

# RISKworld

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## In This Issue

Welcome to Issue 5 of our new look RISKworld. Incidents and business disruptions are nearly always attributed to human error. But why do people make mistakes? Research has shown that 75% of incidents are the result of organisational failures, leading to the conclusion that to prevent incidents, control of the working environment is the most effective approach.

Our lead story (page 2) describes the Tripod methodology for identifying organisational weaknesses and reducing the number of incidents.

Contact Steve Lewis

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## New Horizons for Risktec



Risktec's new office in Kuala Lumpur is just a few minutes walk from the Petronas Twin Towers

While we predominantly serve our international clients from our UK offices in Warrington, Aberdeen and Teesside, a local office has been set up in Malaysia to manage an increasing workload in South

East Asia. Our new office is within the MNI Twin Tower complex in Kuala Lumpur, employs 4 people and is led by Mark Cowan.



Mark Cowan

Mark commented, "The Risktec message has struck a chord with clients in the region. Helping clients to reduce and control risk cost effectively, through smart thinking and quality project delivery, has received a very promising response.

Methodologies and tools such as Tripod and Bowtie assessment are already being integrated into our clients' existing business processes."

In conjunction with our parent company, the Global Safety Group based in The Netherlands, additional offices are likely to be set up around the world wherever there is a sound business case.

Managing Director of Risktec Solutions, Alan Hoy said, "We have made excellent progress and have been especially pleased with what our clients have said about our people. Clients appear to genuinely recognise the professional, helpful and responsive approach we are striving for.

"As one client put it - 'With some consultants you feel as though you are almost paying them to breathe, but that is certainly not the case with Risktec.' However, we are not complacent and are totally committed to developing sustainable and long-term business relationships by improving all aspects of our service."

Contact Alan Hoy

 Risktec

# Accidents Waiting to

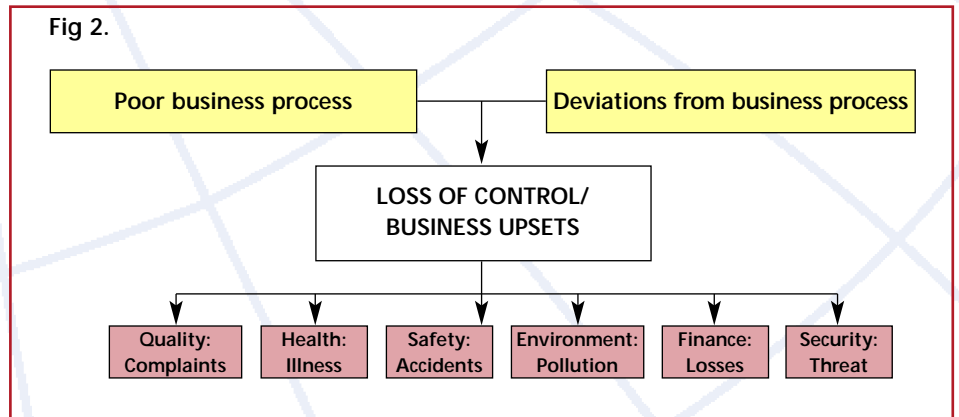
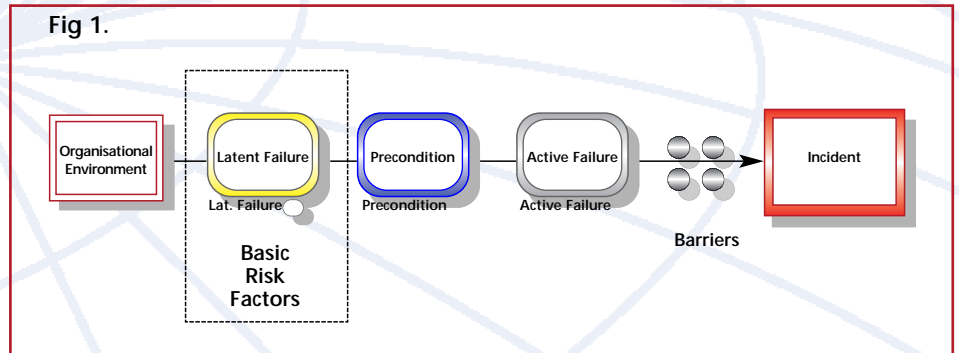
**Why do things go wrong?** A relatively simple question, but one that is fundamental to the risk management of any organisation. Whether it is the computer failure that delays the payroll, prescribing the wrong medication, an object falling from height or a fire in a warehouse, the chances are that at some point there was a human involvement that could have been better managed. Unfortunately we never have the required hindsight in advance. But if we can understand the underlying factors that influenced the action, then we will be in a much better position to improve performance for the future.

