



CHAIN RESPONSIBILITY: WORKING TOGETHER ON CONTINUITY

HOW COMPANIES CAN ENSURE
THEY DEVELOP INTO THE STRONGEST LINK IN THE CHAIN
IN WHICH THEIR COMPANY OPERATES

CONTENTS

WHAT DOES THIS WHITE PAPER OFFER?	3
WHY CHAIN RESPONSIBILITY DESERVES YOUR AND OUR ATTENTION	
TAKE ACTION! INVESTMENT: OFTEN ZERO	
GETTING TO WORK ON CHAIN RESPONSIBILITY	4
CHECKLISTS	5
IS IT TOO COMPLICATED AND COULD YOU USE SOME PROFESSIONAL HELP?	12
APPENDICES	13

TAKE YOUR RESPONSIBILITY TODAY

Fires, floods and other calamities often cause considerable damage with far-reaching consequences. Beyond the 'simple' fact that company resources are lost and a burnt-out industrial unit needs to be rebuilt, the consequential damages often have the greatest impact. Production comes to a stop, often for months or even longer. Just think about it, how much turnover and profit would you lose in that period? If it happened to your supplier, how damaging would it be for your business operations if they were unable to supply you for an extended period?

You should be aware above all that your company also forms part of a chain that is only as strong as its weakest link (a cliché, but very true). Calamities in one link have a huge influence on the entire chain. We see examples of this every year. For instance, take the consequences for the business world within the country and (far) beyond of the 2011 tsunami in Japan. Or take the unavailability of a piston ring costing \$1.50 that caused almost 70% of the Japanese car industry to come to a standstill several years ago. A fire at a supplier in Michigan caused significant problems to Ford, Fiat Chrysler, BMW and General Motors factories in 2018.

It is one thing to be aware of the need to take action, being spurred into action is another. This white paper does both and gives you a tool to work on limiting the risks and effects, with a handy checklist. What I would like to see is that you make a start today on taking responsibility for your place in the chain. It is in the interest of us all.

Ron de Bruijn
Managing Partner at Riskonet



WHAT DOES THIS WHITE PAPER OFFER?

BASICALLY, IT PROVIDES AN INSIGHT INTO THE IMPORTANCE OF CHAIN RESPONSIBILITY.

IT ALSO PROVIDES SPECIFIC TOOLS TO GET WORKING ON THIS TODAY.

Through this white paper, we would like to call your attention to this subject, to chain responsibility, and what we can do about this together. What you can do to avoid problems for your business operations and for all companies which make up the chain with you.

We will tell you about the importance of this, but also show how extensive the consequences of an incident can be. However, the most important thing is that we would like to tell you all about safe operation in practice. We would like to point out the logical things you can do to avoid misery. We would also like to point out the fairly simple steps that you can take in your organisations to not only limit risks, but also to minimise the consequences. The extensive checklist will help you to do this.

When you have read this white paper, you will no doubt conclude:

1. Being alert to small, but important matters that may cause a calamity, is an essential basic attitude;
2. Prevention and preparation are not rocket science, but largely a question of common sense; and
3. The actions you can take usually do not require major investment!

WHY CHAIN RESPONSIBILITY DESERVES YOUR AND OUR ATTENTION

What if you are hit by a fire or other calamities? How would these consequences directly or indirectly affect your company? Also consider the consequential damage. Insurance data shows that around half of the companies go bankrupt as a result of this damage, which often has a devastating effect on other companies in their supply chain. A hole immediately appears in the turnover, the money from the insurance company does not arrive straight away, clients are lost and this triggers a snowball effect.

Time for a few important soul-searching questions, also eye-openers: how long could your organisation stay afloat in such a situation? What is your policy on risks and insurance? How can you prevent a calamity and how can you limit the consequences if a calamity nevertheless occurs? Do you have an emergency plan? Do you have alternatives to continue production?

In a reality where supplier(s) and buyer(s) are so closely linked, an incident can quickly throw a spanner in the works. A fire in a storage warehouse will soon lead to a disruption in the supply chain and in delayed deliveries that can affect many parties. And then the company management can only

hope for what in the insurance world is called a 'perfect fire', one where there is damage but fortunately no deaths or injuries. According to insurers and risk professionals, there are also many companies that are unjustly satisfied with the fact that their premises meet its countries Building Decree. It is typically a minimum standard that offers no certainty that fire safety is up to scratch.

Disruptions can also come from other sources. A storm can severely damage a production site. Climate change could also result in more frequent flooding. A flexible attitude of: 'We'll fix it, it won't take long to find another supplier' might not work anymore. With the severe flooding in and around the Thai capital of Bangkok, tech companies experienced this at first hand. Not only were their preferred suppliers 'out of order' but the alternative suppliers were too!

When natural disasters occur the extreme weather conditions make assets increasingly vulnerable. In many countries, specific industries are concentrated in one area, which means that multiple companies from the same branch of industry could be hit at the same time. The point is: the risks of disasters are increasing. And we have to be prepared.

TAKE ACTION! INVESTMENT: OFTEN ZERO

Let's be clear right away: there is plenty you can do to identify the risks and to take measures to limit the consequences of an incident. Investment? Frequently zero. It is usually a matter of focus and attention, of organisational adjustments!

It starts with your organisation's housekeeping and with creating a situation where dust, litter and waste cannot form a fire risk; where there is a clear smoking policy; where staff handle flammable liquids with care; where storage is arranged safely; and where battery charging stations are installed according to safety standards.

