

Hull Insurance of “Latent defects” – i.e. Errors in Design, Material or Workmanship

Trine-Lise Wilhelmsen

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1 Introduction

The topic of this article is hull insurance of error in design, material or workmanship and similar "latent defects". By hull insurance is meant hull insurance for ocean-going ships, i.e. casualty insurance covering material loss of or damage to hull and machinery. The concept of a "latent defect" is not clearly defined but implies a defect in the ship that either has not yet developed into a casualty or damage, or, if damage has materialized, this is hidden and thus not yet discovered. Examples of latent defects are errors in design, errors in material and faulty workmanship.

Coverage for latent defects in hull insurance has developed gradually since the so-called Inchmaree clause was introduced as a part of the first edition of the English hull insurance clauses, the Institute Time Clauses Hulls 1888. According to this clause, the insurance covered loss of or damage to hull and machinery through bursting of boilers, breakage of shafts or through any latent defect in the machinery or hull. The Norwegian marine insurance market has gradually followed the English practice. Both the English and the Norwegian clauses have been altered several times. The many alterations are due partly to difficulties in deciding how far the insurance coverage should extend for these kinds of perils, and partly to difficulties in constructing a clause that matches the parties' intentions in respect to the coverage.

In 1996, the coverage provided in the Norwegian market was modernized and widened compared with the English conditions and the earlier Norwegian ones. Subsequently, the English conditions have been revised twice: 1.11.2002 and 1.11.2003. These new English conditions have been re-edited and amended to some extent compared with the previous ones. It is therefore interesting to compare the Norwegian 1996 regulation with the new English regulation of this problem, and thereby analyse whether it is necessary for the Norwegian and Scandinavian markets to revise this part of the coverage further in order to be able to compete with the new English conditions.

The last English revision must be seen in conjunction with the work of the Committee Maritime International (CMI) to harmonize marine insurance clauses.¹ Even if coverage for latent defects so far has not been analysed in this context, this issue is on the list of problems to be examined.² The purpose here therefore is also to see how far harmonization has come in the English and Norwegian market concerning this issue. Indirectly, the discussion is relevant also for the Swedish marine insurance market as the Swedish conditions are modelled on the Norwegian ones.

In the following, an overview of the legal sources is presented in item 2. Then the concept of "latent defect" and some legal starting points are discussed in item 3 in order to define and limit the presentation. Items 4 and 5 present the regulations in the Norwegian and English systems respectively. A summary and some conclusions are given in item 6.

¹ See *CMI Yearbook 2000 Singapore I*, p. 332 ff.

² *CMI Yearbook* op.cit, p. 326, item 4.

2 The Legal Sources

In Norway, insurance contracts are regulated in the Insurance Contracts Act of 1989 (ICA). However, the ICA contains few if any provisions concerning the objective scope of the coverage. This question is therefore regulated by the Norwegian Marine Insurance Plan of 1996, Version 2003 (NMIP). The NMIP is an agreed document, i.e. it is a standard contract that is constructed by representatives of all the interested parties to the contract. In Norway, there has been a long tradition for marine insurance contracts to be constructed by broadly based committees consisting of representatives of both the insurers, the assureds, and other interested groups.

The NMIP is also supplemented by comprehensive material in the Commentary to the Norwegian Marine Insurance Plan of 1996. This Commentary has been written by the parties participating in the construction of the Plan, and is intended by the parties to be part of the negotiations and the compromises leading to the provisions in the Plan. The Commentary, Version 2003, is on the Internet, but unfortunately not published. References here to the Commentary will therefore be to the most recently published version, which is that of 2002.

English marine insurance is regulated by the Marine Insurance Act of 1906 (MIA). The MIA contains one rule of relevance for the problem to be discussed here. However, coverage for latent defects is mainly defined in the conditions. Until 1.11.2002, insurance in the English market was based on the Institute Time Clauses Hulls, the latest edition dated 1.1.95. However, on 01.11.2002 a new set of clauses was introduced, the International Hull Clauses of 01.11.2002. These clauses were again revised on 01.11.2003.

3 The Concept of "Latent defect" and some Legal Starting-points

The starting point for insurance coverage is for fortuitous events, i.e. accidents caused by an external peril as compared with a peril inherent in the insured object. In marine insurance such fortuitous events are often named "perils of the sea", even if this term conveys no clear information as to what perils are covered. However, the distinction between "fortuitous events" and "inherent perils" differs in the English and Norwegian marine insurance.

The NMIP is based on an all-risk principle, cf. § 2-8 first subparagraph. This implies that all perils are covered unless expressly excluded. The starting point is therefore that damage caused by "inherent perils" is covered. However, there are two exclusions from this that concern such "inherent perils":

§ 12-3. Inadequate maintenance, etc.

- 1 The insurer is not liable for costs incurred in renewing or repairing a part or parts of the hull, machinery or equipment which were in a defective condition as a result of wear and tear, corrosion, rot, inadequate maintenance and the like.
- 2 If frames or similar supporting or strengthening structures are defective due to circumstances referred to in subparagraph 1 and, as a result parts

of the outer hull are lost or damaged, the insurer is not liable for the costs of repairing or renewing those parts.

§ 12-4. Error in design, etc.

If the damage is a result of error in design or faulty material, the insurer is not liable for the costs of renewing or repairing the part or parts of the hull, machinery or equipment which were not in proper condition, unless the part or parts in question had been approved by the classification society.

Thus, the NMIP does not use the concept of a "latent defect", but rather divides these kinds of perils into two main groups. The first group consists of "wear and tear", "corrosion", "rot", "inadequate maintenance" and "the like". For this group the rule is that the insurer will not be liable for the part or parts of the ship that were in a defective condition ("primary damage" in Norwegian terminology), but will pay for any consequential damages caused by the mentioned perils unless the more extensive exclusion in the second subparagraph applies. The second group consists of error in design or material, where coverage is provided both for damage to the part not in proper condition and for consequential damage, unless the part is not approved by the classification society.

In English marine insurance the starting point for coverage of latent defects is defined in UK MIA sec. 55 (2) (c):

Unless the policy otherwise provides, the insurer is not liable for ordinary wear and tear, ordinary leakage and breakage, inherent vice, or nature of the subject-matter insured, or for any loss proximately caused by rats or vermin, or for any injury to machinery not proximately caused by maritime perils.

In this provision the inherent perils are divided, *inter alia*, into "wear and tear", "ordinary leakage and breakage", "rats or vermin" and "inherent vice". The other terms used in the NMIP are not applied here. Neither is the term "latent defect" used. Apparently, the term "inherent vice" is more narrowly than latent defect: Inherent vice means deterioration which arises solely from a principle of decay or corruption inherent in the subject matter insured, or from its proper vice,³ whereas a "latent defect" may be any kind of defect, whether arising from inherent characteristics of the goods, from the sensitivity of the goods or from something else.⁴ However, as the English marine insurance is based on a named perils principle, i.e. the insurance covers only perils that are expressly listed,⁵ none of the perils listed in NMIP § 12-3 or § 12-4 will be covered unless such coverage is expressly provided for.

The IHC contains no coverage for wear and tear, inadequate maintenance, rot or corrosion. On the other hand, coverage is provided for some types of breakage and for latent defects in IHC clauses 2.2 and 41. Clause 2.2

³ Arnould § 782, Clarke: *International Carriage of goods by road, CMR*, Lnd 1997. p. 263 and 337.

⁴ Clarke op. cit. p 337.

⁵ See IHC clause 2 Perils.

corresponds to the previous Inchmaree clause in the Institute Time Clauses Hulls:

- 2.2 This insurance covers loss of or damage to the subject matter insured caused by
 - 2.2.1 bursting of boilers or breakage of shafts but does not cover any of the costs of repairing or replacing the boiler which bursts or the shaft which breaks
 - 2.1.2 any latent defect in the machinery or hull but does not cover the costs of correcting the latent defect

Clause 41 corresponds to the previous Liner Negligence clause:

- 41.1 If the underwriters have expressly agreed in writing, this insurance covers
 - 41.1.1 The costs of repairing or replacing any boiler which bursts or shaft which breaks, where such bursting or breakage has caused loss or damage to the subject matter insured covered by Clause 2.2.1 ...
 - 41.1.2. The costs of correcting a latent defect where such latent defect has caused loss of or damage to the subject matter insured covered by Clause 2.2.2 ...

This article will focus on error in design, error in material, and error in workmanship as three types of "latent defects". This starting point implies that the perils defined in NMIP § 12-3 will not be discussed except to the extent necessary to define the mentioned errors. Similarly, the regulation in MIA sec. 55 will only be analysed in order to define the coverage in IHC 2.2 and 41. On the other hand, in order to outline the concept of "latent defect" in IHC 2.2, it is necessary to include the coverage for "bursting of boilers" and "breakage of shafts".

