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Can Engineering (Re-) Insurers help reduce Loss (MD and BI)?

Prepared by:

Ilona Strauß, Munich Re CIP, Munich (Chairman)
John Timothy, Infrassure, Zurich
Christian Roch, Generali Versicherung AG, Wien
Joseph Haddad, Precision, Beirut
Ulf Ohlstedt, Zurich SAL, Stockholm
Olaf Anhalt, R+V Re, Wiesbaden
Javier Rodriguez, (Re-) Insurance Consultant, Mexico City

EC Sponsor: Christoph Hoch, Munich Re, Munich

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Can Engineering (Re-) Insurers help reduce Loss in Material Damage and Business Interruption?

Executive Summary

- Is it possible to reduce an indemnifiable loss?
- Is it possible to align the interests of all contracting parties after a loss?
- Are there opportunities for loss mitigation post loss?
- What challenges can one encounter?
- Are there pre loss measures available to assist any post loss mitigation?
- What contractual / legal obligations does one have to consider?

The purpose of this paper is to address the above questions and to propose practical solutions on loss mitigation.

There will never be one perfect solution. This paper attempts to demonstrate the variety of measures available.

1. Introduction

For the purpose of this paper a loss is understood as material damage and consequential losses under all Engineering lines of business[1], such as property damage (PD), machinery breakdown (MB) as well as business interruption (BI), delay in start-up (DSU) and advance loss of profits (ALoP). It should also be understood that where this paper says Insurer(s) this shall include Reinsurers as well.

The starting point for the measurement of the loss amount is not the originally claimed or estimated amount but the reasonably incurred costs to repair or replace the damaged property to put the Insured in the same operating situation he had been immediately prior to the loss, or, in respect of BI/DSU/ALoP losses, in the same position he would have been, had the loss not occurred.

As the general term "**loss mitigation**" can be interpreted in different ways, it needs to be defined what is meant by this term for the purpose of this paper. Generally, the focus is the reduction of the insured loss (amount) for both the PD and the time element. As outlined above, it is not about coverage analysis, as the starting point is only the covered loss. In the first instance one might only think about post loss actions such as finding alternative suppliers, repair methods or alternative ways of operation that can be adopted. Some may consider subrogation actions as a post loss tool for mitigation, but this option is not a subject of this paper.

There are however several pre loss mitigation measures and necessary preconditions that are available to enable effective loss mitigation. The above mentioned measures will be described in more detail in this paper and we will outline several possibilities how to mitigate a loss which can be considered separately or even cumulatively as the case may be.

It is to be noted that between the occurrence of a physical loss or damage and the gradual realisation of a financial loss due to business interruption / delay in start-up there usually is the span of time to be made use of for possible measures of loss mitigation / minimisation.

It is clear that the Insured knows his business/plant intimately and he should be capable and willing to mitigate a loss better than any other party. One might think that the same applies for the (main) contractor of a construction/erection project. However, sometimes it can

[1] Project Insurance Covers (Construction/Erection) and Operational Covers

appear that the Insured's efforts are not optimal. Although the Insured knows his normal business, e.g. how to operate and how to carry out regular maintenance, they might lack the experience of how to react on sudden losses, how to repair an (unusual) damage and who to contact. An Insured therefore might also run the risk not to focus on the critical path in terms of costs and time.

Therefore the question is if Insurers can help reduce a loss and whether they can be seen to be a value adding party. Claims handling of losses is a complex matter and usually requires the assistance of a loss adjuster, however the wide range of loss mitigation measures may involve high risk elements and require the Insurer to understand and decide on measures he would support or not, and he needs to closely follow up actions, development, and timing to keep control of the loss mitigation process and its success and the costs involved, or intervene as may be required.

Consideration will also be given to which extent general preconditions need to be fulfilled to assist in post loss mitigation. These can be also "formalities" such as policy stipulations or a claims protocol and their impact on loss mitigation. An important factor also is what law and jurisdiction is applicable and what impact this can have on the policy stipulations.

Another topic of this paper is what challenges one can encounter especially touching on guaranty issues and new technologies but also on the limits of loss mitigation.

For easier reference please find an overview table of possible loss mitigating measures, their impact and potential risk (Toolbox) in ***Appendix A****.*

It is quite obvious that the Insurer and the Insured can have different interests and agendas. Therefore the interests need to be aligned in order to ensure a mutually acceptable solution. A partnership approach therefore is key to successful loss mitigation and the close cooperation between the involved parties is necessary. Ideally a trustful relationship is established before any loss materialises to ensure a good collaboration after a loss occurred. No doubt transparency and openness of all parties is essential for the successful conclusion of any loss.

2. Insurance interests of the contracting parties

If a loss cannot be avoided it should be in everybody's interest to minimise the loss amount and to shorten the timely impact as much as possible.

It is always in the Insured's interest to get his claim paid by the Insurer and it is Insurer's interest to pay what he owes.

Although one might think these two interests are fully aligned there are still a lot of challenges which appear due to the fact that the Insurer's and the Insured's incentives are different and might even be contradictory, as they can very well focus on different aspects and risk scenarios. It is therefore of most importance that the two parties act toward a common goal and keywords to reach this are "cooperation" and "teamwork". If the discussion involves only two parties the probability to reach an agreement is of course much higher than if several contractors working on a construction project are involved in the discussion. With an honest and open discussion with all relevant facts on the table the probability to find a mutual understanding increases considerably.

An issue that quite often can lead to some discussion is how the repair work after a loss should be performed; can the damaged equipment be repaired or does it have to be replaced with new? It is of course impossible to answer the question once and for all but the important thing is that the two options have to be evaluated closely, taking into consideration time aspect, repair method, cost etc. and to discuss between the parties in order to reach an agreement which is acceptable to all involved. *Please refer also to Chapter 4.2 for more details on this topic.*

Obviously the incentive for shortening the downtime period is mainly cost driven considering the financial impact, but from the Insured's perspective there is also a commercial aspect. It is important for the Insured to be back in normal business as quickly as possible after an interruption. If not, clients might be lost forever as they will have searched and found alternative suppliers for their needs. The planning to solve this situation including conventional risk management is therefore just as important or maybe even more important for the Insured than the insurance policy as such. However, the Insured's willingness to use all possible efforts which are of course cost intensive might differ especially regarding shortening the downtime period. This definitely depends on the question whether BI cover is granted or not. If BI cover is in place, it can also make a difference if the BI waiting period (often called Time Excess) will be exceeded or not. The Insurer might be more interested in assisting in loss mitigation measures, if the waiting period is likely to be exceeded, whereas the Insured might show less interest, if the interruption period will exceed the waiting period and, in any case, will not be reduced to less than the waiting period. However, loss mitigation efforts are not just in respect of reduction of the interruption period but also in respect of the loss amount per day.

The usual inclusion of cover of Increased Costs of Working in BI / DSU policies (although limited to the amount of BI loss thereby avoided) is a great incentive for the Insured to take action in mitigating / minimising a possible BI loss.

3. Loss Mitigation Measures

Obviously the Insured knows his business (works being carried on or machinery/plant) best and should be best able and willing to mitigate his loss, analysing with the Insurer and loss adjuster all possible mitigation measures and implementing them even if they are not common practise.

The possible measures and options outlined in this chapter merely describe what could be done in a given case as a remedial action; it is also possible that two or more of these or other measures can or need to be used independently and/or in combination, but the possibilities and/or necessities are infinite, and every case and its circumstances are different.
For your easier reference please find an overview of possible mitigation measures and their impact in ***Appendix A****.*

3.1 Pre Loss

Leaving aside the formal preconditions, such as the policy wording and a claims procedure the measures described in this chapter are the factual activities which shall be considered prior the loss occurring and can help to contribute to mitigate the loss once occurred.

Some measures, like those described under 3.2.12 to 3.2.14 can be considered and used both as pre-loss and post-loss measures, because they are facts that need to be sought or known during the underwriting.

3.1.1 Risk inspection

The best way for an Insurer to be in a position to judge and evaluate risks, as well as the risk dynamics during operation, erection or construction, is to know the insured property or project as widely and precisely as possible. He also needs to be informed, especially of the maintenance of and changes in operating machinery, as well as of the progress of works, as opportunely, adequately, and permanently as possible, because only this way can the Insurer be aware of the condition of the insured machinery or plant and/or the progress and status of insured works.

Only this will enable the Insurer to design the probable measures to be taken in order to carry on or accelerate the damage repair and reduce the consequential loss, so that these measures can be analysed and agreement reached with the Insured on their implementation. Especially in case BI/DSU/ALoP cover is granted, the close communication between

the parties is necessary to keep track of all insured and uninsured events which (could) cause an overall delay.

To get a deeper insight it is probably not sufficient to rely on the information provided in the submission. Therefore it is common practise to take out risk inspections, ideally on a regularly basis. Depending on the in-house expertise of the Insurer this can be done by internal staff but also external companies might be hired to take out site surveys and to provide Insurers with written reports. Alternatively to site visits the desk top review of other available reports should be an option.

Such Risk inspections are not only helpful to evaluate the risk properly but over a longer time period also to track the Insured's operational skills and the level of quality how a plant is operated. The review of quality assurance and quality control activities, as well as the review of critical activities, such as testing phase or heavy lifts enables the Insurer to obtain valuable risk data.

Especially in the project business it is essential that risk inspections take place periodically. This can be done by an external project monitoring company, but also or even additionally by internal experts.

3.1.2 External/Internal expertise

Having the best and most skilled experts available could be regarded as a pre loss measure and this does not only apply with respect to measures like loss prevention and risk analysis. If there is a clear understanding of where to obtain the needed expertise for certain scenarios this knowledge is very beneficial when the loss occurs.

Insurers have different approaches if and to which extent they want to build up internal expertise and to which extent they want to use external experts. Several factors, such as costs, level of trust, efficiency etc. need to be taken into consideration.

Thus, the use of their own or external experience to develop such expertise internally and a data bank must be a continuous activity of Insurers, in addition to the identification and location of external expertise in the same technical/technological areas as those in which the Insurer is involved.

Special importance should be given to the evaluation of local expertise wherever it is needed. This is not only a matter of costs, but especially because local experts usually know the mentality, culture, language, market, possibilities, ways to handle the issues arising continuously out of a loss. Also their local network and knowledge of the client as well as their relationship and continuous presence in country are important factors.

3.2 Post Loss

3.2.1 Experts

As mentioned above, expertise is important for the operation of engineering insurance, but it becomes crucial in loss handling. Having the right experts with the required skills and expertise to handle a loss is key.

The loss adjuster shall have this expertise (as a person, as a firm, internally and/or externally) but also the ability to actively steer and handle the loss management process. It is desirable and usual for the person adjusting the loss to have a certain amount of expertise, while the in-depth and specialised knowledge of critical issues are gained from one or more external experts. *Please also refer to Chapter 6.3 where the matter of nominating an adjuster already in the policy/claims protocol is addressed.*

When talking about experts one should therefore not exclusively think of a loss adjuster. When a loss is likely to cause a delay or business interruption, forensic accountants are needed. Certain specialised experts shall be instructed to analyse cause and origin, e.g. metallurgists or to do other analysis to assist in the loss handling, e.g. calculation of hypo-

thetical repair works and time schedules. Also other experts, such as specialist engineers might add value to the adjusting process.