But it is also about procedures for activities that could incur a fire hazard and for the way in which third parties work at your industrial sites. It's about alarm response procedures, staff training, using existing checklists correctly and self-inspection, and about how electrical installations are installed and maintained. And, as we said, whether your organisation is prepared to collect extra rain and flood water.

We are also talking about taking damage-limiting measures with detection and sprinkler system installations, extinguishers and burglar alarm systems. Does your

WHAT DOES THIS WHITE PAPER OFFER?

organisation have a continuity plan? And an emergency plan? A recovery plan, should the unthinkable happen? A flood emergency plan? Which temporary protection measures have you prepared to contain the problems?

As you can see, there is plenty you can do to protect your organisation against a catastrophe. There is a good chance that you have already considered most of the aforementioned points. But play it safe: get to work on safety, on protecting your organisation, your continuity, and that of every party in the chain.

GETTING TO WORK ON CHAIN RESPONSIBILITY: THE CHECKLIST

What does the checklist offer? Above all, it provides an overview of big and small issues that determine the risks and consequences. Insurers are all too aware of these facts. When they analyse the minor and major damage that has occurred in industry, time and time again it turns out that in many cases the cause was avoidable. Think of carelessness when carrying out tasks, poor maintenance, and above all, delayed maintenance. Also, sloppy waste processing, storage at unsuitable locations, and being careless with hazardous substances.

During a damage investigation after a fire or other calamity, when people are confronted with the causes their reaction is almost always: "We could have prevented that with a simple measure or action."

That's how it is. The checklist is an extensive list of those measures and actions. Get to work on it. Today! And do keep in mind, you won't succeed with only measures and procedures. It is the people who determine the actual level of safety. You will need to constantly work on the human factor. Considering safety should always be a priority, even when everything appears to be under control. One example underlines this: at a recent fire at a company it appeared that the staffs' standard reaction to fire alarms at the organisation was: "It will probably be a false alarm." Well, until they are hit by reality.

Keeping safety top of mind, that alertness, should also be expected from the board and management. Do you base renovations or new buildings on the minimum requirements of your country's Building Decree, or do you opt for real safety according to your norms and standards? Often business communities are still wasting vast amounts of money on the wrong systems. On systems that should help companies to limit and prevent damage but that fail to achieve their purpose. Or on systems that should basically suffice but that are not kept 'in shape' due to saving on maintenance.

CHECKLISTS

1. HOUSEKEEPING

1.1. Cleanliness

A company in which dust is left to accumulate and where tidying and cleaning are not prioritised runs the potential risk of calamities. Dirt and dust are a fire hazard!

The installation and surrounding site must be continually kept clean and tidy through a structured cleaning programme. Such a cleaning programme must include at least:

- The removal of dust and litter from cable channels, buildings, switch boards and suchlike;
- Cleaning dust, oil and litter from machines and equipment; and
- Cleaning floors, gutters and workplaces.

1.2. Waste management

Waste in itself mostly doesn't cause fires. But if there is a fire, waste can be an additional source of fuel. This means that good waste management can be a factor in reducing the risk of fire.

In general, all types of waste in and around the factory as well as at the workplaces should be collected safely, removed daily and disposed of at a designated location.

The following measures are required:

- The consistent use of the correct metal waste bins, buckets, containers and suchlike. These should be emptied regularly, but at least daily, in a safe manner to prevent heat from accumulating;
- Frequent cleaning of the installation and the site as part of a structured cleaning programme; and
- While awaiting transport, waste should not be stored against or in the vicinity of the outer walls, but should be kept at least 10 metres away from buildings.

1.3. Smoking

Particularly when thrown away thoughtlessly, cigarettes can cause a major fire. This seems to be a question of common sense but procedures and discipline are essential for safeguarding a company from problems due to smoking.

In general, there should be no smoking at an industrial site.

If smoking is permitted, then there should be strict smoking regulations in place. Smoking should be restricted to separate and dedicated areas. The smoking rules and the consequences of not adhering to regulations should be made clear to all staff and visitors.

The smoking policy should include, among other things:

- Prohibitory or mandatory signs in clearly visible places.
- Where smoking is permitted, there should be fire-safe ashtrays and waste bins present.

- Ashtrays should be emptied daily in metal bins/containers.
- Locations where smoking is permitted should be free of flammable materials.

1.4. Flammable fluids

Flammable fluids are an undeniable factor in the origins and further development of calamities. But has your company got proper arrangements in place for the storage and use of these substances?

The use, handling and storage of flammable fluids must occur in full compliance with the local laws and standards, as well as according to the company's guidelines related to environmental risks. The company guidelines for the use, handling and storage of combustible fluids must be fully complied with. This includes the use, handling and storage of oils and lubricants.

When combustible fluids are used, the following applies:

- Storage must meet the specific requirements set for the fire resistance of the walls, partitions, ventilation system, explosion-proof lighting, and heating. Moreover, explosion vents could be required.
- The combustible fluids must be discharged in a specific area, with suitable ventilation.
- Fluids with a low flammability limit, such as solvents, should be distributed in safety cans.
- In areas where solvents and aerosols are used, storage must be limited to the amount required on a daily basis.

1.5. Workplace/workplace storage

The storage of raw materials and equipment at the workplace can play a role in an incipient fire. A spark can have dire consequences, and the same applies for a ruptured cable at a workplace.

