

Things You Should Know:

Fire Prevention

Ian M. Johnstone-Bryden



Nighthawk





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NIGHTHAWK

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Table of Contents

Download License	9
1. Warning	11
2. Motivation	11
3. Industrial Action	12
4. Terrorist Threats	13
5. Avoidable Risk	14
6. What Causes Fire?	14
7. What Burns?	15
8. First Steps to Fire Prevention	16
9. Avoiding Dependence	17
10. Maintenance	19
11. Prevention Practices	20
12. Detection	21
13. Fire Extinguishing	22
14. Giving an Alarm	24
15. The Incident Plan	25
16. Protecting Documents	26
17. Simplicity	27







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1. Warning

This paper is not an exhaustive treatise on the subject of fire prevention. It is intended to provide some general information and to help those wishing to begin the process of effective risk management at home or at work. It is an attempt to explain some of the key points to avoid many of the errors that people make when buying products in panic. At work there are regulations under fire codes, byelaws, and national legislation. They are often only there to ensure that the very minimum standard is achieved rather than to require the ideal fire precautions in any particular type of work place.

Domestic premises are largely outside any regulation in respect of fire precau-

tions. The main control is in the form of building regulations that lay down requirements for building materials, constructional techniques, and installation of services.

There may be encouragement from insurance companies in the form of discounts where particular fire precautions are in place.

I hope that anyone reading this paper will decide to take fire prevention seriously, start doing something now, and either study the subject more completely or seek specialist assistance in planning and implementing an effective fire prevention policy with its attendant equipment and practices.

2. Motivation

Fire prevention is one of the many aspects of

risk management which we tend to avoid thinking about, much less doing anything about it. The motivation to act is frequently a case of bolting the stable door after the horse has gone. For this reason, more than 70% of all companies suffering a major fire go out of business within eighteen months of the incident. In domestic fires, the results can be even worse with horrible injuries and death when fire breaks out at night with the household asleep.

Another rare event to motivate active fire prevention is a firefighters' strike. Frankly, basic fire risks increase only slightly in the event of an industrial dispute where firefighters withdraw labour. In the United Kingdom there have only been

two national firefighters' strikes. On both occasions there have been fires and on both occasions there have been deaths, but it is highly debateable how far industrial action contributed to the incidents.

3. Industrial Action

What makes impartial analysis difficult is that striking firefighters have left their picket lines to assist teams of soldiers used during the strike to provide emergency cover, or arrived at the scene before the troops and dealt with the situation effectively.

What also makes analysis difficult is that political considerations can introduce special risk. In general terms, industrial disputes are the result of inadequate management that created a situation

where either workers are so frustrated that they see strike action as their only option or where political extremists find an avoidable situation that they can exploit

4. Terrorist Threats

In Britain, the use of the long obsolete “Green Goddess” fire tender is either a result of Government parsimony, or a deliberate political ploy to increase public fear and put greater pressure on the fire fighters.

This is incredible given the rising tide of terrorist activity over the last thirty years and the significant increase during the last eighteen months.

From 11th September 2001, it should have been obvious to politicians that a com-

plete overhaul of Civil Defence (or in the British case, a total lack of it) was urgently required.

There may be practical and political reasons why troops should not cross picket lines to requisition modern fire fighting equipment, but there is no reason why an effective Civil Defence force could not be created and equipped to support firefighters during a national emergency resulting from war or terrorist activity.

That same force would provide a much more effective last resort cover in the event of Government proving incapable of providing the conditions to avoid the need for strike action. It would however cost money just like any new fire prevention measures. The lack of

provision just points to the remarkably low priority given by politicians and others to taking adequate fire precautions.

5. Avoidable Risk

In the exchanges of rhetoric during the dispute, what is overlooked is that many of the fires that occur every year, whether there is an industrial dispute or not, are entirely avoidable.

Increasing legislation is forcing some levels of fire prevention on companies to protect workforces and the public. It does not provide all that could be provided, but it does at least set some minimum standards, below which it would be madness to fall.

What is not addressed is domestic fire prevention where risks

are at least as great as in the work place.

It is very sensible to address fire risk at home and at work, seeking to achieve more than minimum standards and to recognize that there are occasions when firefighters will be unable to arrive in time to avoid disaster. This is more likely during an industrial dispute because the facilities introduced to provide basic cover are less comprehensive and response times, in particular, suffer.

