

10 QUALITIES OF A WELL-PROTECTED FACILITY





In today's highly competitive environment, companies are struggling to stay on top by finding ways to both limit expenses and increase profits. No company can afford the loss of property and productivity from destruction caused by fire, natural hazards or equipment outage.

Although insurance helps to alleviate some of the costs associated with property damage, intangible loss—such as loss of time, customers, goodwill and trained employees—generally is not covered. Equipment damaged within minutes can take months to repair or replace. In the meantime, skilled employees find new jobs. If that happens, time must be taken to train new personnel and obtain and set up new equipment. Key executives will spend their time dealing with the loss rather than developing next year's business plans.

What's the impact? Market position may be lost. And, inflation and material shortage may make rebuilding difficult and costly.

For these reasons, FM Global identified 10 basic qualities to protect industrial, commercial and institutional properties. By communicating these qualities, we hope to encourage you to carefully examine your own facility. In areas where you find deficiencies, you can make changes that will protect your property against a major loss.

This publication offers a light synopsis of the desired qualities. Each is further supported by FM Global Property Loss Prevention Data Sheets and other loss prevention publications and online training courses that should be consulted before developing or enhancing one or more of these qualities. Visit fmglobal.com/datasheets or browse our Resource Catalog at fmglobal.com/catalog to learn more.

NO COMPANY CAN AFFORD THE LOSS OF PROPERTY AND PRODUCTIVITY FROM DESTRUCTION CAUSED BY FIRE, NATURAL HAZARDS OR EQUIPMENT OUTAGE.



PROPERTY LOSS PREVENTION COMMITMENT

From the outset, management must genuinely commit to property loss prevention. Concerned management, wishing to endorse an effective property loss prevention and control program, should demonstrate its support by putting the objectives, procedures, responsibilities and accountabilities of such a program into writing. A formal policy statement conveys the company's commitment to property loss prevention and encourages employee involvement and enforcement of property loss prevention measures.

After endorsing the program, management must ensure it is implemented. The goal is for all employees to be able to react effectively to emergencies and any hazardous conditions they may encounter. Motivated employees who understand and support property loss prevention and control principles are the key to building a continually improving program aimed at reducing the frequency and severity of loss. Employees should know that property loss prevention and control is a permanent aspect of their jobs. They also should understand that the actions they take benefit everyone: Property loss prevention and control measures protect not only the company, but their jobs as well.

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SUITABLE CONSTRUCTION

A building's inherent construction type plays a major role in determining the extent of fire exposure it can withstand. The proposed content of a building is another important factor in determining the building design and choosing construction material. When a building contains highly hazardous processes or is several stories high, fire-resistant material, such as reinforced concrete or a protected steel frame, is desirable. Reduce the possibility of property loss by subdividing large areas of your building with firewalls.

Ignitable liquid, combustible dust and other material presenting an explosion hazard should be stored in detached buildings, if possible. If these items must be kept in main buildings, enclose them with a combination of pressure-resistant and pressure-relieving construction. The proper design of damage-limiting construction can vent the force of an explosion in the least destructive direction.

Design roofs to withstand loading from snow, ice and rainfall. Also, design main roofs and their coverings to resist wind uplift. Adhere to seismic details found in your local building code if buildings are located in an earthquake area. Select appropriate building material to resist deterioration where processes can produce a corrosive atmosphere. Take note of nearby facilities that may house highly combustible occupancies. If such facilities exist, design your structure to resist this exposure.

As the cost of fuel for processes and area heating continues to increase, the design of buildings and processes to conserve energy becomes more critical. It's best to use insulation material that does not introduce fire hazards. If you must use combustible insulation, protect it with noncombustible barriers and automatic sprinklers. When planning construction, give preference to a site that has an ample and reliable public water supply, and is located nearer to the public fire service. Consider the site's flood, earthquake and windstorm history as well.

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AUTOMATIC SPRINKLER PROTECTION

SPRINKLERS OFFER THE BEST AUTOMATIC, ALWAYS-ON-DUTY FIRE CONTROL SYSTEM ON THE MARKET TODAY.

The backbone of a workable property loss prevention and control program is recognizing the need for automatic sprinkler protection. Automatic sprinklers are needed wherever you have combustible construction, material or processes related to the type of occupancy. Sprinklers offer the best automatic, always-on-duty fire control system on the market today. They can mean the difference between a minor business interruption and a prolonged or permanent shutdown. In addition to automatically detecting and controlling or extinguishing a fire, sprinklers can initiate and transmit an alarm. A properly designed system eliminates excessive water damage.

