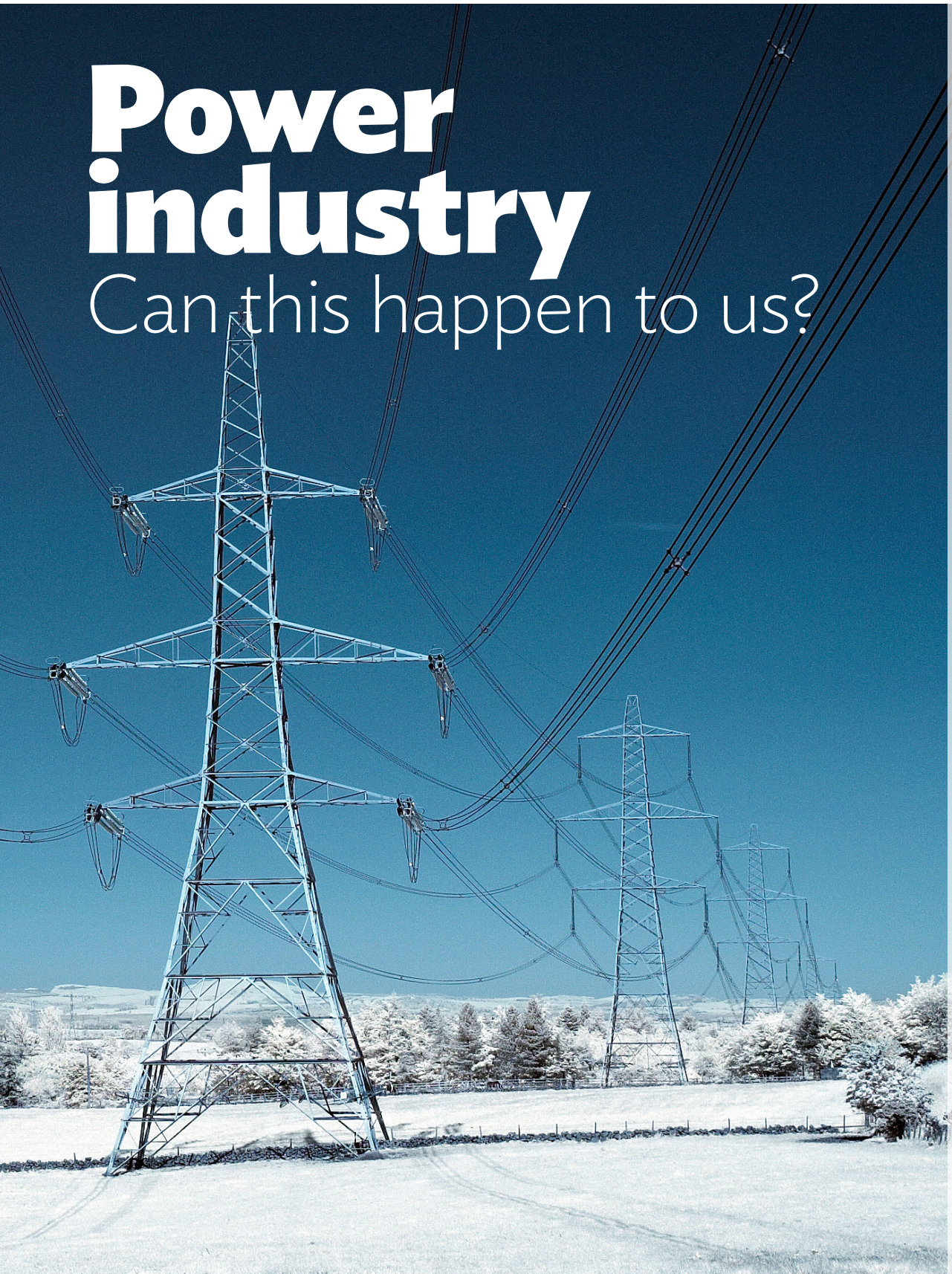
RISK CONSULTING

IF'S RISK MANAGEMENT JOURNAL 2/2016



Power industry

Can this happen to us?

IKEA: Managing fire risks of solar panels

Extreme rainfalls ahead

The human factor behind major property losses

Managing risks together

"COMING TOGETHER IS the beginning. Keeping together is progress. Working together is success."

Welcome to the latest edition of Risk Consulting Magazine. It was just too tempting for me to begin my first editorial with this quote from Henry Ford, founder of the Ford Motor Company and a truly visionary industrialist. We work together with many fantastic companies and people and we can bear witness to just how important this is.

As the new Head of Industrial at If, I want to stay on the course we have plotted of managing risk in the best possible way together with our customers. It is together that we are strong, together that we can avoid incidents, both big and small. We must be our customers' preferred partner for risk management work.

TO DO THIS as well as we possibly can, it is vital that we have good cooperation. Business owners and employees know the local conditions and companies best, while we have unique expertise in understanding and managing risk. So together we can achieve stable operation and minimise undesirable events. This edition of the magazine contains several examples of just that.

One of the good examples I would like to highlight is what we have done together with IKEA to minimise the risk of fire in solar panels. The global furniture giant has an extremely ambitious target of becoming self-sufficient in terms of its energy needs, but this also involves minimising the fire risk. The proactive approach to IKEA is an example we should follow.

ANOTHER AREA WE are heavily involved in at If is digitalisation. One specific example is new solutions that make work easier and improve accuracy for our risk engineers when they are on customer visits. A software program we have developed for tablets allows risks and potential improvements to be plotted quickly. The time saved can be used on highly beneficial conversations with our customers. Or to put it another way: Managing risks together.

Happy reading!

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Publisher If, Niittyportti 4, Espoo, FI-00025 IF, Finland, +358 10 19 15 15, www.if-insurance.com **Editor-in-chief** Mats Nordenskjöld **Editorial board** Mats Nordenskjöld, Sigmund Clementz, Ken Henningson, Fredrik Holmqvist, Carita Hämäläinen-Tallgren, Laura Rastas-Jansson, Anders Rørvik-Ellingbø, Pekka Sarpila, Marianne Wiinblad **Production** A-lehdet Dialogi Oy **Printing** Forssa Print **Changes of address** industrial.client-service@if.fi **ISSN** 1459-3920. **Cover photo:** Getty Images

GETTY IMAGES

The great fire of London

SEPTEMBER 2ND 2016 was the 350th anniversary of the blaze which destroyed more than 13,500 homes and 87 churches in London. It is also the event which created the modern property insurance industry and, in turn, the fire service, according to ABI.

The Great Fire of London caused damage on an unprecedented scale. Unlikely as it is, if such a fire were to tear through London today we estimate it would cost £37 billion to rebuild the city. What's particularly hard to imagine is that there was no organised firefighting force, and no insurance to cover the thousands of properties destroyed.

As well as shaping modern London as we know it, the Great Fire inspired businessmen to offer fire insurance policies, which have evolved into the world leading insurance industry we have today. The crews the insurers employed to protect their investments became the first publicly funded fire service. ■

IBER still under scrutiny

The EC has commissioned two further studies on the operation of the Insurance Block Exemption Regulation (IBER), which allows the sharing of information between insurers and the operation of national insurance pools, before it decides whether or not to follow through its initial decision to discontinue the exemption.

The first study is on asset switching between different insurance products that are of relevance to defining the appropriate market for pools. The second will look into the impact on competition of forms of co-insurance other than pools.

The EC said, a final decision on whether to renew the IBER, is expected in early 2017.

Limited losses from Italian earthquake

Fitch Ratings has estimated that the insured losses of the earthquake that struck central Italy in late August will be between 100 million and 200 million €.

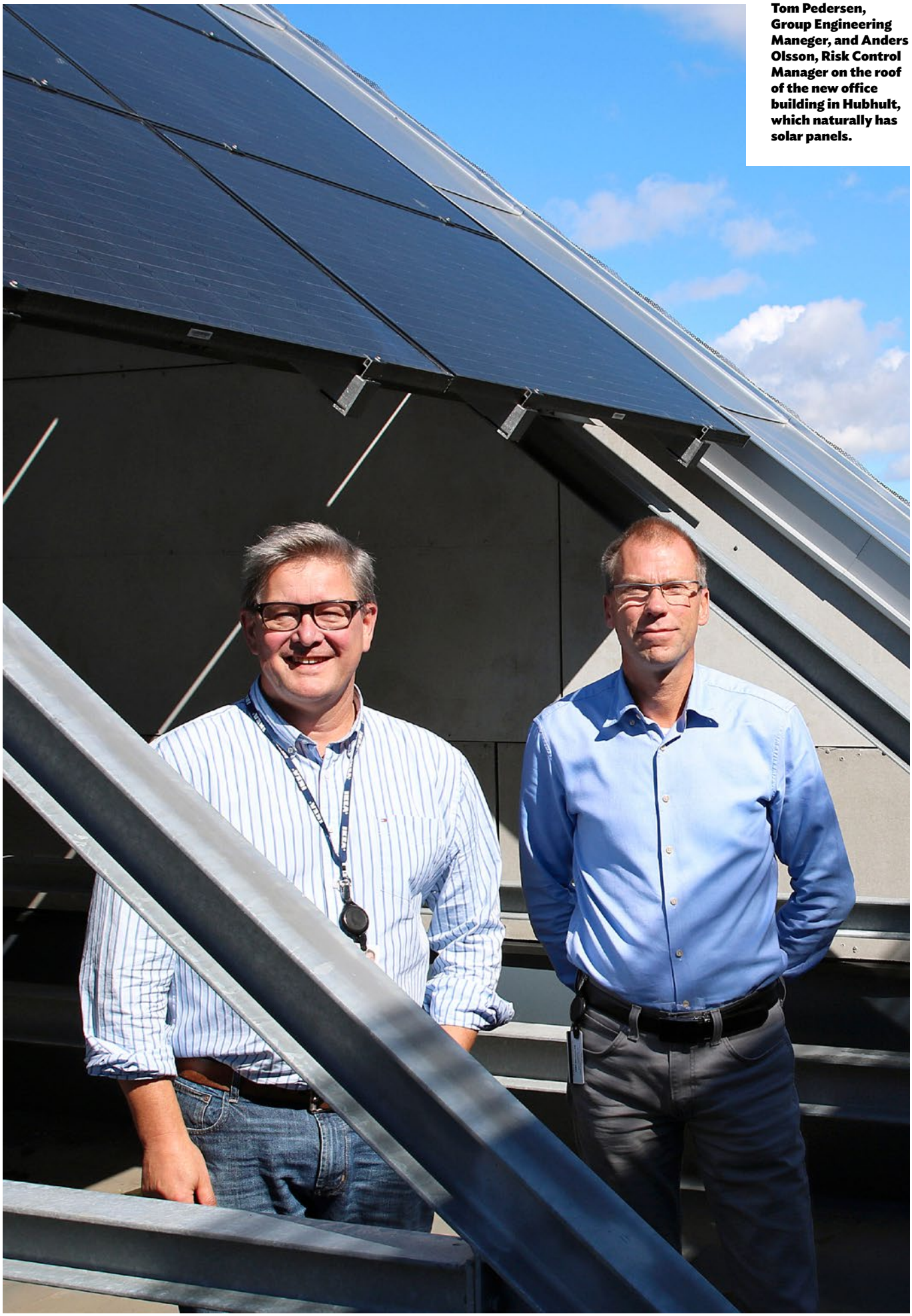
The fairly limited impact for Italian insurers is expected to arise from property lines, and Fitch's estimate reflects the low density of population and businesses and limited insurance coverage in the region. Fitch suggests claims of this magnitude would not have a material impact on Italian insurers' underwriting results or credit profiles.

A state of emergency in the region hit by the earthquake was declared. This declaration means that certain losses will be covered by a state fund for emergencies, limiting losses for insurers.

Rising political risk

Political risk is rising in Europe, with terrorist attacks in France and Germany, as well as the attempted coup in Turkey, according to Commercial Risk Europe.

The terrorist attack in Nice on 14 July, in which more than 80 people died and 300-plus people were injured, suggests that political risk is increasing in France. Political risk analyst Verisk Maplecroft said France is likely to move up its Terrorism Intensity Index when it is released in October. The country is currently marked as high risk by the consultant. It ranks France 29th of all countries for terrorism exposures.



Tom Pedersen, Group Engineering Maneger, and Anders Olsson, Risk Control Manager on the roof of the new office building in Hubhult, which naturally has solar panels.

IKEA: Managing fire risks of solar panels

Solar-related fires have become a global problem as more and more homes and buildings are fitted with these environmentally-friendly energy sources. Yet in spite of this, the major players have been slow to put safety solutions in place. That's why IKEA has taken matters into its own hands.

Rather impressive, wouldn't you agree?

Anders Olsson, Risk Control Manager, and Tom Pedersen, Group Engineering Manager at IKEA, are standing on the roof of IKEA's new headquarters in Hubhult, gazing up at the huge solar panel array.

The wind tugs at their hair and the Swedish countryside stretches mile after mile as far as the eye can see.

