

Every day more than 300 oil tankers cruise the Mediterranean and every day some 2,600 tonnes of oil are spilled there. The deliberate, illegal discharge of oil and fuel during washing of tanks or ballast-water exchange operations is a regular practice among oil tankers, cargo ships and cruise liners. The transport sector is consequently a good example to highlight the risks of industrial activity.

Finance and insurance institutions deal with risks in a different context. Innovative solutions to diversify financial risks might sometimes seem cynical to outsiders, but they are also attempts to alleviate the burden of those who cannot afford to insure their possessions.

Financing the risk from natural disaster

Anselm Smolka

The loss data on great natural disasters in the last decades show a dramatic increase in catastrophe losses. A decade comparison since 1960 is shown in the table below. The reasons for this development are manifold and encompass the increase in world population and the simultaneous concentration of people and values in large conurbations, the development of highly exposed regions and the high vulnerability of modern societies and technologies, and finally changes in the natural environment like global warming and the related regional effects. As the underlying factors for the observed

loss trend remain unchanged, a further increase in losses from natural disasters is inevitable.

Coping with these future loss burdens represents a formidable challenge which requires the cooperation of all parties involved – potentially affected private persons and industries, the financial sector and the state in public-private partnerships. Turning to the role to be played by insurance within the context of natural disaster management, we can distinguish between the insured persons or entities; primary insurers; reinsurers; capital markets and banks; governments and public authorities.

Each of these parties has its own tasks and responsibilities in managing the risk arising from natural disasters. Beyond the pure financing of losses, which is a reaction after the event, much more effort than hitherto has to be invested in a proactive strategy, i.e. in reducing and preventing future losses. Such a strategy is not only a matter of financial resources, but also a result of good and foresighted planning and of coordination at all levels, from private households and industrial companies to public institutions and authorities. As far as risk financing is concerned, reinsurers are usually the main risk carriers in the field of natural disaster losses, because they can achieve a worldwide balance of risk over time and regions. In recent years attempts have been made to supplement the capacity provided by traditional reinsurance by tapping into the resources of the capital market. The main function of the capital market is to secure capacity for top-rank losses by what is called alternative risk transfer, or ART instruments like Cat bonds. It is worth mentioning that the large majority of ART programs have so far been placed for highly developed countries. The complexity of the programmes, investor attitudes and also the usually high price seem to require mature insurance markets. The successful placement of an unrated (!) Cat bond for the Taiwan Residential Earthquake Insurance Pool, however, may be seen as a sign of hope for increasing business opportunities in this field.

The main task of the state lies in the field of risk management and risk reduction by: designing and enforcing land use and building regulations; securing the serviceability of critical facilities and infrastructure; developing emergency plans which precisely define the responsibilities and the coordination of the authorities involved; and granting tax exemption for catastrophe reserves of private insurers.

What can be done by insurance to promote proactive loss prevention and reduction? Competition and a short-term financial perspective in the insurance sector do not create a favorable environment for actively promoting prevention and mitigation measures, as the time scale for a possible positive outcome tends to be long. However, there are promising developments like the community classification scheme of the insurance-sponsored Institute of Home and Business Safety (IHBS) in the US where communities are classified according to code compliance. This classification is reflected in the insurance conditions. Generally, taking risk mitigation measures can and should be rewarded by more attractive insurance conditions like discounts on rates or lower deductibles. Vice-versa, the insureds' participation in losses, in the form of deductibles and/or coinsurance, serves as a powerful incentive for taking mitigation measures. Linking the availability of disaster protection, be it state or private bank loans, or insurance payments, to the observance of building regulations can provide an efficient mechanism for code enforcement and thus forms a key element of proactive risk management.

