RISK MANAGEMENT JOURNAL 1/2017

Climate change adaptation in the built environment CP Kelco – risk management expertise at its best

Autonomous ships – fact or fiction?

How do you protect yourself from terrorism?





The robots are coming

EXTREME WEATHER, TERRORISM, unmanned ships and catastrophic events. This string of calamities might read like the tagline for a new Hollywood summer blockbuster, or the latest global sensation from Netflix. Yet, these keywords have nothing to do with entertainment. We use them every day in our work here at If.

Floods affecting industry in Asia create negative ripple effects that can be felt globally, even here in Scandinavia. An act of terrorism in a distant country can affect Nordic companies that have a global footprint. The shipping of goods across the world's oceans may soon be carried out by gigantic, unmanned vessels, but the ship and cargo of these seafaring drones must nonetheless be insured.

It is increasingly clear that change has become a constant, and that there is thus a greater need than ever before to focus more closely on issues pertaining to risk management. It is crucial to keep track of vulnerable assets in a business environment characterized by constant flux, and which is becoming increasingly computerized and complex.

We collaborate with our clients throughout the risk management process, and our versatile team of experts, with offices throughout the Nordic region, offers support, expertise and tools.

As an insurance company, we must also change the way in which we work. Internally, we have established If Tech Lab, which allows us to move swiftly in order to take advantage of technological developments. Here, we test and develop digital technologies which are beneficial to both us and our clients. One of the concrete results of our efforts has been the creation of better and more comprehensive risk management tools for client use.

Thus far, inspections have been carried out by a real live risk engineer. But who knows? In a few years' time, a robotic colleague may be accompanying If's risk engineer on survey visits...

Happy reading!

POUL STEFFENSEN Head of BA Industrial, If



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- 4 CP Kelco leaves nothing to chance
- 8 Class actions without losses: A challenging US trend
- 10 Management of "The catastrophic claim"
- **12** Fire hazard management for unified fire brigades
- 14 How do you protect yourself from terrorism?
- 16 Autonomous ships fact or fiction?
- 28 Crisis consulting services in product recall

24 Close collaboration decisive

20 Climate Change Adaptation:

built environment

23 The progress of climate

change is inevitable

after major fire

Managing conditions in the

- 31 Partner Network built on strong co-operation
- **31** Appointments



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Storms becoming normal

HURRICANE SANDY-LEVEL flooding could become normal, reports the Guardian.

The frequency of floods of the magnitude of hurricane Sandy which devastated parts of New York City in 2012, is rising so sharply that they could become relatively normal. An analysis of past storms and models of future events as the planet warms has shown that Sandy-like floods have become three times more common in the New York area since 1800. This frequency is set to climb further, from once every 400 years to once every 90 years by 2100, due to the effects of sea level rise alone. Worse still, when the impact of future storm conditions, supercharged by the warming oceans and increased atmospheric moisture, is considered, New York could be swamped by Sandy-level flooding once every 23 years by the end of the century, according to research led by Princeton University.

Asbestos losses continue to increase

US p&c insurers can expect losses from asbestos claims to increase to USD 100 billion, according to an AM Best report. AM Best said that the USD 15 billion increase to the asbestos loss estimate comes as insurers are incurring approximately USD 2.1 billion in new losses each year while paying out nearly USD 2.5 billion on existing claims.

AM Best believes the p&c industry's asbestos losses will continue to be an issue given an unstable environment faced with evolving litigation, increasing secondary exposure cases and an increase in life expectancy.

The role of the risk professional is under transformation

Airmic has launched a major project to understand and analyze the future of the risk management profession. The research will be based primarily on a survey of the association, and its deputy CEO Julia Graham has urged members to take part.

Graham said: "Our profession is changing. The role of the risk professional is undergoing a transformation as organizations respond to the rapidly changing business landscape. We want to understand how risk management should be responding but we need the help of our members - the more survey responses we receive, the greater the success of the project."

All terrorism insurance has challenges

Any alternative funding structure to the Terrorism Risk Insurance Act (TRIA) would create a significant challenge for insurance, reinsurance and government leaders in finding an acceptable alternative, according to a report by the U.S. Government Accountability Office (GAO). Specifically, the GAO said that the two leading proposals, a pre-event federal surcharge, or an insurance industry capital "set aside" would include a mix of regulatory and market challenges that would make them difficult to pull off.

The report was required following the passage of the TRIPRA (Terrorism Risk Insurance Program Reauthorization Act) of 2015 with the goal of finding financial "alternatives" to the current funding structure that expires in 2020.

CP Kelco leaves nothing to chance

CP Kelco's Äänekoski plant producing carboxymethyl cellulose (CMC) represents risk management expertise at its best.



engineers.

Carboxymethyl cellulose has long been produced in Äänekoski, and today the production facility is owned by CP Kelco, a world-leading CMC producer, which is part of the American J.M. Huber Corporation. The annual production capacity of the Äänekoski plant is currently around 70,000 tonnes of CMC.

If insures J.M. Huber Corporation's production sites and other facilities in Europe, Asia and South America, and has cooperated with them systematically in risk management for years.

"Our cooperation with CP Kelco's Äänekoski plant is an excellent example of how close cooperation between the client and If results in high-quality risk management solutions", says Pekka Sarpila, Head of Risk Management Services, Finland at If.

Changes affect demand

Carboxymethyl cellulose (CMC) belongs to the group of cellulose ethers, which have significant applications in almost all industries from medicines to food products and from papermaking to oil drilling.

CMC compounds are known for their good water solubility and gel formation properties, thanks to which they can be used in various products to make these easily usable.

The first things that spring to mind when you think about CMC are proba-

bly not the homogeneous consistency of fruit yogurt or the better workability of a dough, but these are typical examples of the uses of CMC in the food industry.

In oil drilling, CMC is used both to lubricate the rotating drill bit and to thicken the drilling fluid in

order to lift rock cuttings to the surface. CMC also prevents the drilling fluid from entering any cracks in the rock.

"Although CMC has many applications in oil drilling, the amounts

supplied to the oil industry today are relatively low due to the current recession in the industry. Previously, a significant proportion of the plant's production was sold to the oil industry, but today new applications have increased their share", says Jukka Kivimäki, Director, Operations, at CP Kelco in Äänekoski.

CMC is also well known as a viscosity modifier in the paper industry. For example, CMC helps to spread the coating colour evenly on printing paper and paper board.

Process inerted with nitrogen

In accordance with the policy of the Huber Corporation fostering its good safety reputation, the CMC production site in Äänekoski also applies solutions that ensure the best safety levels both in its production and the related risk management.

The main raw materials used at the plant are cellulose, sodium hydroxide and monochloroacetic acid.

The manufacturing process is challenging, as high volumes of flammable liquids, basically light alcohols, are handled and stored at the plant.

Due to the dust explosion hazards, extreme caution and many precautions are also required at the beginning and end of the manufacturing process when raw materials and finished CMC are ground.

By far the majority of work input and financial resources required by safety activities have been invested in the inerting of the manufacturing process in order to control the level of oxygen content. It is the foundation and basis of risk management at the Äänekoski plant.

Jani Rosala, EHS Manager, states that, in terms of safety, the production pro-

"If you cannot

manage safety,

you cannot

manage anything else much either."

cess inerted with nitrogen represents the best available technology. Inerting with nitrogen prevents the formation of explosive gas

mixtures in the process with flammable liquid in the equipment. Today, all process equipment at

the Äänekoski plant that processes flammable liquids is inerted with nitrogen.

Personal safety and process safety are guiding principles in all operations at CP Kelco. The 'safety first' philosophy is the most important of the values guiding the company's operations.

"Here in Äänekoski, we have reversed the thinking and concluded that if you cannot manage safety, you cannot manage anything else much either", Jukka Kivimäki crystallises.

Still room for improvement

As a result of its long-term safety work, CP Kelco Oy's Äänekoski plant has become a forerunner in occupational safety and fire safety in Finland. It has also integrated well-being at work into its safety strategy.

"Although we are part of a global company and comply with CP Kelco's safety policy, we are responsible for the safety of our own production site", shares Jukka Kivimäki.

The manufacturing process requiring flammable liquids, i.e., the use of solvents is well under control thanks to oxygen content measurement and inerting.

"Our next challenge relates to the grinding process of pulp that is used as raw material and the grinding process of the finished products, in which we still have some homework to do".

Risk management is highly valued at the Äänekoski plant. Jukka Kivimäki em-



phasises that skilled personnel is the most important asset. This is reflected not only in safety investments but also in safety training covering the entire personnel.

"The Äänekoski plant has succeeded in improving its safety culture and its personnel's commitment to safety despite the fact that studying monthly training packages and taking exams every month throughout the year is not always very tempting. However, as a result of this work, our safety level is now considerably higher."

According to Jukka Kivimäki, problems are not only covered, but all personnel work together and implement changes in a spirit of shared responsibility and with an attitude of respect for others.

The company looks ahead to future work. Jukka Kivimäki considers proactive work as vital and finds it extremely important that all personnel learn to understand when the safety related topics are well taken care off and when they are developing in the wrong direction.

"For example, a dusty floor is both a process safety risk and a personal safety risk. Observing and reporting such issues and developing corrective measures are extremely important. In many cases, safety can be improved with relatively little effort in the first place."

Value for money for investments

Production morning meetings always start with discussions of all safety observations and incidents recorded during the past 24 hours as the first item of the agenda, and responsible persons are designated for them.

All plants of the J.M. Huber Corporation have a common information system in place to record observations made by the personnel. "In the system, the entire organisation can follow the incidents recorded and the related corrective measures."

The observations are classified into three categories.

