integrated

Bringing clarity to complex insurance claims

Issue Two 2017

CONSTRUCTION & ENGINEERING DEFECTS CLAIMS ON THE RISE?

RESERVING MAJOR & COMPLEX CLAIMS

USING LINEAR PROGRAMMING TO MANAGE BI CLAIMS

THE IMPORTANCE OF APPOINTING THE RIGHT 'EXPERT'

CONTENTS

"LP MODELS ARE NOT THE SOLE ANSWER TO OIL REFINERY BUSINESS INTERRUPTION INSURANCE CLAIMS BUT THEY CAN HELP IN FIVE KEY WAYS"

PAGE 19

We would like to thank all those that contributed to the Construction & Engineering Defects Claims article on page 10, including those anonymous contributors to the online survey as well as Tony Bennee (Alesco), David Lammond (Generali) and Steve Hatch, Graham Goddard and Gemma Tait (Willis Towers Watson).

integra TECHNICAL SERVICES

Integra Technical Services Ltd.
6th Floor, 117 Houndsditch,
London EC3A 7BT
Tel: +44 (0) 203 879 8320
www.integratechnical.com

Welcome to the second edition of **integrated**, our magazine devoted to the specialty insurance lines marketplace and sharing knowledge, experience and insight to improve claims management. We were delighted with the feedback we received about our inaugural edition and we hope you like this one even more – we've certainly tried to turn the technical content dial up.

Before I discuss the content of this magazine I would just like to update you on a couple of matters. Firstly, in response to client demands and instructions received over the past 12 months, we been working hard to expand our team and enhance our capabilities. In this regard you'll be hearing more in August and September about the new Loss Adjusters we've recruited to strengthen our teams in Dubai, Houston, New York, Singapore and Sydney.

I would, also, like to congratulate Alistair Lamb, who has been promoted to Managing Director of Integra Technical Services (Asia) Pte Ltd from 1 July 2017. He will have operational responsibility for Integra Technical Services in South East Asia, working closely with Stephen Thorpe in continuing to develop our business in the region. I am sure you will join me in wishing him well in his new role.

In the first edition, our feature article considered Onshore Energy and what improvements were needed to consistently deliver a service experience that delights the Insured. A survey of Insurers, Brokers and Insureds provided some excellent ideas, one of which was to run individual complicated claims using project management techniques. We've actually been adopting a very similar technique for many years, using Loss Management Plans as the vehicle for driving this approach, and this subject is examined on page 4. Elsewhere in the magazine we focus on Construction Claims (pages 10 and 16) and look at the complex area of Linear Programme Modelling (page 18) and its role in Business Interruption claims management (page 14). To conclude this edition, we have an article from the Product Liability arena (page 20), although the message contained within could apply to any line of insurance business, focusing on the importance of appointing the right 'experts'.

I hope you enjoy reading the magazine and as always would welcome your ideas for stimulating topics and discussion for future editions. We want to address the issues that matter to our stakeholders. From Insurers, Brokers, Consultants and Legal Experts to the ultimate beneficiary of the insurance product, be that the Risk Manager, senior company executives or project debt or equity investors.

Leo Dixon BSc (Hons)
Chief Operating Officer
Integra Technical Services Limited

CYCLONE DEBBIE IMPACT LESS THAN FEARED

When Tropical Cyclone Debbie hit the Bowen Basin region of Queensland many feared that this would have a devastating economic effect. The area accounts for almost all the state's coal production and 55% of Australia's coal exports. With coal accounting for 12% of Australia's total exports it's easy to understand why business commentators were worried.

"Insurers and international Reinsurers were immediately looking for information to set loss reserves.

The storms of 2008 and 2010 resulted in substantial Mining Insurance claims, but we felt something different about Cyclone Debbie, so decided to look at things from a different angle" said Stephen Thorpe, Managing Director – Asia Pacific Region, Integra Technical Services.

Hydrologists from WRM were asked to compare the 2008, 2010 and 2017 rain events by looking at rainfall preceding, during and after the storm. Stephen explains "by 31 March, just three days after Cyclone Debbie had struck, we were able to reveal some interesting results."

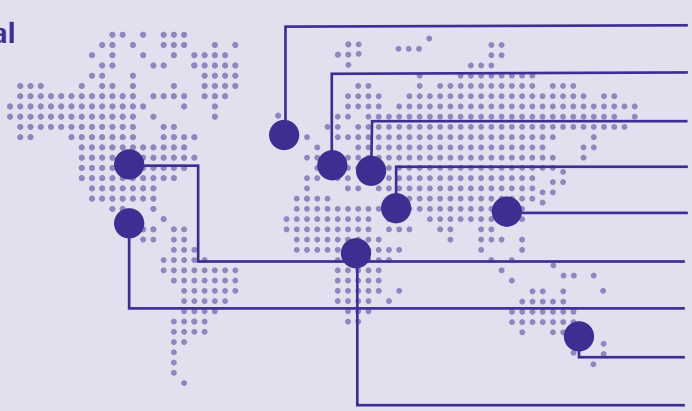
While rainfall which accompanied Tropical Cyclone Debbie was similar to events in 2008 and 2010, the amount of rainfall prior to Tropical Cyclone Debbie was lower. This meant that the ground was less saturated reducing the risk of flooding. In addition, water management at most of the Bowen Basin mines had been substantially improved in prior years.

However, in some areas the rainfall accompanying Tropical

Cyclone Debbie as it made landfall was extreme (greater than 1 in 50 return intervals) which caused land slips. One such landslip in the Black Mountain area caused substantial damage to rail infrastructure used by Rail Operators to haul coal to the export ports.

This early indication is now being borne out, with recent analysis suggesting that stoppages in mining production due to water ingress was substantially less than in 2008 and 2010, but Mine Operators have still been affected by damage to downstream rail logistics.

Integra Technical Services Q1 and Q2 2017 new appointments



UK	52
Europe	11
Turkey	11
Middle East	12
Asia	12
USA/Bahamas	11
Central & Latin America	12
Australia / New Zealand	78
Africa	5

Q & A

TEAM IN THE SPOTLIGHT

INTEGRA TECHNICAL SERVICES, MEXICO

Mexico has the second-largest economy in Latin America, is a major oil producer and one of the world's largest exporters. Integra Technical Services established their team in Mexico in 2011. It's led by Andres Alvarez and when **integrated** *saw pictures of him and the team posing in their Lucha Libre masks we were curious to find out more about them. So, we met with Andres and asked him a few questions.*

Is it true that you have some artistic talent?

Yes. Arturo likes to dance Salsa and when he was younger worked as a waiter at a party room, where before serving the dinner, the waiters danced on the dance floor. Nowadays, toward the end of parties he likes to sing and imitate famous singers.

