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Abortive repairs: Is it a new accident or the unfinished business of an old one?

The issue

The topic that I chose to address and wish to discuss with you is a dispute which not infrequently appears in practice. It may be the source of major disputes between the assured shipowner and the insurer and lead to protracted discussions.

The issue is very simple. A vessel has been struck by an insured peril and sustained recoverable damage. The repairs of the original damage failed shortly after they were completed. The surveyors of all sides agree about the cause of the original failure as well as the cause of the second failure and both causes are indeed insured perils. It is also common understanding that the defect that caused the second failure, or multiple subsequent failures, was introduced during the repairs of each preceding damage.

On one side, a shipowner who claims that any and all losses, arising out of the original peril including the unfortunate repairs, constitute one large claim because the second and subsequent failures would not have occurred if it wasn't for the original one. The underwriter, sitting on the opposite side, considers that the negligent acts, and/or the defects, which were introduced in the repairs of each preceding damage constitutes a new casualty, which should attract a separate deductible.

The scene is completed with the adjuster, in his solitude, pressed by both sides to decide how many deductibles should be applied.

In the fundamental principles of marine insurance one finds the duet "peril vs loss" which is instrumental in the application of the policy. The main purpose is to identify whether the particular

loss has been proximately caused by the subject peril. In order to identify whether the loss is included in the cover, the Marine Insurance Act 1906 in s. 55(1) states “... *the insurer is liable for any loss proximately caused by a peril insured against.*”. The Institute Time Clauses of 1983 have a similar provision at s. 6.1 which begins by stating “*This insurance covers loss of or damage to the subject matter insured caused by: ...*”.

The issue of abortive repairs is not about the discovery of the proximate cause of damage, not even which cause resulted to which loss. All these facts have been well established in the handling of the casualty and agreed.

It is not a case of concurrent causes because the two perils do not act concurrently in order to result to a single loss. It is not a case of contributory causes because the two perils result into independent damages. The vast majority of cases deal with the rules for the discovery of the proximate cause, amongst concurrent or contributory causes and thus are not directly applicable.

The real issue at hand is whether the causes of two or more independent losses are separate or not.

Looking at another feature of the same problem, **the defect responsible for causing each subsequent damage did not exist at the time that the original peril struck**. This defect would not have been introduced if it wasn't for the repair of the original loss. One may also say that the original peril run its course and caused a certain ascertainable damage to the vessel. If the assured had claimed on the basis of unrepaired damage the insurer would not have been responsible for any subsequent failure due to defects or negligence introduced/committed at the repairs of the original casualty, so why should the two casualties be connected and not separate?

The starting point of any such consideration is the application of the provisions in clause 12.1 of the ITC/83 and 95 and clause 15.1 of the IHC/03 for one deductible for “*each separate accident or occurrence*”. The interpretation of the subject clause is not as straight forward as it may seem.

In 1971 a special committee considered the interpretation of the deductible clause and issued a report in March 1972. The report has been an important guide in the understanding and application of the “*separate accident or occurrence*” for almost half a century. The most important conclusion of the report regarding the application of the deductible, supported by various examples, is the following:

- a) *One deductible is to be applied when either:*
 - i. *There is only one accident or occurrence from which the claim arises, or*
 - ii. *even though there is more than one accident or occurrence, these accidents or occurrences are not separate but form a connected set of events from which the claims arise.*
- b) *On the other hand, if one or more of the events from which the claims arise are the result of a new cause, not directly connected with the previous events, i.e. that which would be considered in law a *novus actus interveniens*, then more than one deductible is to be applied to the claims.*

Thus, one needs to consider whether there is a “*new cause, not directly connected with the previous events.*” and in this quest the report directs the reader to the definition of the *novus actus interveniens* in law.

Despite its invaluable guidance in the majority of casualties the report does not provide directions for the particular situation of abortive repairs which is repetitive failures of the same equipment after repairs, by clearly distinguishable causes.

