

BUSINESS SESSION 4

TOPIC: BUNKER AT YOUR PERIL

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"BUNKER AT YOUR PERIL"

By Jonathan Lux, Partner, Ince & Co, London

INTRODUCTION

The subject I have been asked to address in fact involves two quite separate subjects: firstly, bunker quality dispute (involving the triangle of bunker supplier, time charterer and ship owner) and, secondly, cargo theft (involving complaints by charterer or cargo interests against shipowner). The common link is perhaps greed - greed brought about by the dramatic upward spiral of fuel oil prices since the early 1970s. Or, for the more pragmatic, is it just a case of economic survival?

BUNKER QUALITY DISPUTES

A study of the Law Reports reveals scarcely any reported cases arising out of bunker quality disputes before the last decade. One exception is the 1922 Court decision in the case of Norse -v- Elder Dempster. In that case, faulty bunker coals supplied by the charterers heated dangerously causing delays. The charterers argued that the vessel was off-hire (pursuant to the off-hire clause in the charterparty) during the period of such delays but the Judge decided that although, technically, the off-hire clause might apply, hire should not cease when the loss of time had been caused by "anything for which the charterer is responsible".

The reasons for the growing number of bunker disputes which we are undoubtedly seeing in London include the following:-

- a] Until the mid 1970's, the price of bunkers had been relatively stable. From the mid-1970's until end 1986 the statistics show an overall tenfold increase in costs. Clearly, bunkers now constitute a key element in calculating the overall profitability (or otherwise) of an owners' or charterers' trade.
- b] A second factor concerns quality. In the old days it was the dependable straight run residual marine fuel oil. No doubt connected with the cost considerations referred to,

quality standards have been dropping, more in some parts of the world than others.

- c] A further factor is the proliferation of smaller suppliers operating in the bunker supply market. The profit motive has perhaps led certain of the less scrupulous suppliers to use questionable blend stock enabling them to supply at a more competitive price but retain or enhance profit margins.

The manner in which the most commonly used time charter forms regulate the matter of bunkers is no doubt due to the foregoing factors and the rarity of disputes until recent times. Thus, the New York Produce Exchange form simply provides, at Clause 2:-

"That the Charterers shall provide and pay for all the fuel except as otherwise agreed...".

The Baltime form, a little archaically:-

"The Charterer to provide and pay for all coals, including galley coal, oil - fuel...".

Often there is little more than this and the information in the Charterparty that the engine consumes, for example, IFO 180 CST.

The nature of charterers' duty as regards the supply of bunkers

arose in the London Arbitration between Nippon Yusen Kaisha and Alltrans Group of Canada Limited (1984). The dispute arose under a NYPE Charterparty and the LMLN Report of the decision describes the issue in these terms - whether "...Clause 2 of the NYPE Form imposed a strict liability on the Charterers with respect to the quality and fitness of the fuel supplied to the vessel or whether the Charterers were merely under a duty to use due diligence in ensuring that there were proper bunkers". In the words of the report, it was decided "by the Arbitrators that the duty on the charterers was an absolute one. The Court did not interfere with that decision".

This suggests that the Court in some way endorsed the Arbitrators' view that the charterers' duty was absolute. This is not the case. In their Award, the Arbitrators had put the matter as follows:-

"We were addressed on the obligation of the Charterers under this charterparty, and the questions posed for our determination were:

- i] Were the Charterers under an absolute duty to provide proper bunkers, or alternatively
- ii] Were the Charterers only under an obligation to use due diligence in ensuring that there were proper bunkers?, or alternatively
- iii] Were the Charterers merely under an

obligation to make arrangements for the supply from a reputable supplier?"

The Arbitrators expressed the view that the charterers' duty was absolute rejecting the other two possibilities. The charterers then applied to the Court for leave to appeal and the Court gave leave to appeal. Demonstrably, therefore, the Court must have been of the view that it was arguable that the charterers' duty was other than an absolute one as, otherwise, leave to appeal would no doubt have been refused.

At the end of the hearing, Counsel suggested that it would be of use to invite the Arbitrators to provide further reasons stating what their finding would have been if the Charterers' duty was simply to exercise due diligence. The Arbitrators indicated that, if the proper test was due diligence, they would still have held the charterers liable in the circumstances of that case. That being so, when the appeal came on for hearing before a different Judge, the Judge concluded:-

"There is therefore no point in the appeal continuing and no point in my expressing a view on the question of law which might have arisen. Such a view would be purely obiter and of no assistance either to the parties or to future Arbitrators".

Thus far, therefore, there existed an indication that London

Arbitrators were in favour of an absolute duty but no indication as to the view of the Court.

In the "Panagia" (1986) London Arbitrators again had to grapple with similar issues. The dispute arose under a Baltime charterparty which, aside from Clause 4, contained a type-written clause stating:-

"The charterers to be responsible for loss or damage caused to the vessel or to the owners by improper or careless bunkering".

The Arbitrators had no hesitation in rejecting owners' argument that this clause embraced the quality of bunkers placed on board. They decided that it was limited to the way in which the bunkers were loaded - i.e. to the consequences of spillage and similar accidents.

Addressing what they described as the central issue in the case, the nature of charterers' obligation pursuant to clause 4, they made certain disparaging comments concerning the Award in the NYK - v - Alltrans case. They concluded:-

"In the end we considered that the "officious bystander" on the Baltic Exchange if asked at the time the parties were making their bargain whether the duty on the charterers to provide fuel oil implied they

should take reasonable steps to get fuel of a reasonable quality or, in the alternative, oblige them to give an absolute guarantee as to the quality of unspecified fuel, then in our view only the first proposition would be in the running. The charterers would have been bound to reject the second proposition and no officious bystander would presume otherwise. However imperfect our analysis of the law on this point we continuously come back to the commercial nonsense of requiring the Charterers to give an absolute guarantee of the quality of fuel when they are not told within the contract what quality of fuel is acceptable".

The final paragraph in this section of the Award betrays a singular disregard of this unfortunate owner's plight:-

"We doubt whether it is relevant to examine whether or not the Owners have a claim over against the bunker suppliers in tort, or what were the terms of the supply contract arranged by the time charterers. It seems to us that we have to determine the liabilities between the parties to this contract, and under this contract, without reference to such matters".

Others might think that such considerations are indeed of relevance in determining whether the implied term should be of

an absolute duty or some lesser duty - especially in a matter so vital to the safety of the vessel, her crew and the cargo.

The third in the trilogy of London Arbitration Awards I will refer to is the "Doris" (1987). In that case the charterparty was on NYPE Form which, aside from clause 2, simply said in the vessel's description clause, next to speed/consumption: "IFO 180 cst". A very experienced technical Arbitrator (who was acting as sole Arbitrator) concluded that the fuel was defective in terms of ash content, aluminium content and an unacceptably high level of chloro compounds. Whereas there is a maximum set for ash content in the British Standard and a "guideline" figure for aluminium, the British Standard makes no mention of chloro compounds. Although the ash and aluminium levels were excessive, these did not cause the great majority of the engine damage; this resulted from the high level of chloro compounds.

If the reasoning adopted by the Tribunal in the "Panagia" had been followed owners' claim would no doubt have been dismissed for the reason that the charterparty stipulated no more than "IFO 180 cst". Again, if the British Standard itself had been regarded as the criterion, the result would presumably have been the same on the ground that the British Standard makes no mention of Chloro compounds. The Arbitrator took a robust approach to the problem, saying:-

"Nobody expects to find more than a trace of chlor in

a marine fuel, hence nobody has considered setting a limit. However, everyone would agree that anything more than a trace of chlor is highly undesirable. In the words of the owners' petroleum expert, you would not legislate for "old socks" simply because this is not something you would expect to find.

---. I had no hesitation in concluding that the charterers' obligation to provide bunkers which were reasonably fit was an absolute obligation".

Early the following year, 1988, the charterers sought leave to appeal from the Arbitrator's award but their application was rejected by the Court. The Judge must have been of the view that the proper test was indeed "absolute duty" as, if some other test arguably applied, the Judge would no doubt have felt constrained to grant leave to appeal. Whilst it would be premature to say that this issue has been laid to rest, there are powerful grounds for supporting the "Doris" decision. Indeed, the trend in this direction has been reinforced by the recent unreported Court decision in the case of FAL Bunker Co Ltd -v- Gerrard Chartering A/S (1990). That case involved a dispute between bunker suppliers and charterers and it was held that the fuel supplied was not of merchantable quality in that it was unstable. A parallel dispute between charterers and shipowner is being dealt with in London Arbitration and the matter may well go back before the Court once the award is issued.

There are modern international market standards - British Standard BSMA 100: 1989 and International Standard ISO 8217:1987 and those ordering from bunker suppliers and owners entering into time charterparties, rather than setting out in the bunker order or charterparty an exhaustive specification, can now stipulate in a short form clause that the fuel shall be of a given viscosity and comply, as a minimum, with the relevant BSMA/ISO Standard.

Finally, at their AGM in Singapore on 11th May last year, Intertanko (International Association of Independent Tanker Owners) introduced their Risk Rating Report, which is produced monthly, and sets out the commercial performance of bunker suppliers, lifting ports, suppliers, an energy index and a risk rating. Whilst the Report is in its early days, and does not cover all bunker suppliers worldwide, it is a further aid for the purchase of sound bunkers: RRR: AA = seal of approval.

1] Background Factors

Whilst lawyers, prostitutes and seafarers can claim to be ancient professions, the oil-carrying industry is a relative babe. It is only just over a century ago that the first tanker specifically designed for oil in bulk was launched; this took place in England in 1886. She was 2,307 tons - in other words somewhat smaller than a modern oil barge. Prior to the second World War, it was rare to find oil tankers of in excess of 12,000 tons deadweight.

Matters really started to take off after the second World War as economic activity increased and the western world became increasingly dependent upon oil as the prime ingredient for its energy requirements. The size of tankers followed suit. By 1950, 16,000 tonnes were plying the seas. During the 1960s our Prime Minister, Harold Macmillan was telling us that we had never had it so good, and we were seeing vessels in excess of 100,000 tons, VLCC's (very large crude carriers) ranging from 200,000 to 300,000 tonnes and by 1968 we had the first ULCC (ultra large crude carrier) of 327,000 tonnes deadweight.

The size seemed to be spiralling forever upwards and, in the 1970s, there was an increasing number of ULCC's of

about 500,000 tonnes - the crew needing motorised scooters to take them from one end to the other of the vessel.

Prior to the early seventies, matters were relatively harmonious: freight rates were healthy and the price of oil was low. The first shock arrived in 1973 when OPEC imposed the oil embargo. The second shock followed in 1979, with the Iranian revolution. These two events brought about a dramatic rise in oil prices and a depressed world economy resulting in freight rates coming under pressure and an increasing number of tankers being scrapped or "mothballed", awaiting better times. During the first half of the 1980s, rock bottom freight rates and high bunker prices meant that a tanker's total operating expenses frequently exceeded the income which the vessel could generate. It is estimated that some 50% of freight was "consumed" by the cost of bunkers and, from their historical low prior to the early 1970s, bunkers became one of the owners' largest operating expenses.

OIL CARGO LOSSES

Whilst there were of course oil cargo losses prior to 1973, oil cargo shortage claims were more or less unheard of except following a major casualty. With the increase in crude oil and fuel oil prices this matter has come under the microscope and a whole "loss control" industry has developed. Given that a typical VLCC may carry approximately 250,000 tonnes of crude oil (about 1.5 million barrels) the cargo value (at US\$15 per barrel) will be in the region of US\$22.5 million. The so-called customary trade allowance of 0.5% would then amount to US\$112,500 per voyage.

The global figure for routine adventitious oil losses, both real and apparent, has been put at in excess of US\$100,000 million per annum or approx US\$1/tonne of crude traded world wide, equivalent to an average unit loss in excess of 0.5%.

It is however important to bear in mind that, quite apart from accidental leakage and deliberate malpractice, the properties of crude oil are such that there are certain inevitable losses during the course of transit.

There follows a random list of some of the factors which account for such inevitable loss:-

A] "Paper Shortages"

These arise due to the inaccuracies in measurement and the calculation system used for the quantification used for fluid cargoes. The factors required for measurement involve:-

- (i) ullages or soundings to get the volume of the cargo,
- (ii) taking the temperature of the cargo, and
- (iii) Sampling the cargo to ascertain its density which enables one to convert volume at standard temperature to weight.

All three steps, ullaging, taking temperatures and sampling are subject to inaccuracies, both ashore and in the ships' tanks. If an ullage is wrong by 1" in a ship's tank which is 10ft long by 50ft wide, the unaccounted volume in the tank due to this error would be 74 barrels amounting, at US\$15 per barrel, to US\$1,110 - multiplied by, say, 13 ships' tanks. As regards (ii), at high temperature oil expands and at cold temperature it contracts in volume. A 1°C error in temperature is equivalent to an inaccuracy in volume at the standard temperature of approx 0.1%. As regards (iii), it is difficult and time-consuming to take representative samples and any deficiencies in the sampling result, once again, in a mis-stated density and an inaccurate weight.

B] Differences between shore tanks' and ships' figures

The former are not necessarily more accurate. In a case we were concerned with, a well-respected London Surveyor made out a case but measurement errors at the shore terminal accounted for a significant proportion of the official out-turn loss. Further room for error involves the shore-line itself; how long is it, is it heated, is it kept full prior to and after loading/discharge.

C] BS & W (Base Sediment & Water)

Reliable measurement of water and sediment is very difficult and, of course, has a direct impact on the net quantity of cargo received.

D] Inherent vice of the cargo

As you will know, Article IV, Rule 2(m) of the Hague Rules provides that neither the carrier nor the ship be responsible for loss or damage arising or resulting from:

"wastage in bulk or weight or any other loss or damage arising from inherent defect, quality or vice of the goods".

The key factors here are evaporation of volatile fractions during the voyage and cargo clingage in the ship's tanks, resulting in cargo rob following discharge.

