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DISPERSANT EFFICIENCY

INTRODUCTION

The purpose of this work was to ascertain the efficiency of two dispersants, namely Slickgone NS and Slickgone EW, against an intermediate fuel oil (IFO180) and a heavy fuel oil (HFO 380).
The Slickgone EW was also tested against the AMSA reference oil (Kuwait Crude topped)

The two fuel oils were sourced through AMOSC. The oils came in plastic bottles with the HFO having some literature on the bottle dated 7/1/2012 and a sheet with specifications for a FUELOIL_380 dated 18/5/2012 (see attached photos). Presumably the spec data belongs to the same fuel oil supplied. Note that the viscosity and density on the bottle is greater than those on the spec sheet. No literature came with the IFO 180.

TESTS

Fuel oils are difficult to use, particularly the heavy fuels, as they seem to solidify quickly once exposed to air and therefore it becomes difficult to measure the weight that is used in the MacKay tests. Good accuracy was displayed as the STD Dev between the two replicates was between 2 and 4 percent.

The MacKay apparatus was set to an air and seawater temperature of 20 ºC with a moderate wave action height of 3.5 cm.

A 1:20 ratio is aimed at for the dispersant/oil mixture.

After a 10 minute period of mixing in the MacKay test chamber, a subsample is taken (A cut). The wind is then turned off. After a further 5 minutes, another subsample is taken (Q cut) and samples are subsequently extracted with Methylene Chloride.

RESULTS

A good dispersant will immediately break up the oil to really fine droplets and will produce a coffee coloured appearance in the Mackay test chamber. The finer the droplets the longer they will stay in suspension and therefore the % recovery of oil in the “Q cut” (quiescence) ultimately determines this.

Both dispersants were efficient in dispersing the AMSA reference oil and particularly with the IFO 180, were the % recovery was greater than 70.

In regards to the HFO 380, the oil took a few minutes before the dispersants started to break it up. Some of the oil would stay in clumps and some of it adhered to the test chamber as it started to solidify thus producing low recovery rates. Most of the oil did form droplets but were large enough to easily see and once the wave action was stopped they would find their way to the surface. The Slickgone EW seemed to be able to better disperse the heavy fuel oil giving a % recovery of almost double that of Slickgone NS in regards to the Q cut. The figure in red is an anomaly and therefore ignore.

KUWAIT CRUDE	
SLICKGONE NS	
SLICKGONE EW	

MacKay Apparatus Settings

Wave height	4 cm
Wind	7.9"
Temp water	20°C
Salinity	34

IFO 180 + SLICKGONE NS					
Test #	**Weight of Oil**	**Wt of slickgone NS**		**%Oil recovered 10A**	**%Oil recovered 5Q**
1	9.75	0.47		111.7	78.9
2	9.79	0.47		108.8	75.2
			Mean	**110.3**	**77.1**
			Std Dev	**2.09**	**2.61**

IFO 180 + SLICKGONE EW					
Test #	**Weight of Oil**	**Wt of slickgone EW**		**%Oil recovered 10A**	**%Oil recovered 5Q**
1	9.76	0.51		101.8	78.3
2	9.68	0.49		95.5	**56.2**
			Mean	**98.7**	
			Std Dev	**4.42**	

HFO 380 + SLICKGONE NS					
Test #	Weight of Oil	Wt of slickgone NS		%Oil recovered 10A	%Oil recovered 5Q
1	9.87	0.5		50.1	11.9
2	10.01	0.5		44.4	13.1
			Mean	47.3	12.5
			Std Dev	4.08	0.83

HFO 380 + SLICKGONE EW					
Test #	Weight of Oil	Wt of slickgone EW		%Oil recovered 10A	%Oil recovered 5Q
1	9.84	0.48		50.0	18.4
2	9.78	0.48		52.9	22.2
			Mean	51.5	20.3
			Std Dev	2.06	2.71

AMSA REFERENCE OIL "KUWAIT CRUDE WEATHERED" vs SLICKGONE EW					
Test #	Weight of Oil	Weight of slickgone EW		%Oil recovered 10A	%Oil recovered 5Q
1	10.00	0.56		97.2	34.8
2	9.64	0.48		102.5	70.3
3	9.62	0.47		94.0	64.7
			Mean	97.9	67.5
			Std Dev	4.28	3.96