This point was recognised by J.K. Goodacre in his well-known book Marine Insurance Claims where in this subject states: “*Strangely enough the examples in the Report did not touch upon the subject of negligence causing further damage after an insured peril has operated. Such negligence may be an act of omission in remedial action, or it may be an act of commission when, for instance, repairs are in fact undertaken but they are carried out badly. Since the circumstances are bound to differ widely it will be necessary to decide whether the negligence was still sufficiently associated with the original casualty to justify the application of only one deductible ... or whether a new intervening cause has arisen.*”

The matter of the application of the deductible was also addressed by Miles Duncan in his address as Chairman of the Association in 2001. I extract from the subject address a paragraph which reflects part of the issue under consideration:

“... the test of separation is to be applied to the negligent acts or omissions. It is important that the acts of insured negligence, ..., can be fairly described as a “connected set of events”, a pattern of negligence, rather than unconnected or separate acts of negligence.

Thus only one deductible is applied when damage results from a series of linked repeated acts or omissions of the same kind.”

The life of every practitioner in the insurance industry and especially of the adjuster is spend in a sea of grey zones. What a practitioner needs, when in such predicament, are clear qualitative guidelines in order make a fair, reasonable and well substantiated view.

During the following analysis a fundamental fact that one has to keep in mind is that we are talking about a highly technical matter. No human construction exactly reflects the theoretical design and calculations and the same holds for the repairs. The plain reality is that the final product, or repair, will certainly slightly deviate, which means that inevitably the structure will contain inherent flaws. Engineers combat this reality by either high standards of quality control and/or the inclusion of a large safety factor in the design. Of course one understands that the quality control of a normal vessel is not the same with that of a space station. Thus, defects are expected to be present during the manufacturing, or the repairs, but due to the safety factors and the quality control in the design it is expected that within the lifetime of the structure they will not result in any substantial failure of the structure or the machine.

The Marine Insurance Act 1906, identifies the term **reasonable** in section 88 as **a question of fact**. It is not reasonable to expect that a normal modern vessel will be repaired or constructed with space station standards but neither based on a blacksmith’s craftsmanship. The repairs to a vessel carried out of necessity in a remote place in the world, lacking equipment and expertise, cannot be

compared with the comfort, facilities and wealth of knowledge available at a modern shipyard that would carry out the same repairs to the same vessel. Different repair expectations are anticipated from the two extremes.

The relevant authorities

The first point of reference is the almighty wisdom of the Courts. However, neither in the English Courts nor in Canada, United States or Australia, did I manage to find a case law that will exactly fit the circumstances.

There are court decisions where the issue “*new intervening cause*” was debated and finally decided and can be classified in two groups. The first group are cases of personal injury, where after having received medical treatment, and either due to a malpractice or a subsequent accident the same injury either fails or, even worse, leads to permanent disability or death. The second group are cases of professional negligence where the same person committed the same act of negligence and caused in independent occasions loss or liability of the same kind.

The understanding is that the law of tort, as in personal injury cases, is not immediately transferable to the contract law of the marine insurance environment, so one has to be extra cautious when such transpositions are attempted.

The second group of cases does involve disputes over insurance contracts, however, the facts are fundamentally different than the cases of abortive repairs because it is not the same person that commits the same negligence, but different repairers, at different times, under different conditions.

Despite the lack of immediately applicable case law, one can draw valuable guidance from the reasoning of the available and well established authorities on the law of causation.

The authorities in the discovery of the proximate cause among concurrent or competing causes offer useful **indirect** guidance in order to construct the conceptual apparatus that will help us consider whether the accidents, events, occurrences are causally connected or not.

The most important authority is the Leyland Shipping v. Norwich Union Fire Insurance Society Ltd [1918], The Ikaria. The concept of proximate cause of the loss was explained by Lord Shaw as follows:

... Causation is not a chain, but a net. At each point influences, forces, events, precedent and simultaneous, meet, and the radiation from each point extends infinitely. At the point where these various influences meet it is for the judgement as upon a matter of fact to declare which of the causes thus joined at the point of effect was the proximate and which was the remote cause.

What Lord Shaw actually states is, don't look for easy solutions, like the dominant in the 19th century principle of “*last in time*” which ended once and for all with The Ikaria, or the “but for” principle.

One needs to identify all the strings in the net as well as the gravity of each string and then stand back, observe the whole map and assess which cause is the most proximate in efficiency for the particular loss. If the proximate cause is any other than the original cause then the causation link has been severed.

