Contingent business interruption and other special covers
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Introduction

After an insured business interruption, the insured should find himself in nearly the same financial position he would have been in had the loss never occurred. Easier said than done! Anyone ever involved in a business interruption claim can attest to how difficult it is to juggle its many inherent challenges. These not only include “intangibles” such as reduction in turnover compared to projected business results, but also relate to various problems of business operation maintenance and/or re-launch of production under adverse circumstances.

A Swiss Re business interruption publication which appeared in 1998 addressed major characteristics such as internal and external susceptibility to disruptions, income at risk, objectives and forms of cover, but it touched only briefly on special issues. The publication in hand probes BI specialities which have gained importance over the past few years.

In today’s “global village”, business processes in industry and commerce form a chain of interrelated activities by highly diverse, but interdependent parties. Technological progress is moving at tremendous speed. Raw materials and products need to be finished and assembled according to extremely tight schedules. In particular, international companies now outsource part of their original activities or enter complex partnerships with external organisations. By doing so, they lose a degree of control over resources, business processes and the very product itself.

Insurance markets and insurance products could hardly stagnate in this ever-changing environment. The growing exposure linked to the use of internet and telecommunication services has become crucial. Sudden and accidental failure of IT systems, minimum requirements on protection and backup procedures, and the assessment of new types of cyber risks are among these burning issues.

Not all the products, wordings, extensions and alleged simplifications devised by the trade in the soft cycle represented genuine improvements. Indeed, with regard to business interruption, some rather suspect methods of insuring large companies’ interdependencies were occasionally applied. Non-transparent exposures and accumulations were the unfortunate result of such practice.

Outlining the problems of BI insurance and offering some solutions in this publication is to underline Swiss Re’s decisive strategy. In return, the authors anticipate a fruitful dialogue with underwriters around the globe.
...the blaze in an Albuquerque, N. M. semiconductor plant burned for just 10 minutes last March. But far away in Scandinavia, the fire touched off a corporate crisis that shifted the balance of power between two of Europe’s biggest electronics companies, both major players in the global electronics industry.

Both companies bought computer chips from the plant, which is owned and operated by Philips Electronics NV of the Netherlands. The flow of those chips, which are crucial components in the mobile phones they sell around the world, suddenly stopped.

Philips needed weeks to get the plant back to capacity. With mobile phone sales booming around the world, neither customer company could afford to wait.

But how the two companies responded to the crisis couldn’t have been more different. Company “A”, which was Europe’s largest corporation by market capitalisation at the time, met the challenge with textbook crisis management effort.

Company “B” moved far more slowly. And it was less prepared for the problem in the first place. It didn’t have other suppliers, and in the end, came up millions of chips short of what it needed for a key new product.

“We did not have a contingency plan”, conceded the marketing director for consumer goods at Company “B”.

A Fire in Albuquerque Sparks Crisis for European Cell-Phone Giants

1 Contingent business interruption

What happens to a business after a fire? Production slows down or stops and turnover decreases; profits begin to diminish and eventually turn into losses as wages and other charges continue to accrue.

What happens, however, if goods or services cannot be supplied to the business because of material damage at the premises of a supplier or, perhaps even worse, after a fire on the premises of an important customer? Depending on the type of industry, it may be difficult to find alternative suppliers or new customers. For some businesses, in fact, the risk of reduction in turnover triggered by an event outside their control may be as high as that of material damage on their own premises.

Since most business processes extend beyond the boundaries of a single manufacturing or assembly plant, management’s awareness of dangerous interdependencies has risen sharply. The importance of adequate insurance against the consequences of business interference after property damage elsewhere than on the insured’s premises is growing fast, triggered by rapid technological and organisational changes. Therefore, it is essential for underwriters to pay strict attention to the assessment of contingent business interruption exposure and to apply technical underwriting of the risk.

1.1 Suppliers’ and customers’ extensions

Insurance for business interruption at the insured’s premises caused by material damage at the premises of a supplying company or customer is neither new nor “exotic”. In fact, almost every business—be it large or small—depends on raw material, semi-finished and finished products from outside sources and on customers to whom its goods and services are sold. In the motor trade, for instance, dependencies on certain sole producers of critical parts and components triggered the development of suppliers’ extension from the first half of the last century.

Terms and conditions of the extension, as well as terminology, vary greatly from country to country. They may even differ according to the insured’s trade and occupation. Further, they are influenced heavily by diverse underlying BI systems, the US versus the UK system, for example.
It is neither possible nor necessary to outline the existing differences in terms, variations in conditions and terminology. Technical literature describes the systems relevant to their particular markets. However, where it may prove helpful, differences are referred to in the relevant chapters.

The principal elements of contingent business interruption are the same all over the world, and this publication addresses the main underwriting features. In difficult market periods, underwriters run the risk of overlooking some of these characteristics.

### 1.2 CBI – an underestimated risk

Industry and commerce today are facing fierce competition, extreme cost consciousness and smaller margins. Raw material is transported in the most rapid, rather than the safest way, industrial robots are working at full or over their full capacity in serial production, semi-finished products and finished components are delivered only minutes before they are assembled. Duplication processes, back-up for critical elements and buffer stock to ease the effect of an incident.
have been abandoned and certain businesses depend on single-source supply to a dangerous degree. In short: in a modern, complex supply chain, redundancies are reduced and vulnerabilities greatly increased.

How have business interruption insurers responded to this increasingly challenging environment within the last ten years? In many cases, they have not!

1.3 Underwriting aspects
The main underwriting features for the extension of business interruption insurance to suppliers or customers can be categorised as follows:
- risk quality of supplier and/or customer;
- insured’s degree of dependency;
- insurance terms and conditions;
- accumulation and reinsurance aspects.

Risk quality of suppliers and/or customers
Whether directly or indirectly, everyone in a supply chain is interdependent; the main problem for the insureds’ business is that both the performance and safety measures of suppliers and customers are beyond their control. Therefore, delivery of vital material, parts and components cannot be safeguarded. Modern industrial concepts such as “extended enterprise” may mitigate the problem some, since close cooperation fosters better knowledge and understanding of what transpires in the chain. Conversely, close cooperation may mean that products are developed and designed jointly. In case of an incident, replacement may become an even greater problem.

Surprisingly, underwriting features – such as suppliers’ and customers’ situations, the condition and locations, working processes, material, machinery and equipment, as well as protection and prevention measures – seem to have been of little concern to business interruption insurers in the recent past.

But the revival of technical underwriting in the current market has seen a thorough risk analysis of key suppliers and customers once again become a standard, if not indispensable part of the job. We strongly suggest that, without exception, suppliers’ and customers’ risk quality be checked, the key elements of such an examination being:
- address and situation of premises;
- exposure of locations to fire, explosion and natural perils;
- exposure of locations to socio-political perils (if insured);
- structural and technical fire and explosion protection;
- organisational protection (eg intervention, emergency planning, staff resources);
- machinery, equipment, state of technology;
- work processes, storage, critical components and materials;
- neighbourhood; and
- key suppliers’ and customers’ own dependencies.
Underwriters with in-depth knowledge of these elements will better understand the vulnerabilities to material damage and be able to locate the “Achilles heel” of suppliers and customers.

Degree of insured’s dependency
Suppliers’ and customers’ extensions can only be granted to those business organisations – be they manufacturers, assemblers or distributors – which are aware of the effects of material damage to their suppliers’ or customers’ premises. While incidents at outside premises would invariably be beyond their immediate control, they – and their insurers! – should be able to assess the impact on their own operations.

A more sophisticated approach can be taken if more information is available about the plant. For example, in the automotive production process, the paint shop is a bottleneck because there is no redundancy within the plant, and every car body must go through this stage. Moreover, since the finish coat contains solvents, there is the possibility of an explosion and fire occurring at this vital point.

This type of information facilitates the evaluation of organisational, technical and construction-related fire-prevention measures, and conclusions as to what can happen if there is an “incident” in the paint shop. Estimates regarding property damage and the business interruption period will thus be considerably more accurate.
Such an analysis embraces the following:

- probability and duration of an insured loss;
- quantifiable effect on own business operations;
- loss mitigation possibilities (e.g., can critical parts, equipment, components be ordered elsewhere? What is the time element under normal conditions and in the worst case to resume normal supply or to find alternative customers?); and
- extra expenses for the above measures.