The foregoing discussion has identified several levers for mitigating losses from natural disasters. The components are there, the challenge is to knit them together into a secure and tight network of risk reduction measures. At present, there are various holes in this network. Filling one of the most important gaps – the lack of insurance penetration – is the intention behind the creation of disaster insurance pools. Typically, only 10% or less of disaster losses are covered by insurance in the less developed world. The Turkish Catastrophe Insurance Pool (TCIP) can be considered as a model case which has already served as a catalyst for the establishment of similar pools in Tai-

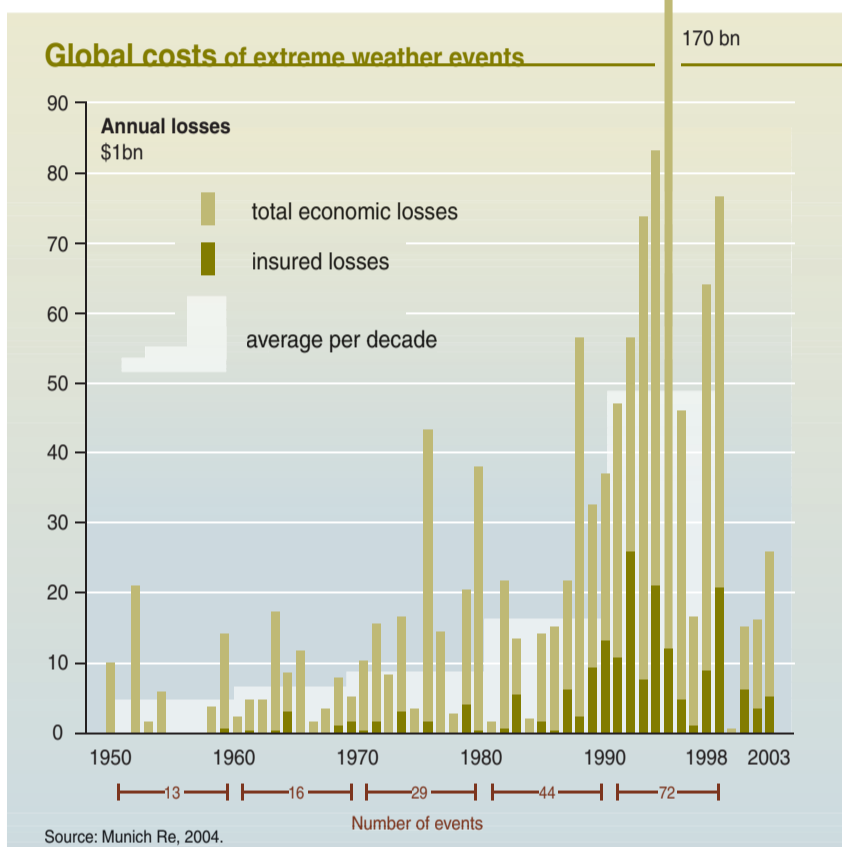
wan and very recently in Algeria, or for the conception of pool solutions in several other countries. Essential elements of the TCIP are:

- mandatory scheme
- no post-disaster loans to affected parties without insurance
- 2% deductible
- coverage up to \$35,000 loss limit
- rating scheme graded according to hazard zone and risk type
- complete risk transfer to global reinsurance market in the starting phase

The scheme covers dwellings and small commercial risks, whereas larger commercial and industrial risks and high-value residential buildings are covered by the private market.

None of the above is within the reach of a large part of the world's population, namely the poor. Beyond the regulatory context mentioned above the state is often expected to serve as a reinsurer of last resort for very rare, extraordinary losses on the one hand and uninsurable risks like dwellings of the poor on the other hand. Whereas the first role will continue to apply in the future, this is not necessarily true for the second one. Microinsurance schemes, which first started in life insurance, now find counterparts in property insurance. Markets in Southeast Asia seem to be particularly innovative and adventurous in this field, and companies like ASA in Bangladesh or BRI in Indonesia already have more than 2m customers insured under microinsurance schemes, which may illustrate the potential of this new avenue to produce better protection for the poor.

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Hunger insurance – looking for alternatives to aid programmes

Tobias Gasser

Last autumn leading insurance groups, humanitarian organisations and government policymakers gathered at The Swiss Re Centre for Global Dialogue in Zurich for an international conference on "Solidarity and Opportunity: The Potential of Insurance for Disaster Risk Management in Developing Countries".