In the Reischer v Borwick [1894] where a tug was crippled due to a collision, she was temporarily repaired to save her from immediate danger and in the course of her removal to a place of repairs she was lost from ingress of water due to perils of the sea. The question was whether she was lost due to the collision or the perils of the sea. The Court of Appeal stated that “... *the consequences of the collision never ceased to exist, but constantly remained the efficient and predominating peril to which the damage now sought to be recovered was attributable.*”

In the case of the Owners of Steamship Singleton Abbey v. Owners of Steamship Palundina [1927], involved three vessels in the port of Valletta. The Palundina dragged her anchor and fell upon the Singleton Abbey which in turn struck the Sara. After the Palundina was clear of both ships and the Singleton Abbey and Sara were under steam with full manouvering control attempting to leave the port area, owing to her own negligence, the Sara was struck and sunk by second contact with the Singleton Abbey. The House of Lords affirmed the decision of the Court of Appeal that the action of the Sara constituted a new intervening cause and it was not connected with the original incident involving the Palundina.

In The City of Lincoln [1889] the Albatros was run over by the steamer City of Lincoln and as a result she damaged and lost essential navigational equipment. Immediately the master sought to reach the nearest port of refuge navigating under difficult circumstances. The Albatros without any negligence of the master was grounded and abandoned. The Court of Appeal held that the loss of the Albatros was “... *the natural and reasonable result of the negligent navigation of the steamer and that the attempt by the captain of the barque to avoid further loss could not be considered unreasonable conduct severing the causal link between breach of duty and injury.*”

In the US Courts a similar question arose in the case of the Exxon v Sofec (1997). The tanker Exxon Houston was delivering oil in a single buoy pipeline when due to severe weather the connection with the single point mooring broke. The captain was offered assistance several times from the USCG which he repeatedly refused. Following the breakage of the connection the captain of the Exxon Houston, for three continuous hours, made extraordinary negligent and ill-advised acts and omissions which finally lead to the stranding of the vessel on a charted reef. The Court of Appeal confirmed the decision of the court of first instance which found that the negligent act of the captain of the vessel constituted a superseding cause (the US equivalent of new intervening cause) responsible for the grounding of the vessel. The master was deemed to have had ample time and sufficient resources, subsequently to the forced disconnection, to take full control of the vessel and avoid the grounding.

What is the common background that can be drawn from all above mentioned cases considering the issue of new intervening cause? The captain of the Exxon Houston as well as the captain of the Sara in the Singleton Abbey case following the casualty, were put in a position of relative safety. They had at their disposal full control of their vessels, there was no urgency and their vessels were not handicapped by the original incident. The captain of the Albatros was in a diametrically opposite situation, his vessel was damaged and due to the original casualty he lacked the means to properly

control his vessel. In short, in the Exxon Houston and Singleton Abbey cases the vessels were clear from the shadow of the original incident, and any new peril that struck them was not influenced by the original peril, whereas the captain of the Albatros up until the final grounding of the vessel was struggling to regain control of the vessel, control which had been lost due to the collision with the City of London and never regained before the grounding.

A similar result could be drawn for The Ikaria and the Reishcer v. Borwick. The shadow of the original accident was still hanging over them when they were hit by the subsequent peril.

Both vessels were brought structurally to a critical situation due to the original casualties and never attained a state of safety from their original injuries.

The technique

Putting in practice the wisdom of the jurisprudence for the particular circumstances of abortive repairs the following factors should be ascertained in order to deduce whether the second failure is due to a new intervening cause or causally connected with the initial peril.

- **Foreseeability:** Is the cause of the second damage, in all probability and considering the circumstances of the first repairs, something that one would reasonably expect to be introduced into the structure?
- **Likelihood:** Is the defect that caused the second damage something that, if known, one would likely expect it to cause such a failure of the repairs?
- **Frequency:** What is the frequency/history of this particular recurrent abortive failures?

The test of foreseeability mentioned above is not of the same kind as the one addressed in the Polemis v. Furness which was later overturned in The Wagon Mound (No.1). It is not an assessment of the remoteness of damage and whether the final extent of the loss would have been reasonably foreseeable at the time of the original peril.