All workplace storage (including, but not limited to: pallets, litter, waste paper, trucks, trailers, portacabins, etc.) must be kept at least 10 metres away from the buildings. That also applies to portacabins and other equipment belonging to third parties, such as contractors.

If these minimum requirements are not met, proper alternative solutions must be discussed with the insurance manager or the risk control engineer.

1.6. Battery charging stations

Electric vehicles are becoming increasingly common. Drive batteries can form a risk if used irresponsibly and if they malfunction. Installation errors can also cause problems. Make sure that doesn't happen to you!

Forklift charging stations must always be mounted on walls with non-flammable materials (brackets and boards or suchlike). Furthermore, no flammable substances should be

CHECKLISTS

stored within a radius of at least two metres of the charging station. That should prevent the charging stations from causing a fire, e.g. through short circuiting. That could occur if they are hit by trucks, people moving pallets, etc. If no flammable substances are stored in the vicinity of the charger, then the chance of fire is almost zero.

The charging stations must always be installed at locations with good air ventilation to reduce the risk of a hydrogen explosion. When conventional batteries are charged they generate hydrogen and if it ignites, it could cause a fire or explosion.

Lithium-ion batteries and modern lead-acid and gel batteries do not generate hydrogen, or to a lesser degree, but the risks of short circuiting still apply.

1.7. Household appliances

It is fairly common practice at many companies for staff to bring old fridges, radios, microwaves, coffee makers and other appliances from home and use them in the workplace. The intensive use of these appliances in industrial environments can unintentionally cause new risks.

A company should avoid using household appliances, such as coffee makers, radios and fridges coming from private homes, because this is a known cause of fires as a result of short circuiting. This often regards appliances that are discarded at home and that were no longer completely safe.

If such appliances are required in a production area or office then they should be appliances for industrial use and be placed at suitable locations away from flammable materials. The appliances should be included in the maintenance programme and in the inspections of electrical appliances just like all other equipment at the site.

Industrial coffee makers must be equipped with an automatic shut-off system and protection against overheating.

2. PROCEDURES

2.1. Activities involving fire hazards

All activities and tasks, also by third parties, must be carried out under a Safe Work Permit (Vergunning Veilig Werken), see appendix.

2.2. Third parties

A company could have its safety situation well under control but there are risks associated with third parties who carry out installation, maintenance and repair work. It is important to ensure that the paperwork is in order and that people know the safety regulations and adhere to them. That is also a question of organisation.

The aim should always be to avoid work involving a fire hazard, be it by using a safer method where no heat is required, or by performing the task in a safe location, such as an open area or maintenance workplace.

Third parties (contractors, suppliers' maintenance engineers, etc.) can only start work under the conditions of the Safe Work Permit and only once this agreement has been signed, preferably as part of the purchase order.

Best practice with extended and complex projects is to draw up a risk inventory alongside issuing the permits. This means that before work starts a senior or competent person should prepare and include the necessary information, such as:

- the nature and purpose of the project;
- the turnaround time;
- the equipment to be used;
- the area/location of the work;
- details of the people carrying out and managing the work;
- details of the specific risks accompanying execution of that work at this location;
- the safety measures taken; and
- the protective equipment that is available.

The experience and competence of the contractors and its staff must always be established before work can go ahead and the equipment must be checked for safety and level of maintenance.

Fire safety/detection equipment must be checked to ensure it is working correctly.

A permit may only be issued by personnel who are competent and trained to do so.

The precautionary measures included in the context of the work permit must be strictly followed. During the work, areas must be kept clean and tidy. Flammable waste created during the work is preferably removed at regular intervals.

If a fire starts during the work and is extinguished straight away, work must be stopped immediately. The incident should be reported to the permit issuer. The tasks can only be resumed after a full investigation into the cause and after taking additional safety measures.

On completing the tasks, it is essential that an inspection is carried out to ensure there is no smouldering residue, smoke, residual heat, et cetera.

The scope of the inspection depends on the environment in which the tasks have taken place. The final inspection can be less extensive in areas with few or no flammable materials present. In areas with a lot of flammable materials or a complex building construction, a comprehensive and detailed inspection should be carried out.

CHECKLISTS

The final inspections should take place up to 90 minutes after completing the work, whereby someone is permanently present for at least the initial 30 minutes.

2.3. Alarm response procedures

Alarm response procedures exist for a good reason. What exactly do you do in an emergency situation? And are the procedures, that may have been drawn up long ago, still correct?

Good procedures must be in place to alert the agencies that will respond to the alarms, including the fire service, first aid teams, hospitals and the police.

The measures include:

- a written emergency plan;
- general instructions for all staff;
- stickers with emergency numbers on all phones; and
- instructions for staff who are the link in the alarm response chain, such as switchboard operators and members of the first aid team and fire service/ fire service officers.

2.4. Training

Dealing with risks and incidents is not an easy task. As well as preparing for an evacuation on paper, it is important it is put into practice. Do staff know how to use the fire extinguishers? Are they able to provide first aid to the wounded? Staff education and training are essential.

Staff training must, above all, comply with the local laws and legislation. The training must be aimed at first aid or initial interventions after an accident or event that could lead to damage.

It should include the following:

- First Aid courses for a number of staff;
- instructions on and training for using fire extinguishers;
- if possible, an annual course in partnership with the fire service; and
- regular evacuation drills.

Important: staff taking part in the courses must be clearly told that they should never endanger themselves when putting their training into practice.

