

## Oil weathering studies

The Norwegian Environment Agency, expects oil companies operating on the Norwegian continental shelf to document the weathering properties of crude oils that are in or will come into production. These properties should be related to the choice of countermeasures in the oil spill contingency plan, both for mechanical recovery and dispersant application.

### SINTEF methodology

SINTEFs standardised weathering methodology for studying weathering properties includes :

- stepwise weathering (both evaporation and emulsification) of the crude oil
- physical and chemical characterisation
- emulsifying properties
- dispersibility testing (screening of dispersants, dosage needed and “time-window-of-opportunity” for use of dispersants)
- meso-scale flume test

- characterisation of the water accommodated fraction (WAF).
- oil appearance

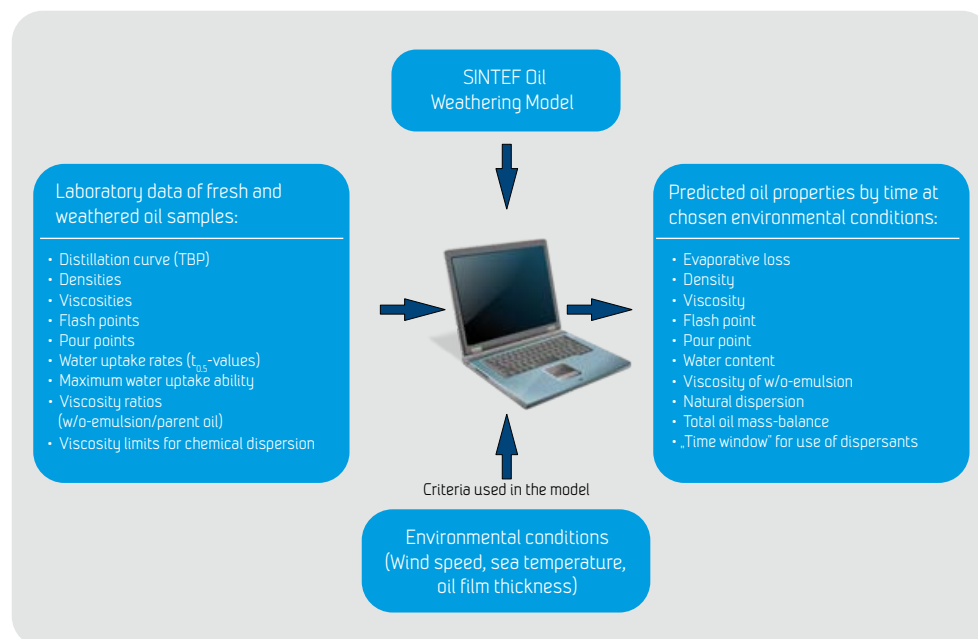
The laboratory results form the basis as input to SINTEFs Oil Weathering Model (OWM) and the OSCAR (Oil Spill Contingency And Response) model.

The SINTEF methodology has been a standard in Norway and the output has been verified by numerous field trials.

### Oil Weathering Manual (OWM)

Prediction of the oils’ weathering at sea under different temperatures and sea states. The “time-window of opportunity” for use of dispersants is also defined.

SINTEF has performed weathering studies for most of the oils in production in the North Sea and the Norwegian Sea. In addition similar studies on a large number of international oils have been performed.



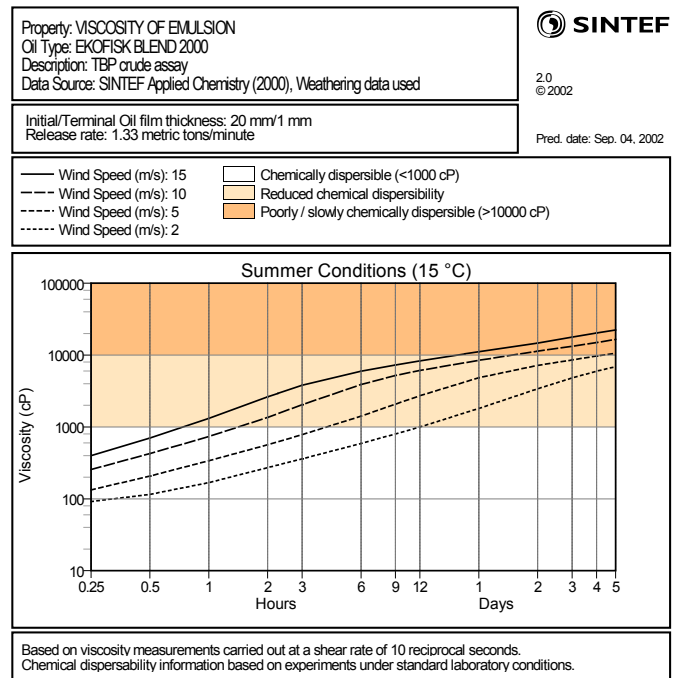
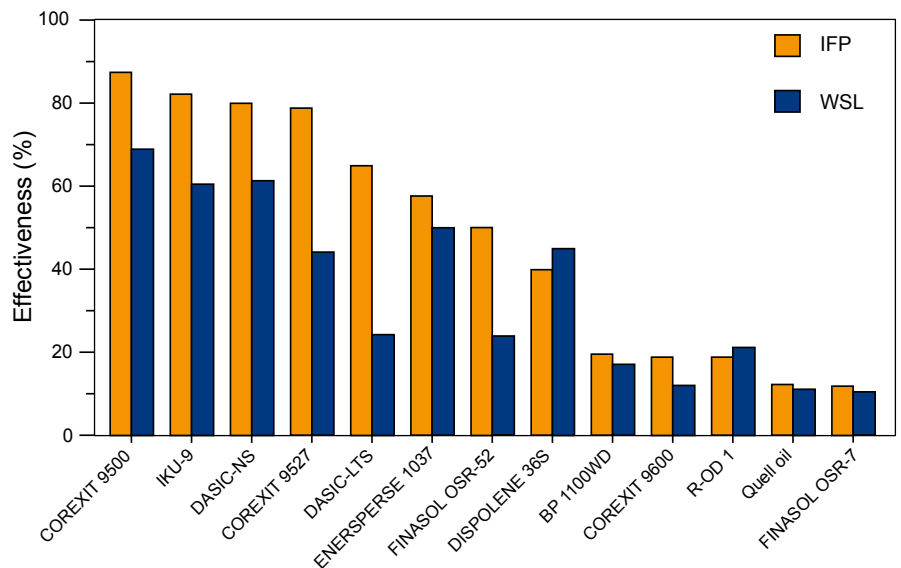
Prediction of emulsion viscosity based on laboratory data using the SINTEF OWM. The “time-window-of-opportunity” for use of dispersants is also shown. The weathering properties of a specific oil is reported as a “manual” where the predictions of the changes in oil properties as the oil weathers at sea is shown. A discussion of the oil behaviour related to response (both mechanical and dispersion) is also discussed.

### Dispersant testing

In the evaluation of possible response operations for the different oils, the dispersibility of the oils is tested. According to new dispersant regulations in Norway the testing includes :

- Screening of dispersant to find the best dispersant for the specific oil
- Dosage needed to disperse the oil effectively
- “Time-window-of-opportunity” for use of dispersants for the specific oil

Screening of different dispersants for a paraffinic oil using the IFP and WSL dispersant test methods. For other oils eg. asphaltenic oils, the order of dispersants may be different.



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Pred. date: Sep. 04, 2002



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