There are no doubt other factors that oil cargo experts could point to. The bottom line is that some allowance is called for. The American case of Sun Oil Co v. Mercedes Maria (1983) AMC 719 allowed 0.5% based upon:-

"The well-known factors of inexact measurement and inevitable loss associated with the transportation of liquid cargoes---(arising) routinely due to both the inherent nature of oil as a cargo and the imperfect methodology used for measurement of cargo aboard ship".

Neither in the USA nor in England is 0.5% regarded as a fixed allowance. In the "Rio Sun" (1985) 1LLR350, Mr Justice Bingham observed:-

"A cargo of crude oil always shows some shortage in discharge. The percentage of loss varies from about 0.25% as a minimum to about 0.5% as an acceptable maximum in the absence of heating. The percentage loss tends to be lower on an OBO such as the "Rio Sun" than on a conventional tanker--".

THE REGULATIONS

I attach extracts from the SOLAS (Safety of Life at Sea) Convention and from the Lloyds Register "Rules and Regulations for the Classification of Ships".

Whilst the Convention and the Classification Society Rules are very detailed, the key factors for present purposes are these:-

1. The flashpoint of fuel should not in general be less than 60°C. (The flashpoint of crude oil is generally far lower).
2. The bilge, ballast and oil fuel lines, etc. are to be entirely separated from the cargo tanks.
3. The oil fuel bunkering system is to be entirely separate from the cargo handling system.
4. The arrangements for storage, distribution and utilisation of the fuel is to be such as to ensure safety of the ship and the persons on board.

It goes without saying that the use of crude oil cargo as fuel amounts to a serious breach of the Convention and of Class Regulations and no doubt invalidates the Owners' hull insurance and P & I insurances. However, on a typical 100,000 dwt OBO, there may be as many as 50 separate spaces to inspect and survey. Accordingly, a total "audit" of all the vessel's spaces, including the cargo, ballast, bunkers, cofferdams and void spaces is an extremely arduous and time-consuming task. It may happen,

therefore, that the "systems" used to convert cargo are only discovered when the vessel is in a repair yard following a major incident or is sent for breaking-up.

THE DANGERS

I attach extracts from the International Safety Guide for Oil Tankers and Terminals illustrating just what a hazardous substance we are talking about. There are numerous instances of serious explosions and fires believed to result from use of low-flashpoint cargo as fuel. According to Lloyds' Mardata, during the period 1970 to 1987 a total of 65 tankers exploded involving extensive loss of life, injury, damage to shore terminals and to the ships in question. Whilst the files were closed marked "cause unknown" a number are likely to result from burning low-flashpoint cargo as fuel. The known cases include the following:-

- 1] The "Spyros" explosion in Singapore, October 1978. There were 83 fatalities and 46 crew and shipyard workers injured.
- 2] The "Taxiarchis". In October 1982 a Liberian Board of Enquiry determined the vessel to have crude oil of 10°C flashpoint in its bunker tanks.
- 3] The "Ypapanti". Again, a Liberian Board of Enquiry in October 1982 determined that the vessel had crude oil of 10°C flashpoint in its bunker tanks.
- 4] The "Haralabos" suffered an explosion in November 1982 whilst at an Egyptian refinery. This was followed by a series of further explosions causing the vessel's constructive total loss. The Liberian Board of

Enquiry Report of August 1983 found that the crude oil flashpoint in the bunker tanks was 4°C.

Liberia became so concerned about the reported instances affecting Liberian flag ships that it presented a formal note to the IMO (International Maritime Organisation) in February 1983 and I attach a copy of this Note and of the IMO circulars and resolutions which followed.

In their note, Liberia drew attention to the use of low flashpoint cargo as fuel and continued:-

"Liberia believes the practice described in previous paragraphs is more widespread than may be presently apparent and is a serious source of danger to ships and personnel both at sea and in port and also to port installations which service tankers".

Their suggestion was a strengthening of survey requirements "--to include a positive examination of cargo and bunker piping systems for evidence of unauthorised connections. Liberia also feels that Port States could introduce random sampling of bunker tanks as a deterrent".

In their reaction to this Note, the Maritime Safety Committee of the IMO noted that the SOLAS Guidelines on Surveys "--requires the examination of cargo and bunker piping systems. Member

Governments are urged to advise their nominated surveyors or recognised organisations to give special attention during surveys to the possibility of cross connections between the cargo and bunker piping systems".

The Committee stopped short of endorsing random sampling of bunker tanks on the ground that it would be difficult to implement. They concluded:-

"However the Committee urges Member Governments to require the testing of a sample from the bunkers in connection with the control procedures of the SOLAS Convention whenever there are clear grounds to believe (due to the odour of hydrocarbon vapours in the engine room, by irregularities in the cargo or bunker pipework or otherwise) that a ship may be using crude oil cargo as fuel".

In November 1985 the IMO adopted Resolution RA565 (14) setting out recommended procedures to prevent the illegal or accidental use of low-flashpoint cargo oil as fuel. The Resolution includes the following:-

"7. Random sampling of bunker tanks will act as a deterrent against the deliberate use of crude oil cargo to supplement the fuel oil. Member Governments are urged to incorporate this into their Survey Procedures under the

1978 SOLAS Protocol (Resolution A560[14]).

Additionally, wherever there are clear grounds to believe (due to the odour or hydrocarbon vapours in the machinery, irregularities in the cargo or bunker pipework or otherwise) that a ship may be using cargo oil as fuel, consignees, cargo officers, surveyors or inspectors should test the percentage of the lower flammable limit of the vapour in the bunker or bunker tanks by the use of an appropriate combustible gas indicator. If the percentage of the lower flammable limit is above 50, a sample should be taken of the liquid contents of the bunker tank and analysed by a laboratory recognised by the Administration of the flag state, or Port state concerned to ascertain the flashpoint using the closed cup method.

8. If the flashpoint is below 60°C, except when authorised under Regulation II-2/15 of the 1974 SOLAS Convention as amended, the flag State administration should be notified and cargo operations and/or bunkering stopped.

In consultation with parties concerned (master, port services and ship inspectorate, consignee, shipowner,

classification society as appropriate etc)
a plan of measures to be taken is to be
drawn up with the objective of removing the
contaminated fuel, washing and gas-freeing
the tanks and associated piping".

It is difficult to know to what extent the IMO Resolution has acted as a deterrent. It is my impression that the crop of oil cargo frauds from the 1980s has abated and it may be that more stringent surveys and greater awareness on the part of cargo interests have caused shipowners to become more wary of using this method to increase the profitability of their operation.

THE MECHANICS

Crude oil may be diverted from the cargo lines or cargo tanks either directly or indirectly to the bunker tanks and thence to the main engine. This can be done at any stage of the voyage - from the time of loading until discharge. It sometimes involves setting up secret compartments - a compartment within a compartment. The cargo shortfall is generally covered up by replacement with an equivalent amount of salt water or by the use of slops, which are rarely checked in any detail at the load port.

In a cargo claim we were concerned with against a vessel suspected of theft of gas oil cargo, an early Mareva failed to attach any assets, the P & I Club withdrew cover and the case unfortunately went no further for lack of traceable funds. As the owners were never adjudged liable it is of course not possible for me to disclose their identity or that of the vessel. However, we arranged for the vessel to be surveyed prior to being scrapped and the survey report provides an interesting example of the means used to "tap" the cargo tanks.

Quoting from the report:-

"Whilst surveying the pump room, the undersigned noted the presence of a fourth cargo line rising out of the pump room and connecting to the end of the cross-over

on the discharge side of the pumps. This pipeline was isolated by one valve, which is shown in photographs 1 and 2, which due to the presence of grease and the state of the thread on the valve spindle, indicated that it had been used. For comparison purposes the undersigned would draw your attention to the stripping line isolation valve as is shown in photograph no 25 where the thread of the valve stem is not greased and, clearly, has not been used for some period of time.

The relevant pipeline was followed up through an enclosed space within the pump room, as is shown in photograph no 4, and emerged on deck by the side of the pumproom, as is shown in photograph no 5. This pipeline was later discovered to be a stern cargo line which may be utilised for the loading or discharging of cargo over the tanker's stern rather than through the traditional manifolds amidships, Port and Starboard. Photograph no 6 shows the run of the pipeline down the port alleyway of the accommodation, terminating in a single manifold connection, as is shown in photograph no 7. On the basis of the aforementioned pipeline layout, nothing untoward would be suspected. However, a small pipeline appears from the bottom of the stern loading line, which may under normal circumstances be mistaken for a stanchion supporting the main cargo pipeline, and this stanchion may be seen in photograph no 7 and again in photograph no 8. It is

suggested that this small section of pipeline may easily be disguised by general refuse and/or ships ropes and not readily detected by the average cargo inspector when carrying out his duties with respect to the quantification of a cargo on discharge or loading. Having located this pipeline "stanchion" the accommodation space directly beneath this pipeline was sought. This was carried out by pacing the distance from this connection to the forward bulkhead of the accommodation and by using a similar number of paces through the Port internal alleyway within the accommodation. The location of the compartment directly beneath the stern loading manifold was determined to be that of the crew's toilets and the nameplate over the door is as shown in photograph no 9. The crew's toilets consisted of two toilets, one outboard and one inboard and it was through the deckhead of the outboard toilet that the pipeline re-emerged as is shown in photograph No 10. When examining the state of the pipeline as shown in photograph No 10, it can be seen that this pipeline has existed for some period of time and that renewals have been made. This is particularly pertinent with respect to the bend suction where the thrust of liquid passing through the pipeline has eroded a section of the bend and this has been repaired using a doubler plate. The pipeline then passes transversely over the deckhead of the toilets and this pipeline section is of much better condition than the bend section, due to the lack of pitting which can be seen on

the bend section under the paintwork. The pipeline section as it passes over the top of the toilets, particularly that of the outboard toilet, is shown in photograph no 11.

The inboard toilet door was firmly closed and secured by the use of numerous nails and a block of timber and excessive force had to be utilised to open this door. A method of closing is as shown in photograph No 12. On entering the inboard toilet cubicle, it was noted that this toilet had not been used for some period of time due to its relative cleanliness when a comparison was made with the outboard toilet cubicle bowl. The pipeline traversed in this inboard toilet cubicle through a 90° bend and dropped vertically through the deck of the toilet on the inboard side of the toilet. This can be seen in photographs 13 and 14. In order to locate the position where this pipeline would have entered the next compartment below the crew's toilets, a similar exercise was carried out with respect to pacing, to the engine room door, which is half way down in the inboard accommodation alleyway on the Port side. On entering the engine room the undersigned paced approximately 19 paces aft of the engine room door, which caused him to enter the boiler flat. As can be seen in photograph no 15, the wastepipes from the toilets are present at the deckhead and furthermore, the connection at the deckhead of the pipeline can be seen, both in photographs 15 and 16. The pipeline ended with a

modification which is a Butterworth valve and blanked at the end with a screw threaded blank. Both photographs nos 16 and 17 show heavy oil staining around the connection and also on the valve and blank. After these photographs had been taken the blank end was removed from the valve piece and is held in custody by the undersigned. The valve was subsequently opened and a large volume of water appeared from the valve or the pipeline. It can only be assumed that this water had been used to flush the cargo line system prior to her delivery to the scrapyard, pursuant to the warranty that the vessel was gas-free. Directly beneath the Butterworth valve connection, the shell plating was heavily stained by oil and this can be seen in photograph no 18.

Having discovered that it is perfectly feasible for cargo to be diverted via the stern cargo loading line into the vessel's engine room, it was necessary to discover if it was at all possible for cargo to be redirected into the vessel's bunker tanks. The vessel's fuel oil transfer pump was located (the engine room was in total darkness) and a Butterworth pipeline was found connected to the suction manifold of the fuel oil transfer pump. This Butterworth line was traced and its end was found left draining in the stern gland bilge well. Photograph no 19 shows the propeller shaft running towards the stern gland and to the right hand side of the main propeller shaft the

Butterworth pipeline, as mentioned above, laying on the engine room plates. The end connection to this Butterworth pipeline was suitable for a direct connection onto the Butterworth valve, which was found in the boiler flat. Furthermore, the length of the Butterworth pipeline was also sufficient to reach the aforementioned valve with necessary telltale scrapings on handrails at the entrance to the boiler flat. It is, therefore, concluded by the undersigned that the Butterworth pipeline was capable of connection to the cargo system at one end and was connected to the suction side of the fuel oil transfer pump at the other end. This would have enabled the vessel to relocate any misappropriated cargo to any of her bunker tanks".

The crew's toilet was really the hot-seat!

AN OVERVIEW OF SOME U.S. CASES

"Ypapanti" S.M.A. 1852 (N.Y.1983)

The vessel loaded nearly 600,000 bbls of crude oil in Nigeria during April 1982 for carriage to Philadelphia. Upon arrival, the U.S. Coastguard refused permission to discharge at Philadelphia because the vessel's COW (Crude Oil Washing) and IGS (Inert Gas System) did not meet Federal specifications. Ultimately, the cargo had to be trans-shipped at Bonaire in July 1982, where it was found that there was a shortage of 23,881.83 bbls. Tests were later taken of the vessel's bunker fuel which showed that the oil there was similar in composition to the cargo. Also, a final survey conducted at Bonaire revealed apparent modifications to the cargo piping and valve system allowing for diversion of cargo to the bunker tanks. Cargo interests alleged that a quantity of about 12,114 bbls was diverted in this manner and claimed also punitive damages.

The Arbitrators found that a shortfall was clearly proven on the basis of the shoretank figures at the load and discharge ports. The Arbitrators expressed the view that, to qualify for punitive damages, shipowners' conduct must have an extra element of "ill-will, actual malice or a conscious disregard of the consequences". They concluded that the owners' conduct "just doesn't quite measure up" and awarded ordinary compensatory damages only.