2.5. Checklists and self-inspection

A company can grow and change over the course of time. But do those safety measures and procedures drawn up at one point still fit with the current scope of the organisation?

It is important that the various risk management measures that are used are checked regularly. The scope and frequency of these checks can vary, depending on the scope and nature of the business.

The points to be assessed should be included in a checklist (see appendix).

The staff member performing the checks should note their findings on the checklist during the rounds. The results of the checks should be discussed with the responsible manager and if required, action should be taken.

Completed checks should be made available at the meetings of the company board.

The frequency of the inspections of the fire safety equipment depend on a number of factors. For example, dry pipe systems should be checked daily in winter; less frequent checks are acceptable in summer. With regards to the sprinkler systems, the recommended frequency for testing and maintenance is established in local regulations.

You can find a sample checklist in the appendix.

2.6. Electrical installations

Installing and maintaining electrical installations requires professional work. Considering that electricity is a risk factor, it is advisable to establish clear requirements for fitting and maintenance.

Electrical installations must be installed and maintained according to the applicable local or international standards, including the periodic checks.

A separate programme should be in force for scanning the electrical installations using infrared technology. New installations or machines should also undergo an infrared scan on delivery. When tendering the infrared inspections, ensure that clear requirements are set for the contractor and that this person or organisation is qualified and properly trained.

2.7. Rainwater drainage

The climate is changing. With the increase in the amount and intensity of rain it is becoming increasingly important to ensure that rainwater drainage systems are checked regularly to prevent blockages. Additional inspections are recommended in autumn, when the leaves fall. Roofs with parapets, in particular, also need to have emergency drainage available. In the event of a blockage and with a very limited capacity, water can accumulate, which could lead to the roof collapsing.

3. DAMAGE LIMITATION MEASURES

3.1. General

In the event something does occur, try to limit the damage as much as possible. There are numerous actions an organisation can undertake for that purpose.

CHECKLISTS

Damage limitation measures often correlate to the scope of the business and the legal requirements. They can vary from firewalls to automatic extinguishing systems and detection system installations.

It is essential that these systems correspond with the applicable fire safety concept at the company and that this is well thought out.

This concept will not only be based on legal requirements but also on the actual vulnerability of the company when considering business continuity, customer provisions, insurability and business risks.

Legal requirements provide for the safety of staff and visitors and protect the neighbours, but they do not protect the company itself against fire damage.

3.2. Sprinkler/detection/gas extinguishing systems

If the fire safety concept includes detection, sprinkler and/or gas extinguishing systems, it is crucial these work perfectly and do what they were purchased and installed for.

Fire detection and/or fire extinguishing system installations could be required:

- as an equivalent to requirements in the Building Decree;
- when storing hazardous substances and thereby required by regulation; and
- if deemed necessary by local management or corporate management as part of the company philosophy.

Installations must comply with and be designed and built according to internationally approved standards (FM, NFPA, VdS, LPC). If local standards must be applied then they should only be used if they do not contradict the most recent expertise or state-of-the-art technology for the specific type of industry as described in NFPA or FM standards. The principles for the design and the how and why of such installations are preferably established in detailed specifications or a Design Criteria Document.

The installations should be maintained in good condition and be subject to regular (at least annual) external checks. Considering the safety concept is often built around these systems, it is important to take additional safety measures as a precaution in the event such an installation is temporary out of order, such as:

- appointing a firewatch, readiness of extinguishers;
- avoiding risky tasks;
- informing the local fire service; and
- informing the insurer.

All (new) installations or changes to existing installations should preferably be discussed with a specialist in these systems and a risk manager, for instance. The installations

should be designed and installed in such a way to safeguard the continuity of the company.

3.3. Extinguishers

Portable extinguishers should be present throughout the premises. Extinguishers should be selected on the basis of their effectiveness for a specific hazard. They must be easily accessible and installed in clearly visible locations. The walking distance to an extinguisher should preferably be a maximum of 25 metres. Extinguishers must be clearly visible and easily accessible at all times.

3.4. Fire-resistant barriers and doors

The correct fire-resistant barriers (consisting of fire-resistant walls and doors) should preferably be installed:

- around technical rooms, such as control, boiler, transformer rooms, et cetera; and
- between storage and production buildings.

Existing fire-resistant barriers should stay in place and not be removed (e.g. additional doorways) without thorough consultation. Fire-resistant barriers must be well maintained and inspected (with particular attention to fire doors and cable grommets) as part of the checklist procedures.

Fire and smoke retardant measures between buildings should be installed (and well maintained through a service contract) where possible and/or necessary.

3.5. Burglary alarm systems

As an organisation, you want to keep burglars out because they can damage buildings and steal goods and equipment, but also because burglars may cause damage inside and they sometimes start fires to cover their tracks.

If a burglary alarm system is present, like all security systems, it must be checked regularly.

An assessment should be carried out to see which security measures should be taken on the basis of company policy. Door and window fittings of an adequate quality should be installed on doors and windows as a minimum requirement. If that is considered inadequate then you could consider additional safety measures in the form of electronic burglary alarm systems.

If such a system is installed it is of vital importance that the correct measures are taken to follow-up on an alarm. The preference is for a professional company to follow-up on the alarm, and one that can be on site within 10 minutes of the alarm going off.

3.6. Continuity planning

What happens if business activities grind to a halt after a calamity? What is plan B to get production and turnover up

CHECKLISTS

and running again as soon as possible? And what if this happens to an important supplier?

