In the insurance industry, industrial facilities are said to have both common hazards and special hazards. Common hazards are those found in many facilities regardless of the occupancy or the product being manufactured. Special hazards are those associated with a specific industry.

For example, almost all facilities have electricity. The hazards associated with electricity distribution are considered common hazards because they are common to all industries. Compressed air is another example because many industries use air compressors, and compressed air has many uses.

Special hazards are primarily associated with specific industries. For example, conducting a proprietary process involving combustible materials with a nearby ignition source may be a special hazard at a facility. Flammable liquids are considered special hazards because they represent high hazards and are usually specific to the facility’s occupancy.

What may be a common hazard for most industries can become a special hazard in a particular industry. One example is the use of electricity in special applications. Transformers used for electricity distribution under normal voltage and power levels are usually considered common hazards, but when the voltages or power levels exceed normal levels, they become special hazards. Another example is large arc furnaces, which use specially designed and built transformers that can withstand wear and tear from large electrical loads. Arc furnace transformers are typically built to certain specifications and are matched to specific furnaces. Arc furnace transformers can take 12 to 18 months to replace.

**Management Programs**

Your business is your company’s biggest asset and it is worth protecting. Controlling hazards helps safeguard a business. Management programs are critical to controlling hazards. Some programs a company should have in place include:

- emergency planning and response;
- evacuation plan;
- self-inspection for fire safety items and fire protection equipment;
- housekeeping inspection program;
- business continuity and recovery plan;
- hot work permit program;
- lockout/tagout (LOTO);
- fire protection impairment program;
- fire extinguisher inspection and maintenance program;
- fire protection inspection, testing and maintenance programs;
- alarm system and illegal entry inspection and testing programs;
- electrical inspection programs;
- grounding system inspection and testing programs;
- pressure vessel inspection program;
- incident investigation program;
- safety committee and safety training program;
- hazard analysis program.

These programs can help prevent or mitigate an otherwise devastating loss. Management commitment and involvement in these programs is critical.

**Fired Equipment**

Boilers, furnaces and fired or heated equipment are present in many facilities. Some of these devices not only use a type of fuel for heat, they may also develop pressure and become pressure vessels. Boilers are an example of a fired pressure vessel. Other equipment in this category may include steam generators and chemical dryers.

Fired equipment may use several different types of fuels such as natural gas, propane, fuel oil, coal or alternative fuels. Each of these fuels requires various combustion control arrangements to operate safely. The equipment may expose critical facility operations, and a fire or explosion could be devastating. Depending on the fuel, operating temperature, pressure and specific type of equipment, combustion control standards may be followed. Two of the most widely used standards for fired equipment are NFPA 85, *Boiler and Combustion Systems Hazards Code*, and NFPA 86, *Standard for Ovens and Furnaces*.

**Heating & HVAC**

Heating and heating, ventilation and air conditioning (HVAC) systems are considered common hazards because many fuels may be used in the heating system. Systems utilizing electrical power require appropriate breakers and electrical safeguards to protect the systems from overheating. Heating systems using natural gas or propane require combustion controls on the fuel lines coming into the building. NFPA 85, *Boiler and Combustion Systems Hazards Code*, may be used to identify the combustion controls needed for such systems.
**Electrical Systems**

Electricity has become a part of everyday life and is considered a necessity. Electricity operates everything from heating systems to appliances to entertainment devices. Because so many building systems depend on electricity, a facility may completely shut down when power is interrupted.

When properly designed and installed, electrical systems are safe and reliable. Occasionally, electrical systems malfunction and produce arcing or overheating. When this occurs, a fire may develop, which is why electrical systems must be regularly maintained and inspected. A documented electrical equipment reliability and integrity program should be implemented. Electrical system inspections and analysis should be conducted by licensed or qualified people. Analytical inspection methods include infrared imaging of electrical switchgear and motor control centers. Oil analysis should be performed for oil-filled transformers. Mechanical equipment, such as large motors, may be inspected using vibration analysis, stress fatigue and other methods that may be specific to the equipment installed at the facility. When deficiencies are found, they should be repaired in a timely manner. A regular inspection program will detect abnormalities early and often before a loss can occur. Managers will be able to schedule repairs at the facility’s convenience, eliminating the need to shut down production at a critical time.