And it's truly spectacular: Today, there are solar panels on 170 of IKEA's facilities around the world and plans are in progress for another 55 premises to be fitted out.

Anders Olsson says, "It's a tremendous investment and has probably made us one of the largest users of solar panels in the world".

The goal that IKEA has set is for the entire Group to be completely energy independent by 2020. In order to achieve this goal, the furniture giant has invested more than €2 billion in wind and solar energy since 2009. There are already almost 700,000 solar panels on IKEA's buildings around the world.

The initiative was launched on a small scale in 2007 and started to accelerate in 2010. Initially, everything proceeded smoothly. In the beginning, there were only a couple of incidents with fires. In 2015, however, a number of incidents were reported, mainly in one country with the same supplier.

"Thanks to our incident reporting system, we were able to see that there were several occurrences of minor fire incidents in the solar panel systems. We were able to establish that they were due to poor installation or external factors", says Anders Olsson.

"We felt it was highly probable that something might happen."

ALTHOUGH NONE OF the incidents at IKEA had caused any serious fires so far, there was always the possibility of a major fire breaking out on a roof where the insulation is combustible. A fire in one of IKEA's department stores, factories or warehouses could have severe financial repercussions too.

"We felt it was highly probable that something might happen and we thus needed to resolve these issues urgently", Anders Olsson explains.

Despite the many risk factors associated with solar panels, there are relatively few guidelines today on how solar panels should be installed and maintained to ensure maximum safety.

So IKEA contacted Ken Henningsson, who is Head of Risk Management Sweden at If, to set up a collaboration. As a result, Martin Sørensen and Anne Nielsen- Sønderskov at Risk Management Services at If in Denmark, together with the Technical University of Denmark and IKEA, worked as a team to create a plan to mitigate the risks associated with solar panels.

They performed a series of tests to see whether a fire-resistant layer of mineral wool could protect roofs with combustible insulation in the event of an accident.

There are almost 700,000 solar panels on IKEA's buildings.

Managing fire hazards from solar panels is of great importance to many companies all around the world.

"The tests were successful. We could see that the protective layer was highly effective. It limits the spread of the fire and protects the panels and the roof, although there is no absolute guarantee that a large fire won't set the roof alight", Ken Henningson explains.

IKEA HAS NOTIFIED its operations in all countries of the results and has introduced a programme of measures. The first step is to carry out an inventory of the 170 facilities that have solar panels on their roofs.

"Those that are not fitted with approved insulating material must upgrade the roof and install a protective layer of mineral wool, or remove the solar panels. In addition, we have developed an "inspection package", whereby all wires, cables, connectors and solar panels must be checked", Anders Olsson says.

From now on, systems will be inspected annually to ensure that they are working as they should. They must also be inspected following external events, such as storms, earthquakes, hail or work carried out on the roof. The inspection is carried out manually by technically qualified and experienced personnel, and also using thermal imaging cameras to test the solar panels.

IKEA has also drawn up a crisis and emergency plan for incidents relating to the solar panels.

"We are testing new technology."

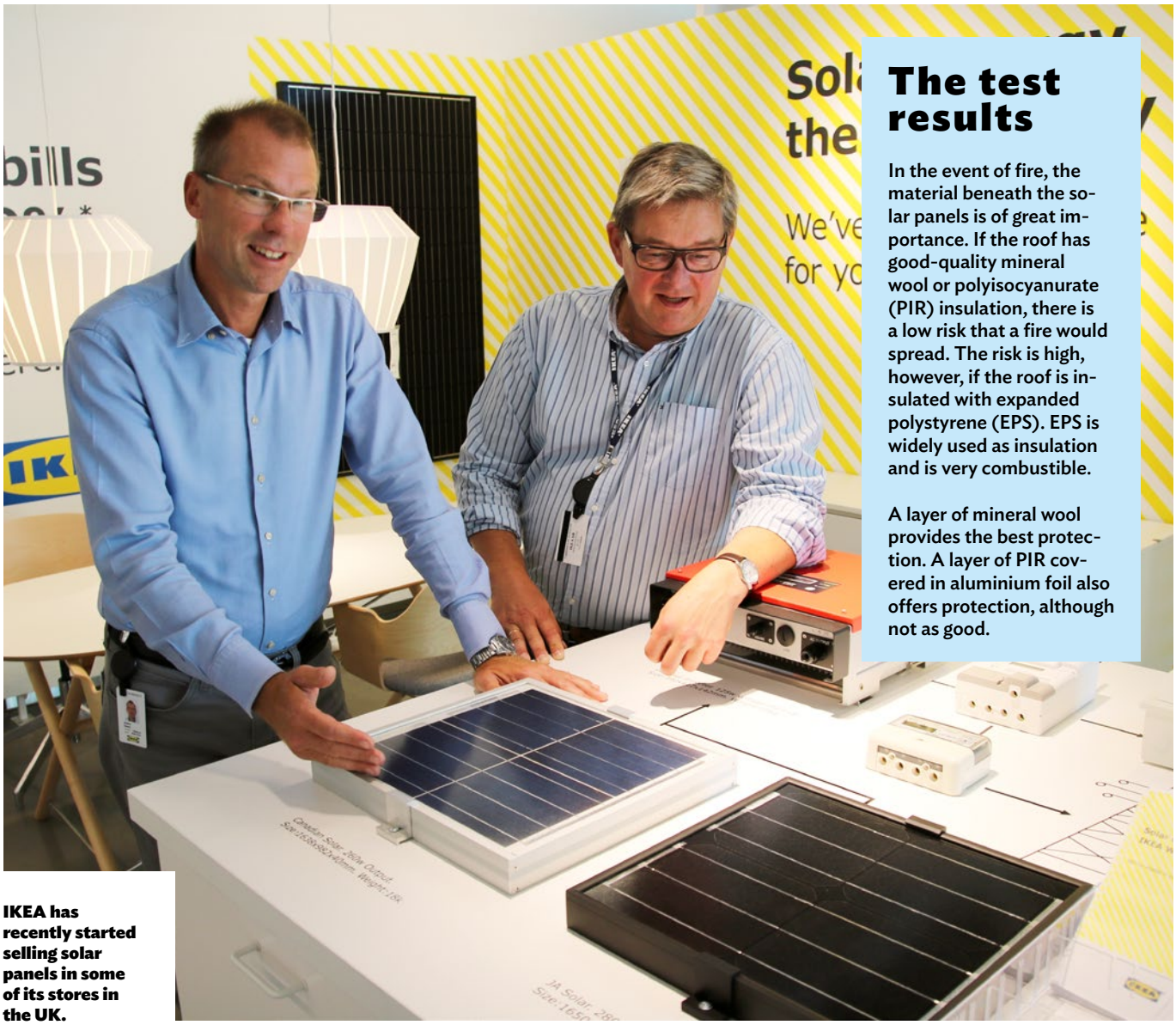
THE NEXT STEP is to integrate warning equipment into the solar panel systems that will provide an early alert if something is wrong in the system.

"We're testing new technology for this", Tom Pedersen says.

The detection equipment sets off an alarm and indicates where in the system a fault has occurred. It should then be possible to manually disconnect that part of the system. It can also be combined with a switch for automatic disconnection.

Ultimately it should be possible for this equipment to be connected to the fire alarm system.

"However, developments in this area are lagging be-



IKEA has recently started selling solar panels in some of its stores in the UK.

The test results

In the event of fire, the material beneath the solar panels is of great importance. If the roof has good-quality mineral wool or polyisocyanurate (PIR) insulation, there is a low risk that a fire would spread. The risk is high, however, if the roof is insulated with expanded polystyrene (EPS). EPS is widely used as insulation and is very combustible.

A layer of mineral wool provides the best protection. A layer of PIR covered in aluminium foil also offers protection, although not as good.

hind somewhat, because most of the fire alarm system providers do not accept connections to third-party solutions", Tom Pedersen says.

IKEA is also looking at new technologies to break up electrical circuits in, for example, every third solar panel. While it's still light outdoors, solar cells generate electricity, which makes it difficult to put a fire out. Fires are often extinguished using water, which puts firefighters at significant risk because water is a good conductor of electricity.

"If the electrical circuits were broken up, we could bring the current and voltage down to a level that would not present an electrical shock hazard for firefighters", Tom Pederson explains.

IKEA will be continuing to focus on risk prevention in connection with solar panels and is keen to engage in relevant projects initiated by the National Fire Protection Association (NFPA) and other key players.

THE COLLABORATIVE WORK that IKEA, If and the Technical University of Denmark have been doing has produced a win-win situation for all those concerned.

"This teamwork with If has been invaluable for us as it has optimised our exchange of experience, enabled us to see what's happening in other sectors and to apply this to our operations to reduce accident levels", Anders Olsson comments.

If has been able to incorporate the new knowledge it has gained into an inspection programme for solar panels.

"The teamwork is a textbook example of how to create value for all parties, with a professional and transparent approach to planning, implementation and the measures adopted. IKEA is extremely positive and keen to share our experience and, for If's customers, this means that we can proactively communicate findings and proposals for preventive measures," says Ken Henningson. ■

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Being located in a separate technical room limits the potential fire in a vacuum pump spreading to the production areas.

Fire safety of vacuum pumps

Attitudes towards risk-taking and the whole culture of risk environments are set from the top of an organisation.

Company boards find themselves under the risk spotlight and are increasingly being challenged to provide evidence of their competence to deliver their responsibilities for risk management. Faced with disruptive new business models, companies must take risks to succeed. They must also manage risks and comply with regulations and demands for disclosure.

Vacuum pumps are utilised extensively throughout various industries, with the food-, pharmaceutical-, plastics- and wood processing sectors being major users of this type of equipment. These pumps are for example used for packaging machines – including thermoformers, vacuum lifters, drying, pneumatic vacuum transport, and vacuum forming of plastic components.

The use of vacuum pumps in factories entails an increased fire risk, and fires involving this type of equipment are a fairly frequent occurrence.

One of the companies to have experienced this is the food processing giant Danish Crown. Flemming Damholt, Danish Crown Fire Safety Officer says:

"Over recent years, Danish Crown has experienced a number of incipient fires involving our oil-filled vacuum pumps. Typically this happens because the pumps run hot. Fortunately these haven't caused substantial fire damage, mainly because, as part of our fire safety project for the Danish Crown companies, we have been aware of the risk and incorporated guidelines for this type of equipment. These concern fire compartmentation, protection against increased operating temperatures, preventive maintenance, tidiness and so forth."

There are many types of vacuum pump available, of which the most commonly used in industrial applications are:

- Oil-lubricated rotary vane vacuum pumps
- Dry running rotary vane vacuum pumps
- Booster pumps
- Rotary blowers
- Side channel blowers

It is important to keep in mind that, over time, oil-lubricated rotary vane vacuum pumps in particular, but other types too, may pose an increased fire risk if they are not monitored and maintained in accordance with their operating and installation manuals. However, preventive fire safety can be improved by means of relatively simple measures.

In the food industry, two main types of vacuum pumps are especially widely used. These are the side channel blowers and the oil-lubricated rotary vane vacuum pumps.

"Dust should be controlled at the source."

The fire risks for these pumps vary somewhat and accordingly entail differences in the optimisation and fire protection standards that can be proposed.

THE DESIGN OF side channel blowers (also known as regenerative blowers, turbine blowers, ring compressors or vortex blowers) is based on the principle of horizontal channels. A specially designed impeller forces the intake air flow to follow a spiral channel. The air stream is thereby subjected to repeated accelerations, resulting in the creation of a relatively high vacuum.

Side channel blowers are for example used for vacuum lifters and pneumatic conveyer systems. Some of these blowers can reach very high surface temperatures during operation – high enough to ignite combustible materials left too close to the equipment. Attention should therefore be paid to ensuring that combustible inventory is kept at safe distance away from the surfaces of side channel blowers due to the heat they radiate.

Side channel blowers, rotary blowers and booster pumps are often used in the food industry. In this industry production areas can be chilled for environmental and hygiene reasons, and to save energy on cooling and avoid the additional heat released by the vacuum pumps, such incidental heat sources should be located outside of the production area in a dedicated technical room.

IT IS IMPORTANT that these technical rooms are only used for technical equipment and not for storing combustible inventory. Periodic cleaning of the cooling grooves on these vacuum pumps should also be part of the periodic maintenance programme.

Ventilation should be installed in the vacuum room to prevent the temperature exceeding 25˚C, and the exhaust air from the pumps should be ducted directly out of the room, so as not to add more heat.

Placing equipment in a technical room has the added benefit of removing a certain amount of noise from the production premises, thereby improving the working environment.

Oil-lubricated rotary vane vacuum pumps pose a specific fire-risk challenge in that the seal between the vanes and the pump cylinder is achieved by a dispensed oil lubrication film. The fires that occur in this type of vacuum pump are often due to overheating of the oil. It is therefore recommended to fit the pumps with a thermo switch that disconnects the pump if the oil temperature in the oil separator housing exceeds the manufacturer's recommendations. It is also important that, if/when the vacuum pump is disconnected, it cannot be remotely reset, but requires a physical check before the thermo switch is reset and the pump restarted.

