

FIRE AND POWER OUTAGE RISK MANAGEMENT PRACTICES LESSONS FROM AUCKLAND'S POWER CRISIS

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ABSTRACT

The power crisis in Auckland has focused attention on '*risk management*' with many leading articles using the term. What happened was both simple and devastating. Of the five power cables feeding the Auckland central business district, four failed virtually at the same time. This meant the heart of Auckland's business district was immediately without power - with the outage estimated two weeks at least. An immediate outcome of the crisis was how businesses coped. Some rapidly and successfully activated their disaster recovery/business continuity plans whilst others were caught flat-footed. This paper focuses on the risk management of two of the most common physical risks faced by companies in Singapore, namely fire and power outage, and lessons learnt from the power crisis in Auckland.

INTRODUCTION

Organizations face numerous types of risk everyday. These range from employee fraud to computer failure. The costs of these risks are high as they could ultimately result in human suffering and/or huge financial losses for business firms. This paper focuses on risk management of the fire and power outage risk.

Fire poses a dangerous threat to life and property. Power outage halts electrical equipment and machinery, both of which can jeopardize an organization's ability to continue its normal business operation, or even put its survival at stake if business interruption is prolonged.

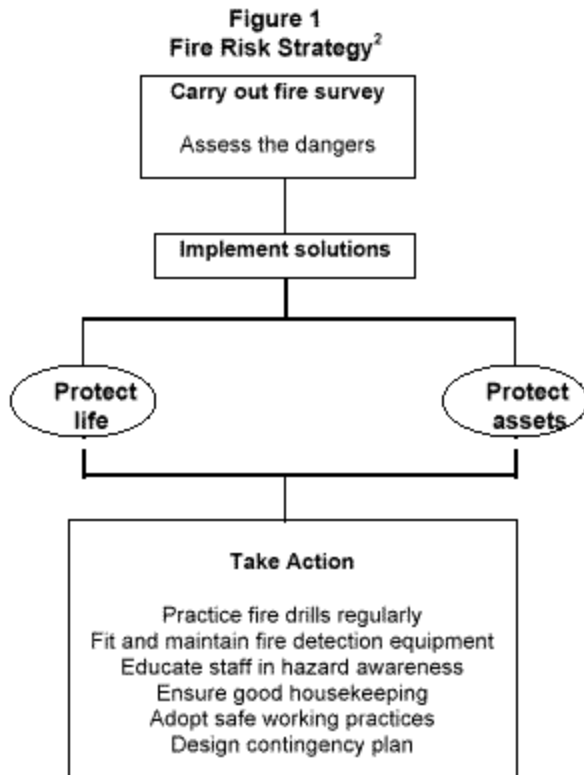
FIRE RISK - A MAJOR PHYSICAL THREAT

Fire is one of the most common commercial and industrial risks faced by firms worldwide. Many Singapore companies have the over-optimistic 'it will never happen to me' syndrome. They presume they are well protected, believe that fire is somebody else's problem, and underestimate the potential consequences of a fire.

In the UK, fire is a common workplace problem: according to its Fire Protection Association, 72% of all fire claims to insurance companies are from commercial and industrial premises, which in 1992 amounted to 850 million pounds.¹

Designing a Fire Risk Strategy

Figure 1 shows that a fire risk strategy begins with a detailed fire risk survey, which should be carried out at regular intervals to identify the likely causes of fire within the company premises.



Fires often start in the most unpredictable places because these are the areas where fire safety has been overlooked. The fire risk surveyor should bear in mind the specific activities occupying the premises that can easily start a fire, for example hotworks, paint-spraying and smoking. The audit should cover all areas of the building, including offices, production facilities, storage areas, roof spaces and basements.

In assessing the risk of fire, the surveyor should always look out for the main causes of fire. In addition, the survey should include the assessment of the adequacy of fire protection measures available at the premises. If these are found to be insufficient, solutions to improve the fire risk should be implemented.

To protect life and assets, organizations should take precautionary actions to guard against the possibility of a fire. These actions should aim to prevent a fire by reducing hazards, to increase preparedness to ensure prompt reactions in case of a fire, and to minimize the effects of a fire by various fire control measures. These actions are cost-beneficial as they help reduce possible fire risks and losses to a minimum.

