

## **Fire Protection in Religious Properties through Management, Operations, and Architectural Changes**

While equipment that can detect, provide alarm, and suppress fires in buildings is, unquestionably, an important component of the fire protection plan for any facility, it should be considered neither the single nor final solution to safeguard religious properties from the ravaging effects of fire. This article presents the concept that operational procedures play an equal role in establishing a fire safe environment.

These procedures must be performed by those individuals most closely involved with all operational aspects of the property, and, on a daily basis, can provide the highest level of fire protection available.

Operational procedures of fire protection are the daily, weekly, or annual routines established and implemented by governing boards, staff, and volunteers that can minimize fire risk. These approaches can be as mundane as checking that appliances are unplugged at the end of the day, or as burdensome as assuring that the religious property is free of all materials that can cause or spread a fire, such as oily rags, janitorial equipment, or old furniture or clothing.

Operational approaches are unmatched as means of minimizing the risk of a fire start and equipment failure or shutoff during maintenance or construction. Operational approaches -- versus other approaches relying on fire protection equipment -- are essential for those properties that cannot afford to fully equip a building with appropriate fire protection equipment.

That so little attention is paid to these operational aspects is not surprising. The practice and business of fire protection, and the building and fire codes that govern buildings, focus on equipment. Equipment is easier to quantify and verify than a management and operational structure. And, since operational procedures require regular property surveillance as well as other routine, maintenance-oriented tasks, it can be difficult to establish and maintain an effective system in an organization consisting of volunteers or overworked staff.

In addition to benefitting from operations policies, the fire risks at the religious site can often be minimized by architectural, mechanical, and electrical system upgrades that resolve fire hazards with minimal impact on historic materials, and often with minimal costs. Both of these approaches are discussed in this article. Fire protection practices are, in this paper, categorized as related to Building and Systems, Occupancy, and Construction and Repairs.

Building and Systems present hazards attributed to the physical building, many of which can be successfully addressed by architectural and non-fire protection equipment solutions. The categories of Occupancy and Construction and Repairs include hazards generated by human activity, many of which can be minimized by a combination of alterations and Building and Systems

Building and Systems includes the physical fabric of the building (walls, floors, roofs, etc.), and the mechanical and electrical systems that provide power, heat, or air conditioning, plumbing and light. Since building techniques, materials, and standards are constantly changing, all buildings constructed prior to the current building code in effect can be considered outdated, or in the case of truly older buildings, archaic. This term is not intended to suggest that archaic buildings are inherently unsafe, but rather they are built with different construction materials and techniques than those now in common usage. Older buildings of all ages do, however, become unsafe when mechanical and electrical systems age and deteriorated systems remain unaddressed.

The religious property must be responsible for its own inspection of such physical conditions, and it is the job of the leadership board to ensure that these inspections occur. Periodic inspection by local building code or fire officials is not universal, and in many municipalities such involvement only occurs when a construction project is undertaken. Inspections are to be undertaken on a regular basis by staff or volunteers, and on an annual basis by outside experts.

Examples of readily repaired unsafe building and system conditions are the unlined masonry chimney, the damaged or nonexistent lightning protection system, or the 50 year old poorly insulated electrical system. Situations such as these can usually be readily repaired at reasonable cost and with minimal impact on the historic space. Some less visible or hidden conditions, once identified, can also often be improved with minimal visual impact. One example is the introduction of fire-stopping or fire-rated partitions to limit the spread of fire from one area of the structure to another. Existing buildings can often be fire stopped within walls or vertical and horizontal flues and chases, or have partitions constructed around mechanical equipment or within the attic to reduce the open floor area in which a fire could spread undetected.

Modifications to minimize fire hazards to the building or to improve the level of life safety can be most challenging when changes cannot be hidden or located in areas with minimal historic character. Successful solutions can be most readily achieved when the architect and others involved in planning the alteration are very sensitive to the structure's historic detailing. For example, a common example faced by religious properties having substantial areas of the building dedicated to offices or other program areas is the multi-level structure with improper or inadequately sized or configured exits or stairways.

Although it is challenging to address such code requirements in an architecturally sensitive manner, qualified architects and other preservation professionals can identify solutions that will meet the intent of the code and not damage the historic character of the building. In other situations, existing conditions cannot be changed, such as the distance between adjacent buildings and established heights and areas. Often these conditions can be mitigated by the creative design work of individuals or teams with sufficient background in fire protection and historic preservation to weave the separate goals into a single solution. Solutions may incorporate combinations of fire protection equipment, architectural alterations, and operational solutions. This three tiered approach is reasonable, although may be considered by some unconventional. The expertise of the design team in this instance is essential, as it often must counter opinions regarding the unaccept-ability of the existing building given its older construction.