It is recommendable that Insurers set up an expert list, collecting reliable experts and their contact details all over the world which should be constantly updated and developed.

3.2.2 On site repair supervision

It is known that the repair and replacement of damaged property and the best way to perform it as safely as possible, at the most reasonable cost, in the shortest time, and with the best results, will cause lengthy discussions between the parties. An established way for the Insurers to help accelerate the start-up after the occurrence of damage to the benefit of all parties is to have a repair supervisor on site. The aim is to record all repair or replacement works projected and in process, to discuss them with the Insured, suppliers, contractors and subcontractors, evaluate their necessity, adequacy and costs, as well as opportunely provide advice and report - in writing - to the Insurers. In certain cases it might even be considerable to have a full time representative on site for one or several claims, especially during the critical repair phases.

With such supervision it is also possible to achieve the timely identification, analysis, discussion and evaluation of the betterments and/or error corrections being carried on together with or additionally to the repair and replacement of the insured damage.

All of these activities in progress during the repair and replacement allow the Insured to quickly perform the works and the Insurers to be in a position to discuss with the other parties and to establish a founded, firm and clear position in respect of each work, cost and consequential loss claimed.

The cost of this supervision might be considered high, but the possible costs of not having the possibility of a timely discussion and clarification of any disagreement, including the possible costs of a dispute, are certain to be much higher, not only in terms of money, but also in terms of reputation.

3.2.3 Consider “special” tools for special kinds of insured property

Sometimes tailor-made and unique solutions need to be considered which might only be available on an individual case basis.

Examples for such notably situations might be:

- If damage occurs to toll roads/bridges (in normal use or during their construction/extension), the construction of an alternative road or connection should be considered, depending on the circumstances of the damage to the property or construction works.
- Rebuilding or relocating a plant or a part of it at/to another location which might be not as cost and time consuming than the repair of an entirely destroyed plant but might be a very restricted option in practise taking into account necessary approval procedures and requirements, etc.
- If damage occurs at an operating plant it could be considered to obtain the replacing part/machine from another plant or construction project already having the part/machine on site. Depending on the time schedule of the plant under construction ordering a new part might not delay the start up or at least not so significantly as the interruption period at the operating plant would be.

No need to say that such measures can only be successful if the involved parties are cooperative, which will always depend on the incentives.

3.2.4 Expediting measures

Cost necessary to accelerate the repair or replacement of the damaged property in order to reduce or avoid the interruption of operation of insured plant or delay in the scheduled start-up of the insured project are considered as expediting costs.

The most common types of expediting possibilities applicable in most loss scenarios are:

- increasing the number of workers per shift,
- using additional shifts (overtime, night work, work on public holidays)
- air or express freight instead of normal freight for the shipment of parts and/or equipment or even chartered transports
- paying a client of the Insured's supplier to transfer to the Insured his turn to be supplied with a machine or part necessary to replace or to repair the damaged property,
- paying third parties to make freight space available to the Insured when ships or planes are full, so that parts, machines, and materials necessary for repair or replacement can be shipped as soon as they are ready.

3.2.5 Temporary / Provisional repair

Especially if a significant downtime is expected due to the fact that repair/replacement are related to the delivery of a long lead item, a temporary and/or provisional repair could be an option to reduce the downtime or to minimise loss of production.

In any case such a measure needs to be treated with caution and the possible benefit needs to be balanced with the potential risk. A temporary or provisional repair might increase the risk, cause damage and/or a larger consequential loss than one might have intended to reduce.

Due to the above-mentioned reasons, it is necessary for the Insurer to very precisely analyse and carefully consider this measure before recommending or accepting it, because the Insurer could also be liable for the additional losses occurring due to the temporary and/or provisional repairs.

3.2.6 Bonus schemes/financial incentives

Using a bonus or incentives in whatever form or manner can be useful to expedite repair works, but this shall always be based on a previously defined solution for reduce or to avoid the consequential loss arising out of a material damage.

Nevertheless, its use can differ depending on whose interests are involved. Cost efficiency, commercial relationships or even political motivations are possible factors.

Furthermore, once this measure is a reward for a successful strategy, the Insurer must pay attention and – if possible and/or necessary – accept it provided the risk is not increased unreasonably by the repair or replacement measures implemented to effectively reduce the insured loss.

3.2.7 Alternative quotations

Whenever the situation or costs allow or make it necessary, alternative quotations need to be sought because the Insured's, supplier's or contractor's proposed costs and/or time to repair or replace the damaged property may not always be optimal, e.g. could involve a delay of repair or replacement due special to circumstances such as the manufacturer being far away / in another country, the manufacturer's lack of personnel or capacity etc.

A very important factor to be taken into account is the guarantee issue. For example, an item still under the manufacturer's / supplier's guarantee could lose such guarantee, if re-

paired or replaced by a repairer / supplier other than the OEM[2], the original manufacturer / supplier. Guarantee could only be expected for the repair work itself.

These situations should be discussed and clarified with the Insured.

Obtaining different quotations shall consider the time effectiveness, and adequacy of terms and conditions.

3.2.8 Alternative repair methods / solutions

When conventional repair methods do not help to reduce the consequential loss, and alternative ones are available that make loss mitigation possible, it must be analysed how safe these are, whether they can be relied on to achieve the targeted reduction and whether they cost less than the targeted loss reduction. Naturally the supplier's reliability must also be evaluated.

If a replacement part has a long lead time it might be a considerable option to find a similar part which can be used even if requiring some (technical) modifications. Also second hand items could be an option as long as it can be ensured they are technically sound or can be up upgraded or modernised as necessary.

Regardless of who is the repairer, a clear and fair regulation of duties and responsibilities between the parties should be proposed by the Insurer or loss adjustor in the event that the risk is increased or worsened due to the use of these alternative methods.

3.2.9 Alternative production facilities

The use of other facilities to substitute the production not carried out due to the interruption or reduction of operation of damaged machinery is always a possibility to consider for reduction of consequential loss. The alternative facilities can be reserve capacity, rehabilitation of facilities out of use, adaption and/or adjustment of existing facilities dedicated to other products, adjusting the production programme and/or products to the changed requirements.

Alternative facilities might be external plants owned by third party or owned and operated by the Insured and may allow an increase of production subject to capacities. Alternative ways of working could also be the rental of third party machinery and/or temporary contract production by a third party;

Such loss mitigating measure may apply not only to producers of manufactured goods, but also to service providers, power plants, etc. it is also common practice in the case of natural catastrophe damages to airports covered under a CECR[3] policy that loss of service/income is avoided by redirecting the flights from the damaged airport (e.g. Cancun after Wilma) to other non-affected airport/regions (e.g. Mérida, Chetumal, Campeche City) where the Insured owns other operations or has commercial agreements with other owners.

3.2.10 Partial start-up/production, provisional opening

The aim of this measure is to restart operation as soon as possible in that area of service or production that is the most profitable one, working at the lowest costs or in the one with the highest reliability, so that the consequential loss can be narrowed, where an operation consists of various production/service lines affected by damage. Or the owner could fasten repairs up of those lines or areas that could be repaired faster than others. With this measure it is important to decide which area or line will be first to be accelerated to reduce the delay in start-up and the amount of loss.

[2] OEM stands for Original Equipment Manufacturer
[3] Civil Engineering Completed Risks

It is also possible that a partial (re-)start-up after damage already during continuing repair/replacement of damaged property could have the effect of keeping costumers by showing that despite the damage, the plant is back in operation and thus create confidence that the plant will be back to full capacity soonest.

3.2.11 Purchasing of feed/product

The strategic goal of this measure is to substitute the lack of own production by buying in the services or goods not produced in the own works. This could be an option for final as well as for semi- finished products whatever part of the production is affected, provided the additional price is lower than the expected BI or ALoP/DSU loss; for example, a sugar mill purchases electric energy from an outside supplier following damage to its own power generation equipment, or a metal cans producer (part of a food company) substitutes its own lost can production by purchasing these from third parties as finished products or as packing material for the own food production.

3.2.12 Location of spare parts

The question of availability of spare parts renders a repair possible or impossible, easy or difficult, quick or slow, and can greatly impact their costs.

Spare parts can be a critical factor especially if only few suppliers exist for manufacture of large capacity machines such as turbines, generators, plate presses, paper machines, etc. This means that the place where critical spare parts are available or can be manufactured needs to be located so that the repair time can be shortened in case of need. Risk inspection activities can help identify critical spare parts and their possible suppliers early on.

Ideally, critical spare parts for specialised and large capacity machines should be held at own premises or at other places for keeping such spares for joint use with others in the market, thereby ensuring timeliness and easy access to them. Constant availability of specified critical spare parts might also be stipulated as a policy requirement.

3.2.13 Alternative Suppliers

Not only the localisation of existing spare parts can help to reduce the loss, but also knowing, if and where alternative suppliers exist, knowing what their delivery times, reliability, etc. are, so that in the event of damage their supply might help to mitigate the loss.

Even smaller and not so well known companies should be taken into this consideration who may supply at competitive prices and may also act as contractors of OEMs for service, repair and restoration and may react fast and reliably.

The use of Non-OEMs or aftermarket repairers shall be evaluated not only for the fact of competitive price but especially as regards expediting repair/supply, always subject to being reliable. *Please refer to chapter 4 for a more detailed analysis.*

3.2.14 Refurbishment / Restoration

Sometimes the damage to machinery is declared as non-repairable by the manufacturer, but may be found repairable by others. The original manufacturer may object that the repair by third parties is not safe and refuses to maintain an existing guarantee. If the damaged machine is of a highly specialised manufacture, such as tunnel drilling machines turbine etc., the Insured and the Insurer may well be dependent on this manufacturer after damage.

Please also refer to Chapter 4, especially Chapter 4.2 dealing with repair vs. replacement.

This situation would leave the Insured and Insurers with the only possible solution of waiting until the manufacturer can repair / replace a machine or part of it.

In situations like these, the first step towards solving the problem is to contact a repair workshop to have the damaged property inspected and obtain an opinion, a plan for restoration (i.e. removal of debris and deposits, dismantling as required, description of extent of damage, ways and cost of partial/total repair/replacement as required and any proposal of speeding up the works). Any tasks or part of the works the operator of the plant can do shall be taken into account.

If damage proves to be repairable, they will contact the manufacturer to obtain spare parts and maybe some support. Cases are known in which, after the manufacturer was persuaded by the alternative supplier not only to accept the reparability of a machine, but also to supply parts, the manufacturer worked as subcontractor for restoration firms to repair specialised machines.

Depending on the class, type and cost of machine, the time reduction through repair or restoration instead of new manufacturing can be up to 80-90% thus substantially reducing the consequential loss.