The company should have an on-site contingency plan that is up to date and applicable, and that has been communicated to all those concerned, both internally and externally.

Relevant plans are:

- an emergency plan, focused on limiting damage to people (both on- as well as off-site), goods and the environment after major damage/accidents; and
- a contingency plan, focused on restoring the objectives and the earning capacity of the companies immediately after major damage/accidents.

3.7. Emergency plan

An emergency plan should contain all the various steps required in the event of a calamity to ensure efficient protection of people, business resources, the environment and property of third parties.

It contains the following;

1. General information about the location and map of the premises and the environment, raw materials, substances, access roads, specific hazards, organisation, emergency equipment and tools.
2. A plan for quickly evacuating all occupants in the event of a fire or other calamity: evacuation plan and muster stations.
3. A description of the preventative systems/fire extinguishers, sprinklers, any restrictions for collecting contaminated materials, such as firewater, warning systems, et cetera.
4. An organigram of how the emergency help is organised (command structure, responsibilities, tasks, team members' tasks) and of the internal safety organisation.
5. Chart of the safety organisation, including a description of the training and drill schedules.
6. Agreements with authorities, police, public fire departments, hospitals and first aid providers.
7. Incident response teams to inform the press and to manage the coordinated information to customers, authorities and the public.
8. Internal and external communication structure (alarm response procedures, telephone numbers, et cetera.).
9. Regular evaluations and (live) testing of the plan.

3.8. Recovery plan

A Recovery Plan defines the steps that need to be taken when the factory's production capacity is at risk after an undesirable event or calamity. The plan describes the actions that need to be taken to return to full production capacity as soon as possible to safeguard the continuity of the business objectives.

These activities can be divided into measures:

- short term: outsourcing the production within or outside the group; and
- long term: schedule for restoring production capacity.

It contains:

1. An identification and analysis of all risks that could cause a threat to the company's continuity.

Focal points:

- Availability of raw materials
 - Availability of products
 - (Re)construction time of buildings
 - (Re)construction time of machines/replacement period
 - Parts – delivery time
 - Suppliers (find alternatives)
 - Bottlenecks in production
 - Utility companies (electricity, gas, steam, process air, process water, refrigeration, wastewater treatment)
 - Research
 - Support units
 - Storage facilities
 - Data communication
 - Orders and (large) contracts (stored internally and externally)
 - Computer (automatisation facilities)
 - Back-up organisation
2. Organisational charts for a crisis team (team members, responsibilities, etc.) that will come into action after an event and carry out the recovery plan.
 3. Communication policy with procedures for providing information to staff, customers, press, et cetera.
 4. Classification of incidents and calamities and warning procedure.
 5. Business recovery and outsourcing/outsourcing scenarios;
 6. Location of the crisis centre and required facilities (e.g. communication devices).
 7. Procedure for updating and testing/simulating the plan.

3.9. Flood emergency plan

Due to the changing climate, storms and persistent rainfall can cause a risk of flooding and damage. You need to be properly prepared. There is a lot an organisation can do to prevent flooding and limit its consequences.

Identification of exposure to flooding

Below, you will find a (non-exhaustive) list of issues that could point to a higher risk of flooding for buildings and the surrounding elements:

1. Buildings with cellars.
2. Sites on, or adjacent sites at a higher level than the finished floor of the premises, or terrain that slopes towards buildings, workplace storage or workplace equipment.
3. Buildings with history of problems with flooding.

CHECKLISTS

4. Buildings with openings under street level e.g. for:
 - air treatment systems;
 - utility tunnels; and
 - cable boxes.
5. Buildings with sloping access routes, or access routes where the overhead door closes at floor level.
6. Buildings on sites where natural waterways have been diverted.
7. Buildings with cellar parking.
8. Recent developments in the vicinity that have changed the outflow to drainage basins.

Protection

Various protective measures can be taken to limit potential flood damage. The following methods can reduce the vulnerability of buildings and contents to flooding and incoming rainwater. We will look at three types of flood protection: permanent, temporary and emergency.

Permanent protection

Permanent protection consists of elements that become an integral part of the building or adjacent grounds, such as sealed windows or dykes. Permanent protection is based on eliminating openings that can be penetrated by water, or installing barriers that stop the floodwater at a certain level. Permanent protection is the most reliable form of physical protection.

The following are examples of permanent safety measures:

- Flood doors: which can be mounted with hinges, or hanging above an opening, or on rails next to openings that are ready to be rolled up. The doors must be made watertight using seals. They can be made of aluminium, steel or wood.
- For window protection you can consider various alternatives:
 - Surplus windows: fill the window opening with materials comparable to those used for the wall. That is the most reliable protection.
 - At windows where low flood levels are expected, you only have to block the lower part of the windows.
 - At shop windows, you should install a moveable barrier on the inside of the window. Seals and gaskets are required to achieve a water-tight seal.

Interior protection

The interior needs protection to limit the scope of the damage if it is impossible to prevent water from entering the premises.

- Build low protective walls around important equipment, such as ovens, boilers and computers, or reinforce existing walls.
- Install valves on pipes to prevent backflow. Manually-operated positive shut-off valves are the most reliable.

- Create channels (overflow areas) and pump the water out of the premises if you expect even a small amount of inflowing water.
- It is imperative that floor slabs and walls are sealed as a protective measure to limit the amount of outdoor water leaking through the walls of the buildings.
- You should switch off electrical installations to prevent short circuiting when the power returns.
- Anchor tanks with bolts or fastenings at the base. If a tank cannot be securely anchored, fill the tank with its standard contents before the water level rises.