The insured’s business recovery plans should include:

- a general response concept in respect of supply shortage and delivery impediments;
- impact mitigation management (e.g., buffer storage of critical components, alternative outlets);
- resources planning for critical situations;
- image management (because of additional increase in cost of working!);
- adequate insurance programmes.

Any incident at premises outside the insured’s control can become a crisis and any crisis may provoke a disaster. The underwriter’s duty is to determine whether or not the insured has taken all measures to minimise the “ripple effect”.

**Some principles affecting the extension**

Underwriters would do well to consider the following:

*Material damage proviso (UK system)*

One must understand that this clause does not apply to CBI extensions. Among other things, it cannot be automatically assumed that the cause of the loss is accepted by the material damage insurer. Without the suppliers’ or customers’ consent, it may even be difficult to find out the exact cause of the loss. Therefore, insurers do well to envisage an additional claims condition in order to expand the insureds’ actions in obtaining the required particulars.

However, the non-appliance of the proviso mentioned above should not be misunderstood. The CBI extension is governed by the underlying business interruption cover which must be in respect of material damage. The effect of the extension is only to add certain premises over which the insured has no direct influence and not to expand the character of the cover – for example by the inclusion of non-physical loss or damage.
**Difference in perils**

Another effect of the missing material damage proviso for premises outside the insured’s control may be that extra perils are added to the extension. However, if suppliers’ or customers’ premises are heavily exposed to natural perils (e.g., flood) and if such perils are added, these considerations must, of course, be reflected in the rating. For the sake of better transparency, it is far preferable to keep insured perils identical.

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**Schematic representation of the insured’s external dependencies**

Many organisations are linked up with the insured company, creating dependency cascades across many levels including suppliers and their suppliers, customers and their suppliers, power suppliers and communications services, and even operations that are not contractually linked up with the insured, e.g., leader locations.
Insurance terms and conditions

Further to be considered are:

Rating
CBI risks are often underrated or even “tend to be forgotten” in the rating process. However, in order to technically rate the risk, the following simple, yet effective approach, should be considered:

Parameters:
- The basis is each supplier’s/customer’s material damage rate (within the relevant locations). This indicates best how often a CBI loss may occur at the insured’s premises. In other words: it reflects the probability.
- Once the probability has been determined, the likelihood of a CBI loss, ie the vulnerability, must be assessed. This is no easy task, as the relevant factor is not automatically available. Roughly, the factor can be expressed as the supplier’s/customer’s theoretical “BI loading” in respect of the item(s) upon which the insured depends. The underwriter may improvise by estimating the adjustment factor – which should correct the underlying material damage rate – to achieve this artificial loss of profits rate.
- There may be a mitigation factor for redundancies and recuperation possibilities on the suppliers’/customers’ and on the insured’s side. This factor mainly depends on satisfactory results of supply chain audits and impact analyses.
- The degree of dependency is represented by the percentage of estimated gross profits chosen for each and every supplier/customer, ie the corresponding limits.
- Finally, credits may apply for deductible, waiting period and – in exceptional cases – for loss limits which do not meet the full exposure.
Expressed as a formula, the above reads as:

\[
\text{Net CBI premium} = \text{MD rate} \times \text{vulnerability adjustment} \times \text{mitigation factor} \times \text{degree of dependency} \times \text{BI TSI} - (\text{corrections for deductible + loss limit})
\]

**Example:**

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Net MD rate</td>
<td>0.5‰</td>
</tr>
<tr>
<td>Vulnerability factor</td>
<td>1.8</td>
</tr>
<tr>
<td>Mitigation factor</td>
<td>0.7</td>
</tr>
<tr>
<td>BI sum Insured</td>
<td>50 million</td>
</tr>
<tr>
<td>Degree of dependency</td>
<td>30%</td>
</tr>
<tr>
<td>Loss limit</td>
<td>10 million</td>
</tr>
<tr>
<td>Deductible</td>
<td>2 million</td>
</tr>
</tbody>
</table>

\[
\text{Net CBI premium} = 0.5\% \times 1.8 \times 0.7 \times 0.3 \times 50 \text{ m} \times 0.75 = 7\,086
\]

The resulting net premium must be loaded for cost and expenses as required.

**Limits**

It is best practice to calculate the percentage of the insured’s dependancy as precisely as possible for each and every named supplier and customer. The results of these estimates should be indicated either as a percentage of gross profits or as monetary limits. In view of the accumulation risk, underwriters should not tolerate any deviation from this practice.

**Deductibles and waiting periods**

Similarly, what might be considered “alibi” deductibles are no longer admissible. Production techniques that are geared to minimum costs and maximum output have made large companies increasingly vulnerable to supply-chain disruption. What is worse, there seems to be little room left for buffer stock. This means that business interruption following a supplier’s failure to deliver immediately is part of an entrepreneurial risk taken willingly and consciously, which, as such, should not be insured. Hence, underwriters must insist on meaningful monetary or time deductibles.
Further conditions and extensions

Named suppliers of suppliers (and the like)
Although this type of extension may be perfectly legitimate for certain business classes, such as chemical and semiconductor industries and motor trade, underwriters should stay reserved. The cover can only be granted exceptionally and for specific reasons; it takes risk carriers another step back in the supply chain, thereby reducing transparency and creating almost uncontrollable accumulations. Technically, a simple amendment of the ordinary (named!) suppliers’ extension clause will do the trick: the named suppliers’ suppliers and the exact premises are added beneath the direct suppliers.

If this type of risk is underwritten, the following principles apply:
- geographical limits (no “global approach”);
- exact addresses and situations of suppliers’ suppliers premises;
- low limits (say maximum 10% of limits for direct suppliers);
- full documentation of every acceptance in the underwriting file;
- increased rates (security loading because of lack of information);
- only in connection with (named) direct suppliers.

Similar underwriting rules apply for suppliers of customers and customers’ customers extensions and the like.

Unnamed suppliers and unnamed customers
Some manufacturers depend on a majority of small, frequently changing suppliers; wholesalers usually deliver products to a vast number of customers: these are the main reason for the existence of the extension mentioned above. Formerly, it was granted exceptionally, both for small local businesses and on the basis of modest loss limits.

However, as the market softened during the 90s, unnamed suppliers and unnamed customer extensions began to mushroom into large national and international accounts. It was not unusual for those extensions to bear extremely large limits or even to be unlimited.

Meanwhile, in the aftermath of some large contingent BI losses, underwriters’ awareness of accumulations is rapidly growing. As the current market allows to charge commensurate premiums, underrated extensions or the inclusion of unspecified customers’ or suppliers’ extensions are rarely seen. Insurers and reinsurers are once again questioning the wisdom of exaggerated practices and patchwork policy wordings. If, under exceptional circumstances, covers are still extended to unnamed suppliers or unspecified customers, very low overall limits and increased premium rates should be introduced.
Ordinary proportional treaties deal with usual business and are not geared to special risks and extensions. Therefore, whether or not CBI should continue to be accepted under ordinary treaties deserves examination. For the time being, Swiss Re suggests that at least the following extensions are found on proportional treaties’ exclusion lists:
- CBI under global master policies;
- CBI unless realistically sub-limited;
- CBI including unspecified suppliers and unspecified customers;
- CBI including suppliers’ suppliers (especially if unnamed), suppliers’ customers and the like.

The information level with respect to these “2nd tier” suppliers is usually low. In this case, the 1st tier supplier is known and sufficient information about this risk is available. As a rule, however, information is scarce concerning the probability of a contingent loss triggered by the failure of a “supplier’s supplier”, ie the 2nd tier, and nothing is known about 3rd tier suppliers.

** Suppliers’ bottlenecks: Figure C**

![Diagram showing the supply chain and information level for different tiers of suppliers.]

- **Accumulation control**
  - Does the loss estimate (sum insured, maximum possible loss or anticipated loss potential) on which you base the share of your acceptance take all dependencies into account?
  - Have you checked whether your companies’ man-made or natural perils catastrophe limits in exposed zones are affected by contingent business interruption risks?
  - Have you made sure that the identified exposures were entered into your accumulation control system?

- **Accumulation and reinsurance aspects**
Risks including the above features are best dealt with by facultative underwriters who judge them on their own merits.