4 The Norwegian Marine Insurance Plan

4.1 Overview

Damage caused by error in design and material is regulated in NMIP § 12-4 and discussed in item 4.2. The first issues to be discussed here are the concepts of "error in design" and "faulty material", see items 4.2.1 and 4.2.2. It is also necessary to examine how the provision in § 12-4 relates to § 12-3 concerning inadequate maintenance etc., see item 4.2.3. Further, in order to trigger the insurer's liability, the error in design or material must have resulted in "damage", i.e. there must be "damage", and this damage must be a result of the mentioned perils, see item 4.2.4.

The last issue concerns the extent of cover. If the part that was not in proper condition was approved by the classification society, the insurer will be liable for damage both to the "part that was not in a proper condition" and damage to

other parts of the ship. However, if the part that was not in a proper condition was not approved, the insurer will not be liable for this part. In this case, it is therefore also necessary to look into the distinction between separate parts.

NMIP § 12-4 does not regulate failure in workmanship. Coverage for this peril is discussed in item 4.3.

A characteristic feature of the perils discussed in this article is that they develop over time. This development may last over more than one insurance period. The question then arises under which insurance period the damage shall be covered, see item 4.4.

4.2 *NMIP § 12-4*

4.2.1 Error in design

The first fault to be covered is "error in design". The expression "design" refers to the specifications concerning how the ship shall be built, rebuilt or repaired. These specifications may concern the form and functioning of the ship, the choice of material – hereunder dimension and strength – and the process of manufacture.⁶

An "error" in design means that the design of a part of the ship proves to be imperfect, or that the degree of strength proves to be inadequate.⁷ As a starting point the word "error" seems to presuppose that the designer has made an error in the sense that the design of the part in question is weaker than it ought to have been, given the knowledge available at the time of construction regarding material strengths, production methods and stress factors to which the part may be exposed. In this case, the error is "subjective". It is less natural to use the word "error" in cases where the structure is sufficiently sturdy, based on experience at the time of construction, but where it later proves not to stand up to the loads which, under the circumstances, must be deemed to be within the foreseeable limits of the part in question. However, according to the *Commentary* Part II pp. 52-53, it is clear that such objective errors are included in the provision.

Error in design must be distinguished from error in the manufacturing process, which is a case of error in workmanship, see below in item 4.3. If an incorrect specification of the process of manufacture is given, the resulting defects must be regarded as errors in design. Defects attributable to a performing link in the manufacturing chain having failed to comply with the specifications given, however, cannot be classified as errors in design, but the distinction is not clear-cut. Normally, an "error in design" will have occurred before the construction starts.

⁶ Brækhus and Rein: *Handbook on Hull Insurance* (Brækhus and Rein), p. 94, *Commentary on the Norwegian Marine Insurance Plan 1996* (Commentary), Version 2002, Part II, p. 53.

⁷ *Commentary* Part II, pp. 52-53.

4.2.2 Faulty material

The wording "faulty material" implies that there is some kind of fault connected to the material. As the expression is general, one would assume that both faults existing before the material was incorporated in the ship, and faults developing later because of another peril, would be covered. However, according to the *Commentary* Part II, p. 52, the concept "faulty" refers only to original faults:

"Error in material means that the material in a part of the ship (hull or machinery) is of a quality inferior to the presupposed standard. Such a quality deficiency may, for example, be due to a defect in casting or some other fault in the structure of the material which occurred during processing, or to the supplier of the material having delivered a quality which is not in accordance with the specifications he has stated (e.g. that the steel supplied is too brittle). Thus, "faulty material" will have been present from the outset when the ship was delivered from the shipyard, or from the repair yard, if the part was incorporated in the ship at a later date. If the defect is attributable to a casualty, it is not a question of faulty material, but a latent concealed casualty damage, and repairs must be covered by the insurer who was liable when the peril struck."

This solution is accepted in practice by the Swedish Average Adjuster in Partikulärdispasch 3050, issued in Gothenburg on the 19 August 2002, in matter 2001-14, concerning a similar Swedish clause:

The case concerned corrosion damage on a High-speed Sea Services (HSS) vessel developed by the Stena cooperation. The vessel was built from aluminium in order to keep the weight of the vessel at a minimum. During dry docking eight months after delivery of the vessel, a narrow band of corrosion at a distance from the welding of about 20-30 mm. was found in part of the building material, particularly in areas where water had collected. Further investigation showed extensive corrosion damage in aluminium profiles of the same type. The technical report concluded that the damaged material was not suitable for use in areas that were not totally dry. The owner claimed that the damage should be covered under the previous Swedish Hull Conditions (SHC) 1987 § 8.1.b) no. 2, stating that damage caused by error in material were covered. This clause is similar to the SHC 2000 § 7.1.b) no. 2, and to NMIP § 12-4. The insurer alleged that the peril that had caused the damage was error in design, which according to § 8.1.b) no. 3 was only covered if the result was breakage of a boiler or part of the machinery. This clause was modelled on the 1964 NMIP § 175, where the concept of error in material is the same as in the 1996 NMIP § 12-4. The adjuster held that the material was not faulty if compared to other material of the same kind, and that the corrosion damage was caused by using a material that was unsuitable for its intended purpose. The choice of material was an error in design, not an error in material. Coverage was thus denied.

Faulty material will normally be concealed in the sense that it is not detectable by a superficial examination. Discovery will normally require more complex methods, such as load tests, etc. However, faulty material may also be

attributable to an "external influence", e.g. where the part falls to the floor during processing at the building yard and sustains a flaw.⁸

Since the fault must be inherent in the material from the outset, faulty material must be distinguished from metal fatigue. Metal fatigue occurs if variation of pressure over a certain time causes changes in the molecular structure of the metal which leads, for example, to brittleness.⁹ Metal fatigue arises from repeated cycles of stress exceeding a certain value. It starts with microscopic changes in the structure of the metal which lead to the formation of minute cracks which then grow in size. As they develop over time, these fatigue cracks progressively become more detectable, initially by scientific investigation and eventually by the naked eye. Assuming that the cycles of stress continue and that the process of cracking does not itself relieve the stress, the fatigue crack will continue to grow until the metal shears or some other failure of the structure occurs. The presence of a fatigue crack will itself concentrate stresses at its tip and thereby lead to an extension of that crack unless and until those stresses are relieved. Similarly, the presence of a fatigue crack will weaken the structure and consequently tend to cause other fractures or failures of the structure.

If the cause of the metal fatigue is an error in design, this peril is covered according to § 12-4 through the first alternative. A badly designed or made weld may, for instance, lead to a concentration of stress which over a period of time will cause the condition of metal fatigue to occur. In this case, coverage will depend on whether or not the metal fatigue may be characterized as damage, see item 4.2.4 below. Similarly, if the cause of the metal fatigue is error in workmanship, coverage will be provided according to the discussion in item 4.3. On the other hand, if metal fatigue is caused by ordinary wear and tear, it is regulated by § 12-3.

4.2.3 The relationship with § 12-3

An error in design or material may result in defects of the kind described in § 12-3, i.e. wear and tear or corrosion. If wear and tear and corrosion due to an error in design or material occur in a shorter time than normal, this must be characterised as extraordinary wear and tear and corrosion, and will be covered according to § 12-4. This conforms with the finding in the Partikulärdispassch 3050 referred to in item 4.2.2, where it was held that the extensive corrosion damage developed during eight months was not excluded as damage caused by corrosion according to SHC § 8.1.b) no. 1.

The exclusion for "inadequate maintenance", on the other hand, rules out compensation for any fracture damage, etc. which must be regarded as a normal and foreseeable consequence of the use of the engine, and which could have been prevented by proper maintenance. If the manufacturer of the engine has directed that specified parts must be replaced after a certain period of operation or after a certain amount of wear, the insurer will not cover a replacement effected after the parts in question have been used beyond the prescribed period

⁸ *Commentary* Part II, p. 52.

⁹ Brækhus and Rein: p. 98.

of time. In this case the damage is caused by inadequate maintenance and not by error in design.¹⁰

4.2.4 Damage as a result of error in design or material

What is covered by NMIP § 12-4 is damage as a result of the defined errors. There are two conditions inherent in this expression: The first condition is that there must be "damage", and the second is that this damage must be a result of the mentioned perils.

