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Alarming side of a U-turn

THERE is a sort of irony in the headlines. On the one hand we have the news that Crédit Suisse is making final plans to join its numerous financial services compatriots in outsourcing a thousand or so jobs to India, profiting from the cheap and available brain power in the sub-continent.

This can be easily juxtaposed with the about-turn by President Jacques Chirac, who has intervened to recall the redundant aircraft carrier *Clemenceau* to France from somewhere off the Arabian peninsula.

It is suggested, moreover, by the activists who have leaned on the president that the ship could be the focus for a new French maritime recycling industry.

Might it employ thousands of redundant French IT specialists whose jobs are being outsourced?

Or will the lack of dismantling skills in France require the import of thousands of Indian experts from those unemployed at Gadani Beach as a result of the biting of the Basel Convention, which prohibits the trans-boundary movement of waste? Molière himself could not have invented such a farce.

In such a political drama, beloved of politicians as it provides an opportunity to grandstand and appears, moreover, to be decisive without any apparent risk, common sense invariably goes out of the window.

Pointless, it appears, has been all the careful preparatory work by the contractors, the training of the Indian dismantling teams by the French and the efforts to be responsible and safe.

The activists have effectively been able to derail all of this work, and have made such a noise that it has penetrated to the president of the republic himself.

Why such a fuss over a single ship? This old warship may be just so many light tonnes of steel and non-ferrous material for the recyclers, but it has become something of a symbol.

It is not the aircraft carrier that should be concerning us, but the whole principle of whether the Basel Convention is to apply to demolition tonnage.

"Is a ship waste?" is the question that should concern us most, thinking ahead from the grey hull of the *Clemenceau* to the enormous queue of merchant ships that will require dismantling over the next five to 10 years.

If the French government is to cave in over the Basel Convention, bang goes all the practical and important work that has been done by the International Maritime Organization and the International Labour Organisation, along with the responsible shipowners' bodies.

There has been great effort and good will put in by large numbers of technically qualified people to make sure that solutions were arrived at that would be practical for both existing and future ships and would preserve the health and safety of sub-continental demolition workers and the environment in the vicinity of the scrapyards.

Is this all to self-destruct before the simple intransigence of activists operating to their own deluded agenda?

Are mad stunts on the high seas to become the levers for political action that will ultimately put the livelihoods of tens of thousands of scrapyard workers at risk? It certainly looks that way.

But who will be mad enough to provide these "recycling" facilities, which it is thought will spring up to scrap redundant ships in their countries of origin?

If the example of Able (UK) is anything to go by, there are probably easier ways of earning a living.

Two years after the "ghost ships" came across the North Atlantic to their moorings off Hartlepool, the ships are still lying there deteriorating.

The excellent facility which had been prepared for their reception lies idle, with the whole operation stalled because of pointless grandstanding by local politicians. Which is where we began...

Analysis uncovers tanker fleet pollution surprises

For the first time, a detailed academic study has been made of tanker accidents and the age and type of hulls involved. What important lessons can be learnt by regulators as they grapple to further improve the pollution record of tanker industry? One of the study's authors, **Nikos Mikelis**, reflects on its findings

THE European Commission's collaborative research project on oil tanker pollution prevention and control, POP&C for short, aimed to predict from first principles the pollution potential of different crude oil and product tanker hull configurations using a rigorous "probabilistic" methodology.

Conducted by Professor Apostolos Papanikolaou, Eleftheria Eliopoulou — both of the Ship Design Laboratory of the Athens Technical University — and independent consultant Dr Nikos Mikelis, it aimed to present for the first time a comparison of oil spill outflow between those different hull configurations in use in the world fleet today.

For the calibration of this methodology, a database of historic records of accidents was set up — concentrating on the fleet of aframax tankers between 1978 and 2003. Records of accidents and incidents were obtained from the Lloyd's Marine Intelligence Unit database and re-analysed by members of the POP&C research consortium in order to extract all possible useful information.

The records had to be re-categorised according to an adopted classification applicable to accidents with the potential for loss of the watertight integrity of the hull. The database also had to be enhanced by importing additional hull configuration particulars obtained from Lloyd's Register-Fairplay, which also provided all necessary historic data for the fleet at risk for each of the 26 years of the analysis.

Some results from the historic analysis of accidents on the aframax fleet were presented in an article in Lloyd's List on September 29 last year which discussed the overall safety record of aframax tankers, the improvement that has taken place over the past two and a half decades and possible reasons behind this improvement.

The first key findings can been seen in Table 1, which summarises the accident record of the aframax fleet. The first column confirms that the most common accidents are collisions and groundings, followed by contact damages and structural failures.