In 1986 the Universities of Leiden and Manchester were asked to consider this question. They identified that 75% of incidents are the result of organisational failures, leading to the conclusion that to prevent incidents, control of the working environment is the most effective approach. Their research identified 11 basic risk factors (Box 1) that influence the work environment and have a direct bearing not only on those incidents which have happened but also those which have yet to occur.

### The Tripod Theory

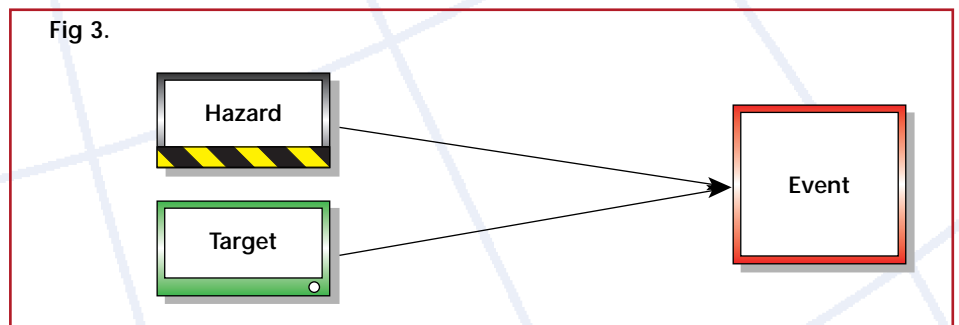
To assess an incident requires understanding not only what happened, but also why it happened. Any incident occurs because protective barriers fail. These barriers can fail when people make mistakes (the 'active failure'), which are more likely with a 'precondition' that was encouraged by a 'latent failure', which was established by the 'organisational environment' (the basic risk factors). This is the model of the Tripod theory (fig. 1).

Although we tend to think of incidents purely as injuries to people, incidents occur in many forms and affect many parts of any business. Each incident, whether of a financial, security, safety or environmental nature, has its roots in the basic risk factors. Only the consequences of bad risk management are different (fig. 2).



### The Tripod Cause-Consequence Diagram

Any incident may be represented as:



Where the hazard (the potential to cause harm) is allowed to come into contact with the target (e.g. a person, an asset, a process) there is an incident. Normally the target is protected and the hazard contained by protective barriers - the failure of one or more of which allows the incident to occur (fig. 4).

As well as correcting the active failure, the accident investigation needs to track back from the missing or failed barriers to identify the underlying causes. Replacing the barrier allows resumption of the operation, but identifying the basic risk factors allows correction of the

underlying causes, so preventing the active failure from recurring.

Additionally, because the basic risk factors are representative of the work environment, any improvements made to one risk factor should also spread throughout the organisation and prevent further incidents elsewhere.

Fortunately organisations are moving away from investigations to 'kick butts and take names' and the incidence of the person involved being made an example of (sacking, disciplinary actions) 'pour encourager les autres' (Box 2) is

# o Happen . . .

decreasing. Incidents should be investigated to identify causes to prevent reoccurrences, not to apportion blame.

### The Tripod Tools

In the same way that incidents are investigated to identify common organisational failures, it is also possible to conduct a forward looking audit, against the same basic risk factors, to identify weaknesses in areas of an organisation.

These Tripod methods are captured in two tools which are used by Risktec to help organisations make sustainable

improvements in their risk management:

- Tripod Beta; an incident investigation tool - the reactive approach
- Tripod Delta; an organisational performance audit - the proactive approach

### Conclusion

With well over 10 years of research and science built-in, the Tripod tools provide a solid foundation for making sustainable improvements and preventing those accidents that are just waiting to happen.