The conference was organised under the aegis of the ProVention Consortium, founded by the World Bank. This is a global coalition of international reinsurance companies such as Munich Re and Swiss Re, Lloyds, the Red Cross and Red Crescent Societies, the UN World Food Programme (WFP), the World Bank, as well as foreign ministries and other NGOs. The aim of the conference was to involve the private sector in disaster reduction and reconstruction.

The world's humanitarian organisations are facing slow growth or stagnation of available aid and consequently unable to keep up with demand for help. Major disasters tend to occur at irregular frequencies, with each event upsetting aid budgets.

The World Bank and the WFP are working together to present an "innovative solution". In a recent article in Germany's Tageszeitung, James T. Morris, Executive Director of the WFP, says that "high-performance financial instruments such as weather derivatives and catastrophe bonds" are being used

to create a risk management system to "protect populations at risk from losses incurred through weather-related damage", in short, a form of hunger insurance for the world's poorest.

Morris says that such financial market instruments would have a fundamental impact. The risk of a disaster would no longer have to be borne by the families concerned, but by humanitarian organisations.

Richard Wilcox, special programme director at the WFP, explains that the WFP and the World Bank plan to start with a pilot project in Ethiopia. Another drought like the one seen in 1984 would require aid in excess of \$2.6bn. "Even at the highest levels, funds pledged for humanitarian aid are unreliable and come too late," says Wilcox. The WFP now plans to start talks with reinsurers, using a rainfall index as a basis for insuring Ethiopia's harvest for 2006 with a catastrophe bond and a reinsurance policy.

Speaking to Switzerland's Wochenzeitung, Jürg Trüb, head of Swiss Re's weather desk, compares hunger insurance with similar solutions in energy. "When the winter turns out to be warmer than usual, and energy companies sell less power, they come to us to help make up for the shortfall." The difference with hunger insurance is that it covers changes in precipitation levels instead of temperatures. Trüb sees a number of conditions that would have to be met before Swiss Re could move into hunger insurance.

One of these is the existence of reliable precipitation measurement data. Also, local supervisory bodies would have to approve this type of insurance. Interested parties would have to be prepared to pay commercial rates, and a certain volume of transactions would be necessary to make the market worthwhile.

Bruno Kopp is an independent insurance broker in Basel, specialising in the hard-to-insure market. His company, Risk Management Service, offers insurance products for businesses affected by war or political instability. Kopp is all in favour of the idea of hunger insurance. The major problem he sees, however, is the likelihood of a claim. "If the cat bond is drawn upon regularly, then nobody will invest in it anymore. What investors want is a bond that is never actually used," he explains.

Ralph Läubli, fund manager for alternative investments at Bank Leu, a private Swiss bank, finds the WFP's idea an interesting proposition and is prepared to include a "hunger bond" in his portfolio. The fact that the WFP bond poses a higher-than-average risk among catastrophe bonds is not a problem. But he does think it must be offset with a higher risk premium. It is here that charities are sceptical. "Who's going to pay for this?" asks Bruno Gurtner, a financial markets specialist with the Swiss Coalition of Development Organisations. "If the public sector pays for it, this is a socialisation of costs." Such a model could only work if private sponsors see a financial interest.

Gurtner sees hunger insurance as an example of a public-private partnership involving private enterprise and the state. But, much as for other similar projects, he wonders "how much sense they make and how they can really make a difference to developing countries". However he is glad international organisations are making an effort to speed up the rate at which they use available aid funds. Another alternative to insurance, he empha-

sises, would be for states to release aid money more promptly to international organisations. He believes such bodies should also have greater flexibility in the use of funds.

Tobias Gasser is an independent journalist in Bern, Switzerland and regular contributor to the weekly Wochenzeitung, which originally published this article on 21 October 2004.

Translated by Avril Wright.

