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Case No: 2011 FOLIO 211

IN THE HIGH COURT OF JUSTICE
QUEEN'S BENCH DIVISION
COMMERCIAL COURT

Royal Courts of Justice
Strand, London, WC2A 2LL

Date: 21/12/2012

Before:

THE HON MR JUSTICE COOKE

Between:

(1) CHS Inc Iberica SL	**Claimants**
(2) CHS Europe SA	
- and -	
Far East Marine SA	**Defendant**

m/v "Devon"

David Walsh (instructed by **Hill Dickinson**) for the **Claimants**
Adam Turner (instructed by **Reed Smith**) for the **Defendant**

Hearing dates: 11 – 14 and 17 December 2012

Judgment

The Hon Mr Justice Cooke:

Introduction

1. In this action the claimants (to whom I shall collectively refer as "CHS", because there is no issue about title to sue) are the owners of a consignment of corn carried by the defendant, the owners of the vessel "Devon" (to whom I shall refer as the "Owners") from Varna in Bulgaria to Tarragona in Spain. The vessel's main engine was put on standby at 1650 hours on 23 December 2010 and she was "Full Away" at 1830 hours. At 1950-1952 she suffered a main engine breakdown some 14 miles out of Varna and, was towed back the next day. No claim has been made for General Average. The necessary repairs were not completed and approved by class until 10 February 2011, with the result that the vessel sailed on 10/11 February and only arrived in Tarragona on 20 February, some 59 days later than she would have done in the absence of the engine breakdown.

2. The cause of the engine breakdown is disputed and in particular whether it is attributable to unseaworthiness at the commencement of the voyage and whether the Owners exercised due diligence within the meaning of the Hague Rules. CHS also

allege a failure to proceed on the voyage with all convenient speed as required by the contract of carriage.

3. It is now common ground between the parties that the effect of this delay was that some of the cargo arrived at destination caked and mouldy, although the extent of that damage and its effect on the value of the cargo is very much in issue. The Owners say that the damage was so limited that the damaged cargo could have been, and should have been, mixed with sound cargo and sold without any diminution in price at all. Dr Crouch, the Owners' expert put the figure for damaged corn at about 600 MT in total (554 MT from Hold 2 and about 48 MT in Hold 4). The Owners submit that the limited damage largely arose because of the moisture content of the cargo present at the loadport and that, although such damage would not have been present if the vessel had arrived without any undue delay at Tarragona and discharged there in early January 2011, none of the cargo, when sampled and analysed at the disport showed any detectable levels of toxins, which meant that the salvage sale of approximately 3020 MT of the total cargo of 14,353.50 was completely unnecessary. The price obtained did not therefore reflect the difference between the sound arrived value of the cargo and its actual value and the loss claimed is therefore irrecoverable. It also disputes various incidental expenses incurred by CHS in investigating the effect of the delay on the cargo and in effecting the sale.

The Bill of Lading

4. It is common ground that the Bill of Lading incorporated an amended Synacomex 90 charterparty dated 10 December 2010 between the Owners and the shippers Vitagrain BG AD, which provided by clause 3 for the vessel to "proceed with all convenient speed to one safe port Barcelona- Cadiz range" and was expressly governed by English law. The Bill of Lading contained a General Paramount Clause (also incorporated into the charterparty) with the result that the Hague Rules apply to the carriage of the corn. The corn was carried in Holds 1, 2 and 4 and it is undisputed that the cargo in Hold 1 arrived undamaged. A cargo of wheat was carried in Holds 3 and 5 which was also unaffected by the delay.

5. The cargo of corn was shipped in apparent good order and condition as acknowledge by the Master in the Bill of Lading. The Loadport Quality certificate which was issued by Baltic Control Bulgaria referred to the taking of incremental samples taken uniformly and systematically during loading, to the creation of composite samples and to the analysis of a final composite sample which showed a moisture content of 14.45% as compared with the contract specification of 14.5%. Sampling was said to be done in the manner approved by GAFTA 124. The analysis of the composite sample of composites was final and binding for the quality of the cargo under the purchase contracts by which the CHS companies bought the cargo. Acceptance or rejection fell to be determined by reference to the certificate. It was, unsurprisingly, common ground that this analysis of moisture content, being an analysis of a composite sample, necessarily meant that parts of the cargo would have had a higher moisture content than 14.45%, whilst other parts would have a lesser content on shipment. The Quality certificate stated that the goods were "sound, loyal and merchantable" and met contractual specifications. Damaged kernels were shown at 1.47% and no toxins were present. There was a 5% limit on damaged kernels in the purchase contracts.

The Incident

6. The breakdown report signed by the Chief Engineer on 23 December 2011 stated that:-

> "At about 1950 of 23 December notice luboil high temperature. The automation energized with indication high luboil temperature. Bridge informed immediately for this abnormality. After a very short time period the automation energized again with indication from oil mist detector from no. 4 unit. As you understand this condition enabled me to act quickly to stop the main engine but during my way to control panel the main engine tripped through automation with indication of main bearing high temperature."

7. The owners called no evidence from any officer or member of the crew, nor from any surveyor who examined the damaged engine at Varna and it was left to expert Marine Engineers to opine as to the cause, nature and effect of the damage recorded on the vessel's return to Varna and the repairs which were conducted there, by reference to documents produced by the Owners. The vessel had an unmanned engine room and, if the report is taken at face value, it appears that the Chief Engineer was not in the engine room at the time of the events in question. The absence of any direct evidence of the events in question, of any observation of temperature or pressure increases on the gauges by anyone on watch there, and of the damage caused was a notable feature of the trial with semi illegible copies of engine logs produced by the Owners with other documents such as maintenance reports, without any evidence as to their accuracy or provenance. As appears hereafter, there were some obvious errors in some entries in the engine log, which meant that the reliability of the log could not be taken as read. Nor, without evidence, could the Chief Engineer's report be assumed to be entirely accurate, though no one suggested that it was not. It was the only record of the sequence of events on which the experts voiced their opinions. The engine log contained no records of temperatures or pressures of any kind in the engine room after leaving Varna and prior to the incident, because Captain Livanos said, and the engine log illustrated, that readings were recorded only once a day at 1100 hours or, more probably noon, (though appearing in the log as at 1100 because of the inadequate spaces in the engine log for all 12 cylinders).

8. CHS drew attention to the sequence of events as recorded in that breakdown report. First, the main engine lubricating oil inlet temperature alarm sounded indicating that the temperature of the oil lubricating the main engine had reached an excessive level. It was common ground that the normal luboil temperature was 55-6 degrees C and that the alarm was set to sound at 65 degrees C. Secondly the main bearing No. 4 high oil mist alarm sounded (set at 95 degrees C) and then subsequently the engine shut itself down automatically before the Chief Engineer could do so.

9. On inspection in Varna, the crankshaft journals and Main Bearings 2, 3 and 4 were found severely damaged. It was agreed by the experts that the damage began in way of Bearing 4, as revealed by the hardness test of the journal, which indicated that the highest temperatures were found there. The other damage was secondary. All the bearings were replaced and the repairs took some 6- 7 weeks to complete.

Unseaworthiness of the vessel

10. CHS allege that the vessel was unseaworthy in the following respects:

> "…the Claimants' case is that the Vessel was unseaworthy before and at the beginning of the voyage by reason of:
>
> 1. the poor condition of the Vessel's engine lubrication and lubrication cooling systems; and
>
> 2. the lack of adequate systems on board the Vessel to ensure that:
>
> i) the temperature of the engine lube oil was properly regulated;
>
> ii) the cooling system did not become blocked; and
>
> iii) the engine was adequately lubricated."

11. The vessel was built in 1981 and was therefore 30 years old at the time of the incident. She had a 12 cylinder diesel Pielstick engine (12PC2-SV-400). She was purchased by the Owners in 1990 and had been managed by Scarmar Shipping Agency SA since 1997. She had always been classed with ABS and was fully in class without conditions or recommendations at the time of sailing from Varna. She had passed her 30 year special survey in 2011. She was classed for service with unmanned machinery spaces with an automated engine room with control from the bridge.

12. Following the incident, the marine superintendent employed by Scarmar, Captain Stavros Livanos attended the vessel, arriving in the early hours of Christmas Day. The crew were then stripping down the main engine to gain access to the crankshaft to ascertain its condition by testing for hardness and cracks and to determine the scope of repairs required. Independent specialists in main engine repairs, Goltens, were brought in as were the engine manufacturers (now part of MAN) on their recommendation. Representatives from ABS were present. BMT Marine & Offshore Surveys Ltd attended on instructions from the Hull and Machinery Insurers. I did not hear evidence from any of these persons, other than Mr Livanos, BMT produced four reports listing the damage to the main engine and the repairs required. In their reports, the last of which was dated 25 February 2011, BMT confirmed that the lubricating oil purifier was used continually throughout the voyage without problems and that the type of oil in use was that recommended by the engine manufacturers. They also stated their understanding that no differential pressure of the automatic filter or low lubrication oil pressure was indicated during the incident. All that information was obtained from the Chief Engineer, according to Captain Livanos. The report referred to the last measurement of crankshaft deflections on 22 June 2010 as showing all within the manufacturers' limits and the absence of abnormal readings in the engine logs indicating any main engine failure.