For further info contact **Andy Lidstone**

## Basic Risk Factors

DE	Design	TR	Training
HW	Hardware	CO	Communication
MM	Maintenance Management	IG	Incompatible Goals
HK	Housekeeping	OR	Organisation
EE	Error Enforcing Conditions	DF	Defences
PR	Procedures		

Box 1.

## Admiral Byng

In 1757 Admiral Byng was executed on the quarterdeck of HMS Monarch after being made a scapegoat for the government having failed to relieve the garrison at Minorca. He had an under-equipped and poorly manned fleet (hardware, training) following contradictory orders (communication, incompatible goals) and using poor instructions (procedures). The disciplinary process was summed up by the comment from Voltaire.



The execution of Admiral Byng "pour encourager les autres"

Box 2.

## Tripod Symposium Success

The Third International Tripod Symposium held in Amsterdam on 2nd and 3rd December 2003 was a resounding success. Attended by over 120 risk management professionals from over 70 companies and 10 countries, it demonstrated that there is a clear role for Tripod in the drive to take an integrated approach to risk management.

Parallels were drawn between different incidents such as the Enron collapse and the sinking of the oil tanker Prestige. Each incident had its roots in the Basic Risk Factors identified by Tripod. The conclusion reached was that every risk management department, whether financial, security, health, safety or environmental, should aim to manage these factors.

A copy of the Symposium proceedings is available on CD-Rom.



Please email [enquiries@risktec.co.uk](mailto:enquiries@risktec.co.uk)

Fig 4.

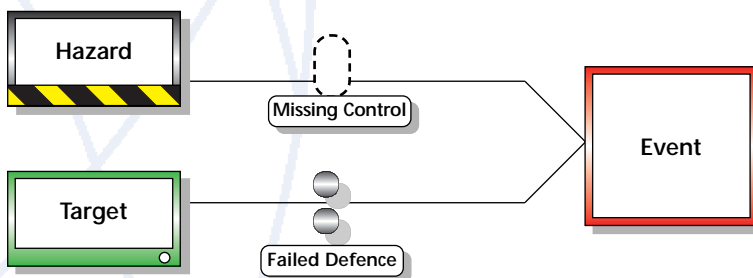
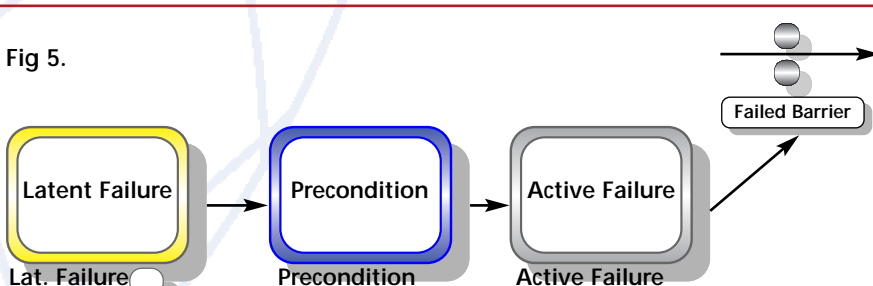


Fig 5.



## At the Core of Nuclear Safety

The graphite core of an advanced gas-cooled reactor (AGR) is subject to a number of ageing mechanisms and must be regularly monitored to assure continuity. The core's geometry must be within acceptable limits, its structural integrity must be preserved and the optimum reactor performance must be maintained.

Specialist Graphite Trepanning equipment is used to retrieve small graphite samples from the wall of a fuel channel for analysis. The retrieval must be accurate, efficient and safe and not compromise the integrity of the core.

Risktec Solutions recently assisted British Energy in a detailed safety analysis of the existing fleet of Graphite Trepanning equipment against modern assessment criteria.

By starting from first principles, Risktec unambiguously determined the precise safety functions of the equipment and identified the degree of reliance placed upon each function to manage nuclear

safety. As a result, a range of essential modifications, covering electrical, mechanical and procedural aspects of the equipment, could be developed.

