

COMMERCIAL PROPERTY RISK CONTROL (551-1)

EO 1. THE THREE ELEMENTS OF FIRE AND HOW THEY RELATE TO RISK CONTROL:

1. **HEAT SOURCES**--Heat originates from electrical energy (electricity, lightning), chemical energy (matches, spontaneous combustion), mechanical energy (all movement generates friction which diffuses as heat), *and* nuclear energy (fission or fusion, including solar energy). Heat sources are **planned** (blast furnace) or **unplanned** (friction between a saw blade and wood). Heat sources are **fixed** (boiler) or **mobile** (welding torch). Mobile sources are harder to control than fixed sources because the exposure changes every time the heat source is moved.
2. **OXYGEN**--Oxygen is supplied by ordinary air. Oxygen-rich atmospheres increase the frequency and severity fire. Hot fires create their own drafts to draw in more oxygen. Fires that can't get enough oxygen die (are smothered). Some substances can burn without an outside oxygen supply. **Remove oxygen** by smothering the fire (as with a blanket or foams), containing it (as in a safe), *or* diluting the oxygen (as with a CO₂ extinguisher).
3. **FUELS**--Fuel's important characteristics are its vaporization temperature and its ability to absorb heat. **Fuel's vaporization temperature** is the minimum temperature required to sustain combustion independently of the original heat source. A solid's vaporization temperature is its **autoignition temperature**. A liquid's vaporization temperature is its **flash point**. **A fuel's ability to absorb heat depends on its**
 - a. **shape** (surface area to volume) *and*
 - b. **material** (ability to conduct and diffuse heat--wood versus metal, gasoline versus cooking oil).**Remove fuel by**
 - a. **turning off its supply** (cooking gas),
 - b. **back-firing** (forest fires), *or*
 - c. **blowing away the fuel vapor** (match).A building's **fire load** (expected amount of combustibles available as fuel for a hostile fire in a given area) is the weight of wood and paper combustibles per square foot, *both* building materials *and* contents.

EO 2. THE FIVE ISO CLASSES OF BUILDING CONSTRUCTION:

1. **Wood frame construction**--has walls (maybe with masonry veneer), floors, roofs, and frame of wood.
2. **Joisted masonry construction**--has self-supporting masonry walls and floors and roofs of wood with wooden joists. **Heavy timber or mill construction** is a much more fire-resistive form of joisted masonry that uses large, heavy, timber for structural support.
3. **Noncombustible construction**--has walls, floors, and roofs of noncombustible materials. Although these buildings do *not* add fuel to their fires, their structural members are easily damaged by heat, causing them to collapse in fires.
4. **Masonry noncombustible construction**--has floors and roofs of noncombustible materials and walls of masonry materials.
5. **Fire-resistive construction**--has walls, floors, and roofs of materials that resist fire for two hours. **Modified fire-resistive construction** resists fire for between one and two hours.

EO 3. **FIVE PRE-LOSS MEASURES FOR REDUCING FIRE FREQUENCY AND SEVERITY:**

1. **Control heat sources**--Eliminate unnecessary planned heat sources; reduce the heat of necessary sources; reduce the amount of by-product heat by using cooler materials (fluorescent bulbs) and by cooling areas that generate heat (auto radiators, low-friction machines, water-cooled saw blades); control electrical heat energy with proper fuses and grounding (lightning rods).
2. **Separate fuel from heat sources**--Keep fuel away from fixed heat sources and enforce similar fire precautions for mobile heat sources. The specific exposures of mobile heat sources change each time the heat source is moved, making control of exposures difficult. Prohibit and restrict unplanned heat sources (no smoking, coffee makers and hot plates in designated areas).
3. **Limit the spread of fire--Limit**
 - a. **vertical fire spread** (channel heat upward past combustible property; avoid high stacking; fill hollow interior spaces with **fire stops**--solid pieces of material used to block interior spaces and slow the flow of heat; vent and cool upper stories; stagger windows to prevent **looping** of fire from lower to higher windows) **and**
 - b. **horizontal spread** (use floor-to-ceiling barriers; close openings in barriers with **self-closing doors**--aka **automatic fire doors**; install sprinklers).

A fire division is a space sufficiently separated from other spaces to prevent the spread of fire. **Fire walls** (self-supporting, fire-resistive, floor-to-ceiling barriers) create fire divisions within buildings.