ATTENTION ALSO NEEDS to be given to ensuring that the quality of the oil in the vacuum pumps meets the manufacturer's requirements. One particular problem may concern packaging machines that package foodstuffs in a high-oxygen protective atmosphere. An oxygen percentage volume above 21% requires the use of a special vacuum oil approved for raised oxygen levels, to avoid the increased risk of spontaneous ignition in the vacuum pumps.

Where the vacuum pumps are an integrated part of the machine, it should be investigated with the manufacturer whether the design incorporates controls for disconnecting the equipment in the event of excessive oil temperatures. Another potential solution is to establish a central vacuum system in which the vacuum pumps are separated from the packaging machines and located in a "fire safe" vacuum room/technical room as described above.

THERE NEEDS TO be awareness that all oil-lubricated rotary vane vacuum pumps and certain other vacuum pumps represent a not insignificant fire risk, but if the fire safety aspects of vacuum pumps are handled as described above, the risk of damage can be greatly reduced.

We recommend that companies consider vacuum pumps as an important focus area in respect of their general fire protection measures, and If's risk engineers will be pleased to offer further advice and guidance on this matter. ■

Fire safety of vacuum pumps in general

• For fire safety reasons, we recommend that (where possible) vacuum pumps, which constitute a fire risk, are installed in a separate technical room. The technical room should be a separate fire compartment class EI60 (60 minutes of fire resistance). Being located in a technical room limits the potential for a fire in a vacuum pump spreading to the production areas, as well as limits the potential for smoke and soot damage to the production machinery, and thereby reduces the risk of a major business loss.

• In order to ensure rapid alerting of the fire service, it is recommended that technical rooms containing this type of equipment and which are normally unmanned should be fitted with an automated fire alarm system.

• In the food industry, production areas are often chilled for environmental and hygiene reasons. To avoid using extra energy on cooling, incidental heat sources like vacuum pumps should be located outside of the production area in a dedicated technical room.

• Ventilation should be installed in the vacuum room to prevent the temperature exceeding 25˚C, and the exhaust air from the pumps should be ducted directly out of the room, so as not to further raise the temperature.

• It is important that technical rooms are only used for technical equipment and not for storing combustible materials.

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PHOTOS: IF, CICERO

Extreme rainfalls ahead

The occurance of extreme rainfall events is increasing as the global temperature is increasing, writes Siv G. Aalbergsjø and Gunnar Myhre from CICERO.

The occurrence of extreme rainfall events is increasing as the global temperature is increasing. We have seen several examples of extreme rain over just a few hours in cities causing chaos and large amounts of damage in recent years. How much more of this will we have to endure because of global warming?

So far, global temperature has risen by approximately 1°C since the beginning of temperature measurements around 1860. This increase is mostly due to emissions of CO_2 and other greenhouse gases. In general, the warming is greater over land than over sea. 2015 was the warmest year ever recorded and it looks like 2016 is about to beat that record.

With a warmer climate, the atmosphere can contain more water vapour, and with more water available in the atmosphere, the chance for rain increases. The mean precipitation (such as rain, snow and hail) on earth is expected to increase by 1-3 % per °C of temperature increase. Extreme precipitation events, however, are expected to increase by 6-7 % per degree, and short-duration extremes may increase even more than that. The infrastructure in urban areas makes them more vulnerable to short-duration extreme precipitation events than rural areas. Extreme rain and flooding in cities will cause large amounts of damage with high economic and social costs.

The influence from global warming and other human influence on the climate system causing extreme precipitation is something scientists have not fully understood yet. Additionally, there are aspects of urban areas that make the climate there different from that in rural areas. The new research project called SUPER (Sub-daily Precipitation Extremes in highly-populated Regions) will quantify human impact on this part of the climate.

City climate

Urban areas tend to be warmer than their surrounding rural areas. This is in part due to exhaust heat from activities that come with city life. Additionally, and more importantly, buildings and pavements cover urban areas so that they absorb more sunlight than areas covered by vegetation. This daytime heating of urban areas lasts into the night as well because these urban materials stay warm quite long once they are heated. The urban areas function as local heat generators, this effect is called the urban heat island effect.

The urban heat island does not only affect the local temperature, but also other aspects of the climate. Just as large bodies of water lead to a sea breeze during the day and a land breeze at night due to the temperature difference between land and water, the hot air caused by the urban heat island may affect the winds. This can enhance the upward motions in the atmosphere and lead to cloud formation.

"These extreme events are local, but they are still influenced by the global climate."

A more well-known human influence on climate is pollution. Emissions of greenhouse gasses, such as CO_2, lead to a warming of the atmosphere through the greenhouse effect.

Other pollutants influence the climate differently. Aerosols are small particles in the air. The aerosols interact with incoming sunlight and reflect it before they make it to the earth. The fact that the

The CICERO Center for International Climate and Environmental Research

The CICERO Center for International Climate and Environmental Research was founded in 1990 by the Norwegian government. Its task was to develop the knowledge base for national and international climate policy.

Today, CICERO is an independent research foundation with links to the University of Oslo. CICERO's vision is to foresee and respond to society's climate challenges through research and a high international standard of education.

CICERO is internationally recognised as one of the world's leading institutes for climate research.

Eleven of the researchers at the centre were involved in writing the UN climate panel's fifth assessment report, with CICERO having contributed to the panel's reports, since 1999.

This picture from Oslo shows how consentrated rain can make a major impact on a small part of the city.

aerosols reflect sunlight means that they are not transparent and invisible like greenhouse gases. Thick aerosol clouds can be seen as a haze around big cities. This reflectiveness has a cooling effect on the planet. How effective it is depends on the colour of the aerosols. Sulphates and nitrates reflect nearly all the sunrays they encounter, whereas darker aerosols like soot absorb some of the radiation.

Polluted clouds cause less rain

Aerosols can also influence clouds. Darker aerosols, which absorb radiation, can lead to local heating of the atmosphere. This may lead to the evaporation of water droplets in the air thereby lowering the chances of rain.

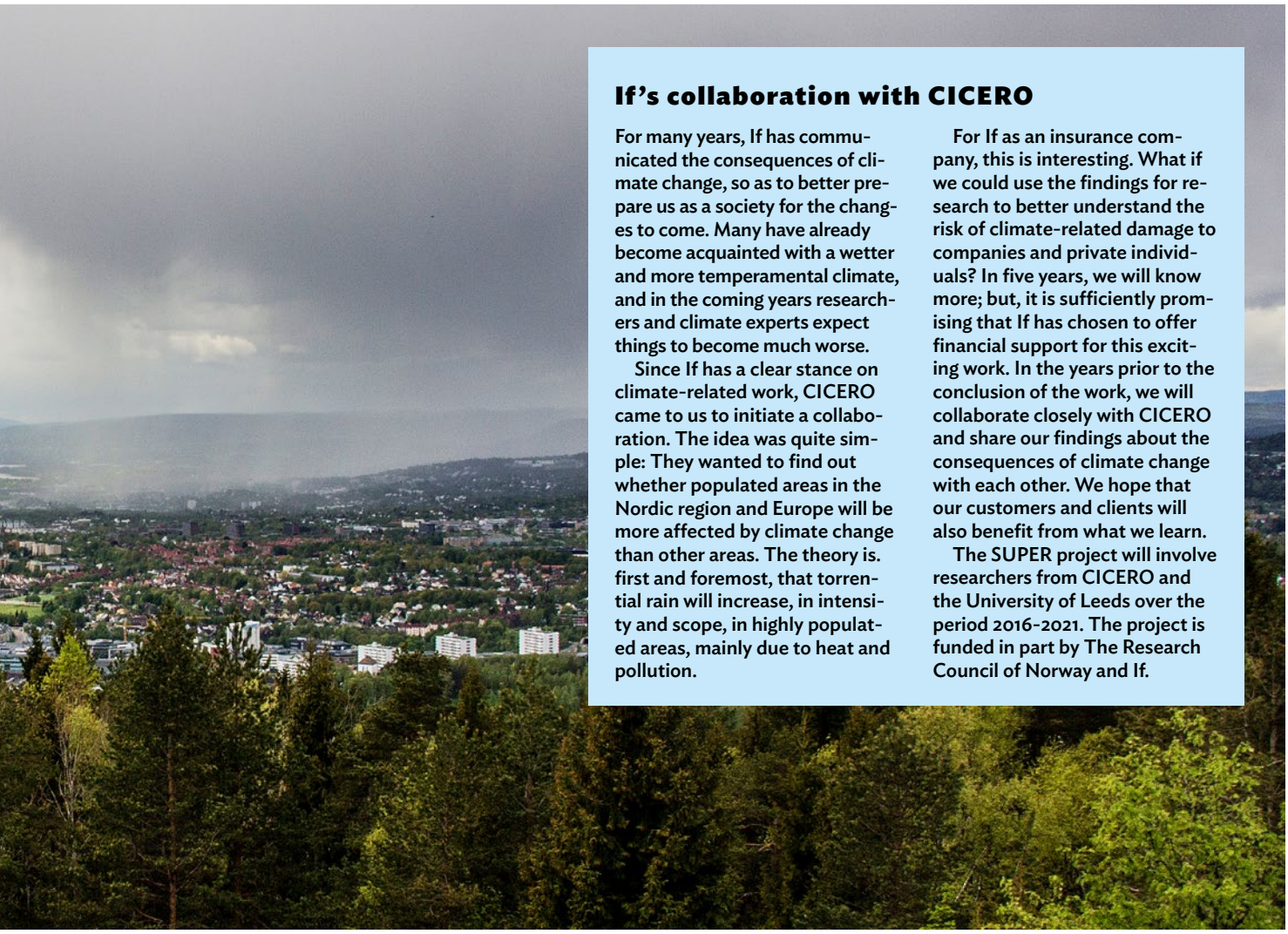
Furthermore, the tiny aerosol particles make it easier for the humidity in the air to form water droplets and clouds, because the water droplets now have somewhere to start growing. Since it is easier for the water droplets to form with than without aerosols, polluted air tends to have many smaller water droplets instead of fewer larger droplets. Surprisingly enough, the smaller droplets make the clouds look whiter so that polluted air has brighter clouds than non-polluted air. Another surprising effect of the aerosols is that since the water droplets are smaller they stay flying in the atmosphere longer. So the easier formation of droplets and clouds, leads to less rain. However, this is less rain on average. There are indications that the clouds formed due to aerosols are more likely to produce heavy rain.

Excess aerosol production and the urban heat island effect are both examples of human influence on urban climate. Their effect on extreme precipitation is complicated and predicting the outcome is not trivial. The overall effect of atmospheric aerosols is thought to be a reduction in precipitation. The question is whether this is also true for local short-duration rainfall.

The population living in urban areas is growing and is expected to continue to increase, which is likely to enhance the urban heat island effect. On the other hand, aerosol concentrations are now decreasing in Europe and the US due to strict air pollution regulations. One possibility the researchers are looking into is that aerosol clouds over cities have been masking the effects of global warming on precipitation,, so that when these clouds disappear there will be more rain on average.

What can climate models tell us?

The many different factors that influence climate in urban areas have different and sometimes opposite effects. Scientists use climate models that simulate the earth, its atmosphere and all the different factors, both natural and human, influencing the climate in order



If's collaboration with CICERO

For many years, If has communicated the consequences of climate change, so as to better prepare us as a society for the changes to come. Many have already become acquainted with a wetter and more temperamental climate, and in the coming years researchers and climate experts expect things to become much worse.

Since If has a clear stance on climate-related work, CICERO came to us to initiate a collaboration. The idea was quite simple: They wanted to find out whether populated areas in the Nordic region and Europe will be more affected by climate change than other areas. The theory is. first and foremost, that torrential rain will increase, in intensity and scope, in highly populated areas, mainly due to heat and pollution.

For If as an insurance company, this is interesting. What if we could use the findings for research to better understand the risk of climate-related damage to companies and private individuals? In five years, we will know more; but, it is sufficiently promising that If has chosen to offer financial support for this exciting work. In the years prior to the conclusion of the work, we will collaborate closely with CICERO and share our findings about the consequences of climate change with each other. We hope that our customers and clients will also benefit from what we learn.

The SUPER project will involve researchers from CICERO and the University of Leeds over the period 2016-2021. The project is funded in part by The Research Council of Norway and If.

to make predictions of which effect will dominate and what the net resulting climate effects will be.

A climate model is a physical description of the weather and climate all over the earth and how these evolve over time. The models are used to both describe the climate that has already been (our history) as well as make predictions into the future. Modelling the past is important for the ability to check just how good the models are, and what climate effects are important. The models allow the researchers to vary the input parameters and descriptions of the different climate effects, to see which description corresponds best to the real world. This way, they can identify the human influences on climate that are important for an accurate description.

The SUPER goals

In the SUPER project, the researches will study the time development of the number of extreme precipitation events by using knowledge about aerosols and the urban heat island effect combined with climate models and weather observations. The main goal is to quantify the human influence on short-duration extreme precipitation in highly populated areas and understand how important this may become in the future up to the year 2100.