Fire Loss Prevention and Control

It is paramount for a company's top management to recognize fire loss as a possible loss exposure and thus be committed to invest time and money in devising a fire safety policy as well as design a proper fire loss prevention and control program.

In addition, the service of a safety officer or fire officer is indispensable. With the relevant technical knowledge, he will be responsible for designing the fire prevention program,

implementing it, and monitoring compliance (the tedium of the continual use of "he or she" would probably offend more readers; thus throughout this paper, only the masculine form is used to denote both sexes). Together with cooperation of staff and employees, he will help raise and maintain the standard of fire safety and prevention within the organization.

The effective use of various resources available to an organization can also be of great help in countering the risk of fire. Table 1 summarizes the resources required, measures to be taken, and parties involved to successfully guard against fire.

Table 1
Resources Required for Effective Fire Prevention and Control³

Resources	Pre-loss Prevention	Time of Loss		Post-loss Recovery
		Protection	Salvage	
<i>Human</i>	Fire prevention engineers. Security patrols. Risk manager.	Fire prevention engineers. Fire Brigades.	Salvage teams. First Aiders.	Contingency plan controller. Risk manager.
<i>Physical</i>	Fire separation. Flame-proofing	Sprinklers. Extinguishers. Fire doors.	Smoke removal. Sheeting.	Alternative plant or premises.
<i>Organisational</i>	Maintenance. Housekeeping. Supervision of workflow.	Loss limitation procedures.	Emergency procedures. Orderly evacuation.	Recovery plan.
<i>Educational</i>	Awareness training. Practice drills.	Training put into practice.		
<i>Financial</i>	Loss control budget. Fire insurance.	Loss control budget.		Contingency reserves. Business Interruption insurance.

(a) Installation and maintenance of fire protection systems

Installation of fire protection systems serves two purposes: fire detection and fire fighting. Fire fighting equipment includes fire alarms, smoke detectors, fire extinguishers, sprinklers, hydrants and water pumps. These require proper and regular maintenance in order to keep them in good operating condition and functioning when they are needed.

(b) Inspection and supervision

Routine inspection of the premises could help discover risks that are inherent in the work processes. It improves the safety of the areas where specific risks are addressed. Daily supervision of work practices also ensures strict adherence to safety rules and regulations.

Table 2
Costs and Benefits of a Fire Loss Prevention and Control Program⁴

	Costs	Benefits
Direct	<ul style="list-style-type: none"> • Cost of loss reduction equipment. • Cost of improved construction. • Cost of maintaining equipment. • Cost of education and training of staff and workers. 	<ul style="list-style-type: none"> • Savings through losses which do not occur. • Savings in future premium through improved claims experience. • Discounts on insurance premium for improved fire risk.
Indirect	<ul style="list-style-type: none"> • Disruption of business activities while installing, maintaining & testing equipment. • Disruption of business activities by equipment itself when functioning as well as when mal-functioning. 	<ul style="list-style-type: none"> • Improved productivity by avoiding loss disruptions. • Improved public relations • Improved industrial relations • Improved employee morale

(c) Education and training

Organizations should adopt a system of educating and training employees in fire safety. Educating them about the possible extent of fire loss and their causes, will enhance staff awareness level of fire hazards. They should also be properly trained in evacuation procedures, as well as the handling of fire extinguishers. This program will increase preparedness and maximize life protection in the event of a fire breakout.

(d) Disaster Recovery Plan

A fire contingency plan will help an organization to take prompt actions to minimize the extent of fire damage. Firms should take steps to safeguard critical facilities that are needed to keep business operational, even when a disaster strikes. The plan should lay down procedures to take, persons responsible, and important assets to safeguard. This plan must be highly comprehensible. Periodic testing and maintenance are needed to keep it up-to-date. It can then cost-effectively help to reduce the severity of a fire loss to a minimum.