All three dimensions are independent of each other and aim to weave the causation map, the causal net referred in The Ikaria, from which one will distinguish whether the causal link is strong enough to consider the original peril as the proximate cause of the subsequent failure or the chain has been broken by a subsequent event.

To avoid a situation where we think we have the answers but the questions are wrong, it is of paramount importance to identify the right questions. Once the right questions have been enquired the answer will lead straight to the heart of the issue under consideration.

All three questions are highly technical and can only be answered by a technical expert.

The below analysis attempts to demonstrate the importance of each parameter.

- **Foreseeability**

Foreseeability. This is the question of how reasonably foreseeable was that the process and the circumstances of the first repairs would introduce a defect in the structure such as the one that was found to have caused the second failure. Conversely, given the circumstances of the original repairs how foreseeable was that a defect, or negligence, of the kind that triggered the second damage will be introduced/committed?

The question is NOT how foreseeable is the resulting second damage arising from the original peril, but how foreseeable, under the particular circumstances of the first repairs, is that a defect of such nature and magnitude will be introduced in the structure.

The ends of the whole spectrum of the degrees of foreseeability can be demonstrated by the following examples.

The picture below is the fracture surface of a propeller blade.



The defective repair is obvious in the body of the blade and the fracture cuts straight through the whole depth of the welding. The repair of the casting defect introduced microstructural faults in the parent metal which with the normal stress loading of the blade propagated to a full crack. The original repairs were carried out by expert welders, under continuous class supervision, in a properly controlled environment with pre and post welding heat treatment, by one of the largest propeller manufacturers in the world and finally the result was approved by rigorous non-destructive tests.

Compare the above picture with the following.



This is again a propeller blade which had been repaired and later developed a crack in service. The owners had recently purchased the vessel with a class notation that the propeller had been satisfactorily repaired three months before the change of ownership. The part of the cracked propeller blade was cropped and was sent for a metallurgical analysis. When at the metallurgists' laboratory, the cracked surface was dissected in order to expose the extent and nature of the previous repairs.

The lack of professionalism of the repairers as well as of the people that should have assessed and confirmed the quality of the welding is obvious. The manner in which the repair had been conducted is not just negligent it could better be described as criminal. The metallurgist indicated that this is not a case where the defect evolves into cracks, the repair itself must have been full of internal cracks before the vessel was put in the water. However, the repairers should be congratulated for the perfect polishing of the blade surface which visually concealed what was underneath.

The two photos are extreme examples of how foreseeable the inclusion of a defect is during the repairs. It is reasonably foreseeable that even under the most perfect conditions a minor defect will be introduced in the structure during the repairs. However, it is not foreseeable at all, that a repairer will be so grossly negligent, or even that he will intentionally carry out repairs which will include a defect of such magnitude.

Another example in foreseeability is with the most frequently encountered cause of generator engine failures, negligence of repairers. The most common form of negligence is insufficient or inappropriate tightening of the connecting rod bolts. It is a foreseeable mistake that happens either during the overhauling or during repairs. A mistake of this nature cannot be compared with a repairer who forgets to install a connecting rod bolt altogether. The later cannot reasonably be considered a foreseeable negligence.

- **Likelihood**

Likelihood: likelihood is a separate dimension of the same issue. Likelihood assesses the probability that the particular defect, which was introduced in the preceding repairs, will cause damage to the structure.

Before analysing likelihood in practice, it should be made clear that it is not the same with foreseeability. The issue was addressed in the non-marine case of the Home Office v. Dorset Yacht Co. [1970] when trainees avoided supervision, boarded, cast adrift and damaged the plaintiffs yacht. Lord Reid in the House of Lords posed this question:

Is it foreseeable or is it such a degree of probability as warrants the conclusion that the intervening human conduct was the natural and probable result of what preceded it? There is a world of difference between the two. If I buy a ticket in a lottery or enter a football pool it is foreseeable that I may win a large prize – some competitor must win. But, whatever hopes gamblers may entertain, no one could say that winning such a prize is a natural and probable result of entering such a competition.

Thus, in practical terms the defect of the first picture has a low probability of causing a failure because it is of such magnitude and nature that even if known, a technical expert would have advised that it is highly unlikely that it will cause any failure. On the opposite side of the spectrum, the defect in the second picture has a high probability to cause failure almost to the point of mere certainty.