The first condition implies that in order to trigger the insurer's liability, it is an absolute prerequisite that the error must have caused some kind of "damage". On the other hand, the clause contains no definition of the concept of damage. Neither is this concept defined in other provisions of the Plan. Any destructive impact on the ship should therefore be covered regardless of the extent of the damage or the form it takes. This is also emphasized in the *Commentary Part II*, p. 54:

"It is, however, a fundamental prerequisite for cover that a "casualty" has occurred in the form of demonstrable damage. Accordingly, the insurer's liability does not arise until the occurrence of a visible physical defect. However, no minimum requirements are stipulated regarding the physical defect that makes replacement necessary. The initial signs of cracks, which it is only possible to ascertain by means of fluoroscopy or other similar methods, will also be sufficient. However, a mandatory replacement is not recoverable if the background for the requirement from the classification society is a strong suspicion that the part in question is under-dimensioned."

The *Commentary* presumes that the physical defect must be "visible" or "demonstrable", for instance, in the form of initial signs of cracks. This criterion is not problematic if the damage may in some way be observed visually. What is less clear is how to treat defects that can only be observed through testing, for instance, load testing or destructive testing. However, the expression "visible physical defect" in the English *Commentary* is a translation of the expression "påviselig skade", which is synonymous with "demonstrable damage". The Norwegian *Commentary* thus does not contain a condition of visibility. This implies that any kind of demonstration must suffice.

On the other hand, it is not sufficient for the insurance to be triggered that the fault itself may be detected by load tests or other kinds of tests. The fault is in this context the insured peril. In order to establish liability, the fault must have developed into a physical, destructive change of the part as compared with the faulty part. This is supported by the remark in the *Commentary* that "under dimensioning" is not sufficient to constitute damage, and that it does not represent a casualty if the design of a part of the ship proves to be imperfect, or the degree of strength proves to be inadequate. This must hold also if inadequate strength can be demonstrated by testing. However, the distinction between the fault and the incident of damage may be difficult, for instance, when the error in

¹⁰ *Commentary Part II*, p. 54.

design results in changes in the molecular structure of the material (metal fatigue), which will develop into fractures. The fractures will qualify as damage, but changes in the molecular structure *per se* are probably not sufficient.¹¹

This must also be the result if the degree of strength is at variance with the specifications for the building of the ship, and thus constitutes a failure of delivery from the yard or of the contractor delivering the material. The quality of the building material must be measured against the specifications, and inferior quality may result in redelivery or other claims against the contractor. This does not, however, mean that the material is damaged; it may be perfectly suitable for use in other situations. However, once the inferior quality results in demonstrable damage, see above, the insurance is triggered.

In regard to faulty design, the requirement of damage will normally mean that the error in design has developed in a way that may be described as a "casualty". The same may hold for error in material if the error in itself consists of a weakness that does not qualify as damage, or if it is clear that the initial error has developed into a casualty. However, faulty material may in itself constitute physical defects in a part, i.e. cracks or fractures in the material developed during the manufacturing process. If such cracks or fractures are detected before they develop further, the question is whether these cracks are damage caused by error in material, or if the cracks *per se* are the error in material and thus the peril. The expression "damage is a result of ... faulty material" implies that a distinction must be made between the "faulty material" and the "damage", so that the original fault must have developed in some way before the insurance is triggered.

This question is not directly remarked on in the *Commentary*. However, it is stated in the *Commentary* Part II, p. 52 that "the cover for 'faulty material' is the same as under the 1964 Plan: Such damage is coverable in full, unless the faulty part has not been approved by the classification society".

The *Commentary* to the 1964 Plan contains the following remarks concerning this issue:¹²

"Faulty material will be attributable to negligence or to an accident during the manufacturing process. Very often the defect will only be detected after expiry of the period of guarantee given by the supplier or the repair yard. If the part in question cracks as a result of the faulty material a straight forward casualty will have occurred, *but a situation arising from a latent defect in the material being detected during an inspection of the ship will also have a lot in common with a casualty from the shipowner's point of view: due to external unverifiable causes a part of the ship is defective and has to be replaced.* It was therefore agreed that faulty material constitutes an insurance risk which should, as far as possible, be covered by the liability of the hull insurer. It was further agreed that the requirement in respect of "extraneous cause" should be omitted, not only in respect of the parts specified in the quoted clause in the Hull Policy, but altogether."

The italicised section may imply that to constitute damage it is sufficient that the error in material is detected without it having developed as compared to the

¹¹ See Brækhus and Rein p. 98.

¹² Translation of the *Commentary to the Plan of 1964* [1989] p. 143.

original flaw. However, the sentence is not clear, and the result is criticized in legal theory as contradicting the usual ideas about what shall be considered as a recoverable casualty.¹³

The critique of the solution is supported by some comments in the *Commentary* Part II p. 53 concerning error in design:

"If the requirement for approval by the classification society is met, the insurer is liable for both the repairs of the part that was in defective condition and for the consequential damage. However, the insurer is not liable for the additional costs incurred in order to rectify the actual error, such as costs of strengthening a part which was too weak from a design point of view, cf. the principle in § 12-1, subparagraph 3, and above in § 12-3 concerning errors in performance."

The remark concerns error in design and not faulty material. However, policy considerations would imply that the original fault should be treated the same way regardless of whether it was connected to the design or the material, and regardless of whether the fault in itself could be characterized as "damage" according to the definition in the *Commentary*.

This interpretation is also supported by Statement of Particular Average 3045 issued in Gothenburg on 25 March 2002 in matter 2001-10:

The case concerned the coverage for faulty material in SHC 87 § 8.1.b) no. 2, which as mentioned is similar to NMIP § 12-4. The question was whether or not the insurer was obliged to pay compensation for cracks in the crown wheel in two so-called Azimuth thrusters in a vessel. The parties agreed that the cracks existed already at the delivery of the ship from the building yard, and it was accepted that the cracks were produced in connection with the case-hardening process of the wheels in 1984. The adjuster therefore held that the crown wheels had to be considered as faulty material. It was clear that the relevant parts were approved by the classification society. The assured claimed that errors during the hardening process of the crown wheel constituted the peril, and that this peril had caused the damage in the form of cracks. The insurer, on the other hand, claimed that the cracks were the faulty material *per se*, and that there was no damage that was covered by the conditions. This was accepted by the adjuster, who held that there were no "indications in the documentation that the cracks have propagated during service or that the defects have developed since the wheels were hardened". Thus, coverage was not granted.

4.2.5 The extent of coverage

According to § 12-4, damage to parts other than the one that is not in proper condition is always covered. In order to cover the costs of renewing or repairing the defective part, however, this part must have been approved by the classification society. The wording implies that special approval must be obtained for the part in question. However, according to the *Commentary* Part II p. 53, the approval requirement is far more lenient:

¹³ Brækhus and Rein, p. 87 ff.

“This requirement must be tied to the general supervision of the building or repair work. ... The part must be included in the classification society’s checking procedure in connection with building or repairs, and no replacement or repairs of the part which result in the setting aside of the classifications supervision regulations may subsequently be made for the owner’s account.”

If the requirement for approval by the classification society is met, the insurer is liable for both the repairs of the part that was not in a proper condition and for the consequential damage. If, on the other hand, the relevant part has not been approved, the assured must cover the costs incurred in replacing or repairing the part which was in defective condition. In this case, it is necessary to make the distinction between the part that is not in a proper condition and other parts of the ship, i.e. the consequential damage. The *Commentary* Part II, p. 53 refers on this point to the explanatory notes to § 12-3, which are found at pp. 44-45:

“The actual identification of what must be regarded as ‘part or parts’ for the purpose of the provision shall be based on technical and economic considerations. If the classification society refuses to accept a partial renewal of a steel plate that is merely corroded in a limited area, the hull plate must thus be regarded as excluded from cover. The same will apply in relation to parts and components of the ship’s machinery or equipment. If it is technically or economically justifiable and sensible to carry out a separate renewal or repair of one or several parts of the machinery or equipment, it is only that part or parts that are excluded from cover. If, however, the most expedient procedure from a technical/economic point of view is to replace a larger component, and not merely the part or parts which were in defective condition, the entire component will be excluded from cover.

Neither the size of the relevant part nor its value will be of significance. Thus, if a nut or bolt in the machinery has rusted to pieces and it would have been possible to replace it without any major problems, it is only the costs of the renewal of the nut or bolt that are excluded. The precondition is nevertheless that other parts of the machinery which have been damaged as a result of the breakdown of the bolt or nut concerned are not in defective condition. If they are, the insurer shall not cover the costs of replacing these parts either. Nor will the size of the ship in question be of any relevance. The fact that the rudder on smaller ships consists of one steel plate, whereas in larger ships it consists of several plates, is therefore irrelevant. If, in the latter case, it is technically and economically possible to repair the rudder by replacing the plate that was in a defective state, it is merely the costs of replacing the plate that are excluded.”

It is obvious that the distinction between the part or parts that were not in a proper condition and the consequential damage can cause difficulties. However, as this issue will only arise when the part in question is not approved, the question is of less practical importance concerning § 12-4.