The following column shows that groundings and structural failures are the categories of accident that most frequently lead to pollution, followed by contact damages and collisions. The last column shows that groundings lead to the highest spill sizes, followed by structural failures and explosions.

By considering the collective information contained in the last three columns of the table a number of interesting conclusions may be drawn. Groundings, which in the period examined were one quarter of all accidents, lead disproportionately to 43% of all pollution.

Collisions are the most frequent category of accident but lead to proportionally little pollution. Contacts are reasonably frequent but also lead to little pollution. Fires, which were 10% of all accidents, resulted in only 2% of the pollution cases, while the quantity spilled was miniscule. Explosions, on the other hand, which at 5% is the least frequent category of accidents, led to 22% of all pollution in the period. And, finally, as expected, structural failures lead to disproportionately high volumes of pollution.

In passing, we note that some of the conclusions may be of added relevance to those responsible for assessing the relative weights of side shell and bottom protection in tanker regulations.

The same data was further analysed according to the main five types of hull configuration found in crude oil and product tankers during the 26 years of the analysis. Note that configurations relevant to combination carriers and chemical tankers were not excluded.

- Category 1 are the pre-Marpol tankers without SBT-PL ballast tanks, built until 1981 and which, by the 2003 amendment to Marpol's regulation 13G of Annex I, were phased out by the end of last year.
- Category 2 are the Marpol tankers with SBT-PL ballast tanks, built until 1996, and which, in accordance with regulation 13G of Annex I of Marpol, are in the process of being phased out up to 2010, with a possible exemption allowing continuing operation up to 2015 or the date on which they reach 25 years of age, whichever is earlier.
- Double-bottom (DB) and double-sided (DS) are oil tankers fitted with only double bottoms or double sides. In accordance with regulation 13G of Annex I of Marpol, these ships are progressively being phased out until 2010, with a possible exemption allowing continuing operation up to the date on which they reach 25 years of age.
- Fully double-sided (DH) are double hull tankers fulfilling the requirements of regulation 13F of Marpol Annex I.

A few notable comments arise from examining the accident data for each hull configuration, as can be seen in Table 2. First, as expected, the DH fleet is seen to perform very well in terms of the pollution index.

Also as expected, the DS and DB tankers perform better than the Category 1 tankers and worse than the DH tankers. In this respect, the performance of the DS and DB fleets justifies the exemptions which were granted in the 2003 amendments to Marpol.

What is surprising, however, is the very poor performance of the Category 1 fleet and the nearly excellent performance of the Category 2 fleet, which incidentally is seen here performing nearly as well as the DH fleet and better than the DS and DB fleets.

Finally, the pollution index data shows that the DS fleet has a better performance than the DB fleet, which is contrary to the conclusion drawn from Table 1. This will be discussed below.

A few words of caution are needed with respect to the statistics. First, it would take one catastrophic loss of, for example, a DH tanker with its full load of oil to dramatically change the picture we have drawn on the basis of pollution indices.

Secondly, it should be noted that the ship years of the DB and, to a lesser extent of the DS fleets, are relatively low and because of this smaller exposure it may be unwise to draw too firm statistical conclusions about the pollution performance of these fleets.

One key finding from the analysis is the large difference in the pollution performance of Category 1 and 2 tankers, with Category 1 vessels having caused 60 times more pollution per ship year than Category 2. Table 3 uses the data of Table 2 in a way that should help us understand the very different performance of the two tanker types.

Looking first at the frequency of accidents leading to small spills (accidents with 0t-7t spill per ship year) we can see that there is no difference between Category 1 and Category 2 tankers.

Also, the frequency of medium sized spills (accidents with 7-700t dpill per ship year) is the same for the two types of tanker. On the other hand, the frequency of large spills of Category 1 tankers is three times that of Category 2 vessels. This difference, however, is still too small to explain the 60-fold difference in the pollution index.

Turning next our attention to the magnitude of the spills (see Table 3: Tonnes spilled per accident in spill range…) we see only small differences in the consequences of small and medium spill accidents of Category 1 and Category 2 tankers. But we cannot fail to notice the severe consequences suffered by Category 1 ships when involved in major spills.

It therefore follows that, according to the available historic spill data, the substantially inferior pollution performance of the Category 1 tanker is to a lesser extent due to its higher frequency of accidents leading to large spills and, to a far greater extent, due to the more catastrophic consequences this ship suffers in such accidents — much larger quantities spilled per accident.