Cost-Benefit Analysis of a Fire Loss Prevention and Control Program

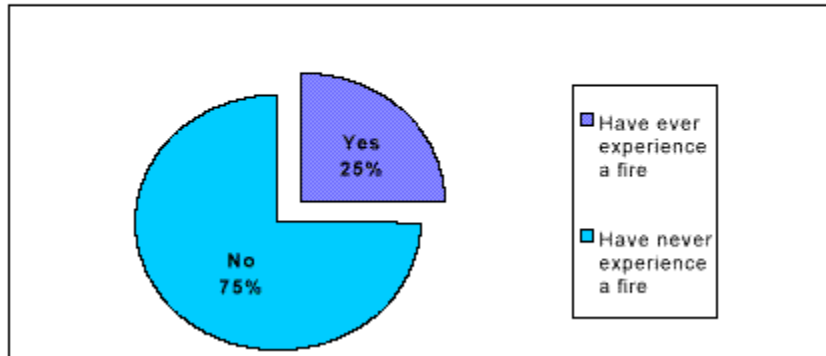
Various fire prevention and control measures require resources. This is why many organizations are reluctant to invest time and money into these as they appear to lock up funds that can be 'better utilized' on other more lucrative investments. The benefits are often not visible and it takes time for organizations to realize their long-term benefits. Table 2 shows the costs and benefits of a fire loss prevention and control program. It is rather obvious that an organization can reap benefits in the long run.

POWER OUTAGE RISK

In this technology age, as business become ever more dependent on electrical equipment and machines, their demand for electricity increases. Lights, phone systems, computers, and other equipment vital to a business operation, are reliant on the sometimes-unpredictable streams of

power distributed through a building’s electrical systems.⁵ However, even the most well-organized buildings with elaborate power protection systems are not immune to breakdown. Any electrical systems –new or old, simple or complex - requires regular maintenance to minimize the risk of a failure.

Figure 2
Fire Experience of Manufacturing Firms

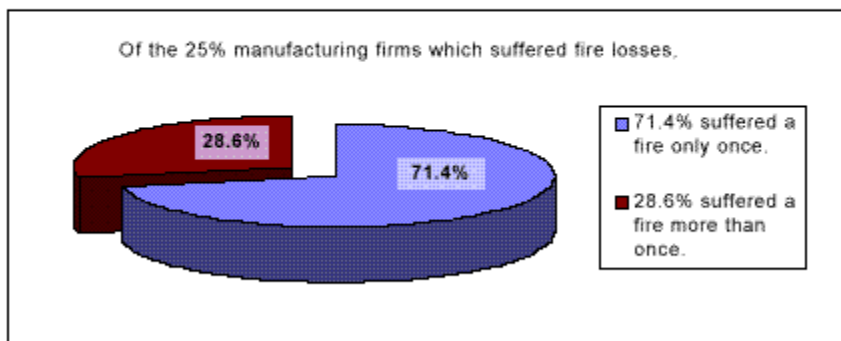


When a disruption to an electrical system occurs, a power outage results, causing blackouts and loss of use of communication and computer systems, equipment and machinery. The entire business operation may be forced to stop. If power supply does not resume quickly, business interruption may be prolonged, causing large financial and consequential losses. Thus, electrical outages are not simple inconveniences, but menacing problems.

Factors Increasing the Risk of Electrical System Failures

As businesses are now using more equipment and machines, demand for electricity increases. However, electrical systems in many buildings are not designed to handle the growing demand. A building’s electrical system can easily become overloaded, unless they are updated to accommodate their increased use. These increased loads will cause a slow but steady deterioration of the electrical infrastructure.

Figure 3
Number of Fires During the Last 10 Years



The interconnectedness of modern building systems is another factor increasing the severity of electrical outage. A simple loosed connection at the main electrical distribution panel of a large

building can destroy mechanism that distribute electricity to all floors, causing extensive equipment damage and blackouts.

The increased risk of power outages is also attributed to the failure of risk managers and business owners to recognize electrical-related exposures. The culprit may be the "out of sight, out of mind" syndrome. Electrical system cables and components are usually located behind walls, in closets or in basements, making them concealed and easy to overlook.