Moreover, it should be borne in mind that the accumulation of net retentions could lead to direct insurers suffering from unexpectedly large losses in respect of CBI exposures even under well-construed pro rata protection. This would most probably happen if:

- a single-source supplier (eg of an indispensable and not otherwise procurable component) for several manufacturers suffered serious material damage at its premises;
- floods, earthquake or another natural peril damaged or destroyed customers’ or suppliers’ premises, or made access to and from insureds’ premises impossible for several days or even weeks;
- ordinary suppliers, customers or energy providers suffered an attack (only in as far as insured under the insured’s original policy).

For the reasons above, we propose that cedants query their reinsurance protection:

- Are net retentions set correctly?
- What is the effect of per event and/or annual aggregate limits under pro rata treaties in the event of worst case scenarios?
- Has sufficient catastrophe reinsurance protection been arranged?

Under prevailing market conditions, and for technical reasons, reinsurers will not be in a position to remove limits under surplus treaties in the foreseeable future; relief must be sought outside the pro rata field. Non-proportional catastrophe reinsurance should protect the cedant against an accumulation in his net and a possible overflow owing to the surplus treaties’ event and aggregate limits.
1.4 Public utilities

A wide range of different wordings exists for this special form of suppliers’ extension often referred to as “public utilities”. The term refers to failure of any or all of the following:

- electricity supply,
- water supply,
- gas supply, and
- telecommunication services.

A word of caution in respect of the ambiguous term “public”: In many countries over the last decade, public services were privatised. As such, the meaning of the word “public” may only signify “used” and not “owned” by the public. This seemingly small discrepancy must not be underestimated. Underwriters should take into consideration that private operators’ duties towards the public are reduced in comparison with state-owned companies. This fact might be reflected in a longer restoration period after accidental failure of supply if, for example, delivery after an incident would be less than economical. Like other suppliers, suppliers of electricity, gas, water and telecommunication services need not suffer from business interruption themselves; it suffices for them to be hit by material or accidental damage as defined in the policy wording. The effect of such damage will then result in reduced turnover and, most probably, extra expenses at the insured’s premises.

The more transparent forms of the various wordings used in the markets limit the extent of cover to the same perils as insured under the BI insurance to which they attach. Other clauses, however, refer to a much wider range of perils up to a type of all risks protection for “accidental failure”. Such broad forms of all risks should, of course, be accompanied by a list of exclusions. These should refer not only to the standard exclusions of the underlying cover—war, civil war, nuclear risks and so on—but must also embrace a number of “undesirables”, such as interference due to weather disturbances without material damage to suppliers’ buildings, machinery or equipment.

The extension to public utilities supply must be strongly limited per incident and overall. Additionally, a time deductible of several hours should apply to minimise frequency losses. Underwriters should be aware that a large number of different insureds could be affected by a comparatively short supply failure. A word of caution: the extension was frequently underrated in the recent past.

1.5 Loss of access (ingress/egress)

So far, this publication has dealt with extensions caused by the insured’s business relations. The reason for the “loss of access” clauses is different, namely material damage to adjacent property or to property outside the insured’s control, of course—in the immediate vicinity.
There is a wide range of various wordings in many markets. Some are more restrictive and require access to be prohibited by the authorities, while others are more open. Some are even satisfied with “hindrance of use” of the insured’s premises.

An additional “extension of the extension” is loss of attraction. It operates if the so-called “leader location” — whose name and address are stipulated in the schedule — suffers insured material damage, thereby triggering reduction in turnover of the insured’s business. If a market, however, consists of a number of small shops and boutiques without a single “outstanding location”, the cover should be limited to an appropriate, narrow radius.

From an underwriting standpoint, we suspect the effect of “loss of access and attraction” clauses is often greatly underestimated. If natural and socio-political perils are insured in shopping malls, general markets or in the vicinity of “leaders” — such as huge department stores — there may be a genuine catastrophe exposure!

For reinsurers, the information level should be as high as possible with respect to the 1st, 2nd, and ideally even the 3rd tier suppliers. Normally, though, they have such extensive knowledge only if these risks are also in their portfolios — which in turn would constitute a fairly significant accumulation risk.
For reasons given above, the minimum underwriting requirements are:

- same named perils as underlying cover or restricted to “Flexa”;
- if the underlying BI policy is of an “all risks” or “accidental damage” nature, the extension must be restricted to “named perils”;
- strict monetary limit (rule of thumb: two weeks of worst possible loss of turnover, e.g., December, or reduced indemnity period, correspondingly);
- monetary deductible or waiting period of at least one day;
- increased rates in case of above-average vulnerability of “leading location”.

A number of related special covers are available in the insurance market. They deal with “loss of use” in its widest sense: not triggered by material, but by non-physical damage. Bomb threats, adverse weather warnings, suicide and murder are among these, to name but a few. For more details about such special covers against loss of income, see Part 3 of this publication.
Imagine being a large telecommunications manufacturer who produces both systems equipment and consumer products. As part of the risk management process, the risk manager should know the company’s external dependencies on its suppliers.

**Objective:**
The risk manager should be able to identify suppliers who are in a position to cause CBI losses to the company in excess of EUR 100 million. Theoretically, the result of a related study could be illustrated by a table listing the suppliers and their respective CBI exposures.

The study would include the following five steps:

1. **Define relevant products**
   To keep costs down, the study could be limited to high-volume products, eg to product lines with sales exceeding EUR 10 m. It should not cover less than 80% of total turnover, however.

2. **Break down into procured parts and systems**
   - A breakdown of purchased parts can be established using the parts database. Since each part has a unique number, the company will be able to identify each part in the final product. An automobile, for example, may consist of some 28,000 parts.
   - Systems are generally more difficult to replace as they are often developed in cooperation with the client, creating a technological dependency on the supplier.
   - Data usually needs to be cleaned up at this stage. For example, supplier XYZ may be listed in the database under different names, eg XYZ, XYZ Belgium, XYZ Switzerland, etc.
   - Suppliers are often selected on the basis of price, quality, volume or technology. Risk management is not usually a major selection criterion.

3. **List critical parts and systems**

4. **Estimate downtime**

5. **Analyze consequences**

The following can be concluded from the figure:

- The OEM does not usually know who supplies its suppliers. The amount and quality of information decreases as the distance between the OEM and the supplier’s suppliers increases.
- CEM Z produces an entire product line for Company A (outsourcing). This trend can be observed in both the electronics and the automotive sectors. In an assembly operation, the main share of the costs (more than 80% in the electronics industry) is accounted for by components purchasing. By outsourcing the assembly to external contractors, Company A hopes the contractor will be able to purchase these parts more efficiently (ie cheaper), which will render the entire product less expensive. At the same time, Company A loses control over these component suppliers, since CEM Z negotiates the contracts with its own suppliers.

CEM: contract electronic manufacturer
Another problem arises due to the fact that the company negotiates with its sales departments rather than with the production unit. Thus, Company A may not know where Company B’s production is located. Company A may discuss the technology with Company B’s R&D department during the development phase. This is usually the case when the components under negotiation play a key role in the product. In this case, Company A should be acquainted with Company B’s production facility. Large companies (for example in the automotive industry) subject their suppliers to a qualification process. This includes audits by Company A’s personnel in Company B’s production unit.

3 List critical parts and systems
In theory, a part may cause a CBI even if it is supplied by several different companies (multisourcing). For example, a part may be procured from three independent suppliers. Supplier A delivers 50% of the required quantity, Supplier B delivers 30% and Supplier C 20%. All three suppliers are able to deliver ±10% of the agreed quantity. If Supplier A is unable to deliver, what part of the deliveries could then be taken over by suppliers B and C?\[10\% \times (30\% + 20\%) = 5\%.

4 Estimate downtime
This estimate concerns the time required to substitute the same part – ie to procure it from a competing supplier – rather than the time required for the standard supplier to restore production. If the competitor’s part is already qualified (certified as suitable by quality control), the lead time to bring the new source on line will be much shorter.
5 Analyse consequences

- A product goes through several “sourcing phases” during its life cycle. Often, as in the startup phase, there is only a single supplier. Accordingly, the point in time at which a loss occurs may massively influence its impact.
- Depending on the product involved, different approaches are taken to estimate BI potential. With mass products (e.g., cellular phones), market share is likely to drop radically shortly after the loss, since customers will simply buy a competing product. Company A, however, might be in a position to supply clients from its inventory.
- In the case of systems, there is normally a stronger bond to the client. The company will test systems before concluding a procurement contract. Sometimes, the company wants the systems modified to fit its needs. The supplier will then produce and deliver systems especially for that company. In the case of a loss, it may be possible to deliver an older version of the product, and retrofit the finished product with the newer version after the client has already made the purchase.