3.2.15 Reschedule a planned shutdown

In operational plants service/maintenance shutdowns take place on a regular basis. In case of a damage causing an outage of the plant it shall always be evaluated, if shifting forward a scheduled downtime into the forced outage time could be a beneficial action for the Insured by avoiding the later outage for the planned maintenance or at least part of it. An example is forwarding the service of an electric generator while the hydraulic turbine serving this generator is being repaired due to an insured damage.

3.2.16 Cash calls/Payments in advance

Under contractual or treaty conditions, the Insurer may be obliged to make this kind of payment. Even if no obligation to make such a payment exists an advance payment can be considered as a loss mitigation measure.

This measure attempts to resolve a liquidity problem of the Insured in order to avoid delays in repairs for that reason. The payment would be in respect of the known or reliably estimated claims amount of the indemnifiable damage. This way, the Insurer makes it possible for the Insured to begin, continue or expedite the repair or replacement works without delay.

In case of a payment on account the Insurer should insist on a reservation of rights as later the payment or part of it may turn out to be unjustified. This might be done by a properly worded proof of loss/release agreement to ensure that the Insurer is entitled to be reimbursed if the payment is in excess of the finally adjusted amount or not justified at all.

It is strongly recommended to first make sure that the loss is covered in terms of the policy (preferably by the loss adjuster) and the consequential loss has been estimated on a profound basis.

3.3 Supervision of loss adjustment

Large and complex individual losses as well as catastrophe losses require a team to handle them properly. Once the adjustment of these losses is done simultaneously by local and international loss adjusters, their handling can become a challenge.

One way for Insurers to structure this situation is to supervise the adjustment of selected losses through an expert, usually external, who inspects the damages, continuously checks the progress of loss adjustment in each case, coordinates the loss adjusters (local and international), and the flow of information from all parties involved, and reviews the quality and figures of loss adjusters' reports, issuing written reports on them and discussing them with the Insurers, so that they can analyse these special reports and comments and can make decisions faster and more easily.

Summary:

- *Loss mitigation is not an individual task for the Insured, but also for the other parties involved in the (re)insurance contract.*
- *The Insured knows his business best and should be capable and willing to mitigate his loss best, with the cooperation of Insurers, loss adjusters, (re)insurance brokers, etc.*
- *The expertise is a crucial issue for loss mitigation and can also be provided and/or hired by Insurers.*
- *Loss mitigation measures are not always the same and they can differ, for instance, depending on the type, age, use, maintenance, availability, etc. of property insured, the moment and location of the occurrence of loss or damage, etc.*
- *The measures included here are merely examples of what is imaginable or what may been done in a given case; they can be used alone or combined.*
- *There are measures that can be considered not "normal" but its implementation is necessary to mitigate the loss.*
- *Some of these measures can be done pre-loss (inspections, location of critical spare parts or of alternative suppliers, production possibilities, etc.) or post-loss.*
- *The catastrophe, large or complicated individual losses require a different handling and a team to properly settle the claim, e.g. by supervision of the loss adjustment*

4. How to deal with Guaranties / Warranties

4.1 Definitions

Guaranty

A *guaranty*[4] is a promise that, if a product is not of a certain standard or does not fulfill predefined conditions, the originally paid price will be returned as well as the product. For example an electronic device does not fulfill the predefined standards (post purchase), the device can be returned and the price will be reimbursed. The length of the period is mostly limited to a short timeframe in which the product can be tested and used by the customer. In case predefined conditions are not fulfilled, the customer is entitled to return the product and to be reimbursed for the original purchase price.

Warranty

A *warranty*[5] is an assurance to fulfill predefined condition, but without the cancellation of the whole contract and refund of the paid price if the warranty is breached. For example a contractor for a solar park warrants a specific energy output of the solar modules within a certain time frame. If the defined output is not reached, the contractor or manufacturer will need to adjust the system to fulfill the assured performance. The restitution of the whole solar plant for the original price is not intended.

OEM (original equipment manufacturer)

An OEM designs and manufactures products or components that are purchased by another company and retailed under that purchasing company's brand name. OEM refers to the company that originally manufactured the product. When referring to machinery parts, OEM designates a replacement part made by the manufacturer of the original part.

[4] Please note that this is a very general definition. The interpretation of a guaranty from a legal perspective and the legal consequences might differ depending on the applicable law and jurisdiction.
[5] Please note that this is a very general definition. The interpretation of a warranty from a legal perspective and the legal consequences might differ depending on the applicable law and jurisdiction.

For example manufacturer A is owned by B and manufactures blades for other manufacturers. However, manufacturer A manufactures B's steam turbines and gas turbine compressor blades as an OEM.

Non-OEM

Non-OEM's refurbish used parts and manufacture new "aftermarket" parts.

Aftermarket

The *aftermarket* is a secondary market that supplies spare parts, second-hand equipment, and other goods and services used for repair and maintenance. Aftermarket parts can be seen as the opposite of OEM parts. These parts are produced by companies other than OEM's but are made to fit and perform as well as the originals. In this chapter aftermarkets are treated like Non-OEM's.

4.2 Repair vs. Replacement

Insurers settle claims of all kinds of insurable technical property and the corresponding time element (if insured). This applies for construction, erection and operation of all types of properties in the same way as it does for machinery and electronic equipment.

Due to contractual obligations damaged property must be restored in the same type and quality as it was before the loss occurred.

Here it is essential to understand that an Insurer might be entitled to consider a settlement of a claim by repair, partial replacement or refurbishment rather than full replacement. From a technical point of view this obligation can differ for all types of engineering lines or kind of property (e.g. electronic (mostly replacement) vs. turbine (partial replacement or repair) vs. façade cladding (refurbishment).

If repair costs are very close to the replacement costs, it could be commercially and/or technically reasonable to pay for a replacement in order to increase reliability in the future and avoid consequential losses due to the first claim on a long term basis.

The decision of the Insurer will depend on costs for repair or replacement, availability of OEM's or Non OEM's, existence of business interruption cover, and last but not least the willingness of the Insured to get back into business within a short timeframe and without long disputes.

Especially business interruption (when insured) can be a crucial factor for an Insurer to replace damaged property rather than to repair or refurbish.

In some cases the Insured will ask for a replacement of damaged property instead of restoration by paying the difference between the restoration costs and the value of purchase. This decision might be regarded as a compromise payment by the (Re) insured whereas the repair / refurbishment costs are subject to negotiations between the parties. Important to note, the Insured is not allowed to better its position compared with the situation before the claim.

4.3 Impact on Guaranty / Warranty

In many cases damaged property has a warranty and / or guaranty by the original contractor and / or OEM in place, which will be influenced by damage and the following repair / replacement and settlement of the claim.

Warranty / guaranty stands for a commitment of the OEM / contractor toward the customer of the product to guaranty certain condition of the product over a defined period of time.

As soon as repair, partial replacement, refurbishment, cleaning, etc. is performed by an external contracted company (Non-OEM), the Insured may lose the original guaranty / warranty by the contractor / OEM.

Even if the contractor / OEM executes the remedial works without replacement on the whole, it might be the case that the guaranty / warranty on the insured property becomes void, in case that an external cause gives rise to a claim. There are generally two reasons for that.

First, the OEM cannot guaranty that remediation works will restore the damaged property to its original predefined conditions to last for the originally promised period. Secondly, the OEM is keen to sell new equipment to the customer. Only if the cause of a claim is based on an internal defect, the OEM will most likely renew the existing guaranty / warranty after restoration by himself or a contractor approved by him.

With regard to chapter 4.2, repair or replacement is often subject of dispute between the Insured and the Insurer. The Insurer may be obliged to replace damaged property by new property in order to maintain the corresponding guaranty / warranty on the insured property generally supplied by the OEM / contractor.

The loss of a guaranty / warranty on damaged property might not be covered by the insurance and losing such a guaranty / warranty might not be considered as part of an indemnifiable loss.

4.4 Liability of Insurers post loss

As mentioned in chapter 4.2 an Insurer can decide whether to replace damaged property with new items and therefore renew the existing guaranty / warranty by the original contractor and / or manufacturer. However, this is an economical decision by the Insurer. In the end, the damaged property must be restored to the same type and quality as before the loss.

Nevertheless, in case the Insurer decides to repair, refurbish or replace the damaged property, it might be arguable whether the Insurer will be liable to settle subsequent claims which are related to a deficiency in the restored property for which the original guarantee was lost. The external contracted remedial company is only liable for the work they performed.

4.5 OEM vs. Non-OEM

Due to lack of competition OEM’s often provide exclusive quotes for repair. OEMs regularly outsource their repairs to (licensed) contractors. However, those contractors might not have the knowledge and the detailed information of the original construction and arguably might not have better skills to undertake the repair in a better quality than Non-OEMs. And an important key for a quick and sound repair on site in order to mitigate the loss is a well suited equipment manufacturer/repairer.

All in all there is little reason why an external contracted company (Non-OEM) should not repair a damaged item, if the work has no material effect on other parts of the property under warranty.

4.6 Insurers to take over Guarantee / Warranty

Referring to chapter 4.3 an Insurer is not obliged to take over a guaranty / warranty on the insured property after a loss. Considering this as a pure financial loss it would not be insured under normal conditions (business risk of the Insured).

The only case for a full recovery of guaranty / warranty is either the full replacement with OEM products by a certified contractor, or the OEM itself or an agreement with the OEM, or actual contractor to restore the damaged property at predefined conditions (depends on the willingness of OEM or contractor).

As a full replacement is within the Insurer's freedom of action and to a large extent an economical decision the recovery of guaranty / warranty for the Insured is most unlikely. The above shown approach does not include any compromise decision by the Insurer.

Summary:

- *Loss of guarantee / warranty represents a non-quantifiable financial loss to the Insured (business risk)*
- *Re(insurers) are obliged to restore damaged property to the same type and quality as it was before the claim happened – no financial loss*
- *Re(insurers) have to decide whether to repair or to replace damaged property (economic factors)*
- *For most cases repair of damage due to external cause and/or by non-OEMs will lead to loss of guarantee / warranty (except if the OEM / approved contractor and the insurers compromise on a solution)*
- *For internal caused damage (MB / MBBI – not considering maintenance covers) repair by the OEM or approved contractor will most likely continue the guarantee / warranty whereas repair by aftermarket will lead to loss of guarantee / warranty*
- *Only a full replacement of damaged property will restore full entitlement of guarantee / warranty to the Insured*
- *Agreements in remedial actions between OEM / approved contractor and Insurer or full replacement of damaged property when not necessary to guarantee same type and quality of property before the claim and after the remedial works could be regarded as compromises (compromise payment).*

5. How to deal with new technologies

5.1 Introduction

Standard underwriting guidelines propose that engineering underwriters refrain from (re)insuring design / manufacturers risks that comprise prototype elements for various reasons. However, accepting certain risks with prototype elements might be unavoidable, in which case engineering underwriters would need to handle the risk with caution if those (prototype) elements cannot be carved-out.