Preventing and Controlling Electrical System Failure

(a) Identify specific risk areas

Engineers can use advanced detection technology such as infra-red thermography to locate hot spots that indicate problems of electrical surge. This ongoing analysis of the root causes of electrical-related losses enables loss control specialists to assist risk managers and building owners in preventing electrical system failure by addressing specific areas of opportunity.

(b) Regular testing and maintenance

Companies should adopt a regular program of maintaining its electrical systems. This program should focus on cleaning, tightening and monitoring systems. These include cleaning of switchboards, checking torque on connectors, ensuring wires are well insulated and sockets are not overplugged.

(c) Education

Educating the management, staff and workers on the frequency and severity of losses caused by electrical system failures will help demystify the subject and open their eyes to an area that represent their most significant loss exposure. Explaining to them about hazards of loose connections and over-loading of circuits will help emphasize the importance of safe working practices.

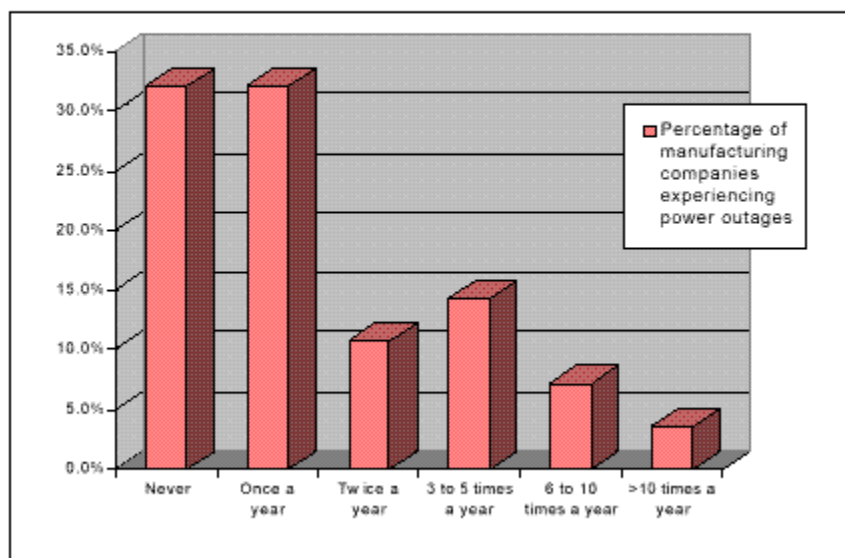
(d) Pre-emergency/Contingency planning

While inspection reduces frequency of losses, pre-emergency planning manages the severity of a loss. A contingency plan should include surveying electrical distribution systems and difficult-to-replace equipment. For example, plans can be drawn up to bypass electrical failures to restore critical power speedily. Having a pre-approved vendor network can help replace broken-down equipment quickly enough to resume business operations as soon as possible.

Table 3
Severity of Fire Damage and Adequacy of Insurance Coverage

Measures	Approximate Extent of Fire Damage (S\$)	Time Taken to Resume Normal Operation
Range	2,000 - 1,000,000	1 Day - 6 Months
Mean	260,400	37 days
Median	80,000	2 Days
Mode	-	2 Days
85.7% of the fire damages were adequately covered by insurance.		
99.85% of the fire losses by value were sufficiently covered.		

Figure 4
Frequency of Power Outage Occurrences in Manufacturing Firms



SURVEY ANALYSIS

A survey was conducted this year to find out the frequency and severity of fire and power outage losses experienced by manufacturing companies in Singapore, as well as their risk management practices in preventing and controlling these two common physical risks. It examined the extent of business interruption resulting from these losses and the adoption of disaster recovery plans in manufacturing firms here.

A sample size of 50 manufacturing companies was chosen from various industries, including computer, semi-conductor, electrical, electronic, chemical, plastic and paper industries. Telephone calls were made to each company’s fire officer or safety officer, to increase the response rate. Nine immediate responses were given over the phone and the survey questionnaire was faxed to the 41 remaining companies. Among these, 19 responded, bringing the total number of companies that responded to 28. The response rate for this survey is therefore 56%.