4.3 *Faulty Workmanship*

Faulty workmanship refers to faults committed in connection with the building of or repairs to the ship, and is not regulated in § 12-4. As a starting point,

damage caused by faulty workmanship is covered according to the all-risk principle in NMIP § 2-8. The question is, however, if "faulty workmanship" is included in the term "similar causes" in § 12-3. Characteristic of the perils referred to in § 12-3 is that they consist of a gradual deterioration of the ship. Faulty workmanship, on the other hand, is an occasional act or omission, which is more similar to error in design or material. It therefore seems less natural to equate this with wear and tear etc. This solution is confirmed by the *Commentary* Part II, p. 48. The implication is therefore that damage caused by faulty workmanship must be covered in full.

This must hold for both the damage to the part which was originally affected by the error, and for any consequential damage.

However, the cost of rectifying the error is not part of this casualty. If such errors were committed in connection with the repair of damage covered under the insurance, the costs of rectifying the errors must be covered by the relevant insurer. Were the errors, on the other hand, performed under non-recoverable work, the rectifying cost must be carried by the assured, similar to the situation for rectifying an error in design or material, see above in item 4.2.4. Also, errors in performance committed in connection with non-recoverable work may in certain cases be equated with inadequate maintenance, viz. if the faulty workmanship is a result of the fact that the assured has chosen an incompetent repair yard or has failed to follow up the yard's work. In that event, the error must be considered in accordance with § 12-3.¹⁴

4.4 Which Insurer is Liable

The question to be discussed here is under which insurance the damage shall be covered in cases where the damage develops over more than one insurance period. This question is regulated in NMIP § 2-11 concerning Causation and Incidence of Loss. The starting point in the first subparagraph is that the insurer is liable for losses incurred when the interest insured is struck by an insured peril during the insurance period. This would imply that the point in time when the defect struck would be decisive. However, the second subparagraph contains a special provision for unknown defects or damage:

"A defect or damage which is unknown at the inception or on the expiry of an insurance, and which later results in a casualty or an extension of the damage to other parts, shall be deemed to be a marine peril which strikes the ship at the time of the casualty or damage to other parts, or at such earlier time as the defect or the first damage becomes known."

This provides for a rather complicated regulation of the incidence of loss for an unknown "defect or damage". The expression "defect" is general, and it is clear that it encompasses both error in design, material and workmanship.

In the *Commentary* to NMIP § 2-11, the concept of defect is explained as follows:

¹⁴ *Commentary* Part II, p. 48.

“The word ‘defect’ covers any defect in the ship, including faults in construction, material and workmanship, both during the building of, and any later repairs of the ship.”

The Commentary here uses the expression “faults in construction”, whereas the Norwegian version uses “konstruksjonsfeil”, which rightly translated is synonymous with “error in design”. In § 12-4, the correct translation “error in design” is used. Thus “faults in construction” according to the quoted comment should rightly have been “error in design”.

Section 2-11, second part, states that if an unknown defect during the insurance period results in a casualty or damage to other parts (consequential damage), this consequential damage shall be allocated to the insurance period in which the consequential damage occurs, and not to the period during which the defect occurred. However, the defective part (primary damage if the defect constitutes damage) is not seen as part of the consequential damage and shall be allocated to the insurer at the time of the defect occurring. The condition for this solution is that the defect was unknown at the inception of the insurance period. If the defect was known, the casualty shall, according to § 2-11 first subparagraph, be attributed to the period when the peril struck, i.e. when the defect occurred. Also, according to the second subparagraph, if the defect is discovered before it develops into damage or results in a casualty, the consequential damage shall be covered under the insurance effective at this point in time. The defective part/primary damage is attributed to the time the previous instance occurred.

The time for the incidence of loss of the consequential damage thus depends on knowledge of the defect. This knowledge is not linked to any person, and it may be presumed that anybody’s knowledge of the defect is relevant. However, according to the *Commentary* Part I, pp. 58-59, this is not the meaning:

“That the defect or damage is ‘unknown’ means that neither the insurer nor the assured is aware of it. As far as the assured is concerned, there must be an identification with a larger circle of people than is usual in marine insurance cf., *inter alia*, § 3-36. If the damage was, on the expiry of the period of the insurance, known to a person whose duty it was to report the matter, the replacement costs as well as any consequential losses must be borne by the earlier insurer and not by the one during whose period of insurance the replacement took place. Hence, if cracks are beginning to form in the shaft and this is known to the chief engineers but has not been reported to the shipowner, this must be the solution; this is necessary in order to counter any fraudulent collaboration between the shipowner and the crew for the purpose of obtaining better insurance cover before the new insurer comes into the picture. There should be no reason, however, to attach importance to the fact that the damage may accidentally have been known to a subordinate member of the crew who is unaware of its significance for the insurance. The term ‘unknown’ has been chosen with the very view in mind that in practice it is possible on this point to choose the solution which, in individual cases as well as in general, furthers the purpose of the rule, *viz.* to counter the disloyal suppressions of facts in the relationship between the parties to the insurance contract.”

It is thus the knowledge of the assured and anybody in his organization that realize the significance of the defect for the insurance that is relevant.

5 The English International Hull Clauses

5.1 The Covered Perils

5.1.1 Bursting of boilers and breakage of shafts

The perils that are covered in clause IHC 2.2.1 are "bursting of boilers" and "breakage of shafts". The expression "bursting" implies that the boiler explodes or that it cracks open due to pressure. There seems to be no English court practice concerning this part of the coverage. According to cases from the United States, on the other hand, the boiler must actually burst. Coverage is not triggered by the discovery of fractures. Nor is the bursting of an exhaust line covered.¹⁵

This part of the clause is illustrated by the *Thames and Mersey Marine Insurance Co Ltd v Hamilton, Fraser and Co, Inchmaree*, [1887] 12 AC 484, which is the reason for the original Inchmaree Clause:

Inchmaree was a steamship insured under a time policy, wherein the risks insured against included perils of the seas and "... all other perils, losses and misfortunes that have or shall come to the hurt, detriment, or damage thereof of the aforesaid subject matter of this insurance, or any part thereof". Whilst lying at anchor awaiting orders, it became necessary to pump up the main boilers by means of the donkey engine. However, a valve in the pipeline between the donkey engine and one of the boilers was closed. The result was that the donkey engine became over-pressurised and was damaged. The claim for the cost of repairing the donkey engine was denied as the bursting of the boiler was not a peril of the sea or "all other perils" as the peril was not "of a marine character".

The denial of the claim in this case resulted in the inclusion of the Inchmaree Clause in the first version of the Institute Time Clauses.

The second peril is the "breakage of shafts". The expression "breakage" implies that the shaft is broken, i.e. a mere crack or fracture is not sufficient. Further, the case *Oceanic Steamship Co. v Faber*¹⁶ may indicate that physical discontinuity between two parts of the shaft is necessary in order to constitute breakage:

In 1891 a new end was imperfectly welded to the tail shaft of the insured vessel, causing a flaw in the shaft. The flaw developed into a fracture so as to become visible on the surface of the shaft some time between April 1900 and October 1902, but as long as the shaft was in place could not be discovered. In October 1902, the shaft was drawn and the crack was discovered. The shaft was condemned and replaced by a new shaft. The owner claimed the cost of replacing the shaft under an insurance contract having an insurance period lasting from May 1902 to May 1903. The claim was denied due to lack of evidence that the

¹⁵ Arnould: *Law on Marine Insurance and Average*, 16th edition volumes I and II, 1981 and volume III, 1997, (Arnould) § 831.

¹⁶ [1906] 11 Com. Cas. 179 KB, [1907] 13 Com. Cas. 28, in: Reports of cases relating to maritime law Vol X p. 515.

fracture occurred during the period of the policy. However, it was also concerning the expression "breakage of shafts, or through any latent defect in the machinery or hull" expressed *obiter, inter alia*, that "I should have thought certainly that there was not a breaking of the shaft; but if the shaft did not break that *prima facie* it was a loss of or damage to machinery through a latent defect in machinery".¹⁷

This seems to imply that even if the crack was so extensive that the shaft had to be condemned, this did not constitute "breakage". However, Arnould claims in § 831 that a fracture of sufficient magnitude to render the shaft useless constitutes "breakage".

Only breakage of shaft is covered. In *Jackson v Mumford* [1902] 8 Com. Cas. 61 it was held that breakage of a connecting rod is not covered:

The case concerned the interpretation of the Inchmaree clause in hull insurance for the building of a new torpedo-boat destroyer Bullfinch (B). The designers intended to produce machinery to propel a very peculiar type of ship at a novel rate of speed. In doing this, they were making what was then a bold and difficult experiment – trying to attain very high power with the least possible weight by working with a very low factor of safety. While the ship was on her trials, the connecting rod of the starboard high-pressure engine broke, resulting in damage to the ship. The owner claimed, *inter alia*, that a connecting rod was *ejusdem generis* with a shaft. The judge held, however, that the function of the connecting rod is different from that of a shaft inasmuch as they transmit power by stresses which are of an essentially different character (p. 70).