Equally, the incorrect tightening of a connecting rod bolt has a probability to cause damage. However, depends how severe the incorrect tightening was. In the other extreme, the completely loose bolt will certainly cause severe damage.

As another example, a vessel's engine was constructed with a large number of manufacturing defects. When the first defect caused severe damage to the crankshaft and the unit was dismantled and sent for repairs it was discovered that the maker had introduced during the manufacturing defects of such kind, like different size bolts and wrong dimensions which were entirely unforeseeable. However, the likelihood of failure of the engine because of these defects was very low, mainly because the subject defects were contained in non-critical equipment or due to the fact that the design had such a large safety factor that it could accommodate such defects. The independent design defect that actually caused the severe damage was unforeseeable and with high likelihood of causing a failure.

As a further example, it is reasonably foreseeable that a crankshaft which is transported ashore for repairs, may sustain damage during the transportation which is entirely alien to the latent defect that caused the first damage. However, in some places where the shipyards resemble more a blacksmith's workshop the likelihood of sustaining such damage is higher than in advanced quality shipyards.

- **Frequency**

Frequency: The third dimension is frequency. Obviously there cannot be a certain number allocated. The same damage can be repaired several times and yet fail again. It would be hard to imagine that the circumstances of each repair were identical. Even if so, at some point the losses cease to be a fortuitous risk and become a certainty.

If all reasonable opportunities were given, at every occasion, to carry out repairs to the preceding damage and every time a foreseeable defect was introduced by somebody's negligence that caused the repairs to fail again, then a reasonable man should stand back, observe and weigh all repairs carried out and negligent acts introduced and cut the Gordian knot at a place in the sequence of the events where one could reasonably say that as from this point-on the new defect has severed the casual link and it is a "new intervening cause".

The following example demonstrates the problem of frequency when dealt in isolation from the factors of foreseeability and likelihood mentioned above. A vessel strikes the berth causing a very mild damage to the hull. The small indentation is repaired by a new insert plate whilst the vessel is conveniently alongside a repair berth. The welders by accident did not use low hydrogen electrodes which should be used for high tensile steel. A month later the welding of the insert plate fails and causes a larger but still manageable crack that affects the frames and a couple of brackets. Since the repairs are above the waterline and the vessel does not have any urgent commercial obligations, owners effect full repairs alongside a berth. This second repair consists of replacing the affected brackets and part of the frame together with the insert plate. During the fitting of the brackets though a small misalignment was introduced. A couple of months later, during heavy weather, the frame in the particular area is shredded and the ship's side shell develops a large crack which, due to the heavy sea, allows water into the engine room. The vessel immediately deviates to the nearest port of refuge in order to carry out urgent and extensive repairs.

All repairs in isolation contained reasonably foreseeable defects. All defects had a reasonably low likelihood to cause future failure of the structure, but apparently they all did. The severity of the loss in each of the three cases was increasing. All repairs were carried out by professionals, working in reputable workshops with full necessary certifications and class approvals. Yes, there were three independent acts of negligence, of the master, of the welder and lastly of the fitter, but were they separate?

Now, considering the whole story, could a reasonable man say that it is reasonably foreseeable as well as likely, that the initial bump on the dock will result to a whole frame shredded as well as large parts of the side shell cracked? Could somebody say the same for a negligent welder who grabbed the wrong box of electrodes to weld a small insert piece? Or could also one reasonably claim that the negligent fitter that missed the alignment of the new brackets by few millimetres has caused the shredding of the frame and the opening of the side shell?

How many separate accidents can one identify in the above story?

This is not a case where the repairs were carried out under unusual circumstances or the only option was to use semi-skilled workers. This is also not a case where one could say with absolute certainty that the defects would cause the failure of the structure. But they did.

In a case like this, where there is a low probability that substantial defects can be introduced and a low likelihood that the defects introduced, even if known, will lead to failure, if after all the structure fails from such defects there may be a basis to consider that each accident is completely separate.

If one considers that this approach is harsh then one should also consider whether the reverse question is reasonable. If one knew nothing about the first two incidents and was invited to consider the last extensive repairs of the ship's structure due to the misalignment of the brackets at which time the owners declare that they also wish to claim the cost of the two previous failed minor repairs because they consider them all one big parcel starting with the little bump, would this person reasonably consider that the substantial damage of the last failure, which probably put the vessel at risk, is the natural result of the initial bump without any severing of the causation link? How reasonable does this sound?