Christian studied classical music and the saxophone at the National Music School in Mexico and has played in some jazz, blues and rock bands.

What is your favourite pastime?

My passion is riding my Street Glide, Harley Davidson motorcycle. One day I would like to ride it from Mexico and across America to Alaska.

And finally, for the benefit of our readers what is Lucha Libre?

It is a Mexican style of wrestling where fighters enter the ring in flamboyant capes and outlandish suits, wear mythical and colourful masks, perform acrobatic moves and fly from spectacular heights. We know that Leo (Dixon) is interested in the sport and thought he would appreciate the masks!

MEET THE TEAM

This is me, Andres Alvarez. Qualified Architect. Loss Adjuster since 2001. Specialising in the Energy sector and the management of complex Property and Casualty losses, particularly from catastrophe events.

Arturo Suaste. Automation and Control Engineer. Loss Adjuster since 2004. Expertise geared towards the management of large and complex Property claims, ground Power, Mining, catastrophic events and Government accounts.

Christian Blando. Mechanical Engineer. Began working in the Reinsurance market in 2006, before embarking on his loss adjusting career at one of the largest international loss adjusters. Joined Integra Technical Services in 2013.

Adriana Garza. Administrator and Credit Controller. Moved to Integra Technical Services in 2014 after more than seven years working within the loss adjusting sector.

VIEWPOINT

PROJECT MANAGING THE CLAIMS PROCESS

Handling complex claims as if they were projects in their own right with milestones, commitments, an actions log and issues log, can enable faster and more amicable settlement, but there are some key points to remember.

In issue 1, **integrated** posed a number of questions to Insurers, Brokers and Insureds to find out what they felt needed to happen to consistently deliver a 'world class' claims service. One of the improvement suggestions was to "run large losses using professional project management skills and techniques."

Professional 'project management' is something that Construction Project Owners and Contractors, Oil and Gas, Utility, Petrochemical, Mining and Renewable Energy companies (to name a few) are very familiar with and to some degree is part of their corporate DNA. This is possibly why it is well received when we adopt a similar technique to handle their more complicated claims. Whilst this approach is not appropriate for every claim emanating from specialty lines of business in the international Insurance & Reinsurance arena, there are certain types of loss where the adoption of project management techniques adds substantial value for all the stakeholders.

Lack of access to the damaged areas of site, government and regulatory intervention, opposing views on the root cause analysis, difference of opinions on the scope of damage and therefore scope of the reinstatement project, immature or partisan jurisdictions and the sheer scale of the financial exposure involved are some of the factors that can delay key decisions and milestones being reached, polarise stakeholders' positions and raise the threat of dispute. Whilst settlement is typically ultimately achieved, the journey to get to that settlement can leave a bitter taste in the mouths of the parties involved.

In such circumstances, Integra Technical Services have a strong track record of using Loss Management Plans (LMPs). Combined with our knowledge of local practices, jurisdiction and politics this helps to bring structure and direction to complicated losses by dividing the claim into distinct sections, each with key milestones e.g. Root Cause Analysis, Scope of Damage, Loss Mitigation, Costs of Reinstatement, Business Interruption, etc.

By sharing the LMP with key stakeholders (Insured, (Re)Insurance Broker and leading (Re)Insurer and Claims Agreement Parties) for their input and agreement to the content, it formalises stakeholders' collective intent to handle the claim in a professional and controlled manner. This is key to its success, if one party is not engaged the claim will typically be frustrated. As a 'living document' that evolves over the life of the claim we encourage all parties to engage in regular dialogue, to discuss the progress being made and actions and issues arising. Many of you reading this article will have seen that, at times, this can be a genuine challenge and ultimately undermine the amicable route to settlement.

Whilst there have been many successes over the last 19 years we have experienced failure, but this has only served to create learning opportunities which in turn have strengthened our LMPs.

KEY POINTS TO REMEMBER WHEN ADOPTING LOSS MANAGEMENT PLANS

1. Ensure key stakeholders not only 'buy-into' the concept but, also, they tangibly contribute and remain accountable for their part in its delivery.

2. Hitting early milestones gives stakeholders confidence the plan is working. If this involves a payment on account or even better, from an Insured's perspective, a decision on policy liability in a timeframe they can rely on, there is no better environment for getting a complex claim settled amicably.

3. Ensure key stakeholders attend meetings and conference calls. When their attendance starts to wane, the same behaviours can be adopted by their subordinates.

If you would like to see a template LMP please contact leo.dixon@integratechnical.com.

Leo Dixon is Chief Operating Officer of Integra Technical Services. Prior to joining Integra Technical Services in October 2015, Leo was Global Head of Energy Claims at Zurich Insurance Company and has also worked for Jardine Lloyd Thompson and Indecs LLP.

EVENT ROUND UP

ASIA POWER FORUM 2017

Integra Technical Services co-sponsored and collaborated in the organisation of the inaugural Asia Power Forum on 20th April 2017. Held in Singapore, the event attracted 240 delegates from the Asia Pacific and international Insurance and Reinsurance markets. Alistair Lamb, Managing Director, Integra Technical Services - Asia, was a member of the organising committee. Presentations included topics such as battery storage to help smooth intermittency for renewables or help with peak loads, the Brokers' view of the Asia Power market, the Underwriters' perspective on Offshore Wind and Infrastructure development projects in Asia and a panel discussion on Power Purchase Agreements. You can view Alistair's pre-event report at www.linkedin.com/pulse/asia-power-forum-2017-alistair-lamb.

AC GLOBAL ANNUAL BI CONFERENCE

On 17th May 2017, Integra Technical Services' Strategic Partner, AC Global, held their annual Business Interruption Conference. This attracted more than 200 members of the Turkish Insurance Market including Insurers, Brokers and Risk Managers. Adam Humphrey, Chartered Loss Adjuster, Integra Technical Services, presented a session titled "Fast Tracking claims with Physical Damage and Business Interruption elements involved."

Integra Technical Services' approach to such claims relies on the expertise of our in-house team, with our Loss Adjusters being both CILA (Chartered Institute of Loss Adjusters) qualified as well as being Chemical, Civil and Mechanical Engineers, Quantity Surveyors and Architects who have a deep understanding of the lines of business they specialise in and as a consequence very quickly build trust with the Insured's own in house team.

As part of this presentation Adam was able to walk the audience through the Loss Management Plans that we typically use when handling complex specialty lines claims (see page 4).

REINSURANCE LOSS ADJUSTING

Using diplomacy and pragmatism to create extra value

If, as is frequently cited, problems with communications are those which most typically complicate the claims handling process, the task of the Loss Adjuster acting purely in the interests of Reinsurers requires a certain skill to ensure that straightforward or distressed claims are brought to a successful conclusion in a timely and efficient manner.