"Haralabos" S.M.A. 2033 (N.Y. 1984)

In November 1981 the vessel loaded crude oil in Venezuela for Quebec. In accordance with the shore-tank readings, she loaded 483,201 net bbls and discharged 464,744.46 bbls - a short delivery of 18,457 net bbls. A survey of the vessel indicated that two bilge tanks contained 2,000 bbls of liquid conforming to the specification of the cargo, albeit with a high proportion of water. A survey of the bunker tanks showed an extra 90 mt fuel oil on board. The voyage records, etc were supposedly "destroyed" by the Managers who were being investigated by the Liberian Maritime Commissioner for suspected theft of cargo for bunkers. That investigation disclosed illegal cross-connections between the cargo and bunker oil piping arrangements.

The Arbitrators held that misappropriation of cargo was proven and determined the amount of the shortfall by reference to shore tank figures. This was a departure from the normal rule - namely, a comparison of the vessel's ullage measurements, which tends to be more favourable to the vessel. However, it was observed that the normal rule was based upon a presumption of fair dealing between the parties and in the present case, where there was obvious conversion, the panel saw fit to accept cargo's request to determine the loss on the basis of shore figures instead. Compensatory damages were awarded based upon cargo's

figures for the shortfall. Contrary to the standard practice that each party bears its own costs, the costs of the Arbitration and attorneys' fees were also awarded to cargo owners to penalise the ship owner for his bad faith. What appeared to clinch the argument was the findings concerning the bunker figures:-

".. the most damaging piece of evidence is the bunker survey which showed 585.097 m/t at 60°F on arrival at the load port; 555.097 m/t at departure and 795.875 at 15°C on December 20, 1981 after discharge with the vessel having taken on 150 M/T during discharge. Analysing these figures, the Panel found as a net result that the vessel had an excess of 90.778 M/T bunkers on board on December 20 than upon sailing from Venezuela on November 28 despite a delay of 24 days of which 10 days were at sea".

"Athena" S.M.A. 2086 (N.Y. 1985)

During November 1983 the vessel loaded crude at St.Croix for Delair and Baltimore. Tank 5C was to be inspected by the U.S. Coastguard on arrival, so in the course of the voyage, this tank was cleaned and Butterworthed in preparation. The inspection was conducted during discharge at Delair and the vessel then sailed to Baltimore. During discharge in Baltimore, a crew member reported the existence of a concealed "thiefpiece" used to transfer

cargo to the bunker tanks. Discharge was stopped so that charterers could survey the vessel, whereupon irregular pipelines connecting the vessel's cargo system with the fuel oil system were found together with oil residues in the double bottom and feedwater tanks. The cargo owner/charterer claimed for cargo converted on this and also six previous voyages and also for treble the loss as punitive damages.

The panel found that the purpose of the pipelines was clearly to divert cargo for use as bunkers - their permanence, concealment and the skill of installation pointed to this. This was further corroborated by the testimony of the crew members.

However, the claim in respect of the previous voyages was refused for lack of evidence that the irregular pipelines were in existence at the time of those voyages. Also, the claim for treble damages was refused, the Arbitrators holding that they had no power to award punitive damages, stating:-

"The Panel believes that the award of punitive damages is not within the intent and scope of the Arbitrational process which is fundamentally grounded in the concept of equitable resolutions of commercial disputes. Moreover, there appears

to be legal precedent which would deny Arbitration Panels the power to award punitive damages".

"Octonia Sun" S.M.A. 2424 (N.Y.1987)

The vessel was chartered for the carriage of fuel oil from Luanda to New York during November 1982. Upon discharge at New York there was a considerable cargo shortfall and ROB. Charterers sought punitive damages from the shipowner for theft of cargo. The ship's ex-Chief Officer testified that (i) he had been instructed to steal cargo by the shipowners; (ii) there was a "thief piece" (verified by an independent surveyor) joining the aft cargo line with the bunker line; (iii) a previous Captain was convicted of stealing cargo and the witness himself had lied to FBI agents investigating the theft; [iv] the cargo was deliberately allowed to cool at the discharge port so that large quantities would be on board as ROB. Also analysis of the bunker figures and consumption indicated that less fuel was burned than would be expected for a vessel of this type and age.

There is interesting comment by the Panel on the main witness for the "prosecution":-

"As stated earlier, Athanasakos testified at great length and in specific detail. While

he was at times excitable, belligerent, morose and irrational, he nevertheless was relatively consistent in his responses. Recognising his obsessive antagonism to the shipowner and his gratitude to Stinnes (charterer) for its assistance in finding him shore-side employment, I nevertheless found Athanasakos to be a credible and truthful witness".

Charterers were awarded US\$140,000 to compensate them for the cargo loss and a further US\$100,000 as punitive damages. The rationale for this was expressed in these terms:-

"I find that owners' conversion of cargo on this voyage was part and parcel of an on-going practice of diverting cargo to ship's bunkers. Such conduct cannot and should not be considered acceptable practice and, in fact, should be vigorously condemned. Generally, Maritime Arbitrators have been loathe to assess punitive damages even where a party's conduct has been particularly reprehensible (citing "Athenia" and "Ypapanti"). In fact, a search of New York Maritime Arbitration awards indicates punitive damages have never been awarded in the past. I have reflected on this apparent reluctance and

seriously considered the implications of breaking new ground. Although the decision is a difficult and painful one, I must admit it has been made somewhat easier by the gross nature of the vessel's conduct".

In Valero Refining Inc -v- M/T Lauberhorn 813F 2d60 (5th Cir 1987) there was a reference to the U.S. Court of Appeal for the 5th Circuit on a question of law - namely, whether a claim under RICO (the Racketeer Influenced & Corrupt Organisations Act, 1970) is arbitrable.

Briefly, to trigger RICO liability there must be [a] conduct [b] of an enterprise [c] through a pattern [d] of racketeering activity. When these tests are satisfied the Act allows treble damages.

The U.S. Court of Appeals held that so long as the conduct upon which a RICO claim is based is "arising out of the Charter", and the charterparty provides for arbitration, a RICO claim is arbitrable.

"Triumph" S.M.A. 2642 (N.Y. 1990)

This case is of particular interest from several points of view; it appears to be the first case where RICO treble damages were awarded. The owners purchased the vessel in 1982, the subject voyage on which there was a shortage of

about 7,500 bbls of crude took place in March 1984, the vessel was sold for scrap in 1985 and surveys of the vessel were carried out in 1986. During the second survey it was discovered that No 3 C Tank had been modified so as to construct a compartment within a compartment with a capacity of about 500 cubic metres. Although there was no direct evidence that the Owners constructed or knew about the modifications, the Panel drew adverse inferences from the fact that the modifications were permanent in nature; their purpose was clearly conversion of cargo; and it would have been naive to suggest that the "special compartment" was intended to be used, or was used, on only one occasion. The majority also found that the Chief Officer and Chief Engineer were unreliable witnesses, that the engine log bunker entries were suspect because of the use of white-out to change some of the figures and that there had been at least four other instances of substantial crude oil shortages from the vessel over a two year period.

The dissenting Arbitrator was highly critical of the majority's decision. He said:-

"I find the majority's rush to apply, for the first time ever, the statute's treble damage relief in Maritime Arbitration an exercise in arbitral arrogance".

He was clearly concerned about the decision opening up the floodgates to RICO claims in the hands of "aggressive maritime attorneys". He continued:-

"The Triumph" is a typical case of a greedy plaintiff who was not satisfied with the compensatory damages of \$332,138.41 which the Panel awarded it in its Partial Final Award. It now wants to line its pocket by collecting another \$1,115,638.80. Counsel for charterers implied his client seeks treble damages out of some noble calling to improve the moral standards of society, as if it is society's self-appointed protector".

Finally, the Award is extraordinary, at least to an English lawyer, in that the dissenting Arbitrator deems fit to quote in the Award, correspondence exchanged with his fellow Arbitrators chronicling the disagreement as to whether RICO should be applied.

The sequel was an appeal to the U.S. District Court (which vacated the Final Award) and a further appeal to the U.S. Court of Appeals (924F. 2d467; 2nd Cir 1991). The U.S. Court of Appeals allowed the appeal, thereby endorsing the majority's award of RICO damages.

"Lauberhorn" S.M.A. 2699 (N.Y. 1990).

The vessel loaded crude at Kuwait and Oman during June 1985 and sailed for Corpus Christi, Texas via the Suez Canal. The vessel bunkered en route at Augusta, Italy, towards the end of June. The owners alleged that the vessel also took on bunkers at Suez but this was disputed. The vessel arrived at Corpus Christi in mid July and it was found that there was a shortage of about 1,000 tonnes on the bill of lading figure of about 125,500 tonnes.

Cargo owners alleged that on two occasions during the voyage cargo was diverted into the bunker tanks and burned as fuel. It relied on [i] the presence on board of a "Kleftis" (thief-piece), a "U"-shaped tube joining the cargo pipe to the bunker pipe; [ii] the eye-witness testimony of the ex-Chief Officer who witnessed the conversion; [iii] testimony that the ex-Chief Officer had been instructed to convert cargo; [iv] alleged forgery and alteration of the voyage records; [v] excessive bunkers remaining after the voyage; and [vi] evidence of similar incidents occurring on previous voyages.

The Charterers claimed punitive damages or alternatively treble damages under RICO.

The Arbitrators held that the owners' fraud was established. They relied upon "Octonio Sun" as authority to award punitive damages. They also held that they had power to award treble damages under RICO and that this was

the appropriate course because:-

- 1] There had been a "pattern of criminal conduct" (i.e. conversion of cargo on at least two occasions on one voyage);
- 2] "Fraud" was present; and
- 3] By using the postal system to mail the charterers a (fraudulent) invoice for freight there was "postal fraud".

Treble damages were accordingly awarded.

A significant factor in a number of the above cases is that the main witness for the claimant is a disgruntled ex-employee of the respondent and one entertains some doubts as to the reliability of a witness who was apparently involved in the fraudulent activity and then "blows the whistle" after being sacked.

Whilst deterring owners from committing such criminal activity is laudable, one also questions the logic of heaping rewards on the cargo interests in the form of punitive and/or RICO damages; there are surely more worthy objects such as the emergency services who are called upon to pick up the pieces when the floating timebombs explode.

POT-POURRI OF ENGLISH CASES

Unlike New York Arbitration Awards, London Awards are not published and one is therefore limited to the comparatively rare cases which get to Court, either originally or by way of appeal from an Arbitration Award.

It will be obvious that in these cases much depends upon the quality of the oil fuel/cargo experts who carry out the contemporaneous surveys and are called upon to assist in the prosecution or defence of the proceedings. I heard of a case recently where crude oil was discovered in the vessel's boiler following a fire and explosion. A key issue was whether the charterers had supplied sub-standard bunkers, containing the low flashpoint crude, or whether owners had been helping themselves to the cargo to keep their expenses down. In hull insurance terms, fire/explosion is a peril specifically insured against and the shipowner is entitled to recover unless the underwriters can prove that the owners themselves brought about the loss. In this case, the "experts" advised that the casualty was caused by sub-standard bunkers and the owners' total loss claim was paid. The hull underwriters thereupon pursued their subrogated rights against charterers and years later, in the run-up to the arbitration, the views of the "experts" went through something of a sea change; they admitted that perhaps cargo conversion was a more likely cause than sub-standard bunkers!

The "Ypatianna" (1987) 2LLR 286 is a curious case where, prior to loading in Russia, there was already approx 13,000 bbls of ROB from previous voyages spread throughout the cargo tanks. The vessel was chartered to the plaintiffs and loaded for their account about 70,000 MT of crude for carriage to India. The cargo was short-delivered and the plaintiffs were awarded damages in respect of the shortage - a sum of approx US\$46,000. However, the plaintiffs maintained that they were entitled to more; they maintained that they had title to all the cargo on board the vessel at the time of discharge - a further approx US\$400,000. Their argument was that where B wrongfully mixes the goods of A with goods of his own, so that the original goods cannot be separated or identified, the whole of the mixture becomes the property of A.

The preceding Arbitration Award found that there were many deliberate inter-tank transfers/leakages during the voyage and that there was inter-connection between the vessel's cargo and fuel oil systems. The Judge treated this evidence in somewhat summary fashion. He said:-

"so there is a hint here that these owners were going equipped for theft; but it is no more than a hint".

After an interesting review of some ancient authorities on "confusio" (the mixing of goods belonging to different owners so that they can't be separated) and "commixtio" (where they can be

separated) the Judge concluded:-

"Seeing that none of the authorities is binding on me, although many are clearly persuasive, I consider that I am free to apply the rule which justice requires. This is that, where B wrongfully mixes the goods of A with the goods of his own, which are substantially of the same nature and quality, and they cannot in practice be separated, the mixture is held in common and A is entitled to receive out of it a quantity equal to that of his goods which went into the mixture, any doubt as to that quantity being resolved in favour of A. He is also entitled to claim damages from B in respect of any loss he may have suffered, in respect of quality or otherwise, by reason of the admixture".

In rejecting the claim for the further US\$400,000 the Judge said:-

"I do not see that it is the function of civil justice to punish or discourage crime by awarding the victim more than he has lost, unless it be in the special case of an award of exemplary damages".

This of course contrasts starkly with the approach now prevailing in the USA, as set out above.

The "Irimi M" (1988) 1LLR 253 involved a charterparty for the carriage of crude from Tartous to Le Havre. The cargo was loaded at the end of October 1981 and a discrepancy was noted between ship and shore figures amounting to 691 cubic metres. The vessel arrived at Le Havre in mid November and, upon discharge, there was an increased discrepancy between ship and shore figures amounting to about 1,006 cubic metres. Although this is a case where the plaintiffs might have run a positive case on cargo conversion they refrained from doing so, alleging that the oil must have leaked from the cargo tanks into other tanks/spaces. The defendants maintained that the shore measurements were inaccurate.

In upholding the plaintiffs' claim Mr Justice Leggatt observed:-

"although no allegation of theft is made against the defendants, the ascertainment of what became of the oil has not been assisted by the conspicuous lack of documents provided by the defendants".