References to prototypes under non-renewable (contract works) covers or renewable (annual) covers appear in various forms in engineering insurance wordings. These (forms) include:

- Prototype elements are incidental to the (whole) risk
- Critical parts of the risk are classified as "prototypes"
- Revamping and modernisation of machines, equipment, or processes in existing plants
- Engage third party maintenance contractors not capable of providing high quality maintenance and repair services similar to those of the OEM, therefore by,
    - Fitting new spare-parts not manufactured by the OEMs, but manufactured under a different patent and possibly with enhanced / varying design characteristics, and / or
    - Fitting spare-parts which have been refurbished after reaching the end of their service life

When confronted with cases, similar to the ones referred to above, engineering underwriters and Insureds encounter challenges during the period following a loss incident. This

chapter addresses those challenges encountered by the Insured and their solution(s), pre-loss “loss prevention / mitigation” measures, and post loss “contingency” measures.

5.2 Imminent Challenges

Engineering underwriters and Insured alike might begin to encounter challenges with prototype or “unproven technology” classified processes or rotating machines during the testing phase (that is, under the Erection All Risks policy) or during the early months of commercial operation / production, being immediately following the project’s hand-over. Following a machinery failure, the challenges faced include (the) lack of supplier’s / manufacturer’s capacity to provide prompt support in repair services, absence of third party qualified and experienced technicians to be called upon for assistance, unavailability of (critical) spare parts, and / or recurring loss incidents.

5.2.1 Lack of supplier’s / manufacturer’s capacities for repairs

Purchase Agreements with the OEM, usually require that the latter has to ensures that his own qualified technicians be present on site during the commissioning / testing phase and for a specific maintenance period following the hand-over of the project. In addition, the OEM is to provide the Insured’s designate employees or technicians with the necessary trainings to carry out maintenance and repair works.

Expertise in new technological advances such as prototypes or “unproven technologies” remains confined to the OEM mainly due to not being inclined to reveal to third parties information about his special technologies (that is, his intellectual property) and related repair techniques. Consequently, in an expanding market an increased demand for the OEM’s turbines for instance, may exceed his resources of manufacture and/or qualified manpower to provide their customers (that is, the Insured) the needed maintenance and restoration services in a prompt manner.

5.2.2 Lack of qualified experts, maintenance teams, experience and loss reference data

When encountered with prototype or “unproven technology”, third party qualified experts or maintenance teams are scarce, because the spread of expertise of the industry has not kept pace with technological advances. This is observed e.g. in the Renewable Energy industry, specifically the Wind Energy sector.

Furthermore, the loss history of prototype or “unproven technology” models is “undeveloped” because the associated performance and experience with these new models has a too short record. Hence, the design validation remains pending until the OEM advises otherwise.

The Insured may seek experienced third party maintenance and repair contracting companies that are approved and licensed by the OEM to handle and repair, on their behalf.

5.2.3 Spare Parts Availability

If it is inevitable to purchase machines (still) classified as “unproven technology”, such as new wind turbines, then the availability of critical spare parts, among others, should be a key factor for the Insured when selecting the model(s) for their plant.

The Insured is advised to place a Purchase Order for additional (critical) spare parts (provided the budget allows) to be stored at designate facilities / warehouse(s), and to be maintained in accordance with the OEM’s instructions.

5.2.4 Potential for serial losses

"Serial loss" events are a continuing problem the OEMs of machines (classified as prototype or "unproven technology") have to deal with until the design validations have been achieved. These problems are the consequence of various causes such as faults in manufacturing, faults in design, use of inadequate materials, and the integration of insufficient internal monitor and control systems, to name a few.

Therefore, to minimise the risk of failures, one of the key factors to be considered by the Insured is to ensure that adequate and proper electronic monitor and control systems have been installed in accordance with the OEM's instructions, which may work as an early warning system of problems and when an inspection or preventive maintenance is required.

5.3 Loss Prevention / Mitigation Measures

In Appendix B below, this paper provides a list of standard pre loss prevention measures currently applied in different sectors of the Power Generation industry. The main purpose of these measures is to monitor and to detect possible failures in processes and rotating machines prior to happening.

It is important to point out that the loss prevention and mitigation measures cited below in the said Appendix should be applied by the Insured in close cooperation with the OEM. These measures are normal and standard technology applications which could be applied also to prototype or "unproven technology" classified processes or rotating machines undergoing commissioning / testing or under commercial operation.

5.4 Contingency Plan

A post loss contingency plan (or Emergency Plan) encompasses procedures designed to mitigate the damage and its ensuing BI/DSU/ALoP loss, and to bring the process or plant back to operation / production in the shortest possible time. The recommended solutions addressed above should be an integral part of the Contingency Plan. It is important to mention that the mitigation measures cited apply to new technologies as well as to standard proven technologies alike. Please find a summary of necessary contents as Appendix C.

This Plan should be up-dated at least once a year where necessary.

Furthermore, it is highly recommended to the Insured to share with and to provide its Insurer(s) their Contingency Plan for review for relevant reasons such as:

- Insurer(s) could provide valuable input to the Plan based on their existing local and international network with suppliers, contractors, qualified experts, etc.
- It provides the Insurers with a "positive" impression about the Insured and their Risk Management philosophy, something which is highly accounted for in the risk underwriting process, prior to the issuance of the relevant insurance policy.

Summary:

"Prototypes" or "unproven technologies" should be handled with extreme caution both from a (re)insurance underwriting perspective and from the Insured's standpoint because they present a significant and uncertain risk factor, in which case the Insured is advised to consider the following procedures:

- *To ensure that the OEM's maintenance and repair team is based in the same area where the project or plant is situated. If this is not so, then a team should be available to be dispatched within a matter of 24 hours in case of an emergency incident.*

- *To ensure that third party maintenance and repair contracting companies which might be called upon for support are pre-approved and licensed by the OEM. By doing this, the OEM's Warranty does not become void.*
- *To ensure that the models to be purchased, though not yet classified "proven technology", should be provided with minimum information about imminent technical challenges and possible failures.*
- *To ensure that critical spare parts are available with the Insured, and not have to wait for a loss incident to occur to place the Purchase Order because the needed spares might not be available on stock at the time of the incident.*

6. Claims Procedure/Protocol

6.1 Introduction

One could argue that a good claims procedure will not necessarily reduce an indemnifiable claims amount, but a poor claims procedure can potentially increase it. Others may argue that a good claims procedure can reduce an indemnifiable claims amount allowing remedial measures to be implemented quickly. Most would agree though that the intention of a good claims procedure is to ensure a smooth handling of a claim where no opportunities are wasted to implement most effective remedial measures post loss.

Sections 6.2 to 6.7 cover the main requirements for a smooth claims life cycle.

It should be noted at this stage that a claims protocol should form part of contract policy, whether it is included in a reinsurance slip or part of the original policy wording. It is necessary to bear in mind that such a contractual agreement has only a binding effect for those who are a (signing) party of such an agreement. Considering that an ideal claims protocol stipulates rights and duties of the Insured, the Insurer and the Reinsurer it is recommendable to consider a separate contractual document detached from the policy / slip and to have it signed by all involved parties. Ideally the consequences of breach should be clearly expressed to ensure the enforceability of the stipulated procedures.

Also, for the purpose of this paper, the Insurers are the instructing party for the loss adjuster and any experts. This is further explained in the sub-chapter "Correspondence and lines of communication".

6.1.1 Lead Carrier/Steering Committee clauses

It is worth noting that quite often a leader is nominated before a contract starts to coordinate and lead on behalf of follow markets both the policy operation and adjustment process. Additionally, and typically for large risks, a Steering Committee is often nominated by the markets after a claim has been notified to act on their behalf. With both possibilities, the roles of the lead and steering committee stipulate how they can act on an advisory basis for the markets where they coordinate, liaise, recommend and expedite the claims negotiation and the agreement process.

It is also important to note that where there are reinsurance contracts in place then there is a need to consider how the Reinsurer can associate with the claims process. This need is typically expressed in the form of a claims cooperation or a claims control clause.[6] These clauses define how much influence a Reinsurer has during the claim notification, adjustment and settlement stages. There are different versions of these clauses, but in essence they define the Reinsurer's influence ranging from a full follow of a leader to full control of the whole process. The governing law of the contract will of course dictate the extent to

[6] *Please also refer to chapter 7.2.1.6*

which these clauses will be interpreted and the effects in the case of breach.

6.2 Notification

In the event of a claim the Insured needs to inform the Insurer as soon as possible. Often clauses state that the Insured should do this “as soon as reasonably practical”. Whilst there may be good intentions here unnecessary delays can occur in notification. Best practice is to state a defined number of days after the event, where no more than 7 days is considered reasonable. Notification periods included in the contract can be overridden by mandatory legal provisions found in certain jurisdictions. The effects of breach of notification periods will also depend on the governing law of the contract. *See chapter 7 Legal and contractual background.*

The term “once the Insured has become aware of a claim” needs to be treated with caution as breakdown in communication between site and head office can occur. Also “once the Risk Manager has become aware...” is also used. Best practice would be to maintain that it is when the Insured becomes aware rather than one particular person. Further one could use the expression “once the Insured has become or ought to have become aware of a claim”. This places a higher burden on the Insured beyond actual knowledge.

A general clause clarifying the breakdown of communication and identifying the individual’s duty could be: “Where any duty or obligation of the Insured, or any Policy provision such as a Policy Condition, Policy Warranty or Exclusion applies to the Insured, that duty or obligation or Policy provision applies at a decision making level of Project Manager or above, unless otherwise expressly provided in this Policy.”

The definition of what parties need to be stated and their contact details is then required. Obviously the critical notification parties here are the Insurers. Often one sees brokers and loss adjusters being the primary point of contact in contracts but this can lead to hold-ups in the communication process and even non-communication if not properly controlled.

A brief summary of the loss details is very helpful including date of loss, circumstances surrounding the loss and details of the damage.

Summary:

- *On the occurrence of a claim the Insured, once he has become aware, is to inform the Insurer/s within 7 days of the event. (Provided this is enforceable according to the governing law of the contract.)*
- *Brief loss details to be submitted including date of loss and circumstances.*
- *Addresses and contact details of Insured and Insurers to be stated.*

6.3 Investigation

Once notified, Insurers need to instruct a loss adjuster to visit the claim location as soon as practicably possible. Access to the location may be hindered due to natural catastrophe events or local authority intervention. The loss adjuster may need to ask the Insured for further information before any site visit is made. A target of within 14 days after the loss should be made to visit the site provided access is available.

A loss adjuster needs to report directly to Insurers as he is contracted by them and is the only means by which they can independently establish their liability and quantum. If an Insured disagrees with the Insurers decision there are mechanisms in place to deal with this scenario and these are described later in this chapter.

A named loss adjuster should ideally be defined before policy inception to ensure speed of inspection after a loss. A panel of loss adjusters can be helpful to ensure someone is always available and avoid unwanted delays in inspection. It can also be helpful if specialists,

such as forensic accountants or other experts are named up front, again to ensure a swift loss adjustment procedure.

