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NATIONAL BULK CARRIERS, INC., OWNERS OF STEAMSHIP PANMASSACHUSETTS, vs. AMERICAN  
MARINE HULL INSURANCE SYNDICATE, INSURERS OF STEAMSHIP PAN MASSACHUSETTS.

[NO NUMBER IN ORIGINAL]

ARBITRATION AT NEW YORK

1949 AMC 340

December 23, 1948

HEADNOTES:

MARINE INSURANCE - 156. Inchmaree Clause.

A clip holding a flexible thermometer tube inside a gear case became detached apparently because the bolt which held it backed out when the lock-washer which held it lost its springiness or temper; the loose clip fell between the gears damaging the teeth. The ship made port at reduced speed by forcing the damaged gears. After repairs, other teeth in other gears of the train broke. Held: both breakages were caused by the original failure of the lock-washer; and each was a damage insured under the Inchmaree Clause.

OPINION BY: PRIZER

OPINION:

JOHN C. PRIZER, Arbitrator:

The owners and insurers of the tank steamer Pan Massachusetts have submitted to the undersigned, as Arbitrator, the question of the liability of the underwriters under a marine hull insurance policy for a claim arising out of damage to the reduction gears of the propulsion machinery of the vessel.

The Pan Massachusetts was a turbine driven steam tank vessel of 11,015 gross and 8595 net tons, built in the year 1943. From April 1945 until after the discovery and repair of the damages involved in the arbitration she was continuously insured with the American Marine Hull Insurance Syndicate under a form of policy containing an Inchmaree Clause, the material parts of which read:

"This insurance also specially to cover (subject to the Average Warranty) loss of or damage to hull or machinery directly caused by the following: \* \* \* bursting of boilers, breakage of shafts or any latent defect in the machinery or hull (excluding, however, the cost and expense of repairing or renewing the defective part); \* \* \* Negligence of Master, Charterers, Mariners, Engineers or Pilots; Provided such loss or damage has not resulted from want of due diligence by the Owners of the Vessel, or any of them or by the Managers."

No controversy appears to exist regarding the occurrence of the damage or the cost of the repairs. The question at issue is the liability of the underwriters.

The initial damage occurred during war time on June 5, 1945, while the Pan Massachusetts was returning unaccompanied and in ballast from France.

In the report of the survey made by the underwriters' surveyor upon the Pan Massachusetts at the port of New York on June 14, 1945, the following extract is quoted from the engine room log of the vessel:

"June 5th, 1945 -- 10.30 a.m. a heavy pounding in the main gears was noted. The engine was immediately ordered shut down and reported out of order to the bridge. The turning gear was put in and inspection plates opened. Upon

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inspection the chief engineer found that some teeth had broken off and carried through scoring up the gears. Inspection plates closed up and turning gear removed, we proceeded at 11.05 at 50 R.P.M."

The same survey report noted the following damage to the second or low speed reduction gears:

- "1. Port low speed pinion damaged on forward helix and 2" of two teeth missing from after helix.
2. Starboard low speed pinion damaged on forward helix for a distance of approx. 6".
3. Bull gear damaged on forward helix for a distance of approx. 6".

The survey report contains the following explanation of the origin of the accident:

"Two teeth on the after helix of the port low speed pinion broke off at the forward end of the helix for a distance of approximately two inches each. The broken teeth were thrown forward to the forward end of the forward helix of the port low speed pinion and damaged the teeth on the forward end of the forward helix of the port side and starboard low speed pinions and the bull gear for a distance of approx. 6 inches.

The probable cause of this damage was due to a half of a steel bracket for the dial thermometer tube for the port after low speed bearing breaking off and meshing with the gear teeth on the after helix of the port low speed pinion."

The draining and careful examination by the surveyors of the gear casings and sump tank resulted in the discovery in the sump tank of a distorted portion of a steel bracket or section clip, which had held in place a flexible tube of the thermometer of the after bearing on the port pinion. The clip had been held in place by a machine screw and lock washer. Neither the screw nor the washer could be located. They were missing, however, from their position on the inside of the casing and all the surveyors who participated in the survey were in agreement that the meshing of the clip and/or machine screw with the teeth of the gears was the cause of the damage.

As a result of war-time conditions new gears were not promptly obtainable. Consequently the underwriters and American Bureau of Shipping approved the making of temporary repairs and the operation of the vessel at reduced speed until new gears could be obtained. A note attached to the underwriters' survey report reads:

"As owners are unable to obtain new gears at this time, temporary repairs are being made by removing the damaged gears and machining off all damaged teeth. Vessel will be operated at a reduction in speed of approximately 30% until new gears are obtained at which time (Approximately 6 months) permanent repairs will be effected."