A sprinkler system attacks fire where it starts, with sprinklers operating directly over the fire area. If this is not sufficient to control the blaze, neighboring sprinklers will then activate as needed. Hence, water damage is minimized.

In today's facilities, there are few locations where sprinklers are not needed. Automatic sprinkler protection is appropriate for every area where material and processes have the potential to start a fire, contribute fuel to a fire, help fire to spread or where fire damage is a threat.



SPECIAL HAZARDS PROTECTION

Many industrial operations involve special hazards that require additional safeguards beyond sprinkler protection and normal construction features. Ignitable liquid, combustible dust and flammable gas, for example, each deserve special attention.

Handled carelessly, ignitable liquid is one of the most insidious threats to industry. At room temperature, a liquid gives off vapor that flows through an area, forming an easily ignited flammable vapor-air mixture. Combustion is extremely rapid, and far greater heat is released than with a fire that involves ordinary combustible material.

There are several basic safeguards for the storage, handling and use of ignitable liquid. Isolate ignitable liquid by distance or construction. A detached location is preferred. Otherwise, use a carefully located and designated cutoff area within a main building.

Confine ignitable liquid with curbs or dikes to avoid contact with any ignition sources. Use appropriate passive physical controls, such as safety cans, grounding straps, safety bungs or interlocks. Provide adequate natural or forced mechanical ventilation in confined areas involving ignitable liquid to eliminate concentrations of flammable vapor. Provide employees with procedural training on ignitable liquid hazards, and foster safe-handling awareness with strict reinforcement of procedures. It's also wise to have an adequate spill response program in place.

Still other steps include eliminating ignition sources, such as open flames, smoking, static, electrical sparks and hot surfaces, and using specially designed electrical equipment.

Dust-producing processes require many of the same safeguards used for ignitable liquid. Confine dust within well-designed process and transfer equipment to minimize leakage. Do not allow dust that escapes to accumulate. Clean process and storage areas periodically.

As with ignitable liquid, maintain strict control of ignition sources. And, if possible, isolate dust-producing processes by locating major equipment outdoors.

Flammable gas also requires special attention. Again, isolate its storage and confine it to properly designed process and storage equipment to prevent leakage. Avoid physical damage, overheating and overpressure. You will need sprinklers and/or water spray protection or fire-resistive insulation for many tank installations.

Also consider emergency shutoff valves. The type of valve required and the number and location of each depend on what you are storing, the quantity being used, the type of storage tank used and the number of storage tanks in the area. Ensure that emergency shutoff valves are easily accessible so you can isolate and stop the flow of flammable gas or ignitable liquid in an emergency.



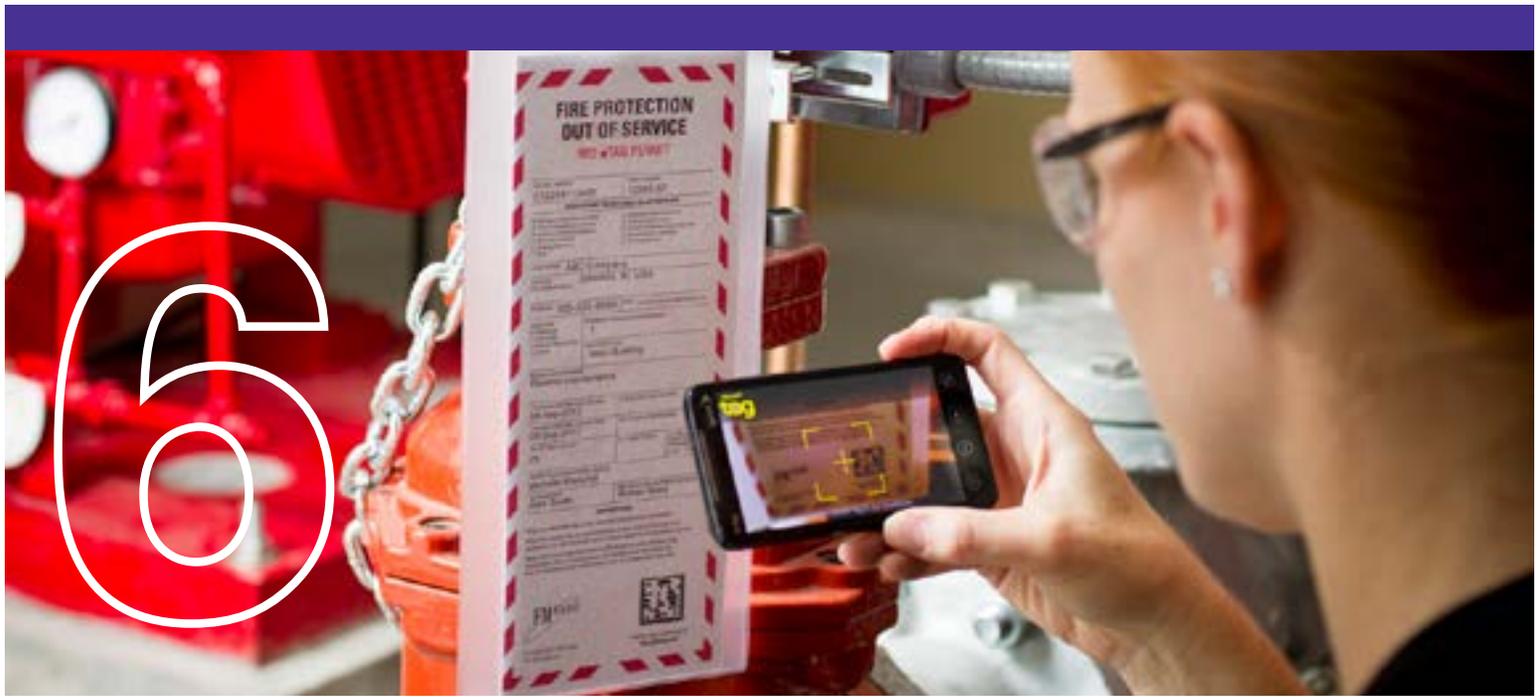
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ADEQUATE WATER SUPPLY