One difficulty in conducting this survey was that some manufacturing companies only employ part-time safety officers who visit the company only once a week. Thus, it is difficult to locate

them and some of them did not respond. Another limitation was that some companies were reluctant to reveal their loss statistics although they were kind enough to call back to apologize for their inability to help in the survey as 'it required data that was considered by them as confidential'. This further dampened the response rate.

From the results of our survey, 75% of the respondents have never suffered a fire before. Of the 25% which have fire experiences, 71.4% experienced only one case of fire during the last ten years, while the remaining 28.6% suffered 2 or 3 cases (Figures 2 and 3).

Table 3 shows the extent of fire damage ranges from minor cases, with losses of a few thousands, to large-scale damage of more than a million dollars. Duration of business interruption stretches from one day to as long as six months. Regarding the adequacy of insurance coverage for these fire losses, 85.7% of the respondents said they were covered sufficiently, while the remaining 14.3% bore the losses themselves, which were fortunately quite small Figure 4 shows that 35.7% of the respondents indicated that they do not experience any power failure all year round. An equal percentage said they encountered a power outage only once a year, while 10.7% met with a failure twice a year. Only one company suffered an electrical outage more than 10 times a year, but each lasted only a few minutes.

LESSONS FROM THE NEW ZEALAND POWER CRISIS

Soon after the power failure, many businesses relocated to the outskirts of the city where space and power was available. Singapore companies can do likewise, perhaps even to Malaysia and Indonesia. Many businesses actually operated from their homes and were armed with portable computers, cellular phones, faxes and other essentials. These help to keep the basic functions going. Buildings that had emergency generators were spare the agony. Many others had to hire theirs from wherever they could. Some even flew them in from Australia to keep real time systems going. Many practical aspects such as redirecting mail had to be attended to. Many businesses also had to arrange security on their vacated premises and took other precautions to cope with their predicament.

Not many manufacturing concerns were affected. Even then, losses will run into the multi millions. In some businesses, for example, hotels and restaurants, immediately felt the crunch of the lack of power and customers. Their losses were immediate, and in some cases fatal, as the cashflow almost dried up immediately.

Many businesses have since reviewed their disaster recovery/business continuity plans at other locations because of the scare they got at Auckland. The crisis showed that it is not just fires, earthquakes or floods that close a business down. Business interruption can arise from any source.

There are also insurance implications. Some businesses had full unrestricted cover for all business interruption losses. Others had only limited or no protection at all. The main problem arose around the dependency extension. In some instances, this relates to actual physical damage as insured by the material breakdown policy. Many policies limit or exclude the business interruption claim together. Many claims will be challenged or declined. These may then lead to the specter of professional negligence, by intermediaries or the insurers themselves. It is also clear that insurers will be mounting subrogation recoveries for any claims they have paid out against Mercury energy – the Power Supply Authority.

The risk management implications for businesses are clear. Their disaster recovery/business continuity plans must be up to date and flexible. They must cater for the potential termination of any supply of electricity, gas or water. The plan must also have an effective insurance cover in place to pick up, without restrictions, all business interruption losses. In addition, their corporate governance must be of such a level that no directors' and officers' liability could be leveled at them.

CONCLUSION

Only 25% of the manufacturing firms that responded to our survey had fire experiences. Severity of fire losses varied but almost all were covered adequately by insurance. Electrical hazard and smoking are the main causes of fire, unlike in UK, where arson is the predominant cause. Fire prevention and control measures are on the whole sufficient.

Power outage is relatively a more common problem as 64.3% encountered power outages at least once a year. However, the extent of losses is lower, because most failures only last at most a few hours, and so business interruption is still at an acceptable range. The majority of manufacturers maintain their electrical system regularly, but only a handful had backup power sources. Only a fifth of the manufacturing companies adopt disaster recovery plan (DRP), leading to the conclusion that DRP as part of risk management, is very much in its infancy here.

Fire and power outage can suddenly jeopardize business operations. Such risks are unavoidable, but can possibly be reduced by investing resources in prevention and control measures. These are vital for business continuity and survival when such disasters strike. Documented contingency plans and proper crisis management will undoubtedly help a company react promptly and appropriately in overcoming these disasters, and thus should be incorporated into a firm's risk management program.

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