Brain teaser:
Manufacturer A makes a product comprising ten individual components. Each component is delivered by a different supplier. For all the suppliers, the hazards and the standard of protection can be assumed to be comparable with Manufacturer A itself. Thus, the probability of any one party experiencing a loss is approximately the same. Under these conditions, the probability of Manufacturer A experiencing a CBI loss is (… ?…) times greater than the probability of a direct BI loss!
On 4 May 2000, a massive virus called “Loveletter” flooded and paralyzed the mail servers of numerous corporations, including publishing companies and banks, public authorities and government offices. Consequently, some computers had to be shut down. Experts estimate that some 45 million computers were affected worldwide.

The virus was concealed in an e-mail attachment entitled “I LOVE YOU”. The reader was asked to “kindly check the attached Loveletter coming from me.” Opening the attachment activated a program which raced through the recipient’s address book, then forwarded itself automatically to every address it contained, using the victim’s name as sender...

Employees in many companies reading these e-mails unleashed an avalanche which IT specialists could not control. Networks were jammed within seconds, countless e-mails accumulated in people’s inboxes. Anyone who wanted to work was constantly interrupted by the message: “You have new mail. Do you want to read it?”

Source:
www.sicheres.web.glossar.de/glossar/z_loveletter.htm
2 Virtual world, real threats

The emergence of the computer is often compared to the introduction of steam or electricity in factories during the Industrial Revolution. However, a more suitable comparison might be to the invention of printing or even the wheel. Despite the ever-increasing capacity of computers to calculate and store information, the profound changes taking place today primarily relate to the capacity to communicate and provide the network structure for activities which were previously organised individually. The advent of new communication tools has invariably influenced social organisations. In companies, they have the effect of opening up processes, removing partitions and bringing together ideas generated at long distances from each other.

Another revolution currently in full swing is the dematerialisation process, which creates new tasks and workflows with the ultimate goal of acquiring new clients or increasing efficiency. For example, rather than buy the 25 volumes of the Encyclopaedia Britannica, why not subscribe to the electronic version via the internet and use the most up-to-date version at a lower price? Cost reduction is achieved by rationalising processes, often by way of outsourcing or moving production to another location. Another key concern is to avoid the duplication of costly centres of competence whose experts must be accessible from anywhere in the world.

Dematerialisation also profoundly alters the client-supplier relationship and affects the roles of the intermediaries. The client’s direct access to the supplier weakens the position of the intermediaries, who fail to generate sufficient added value. Long-term relationships with selected suppliers foster the development of computerised tools necessary to deliver optimally-priced products just in time.

New means of communication also enable companies to acquire new clients. Web airline booking systems, such as Amadeus, Galileo and Sabre, seek to establish direct client access. Virtual bookstores inform their clients of a book which may be of interest to them based on preferences shown on a previous website visit. Using information systems which detect and record the preferences of their clients, retailers try to tailor their offers and create individual marketing solutions.

If the modern version of “to be or not to be” now reads as “access and speedily process information or cease to exist”, then the vital nature of infrastructures for computers centralised in networks becomes readily clear.
The new shape of business: the fragmented company

Exposures
When conducting business activities on the internet, the user must be aware that the web is an open network, which today links some 100 million computers to some 300 million users. Its penetration rate is expected to increase by 30% every year. While this presents a tremendous opportunity to companies and organisations, it also harbours specific threats arising out of the ever-changing legal environment, the (inter)dependency of complex technical systems and exposure to malicious behaviour.

The legal environment
The virtual world knows no national boundaries. At the same time, liabilities arising out of task performance or the delivery of services or goods are real and, if a claim arises, it may be difficult to clearly identify the applicable laws since legislation has not yet matured sufficiently in this field. For example, the value of an electronic signature is different in the US than in Japan or in the European Union. Although efforts in this respect are being made, convergence of various legislative principles has not yet been achieved.

Another key issue is the unpredictable pace of evolution among information systems and the related social impact. The internet boom started unexpectedly in 1995. Today, the internet can be accessed through cell phones and handhelds. Can this pace of developments be matched by corresponding regulations? Industries, including the insurance sector, require a stable legal environment to maintain sustainable development.
Technical dependency

Computer systems organised in networks are a marvel of engineering. Local networks or dedicated lines are complemented by shared networks consisting of telephone lines, cables, undersea lines and satellites grouped under an internet organisation. Unfortunately, this complex world is prone to failures, malfunctions and disorders, and ever-changing technology is a challenge for users and companies who are constantly obliged to upgrade their programs, verify compatibility and train their staff.

Technical problems account for the vast majority of computer outages. While they are not entirely new to industrial processes, the consequences are far more severe when they affect information systems and thus impair business processes. The distribution of recent computer outages according to cause is illustrated in the figure below.

Malicious acts and hacktivity

As an open network, the internet is exposed to many forms of malicious activity ranging from virus attacks, mobile codes, denial of services, automated attacks, Trojan Horses and hybrid attacks to the occasional manual attack. IT security auditing firms and antivirus producers are engaged in a fierce battle against the virtually unlimited imagination of hackers. The figure below illustrates the variations in the number of malicious incidents over four years.
There is a possibility that a virus will successfully pass through the various protection systems. The potentially severe consequences are a prime concern for risk managers. The damage a successful virus attack causes may also involve a liability aspect. Further, where the depositary has failed to enforce the necessary measures of protection, theft of credit card codes, bank information or industrial secrets may lead to prosecution. Equipment or program malfunctions, or malicious acts resulting in system outages or loss of data, are potential causes of a business interruption or impaired operations.

Since data and software are not tangible property, they do not sustain material damage and, accordingly, traditional insurance contracts do not grant protection against any corresponding business interruption losses.

2.1 Information Systems Business Interruption (ISBI)
Swiss Re developed the Information Systems Business Interruption (ISBI) policy to remedy the situation described above. This policy is dedicated to covering the financial consequences of a temporary reduction in a company’s activities resulting from a failure of its information systems. A necessary condition to trigger the cover is that the affected systems are under the care and custody of the insured. While cover is granted for the failure of a server on a local network, it is not provided for the unavailability of an internet provider or even of a telecommunications company. Physical damage and the corresponding business interruption resulting, for example, from fire or a head crash on a hard disk, are covered under traditional policies. By contrast, ISBI cover is limited to non-physical causes which do not result in permanent and visible loss to IT systems.

The comparison of the trigger of traditional BI with that of the ISBI policy is illustrated in the figure below.
The sum insured
The sum insured is based on gross profit. This may have significant seasonal variations which are taken into account by setting a maximum daily indemnity. The maximum indemnity during the period of the policy is also limited to an aggregate which clearly identifies the insurer’s maximum liability per policy.

Since the intention of this policy is to provide cover on a full-value basis, an accurate evaluation of the sum insured is absolutely essential. An average clause is included to reduce the indemnity proportionally in cases where the sum insured is significantly underestimated.

What cannot be covered
A prerequisite for IT systems covers is that the systems are fully and successfully tested, licensed and commissioned. Failures due to malfunction of equipment or programs are indemnified only for the time required to replace or reinstate the programs or data to the condition they were in prior to the loss. Delays caused by the addition or improvement of software are excluded, as they clearly fall under the contractual liability of the software provider. Just so, failures caused by a test or experiment, including system overloading, are beyond the scope of the policy.

Given that, for years, it has been an industry standard to back-up data or programs, the insured is expected to take this precaution. Excluded, therefore, are delays arising out of lack of, or inadequate, back-up data.

Extensions
By endorsement, cover can be extended to business interruption resulting from an event covered under the standard Swiss Re “Computer all risks/Low voltage and electronic equipment” or equivalent policy. In this case, it is imperative for the insurer to participate under both the business interruption and the material damage policies. By doing so, it can properly address the loss settlement, which may involve increased working costs.

The other possible extension is for business interruption following an outage of external services, ie power suppliers and telecommunication providers. This extension is only granted following an in-depth study of the exposure involved.
Risk assessment

A key step in underwriting ISBI cover is a risk assessment by specialists which focuses primarily on organisational matters, such as the presence of a code of conduct or the existence of contingency plans and IT security matters.