From January 20 through January 31, 1946, permanent repairs were made at the Alabama Drydock at Mobile. A new bull gear and low speed pinions were there installed. The installation was made under the supervision of the Falk Company, manufacturers of the gears. The entire train of gears was inspected but the high speed units were not submitted to a magnaflux test for cracks.

After departure from the shipyard at Mobile the vessel made one coastwise voyage at reduced speed, operating at between 85 and 90 revolutions. On the following voyage leaving Texas City at 12.54 a.m. on February 19, the Pan Massachusetts was operated at customary full speed of about 115 revolutions. At 4.48 a.m. on February 20, when in the vicinity of Key West, a heavy pounding was heard in the gears. The chief engineer gave the following description of what occurred on that occasion:

"We opened up the gear casing and found the H. P. Pinion stripped. We turned over the gears to see if any broken teeth were jammed, finding none we closed up the gear casing and ran for about an hour at which time it was noticed that the gears developed more noise. The engines were then stopped again and we opened up the gear casing but found no change in conditions or any further damage. We closed up the gear casing and ran at 40 R.P.M. until 8.05 p.m. February 20, 1946, at which time we stopped the engines and removed the H. P. Pinion and blinded off the H.P. engine and installed steam line by-pass to L.P. engine, and proceeded at 4.42 a.m. February 21, 1946 at 85 R.P.M."

When, following the second accident, the gears were examined at Mobile on April 10 and 11, 1946, by surveyors for the underwriters, the owners and the Classification Society, the following damage in the reduction gears was noted:

"1. HIGH SPEED GEARS AND PINION -- HIGH PRESSURE SIDE: Teeth around gear and pinion badly distorted on after helix.

"2. HIGH SPEED PINION -- LOW PRESSURE SIDE: Pinion from low pressure side had been removed to shop and magna flux test showed teeth fractured for a length of 3"."

The owner's representative states that the surveyors attending upon the Mobile survey appeared to be of the opinion that the damage then evident to the high speed units of the reduction gears was related to the original accident to the gears that occurred on June 5, 1945.

The New York surveyor for the United States Salvage Association in explaining to the Arbitrator the conditions found upon the original survey of June 14, 1945, said:

"A clip from the flexible tube of the thermometer of the after bearing on the port pinion was missing. The oil from the gear case in the sump tank was strained in order to find the missing clip, machine screw and lock washer which retained this clip in place. The bearings and gear casing were removed and examined for these parts also.

The section clip was located in the sump tank and found to be distorted. It was the opinion of all parties present at the survey that the probable cause of the damage was due to the clip, lock washer and screw becoming dislodged and meshing with the gear teeth."

The surveyor for the owners gave the following further explanation:

"The dial of the thermometer was on the outside of the casing of the low pressure high speed reduction gear. It is a distant reading thermometer because the dial is connected by flexible tube with the bulb which is inserted in the bearing cap. The flexible tube is held in place by approximately four clips. The clip holds the flexible thermometer tube to the casing is itself fastened to the casing by a machine screw which has a spring steel lock washer to keep it from backing out.

A machine screw held by such a washer should not back out. It is regarded as universal good practice to use that type of screw and washer both in ship work and in automobile work.

On the Pan Massachusetts there were four bearings for the high speed gear wheels that were completely enclosed and that consequently had to have the thermometer on the outside with the thermometer tubes passing through the casing. The thermometers were necessary so that the engineer could tell whether the bearings were becoming overheated.

There is no way to inspect the flexible tube and its clips without taking off the entire upper half of the gear casing. That is a major operation which is not performed by the engine room force alone. It is ordinarily done only at the time of the major four year classification survey."

The underwriters' surveyor, when questioned by the Arbitrator as to whether in his opinion the machine screw holding the clip could have come loose so long as the spring washer functioned, stated that he did not see how the screw could come loose if the washer were properly tempered and in good condition. He said that if the washer were tempered too highly the washer could break and consequently cease to exert tension on the machine screw and that if it were not tempered enough it would be soft and for that reason would not exert proper tension on the machine screw. Independent information obtained by the Arbitrator confirms the surveyor's statement.

The Inchmaree Clause in the modern insurance policy is a result of the decision in the well-known English case of *Thames and Mersey Marine Insurance Company vs. Hamilton Fraser & Co.*, 12 App. Cas. 484, decided by the House of Lords in 1887, which concerned the steamship Inchmaree. In that case a check valve to a main boiler was either negligently left closed or had accidentally become salted up without negligence. The consequence was that when the donkey pump was operated, water was forced into the air chamber of the pump, which split, damaging the pump. The lower courts following the precedent of the earlier case of *West India and Panama Telegraph Company vs. Home and Colonial Marine Insurance Company* [1886], 6 Q.B.D. 51, which involved the explosion of a boiler, held that the damage to the pump was *ejusdem generis* with the customary enumerated perils and was therefore insured under the

general words "and all other perils, losses and misfortunes that have or shall come to the hurt, detriment or damage, etc." The House of Lords, however, reversed the decision and held that the damage was not due to any enumerated perils nor did it fall within the general words of the perils clause.