"We no longer talk about accidents or ignitions, but incidents. All incidents are recorded, and employees do not have to think about whether the issue relates to occupational safety, process safety or fire safety. In this way, recording observations has been made as easy as possible for the employee making the observation."

Fire safety at CP Kelco's Äänekoski production site has improved enormously over the past few years due to the use of the latest fire protection technology and changes in practices.

"Thanks to this development, our manufacturing process is now much safer than twenty years ago", states Jukka Kivimäki. The Äänekoski plant has spent millions of euros just on the improvement of

fire safety during the recent years. However, these investments provide value for the money.

"Six years have passed without serious occupational accidents or serious process safety incidents. A period of six years without any incidents means that it cannot be argued that we

have just been lucky", Jani Rosala concludes.

Fire safety at the plant, the first parts of which were constructed in the 1970s and which was extended in the 1990s and 2000s, has been improved with considered and steady steps.

"We have a mission and a multiannual strategy developed together with If's experts on how to improve fire safety. At the same time, we improved process safety on our own initiative", Jukka Kivimäki says.

The improvement of automatic fire extinguishing systems in the production areas was started in 2006. First the capacity of the fire water pumping station was increased significantly. This ensures that enough water can be pumped into the sprinkler protections if necessary.

Each investment is assessed in terms of opportunities to improve safety. The company has been able to implement the investments while combining three important issues: increasing efficiency, improving safety and reducing environmental burden.

"The best investments are those that tackle several challenges at the same time", says Jukka Kivimäki.

This work has been considerably facilitated by the fact that expertise is available at If's Risk Management Services.

"In the annual property and business interruption risk surveys carried out from 2006 to 2015, special attention was given to the adequacy of the sprinkler protections. The aim has been to build such sprinkler protections that are in all respects appropriate for a plant that handles and stores high volumes of flammable liquids and other combustible materials", says Matti Koskenkari, If's risk engineer at If's Risk management services.

Plans are discussed together

EHS Manager Jani Rosala says that he discusses with Matti Koskenkari monthly, especially if there are plans to make structural changes or even just purchases, such as a new electric forklift.

"I use If's experts as consultants. If's sprinkler expert, risk engineer Ari Santavuori goes through our plans as early as the pre-project phase. We discuss together in good time how improvements should be implemented. An annual audit is a more extensive inspection in which we go through the improvements that have been made

According to Jani

and any improvements "We have a mission yet to be come", Jani and a multiannua Rosala says. strategy developed Rosala, the risk survev reports prepared together with If's by If's risk engineers experts on how to are of such high qualiimprove fire safety. ty that they can be directly used as attach-

> ments to CP Kelco's safety investment applications.

Matti Koskenkari commends the persons in charge at the plant on their systematic work for improving fire safety.

"In this context, I would like to mention the pumping station of the sprinkler protections, as well as the sprinkler protections of the largest production line and the distillation unit, which were completely renewed."

The sprinkler protections were extended to cover also the key storage areas of combustible packaging materials.

In addition the four large cross-connection rooms of the process control systems were protected with automatic gas extinguishing systems and the dust explosion hazards were reduced by improving the automatic explosion protections of the raw material and product grinders.

However, the renewal and upgrade of the sprinkler protection of the largest production line carried out a couple of years ago is in a league of its own.

"As a result of these measures, which required major investments, the sprinkler protections of the plant's production areas are now in line with all recommendations issued", shares Matti Koskenkari.

Prevention is the baseline

Jukka Kivimäki has long performed management duties at CP Kelco Oy. Therefore, he is the right person to ask how the Äänekoski plant can be expected to develop in the future.

"Prevention is the baseline for everything. How can we ensure that employees think before they act and always make a risk assessment - even a quick one - before they take any action? It is important not only on an individual level, but also



at team level. We need new proactive indicators for this to monitor employees' behaviour and the fact that they do the right things."

Washing and maintenance shutdowns are extremely challenging in terms of risk management, especially if they include hot works, such as welding and other work causing sparking.

There is a separate specific permit procedure for the hot works in place at the site. For example, the solvent content of the process is always measured before the hot works have been started. Last year, a total of 566 such measurements were recorded. The Äänekoski plant has three

"For such exceptional situations, it is

production lines, each of which has a washing shutdown every 6-8 weeks. important to think in advance how the process will be started up again after the maintenance or washing shutdown in such a way that all possible precautions have been taken correctly."

process conditions are simulated before commissioning to the extent technically possible with test runs by using water, for example, so that the tightness and adjustability of the production equipment can be ensured safely.

This helps to avoid dangerous situa-

In practice this means e.g. that the

tions and in worst case accidents, costly interruptions of operations and time-consuming investigations.

CP Kelco is a showpiece of excellent results achieved through determined and comprehensive cooperation in risk management.

Harry Nordqvist harry.nordqvist@if.fi



PHOTO: FITBIT

Class actions without losses: A chalenging US trend

There is a growing trend in the US that first puts a relieved smile, but then a troubled frown on the faces of liability insurers.

t relates to class actions. Class actions? Smile? Yes, because this type of action does not involve claims for actual property damage, personal injury or even economic loss suffered by the plaintiffs themselves, which means it is not usually covered by liability insurance.

Instead, this type of action focuses on a breach of consumers' rights, e.g. where products are accused of failing to live up to accepted standards of safety, performance or advertising hype. No actual loss may have been suffered by the plaintiffs, but the court may recognize their right not to be offered unacceptable products that could cause loss to innocent and unsuspecting ordinary people. Plaintiffs ask the court to award punitive damages ("punitive", means "punishing") to punish companies for putting profit before customers and to deter them from doing it again.

Examples from the real world

Why would insurers frown if such claims are not covered?

Well, these actions are becoming a major headache for many of our larger clients and the question is, does it fall to us to try and help them and if so, how?

Here are a few headlines from a US legal website that serve as examples of these class actions:

- Whole Foods Market Inc. was hit with a putative class action in the Illinois federal court, Monday, accusing the grocer of falsely marketing its St. John's Wort supplement product as "standardized", when testing reveals different bottles contain different amounts of the active ingredient.
- Fitbit Inc. asked a California federal

judge, on Monday, to compel arbitration in a proposed class action accusing the company of making "wildly inaccurate" fitness trackers, arguing that the consumers have had a year for discovery and that the case must now go before an arbitrator.

- A Puerto Rico federal judge has put a hold on a false labeling suit over artificially colored cheese brought against Kraft Foods Group Inc., saying she is pausing the case until the U.S. Food and Drug Adminis-
- tration provides guidance on the use of the term "natural" on food products.

A European approach to this sort of class action may be that they are simply inappropriate. It is the task

of governmental authorities, watchdog agencies and even the criminal courts to police such failings in products and advertising. We generally consider that the civil courts should not be filled up and slowed down by mass protestors who have not suffered actual damage, themselves.

But the American spirit appears to place great faith in the individual raising his voice and demanding financial punishment of wrongdoers, which is presumably seen as the best way to prevent cynical companies from continuing with such alleged abuses. In many countries, we try not to overburden the courts with cases. Every society needs a court system for the rule of law; but, they are a large drain on public finances. However, some jurisdictions in the US are keen to find legal grounds to open the doors of their courts to all comers who have a grievance and who want their day in court.

Why?

Well, in US state courts, judges are elected to office by voters instead of being selected by any kind of ministry of justice. One way for a judge to please potential

voters is to make plaintiff-friendly decisions and to be good at finding reasons why cases, with apparently weak connections to his state or city, should nonetheless be tried in his court. Bringing in litigants from outside can be good for business, a sort of jurisdictional tourism, profitable for local hotels, shops and restaurants, owned and worked in by people who may be more inclined to vote for that judge. As it says on the Statue of Liberty, "Give me your tired, your poor,

your huddled masses yearning to breathe "The American free" and the emphasis spirit appears to is on access to justice, whoever you are and place great faith wherever you are from. in the individual This mirrors the trend of US courts (especially raising his voice." in New York) deciding

that they are competent to offer justice to aggrieved parties, from all around the world, where the connec-

tion to the US is tenuous or non-existent. Defendant lawyers refer to these plaintiff-friendly courts as "judicial hellholes". If a client corporation is sued in, for instance, Cook County or Madison County, which are both in Illinois, the defendant's lawyer will work hard to get the case moved out of the area, to a court where the judges' decisions are more likely to be determined by legal, rather than business, considerations.

California currently enjoys a reputation for class action law suits against food and drink companies. Local district attorneys and government agencies have teamed up with private contingency fee lawyers ("No win, no fee") to bring new types of claims against manufacturers of paint and of prescription drugs. One such case, which resulted in a US\$ 1.15 billion judgment, making three companies responsible for dealing with lead paint across the state, has been appealed. Another case, seeking to blame drug makers for painkiller abuse, was recently dismissed by an Orange County trial judge, who recognized that dealing with such

Fitbit asked a dederal judge to compel arbitration in a



problems should fall to experts and policymakers at the Food & Drug Administration, not to local courts.

Duty to defend?

Should we help our insureds with this sort of case and if so how?

One way, could be to offer legal expenses coverage for such actions, covering the legal costs but not paying the damages awarded in the event that the plaintiffs are successful. In principle, any risk can be insured if the underwriter is able to understand the frequency and cost that the risk implies.