What is essential here is to ensure more time is invested prior to the loss in the choice of loss adjusters and specialists, and more importantly the required expertise is available. Loss adjusters and specialists need to be absolutely impartial and show no prejudice to either party.

One could argue that when loss adjusters are mentioned in the insurance wording, they could end up representing the interests of the Insured reducing impartiality. Better to be able to define an adjuster post loss according to nature and location of the loss. In the current working climate with instantaneous communication appointment of a loss adjuster post loss by the Insurers could be argued as efficient as pre-loss appointment.

The loss adjuster will need to inform the Insured of his brief and compile a list of information he requires from the Insured in order to assess the extent of damage and circumstances of the event. Ideal response from the Insured should be within 30 days.

The loss adjuster needs to be clear of his brief and produce a budget and schedule for his and any specialists input and have that agreed with the Insurers.

Summary:

- *Loss adjuster (or panel of) and if possible specialists to be chosen prior to policy inception. Insurers to appoint loss adjuster immediately.*
- *Loss adjuster to seek further information from Insured and visit site as soon as practically possible, (target within 14 days after loss).*
- *Loss adjuster to inform Insured of brief and compile list/s of information required to assess claim. Ideal response within 30 days for each request.*
- *Loss adjuster to provide budget, schedule and fee split to Insurers.*

6.4 Correspondence and lines of communication

The lines of communication and recipient parties of any communication need to be defined. These need to be specified between the Insured and loss adjuster and between the loss adjuster and the Insurers. Distinctions between types of communication need to be made such as instructions and opinion given to the loss adjuster and formal loss adjuster's reporting.

The Insured (usually via the broker) will need to inform the loss adjuster who is on the insurance panel so that he can report to them or designated markets, and also supply him with the policy wording. This will allow the loss adjuster establish if the same policy wording is valid for all markets.

If confidentiality agreements are required by the Insured from the markets then the loss adjuster will have to get signed agreements from all. In some cases markets may wish to have a claims handling agreement giving Insurers direct access of information/documentation to the Insured. This is often the case if a captive is between Reinsurers and the Insured and would better enable efficiency in communication

Summary:

- *Define contact persons/details for the Insured, Loss adjuster and Insurers*
- *Define who says what and gets what*
- *Define who communicates with the loss adjuster and to what degree*
- *Insured to disclose Insurers panel and policy wording to loss adjuster*
- *Arrange signed confidentiality and claims handling agreements if required.*

6.5 Reporting

The timing of loss adjuster reports needs to be defined including the format and the content. Insurers need to agree on what the report should detail, whether pure damage quantum, discussion on liability and policy response, how in-depth the investigations need to go and how detailed the report should be. If further detailed analysis or experts are required then either a procedure is defined how to manage this, or it is managed by Insurers on an ad-hock basis.

The timing of reports should begin with a preliminary report within 30 days of the loss and then numbered monthly reports for continual updates, even if there is nothing to report other than "investigations are continuing" or "waiting for information from the Insured". Each report should state when the next report is scheduled so Insurers can plan ahead. A final report should then be issued once all investigations are complete and a breakdown of damage, loss circumstances and quantum is established.

Summary:

Define timing, format, content, loss adjuster reporting and how further work is managed.

6.6 Payments

Once there is agreement that a policy responds to a loss and that quantum is of a certain value, a mechanism for "emergency payments" or "payments in advance" needs to be put into place, provided the Insured has first given "proof of loss" or a similar document.

Payment timing needs to be defined/identified (ideally within 30 days of initial request) together with the provision and receipt of a signed "proof of loss" or similar document (depending on law and jurisdiction). A receipt of payment is also required to prove payment. It may also be advisable here to define/identify the effects of late payment of loss (penalty interests may accrue in some jurisdictions from period expiry).

Without these procedures delays could occur in the repair of the damage and adjustment process.

After receipt of the final loss adjuster's report the Insurers need to agree on liability and quantum and inform the Insured of their decision.

Summary:

- *Define procedure and identify timing for emergency and advance payments*
- *Define effects of late payment*
- *Obtain "proof of loss" or similar document*
- *Obtain receipt of payment document.*

6.7 Disputes

With all the best intentions of the Insured and Insurers, disputes of liability and quantum can still arise. A mechanism on how to deal with this needs to be put into place, and, of course, this depends on what law and jurisdiction governs the contract.

Common options[7] available for dispute resolution are mediation, third party review, arbitration and litigation. Mediation and third party review are usually not binding unless specified that way. Mediation is looking to find middle ground in a claim, third party review looks to

[7] For a more detailed analysis of the different options and their (dis-)advantages reference is made to the WGP 71(11), Law and Jurisdiction of Engineering Policies – The underestimated risk

give an independent opinion and arbitration looks to make the “right” decision and outcome based on often a majority decision. Arbitration is normally enforceable. Litigation is a way to have the State resolve the dispute and enforce a decision.

Going to court is often very costly and if some of the above options could be made binding then significant costs could be saved. Arbitration is advisable as it seeks to ensure that the dispute will be heard by experienced legal practitioners.

Summary:

- *Define mechanism for dispute resolution*
- *If possible make any third party decision binding*

7 Legal and contractual background

In many jurisdictions there are more or less detailed codified stipulations about Insurance Law which often also include expressed or imposed stipulations regarding loss mitigation measures.

As it is not possible to touch on all the different laws and jurisdictions it appears reasonable to differ between the general principles. To decide to which extent loss mitigation obligations need to be included in the policy it is important to consider the applicable law and jurisdiction.

The main difference is about the so called case law jurisdictions and the codified law jurisdictions. Exemplary this paper makes reference to the Law of England and Wales[8] and the US law as an example of case law, also touching the Mexican and German Law as an example of extensive codification.

Depending on the applicable law and jurisdiction it is essential to decide which stipulations are incorporated in the policy to fill in the gap, to clarify or event to overwrite the legal stipulations. The clauses which need to be read in context with loss mitigation will be outlined in this chapter as well.

7.1 Legal Background

As a general principle of insurance, insurance cover shall not grant the Insured to be in a better position as if the loss had not occurred. Unjust enrichment shall be avoided as the Insured shall not profit twice. The Insured shall always act as prudent as he would have done, if no insurance cover existed. Consequently one could conclude that it is the Insured’s duty to reduce any loss even if insurance cover is in place, as it would have been prudent to reduce the loss, if no insurance cover had existed.

7.1.1 Law of England and Wales

Although there is to a certain extent codified law e.g. in form of the Marine Insurance Act 1906 the common law precedents which is established by case law.
The law of England and Wales does not contain any expressed and codified stipulations which clarify the obligation to mitigate a loss.

However, even in case there is no expressed obligation set out in the policy, the Insured has some form of a duty to mitigate its loss. Therefore the Insured is generally obliged to take all reasonable steps to avert or minimise its loss. How to define the term “reasonable” will then depend on the circumstances and specialities of the particular loss. Any failure to meet this requirement could have an impact on the Insurer’s obligation to indemnify the

[8] Please note that Scotland has its own legal system and is not subject to this paper.

loss. There are reasonable grounds that an Insurer could argue for a reduction of indemnity payment equal to that amount by which the loss could have been reduced, if the Insured had taken the reasonable steps to mitigate. The reason behind is that the breach of obligation to mitigate the loss breaks the chain of causation for Insurer's liability for the loss occurred.

Absent of any expressed term of who has to bear the costs incurred in preventing or to mitigating a loss, it cannot be implied that the Insured will be indemnified for such costs. Usually costs incurred to take out precautionary measures to prevent a possible loss or damage will not be covered by insurance. However if the policy contains an expressed obligation of the Insured to make reasonable efforts to prevent or to mitigate a loss, it will be a matter of interpretation of the policy terms to decide who is responsible for bearing the incurred costs.

As outlined above, lots of uncertainties could arise when relying on law principles. Therefore it is strongly recommended to insert respective clauses in the policy which clarify and expressly outline the extent of loss mitigation duties and the obligation, who is responsible for costs or to which extent such cost are indemnifiable under the terms of the policy. Such an expressed duty would be beneficial in terms of clarity and contract certainty.

7.1.2 US Law

As US law is also a case law that codified, the situation is more similar to the law of England and Wales than to European law. However, it needs to be taken into consideration that US law itself could be subject to very different rules and interpretations depending on the applicable state law. The issue of how the courts in the US deal with loss mitigation varies from state to state. The intent within the following is therefore not to give a detailed analysis of all 50 state laws and the federal court but more to give an overview how the majority of courts within the US have dealt with the issue of loss mitigation.

Although there is no federal statute or law requiring an injured party to mitigate damages following a loss, there exists a duty at common law which places an affirmative duty on the Insured to reasonably protect his property following a loss.

Therefore courts throughout the US require an Insured to take all reasonable steps and diligence to avoid or minimise losses following a damage and the Insured is not entitled to recover losses which might have been prevented. Even if a loss cannot be prevented and although the failure to mitigate would not entitle the Insurer to deny the entire claim, the Insured might not be entitled to fully recover under its insurance if he fails to take reasonable steps to mitigate.

The duty to mitigate does not require the Insured to take any unreasonable, impracticable or cost prohibitive steps. The interpretation what constitutes reasonable and what is practical will be done on a case by case basis.

Generally the failure to mitigate is an affirmative defence wherein the burden of proof lies with the party invoking the defence. In an insurance situation therefore the Insurer has the affirmative duty to prove by a preponderance of evidence the Insured failed to exercise reasonable care to mitigate post damages losses and that this failure caused identifiable additional harm not stemming from the original damage.

Courts would differ whether the costs to mitigate are recoverable from the Insurer. The decision will depend on the wording and the interpretation of the policy. Where the policy is silent, or a reasonable interpretation of the triggering events for coverage will include mitigation, courts will generally find coverage. In most jurisdictions ambiguities in the policy language are read in favour of the Insured and ambiguous or absent provisions would allow the court to expand coverage and potentially include such costs when the intent of the Insurer was to exclude them. But a clear policy language will require a court to enforce the contract as written and avoid controversy with the Insured.

As outlined above, the general principle of common law would require the Insured to take reasonable steps to mitigate its loss even in the absence of any policy stipulation in this regard. However for the avoidance of any uncertainties it is highly recommended to insert a clause in the policy such as a contractual language clause which will assist in specifically setting forth each party's duties, obligations, and responsibilities in the event of a loss.

Therefore, a clear and concise language needs to be included in the policy outlining which steps the Insured has to take to mitigate a loss and to prevent covered property from future damage. Also one needs to clearly stipulate which costs for such measures are applicable and to which extent such costs will be recoverable. An unambiguous policy wording will reduce both misunderstandings of what is covered and the amount of litigation over the interpretation of the policy.

7.1.3 German Law

As an example of codified law the legal situation in Germany will be outlined below. However, one note that the European Union Law has a strong influence and therefore many similarities occur when comparing the legal situation within the European membership countries. This is especially the case regarding general principles such as those applying for the purpose of customer protection mainly within the business to customer market, but which also influence the rules and principles applying in the business to business market.