### The ISBI risk assessment matrix

<table>
<thead>
<tr>
<th>Physical loss prevention</th>
<th>Inherent process risk</th>
<th>Process control</th>
<th>Logical BI prevention</th>
<th>Physical BI exposure</th>
<th>Management</th>
</tr>
</thead>
<tbody>
<tr>
<td>Natural and allied pests</td>
<td>Capacity, transaction</td>
<td>Central control</td>
<td>Virus detection</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Age of equipment, type</td>
<td>Errors, problems logger</td>
<td>Backup of data</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Complexity of transaction</td>
<td>Emergency shutdown systems, UPS</td>
<td>Password handling</td>
<td></td>
<td>Process and equipment integrity</td>
</tr>
<tr>
<td></td>
<td>Sensitivity of data or transaction</td>
<td>Control of entry points</td>
<td>Logical security, firewall</td>
<td></td>
<td>Operation</td>
</tr>
</tbody>
</table>

Finally, a traditional risk visit is prerequisite to granting the material damage extension cover.
2.2 Conclusion

The emergence of information systems has created an entirely new dimension in our lives, and private companies as well as governmental bodies have already integrated the new rules of the e-driven economy. Insurance companies and their reinsurers are now called upon to adapt their products to the new requirements of their customers and closely monitor developments in the legal environment. To date, traditional first-party policies have been based largely on the notion of material damage. The dematerialisation process has shifted the balance between the importance of tangible properties and the pecuniary consequences of business interruption.

<table>
<thead>
<tr>
<th>Cyber exposures</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Intellectual prop. liability</strong></td>
</tr>
<tr>
<td>Copyright infringement</td>
</tr>
<tr>
<td>Patent infringement</td>
</tr>
<tr>
<td>Trademark</td>
</tr>
<tr>
<td>Names disputes</td>
</tr>
</tbody>
</table>

The ISBI policy is a limited response to what is considered one of the major threats to business sustainability. In the short term, this type of cover may be embedded in policies dealing with physical and non-physical losses, as well as third party aspects.
Annex 2: E-commerce business marketplaces and the electronic supply chain

Electronic marketplaces, also known as business-to-business (B2B) marketplaces, are not only creating new types of networking but also a growing number of direct and indirect dependencies. In contrast to business-to-customer (B2C) marketplaces, the B2B environment is characterised by internet communication among companies – the ultimate consumer is not necessarily linked up to the network. B2B marketplaces began to take off in the late 1990s, when the internet euphoria prompted many companies to start investing in this new electronic supply chain.

A key feature of electronic marketplaces is that manufacturers, suppliers, development partners, forwarding agents, etc, are linked globally in a network that can be accessed 24 hours a day (See figure 1). Its purported advantages include faster and leaner corporate processes, lower inventories, enhanced transparency, more streamlined procurement processes and, above all, lower costs. Large companies have joined together to create e-business marketplaces not only in the automotive but also in the aviation, metalworking and computer industries. The optimisation potential varies according to the industry in question.

The changeover to a web-based supply chain does not affect the status of the individual participants. What is new compared with traditional business processes is the way in which the participants communicate with each other and their growing dependence on the network. Figure 1 clearly shows that, if the supply chain is interrupted, several companies in the network may feel the effects. What is more, a larger number of suppliers may be affected with this network structure than in a traditional supply chain, ie the accumulation risk could be higher.

In addition to property damage as caused by fire, lightning or an explosion, new types of susceptibility could interrupt an electronic supply chain. Hacker attacks, viruses, and hardware or software failure can all cause computer networks to break down (see figure 2), thus interrupting the business operations of the companies involved. This new risk landscape is highly vulnerable and requires skilled logistical
support as well as the availability, confidentiality and integrity of the IT systems involved.

Communication among companies via electronic marketplaces has brought about a number of changes in the way processes are carried out. Some of those changes have increased overall susceptibility to CBI losses:

- The internet helps speed up the cycle comprising development, design/engineering, testing, production and lifecycle support. Volkswagen, for example, announced in February 2002 that the internet has enabled it to cut procurement process times by as much as 95% (car manufacturing). As a result, the time-to-market or time-to-customer of a particular product can be shortened, which in turn reduces the time buffers available in the event of a loss, thus increasing BI exposure.
- B2B marketplaces promote just-in-time production by linking suppliers to manufacturers electronically. Stocks are kept to a minimum and costs transferred as far as possible to the supplier. This phenomenon also aggravates BI and/or CBI exposure, for instance in the event of a fire or explosion.

- Using the internet to process orders and carry out other business processes creates a high degree of dependence. When a loss occurs in systems of this type, the scope for human (re)action may be restricted and the time available for intervention quite brief. The system becomes more vulnerable, and the number of companies that could potentially be affected rises (accumulation risk). The high degree of complexity means that minor errors can have serious consequences, e.g. denial of access lasting several days.

Figure 3 illustrates how dealers, manufacturers and suppliers handle orders via B2B marketplaces. During the production process, orders are automatically placed with the suppliers via the internet so that the production process can proceed without interruption. The supplier processes the order, initiating either a production process or a separate order to the warehouse. As production continues, the supplier delivers the parts or components, adhering as closely as possible to the lead time given by the manufacturer. This approach allows the production process to be automated to a very large extent. Meeting the individual requirements of a customer or intermediary – e.g. when a tailor-made product is ordered directly via the internet – poses a great logistical challenge. While, from the manufacturer’s point of view, this can help save time and costs, it also increases system dependence and the susceptibility to BI risks.

To prevent unwanted downtime in B2B marketplaces, risk managers must be aware of numerous issues. They must have a clear understanding of the system. The outsourcing of IT infrastructure or maintenance can, in the event of a loss, become a stumbling block.

Modern security measures (firewalls, security software, regular security checks, etc) are an absolute must. Redundant systems, such as additional servers, may help to keep downtime to a minimum. Contingency planning and adequate risk awareness on the part of B2B marketplace operators can reduce risks significantly.

Figure 3
The electronic supply chain: handling orders among the dealer, manufacturer and supplier in a B2B marketplace
British Minister for Agriculture, Nick Brown, announced that Great Britain has stopped all exports of live cattle, pigs, sheep and goats on Wednesday due to an outbreak of foot-and-mouth disease.

The highly contagious virus, which causes fever in infected animals, has struck Britain for the first time in over 20 years. Symptoms were found in 28 pigs in an Essex slaughterhouse ... An eight-kilometre quarantine zone was set up around the Essex site to prevent further spread of the epidemic. The farms in Buckinghamshire, in the south of England and on the Isle of Wight, which supplied the infected animals to the slaughterhouse, were also cordoned off.

Britain’s National Pig Breeders’ Association reported that the epidemic had come at a particularly bad time: consumer confidence was already low because of swine fever and the BSE epidemic. The National Farmers’ Union President, Ben Gill, spoke of “potentially catastrophic consequences” for cattle breeding throughout Britain.

Source: www.schweizerbauer.com
22 February 2001
3 Other special covers

3.1 Contingencies
Imagine yourself as the head of the organising committee for a world cup skiing event some twenty-four hours before the downhill race is due to start.

For two consecutive days, it has been snowing heavily, and the ski run as well as the roads leading to the resort are buried under a thick blanket of snow. The chances that the race can be held on the next day are slim. In a final attempt to save the event from cancellation, the roads have been cleared and the ski run once more prepared at considerable extra expense by hundreds of helpers working under tremendous time pressure. Still, there is no guarantee: more snowfall may lead to the definitive cancellation of the event. Weeks – even months – of preparation work, and now the whole investment threatens to be lost.

An additional scenario factor: the organising committee of the same sporting event receives a bomb threat. The police and local authorities are informed and, since the threat does not appear to be a hoax, they have to withdraw the permit for the event. Since not enough time remains for a search of the area before the spectators arrive, the event has to be cancelled. Sponsors and TV companies – in line with standard television rights agreements – will ask for their money back. For the organisers, this spells financial disaster.

Are these losses of a purely pecuniary nature, or rather business interruption losses in a wider sense?