These extreme events are local, but they are still influenced by the global climate. In that sense, it is an attempt to understand very tiny details with big impacts on the economy and everyday life, in an extremely large picture. In order to do this, they need to use observation data of precipitation all the way back to the beginning of weather observation records along with climate models. They will compare variations in average precipitation to the variations in extreme precipitation to look for a connection. The SUPER project will contribute to a more detailed and better understanding of how aerosols and the urban heat island affect humidity, clouds and short-duration extreme precipitation in big cities. This will tell us to what extent we are causing the extreme precipitation events we see today, and how much more of this we will have to see in the future. ■

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PHOTO: SIEMENS, IF & MAN

Power industry

Can this happen to us?

How can we reduce common risks in the power industry? Here are some ideas as a starting point.

One of the most commonly asked question by our clients is: What kind of information can you derive from all the losses you have experienced? The answer, of course, depends on the client's line of business; but, when handling large machinery breakdown problems, there are a couple of common denominators.

The article is written from a power industry viewpoint, but the root causes can be extended to other industries, as well.

Electric utilities are certainly not just the basis for power plants; as they are critical for all heavy industries, such as pulp & paper mills, steel makers, mining companies, chemical plants and literally all manufacturing companies that rely on power, as well. In addition, steam generated by steam boilers is essential for pulp & paper mills and many chemical companies, such as oil and fat producers. Thus, the level of knowledge in operating and maintaining boilers, turbines, generators, transformers and switchgears is, literally, an essential industry risk factor spanning all sectors.

Energy markets today

Machinery cannot be analysed independently of its connection to the surrounding plant and power plant operations cannot be discussed without reference to the market situation.

According to Nord Pool, the electricity system price has decreased from 53.06 EUR/MWh (2010) to 20.98 EUR/MWh (2015), Figure 1. In comparison, the average wood fuel price in Finland was 22.42 EUR/MWh (2015). While not an exact comparison, it shows the kinds of problems electricity producers are facing, today. Profitability is obviously a major challenge.

Electricity prices in the Nordic countries are not encouraging plant owners to spend additional money on machinery and maintenance. At the same time, increased intermittent production has changed the operating philosophy of many power plants. Base load plants have transformed into peaking plants, and many condensing plants have been mothballed. The situation is similar to the European market, where companies have been forced to shut down a significant number of their power generating facilities.

Operating and maintaining a power plant or making energy related investments, in this market environment, is anything but an easy task.

Statistical lessons

Looking at the statistics, power production equipment causes the biggest machinery breakdown claims. According to IMIA, other insurance companies are facing the same situation. One example recently published in FM Global statistics, shows that turbines accounted for 45% of FM's machinery breakdown claims. Generators, switchgear and transformers were among the top five, as well.

Figure 2 shows the statistics from If for turbines and generators. It must be noted, that the claims paid amount does not indicate the total loss amount due to co-insurance cases and deductibles.

Common ways to break your main equipment and how to avoid them

Lube oil system

The lifeblood of any rotating machinery is the lubricating system. Steam and gas turbines in the power industry normally uses journal bearings that consist of a shaft that freely rotates, in a supporting metal sleeve, without rolling elements. For the turbine shaft to move freely, it rides upon several lubricant-filled bearings into which the lubricating oil is pumped under high pressure. The oil lubricates the bearings through hydrodynamic lubrication. The bearings and the shaft are separated by a pressurized film of oil to prevent any metal-to-metal contact.

During emergencies in the power industry, when the electricity supply is lost, the turbines are tripped and coasted down with emergency systems. These systems include a DC lube oil pump, possibly a DC seal oil pump and a battery bank as an electricity source. A major part of turbine related claims come from a malfunctioning DC system causing extensive damage to the turbine.

Far too many power plants simply rely on the assumption that they have an auxiliary pump, emergency generator and battery bank to protect the turbine. The design or operation of these items is taken for granted. There might be, however, disparity during the design phase of the systems between the process designer, the turbine OEM and the oil system component providers. For example, the provider of the DC motor might not understand that there is need for a run-to-failure type of equipment.

Figure 1: Nord Pool System Price development for electricity

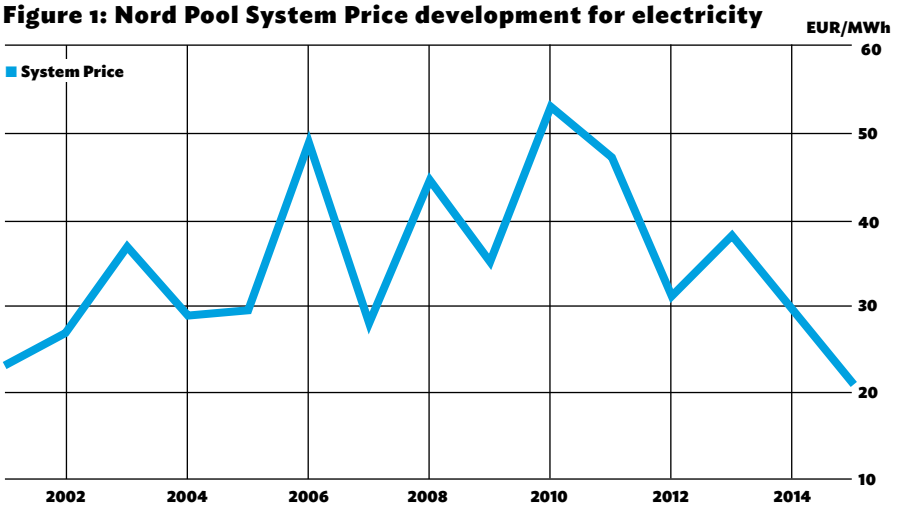
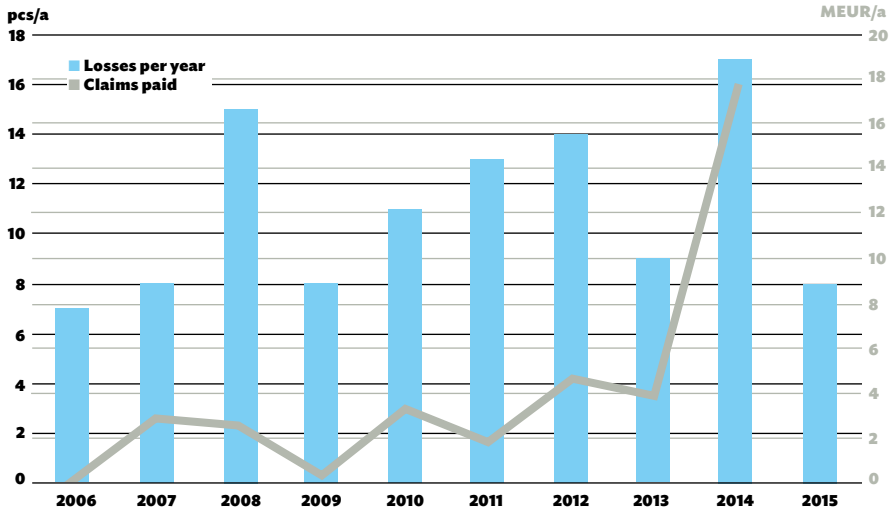


Figure 2: Annual TGS losses and claims paid



A couple of recent cases of lube oil system breakdowns, involving both modern and old turbine installations, have been the result of insufficient battery bank capacity. Although the emergency system, in these cases, worked perfectly, the capacity for operating the emergency lube oil system was insufficient and resulted in turbine failures, despite the emergency system working perfectly. The actual capacity of the battery banks must be oversized, based on the calculated need in a worst case scenario, and the capacity should be tested regularly. Some operators prefer to procure batteries from different production batches in order to avoid possible manufacturing defects.

"Looking at the statistics, power production equipment causes the biggest machinery breakdown claims."

A hazard and operability study (HAZOP) or similar process is recommended to ensure that the process and related equipment is suitable for emergency purposes. The HAZOP process is quite labour-intensive, but when risk areas are known, this process can be done in a more efficient manner.

Incorporating machinery breakdown data is a good starting point for an easier process. Please ask your If specialist for support with this process. When designing processes change, estimate the need and extent of HAZOP carefully. Some starting points for the HAZOP process are:

1. Up-to-date and annual inspection of PI diagrams and system descriptions
2. Connection of the emergency generator to the battery charger
3. DC Motor protections should only send an alarm to the operators and trip functions should be disabled
4. DC switchgear and switchboard protection settings in place
5. Cabling solutions for DC motors in-

cluding feed routing and fire retardant coating

6. DC circuit breaker curve
7. Fire protection for the DC system
8. DC switchgear or board fire
9. Oil leakages resulting in fire
10. Battery bank capacity and testing.

These should be included in all relevant operational and safety instructions.

Operator training

In all organizations, training on a regular basis is necessary for keeping up with changes in technology. Additionally, turbine operators need to be trained in handling emergency situations that are at risk of escalating to catastrophic events that could lead to a fire and explosion, in the plant. Emergency response training should be mandatory and included at all power generation companies and their facilities.

Currently, a major part of the industrial organizations that we meet during our risk management surveys do not have a comprehensive training scheme involving all turbine operators based on individual educational background and years of experience at the plant. A higher level of understanding of the operators' background would additionally provide managers with valuable information that could form the basis for the composition of shift teams and enhance the individual team's capability of handling a crisis.

Based on If's learning from losses programme, we know that many of the incidents that escalated into a complex crisis situation were due to human errors made in a difficult operator's environment, alarm flooding and a general misinterpretation of the situation. However, it is a fact that many emergencies in the control room were solved by a proper action of an operator in place. Thus operator training for emergency situations should be a fundamental priority built into all plants' training schedules.

The training may be organized by turbine professionals, such as suppliers, consultants or others, but it is important to include the interaction of all media and utility systems handled at the plant, which may include high voltage distribution, the boiler and boiler fuel, generator and transformers. The turbine should never be viewed as an isolated piece of equipment and thus, competence from other site processes should be taken into account.

Revisions and revision schedules

One clear trend in machinery breakdown has been problems during and after revisions. As discussed in the earlier turbine article (Risk Consulting magazine 1/2015), this item is unfortunately still a concern to us.

The importance of Original Equipment Manufacturer (OEM) defined revision schedules cannot be overlooked. It might not be reasonable to open up the casing based on the calendar, but the operating hours combined with predictive maintenance methods give an excellent starting point for revision scheduling.

Certain materials in a turbine have a limited lifetime with high temperatures and pressures. This environment causes life limiting factors when the high temperature parts start to have microstructure deviations. These deviations are bound to grow, to become root causes of severe damages. When estimating the remaining lifetime of the turbine or its critical parts, it is necessary to understand the relationship between the design data, material restrictions and the operational data. Pinpointing the critical materials or most highly stressed points in turbine blades is no easy task. With the design data, it is more efficient to properly estimate them. For example, using replicas without an exact knowledge of where the highest stressed point of the part is located, can essentially be a lottery.

"Other clear trend in machinery breakdown has been problems during and after revisions."

Choosing the service provider

When choosing the revision supplier, the first question is usually OEM or non OEM? Non OEM providers are serious options for performing the revision and have modern facilities and extensive partner networks.

The starting point for choosing a revision provider is to figure out the desired result, the extent of the works and any possible needs for options, such as lifetime assessment. If there is a need for lifetime assessment or perhaps a need to change the revision interval, the OEM might be the preferred option. However, non OEM providers might be more flexible, local and available during operation periods, with faster response times, than the OEM crews.

From the insurers' perspective, the paramount question is that the revision scope should be made in accordance with the OEM's intentions and that no area of

inspection is overlooked or postponed, due to time constraints or finding a more cost effective alternative.

When assessing the provider, machining capability and quality control must be reviewed against the required scope. A workshop inspection, by a qualified expert, is recommended before making a final decision, and should include the workshop workload and machinery availability, material availability, machine capability, load lifting capacity and quality control.

Relying completely on the workshop to execute the work with no customer presence, leaves the customer susceptible to quality oversights and production schedule setbacks. A customer that pays attention to the repair process, stays informed and maintains a presence in the process. This keeps their job at the top of the priority list. It should be made clear during tendering process that the customer or third party experts will be monitoring the progress and will participate on witness points during machining and measurement checks.

Lessons from revision

Revision usually takes all available power plants resources, with tight schedules resulting in long working days. When revision is over, the involved personnel need to start tackling their own daily routines and responsibilities. The lessons and findings from revision should be documented

The purpose of the oil system is to:

1. Lubricate journal and thrust bearings and the oil pumps
2. Provide efficient cooling for the bearings
3. Provide the control medium in the hydraulic governing system
4. Supply the sealing medium for the hydrogen cooled generators.

immediately after revision, to be used as a basis for designing operations, maintenance needs and the next revision.