Standards of professionalism in the execution of the role of a Loss Adjuster vary considerably throughout the world, as does the quality of the reports that they produce. Add to this the number of possible delays in a Loss Adjuster's report being produced, reviewed by the Cedant, processed by the local Reinsurance Broker, passed to the international Reinsurance Broker, before eventually being received by the Reinsurance market, it is inevitable that Reinsurers can sometimes have concerns regarding the content of the report that they eventually receive.

Richard Gross, Chartered Loss Adjuster with Integra Technical Services explains "in such circumstances, the Reinsurer will frequently seek to involve an 'international' Loss Adjuster, in whom they have confidence, to intervene in the claims handling process on their behalf, especially if the Reinsurance Agreement is subject to a Claims Control or Claims Cooperation Clause.

Stephen Thorpe, Managing Director – Asia Pacific Region, Integra Technical Services suggests "this can also occur when local insurance markets cede most of the insured risk to international Reinsurers. South East Asia is a good example, especially as insured values can be substantial and involve high risk industries, such as Petrochemical, Power Generation, Mining and Construction. In either case the Reinsurance Loss Adjuster can perform two very different roles."

Where there has been a major and complex loss, they can bring the support of Reinsurers with them to partner with the local Loss Adjuster. This can lead to quicker decision making on the adjusting strategy and ultimately a faster and more efficient settlement. Richard suggests that "where some hard decisions need to be made the Reinsurance Loss Adjuster can ask the difficult questions, share concerns that Reinsurers might have, for example policy liability or indemnity related, enabling the local Loss Adjuster to preserve their relationships."

Sometimes cases will be encountered where the adjustment process has not gone well and the claim is headed toward formal dispute resolution. Bringing a fresh perspective to the issues in dispute, the Reinsurance Loss Adjuster can secure a resolution without the need for expensive and protracted litigation.

The inevitable result of Reinsurers appointing their own Loss Adjuster is that there will be two separate Loss Adjusters involved in the claims handling process. Stephen suggests "if a swift, amicable and equitable resolution to the process is to be achieved, the Reinsurance Loss Adjuster has to be aware of the key challenges and exercise a degree of diplomacy and pragmatism."

CASE EXAMPLE

MAJOR PETROCHEMICAL FIRE

A petrochemical plant in Thailand was severely damaged by fire. The risk was placed with a local Cedant that retained just 1% of the risk. Integra Technical Services were appointed as the Reinsurance Loss Adjuster concurrently with the Cedant's Loss Adjuster. By working closely with the local Loss Adjuster, Integra Technical Services were able to introduce specialist expertise to the team and secure key outcomes:

- Agreement on root cause, providing certainty to the Insured and a policy response within three months;
- Agreement to an interim payment schedule, ensuring the Insured remained cash neutral and Reinsurers had certainty on the timing of cash calls;
- Introduction of critical path and loss mitigation expertise, saving more than five weeks of Business Interruption losses.

KEY TIPS

Apart from the normal considerations (expertise, knowledge etc.), Reinsurers are advised to take account of four key challenges:

1. Language – the Reinsurance Loss Adjuster will typically be required to participate in meetings with the original Insured, Cedants, Retail Broker, local Reinsurance Broker and local Loss Adjuster. Where English is not the normal language of business, these discussions will be conducted in the local language and it can be helpful for the Reinsurance Loss Adjuster to be fluent in that language.

2. Culture – the way business is conducted varies greatly from country to country. It is important to be alive to these differences, whilst simultaneously maintaining the strict professional and ethical standards expected of by the international Reinsurance market.

3. Legal – the Reinsurance Loss Adjuster needs to be conversant with insurance laws and regulations in the country the loss occurred. As local insurance markets become more mature and more regulated, the original Policy and Reinsurance Contract can be subject to local law and jurisdiction. This is particularly the case where the role of the Loss Adjuster is clearly defined in local insurance regulations, which according to Richard "is becoming the norm in many countries in Latin America." This can mean that the local Loss Adjuster must act independently, only considering the arguments presented by Insured and Insurer – not Reinsurers. When the local Loss Adjuster issues opinion on coverage and quantum this has be communicated to both parties simultaneously and it is legally binding unless challenged within very tight time constraints.

4. Expectations – as is the case in the handling of all claims, proper expectation management is key to success. At times, this can involve communicating facts and opinion, which Reinsurers may be reluctant to hear. A poorly drafted Policy text, combined with local law and jurisdiction can often result in the suggestion to negotiate a settlement which, in the view of Reinsurers, may not necessarily reflect the "spirit and intention" of the coverage.

RESERVING MAJOR AND COMPLEX CLAIMS

Setting an accurate and efficient reserve in a timely manner is one of the most important elements of the loss adjustment process, particularly when the financial exposure to the loss directly impacts your company's financial results.

Reserving is one of the most challenging aspect of a Loss Adjuster's role, and one that is vital to get right as the consequences of not doing so run far and deep. As Stephen Thorpe, Managing Director – Asia Pacific Region, Integra Technical Services explains "reserving too low causes challenges with internal reporting and audit teams, it can lead to a 'defending a reserve' mentality; too high and Insurers are tying up capital unnecessarily; and frequent reserve movements or 'step reserving' can erode confidence in the claims management process."

Claims reserving is brought to the fore by the fact that many Insurers now have 'Claims Promises' which require them to pay 50% of a Property Damage reserve within seven days of the Loss Adjuster recommendation. This extra dimension has implications for the Insured's claims management experience. Setting the reserve too low could affect the Insured's cash flow, too high and it could excessively raise expectations as to the amount to be recovered from Insurers.

Whilst each Insurer and Reinsurer will have its own reserving philosophy, ultimately Stephen suggests "sourcing quality and relevant information is important but it is how the Loss Adjuster applies his or her experience and knowledge to the analysis of that information that is the key determinant to producing a cogent and understandable reserve or range of reserves."

When they articulate the reserve, the Loss Adjuster should go to great lengths to explain the assumptions they've relied upon to calculate the reserve or range of reserves. This helps the Insurers and Reinsurers determine how much certainty they have about each of the assumptions. Thereafter, it's important to understand the variable element to each of the assumptions i.e. commodity pricing, production efficiency, etc.

A challenge for the global Loss Adjusting community is to simplify the language they use to describe the financial exposure. In discussions with our Insurer and Reinsurer clients, it appears that there are numerous terms used to describe what historically has been titled 'reserve' i.e. Provisional Exposure, Potential Exposure, Loss Estimate, Financial Exposure, Preliminary Reserve, etc.

The key ingredients to better loss reserving analysis

Information
As with any aspect of the adjustment process the importance of good information cannot be stressed enough.

Industry
Knowledge of processes and operations can be particularly important in sectors where consideration must be given to the ability to make up lost production during the indemnity period, such as in Mining, Oil or Gas Processing.