Protecting the surrounding area

The protection for the surrounding area consists of dykes, alluvial ridges or verges. That is a permanent flood defence around exposed buildings. Areas surrounded by dykes, alluvial ridges or verges can require a drainage system, or water may need to be pumped out after a flood or heavy rainfall.

Dykes, alluvial ridges and verges do require a certain amount of periodic maintenance to maintain the construction. Deterioration of the bed or erosion to the construction materials of the dyke must be minimised to prevent the dyke system from failing.

Temporary protective measures

Temporary protective measures are types of portable temporary protection planned well in advance of an actual emergency situation. When you install this type of protection you need an early warning, which makes this protection less reliable than permanent protection. If a satisfactory warning is received in advance and the correct measures are taken, then it can offer a high degree of protection.

Flood shields are a primary form of temporary protection that can be used to close off windows and doors. They can be stored in a suitable location and then moved to the opening when required. Forces of water against the shield could necessitate reinforcement. Braces, brackets, gaskets and caulk should be of an adequate diameter and fitted correctly against the back of the shield to support it against the force of the water.

A comparable method of protection can be used for air vents at ground level. Installing such protection can prevent water penetrating air channels and cavities below ground level. Once again, when using shields, gaskets or caulk can be used to limit leakages.

Emergency protection

Emergency protection consists of measures taken after the flood warning has been given and when it has been established that the permanent or temporary protection is lacking or insufficient. An early flood warning and use of available equipment, supplies and personnel are

CHECKLISTS

decisive factors in limiting damage. This is a less reliable form of protection compared to the others and it is mainly suitable as a supplement to and not a replacement of the other types.

- Sandbags. The bags must be readily available and there must be enough sand. Filling and positioning the bags is time consuming and tiring and requires a lot of manpower.
- Apply anticorrosive agents to immovable equipment. The equipment can be recommissioned very quickly once the water has receded.
- Moving the furniture. When drawing up a plan for moving the furniture, you must consider both the costs of replacing the equipment as well as its relative value to the continuation of business activities.

3.10. Prevention of earthquake damage

Locations situated in active earthquake zones generally fall under specific requirements from the construction industry and law and legislation. If the applicable building is somewhat older, the rules from the time might not comply with current insights.

Furthermore, there are numerous conceivable additional measures that could reduce the risk of damage to the premises and inventory during an earthquake.

New builds and renovations

- Prior to making changes to a construction (such as attaching heavy objects on or under roofs, removing brackets, or cutting openings in walls) these should be assessed by a registered design engineer.
- Include requirements for seismic anchoring of the equipment in specifications for purchasing new equipment.

Use, installations and processes

- Store heavier articles on the lower levels of storage racks or on pallets on the ground (but not in passageways).
- Protect valuable stock in racks by installing horizontal barriers at a suitable height. This will prevent stock from falling off the racks.
- Make sure the racks are anchored to the floor and each other.
- Secure valuable or vital equipment, that is in use, to work benches or tables. Fasten the benches/work tables to the ground or walls to limit movement. Also consider switch boxes, control panels and transformers.
- Store hazardous chemicals in indestructible containers and, if practical, on or close to floor level. If you have to use glass containers, put them in a place where the chemical substance could cause the least amount of damage. If possible, place glass containers in a second secured container that is immobile. Above all, store chemicals that can react with each other as far away from each other as is practically possible.

- Make sure that dip tanks and other open containers for corrosive or flammable fluids have a sufficient 'rim' to prevent spillage.
- Tanks holding hazardous chemical fluids should be provided with trenches or dykes to prevent potential spillage.

The following measures are recommended for gas pipes and where process pipes transport hazardous fluids, or where a pipe rupture could lead to an extended disruption to production:

- Use seismic shut-off valves, or shut-off systems operated by a seismic switch.
- Use provisions comparable to those for the sprinkler pipes, including flexible connections, and flexibility in seismic joints and supports.
- Make sure there is enough space where pipes run through walls and floors.
- Consider flexible pipes and soldered connections instead of flanged joints.

IS IT TOO COMPLICATED AND COULD YOU USE SOME PROFESSIONAL HELP?

Do you need assistance in identifying your company's specific risks, or would you like advice regarding potential safety issues you may have missed? Or do you in your position as manager, director or entrepreneur want to know more about your role in a successful and solid production chain? Feel free to contact Ron de Bruijn or Russell Swart at no obligation. We would be happy to help you find solutions.



RON DE BRUIJN

Managing Partner

ron.debruijn@riskonet.com

+31 (0)6 225 212 55



RUSSELL SWART

Senior Consultant

russell.swart@riskonet.com

+31 (0)6 531 728 14

DISCLAIMER

This is a Riskonet publication. Nothing in this edition may be reproduced, stored in an automated database or made public in any form or in any manner, whether it be electronically, mechanically, by print, photocopy or by any other means, without prior written permission from Riskonet.

RISKONET.COM

Amsterdam, September 2019



- MASTER THE UNEXPECTED -



APPENDICES

APPENDIX 1: HOT WORK PERMIT

Hot work permit



Before starting hot work:

Ensure precautions are in place. Make sure sprinklers are in service and fire extinguishers are readily available.