Indeed, in an ongoing case in California, the State court has taken a step towards forcing the duty to defend on insurance companies in a situation where the insurer does not admit that the duty arises. Duty to defend means that the liability carrier has to handle and fund

ties this would entail for establishing a "class". The insurers have objected (and are appealing) arguing that the (economic only) losses

claimed are not covered by the policy; if the plaintiffs had actually claimed damag es for the illnesses claimed to have been suffered as a result of the allegedly defective mattresses, that would be different. However, in California, there is legal precedent that establishes that the duty to defend is activated by the underlying facts alleged and not the monetary claims the plaintiff makes on the basis of those underlying facts. After all, the plaintiffs could choose to amend their pleadings and seek damages for personal injuries, even if that does not seem very likely in the current case.

We have ways of working out how much defence costs in legal proceedings may amount to; but, the levels of punitive damages, in these claims, are much harder to predict and therefore, setting adequate premiums is much harder. Jury awards can be as high as 10% of the defendant's net worth (as shown by the

the insured's legal defence. This duty usually only arises where the damages claimed would be covered by the insurance. In this case, a mattress manufacturer is fac-

ing a class action where the plaintiffs are claiming economic losses only, having decided against claiming damages for their alleged personal injuries. They are holding back from claiming compensation for personal injury as a tactical step to avoid the evidential difficul-

company's published accounts), although such awards are often brought down on appeal, where senior judges have the opportunity to impose reasonableness in the absence of a jury. But in cases where actual loss or injury is suffered, punitive awards ten times the size of the compensatory awards can be upheld on appeal.

There is also the complication that punitive damages are awarded for situations where the defendant has been found to have wilfully, recklessly or knowingly sold dangerous products or lied about product safety. Do insurers want to insure such risks at all? Reinsurers are divided about whether this is workable or desirable and insurance companies cannot take this course, unless we have our reinsurers with us.

And even if we are prepared to insure punitives, some US states (such as Philadelphia) make it illegal to compensate punitive damages through insurance, quite logically, because the presence of insurance would reduce the punitive effect.

However, the overwhelming majority of all cases are resolved or settled before trial, as both sides are conscious of the risks of losing and the cost of litigation. Settlements which contain a punitive element are not usually broken down to show how much of the settlement is compensatory and how much is punitive, so the question can be avoided, in practice, if the settlement amount can be justified by reference to the risks of a high compensatory award.

The issue of what to do about class actions without actual loss will not go away. Especially in a soft insurance market, the major players will be watching each other closely, to see who dares offer a product to clients that could win business. Hopefully, a solution will emerge before the dissatisfied corporations, of the US, rise up in a class action against all major insurers and accuse them of wilfully selling defective insurance products.

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Management of **"The catastrophic claim"**

What will happen if you are hit by a major flood, storm or some other severe natural event?

hat if your clients or your most important suppliers are affected? During the flood in Thailand, in 2011, large areas of industri-

al compounds were, more or less, inaccessible. What if your key suppliers are located in such an area? Are you prepared and how will your business be affected? In what seems to be an evermore deteriorating climate situation, where storms, floods, heavy rains and the like are increasingly frequent, it is well worth spending some time to consider how you may prepare yourself and your business for such a scenario. You will, of course, have the most influence over your own facility; but, even here, you cannot fully avoid being hit by, let us say, a flood. If you are at risk of being affected by a flood, you can prepare for it in order to minimize the effects.

Planning ahead

You may be able to prepare by obtaining physical flood protection for the most exposed and critical areas of your facility. Or, you could, as several of our clients have done, establish permanent physical protection. This may imply a significant investment; but, it may prove to be the best option, as the effects of severe damage could be critical. Another approach may include improving preparedness, such as having stored sandbags and necessary machinery available etc. Even though the government will often assist with these undertakings in an actual situation, self-preparedness is, generally, far more beneficial.

Furthermore, planning ahead on how to best utilize your staff in an emergency situation always proves useful, as does ensuring that local management has both the mandate to initiate a prearranged plan and that it is actually prepared to do so. Our experience is that it is worthwhile to consider pre-nominating a project "organization" for such situations, as the ordinary management organization setup may not necessarily be optimal for dealing with an emergent situation.

From time to time, during our claim handling, we detect that critical equipment has been located in areas that are more prone to damage by natural hazards, the reason may simply be that the risks have not been properly considered. Together with our clients, our risk engineers will, of course, try to identify such highrisk "hotspots" and try to find better alternatives. Our advice is that you should always consider where you have located or stored critical machinery, equipment and stock and, rather importantly, where you have based your IT servers etc. If your main IT servers, for any number of perfectly good reasons (such as there being a fire hazard, theft or safety risk) are stored in the basement of your facility and if you are situated by a river, you might also consider what could happen if the basement floods and how you can prepare to avoid this.

Prepare for the worst

It is generally more costly and troublesome to modify and alter your production site, hence, planning ahead, when establishing new operations or expanding your site, is essential. This planning process, along with the ever-increasing risk of being exposed to natural hazards, indicates a need to include this element in such plans. To be prudent, you might consider doing more than that stated in the general governmental regulations, particularly, if the implications for your business are deemed to be severe.

Of course, there will always be different variables and risks to consider and the measures to deal with them may point in different directions; but, natural hazards, such as flooding, heavy rain, windstorms etc., should, nevertheless, be amongst the risks you should consider and prepare for.

As always, it is worthwhile to have a Business Contingency Plan in place, where you have evaluated and included the consequences of others, and not just yourself, being affected by a major natural catastrophic incident. Handling damage caused by a natural hazard may be significantly different from that of a fire or any other incident that solely affects only you.

First of all, everything around you may be affected. The infrastructure may be severely damaged and accessibility to and from your site may be severely compromised or obstructed for some time. This may affect your ability to bring in materials you need for your production or your ability to efficiently distribute your products. There may be considerable strain on the local government and "As always it is resources, making it more difficult to deal with isworthwhile to sues that would normally have a Business be less of a problem. Electricity, the water supply Contingency and other utilities may be scarce and constitute sig-Plan in place. nificant challenges. In situations like this, there are normally a great number of claims in a geographical area, and craftsmen and experts able to do repair and mitigation work may not necessarily be available. Additionally, we have experienced that, following major incidents, such as earthquakes around the world, it might even be difficult to bring experts, equipment and resources into the area, from the outside.

You may very well be affected by the incident, whether or not your location is directly hit, as it is not unlikely that your clients or your suppliers will have been affected. We have experienced this repeatedly, for instance, in the aftermath of the earthquakes in South America, the floods in Asia or even following the severe windstorms in the Nordic countries.

When discussing insurance solutions, we, at If, will, of course, consider such situations carefully, together with our clients.

Also we at If are very mindful during a natural disaster where family, friends and colleagues may have been personally affected by the event. This is nearly always one of the most important aspects of handling claims arising out of Natural Catastrophes.

How does If manage claims handling when our customers are hit by a major natural disaster?

There is no doubt that dealing with a claim, even from a purely insurance point of view, may prove more challenging following a natural disaster than in a more normal claim situation. For instance, international local insurance providers (our partners) may have a great number of affected clients and their resources will be busy dealing with a significant number of claims. Available loss adjusters and insurance experts may be scarce or they may, as we have already mentioned, be experiencing problems due to infrastructure challenges.

However, we have proven that we are able to help and assist our clients in situations where they experience a claim, under such circumstances. During the flood in Thailand, in 2011, some of our clients where located in an area that proved hard to access. Our local loss adjuster contact, who is part of a major international net-

> work, made a significant effort and managed to visit sites others had deemed, more or less, inaccessible. This provided us with important information and gave us the opportunity to further assist our clients. We have an extensive

and very good worldwide

network of local insurance providers who are normally the major players in the different countries; hence, the local insurance provider will have significant resources at their disposal, locally. In any claims situation, and especially following severe incidents, we cooperate closely with the local providers.

In a major claim, we will normally aim to be physically present, as soon as practically possible, with claim experts from If brought in from the Nordic countries. Solving the claim, in close co-operation with our client, locally and liaising with the client's Nordic headquarters, is essential to us.

Mapping the clients

Normally, we will have already made a pre-defined Claim Program. In this programme, we will have pre-nominated loss adjusters and a pre-defined claims programme head within If, to safeguard the knowledge regarding the client's needs, prior to any claim. This Claim Program should also identify our client's key persons and their roles.

When an incident has occurred or threatens to occur, we map all of our clients, in the affected area, by the geographical site coordinates stored in If's systems. By doing this, we aim to pro-actively contact clients that might be affected. Moreover, this may enable us to initiate early co-operation, which is always a good start in a claim settlement process, and allow us to be able to assist when needed.

Our aim is to offer advice to help prepare our clients for the special conditions a natural hazard situation creates, and of course, to offer first class claim services if the claim occurs.

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RISK MANAGEMENT ALL OVER PRESS

Fire hazard management for unified fire brigades

Four basic steps towards better management of fire risks.



ire hazard management is an important part of a safety management system. The term is used to mean an integrated facility approach to reduc-

ing risk from fires and explosions, by the most appropriate means, for a particular facility. The integrated approach means considering the design, plant layout, prevention measures, incident detection, protection systems, mobile equipment, training, etcetera.

Due to the recognition by many legislators and storage facility operators of the benefits of risk based fire safety measures, the concept of fire hazard management (FHM) has been adopted by the Municipal and Unified Fire Brigade (GB) of Rotterdam and the Rotterdam Port Authority (RPA).

In this article, we use Rotterdam as a case.

The basic steps of the FHM

In terms of storage tanks in Rotterdam, the stated aims of the risk assess-

ment (Steps 2 and 3) are to: • Minimize the risk of loss of contain-

- ment (i.e. product or vapour release) • Minimize the risk of a fire or explo-
- sion occurring on or in the tank itself • Mitigate the consequences of such an
- incident, particularly with regard to people and the environment
- Protect the tank from fires occurring elsewhere.