The German Insurance Contract Act[9] contains expressed stipulations outlining the Insured's obligation to prevent and to minimise a loss. Section 82 I VVG stipulates the obligation to take all reasonable steps to avoid and to minimise the loss. This obligation is exclusively related to the loss or damage to the insured property itself and does not apply with respect to reducing the amount the Insurer has to indemnify. Therefore the Insured is not obliged to claim against a third party first, even if he would be entitled to do so. Furthermore section 82 II VVG stipulates that the Insured has to request instructions from the Insurer and if such a directive is given the Insured has to act accordingly. However this only applies if the circumstances do not require Insured's immediate action.

Section 82 III VVG defines the consequences of breach. Therefore the Insurer is not liable, if this duty is breached intentionally. In the case of the Insured acting in gross negligence the Insurer is entitled to reduce the amount proportionally. The Insurer has the burden of proof regarding the breach.

In accordance with section 82 III VVG the Insurer remains liable to fully indemnify the Insured if the breach of the mitigation obligation had no impact on the ascertainment of the loss or the measurement of the indemnifiable amount. It shall be noted that costs solely incurred to prevent a loss are not indemnifiable.

As these principles of codified law would be applicable in absence of any contradictory contractual agreements, it is less essential to have the respective clauses expressed in the policy. In case the Insured's loss mitigation obligations are expressed in the policy, it needs to be taken into consideration that all amendments to the legal stipulations which are of disadvantage to the Insured are void.

Generally the Insurer has to indemnify the Insured for all expenses the Insured had to incur to fulfil his mitigation obligation, which is codified within section 83 VVG. If the Insured has spent any costs to minimise the loss which he considered as necessary the Insurer remains liable for such costs, even if the measures were not successful. Any divergent contractual stipulation which is adverse to the Insured is void.

[9] Versicherungsvertragsgesetz (VVG)

7.1.4 Mexican Law

Insurance and reinsurance contracts in Mexico are governed by the Insurance Contract Act[10]. This Act applies to all insurance contracts, except for maritime insurance that is governed by the Navigation and Maritime Commerce Act.

In particular with mitigation, article 113 of the Insurance Contract Act sets out the insured's obligation to take all reasonable actions to avert or mitigate its loss. The Insured is obliged to request his insurer's instructions to implement in order to avert or mitigate its loss. However, this obligation to request insurer's instructions only exists, if the circumstances of the loss give a chance to the Insured to request such instructions.

Article 113 also sets out the obligation on the insurer to provide in advance to his Insured the funds required to implement his instructions.

If the insurer does not provide mentioned instructions, then, only reasonable expenses incurred in order to avert or minimise the loss will be covered by the insurer.

Article 115 of the same Act provides that a failure to mitigate or avert the loss will entitle the insurer to reduce the amount of loss in monetary terms that could have been avoided by the Insured. In practice, these figures can be very complex to calculate.

Finally, this article also establishes that if the Insured fails to take all reasonable actions to avert or mitigate a loss with the "intention" of causing damage to his insurer, the insurer will be able to reject the loss. In practice, it would be very difficult to prove that the Insured's failure was done with such an "intention".

Summary:

- *To which extent clauses in the policy should stipulate Insured's obligation to mitigate depends on the applicable law and jurisdiction*
- *If there is no expressed codified law defining the duty and extent of loss mitigation duties, sufficient contractual stipulations in form of clauses in the policy wording are essential. If codified law is applicable it needs to be considered if stipulations in the policy are necessary to define different or more detailed requirements (only to the extent legally possible)*
- *For clarity and "contract certainty" it is always recommendable to stipulate in the policy all required obligations and clarify who has to bear which costs. Additionally the consequences of breach should be expressly included.*

7.2 Contractual obligations/Policy clauses

With respect to the uncertainties which can arise out of the applicable law, it appears to be strongly recommendable that the policy defines all necessary rights and duties to the extent legally. The more detailed Insured's obligations and the consequences of breach are implied in the policy wording the more clarity can be ensured. But what are the relevant clauses in a policy wording and how should they be ideally drafted?

Clauses which have an impact on loss mitigation are usually not only located just in one section of the policy. One has to consider several different clauses and their respective impact. As several different clauses touch more or less expressly the topic of loss mitigation the interaction between such clauses needs to be taken into consideration.

Having an appropriate policy wording in place is the most important pre loss "mitigation measure" as the wording defines the framework of existing duties, consequences of breach and also defines who is entitled to take control over the process.

[10] Ley Sobre el Contrato del Seguro (LSCS)

7.2.1 Insurance clauses:

7.2.1.1 Notification requirements

The starting point allowing the Insurer to help reduce loss is to be notified about a loss as early as possible. *Please also refer to the previous chapter 6.*

The consequences of a late notification will vary significantly depending on the applicable law and jurisdiction and the policy wording. Generally this could have no impact on the liability of the Insurer up to entitling the Insurer to fully deny coverage.

Under the Law of England and Wales there is no stipulation defining the notification period. Therefore it is the more necessary to have a clear and unambiguous clause in the policy. The consequences of a late notification differ depending on the nature of the clause. If the notification is stipulated to be a simple condition the Insurer might be entitled to damages, if prejudiced. But in case of a breach of a condition precedent, the Insurer is entitled to deny liability, even regardless of whether there is any prejudice. The breach of a condition precedent will therefore provide the Insurer with a complete defence to the claim. For the avoidance of too much room for interpretation it is recommendable to expressly use the words “condition precedent”.

In case of a late notification it is strongly recommended that the Insurer issues a proper worded reservation of rights letter which can preserve defences available to Insurers investigating a claim.

In terms of the notification obligation the principles applying under US law are particularly comparable to those applying under the law of England and Wales, especially regarding conditions. The consequences of breach differ depending on the obligation being a condition precedent or a simple condition. The exact consequences of a breach vary in the different states from the Insurer being partially entitled to deny the claim up to a full denial. The main difference to the laws of England and Wales is that in almost all states prejudice is necessary. Therefore one could argue that the laws of England and Wales are most draconian in terms of the consequences of breaching a condition precedent.

In the US it is essential to be aware that each state has different requirements in terms of timing and content which need to be met in case of a reservation of rights. In some states the insurer is required to issue a reservation of rights letter within a defined number of days after the insurer knows, or should have known, of a potential coverage defence, e.g. 30 days in Florida. In other states the timely requirement is as soon as reasonably possible after becoming aware of the facts warranting a disclaimer, e.g. New York.

Also regarding the content there are differences regarding how specific such a reservation must be. In some states all coverage defences must be identified of which the insurer is aware or should be aware had it pursued a diligent inquiry, and any other coverage defences not identified are waived.

The German Insurance Code stipulates in section 30 I VVG that the Insured has to notify the Insurer immediately after having obtained knowledge of a loss. Due to legal practice “immediately” shall be interpreted as acting without undue delay. However, the consequences of breach are not expressed in the code. Different opinions exist if the consequence is only Insurer’s entitlement to claim damages or if he is entitled to deny coverage (at least in proportion to the level of default). This lack of stipulation and the uncertainties arising there from must lead to the conclusion that a clear policy language defining the consequences is necessary.

Under Mexican Law Article 66 the Insurance Contract Act sets out that the Insured must notify his loss to his insurer within five days as of the date he becomes aware of such loss. Late notice will entitle his insurer to reduce the amount of loss in monetary terms that could have been avoided by being provided notice of the loss in the required time frame. In practice, this figure would be complex to calculate. It shall be noted that reservation of rights is

not a legal concept recognised in Mexico. As a matter of law, Insurer's rights are in principle, reserved.

7.2.1.2 General obligation of Insured to mitigate its loss

To which extent such an obligation needs to be stipulated in the policy depends very much on the applicable law (please refer to the outlined above).

However, it appears to be recommendable to stipulate the Insured's obligation to mitigate his loss and also the obligation to which extent who bears the cost incurred for taking out the necessary actions. This needs to be read in context with any stipulation regarding loss prevention costs, which should be stipulated as Insured's obligation as well as his obligation to bear any cost arising with respect to this approach.

To make sure that such a stipulation is practically effective it should also include the consequences of violation. If the Insured does not meet the requirements to mitigate its loss properly the Insurer shall not be liable for this portion of the loss/costs which could have been avoided.

7.2.1.3 Sublimits

There are several sublimits which can become relevant in relation to loss mitigation. Some policies include an expressed and separated limit for loss minimisation costs. As a general principle it is recommended to phrase such a clause as clear as possible and to outline as detailed as possible what kind of costs are considered as loss minimisation costs. One should bear in mind the general approach that pure loss prevention costs usually should not be part of the indemnifiable costs. When drafting such a clause it is of course necessary to take into consideration to which extent such a stipulation could run the risk to become void due to legal restrictions.

Some other important clauses, like Expediting Expenses and Increased Costs of Working (ICoW) were already mentioned especially within the chapter 3. No need to mention that cover for Expediting Expenses and ICoW is only granted within a sublimit and it should be clearly stipulated to which extent cover shall be granted for such costs. Although these are standard elements of a policy in some cases it can become an issue and subject of discussions what kind of costs are to be allocated within one of these sublimits or if certain costs are part of the (unlimited) indemnifiable amount for repair works/BI.

With respect to loss mitigation clauses dealing with Expediting Expenses / ICoW these should include some kind of "economic test". Therefore it is (from an Insurer's perspective) recommendable that only loss mitigation costs are indemnifiable, which are economically reasonable, especially with respect to reduce the loss. In this context it becomes important which party has the burden of proof. As a general principle, always depending on the underlying law, the implicit burden of proof lies with the party asserting a claim. One could then argue that the Insurers have to proof if any costs were uneconomical. Again, an unambiguous wording helps to avoid any uncertainties.

In practice the difficulty might arise that at the time the additional expenses are spent, it is not easy to predict, if the expenses will effectively reduce the overall loss. It might turn out at a later stage that the measures causing such extra expenses did not reduce the loss. Depending on the interpretation of the policy it might still be arguable that the Insurer might be at least proportionally liable for such costs, if the Insured has spent the expenses in good faith and demonstrated an honest approach to mitigation.

From a practical standpoint it is recommended that Insured and Insurer closely communicate and co-operate from a very early stage. Discussion at a later stage about the outlined matters might be avoidable, if a clear agreement can be made, who has to bear which costs or to which proportions under which preconditions.

7.2.1.4 Deductibles

The way, deductibles are structured, often dictates the incentive of the involved parties. The "All or nothing" principle applying for a regular waiting period within the BI cover might steer the Insured's interest to make all efforts from the start in the wrong direction, as all the costs incurring during the time period following the loss might not be recoverable. Therefore it might seem economically more reasonable for the Insured to spend any costs at a later stage so that they do not fall within the waiting period.

Especially regarding the BI/DSU/ALoP cover one could think of a consistent co-participation from the date of loss onwards. This can be an effective measure to mitigate as this streamlines the Insured's and the Insurer's incentives.