The successfully modified equipment provided both dose reductions and availability improvements when used at the Hunterston B and Hinkley Point B nuclear power stations. Further trepanning campaigns at other British Energy stations are now planned.

**Contact Andy Reynolds**



## Some recent projects

### Nuclear and Defence

- Safety case and design integration framework for major defence project.
- Weapons handling authorisation conditions.
- Hydrogen fuel cell risk assessments.
- Independent peer review of nuclear safety reports.

### Rail

- Safety manager for national railway radio communications system.
- Safety manager for voice radio system for regional railway system.
- Risk assessment of railway signaller's use of telephone handsets.
- Safety manager for railway infrastructure maintenance provider.

### Oil & Gas & Chemical

- Onshore COMAH safety report for gas facilities.
- Health and safety legislative framework, Kazakhstan.
- Offshore safety case support, Aberdeen.
- Safety critical system performance standards, Aberdeen.

### Manufacturing

- Environmental risk assessment training.
- OHSAS 18001 safety management system support, Europe.
- Business continuity planning for manufacturing facilities, Worldwide.

## What is Authorisation in the Ministry of Defence?

In 1999, the UK MoD's regulatory handbook for nuclear submarines at sites (BR3018 Volume 2) was revised significantly and became mandatory for new contracts. Included were 36 Authorisation Conditions (ACs), derived from the Licence Conditions of the civil nuclear regulator, the NII. This marked the beginning of a substantial overhaul of MoD nuclear regulation, which has now seen:

- BR3018(2) replaced by JSP 518, which also introduces separate ACs for nuclear submarines at sea.
- The development of a similar regulatory regime for nuclear weapons (JSP 538).

### How is Authorisation achieved?

For activities involving nuclear material the process of Authorisation mirrors that of licensing by the NII, with each "Authorisee" required to produce Compliance Statements detailing the

arrangements against each AC, for subsequent confirmation by regulatory audit.

### Who are the Regulators?

There are two MoD Nuclear Regulators: the Nuclear Weapons Regulator and, for the Naval Nuclear Propulsion Programme, the Chairman Naval Nuclear Regulatory Panel.

### Who are the Authorisees?

There are separate Authorisees for:

- Authorised sites for nuclear submarines, such as naval bases.
- Submarine reactor plant.
- Authorised sites for nuclear weapons.
- Nuclear weapon transportation.
- Deployed nuclear weapons.

### What are the benefits of Authorisation?

The top-level regulatory framework provided by Authorisation draws heavily upon the strengths of Licence Conditions, which have been

implemented to great effect by the NII, while also taking advantage of the many good practices associated with the regime it succeeds.

**Contact Greg Davidson**



Authorisation applies to nuclear submarines as well as sites

## Assuring Business Continuity

### New Business Continuity Standard

Business continuity and reputation topped the list of "most important risks over the coming year" in a recent survey of risk managers (ref.1) and along with the publication of a new Business Continuity Standard (ref.2), is likely to lead to businesses coming under even greater pressure to demonstrate that business continuity risks are managed effectively.

Risktec has recently been engaged by one of the world's leading consumer packaging companies to support the development and implementation of a Business Continuity Management (BCM) strategy across its business. To facilitate this process, Risktec has developed a risk-based framework for BCM.

*"Business continuity is about more than countering terrorist threats". A recent survey (ref. 3) has shown that less than 5% of business continuity plans are invoked due to terrorism. Instead, business interruptions are much more likely to result from power failure, equipment failure, loss of key personnel and skills or supplier failure.*

### Risk-Based Framework

The first stage is to guide management and operations personnel through a structured risk identification and assessment process. Facilitated workshops have been found to be a very effective means of doing this. The threats identified are assessed using an organisation specific risk matrix taking into account the recovery time objectives for the business.

The next stage is to identify strategies to reduce the risk for the key scenarios identified. The suitability of alternative strategies is assessed against the output of the risk assessment and, if necessary, the cost-benefit of alternative strategies is analysed.