Tank fire scenarios and corrective actions

Causes of ignition

- Lightning strikes
- Hot work on live tanks
- Flare stack fall-out
- Over heat or mixer failures
- · Over-fill with remote ignition sources (Buncefield)
- Floating roof contact with tank shell • Build-up of static electricity.

Reducing the likelihood of ignition

- Secondary seals for high vapour pressure products
- Fire retardant rim-seal materials
- Independent high level alarms
- Linear heat detection in the rim-seal
- THE BASIC STEPS OF THE FHM Step 1 Review fire scenarios that can occur Review different policies to reduce fire and explotion risks Step 2 Step 3 Decide which policy is the most appropriate Step 4 Implement and maintain the policy

- Wind girders with handrails, to facilitate inspection of seal areas, and foam application to the seal area. Open top or external floater tanks are designed with a stiffening ring (commonly known as a wind girder) to add support, due to the absence
 - Proper system maintenance.

of a roof.

Resource requirements for larger (>40 m) diameter tanks

For a ground level foam attack on a tank full surface fire, it is important to realize the following:

- It is not an exact science, each fire may differ due to weather conditions, the fuel involved, etcetera
- Provide the tools and the knowledge to keep options open
- Be aware of the extremely large quantities involved! Foam Pumping Appliances and foam procurement (some 100,000 litres of foam concentrate needed per hour of firefighting) and Water Supplies (approximate 3.5 million litres of water needed per hour of fire-fighting) must be met. The capacity of any water pumping appliances, being used for water monitor supply, must be as large as possible. Typical "standard" water tenders/pumpers may only have a 2,500 L/m pump on board. Obviously, this will only be enough for 1 typical water monitor, and if larger water monitors are used, then it may require 2 or more water

pumping appliances, for every monitor. This can lead to major logistic and deployment challenges.

Large tank incidents may involve more than 100 firefighters and during the fight, fatigue due to physical effort and manual handling of hoses and equipment is likely to play a major role. Additionally, a long duration usually introduces catering and backup needs.

A major item to consider, when fighting fire, is wind direction! Not only in regard to the difficulty in getting the water foam mixture in the right place, but also with visibility, which may be reduced due to dense black smoke, resulting in firefighters being exposed to slips and falls.

Normal municipal fire brigades are not equipped, nor trained, to handle or adequately respond to these types of large chemical fires. A main criterion is the time needed to reach the incident site, which is now defined as being within 10 minutes.

Thus the Unified Fire Brigade (GB) was formed and became operational in 1998. It is a fully equipped professional fire brigade that is able to handle chemical fires and is part of the Industrial Firefighting Pool or Industriële Brandbestrijdingspool (IBP). It is manned 24/7 and staffed by 300 qualified employees.

Unified fire brigade (GB)

The Unified Fire Brigade (Gezamelijke Brand weer) was formed to adequately protect the large industrial area to the west of the city of Rotterdam. This area is some 35 kilometres long and some 2 to 5 km wide and comprises Rotterdam Waalhaven, Pernis, Botlek, Rozenburg, Europoort, Maasvlakte 1 and Maasvlakte 2.

Here, we find an impressive mix of industrial activities that are not restricted to the harbour, such as logistic service providers, as well as an impressive mix of chemical plants, ranging from oil refineries to fertilizer plants, specialty chemicals manufacturers and power plants. All big names like Shell, Exxon, Akzo Nobel, Neste, Unilever, Dupont, BASF and DOW have plants in this area. Moreover, the available tank storage capacity is one of the largest in the world. The area is Europe's most concentrated region of oil and chemical,

storage and processing facilities. Facilities include crude oil import and transfer terminals, refineries, petrochemical processing plants, chemical storage depots and plastics manufacturing facilities. Consequently, it contains a massive "Similar number of storage tanks, organizations containing a wide variety of materials.

can be found Storage tanks may contain large volumes of in other flammable and hazardregions. ous chemicals. A small accident, here, may lead to a multi-million euro property loss and a few days of production interruption. A large accident could result in lawsuits, stock devaluation or may even lead to company bankruptcy. That is why we, at If, put great emphasize on the importance of proper levels of incident (loss of containment and fire) prevention measures and proper protection.

The GB objectives

- Performing, maintaining and renewing industrial and public fire services, in its service area, which may arguably be comparable to similar organizations around the world, in terms of efficiency, quality and service.
- Fighting incidents through an organization of specialized industrial firefighters, whose core purpose is swift intervention.

• Providing assistance, in the broadest sense, with non-fire disasters. Or in other words; it comes down to performing the following tasks: the rescue of humans and animals, fighting building, unit and tank fires and "chemical spills", plus technical assistance.

The following special appliances are available:

Two 37,500 L/m monitors that include individual diesel driven pump sets (for fighting tank fires of up to 80+ meters in diameter and tanks up to 22 meter high) using a driven booster pump with a capacity of up to 80,000 L/m at 10.5 bar diesel, which combined, allow for a longer water supply distance. In addition, special large hose reels and re-reeling equipment are included.

Water is supplied by two Rotterdam Port Authority patrol boats or incident





fighting vessels via eight large diameter hoses.

Sufficient synthetic, alcohol-resistant AFFF foam concentrate is available, on site, on fire fighting vehicles and in

> small containers (60 m3 in total), as well as in six hook-arm containers of 20 m3 each. The combination of all of this equipment, along with the trained fire fighters, should enable them to successfully fight tank and tank bund fires.

For tank bund fires, a special sector driven approach was developed, where the tank bund is divided into imaginary sectors and each sector is approached in succession, one after the other, whilst the foam blanket is maintained on earlier sectors and water is supplied by the RPA. Special equipment was acquired, at an additional cost of some € 300,000, to facilitate this.

Also in Sweden

Similar organizations can be found in other regions, for example, Släckmedelscentralen -SMC AB. Seven Swedish oil companies established the SMC in 1994. They invested in equipment and reached agreements with fire brigades in Stockholm, Gothenburg, Malmö and Sundsvall, regarding SMC operations and emergency preparedness. With the Emergency Centre, SMC and the currently available equipment, and the professional and specially trained personnel from the Rescue Services, Sweden has the capacity to tackle very serious fires that may occur at an oil terminal or any other large scale fires. This was successfully put to the test in August 2011, when the SMC force was called out to the Södra Cell pulp and paper plant in Mönsterås, when a major fire broke out in a large chip pile, and again, in Västmanland, in 2014, when forest fires raged there, for eleven days. 🗖

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How do you protect yourself from terrorism?

Terror attacks are hard to predict, but terrorist expert Hans Brun does have a couple of tips to companies and industries that want to protect their businesses.



ombs, vehicles, lone wolves and coordinated attacks. Terror, blood and chaos. The threat of terrorism lies like a shadow over Europe and the rest

of the world.

There has been an increase in global terrorism since the new millennium, both in the amount of attacks and the number of casualties. Yet despite the increased concern about terror attacks, the number of deaths they have caused in Europe has in fact decreased over the past 40 years.

On the other hand, terror attacks are different nowadays and pose a more serious threat to the public.

Threat to the public

"There are fewer deadly terrorist attacks per year in Europe today than in the 70s and 80s when ETA and the IRA were most active. However, the difference between those attacks and the ones that happen today, according to terror expert Hans Brun, who works at the Swedish Defence University and as a researcher at King's College London, is that the attacks that took place in the 70s and 80s were easier to predict and were linked to specific places.

Those attacks were aimed primarily at the national security, police forces, the army and politicians, which meant there were few civilian casualties.

"Today, the threat of terror is less predictable and it is impossible to know where the next attack might unfold. They are also aimed at the public in a new way", according to Hans Brun.

There are two main ideologies behind today's attacks - jihad and right-wing extremism. They are well organised and the attacks can be synchronised between several terrorists.

"Modern technology has made it easy for these ideologies to spread more quickly than previously. It is easy to use the internet and social media to share both your view of the world and knowledge on how to perform different crimes", says Hans Brun.

And a new form of terrorism has shook the world:

"We are seeing an increase in Lone Wolf attacks. It is nearly impossible to prevent these attacks because they do not communicate with others."

Protecting your business

The purpose of terror attacks is to spread chaos and fear to achieve certain political objectives. At the same time, the attacks - with or without purpose - cause damage to buildings and property, disruptions to business, bodily

harm and result in insurance claims. Some sectors

have a higher level of exposure to terror attacks, such as communications and transportation, infrastructure such as electricity, water and gas, as well as large, central public buildings.

How should one think and act in order to provide maximum protection to one's business and employees? And where is the biggest threat? "Turkey is an ex-

tremely high-risk country within Europe. This is partly down to the complicated political situation within Turkey and partly because it shares borders with Iraq and Syria, both of which are at war", says Hans Brun.

"We are seeing an

increase in Lone

Wolf attacks.²

Hans Brun

savs Hans Brun.

France and Great Britain are also coun-

tries with a higher level of threat.

"They have an active presence in the Middle East and are seen as a natural enemy by Jihadists. Shortly thereafter comes Germany, Belgium, Italy and Spain which have borders with France and Great Britain. They are transit countries that are large and where it is easy to move across the borders."

And more precisely, it is hard to predict where an attack might unfold.

"In simplified terms, big cities, popular sightseeing destinations and places of interest with a direct connection to major motorways are at extra risk from attacks."