6. What Causes Fire?

Fire can be caused by a great many things. Overwhelmingly, fires are caused directly or indirectly by human error. Dangerous electric wiring, untended open fires, inadequately serviced equipment, badly

designed and constructed buildings and vehicles, untended frying pans, and badly used equipment are just some of the frequent causes of fire, and all are avoidable. Even some of the events we regard as acts of nature are avoidable, for example trimming trees and cutting down dead trees before they blow onto buildings and power lines, starting fires.

7. What Burns?

Anything can catch fire or break down if it is heated to a high enough temperature. Long before some materials are hot enough to burn, they can transmit heat to other materials that ignite at a lower temperature. One example used during the training of firefighters is the case of fires that have

been started when a steel beam strengthening a wood floor is heated and transfers sufficient heat to timber joists and floor boards, setting them alight.

Many materials also produce lethal gases before they ignite, or during the early stages of combustion. Some materials can cause injury before they catch fire, such as nylon socks that melt onto the victim's feet, causing serious injuries.

So called "fire-proof" materials are not truly fire-proof, but are not easily set on fire and act as a barrier, delaying the spread of fire from more easily combustible materials. Before there is any real risk of "fire-proof" materials igniting, they cease to insulate what they are designed to protect from increasing

temperatures.

A more accurate description is “flame-resistant” or “flame retardent”, because these materials provide more vulnerable material with a level of resistance that either allows a wearer to escape the fire, or for fire-spread to be delayed long enough for assistance to arrive.

5. First Steps to Fire Prevention

The first step to fire prevention, whether at home or in the largest organization, is to analyse the probable risk, decide on priorities, and then develop a plan. That plan should include all the steps that have to be taken to reduce vulnerability to fire, and also to produce an incident and escape plan.

For the home, it

is necessary to identify all of the components of the home and consider their vulnerability.

Electric wiring and gas pipes have a limited life. That life can be extended by correct installation but, eventually, they will need replacement. Reputable suppliers can advise on the frequency of inspection necessary to avoid risks.

If the home has been in use for a number of years before you occupy it, the wise course is to have competent specialists fully test the wiring and pipes. There is also a financial inducement because an insurance company may try to reduce payment or refuse to pay against a claim if it sees evidence that checks of this nature have not been carried out.

It may be desirable to divide the building up into sections by installing fire resistant doors and partitions. In some cases, building materials that were in common use when the building was erected may now need replacement with more fire resistant materials.

A domestic property may not merit the cost of installing an automated fire extinguishing system although many lives would be saved if this capability was designed into all buildings. In this case there should be manual fire extinguishers sited at key locations.

Compromise is inevitable and it may be that the best approach is to concentrate resources on ensuring that the maintenance of the structure and appliances

is adequate, that there are methods of detecting an outbreak of fire, an effective method of ensuring that all in the building are alerted to an outbreak, and that a reliable evacuation plan is in place. If resources are not a constraint, it may be desirable to make the building as resistant to the outbreak and spread of fire as possible, but it will still be necessary to provide detection and alarm facilities and to ensure that there is an effective escape plan.

6. Avoiding Dependence

One very important consideration is that you should never depend on the arrival of firefighters, even if a very large firefighting resource is available and there is no form of industrial action.

A well-trained and equipped fire service aims to attend fires within ten minutes.

That's fine, but its ten minutes from when they receive an emergency call. It only takes a combination of unexpected factors, such as a series of emergencies breaking out at the same time, rush hour traffic, and adverse weather conditions, to make the best intention ten minute response impossible.

Even under optimum conditions, that requires the victims to be aware of the outbreak of fire and to very promptly raise the alarm with an emergency call to the fire service. In typical domestic properties, a fire can become fully developed within ten minutes, not from when it was spotted, or when it

was reported, but from the point of ignition.

A ten minute response from a fire service may be inadequate to save the building, or even the occupants, but it should be adequate to stop the fire spreading to neighbouring buildings.

That performance can be reduced if the firefighters have to waste time searching the burning building for people who might be trapped, but were either not in the building, or managed to escape. It will also be reduced if the building is difficult to access.

Therefore, the house holder should have a plan that provides for early detection of fire, a method of alerting those in the building and evacuating them, and a method of identifying who was in

the building and who has escaped.

What complicates matters is a contention between crime prevention and fire prevention and means that the two objectives should be considered together. It is possible to provide methods of stopping illegal entry but to also provide for rapid evacuation. To be effective it does place reliance on detection and alarm because crime prevention systems do not differentiate between burglars and firefighters.