IHC clauses 2.2.1 and 41.1.1 contain no limitation as to what kind of peril has caused the bursting of the boiler or the breakage of the shaft. One would therefore assume that coverage was provided regardless of cause, i.e. also if the cause was an error in material, design or workmanship. This view is challenged in *Scindia SS Ltd v London Assurance* [1936] 56 Ll.L. Rep. 136 KB:

In this case the ship was in dry dock for the purpose of renewing the lower half of the wood lining of the stern bush. As the propeller was being wedged off, the tail shaft broke owing to a latent defect in the shaft consisting of a smooth flaw extending downwards from the top of the shaft deep into the metal and involving about one-half of the material.

The insurer admitted the loss of the propeller and the consequential damage, but denied that the damage to the tail shaft was covered, *inter alia*, because it was caused through inherent vice of the shaft itself and thus excluded according to MIA sec. 55 (2). The judge stated *obiter* that it was "a sound proposition" to argue that "except under those words of this clause which deal with latent defects, damage caused by latent defects are excluded from this clause by virtue of Sect. 55 (2) (c), of the Marine Insurance Act" (p. 138).

The view is *obiter*, but implies that the coverage must be read in conjunction with the limitations of coverage as defined in MIA sec. 55 for inherent vice. This proposition seems to be accepted by Arnould in § 829. Inherent vice means as mentioned above in item 3 deterioration which arises solely from a principle

¹⁷ [1907] 13 Com. Cas. 28, in: Reports of cases relating to maritime law Vol X, p. 517.

of decay or corruption inherent in the subject matter insured, or from its proper vice, i.e. not from external damage but from internal decomposition.¹⁸ Inherent vice connotes some condition of the hull or machinery at the inception of the risk which is caused by a previous casualty or a defect present at the time of construction or installation or introduced by work done in the course of maintenance or repair prior to the vessel coming on risk.¹⁹ According to this interpretation, bursting of boilers or breakage of shafts caused by error in design, material or workmanship, are not covered by IHC 2.2.1 or 41.1.1. This implies that the coverage for these parts of machinery is much more limited than the coverage under NMIP. Whether bursting of boilers or breakage of shafts caused by latent defects in machinery can be covered by IHC 2.2.2 ref 41.1.2 is more unclear, see *Oceanic v Faber* quoted above, and also below under item 5.2.

Further, it is held that if breakage of shafts or bursting of boilers is caused by wear and tear, it will not be covered.²⁰

5.1.2 Latent defects

The expression "defect" means deficiency, imperfection, error or failure. As there is no requirement connected to the cause of the defect, the wording implies that any kind of defect should be covered. It does not matter if the defect is connected to the design, material or workmanship, and both defects dating back to the building process and defects developing afterwards should be covered. This must hold also if the defect has the character of inherent vice, which is excluded in MIA sec. 55. If inherent vice should be accepted as a defence against a claim for damage caused by a latent defect, the coverage for latent defects would be more or less meaningless.²¹

However, some doubt exists concerning the extent of the coverage in relation to error in design. The uncertainty stems from the *Jackson v Mumford* case,²² quoted above in item 5.1.1, where it was held that error in design is not a "defect" in respect to the previous Inchmaree clause:

In this case the connecting rod of the starboard high-pressure engine broke, resulting in damage to the ship. As the breakage was caused by an error in design the owner inter alia claimed coverage for damage caused by latent defects. The judge held that the phrase "defect in machinery" in the Inchmaree clause meant "a defect of material, in respect of either its original composition or in respect of its original or its after acquired condition". It was further held that "the phrase, at all events, does not, in my view, cover the erroneous judgement of the designer as

¹⁸ Arnould § 782.

¹⁹ Arnould § 780.

²⁰ Arnould § 829, who refers to the *Caribbean Sea* [1980] 1 Lloyd's Rep. 338 at pp. 345-346, per Robert Goff. This judgment, however, refers to "latent defects" and not to bursting of boilers and breakage of shafts, see below in item 5.2.2.

²¹ This is the view of Arnould § 829, and in *The Caribbean Sea* at p. 347. According to Clarke p. 337, who makes a distinction between latent defects caused by inherent vice, sensitivity and other causes, the coverage for latent defects would have meaning even if inherent vice is excluded.

²² [1902] 8 Com. Cas. 61.

to the effect of the strain which his machinery will have to resist, the machinery itself being faultless, the workmanship faultless, and the construction precisely that which the designer intended it to be" (p. 69).

It was thus held that the concept of "defect" does not include error in design. According to the judge, the phrase "defect in machinery" in the Inchmaree clause meant "a defect of material, in respect of either its original composition or in respect of its original or its after acquired condition".

The result of *Jackson v Mumford* is however, questioned in the Caribbean Sea case [1980] 1 Lloyd's Rep. 338 at pp. 345-346.

This case concerned a 19-year-old vessel that sank. The reason was the development of fatigue cracks in certain gussets as a result of a defectively designed fillet weld weakening the gussets. Once the fatigue cracks reached the weld, the high residual stress in the weld favoured rapid crack growth, allowing seawater to enter the vessel. The owners claimed that the loss was caused by a latent defect. The insurers referred to *Jackson v Mumford* and claimed that the proximate cause was defective design and not a latent defect. The judge stated that if there were a defect in material caused by a defect in design this would constitute a latent defect. He continues:

"Even so, I must (with the greatest respect) express some misgivings about the narrowness of this definition of defect in machinery. If, for example, machinery were to have been wrongly assembled, would there not then be, on the ordinary meaning of the words, a defect in the machinery?" He then refers to the conclusion in *Jackson v Mumford*, that an inadequacy of a part due to an error in design would constitute a shortcoming rather than a defect in the machinery. However, he suggested an alternative interpretation of the facts in the *Jackson* case: Since "the casualty occurred during the trials of the ship in whose design risks were deliberately being taken, the proximate cause of the casualty was the deliberate running of the risk rather than anything which could properly be called a defect in the machinery." He further adds: "At all events, however this case is to be interpreted, neither the decision, nor the dictum on which Mr. Kentridge relied, has in our judgment the effect of excluding a defect in hull or machinery from the cover provided by the Inchmaree clause merely because the historical reason for such defect was a defect in design."

English court practice is thus not very clear concerning the distinction between "defect" and error in design. According to Arnould, § 831, one must make a distinction between a "shortcoming" which is not a defect, and a "defect" in machinery. There is merely a "shortcoming" if "an item of machinery functions correctly in accordance with its design specifications, but damage is caused to other parts because the machinery was unsuitable for that vessel." If, however, "there is some malfunction of an item of machinery caused by an error in its design" this may constitute a defect. Apparently, this view seems to hold also if the defect in machinery causes bursting of boilers or breakage of shaft.

On the other hand, the concept of a defect must be distinguished from ordinary wear and tear, which is also excluded in MIA sec. 55. Arnould § 831 describes the distinction this way:

"A 'defect', as has been observed, is to be contrasted with the effects of ordinary wear and tear, which are not covered. Both may be gradual in their effects and this is not in itself a ground for attributing the loss to wear and tear. The

distinction appears to be between defects, created by a positive act of human agency and wear and tear as the uncorrected result of ordinary incidents of trading. If the relevant part of the vessel is one that requires renewal at intervals during the life of the vessel and it has merely worn out in service at the end of its normal working life, this is wear and tear. If the part fails prematurely as the result of external circumstances, rather than due to any defect internal to itself such as, for example, where corrosion takes place and is not corrected, the loss may be attributed to wear and tear, or, in appropriate circumstances to negligence or to the casualty which set in motion the process of deterioration. Although in one sense there is, in such cases, at a certain point of time a defective condition of the vessel, such occurrences are not within the latent defect cover. A 'defect' for the purposes of the clause is a condition causing premature failure which is present in the relevant part of the hull or machinery when it is constructed or installed in the vessel, or which comes into existence as a result of the way in which the relevant part was designed, constructed or installed."

This seems to conform to the distinction according to the NMIP between corrosion caused by insufficient maintenance and corrosion caused by error in design or material.

Arnould also makes a distinction between damage and defect in footnote 42:

"Damage to the structure is to be distinguished from a defect in the structure; thus, it is submitted, the assured could not recover under the clause were it to be concluded that the structural weakness in the hull must have been due to some previous grounding prior to the inception of the risk, even though the weakness was not reasonably discoverable by him."