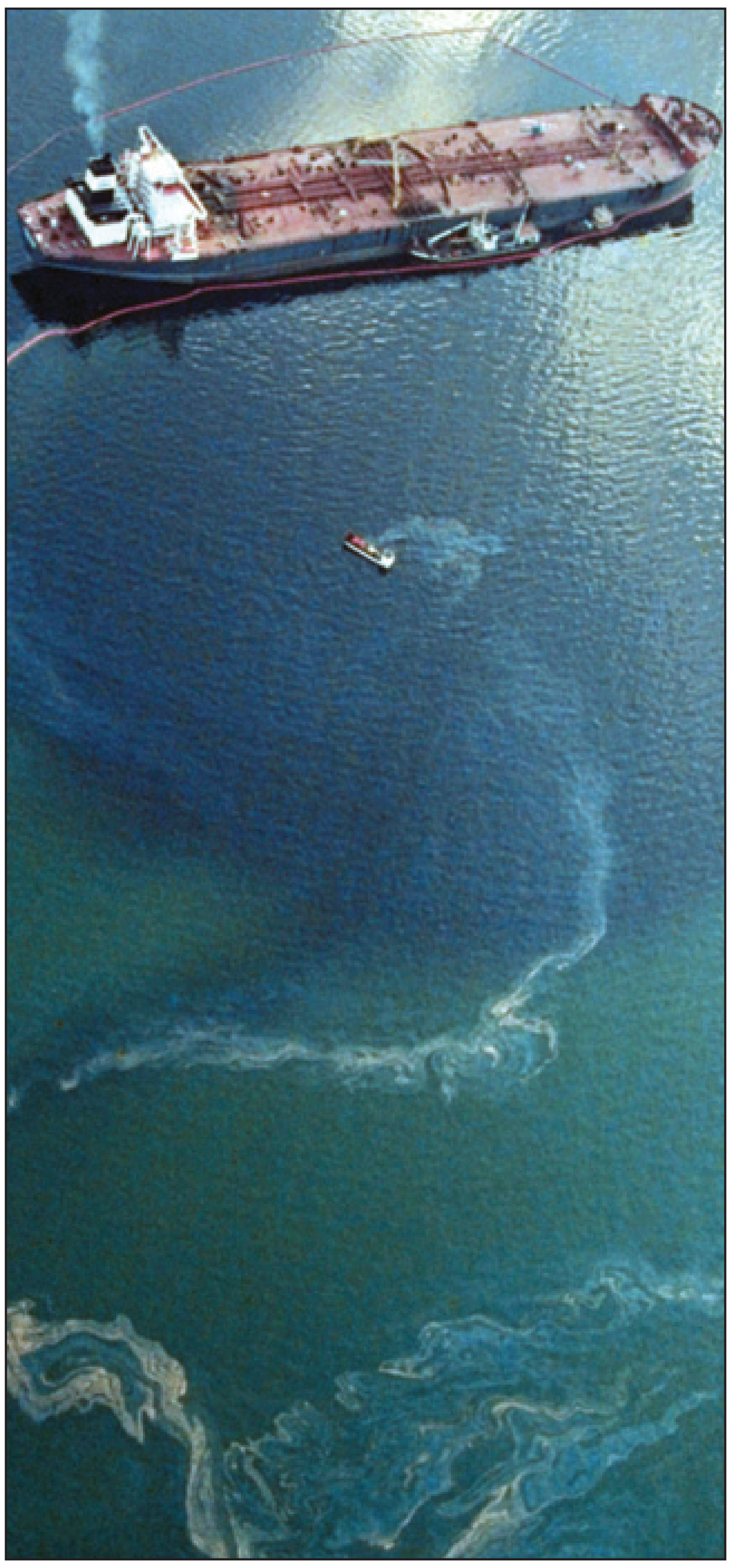
A similar conclusion can be drawn from the records in the accident database, where when looking for spills over 10,000 tonnes we identify seven cases involving Category 1 aframax tankers and none involving Category 2, or for that matter any of the other tankers configurations.

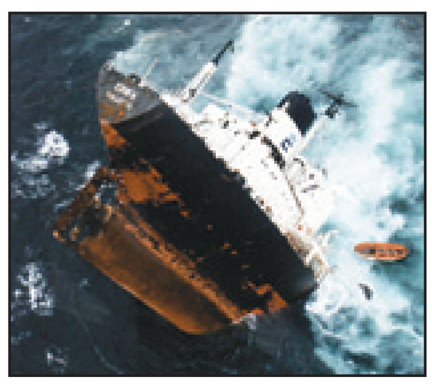
We noted above that the better performance of the DS fleet compared with the DB fleet, as seen in Table 2, is contrary to the conclusion drawn from Table 1 whereby a tanker which is protected with continuous double bottoms should be yielding a lower pollution index when compared with a tanker protected with continuous double sides. We have already remarked on the possible question of statistical significance of the small fleets involved, but the discrepancy may be explained with Table 3, where, as expected, the consequences of spills (tonnes spilled per accident) of the DB fleet are seen to produce less pollution than the DS fleet. On the other hand, the DB fleet is seen suffering higher frequencies of polluting accidents and it is this feature of this fleet which results in its higher pollution index.