10. Maintenance

When a house is built and equipped, there will be a number of components that require some form of regular inspection or testing. If this is not adequately catered for, the risk of fire and injury increases, but the

components also become less efficient at doing what they were designed to do. If electrical wiring is defective through age, or damage, or is overloaded, fuses and light bulbs fail usually before a fire starts and more electricity is probably consumed. That costs time and money, often more than the cost of preventive maintenance.

If the badly maintained equipment is gas powered, there is a risk of death from carbon monoxide poisoning, before the risk of fire or explosion.

After completing a fire prevention plan, new appliances will be acquired, such as smoke detectors and fire extinguishers. These will require testing and maintenance to provide effective per-

formance.

As we all have many things claiming our funds and attention, preventive maintenance is all too easy to neglect. The answer is to write a maintenance schedule that is always updated and adhered to. Not only does this ensure that every item receives the attention it needs, when it needs it, but it also helps us to budget for the necessary work.

8. Prevention Practices

Most prevention is really very simple and common sense. Waste paper should be disposed of and not allowed to build up in areas, such as the space beneath stairs, where its ignition could rapidly lead to escape routes being blocked by smoke and flames. If

mice or rats have got into the building they must be eliminated before they chew through electric cabling. If there is a power failure, great care must be taken with candles and oil lamps, and special care should be taken with portable gas appliances that are often designed for use outside on picnics and for camping.

Before undertaking home improvements, make sure you really do understand the risks, and hire a specialist if you have any doubts about your own abilities. When you hire specialists to carry out work, make sure they are qualified to do the work. When you buy new appliances, read the instruction book and make sure you know how to correctly use them.

9. Detection

The key to fire prevention, after having made sure that all unnecessary risks have been avoided, is to use the right detectors for the right job. There is now much choice of fire detectors.

The now-popular ionisation smoke detector is very easy to install, relatively cheap and reliable, but it does have some limitations. Areas such as kitchens cannot be effectively fitted with smoke detectors because they will be prone to false alerting and can be damaged by steam and materials, such as grease, carried in the steam. A good supplier will be able to offer a rate-of-rise heat detector and a fixed temperature detector for areas that should not be covered by smoke de-

tectors.

A single smoke detector on the ceiling above the top of the stairs is much better than nothing, but each room should be fitted with an appropriate detector, and homes supplied with gas should also fit carbon monoxide detectors.

At this point the householder has to decide whether to buy a fire detection and alarm system, fitted by specialists, or to use DIY individual detectors with built-in audible alarm. This may be a question of finance. Individual units are low cost, but effective, require no special skill to install, and do not require specialist maintenance. They have their own battery and should give a warning tone when the battery needs changing. Some models

include a very simple but effective emergency lighting facility. The only other maintenance required is to vacuum out dust periodically and to operate the test system that, in some units, only requires a torch to be shone on them to trigger a test alarm.

The great advantage of these units is that their low cost and easy maintenance makes it more likely that every householder will buy at least one and the coverage can be improved by adding more detectors over a period, so spreading the cost of purchase.



The larger house may be better served by a professionally installed system with a central power supply, fail-safe wiring, a mixture of detector types, total coverage of the

building with audible alarms and visual alarms, particularly if any occupants have hearing difficulties, a control panel that divides the house into zones and indicates the source of the probable fire, and a method of automatically alerting the local fire service.

This type of system can also include a full emergency lighting system, carbon monoxide warning and intruder detection, providing different alarm tones for each of several alarm conditions. Inevitably this type of system costs more and is likely to require regular maintenance by specialists.

13. Fire Extinguishing

The priority is to detect, alarm and evacuate **very fast**. Staying to



fight a fire can be extremely dangerous.

However, having extinguishers in the home will enable very small fires to be extinguished immediately and extinguishers will provide a means of maintaining an escape route. If extinguishers are purchased, it is important to buy the correct type for the conditions, make sure you know how to use them, know how frequently they should be tested and/or serviced, and locate them where they are very visible and easy to reach near an escape point. A reputable specialist supplier will be able to advise.

As fire equipment becomes a volume commodity, it tends to be available from non-specialist suppliers, usually at a much lower cost and without the

availability of experienced advice. It is important to buy from someone who is likely to be in business for some time and has a reputation to protect, even if they do not specialise in fire equipment, because there are always disreputable vendors who sell dangerous products. This is particularly important when an event, such as strike action by firefighters, may encourage a sudden increase in buying fire equipment.