Implications
With certain types of peril, say earthquake or flood, then the full extent of the damage may not be immediately apparent, the time taken to get rebuilding permits can be longer than expected and extra cost of reinstatement provisions are usually quite onerous. All these aspects can put upward pressure on the reserve.

Factors
The Loss Adjuster should be able to set out clearly what the main drivers of the quantum of the claim are (Property Damage or Business Interruption),the variables and, importantly, risk factors to the ultimate reserve recommendation.

Impacts
How the Policy coverage and specific clauses will affect the insured loss, for example Sub-Limits or Average.

Experience
Awareness of disaster management and recovery processes and the likelihood of success of the different options.

Stakeholders
Understanding that there might be reasons why some parties want to keep the reserve low, for example during renewal negotiations. The Loss Adjuster must make an impartial recommendation – others will set the ultimate reserve.

CONSTRUCTION & ENGINEERING DEFECTS CLAIMS ON THE RISE?

Property damage as a result of defective design, workmanship and specification is among the most common forms of claim for large and complex construction and engineering projects. Unsurprisingly, defects are equally a major cause of dispute and construction litigation, due to the differing stakeholder interests. As Insurers continue to look for ways to minimise claim processing costs and reduce friction between themselves and the Insured, we look at whether more large and complex projects should be insured under a Single Project Insurance Policy covering CAR/EAR, Third Party Liability and Professional Indemnity and indemnifying all Contractors, Architects, Consulting Engineers and other professionals as joint Insureds.

Back in 2014, Zurich Insurance analysed their database of large losses, which covered more than 225 claims valued at over USD300 million across 16 major categories of types of loss. This showed that faulty design, workmanship and specification was the second largest loss type in terms of severity and frequency.

David Lammond, Head of Property & Engineering Claims at Generali endorses this view "some 10 years ago Generali analysed the split in claims between defects in design, workmanship and other perils and found this to be 51%/49%. I'd say that now we would more likely discover this to be 75%/25%, although this may partly be the result of changes in our geographic risk portfolio".

integrated surveyed Insurers and Brokers to ask this very question and this revealed differing opinions. Gareth Evans, Senior Loss Adjuster, Integra Technical Services explains "anecdotally, based on my caseload over recent years, I would say that the incidence of this type of loss is very high on certain risk types and we have recently seen a number of large losses, but when we looked at the responses to the survey only 20% thought that the loss frequency had increased. Interestingly, whilst some felt that just 10% of CAR/EAR claims resulted from defect in design, workmanship and specification, others suggested over 50%."

DEFECT IN DESIGN, WORKMANSHIP OR SPECIFICATION?

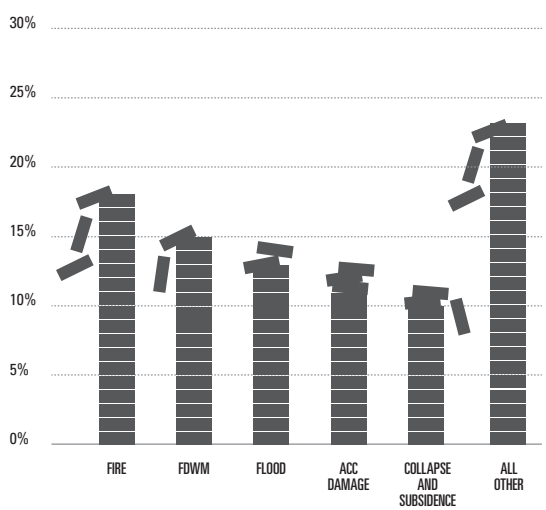
Most, if not all, CAR/EAR Insurance policies will include DE or LEG exclusion clauses which broadly distinguish between the costs of rectifying a defect (excluded), and damage caused as a consequence (normally covered, except under the most restrictive clauses). This quite often results in the Insured sustaining an uninsured loss and these can be substantial.

Where a loss is considered to be as a result of defective design or at least in part, an opportunity may exist for both the Insurer and the Insured to jointly pursue a subrogated recovery of both insured and uninsured losses from the responsible third party e.g. Architectural and Consultant Engineers.

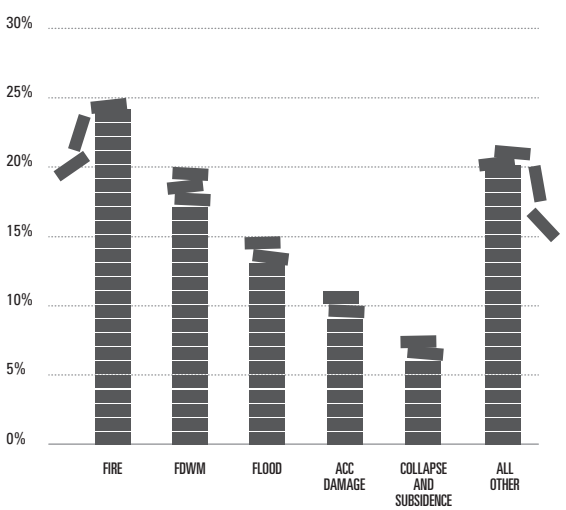
Under most standard CAR/EAR policies, cover for these parties is limited to their on-site activities only, of which design, provision of design information or professional advice is not generally considered. These parties would have Professional Indemnity insurance policies in place to cover the cost of remedying the defect and any consequential damage. Whilst many contractors now have their own in-house design teams it is not unusual for firms to sub-contract their work to a specialist Consulting Engineer which then brings them and their Professional Indemnity Insurers on any potential action.

The trouble is that all too often there is disagreement as to the cause of the loss. As Gareth explains "On certain CAR/EAR risks involving elements of geotechnical design, whilst an overall

SEVERITY % of total incurred value



FREQUENCY % of total number of claims



Source: Zurich

scheme is designed, requiring a discrete set of pre-determined interventions, the application of these interventions will be based on observations during the course of construction. In some instances, this may be directed by a resident Engineer, or a specialist Contractor on-site. Sometimes the source of disagreement regarding causation is whether the loss that arises can be considered to be as a result of shortcomings in the design or workmanship, with the obvious implications in terms of cover afforded under the CAR/EAR Policy."

According to Tony Bennee, Partner, Alesco Risk Management "the various parties involved may appoint their own experts and then you can end up with all these reports that say roughly the same thing, but coming to slightly different conclusions".

According to Gemma Tait, Divisional Director, Willis Towers Watson "the expert pool being called upon is probably not as wide as it should be. Sometimes there is an investment in one individual opinion and the reality is that this single person has a different view to an entire project of experts. For me it's important to have an early meeting with the different experts as that often reveals the reason for this difference in opinion and can result in a change of view about the cause of the loss."