7.2.1.5 Law and jurisdiction

The application of law and the jurisdiction has a significant impact on the interpretation of a policy. Needless to highlight that the impact is not only related to loss minimisation! *Please refer to chapter 7.1.*

As loss mitigation in general is likely to become subject of a dispute e.g. breach of the obligation or the amount of indemnifiable costs, the agreed dispute resolution procedures and the applicable rules become important[11]. *Please also refer to chapter 6.7.*

7.2.2 Reinsurance Clauses

If Reinsurers want to be pro-active in claims handling it is very important to have the necessary clauses in place which allow the Reinsurer to be involved in the process or even being in the driving seat.

Which clause (claims co-operations or claims control clause) is implied in the slip is a very efficient basis how far and to which extent the Reinsurer is able to contribute to any loss mitigation measures and to steer the entire loss process. *Please also refer to chapter 6.1.1.*

There are several standard clauses available defining Reinsurer's rights to control or influence the claims process. Although it is in any case recommendable to ensure the right to steer the process i.e. by appointing experts it might not always be favourable to have the obligation to control. If and to which extent a Reinsurer prefers to steer the process, will always depend on different drivers.

The minimum rights a Reinsurer would need to have is that the cedent is obliged to co-operate with the Reinsurer. Such a claims co-operation clause usually includes the Reinsured's obligation to furnish all available information to the Reinsurer and keep it fully informed. Generally the Reinsured has the duty to co-operate with the Reinsurer or other persons designated by the Reinsurer in the investigation, the adjustment and settlement of a claim. Most often such a clause is a combined claims notification and co-operation clause such as most standard clauses[12].

It needs to be noted that "co-operation" might not always be interpreted in the same way. How extensive such a co-operation is required is subject to the applicable law and jurisdiction, but maybe also to different market habits.

The strongest position for the Reinsurer in terms of steering the claims process can be accomplished by implementing a claims control clause. In addition to the rights which can result from a claims co-operation clause a claims control clause could give the Reinsurer the right to appoint adjusters for the purpose of controlling all negotiations, adjustments and settlements. The most important right for the Reinsurer is that no settlement shall be made

[11] For detailed analysis of dispute resolution procedures please refer to the WGP 71(11) Law and jurisdiction of Engineering policies – The underestimated risk

[12] IUA LM3 Claims Co-operation clause; LMA 5073 Claims Co-operation Clause, NMA 2738 Claims Co-operation clause

and no liability admitted without his prior written approval. Most often the standard clauses reflect a combination of claims notification, claims co-operation and claims control[13].

7.3 Limits of loss mitigation

As outlined in this chapter above the necessary pre- requisites - on the one hand obliging the Insured to mitigate its loss but also on the other hand allowing the Insurer to play an active role – need to be in place and if not this could be regarded as a limitation of loss mitigation.

For the purpose of this sub chapter the pure economic limit shall not be regarded as a general limit of loss mitigation. When no economic reasonable measure is available to minimise the loss the reduction of the overall loss amount is not possible from the beginning.

But even if a mitigation would be possible in theory there might be purely factual hurdles preventing the involved from mitigating the loss. Thus, the Insured and the Insurer could be hindered to mitigate a loss due to formal restrictions, such as legal stipulations, directives, orders from public authorities or any other formal prohibition or requirement which has to be followed, such as denial of access.

For example in the US the Occupational Safety and Health Administration (OSHA) was created to assure safe and healthful working conditions for working men and women by setting and enforcing standards and by providing training, outreach, education and assistance. This organisation is part of the United States Department of Labour and is also involved in investigation when a fatality or a catastrophic loss occurs. If an imminent danger is found, OSHA may apply to the nearest Federal District Court for appropriate legal action, which could be a temporary restraining order (immediate shutdown) of the operation or section of the workplace where the imminent danger exists.

More specific and only related to mining business the Mine Safety Health administration (MSHA) might come into play. Similar to OSHA this authority might cause an order for preventing access to the mine and/or even a shut down.

Although such an access restriction is definitely justifiable for safety reasons, it also prevents from taking immediate actions ensuring the mitigation of a loss, such as dewatering of a flooded area.

Another hurdle could also be when the loss occurred due to natural catastrophes. It might simply be a factual issue to enter the loss site e.g. in case a wide area is flooded. Additionally there might be a lack of the “right” experts or a lack of their timely capacity due to heavy workload. It might also turn out to be difficult to enter into the repair contracts, or to order spare or replacement parts, due to the suppliers already working to their full capacity. Parts or capacities might simply be not available to ensure immediate action. Obtaining the necessary “rescue equipment” can also turn out to be an issue. For example, if a wide area is flooded there will be a huge demand for dewatering pumps and mitigation will be limited by the limited availability to rent/buy such equipment.

Even if such limits appear to be very definitive it is still necessary to consider all options. Especially when the situation appears to be difficult the greatest success can be achieved when a proper measure can be found to overcome the hurdles and to minimise a loss.

Summary:

- *A successful loss mitigation could be hindered due to formal or purely factual reasons.*
- *Formal restrictions i.e. orders from authorities or courts which might prevent from access to site/plant but also factual hurdles, e.g. flooding can hinder access*
- *Limited capacities in terms of supplies or internal/external experts*

[13] IUA LM4 Claims Control Clause; NMA 2737 Claims Control Clause

8. Conclusions

We've certainly seen in the answers to the questions raised at the beginning of this paper that it is possible and even an obligation to minimise an indemnifiable loss and there are also many options available to Insurers to help reduce losses.

A key factor in achieving a successful outcome is a partnership approach and the co-operation between all involved parties. Although Insurer's and Insured's interests may be different and might change pre and post loss, it must be the aim to align these interests by gaining a mutual understanding to arrive at the common goal. A good professional relationship before any loss materialises is therefore of great benefit where transparency and openness is a catalyst to the successful conclusion to any loss.

Pre-loss as well as post loss measures are available to Insurers ranging from progress surveys to financial incentives, all of which are highly dependent on cooperation between the Insured and Insurers. For loss mitigation the knowledge of risk, expertise, supervision on site, flexibility, consideration of alternative–suppliers/repair/methods/capacity, etc. and emergency planning, crisis/risk management are crucial to design, structure, agreement and implementation of loss mitigation measures.

It was outlined how to deal with guaranties and warranties and how they can represent a non-quantifiable hurdle and may even cause an increased financial loss, and repair/replacement of damaged property will not necessarily restore a full entitlement of guarantee/warranty to the Insured.

"Prototypes" or "unproven technologies" should be handled with extreme caution, both from an insurance underwriting perspective and from the Insured's standpoint, and this paper offers some recommendations on how best to deal with these challenges.

This paper has suggested that a good claims procedure/protocol is essential to ensure a smooth handling of a claim where no opportunities are left unconsidered for possible effective loss minimisation. Such matters as provision of clauses to ensure a timely notification, the nomination of a loss adjuster and the ways and lines of communication should be considered. A poor claims protocol and even more the absence of one can certainly hinder any efficient process of loss minimisation. The usual inclusion of cover of Increased Costs of Working in BI / DSU policies (although limited to the amount of BI loss thereby avoided) is a great incentive for the Insured to take action in mitigating / minimising a possible BI loss.

In this loss mitigating process the applicable law is certainty of high importance as are clear and unambiguous policy conditions and stipulations. For the sake of clarity and the avoidance of uncertainties is should be the aim to expressly clarify what the obligations of the Insured and the Insurers are and what duties are placed on them to achieve their objectives.

Although in some cases loss mitigation is limited, generally there is a great variety of measures available which can be considered individually or cumulatively. Which measures and "tools" shall apply and which ones are likely to be successful, needs to be carefully evaluated and decided on as the case may be!

Appendix A: Toolbox

This table summarises all pre and post loss mitigation measures dealt with in this paper.

Factual pre and post loss measures			
MEASURE	**DESCRIPTION**	**IMPACT**	**RISK**
Risk Inspection	Risk survey to evaluate quality of the risk Project Monitoring – identification of possible DSU/ALoP impact	Knowledge of risk incl. embedded hazards, tracking of events potentially causing delay	Failure in risk assessment. Lack of transparency/coordination between project monitoring and loss adjusting. Non-compliance with expert's recommendations.
External/Internal expertise	To get expertise for Risk UW and/or Loss Adjustment	Decision making	No sufficient capacity to build up internal expertise in an efficient way.
Experts	Evaluate (ideally) pre-loss the most skilled / experienced experts for different loss scenarios. The adjuster shall have the skills to actively steer and handle the claim. Additional experts might be needed, such as: Forensic accountants Metallurgist Scheduler Specialist Engineers Development of an expert list is recommendable.	Active participation in the loss management process. Focusing on loss mitigation is a key driver. Transparency and timely updates to the Insurance market help the decision making process.	If adjuster/experts are named in the policy they might not be with the same company anymore, except those who are working independently.
On-site repair supervision	Approach experts to be available on site to oversee repair works.	Decision making and Price reduction	Costs could run over, especially by using a full time representative. Lack of communication or isolation of representative.
Unique solutions on an individual basis	Open mind in risk and/or damage analysis; consider tailor made solutions which can be unique for a certain loss, e.g. (re)building at another location, alternative roads, obtain parts from construction risk to be installed in operational plant.	Decision making	Failure in predicting success chances during early stages. Unique solution is not available, cannot be identified.
Expediting measures	Additional shifts, overtime, night work, work on public holidays, air/express freight, additional costs/bonus to secure repair capacity/slots	Time saving	Failure in identification and segregation of the non-insured costs from the covered Expediting Expenses.
Temporary / provisional repair	Timely limited repair can allow (partial) restart prior to the final repair	Time saving and cost reduction	Might be an "unsafe" option and an additional failure/further damage could occur due to the temporary/provisional repair.
Bonus schemes / financial incentives	Accelerating operation/production restart	Time saving and cost reduction	Quality of work could be compromised. Increase of risk due to acceleration of restart.
Alternative quotations	Obtain quotations from other suppliers, which might have better conditions than the OEM's quotation	Time saving and cost reduction	Insured's refusal to accept alternative quotation. Loss of existing guaranty. Compromise on quality of service and spares.
Alternative repair methods / solutions	Use of alternative repair methods maybe also considering non-conventional repairs. Use of similar parts after modification. Use second hand items.	Time saving and cost reduction	Lack of expertise/know-how of plant/ parts. Loss of existing guaranty/warranty. Modification not possible, no second hand item available or not fit for purpose.
Alternative suppliers	Evaluation and expertise (reliability, delivery times)	Getting new suppliers/repair possibilities	Lack of sufficient expertise/know-how of plant/parts. If a warranty was in force for the damaged parts/machines and of works at the time of damage: Loss of warranty.