In closing, the defendants' Counsel asked: "why have the defendants defended?" (in other words, if they had deliberately set out to secrete the missing cargo). In answering this and other of the defendants' submissions, Mr Justice Leggatt said, in characteristically forthright fashion:-

"-- it must be said that the plaintiffs have not

disavowed the possibility of theft or intentional concealment: they have simply refrained, because they have no evidence of it, from making an affirmative case of loss by that means. Old though the ship was, there were still difficulties in inspecting her; and even in 1981 the practice of inspecting all spaces in a ship in addition to cargo tanks, when loss was alleged, was not yet universal. I cannot without risk of impoliteness satisfactorily answer Mr Milligan's question about why the defendants defended".

The "Delfini" (1988) 2LLR 599 concerned an oil shortage claim but the main issue was whether the plaintiffs had title to sue and whether the ex parte leave which they had obtained to serve out of the jurisdiction should be set aside. It was held [and affirmed on appeal (1990) 1LLR 252] that the plaintiffs had no title to sue and that the service out should be set aside. In commenting on the claim itself, the Judge observed:-

"A statement as to quantity shipped, if made without qualification, in a bill of lading is prima facie evidence of the shipment of the quantity in question. A discrepancy between such a bill of lading quantity and a lesser quantity received ashore will normally be sufficient to establish a good arguable case of breach of duty by the shipowner. ...This is a case where I consider that the plaintiffs are properly entitled to rely upon the discrepancy between bill of lading

figures and discharge figures as constituting a good arguable case of breach of duty by the defendants".

Next came the Court of Appeal decision in the "George S" (1989) 1LLR 369. In that case, shore tank measurements indicated a short-delivery of 8,503 bbls of crude oil whereas, in accordance with ship's figures, the shortfall was 6,408 bbls. There was no intermediate port of call between the load and discharge ports and three explanations were advanced for the loss - namely [i] leakage from the vessel en route; [ii] cargo had remained on board after discharge; or [iii] cargo was converted for use as fuel.

Explanations [i] and [ii] were rejected as either leakage or ROB of about 7,000 bbls of oil would be bound to be noticed. It was held that there was a "hint of suspicion" that [iii] may have occurred, but hard evidence was lacking and the fraudulent nature of such an act required persuasive proof matching the gravity of the allegation.

The Court of Appeal held that the burden of proof was on the cargo owner to establish a short delivery which they could generally satisfy, in the case of an oil cargo, on the basis of discrepancies between bill of lading and shore tank receipt figures. It was then for the owner to counter this evidence by showing, for example, that the losses occurred in the shore pipelines, that there were inaccuracies in the fuel tank

measurements or otherwise.

The claim had been dismissed at first instance on the ground that, of the two explanations for the shortage on offer - apparent or actual loss after discharge and actual short delivery, the Judge considered the former "the least unlikely explanation". Lord Denning MR, who gave the leading judgement in the Court of Appeal described this approach as erroneous and continued:-

"The shore figures pointed inexorably to a short delivery, unless there was some evidence pointing to diversion after discharge or air in the pipeline and there was none. It was for the shipowners to counter this evidence and they did not do so. In the absence of such evidence, their only remaining defence was to establish beyond all reasonable doubt that a short delivery was impossible. This they did not do. All that they achieved was the finding that this was more improbable than an actual or apparent loss after discharge".

In the "Captain Gregos" (1990) 1LLR 311 the cargo was discharged in June 1984 and the one year time limit under Article III Rule 6 of the Hague-Visby Rules (incorporated in the bills of lading) expired in June 1985. In December 1985 the cargo interests claimed that owners had converted a portion of the cargo by

diverting it into a secret compartment on board and in June 1987 shipowners applied to the Court for a declaration that the cargo interests' claim for damages arising out of alleged theft of part of the cargo was time-barred. At first instance Mr Justice Hirst rejected the shipowners' application holding that "delivery" was outside the scope of Article II and "misdelivery" was outside the scope of Article III, Rule 6. He continued that, even if wrong on this, he would still have held that theft by the carrier was outside the scope of the Rules and, therefore, that the claim was not caught by the one year time-bar.

Unfortunately, the Court of Appeal took a different view and the owners' appeal was allowed. This result followed, apparently, from the use of the words "in any event" and "all liability whatsoever in respect of the goods" in Article III Rule 6 ["--- The carrier and the ship shall in any event be discharged from all liability whatsoever in respect of the goods, unless suit is brought--"].

Lord Justice Bingham held that: "The inference that the one year time bar was intended to apply to all claims arising out of the carriage (or miscarriage) of goods by sea under bills subject to the Hague-Visby Rules is in my view strengthened by the consideration that Article III Rule 6 is, like any time bar, intended to achieve finality and, in this case, enable the shipowner to clear his books" - and one might add, in a case such as this, the vessel's cargo tanks also!

Whilst hard cases make bad law, was the Court of Appeal really driven to this unattractive result?

In the "Cap Palos" (1921) P 458, tugs abandoned the "Cap Palos", she became a constructive total loss, but the towage contract contained an exclusion for "any damage or loss that may arise to any vessel or craft being towed, or about to be towed, or having been towed --- whether such damage arise from or be occasioned by any accident or by any omission, breach of duty, mismanagement, negligence, or default of the steam tug owner, or any of his servants or employees ---". In a judgement heralding the "fundamental breach" cases, Lord Justice Atkin said this:-

"The question that arises is whether under the above circumstances the defendant can rely upon the exceptions. In my opinion, they have no application in the facts of this case. It is immaterial to discuss whether the true view is that the wide words of the exceptions "default", "omission", "breach of duty" properly construed do not extend to cases where the contracting party ceases altogether to perform the contract; or that the exceptions construed in their widest sense do not apply where the contract is not being performed at all. The principle appears to me to be common to all classes of contract, ---. The principle is well-known,--- that if you undertake to do a thing in a certain way, or to keep a thing in a

certain place, with certain conditions protecting it, and have broken the contract by not doing the thing contracted for in the way contracted for, or not keeping the article in the place in which you have contracted to keep it, you cannot rely on the conditions which were only intended to protect you if you carried out the contract in the way in which you had contracted to do it": per Scrutton L.J. in Gibaud -v- Great Eastern Ry. Co. (1921) 2KB 426, 4435".

Is it not legitimate to take a similar approach to construction or application of the Hague Rules' defences - namely, that they cease to apply when the carrier is deliberately (and criminally) failing to perform the contract.

The last case I shall mention in this section is the "Filiatra Legacy" (1990) 1LLR 354, another decision of Mr Justice Leggatt. The facts were as follows. In November 1983 the vessel loaded 104,623 tonnes of Iraqi crude oil at Ceyhan in Turkey for delivery at Falconara. The discharge was prolonged, being interrupted at various stages due to leakage from the floating hose, bad weather, leakage in the pipeline and reconnection of the cargo pump to allow ballasting of cargo tanks 1, 5 and 7. After discharge it was claimed that there had been a short-landing of 4,502 tonnes, valued at US\$946,230. It was common ground that when the vessel arrived at Falconara all the cargo was on board and in the legitimate cargo tanks. The central issue was, had the cargo been retained on board or had it gone

astray after discharge, in the shore pipelines and/or tank farm.

The plaintiffs understandably relied upon the "George S" (ante) but Mr Justice Leggatt commented:-

"It is to be noted that in the "George S" the shore figures pointed "inexorably" to a short delivery, whereas there is no such datum point here".

In the present case where there is no inexorable proof either way to afford a starting point, it is common ground that the standard of proof which I should apply is that adopted by the Court of Appeal in Hornal -v- Neuberger Products Ltd (1957) 1Q.B.247, in which it was held that the standard of proof depends on the nature of the issue: the more serious the allegation the higher the degree of probability that is required. But it need not in a civil case reach the very high standard required by the criminal law.

---I do not therefore consider that where the only alternative explanation to shortage ashore is deliberate theft by the ship, cargo-owners are to be relieved by the formulation of the burden of proof from the difficulty that lack of evidence may inhibit or preclude an allegation or proof of fraud".

The Judge was highly critical of the defendant shipowners expert witness whom he described as "one of the less satisfactory expert witness whom I have encountered -- he espoused the role of Perry

Mason. --. By the time he came to give his evidence he was unhelpfully partisan".

After reviewing the defendants' arguments as to how the missing oil may have been lost in the refinery, the Judge continued:-

"-- there is no evidence that any of the missing oil reached the shore or that it went astray in the refinery; and I decline to find that there was any real risk of any significant part of it having done so without detection or to infer that any did. On the evidence I have so far considered I should therefore be disposed to hold on balance of probabilities that (plaintiffs) claim succeeds, but I shall refrain from reaching any conclusion before evaluating and taking into account the evidence relating to the ship".

Having reviewed the evidence of the defendants' witnesses, the Judge continued:-

"The defendants rely upon their witnesses of fact -- for their evidence that the ship did discharge the entirety of

the cargo originally loaded on board the vessel, and that the cargo was not stolen. But I have to say that none of those who gave evidence before me was satisfactory, and having heard them I am quite ready to find that all of them were parties to knowing retention of cargo. -- In particular I believe that there were instances of pilferage on the vessel --. That there were no claims for short delivery was probably accounted for by the fact that they were conducted on a modest scale".

The most plausible of the plaintiffs' allegations regarding the missing cargo was that crude oil and ballast water were commingled in cargo tanks nos 1, 5 and 7 during the process of ballasting these tanks concurrently with discharge from other tanks. The problem faced by the plaintiffs was that their own loading master, who had attended the discharge, gave evidence in the form of a Civil Evidence Act Statement that he had inspected inter alia tanks 1, 5 and 7 after they had been discharged and ballasted by means of a water paste which showed no significant quantity of oil in the tank. The loading master did not attend the trial in person and, towards the close of the trial, the plaintiffs were driven to argue that his evidence must be false and the Judge apparently accepted this, - notwithstanding that the loading master was not given any opportunity to clear his name, let alone notified of what was being said about his evidence!

After some twelve days of trial the Judge concluded:-

"In these circumstances, against the background that I have not found any evidence of diversion after discharge or other explanation for loss of the missing oil ashore, I conclude that when the vessel left Falconara the missing oil was intentionally retained aboard the vessel admixed with ballast water in cargo tanks nos 1, 5 and 7; and that conclusion is in my judgement attended by the high degree of probability that such a conclusion demands.

It would have been open to the defendants to show, with what at this stage would also require a high degree of probability, that crude oil thus retained could not thereafter have been discharged without detection".

Notwithstanding a considerable body of evidence to the effect that it would have been impossible for the defendants to have discharged some 4,500 tonnes without detection, the Judge held:-

"This they have failed to do".

For the appeal, we took over the conduct of the case on behalf of the defendants and the Court of Appeal's decision is reported in Lloyds' Law Report this month. Following a hearing which lasted longer than the trial itself, virtually a re-trial, the

Court of Appeal have held, in a 134 page Judgement, that the cargo claimants have not proved their case and that there were no grounds for finding that the owner or anyone else involved in the ownership or management of the vessel had participated in any wrongdoing.

The Court of Appeal focused on the three explanations suggested by the Plaintiffs as to how the missing cargo may have been converted by the ship and stated:-

"Thus, by the conclusion of the evidence, the position was as follows. Two of the theories (secrection in ballast system and consumption in bunkers) had been completely ruled out. The third theory, namely that the missing cargo had been admixed with ballast water in the three tanks could not be right if Captain Bellucci (the plaintiffs' loading master) had tested the tanks as he had said in the two statements which the plaintiffs had themselves put in evidence".

The Court of Appeal was extremely troubled by this. The Judgement continues:-

"Should the plaintiffs have been allowed to put forward a case which not only had been neither pleaded nor opened, but also contradicted the case which they had opened in an important respect? Should they have

been allowed to contend that Captain Bellucci was a liar, when they had themselves put his statements in evidence and relied on them?".

After exhaustive analysis the Court of Appeal concluded:-

"The question for decision is whether the plaintiffs have proved, in the manner appropriate to a case which involves the assertion of a serious crime, that their version of events is correct. We are each of us satisfied that the Plaintiffs have not proved this and that in the light of the evidence which we have examined at such length no finding can be made on the origin of the loss. Even after this costly and elaborate investigation the affair remains a mystery".

The careful review conducted by the Court of Appeal entails that this judgement will be essential reading for those concerned with oil shortage claims, not only where fraud is in issue, for some time to come. Certain conclusions may be drawn:-

- 1] The old Court procedure called for largely oral evidence and a full opening of the case by the plaintiffs' Counsel. The new Commercial Court procedure encourages exchange of witness statements which will be treated as the witness's evidence in chief (if he attends the trial) and obviates the need for many witnesses to attend the trial at all.

There is scarcely any opening of the case and the trial tends to launch straight into evidence. On this the Court of Appeal observed:-

"We do however suggest that the uncritical application of the new procedure to every aspect of any case which happens to find itself in the commercial list may create a risk of misunderstanding, excessive haste and even injustice. The more complex and technical the issues, the more important it will be to give thought whilst the evidence is still in preparation to the most helpful way to present it to the judge. The more dependent the issues on truthfulness and credibility the less likely that written statements will suffice. The greater the extent to which the action puts in suit the honesty or professional reputation of a party or witness, the greater the need for a rigorous, formal statement of the case which he has to meet, and for alertness to make sure that his interests are not subordinated to economy and dispatch".

- 2] The plaintiffs did plead fraud - namely, that the missing cargo was diverted from the cargo tanks to the bunker tanks, but they failed to provide Further and Better

Particulars of this plea. The Court of Appeal considered that Order 18 of the Rules of the Supreme Court had not been complied with. The suggestion is that in any cargo claim where conversion is alleged, the defendant ought to be given full particulars as to whom is alleged to have been involved, when and where.