SUBROGATING THE LOSS

There can be many reasons why subrogation does not happen, for example an inability to find a definitive cause. David, also, suggests "it's preferable not to subrogate, if possible, it is about getting other stakeholders to assume responsibility, should the contractual situation allow, before an indemnity is provided under the Policy."

Where Insurers take a decision to subrogate the loss, this would generally mean that they consider it to be economically viable and their chance of success to be strong. However, in today's soft market where Insurers are increasingly looking to minimise outlaid indemnity costs, according to Gemma "some Insurers may be looking at ways of pursuing subrogation actions which possibly in the past they may have written off much earlier."

Gareth says "Over the past several years, more of an emphasis appears to have been put on establishing the possibility of pursuing a subrogated recovery by Insurers. That may be the result of Insurers analysing historical claims data or trends where it may have been concluded that they have missed recovery opportunities, a function of a slight over capacity within the market allowing focus to be applied in this area, or the way in which legal services are being provided. Either way the role of the Loss Adjuster is key in identifying the potential for a subrogated recovery, and working with the Insured at an early stage to collate the necessary documentary evidence in terms of causation and quantum to hopefully form the basis of a successful recovery action."

IS THERE A DIFFERENT WAY?

Defective design, workmanship and specification claims can be among the most difficult to manage. Focusing on remediation works to ensure the loss does not also cause delays in completing the project and then trying to establish the root cause of the loss – design, workmanship or specification – and consider the potential for subrogation, which will essentially be against the Contractors' project partners.

As Gemma explained "investigations relating to loss causation and the potential for subrogation are generally run in parallel to the remediation works. This can create friction and require sensitive handling as often this may involve partners to the Contractors who are key to completing the project on time."

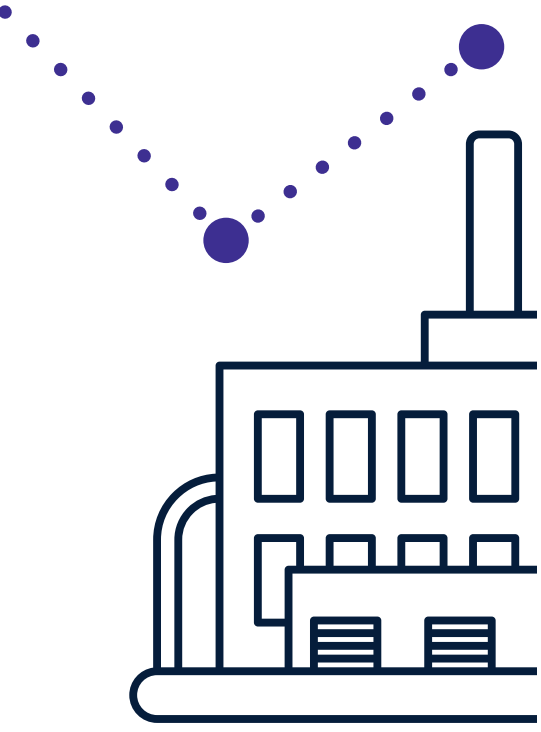
This begs the question of what the insurance market could do to reduce potential conflict and ultimately claims management costs. For many years, Single Project Professional Indemnity (PI) Insurance has been available, with cover placed alongside CAR/EAR and with the Insured including all Contractors and professional Consultants.

A trawl of the internet quickly reveals several articles espousing the benefits of such arrangements, but Graham Goddard, Executive Director at Willis Towers Watson feels that "this has to be carefully considered on a project by project basis as it can make insurance procurement difficult. Consultants and Contractors are likely to question their contribution as they already have annual PI insurance policies in place and this is also likely to limit choice of CAR/EAR Insurer. Many Insurers and Reinsurers are just unwilling or unable to offer the 10, 12 or 18 year liability period that's required."

Whilst we may be facing a rising level of claims emanating from defect in design, workmanship and specification, it seems that to reduce friction and cost we need to maintain a high level of dialogue with all the parties and work with the experts on site to reach collective agreement on causation as early as practically possible.

MODELLING BUSINESS INTERRUPTION CLAIMS

Integra Technical Services has pioneered the concept of 'real time' measurement of Business Interruption insurance claims in sectors such as Petrochemical and Oil and Gas Refining. Taking the subjectivity out of the process has been shown to reduce friction, increase certainty and improve claims satisfaction.