Perimeter security and crisis plan

Obviously it is important to have security checks and controls in place to prevent attacks on buildings and property. However, it is becoming increasingly harder to prevent terrorists simply through such measures. Terrorists commonly pick tar-

gets where surveillance is difficult and there are a lot of people, such as marketplaces, universities, concert venues and airports. "As a business

owner, you can think about the physical characteristics and perimeter security of your buildings. Make sure that unauthorised persons cannot enter or get close to the buildings. Review your fire safety procedures. Assess plans for emergency evacuations",

He also stresses the importance of keeping evacuation procedures a secret. "Terrorists can use any information about emergency assembly places that is posted on companies' websites. It is therefore important to make sure that

this information cannot be accessed. It is easier to start a fire alarm inside a building and then set off a bomb in an open area than to carry out an attack inside the building. My best advice is to think twice when it come to security - how would a terrorist with really bad intentions think and act?"

You should also take into consideration where the employees live and the routes they take to get to the workplace. If a terrorist attack were to take place, what happens, where can employees stay to be kept safe, and how do you fly home employees who are on business trips?

"Information is another very important aspect that companies and authorities must take very seriously. How can you guarantee that information is communicated in a correct and reliable manner in a crisis? How do you make sure that family members can be reached and media can be informed?"

Hans Brun believes that the next major terror attack that will leave the world reeling will be done through computers and by using cyberspace.

"I don't think that the next 9/11 will be committed with bullets or bombs. It will be aimed at damaging the infrastructure of society, leaving people feeling insecure. It could be aimed at electricity networks or food supplies. It could be exceptionally unpleasant."

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The four most deadly terrorist attacks in Europe since 2000

11 March 2004, ten bombs were detonated at Atotcha railway station in Madrid, Spain. 191 people were killed and 600 were injured. Initially the authorities suspected that the Basque separatist group, ETA, was behind the attack. A group affiliated with al-Qaida later claimed responsibility for the bombings.

7 July 2005, Islamic suicide bombers attacked a double decker bus and three underground trains in London. 52 people were killed and more than 700 others were injured. This attack was the first suicide bombing in Europe.

22 July 2011, right-wing extremist Anders Behring Brei-



vik killed 77 people outside the executive government building in central Oslo and on Utöya island.

Three groups of coordinated attacks by Islamic terrorists took place in and around Paris on 13 November 2015. 130 people were killed in these attacks and 350 were injured. In 2016, there were 22 terrorist attacks in Europe, 18 of these were carried out in Turkey.

Source: SVT News

Autonomous ships

Factor fiction?

Autonomous cars have now been on everyone's lips for a few years – but autonomous ships?



riverless car technology is at an advanced stage, with major companies such as Google, Tesla, Ford, General Motors and Nissan paving the way. For quite

some time, Volvo has been testing driverless cars on public highways in Gothenburg, in conjunction with the Swedish authorities.

In the field of transportation, autonomous (or unmanned) ships have been and still are being intensely debated. It is virtually on the agenda of almost all transport related seminars. As with all technical developments, there will inevitably be ascribing risks. From an insurer's perspective, it is new territory and these new risks difficult to assess and grasp. Autonomous ships are a new frontier for the insurance and legal communities. Many questions remain unanswered. For instance, if there is no ship master on board, who can be held liable if something goes wrong? Will autonomous ships become a reality or remain fiction?

Fact or fiction?

Let us start off on the right foot. Autonomous vehicles are already state-of-the-art, in many land-based transport modes. Several examples of automated subways, self-driving intralogistics vehicles or automated guided vehicles at modern container terminals already exist. There are also very wide-ranging approaches to autonomous control concepts in modern aviation. Autonomy is seen as an opportunity for maritime transport to meet today's and tomorrow's competitiveness, safety and sustainability challenges.

One could, therefore, argue that the technology is in place. However, there are still a number of nuts to crack, before the world will see autonomous ships on any larger scale. Some of the challenges involve infrastructure: ports, fairways and cargo handling etc. Other challenges are of a political, geographical and regulatory nature.

That said, the continued drive for extracting cost efficiencies and increasing competitiveness within transportation and the supply chain continues to be a powerful driver for making this a reality.

Developments

Autonomous ships will transform the entire marine business. The operational profile of ships will change, as more tasks and functions become controlled from shore centres. Remote and autonomous solutions will enable entirely new ship designs and concepts for improved economic performance.

Politically, logical reasoning for encouraging autonomous ships ploughing the seas and waterways includes, e.g. that the EU road network is suffering from congestion. Pop-



tonomous ship?

ulation growth in urban areas will lead to a demand for transportation that exceeds the capacity of existing roads. To alleviate these issues, governments all over the EU are trying to move some of the freight volume from the roads to the waterways. To this end, the Europe Commission funded the three-year MUNIN (Maritime Unmanned Navigation through Intelligence in Networks) research project, to investigate the possibilities of unmanned ships.

MUNIN, which was completed in August 2015, used ten years of global manned ship data to compare the risks of manned ships to those of unmanned ships. The study projected that an unmanned ship would have one-tenth of the risk of a manned ship of colliding and foundering, where human error often plays a role. The analysis also predicted a savings of \$7 million over a 25-year period, per ship, in fuel use, crew supplies and salaries. With the number of cargo ships operating worldwide, currently estimated at 9,600, the potential savings are enormous.

Some companies that have invested a lot of time and effort into developing concepts for autonomous ships include the Classifications Society DNV GL and Rolls-Royce. DNV GL has announced its concept for an unmanned, zero-emission, shortsea vessel and has built a 1:20 scaled model. Automated Ships Ltd and Kongsberg Maritime have signed a memorandum of understanding to

build the world's first unmanned, fully automated vessel for offshore operations. Sea trials will take place and the vessel will ultimately be classed and flagged.

There are many tech-

nical challenges. Various sensor systems will be needed to detect problematic situations, such as unexpected objects in the sea, dangerous weather conditions or collision dangers. A major challenge will be to devise sensor systems that reliably detect all relevant dangerous situations and appropriately act on them.

Legal challenges

New strict, international and uniform technical safety standardization will be absolutely essential for the introduction of an unmanned merchant service. This needs to be implemented in the context of the SOLAS Convention and the rules of Classification Societies. The IMO will be scrutinizing the development of such a framework.

Can existing maritime law still be applied, in principle? What existing rules will require amendment

or expansion and what "New safety new rules might have to be developed? standardization Maritime law is a diswill be absolutely tinct body of both domestic law, governing essential. maritime activities and

private international law governing the relationships between companies that operate ships on the oceans of the world and the tidal waters of rivers. It deals with all matters, including marine commerce, international trade, shipping, marine navigation and the transportation of passengers and goods by sea. Maritime law also covers many commercial activities, which although land based, are maritime in character.

How will current international regulations deal with unmanned ships, including the changes required to conventions such as SOLAS, MARPOL, STCW and COL-REGS? What is the potential impact of autonomous ships and the carriers' duties

to cargo, under the carriage of goods regulations, such as The Hague-Visby or the new Rotterdam Rules. Will autonomous ships have an impact on the carriers' right to limit their liability? Threats, such as cyber piracy, will spur whether further regulations are required.

As for the UN Convention on the Law of the Sea (UNCLOS), it is quite clear that an autonomous ship will have to fly the flag of a state. But

is the autonomous ship, with no master or crew on board, still a ship? Most commentators accept that, for the purposes of the

law of the sea, unmanned vessels must be regarded as ships. Other national laws simply define the master as any person to whom the authority of the ship is transferred or as the person who effectively exercises that authority. It can, however, be concluded, with a considerable degree of certainty, that unmanned ships would be covered by the great majority of the existing regulatory definitions, conventions and national laws.

The duty of the carrier to apply due diligence in making the ship seaworthy, which is a fundamental element of The Hague-Visby Rules and the Rotterdam Rules, will, in the light of the available case law about the general state of the ship, imply that the guiding IT mechanism and the shore-based vessel controller must function satisfactorily.

Collision law also appears to be able to stand up well against the arrival of autonomous ships. The 1910 Collision Convention governs the liability for collisions on the basis of the errors of ships and not the errors of the master and the other crew members (even though these are, of course, the cause of the collision). Should the collision be caused by the error of a shore-based vessel controller nothing will change regarding liability.

As for contracts of affreightment (usually a charter party), which determines how the ship is operated, there is nothing to stop the various types of charter parties continuing to play a role. The fact that ships will, in the future, perform their tasks without anybody on board does not appear to have an essential impact on these contracts. Some amendments need to be done, especially regarding competences, recruitment and the functioning of the master.

As for the rules of the special conventions relating to pollution damage, they appear to remain entirely unaffected.

To the extent that the unmanned ship is operated or controlled from the shore, the question arises whether or not the shorebased vessel controller can, under the current state of maritime law, be regarded as the master?

> ing valuable cargo. Just like the master, the shore-based vessel controller must have certain qualities, such as good judgement, the ability to communicate well, a cool head in emergencies. The

The shore-based vessel controller, sitting at his control desk, will have the responsibility of handling transports carry-Will an unmanned autonomous vessel at sea be at higher risk of piracy? shore-based vessel controller will have the duty to maintain a proper look-out and to proceed at a safe speed.

> All things considered, it appears that, with regard to the liability of the ship owner, relatively little will have to change. But, the introduction of fundamentally new liability rules may become the subject of political discussions. Would it be preferable to have liability based on strict liability for ships controlled by artificial intelligence?

Maritime law, with its long history, appears, on first examination, to be relatively well armed for this technological innovation and the necessary and undoubtedly extensive adaptations of existing public and private maritime law will be unlikely to bring about a revolution. Maritime law will enter a new phase of development; but, it will certainly not die out.

Insurance - risky business?