Using a list of key risks as guidance on the type of events which the business may need to respond to, the final stage is to develop the business continuity plan (BCP). The BCP brings together the actions to be taken at the time of an

incident, the persons involved in managing the incident and how they are to be contacted. It should also interface with other key plans for the business (e.g. crisis communications and PR, safety and emergency plans, etc.).

Documenting the BCP is one part of the overall BCM programme. Its success, however, relies upon the development of a risk-aware culture across the business, regular rehearsing and testing of the BCP and reviewing of the key risks and BCM strategies.

### Conclusions

Risktec's approach is believed to be unique in that it focuses BCM on the threats which present the greatest risk to the business, not just the worst-case impact, as is often the case with conventional business continuity or disaster plans. Business continuity is now recognised as being a key area of any overall risk management strategy.

**For further details contact Gareth Book**

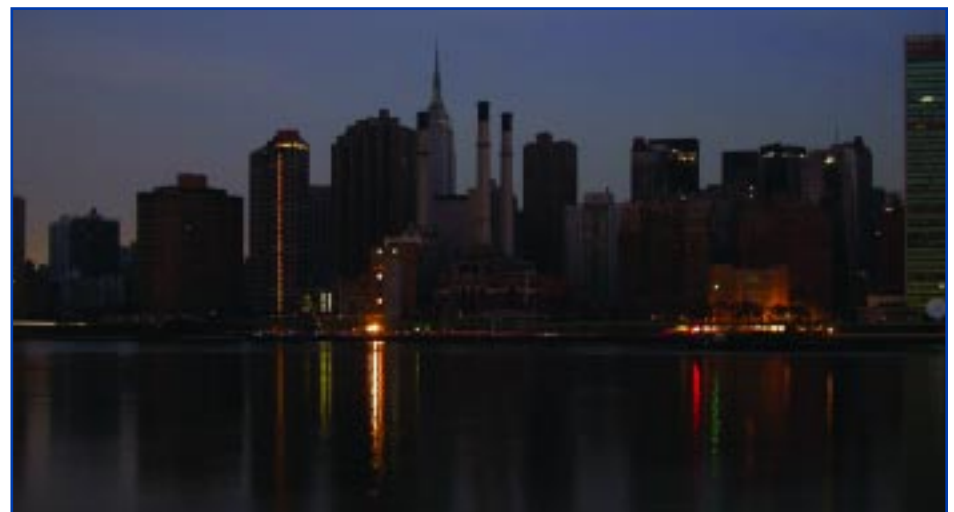
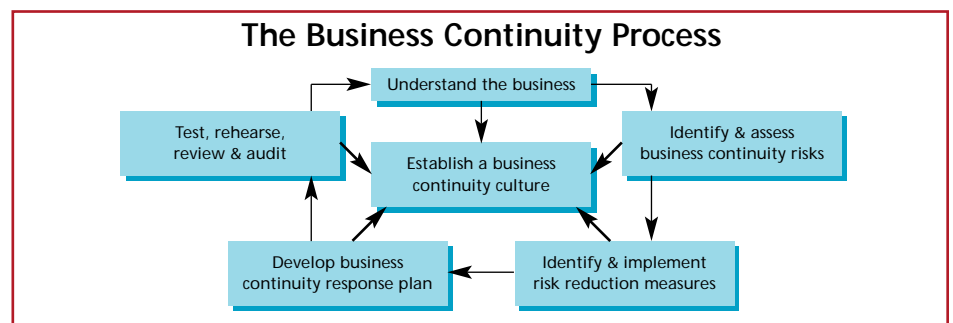
Ref. 1 Association of Insurance and Risk Managers, June 2003.  
Ref. 2 PAS 56 Guide to Business Continuity Management, British Standards Institute, December 2003.  
Ref. 3 The Journal of the Institute of Risk Management, November 2003.

## Did you know . . . that interruptions can be more than just rude?

- A typical company will suffer a major business interruption once every 4 years.
- 40% of businesses that suffer a major business interruption go out of business within 2 years.
- 77% of businesses implemented Business Continuity Plans at the request of customers or insurance suppliers.
- 70% of organisations failed to meet their objectives for their most recent business interruption.
- Only 19% of businesses use risk assessment to analyse supply chain risk.