MEASURE	DESCRIPTION	IMPACT	RISK
Alternative production facilities	Use or adjustment of alternative production facilities (owned by third parties or the insured)	Loss reduction	Lack of quality/impossibility to meet all client's requirements and demands. Reduced variety of products.
Partial start-up/ production, provisional opening	Accelerating operation/production restart	Loss reduction	Impossibility to operate repaired machines/areas due to ongoing repair to other machines/areas
Purchasing of finished or semi-finished product	Purchase of product to resell it to customers. For the insured this is an investment in a long term customer relationship and helps to avoid losing clients.	BI/DSU/ALoP loss reduction.	To mix insured's commercial interests/ necessities with covered mitigation cost. It must be ensured that the cost of this measure is lower than the expected BI/DSU/ALoP loss.
Location of spare parts	Localization of available spare parts	BI/DSU/ALoP loss reduction	Actual unavailability of spare parts once the loss occurs.
Reschedule downtime	If a BI is unavoidable the possibility to bring forward scheduled downtimes, e.g. shift regular maintenance periods.	Could be beneficial for the Insured and the Insurer	No reduction of BI loss
Restoration	Use restoral and convince the insured to accept this instead of replacement/repair.	Cheaper and faster "repair"	Reliability and fulfillment of quality of restoral company. Loss of warranty/guaranty.
Cash calls	Ensure cash flow by agreeing to advance payments.	Financial solvency avoids delays in placing orders	Insurer pays in advance more than he owes / for an uninsured damage, risk or part. This risk might be avoided by a properly worded policy ensuring Insurer's right to recover and only if the cost estimate is substantiated to justify a payment.
Loss adjustment supervision	If an appointed adjuster appears to be not capable to "handle" the loss as would be expected a second adjuster should be brought in to supervise, oversee, to give a second opinion or to review the reports. Especially in Nat Cat losses supervision of the loss adjustment process, coordinating the local and international adjusters, reviewing the reports and giving a second opinion.	Increase of level of trust; can help to adjust the loss resulting in a lower loss amount	Additional costs. Unsatisfied Insured due to lack of transparency why more experts are involved and due to possible delay of settlement.

Special constellations and challenges			
New Technology			
Secure supplier's / manufacturer's capacity for repair	Best quality and availability of supplier's / manufacturer's capacity can be secured within the purchase agreement with OEM. Also availability of repair teams on short – notice call should be addressed. Also order for additional critical spare parts, maybe even requiring availability at OEM's warehouse.	Reduction of repair time.	OEM overstretches resources. Disconnection between OEM and customer. Long manufacturing delivery time and lack of required stock. All this leading to a delay in repair service execution resulting in a delay of restart of operation.
Qualified experts, maintenance teams etc.	Sort out as early as possible who the most qualified experts are, where to obtain the necessary expertise and to secure their capacities or at least know who to involve. Ensure proper maintenance with sufficiently skilled personnel.	Only skilled and efficient experts/personnel can contribute to cost and time reduction.	No properly skilled experts/maintenance companies available as service industry has not kept pace with technological advancements. No connection between OEM and third party repair/maintenance company or non – compliance with OEM's specification resulting in loss of guaranty.
Pre loss measures, such as monitoring and control systems	Special focus shall be if there is a potential for serial losses. Although a general requirement continuity planning becomes crucial in the context with new technology. Preventive and predictive maintenance programs shall be established.	Creates awareness and transparency when the loss occurs but especially a time saving measure.	Lack of proper maintenance program. Continuity planning is qualified and does not work in practice.

MEASURE	DESCRIPTION	IMPACT	RISK
Wide Area damage			
Special tools in terms of wide area damage	Secure repair slot/capacities as soon as possible, either within general agreements or as the case may be e.g. when a NatCat event is foreseeable. Resources (experts, parts, supplier capacities) need to be secured as early as possible. Orders to be placed as early as possible (if a damage is foreseeable maybe even pre-loss).	Time reduction	Possible risk to paying higher price, but a huge saving might be achieved in terms of time. Orders are placed too early and it turns out the damage is not worth as much as expected/predicted.
Guaranty/Warranty			
Non-OEM / Aftermarket	Use non-OEM for repair works instead of the OEM	Non-OEM is usually cheaper and it might be easier to negotiate expedited repairs	Lack of skills and quality of works. Lack of international network (e.g. to obtain parts and personnel). Cessation of guarantee/warranty.

Pre loss "formalities"			
Claims protocol	Claims protocol can be part of the policy or a separate contractual document. Recommendable content: - Notification - Investigation/Nomination of experts - Correspondence and lines of communication - Reporting - Payments - Disputes	Ensure smooth claims handling process to enable most effective remedial measures post loss.	If such a protocol has no binding effect no consequences of breach are available. Especially in long term project business the content might need to be amended (e.g. if adjusters are nominated namely) – periodically review necessary.
Insurance clauses	Proper wording of the insurance stipulations related to loss mitigation taking the applicable law and jurisdiction into consideration. Clauses which need to be read in context with loss mitigation are: - Notification - Obligation to mitigate a loss incl. cost bearing and consequences of breach - Sublimits (EE, ICoW, etc.) - Deductibles - Claims Cooperation/Control clause	Smooth claims handling process and clarity about coverage avoids discussions and therefore ensures a quicker settlement.	Too much room for interpretation as clauses might be ambiguous Clauses might be void under the applicable law and jurisdiction.

Appendix B*: New Technologies* - Pre-Loss Loss Prevention & Mitigation Measures

Reference to Section 5.3 above, below are lists of pre-loss "loss prevention and mitigation" measures which might be applied to turbine units whether prototypes or "unproven technology" classified models and prior to or during post-erection testing or during commercial operation / production.

Gas and Steam Turbines

- To allow the Insurer's loss prevention specialist(s) or design engineer(s) to visit the site on regular basis and / or meet with the Original Equipment Manufacturer in order to stay up-to-date with changes / modifications done or scheduled to be done.
- To acquire complete understanding of changes made to the latest model or version of the Original Equipment Manufacturer's products.
- To ensure that the Original Equipment Manufacturer's original spare parts are fitted during maintenance or repair services.
- To conduct an up-grade study with adaptation measurement and to share it with the Insurers in case of fitting non- Original Equipment Manufacturer spare parts.
- To adopt predictive and preventive maintenance philosophies in accordance with the Original Equipment Manufacturer's recommendations and directions. Alternatively, U.S. and European Maintenance Practices may be reviewed and considered; they are listed in IMIA's publication WGP 42 (05) – Maintenance and Overhaul of Steam Turbines.
- To conduct any of the following Non-Destructive Testing [NDT] as per Original Equipment Manufacturer's recommendations and directions:
    - Visual inspections [e.g. with the aid of endoscopes and fiberscopes]
    - Liquid or Dye Penetrant testing
    - Fluorescent Penetrant Inspection
    - Magnetic Particle testing
    - Ultrasonic testing
    - Eddy Current testing
    - Digital Radiography X-Ray inspection
- To ensure the installation and operability of an Advanced Condition Monitoring Instrumentation / System
    - Vibration monitoring [of turbine rotor system]
    - Pulsation monitoring [for tuning and operating DLN systems]
    - Pyrometer Testing: Critical air-foil temperature monitoring for loss of cooling and thermal barrier coating [TBC]
    - Infrared Boroscope inspection
    - Coupling concentricity and malfunctioning
    - Electronic Governor and Electronic Over-speed Trip Systems are installed [instead of a Mechanical Governor and Over-speed Trip Systems]
- To train the Insured plant Owner's / Operator's staff.

Onshore and Offshore Horizontal-Axis Wind Turbine Farms

- To adopt predictive and preventive maintenance philosophies in accordance with the Original Equipment Manufacturer's recommendations and directions. However, for Offshore Wind Farms careful planning is of paramount importance due to weather dependency for maintenance [and repair] works.

- To ensure fitting spare parts or components manufactured or supplied by the Original Equipment Manufacturer.
- To ensure that the braking system [e.g. mechanical and aerodynamic braking system] is maintained and is functional.
- To inspect the monitoring and control systems at regular intervals by experts.
- To inquire about recurring claims on identical components and models.
- To ensure the installation and operability of Condition Monitoring System [on-line] – to monitor the following:
    - Rotor blades: rotating speed, oscillations
    - Main bearing: oscillations
    - Gearbox: input shaft, outer shaft, oscillations
    - Chassis: oscillations
    - Generator: oscillations
    - Etc.
- To conduct Visual inspection, e.g. via Video Endoscopy.
- To conduct Electro-Thermography examination [on electrical installations].
- To use Capacitive or Hygro-thermal Transducers [to monitor and measure the temperature inside the Nacelle].
- To ensure functionality of automatic switch-off of the turbines and complete disconnection from the power supply system / public grid.
- To ensure that the base foundations are adequately designed, built, and maintained. Coordination between the expert contracting company and the Original Equipment Manufacturer is a must.
- To operate a Marine Warranty Surveyor for Offshore Wind Farms in order to scrutinise all stages of design, fabrication and [offshore] installation in order to ensure that quality will never be compromised at any aspect of the project.

<u>Photovoltaic Plants</u>

- To schedule a regular inspection and maintenance in accordance with the Original Equipment Manufacturer's recommendations for the critical system components. These components include:
    - Frame
    - Terminal box
    - Plug connectors
    - Power Converters / Inverters
    - Generator terminal box
    - Single- or Dual-Axis Tracking System
- To ensure that coordination between the expert contracting company and the Original Equipment Manufacturer is realised as far as designs of the foundations and the mounting systems as well as in the installation / erection procedures of the plants are concerned.
- To ensure that the owner's / operator's personnel fully understand the system's operation and safety whether the Operation & Maintenance is performed by them or by a third-party maintenance and repair services contractor.

Appendix C: Contingency Plan – Post-Loss Mitigation Measures

Referring to Chapter 5.4 a contingency plan should include:

1. A Service Agreement signed between the plant owner / operator and the Original Equipment Manufacturer; under this Agreement, for instance, the Original Equipment Manufacturer warrants to provide spare parts, and [planned and forced] outage inspection and repair services.

2. A sub-Plan [developed] to manage losses of key / critical items of machinery and equipment which are not spared at the time of the loss incident.
   - To seek opportunities for pooling of common spare parts
   - To develop a strategy for the Key / Critical machines and equipment which identifies the main possible causes of failure and lists all possible actions to expedite replacement and / or repair works

3. An adequate inventory of spare parts, key / critical and non-critical parts with the longest delivery time.

4. Contact details of suitable repair facilities within close proximity of the plant.

5. A list of Suppliers from which machines and equipment could be rented
   - Quotes from companies that rent machines and equipment [e.g. mobile cranes, etc.] designated as key in case of an incident. The list must be kept up-to-date, and it must include cost of rental, set-up, breakdown, shipping both ways, estimated time from placement of order till start-up, etc.
     - In case of Offshore Wind Farms, special-purpose ships are required like large floating cranes, lifting platforms, cable layers, etc.
   - List of pre-approved alternative suppliers

6. A list of qualified Contractors
   - Consult with the Original Equipment Manufacturer and / or with their authorised representatives for referrals
   - List of qualified, and pre-approved and licensed contractors to perform key tasks

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