The expression "latent" is synonymous with "hidden", "concealed" and "dormant", or "that which does not appear on the face of a thing". Thus, in order to be covered, the defect must be hidden or concealed. This understanding raises two questions. The first question is to whom the defect must be "latent" or "hidden". The second question is how "hidden" the defect must be to be qualified as "latent".

The regulation in IHC clause 2.2.2, states only that the defect must be "latent". Read literally, any person's discovery may therefore imply that the defect is no longer latent or hidden. However, the clause may also be understood to mean that the defect must be hidden to the assured.

This question appears to be undecided in English law, but Arnould claims in § 831, note 52, that there are strong arguments that the defect need only be latent "qua the assured". This point appears to have been accepted in *Hutchins v Royal Exchange Assurance Corporation* [1911] 2 KB 398, but the case was denied on other grounds:

The case concerned a time policy on hull including the Inchmaree clause. The vessel was built in 1906 in England but her stern frame was a casting which had been supplied by a continental foundry. The casting had been improperly made using an inclusion from a separate batch of metal which, when it cooled, caused shrinkage cracks. The foundry was well aware of what it had done and took steps to conceal it by covering over the evidence of the defect. Their deception was successful and the casting was passed by the classification society and incorporated into the hull of the vessel. In March 1909, the vessel was docked at

Barry for painting. The steel structure was scraped and the defect in the casting was uncovered. The frame was condemned by the surveyor and had to be replaced. It was not questioned that the defect, which was known to the factory, was "latent" qua the assured.

As there is little authority on this point, it is rather difficult to reach a conclusion on it.

The next question is how "latent" or hidden the defect must be. This question was considered in the *Caribbean Sea*, although there was no argument on the point. Mr. Justice Robert Goff applied the test adopted in the English cases concerning contracts of affreightment, namely, whether the defect is one which could not be discovered on such an examination as a reasonably careful skilled man would make.²³ This view was supported by Mr. Justice Mustill in *Lloyd Instruments Ltd v Northern Star Insurance Co Ltd*, *Miss Jay Jay* [1985] 1 Lloyd's Rep. 264, ref [1987] 1 Lloyd's Rep. 32 CA:

The yacht *Miss Jay Jay* was insured on a time policy which included cover for "... latent defects in the hull or machinery". During the insurance period it was discovered that she had suffered damage to her hull as the bonding between the plastic layers of the hull had separated in places. The owner's claim under his insurance policy was accepted by the Commercial Court. Concerning the expression "latent", Mr. Justice Mustill held that the "defects in design were latent in that (a) the plaintiffs themselves could not have detected them upon such inspection as persons in the position of the plaintiffs could reasonably have been expected to make, and (b) even if the defects could have been detected by a minute survey, the plaintiffs could not reasonably have been expected to commission such a survey for this type of vessel". The decision was upheld in the Court of Appeal.

In *RA Houghton and Mancon Ltd v Sunderland Marine Mutual Insurance Co Ltd*, *Ny-Eeasteyr*, Queen's Bench Division (Commercial Court) [1988] 1 Lloyd's Rep. 60 both sides adopted the test for a latent defect laid down by Mr Justice Robert Goff in the *Caribbean Sea*, i.e. that the defect must be such as could not be discovered on such an examination as a reasonably careful skilled man would make.

It seems as if the concept of "latent" in this connection solves some of the problems of the incidence of loss that are regulated in NMIP § 2-11. The condition that damage shall be caused by a "latent defect" means that if the assured should have detected the defect before consequential damage occurred, the defect is no longer latent, and coverage for the resultant damage will be refused, regardless of when it occurs. The implication here must be that the assured when he should have discovered the defect has a duty to repair or replace the defective part in order to hinder future damage, and if he fails to do so, the risk for future damage will rest with him. Compared to the Norwegian approach, this is a more strict solution. As long as neither the assured nor anybody in his organization knows about the defect, damage caused by this defect will be covered. The consequential damage will according to NMIP § 2-

²³ The *Caribbean Sea* case [1980] 1 Lloyd's Rep. 338 pp. 347-348. See also Arnould § 831 note 52 and 53 and *The Amsstelslot* [1963] 2 Lloyd's Rep 223 (HL).

11, second paragraph, be attributed to the policy in effect when the consequential damage occurred, whereas the primary damage is attributed to the time the peril struck.

5.2 *The Distinction Between Damage and Peril*

IHC clause 2.2 provides coverage for "loss of or damage to the subject matter caused by "bursting of boilers or breakage of shafts [...] or any latent defect in the machinery or hull [...]". According to clause 41.1, additional coverage may be provided for the cost of repairing or replacing any boiler or shaft or correcting a latent defect to the extent that the bursting of the boiler, the breakage of the shaft or a latent defect has caused damage according to 2.2. Read together, the wording implies that a distinction is made between loss or damage caused by the defined bursting/breakage/latent defects and the bursting etc. itself.

As far as bursting of boilers and breakage of shafts are concerned, bursting and breakage will in itself constitute "damage" according to Norwegian terminology. IHC 2.2.1 thus implies that coverage is provided for consequential damage, but not for primary damage, i.e. the damage to the boiler or the shaft itself. On the other hand, coverage for the primary damage, i.e. damage to the boiler and the shaft, is provided for as an additional peril in 41.1.1. According to this regulation, "bursting" or "breakage" is a fundamental requirement for cover. A defect in the material that may lead to such bursting or breakage, is not sufficient to trigger the insurer's liability. As it is argued in English law that bursting or breakage caused by inherent vice is excluded by MIA sec. 55 (2) (c) this may be less important. However, if bursting or breakage caused by error in design or material is covered, this conforms to the solution in NMIP for error in design and material. On the other hand, the primary damage to the boiler or shaft is only covered if it has resulted in consequential damage. Primary damage with no consequences is not covered. This is contrary to NMIP § 2-4, where primary damage is covered provided that the part that was not in a proper condition was accepted by the classification society.

For latent defects the solution is somewhat less clear. The expression "defect" may refer both to a weakness or shortcoming in a part of the ship, and to the defective part, i.e. destroyed. If the word "defect" refers to a part that is destroyed, this seems to be equivalent to the Norwegian concept of damage, and the solution is similar to bursting of boilers and breakage of shafts: The primary damage (the defective part or parts) is covered by IHC 41.1.2, whereas consequential damage is covered by IHC 2.2.2. On the other hand, if "defect" includes a weakness or shortcoming, IHC 41.1.2 seems to provide coverage for the defective part regardless of damage. However, similarly to the situation for bursting of boilers and breakage of shafts, such defect will not be covered until it has caused "damage" to the ship. Thus, it is clear that a defect that has not yet materialized into damage is not covered. What is unclear, however, is whether "damage" in IHC clause 2.2 in this instance refers to "consequential" damage only, implying that clause 41.1.2 provides coverage both for primary damage and a defective part not sustaining damage, or whether "damage" in 2.2 also covers primary damage. In the latter case, coverage for the primary damage is

provided in 2.2, whereas the repair of the original defect causing the damage is provided for in 41.1.2.

In the guide to the changes made in the 2002 version,²⁴ it is stated that “the clauses seek to reinstate the distinction between the defect and consequential damage as understood prior to the Court of Appeal decision in the Nukila case without referring to “part”. “Part” defies easy definition.” According to the 2002 clause the insurance covered losses caused by any latent defect, “but only to the extent that the cost of repairing the loss or damage caused thereby exceeds the cost that would have been incurred to correct the latent defect.” This expression is in the 2003 version changed to “but does not cover the costs of correcting the latent defect”. The meaning seems to be the same, and there are no comments included to indicate that a material change was intended. In order to understand the intention behind this provision, it is therefore necessary to look into previous court practice, including the Nukila case.

The first case in this matter concerned the Inchmaree clause in the first edition of the Institute Time Clauses Hulls (ITCH) in 1888. The relevant part of this clause originally read as follows:

“This insurance also specially to cover loss of, or damage to hull or machinery through ... bursting of boilers, breakage of shafts or through any latent defect in the machinery or hull.”

Contrary to IHC, there is no coverage for additional perils similar to IHC 41.1. The expression “damage ... through any latent defect” was as a starting point interpreted to provide coverage for any defect in the machinery being unknown to the assured.²⁵ However, this interpretation was challenged in the Oceanic case,²⁶ quoted above in item 5.1.1:

The case concerned a flaw in the shaft that developed into a fracture which was discovered when the shaft was drawn. The claim was denied due to lack of evidence that the fracture occurred during the period of the policy. However, Judge Walton also expressed *obiter* the opinion that as the “... crack which is the damage, the only damage which is proved, is really nothing but the development of the flaw – that is, of the latent defect. In my opinion, such development of a latent defect is not ‘damage to the machinery through a latent defect’. In such a case I think the damage is not damage caused by the latent defect, but is the latent defect itself and nothing more; a latent defect becoming patent is all that has happened ...”.²⁷

This opinion was not decisive for the case. However, the view was repeated in the Hutchins Brother case,²⁸ also quoted above in item 5.1.1:

²⁴ *International Hull Clauses at a Glance, Comparing the International Hull Clauses 01.11.02*, Hill Taylor Dickinson, 1st edition, November 2002.