- 3] For those troubled by the Court of Appeal Judgement in the "George S", which appears to place a very heavy burden on a shipowner in resisting an oil shortage claim, the "Filiatra Legacy" is of assistance. The Court of Appeal reject any suggestion that the evidence must be considered in stages. The relevant passage reads:-

"Obviously the Judge may find it convenient, as we shall here, to look at the evidence in groups, and to ascertain the parties' strengths and weaknesses in relation to each group. He does not however reach a conclusion on one group and then ask himself whether it is displaced by a contrary conclusion on another group, but simply regards the evidence as a whole, weak and strong together, and asks what if any conclusion can be drawn from it".

The "George S" was decided on particular facts where the shore-side evidence pointed "inexorably" to a short delivery. Where

the evidence is less clearcut it may be considered in groups, but should be weighed as a whole.

ORDERS FOR THE INSPECTION OF THE SHIP AND TAKING OF SAMPLES

Many Tanker Charterparties nowadays incorporate a Survey and Sample Clause along the following lines:-

"Owner agrees to allow an independent Surveyor appointed by Charterer and/or Charterers' representative to survey and take samples of cargo and bunker tanks, cofferdams, ballast and slop tanks or any other void space on the vessel prior to, during, and after the time of the vessel's loading and discharge, with extra time, if any, to count as used laytime or time on demurrage if the vessel is on demurrage, unless caused by the fault or neglect of the Owner, Vessel, her Master, crew or the representatives of any of them".

Whether or not there is such a clause, if there is a substantial cargo shortage in suspicious circumstances and one is instructed quickly, it is possible to obtain an almost immediate ex parte Order to "search and sample" and I attach a specimen of the sort of Order which can be obtained. There is a growing band of Surveyors who are experienced at carrying out such surveys and, in practical terms, if the inspection shows up a web of fraud, this is likely to lead to settlement of the case there and then rather than the agonies of a case such as the "Filiatra Legacy".

In the "Mare del Nord" the Admiralty Judge set out guidelines concerning the tests to be satisfied:-

"--It may be helpful to practitioners if I set out what seem to me to be the principal matters to which the Court should have regard when exercising its discretion whether or not to order that samples be taken for the purpose of analysis. There is, of course, an infinite variety of circumstances which may arise. The Court should take into account all the circumstances of the particular case. The following matters appear to me to be important.

The evidence on affidavit in support of the plaintiffs' application must show that the plaintiffs have a good arguable case on the merits. The evidence must show prime facie that on delivery there was a shortage of cargo which should not be treated as de minimis. The Admiralty Registrar is not expected to try the question whether or not there was, in fact, a shortage. This is a matter for the trial. Such a question may involve very complicated problems. There need not be an allegation of fraud. Indeed, it would be rare for the plaintiffs to have evidence upon which such an allegation could be made. But if the evidence shows that

apparently all the relevant cargo has been discharged and that nevertheless the amount discharged is less than that which was loaded, a question will arise whether or not cargo may have found its way into other parts of the ship. It is hardly necessary for me to say that plating does not necessarily remain oil-tight indefinitely.

Next, the plaintiffs must show that the taking of samples and analysis of, or any other experiment on, those samples may assist the Judge at the trial. The longer the lapse of time between the discharge of the cargo and the moment when samples are taken, the more difficult it will become for the plaintiffs' expert witness to satisfy the Court that the results of such an analysis or experiment are likely to be of assistance to the trial Judge. Obviously there will be many borderline cases in which the decision will not be an easy one. It is in the interests of justice that, when in doubt, it is better to preserve evidence than to let pass an opportunity of obtaining evidence. Shipowners must be protected from unnecessary interference with the running of their ships. But, provided that shipowners are fully protected against any damage which they may suffer, the provision of a sample of oil which may be relevant to the issues in

the action is no more burdensome than is discovery of many documents, the disclosure of which puts the shipowners to a great deal of trouble and inconvenience. Both processes help the Court to ascertain the true facts, and thus to reach a decision which is fair and correct.

An order that shipowners must allow an inspection to be made of parts of their ship and samples to be taken of the oil in bunker tanks will probably cause some inconvenience to the owners or charterers of the ship and possibly to others. Accordingly, the plaintiffs should be required to give an undertaking in damages should it appear subsequently that the defendants have suffered loss as a result of the order obtained by the plaintiffs. The plaintiffs should also be required to give an undertaking to indemnify any third party adversely affected by the order.

If the registrar is satisfied that the plaintiffs have a good arguable case and that the evidence to be obtained may assist the trial Judge, then the Registrar should take account of the undertakings given by the plaintiff and balance the inconvenience which might be caused to the shipowners and others against the possible benefit to the plaintiffs".

We have successfully obtained Orders along the lines of the specimen attached for inspection of vessels, wherever they may be. The "Filiatra Legacy" should be an object lesson to cargo claimants to pick up the 'phone to their lawyer at the earliest opportunity!

**INTERNATIONAL CONVENTION
FOR THE
SAFETY OF LIFE AT SEA**

**CONSOLIDATED TEXT OF
THE 1974 SOLAS CONVENTION
THE 1978 SOLAS PROTOCOL
THE 1981 AND 1983 SOLAS
AMENDMENTS**



IMO

Regulation 10 **P**

Surveys of hull, machinery and equipment of cargo ships

(a) The hull, machinery and equipment (other than items in respect of which Cargo Ship Safety Equipment Certificates, Cargo Ship Safety Radiotelegraphy Certificates or Cargo Ship Radiotelephony Certificates are issued) of a cargo ship shall be surveyed on completion and thereafter in such a manner as the Administration may consider necessary in order to ensure that their condition is in all respects satisfactory and at the following intervals:

- (i) at intervals specified by the Administration but not exceeding five years (periodical surveys);
- (ii) in addition to such periodical surveys a tanker of ten years of age and over shall undergo a minimum of one intermediate survey during the period of validity of its Cargo Ship Safety Construction Certificate.* In cases where only one such intermediate survey is carried out in any one certificate validity period, it shall be held not before six months prior to, nor later than six months after, the half-way date of the certificate's period of validity.

(b) The initial and periodical survey shall be such as to ensure that the arrangements, material and scantlings of the structure, boilers and other pressure vessels, their appurtenances, main and auxiliary machinery including steering gear and associated control systems, electrical installation and other equipment are in all respects satisfactory for the service for which the ship is intended. Such surveys shall, in the case of tankers, also include inspection of the outside of the ship's bottom, pump-rooms, cargo and bunker piping systems, vent piping, pressure vacuum valves and flame screens.

(c) The intermediate survey of tankers of ten years of age and over shall include inspection of steering gear equipment and associated control systems, pump-rooms, cargo and bunker piping systems on deck and in pump-rooms, vent piping, pressure vacuum valves and flame screens, the electrical installations in dangerous zones, and the outside of the ship's bottom.** In addition to the visual inspection of the electrical installation, the insulation resistance of the electrical equipment in dangerous zones is to be tested. If, upon examination, there should be any doubt as to the condition of the piping, extra measures, such as pressure tests and thickness determination, shall be taken as necessary. Such intermediate surveys shall be endorsed on the Cargo Ship

* Reference is made to the Guidelines on Mandatory Annual Surveys, Unscheduled Inspections of all Cargo Ships as well as Intermediate Surveys on Tankers of Ten Years of Age and Over, under the Protocol of 1978 relating to the International Convention for the Safety of Life at Sea, 1974 (resolution A.413(XI) as amended by resolution A.465(XII)).

** Reference is made to the circular concerning inspection of the outside of the ship's bottom (PSLS.2/Circ. 5).

Regulation 21

Casualties

(a) Each Administration undertakes to conduct an investigation of any casualty occurring to any of its ships subject to the provisions of the present Convention when it judges that such an investigation may assist in determining what changes in the present regulations might be desirable.*

(b) Each Contracting Government undertakes to supply the Organization with pertinent information concerning the findings of such investigations. No reports or recommendations of the Organization based upon such information shall disclose the identity or nationality of the ships concerned or in any manner fix or imply responsibility upon any ship or person.

* Reference is made to the recommendations on "Exchange of information for investigations into marine casualties" and on "Personnel and material resource needs of Administrations for the investigation of casualties and contraventions of conventions" adopted by the Organization by resolutions A.440(XI) and A.442(XI).

of operation of heat detectors may be increased to 30°C above the maximum deckhead temperature in drying rooms and similar spaces of a normal high ambient temperature.

Regulation 13-1 **F**

Sample extraction smoke detection systems

Regulation 14

Fixed fire detection and fire alarm systems for periodically unattended machinery spaces

- 1 A fixed fire detection and fire alarm system of an approved type in accordance with the relevant provisions of regulation 13 shall be installed in periodically unattended machinery spaces.
- 2 This fire detection system shall be so designed and the detectors so positioned as to detect rapidly the onset of fire in any part of those spaces and under any normal conditions of operation of the machinery and variations of ventilation as required by the possible range of ambient temperatures. Except in spaces of restricted height and where their use is specially appropriate, detection systems using only thermal detectors shall not be permitted. The detection system shall initiate audible and visual alarms distinct in both respects from the alarms of any other system not indicating fire, in sufficient places to ensure that the alarms are heard and observed on the navigating bridge and by a responsible engineer officer. When the navigating bridge is unmanned the alarm shall sound in a place where a responsible member of the crew is on duty.
- 3 After installation the system shall be tested under varying conditions of engine operation and ventilation.

Ch. 11-Z, Part A

Regulation 15

Arrangements for oil fuel, lubricating oil and other flammable oils

1 *Limitations in the use of oil as fuel*

The following limitations shall apply to the use of oil as fuel:

- .1 Except as otherwise permitted by this paragraph, no oil fuel with a flashpoint of less than 60°C shall be used.

F See Annex 2.

- .2 In emergency generators oil fuel with a flashpoint of not less than 43°C may be used.
- .3 Subject to such additional precautions as it may consider necessary and on condition that the ambient temperature of the space in which such oil fuel is stored or used shall not be allowed to rise to within 10°C below the flashpoint of the oil fuel, the Administration may permit the general use of oil fuel having a flashpoint of less than 60°C but not less than 43°C.
- .4 In cargo ships the use of fuel having a lower flashpoint than otherwise specified in this paragraph, for example crude oil, may be permitted provided that such fuel is not stored in any machinery space and subject to the approval by the Administration of the complete installation.

The flashpoint of oils shall be determined by an approved closed cup method.

2 *Oil fuel arrangements*

In a ship in which oil fuel is used, the arrangements for the storage, distribution and utilization of the oil fuel shall be such as to ensure the safety of the ship and persons on board and shall at least comply with the following provisions:

- .1 As far as practicable, parts of the oil fuel system containing heated oil under pressure exceeding 0.18 N/mm² shall not be placed in a concealed position such that defects and leakage cannot readily be observed. The machinery spaces in way of such parts of the oil fuel system shall be adequately illuminated.
- .2 The ventilation of machinery spaces shall be sufficient under all normal conditions to prevent accumulation of oil vapour.
- .3 As far as practicable, oil fuel tanks shall be part of the ship's structure and shall be located outside machinery spaces of category A. Where oil fuel tanks, other than double bottom tanks, are necessarily located adjacent to or within machinery spaces of category A, at least one of their vertical sides shall be contiguous to the machinery space boundaries, and shall preferably have a common boundary with the double bottom tanks, and the area of the tank boundary common with the machinery spaces shall be kept to a minimum. Where such tanks are situated within the boundaries of machinery spaces of category A they shall not contain oil fuel having a flashpoint of less than 60°C. In general the use of free-standing oil fuel tanks shall be avoided. When such tanks are employed their use shall be prohibited in category A machinery spaces on passenger ships. Where permitted, they shall be placed in an oil-tight spill tray of ample size having a suitable drain pipe leading to a suitably sized spill oil tank.
- .4 No oil fuel tank shall be situated where spillage or leakage therefrom

can constitute a hazard by falling on heated surfaces. Precautions shall be taken to prevent any oil that may escape under pressure from any pump, filter or heater from coming into contact with heated surfaces.

- .5 Every oil fuel pipe, which, if damaged, would allow oil to escape from a storage, settling or daily service tank situated above the double bottom shall be fitted with a cock or valve directly on the tank capable of being closed from a safe position outside the space concerned in the event of a fire occurring in the space in which such tanks are situated. In the special case of deep tanks situated in any shaft or pipe tunnel or similar space, valves on the tank shall be fitted but control in the event of fire may be effected by means of an additional valve on the pipe or pipes outside the tunnel or similar space. If such additional valve is fitted in the machinery space it shall be operated from a position outside this space.

[F] .6 Safe and efficient means of ascertaining the amount of oil fuel contained in any oil fuel tank shall be provided. Sounding pipes shall not terminate in any space where the risk of ignition of spillage from the sounding pipe might arise. In particular, they shall not terminate in passenger or crew spaces. Other means of ascertaining the amount of oil fuel contained in any oil fuel tank may be permitted:

- .6.1 in passenger ships, if such means do not require penetration below the top of the tank, and providing their failure or overfilling of the tanks will not permit release of fuel;
- .6.2 in cargo ships, providing the failure of such means or overfilling of the tanks will not permit release of fuel. The use of cylindrical gauge glasses is prohibited. The Administration may permit the use of oil level gauges with flat glasses and self-closing valves between the gauges and oil tanks.

Such other means shall be acceptable to the Administration and shall be maintained in the proper condition to ensure their continued accurate functioning in service.

- .7 Provision shall be made to prevent overpressure in any oil tank or in any part of the oil fuel system, including the filling pipes. Any relief valves and air or overflow pipes shall discharge to a position which, in the opinion of the Administration, is safe.
- .8 Oil fuel pipes and their valves and fittings shall be of steel or other approved material, except that restricted use of flexible pipes shall be permissible in positions where the Administration is satisfied that they are necessary. Such flexible pipes and end attachments shall be of approved fire-resisting materials of adequate strength and shall be constructed to the satisfaction of the Administration.

[F] See Annex 2.