Problems after revision

The contractual obligations for the revision crew are over after the turbine generator is up and running, and tested. If the machinery starts to have problems soon after start-up, the first point of contact should be the revision crew, immediately followed by the OEM (if not the same company). A systematic and thorough check of different root causes for anomalies is highly recommended. Once the possible root cause(s) is/are found, any and all consequent possibilities must be analysed, as well. Damage is rarely limited to the original point.

Transformers

Transformers are one of the most important components of energy grid systems. As such, they are one of the most valuable parts of any generation facility, not only in terms of its associated manufacturing and installation costs, but also on account of their essential role in the export of power and subsequent revenue generation.

As transformers age, their failure risk increases. Therefore, condition management is needed, and it plays a very important role in preventing these failures and in making the grid operate correctly. Usually the root cause for a transformer is an incident, such as a lightning strike or a failure down line from the transformer. These may be root cause failures, but they neglect an important fact, that an overloaded transformer with well-maintained transformer oil is much less likely to fail than an overloaded transformer that has not been maintained. The risk of a transformer breakdown is not only a plant interruption risk, it is also a fire risk, which may cause a disastrous fire to progress throughout the whole plant.

The vast majority of transformers have been built when the infrastructure construction peaked in the 70s. According to Vaisala Oyj research, there are more than 450 000 large power transformers around the world and the average age of equipment is 42 years. The aging population of electrical power equipment means a great potential for failure, over the next decade.

Improvements and actions

As a machine with very few moving parts, condition monitoring of the transformer is straightforward, but requires a great deal of expertise in order to be done properly. Repeatability is one of the key words here. A collection of best practices is as follows:

1. Oil Testing on a regular basis to catch early warnings of possible decomposition. Testing should be done four times per year and the results presented in graphical form, including trending.

2. Electrical testing according to the OEM and if an oil testing result indicates a need for additional testing.

3. Mechanical Inspections. Checking the levels and proper functioning of gauges, bushings, fans, radiators and their connections, according to the OEM inspection plan.

4. Conducting transformer Infra-red scans at the time of the oil test. The combined information can lead to specifics about faults.

5. Monitoring for gases. Fault gases can lead to catastrophic failure; thus, monitoring these gases online creates an early warning system.

6. Insulation condition analysis with insulation samples and furan analysis.

The reason for testing is to determine the condition of the unit in order to perform preventive maintenance. It is important to test in order to gain information on the condition of equipment and to be able to use that information to provide a low cost, reliable electric system.

As with other equipment in power production, the transformer lifetime is also related to steady load conditions. With cycling operations, the same kind of maintenance and monitoring is required, but with shorter intervals.

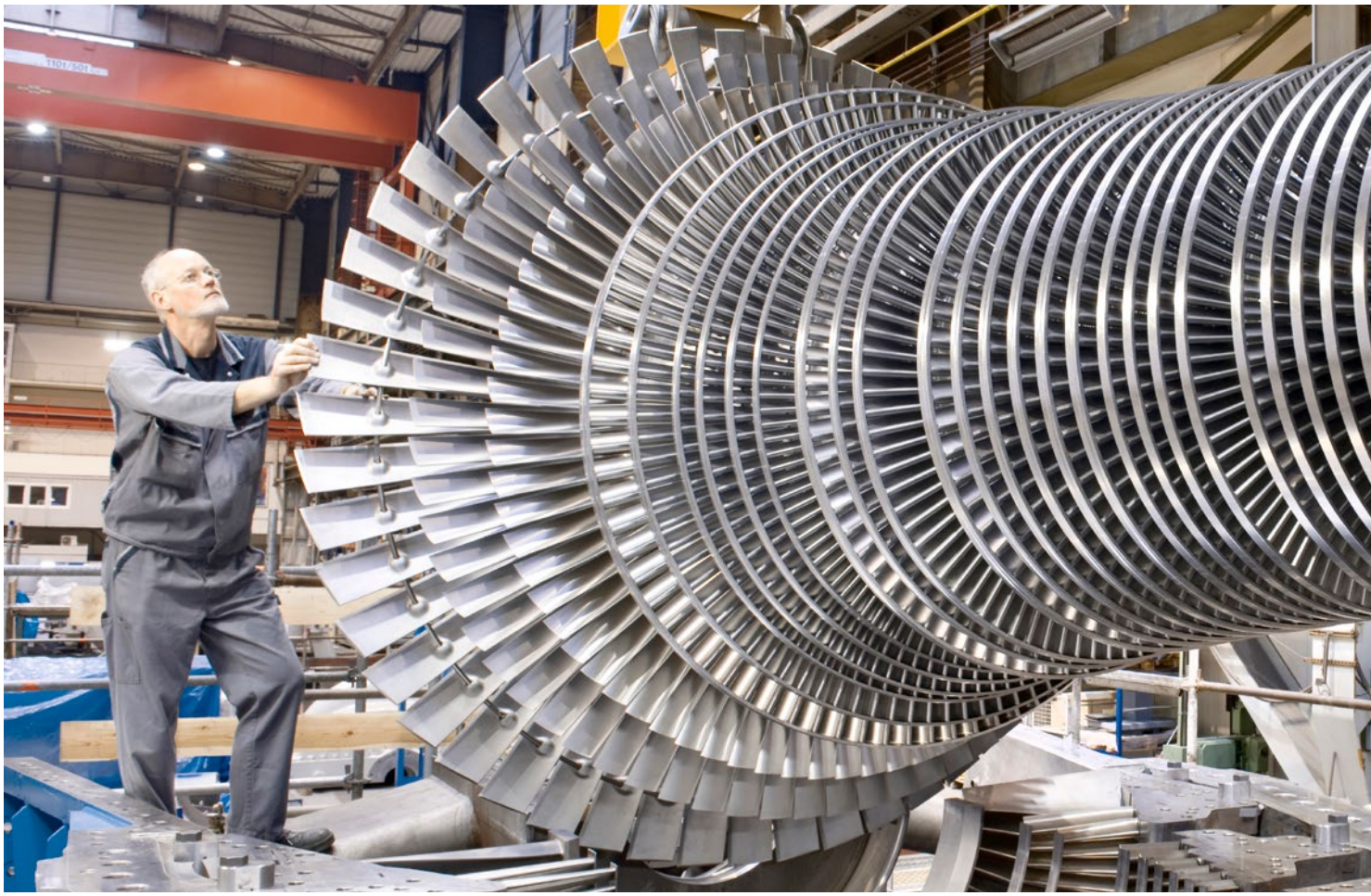
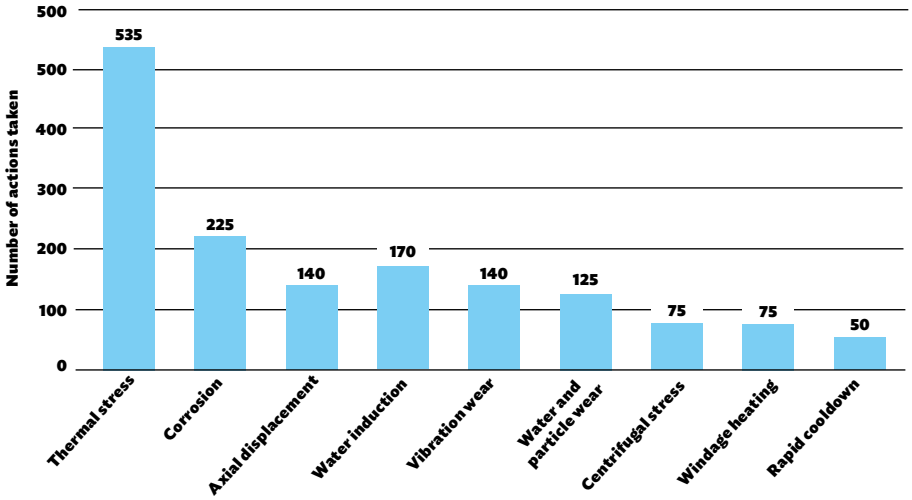


Figure 3: Common problems in cycling plants (Intertek-Aptech)



From base load to cycling load

When conventional power plants designed for baseload service are required to operate on a cycling mode, stress levels on pressure parts might increase above that allowed by the original design. Understanding the effects and introducing mitigation strategies could prevent premature component failure. The challenge for plant owners required to operate in this way, is to fully understand the effects on the plant and component life expectancy created by these new operating situations.

When operating machinery against fluctuating demand, it is important to carefully examine the system descriptions and operating procedures. The importance of suitable and well thought out preserving systems is critical for ensuring the reliable operation of the machinery. Money spent here could save far more, in the future.

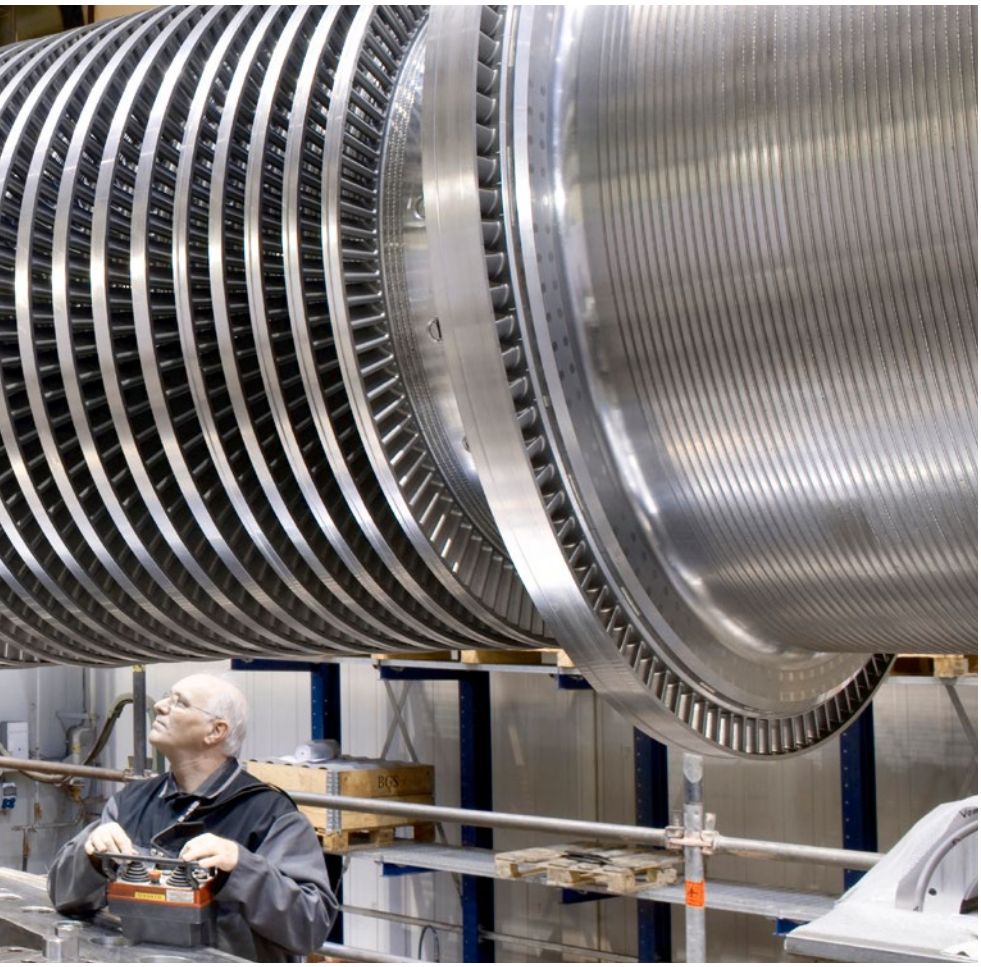
According to Intertek-Aptech, 60% to 80% of power plant failures are related to cycling operations. In Figure 3, survey data gathered from 215 power plants shows the following root causes for damages to the plant systems.

Boilers

For boilers, the key issue mitigating equipment damage is to design and construct more flexibility into piping, piping penetrations and possibly header relocations to accommodate higher thermal expansion. It must be remembered that the whole feed water system is affected by thermal stresses:

1. Feed water pumps often operate outside the optimal area and require more start-ups and shutdown than intended in the original design causing additional wear and tear
2. Feed water heaters are constantly heated and cooled, which often leads to tube failures
3. Feed water consumption increases because of large amounts of water used during start-ups
4. Condensate pumps might need added recirculation capacity
5. Condenser swallow capacity might not be suitable.

Lower ramp rates in load change situa-



tions and of course slower start-up times are needed to reduce the thermal stresses. Thermal gradients can also be reduced by proper heating, in order to evaporate all of the condensate before increasing the heat input.

Water chemistry is always a very important aspect; but, when operating on cycling mode, it becomes critical, especially during start-ups and load shifts. In some cases, the entire water chemistry programme must be redesigned to optimize the remaining boiler tube life.

Fuel changes

There are significant economic, environmental and political reasons for changing boiler fuel from fossil fuels to renewable biomass materials. Conversion from fossil fuel to biomass fired boilers is a huge investment as the boiler needs to be significantly modified.

The required modifications include the firing configuration, emission requirements, fuel supply, and controls. The boiler performance impacts include furnace exit gas temperature, radiant superheater absorption, air and flue gas flow rates, heat transfer through sections, boiler efficiency, attemperator flow and tube metal temperatures.

