Short presentation of SINTEFs Oil Weathering Model

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Summary: Laboratory weathering data input to SINTEF Oil Weathering Model

Lab weathering data:

PROPERTY	Fresh	150°C+	200°C+	250°C+
Boiling liquid) temp. (°C)	-	210	255	300
Volume topped (%)	0	8	15	24
Residue (wt.%)	100	93	87	78
Specific gravity (g/l)	0.893	0.903	0.909	0.919
Pourpoint (°C)	-39	-15	-9	3
Flashpoint (°C)	3	50	80	119
Viscosity at 13°C(cP)	27	49	83	200
Viscosity of 50% emulsion (cP)	-	343	593	1300
Viscosity of 75% emulsion (cP)	-	1815	2673	4790
Viscosity of max water (cP)	-	2250	3079	4790
Max. water content (%)	-	80	77	75
Emulsification rate (t _{1/2} , hours)	-	0.15	0.20	0.22

Chemical dispersibility:

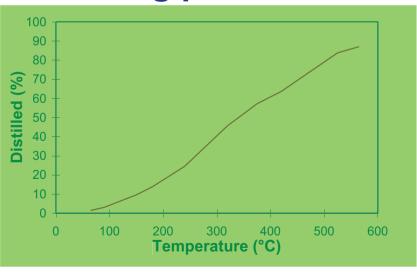
Dispersible < 3000 cP
Reduced dispersibility 3000 - 7000
Not dispersable > 7000

Meso-scale flume:

Supplementary data to bench-scale data:

- Calibration of emulsification rate / max. water
- Natural dispersion / Mass-balance
- In-situ dispersant treatment / testing

Boiling point curve





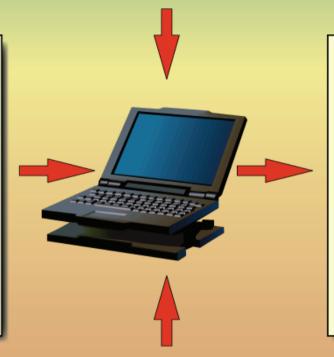


SINTEF Oil Weathering Model

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Laboratory data of fresh and weathered oil samples:

- Distillation curve (TBP)
- Densities
- Viscosities
- · Flash points
- Pour points
- Water uptake rates (t_{0.5}-values)
- · Maximum water uptake ability
- Viscosity ratios
- (w/o-emulsion/parent oil)
- · Viscosity limits for chemical dispersion



Criteria used in the model

Environmental conditions

(Wind speed, sea temperature, oil film thickness)

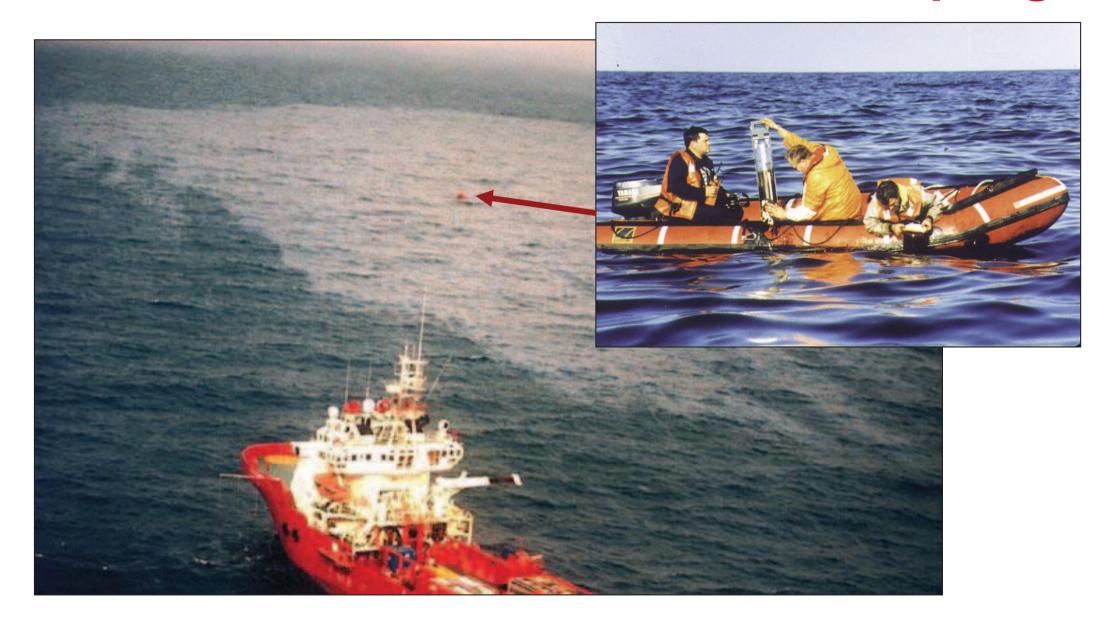
Predicted oil properties by time at chosen environmental conditions:

- Evaporative loss
- Density
- Viscosity
- Flash point
- Pour point
- Water content
- · Viscosity of w/o-emulsion
- Natural dispersion
- Total oil mass-balance
- "Time window" for use of dispersants



SINTEF

Field verification Ground-truth sampling



Field verification - Barents Sea 2009



Measurement of oil film thickness



Sampling of surface oil





Correlation SINTEF OWM prediction and field samples (NOFO-trials, 1994)