Automatic extinguishing systems are not that common in public and work places, but they are very rare in domestic buildings. One objection is that they will be ugly but, if an installation is carefully planned, it can blend into the decor and be virtually invisible. A more practical objection

may be the difficulty of ensuring adequate water pressure, but the most common objection is cost. Undoubtedly, automatic extinguishing systems would save lives in domestic premises and might reduce the consequential cost of a fire.

14. Giving an Alarm

Low cost smoke detectors do have integral alarm sounders that can be heard several rooms away. If they also have an emergency light, they will provide some form of alarm for those with hearing difficulties. What they may not do is provide an alarm to someone at the other end of the building, and they may not detect the fire as quickly as a person present in the room. The simple solution may be to also install a

basic manual alarm system, in addition to the automatic detectors, and either link several individual units and their alarms or add suitable audible alarms.

Whatever alarms are adequate within the building, it will be important to call the fire service as quickly as possible. A delay of only a few minutes can be the difference between a few damaged rooms and a totally destroyed house. Fire services are cautious about taking direct links from domestic, or even commercial premises, into their control room. Where they do allow this type of connection, they will almost certainly make it a condition that the system is maintained by a company that is approved by the fire service.

The alternatives are either to include, in the incident and escape plan, a priority to alert the fire service, or to use a method that does not require fire service approval, such as an automatic alarm dialler, or a commercial central control room. In either case, a fire service receiving a number of false alarms may make a charge for attending subsequent false alarms.

15. The Incident Plan

Whatever equipment is acquired to reduce fire risk, the most important element of any good policy is a well thought out and rehearsed incident plan. Domestically that may sound like overkill and many people feel strangely embarrassed at writing and rehearsing an incident

and escape plan for their family. That's perhaps not so strange because even organizations that are legally required to hold fire drills regularly don't. Those that do hold evacuation drills frequently fail to monitor how well they went or revise training to ensure future drills and the real thing go smoothly.

Even if there are only two people in the house, there is nothing like a real emergency to create panic. Planning what to do and rehearsing it identifies any weakness in the plan and makes the procedure automatic when the real incident strikes. It is so easy to do something really stupid during a fire, like going back into the building to save something from the fire, or to rescue a pet that could have been

saved automatically had the plan been well prepared and rehearsed.

Having escaped the fire, it is very important to make sure that everyone is out of the building, to know where they are and what injuries they may have suffered.

Even when there are only one or two people normally in a house, there are many cases where a neighbour, or a fire-fighter, has been injured or killed attempting a brave rescue, when there was no one in the building. Equally sad is the case where it was assumed that everyone had escaped, when this was not the case. The plan therefore should include an assembly area safe from the fire.

It should also be kept in mind that a house which normally

only has only one or two people living there will probably have parties where very much larger numbers of people will be in the building. In this case there should a reliable method of identifying who was in the house and who has got out safely.

16. Protecting Documents

Even a domestic property will have some items of value that are easily damaged by fire and be difficult to replace. Apart from protecting these items because of their value, it also reduces the risk that someone will be tempted to reach the items and remove them from the fire, so placing themselves and others at risk.

A large fire-resistant safe or cabinet

can be a high cost item but a typical family may have only a few things that need this protection. In this case, fire-resistant document boxes are available at relatively low cost.

An alternative is to store valuable documents at a bank or some other type of document repository. Records on computer disk are easy to deal with because it is only a matter of making copies and storing them at different locations but they should be kept up to date.

At home, it might be easy to store the duplicates in an outbuilding that is not directly connected to the house. Alternatively the answer might be to have a reciprocal arrangement with friends or relatives nearby to safe keep each other's copy disks.



17. Simplicity

All of the excuses for not taking precautions are really justifications for acting. The best plan is a simple plan. The best precautions are those that directly address the risks.

In typical domestic premises there is not that much to plan and not that many ways we can reduce risk, so that the process will not be very time consuming or costly. The fact of considering the risks and making a basic plan on how you will respond to fire goes a long way to reduce the potential risk.

Installing simple devices like smoke detectors dramatically reduces risk. Spending a little more time and money may provide even better protection.

Whatever motivated the process of re-



ducing fire risk, the most important thing is not to put off doing something. A few hours delay could be costly and even tragic.

At work, it is essential to make sure that all minimum standards required by law, or by insurance companies, are implemented immediately. However, these will be **minimum** standards and do not remove the need for responsible employers to look carefully at the risks facing them and take more than the bare minimum effort to prevent fire and to reduce risks in the event of an outbreak.





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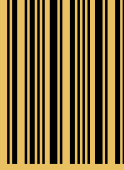
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