Waste derived fuels have been the solution for some operators looking for cheaper power and heat generation options. There are, however, lurking risks that have already materialized for some operators, including that waste fuels by nature contain a mix of materials and thus foreign chemical compounds may be present in the boiler, causing undesirable and in some cases, very quick corrosion effects. For example, burning PVC plastic waste containing chlorides can literally degrade the boiler, in a very short time.

Fuel distribution from fuel storage through conveyors into the boiler silos has been a starting point for multiple fires and even dust explosions. The fire usually begins from poorly maintained bearings, or sparks generated by crushers. Normally, the distribution line should be protected by an active fire protection system, which will save a considerable amount of down time and lost property in the long run.

Of course, all of these changes are also related to the challenges mentioned in the previous section, as well.

Steam turbine generators

The steam turbine generator lifetime is related to thermal stresses, experienced over time. The OEM has calculated the ramp rates and number of expected start-ups during the lifetime. For example, Siemens usually calculates 5,000 start-ups during the steam turbine's technical lifetime.

When optimizing the steam turbine lifetime, the key issue is slow temperature changes during start-up and load changes. For cycling units, fast start-up times and rapid response times are required, which increases thermal stress in turbine components. To reduce load change and start-up stresses, the capability of the steam bypass system and its components must be evaluated for cycling operation. For start-ups, turbine heating systems (hot air, heated blankets, flange heating) might be beneficial.

When planning the revision for cycling turbines, it must be noted that there is a high possibility for greater wear and tear than that seen in base load operations.

Power plants today are facing a great deal of commercial and technical challenges. These challenges, together with technical developments, have resulted in a growing number of companies offering technical and service solutions to address these problems. In any case, the chosen solution should always be based on solid facts, gathered and calculated by a team of experts. Technical problems combined with the cheapest solutions too often leads to machinery breakdowns.

Our knowledge of power plant equipment is derived from our client portfolios and our employees' expertise. For example, we currently insure over two hundred steam turbines. Many of the turbine related questions are handled within our Turbine Competence Centre, which is composed of our dedicated underwriters, risk engineers and claims engineers, all of which work with turbines.

Should you experience any abnormalities in your operating machinery or if you simply need advice, please contact us. It is highly likely that we have seen similar kinds of problems or abnormalities that resulted in failure, within our portfolio. ■

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PHOTO: GETTY IMAGES

"All natural" – misleading food labels?

The food industry as well as consumer organizations in the United States are awaiting a definition of what "all natural" means and how that word may be used in the marketing of food products.

Numerous cases are on hold and the outcome is hard to predict. These cases show what kind of claims could be made by consumers and should be of interest, not only to food manufacturers, but all companies manufacturing or selling consumer products in the US market.

In many parts of the world people are becoming more and more concerned about what the food they daily consume really contains. This is partly related to a general health trend but also as a concern for what effects synthetic ingredients as well as genetic modification may have. The food industry has therefore started to use labels that promote health benefits such as "all natural", no preservatives" or "contains antioxidants". But are all such statements correct or are they misleading?

RECENTLY, THERE HAS been an increase in lawsuits filed by consumers challenging allegedly false or misleading labels on food products, particularly labels promoting "all natural" or other health benefits. Many of these lawsuits have been filed in California under California's Consumer Legal Remedies Act and Unfair Competition Law, under which the plaintiff must present reliable evidence showing the difference between the market price actually paid by consumers and the true market price that consumers would have paid had product not have been promoted with a misleading label. Allegations have also been made on the grounds of consumer fraud and breach of warranty.

The claimed deviations from the "all natural" theme vary, but some of the recurring themes have been products labelled as "all natural" should not contain genetically modified organisms (GMO), have unnatural additives (preservatives, artificial colours and flavours etc.) or be grown with the intense use of pesticides. The courts that are to determine whether an "all natural" label is misleading would prefer to rely on the opinion of the U.S. Food and Drug Administration (FDA) and have therefore issued a stay in these cases until the FDA has provided such a definition. The FDA had previously in a more than two decade old informal advisory defined natural as "nothing artificial or synthetic". This advisory was however not legally enforceable and with the changing landscape of food ingredients and production as well as an increased number of lawsuits filed a new more formal definition was considered necessary. The FDA has, however, struggled with finding such a definition and earlier this year chose instead to ask the public for an opinion on how to define this term. Specifically, the FDA asked for information and public comment on questions such as:

- Whether it is appropriate to define the term "natural,"
- if so, how the FDA should define "natural", and
- how the FDA should determine appropriate use of the term on food labels.

The comment period closed on May 10, 2016 and by that time over 7,600 comments had been received. The FDA is now expected to sort through these comments over the next several months in order to reach an actual definition. Following such a definition the lawsuits may be finally tried. The outcomes of these trials are now difficult to predict.

IN THE LIGHT of the above one could see the recent Volkswagen case where the automotive manufacturer is accused of fraudulently having programmed its diesel engines so the emissions were significantly lower in a testing environment than in ordinary traffic.

In Europe it looks like Volkswagen's liability will be limited to a duty to adjust the engines so that they meet the requirements and some minor compensation. As per a European definition there is no actual "damage". However, in the US there is an obvious liability exposure based on fraud. Even though there is no real physical damage to the cars, customers could be considered to have been "damaged" just because of the alleged fraud without having to prove any other loss or damage.

The Volkswagen case is of course not directly comparable to the mislabelling claims against the food industry, but shows that similar cases can be considered in different ways and can have much more severe consequences in other parts of the world than what we might expect from our experience of our Nordic home markets.

WHILST THE MISLABELLING claims may not be typically covered under a general and products liability policy there may however be some aspects to consider. A US liability policy may provide cover for advertising liability. This coverage may respond to claims of disparagement by competitors should the insured have used false statements from which the competitor has suffered a loss.

Also a Directors & Officers Liability insurance (D&O) or an Errors & Omissions Liability insurance (E&O) could potentially be triggered for allegations of wrongful acts or misleading statements.

What should be considered when looking at the insurance aspects of claims under any of these policies is whether the insurance policy is a "duty to defend" policy or a "non-duty to defend"/"duty to indemnify". In US liability policies the insured's own co-insurance is either in the form of a deductible or a Self-Insured Retention (SIR). Most general and products liability insurance policies in which the insured's co-insurance consists of a deductible would have a duty to defend language. In most states that would result in the insurer having a duty to defend not only obviously covered claims, but also non-covered claims that may be groundless, false or fraudulent. For these policies it is likely that the insurer would have a duty to defend the insured also for mislabelling claims. For costs that are below the deductible the insurer would be reimbursed by the insured.

Instead, should the policy not have such a duty to defend obligation for the insurer, typically if the insured instead of having a deductible has chosen a SIR, the insured typically must manage the litigation process himself. The insurer would have no obligation to neither pay nor defend the claim until the SIR is eroded. In that case, the insured needs to be fully aware of the risk and how to proceed should a claim be made against him. This is one of several differences between a deductible and a SIR. It is recommended that companies especially reflect on this important difference in order to avoid unpleasant surprises should a claim for mislabelling or any other claim, arise. Being prepared is a key to success. ■

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The human factor

The human factor behind major property losses in chemical, food and construction industries was investigated, and the complex nature of accidents was, again, emphasized.

The definition of the human factor is somewhat problematic, as it is used in many contexts, without clarification, as to what is actually meant. These have been identified as contributors of accidents, however, there is no common agreement as to which fall under human factors or what is the best taxonomy. In the Master's thesis, "Human factor as a source of property losses", the human factor was defined as a factor that affects human performance. They were divided into individual, group, organizational and external factors, and their contribution to property losses was investigated.

The selected industrial sectors for the research were the chemical, food and construction industries, with the research consisting of two parts. The first part included the statistical analysis of all of the reported claims and the second, the investigation of 16 major losses. This article focuses on the results obtained from the major loss investigations. To obtain information on the human factors behind the

losses, claims adjusters from If were interviewed using a questionnaire based on the HFACS (Human Factors Analysis and Classification System). Organisational factors were strongly linked to the investigated major losses. The identified themes were maintenance failures in chemical industry, risk management failures related to hot work in the food industry and poor quality of work in the construction industry.

49 CONTRIBUTING FACTORS were identified from the five investigated major losses in the chemical industry. Each major loss had between 2 and 16 contributing factors, with the common major loss theme being maintenance failures. Maintenance failures have contributed to many major accidents throughout history, for example, the BP Deepwater Horizon oil spill. In this study, this type of failure was identified in three out of five major losses. Failures were either due to a lack of condition monitoring, inadequate preventive maintenance or insufficient maintenance. A contributing reason behind inadequate maintenance was the difficulty of risk identification. Understanding the risks associated with the complex equipment required versatile expertise and experience that was often only gained by using the equipment.

Although the contribution of inadequate maintenance to accidents is well recognized, companies often cut maintenance costs, first. Cost cutting and minimization of costs were identified as strong contributing factors that sometimes stemmed from the diminishing of risks. In some companies, equipment was only serviced in the event of a total failure, which stopped production. However, the minimization of costs was mainly due to economic factors experienced by these companies. Because of these pressures, plants run continuously at full capacity and only employ maintenance shutdowns on an annual or less frequent basis. In many cases, this is the only time service operations can be carried out. The challenge is to find a balance between sufficient maintenance and cost-effectiveness.

"In the food industry, 66 contributing factords for the six major losses were indentified."

Despite the fact that overhauls are not possible multiple times a year, proper condition monitoring, which is the key to preventive maintenance, is possible during operation and most often does not require major investments. Condition monitoring could significantly enhance the early identification of malfunctions and reduce the probability of total equipment failure. Condition monitoring should preferably be done online. Maintenance failures could also be prevented with inherent safety, by applying the principles, both in design and in maintenance activities.

IN THE FOOD industry, 66 contributing factors for the six major losses were identified. Each major loss had between 2 and 26 contributing factors with the common theme being inadequate risk management of hot work. It would appear that risks related to hot work are neither properly controlled nor understood in the food industry. Companies fail to comply with hot work procedures or fail to understand their significance, when implemented.

Negligence towards hot work safety can be extremely pervasive in some food industry plants. Hot work permits, for a temporary hot work place, may be written in advance and handed over without any risk assessment. Irrespective of the fact that management is aware of the risks, they sometimes struggle with conveying the message of the importance of safety to employees. If revisions are made, employees may not change their way of doing things or, if they do, it occurs slowly.

Sometimes hot work is outsourced. Distribution of responsibilities may become confusing when several parties are involved and communication, for example, between a food company, a contractor and a subcontractor may become difficult. Essentially, the client is responsible for hot work risks being managed, although it is reasonable to assume that professional hot work employees, working for the subcontractor, know what they are doing.

Hot work procedures should be strictly followed and risks related to them have to be taken seriously. The physical environment has to be carefully assessed, beforehand, and alternative methods for hot work should always be considered.

116 CONTRIBUTING FACTORS were identified from the five losses in the construction industry. Each claim had between 3 and 24 contributing factors. Fixation on cost at the expense of quality, poor quality control, poor communication between project parties and lack of time have been identified as contributing factors for construction industry claims. What was clearly identified from the claims, were deficiencies in cooperation and communication between the project parties. Because of these deficiencies, the quality of work was unsatisfactory.

Avoidance of effort and responsibility appeared repeatedly in the answers. They resulted in routine violations at many levels of an organisation. According to the interviewees, work quality or safety is not

held to be of great significance amongst employees and even less amongst the employees of subcontractors. Subcontractors caused four out of five claims; partly due to tight project schedules and partly because of their own personal haste, with work being performed as fast as possible.

The above mentioned factors were symptoms of economic pressures. The selection of a subcontractor is, naturally, the result of a tendering process. Safety does not govern the selection; instead, the company with the cheapest offer, often wins. The selected subcontractor aims to perform the work, as cheaply as possible, to get the highest possible returns. This economic pressure impacts everyone: the client, the contractor and the subcontractor.

The key questions in loss prevention were: 1) How work quality ensured on construction sites, 2) How do the project parties communicate with each other and 3) Is quality the first priority for everyone? To ensure the work quality, it should be a topic at all project meetings and everyone should be responsible for it.

FIVE CLAIMS OUT of 16 were caused by natural phenomena, which the interviewees considered to have unidentifiable associated risks that could not be identified by the organisations beforehand. This also resulted in only a few identified contributing factors. Each claim caused by natural phenomena had between 2 and 5 contributing factors. However, this raised the question of what is the acceptable level of protection regarding natural phenomena? Organisations are responsible for taking natural phenomena into consideration; but, the difficulty lies in identifying the extent of the possible risk.

"Organisations are responsible for taking natural phenomena into consideration."