²⁵ Arnould § 826.

²⁶ *Oceanic Steamship Co. v Faber* [1906] 11 Com. Cas. 179 KB, [1907] 13 Com. Cas. 28, Reports of cases relating to maritime law Vol X p. 515.

²⁷ [1906] 11 Com. Cas. 179 KB p. 186.

²⁸ *Hutchins Brother v Royal Exchange Assurance Corporation* [1911] 2 KB 398.

In this case the stern frame of the vessel had to be replaced due to shrinkage cracks caused by the use of inferior material by the manufactory. The owners claimed the cost of the repair from the underwriters, but the claim was denied by the court. Mr. Justice L. Scrutton held that the only damage was the latent defect itself, which by wear and tear had become patent. But the latent defect did not arise during the currency of the policy. It existed in 1906; the only change was that a previous latent defect had by wear and tear become patent. The court thus adopted the judgment of Mr. Justice Walton in the Faber case: The damage is not damage caused by a latent defect but is the latent defect itself and nothing more; a latent defect becoming patent is not within the words of this clause "damage to the machinery through a latent defect".

The same approach was accepted concerning the coverage for "breakage of shafts" in the *Scindia* case,²⁹ although the word "through" was at this stage replaced with "directly caused by".

In this case the ship was in dry dock for the purpose of renewing the lower half of the wood lining of the stern bush. As the propeller was being wedged off, the tail shaft broke owing to a latent defect in the shaft consisting of a smooth flaw extending downwards from the top of the shaft deep into the metal and involving about one half of the material.

The insurer admitted the loss of the propeller and consequential damage, but denied that the damage to the tail shaft was covered. The judge held that the breakage of the shaft itself was not covered: "It seems to me that proper reading (of this clause) is that the breakage of the shaft itself is not covered, nor can it properly be said that the breakage of the shaft is a loss or damage to machinery caused by the breakage of the shaft". It was further held that "What I have said in regard to the breakage of the shaft and the necessity for there being some damage caused by the breakage of the shaft other than the breakage of the shaft itself, seems to apply also to the case of a latent defect".

The result of these cases is that coverage for damage *caused by* bursting of boilers, breakage of shafts or latent defects does not provide coverage for a fracture or a crack that is merely a development of the latent defect (the defect becoming "patent"), but only for consequential damage to the ship or machinery. As the cracks or breakages that were not covered in all three cases occurred in the part where the original defect struck, it may be inferred that the result rests on a distinction between primary damage (fractures in the part where the defect originated) and consequential damage (damage or loss to other parts in the hull or machinery).³⁰ However, this view was challenged in *Promet Engineering PTE LTD v Sturge and others, the Nukila*, [1997] 2 Lloyd's Rep. 146.

The case concerned the mobile self-elevating accommodation and work platform *Nukila*, which was insured on the terms of the Institute Time Clauses, including the Inchmaree clause and the Institute Additional Perils Clause, which read as follows:

"The Inchmaree clause:

²⁹ *Scindia SS Ltd v London Assurance* [1936] 56 Ll.L. Rep. 136 KB.

³⁰ Hudson and Allen: *The Institute Clauses*, 3 ed., pp. 110-111.

- 6.2 This insurance covers damage to the subject matter insured caused by: . . .
- 6.2.2 bursting of boilers, breakage of shafts or any latent defect in the machinery or hull . . .

The Institute Additional Perils Clause -- Hulls:

- 1 In consideration of an additional premium this insurance is extended to cover
 - 1.1 The cost of repairing or replacing
 - 1.1.1 any boiler which bursts or shaft which breaks
 - 1.1.2 any defective part which has caused loss or damage to the vessel covered by Clause 6.2.2 of the Institute Time Clauses . . .
- 2 Except as provided in 1.1.1 and 1.1.2 nothing in these Additional Perils Clauses shall allow any claim for the cost of repairing or replacing any part found to be defective as a result of a fault or error in design or construction and which has not caused loss of or damage to the vessel."

In February 1987, fatigue cracks were discovered in all three legs of the platform. The cracks had developed to such a degree that the platform was in danger of collapsing and extensive repair amounting to Singapore \$ 903,148 were necessary. Analysis of the technical report disclosed that the fractures had their origin in certain welds which had not been properly profiled. In these locations there had been a concentration of stress which over a period of time had caused metal fatigue. The fatigue cracks had spread from the weld to the adjoining structures which the weld was meant to hold together. The bad welding amounted to a latent defect. The issue was whether the serious fractures which had developed from that condition amounted to damage to the hull of the vessel, or as argued on behalf of the underwriters, a mere manifestation of the defect.

In the Commercial Court, the judge referred to the cases quoted above and held that "if all that has happened is that a latent defect has become patent", there is no coverage under the Inchmaree clause. He concluded that in this case there was nothing which could be characterized as consequential damage to the vessel. He thus accepted the argument put forward by the underwriters that the insurer would only be liable if there was damage to a separate part of the hull or machinery and not merely to the defective part, and that a part for this purpose was one which was physically separable and performed a separate function from the other part.

This line of reasoning was not accepted by the Court of Appeal, which held that the extensive fractures constituted damage to the hull of the vessel caused by the latent defects (the inadequate welds). The court held that at the commencement of the period of coverage there was a latent defect in the welds joining the underside of the top plate of each spud can to the external surface of the leg tube. This latent defect had at that time also given rise to minute fatigue cracks in the surface of the tube in the way of the weld which could also be described as latent defects. These features caused extensive fractures in the full thickness of the tube extending in places both above and below the defective weld, extensive fractures in the metal of the top plating and bulkheads of the spud cans and other fractures at other locations. Such fractures were in any ordinary use of language damage to the subject matter insured, i.e. the hull and machinery of Nukila. It would be an abuse of language to describe the legs and spud cans as

merely defective. It was further held that this damage was caused by the condition of Nukila at the commencement of the period i.e. by the latent defects. The hull and machinery were damaged by being subject to stresses which they were unable to resist due to the latent defects, i.e. the wrongly profiled welds and the incipient fatigue cracks. The court also emphasized that the use of the word "part" in clause 1.1.2 of the Institute Additional Perils Clause provided no criterion for distinguishing between what was and what was not damage. The word "part" was capable of being used in a whole variety of ways depending on the context; the weld was a part just as much as was a bracket or bulkhead or plate or the totality of the leg structure. The use of the word "part" in the additional perils clause was normally simply to avoid the need to exclude from the indemnity to which the plaintiff was entitled if he proved a claim under the Inchmaree clause of deducting the cost of repairing or replacing the original defective part. It provided no guidance on the construction to be placed on the Inchmaree clause beyond emphasizing the need under the clause to prove that damage to the subject matter insured was caused.

It was also stated that a "policy of insurance does not cover matters which already exist at the date when the policy attaches. The assured if he is to recover an indemnity has to show that some loss or damage has occurred during the period covered by the policy. If a latent defect has existed at the commencement of the period and all that has happened is that the assured has discovered the existence of that latent defect then there has been no loss under the policy. The vessel is in the same condition as it was at the commencement of the period. Therefore, in any claim under the Inchmaree clause or any similar clause, the assured has to prove some change in the physical state of the vessel. If he cannot do so, he cannot show any loss under a policy on hull. ... If, however, damage has occurred, that does involve a physical change in the condition of the vessel and can be the subject of a claim under the policy. ... A further factual difficulty arises when the latent defect is some feature of the hull or machinery which creates an excessive stress concentration and therefore will lead to a condition of metal fatigue and the formation of fatigue cracks. No clear dividing lines can be drawn. A crack is itself one of the forms of discontinuity that can concentrate stress. It can be both the consequence and the cause of metal fatigue. Fatigue cracks not detectable by the exercise of due diligence are a typical example of latent defect. But it is equally accurate to say that fatigue cracks are the consequence of metal fatigue."

The judgment of the Court of Appeal in the Nukila case articulates a new approach to the interpretation of the phrase "damage ... caused by ... latent defect".³¹ According to the Nukila case, the distinction between "defect" and "damage" is not a question of damage extending to a part other than the one where the defect originated, but rather a question of degree, where a main point is whether the defect has caused any physical change in the vessel during the policy period. On the other hand, it is equally clear that minor fatigue cracks caused by the badly profiled welding is the latent defect *per se* and not damage caused by the latent defect. The Nukila case thus does not shed any light on what degree of physical changes in the vessel is required for the defect to have developed into damage.