Swiss Re and the typhoons

Insurance companies use cat bonds to cover their accumulated risks, shifting these onto the capital market. If an insurance company wants to set aside provisions for a catastrophe, it raises the money by issuing a bond on the capital market. Investors receive an annual rate of interest, in line with the money market rate and 1% to 2% higher than a comparable corporate bond. Such bonds mature in one to 10 years. If the disaster occurs during this period, investors lose all or part of their money.

The Leu Prima Cat Bond fund, which combines a number of different cat bonds, offers an investment opportunity related to earthquakes and hurricanes hitting the US, storms in Europe, earthquakes in Monaco and typhoons in Japan.

As Läubli (see article beside) explains, it takes some time to actually get a payout. The demand for cat bonds remains strong, despite the devastation caused by Hurricanes Charley, Frances, Ivan and Jeanne last summer. The risk of the bond not being paid back is one in 100 years. One of the world's leading issuers of catastrophe bonds is Swiss reinsurance giant Swiss Re. Some \$4.3bn are invested in cat bonds worldwide.

A cool summer means lower beer sales, so breweries insure themselves against bad weather. The magic word here is weather derivatives. By buying an option that pays up if temperatures fall, a brewery can make up for its loss in sales. If the summer turns out to be hot, plenty of beer will be drunk: all the brewery loses is its premium. Thus, the higher the likelihood of cool weather, the more the brewery has to pay for this option.

Banks and insurance companies issue weather derivatives to diversify into economic sectors not correlated with the traditional credit risks.

Preparedness and response to pollution at sea

Patricia Charlebois

The environmental and economic impacts from large-scale oil spills can be staggering with the cost of response, recovery and restoration running into millions, even billions, of dollars for a single incident. Spills such as the Exxon Valdez (US, 1989), Sea Empress (UK, 1996), Erika (France, 1999) and Prestige (Spain, 2002) (see opposite) have highlighted the devastating impacts of such incidents.

The International Convention on Oil Pollution Preparedness, Response and Co-operation 1990 (OPRC 90), provides a framework designed to facilitate international co-operation in preparing for and responding to a major oil pollution incident and to encourage States to prepare by developing emergency response structures.

The International Maritime Organization (IMO) is a specialist UN agency with a global mandate for safeguarding life at sea and protecting the marine environment from pollution caused by shipping. IMO acts as the secretariat to OPRC 90 and has identified responsibilities for promoting and assisting preparedness and capacity-building, facilitating and co-ordinating international assistance, if needed, during emergencies.

Although oil spills remain the largest threat due to the volumes transported, chemicals or "hazardous and noxious substances" (HNS) are receiving increased attention as they generally represent a higher degree of hazard than petroleum products, not only to the marine environment, but also to human health. In 2000, realising the growing threat from the carriage of HNS by sea, IMO adopted the HNS Protocol. The OPRC/HNS Protocol 2000 provides the same basic framework for co-operation and mutual assistance as the OPRC Convention. Though still in its infancy, and as yet not in force, IMO continues to encourage States sign the protocol and develop their capacity to respond to chemical spills in the marine environment.

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The Prestige: business interests at odds with safety concerns

Thomas Höfer

On 13 November 2002, in stormy weather, the 26 year old tanker Prestige, sailing with a Lebanese crew under Bahaman flag from the Baltic to Asia, sustained hull damage. The tanker was carrying 77,000 tonnes of heavy fuel oil. It began taking on water and started to drift towards the coast of Galicia. The Spanish authorities ordered the Prestige to leave Spanish waters and head beyond the 120-mile territorial limit. Once the ship had been pushed out onto the high seas, the Portuguese government sent a warship to prevent it from entering its waters.

After five days of towing operations, 130 miles from the coastline of Spain and Portugal, the tanker split in half and sank. The two parts of the wreck now lie at a depth of 3,5 kilometres more than 200 kilometres off the coast.

The Prestige spilled 64,000 tonnes of oil, 60% more than initially estimated. The resulting pollution is thought to have killed 300,000 seabirds. It will take between two and 10 years for the affected ecosystems and resources to recover.