**TO BE EFFECTIVE,
SPRINKLERS ALWAYS
MUST BE SUPPLIED
WITH WATER, ADEQUATE
BOTH IN VOLUME
AND PRESSURE.**

To be effective, sprinklers always must be supplied with water, adequate both in volume and pressure. Possible sources include public water mains, a gravity tank, fire pump and suction tank, a natural body of water, or a suitable combination. Pumper connections are desirable, allowing the public fire service to reinforce the system further.

Keep in mind that occupancy changes, the addition of new buildings or extensions, as well as the introduction of more hazardous processes or storage arrangements in existing buildings, may increase your water supply requirements. Also take note of any new neighboring facilities in your area. An increase in demand on the public water supply may necessitate improvements in your own fire protection water supply system.



ONGOING FIRE PREVENTION PROGRAMS

Another step toward a well-protected property is to establish regular, recorded inspections of fire protection equipment. Physically trying locked or sealed valves periodically is essential. Locked valves should be physically tried at least monthly and visually checked weekly. Valve inspection schedules should include all valves and allow ample time for the careful examination of each. List and number every valve in the order in which you examine it.

Inspections also should include house-keeping, ignitable liquid handling and control of smoking. Ensure that basic ignitable liquid safeguards, such as ventilation, diking and containment, are in place. Ensure that smoking material is confined and contained. (It's up to management to communicate the organization's smoking policy to all employees.) Also, make certain your facility is protected against arsonists. Key safeguards include the provision of security measures and identification of vulnerabilities.

During inspections, you also should check the condition of extinguishers, fire hoses, hydrants, sprinkler alarms, fire pumps, water supply tanks and fire doors.

Occasionally, sprinkler system control valves must be closed for repair or maintenance. Do this cautiously! This type of impairment leaves your property in jeopardy of fire because its principal means of protection is out of service. Obtain authorization from the fire-safety supervisor before closing a sprinkler system control valve. Follow FM Global's Managing Fire Protection System Impairment (P9006), which outlines necessary steps to take before, during and after impairment. Remember, have everything in place to do scheduled work on sprinkler systems before the valves are closed.

Hot work operations impose fire hazards from sparks that fly long distances and stay hot long after they slip out of sight into holes or cracks. FM Global encourages the use of its Hot Work Permit (F2630) for controlling these operations. Using the permit, a fire-safety supervisor authorizes hot work only under specific firesafe conditions. This permit has proved to be an invaluable tool for managing hot work.

Another way to protect against hot work hazards is to ensure employees and outside contractors use proper procedures and observe appropriate precautions. Continuously monitor areas for up to five hours following hot work (refer to the back of the Hot Work Permit for required times, based on construction factors). Also, be sure employees take responsibility for requiring outside contractors to conform to your policies. Finally, ensure your emergency response team (ERT) is made aware of and instructed in the company's hot work procedures.



GOOD HOUSEKEEPING

One key component in any property loss prevention program is good housekeeping, which involves all employees. Personal pride and common sense motivate personnel to keep their work areas clean, and help keep them aware of possible hazards.

Good housekeeping is more than just looking neat. Besides frequent cleaning, some basic steps employees can take to ensure good housekeeping include prompt waste disposal and proper material-handling practices—especially in large storage areas.