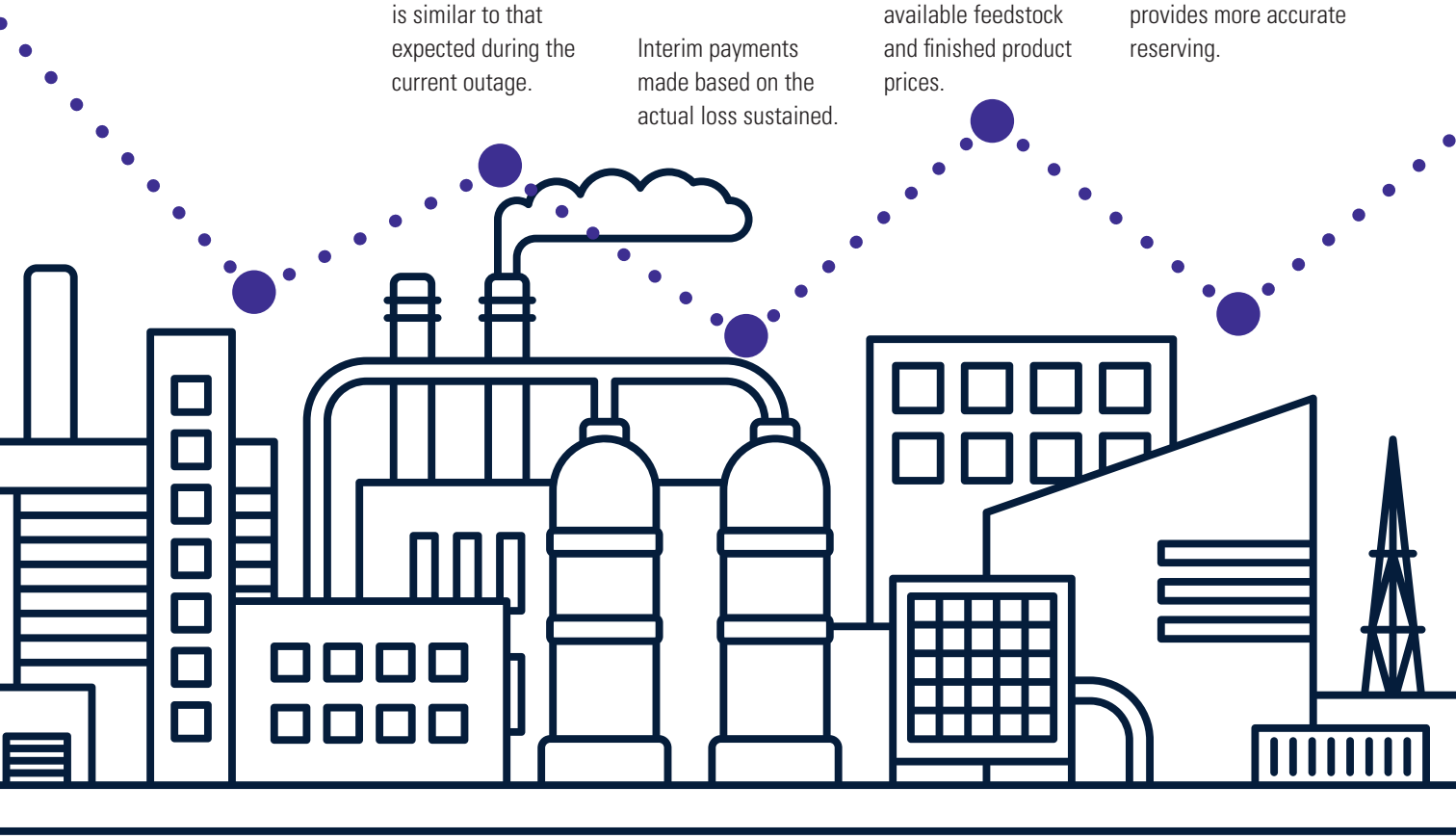


Sectors where the use of linear programming or LP modelling is prevalent (see page 18) are potential candidates for this revolutionary service that has already been proven to increase Insured and Insurer satisfaction and provide a better overall claims management outcome.

Ewan Cresswell, CEO of Integra Technical Services explains "the service uses an existing client resource (their own LP model) to create a 'virtual business' during the outage period, enabling the Insured to demonstrate exactly what would have happened if the loss has not occurred. This facilitates earlier accuracy and so more frequent interim payments, ensuring that the Insured maintains cash flow and stability during the period of the outage."

Whilst a 'virtual business model' can take up to 12 weeks to construct it is possible, with the Insured's cooperation, to achieve this within the typical Waiting Period. The diagram on page 15 details how the service works, but key to its success is building a deep level of trust between the Insured, their Broker and the Insurer. Only through this trust will the parties invest the time and resources needed, to deliver an improved outcome.

DAY 1	DAY 30-90	EVERY 30 DAYS (or as determined by the Insured)	CRITICAL SUCCESS FACTORS	ADVANTAGES
Understand the extent of damage and how much of the Insured's production capacity has been affected.	Create the 'virtual business model' to reflect the operating characteristics of the facility, with all relevant constraints and variable costs pre-agreed. This involves understanding and validating the LP model being used by the Insured and how this works in practice during a period that is similar to that expected during the current outage.	The Insured's operating personnel connect with their marketing team and state how they would have optimised the facility (feedstock choice and operational characteristics). The 'virtual business model' is run with the selection to calculate the Business Interruption loss, during the period, based on real time pricing. Interim payments made based on the actual loss sustained.	Coverage has to be clear and accepted in the early stages. (Re)Insurers and Insured willing to invest the time and resources to create the model. Significant period of indemnity and outage (usually 100%) for minimum of 9+ months. Access to publicly available feedstock and finished product prices.	Reduces loss measurement disagreements – agreed monthly based on actual prices. Accelerated claims settlement process. Improved Business Interruption measurement accuracy. Facilitates interim payments – helps Insured's cashflow and provides more accurate reserving.



CASE STUDY

"THINK DIFFERENT"

TO QUANTIFY CONSTRUCTION CLAIMS

Queensland is the second-largest and third-most-populous Australian state. Situated in the north-east of the country and known for its tourism, it happens to have one of the richest sources of natural gas in Australia particularly within the Bowen and Surat Basins. This has resulted in many pipeline development projects to ship the gas from source to ports for ongoing distribution and sale. When flooding damaged the construction of one such 540km pipeline, out of the box thinking was needed to quantify the loss.

"Think different." was an advertising slogan used by Apple in the late 90's, but you might sometimes wonder whether this should have been reserved for Loss Adjusters. Kevin McElhenny, Chartered Loss Adjuster with Integra Technical Services, suggests that "losses involving large civil contracts often require a different way of thinking to quantify the loss. Damage spread across large areas and the Contractor using the same work crews to carry out the claim reinstatement works at the same time as continuing with normal construction activities. Separating plant, materials and labour costs is problematic."

Whilst some may point toward the maintenance of detailed timesheets, repair coding and on-site diaries, this may not always be practical. "The volume of paperwork can become unmanageable, for example in one instance the Contractor produced four lever arch files of site records for the first month of works alone" says Kevin.

Without a suitable approach to measuring the loss, the claim can become bogged down in detail leading to significant differences in quantum between the parties and extending claim life. The use of Quantity Surveyors and, perhaps, a Clerk of Works to record and measure the work as it is carried out is one option. With multiple work sites over long distances this can present its own logistical issues.

A vast construction area

Flooding occurring during the construction of a 540km, 42 inch diameter underground pipeline from the Surat Basin to Gladstone in Queensland, Australia required us to think differently - and our approach stood out.

The work sequence involved clearing the ground along the pipeline route to create an even surface, digging a trench up to 6m deep, aligning and welding 12 metre long sections to form continuous sections of pipe, lowering the sections into the trench, backfilling the trench and rehabilitating the ground. Multiple work fronts were utilised to progress the works.

The passage of an ex-tropical cyclone resulted in heavy rainfall and flooding, at a time when the majority of the 540km pipeline was under construction. Multiple work fronts were at different stages of completion, although it was estimated that the project was 75% complete.

The damage included flooding and collapsing of open trenches, scouring of rehabilitated area as well as areas still under construction, erosion of bedding materials installed around pipes in trenches and impact pipelines and their coatings.

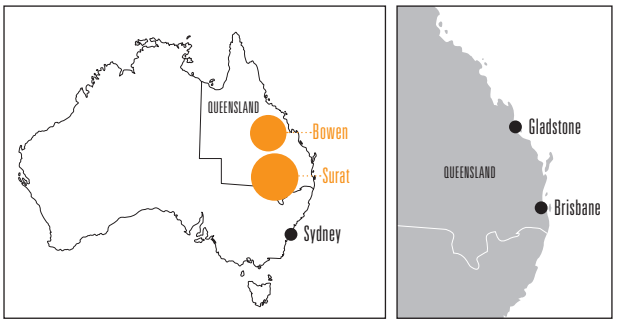
Mitigating delay in start up

To mitigate delays in the construction, work crews were deployed to both carry out the repairs and then continue with normal construction activities. The repairs to the various types of damage did not require significant plant and labour for each of the numerous locations of damage.