13. According to an ABS report, Main Bearings numbers 2, 3 and 4 were found wiped out and the crankshaft journal in way of those bearings was found to have excessive hardness and surface cracks, with evidence of overheating. BMT, the Hull Insurers' surveyors described the damage as follows:

> "1. Main bearing No2 upper and lower shell found completely wiped, with white metal and copper layer missing.
>
> 2. Main bearing No3 upper and lower shell found completely wiped, with white metal and copper layer missing. The back sides of the bearing shells were lightly scored indicating that the bearings had rotated inside their housings.
>
> 3. Main bearing No4 upper and lower shell found completely wiped, with white metal and copper layer missing. The back sides of the bearing shells were heavily scored indicating that the bearings had rotated inside their housings.
>
> 4. Main bearing No4 base found heavily scored. Measurements revealed that the base is closed at approximately 0.5mm which is over the Manufacturer's limits.
>
> 5. Main bearing No4 upper cover found heavily scored and discoloured.
>
> 6. Main bearing No2 base found heavily scored. Measurements revealed that the base closed at approximately 0.6mm which is over the Manufacturer's limits.
>
> 7. Main bearing No3 base found heavily scored. Measurements revealed that the base is closed at approximately 0.5mm which is over the Manufacturer's limits.
>
> 8. Crankshaft main journals No2, 3 and 4 found variously scored. The magnaflux test carried out by Messrs GOLTENS revealed micro cracks at the journal area.
>
> 9. Main engine unit No3 Piston found heavily scored and wiped at various locations.
>
> 10. Main engine unit No3 cylinder liner found wiped at various locations.
>
> 11. All main engine fuel pumps and nozzles found stuck due to engine shut down during operation with heavy fuel oil.
>
> 12. All crank pin bearings found variously scored.
>
> 13. 5 pcs connecting rods found bent.
>
> 14. 4 pcs connecting rod found with cracks in way of connecting rod bolt holes."

14. The following work was done, according to ABS:

> "Rectification (Full) The following work carried out under supervision of maker representative:
>
> 1. Disassembling of all cylinders covers, pistons, liners, jackets, removal of piping where necessary. Thrust bearing was replaced. All foundation bolts were checked.
>
> 2. All main bearing were opened for inspection. All crank shaft journals visually inspected including MPI. No evidence of overheating of crank shaft journals exept nos 2,3 and 4.
>
> All main bearings were replaced (for no 2,3, and 4 see below.)
>
> 3. Journals no 2, 3 and 4 of the crank shaft were machined in place.
>
> Upon completion of machining journals were measured and no ovality and conicity found. Hardness was measured and found acceptable. MPI examination carried out and found free of defects.
>
> 4. New undersize bearings including saddles and connecting rods were supplied by MAN Diesel & Turbine, Saint Nazaire, France.
>
> 5. Clearance of all main bearing was measured and found as per maker's recommendations.
>
> 6. Crank shaft deflection was checked and considered satisfactory.
>
> 7. Foundation bolts and chocks were verified.
>
> 8. Main engine oil mist detector tested in operation.
>
> 9. Main engine bearing temperature control including alarm was tested.
>
> 10. Main engine tested in operation without load for 3 hrs while vessel was in anchorage. For details refer to attached documents.
>
> All inspection and tests related to this main engine damage were considered with satisfactory results."

15. The cargo owners' surveyor was not given access to any areas to allow him to see any damaged parts. He was in no position to determine the cause of the main engine breakdown. The personnel attending on behalf of Owners' interests were in such a position but came up with no documented conclusion that has been disclosed. The documentation made available by the Owners in relation to the repairs was limited and the whereabouts of the main engine bearings, all of which were removed on the recommendation of the main engine manufacturers, was not known to Captain Livanos nor revealed to the Court. No photographs were produced. The Owners produced no statement from the crew to whom Captain Livanos spoke, other than the Chief Engineer's statement, referred to earlier in this judgment. Above all there was a dearth of discussion about the cause of the problem in any documents disclosed, the final BMT report stating only that the Owners had chosen to advance their claim on Hull insurers as a "failure in service", whilst BMT then concluded that none of the damaged items replaced were subject to any "latent defect, wear and tear, gradual deterioration, fault or error".

16. Mr Turner, for the Owners submitted that all the investigators worked on the basis that there had been a failure of lubrication in the main engine, a matter to which BMT adverted. He referred to the ABS report which stated that no deficiencies were observed during the survey which related to possible Safety Management System failure, but no evidence was produced as to what such a statement encompassed and the surveyor responsible for that statement did not give evidence.

17. Captain Livanos' evidence was that efforts were made to ascertain the cause of the damage. His first statement included the following:

> "32. From my investigation, it was clear that the first record of any abnormal main engine operation were the alarms that were triggered by the high temperature of the lubricating oil at the main engine inlet sensor and the sensor in the crank case that detects a high level of oil mist. There were no alarms set-off in relation to any failure of the operation of the lubricating system and there was no evidence that it had failed.
>
> 33. Although I have referred to the main engine breaking down, it did not stop due to a mechanical seizure or critical failure. It stopped because the protective auto-shutdown mechanism was triggered.
>
> 34. The Chief Engineer informed me that he did ask the Master for permission to stop the main engine manually once the above mentioned alarms were set-off. However, the Master asked for time to clear the traffic separation scheme that the Vessel was navigating within.
>
> 35. In the event, the decision was taken out of their hands, as within two minutes the high temperature alarm for main crankshaft bearing No. 4 triggered the protective auto-shutdown mechanism. The shut-down procedure was not triggered in error as it was found to be working as the main engine manufacturer intended.

> 36. On inspection, main bearing No. 4 was found to have been damaged in addition to damage to the journals in way of Nos 2, 3 and 4 crankshaft bearings.
>
> 37. Even with the assistance of the main engine manufacturer's representatives, it was not possible to determine the exact cause of the failure. However, given the nature of the damage, the most likely explanation is that there was insufficient lubrication. However, there was no indication as to why this may have happened. The lubricating oil was as recommended by the manufacturers, the preceding lubricating oil analysis was within parameters and the purifiers were used continuously during the voyage without problem."

18. Captain Livanos therefore placed the blame fairly and squarely on a failure of the lubrication system, though he could offer no reason for that failure. No claim has been made in General Average. As I have already said, I heard no evidence from anyone on board the vessel at the time of the incident, nor from any expert who attended at Varna to investigate the cause. The record in the Chief Engineer's Report and in the logs, (which contained less information than that report) were the only basis upon which the experts who gave evidence to the court could express their views, together with the descriptions of the damage suffered and the repairs done at Varna. The absence of any oral evidence from the Chief Engineer, whose comments were relayed as hearsay was not a satisfactory basis upon which to proceed. Although it was said that he was no longer in the employment of the Owners this did not seem to me a satisfactory reason for the failure to call him or either of the other two engineers or the oiler who worked on the vessel as the time. No reason was advanced for the absence of any evidence from the surveyors who inspected the ship in Varna.

19. Nor could I be satisfied that the Owners had disclosed all documents in their control relating to the cause of the damage. It is inconceivable to me (as it was to the Owners' expert Mr Findlay) that, with such major repairs (costing in excess of $1m), there would not have been a full discussion of causation between all those involved at Varna in deciding on the repairs required and the means of avoiding any recurrence of such a breakdown. Documents must have been engendered by the Owners themselves regardless of documents emanating from the Hull Insurer's surveyors, Goltens and the engine manufacturers on this issue, but none have been forthcoming. There were no internal documents disclosed by Owners at all which showed any discussion of the cause, whether by reference to the crew's version of events or to the damage found. There were no photographs of the damage. There were no contemporary notes of any interviews or discussions with the Chief Engineer or engine room personnel. No bearings or other parts were apparently sent for analysis, save that crankshaft hardness and crack tests were conducted by Goltens. The Owners' expert said he would have liked to see the bearings but they were not available to him. Those who were present on board the vessel at Varna did see the engine damage and were in the best position to ascertain the cause, but nowhere do the disclosed documents show their conclusions on the subject. Mr Turner said that this was because, though they recognised it was a problem of lubrication, they could not ascertain the cause of the problem. Yet if they were unable to ascertain the cause, that would surely have been the subject of documented discussion with the possible

explanations explored, as they were in court by the experts later instructed on each side.