Although interviewees did not consider human factor to have contributed to these five losses, it does not necessarily mean that these factors were lacking. For example, it has been concluded that the Fukushima accident was actually "man-made", although it was triggered by a tsunami. These so called NaTech (Natural-Technological) accidents are now considered as an emerging risk, but they can be mitigated with human factors. However, there is a lack of tools for assessing these risks. Being able to reliably prepare for these types of phenomena also presents a challenge for safety research. Loss prevention measures for extreme natural phenomena are difficult to assess; however, existing instructions should be followed. Adequate plans should be in place in the event of rain and floods, especially for underground structures, as well as for the whole site.

THE MOST IMPORTANT result of this research was the indicated complex nature of accidents. Accidents had several contributing factors and no conclusion could be reached as to which factor was of the greatest significance. Some safety researchers claim that there is no single root cause for accidents and similarly, for example, inadequate maintenance, poor work quality and human error are only consequences of several other deficiencies in the system. It is important to shift thinking to along these lines, as employees, alone, are never responsible for accidents. Systems are becoming increasingly complex and this phenomenon should be kept in mind when accidents are investigated. In order to prevent accidents, improvement is required at every level of an organisation. The most important of which include collecting data and critically reviewing the whole organization. Generating comprehensive reports of this data is essential because reporting is the first step in learning from accidents. ■

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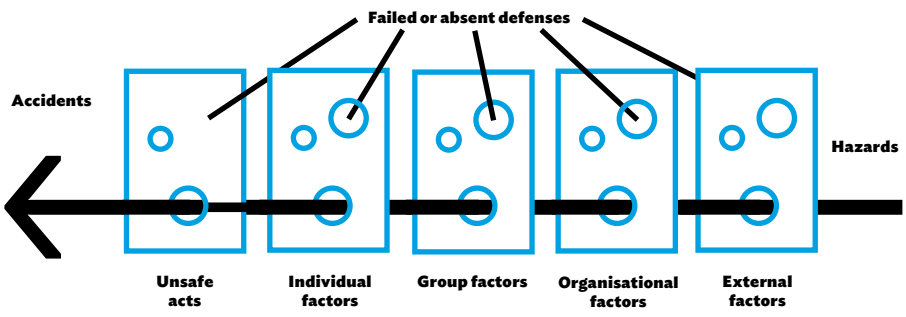
Accident defence layers in HFACS



August Ramsay Foundation – rewards to promote loss prevention activities

The purpose of the Foundation is to promote loss prevention work in companies in Finland insured by If and to promote practical and theoretical research within insurance.

To achieve its purpose the foundation grants awards to persons and communities in Finland that have been taking part in the loss prevention work or in the development of insurance. Such activity may be e.g a successful first aid extinguishing or saving somebody's life in an accident.

August Ramsay foundation has financed Katja Salmi's thesis on Human factor behind property losses.

Risk engineer Maria Collin can do on-site surveys more efficient with a tablet than pen and paper.

Better feedback with mobile tools

Tablets make reporting from risk surveys faster and more efficient.

TAP, TAP, TAP! The stylus moves rapidly across the tablet. Risk engineer Maria Collin has left her ballpoint pen at home. Moving from area to area on the industrial site, she is making notes and taking photos with a new tool for If's experts on safety and loss prevention. With the tablet she can easily map risk zones and areas where the client can improve on safety.

"The clients like the immediate visual feedback in our meetings."

"Reports from the surveys are done more quickly. The mobile tool frees up valuable time, so we can make better wrap-up meetings with site managers and deliver our loss prevention report faster," she says.

SHE CAN CONNECT the tablet to a projector, and only minutes after the survey is finished show photographs of areas with room for improvement safety wise.

"The clients like the immediate visual feedback in our meetings. The pictures are fresh, and it is much easier to discuss observations and how certain things can be improved."

THE PROJECT TO develop an application for carrying out surveys with tablets was initiated to improve If Industrial's efficiency by reducing the time for reporting, allowing engineers to spend more time on consulting with clients and underwriters. Risk engineer Philip Preston has been project manager for the mobile tool project.

"Our clients should experience a faster turnaround in our delivery of recommendations reports. The tool has also been developed to help support the engineer to provide a more professional wrap-up meeting with the site manager, when there is often only little time to prepare," he says.

Having recommendations from previous surveys carried out using the tool makes it easier for a new engineer to take over a survey from another. The observations that gave rise to recommendations are shown on a site plan and the engineer is able to better orientate themselves during a survey. Having reference documents at hand on the tablet also helps to make the survey more efficient.

Philip Preston explains: "Looking further in to the future, the tool could form the basis of a more interactive experience for If's clients, with recommendations being accessible on an electronic map, which the client can interrogate and give feedback on. The old PDF report form can be replaced or supplemented by online access." ■

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PHOTO: ISTOCK

Helping travellers 24/7

What happens if your employee gets ill or hurt during a business trip or assignment?

If's Industrial clients have hundreds of business travellers all over the world every day. In addition, many have expatriates located in different countries. But If cooperates closely with its assistance partners to help clients globally – at all times.

When an employee is travelling or working abroad, an important safety factor for both the employer and employee is that he or she is able to get immediate help if something should happen. This safety also has a huge impact on both willingness to travel, and the work efficiency during business trips.

"Being in need of medical care in a foreign country can be challenging."

Clients might have different kinds of requirements, and If cooperates closely with the client to ensure that the assistance services match their needs. The assistance service concepts are made for each client and defines the chosen coverages.

To ensure a global presence at all times, If cooperates with assistance partners who can help the injured where they are. These assistance partners offer a variety of services but their most used service is the medical assistance.

WHEN AN EMPLOYEE needs medical assistance abroad it is crucial that it is easy to get help. The helpline number is printed on the insurance cards, and in minor medical cases the insured can also find a suitable clinic through If's or the assistance partners' websites.

If also has skilled personnel available by phone during office hours and, thanks to our partnerships, competent and experienced personnel are available 24/7.

Being in need of medical care in a foreign country can be challenging, but assistance partners are also able to serve the person in need of assistance in the Nordic languages, and can provide information about both the local medical practices as well as local facts and habits. Our assistance partners also keep in contact with the insured throughout the treatment and don't leave the insured without care or contact.

IFS' PARTNERS HAVE a wide network of cooperation hospitals all over the world where they guide the insured to get the best possible treatment. Consequently, these hospitals and clinics are carefully selected to ensure the quality of the treatment. If or the assistance partners have also negotiated prices with these hospitals, and have firsthand information as to where the best treatment for different kinds of medical needs can be found.

When the insured has recovered, the assistance partners handle all the invoicing and other documentation received from the clinic. They make sure that the prices correspond to the agreed price, and that the invoiced procedures include only the necessary and agreed ones.

Should the insured have any additional costs (e.g clinic visits, medicines from the pharmacy), these can be regained from If through our online services.

What cover the insured has is defined by If and the client, and the agreement with its terms and conditions is also respected by the assistance partners. Their trained professionals know the basics of If's insurances, and they even have an application that allows them to check the insurance details of each policyholder.

If is also informed about every medical case, which has been reported to the assistance partner, and can inform about any restrictions that need to be notified in the case handling.

SOME SERIOUS INJURIES might be critical for days and require larger efforts from the caseworkers of the assistance partner. In these cases, there are always doctors on call who can collaborate with the clinic doctors. The case handler in If will also follow the situation closely and give the needed support to the assistance partner who is operatively managing the case.

If the insured medical status is life threatening, it is also possible to send the next of kin. The assistance partner will arrange the plane tickets and hotel accommodation. When the medical status is stabilized the next step is to transport the injured home. This is also arranged by the assistance partners. The employer can even send a colleague to replace the injured in order to continue the work. All these services are included in the insurance cover.

If and its assistance partners seek to offer premium service with the human touch. The faster the insured gets quality treatment, the faster the employee will recover and become capable of returning to work. ■

The role of If in medical case abroad

- checks the coverability and makes the final claims settlement decisions
- gives assistance and guidance to the assistance partner, insured, employer, next of kin, brokers etc.
- handles the claim applications received from the claimants
- follows the quality of customer happiness and receives customer feedback
- develops and manages the joint cooperation with the assistance partners
- maintains and delivers claim statistics

The role of the assistance partner in medical cases abroad

- guides the insured to the right kind of clinic
- informs If about the case and asks about the coverability if needed
- keeps If updated about the case handling
- arranges the treatment and gives the payment guarantees to the hospital
- communicates with the hospital about the medical issues related to the insured
- communicates with the insured about the treatment plan
- handles the invoicing and documents with the clinic

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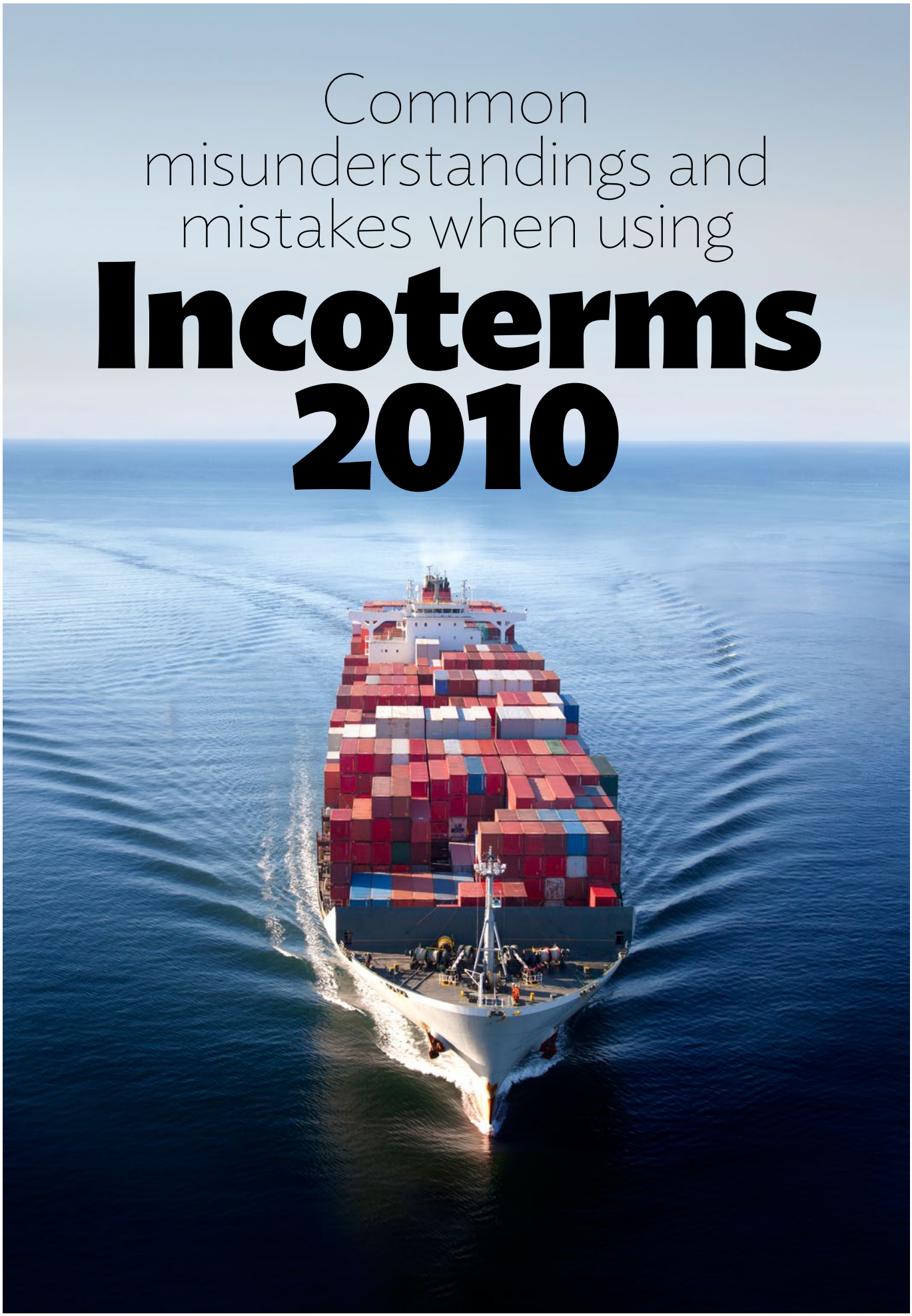
PHOTO: GETTY IMAGES

Common misunderstandings and mistakes when using **Incoterms 2010**



When doing trade it is in both parties interest to define rights, liabilities and obligations regarding transportation and delivery of the goods accurately.

Who is to arrange transportation, who bears costs and which costs, who bears the risk of loss of or damage to the goods in transit and is there a requirement to insure the goods and what kind of insurance is expected?

Incoterms (International Commercial Terms) were created to simplify and clarify these issues in 1936 and the latest revision of the Incoterms came into force on the 1st of January 2010. Despite the relative clarity of the rules we have faced and will face numerous misunderstandings and as a consequence awkward situations – unfortunately these cases pop up often in connection with a cargo claim.

PRIOR TO DIGGING into the world of misunderstandings and mistakes let us get the basics right. Altogether there are thirteen different clauses, which can be split into two different categories: rules that can be used for any mode or modes of transports and on the other hand rules to be used only for sea and inland waterway transports.