**Storage**

Almost every facility has some type of storage. Sometimes, a facility’s storage is limited and incidental to its occupancy. As an organization’s need for storage increases, so does the hazard from the materials being stored. As the number of particular items in storage increases, the storage arrangement will become more complex. Shelves or racks may be needed for storing goods in an easily accessible manner.

Designs for adequate sprinkler protection for storage occupancies can be extremely complex. The fire protection systems installed in a building take many considerations into account. The commodity and class of storage must be determined. The storage configuration and maximum storage height are also significant criteria. The height of the building is important. Once a storage arrangement has been defined, careful selection of sprinkler system arrangements must be identified, which may include the particular sprinkler head to be used, the head’s temperature rating, the design density and area of operation. In-rack sprinkler protection may be needed, and sufficient clearances from sprinklers must also be determined.

In manufacturing facilities, storage is a significant exposure equipment and operations. Storage should be separated from manufacturing operations with adequate fire cut-off walls and separations to prevent manufacturing operations from being lost in the event of a storage fire.

When storing small quantities of materials in a relatively small storage area, the fire protection system
should be evaluated to assess whether it adequately protects the storage area. NFPA 13, Standard for the Installation of Sprinkler Systems, defines miscellaneous storage as storage that does not exceed 12 ft in height and is incidental to any other occupancy use group. It should not constitute more than 10% of the building area or 4,000 ft² of the area covered by the sprinkler, whichever is greater. The storage may not exceed 1,000 ft² in one pile area. Additionally, the miscellaneous storage area must be separated from other storage areas by at least 25 ft. Sometimes occupants discount the significance of miscellaneous storage, yet it may present a significant fire protection exposure and the protection criteria required to protect miscellaneous storage is very specific.

**Idle Pallets**

Storage of idle pallets represents a significant fire hazard. Excessive idle pallet storage may overtax sprinkler systems and contribute to the total loss of a building or facility. Wood pallets often become dry and the wood fibers fray, allowing them to ignite easily. Geometrically, idle pallets stacked in piles are almost perfect for an intense fire. Ample air supply to many surfaces exists in such piles, allowing the fire to grow rapidly. Extremely high heat release associated with a fire in stacks of idle pallets may create a high velocity flow of fire gases. These gases can quickly spread across the ceiling, potentially opening an excessive number of sprinkler heads. The water discharge from sprinkler heads may evaporate before it is able to significantly cool or control the fire.

The sprinkler system may become overtaxed and a severe fire loss may result.

Idle pallets should be stored outside the building in an organized manner at least 50 ft from all buildings and yard storage. Idle pallet piles should be arranged to ensure that the fire department has ample and adequate access to fight a fire. Another acceptable storage arrangement is to store the pallets inside a low-value detached building or trailers used exclusively for the storage of idle pallets. This storage should be at least 25 ft from other buildings or yard storage.

If pallets are stored indoors, the number of pallets stored in any one area should be strictly limited and the sprinkler system must be able to provide adequate protection for them. Idle pallets may be stored in cut-off rooms that are adequately protected with automatic sprinkler protection. NFPA 13, Standard for the Installation of Sprinkler Systems, has strict criteria for the protection of idle pallets.

If idle pallets must be stored in the open, the organization must recognize that they directly expose the facility to loss. In general, idle wood pallets should not be stacked higher than 6 ft with no more than four pallet piles grouped together. The group of wood pallets should be separated from any other group of idle pallets by an 8-ft aisle or 25 ft of commodity. Plastic pallets constitute an even greater hazard and should be stacked no higher than 4 ft, with no more than two stacks together separated by 8 ft of clear space or 25 ft of stored commodity. Storage of pallets beyond these criteria should be protected in accordance with NFPA 13, and have suitable sprinkler protection.

**Cooling Towers**

Cooling towers are necessary pieces of process equipment. Loss of the cooling tower may significantly impact a facility’s operation. Many processes are not able to run without sufficient cooling. Cooling towers are designed to transfer heat from one medium to another. An industrial process that creates heat may require a cooling tower to dissipate that heat. Cooling towers are constructed in various sizes, with some of the largest units found in nuclear power plants.

Cooling towers may be constructed of wood, metal, metal frame with wood fill or metal frame with plastic fillers. Depending on the materials used, the cooling tower may be extremely combustible. Despite significant water flow through the tower, dry areas in the tower may exist and can ignite.