20. In my judgment, there are only two possible explanations for this absence of disclosed documents discussing the cause of the damage, both of which bear unfavourably upon Owners. The most obvious explanation, and to my mind the most realistic, is that such documents did exist but have not been disclosed. If, as the Owners suggested, no one was able to come up with a cause, that would have been the subject of considerable exchanges between those involved, with various potential explanations being put forward and rejected. Instead, there is just a ghostly silence on the subject. The alternative explanation is that there was a deliberate policy not to set out the cause in the documents and those instructed were prevailed on not to do so. There can only be one reason for either course of action, which is that the cause or possible causes discussed were causes which the Owners wished to hide because it or they were causes which would not have assisted them in their dispute with CHS. It or they must have involved some unseaworthiness of the vessel at the commencement of the voyage from Varna. Otherwise, why would not the discussion be made available in the context of this dispute? Hence also the absence of any evidence adduced from the Chief Engineer, any of the other engineers or personnel in the engine room, or any of the surveyors, or representatives of the engine manufacturers, or of Goltens who attended on the vessel in Varna.

21. Whilst this is not a case of the kind to which Devlin J (as he then was) referred in Waddle v Walsend Shipping Co Ltd [1952] 2 LLR 105 at p139 where an inference of unseaworthiness can be drawn when a vessel sinks or leaks, without any apparent reason, shortly after leaving port, the defect, whatever it was did manifest itself within 3 hours of engine standby and one hour and twenty minutes of "Full Away" in circumstances which the Owners have not made any effort to explain by any form of direct evidence, save for Captain Livanos. CHS has to make out its case on the evidence as to the vessel's causative unseaworthiness but I am entitled to bear in mind the timing of the main engine breakdown and the absence of material evidence adduced by the Owners.

22. Both experts agreed that the damage to the crankshaft in way of Number 4 bearing was most severe, as revealed by the Golten's hardness test. The damage initiated there and the damage to Bearings Nos 2 and 3 and the other damage, including that to the crankpins, pinions and connecting rods was secondary. The issue with which the experts sought to grapple was what had caused the problem, given the sequence of events as recorded by the Chief Engineer.

23. The opinion of CHS' marine engineering expert, Mr Rossiter was that the damage to the bearings and crankshaft was caused by the breakdown of the luboil viscosity caused by increased temperature in the luboil as a result of the failure of the saltwater (SW) cooling system adequately to cool the fresh water in the fresh water (FW) system which in turn was designed to cool the luboil used in the main engine. This, he said was borne out by the sequence of alarms reported as sounding in the engine log - first the luboil temperature alarm and subsequently the oil mist detection alarm for Bearing No 4. The failure in the SW system was the result either of the blockage on the salt water side of the Low Temperature Fresh Water cooler (the LT FW cooler) either by marine growth or by partial or full closure of a valve in the system or by blockage in a strainer preventing the cooling medium from cooling the volume of

fresh water to the correct temperature (or a combination of these defects). In cross examination he was inclined to dismiss the partial closure of a valve as no more than a possibility, rather than a likelihood. The sea water strainers in way of the sea chests presented a potential candidate because the maintenance records produced by the Owners showed that the last maintenance on them had taken place on 14 May 2010, with a required interval for maintenance of 6 months, which was 6 weeks or so overdue at the time of the incident. Both the experts and Captain Livanos would have expected routine maintenance to occur with much greater frequency than this- every 3 months or so, or, as a matter of practice, at every port.

24. The opinion of Mr Findlay, as expressed in his first report was that "it was not inconceivable that the damage occurred simply due to premature failure of the bearing shell such that the flow of oil between the bearing and the journal was interrupted." He stated that, on the basis of the documents provided and in the absence of any examination of the damaged components, he could not provide a definitive cause of the incident. He stated that bearings are expected to last for 24,000 running hours and often far longer, but that there are occasions when bearings fail well before the end of their expected life. By the time he came to write his supplementary report, his view was that the damage to No 4 main bearing "was most likely due to a momentary interruption in the supply of oil to that bearing or possibly a premature failure of the white metal bearing." He went on to say that it was possible that there was "a very momentary interruption, perhaps a hiccough in the supply to that bearing and perhaps for a fraction of a second. Such momentary interruptions can and do occur, perhaps due to vibration or air ingress, or perhaps when the vessel encounters heavy weather. It is also not unknown for a luboil pump to momentarily reduce speed, and thus output, due to a power surge at the main switchboard. This momentary interruption or premature failure of the bearing may have been just enough to cause the white metal to make contact with the journal and from then on, the damage increases".

25. Each expert challenged and criticised the explanation of the other, but in my judgment, the unlikelihood of Mr Findlay's theories is such that I can exclude them as realistic causes of the problem.

26. There is self evidently no basis for any suggestion of a premature failure of a bearing by reference to its prior condition nor any reason advanced as to why it should occur. It was common ground between the experts that bearings have an expected life and that failure usually occurs at that stage. When bearings fail prior to that, it is normally a failure at a very early stage in the life of the bearing. They rarely fail in mid life, which would be the position here where they had been in use for about 10,000 running hours. Mr Rossiter said that he had never come across a bearing failure save at the early stages or at the end of its expected life. Further, to talk of premature failure of a bearing is not to ascribe a cause. The cause, if Mr Findlay were right, and the Owners were not guilty of a failure to maintain the vessel would have to be a latent defect in the bearing itself. Yet this is the one cause ruled out by BMT. Mr Findlay did not see the bearings, as he would have liked to. The only documented conclusion before the court as to causation reached by anyone who did see the bearings is that of BMT who concluded that there was no latent defect in any item replaced. All the bearings were replaced. As this is a crucial point in the context of most Hull and Machinery policies, it can safely be assumed that this was a conclusion reached on the basis of a full investigation.

27. Whilst Mr Findlay maintained that, if the bearings were wiped with no remaining white metal, it would not be possible to ascertain the cause of the failure, and that neither metallurgists nor surveyors might be able to ascertain the cause in such circumstances, the fact remains that BMT were able to express the conclusion they did, having examined the bearings for themselves and Mr Findlay would have liked to do so himself in order to investigate the cause. The absence of any determination to the contrary by any of the other personnel who attended at Varna speaks volumes and this was not even an explanation suggested by Captain Livanos.

28. Mr Rossiter's objections to this theory were as follows:

i) The order in which the alarms sounded show that luboil temperature rose first, before the bearing failed. Mr Findlay agreed but said that did not reveal the order of events since the bearing temperature alarm was set to 90 degrees whereas the luboil alarm was set to 65 degrees C. The fact remains that, according to the engine log, the order in which alarms sounded involved the luboil temperature alarm first and if there had been metal to metal contact from some failure of the bearing in metal to metal contact, it would be surprising if this had been the sequence. It should be obvious to a marine engineer, that the oil inlet alarm should not be the first to sound in a breakdown due solely to a cause within the main engine.

ii) If bearings are going to fail before their life expectancy, they fail early in life rather than later. Mr Findlay agreed that this was the usual position. Although he said that he had known them fail for no apparent reason, he did not suggest that a mid life failure was likely.

iii) Bearings are part of the main engine which is generally a reliable piece of equipment, if properly maintained.

iv) If a bearing such as this was close to failure, there would be evidence in the prior luboil analysis reports which would show debris from the engine wear. There was none in the analyses produced by the Owners in the previous months.

v) The amount of heat needed to overcome the cooling capacity of the luboil cooler and raise the temperature to the extent required to trigger the alarm at 65 degrees C is far more than could be generated by a single bearing failure. The volumetric flow through one bearing would not be enough to overcome the system with its content of 4 cubic metres of luboil. That large volume of luboil in the system was such that the temperature required could not be reached.

vi) The trip temperature of the main bearing is 90 degrees C and the melting point of Babitt on the bearing is about 190 degrees C which is not a significant temperature in the context of the volume of luboil flowing round the system.

vii) If a bearing starts to fail from metal to metal contact, a complete wiping of the bearing will occur within a matter of minutes so that the luboil inlet temperature could not be raised to the level it was before the bearing failed completely.

29. Mr Findlay did not agree with the latter points but could advance no adequate reasons for that disagreement. At the end of the day, he could only say, as he had at the outset, that bearing failures can occur at any time, however infrequent the occurrence at mid-life. He said he did not know why the bearing failed and could not say whether latent defect was likely or unlikely. There was, he accepted no evidence of it, but it remained a possibility.

30. On this evidence, it can safely be concluded, on the balance of probabilities that a latent defect leading to premature bearing failure, was not the cause of the main engine breakdown. No other reason is put forward for a failure of the bearing in and of itself and I cannot conclude that a premature bearing failure occurred without some mechanism to explain it.

31. As to the "momentary interruption" or "hiccough" in the supply to No 4 Bearing that is posited by Mr Findlay (and was as Captain Livanos said, no more than a guess at the cause, so far as he was concerned) there is simply no basis for the suggestion. There is no evidence of any abnormal vibration or air ingress. The vessel did not encounter heavy weather in the one hour and twenty minutes since "Full Away". No suggestion was made in the Chief Engineer's report, nor even by Captain Livanos on a hearsay basis, of any power surge at the main switchboard, nor of any luboil pump reduction in speed or output of the motor, nor of any of the other potential causes suggested.

32. Mr Findlay said that such things happen- he described it as a "rogue interruption" or a phantom event, whereby damage was caused. He accepted in cross examination that luboil would remain under pressure in the system and that there would not be a point where there was simply a gap in the luboil delivered. He said that the pressure would be temporarily reduced.