At first sight, autonomous transport would eliminate the human factor, which, according to estimates, accounts for roughly 80 per cent of all maritime casualties. However, to the extent that unmanned ships are operated or guided by human operators, the human factor will continue to play a role. The shore-based vessel controller will be unable to react with the same intuitive feel for the situation (or at the very least a good deal less). Safe autonomous operation will ultimately depend on the satisfactory operation of the on-board equipment, the required connections with shore stations and the stability of the computer programs. There will be communications and cybersecurity considerations.

What risks will follow an autonomous ship being isolated on the ocean? How will the duties of the crew, to ensure the cargo is inspected, transfer to an autonomous ship? Who will fight a fire that

breaks out? There would need to be a credible backup plan, if something goes wrong at sea. The risk is paramount, as there would be millions of dollars of cargo on board, on larger merchant autonomous ships. Who would be there, if there was a breakdown of the computer systems?

Will an unmanned autonomous vessel at sea be at higher risk of piracy or will human presence on board, with active piracy measures in place, be a more effective deterrent to a pirate boarding? It would be naive to expect that pirates and terrorists will disappear from the high seas. Could an autonomous ship, whose controlling software has been hacked from the shore or another ship, be regarded as a pirate ship? Whether or not the hacker of an IT system controlling an unmanned vessel would be considered a pirate in the meaning of the UNCLOS, is not so clear.

What will happen if a fully autonomous vessel is unable to avoid a collision with a traditional vessel and is rendered holed, grounded or otherwise unresponsive and uncommunicative?

The interaction between autonomous ships and large manned ships can probably be solved by route exchange and coordination. However, a large unknown remains in how to deal with the interaction between smaller vessels, such as leisure craft, coastal fishers and, for example, kayaks in inshore areas.

Must the shore-based vessel controller be protected against unlimited personal liability? Would there be reason to make software and hardware developers, system engineers and manufacturers subject to a special product liability?

If there is no longer any crew required on vessels, what will happen to the pool of available experience, traditionally obtained from individuals with prior seagoing experience that is essential for shore-based legal and insurance companies and brokers?

The list of potential policy and risk questions is almost endless. At present, it is still too early to try to answer all of them.

If we can put a rover on Mars and have it autonomously conduct research, why can we not sail unmanned vessels across the Oceans? The dawn of the autonomous ship is upon us.

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Climate change is expected to have serious impacts on housing and infrastructure. No Swedish national strategy vet exists to facilitate the planning required to act upon it. The Swedish Geotechnical Institute (SGI) has, therefore, developed an action plan for adaptation of land use and ground constructions in the built environment.



daptation to climate change, particularly flood risks, may come to pose large challenges, in the future, and will require co-

operation among a range of stakeholders. The new action plan, for managing ground conditions in the changing climate, proposes a framework for delivering adaptation action, at all community levels: national, regional and local. Not only does adaptation help ensure that our urban environments are more robust in the face of an inevitable climate change, but it offers opportunities, as well. By building adaptive capacity and delivering sound adaptation solutions, we can make cities more attractive, with a better quality of life.

Action plan

Effective adaptation, in the built environment, needs to be supported by robust policy, a good knowledge base and a range of incentives to ensure delivery on the ground. Our hope is that the action plan will be supportive of this process. Bringing forward new digital bases such as maps, decision support tools and guidance on climate change effects on ground conditions, is a cornerstone of the action plan.

The action plan describes key guiding measures and specific activities by which authorities and the construction industry can deliver climate change adaptations for managing ground conditions. Insurance providers may have much to contribute, as they offer other parts of society services to appropriately identify, assess and reduce the financial impacts of climate changeinduced risks. The action plan highlights the need to explore the distribution of liability, for example, the costs from flooding between public authorities and the private insurance sector. To address this issue, the action plan proposes activities to examine how the commercial insurance indus-

try and public authorities can coordinate their actions to promote climate change adaptation.

Key climate adaptation messages

Seek opportunities to incorporate adaptation into new and existing developments. Planners, designers and developers need to work together to ensure that any new development or reconstruction takes climate change impacts into account. There are many Incorporate ways to facilitate adaptaflexibility to tion. While it is often more deal with cost-effective to adapt new developments at the planchanging risks. ning and design stages, restoration efforts also offer significant opportunities to incorpomeasures to increase respect for ground conditions throughout the Swedish civil process from planning, design and construction, management, demolition and restoration. Measures for knowledge

rate adaptation. The action plan proposes building are proposed, for all processes. Work in partnership with communities. Engagement of national and regional authorities with local communities and the construction industry is crucial for developing adaptation actions that will work in practice. The action plan highlights the advantages of partnerships, between the public and private sectors, to form a fundamental part of the process of developing sufficient knowledge of the effects of climate change on ground conditions, to be able to make the right decisions for both new and existing developments. Incorporate flexibility to deal with changing risks. Adaptation efforts must incorporate sufficient flexibility to deal with changing climate risks over time. The most appropriate responses will differ, depending on the scale on which they operate from conurbation, to neighbourhoods, to building scales. The action plan concentrates on several largescale monitoring ac-

tivities, risk assessments and mapping to facilitate long-term planning and management of ground condition risks. A better basis is a prerequisite for assessing and incorporating both current and likely future climatic risks to ground conditions into development plans. It is vital to ensure that development does not constrain our ability to deal with land stability risks, in the future. If well designed and integrated, strategies for management of ground conditions, such as vegetated slopes and managed realignment, can provide amenity by enhancing the quality of public places. Understand existing vulnerabilities to climate and identify critical thresholds.

The imperative for adaptation is greatest in areas that are already vulnerable to climate risks. The Swedish coastal communities and infrastructure will be will be very vulnerable to sea level rise. It can lead to large claims costs and parts of the Swedish cultural heritage being lost, unless climate change adaptation measures are implemented. Understanding how sea level rise will affect an area and identifying

> the critical thresholds such as when ground conditions become unsuitable for developments - can help determine when and what adaptation actions to undertake. The action plan suggests that concerned

authorities, together with the insurance industry, are consolidating to increase knowledge on how the changing conditions should be managed, to minimize vulnerabilities and possible claim costs.

Future sea levels

Identify key climate change risks for ground conditions using the latest climate change scenarios. Knowledge about climate change effects on ground conditions and geo-constructions is still, to a large extent, to be developed. The action plan points to the need for more knowledge of, for example, long-term ground constructability in the changing climate and how coastal management is to be developed to handle the rising sea level, together with increasing shore erosion. The latest climate change scenarios for Sweden are provided by the Swedish Meteorological and Hydrological Institute (SMHI). Before summer of this year, new data will be provided by SMHI on future sea levels along Swedish coastal areas - this information will be essential for future risk management and relocation plans.

It has become very clear, while developing the action plan, that there is a strong demand by the stakeholders involved in land and ground construction, for a new complementary basis and guidelines on the effects of climate change on ground conditions. More research and development is needed on changing ground and geo-construction conditions, models for risk analysis and practical guidance on how existing and new developments can be adapted.

Sweden is the only Member State in the European Union that is still lacking a national strategy and action plan for climate change adaptation. However, there is a well-developed structure of regional action plans, as well as about 10 sec-



torial action plans, at the national level. The design of the action plan, for managing ground conditions in a changing climate, is underpinned by SGI's instruction, issued by the government, to be proactive and maintain a coordinating role in its field, to identify the levels of knowledge and disseminate new knowledge, to streamline the planning and construction process.

Dialogues have been implemented, in various meeting forms, with about 70 organizations, mainly from the public administration, but also with representatives of industry and academia. A total of 200 stakeholders gave their views on what needs to be done to achieve ground constructions adapted to a changing climate and how SGI can be supportive, in that effort. The feedback from the outside world. via close to 90 consultation responses on the action plan before it was adopted, showed a positive engagement - both to SGI's initiative for developing an action plan

for adaptation of land and ground condition management, and to the overall approach.

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The Swedish Geotechnical Institute (SGI) is an expert agency that works for a safe, efficient and sustainable development and sustainable use of land and natural resources. The mission includes the prevention of landslides and coastal erosion, sustainable and effective soil works, know-how and methods to remediate contaminated sites and climate adaption. In

its role as an expert agency, SGI collects, develops and distributes knowledge to society. This knowledge is attained through research, consultancy and cooperation with others, both nationally and internationally. Knowledge dissemination and provision of advisory services is part of the role in supporting municipalities, county councils and other authorities throughout Sweden on geotechnical issues.

SGI was established by the Government in 1944 to "strengthen geotechnical research and to support state agencies with construction operations". Today, there are about 90 employees. Website: www.swedgeo.se

English website: www.swedgeo.se/en/

The progress of climate change is inevitable

During the last decade, the increase in weather-related risks, global warming and climate change have become major issues in public debate and have impacted public decision-making.

n the 1/2006 issue of Risk Consulting magazine, we highlighted the views of Ernst Rauch, the Head of Munich Re's Corporate Climate Centre, regarding the impacts and threats of climate change. What is the situation, today? How well have we succeeded in climate change prevention?

According to Rauch, there has been a very clear trend in the progress of weather-related risks and climate change over the last decade.

"The number and frequency of losses arising from weather phenomena has continued to increase. As I mentioned in Risk Consulting magazine in 2006, the quantity of economic and insured losses, caused by weather phenom-

ena, reached their highest ever level, in 2005. In 2011, we experienced a new record high, when economic losses, caused by natural catastrophes around the world, amounted to USD 360 billion," Rauch said.

During the last decade, climate change has been a major issue in public discussions, both nationally and internationally. In 2015, 195 countries signed the Paris Climate Agreement and committed themselves to the goal of keeping global warming under two degrees Celsius.

"This is an ambitious goal. To achieve it, we should significantly reduce emissions and the use of coal, by 2050. Unfortunately, I am not very optimistic, and I doubt whether we can reach our shared goals on a global basis," Rauch said.