[F] 3 *Lubricating oil arrangements*

The arrangements for the storage, distribution and utilization of oil used in pressure lubrication systems shall be such as to ensure the safety of the ship and persons on board, and such arrangements in machinery spaces of category A and whenever practicable in other machinery spaces shall at least comply with the provisions of paragraphs 2.1, 2.4, 2.5, 2.6, 2.7 and 2.8, except that this does not preclude the use of sight flow glasses in lubricating systems provided that they are shown by test to have a suitable degree of fire resistance.

4 *Arrangements for other flammable oils*

The arrangements for the storage, distribution and utilization of other flammable oils employed under pressure in power transmission systems, control and activating systems and heating systems shall be such as to ensure the safety of the ship and persons on board. In locations where means of ignition are present, such arrangements shall at least comply with the provisions of paragraphs 2.4 and 2.6, and with the provisions of paragraphs 2.7 and 2.8 in respect of strength and construction.

5 *Periodically unattended machinery spaces*

In addition to the requirements of paragraphs 1 to 4, the oil fuel and lubricating oil systems shall comply with the following:

- .1 Where necessary, oil fuel and lubricating oil pipelines shall be screened or otherwise suitably protected to avoid as far as practicable oil spray or oil leakages on to hot surfaces or into machinery air intakes. The number of joints in such piping systems shall be kept to a minimum and, where practicable, leakages from high pressure oil fuel pipes shall be collected and arrangements provided for an alarm to be given.
- .2 Where daily service oil fuel tanks are filled automatically, or by remote control, means shall be provided to prevent overflow spillages. Other equipment which treats flammable liquids automatically, e.g. oil fuel purifiers, which, whenever practicable, shall be installed in a special space reserved for purifiers and their heaters, shall have arrangements to prevent overflow spillages.
- .3 Where daily service oil fuel tanks or settling tanks are fitted with heating arrangements, a high temperature alarm shall be provided if the flashpoint of the oil fuel can be exceeded.

6 *Prohibition of carriage of flammable oils in forepeak tanks*

Fuel oil, lubrication oil and other flammable oils shall not be carried in forepeak tanks.

[F] See Annex 2.



Rules and Regulations for the Classification of Ships

Part 5

Main and Auxiliary Machinery

January 1984

LLOYD'S REGISTER OF SHIPPING

Machinery Piping Systems

CONTENTS

Section

- 1 General requirements
- 2 Oil fuel—General requirements
- 3 Oil fuel burning arrangements
- 4 Oil fuel pumps, pipes, fittings, tanks, etc.
- 5 Steam piping systems
- 6 Boiler feed water and condensate systems
- 7 Engine cooling water systems
- 8 Lubricating oil systems

SECTION 1

General requirements

1.1 General

1.1.1 In addition to the requirements detailed in this Chapter, the requirements of Ch 13,1 and 2 are to be complied with, where applicable.

1.1.2 The requirements of Ch 13,3 are also to be complied with, so far as they are applicable, for the drainage of tanks, oil bilges and cofferdams, etc.

1.1.3 The requirements of Sections 2 and 4 are to be complied with, as far as they are applicable, for all flammable liquids in the machinery spaces.

SECTION 2

Oil fuel—General requirements

2.1 Flash point

2.1.1 The flash point (closed cup test) of oil fuel for use in ships classed for unrestricted service is, in general, to be not less than 60°C. For emergency generator engines a flash point of not less than 43°C is permissible.

2.1.2 Fuels with flash points lower than 60°C may be used in ships intended for service restricted to geographical limits where it can be ensured that the temperature of the machinery and boiler spaces will always be 10°C below the flash point of the fuel. In such cases safety precautions and the arrangements for storage and pumping will be specially considered. However, the flash point of the fuel is to be not less than 43°C unless specially approved.

2.1.3 The use of fuel having a lower flash point than specified in 2.1.1 or 2.1.2 may be permitted provided that such fuel is not stored in any machinery space and the arrangements for the complete installation are specially approved.

2.1.4 In general, oil fuel in storage and service tanks is not to be heated to a temperature exceeding 10°C below its flash point. Higher temperatures will be considered where:

- (a) The tanks are vented to a safe position outside the engine room and, as in the case of all oil fuel tanks, the ends of the ventilation pipes are fitted with gauze diaphragms,
- (b) Openings in the drainage systems of tanks containing heated oil fuel are located in spaces where no accumulation of oil vapours at temperatures close to the flash point can occur.
- (c) There is no source of ignition in the vicinity of the ventilation pipes or near the openings in the drainage systems or in the tanks themselves.

2.1.5 The temperature of any heating medium is not to exceed 220°C.

2.2 Special fuels

2.2.1 When it is desired to carry a quantity of fuel having a flash point below 43°C for special services, e.g. aviation spirit for use in helicopters, full particulars of the proposed arrangements are to be submitted for special consideration.

2.2.2 For the burning of methane gas in methane tankers, see the *Rules for Ships for Liquefied Gases*.

2.2.3 Where it is proposed to use gaseous fuels for main or auxiliary engines in ships other than methane tankers, the relevant requirements of the *Rules for Ships for Liquefied Gases* are to be complied with. Full particulars of the proposed arrangements are to be submitted for special consideration. Attention is to be given to any relevant statutory requirements of the National Authority of the country in which the ships are to be registered.

2.3 Ventilation

2.3.1 The spaces in which the oil fuel burning appliances and the oil fuel settling and service tanks are fitted are to be well ventilated and easy of access.



Rules and Regulations for the Classification of Ships

Part 6

Control, Electrical, Refrigeration and Fire

January 1987

LLOYD'S REGISTER OF SHIPPING

shown that the protection of the ship against fire will not be reduced thereby.

10.1.10 A section of fire detectors which covers a control station, a service space or an accommodation space is not to include a machinery space of Category A.

10.1.11 Detectors are to be operated by heat, smoke or other products of combustion, flame, or any combination of these factors. Detectors operated by other factors indicative of incipient fires may be considered provided that they are no less sensitive than such detectors. Flame detectors are only to be used in addition to smoke or heat detectors.

10.1.12 Suitable instructions for testing and maintenance are to be provided.

10.1.13 In each section, one spare detector head shall be provided for each 50 heads in that section with a minimum of 6 heads for each type fitted. They are to be stowed in a suitable container at the control station.

10.1.14 The function of the detection system is to be periodically tested by means of equipment producing hot air at the appropriate temperature, or smoke or aerosol particles having the appropriate range of density or particle size, or other phenomena associated with incipient fires to which the detector is designed to respond. All detectors are to be of a type such that they can be tested for correct operation and restored to normal surveillance without the renewal of any component.

10.1.15 The fire detection system is not to be used for any other purpose, except that closing of fire doors and similar functions may be permitted at the control panel.

10.2 Installation requirements

10.2.1 Manually operated call points are to be installed throughout the accommodation spaces, service spaces and control stations. One manually operated call point is to be located at each exit. Manually operated call points are to be readily accessible in the corridors of each deck such that no part of the corridor is more than 20 m from a manually operated call point.

10.2.2 Smoke detectors are to be installed in all stairways, corridors and escape routes within accommodation spaces. Consideration will be given to the installation of special purpose smoke detectors within ventilation ducting.

10.2.3 Where a fixed fire detection and fire-alarm system is required for the protection of spaces other than those specified in 10.2.2, at least one detector complying with 10.1.11, is to be installed in each such space.

10.2.4 Detectors are to be located for optimum performance. Positions near beams and ventilation ducts or other positions where patterns of air flow could adversely affect performance and positions where impact or physical damage is likely are to be avoided. In general, detectors which are located overhead are to be a minimum distance of 0,5 m away from bulkheads.

10.2.5 The maximum spacing of detectors is to be in accordance with Table 4.10.1. Other spacings based upon test data which demonstrate the characteristics of the detectors may be required or permitted.

Table 4.10.1

Type of detector	Maximum floor area per detector	Maximum distance apart between centres	Maximum distance away from bulkheads
Heat	37 m ²	9 m	4,5 m
Smoke	74 m ²	11 m	5,5 m

10.2.6 Electrical wiring which forms part of the system is to be so arranged as to avoid galleys, machinery spaces of Category A, and other enclosed spaces of high fire-risk except where it is necessary to provide for fire detection or fire-alarm in such spaces or to connect to the appropriate power supply. See also Ch 2-1, 7.14.4 and Ch 2-2, 1.7.1.

10.3 Design requirements

10.3.1 Smoke detectors required by 10.2.2 are to be certified to operate before the smoke density exceeds 12,5 per cent obscuration per metre, but not until the smoke density exceeds 2 per cent obscuration per metre. Smoke detectors to be installed in other spaces are to operate within satisfactory sensitivity limits having regard to the avoidance of detector insensitivity or oversensitivity.

10.3.2 Heat detectors are to be certified to operate before the temperature exceeds 78°C but not until the temperature exceeds 54°C, when the temperature is raised to those limits at a rate less than 1°C per minute. At higher rates of temperature rise, the heat detector is to operate within satisfactory temperature limits having regard to the avoidance of detector insensitivity or oversensitivity.

10.3.3 The permissible temperature of operation of heat detectors may be increased to 30°C above the maximum deckhead temperature in drying rooms and similar spaces of a normal high ambient temperature.

10.4 Requirements for periodically unattended machinery spaces

10.4.1 Where it is intended that the engine and or boiler rooms will not be continuously manned at sea, a fixed fire detection and fire-alarm system is to be fitted complying with the requirements of Pt 6, Ch 1,2.8.

SECTION 11

Arrangement of oil fuel, lubricating oil and other flammable oils

11.1 Limitations in the use of oil as a fuel

11.1.1 For the limitations of the use of oil as a fuel see Pt 5, Ch 14.

11.2 Oil fuel arrangements

11.2.1 In a ship in which oil fuel is used, the arrangements for the storage, distribution and utilization of the oil fuel are to be such as to ensure the safety of the ship and persons on board. For details see Pt 5, Ch 14.

Fire Protection, Detection and Extinction

11.2.2 As far as practicable, oil fuel tanks are to be part of the ship's structure and are to be located outside machinery spaces of Category A. Where oil fuel tanks, other than double bottom tanks, are necessarily located adjacent to or within machinery spaces of Category A, at least one of their vertical sides is to be contiguous to the machinery space boundaries, and is preferably to have a common boundary with the double bottom tanks, and the area of the tank boundary common with the machinery spaces is to be kept to a minimum. Where such tanks are situated within the boundaries of machinery spaces of Category A they are not to contain oil fuel having a flashpoint of less than 60°C. In general the use of free standing oil fuel tanks is to be avoided. When such tanks are employed their use is to be prohibited in Category A machinery spaces on passenger ships. Where permitted, they are to be placed in an oil-tight spill tray of ample size having a suitable drain pipe leading to a suitably sized spill oil tank.

11.3 Lubricating oil arrangements

11.3.1 The arrangements for the storage, distribution and utilization of oil used in pressure lubrication systems are to be such as to ensure the safety of the ship and persons on board. See Pt 5, Ch 14.

11.4 Arrangements for other flammable oils

11.4.1 The arrangements for the storage, distribution and utilization of other flammable oils employed under pressure in power transmission systems, control and activating systems and heating systems are to be such as to ensure the safety of the ship and persons on board. See Pt 5, Ch 14.

11.5 Prohibition of carriage of flammable oils in forepeak tanks

11.5.1 Oil fuel, lubricating oil and other flammable oils are not to be carried in forepeak tanks.

SECTION 12

Fixed pressure water spraying systems

12.1 This Section applies to special category spaces and ro-ro cargo spaces

12.1.1 A fixed fire-extinguishing system for special category spaces is to be at least as effective in controlling a flowing petrol fire as a fixed pressure water-spraying system complying with 12.1.2 to 12.1.10.

12.1.2 The nozzles are to be of an approved, full bore type. They are to be so arranged as to secure an effective distribution of water in the spaces which are to be protected. For this purpose, the system is to be such as will provide water application at a rate of at least 3,5 litres per square metre of deck area per minute for spaces with a deck height not exceeding 2,5 m, and a capacity of at least 5 litres per square metre of deck area per minute for spaces with a deck height of 2,5 m or more.

12.1.3 The water pressure is to be sufficient to secure an even distribution of water.

12.1.4 The system is normally to cover the full breadth of the vehicle deck and may be divided into sections provided that they are of at least 20 m in length, except that in ships where the vehicle deck space is subdivided with longitudinal 'A' Class divisions forming boundaries of staircases, etc., the breadth of the section may be reduced accordingly.

12.1.5 The distribution valves for the system are to be situated in an easily accessible position, adjacent to but outside the space to be protected, which will not readily be cut off by a fire within the space. Direct access to the distribution valves from the vehicle deck space and from outside that space is to be provided. Adequate ventilation is to be fitted in the space containing the distribution valves.

12.1.6 The water supply to the system is to be provided by a pump or pumps other than the pumps required by 3.3 which are additionally to be connected to the system by a lockable non-return valve, which will prevent a backflow from the system into the fire main.

12.1.7 The principal pump or pumps are to be capable of providing simultaneously and at all times a sufficient supply of water at the required pressure to all nozzles in the vehicle deck, or in at least the two adjacent sections having the greatest aggregate application rate.

12.1.8 The principal pump or pumps are to be capable of being brought into operation by remote control (which may be manually actuated) from the position at which the distribution valves are situated.

12.1.9 The principal pump or pumps are to be situated in a position which is reasonably remote from the protected space.

12.1.10 If independently driven, e.g. by internal combustion engines, the pumps are to be so situated that a fire in the protected space would not affect the air supply to that machinery.

SECTION 13

Ventilation systems in ships other than passenger ships carrying more than 36 passengers

13.1 General requirements

13.1.1 Ventilation ducts are to be of non-combustible material. Short ducts, however, not generally exceeding 2 m in length and with a cross-section not exceeding 0,02 m² need not be non-combustible, subject to the following:

- these ducts are to be of a material which has a low fire risk;
- they may only be used at the end of the ventilation device;
- they are not to be situated less than 600 mm, as measured along the duct, from an opening in an 'A' or 'B' Class division including continuous 'B' Class from ceilings.