### Sources:

- Business Continuity Institute, 2003.
- Chartered Management Institute, 2003.
- KPMG, 2001.



The blackout that swept across America's north-east in August 2003 cost New York City's already struggling economy \$1.1bn (£680m) - roughly \$36m an hour

## The Application of Health Risk Assessment

The application of risk assessment techniques has helped to reduce the number of accidents at work across hazardous industries. For many companies, reducing health risks is a priority and the same techniques can be applied to identify, assess and manage the causes of ill-health at work.

Risktec has developed a simple Health Risk Assessment (HRA) method and applied it in diverse yet hazardous situations for several facilities, including geothermal drilling operations and offshore oil production with supporting onshore supply base activities.

### Health Risk Assessment Method

HRA is the identification of health hazards in the workplace and subsequent assessment of risk to health, taking into account existing or proposed control measures and, where appropriate, identifying further measures to control exposure. The method is illustrated in Figure 1.

Low risk health hazards where exposure to the hazard is infrequent are managed

by the company health, safety and environmental management system arrangements. Specific controlling procedures, systems or working practices are identified.

For medium and high risk hazards, and low risks where exposure is frequent, a detailed task assessment is undertaken which identifies the worker groups exposed to each hazard and the activities which could result in exposure. Interviews are conducted in the workplace to examine the levels of hazard present, the controls in place and their effectiveness.

*“For many companies reducing health risks is a priority and the same techniques can be applied to identify, assess and manage the causes of ill-health at work”*

In all cases, any additional controls to remove or limit exposure to the hazard or remediate the effects of exposure are identified where practical. Where further information is required, health surveillance schemes or quantitative monitoring (e.g. of noise levels, airborne concentrations) is also actioned.

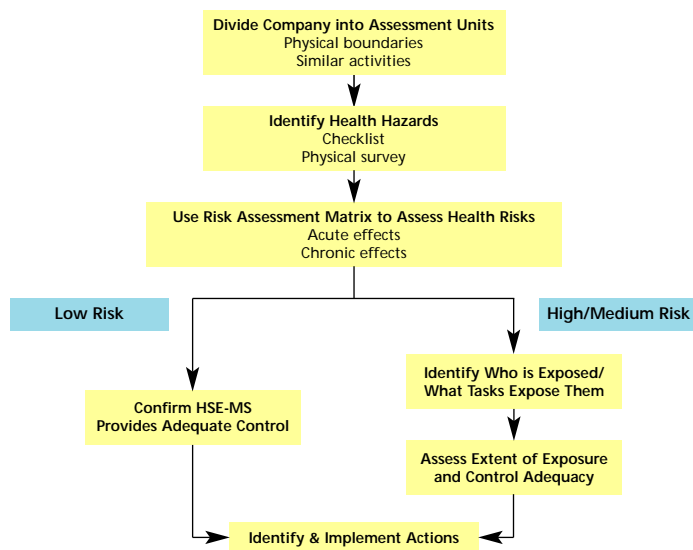
### Advantages

The advantages of the method include:

- Simplicity and ease of application.
- Checklists combined with workplace inspections to ensure that the health hazard inventory reflects reality.
- Clear demonstration of systematic health hazard identification, assessment and control, linking controls with management system arrangements.
- Raising workforce awareness of health hazards and their controls, through participation in workshops and individual task assessment interviews.

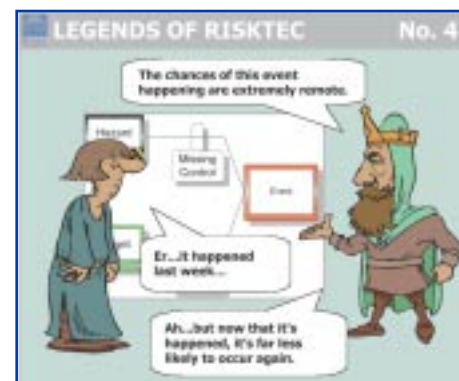
For further details contact Sheryl Hurst

Figure 1: HRA Method



### Tips for Success

- Physical survey
- Personnel interviews
- Involve health professionals
- Consider immediate (acute) and long term (chronic) health effects



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