Adjustment to climate change

Given the scientific evidence that climate change will continue, we must, first and foremost, respond by adjusting to this change.

"We must be able to adjust to global warming and the changes in the weather that it is causing. In the future, we have to expect - with regional differences - even more violent hurricanes,

Statens geotekniska institut





tropical storms, thunderstorms, hailstorms and floods," Ernst Rauch said.

Authorities and political decision-makers must find solutions for managing the risks associated with weather phenomena and minimising the losses caused by them.

"The insurance industry plays an important role in such work. Climate risk identification and management have become deeply rooted in insurers' DNA. Through our expertise, we can help our customers, businesses and decisionmakers to adapt to the consequences of climate change and improve resilience against its harmful effects."

Monitoring of rainfall patterns

According to Ernst Rauch, the Munich Reinsurance Company will be paying particular at-

"The identification and management of climate risk are deeply rooted in insurers' DNA."

tention to regional variations in rainfall in its, current and near-future, research activities.

"Major variations in rainfall cause either drought or floods. In particular, we are monitoring flash floods from severe convective storms and rises in sea level, as well as the frequency of floods caused

by storms in coastal areas. Our data indicate that particular attention should be paid to flood protection in risk-prone areas. Furthermore, building regulations should be updated, so that buildings withstand more violent storms."

Rauch points out that the Nordic Countries should also update their building regulations and perform detailed analyses of the measures needed, in order to adjust to the risks of change from climate change, in general.

"The good news is that, according to the latest scientific research results on climate change, which is supported by Munich Re's NatCatService loss database, no major trends are expected, in the short-term, with respect to weather-related losses or extreme weather conditions in the Nordic Countries, compared to past decades," Rauch concludes.

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after the fire.

Close collaboration decisive after major fire

How do you rebuild a business when the unthinkable happens? The forestry group Holmen and If had to display both strong collaborative skills and ingenuity when a fire had ravaged one of the group's paper mills.



hat would prove to be one of If's biggest ever claims in recent years be-

gan on a perfectly normal Friday afternoon in November 2015. Just after 6 pm the emergency services received the alarm - a fire had started in the Hallsta paper mill to the north of Norrtälje. It spread quickly, and although the emergency services managed to put out the fire in one and a half hours, the damage was extensive.

Victoria Thomasfolk at If's property damage department had just returned from a trip abroad and was at home on the sofa when she heard the news. She phoned her contact at the forestry group Holmen to see if they needed help.

"I travelled there on the Saturday morning to see what the situation was on site. We realised very soon that this was a really major claim, although the true extent that later emerged was something we couldn't imagine on that first weekend," she says.

The fire had started in one of the plant's refiners. It was then able to spread via ducts and cable trays to other parts of the four-storey building. Neither of the two paper machines were damaged, but cables and a lot of electronic equipment in the building were damaged. Most of them were never reached by the flames but were damaged by the heat, which reached temperatures of several hundred degrees while the fire raged. The effect

was that all production had to be shut down.

"We manufacture our own pulp for paper and can't buy the same product on the market – so we're dependent on the factory operating. We usually count our shutdowns in terms of minutes, but in this case it took almost 100 days before we were back in full production again," says Johan Abrahamsson, Acting Site Manager at the Hallsta paper mill.

the fire, all the electronics in the building were knocked out, everything was black and sooty. Cables were hanging all over the place, it was cold as the heating system wasn't working and everything was soaking wet from the extinguishing water. It looked really bad," recalls Magnus Johansson, claims adjuster and part of If's team during the process of settling the claim.

Large claim team

The initial period following a major incident is always absolutely decisive, and this was no exception. It was a case of quickly creating a structure in the organisation, obtaining resources and managing both internal and external communication. Before decontamination work could begin, consultants had to be brought in to make sure that the building was actually safe to work in.

"We had several meetings during that first weekend, and after only two days Holmen had much of this in place, which was incredibly impressive and professional," says Victoria Thomasfolk.

The next stage for If was to assemble their own large claim team to deal with the assignment. Joining Victoria Thomasfolk, who took the role of Chair and was responsible for machines, and Magnus Johansson with responsibility for the building, sanitation and ventilation, was Maria Holst, who took care of settling the claim relating to business interruption insurance. In order to make sure that the

"When I arrived a couple of days after

ture, the team was also augmented by underwriter Joakim Troive and risk engineer Stefan Nyberg. They were to spend a lot of time at the mill, and the phrase "Tuesdays at Hallsta" was soon coined. The fact that the

terms and conditions were interpreted

correctly and to learn lessons for the fu-

whole team was on site at the factory at least once a week proved to bring many benefits.

"It's natural for us to be involved. It's

"It's extremely important that we can take up discussions on an ongoing basis."

extremely important that we can take up discussions on an ongoing basis and be in agreement with the customer at all times about what's covered by the insurance policy - that's much easier if you can be on site," says Maria Holst.

The task of getting production up and running once more required a lot of external labour. In total there were at least 400 people with expertise in various fields on site at different times in order to restore the plant including several decontamination companies and firms of electricians, together with mechanics, scaffolders and many others.

Hotels, conference facilities and hostels in the vicinity quickly filled up – Holmen estimated that 4,000 hotel nights were used before the work was finished. But the regular workforce at Hallsta also contributed tremendous efforts during the restoration process.

"Our employees have put in heroic performances. Everyone's understood the gravity of the situation and stepped up to the plate to a degree you can't normally ask for – they have been amazing," says Mill Manager Johan Abrahamsson.

Had to wear masks

More than 300 kilometres of cables were laid during reconstruction work, to replace those damaged by the fire. But this was just one of several kinds of material that had to be obtained in large quantities. "Initially everyone had to wear heavy



destroyed, and plant during the reconstruction.

> duty protective masks just to be on the premises. When the PVC in the electrical cables burned and mixed with the extinguishing water, hydrochloric acid was generated and this not only attacked metal, it

was also dangerous to inhale. I believe that Holmen emptied Sweden of those masks, so that there were enough for everyone who was working," says Victoria Thomasfolk.

As the heat from the fire affected the whole building, it was a major challenge to assess which equipment needed replacing and which could still be used.

"There were thousands of machine parts and electrical components that could potentially have been damaged by the fire. If we'd examined each and every one of them, it would have taken an unreasonably long time. We were forced to find a better way," says Victoria Thomasfolk.

One part of the solution was a heat map – a tool developed by consultants that showed how high the temperatures had been in different parts of the build-

ing while the fire was in progress. By comparing the map with information about the temperatures that various components can withstand, it could be deduced which equipment had been destroyed - after this there were random samples.

Coordinating the work on site

"An understanding could have been a challenge. While of the customer's the decontamination workers had to battle with soot and deposits on manufacturing walls and machines, the electricians process is and Holmen's employees wanted to draw electricity cables and repair maimportant" chines so that production could re-

start as soon as possible. The solution was to divide up the work - decontamination with water and chemicals took place at night time in order to avoid clashes and conflicts.

To apply a systematic approach to the work and be able to keep track of what had been done and what remained, the premises were divided into a grid with named sectors, which made it possible to monitor which parts of the building had been decontaminated and which still had to be worked on.



In March 2016, 99 days after the fire, both of the factory's paper machines were back in production, and in October the same year If completed its settlement of the claim. Instead of two or three years, which is usual in connection with major fires, settlement only took ten months.

The fact that If works with its own personnel on claims is one factor behind the work being able to proceed so quickly. Doing it this way instead of bringing in external claim handlers, which is otherwise usual in the industry, creates shorter decision-making paths and a simpler prioritisation of resources. It also brings If closer to the customer, which is usually very much appreciated.

But that's not the only explanation.

"The fact that it went so quickly was also because Holmen was proactive and had good procedures for the work. A process such as this takes a lot of energy and we agreed with them not to let it drag on in terms of time," says Maria Holst.

If handles a lot of major industrial claims every year, but the fire at Hallsta turned out to be one of the biggest in recent years. According to Magnus Johansson,

"An understanding of the customer's manufacturing At Hallsta, Johan Abrahamsson can look back on an

there were several lessons to be learned from it. process is important for a good claim settlement process, but it's also very much about good communication with both the customer and others involved in the claim. Building a relationship is incredibly important. You're making thousands of small decisions all the time, and the most important thing is that they can feel confidence in us and we in them," he says. incident that despite everything has made the business stronger.

"Of course the fire was a major challenge for us, but we achieved a good settlement in partnership with If and I believe we came through it all with flying colours," he says.

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Crisis consulting services in product recall

As consumers, we all have plenty of rights in case the products or services we use turn out to be defective.

n the worst case, the products we buy can cause serious injuries, due to safety defects. Product liability laws make the manufacturer strictly liable for these injuries. In many product groups, such as food and beverage, pharmaceuticals, automobiles and cosmetics the regulation goes even further, requiring stringent management policies and procedures for product safety. The products must be designed and manufactured to be safe to use. However, even with the best management policies and manufacturing methods, it is possible for dangerous products to be distributed, before a defect is identified.

Frequently, there is news in the media of large recalls. An example from recent years is the recall of Takata airbags that caused a massive recall, of up to 100

28 IF'S RISK MANAGEMENT JOURNAL 1/2017

million cars made by many of the bestknown auto brands in the world.

A vulnerable industry

The food and beverage industry is inherently vulnerable, as even small errors can escalate into large recall events. The largest events in the food and beverage industry have cost hundreds of millions of euros in product liability compensations, recall and other mitigation costs, as well as lost sales. In severe cases, companies have lost their business and gone into bankruptcy or landed in mergers or other corporate restructuring arrangements. Smaller, but not necessary less dangerous recalls in the food and beverage area are announced in the media, all the time. As safety requirements are high, there are both EU level and domestic regulations of when and how to conduct a recall and how to report them to the authorities.