It was for the purpose of furnishing to shipowners the protection denied to them under the interpretation placed upon the general perils clause by the Thames and Mersey Marine Insurance Company decision that the clause known as the Inchmaree Clause was introduced into marine policies.

A series of decisions both in England and in this country involving the Inchmaree Clause have dealt with the distinction between a latent defect merely becoming patent, and a latent defect causing consequential damages to other parts of the machinery or hull. An early case in this country permitted the assured to recover the cost of replacing a fractured engine plate although no consequential damage resulted. *Cleveland & Buffalo Transit Company vs. Insurance Company of North America*, 115 Fed. 431 (D.C.S.D.N.Y.). Later, however, the law became well settled both in England and in this country that the Inchmaree Clause does not constitute the insurer a guarantor against latent defects but imposes upon the insurer liability only for the consequential damage resulting to other parts of the machinery or hull from the initial defect. *Mellon vs. Federal Insurance Company*, 1926 A.M.C. 1449, 14 F.(2d) 997 (2 CCA., 1926). *Borland vs. Standard Marine Insurance Company, Ltd.*, 1925 A.M.C. 1116, 125 N.Y. Misc. 395 (Supreme Court, Appellate Term, First Department 1925); *Oceanic Steamship Company vs. Faber*, 11 Com. Cas. 179 (1907); *Hutchins Bros. vs. The Royal Exchange Corporation* [1911] 2 K.B. 398; *Scindia Steamships (London) Ltd. vs. London Assurance*, 56 Lloyd's List L.R. 136 (1936).

A typical example of the character of damage for which the underwriter is liable under the Inchmaree Clause is shown in the case of *Wills & Sons vs. The World Marine Company, Ltd.*, The Times, March 14, 1911, described in ARNOULD on Marine Insurance and Average, 12th Ed. sec. 861-a, page 1152 and cited in *Mellon vs. Federal Insurance Company*, *supra*, and *Borland vs. Standard Marine Insurance Company, Ltd. supra*. In that case a link of the hoisting chain of the bucket ladder of a dredger gave way due to a latent defect in the welding of the link. The ladder and bucket fell, doing damage to the hull and machinery. SCRUTTON, J. held that the underwriters were liable for the damage to the hull and machinery although the latent defect had in fact existed long before the commencement of the policy.

Another case illustrating the application of the clause is *Scindia Steamships (London) Ltd. vs. London Assurance*, 56 Lloyd's List L.R. 136. In that case a vessel was in drydock in Bombay for the purpose of renewing the lower half of the wood lining of the stern bushing, and as the propeller was being wedged off the tail shaft broke owing to a latent defect in the shaft. The propeller fell to the dock and one of its blades was broken. Liability was admitted for a new propeller but the court sustained the refusal of the underwriter to pay the cost of renewing the defective shaft.

In spite of the sequence of cases referred to, involving the distinction between liability for a latent defect itself and liability for the consequences of the defect, little judicial consideration appears to have been given to the question of what constitutes a latent defect within the meaning of the Inchmaree Clause.

Defective welding has been treated as constituting a latent defect. *Wills & Sons vs. The World Marine Insurance, Ltd.*, The Times, March 14, 1911; *Oceanic Steamship Company vs. Faber*, 11 Com. Cas. 179. Metallic flaws or defects in casting seem to have been similarly regarded. *Scindia Steamships (London) Ltd. vs. London Assurance*, 56 Lloyd's List 136; *Borland vs. Standard Marine Insurance Company, Ltd.*, 1925 A.M.C. 1116, 125 N.Y. Misc. 395.

Beyond those situations little, if any, assistance appears in the reported decisions. An English judge of first instance in a case in which he held the underwriter liable upon another ground, expressed the view that an error in design was not a latent defect. *Jackson vs. Mumford*, 8 Com. Cas. 61. The vessel in that case was designed experimentally for lightness and speed, and the judge was of the opinion that the oversight design of the connecting rod that broke was not a "defect in machinery" in the commercial sense. The reasoning of Judge KENNEDY in that case is of little general application.

When consideration is given to the circumstances of the origin of the Inchmaree Clause and to the fact that it expressly covers damage to hull or machinery whether caused on the one hand by the bursting of boilers, breakage of shafts, or any latent defect in the hull or machinery, or on the other hand by the negligence of master, charterers, mariners, engineers or pilots, it does not seem consistent with the purpose and scope of the clause to put a strained construction on

the word "latent." The natural meaning of latent defect is a concealed defect, a defect that is not discoverable by ordinary practicable means.