33. The major objection which was taken by Mr Findlay to Mr Rossiter's conclusion of reduction in the flow of luboil due to lowered viscosity as a result of high temperature, was that the damage was apparently limited to Bearings Nos. 2, 3 and 4 and initiated in way of No. 4. Mr Findlay said that if the luboil pressure had diminished, it would have led to damage to all the bearings, rather than be as isolated as it appeared to be. He said that this would apply whether the luboil was contaminated with debris, whether it was emulsified due to water or whether the viscosity was reduced. But, as he accepted in cross examination, that objection applied to his theory of momentary interruption in the supply of luboil too.

34. Mr Findlay accepted that there was no evidence of such a rogue interruption or phantom event. Mr Rossiter said that such momentary interruptions did not occur. Furthermore, even if there was a main power supply failure on the vessel, or all power was lost, and there was a consequent interruption of the flow to the bearings, this would not result in the bearings being written off, as had happened here. I find Mr Rossiter's view on this entirely convincing and Mr Findlay's theory so far fetched that it can be dismissed as a realistic possibility.

35. I turn then to Mr Rossiter's view as "the only other show in town", as Mr Walsh put it for the CHS. Mr Rossiter expressed certainty that the cause of the main engine breakdown was the excessive temperature of the luboil but could not be certain as to the cause of that. For how long the temperature had been rising was unknown, but it

had reached 65 degrees C when the alarm sounded and must have gone beyond that in the further two minutes or so before the engine shut down, An abnormally high temperature would affect the viscosity of the oil which would affect its ability to create the hydrodynamic wedge formed at the bearing interface to withstand load pressures. Mr Rossiter accepted that the viscosity of the luboil in use on the vessel at 65 degrees C should not have led to problems, since it would be about 43.4 cst, and it would be expected that an alarm would sound before the point at which main engine damage would occur, but if the temperature rose to something of the order of 73-74 degrees, the viscosity would be so diminished that metal to metal contact became possible at the bearing.

36. The Owners, through their expert and in cross examination of Mr Rossiter by Counsel, raised a number of objections to his theory.

i) The main engine luboil temperatures were recorded as normal for the three months prior to Varna.

ii) Any blockage in the SW system would lead to a change in pressure at the SW pump which had a pressure gauge on the discharge side and that there were no indications of anything unusual in the daily engine log records in the 3 months prior to Varna. There were no readings after arrival at Varna. If the sea suction strainers were blocked there would likely be a fall in the pressure seen at the gauge. If there was some blockage in the SW side of the LT FW cooler, that would be likely to be reflected in an increase in pressure at the gauge, though Mr Rossiter was dubious as to the extent of any such rise because salt water also went to the air coolers to the main engine. If a valve was left closed or partially closed on the discharge side of the pump, this too would result in an increase in pressure at the gauge.

iii) If there was such a blockage, the SW that fed the air coolers to the main engine would also show changes in pressure, but the entries in the engine logs prior to Varna revealed no such change.

iv) Mr Rossiter's theory therefore depended on events at Varna causing the problem, on the basis of the entries in the engine log which did not reveal any prior pressure differentials. The Owners' submission proceeded on the basis of the accuracy of the engine logs, to which no witness was available to speak and which cannot be taken as read. Nonetheless, Mr Rossiter accepted that his theory did depend upon some effective blockage occurring at Varna, whether or not there had been a gradual building up earlier which had not affected the vessel's apparent performance. It was not known which sea suction strainer was in use at Varna. Captain Livanos' evidence was that the normal practice was to use the outboard strainer in port. But the ship's records revealed nothing as the identity of the strainers in use at any time and there was no evidence from shipboard personnel about this. A change from one strainer to another could, of course make a difference and a strainer could have become blocked in Varna by any debris in the port, when in use or not in use. Mr Rossiter was not prepared to accept that the pressure on the 3 hour voyage from Varna was the same as that recorded on the voyage from Tripoli to Varna which terminated on 18 February. In his view, the fact of the high temperatures in the luboil within 3 hours of leaving Varna and one hour twenty

minutes after "Full Away" spoke for itself and outweighed any log entries for pressures on the inward journey some 5 days earlier.

v) If there had been a blockage in the SW system this would result in increased charge air temperatures for the main engines, which it also served and a consequent increase in exhaust gas temperatures also. The records in the engine log for the previous voyage showed no abnormality in these temperatures prior to Varna and no record existed of any engine alarm sounding for either reason at the time of the incident.

vi) If the FW cooling system was adversely affected by a blockage in the SW system, so too would be a number of other systems on the vessel, as they were inter-related. The LT FW cooling water flowed to the Reduction Gear Luboil Cooler before entering the Main Engine Luboil Cooler. The salt water from the LT FW cooler flowed to the HT FW Cooler next and the same system fed the Air Cooler for the Main Generator, the Main Engine Fuel Valve FW cooler and the Controllable Pitch Propeller Oil Cooler also. There was no record of any alarms sounding from deficient cooling of any of these items at the time of the incident.

vii) It was suggested that the absence of any record of any alarm sounding other than those referred to in the Chief Engineer's report showed that Mr Rossiter's theory could not be right, as they should have sounded also if he was correct in his views. Mr Rossiter considered this simplistic since the size of the pipes and the coolers and the different temperatures engendered by the different pieces of machinery inevitably meant that the heat loadings were different and the biggest component which delivered heat to the system was the main engine, which was where the failure occurred. In the event of a failure of the SW cooling system with its knock on effect on the FW cooling system, not all items would be equally affected and one item would probably fail before the others. The main engine was the obvious candidate to fail first because it generated the most heat and required the most cooling.

viii) It was suggested also that because the SW system cools the contents of the HT FW cooling system also, a blockage/closure in the SW system would adversely affect the items fed by the HT FW system, namely the Main Engine Cylinders and the engine for the Main Generator. The engine logs showed no abnormalities in the 3 months prior to the vessel's arrival at Varna and there was no record of any alarm sounding at the time of the incident. Mr Rossiter's answer to this was that the Chief Engineer's Report showed that it was the main engine luboil temperature inlet alarm which was reported as sounding first and the only way that this could happen was if the luboil cooling system was not working properly.

ix) The luboil temperature must have reached 65 degrees C at 1950 hours for the alarm to have sounded but that temperature, was not, as Mr Rossiter accepted in cross examination, a temperature which should have created a viscosity problem. The luboil would have to reach a higher temperature of the order of 73-74 degrees C for a viscosity problem to occur and there were only 2 minutes for that to happen after the alarm sounded. The vessel would have preheated the luboil before the vessel left Varna and in Mr Findlay's view, it

would reach its usual temperature within half an hour. How then could it reach 65 degrees C in 3 hours and then rise so much more in the next two minutes or so?

x) Moreover, Mr Findlay's evidence was that if there was damage to bearings as a direct consequence of excessive temperatures of the luboil, damage would be evident on all bearings, (main, bottom end, top end and camshaft) rather than restricted to just three bearings, namely Nos. 4, 3 and 2.

37. The Owners cannot make much of the argument as to performance prior to Varna or the absence of other alarms sounding, because no shipboard personnel gave evidence about it nor verified the engine logs or other records. No records exist of the sounding of any alarms. All that the Court has is the Chief Engineers' statement. There is however force in the points made as to the means by which the temperature is said to have risen to 65 degrees by 1950 and then risen significantly beyond that to the point when the engine shut down.

38. As Mr Rossiter testified however, a number of things are known, despite Owners' failure to produce direct evidence of the incident, of the repairs effected and the investigations carried out following the incident. First the very fact of the luboil inlet temperature alarm sounding first. There is no other plausible or coherent explanation, save that produced by Mr Rossiter. There has to have been a failure of the luboil cooling system for the alarm to sound. The temperature could not rise sufficiently in the volume of luboil without such a failure. The temperature has to have risen above 65 degrees for the bearing to fail and the oil mist alarm to sound. The Chief Engineer was on his way to the control panel, according to his statement, after the oil mist detector alarm sounded, when the main engine tripped with an indication of high temperature at No. 4 Bearing. That sequence must be seen as significant in terms of the order of events. The engine was not under full load until "Full away" at 1830. A partial blockage at the sea strainer at the outset of the voyage as a result of debris picked up at Varna, or the death of live marine growth there could readily develop over time to block the strainer more fully or gradually block the tubes in the SW side of the LT FW cooler with changes in the extent of blockage and in the gradient of temperature increase - gradual or more sudden. That is much more probable than a temporary interruption in the flow as envisaged by Mr Findlay, particularly given the evidence of a failure to maintain or clean a sea suction strainer which, it is accepted, if not cleaned over a period in excess of 6 months would likely give rise to problems.