According to the EU Commission's Rapid Alert System for Food and Feed (RASFF), there were 775 new "alert notifications" out of a total of 3,049 notifications from member states, in 2015. The yearly number has been constantly increas-

ing. An alert is sent to the system when a food, feed or food contact material presenting a serious risk is on the market and when rapid action is or might be required in a member country, other than the notifying country. Alerts are triggered by the member of the network that detects the problem and has initiated the relevant measures, such as a withdrawal or recall.

There are many measures companies can take to mitigate the risk of product liability and recall situations. Compliance with regulations is essential, but in the end, it is up to the company, itself, to be in charge of the risks related to product quality. Important areas of risk management are supply chain quality management, risk assessments of the products, documentation and traceability of the products, contract management and, of course, the consistent management of their own operation. These can be built into the company well before any incident.

Good preparations give the foundation for building the handling of a recall. But in a crisis situation, quick and correct actions are needed. It is difficult to make the

right moves without crisis and continuity planning, which should also include product defect situations and conducting a recall. If P&C also has expertise in this area. We can assist in creating recall plans with essential contents to prevent further injuries or damage, minimize the cost and help with maintaining the company repu-

tation and brand. The planned actions may include predesigned decision making policy, action and communication tasks to the named recall team members and measures for the production organization to check production data and trace the defective products. It is cru-

cial for a company to have a well designed and tested plan to take control of an acute crisis.

Rage on social media

Social media is a growing concern for businesses, as many consumers now turn straight to social media to complain about a product; often posting it publicly on the brand's Facebook page or tagging them on Twitter.

The company needs to ensure that social media channels are monitored closely, since customers expect a quick response, even outside of office hours. If no response is received, the void can often be filled by online 'experts' or trolls and this can make the situation far worse. If multiple similar complaints form patterns, and you know you have a problem, then the social channels can be used to proactively get your message out to customers and help manage rumours and speculation. Initially, you can state that you are investigating the issue and that you take consumer safety very seriously; and then later inform them of the recall measures and the

"The company needs to ensure that social media channels are monitored closely.

products it concerns.

Sometimes internal resources, knowhow and abilities are not enough. A major recall is not something that happens every day. Therefore, If's Recall Insurance also covers fees and expenses, when the policyholder needs to appoint a specialist crisis consultant prior to any actions, when an insured recall is imminent.

Crisis consultancy

It may be too late to start finding and evaluating crisis consultants in the midst of a crisis. Also, the insurers consent is needed to safeguard the adequate quality of the services. If co-operates with the experienced crisis consultancy, RQA Group, with headquarters in the UK and offices in the USA. Their services are available 24/7, through the If hotline, to assist in recalls and RQA can help to put actions on right track, from the beginning.

If's Recall insurance covers the cost of assistance in an acute crisis. But RQA can also assist companies directly in planning and reviewing recall plans, training and simulation testing of the plans and other crisis management, as well as quality assurance and product safety related services.

Risk Consulting Magazine has interviewed Client Development & Marketing Manager Nick Édwards from the RQA Group on their experience in recall management.

What do you consider to be the most dangerous mistakes, when a company has learned that their distributed products are defective and quick action is needed?

- Burying your head in the sand i.e. trying to pretend the issue isn't happening and not dealing with it, hoping it will blow over of its own accord.
- Conversely Overreacting and starting to take actions, before you have fully evaluated the issue and confirmed it is a real incident (e.g. checking test results, confirming it is not a hoax) and/ or risk assessed the situation to determine the potential impact on consumer safety.
- · Poor communication can also be an issue, both internally and externally. Ensuring that you communicate clearly and openly with key stakeholders (customers, consumers, authorities, the media) is vital once you have established there is an issue and that you have a clear action plan to communicate. Social media must also be taken into consideration, as complaints can go viral very quickly if you are a known brand, so this channel of communication must be monitored and managed very carefully.

Can you give examples of the best actions taken in real cases to avoid or mitigate the total cost of the recall?

• Example: consumer goods manufacturer approached us believing they had a global recall on their hands following reports that a part was failing, which had the potential to injure the end user. However, after evaluating the complaints and carrying out a thorough risk assessment, it was concluded that

the risk to consumers was very low and due to the lifecycle of the product, the chances of the fault happening again, were even lower. Therefore, the client decided to modify the product and monitor the situation very closely. They were prepared to recall, if the risk level changed; but, that proved unnecessary and saved the company and their insurer many millions in recall costs.

What actually happens during the first hours of crisis consulting in a recall case, in the best examples?

- Facts are checked test results, the feasibility of the issue being the business' fault, the number of complaints (all the same product/SKU?)
- Risk assessment the likelihood of the issue causing harm to a consumer/end user
- Scale of potential issue is determined products affected, production records/ traceability
- Communication recall team needs to communicate with the rest of the business about what is happening and highlight the importance of speed and the accuracy of responses. External communication should be carefully prepared, clear and concise, and consistent across all channels.
- Leadership it is vital that a strong leader is at the head of the recall or crisis team; someone who can work with colleagues to make decisions, delegates well and drives the action plan without getting disheartened, as it can become very stressful during a product incident.

How does the crisis management support the brand and reputation of our clients in addition to the recall?

- During a recall, how well you react and are seen to be taking consumer safety seriously can have a very positive impact on your brand and reputation. Brands that try to bury their head in the sand, deny they have an issue and are slow to react risk seriously damaging their brand, especially if customers suffer further injury or harm, after the issue was known.
- Clear communication is the key, being consistent across all channels. Spelling out the issue as you understand it, a clear action plan as to what will be done to rectify the situation, and if appropriate, apologising for any inconvenience or harm caused. By doing this, you are more likely to have a positive outcome and be favourably seen, in the consumers' eyes.

Learning that your product may cause injuries or damage is a stressful situation. It damages normal business and may affect the company's reputation and endanger future earnings and value. But, it is possible to prepare for it and take control of the needed measures, in a professional way. If P&C Insurance is your support through Risk Management assistance and the Recall Insurance. You are welcome to contact If Industrial Risk Management or Casualty Underwriting to learn more about our services and the RQA Group.

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A competitive International Partner Network built on strong co-operation

One of the If P&C missions is to make sure that we excel in managing risks together with our Nordic corporate clients. We truly focus on high operational efficiency and strive towards doing the right things, in the right way. This way of operating is also applied to our international activities. Today's international insurance marketplace is a complex world of compliance regulations coupled with local legal challenges that confront us, on a daily basis. We can never relax in our constant striving towards operational excellence.

All insurers, who are active in administrating Global Insurance Programs, will have to deal with the noble art of co-operating with a group of independent international partners, to service their multinational clients. Therefore, it is with confidence that we are able to look back at more than thirty years of international insurance experience and can, today, clearly recognize that our network, of co-operating insurance partners, has never been more comprehensive, more professional or more efficient, than today. If P&C handles 14 countries in Europe through our own branch offices and we are, in addition to that, able to service our clients, in 136 countries, through the 185 members in our Network of co-operating partners, around the world.

In order to test our international quality output for our clients, If P&C decided to conduct our first International Network Quality Review, with a group of strategic members of our Partner Network. The review was carried out during 2016 and focused on highlighting the international challenges we face in our daily work. Detailed questions. grouped into several themes, such as competence, co-operation and administrative processes, were delivered to our Partner Network members, who actively spent considerable time answering our questions, and thereby, contributing to a greater understanding of how our services are perceived from their horizon.

We are very happy to have discovered that our international partners were ready to give If P&C a score of 4.59, on a scale 1-5, when responding to

the statement "I would recommend If as a co-operation partner". We were equally satisfied to see that our results show that our partners are very positive towards If and that they find us professional and competent, and value our partnership. Regardless of this positive outcome, we will continue to keep up the work of furthering developments in our everyday international administration. Our focus lies, not only on a strong Partner Network, but also on strong processes. In addition to securing efficient processes, all members of the If P&C Partner Network are continuously evaluated in regard to their rating, financial security and

industry reputation. As the review also included a substantial set of

We consider the 2016 International Network Quality Review to be a true shot of strength into our organisation and will repeat the Review, in 2018. We will be turning this activity into a strong part of our toolbox, to keep us up to date on how well we are succeeding with the Partner Network, in the future.

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APPOINTMENTS

questions to be answered by our If staff, to thoroughly scrutinize how our Partner Network services are perceived by our own organisation, we also received valuable information concerning the streamlining of our international administration. We are set to expeditiously accomplish these activities together with our Partner Network.

Conducted correctly, a quality review can be an excellent source of insight and inspiration for higher goals and for ensuring that we deliver the high international service level our Nordic clients want, and rightfully expect, from If P&C.





TIMO KOSKELA Country Manager & Head of SCS Finland



NIINA KARLSSON EB Underwriter, FI



TONY SCHRÖDER nager of Major Property Claims, Nordic

Disasters in 2016

Total economic losses from natural and man-made disasters in 2016 were at least USD 158 billion. This is significantly higher than the USD 94 billion losses in 2015 and was caused by large natural catastrophes, such as earthquakes and floods, according to preliminary Swiss Re sigma estimates. Insured losses were also higher in 2016 at around USD 49 billion, compared to USD 37 billion in the previous year. However, the gap between total losses and insured losses in 2016 shows that many events took place in areas where insurance coverage was low.

"Planners, designers and developers need to work together to ensure that any new development or reconstruction takes climate change impacts into account."