"However, arranging repairs along the entire length of the pipeline and separating the reinstatement costs from the normal construction costs, could lead to standing or non-productive time for the crews when working on the reinstatement works. This would be difficult, if not impossible, to identify and capture" explains Kevin.

A decision was taken to use a helicopter to film the damage along the entire pipeline. Creating this permanent record made it possible to establish a register of the various types of damage sustained before the reinstatement works commenced.

Three Quantity Surveyors were then engaged to accompany the various work crews along the length of the pipeline and record the actual plant, materials and labour (numbers and hours/quantities) utilised for each type of reinstatement works. After a period of three weeks, sufficient works had been observed to identify the typical



plant, materials and labour required for each category. These were then discussed with the Contractor and agreed as required for each repair type.

As Kevin points out "from there, it was a simple case of applying the established rates to produce the cost for each repair type. Having established an accurate record of the damage from the film, it was then a natural progression of establishing the quantum of the reinstatement works."

Although the cost of three Quantity Surveyors over three weeks may appear to be an expensive option, the cost was less than 0.5% of the reinstatement works. This approach enabled the settlement of this portion of the claim within eight months on an amicable basis and the overall claim within ten months, which was a great result for all parties.

USING LINEAR PROGRAMMING TO MANAGE BI CLAIMS

Linear programming, more commonly known as LP modelling, is commonly used as a supply chain management tool to solve the problem of how to get material to the right place, at the right time and at the lowest cost. Its use as a Business Interruption claims quantification tool is perhaps less understood.

The first LP model was developed by the Russian economist, Leonid Kantorovich, in 1939 to optimise the allocation of resources for the army. The maths required for LP modelling is highly complex and its only since computing power has become more affordable that we've seen its use spread. It is now used across many different industries, from Manufacturing and Transportation, through to Airlines for pricing ticket sales and even to help quantify Business Interruption Insurance claims, for example in relation to Oil Refineries.

Refinery LP modelling

Input into the LP model requires details of the variable parameters and costs, for example distilling to blending, crude availability, temperatures and pressures, yields from the process units for each set of conditions and storage constraints. In simple Oil Refineries, such as Topping and Cracking Refineries, there can be more than 500 linear equations and over 2,000 constraints, with the output often in the form of large data specific spreadsheets.

The LP model uses linear equations for each parameter to: optimise profit, or in some cases costs (if say a refinery receives a government subsidy); determine operational schedules for the coming weeks and months; and plan optimal times for refinery turnarounds.

The configuration of a refinery is modelled for each unit along with the operational details of plant and the refinery processes. These constraints include temperature and pressure; capacities of reactors; distillation, heating and cooling systems; catalyst yields versus life; and product yields, specifications and prices. Each Refinery and Petrochemical Plant has its own unique LP model, although one is not required where there is only one feedstock (e.g. methane gas) used to manufacture a single product (e.g. ammonia) for a common market.

Using the LP model

At each process step a yield of product is achieved. Changes in feedstock blend, temperatures or pressures etc. will affect the intermediate and end product yields. Raw material and product prices vary, so they are benchmarked when entered into the LP model, and this also requires regular and timely updating of the model.

The objective of a refinery is usually to buy the cheapest crude and to process it for the maximum profit, i.e. to obtain the best "Crack Spread".

Whilst artificial intelligence developments are now allowing some refineries to adapt their LP models to run in real time, most LP models are updated at least monthly to optimise crude purchases with orders placed up to 60 or 90 days in advance. Some refineries use a LP model to reflect product prices in order to optimise the use of the Crude Distillation Unit or to input intermediate streams to some units to improve product quality and volumes.

Use of LP models for Insurance Claims

The box on page 19 explains how LP models can support Business Interruption claims. The challenge Loss Adjusters face is that LP models are not always accurate. They rely on expressing complex hydrocarbon reactions, distillation curves, product specifications, etc. as simple mathematical equations.

With the LP model usually being based on a steady state crude slate input, refinery operation "post loss" may be outside the calibration range of the LP model. Coupled with this, Insurers' loss measurements are based on the delta between the actual Gross Profit from the loss affected operation and the hypothetical "had no loss occurred" profit position. An error in each calculation using an LP model can accumulate and result in the overstatement or understatement of the loss - typically this could range up to ±30%.

Recalibrating the LP model can be time intensive but we believe is a necessary exercise to give Insurers and Reinsurers confidence in the model presented by the Insured. It must also be noted that LP models optimise a margin, which is often presented as a sale and corresponding cost value, and is therefore not necessarily a complete measure of the insured

Gross Profit. Insurers often need an LP Consultant to confirm that the loss mitigation efforts have been exhaustive and the LP model calibration checked. A Forensic Accountant helps bridge the gap between the engineer's LP margin and the insured Gross Profit defined by the insurance Policy, as the LP model by itself cannot be used to determine the indemnifiable value of the Business Interruption loss.

Angus Bradley, Chartered Loss Adjuster, Integra Technical Services advises "having used LP models on a number of occasions over many years, we would suggest there are three key success factors"

- 1 -

The LP model needs to be properly validated to ensure it properly reflects the production capabilities of the facility.

- 2 -

Understanding the LP model allows modelling of mitigation options, including altering the crude slate – for instance, to overcome the loss of a desulphurisation unit.

- 3 -

The LP model can be used as a predictive tool for the Insured to select "but for" operating criteria, in the event of a loss (see article on page 14).

THE ROLE OF LP MODELS IN BI CLAIMS

LP Models are not the sole answer to Oil Refinery Business Interruption Insurance claims but they can help in five key ways.

1. Validating the Insured's predicted crude slate and feedstock purchasing and sales forecasts;
2. Determining whether the refinery plant can operate at the forecasted levels;
3. Predicting the refinery outputs from a reconfigured facility during a partial interruption to production;
4. Confirming how the refinery would have operated, had no loss occurred, i.e. the base line model for establishing what should have happened, but for the loss.
5. Determining the economics of various loss mitigation scenarios to enable an optimal course of action to minimise a refinery's Business Interruption loss.

EXAMPLES OF INTEGRA TECHNICAL SERVICES' CLAIMS EXPERIENCE INVOLVING LP MODELS

Texas, USA Complex PE and PPE interdependencies.	USD 200m
Texas, USA Petrochemical complex outage.	USD 120m
Texas, USA Fire, aromatics and olefins plant outage.	USD 320m
Texas, USA Fire and explosion, PDA unit outage.	USD 380m
Oman Fire wet gas scrubber, subrogation.	PRESENTLY ONGOING

THE IMPORTANCE OF APPOINTING THE RIGHT 'EXPERT'

In the world of materials failure analysis, plastics are one of the most common materials encountered as they are in universal use for packaging, electronic films, power cables, construction materials etc. What were once novel applications for plastics are now commonplace. When damage occurs, an expert will often be needed to establish the root cause of the claim.