39. Moreover, as Mr Rossiter said, damage has to start somewhere, and there is no reason to expect it to be uniformly spread, particularly as the luboil temperature alarm would sound when the temperature reached 65 degrees but the viscosity would not diminish sufficiently for metal to metal contact until the temperature rose beyond that. The engine shut down automatically within about two minutes of that first alarm, so that there was a time element in the incurring of damage following initial metal to metal contact in Bearing No. 4, which, together with No 1, appears to have had the greatest clearances on installation in June 2008. No measurement of clearances appeared for the bearings prior to removal and replacement, but if the clearance is greater in one bearing the luboil will be spread thinner than for other bearings and the likelihood of first failure there is increased. Moreover, the bearings in the little ends, big ends and elsewhere are of different sizes and there are different flow rates which apply. Some item is bound to go first and if the engine shut down quickly, as it appears to have

done, then that would have prevented greater damage being done, which is the object of an automatic shut down. The objection to Mr Rossiter's theory of causation, that the damage initiated at No. 4 and was limited to specific bearings applies with more force to Mr Findlay's "rogue interruption" theory and cannot therefore be seen by him as concluding the issue against CHS' submission.

40. I have considered the possibility that neither expert has found the root cause of the problem. In such circumstances I would have to find that the cause of the luboil problem is now, on the material available, incapable of satisfactory explanation with the potential result that CHS would fail to prove its case on unseaworthiness, unless such strong inferences could be drawn that I was persuaded of unseaworthiness without proof of the cause. The position is however that the parties have produced expert evidence on the issue and the explanations they have proposed are the only ones which are put before the court, with all others discounted. I am clear for the reasons given that Mr Findlay's views are not correct and that, despite the points which can be and which were made against Mr Rossiter, his explanation must, on the balance of probabilities be correct.

41. I was referred to passages in the judgment of Moore-Bick J, as he then was, in Kriti Rex [1996] 2 Lloyd's rep 171 at pages 181 and 183-4 where the Judge stated that it was sometimes possible to be satisfied, even perhaps to a high degree of probability, that a certain effect proceeds from a given cause even though the precise mechanism by which it came about cannot be identified. All the evidence has to be examined and a conclusion reached, weighing up the different and at times apparently inconsistent pieces of evidence and the inferences that might be drawn from them. It is in that context that I find that Mr Rossiter's explanation best fits the evidence, when taken as a whole. I consider that the temperature rise of the luboil is only explicable by reference to a failing in the LT FW cooling system, caused by a problem blockage of some kind in the SW side of that system.

42. It will never be known what it was that blocked the seawater system and whether that was at the sea suction strainer or strainers or in the tubes of the fresh water cooler itself. I am satisfied however that there must have been such a blockage as that is the only explanation that fits the facts, as known.

43. In consequence, I find that the vessel was unseaworthy at the commencement of the voyage by reason of the condition of the SW cooling system and its dirty and partially blocked state, which led to a failure in the LT FW cooling system which manifested itself within 3 hours of sailing from Varna in the form of high temperatures in the luboil for the main engine.

44. Furthermore, as appears below, the Owners had no system in place for the proper monitoring of temperatures in the engine luboil or pressures in the SW system. Inspection in the 3 hours preceding the incident should have revealed the developing problem which manifested itself on the sounding of the luboil alarm. The vessel was unseaworthy by virtue of that lack of system also, which meant that the cooling system was prone to fail and the luboil to heat.

45. I therefore find that CHS allegations as to the poor condition of the Vessel's engine lubrication and lubrication cooling systems and the lack of adequate systems on board the Vessel to ensure that the temperature of the engine lube oil was properly

regulated, that the cooling system did not become blocked; and that the engine was adequately lubricated are made good.

Due Diligence on the part of the Owners to make the vessel seaworthy

46. The only evidence produced by the Owners on this aspect of their defence again came from Captain Stavros Livanos, the Marine Superintendent, who had held that position since 2009/2010. He had served as a deck officer between 1987 and 2009 and was familiar with the Devon, having served as Master on her over a period of about 3 years, before assuming responsibility for her (with two other vessels) as a superintendent. He was not a marine engineer, but otherwise, could be expected to know much about the operation of the vessel. He said he had attended on the vessel on at least two occasions in the year preceding the incident.

47. He gave evidence as to what common practice was on the vessel when he was Master and what he understood the common practice to be with the personnel he knew, namely the Master and Chief Engineer. He could not of course, say what had actually happened at Varna before the voyage began or on the voyage.

48. The Main Engine Running Hours Report for December 2010, completed on 31 December, referred to the last work on the main low saltwater suction strainers as taking place on 14 May 2010, with the next planned maintenance after 6 months which would have expired on 13/14 November 2010. Planned maintenance was therefore over a month overdue. The LT and HT FW Coolers had been examined on 6 December 2010, according to the same document, (for which there were also entries in the engine log) whilst the Main Engine Luboil Cooler was not due for planned maintenance until June 2012.

49. A monthly work report for December 2010 referred, in translation, to the "overhaul" of the main engine "attached seawater cooling pump" and Captain Livanos said that this was the work reported in the engine log as taking place on 1 December 2010, translated by him as "inspection of main engine salt water attached cooling pump". He said that in the original Greek, the word translated was the same, and there was no word in Greek for overhaul. If, as CHS suggested, the work report referred to overhaul of the pump after the incident, then it would be a matter of significance. I could form no view about that, but Captain Livanos could give no direct evidence as to what had occurred prior to the incident and could only refer to entries in the records for what had been done and when, rather than to his own knowledge.

50. There were some obvious inaccuracies in the Engine log which are beyond explanation. The engine log showed that the vessel's engine was running on Christmas Day 2010, following the incident, albeit without any consumption of fuel. At that point the main engine had been opened up for ascertainment of the damage suffered. Captain Livanos said that there was no possibility of the engine being run on that day and could not explain the log entries. On the 11 February 2011 the engine log showed no consumption of fuel whilst on voyage to Tarragona. Whilst these are manifest errors in the logs, and there was no obvious reason not to accept other log entries, in the absence of any engineer to speak as to their accuracy or to the accuracy of the work reports, I could not be confident of their reliability.

51. It was said by Mr Turner that, in the absence of any signs of deficiency in the records prior to the vessel's arrival at Varna, the crew would have no reason to believe that there was a problem with the luboil cooling system and there was no evidence of any work done to it at Varna. It appears from the work reports that work was done to No 2 piston and the SW pump in December but the details of that do not appear and I had no evidence on the subject.

52. I do not need to decide whether it is a failure in due diligence to adopt a system of recording information in the engine room logs only once a day in an automated engine room. The evidence before me was that this was acceptable to class and to the flag authorities, although Mr Rossiter said it was inadequate. I heard no evidence of any system for inspection of temperature and pressure gauges however or monitoring of them in watchkeeping duties, regardless of keeping records (of which there were, of course none in the previous 5-6 days and only daily records prior to that). Captain Livanos appeared to think that no watch keeping was needed in an automated engine room to monitor temperatures and pressures. The system was to rely on alarms sounding before investigating a problem. Had there been any monitoring of the pressure gauge at the SW pump or monitoring of the efficacy of the ballast pump, it would have revealed a change in pressure for the reasons given by the experts, if there was a blockage in the SW line. Monitoring of the luboil temperature would have revealed its increase before the alarm sounded also, with the possibility of remedial action. I find that there was a failure to institute a system to monitor such matters which contributed to the casualty. The same feature that constitutes unseaworthiness also constitutes lack of due diligence in this respect.

53. More importantly, the blockage in the SW system was something which should have been discovered at Varna. The Main Engine Running Report for 31 December 2010 states in terms that the main SW suction pump strainer (low) had last been "done" on 14 May 2010 and was due 6 months after that i.e on 14 November 2010. The evidence of Captain Livanos and the experts from whom I heard was that inspection and cleaning could be expected at every port. It was accepted by Mr Findlay that such inspection and cleaning was a straightforward task and that prudent owners would maintain the strainers within the interval provided in the Running Report at the very least. That did not happen and was directly causative of the unseaworthiness of the vessel that I have found to exist on departure from Varna,

54. In these circumstances no defence is available to the Owners based on Art IV.1. As I have found unseaworthiness at the commencement of the voyage, neither Art IV.2 (p) (latent defect not discoverable by due diligence) or (q) any other cause arising without the actual fault or privity of the carrier, or without the fault or neglect of the agents or servants of the carrier, can assist the Owners either.

<u>Failure to proceed with all convenient speed.</u>

55. CHS alleged that the Owners had, in breach of the obligation contained in the Bill of Lading failed to proceed with all convenient speed to the nominated disport. I do not need to decide whether there was such a breach or not, because of my findings of breach of the Hague Rules. I find that the repairs which were undertaken were necessary for the prosecution of the voyage and that there was no unreasonable delay in effecting them. The cause of the delayed voyage was the breakdown of the vessel

which resulted from her unseaworthiness. That was the operative causative breach which led to delay on the voyage and cargo damage.