At the simplest level, the frequency of most accidents should be independent of hull configuration. This should certainly apply to collisions, contacts and groundings — as, for example, the frequency of running aground could not be expected to be influenced by the internal configuration of the ship's cargo tanks — but in fact there are other contributing parameters, such as the age profile of the fleet of each hull configuration and the chronological period when the fleet in question was most at risk, as for example the 1970s and 1980s had a different safety culture from the 1990s and thereafter.

The issue of the effect of the age profile of different fleets is discussed by the authors in a paper which can be located at www.pop-c.org, then go to: Public Library and then select paper IMDC 2006, Michigan, May 17-16, 2006. Whereas the above analysis may now appear as an unnecessary academic expertise, because all new tankers have to be build to DH standards, it is not so for two reasons.

Firstly, the work is necessary for calibrating theoretical predictions for the oil outflow of different tanker designs. It also demonstrates that analytical studies do not have to be unduly complicated before their results can be used for development of rational regulations.





Oil spills are the price of tanker accidents: crude leaks from the tanker Exxon Valdez which ran aground in Alaska in 1989 (main picture); the Torrey Canyon (above centre), which struck Pollard Rock, Cornwall in 1967 spilling huge quantities of oil — and was later bombed to burn the remaining oil; the Erika (right top), which sank off Brittany, France in 1999; the Argo Merchant (right centre), which was grounded off Cape Cod in the US in 1976; the Amoco Cadiz (right below), which broke up off Brittany in 1978; and the Prestige (below) just before it sank 150 miles off northern Spain in 2002. AP

Table 1: Aframax Tankers Period 1978 - 2003
Structural Failure, Collision, Contact, Grounding, Fire & Explosion accidents

Categories	Number of accidents	Number of accidents causing pollution	Total oil pollution Quantity per category, tonnes	Accidents in category as % of all categories	Polluting accidents in category as % of all polluting accidents	Pollution in category as % of total production
grounding	194	18	158,869	25%	30%	43%
contact	125	13	7,877	16%	22%	2%
collision	232	9	20,734	29%	15%	6%
fire	79	1	676	10%	2%	0%
explosion	39	2	81,770	5%	3%	22%
structural failure	120	17	96,369	15%	28%	26%
Totals	**789**	**60**	**366,294**	**100%**	**100%**	**100%**

Table 2: Aframax Tankers Period 1978 - 2003
Structural Failure, Collision, Contact, Grounding, Fire & Explosion accidents

	All hull types	Category 1	Category 2	DB	DS	DH
Shipyears	**11,652**	**6,246**	**1,770**	**372**	**1,093**	**2.171**
Total Nr of accidents	789	578	67	43	47	54
Nr Accidents with no spill	729	536	58	40	45	50
Nr Accidents with 0-7t spill	20	14	4	1	0	1
Nr Accidents with 7-700t spill	20	12	4	0	1	3
Nr Accidents with 700+t spill	20	16	1	2	1	0
Total Quantity	**366,294**	**351,186**	**1,517**	**4,377**	**8,851**	**363**
Tonnes spilled: spills of 0-7t	27	19	7	0	0	1
Tonnes spilled: spills of 0-700t	4,874	347,608	837	4,377	8,571	0
Tonnes spilled: spills of 700+t	361,393	347,608	837	4,377	8,571	0
Pollution Index (tonnes/shipyear)	31.4	56.2	0.9	11.8	8.1	0.2

Table 3: Aframax Tankers Period 1978 - 2003
Structural Failure, Collision, Contact, Grounding, Fire & Explosion accidents

	Category 1	Category 2	DB	DS	DH
Total Nr of accidents per shipyear	0.093	0.038	0.116	0.043	0.025
Nr Accidents with 0-7t Spill per shipyear	0.002	0.002	0.003	0.000	0.000
Nr Accidents with7 - 700t Spill per shipyear	0.002	0.002	0.000	0.001	0.001
Nr Accidents with 700+t Spill per shipyear	0.003	0.001	0.005	0.001	0.000
Tonnes spilled per accident in spill range 0-7t	1.4	1.8	0.0	N/A	1.0
Tonnes spilled per accident in spill range 7-700t	296.6	168.3	N/A	280.0	120.7
Tonnes spilled per accident in spill range 700+t	21725.5	837.0	2188.5	8571	N/A