Fire partitions are *not* as strong or extensive as fire walls and do *not* create fire divisions. Fire-resistive vaults also create fire divisions within buildings.

Clear, open, space creates fire divisions between buildings.
4. **Reduce damageability**--Substitute noncombustible materials for combustible materials.
5. **Control arson loss**--by restricting the arsonist's entry and by detecting his presence promptly.

EO 4. **INTERNAL FIRE PROTECTION** is provided by the organization.

1. **Automatic fire detection/suppression systems** are sprinkler systems.

All sprinkler systems have piping, discharging nozzles or heads, control valves for directing the movement of extinguishant within the system, gauges for monitoring pressure in the system, and an alarm to signal when the system is inoperative.

 - a. **Water systems** discharge water when heat activates the sprinkler head.

A **wet-pipe system** keeps the pipes full of water for immediate suppression.

A **dry-pipe system** keeps the pipes full of pressurized air, eliminating leaks and frozen pipes, but delays water discharge after sprinkler head activation.

A **deluge system** keeps sprinkler heads permanently open to better protect against fast-spreading fires.

A **preaction system** is a deluge system with closed sprinkler heads.

A **water spray system** uses directional nozzles to protect specific items or places.
 - b. **Dry chemical systems** use powder to extinguish electrical and flammable liquid fires.
 - c. **Wet chemical systems** use foam to extinguish flammable liquid fires in commercial kitchens, bulk food processing operations, petroleum terminals, flammable liquid storage rooms, **and** chemical process areas. **Compared to dry systems, wet systems** are nontoxic, are easy to clean up, **and** help prevent the fuel's further release of flammable vapors.
 - d. **Carbon dioxide systems** use carbon dioxide gas to smother electrical and flammable liquid fires. A pre-alarm signal gives personnel time to evacuate the area before it is flooded with carbon dioxide (which can smother people too).
 - e. **Halon systems** use halogenated hydrocarbons (**halon**) to halt the chemical reaction that causes fire. Halon extinguishes fire quickly with little or no property damage **but** it is harmful to humans at certain densities and it **only** works in sealed areas where the halon can't diffuse. [*Halon systems suffocate both fires and people.*]

2. **Detection and signaling systems** activate sprinkler systems and alert public or private fire services. **Seven detection devices:**
 - a. **fixed temperature heat detectors** (respond at pre-determined temperatures),
 - b. **rate-of-rise heat detectors** (respond to the speed of temperature rise),
 - c. **[fixed temperature-rate-of-rise detector** (*responds to either a predetermined temperature or to the rate of temperature rise*),]
 - d. **gas-sensing fire detectors** (respond to changes in the gas content of the environment)
 - e. **smoke detectors** (respond to smoke particles in the air),
 - f. **flame detectors** (respond to the presence of flame), **and**
 - g. **combination detectors** (respond to more than one triggering event).**Five signaling systems:**
 - a. **local alarms** (alert building occupants),
 - b. **auxiliary alarms** (alert the local fire department through public fire alarm circuits),
 - c. **remote station alarms** (alert the local fire department through telephone lines),
 - d. **proprietary alarms** (alert someone on or near the property, who then calls the fire department), **and**
 - e. **central station alarms** (alert a company hired to handle alarms and notify the proper authorities).
3. **Fire extinguishers** are fire control devices operated by employees or other persons. Fire extinguishers should be accessible, visible, inspected, and appropriate for the hazard. Employees should be trained in their use.
4. **Standpipe systems** are water pipes that supply water to hoses. Standpipe systems offer good protection for upper floors.
5. **Guard services** tour the property to detect fires.
6. **Fire brigades** run emergency plans when fire occurs (anything from calling the fire department to fighting the fire themselves).

EXTERNAL FIRE PROTECTION is public fire protection.

External fire protection is effective only when there are enough hydrants in the area **and/or** the fire department is capable of responding. Companies should make sure water supplies are adequate and plan fire responses with their local fire departments.

CONTROL WATER DAMAGE by tailoring protection to the property, installing drains, storing property on skids or pallets, and covering property susceptible to water damage with waterproof covers.

Use **crisis management or disaster planning** to plan cleanup and loss reduction measures after a fire.

Meet the standards outlined in the National Fire Protection Association's **Life Safety Code**.

EO 5. **MEASURES FOR REDUCING THEFT FREQUENCY AND SEVERITY:** In general, theft losses are less severe and more frequent than fire losses.