56. I am not much assisted by the decision in The Kriti Rex (ibid), where the only point argued appears to have been whether or not there was an implied term of reasonable despatch. It seems to me that any failure to proceed with all convenient speed could only arise at the point where the incident occurred because the vessel was proceeding normally prior to that. It is hard to see how there could be such a failure simply by virtue of the total length of the voyage when the reason for the delay was the incident itself which was caused, as I have found, by a breach of the Hague Rules seaworthiness obligation. It does not seem to me that there can be a separate breach of the obligation to proceed with convenient speed, when the vessel could not proceed at all as a result of an earlier breach.

57. The vessel was so damaged as to necessitate repair before proceeding after the incident. Scrutton 22nd Edition at Article 141 states that if a ship has been so damaged as to necessitate repairs, the Master is entitled to make a reasonable deviation or to incur a reasonable delay. It seems to me that CHS must succeed on its Hague Rules submission and, if it fails on that, it could not succeed on the separate obligation to proceed with all convenient speed.

58. There is limited significance in this argument. Mr Walsh submits that the Owners cannot rely on Art IV .1 of the Hague Rules as a defence to the failure to proceed with all convenient speed, since it only applies to loss or damage resulting from unseaworthiness but the reality here is that the loss is caused by the unseaworthiness of the vessel. The defence would surely avail the Owners if the loss is caused by unseaworthiness, even if there was a separate breach of the "convenient speed" obligation. It is accepted that, theoretically, the Owners could rely on the Art IV.2 exceptions, if the ship had been seaworthy, but as I have found that neither (p) nor (q) arise here, this is of no consequence.

The Inspection of the cargo at Varna on 4 February 2011

59. According to an email from a representative of SGS who carried out an inspection at Varna, sampling was performed with a deep vacuum sampler in all holds at two or three points. The condition of the cargo in Hold 1 was normal with temperature varying between the layers of cargo from 5.3 degrees C – 11.4 degrees C.

60. In Hold 2 the temperature of the top layer of cargo was 5.6 degrees C and of the next layer down to 4 metres, 6.4 degrees C whilst from 4-7.5 metres in depth it was 10 degrees C. From7.5- 9 metres, it was however, 20 degrees C and the email refers to a "Layer with wet cargo, with untypical smell, mouldy kernels". It was said that the sample could not penetrate the layer and recommendations were made to the Master for the immediate commencement of ventilation.

61. In Hold 4, the temperature of the top layer of the cargo was 7 degrees C. The temperature of the next 3 metres in depth was 27 degrees C, of the next 4.5 metres 36 degrees C and the 3 metres below that about 30 degrees C. There were said to be four extremely bad sectors measuring two metres by three metres in one half of the hold, it not being possible to check the other half because of the damage to the hatch covers hydraulic system. The bad sectors contained rotten and sprouted kernels with a very

bad sour smell. The process of fermentation was already taking place. Once again a recommendation was made to the Master for immediate commencement of ventilation. In such sectors, the temperature was over 50 degrees C and the moisture content up to 24%.

62. Fidelitas Limited, the owners P&I Club's surveyors recorded essentially the same temperatures in Holds 2 and 4 and referred to the cargo in Hold 2 at some locations in depth of the stow 7-8 metres down as having a slightly fusty odour, whilst in Hold 4 the report referred to "detected locations with caked cargo/lumps, discoloured/rotten kernels with temperature of the cargo reaching 50 degrees C, moisture 20-23 degrees, giving off severe odour of rotten". The ambient air temperature during the inspection was 4 degrees C.

63. The significance of these findings is plain. CHS were alerted to the problems which they might encounter at the disport in relation to the need to separate damaged cargo. The findings also bear on the extent of damage and the dispute about the condition of the cargo at the disport.

<u>The condition of the cargo at Tarragona</u>

64. In their final report on the condition of the corn cargo on outturn, SGS, the surveyors appointed by CHS referred to the samples they had taken during discharge in accordance with GAFTA rules. Whilst their sampling was the subject of some criticism, the analysis of those samples did not differ materially to the analysis carried out on samples taken by Control Union, the surveyors appointed by the Owner's P&I Club. In their report SGS stated that, on opening the holds on the morning of 21 February, they observed a bad smell, a process of fermentation and high temperature in Hold 4 which led to separate discharge of the damaged corn in that hold. In the afternoon they observed high temperatures in various areas of Hold 2 with a bad smell, which led to separate discharge of quantities from that hold also. Segregation of this discharged cargo was performed in the warehouse "as per visual inspection (based on colour, temperature and odour) in agreement with the other inspectors" from MESAC, who were appointed by CHS on behalf of their contingency insurers and their loss adjusters MacAndrews. These surveyors concluded that 1602.480 MT of cargo was damaged and 1,417.060 MT of cargo was partially damaged. Later analysis showed no aflatoxins or ochratoxins but moisture content of 15.54% in the Hold 2 damaged cargo of 554 MT, with 12.63% damaged kernels (against 5% specification) whilst Hold 4 contained 1048 MT of damaged cargo with a moisture content of 15.28% and 1417 MT of partially damaged cargo with a moisture content of 14.86%. The worst cargo, by common consent was the 554 MT from Hold 2 with the damaged kernels. These findings are not inconsistent with the condition of the cargo found at Varna some two weeks or more earlier, but represent a worse condition, albeit that a full inspection was not possible there, particularly in one half of Hold 4 which was inaccessible.

65. In his evidence Mr Thielin, CHS Iberica's commercial manager, whom I found to be an honest and compelling witness, who knew the grain business, said that what happened at the disport was that the surveyors from SGS and SITASA arranged for the discharge of cargo from Holds 2 and 4, where there was damage reported at Varna. Initially cargo from Hold 2 went to the silos until they reached the area of damage whereupon cargo was discharged by crane and trucked to the warehouse.

Apparently damaged cargo from Hold 4 was taken to the warehouse from the outset for segregation of the good from the bad and analysis. There the surveyors and SITASA segregated the cargo into visually sound cargo, visually damaged cargo and sub-lots which required further consideration as they fell into a greyer area, where a decision had to be taken as to their condition. He was looking for the maximum sound corn and the minimisation of loss for CHS and their insurers. He relied on the surveyors to allocate corn to the categories of "damaged" and "undamaged". He had not been involved in that decision making at all, though he was kept informed of the figures as found on a daily basis and, as the email showed, pointed out to SITASA what SGS and MESAC's views were. The end result was as shown in the final reports of SGS and MESAC.

66. Dr Crouch, the Owners' expert had complained that there had been a failure properly to segregate the corn from Holds 2 and 4 in the warehouse, but SGS and MESAC were GAFTA approved surveyors and he relied on them. He considered the samples that they took to be taken in the manner approved by GAFTA, between ship and silo, and that they were therefore the most accurate and reliable. As it turned out, there was little difference in the analyses of samples taken by SGS and Control Union, though Dr Crouch complained of selective sampling by SGS.

67. The cargo had always been intended for resale as animal feed. Whilst Mr Thielin agreed that, prior to the arrival of the cargo, it was anticipated that the analyses of the cargo samples taken from the holds would be critical for the future use of the corn and that this would take 6 days or so from the taking of the samples, he also maintained that the visual appearance of the cargo was important from the point of view of re-sale. Black, discoloured, caked and mouldy grain was unacceptable, as well as cargo with broken kernels and cargo at high temperature because this indicated micro-biological activity in process and deterioration. Before the ship's arrival, there had been discussion of the possibility of mixing cargo, if the analysis of the cargo samples showed no harmful contaminants or bacteria, but at that stage no-one knew what the condition of the cargo would turn out to be. The reports from Varna had led them to believe that there was likely to be a significant problem with Hold 4 cargo and a lesser problem in Hold 2.

68. Both his purchase and his sales contained the same moisture content specification, 14.5% and when the results of the analyses were reported, that content was exceeded in respect of nearly all the samples, whether taken from visually sound, damaged or partly or apparently damaged cargo. Apart from that, however, the analyses revealed nothing out of specification and, in particular, no aflatoxins, contaminants or harmful bacteria. In theory, on the basis of the analyses, mixing of cargo was possible for re-sale but the issue, he said, was the appearance of the cargo and the moisture content. Whilst, if he sold cargo without stating its moisture content, it could be accepted by purchasers, who might well not be concerned at water content up to something in excess of 15% if the appearance of the corn was acceptable, it might equally be rejected on discovery of the moisture content. That would be a risk, which, he said, he did take in relation to that which was described as good cargo for which no discount from the sale price was given. What he could not do, however was to sell corn of substandard appearance as good corn, whether or not it was, taken as a whole, within specification, apart from moisture content. That would lead to rejection by the customers and to dispute, with loss of reputation and business goodwill. Future

business depended on good customer relations. There was, he said, no way in which he could sell corn of poor appearance or which was malodorous. If it was black or mouldy or obviously smelly or with considerable kernel breakage, that could be seen as obvious damage (here some 1602 MT), but there was corn which was not so obviously damaged but was still deficient in appearance (some 1420 MT). That was the problem with the corn which SITASA, SGS and MESAC had designated as partly damaged. It could only be properly sold at a discount.