Consider another scenario: an outbreak of foot-and-mouth disease at a farm in the vicinity of a hotel. Even though the peak season has just started, the hotel owner receives a flood of telephone cancellations from his guests, and the entire area is closed to the public. Many guests cancel their reservations for the forthcoming months as well. The recent advertising and marketing campaign proves to have been entirely worthless. The hotel will not only suffer heavily from loss of income, but will also have to invest in another expensive advertising campaign.

The wide range of different contingency covers includes:
- cancellation of events
- non-appearance
- denial of access
- product tampering
- special BI covers, such as for hotels after a murder or a suicide
- disease
- weather
- prize indemnity
- extended warranty
- over-redemption.
Under a standard business interruption form, cover is granted for losses arising from material damage only. By contrast, cancellation insurance covers loss of profit and additional expenses due to cancellation, abandonment, postponement or relocation of an insured event due to any cause beyond the control of the insured and excluding only specific perils. Accordingly, a standard cancellation insurance is a type of business interruption insurance—and sometimes even provided as an extension to it—that includes an important element of non-physical damage. Examples of this would be the failure of performers to appear, or the lack of spectators or other participants due to inclement weather, traffic problems or official denial of access to the venues.

Non-physical damage
Non-physical damage as a trigger is certainly one of the main reasons why contingency covers were developed mainly for the sports, leisure and entertainment industry. The pecuniary element has gained importance since the early 70s. Today, the sums insured vary between a few thousands dollars for a small local music event and several hundred million dollars for the tour of a major rock group. Sums can amount to even billions, eg for the Olympic Games. As traditional business interruption insurance can not fully cope with the requirements for such events, financing their covers would be impossible but for the introduction of contingency insurance. No bank will lend money, nor will an event be sponsored, unless there is insurance protecting the investment in case of a cancellation. In some exceptional cases, the state guarantees for losses not covered under ordinary business interruption insurance. Otherwise, however, contingency covers are a domain of the private insurance industry.

Accumulation
For the most part, cancellation losses are based on damage involving one venue or one event or one series of events only. Therefore, in these cases, loss accumulation represents only a minor problem. Even adverse weather conditions, such as heavy rain or snow which make it impossible to erect a stage, are rather limited exposures. On the other hand, insurers should be aware that all events taking place at one and the same venue (exhibitions, congress, music hall, stadium) within a certain period may correlate.

The underwriter’s main focus should be on threat scenarios involving many different events or possible accumulations over several insurance lines. These scenarios would include:

- natural catastrophes
- terrorism/bomb threats
- denial of access, withdrawal of permit
In most cases, natural catastrophes, such as earthquakes or windstorms, will cause an accumulation with losses of other covers – property, casualty, engineering and contingencies. Even within different types of cancellation covers, we may encounter severe accumulations since a great number of insured events within a certain area could be involved over a long period. This was the case, for example, following the Northridge earthquake and following the storm Lothar/Martin. In such situations, accumulation is always “on top” of an already high property/casualty exposure.

Concerning terrorism, the main problem is that many different sports or entertainment events can be directly or indirectly influenced by one single act. Some events are cancelled, not due to the direct threat or attack, but simply because people prefer not to attend the event. It is therefore vital for the insured perils to be correctly and clearly defined. The cause for a cancellation must always be beyond the control of the insured, the organiser and any other involved party, including participants. It is therefore absolutely necessary to limit the cover to cancellation due to a direct attack with damage to the property or to direct threats against the organiser or the event’s venue. Threats leading to a denial of access or the withdrawal of permit must be confirmed by an official authority.

Other reasons for denial of access or withdrawal of permit by official authorities are mainly diseases or extreme weather conditions. Losses due to hurricane or tornado warnings are rare, but they constitute a serious threat with regard to (interline) accumulations.

Another important accumulation scenario is denial of access to a closed zone due to the outbreak of a disease – as was the case during the recent outbreak of foot-and-mouth disease in England. All events in such an area may have to be cancelled and access to manufacturers and suppliers will probably be restricted.

Diseases affecting hotels, restaurants or hospitals can be food-related or contagious. Logically, such covers can cause accumulation problems in tourist areas. In most cases, a vast number of hotels and restaurants will have to close for several days or weeks. In addition, a food-related or contagious disease could lead to a general denial of access to the area, thereby involving many other businesses as well.

Other contingency insurance products, such as the somewhat exotic murder and suicide cover, are more in respect of “one-off incidents”. In these cases, there does not appear to be a major accumulation problem; as a rule, only one insured is involved. The same applies for business interruption following product tampering, whether it be accidental or malicious. Such policies usually cover business interruption due to the unavailability of the tampered product, the clean-up of the insured location and the inability to sell the product because of extortion.
3.2 Advance loss of profits insurance (ALOP)

This type of insurance may also be referred to as CAR/EAR loss of profits, delayed earnings insurance, delayed opening of business, delay in startup, loss of rent and loss of interest. As a business income protection cover, its aim is to cover the principal’s loss of gross profit resulting from a delay in completion of the construction and/or erection works. A prerequisite for granting ALOP is for an underlying CAR, EAR or CWAR policy to be in force. Normal working delays are not covered under ALOP.

Cover
Cover is limited to the actual loss of gross profit sustained as a result of a delay in the completion of the project; the delay itself must be caused by a loss covered under a CAR, EAR or CWAR policy. However, the ALOP cover does not embrace the full extent of perils covered under CAR, EAR or CWAR policies (see the exclusions).

Insured party
The insured party is solely the principal or owner of the project to be constructed or erected as defined in the underlying CAR, EAR or CWAR policy.

Exclusions
The special exclusions for ALOP ensure that insurers shall not be liable for losses resulting from delay due to:
- extensions and alterations of coverage as granted to the material damage sections of CAR, EAR and CWAR policies, unless otherwise specifically agreed in writing;
- restrictions imposed by public authorities;
- alterations, modifications and improvements to the insured works that were effected after the material damage incident;
- shortage of funds, penalties, delays of supplies, late completion, non-completion, loss of contract;
- loss of or damage to existing property or objects in the care, custody or control of the insured;
- the contractors’ plant and equipment;
- operating media and feedstock;
- earthquake, volcanic eruption, tsunami, unless otherwise agreed in writing.

Sum insured
The sum insured is usually either the expected annual gross profit, revenue rent or fixed costs which, obviously, have to be defined case by case.

Period of insurance
The period of insurance is identical to that of the underlying CAR, EAR or CWAR policy, excluding the maintenance period.
Only one claim per policy

There can be no more than one claim under ALOP cover. Why? Because there is only one project completion date, regardless of the number of material damage losses. It is this single delay that triggers the insured’s single ALOP claim.

Loss settlement

The delay period – which serves as the basis of indemnity – starts on the date at which the project would have been completed had no incident occurred, but not earlier than the originally planned completion date of the construction and/or erection works as defined in the CAR, EAR or CWAR policy schedule. It ends with the actual date on which the project is completed, but not exceeding the length of time it takes with the exercise of due diligence and dispatch to rebuild, repair or replace such part of the property which has been lost or damaged to its condition immediately prior to the incident.

After receipt of sufficient evidence that a delay has been caused by an incident insured under the CAR, EAR or CWAR policy, indemnification is made on the basis of the actual incurred loss of gross profit or rental income for the actual period of delay. However, this period must not exceed a certain period of indemnity (usually 12 months) which is agreed upon at inception of the policy. The ALOP policy is subject to a time excess, a period for which the insurers are not liable. The corresponding amount shall be calculated by multiplying the average daily value of loss sustained during the indemnity period by the number of days agreed upon as the time excess.
3.3 Liquidated damages and force majeure covers

The global trends of national infrastructure privatisation and private sector infrastructure development have steadily increased the financial risk exposure of principals and contractors. This, in turn, has triggered a rise in demand for special insurance services. The following three parties are generally involved in large infrastructure projects:
- the financiers (lenders, banks);
- the principal; and
- the engineering, procurement, construction (EPC) contractor, including vendors and subcontractors.

Any major project contains a variety of risks. One common aspect of these risks is that they may cause the project to be delayed or fail to be completed altogether. The reasons for the failure of a project could be manifold: there may be technological failures, for example, or cost overruns or force majeure events. Further, there may be complications concerning official licences and permits for the project that are either not forthcoming or subject to costly conditions.

