (one assisting the bow and the other one assisting the stern). Empirical observation suggests that several factors affect the fuel consumption of tugboats while assisting Vessels during the berthing process on a platform, such as

1. Weather conditions
2. Berth location of the Jetty (4 Berths)
3. VTS Pilot strategy (maneuver)
4. Tugmaster strategy (how ships are approached, tugboat orientation, balance between tugboat force and use of ship engine, tugboat speed)
5. Ship features (e.g. gross tonnage and length)
6. Speed and behavior of Vessel crew when mooring (handling ropes) during berthing

Data will be made available to the team detailing the tugboats' fuel consumption for berthing and for the unberthing of vessels, for 2 years. The data includes: which Berth was approached, which Pilot, Vessel characteristics, time sheet, tugboats consumption and weather forecasts.

A **performance assessment and fuel consumption patterns** in the current VTS practice should be undertaken, taking into account the available data. Then, considering safety as the main constraint, the aim is to identify the optimal strategy in order to achieve reduction in the tugboat fuel consumption of tugboats.

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