International Safety Guide for Oil Tankers & Terminals

Third Edition

International Chamber of Shipping
Oil Companies International Marine Forum
International Association of Ports and Harbors



Chapter 1

Hazards of Petroleum

In order to appreciate the reasons for the practices adopted to ensure safety in tanker and terminal operations, all personnel should be familiar with the flammable properties of petroleum, the effects of the density of petroleum gases and their toxic properties. This Chapter contains a brief summary, and fuller information is given in Chapters 14 and 15.

1.1 FLAMMABILITY

When a petroleum is ignited it is the gas progressively given off by the liquid which burns as a visible flame. The quantity of gas available to be given off by a petroleum liquid depends on its volatility which is frequently expressed for purposes of comparison in terms of Reid Vapour Pressure (RVP). A more informative measure of volatility is the True Vapour Pressure (TVP) but unfortunately this is not easily measured. It is referred to in this guide only in connection with venting problems with very volatile cargoes, such as some crude oils and natural gasolines.

Petroleum gases can be ignited and will burn only when mixed with air in certain proportions. If there is too little or too much petroleum gas the mixture cannot burn. The limiting proportions, expressed as percentage by volume of petroleum gas in air, are known as the lower and upper flammable limits. They vary amongst the different possible components of petroleum gases. For the gas mixtures from the petroleum liquids encountered in normal tanker practice the overall range is from a minimum lower flammable limit of about 1% gas by volume in air to a maximum upper flammable limit of about 10% gas by volume in air.

As a petroleum liquid is heated the concentration of gas in air above it increases. The temperature of the liquid at which this concentration, using a specified measuring technique, reaches the lower flammable limit is known as the flashpoint of the liquid.

1.2 FLAMMABILITY CLASSIFICATION

There are many classification systems for defining the flammability characteristics of petroleum liquids, most of which are based on flashpoint and Reid Vapour Pressure data. For the purpose of this guide, which deals only with the particular conditions in petroleum tanker cargo handling, the division of such liquids into the two broad categories of non-volatile and volatile, as defined below, is in general sufficient to ensure that proper precautions can be specified.

Non-volatile

Flashpoint of 60°C or above as determined by the closed cup method of testing.

Volatile

Flashpoint below 60°C as determined by the closed cup method of testing.

If there is any doubt as to the characteristics of a cargo, or if a non-volatile cargo is being handled at a temperature above its flashpoint minus 10°C, it should be treated as volatile petroleum.

1.3 GAS DENSITY

The gases from the normal petroleum liquids are heavier than air and inert gas, thus the possibility of layering of gases is very important in cargo handling operations. The density of the undiluted gas from a high vapour pressure distillate, such as motor gasoline, is likely to be about twice that of air and that

from a typical crude oil about 1.5 times. These density differences diminish as the gases are diluted with air. Flammable mixtures usually contain at least 90% by volume of air and consequently have densities almost indistinguishable from that of air.

Fuller information on the density of petroleum gases is given in Chapter 14.

1.4 TOXICITY

Comparatively small quantities of petroleum gas when inhaled can cause symptoms of diminished responsibility and dizziness similar to drunkenness, with headache and irritation of the eyes. The inhalation of a sufficient quantity can be fatal.

These symptoms can occur at concentrations well below the lower flammable limit. However, petroleum gases vary in their physiological effects and human tolerance to these effects also varies widely. It should not be assumed that because conditions can be tolerated the gas concentration is within safe limits.

The smell of petroleum gas mixtures is very variable, and in some cases the gases may dull the sense of smell. The impairment of smell is especially likely and particularly serious if the mixture contains hydrogen sulphide.

The absence of smell should never be taken to indicate the absence of gas.

Fuller information on the toxic properties of petroleum, and of substances associated with the carriage of petroleum, is given in Chapter 15.

Chapter 2

General Precautions on Tankers

This Chapter deals primarily with the precautions to be taken on board a tanker at all times, whether at sea or in port. Reference should be made to the appropriate Chapters for precautions relating to specific operations such as cargo handling, ballasting, tank cleaning, inert gas or entry into enclosed spaces. Chapter 4 should be consulted for additional precautions to be taken while the vessel is in port.

2.1 GENERAL PRINCIPLES

In order to eliminate the risk of fire and explosion on a tanker it is necessary to avoid a source of ignition and a flammable atmosphere being present in the same place at the same time. It is not always possible to exclude both these factors and precautions are therefore directed towards excluding or controlling one of them.

In the case of cargo compartments, pumprooms, and at times the tank deck, flammable gases are to be expected and the strict elimination of all possible sources of ignition in these locations is essential.

Cabins, galleys and other areas within the accommodation block inevitably contain ignition sources such as electrical equipment, matches and cigarette lighters. While it is sound practice to minimize and control such sources of ignition, it is essential to avoid the entry of flammable gas.

In engine and boiler rooms, ignition sources such as those arising from boiler operations and electrical equipment cannot be avoided. It is therefore essential to prevent the entry of flammable gases into such compartments. The contamination of bunker fuel by volatile cargo through bulkhead leaks, pipeline admixture or any other cause will introduce an additional danger. The routine checking of bunker spaces for flammability by tanker and terminal personnel is therefore to be encouraged.

It is possible, by good design and operational practice, for both flammable gases and ignition sources to be safely controlled in deck workshops, store rooms, forecastle, centre castle, dry cargo holds etc. The means for such control must, however, be rigorously maintained. In this connection it should be realized that an additional danger would be introduced into such areas by the contamination of bunker tanks with volatile cargo.

Although the installation and the correct operation of an inert gas system provides an added measure of safety, it does not preclude the need for close attention to the precautions set out in this chapter.

2.2 SMOKING AND NAKED LIGHTS

2.2.1 Smoking at Sea

While a tanker is at sea, smoking should be permitted only at times and in places specified by the master. Section 4.8.2 lists criteria which should be taken into account in determining the location of smoking places. Smoking must be prohibited on the tank deck or any other place where petroleum gas may be encountered. Additional restrictions on smoking in port are contained in Section 4.8.

2.2.2 Matches and Cigarette Lighters

The use of matches and cigarette lighters outside accommodation spaces should be prohibited, except in places where smoking is permitted. Matches and cigarette lighters should not be taken outside these places by personnel, nor should they be carried on the tank deck or in any other place where petroleum gas may be encountered.

The risk involved in carrying matches, and more particularly cigarette lighters, should be impressed on all personnel. Matches used on board should be of the 'safety' type.

2.2.3 Naked Lights (Open Flame)

Naked lights must be prohibited on the tank deck and in any other place where there is a risk that petroleum gas may be present.

No oil impregnated scale or other material is present at the work site which is likely to generate flammable or toxic gas, even when heated.

No flammable material is present at the work site or adjacent to it within another compartment.

Adjacent compartments have been washed and either gas freed to a safe for hot work standard; or purged of hydrocarbon to less than 2% by volume and inerted; or completely filled with ballast water; or their condition is any combination of these.

All interconnecting pipelines have been flushed through with water, drained, vented, and isolated from the compartment to be worked. Cargo lines may be subsequently inerted or filled with water if considered necessary.

The area will be well ventilated throughout the work period and periodic testing will be carried out to check that no concentrations of flammable or toxic gases develop.

Adequate fire extinguishing equipment is ready for immediate use.

Local cleaning of areas where work is to be carried out in order to make them safe for hot work should not be done by using solvents of any kind; nor should solvents be present in any such area for the purpose of cleaning equipment.

Hot work on pipelines should only be permitted when the appropriate section has been detached from the system by cold work and the open ended sections of the remaining system have been sealed off. The section of pipe to be worked on should be gas freed to a safe for hot work standard.

Written hot work permits (see Appendix F) should be issued for each intended task. The permit should specify the duration of validity, which should not exceed 12 hours, the precautions to be taken, the procedures for fire extinguishing and the means of surveillance and communication.

Additional restrictions for hot work while in port are given in Section 4.12.2 and for hot work in enclosed spaces in Section 10.5.7.

2.9 ALUMINIUM

Aluminium equipment should not be dragged or rubbed across steel since it may leave a smear which, if it is on rusty steel and is subsequently struck, can cause an incensive spark.

It is therefore recommended that the undersides of aluminium gangways and other heavy portable aluminium structures be protected with a hard plastic or wooden strip.

2.10 CATHODIC PROTECTION ANODES IN CARGO TANKS

Magnesium anodes are very likely to produce incensive sparks on impact with rusty steel. Such anodes must not be fitted in tanks where flammable gases can be present.

Aluminium anodes give rise to incensive sparking on violent impact and should therefore be installed only at approved locations within cargo tanks, and should never be moved to another location without proper supervision. Moreover, as aluminium anodes could easily be mistaken for zinc anodes and installed in potentially dangerous locations it might be advisable to restrict their use to permanent ballast tanks.

Zinc anodes do not generate an incensive spark on impact with rusty steel and therefore are not subject to the above restrictions.

The location, securing and type of anode are subject to approval by the appropriate authorities. Their recommendations should be observed and inspections made as frequently as possible to check the security of the anodes and mountings. With the advent of high capacity tank washing machines anodes are more liable to physical damage.

2.11 SPONTANEOUS COMBUSTION

Some materials when damp or soaked with oil, especially oil of vegetable origin, are liable to ignite without the external application of heat as the result of gradual heating within the material produced by

oxidation. The risk of spontaneous combustion is smaller with petroleum oils than with vegetable oils, but it can still occur, particularly if the material is kept warm, for example by proximity to a hot pipe.

Cotton waste, rags, canvas, bedding, jute sacking or any similar absorbent material should therefore not be stowed near oil, paint, etc. and should not be left lying on the jetty, on decks, on equipment, on or around pipelines etc. If such materials become damp, they should be dried before being stowed away. If soaked with oil they should be cleaned or destroyed.

Certain chemicals used for boiler treatment are also oxidising agents and though carried in diluted form are capable of spontaneous combustion if permitted to evaporate.

2.12 AUTO-IGNITION

Petroleum liquids when heated sufficiently will ignite without the application of a naked flame. This process of auto-ignition is most common where fuel or lubricating oil under pressure sprays on to a hot surface. It also occurs when oil spills on to lagging, vaporises and bursts into flame. Both instances have been responsible for serious engine room fires. Oil feeder lines require particular attention to avoid oil being sprayed from leaks. Oil saturated lagging should be removed and personnel protected from any re-ignition of vapours during the process.

2.13 ENGINE AND BOILER ROOMS

2.13.1 Combustion Equipment

As a precaution against funnel fires and sparks the burners, tubes, uptakes, exhaust manifolds and spark arresters should be maintained in good working condition. If there is a funnel fire or sparks are emitted from the funnel the tanker should, if necessary, alter course as soon as possible to avoid sparks falling on the tank deck. Any cargo, ballasting or tank cleaning operations that are taking place must be stopped and all tank openings closed.

2.13.2 Blowing Boiler Tubes

Funnel uptakes, boiler tubes and inert gas uptakes should be blown prior to arrival at and after departure from port. The officer on bridge watch should be consulted and the vessel's course altered if necessary to prevent the hot soot landing on the tank deck area. Boiler tubes should not be blown when the vessel is in port.

2.13.3 Cleaning Liquids

It is preferable that cleaning liquids be non-toxic and non-flammable. If flammable liquids are used, they should have a high flashpoint. Highly volatile liquids such as gasoline or naphtha should never be used.

Cleaning liquids which are flammable should be kept in closed, unbreakable, correctly labelled containers and stored in a suitable compartment when not in use.

Cleaning liquids should only be used in places where ventilation is adequate taking into consideration the volatility of the liquids being used. All such liquids should be stowed and used in compliance with the manufacturer's instructions.

Direct skin contact with or the contamination of clothing by cleaning liquids should be avoided.

2.13.4 Oil Spillage and Leakage

Oil spillage and leakage in the engine and boiler rooms is not only a fire hazard, but can also cause slips and falls. Spills and leaks should therefore be avoided. Floor plates should be kept clean and bilges should be kept free of oil and waste.

2.13.5 Personal Hygiene

In view of the danger to health which may arise from prolonged contact with oil, personal hygiene is most important. Direct skin contact with oil or with oily clothing should be avoided.

2.13.6 Bunker Safety

Although residual fuel oil normally has a flashpoint above 60°C, it should be remembered that it is often

stored and managed at temperatures close to, or even above, its flashpoint. High flashpoint fuels sometimes contain residual quantities of light components which slowly migrate into vapour spaces after loading, so raising their flammability. It must therefore never be assumed that the vapour spaces in, and emissions from, bunker tanks will always be safe simply on account of a high specified flashpoint.

2.14 COLD WEATHER PRECAUTIONS

During cold weather the function of pressure/vacuum relief valves and high velocity vents should be checked. It is also possible that humid air vented from a cargo tank may condense and freeze on gauze screens thus inhibiting ventilation.

On vessels fitted with inert gas systems care must be taken to maintain the water supply to the deck water seal; to prevent freezing of the static water; and to control the heating of such water to prevent boiling. In addition the pressure/vacuum breaker, if filled with water, must be protected from freezing by adding glycol.

Precautions should be taken to ensure that the fire main system is kept operational. Steam operated winches and windlasses should be rotated slowly to avoid damage.

2.15 ENTRY INTO ENCLOSED SPACES

Because of the possibility of oxygen deficiency as well as the presence of hydrocarbon or toxic gas in a cargo tank, cofferdam, double bottom tank or any enclosed space, it is the master's responsibility to identify such spaces and to establish procedures for safe entry. Guidance is to be found in Chapter 10.

Personnel should consult the responsible officer to determine whether entry into such enclosed spaces is permitted. It is the duty of the responsible officer to check the atmosphere in the compartment, ventilate the space, ensure the appropriate procedures are followed, ensure the safety of the personnel concerned, and issue an entry permit.