In the present case the most probable cause of the dislodgment of the clip was a defect in the material or tempering of the spring lock washer. The Arbitrator has been independently advised and the surveyors for the parties agree that a machine screw, when once set up tight with a spring lock washer, will not back out while the lock washer continues to function. The length of time during which the Pan Massachusetts had been in operation before the clip became dislodged would seem to indicate that the machine screw was originally set up tight in the customary way. The reasonable inference is that the eventual dislodgment was due to a defect in the material or tempering of the lock washer; and the Arbitrator accordingly so finds.

The Arbitrator has not been free of doubt as to whether the damage to the high speed units that evidenced itself on February 20, 1946, was the result of the original damage that occurred to the gears on June 5, 1945, or whether it was due to an independent latent defect in one of the teeth, or to some other cause not to be classified as a latent defect.

Mr. Silco, surveyor for the underwriters at New York, expressed the opinion that although the later damage might have resulted from the earlier damage, the length of time intervening before the manifestation of the second damage made it seem to him unlikely. He suggested the possibility of damage from shock on an earlier occasion more than a year prior to June 1945, when the blading of the turbine rotor was damaged from the explosion of a nearby steamship torpedoed in the same convoy with the Pan Massachusetts. At that time, however, none of the surveyors who inspected the damage suggested the possibility of damage to the reduction gears, and the suggestion now appears to the Arbitrator to be remote.

The owner's superintendent engineer on the other hand, expressed the view that the reduced speed with consequently greatly reduced horsepower at which the Pan Massachusetts operated between June 5, 1945, and February 19, 1946, explains why the damage to the high speed units did not become manifest sooner.

The Arbitrator closely questioned the chief engineer of the Pan Massachusetts to learn just what steps were taken in the engine room to force the gears into mesh after the original breakdown of June 5, 1945. The engineer gave the following account, which the Arbitrator believes to be correct:

When the chief engineer went into the engine room, the engineer on watch notified the chief that he had stopped the engines because of the heavy noise in the gears. The chief engineer put in the jacking gear and started the jacking gear, but at once found that there was a very heavy grinding noise in the reduction gears. He accordingly stopped the jacking gear and opened the inspection plates. He could see some badly damaged teeth in the gears. He thereupon closed the inspection plates and tried the jacking gear a number of times. Each time, however, when the bad teeth in the gears came in contact there were heavy noises and a heavy strain was evident on the motor and jacking gear. He accordingly feared to continue to use the jacking gear as he did not think it could stand the strain. He disengaged the jacking gear and put steam on the main engines. Each time the the gears came into mesh at the damaged parts there was a very heavy noise. Gradually that noise diminished. After he had run the engines for a while he stopped them and again opened the inspection plates and examined the gears. He found that the badly bent teeth on the bull gear had straightened up considerably. He accordingly closed the inspection plates, again started the engines and gradually increased the number of revolutions. By continuing at reduced speed he was able to make port without assistance.

The action as described was very drastic. It was no doubt undertaken only because of the emergency in order to reach port without assistance during war time. The Arbitrator has been informed and believes that such a course of action put a very great strain upon the entire train of gears and was likely to have caused fractures in additional units of the train.

When the new low pressure units were installed at Mobile in January 1946, it would have been prudent to have removed all the gears and submitted them to a magnaflux test. That course, however, was not suggested by any of the surveyors and was not followed until April 1946, when the high pressure high speed pinion and gear were removed. At that time the high speed pinion and gear on the low pressure side were also removed, taken to the shop, and submitted to a magnaflux test. It was found that teeth of that pinion were fractured for a length of three inches.

The damage to the high pressure high speed unit manifested itself on the first voyage upon which the Pan Massachusetts operated at full speed and within little more than 24 hours after the departure from port on that voyage.

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The Arbitrator accordingly concludes that the evidence is sufficient to indicate that the subsequent damage to the high speed reduction units as well as the original damage to the low speed reduction units resulted from the clip and machine screw which became dislodged from position and entered the gears on June 5, 1945.

The Arbitrator therefore holds that both the earlier gear damage surveyed on June 14, 1945, and January 20-31, 1946, and the subsequent gear damage surveyed on April 10 and 11, 1946, were due to the same cause, that such cause was a latent defect in the machinery within the meaning of the Inchmaree Clause of the American Marine Hull Insurance Syndicate policy, and that the underwriters are liable for the claim with respect to the entire damage.

Should the parties to the Arbitration fail to agree upon the amount recoverable, the Arbitrator will be glad to give further consideration to any items in dispute. Inasmuch as the underwriters have willingly consented to and cordially cooperated in the arbitration of their liability, and as the delay in bringing the arbitration to a conclusion has not been due to any neglect on their part, no interest is awarded upon the claim. The Arbitrator's fee and expenses will be divided equally between the parties to the arbitration.