Special care should be taken to avoid the buildup of combustible waste and deposits—such as dust—from floors, ceilings, structural members, machinery and equipment. An effective housekeeping program also includes a formal system for employees to report potential problems. Good housekeeping sets the tone for all property loss prevention and control efforts.

**GOOD HOUSEKEEPING
SETS THE TONE FOR
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BUILDINGS AND EQUIPMENT MAINTENANCE

Inspecting fire protection equipment is not enough. Institute a regular preventive maintenance program for buildings and equipment. Preventive maintenance will not only prolong the life of valuable equipment, but it can also prevent unanticipated equipment breakdown, saving money in replacement costs and business interruption.

Some basic safeguards against electrical system failure include checking electrical connections for tightness and inspecting electrical equipment for signs of overheating. Be sure that electrical systems are adequately sized, properly maintained and protected, and appropriate to your occupancy. The physical operating environment should keep electrical equipment clean, cool and dry. Employees should be trained to operate electrical equipment properly, especially in emergencies.

You can avoid machinery breakdown by periodic or continuous monitoring and timely repair when distress is evident.

Boilers and process furnaces present special problems. In the case of boilers and pressure vessels, install, test and maintain recommended safety controls.

Cleanliness, above all, is a major factor in the maintenance of most equipment.

In general, it's good practice to avoid grease, oil or dust accumulations on all types of equipment and machinery.

PREVENTIVE MAINTENANCE WILL NOT ONLY PROLONG THE LIFE OF VALUABLE EQUIPMENT, BUT IT CAN ALSO PREVENT UNANTICIPATED EQUIPMENT BREAKDOWN, SAVING MONEY IN REPLACEMENT COSTS AND BUSINESS INTERRUPTION.

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EMERGENCY RESPONSE TEAM AND PUBLIC FIRE SERVICE

An effective, trained emergency response team (ERT) that comprises those most familiar with your facility and its operations can respond quickly to an emergency and help your company recover with a minimum of damage and disruption. Emergencies run the gamut from fire, explosion, hazardous material spillage or a nuclear accident, to natural hazards such as hurricane, freeze, earthquake and flood.

An ERT can include eight or more key functions, depending on the size and type of location, for which facility employees should be trained. The most common are as follows:

- Person in charge
- Notifier
- Sprinkler control valve operator
- Fire pump operator
- Fire squad
- Pipe fitter
- Electrician
- Salvage squad

Every location should have an ERT tailored to its individual size and needs. FM Global has identified low, moderate and high levels of competency for each of these functions and for ERT training and fire service/ERT planning. By working with FM Global, you can decide how best to customize these functions to design an ERT that's right for your facility.

For a fire emergency, here are some basic skills your ERT members should have:

- The person in charge must develop and maintain a written plan, be familiar with all facilities and any inherent special hazards, know the care and operation of all protection systems and have proper training and experience in firefighting. When a fire emergency occurs, the person in charge must direct all emergency actions until the public fire service arrives.
- Your designated notifier reports a fire to the local fire service and provides preliminary information about the fire's location. (Your company should be sure there is a local fire service that will respond promptly to a fire at your facility, and that firefighters have an adequate available water supply to use.)

AN EFFECTIVE, TRAINED EMERGENCY RESPONSE TEAM (ERT) THAT COMPRISES THOSE MOST FAMILIAR WITH YOUR FACILITY AND ITS OPERATIONS CAN RESPOND QUICKLY TO AN EMERGENCY AND HELP YOUR COMPANY RECOVER WITH A MINIMUM OF DAMAGE AND DISRUPTION.



EMERGENCY RESPONSE TEAM AND PUBLIC FIRE SERVICE continued

- The sprinkler control valve operator knows where, when and how fire control equipment is to be handled to ensure it operates in a fire situation. Likewise, the fire pump operator verifies the fire pump is operating, and shuts it off when instructed to do so by the person in charge or the fire chief.
 - Your fire squad should know the location of, and be trained to use, fire extinguishers to control an incipient fire.
 - The pipe fitter has access to external sources that can shut off gas, water and steam; the electrician has similar access related to electricity. Both of these ERT members also should have 24-hour access to those who may provide these services on a retainer basis.
 - Your salvage squad, which should have access to decision-making management, can evaluate the need for salvage operations and establish contingency plans and a retainer schedule with the vendor, depending on the nature of the occupancy.
 - ERT training also cannot be overlooked. It's essential to update ERT positions and responsibilities and provide training for new members at quarterly meetings.
- Employees who are not directly involved in the ERT still play a role in property loss prevention and control. Train key personnel in all departments to use portable fire extinguishers. Give special attention to equipment, processes and material that have unusual fire or explosion hazards. Emphasize proper operating procedures and maintenance.