Cooling towers should be located a sufficient distance from buildings and other combustible areas. Fire barriers should be integrated into tower designs to help prevent fire spread through the entire tower. Automatic fire protection should be installed in combustible cooling towers. Manual firefighting appliances, such as fire hydrants and standpipes, should be installed near the towers. In addition, cooling towers should be provided with lightning protection. NFPA 214, Standard on Water-Cooling Towers, identifies the specific safety requirements for these towers.

**Air-Moving & Handling Equipment**

Air-moving equipment in industrial and commercial facilities serves important material handling functions. Different types of such equipment use different methods of controlling air movement. Air-moving equipment may
be installed to remove fumes, collect dust, remove impurities, and size particulate matter. The equipment may have significant hazards and may involve combustible components such as plastic ductwork, wood bins and bag houses in which fabric bags are used for screening materials.

Air-handling equipment is installed in many industries. Almost any manufacturing process developing material that must be conveyed from small particulate matter to larger cutoffs may use air handlers to move that material to another area for separation, cooling, environmental control or other applications. Processes that liberate flammable or corrosive fumes are typically provided with air-handling equipment.

Hazard analysis is extremely important for air-moving and handling equipment. Depending on the process, some of this equipment is subject to fire, explosion and environmental impact loss. An in-depth hazard analysis study will help ensure that the air handling equipment is located, installed, operated and maintained properly.

**Flammable & Combustible Liquids**

Flammable and combustible liquids are extremely common in commercial and industrial facilities. The amount of flammable liquids being used has reduced significantly over the past decade, but they still represent a significant industrial hazard. Fire and explosion are the two primary hazards associated with flammable and combustible liquids. Flammable liquids may produce vapors that are readily ignitable at normal atmospheric temperatures. Numerous methods may be implemented to safely handle these materials. NFPA 30, *Flammable and Combustible Liquids Code*, is a standard commonly used to determine adequate protection.

Storage should be a primary consideration when flammable and combustible liquids are used. In bulk, these liquids may be stored in large tanks and placed in tank farms. Smaller quantities may be stored in small tanks, totes, drums or pails. Many users receive product in 55-gallon drums or pails. The material may be transferred to smaller containers for easier handling at the point of use, which also limits the quantity kept outside of a designated and properly designed storage unit. Flammable liquids cabinets may be located at the point of use. UL-listed dispensing cans for flammable liquids should be used for small quantities.

Flammable liquids rooms may be constructed in separate structures or along an exterior wall with rated firewalls and fire doors. NFPA 30 identifies protection criteria for flammable liquids rooms. Some protection strategies include automatic sprinkler protection, electrical equipment of the appropriate classification, grounding, bonding, explosion venting, drainage and containment, ventilation, alarm detection and specific dispensing procedures.

Moving flammable liquids is often performed through pipe systems with pumps. Pumping systems require protection from physical damage and must meet applicable electrical and flammable liquids codes. The piping system may utilize pipe-in-pipe containment strategies and may have sophisticated shutdown systems to prevent a large leak in the event of pipe breakage.

Self-inspection programs should be designed to focus on the storage, dispense and handling of flammable and combustible liquids. Housekeeping should be high on the list of inspection points. Hazard analysis reviews should be performed in all areas where flammable and combustible liquids are stored or used.

**Special Hazards Particular to a Facility**

One effective way to identify special hazards at a facility is to tour the grounds and look at the specific processes and equipment being used. Are any of these processes highly specialized or proprietary? Do they present hazardous operations that could cause ignition or a fire? Identify the consequences of an equipment fire and the time to rebuild the area. Based on this preliminary hazard assessment, it may be deemed necessary to perform a full hazard review of the process.

A hazard review will be beneficial in that it may reduce the probability and severity of loss. A site team can review the process and ensure that it is in compliance with current regulatory standards. The process will help bring managers and employees together to evaluate and solve a common problem.

Identify protection features installed in the process. If the time to recover from a loss is significant and could affect business continuity, additional protection may be provided. Also, substitutions may be made to help eliminate the level of the hazard.

Once the assessment is completed and any changes are implemented, the plant’s documentation should be updated.

**Conclusion**

Dealing with common and special hazards in commercial and industrial facilities is an ongoing process. It requires observation, identification of adequate or inadequate protection, problem solving and documentation. Knowledge and attention to these hazards will help safeguard a business.

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