This hot work permit is required for any operation involving open flames of producing heat and/or sparks. This includes but is not limited to: cutting, welding, grinding, brazing, soldering, pipe thawing, torch-applied roofing.

Instruction

The authorised permit issuer must verify all the precautions listed. A response of 'No' should prevent the hot work taking place until this precaution can be met or the hazard eliminated. Two copies of the completed permit should be completed / printed and signed by the issuer, one copy retained by the issuer and one copy for the person doing the work.

There are no safer ways of doing this job

This permit is being issued by a person authorised to do so

Who, when, where

Permits should not be issued for more than 8 hours.

Hot work being done by:

Employee

Contractor Induction completed

Date

Job no./ref.

Location/building and floor

Work description

Name of person doing work

I verify the above location has been examined, the precautions checked on the required precautions checklist have been taken and permission is authorised for work

Name of fire watch

Signature of issuer

Permit expiration date / time

I confirm that a fire watch has been completed following completion of the work as per the required precautions

Signature of fire watch

Required precautions checklist

Available sprinklers, fire hoses and fire extinguishers are in service

Yes	No	N/A
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Hot work equipment in good repair

<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
--------------------------	--------------------------	--------------------------

Requirements within a 10m sphere of work

Flammable liquids, dust, lint and oil deposits removed

<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
--------------------------	--------------------------	--------------------------

Explosive atmosphere eliminated

<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
--------------------------	--------------------------	--------------------------

Floor swept clean

<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
--------------------------	--------------------------	--------------------------

Combustible floor wet down, covered with damp sand or fire resistant sheeting

<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
--------------------------	--------------------------	--------------------------

Combustible material removed, if not possible then covered with fire resistant sheeting or metal sheeting

<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
--------------------------	--------------------------	--------------------------

All wall and floor openings covered

<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
--------------------------	--------------------------	--------------------------

Fire resistant sheeting suspended beneath work

<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
--------------------------	--------------------------	--------------------------

Work on walls/ceilings or enclosed equipment

Construction is non-combustible and without combustible insulation or covering

<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
--------------------------	--------------------------	--------------------------

Combustibles on either side of wall moved 1.5m away

<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
--------------------------	--------------------------	--------------------------

Enclosed equipment cleaned of all combustibles

<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
--------------------------	--------------------------	--------------------------

Containers purged of flammable liquids / vapours

<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
--------------------------	--------------------------	--------------------------

Fire watch / hot work area monitoring requirements

Fire watch will be provided during and for _____ minutes after work including all coffee or lunch breaks

<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
--------------------------	--------------------------	--------------------------

Fire watch is supplied with suitable extinguishers and/or hose reels

<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
--------------------------	--------------------------	--------------------------

Fire watch is trained in the use of the equipment and general emergency procedures

<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
--------------------------	--------------------------	--------------------------

Monitor hot work periodically for _____ hours after job is completed

<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
--------------------------	--------------------------	--------------------------

Other precautions

Confined space or isolation permit required

<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
--------------------------	--------------------------	--------------------------

Area smoke detection has been disabled

<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
--------------------------	--------------------------	--------------------------

Other (please detail below)



APPENDIX 1: HOT WORK PERMIT

Hot work permit | 2

Issuer guidance notes

Application and scope:

A Hot Work Permit should be used during use of equipment such as:

- Blow lamps
- Cutting and welding equipment
- Brazing and soldering equipment
- Bitumen boilers
- Temporary open flame heaters
- Any other equipment producing heat, flames or sparks.

The hot work permit will be needed whilst work is carried out within or on any part of the premises, **except** permanent facilities designed for use of such equipment, such as welding bays within maintenance work shops.

The Permit to Work should be issued to either own staff or to contractors, and should not be issued for lengthy or prolonged periods.

The Permit must be issued and returned to the authorising official and retained on file for future inspection.

User notes:

Many large fires have been caused in industrial premises in recent years by the careless or inappropriate use of Hot Work and the problem appears to be escalating. For property insurance purposes, Insurers expect that the Hot Work Permit System to be followed with care and diligence by all concerned, to avoid the danger of fire outbreak.

The Third Party Insurance cover held by any contractors working must be checked for adequacy with reference made to the Insurers or Insurance Broker where such cover is limited or low, before the work is undertaken.

It is best practice, particularly where major ongoing projects are concerned, that in addition to issue of hot work permits, that a "method statement" be produced. Before the work commences, this will involve a senior or competent person preparing and recording relevant details such as the nature and purpose of the project; the time scales involved; the equipment to be used; the area/location of work; details of the persons carrying out the work and the personnel in charge; details of the particular fire hazards presented from carrying out this work in this location; the fire precautions taken; the fire protection equipment available; with details of inspections after work is completed.

It is preferable in all cases to conduct work either by a safer method not involving the application of heat, or to take the work to a safe location, such as an open area or maintenance workshop. The experience and competence of the contractors or employee must always be established before the work is authorised and equipment checked for safety and condition. Fire protection/detection equipment should be checked to ensure that it is functioning properly and is not impaired. (NB - fire detection in the immediate vicinity may need to be isolated, but it should not be isolated in adjoining areas and must be reactivated immediately the work finishes).

A hot work permit should only be issued by personnel authorised and trained to do so and a list of these persons should be maintained. The precautions listed as part of the Hot work permit should be strictly observed, and common sense applied where there is doubt. Areas should be kept clean and tidy during the work, combustible waste produced during operations regularly removed to a safe location, and premises NO SMOKING rules strictly observed at all times, particularly where contractors are involved.