Prefire planning with the public fire service is desirable when setting up an ERT. A company representative should make a complete inspection of the premises with a member of the local fire service. Firefighters will want to note a variety of factors, including the number of buildings involved, number of stories in each, construction and any special structures, equipment in the building and sprinkler protection.

Once you've compiled a prefire plan (you and the fire service should retain copies), your ERT and the fire service will be able to work together more effectively in the event of an emergency. Even after a prefire plan has been drawn up, it's important that the fire service visit your facility at least annually to keep abreast of any changes that may have occurred.



NATURAL HAZARDS PROTECTION

A COMPLETE PROPERTY LOSS PREVENTION AND CONTROL PROGRAM SHOULD ALSO TAKE INTO CONSIDERATION HAZARDS POSED BY CONDITIONS OUTSIDE THE FACILITY.

A complete property loss prevention and control program should also take into consideration hazards posed by conditions outside the facility. The recent rise in global natural disasters, as well as exposure hazards created by nearby buildings or outside storage, make the case for increased physical improvements to key business facilities.

The degree of exposure hazard may also call for exterior fire doors, wired glass windows with or without outside sprinklers, or the elimination of openings by bricking them up. Combustible material stored outside should be located at an adequate distance from main buildings.

Windstorm damage also can cause a severe production interruption. A common rule of thumb is to design and build your building to withstand windstorms normally expected in your geographic area. This includes properly anchored roof framings and decks, adequate adhesion or fastening of roof coverings (particularly at corners and perimeters), and adequate fastening of perimeter flashing. Proper maintenance of roof decking, covering and flashing will help minimize wind damage.

Safeguards against flood are especially important for properties located in flood-prone regions. In addition to the expected damage to equipment and storage from water and mud entering a building, consider that floating debris can batter walls and equipment, rupturing pipelines that carry hazardous material. Automatic sprinkler system risers may be broken. Inadequately anchored tanks holding ignitable liquid may break away from their foundations and float, eventually striking other objects, rupturing and discharging their contents.

In high-risk areas, you should provide permanent flood protection such as dikes, flood shields for doorways and special anchoring of tanks. It is advisable to seal unnecessary exterior openings as well.

In areas susceptible to earthquake, buildings should be designed and constructed in accordance with seismic details specified in local building codes. Minimize the possibility of toppling and sliding by bracing and anchoring storage racks, boilers, transformers, tanks and other large equipment. Use special installation techniques to protect sprinkler and process piping.



NATURAL HAZARDS PROTECTION continued

Providing protection against roof collapse also is vital. Depending on the climate, roofs may be subject to excessive loading from ponded rainwater, accumulations of snow, or both.

While local codes may specify that roof design be adequate for uniformly distributed snow depths, the roof may not be able to withstand excessive loading over a relatively small area. In this case, it is important to design these areas to withstand anticipated loads from drifted snow. Quick snow removal will help you avoid additional loading from ice, snow and water in the event another storm should follow. Prevent overloading from ponding water by using adequately sized and properly located drains of sufficient number.

A well-trained ERT, often aided by other employees, is key in dealing with hazards that originate outside the facility. The ERT can inspect and expedite repairs to damaged fire protection systems, provide temporary fire protection as needed, restore process and power equipment, salvage storage of raw stock and finished product, make temporary building repairs as needed and, in general, expedite a return to normal operations. A property damaged by one peril is usually more vulnerable to fire than one free from incident.

Visit our NatHaz toolkit online at fmglobal.com/nathaz for more information and available resources.



10 QUALITIES OF A WELL-PROTECTED FACILITY

1. Property Loss Prevention Commitment
2. Suitable Construction
3. Automatic Sprinkler Protection
4. Special Hazards Protection
5. Adequate Water Supply
6. Ongoing Fire Prevention Programs
7. Good Housekeeping
8. Buildings and Equipment Maintenance
9. Emergency Response Team and Public Fire Service
10. Natural Hazards Protection

Remember these qualities, and incorporate them into your daily risk management functions. They are the result of more than 185 years of experience, which has taught us and our clients that property loss prevention and control is a constant concern.

A property loss prevention program can help protect your company's competitiveness, lower business costs and improve efficiency and effectiveness. It also could mean the difference between being in business today and facing a lasting shutdown tomorrow.

If you do not already have a property loss prevention program at your company, contact your FM Global engineer and/or client service team for additional guidance.



RESILIENCE IS A CHOICE.

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