Damage to fishing and related economic sectors, tourism, and the natural heritage along 3,000 kilometres of coastline polluted by the spill may cost approximately €5bn (€1bn confirmed by the Spanish Government two years after the disaster), with society at large paying almost the full amount. It has directly affected some 30,000 people in fishing and shellfish.

It is believed that a Greek shipping dynasty is behind the registered owner of the Prestige in Liberia, the Mare Shipping Incorporation, which only operates this tanker. It bought it in 2000. The transport itself was chartered by a Russian-owned Swiss company. Such situations, covering "hidden" interests under the flag and registration of some convenient administration, have become typical during the last few decades.

Experts from the US Bureau of Shipping had ordered dock work after finding cracks in the ship's hull. Welding was carried out in China, and the ship was subsequently inspected three times in two years in China, Dubai and Saint Petersburg respectively.

European ship-owners control 34% of the world's fleet, but the majority of their ships are registered under flags of convenience, offering lower fees, less restrictive laws and access to low-wage crews. Although corporate globalisation is not a risk in itself, tanker law cannot be effectively enforced under such conditions.

People living on the coasts of shipping routes and relying on the natural environment pay the real price of spills. For the fishermen, the Spanish authorities opened national funds and defined monthly income compensation. Credits totalling €100m were offered. If an oil tanker causes pollution, then compensation is available from the ship's insurance and the International Oil Pollution Compensation (IOPC) Fund. According to Lloyd's press office, there is a likelihood of compensation amounting to about €7m for the ship, another €10m to €12m for the cargo and €20m to €25m for pollution damage liability paid by a Protection and Insurance Club. Over and above that, coverage based on the International Convention on Civil Liability for Oil Pollution Damage, the 'Fund Convention', is limited to about €180m. Compensation is intended for economic loss and clean-up costs. After the loss of the Erika, the IOPC fund limits were raised by 50%, but this measure only came into force on 1 November 2003. Any claimants will have to assess damages to shellfish grounds, marketing efforts and the travel trade over a period of years. Heavy fuel oil will stay in the area as floating tar for a while. International oil, insurance and salvage-related institutions studied the costs of oil spills outside US waters in the 1990s. While there is no clear relationship between spill volume and costs, the type of oil is crucial: light oil dissipates in rough seas, while heavy fuel oil stays in the marine environment and travels long distances. This was the case with the Prestige. A further impact on costs relates to repeated cleaning, and maintenance of the clean-up team and equipment. The type of coast and tide is an important factor too. Poor management and over-reacting to media pressure, rather than trained decisions by qualified engineers, can escalate costs. All in all, the Prestige spill is well placed to become one of the most expensive oil spills outside the USA.

The tanker Prestige was a single-hulled vessel. Less than 50% of the world's oil tanker fleet – some 2,000 ships exceeding 80,000 tonnes – have single hulls. Double hulls are designed to contain the load after non-severe collisions. In 2001, after the Erika spill, nations represented on the International Maritime Organization (IMO) Marine Environmental Protection Committee decided to introduce a basic rule for taking single-hulled oil tankers out of service: single hull tankers with certain anti-pollution standards could continue operating until 2015 or until they completed 25 years' service, whichever came first. On the basis of these rules ships like the Prestige will have to be decommissioned over the next few years.

The wreck of the Prestige and its aftermath highlight the anarchic character of the shipping industry. This situation suits major corporations as it helps them avoid regulations and taxes. It is a further example of the conflict between basic safety and pollution concerns and a system based on profit and national considerations.

Major oil spills will recur as long as society continues to depend on petroleum and petroleum products to sustain its day-to-day activities. Oil tankers transport some 1,800m tonnes of crude oil around the world by sea each year. In most cases, the petroleum cargo is transported and delivered safely and securely to its destination without incident due to good preventive measures and instruments introduced over the years.