The relevant contract documents, ie the loan agreement and the EPC contract, effectively set down which risk has to be borne by which party. EPC contracting is probably the most popular contract form for major projects. Its main advantage is that it designates one party responsible for both design and construction of the project. This contract addresses the allocation of the relevant risks among the parties involved, namely the EPC contractor and the principal. The EPC contractor usually retains the risk of loss, the exceptions being force majeure perils and specified cases for which the principal assumes responsibility.

Works contracts of this kind generally stipulate that the EPC contractor is responsible towards the principal for any delay and/or under-performance of the project caused by technological failure, or by any fault on the part of the EPC contractor or his subcontractors. At the same time, the principal’s loan agreement puts him under the strict obligation to service his debt. Not surprisingly, then, he tries to pass on as much of this risk as possible to other parties involved in the project.
The liabilities
Most works contracts therefore include a clause stipulating that if the project suffers any delay and/or under-performance, and the EPC contractor is in default, then the EPC contractor is obliged to pay the owner adequate financial compensation, i.e. “liquidated damages”. The amount payable to the owner in respect of liquidated damages generally corresponds to the project owner’s financial obligations towards the party lending the money for the project. It does not contain any punitive and/or speculative element.

In principle, anyone selling a product is responsible for its legal compliance and contractually agreed properties. The vendor must therefore bear the consequences of any product deficiency and of any deviation of the product from the contractually agreed and/or guaranteed properties and standards. This often includes the financial consequences of any delay in fulfilling contractual obligations.

Nevertheless, some events may be entirely beyond the control of the contractor (e.g. exceptional natural events, strike). In such cases, the contractor is relieved of his obligation due to the force majeure exoneration. Force majeure events are specifically listed in each contract.

The insurance covers
From the contractor’s viewpoint, insurance cover should ideally grant protection against claims filed by the principal as a result of the contractor’s failure to comply with legal or contractual obligations. Insurance cover should also protect the principal against debt service obligations under force majeure circumstances.

The basic guarantee categories are:

Quality guarantees
This term refers to the contractor’s obligation to make good – during an agreed period after the provisional acceptance of the product/plant by the principal – any defects resulting from faulty material or workmanship.

Performance guarantees
These are usually found in the machinery industry and generally refer to energy and raw material consumption, production output, efficacy and the like.

Delay guarantees
Contrary to the two forms above, where the crucial criteria are material warranties, the decisive element with this form of guarantee is the exact moment in time when the contractual obligations are complied with. Note: Performance and delay guarantee are very often grouped under liquidated damages appellation.
**RAM guarantees**

Reliability, availability and maintainability are further features which the EPC contractor is often required to grant.

**Force majeure cover**

This is the exoneration of the contractor’s liability due to exceptional events. The financial consequences are retained by the principal, who is also the beneficiary of the corresponding insurance cover.

<table>
<thead>
<tr>
<th>Beneficiary of cover</th>
<th>Contractor</th>
<th>Owner</th>
<th>Owner’s fault</th>
</tr>
</thead>
<tbody>
<tr>
<td>Delay caused by</td>
<td>Contractor’s fault</td>
<td>Force majeure perils</td>
<td>Owner’s fault</td>
</tr>
<tr>
<td></td>
<td>Force majeure liability assumed under construction contract</td>
<td>Error and omission of contractor, subcontractor and suppliers</td>
<td>Physical damage Non-physical damage due to - strike - changes of law - other changes beyond the control of the owner and the constructor</td>
</tr>
<tr>
<td>Liquidated damages</td>
<td>Delay/efficacy</td>
<td>Delay in startup cover</td>
<td>Force majeure Difference in conditions Delay in startup</td>
</tr>
</tbody>
</table>

**Conclusion**

All guarantee types and force majeure covers have a component of entrepreneurial risks and the transfer of these risks to the (re)insurance industry has proven to be difficult.

To date, the contingency covers have been restricted, with a few exceptions, to delay and performances guarantee insurance. Even with a restricted field, the management of this line of business is difficult because it requires a highly detailed and costly analysis of the project. This involves external experts, as well as long-term relationships with the developers or main contractors to skirt possible adverse selection.
Annex 3: Business interruption in livestock production

Introduction
Business interruption (BI) or loss of profit (LoP) insurance in livestock production gained public attention and experienced an upswing following the detection of Bovine Spongiform Encephalopathy (BSE) in Germany and other EU countries in 2000. The foot-and-mouth disease (FMD) outbreak in the UK in spring 2001 and its subsequent spread to France and the Netherlands brought it even more into the public eye. Given their rapid spread and widespread socio-economic consequences, epidemics or transmissible diseases make blockbuster headlines.

With the increasing specialisation of farms and high capital investments of livestock farmers, risk management – and specifically insurance against LoP – is rapidly gaining in importance. The direct loss of animals is generally paid by a compulsory livestock epidemic fund, financed with insurance levies from livestock holders and/or governmental contributions. Private insurers offer LoP covers for consequential losses, which are not covered by these funds.

Covers available
A wide range of covers is available, from very limited lump-sum payments to the compensation of the real loss of profit of up to one year. While standard covers indemnify the LoP only of those farmers who have suffered a direct loss, eg whose livestock was culled, extensive covers also compensate farms which do not sustain a direct culling loss but are affected by commercial restrictions in areas surrounding the outbreak. Examples of LoP covers in various countries are given below.

Germany offers broad cover
One of the broadest covers is offered in Germany. It includes compensation for farms with restrictions only, and indemnification periods are up to one year. Strong reasons for compensating farms with restrictions only are the estimations that in regions with medium-sized farms, the likelihood of being affected by a restriction is some 70 times greater than that of culling. Furthermore, in case of restrictions, the insured LoP is about twice as high as in the case of a cull, as the ani-

OIE and epidemics

The Office International des Epizooties (OIE, www.oie.int), headquartered in Paris, is an intergovernmental organisation with 158 member countries. Its mission includes to guarantee the transparency of animal disease status worldwide, and to guarantee the sanitary safety of world trade by developing sanitary rules for international trade in animals and animal products. OIE standards are recognised by the WTO as reference international sanitary rules. The national veterinary laws generally follow these standards in the classification of the notifiable diseases.

The OIE recognises three kinds of countries or zones: those which are disease-free without vaccination, those disease-free with (preventive) vaccination and those where the disease is endemic (so far defined for FMD and a few other diseases).

List A:
Transmissible diseases with very serious and rapid spread, that are of serious socio-economic or public health consequence and of major importance in the international trade of animals and animal products. Currently 15 diseases, eg FMD, swine fever and avian influenza (see box next page).

List B:
Transmissible diseases that are considered to be of socio-economic and/or public health importance within countries and that are significant in the international trade of animals and animal products. Classification ranges from cattle to aquatic diseases.
mals have to be fed without any prospect of product sale. Prerequisite to such cover is having the farm’s production and accounting data, or reliable reference data, at the very least.

Commercial loss of profit insurance in Germany covers the drop in gross margins resulting from the interruption of production or the non-acceptance of the products (meat, milk). If a herd is culled, an indemnity is paid for gaps in cost of cleansing and disinfection, and for excess costs in rebuilding livestock – unless it is already covered by a livestock epidemic scheme. The market leader also offers a cover including “other transmissible” (not notifiable) diseases.

Compensation can be either the quantified actual lost profit per animal or a predefined compensation rate. The latter generally amounts to a lump-sum amount of 25% of the variable margin immediately upon culling and a further percentage for each week of closure. The indemnity period varies from 16 weeks up to one year, depending on the insurer. Generally, a deductible of 3–6% of the indemnity limit and a waiting period of up to three months applies. Depending on the conditions, the premium amounts to between 0.1% and 0.3% for cattle and 1.2 to 5.5% for pigs. The market penetration is about 50% for cattle, 30% for pigs and 10% for broilers.

Northwestern Germany has a very high concentration of livestock. Forty-six adjacent counties (of 240) along the northwestern coast account for 23% of the German cattle and 32% of the pig population, demonstrating the need for accumulation control. Basically, livestock insurers apply the following types of accumulation control:

- Limit of TSI per county. While this is easy to control, it does ignore the considerable differences in county size (eg LVM)
- Signing limit in PML per square kilometre (eg Uelzener)
- Running regular scenarios in the area with the greatest cattle and swine density, considering livestock census, PML per animal head and a return period of 20 to 25 years. Including the percentage of insured livestock, the insurer’s MPL is compared with its reinsurance capacity (eg VTV).