Rules to be used for any mode or modes (in case of multimodal transportation) are: Ex Works (EXW), FCA (Free Carrier), CPT (Carriage Paid To), CIP (Carriage and Insurance Paid To), DAT (Delivered At Terminal), DAP (Delivered At Place) and DDP (Delivered Duty Paid). So these rules are usable even though there is no waterway transportation as part of the logistic chain. But having said that, these rules can be used if waterway transport is part of the logistic chain.

The following rules are to be used in connection with sea and waterway transports: FAS (Free Alongside Ship), FOB (Free On Board), CFR (Cost and Freight) and CIF (Cost Insurance and Freight). When using these rules both the place to which the goods are to be transported as well as the place of delivery are located in port. And of these rules only CIF and CIP require the seller to insure the goods for the benefit of the buyer.

Only minimum insurance coverage is expected (Institute Cargo Clauses C or similar), but naturally the parties are free to agree on additional insurance coverage.

INCOTERMS RULES FORM only part of the sales contract. These rules do not govern extensively different rights and duties of the parties. Incoterms instruct parties on what is expected from either party in respect of carriage of the goods from seller to buyer; export, import and security related clearance; and how division of risks as well as costs is being done.

The rules stay silent on transfer of property rights. This is something the parties have to state in the contract of sales. Same applies to the consequences of possible force majeure situations – is the party facing some kind of unexpected and unforeseeable event exempted from his/her duties and liabilities.

And also the possible numerous different situations of breach of contract are beyond the scope of Incoterms – apart from the passing of the risk and costs when the buyer is in breach of his obligation to accept the goods or to appoint the carrier when F-term is being used. In this respect the most common misunderstandings are that Incoterms would say something on the transfer of property rights and also would rule the payment terms.

"Incoterms rules form only part of the sales contract."

ONE SHOULD INCORPORATE the chosen Incoterms into the sales contract as follows: chosen rule (three letter abbreviation), destination, Incoterms® 2010. So it's as simple as that? Unfortunately, not quite. Often we see examples where the destination is stated far too vaguely. Luckily very seldom only the country of destination is mentioned, but it is common practice to state only the city/town and country.

In order to avoid unnecessary and time consuming quarrels one should state the named place as accurately as possible – even on the level of street address: DAP Niittyportti 4, Espoo Finland Incoterms 2010. This level of address details should be found at least from the sales contract.

Why is this so important? On clauses EXW, FCA, DAT, DAP, DDP, FAS and FOB the place of delivery is the very place in which the delivery takes place and risk transfers from the seller to the buyer. With CPT, CIP, CFR and CIF the place of delivery is not the same as the final destination. On these four rules the destination is the place to which the seller pays the cost of carriage.

If for example using DAT one does not specify the terminal accurately the seller is entitled to choose any terminal in the region defined – DAT Helsinki, Finland Incoterms 2010 would mean in practice any terminal in Helsinki area.

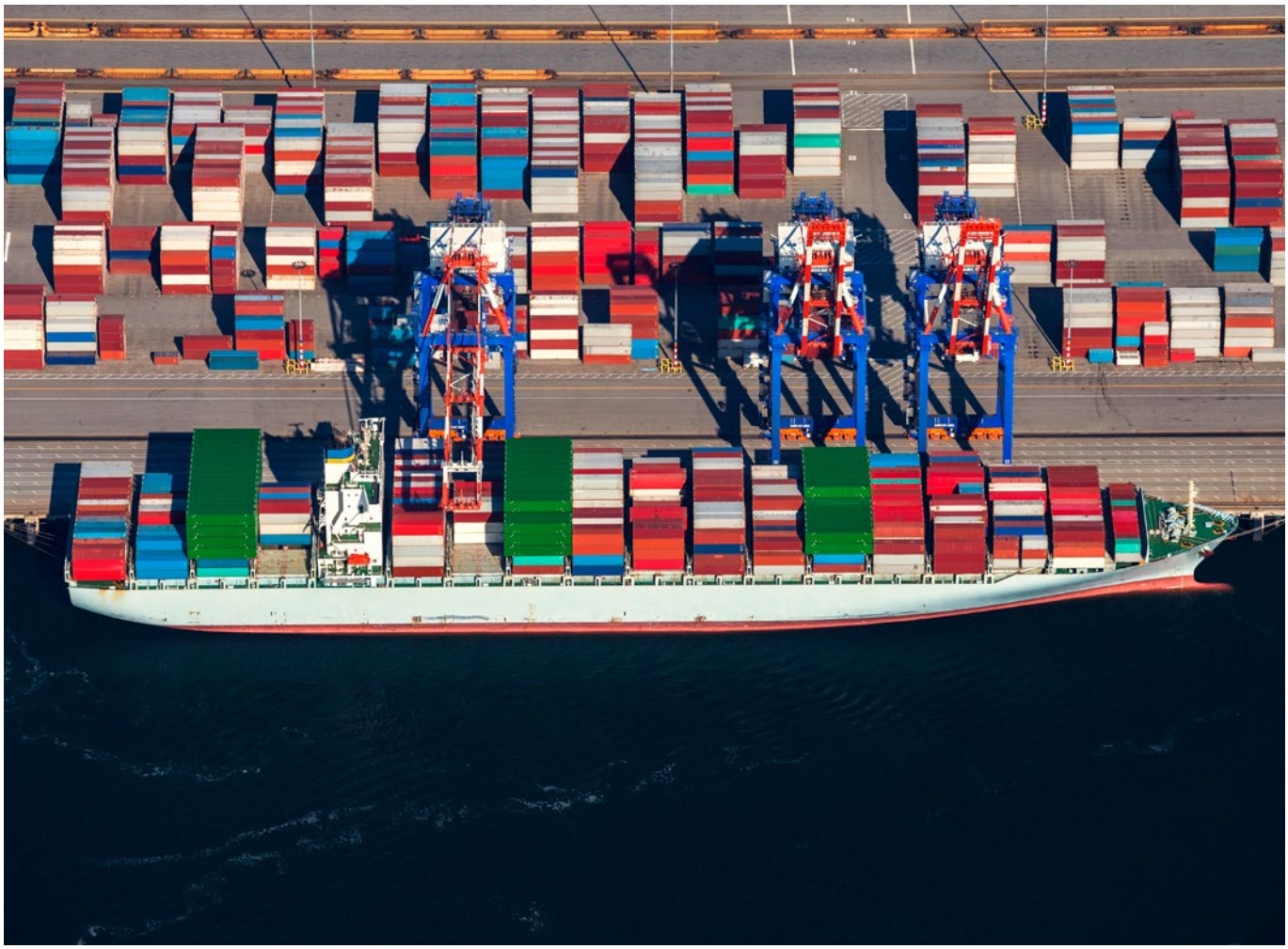
EVERY NOW AND then we see situations in which DDP is being used before taking into account the question whether the seller can really take care of all the necessary formalities in the buyer's country. These formalities could be for example GST (Goods and Services Tax) or VAT (Value Added Tax). If not properly planned beforehand, the duty to register oneself as importer and other responsibilities may result in additional risks, costs, delays and upset clients.

Similarly at first glance using EXW appears tempting to the seller and why not also to the buyer. If EXW is used for export cases the buyer (thus exporter) has to complete all possible export procedures and that may prove to be both costly and time consuming. Therefor one might be better of using EXW only on domestic sales or in situations that correspond to domestic sales.

Even then caution is advisable, because even though the loading of goods into the means of transportation is the buyer's task quite often it is the seller who actually takes care of this. And if a loss occurs it is rather difficult for the buyer to explain that they have had nothing to do with the unfortunate occurrence.

LET US PRESUME that I sell goods and use CIF port, terminal Z, X-town, Y country Incoterms 2010. Because I want to safeguard my relationship with my client I check the goods in the course of transport and should I notice any damage goods I replace them with new ones. And as my client does not even know that there was a cargo loss, I take care of the claims procedures with my cargo insurer. What are the consequences if any?

First of all, after the commencement of the transportation the seller is not entitled to "tamper" the goods in transit. The only party who is to check the condition of the goods is the buyer when the goods have reached their final destina-



tion. Buyer is also the only party who is entitled to make a claim for cargo loss – this is based on the insurance policy given to the buyer by the seller.

What are the consequences if the seller interferes the transport and replaces damaged goods with new ones? The insurance coverage ends at the time the transport is "stopped" and original goods are wholly or partially replaced with new ones – even if the goods are of the very same quality and nature this is the case. Otherwise the insurer in question might end up paying indemnity for the "same goods" twice or more, which of course is not the intention.

"Buyer is the one who is to file a claim for a cargo loss."

And as said, buyer is the one who is to file a claim for a cargo loss. Should the seller prefer handling the claims procedure he/she is required to present a letter of authority from the buyer. So if the seller prefers to serve its client as good as possible and deliver only unharmed goods in all situations I strongly recommend using D-terms for avoiding unnecessary hassle and unpleasant surprises of not having cargo insurance coverage.

Another slightly problematic – if not as bad – example is if the chosen Incoterms rule is in principle suitable for parties' intention, but does not in the end quite match it. Let's take DAT-delivery of containerized goods as an example. This is something we bumped into only a couple of days ago.

First question: when does the delivery take place? Well, this is still relatively easy to answer: when the containers have been unloaded into the terminal. But what if the containers continue their way a couple hundred kilometres and the buyer opens the containers at the final destination and finds the goods to be damaged? This can trigger messy discussions regarding the occurrence of the loss between the buyer and seller; did this happen during the transportation until the place of delivery as per DAT rule or only after.

Simple solution for avoiding this would be agreeing the place of delivery to the final destination (hence up to the buyer's location).

ALL THE ABOVE is meant for general guidance only and do not by any means cover all possible Incoterms related situations, which cause us grey hair. I have had the pleasure of listening to Asko Räty (VTM) number of times and he always gives the following instructions for choosing the correct rule: 1) forget Incoterms; 2) ask yourself: how do we deliver and receive goods? (sourcing, sales, accounting and logistics); and 3) now take a look at the Incoterms and find the suitable rule.

And write all possible additional specifications to Incoterm –rules carefully: EXW loaded – seller is to take care of the loading onto the means of transportation. But at buyer's or seller's risk? ■

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Mapfre Global Risks and If cooperation celebrates 10 year anniversary

• Mapfre Group is the Number 1 non-life insurance company in Latin America.
• They are ranked among the top 15 International Reinsurance companies.
• Mapfre Group has more than 38.400 employees with a presence in 29 countries.
• Mapfre Group insurance premium-income in the year 2015 was 18,415 million €.
• They have an A-ranking with Stable Outlook from Standard & Poor's and A.M.Best.

If P&C has a strategic reciprocal partnership agreement with Mapfre´s Global Risks (MGR), a unit that provides centralized international services for large corporations in coordination with Mapfre regional´s structure. The agreement, which was renewed as per 1st May 2016, includes fronting services for If´s Nordic clients through their administrative hub in Madrid for 23 countries, which include a large part of Latin America, as well as Spain, Portugal and Turkey.

This year the annual partner-meeting celebrating 10 years of our increasingly strengthened cooperation was held on the 19-20th October in Stockholm. The program included a workshop with representation from Nordic Underwriters, with a focus to follow up on the results from If´s Partner Network Quality review. Another workshop was arranged for the purpose of knowledge exchange within Risk Management with representatives from MGR Madrid and If P&C Nordic. In the afternoon of the 20th October, MGR representatives visited the If Stockholm Open tennis-event, to meet with Nordic brokers and clients.

ERGO Group is If P&C´s partner in Russia as of the end of 2015

• Since the 15th of December 2015 If´s international services in Russia are provided by ERGO Group, one of the major insurance groups in Europe owned by Munich Re.
• The fronting agreement with ERGO includes all types of non-life insurances, and insurance services for If clients are administrated through a hub in St. Petersburg.
• A National Reinsurance Company, owned by the Central Bank of Russia, is established to be obligatorily involved in each reinsurance cession in Russia from next year, with up to 10 % of the risk.
• Similar situations, with obligatory increased retention and establishment of national reinsurance companies, are occurring in many other countries in the world, for example in several African countries, in India and Indonesia. We are actively following the outcome of these initiatives in order to update our clients of relevant regulatory changes.

ERGO

HDI-Gerling Industrie Versicherung AG becomes HDI Global SE

• HDI-Gerling Industrie Versicherung AG has changed its name to HDI Global SE, effective January 2016, primarily to better reflect its growing international profile. The company is now operating worldwide under the new HDI Global brand. HDI says the name change reflects its increasingly global business and is a major step in its global growth strategy.
• HDI Global is one of If's strategic international network partners with a widespread geographical cooperation including for example: Australia, several European countries and Brazil. ■

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Property Underwriter, NO

SÖREN ISAKSSON
Risk Engineer, SWE

DANIEL SHWINN
Risk Engineer, SWE

TOBIAS WIDELL
Risk Engineer, SWE

VELI-MATTI KORTELAINEN
Risk Engineer, FI

"The aging population of electrical power equipment means a great potential for failure over the next decade."