69. Whereas, at one stage he considered that the really problematic grain was the 554 MT taken from Hold 2, and that the damaged cargo from Hold 4 might be sold with only a discount of a few Euros, he was proved wrong on that, when the 3020 MT was offered for salvage sale. The best bid, for the damaged and partly damaged cargo came in at E 158 per MT ex store, which was to be compared with the market price of sound grain which was E 236.

70. One of the possible options was for a salvage sale in the open market of the damaged corn. Another option was for CHS to seek to "purchase" the corn at a discount which reflected the damage, with the cargo insurers agreeing the extent of the discount for the damage. CHS could then mix the 3020 MT and sell it. When looking at the expenditure incurred as a result of the delay, without reference to any loss of value on the cargo itself, it totalled approximately E 240,000, so any discount agreed by the Insurers would have to amount to E 80 per MT, to compensate CHS, always assuming that the 3020 MT could be sold for the price of sound cargo, leaving out any costs of mixing.

71. Emails which revealed the internal discussion in CHS were the subject of cross examination, one of which referred to the "buy-back" of the corn at a price between E 140 and E 150 per MT, with a view to sale in the market at a profit on the basis that SITASA had been indicating that the damaged corn could be mixed and sold as "regular corn". At that time, the best offer received by MESAC on a salvage sale was E 136 per MT from Erbrega, a salvage buyer. The email referred to "the only issue" with that course was that CHS might have to "give a proof at which price we then sold the good (if profit might be deducted from our claim)." It was suggested by the Owners that this showed that there was nothing wrong with the so-called damaged corn at all, and that the only reason for not pursuing that course was that they would have to account for the price and profit obtained on resale.

72. The Owners submitted that the whole process of salvage sale was unnecessary and that it arose from CHS' concern to recover its consequential losses in the shape of extra discharge costs, trucking costs, costs of segregation, storage, testing and analysis. It was suggested that CHS had sold the 3020 MT at an undervalue, maintaining to its cargo insurers and the vessel's P& I Insurers that its condition was much worse that it knew it to be. It was suggested also that the original idea was to deceive insurers recovering from them the consequential losses as a discount from the values of the cargo, as if the cargo damage itself gave rise to an equivalent loss of value whilst keeping the cargo itself and then selling it at market value for profit.

73. Mr Thielin said that, in the end CHS considered that the salvage sale to a third party by MESAC in an arms length transaction was better than any "buy-back" by CHS at a discount with a potential future sale to be taken into account also. The latter process would give greater scope for argument about the true loss suffered, would require

CHS to justify every step and involved more work for them. Any mixing would have involved cost and the question of what price they would obtain was uncertain. Indeed, as it turned out, the market showed that his earlier ideas of sale at a small discount or sale as sound cargo were misplaced.

74. I was taken in detail through the various records of the discharge of the cargo, as set out in contemporary emails or daily reports by SGS and MESAC (surveyors instructed by CHS and their insurers) and by the stevedores SITASA and to the final reports which referred to sound cargo, damaged cargo and partially damaged cargo. The Owners made much of differences between these records and submitted that the references to "partially damaged cargo" were so inconsistent and arbitrary as to show that there was no foundation for that category at all.

75. The final report of MESAC set out figures for damaged cargo from Hold 2 as 554.040 MT and from Hold 4 as 1,048.440 MT, with partially damaged cargo from Hold 4 totalling 1,417.060 MT. The final SGS report set out the same figures. Attention was drawn by the Owners to the daily records of MESAC for 22 and 23 February which showed quantities of 365.700 MT, 1,027,400 MT and 1,497.700 MT as partially damaged cargo in Hold 2, all of which appeared as sound cargo in their final report. Where Hold 4 was concerned, the MESAC daily record for 21 February showed 147,320 MT of apparent good condition which was reported in their final report as partially damaged.

76. SITASA's figures for 24 February showed "substandard goods" of 1,602.480 (554.040 + 1048.440) MT only without any reference to partially damaged cargo at all.

77. The SGS daily emails refer on 21 February to 773.220 MT of damaged cargo from Hold 4 and on 22 February to 554.040 MT of damaged cargo from Hold 2 and 275.220MT of damaged cargo from Hold 4 (i.e. a total of 1602.480 MT).

78. An email of 25 February from Mr Thielin to SITASA pointed to a further quantity of approximately 1700 MT which he said had been considered as partially damaged by SGS and MESAC whose final figures include 1417.060 MT of partially damaged cargo.

79. It is clear that there are differences in what was discharged as damaged corn and what was finally decided to be damaged corn, but those differences worked in both directions and, on the evidence, I am satisfied that the surveyors examined the piles of sub-lots in the warehouse in order to classify the corn on an objective basis.

80. The notion that CHS were out to deceive insurers and to pretend that cargo was damaged when it was not makes no sense at all. CHS would always be able to claim for the consequential loss caused by the delayed voyage and the discharge /segregation / storage/ testing and analysis costs if there was any basis for the claim for physical damage as there clearly was (and if liability for unseaworthiness could be established). They had no need to claim consequential losses as physical cargo damage and every reason to maximise the sale price of the cargo to keep their losses down and to make recovery from cargo insurers/P&I insurers. I reject the idea of any conspiracy to maximise the loss to insurers whilst making a profit which would not be

taken into account. The email exchanges on which Owners relied are all explicable on the basis referred to in this judgement, as explained by Mr Thielin.

81. The experts agreed that there was damage to the cargo caused by microbiological deterioration and that moisture content and temperature were both factors in that deterioration. Had the voyage taken the usual 8 or 9 days, the cargo would probably have been discharged without problems. Mr Imrie, the expert instructed by CHS, considered that cargo in Holds 2 and 4 exhibited temperature differentials established during the wait at Varna and the voyage which led to moisture migration that permitted the germination and growth of mould spores which were visible at outturn and that the first signs of damage would have appeared in mid January. Dr Crouch, the expert appointed by the Owners' P& I Club, opined that the damaged cargo discharged from Hold 2 may in part have been loaded in that condition, whilst there were two patches of damaged corn on the surface of Number 4 hold, each 2m x 4m, to a depth of 3 metres, which were caused by ship's sweat. As it is accepted that the cargo would on the balance of probabilities, have been delivered without problems if the voyage had taken the normal length of time, the exact mechanism of damage is not of significance. The experts agreed that the cargo could have been blended and used for its intended purpose as animal feed, subject to questions of costs and logistics.

82. Dr Crouch, who was present at the disport, maintained that there were only limited areas of damaged corn found in Holds 2 and 4 of the vessel and that what was found could have been mixed with the sound cargo without impacting on the overall specification of the cargo and therefore its value. He accepted that 554 MT of cargo from Hold 2 was malodorous and was not capable itself of being sold at full market price. He did not accept that any other cargo justified any reduction from market price at all, except small quantities of sweat damaged cargo in Hold 4. That mould damage on the surface of Hold 4 could and should, in his view, have been removed without difficulty. He pointed out that only the readings for two samples from Hold 4 and the cargo in Hold 1 at the disport showed moisture content less than 14.45%, whilst a good number of other samples showed more, which meant, in his view, that the overall moisture content at Varna was in doubt. Whilst he accepted that moisture migration could occur at smaller temperature differentials than tens of degrees, he did not consider that much had happened with this cargo. He would not accept that the certificate issued by the GAFTA approved surveyors at Varna was accurate as to moisture content (14.45%) or temperature of the cargo (16-20 degrees C) because of what he found at the disport. That unwillingness to accept the findings of other surveyors tainted his evidence throughout. There is no reason to doubt the loadport figures, just because they do not fit with Dr Crouch's view of the cause of damage. The temperature variation and moisture content of the cargo was capable of leading to moisture migration and as the cargo was shipped "in apparent good order and condition", it can be accepted that there was no noticeable damage to the corn at the loadport, whereas there was evident damage present in its appearance, both at Varna on 4 February and at the disport.

83. I found Dr Crouch to be a knowledgeable but argumentative expert who was unprepared to accept the obvious proposition that any potential purchaser who saw the damaged corn, whether mixed with good cargo or not, would not be prepared to pay the full market price available for a sound cargo. He felt strongly that the process of

segregating the damaged cargo was badly conducted so that good cargo was unnecessarily mixed with bad cargo by grab discharge and trucking to warehouses, (instead of to the silo where the unarguably good cargo was taken). The effect of the mixture of good and damaged cargo, should, on his view that this was the correct course to adopt for all the cargo, have resulted in a good price, but he said that, because this admixture was auctioned off by private tender on a salvage sale, a much lower price was obtained than would have been the case had the damaged cargo been completely mixed with the rest of the cargo and sold as sound cargo. He maintained that because the damaged cargo could be lost in the good cargo without affecting the overall specification of the whole, a full market price could be achieved.