Furthermore, as in the cases of the Exxon Houston and the Singleton Abbey, in every repair opportunity, the circumstances were sufficient for a flawless (within reason) repair process, so, any defect introduced during those repairs may reasonably constitute a new intervening cause.

Another parameter that transpires when examining the frequency of the failures is the time between them. If the repairs have lasted for considerable time (years), during which time they have been subjected to the normal labour of the structure at sea, the view that the loss is the solid result of a defect introduced years ago, is not impossible to substantiate but it runs the risk of straining the thought process to unreasonable territories.

...one example to rule them all and in the light bind them...

Lastly, let's examine a final example where all three parameters exist.

Consider the same vessel in the "frequency" example, but the original repairs of the small bump are carried out in the middle of the winter in a remote port, under severe weather, by a local team of welders of an unknown firm, simply because there is a common understanding that this was the only reasonable alternative. The welding of the high steel insert plate is conducted with usual plain electrodes without any heat treatment although the correct instructions have been provided.

The surveyor that may have attended the repairs, or the owners' superintendent, certainly would not feel entirely confident although the work would be done theoretically "by the book" and for such limited damage temporary repairs are no different than permanent repairs. The second failure thus would not come as a surprise to anyone.

The second repairs are carried out at a reputable yard by professional welders, under the proper conditions and supervision, albeit, they fail again in the aforementioned manner and due to the same cause.

In this hybrid scenario, like the captain of the Albatros, like the vessel Ikaria and the tug Rosa in the Reischer v. Borwick, because of the peculiar circumstances of the first repairs the vessel remained under the continuous shadow of the structural failure inflicted with the initial bump, notwithstanding that "in theory" repairs had been carried out admittedly under unusual circumstances.

Under those adverse conditions, it is reasonably foreseeable, that a defect might have been introduced in structure. The wrong electrodes and the lack of any heat treatment made the likelihood of a failure arising from the defective welding, if known, very high. Under such circumstances one could reasonably consider the initial repairs to the bump and the subsequent repairs to the crack of the insert plate to constitute one single accident.

However, when the vessel was in the hands of highly qualified technicians, under optimum conditions and supervision, as during the second repairs of the insert plate and the brackets, the introduction of a defect such as a misalignment of the brackets can reasonably be considered a *novus actus interveniens* which severs the chain of causation and thus gives rise to a recoverable but independent casualty.

In order to complete the picture of abortive repairs it should be mentioned that there could also be a different kind of failure during the repairs. The machinery or structure may fail again not only due to a defect introduced during the repairs. It could also fail because the original cause of the damage was not corrected and the machinery is damaged again in the same spectacular way.

There have been many occasions where the source of the problem was not identified during the repairs and the structure or the machinery failed again right after it was put in service. An example could be the failure of a crankshaft, or a shafting system, which could be due to misalignment, or deformation, of the supporting foundation. What are the principle technical questions to be considered in such cases?

The technique and its application is exactly the same. Foreseeability, likelihood, frequency.

Given the circumstances of the first repairs, how foreseeable was it that the true underlying cause of the original damage will not be discovered or properly investigated? Given that the core source of the original failure remains alive and still hidden inside the machine or structure, how likely is it that it will cause another failure?

The expert opinion in the above two questions differs given the particular defect and the particular circumstances.

Let's take for example the case of a vessel that sustains bottom damage in way of her engine room. After a short period a main engine main bearing fails. The chief engineer investigates the problem whilst the ship is immobilised in the middle of the Pacific Ocean and concludes that the failure was due to some latent defect or lack of lubrication. The bearing is replaced and the voyage continues to the next port. The repairs have been considered permanent until a short time later when the same bearing fails again. The owners remove the vessel from service and direct her to a reputable shipyard where the services of a makers' service engineer are available. The service engineer makes a serious error of judgement and opines that the second failure was due to the improper tightening of the bolts by the chief engineer. Inevitably the bearing fails again and at the final repairs the investigation is far more detailed. The distortion of the ship's bottom and consequently of the main engine foundation is discovered and corrected.