However, another problem is associated with the transports themselves. Every day ships empty some 2,600 tonnes of oil into the Mediterranean. The deliberate, illegal discharge of oil and fuel during washing of tanks or ballast-water exchange operations is a regular practice among oil tankers, cargo ships and cruise liners. In one year this adds up to the equivalent of 15 Prestiges. More attention needs to be paid to these creeping catastrophes as well.

The editorial team assembled this article, drawing largely on "Tanker Safety and Coastal Environment: Prestige, Erika, and what else?" by Dr. Thomas Höfer, an article first published by Environmental Science and Pollution Research (ESPR – 10 [1] 2003).

Transport risks at Compañía Minera Antamina, Peru

Steven D. Botts

Big mines require large quantities of fuel to operate and chemicals for mineral processing. In mountain areas, strict precautions are needed to ensure safe transport of such substances along steep, winding roads. Past transport accidents caused spillage of cyanide, mercury and other chemicals, prompting public outcry and strong media reactions. Safe transport of materials has become a priority for mining companies.

High in the Andean mountains in Peru, Compañía Minera Antamina, together with other nearby mines, has introduced a Safe Road Transportation initiative as an integral part of a wider company programme addressing the environment, health, safety and social responsibility.

A specialised contractor monitors the transportation units of all companies and provides support if an emergency occurs along the route. Hazardous materials trucks travel in convoy, escorted by vehicles that carry equipment to deal with any incident. All drivers and supervisors are trained to respond to an emergency. The trucks are inspected for tire tread depth, number of retreadings, daily scheduled preventive maintenance, first-aid kits, and equipment to control spills. All transporters are

certified, and the route has been evaluated by experts who examine any bridge crossings, proximity of homes and villages, areas with stray animals, sharp turns with steep gradients, etc. Trucks and containers display UN substance codes and hazard identification.

The programme includes outreach to roadside communities based on the international APELL process. Communities receive education in first-aid treatment, how to recognize hazardous materials, and basic actions in case of accident. The communities have a positive attitude towards this training.

Outreach to government organisations has also started to achieve progress. An important achievement is the creation of an APELL Committee that helps representatives of government and industry build up their mutual capabilities in safety and emergency management.

Incidents along the extended transport route from the coast to mines are decreasing in frequency and gravity. In 2004 there were only four minor incidents, causing neither physical injury nor environmental damage, and only minor damage to property. But safety management never sleeps, and constant vigilance is required to push performance ever closer to our common goal of zero accidents.

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Hazardous material transport risk management in Canada

Wayne Bissett

Canada's transport system must cope with many risk factors: long distances, routes through varying climates with 30°C temperatures in summer down to -40°C in winter, even ice roads across frozen northern lakes.

On 10 November 1979 a freight train derailed just outside of Toronto. The ensuing explosion, propane fires and release of chlorine led to the evacuation of more than 200,000 residents. The accident caused the federal government to pass the Transportation of Dangerous Goods Act (TDGA) to improve management systems and infrastructure. Subsequent federal and regional legislation introduced requirements on notifications and permits, placards, particular containment measures, emergency response plans, incident reports and training. The UN Transport of Dangerous Goods Code is a basic part of national regulatory requirements and Canada is an active member of the UN Committee of Experts on Transport of Dangerous Goods.

Transport Canada operates the Canadian Transport Emergency Centre (CANUTEC), which maintains an extensive scientific databank on chemicals manufactured, stored and transported in Canada (1). CANUTEC handles some 30,000 telephone calls a year, about 1,000 of which involve an emergency report. Staff work directly with emergency teams to provide immediate advice.

The Canadian Chemical Producers' Association has been operating a Transportation Emergency Assistance Plan since 1974, to provide emergency response personnel and equipment to incidents involving their members' products as well as other events. Many of our larger municipalities have established dangerous goods routes to avoid the most populated areas.

All of these measures combine to reduce the risk of mishaps in the transport of dangerous goods and minimise any damage when they do occur.

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1. The Emergency Response Guidebook is available in English, French and Spanish at http://www.tc.gc.ca/canutec/erg_gmu/erg2000_menu.htm