FMD, swine fever, avian influenza and BSE

Foot-and-mouth disease (FMD), or aftosa, a highly contagious viral disease affecting hoofed animals (including cattle, swine, sheep, deer, camel), and elephant. Mortality is generally low, but permanent reduction in production (milk, meat, etc) causes high losses.

Classical and African swine fever, are highly contagious viral diseases with high mortality in young pigs, and have the greatest economic impact of pig diseases. Wild boars are feared as carriers in Europe, where outbreaks occurred recently.

Avian influenza is an infectious viral disease that can affect both wild birds and domestic fowl; the virulent form, the highly pathogenic avian influenza, also called fowl plague, causes high mortality. Together with the related Newcastle disease, it is the most dangerous poultry disease.

Bovine spongiform encephalopathy (BSE), a disease causing the destruction of the brain in cattle. Infectious meat and bone meal feed to ruminants is the favoured hypothesis for spreading the agent, called prions. It is assumed to be transmittable to humans, causing vCJD (variant Creutzfeld Jakob Disease). BSE is classified as an “OIE List B disease”, being of public health importance, but with a low infectivity, as there is no evidence for vertical spread (mother to calf), and even less for horizontal spread (animal to another animal in the herd).
The estimate of a maximum total loss of some EU 500 million in the event of a large epidemic outbreak in Germany, as calculated by the working group on livestock insurance within the German insurer’s association GDV, is still considered valid. It considers an outbreak affecting the area approximately as large as an average-sized state.

**Limited cover as offered in the UK and the Netherlands**

In the United Kingdom, consequential loss insurance — offered to complement the compensation offered by the government — pays 25% of the governmental payment. Since the previous major foot-and-mouth (FMD) outbreak in 1967, and owing to the financial hardship in farming, only some 10% of farmers insured at the National Farmers Union (NFU, the leading farm insurer) had LoP cover at the time of the most recent outbreak.

Ironically, only months before the outbreak, a working party in the Ministry of Agriculture, whose members were concerned about the low level of insurance, discussed a compulsory insurance levy to build up a fund against future epidemic outbreaks.

In the Netherlands, LoP insurance is available for farmers with calamity insurance and covers the direct loss of events with more than one dead animal. In case of such a direct loss or an ordered culling following an epidemic, the consequential loss cover pays an additional 15% of the direct loss (or governmental indemnification), which covers an LoP of about 6–8 weeks. The premium is 0.8% to 1.0% (deductible: 3% or 6% of TSI). About 30% of medium and large-sized cattle farms have this type of cover.

**Countries with limited demand**

In Switzerland, compensation from the epidemics fund is comparatively high, and the last significant losses occurred in the 1980s. Accordingly, there is no significant demand for additional cover. However, LoP cover is offered successfully for poultry breeders, and a limited cover for pig breeders.

In France, livestock mortality insurance is available for direct losses caused by six epidemic diseases, BSE among them. Compensation is supplementary to state payments, but may not exceed the market value of the cattle. Additionally, dairy farmers can buy a cover for LoP after an epidemic disease. This covers the loss of gross margin following the ordered culling of stock and/or movement restrictions for animals and their products. Experts argue that there has been little incentive for farmers to buy this cover since the French government has always granted generous indemnification in the past (full market value).

Finally, in most European Union candidate countries, the veterinary authorities can order cull and restrictions, but there is no fund for indemnification. In these countries, the private insurers limit their indemnities to the direct loss.

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**Measurements in quarantine areas around an epidemic outbreak**

**Infected premises:** All stock culled (slaughtered) and destroyed as quickly as possible ("stamping out"). Disinfection of premises.

**Protection zone:** No movement of animals permitted ("standstill"). Cull on suspicious premises. Regular veterinary checks and review 28 days after slaughter. Movement restrictions for population.

**Surveillance zone:** Movement of animals within the surveillance zone is permitted only under licence and directly to slaughter at an approved slaughterhouse within the surveillance zone. Movement restrictions for population.

A wider infected area may sometimes be declared if several outbreaks occur within an area. Animals’ movements out of the infected area are allowed only under licence.

Source: AVIS Consortium (www.aleffgroup.com/avisfmd)
Challenges of the cover—technical considerations

- Measure taken by the veterinary authorities have to be familiar and consistent. While rigorous culling may well contain the disease, it causes heavy insured losses at the same time. Measures influenced by politics must be excluded, as experience gathered from BSE showed.
- There is no correlation between FMD and other diseases normally covered by epidemic policies, nor with perils covered by crop insurance (hail, frost, drought, flood).
- The event definition is of paramount importance in XL covers. An outbreak may last longer than the commonly used three-month event definition (see below).
- BSE is insurable in Western Europe. The incidence rate has peaked and no hidden reservoir is expected. To prevent politically motivated culls, indemnity must be paid only to farmers with at least one animal proven to suffer from BSE.
- Risk of change: A change from the stamp-out method to another containment policy (preventive vaccination, endemic infection) is highly unlikely.
- Frequency: The return period is some 20 to 25 years for severe FMD outbreaks, and 1 to 15 years for minor local outbreaks (eg swine fever).
- Exposure: The crucial diseases in epidemic covers are FMD for pigs and cattle, avian influenza and Newcastle disease for poultry, and classical swine fever for pigs. Other diseases are of minor importance.
- Accumulation: Areas with high livestock density require special attention. These areas may cause considerable accumulation problems for the insurer (mainly local ones), as well as for reinsurers.
- Pricing: The main criteria for this type of cat insurance are accumulation considerations and long-term aspects. Prices come under pressure after a series of loss-free years, and conditions tend to improve in the wake of a major event.

Not only livestock farmers, but all activities within the area suffering from movement restrictions are affected by the outbreak of an epidemic and the measures taken in response. Horticultural farms and all types of industry stand to be affected, increasingly so if they depend on regular transportation (just-in-time production). The insured may influence the measures taken by the authorities in consultations, as described in a publication by the German horticulture insurer “Gartenbau Versicherung” (see related reading, page 45).

Underwriter provisions

Business interruption can be granted in livestock insurance, provided that there is an appropriate accumulation control in place and the event definition is clear. Further, the policy and measurements taken by the government have to be known, to facilitate the calculation of an adequate exposure scenario. The following points must be respected to ensure a sound accumulation check:

- the insured must present the way in which he controls risk accumulation in his area;
- the reinsurer must know the geographical spread of the current portfolio;
- the reinsurance treaty contains a limit of SI or PML per defined area (consider selecting an area unit with as homogenous an extension as possible).

With XL covers, (re)insurers must ensure that the event definition is clear, understood and accepted by all parties during the underwriting process. The solutions proposed include:

- introducing an annual aggregate limit (AAL);
- considering the outbreak of the event, independent of the duration;
- adjusting the reinsurance capacity and price in light of the fact that one outbreak will cost more than one line.

High capital input in livestock production, huge loss potential and the constant health threats through international animal transportation, will guarantee the future of business interruption insurance in livestock production.

The FMD outbreak in Europe 2001

- No country is safe from the introduction or re-introduction of the disease.¹
- International trade in live animals (livestock, exotic pets, game species, zoo animals) and of animal products in most regions of the world is increasing. This remains the primary risk for the spread of FMD.¹
- Improvements in road, air and sea transportation increase the risk of disease spread.¹
- The deterioration of national veterinary services in many countries due to under-staffing, poor salaries and cutbacks in resources seriously undermines their ability to quickly uncover an exotic disease problem and respond appropriately.¹
- Eradicating FMD by emergency or “ring” vaccination around the FMD spot followed by organised slaughter proved to be viable (NL) and tends to reduce the indemnities. Estimates suggest that with a ring vaccination strategy in the UK, the cull would have been 30% lower.
- Return period for FMD is still in line with the assumed 20 to 25 years. The UK’s previous epidemic was in 1967/68, 33 years before the last outbreak in 2001; in continental Europe 1936/37, 1960/64 and 2001 (23 and 37 years respectively).
- The stamp-out method is maintained. It prevents import restrictions and has strong technical and logistical reasons.

¹ EUFMD report, see related reading, page 45
4 Related reading

**Part 1**
**Contingent business interruption**


**Part 2**
**Virtual world, real threats**


**Part 3**
**Other special covers**


Bommeli, M. 1999, *Contingency covers — Force majeure and liquidated damages insurance* (Zurich: Swiss Reinsurance Company)