As mentioned above, the stated purpose of the amendment of the Inchmaree clause was to reinstate the distinction between the latent defect and the

³¹ Hudson and Allen, p. 111.

consequential damage as this distinction was understood prior to the Nukila case. The point here seems to be that as the cost of repairing the latent defect is not covered, this is similar to excluding the defective part from coverage. The Nukila case does not make a distinction between the defective part and the damage, but it may be inferred that the badly profiled welds were the defective part. If so, the exclusion for the cost of repairing the latent defect seems to be similar to an exclusion for primary damage in Norwegian terminology. This conforms to the approach in clause 2.2.1 concerning bursting of boilers and breakage of shafts.

The English result here seems to be similar to the Norwegian if the underlying peril is an error in material which in itself can be characterized as "damage" in Norwegian terminology, i.e. fractures or cracks in the material caused during the manufacturing process which have not developed further. On the other hand, if the original peril is an error in design or a flaw in material that does not constitute damage, the development of the error into a crack or fracture is sufficient to trigger the insurer's liability under the Plan. In case of error in workmanship this will generally be covered both if the error immediately results in damage and if the error constitutes a flaw that develops into damage. According to the IHC, a mere fracture or crack caused by error in design, material or workmanship is not sufficient; the fracture must have developed, i.e. caused a physical change to the subject matter insured.

5.3 *Under which Policy will the Damage be Covered*

The starting point in English marine insurance is that where an insured peril operates during the period of the policy but the damage resulting from that occurrence has not been ascertained or reached its full extent by the time the policy terminates, the eventual loss is recoverable under the policy current when the casualty took place.³² However, this solution is more uncertain in relation to IHC clause 2.2, as what is covered here is "damage caused by" the defined perils. The wording here seems to imply that it is the resulting (consequential) damage that triggers the insurer's liability (incidence of loss in Norwegian terminology).³³ This solution seems to conform with the views in the Nukila case,³⁴ the Oceanic case³⁵ and the Hutchins Brother case,³⁶ all quoted above in item 5.2, that a defect that occurred before the insurance period started, but is discovered during the policy period before it has resulted in "damage" to the ship, will not be covered.

Apparently, the solution must be the same if additional perils coverage for the cost of repairing the shaft or correcting the defect is agreed to as this coverage is

³² Arnould § 830 and § 1138.

³³ Arnould op.cit.

³⁴ *Promet Engineering PTE LTD v Sturge and others, the Nukila*, [1997] 2 Lloyd's Rep. 146.

³⁵ *Oceanic Steamship Co. v Faber* [1906] 11 Com. Cas. 179 KB, [1907] 13 Com. Cas. 28, Reports of cases relating to maritime law Vol X p. 515.

³⁶ *Hutchins Brother v Royal Exchange Assurance Corporation* [1911] 2 KB 398.

tied to damage as defined in IHC 2.2.³⁷ This result implies that there will be no attribution of the primary damage to the previous insurer being liable at the point in time when the primary damage developed.

As a starting point, this solution could result in a temptation for the assured not to detect any latent defects in order to be fully compensated for any consequential damage under future policies. However, this problem is solved through the interpretation of "latent": If the defect before the consequential damage could have been discovered on such an examination as a reasonably careful skilled man would make, the defect is no longer latent and no coverage is provided.

6 Summary and some Conclusions

The approach to coverage for error in design, material and workmanship in Norwegian and English marine insurance is completely different. Where the Norwegian system is based on all-risk coverage implying a wide coverage for these errors, the starting point in the English system is the reverse: coverage is for named perils only, combined with a general exclusion for inherent vice. However, the differences in the result are somewhat less than the opposite starting-points may imply. Both systems afford a wide coverage for latent defects, even if the English solution obviously is more limited than the Norwegian. Consequential damages (in Norwegian terminology) caused by error in material, material fatigue that is not caused by ordinary wear and tear, and error in workmanship are, as a starting rule, covered by both systems. The Norwegian coverage includes error in design; on this point the English solution is more uncertain. Also, the relationship between IHC 2.2.1 and 2.2.2 seems to be unclear: It is argued that bursting of boilers or breakage of shafts caused by inherent vice is not covered by IHC 2.2.1. On the other hand, if bursting of boilers or breakage of shafts are caused by a latent defect in the machinery, this may apparently be covered by IHC 2.2.2 to the extent that the defect has caused "damage" to the ship.

The most extensive difference, however, is in the concept of damage caused by the defect. In the Norwegian system, a mere fracture or crack is sufficient to trigger liability for error in workmanship in general, and for error in design or material to the extent that the part not being in proper condition is accepted by the classification society, unless the crack or fracture is the original error (error in material and workmanship). In the English system, the liability is not triggered until consequential damage has occurred, but if so, the bursting of boilers, breakage of shafts or latent defects will be covered as well, according to the Additional Perils clause.

Under both the Norwegian and English system, the consequential damage shall, as a starting point, be attributed to the policy in effect when the consequential damage occurred. According to IHC, the same holds for the Additional Perils coverage. According to NMIP, the primary damage, on the

³⁷ According to Arnould § 830, this was different under the 1983 edition of the Liner Negligence clause as far as coverage for bursting of boilers and breakage of shafts was concerned, but the wording was different, see § 826.

other hand, shall be attributed to the previous period when this damage occurred, unless the assured and personnel with whom he should be identified with knew about the defect. In this case, consequential damage shall be attributed to the previous insurance period. Whether or not coverage is provided for such consequences will depend upon the rules concerning duty of disclosure and seaworthiness and will not be dealt with here. According to IHC, knowledge about the defect will result in the defect not being latent and thus excluded.

It therefore seems that the new IHC clauses do not provide a better coverage for latent defects than the Norwegian Plan, and also that the IHC is meant to be very similar to the previous Institute Clauses even if the approach to the coverage is changed from the concept of a part to a question of degree.

It may also be questioned if the English solution fulfils the need of the modern shipping community. The natural starting point for casualty insurance is that coverage is provided against external risk. For marine insurance this will typically relate to the perils of the sea and similar external causes. On the other hand, there is no prohibition against also providing coverage for inherent defects. However, this coverage raises a fundamental question as to what extent error in design or material etc. constitutes risks that should be insured.³⁸ As far as error in material is concerned, it seems to be agreed in the Norwegian market that both primary damage and consequential damage should be covered. The reason is that an error in material for the ship owner will be an accidental and unforeseeable event. There is no risk that the ship owner through coverage for such events could speculate against the insurer. In this case the insurance could also cover replacements that are requested by the classification society.³⁹

More doubts have been expressed concerning error in design. On the one hand, it may be argued that loss or damage caused by error in design normally will be unexpected and may result in losses entailing high amounts. Further, such errors may hit conventional ships and be caused by subjective errors made by the designer.⁴⁰ However, the problems are more accentuated when there is a development in design concerning hull or machinery which may lead to objective errors in design. It may be argued that the ship owner will normally only apply or develop new technology if the potential gain generated by this exceeds the costs of development and application of the technology. In order to secure an economic decision, it is necessary that all costs and risk factors are included in the calculation, including the risk of an error in design. If the risk of an error in design is transferred to the insurer, this may lead to a reduction in the estimated costs and to decisions which do not conform with economic efficiency. Also, the potential surplus gained by technological development belongs to the assured. A natural compensation for this is that he should also carry the cost of a potential failure.

On the other hand, if an error in design leads to a casualty, this may well have the same character of an accidental and fortuitous event as any other casualty

³⁸ For a more detailed discussion concerning the Norwegian market, see *Commentary to the 1964 NMIP*, p. 139 ff., Brækhus and Rein, pp. 110-113.

³⁹ Brækhus and Rein, p. 110.

⁴⁰ Brækhus and Rein, op.cit.

covered by insurance. Thus, the economic need for financing through insurance may be the same as for casualties resulting from other perils, for instance, heavy weather or faulty workmanship, as casualties caused by an error in design may be as difficult to foresee as other casualties. This comparison, however, is clearest if the error in design leads to damage in other parts of the insured object other than the part that is defective due to the error in design. This is the reason for the mentioned distinction between coverage for damage caused by a part not being in proper condition and the defective part as such. The starting point for coverage for error in design was coverage for consequential damage only. Today, however, it is also accepted in the Norwegian market that there may be an insurance need for coverage of the defective part. As it may be extremely difficult to distinguish between the "defective part" and damage to the rest of the insured object, this inclusion is also necessary to avoid legal and factual problems. The difficulties in this respect are clearly illustrated by the English court practice reviewed above in item 5.2 and seem to be a strong argument in favor of the Norwegian regulation even if other policy considerations are disregarded.