If the work causes a small fire which is extinguished, work must nevertheless cease and the incident reported to the issuer of the permit for immediate investigation. Only after full investigation should work be permitted to recommence.

When the work is complete, it is **essential that a check is made after work is finished**, to look for glowing embers, smoke, areas of residual heat etc. The extent of this check is a function of the area of the hot work (in areas of low or no combustible loading it may be shortened, or lengthened in areas of high combustible loading) but is normally recommended for up to 90 minutes, with continuous monitoring for the first 30 minutes and periodic checking (every 10-15 minutes) for a further 60 minutes. Where such checks cannot be carried out, issue of the permit should be deferred or delayed.

Any indications of an outbreak of fire should be treated immediately as an emergency, and the Fire Brigade summoned.

Company Adress, Country
Tel: (012) 345 67 89, www.company.com

APPENDIX 2: PREMISES & FIRE SAFETY SELF-INSPECTION LIST

Premises & Fire Safety self-inspection checklist

Date of inspection:

Weekly / Monthly / Quarterly (*circle one*)

Area / building:

General conditions

✓ as appropriate

Building & Structures

- Visually in good condition
- No damage to walls or floors
- Structural members undamaged
- Windows and Doors in good condition and water tight
- Roofs not damaged nor leaking
- Gutters / drains not damaged nor leaking
- Gutters Inspected and cleaned (Annual)
- Roofs inspected (Annual)

OK

Comments / Action

Outside Areas

- Walkways clearly marked and kept clear
- Paths and yard areas in good condition for pedestrians and vehicles
- Outdoor storage properly controlled
- Pallet storage away from buildings

General Housekeeping

- No excessive storage
- Storage only in designated areas
- Aisles kept clear
- Floors kept clear
- Waste removed regularly
- Dust / grease build-up removed

Electrical Equipment

- Visually in good condition
- No damaged cabling
- Trailing leads secured
- Sockets not overloaded
- Portable equipment

APPENDIX 2: PREMISES & FIRE SAFETY SELF-INSPECTION LIST

Self Inspection Form | 2

General conditions

✓ as appropriate

Site Security

OK

Comments / Action

- Intruder detection systems OK
- Alarm signalling OK
- CCTV functional and monitored
- Boundary fences and gates in good condition
- Watchman / Security tours OK

Fire Safety Specific

✓ as appropriate

Portable Fire Extinguishers

OK

Comments / Action

- Correct types in place
- Not discharged
- Visually in good condition
- Accessible
- None missing

Fire Hoses / Hose reels

- Visually in good condition
- None leaking
- Accessible
- Operational

Fire & Smoke Doors/Shutters

- Visually in good condition
- None damaged
- None obstructed
- Close fully

Emergency Escape Doors

- Visually in good condition
- None damaged
- None obstructed
- Open easily from inside

Emergency Procedures

- Clearly posted
- Roles and Responsibilities assigned
- Drills carried out
- Fire Brigade Information pack OK

APPENDIX 2: PREMISES & FIRE SAFETY SELF-INSPECTION LIST

Self Inspection Form | 3

General conditions

✓ as appropriate

	OK	Comments / Action
Combustible Composite Panels		
All panels undamaged	<input type="checkbox"/>	
No exposed insulation materials	<input type="checkbox"/>	
All penetrations sealed	<input type="checkbox"/>	
Repairs undertaken promptly	<input type="checkbox"/>	
Flammable Liquids		
Stored in proper places	<input type="checkbox"/>	
One shift's worth on shop-floor	<input type="checkbox"/>	
Vaults/cabinets/safety cans used	<input type="checkbox"/>	
Earth bonds used for dispensing	<input type="checkbox"/>	
Floor drainage unobstructed	<input type="checkbox"/>	
Bunding in good condition	<input type="checkbox"/>	
Adequate ventilation	<input type="checkbox"/>	
Appropriate electrical equipment in use	<input type="checkbox"/>	
Gas / vapour leak detection OK	<input type="checkbox"/>	
Non-sparking tools used	<input type="checkbox"/>	
Other Ignition Sources		
Smoking rules obeyed	<input type="checkbox"/>	
Hot Work Permits used	<input type="checkbox"/>	
Electrics kept clear	<input type="checkbox"/>	
Friction - moving equip. OK	<input type="checkbox"/>	
Static – no evidence of build-up	<input type="checkbox"/>	
Hot surfaces kept clear	<input type="checkbox"/>	
Burners/heaters OK and clear	<input type="checkbox"/>	
No security breaches (arson)	<input type="checkbox"/>	
No fuels in yard for arsonists	<input type="checkbox"/>	
Other Fire Alarm / Control Systems		
Visually in good condition	<input type="checkbox"/>	
Fire alarm system OK (no faults)	<input type="checkbox"/>	
Weekly fire alarm tests OK	<input type="checkbox"/>	
Fire Hydrants kept clear	<input type="checkbox"/>	
Weekly sprinkler checks OK	<input type="checkbox"/>	
Weekly fire pump checks OK	<input type="checkbox"/>	
Other fire / explosion systems OK	<input type="checkbox"/>	

APPENDIX 2: PREMISES & FIRE SAFETY SELF-INSPECTION LIST

Self Inspection Form | 4

Additional observations & action planning comments

Inspected by:

Reviewed by:

Signature

Signature

Date:

Date:

Company Adress, Country
Tel: (012) 345 67 89, www.company.com