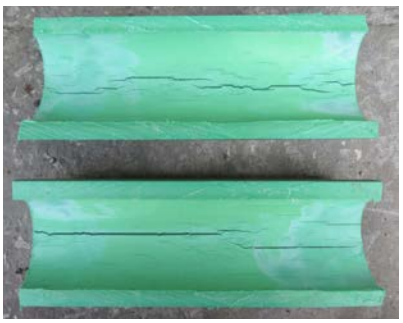
Defining 'expert' is like defining time; people have a clear idea of the concept but agreeing a common definition is not easy. An academic qualification, industrial or commercial experience or post graduate research into a relevant discipline are probably important requirements. According to the Civil Procedures Rules ("CPR") an expert is 'a person who has been instructed to give or prepare expert evidence for the purpose of proceedings'. However remote Trial might seem at the time of an expert's instruction, the emphasis is firmly on the prospect of litigation. The CPR also stipulate that 'it is the duty of experts to help the Court on matters within their expertise'. This duty overrides any obligation to the person from whom experts have received instructions or by whom they are paid'. Barristers, not experts, are paid to advocate – a point sometimes forgotten even by experts.

Plastics are the product of carbon's unique facility to form linear or branched chains of almost any length and stable single or multiple rings. The way in which they are arranged and processed into the long-chain molecules (polymers) that comprise plastics, will significantly influence their performance and characteristics. Many plastics are then modified to improve, for example, resistance to ultra-violet light or flammability. Sometimes these additives can react with the parent plastic or with each other and cause premature failure of the material.

Dr. Edward Ingham, a polymer engineering expert with significant experience of plastic failure investigations, explains "due to the unique nature and microstructure of polymers, the processes by which they deform and by which cracking develops are dependent on other extrinsic factors such as time in service, applied stress (loading), temperature and the service environment (e.g. air, water or chemicals)."

A key process in polymer failure analysis is fractography – studying the fracture surfaces to determine the relationship between the observed mechanisms of cracking and the microstructure. There are also a series of specific analytical techniques for polymers, which can be used to assist in failure analysis.

The photograph below shows a hot water pipe operating at a temperature of 70°C, which was made from a plastic (polypropylene) that failed in service.



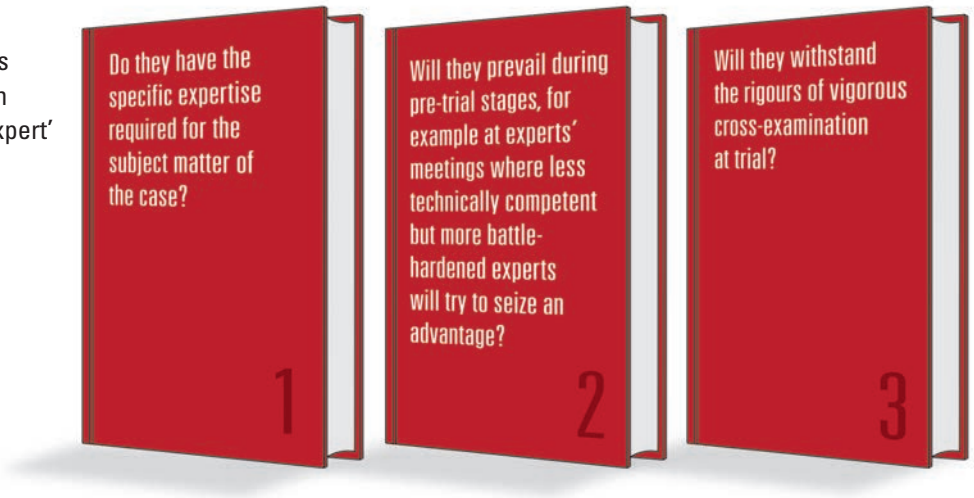
Dr Ingham explains "From a detailed examination of the fracture surfaces using optical and scanning electron microscopy and consideration of the operating conditions, it was considered that the cracking may have been caused by oxidative degradation of the polypropylene by the type disinfectant used in the pipe system. This hypothesis was confirmed by conducting oxidation induction time tests, which indicated significant depletion of antioxidant across the pipe wall and the identification of carbonyl species, using Fourier Transform Infra-Red Spectroscopy (FTIR), which are indicative of degradation."

When the manufacturer of the pipe was identified, it was found that their technical literature clearly stated this type of disinfectant should not be used, due to the potential for damage to pipe and fittings.

In such a case, a generic materials scientist might not have a sufficiently comprehensive understanding of fracture analysis or the ability to evaluate the contribution of polymer characteristics, service conditions and other factors, on the failure.

The Loss Adjuster plays a key role, working in collaboration with the Insured and expert, to develop a clear and robust understanding through expert advice of how failures arise. This leads to more effective management of Liability claims, averting those lacking merit and providing early warning of those that should be compromised before significant further costs are incurred.

Three key factors to consider when appointing an 'expert'



INTEGRA TECHNICAL SERVICES

Specialising in the settlement of complex insurance claims in defined industry sectors and involving Property Damage, Machinery Breakdown, Business Interruption, Delay In Start Up and specialist Liabilities.

LOSS ADJUSTING
MAJOR AND
COMPLEX LOSS

CLAIMS
CONSULTANCY
& RESOLUTION

EXPERT WITNESS
& ALTERNATIVE
DISPUTE RESOLUTION

GLOBAL EXPERTISE

12 CITIES

COUNTRIES HANDLED CLAIMS (2016)

46

9 COUNTRIES

MANCHESTER & LONDON, **UK**
PERTH, ADELAIDE & SYDNEY, **AUSTRALIA**
AUCKLAND, **NEW ZEALAND**
SINGAPORE
MUNICH, **GERMANY**
SANTIAGO, **CHILE**
MEXICO CITY, **MEXICO**
DUBAI, **UAE**
HOUSTON, **USA**

5 STRATEGIC ALLIANCES
ARGENTINA / BRAZIL / CANADA / CHILE / TURKEY

CREATING THE RIGHT TEAM FOR YOUR ASSIGNMENT

INTEGRA HAVE **30 LOSS ADJUSTERS**

OF THAT NUMBER

10 ARE **CHARTERED LOSS ADJUSTERS**

11 ARE **ENGINEERS**

6 HAVE **LAW DEGREES**

FIVE ARE ARBITRATORS / MEDIATORS & **4** ARE **SURVEYORS**

Integra Technical Services | Providing impartial, technically based claims solutions since 1998.
Find out more at www.integratechnical.com or contact Leo Dixon (leo.dixon@integratechnical.com)