The four most common forms of theft:

1. **burglary** (theft with forcible entry),
2. **robbery** (theft by threat or use of bodily violence),
3. **[shoplifting** (*theft of merchandise from a store without forcible entry*).
Note: Shoplifting was dropped from CPCU in 1998.] and
4. **employee dishonesty** (theft committed by an employee against his employer).
To control theft losses, prevent or delay the criminal's access, detect him, and/or identify him.
Risk control for employee theft must address the facts that employees need access to the premises and property, know the employer's procedures and vulnerabilities, **and** are trusted with varying amounts of authority and responsibility.

1+2. **CONTROL BURGLARY AND ROBBERY LOSSES THROUGH**

- a. **physical protection**--Restrain entry (locks, bars, grills) and use **money safes** (burglar resistive safes) and **vaults** (room safes) to store valuables.
Record safes are merely fire-resistive.
- b. **alarm systems**--**There are several types of alarm systems:**
A **perimeter system** signals the opening of doors and windows.
An **area protection or space protection system** detects intruders in specific areas.
Object protection targets the alarm to a specific object (safe, work of art).
A **holdup alarm** can be triggered by a button or foot pedal.
Insurers only give credits for **approved alarm systems**--installed by approved companies listed in the insurer's rating manual.
Alarms are deficient in that they don't prevent theft, burglars disable them by cutting the telephone wires, *and* false alarms dull response time.
- c. **watchmen or security patrols**--A **supervised system** sends a guard to the premises if the watchman fails to signal as required.
- d. **surveillance cameras**--Use such cameras to identify and help convict intruders.
- e. **protective procedures**--Don't keep cash on the premises. Light the premises when closed.

[3. **CONTROL SHOPLIFTING LOSSES THROUGH** (*Note: Shoplifting was dropped in 1998.*)

- a. **surveillance**--Use video cameras and security personnel to detect shoplifting in progress.
- b. **limiting access**--Keep small, high-priced, items in locked display cases.
Keep merchandise in separate storage areas and bring items out as they are purchased.
- c. **anti-theft devices**--Electronic tags sound an alarm when tampered with or taken from the store. Dye tags permanently stain garments when removed improperly.
Electronic cables anchor merchandise and trigger an alarm when cut.
- d. **protective procedures**--Count items passing through the dressing rooms, search handbags as people leave, and require customers to leave their bags in lockers while shopping.]

4. **CONTROL EMPLOYEE DISHONESTY LOSSES THROUGH**

- a. **accounting controls**--Keep track of cash flows through internal audits, audit trails, etc.
- b. **access controls**--Limit access to property susceptible to theft.
- c. **personnel screening**--Avoid hiring dishonest employees by checking references and applicants thoroughly before hiring.
- d. **separation of duties**--Make it difficult for an employee to steal without the collaboration of at least one other employee. Give no employee total control over a sensitive job; design work flows so that each employee checks the work of his supplier; separate record keeping from asset control; *and* don't let employees who authorize asset use control those assets.

EO 6. **MEASURES FOR PREVENTING OR REDUCING LOSSES FROM**

1. **EXPLOSION**--**Fire-type explosion loss control measures** include fire loss control measures, suppression equipment which rapidly reacts to a pressure increase, *and* venting that directs pressure to open air or a solid barrier.
Pressure vessel explosion loss control measures include inspection, maintenance, proper operation, and safety release valves.
2. **WINDSTORM**--Use wind-resistant construction, install shutters and blinds, maintain roofs and walls, secure outside property, keep trees and utility poles away from buildings, make temporary repairs after a windstorm, *and* prevent looting and vandalism.
3. **FLOOD**--Avoid high water and low ground; build dams; sandbag during floods; and use water-resistant construction.
4. **EARTH MOVEMENT**--Avoid earthquake-prone areas and use earthquake-resistant construction, which can be either a rigid design that will resist earthquake forces or a flexible design that will move with and absorb earthquake forces.

EO 7. **HOW TO RECOMMEND APPROPRIATE RISK CONTROL MEASURES FOR A DESCRIBED ORGANIZATION: Risk control measures take one or both of two approaches:**

1. **The engineering approach** reduces hazards by changing the design and location of properties and equipment.
 2. **The human behavior approach** reduces hazards by modifying behavior.
- Apply risk control to a case study by applying what you learned in EOs 1 - 6.