A FIELD TEST AND ASSESSMENT OF OIL DISPERSANT EFFICIENCY

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Laboratory tests for the assessment of oil spill dispersant efficiency cannot exactly simulate the natural conditions existing at the marine air-water interface.[3] On the other hand, large scale trials in the open sea[2,1] are so complex and expensive that they hardly can be considered as a routine method to evaluate dispersant efficiency at sea.[4]

In this paper we describe the procedure of a middle-scale field test to be run in the open and sheltered waters of harbors or roadsteads.

Three boats heading into the wind and sailing on line at a constant speed are used for successively: spreading the oil on the surface of the water; overspraying this immediately with the test dispersant; and continuously sampling the water at three different depths for hydrocarbon measurements.

The spray boat is equipped to discharge dispersant ranging from highly diluted to neat concentrates by means of a volumetric pump and one boom with four spray nozzles mounted near the bow. Agitation of the oil-dispersant mixture is made by a net of floating plastic chains towed astern.

The sampling system consists of a small catamaran rigged ahead of the bow of the analysis vessel. The samples, continuously collected from 0.4, 0.7, and 1.0 m depths, are monitored by one line turbidimetry for the two first levels and UV fluorometry for the deepest one. Fractions of the sampling flows are recovered to check the analyzers and to measure separately the hydrocarbons and surfactant contents.

In the first series of tests, the parameters investigated were:

- oil viscosity in the range of 50 cs (a reconstituted topped crude oil) to 2,000 cs at 20° C
- dispersant type, including conventional and concentrates
- dispersant concentration, from 10 percent aqueous to undiluted concentrate

In addition, the performances of various commercial dispersants could be compared under similar conditions.

Three main conclusions were drawn from this work. (1) The viscosity limitation falls at about 1,500 cs with the oils investigated. (2) Concentrate dispersants applied undiluted are more efficient than when pre-diluted with water, but the distribution of the dispersant upon the slick is more subject to wind and sea-state. (3) Concentrate dispersants seem to work better than conventional ones, even on the more viscous oils.

References

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