84. This ignored the reality that, once notice had been received of damaged cargo on board the vessel, as was the case following inspection of it at Varna, it was inevitable that CHS would need to inspect the cargo closely and seek to segregate the damaged cargo in order to decide what could be done with it, with analysis of samples. The delay on the voyage meant that it could not be used for the sales to the receivers as originally intended, and in order not to delay the vessel at the disport with consequent expense, the discharge of cargo and separation into obviously good, obviously damaged and suspect cargo was essential. This entailed the obviously good cargo being taken to the silos as usual whilst the other cargo, both the obviously bad and the suspect, was taken to the warehouse where it could be laid flat, examined, sampled and analysed so that decisions as to its future use could be made. Dr Crouch agreed that segregation of bulk corn cargoes was not easy, which is self evidently the case if discharge is done by means of grabs. Some good cargo will inevitably be taken out with the bad and since the aim is to ensure that all the damaged cargo is removed, it is likely that the segregators will err on the side of caution and that what will be removed is a mix of sound, suspect and damaged goods. Once parcels are separated from the main cargo in this way, apart from piles which can be seen to be obviously good, the balance cannot be seen as sound in itself. The idea of then mixing it with the cargo in silos presented evident logistical difficulty and expense, as Mr Imrie's supplemental report illustrated.

85. Mr Imrie was only challenged on the conclusions he reached in his supplemental report about the mixing possibilities, by reference to the emails which referred to SITASA, prior to the vessel's arrival, stating that mixing might be done. Mr Imrie questioned how that might have happened and explored the cost involved. He stated that mixing of cargo direct from the ship in silos by means of the conveyor belt was feasible, but that the total cargo would not have been a sufficient mix to overcome the problems presented by the substandard cargo found. The mouldy grain found at the disport had to be analysed to ascertain the extent of mycotoxins present before mixing and no criticism was made of the notion of segregating damaged cargo for storage in warehouses whilst this was done. The levels found were well below EU limits so that, as it turned out, presented no bar to mixing.

86. The only practical way to mix the cargo however with sound grain, once it was in the warehouses, would be by movement of the damaged grain to a bulk silo of sufficient capacity to accommodate the damaged grain and enough sound grain to dilute the parameters which were over specification to appropriate values. The only available facility appeared to be the SITASA terminal but it would be necessary to truck the 3020 MT in the two warehouses to the bulk grain facility, in 76-100 truckloads for

lifting by cranes into the silo. Additional sound grain could be added from a ship, but it appears that the only means of recycling grain from one silo to another, which would be required, would be by discharge into trucks and reloading into another silo by crane. Some 8,800 MT of sound corn with moisture content of 13.6% and damaged kernels of 0.99% would be required to bring the mix with 3020 MT from the warehouses into specification. Corn with 13.6% moisture content would command a premium over the corn at the industry norm of 14.5%. If corn of 14.34% moisture content was used for mixing (the moisture content of the cargo in Hold 1), the 554 MT damaged cargo from Hold 2 would need 4000 MT to reduce its moisture level to below 14.5% and 5,000 MT to reduce it to 14.46%. For the Hold 4 cargo of 2465 MT in the warehouse, 9,000 MT with moisture content of 14.34% would be needed to reduce the overall level to 14.49% and 15,000 MT to reduce it to 14.44%.

87. Thus it would have been necessary to purchase additional corn to blend with the damaged cargo to bring the mixture within specification. The cheapest way of doing this would be to transport such cargo for mixing by ship into the terminal, since any other solution would require something between 220 and 300 truckloads.

88. Mr Imrie concluded that the use of the SITASA facility for mixing was highly impractical with a risk that mixing would not prove successful and the incurring of significant cost. In his view, once segregation had occurred, which was needed to ascertain the nature and extent of damage to the cargo the ability to blend the damaged grain with sound became logistically difficult if not impossible to achieve, and if achievable, would have been excessively expensive. It is not possible to fault that conclusion.

89. The Owners' submissions were, in my judgment, unreal in relation to the question of partially damaged cargo, the need for a salvage sale and the value of the 3020 MT of separated cargo. Once cargo had been separated into the warehouses, as opposed to the silos where the undeniably good grain was stored, it could not realistically be mixed with sound cargo for the reasons given by Mr Thielin and Mr Imrie. It could thereafter only be seen as "a mixed bag" of generally substandard corn, with excessive moisture content, damaged kernels and unsatisfactory appearance and smell. It could not be sold as good corn and in the absence of any buyer being prepared to offer a price with a discount for the substandard features, a process which CHS tried to engender, the only option was a competitive salvage sale which was what took place. This would inevitably lead to a loss as a distressed sale, but there was no practical alternative.

90. As Mr Thielin said, the decision was taken by CHS to explore the possibility of obtaining higher bids, rather than explore further the possibility of "buy-back", for the reasons he gave. CHS invited bids to MESAC from all their regular customers. This, in the end, resulted in a bid from a grain trader with whom they frequently dealt at E156 (with the benefit of an inspection and the analysis of the cargo at the disport) and a bid from Erbrega, (after inspection of the 3000 MT and carrying out their own analysis) of E158, which was more than CHS were prepared to "pay". Mr Thielin said that they had offered the damaged corn to the receivers for whom the cargo had originally been intended (Cargill, Vera Costantal and Riera Roura) seeking to sell it at a small discount, but none of them was interested in such a purchase. MESAC pursued a salvage sale in a market where any grain trader would be happy to make a margin of E2-3 per MT and the best price obtainable, came not from a grain trader,

but from a salvage buyer at E 158 per MT who knew of the bids made by Riera Roura. No grain trader, despite the extensive efforts of CHS through their networks to secure a sale would match that bid. If Riera Roura had considered, on inspection of the 3020 MT with the benefit of the SGS analysis that they could have made an assured margin of E2-3 or more, by purchasing at a price higher than E 158, and whether by blending and incurring the cost of doing so, or otherwise they would doubtless have done so.

91. The conclusion I reach is that that no grain trader or competitive bidder thought that they could make even a profit of E3 on a purchase at E158 per MT for the 3020 MT. MESAC considered the offer of E 154 per MT to be a good offer and being unable to obtain a speedy response from Dr Crouch as to the acceptability of that price on 22 / 23 March, concluded a sale to Erbrega at E158 per MT orally on 24 March, which was confirmed that day in writing. That, said Mr Thielin, showed the true value of the cargo. I agree and so find.

The Loss suffered by CHS

92. It is agreed between the experts that the cargo had deteriorated as a result of the delayed voyage. It is clear also that 3020 MT of cargo were sold at a lower price than the sound arrived value of the cargo and I have found that this sale price properly reflected the value of the damaged cargo. It is agreed that the sound arrived value of the cargo was at least E 224 per MT, which gives rise to a loss of E 199,289.64, which is the extent of the subrogated claim.

93. It is self- evident that CHS were put to expense by the delay of the ship and the need for investigation of the condition of the cargo, which had been reported as deteriorating in Holds 2 and 4 on 4 February 2010.

i) Additional stevedoring costs and warehouse costs paid to SITASA in order to segregate the damaged cargo, amounted to E81,017.75. This comprises extra charges for the slow rate of discharge caused by the need to separate suspicious looking cargo and discharge it by crane into trucks (E 0.75per MT) instead of onto the elevator, the costs of transportation by truck into the warehouses (as opposed to the silo) of E3.00 per MT, and the rental for the two warehouses of E36,000.00 for a month. Once it is recognised that the segregation exercise was a reasonable and appropriate procedure to adopt, these costs must be recoverable, even though some cargo originally discharged to the warehouses, initially labelled partly damaged was ultimately found to be satisfactory. Those costs tally with the figures quoted to CHS before the arrival of the vessel.

ii) MacAndrews' charges for salvage sale, which included MESAC's charges and, within that the charges of Laboratorio Vidal, the laboratory which analysed the samples. The total is E 8,757.80, excluding the mark up of MacAndrews which has not been claimed

iii) SGS charges –E8.342.36. SGS were appointed by CHS whereas MacAndrews, who delegated to MESAC were appointed on behalf of CHS' insurers. I do not

regard this as unnecessary duplication and both the SGS costs and MESAC's costs were incurred directly as a result of the Owners' breach and are therefore recoverable

iv) Spanish Lawyers' fees for arresting the vessel in order to obtain security for the claim amounting to E9,876.80 and E1,043.03. It was submitted by Owners that these were irrecoverable in principle, as the costs of foreign proceedings, by reference to the decision in The Ocean Dynamic [1982] 2 Lloyd's Rep 88 at p94. I do not accept this submission since the proceedings here were for security purposes and would fall to be decided alongside liability issues in these proceedings, unlike the protective writ with which Goff J, as he then was, had to deal. There is no substance in the argument that the arrest was premature and unnecessary. CHS were entitled to arrest the vessel to obtain security for their claim and until full investigation it could not be known what the extent of the claim was. Owners' P&I Club put up a negotiated Club letter in due course to obtain the release of the vessel. There is nothing unusual about that and the costs of arrest are a foreseeable and sufficiently direct consequence of the breach to be recoverable.

Conclusion

94. In the circumstances CHS claim for damages succeeds and the parties should be able to agree on the interest payable and the form of order for me to make.

95. Subject to any special features of which I am unaware, costs would ordinarily follow the event but the parties may make submissions if there is room for dispute on these matters.