2.16 PUMPROOMS

2.16.1 General Precautions

Pumprooms, by virtue of their location, design and operation, constitute a particular hazard and therefore necessitate special precautions.

Pumproom bilges should be kept clean and dry. Particular care should be taken to prevent the escape of petroleum products and/or hydrocarbon vapour into the pumproom. All pump seals, valve glands, drain cocks and mud boxes should therefore be maintained in good condition. In the event of a serious spillage, the application of a layer of fire extinguishing froth will help to control the generation of hydrocarbon vapour until the situation is brought under control.

2.16.2 Ventilation

The probable presence of hydrocarbon gas within the pumproom requires the use of ventilation. Regulations require the mechanical expulsion of air and any petroleum gas from the bottom of the pumproom.

Before anyone enters a pumproom, it should be thoroughly ventilated and the atmosphere checked for petroleum gas. Ventilation should be maintained until access to the pumproom is no longer required.

Special attention should be paid to levels below the lower platform where petroleum gas is liable to accumulate.

Isolation of the pumproom vent system in the event of fire requires the efficient operation of dampers in the vent trunking. They should therefore be well maintained.

2.16.3 Pumproom Entry

No one should enter a pumproom at any time without first obtaining the permission of a responsible officer.

It is the duty of the responsible officer in charge of cargo operations to ensure that adequate ventilation of the pumproom has been accomplished, that the atmosphere within the compartment is suitable for entry, and that adequate communication procedures are established and maintained.



IMO

ANY OTHER BUSINESS

Use of Low Flashpoint Cargo as Fuel

Note by Liberia

Consequent upon recent investigation into irregular and unsafe operational practices in certain Liberian tankers, Liberia notes that low flash cargo oil (crude) has, in some cases, been transferred to bunker systems and used as fuel.

This transfer has, in some known cases, been accomplished by means of a cross connexion between cargo and bunker piping systems in contravention of the prohibition on the use of low flash oil as fuel in the SOLAS Convention and the Rules of all major Classification Societies.

Liberia believes that the practice described in previous paragraphs is more widespread than may be presently apparent and is a serious source of danger to ships and personnel both at sea and in port and also to port installations which service tankers.

Liberia does not suggest that tanker operators in general are guilty of these practices but based upon known facts Liberia feels that there is a case for strengthening of survey requirements to include a positive examination of cargo and bunker piping systems for evidence of unauthorized connexions. Liberia also feels that Port States could introduce random sampling of bunker tanks as a deterrent.

Liberia submits this problem to the notice of the Maritime Safety Committee for consideration as a matter of urgency in the interests of safety of life at sea.



IMO

Ref. T4/4.01

DANGER OF THE USE OF LOW FLASHPOINT CARGO AS FUEL

1 At its forty-eighth session, the Maritime Safety Committee was alerted to an irregular and unsafe practice whereby low flashpoint cargo (crude) oil had been transferred to bunker systems where it was used as fuel. It was pointed out that this was a serious source of danger to ships and persons both at sea and in port and also to shore installations.

2 The Committee was informed that, in some known cases, this transfer had been carried out by means of a cross connection between the cargo and bunker piping systems.

3 The Committee was also informed of the circumstances of a casualty aboard a tanker where crude oil leaked from a cargo tank into an adjacent bunker tank. The crude oil was then transferred together with the fuel oil into a heavy oil day tank and subsequently into a double bottom tank. As the tanker was under repair the flame of any oxy-acetylene torch being used for repair work ignited the hydrocarbon vapours which had escaped into the engine room.

4 The purpose of this circular is to warn Member Governments of the possibility of either deliberate or accidental contamination of the bunkers by crude oil cargo with the consequential risk to persons, ships and shore installations.

5 The Committee recalled that paragraph 3.3.4.1.4 of the Guidelines on surveys under the 1978 SOLAS Protocol (resolution A.413(XI), as amended by resolution A.465(XII)) requires the examination of cargo and bunker piping systems. Member Governments are urged to advise their nominated surveyors or recognized organizations to give special attention during surveys to the possibility of cross connections between the cargo and bunker piping systems.

6 Member Governments are also urged to advise shipowners and crew members of the need to carry out routine checks on the flammability of bunker spaces and to further advise shipowners and ship repairers that such a check should always be carried out before any "hot-work" is started in the region of bunker spaces.

7 Whilst the Committee agreed that random sampling of bunker tanks would act as a deterrent against the deliberate use of crude oil cargo to supplement the oil fuel, the Committee felt this would be difficult to implement. However the Committee urges Member Governments to require the testing of a sample from the bunkers in conjunction with the control procedures of the SOLAS Convention whenever there are clear grounds to believe (due to the odour of hydrocarbon vapours in the engine room, by irregularities in the cargo or bunker pipework or otherwise) that a ship may be using crude oil cargo as fuel.



MARITIME SAFETY COMMITTEE
8th session
agenda item 23

IMO

ANY OTHER BUSINESS

Use of Low Flashpoint Cargo as Fuel

Note by the International Chamber of Shipping

In connexion with the note submitted by Liberia (MSC 48/23/1) concerning the use of low flashpoint cargo as fuel, the Committee may be interested to see the attached copy of the latest report issued under the ICS Tanker Casualty Data Exchange Scheme.

ICS concluded that the investigation to which the Liberian note refers revealed practices of sufficient concern to warrant a general restatement of the hazards associated with the contamination of fuel oil. 10,000 copies of the report have been circulated to recipients - including oil tanker owners and tanker personnel - throughout the world.

The Committee is reminded that copies of these tanker reports - and of the reports issued under the similar Navigational Casualty and Fire Casualty schemes - are available free of charge to interested governments, as well as to shipping companies, educational establishments etc, on application to ICS at the address at the head of the report.

INTERNATIONAL CHAMBER OF SHIPPING

30/32 ST MARY AXE, LONDON EC3A 8ET

TANKER CASUALTY REPORT

Limitations on the use of oil as fuel are dealt with in the International Convention for the Safety of Life at Sea (SOLAS). Although the Convention permits the use of fuel oil with a flashpoint of less than 60°C, e.g. crude oil, the arrangements on board would be subject to very rigid requirements and the complete installation must be approved by the Administration. The vast majority of ships are not, however, designed to use low flashpoint fuel and to do so must be considered a breach of national and international rules and regulations.

The irregular and dangerous practice of transferring cargo to bunker systems is not believed to be widespread. However, accidental contamination of fuel oil can occur and ships' personnel should be alert to such a possibility and take the necessary precautions. A risk could arise, for example, where fuel oil bunker tanks are adjacent to cargo tanks and where, because of a bulkhead leak, volatile cargo contaminates the fuel oil.

In an incident at a repair yard when an explosion occurred in a ship's engine room killing 10 workmen and injuring another 28. Investigations revealed that crude oil had leaked from a cargo tank into an adjacent bunker tank where it floated on top of the heavier fuel oil. The crude oil had then been transferred together with the fuel oil into a heavy oil day tank and subsequently into a double bottom tank. Hydrocarbon vapours had escaped into the engine room where they were ignited by an oxy-acetylene torch being used for repair work. The flashpoint of the oil remaining in the double bottom tank after the explosion was found to be 4°C.

Recommendations on the precautions to be taken to guard against such hazards will be included in the revised edition of the International Safety Guide for Oil Tankers and Terminals (ISGOTT), an extract from which reads as follows:-

"In engine and boiler rooms ignition sources such as those arising from boiler operations and electrical equipment cannot be avoided. It is therefore essential to prevent the entry of flammable gases into such compartments. The contamination of bunker fuel by volatile cargo through bulkhead leaks, pipeline admixture or any other cause will introduce an additional danger. The routine checking of bunker spaces for flammability by tanker and terminal personnel is therefore to be encouraged."

It is believed that if seafarers are made fully aware of the possible consequences of either deliberate or accidental contamination of fuel oil, and in particular that their lives and the lives of their shipmates are at risk, they will pay very close attention to the need to prevent such risks.

Shipowners and ship managers are therefore strongly urged to bring this report to the attention of ships personnel.

RESOLUTION A.565(14).

*Adopted on 20 November 1985
Agenda item 10(b)*

**RECOMMENDED PROCEDURES TO PREVENT THE ILLEGAL OR ACCIDENTAL
USE OF LOW FLASHPOINT CARGO OIL AS FUEL**

THE ASSEMBLY,

RECALLING Article 15(j) of the Convention on the International Maritime Organization concerning the functions of the Assembly in relation to regulations and guidelines concerning maritime safety,

NOTING that the Maritime Safety Committee adopted a recommendation on the danger of the use of low flashpoint cargo oil as fuel (MSC/Circ.347),

NOTING ALSO that this practice is contradictory to regulation II-2/15 1 of the International Convention for the Safety of Life at Sea, 1974, as amended,

NOTING FURTHER that in spite of the information provided in that circular the dangerous practice of the use of low flashpoint cargo oil as fuel is continuing,

RECOGNIZING the urgent need for such practice, whether illegal or accidental, to be discontinued,

HAVING CONSIDERED the recommendation made by the Maritime Safety Committee at its fifty-first session,

1. ADOPTS the Recommended Procedures to Prevent the Illegal or Accidental Use of Low Flashpoint Cargo Oil as Fuel, the text of which is set out in the Annex to the present resolution;
2. REQUESTS all Governments concerned to bring the Recommended Procedures to the notice of shipowners and seafarers, as well as to surveyors and control officers concerned.

ANNEX

**RECOMMENDED PROCEDURES TO PREVENT THE ILLEGAL OR ACCIDENTAL
USE OF LOW FLASHPOINT CARGO OIL AS FUEL**

- 1 For some time an irregular and unsafe practice has existed whereby low flashpoint cargo oil has been transferred to bunker systems where it was used as fuel. This is a serious source of danger to ships and persons both at sea and in port and also to shore installations.
- 2 In some known cases, this transfer had been carried out by means of a cross connection made between the cargo and bunker piping systems.
- 3 In this connection it should be noted that a casualty occurred aboard a tanker where crude oil leaked from a cargo tank into an adjacent bunker tank. The crude oil was then

transferred together with the fuel oil into a heavy day tank and subsequently into a double bottom tank. As the tanker was under repair the flame of an oxyacetylene torch being used for repair work ignited the hydrocarbon vapours which had escaped into the machinery space.

4 Member Governments should take note of the possibility of either deliberate or accidental contamination of the bunkers by oil cargo with the consequential risk to persons, ships and shore installations

5 The Guidelines on Surveys Required by the 1978 SOLAS Protocol, the International Bulk Chemical Code and the International Gas Carrier Code (resolution A.560(14)) require the examination of cargo and bunker piping systems (paragraph 3.3.4.1.4). Member Governments are urged to instruct their nominated surveyors or recognized organizations to give special attention during surveys to the possibility of cross connections being made between the cargo and bunker piping systems.

6 Member Governments are also urged to advise shipowners and crew members of the need to carry out routine checks on the flammability of bunker spaces and to further advise shipowners and ship repairers that such a check should always be carried out before any "hot-work" is started in the region of bunker spaces.

7 Random sampling of bunker tanks will act as a deterrent against the deliberate use of crude oil cargo to supplement the fuel oil. Member Governments are urged to incorporate this into their survey procedures under the 1978 SOLAS Protocol (resolution A.560(14)). Additionally, wherever there are clear grounds to believe (due to the odour or hydrocarbon vapours in the machinery space, irregularities in the cargo or bunker pipework or otherwise) that a ship may be using cargo oil as fuel, consignees, cargo officers, surveyors or inspectors should test the percentage of the lower flammable limit of the vapour in the bunker or bunker tanks by the use of an appropriate combustible gas indicator. If the percentage of the lower flammable limit is above 50, a sample should be taken of the liquid contents of the bunker tank and analysed by a laboratory recognized by the Administration of the flag State or port State concerned to ascertain the flashpoint using the closed cup method.

8 If the flashpoint is below 60°C, except when authorized under regulation II-2/15 of the 1974 SOLAS Convention as amended, the flag State Administration should be notified and cargo operations and/or bunkering stopped. In consultation with parties concerned (master, port services and ship inspectorate, consignee, shipowner, classification society as appropriate, etc.) a plan of measures to be taken is to be drawn up with the objective of removing the contaminated fuel, washing and gas-freeing the tanks and associated piping.

IN THE HIGH COURT OF JUSTICE

QUEEN'S BENCH DIVISION

COMMERCIAL COURT

The Honourable Mr. Justice Peremptory in Chambers

IN THE MATTER OF AN INTENDED ACTION

B E T W E E N :

OIL MARKETEEING LIMITED

Plaintiffs

- and -

RAPACIOUS TANKERS LIMITED

Defendants

O R D E R

UPON HEARING COUNSEL for the Intended Plaintiffs and upon reading the Affidavit of (Solicitor) sworn herein on 28 October 1991

AND UPON the Intended Plaintiffs undertaking by Counsel:

(1) To issue the Writ herein;

- (2) To apply forthwith to serve the Writ on the Intended Defendants outside the jurisdiction;
- (3) To abide by any Order this Court may make as to damages in case this Court shall hereafter be of the opinion that the Intended Defendants shall have suffered any by reason of this Order which the Intended Plaintiffs ought to pay;
- (4) To indemnify any Third Parties against the costs of complying with this Order.

IT IS ORDERED that :

1. The Intended Defendants do permit the Intended Plaintiffs' representative, Mr. Oil Expert of Oil Experts Limited access to their vessel "RAPACIOUS TANKER" and do permit him to:
 - (a) carry out a full inspection of the vessel, including all engine room, void and cargo bunker spaces;
 - (b) inspect all plans and diagrams on board the vessel;
 - (c) to take samples of oil or residues in any tank or space in the Vessel;
 - (d) to take any photographs of any part of the Vessel.
2. The Intended Plaintiffs may serve this Order on the Intended Defendants by notifying Rapacious Tankers Inc., by telex of the terms of this Order.
3. Costs reserved.
4. Liberty to apply.

DATED the 29 day of October, 1991.

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