Three repairs to the same unit and the first two failed to identify the cause of the problem. Are these three separate casualties?

In all occasions the people in charge of the repairs thought that they had rectified the problem, however, in the first two the likelihood of re-occurrence was evidently very high.

How foreseeable is it that the chief engineer, in the middle of the ocean, will most probably fail to identify the cause of the failure? He probably did not have the tools and/or the expertise to deal with problems of such complexity and such knowledge was not reasonably expected from him.

How foreseeable is it that makers' service engineer at the comfort and with the facilities of a reputable shipyard missed to investigate such defect?

The first two failures can reasonably constitute a single casualty, however, at the time of the call at the yard before the final failure, the vessel cannot be considered to be under the shadow of the original peril. The service engineer's error of judgement or gross negligence or incompetence, etc. is serious, it may sever the causation chain and constitute a new intervening cause.

Conclusions

The three parameters that have been introduced in the above analysis and are recommended to investigate when confronted with cases of abortive repairs are by no means quantitative.

The aim of the three parameters is to provide a structured qualitative approach and equip the adjuster, or claims' practitioner, with the tools to weave the web of the proximate causes and conclude whether a new intervening cause has been introduced.

It would not be far from the truth if one says that the test that the below parameters attempt to give shape to is to describe the expectations of that one should have from the repairs, at the time and under the conditions that they were carried out.

The Frequency provides the first indication of the breadth of the web.

How many times has the particular part failed, when and why?

The Foreseeability test operates to assess whether the particular kind of defect or negligence is reasonably expected given the circumstances of the preceding repairs.

Is it reasonably foreseeable that a defect or negligence of this kind can be introduced/committed given the particular circumstances of the preceding repairs?

The Likelihood does not operate independently but functions as a modulation factor together with the foreseeability.

Assuming that a defect or negligence of this kind has been introduced / committed during the repairs, what likelihood is that it will lead to another failure or the same part?

For a defect which has a high foreseeability to be introduced in the structure during the particular circumstances of the repairs and high likelihood to cause failure there may be a strong thrust to consider that it does not break the chain of causation and the original peril is still the proximate cause of the second failure.

A defect which has a low foreseeability to be introduced in the structure and high likelihood to cause failure is a good candidate for a **new intervening cause**.

The grey zone is when a defect is reasonably foreseeable, not likely to cause damage and despite the prognosis it causes severe failure. Applying the above parameters we are looking at a highly foreseeable defect which even if known, would have a low likelihood to cause a failure.

Maybe in these few cases the subject design is wrong or the technical experts erred in the quality control systems or the repair specifications. Apparently there is an inherent flaw in the design of the part itself, or the planning of the repairs.

If, in such cases, the reason for the recurrent failures is an inherent vice, is there anything fortuitous about the failure? Is this an insurable risk? And if it is, what does it say about the technical experts responsible for the repairs that observe a pattern of identical failures and still apply the same recipe? Would this qualify as an error in judgement that may sever the chain of causation?

The expectation of a failure due to the negligence of top quality repairers, with the facilities of modern well equipped shipyards, resources, planning and time is very low. But when it happens one should think of the Ikaria, the tug Rosa, the masters of the Exxon Houston and the Singleton Abbey and contemplate whether the negligence that occurred in the ideal conditions of the above described repairs severs the causation link.

Applying the method of *proof by contradiction* used in mathematics, if one accepts that whatever happens during the repairs of a recoverable damage can always be referred back to the original insured peril that caused the damage, then this implies that the insurer perpetually becomes a guarantor of whatever fault the repairers may commit. Does this make sense? What if the repairs fail after 5 years is it reasonable to refer it back to the original peril? What if they fail again and again and again? When does it stop?

Lastly, in all fairness one has to consider the reasonable outcry that comes from the lips of the assured whilst we are debating the question of separate accidents: *What did I do wrong and you punish me with extra deductible(s)?*

The answer could be: *Nothing dear shipowner. You did nothing wrong. The fact that you acted as a reasonable and prudent uninsured was an assumed and accepted fact in the whole discussion. If your policy did not provide for the application of one deductible per accident or occurrence we would not be here discussing what the definition of one accident or occurrence is.*