## Occupancy

The Occupancy characteristics of a property describe the specific uses occurring within the property and consequently the inherent level of fire risk. Most uses occurring within religious properties do not present a substantial hazard, although those that are hazardous should be eliminated, or, if essential, controlled. Storage is perhaps the one secondary use common to most religious properties, including records, hazardous, or flammable materials; materials saved for white elephant sales; and holiday decorations and costumes for use in pageants. To the extent possible, these materials should be stored in areas within a space free from hazard, with full detection and alarm. All surplus materials with no utility or value should be discarded. Rarely does the regular use of the main sanctuary constitute a significant hazard, although candles burning in unoccupied spaces present an exception. Other functions have higher risk. The most common accessory uses in the religious site are offices, classrooms, kitchen and dining facilities, meeting rooms, and child care centers. Some of these areas may benefit from periodic inspection by local or state officials, while other areas go uninspected for many years.

The most potentially hazardous areas that merit regular evaluation are the electrical system and kitchen equipment. Overloading of circuits can readily occur in office areas, and kitchens present multiple opportunities for a fire to start.

These areas that receive regular use merit inspection at the end of each day. Garbage should be removed daily from the building, in particular if there are areas where smoking is allowed; the use of extension cords should be eliminated; and all kitchen appliances, including coffeepots, should be unplugged and checked on a daily basis.

## Construction and Repairs

Buildings are particularly vulnerable during construction as well as times of routine maintenance, when existing fire protection systems are left shut down or it is wrongly assumed that the contractor has assumed full responsibility for protection. Construction and repair projects bring to the site flammable materials, dusty, oily rags, smokers, and temporary electrical and heating systems.

Too many of the catastrophic fires in religious properties occur as a result of unsafe practices during rehabilitation efforts and maintenance. Many of these are a result of hot construction processes such as cutting and welding of steel or plumbing pipes, roofing with hot tar or torches, or paint stripping. Other articles in this publication address fire protection during construction but it is essential to remember that routine maintenance work warrants the same level of planning and protection. It is recommended that when any work is undertaken at the site, a fire protection procedure be established and a management plan be followed, coordinated by the facility supervisor or by a responsible volunteer to provide oversight for the duration of the project. For larger projects, a fire protection plan can be requested from the contractor, although retaining an independent fire protection coordinator whose sole task is to monitor conditions and ensure compliance with the plan should be given serious consideration.

## Summary

The above fire safety principles related to operations and the building will only provide protection to the building with a committed governing body that has adopted fire protection practices as a priority. The procedures to be followed should be written down and ratified with the property's overall management or facility plan, and should guide the actions of the leadership as well as those of the individuals charged with daily or weekly custodial needs.

The task of overseeing the operational aspects of fire protection should be assigned to a reliable individual who is supported with training and resources. The specific tasks to be followed will vary according to the hazards presented, the personnel available, and the unique circumstances of each facility. The procedures should pay particular attention to fire protection during periods of maintenance or rehabilitation work, as it is precisely at these moments that the religious property is most vulnerable.

## Fire Prevention Checklist

Too often, cherished houses of worship are damaged or destroyed by fire. High, open spaces and towers, and occupancy during only a few hours each day, invite small fires to grow rapidly. To decrease the chances of fire, a congregation must undertake advance planning by evaluating and reducing the probable causes and be prepared to react in a calm, organized, and deliberate manner if disaster strikes. Appoint one key person to represent the congregation in the preparation of a plan and to be contacted in the event of a fire. This person should explain the plan to staff, building users and tenants, and contractors before the start of construction.

## Working with the Local Fire Department

1. Consult with the local fire department and request its assistance in developing a fire preparedness plan. Explain the architectural and historical significance of the building and its contents, including the stained glass windows, and discuss ways to protect them.
2. Ask the fire department to inspect your building for hazards. In addition, many insurance companies and brokers will survey buildings and provide information on risk reduction measures. Consultants can be hired to prepare life safety reports with prioritized recommendations, cost estimates, and contractor and product referrals.
3. Ask the fire department to determine response time, study access, identify water sources, and check hydrant water pressure for fires in your building and adjacent properties.
4. Make sure that the fire department will have prompt access to a complete set of keys no matter what time of day. Establish a list of priority items that might be damaged by fire, water, or smoke. If these items need to be removed in the case of a fire, make sure the fire department knows what and where they are and can gain access to them if they are kept in locked rooms or storage cases.

## Early Detection

1. Install hard-wired smoke and heat detectors connected to a 24-hour centrally-controlled alarm system. Have manual pull stations at exits. A direct reporting system hastens response time by critical minutes or even hours.
2. Automatic sprinkler systems are recommended, especially for buildings with wood frames or truss systems.
3. At the minimum, install battery-operated smoke detectors and fire extinguishers.
4. Ask neighbors to be alert to break-ins or signs of smoke and to call the police or fire departments immediately.

## Documentation and Insurance

1. Choose a good insurance broker to advise you in keeping policies up-to-date, reducing risks, and settling claims.
2. Maintain up-to-date inventories and assessments of building contents. Keep a complete set of documentary photographs of the building and its contents, including the stained glass windows. Also document the building with measured drawings that will assist in restoration or reconstruction.
3. Store duplicate records in separate locations, with one set off site. Keep important original materials, including photographic negatives, in fireproof vaults such as at an insurance office, historical society, or bank safe-deposit box.

## Administration

1. Conduct fire drills with staff and other groups that use the building. Train staff in the proper use of fire extinguishers.
2. Create a phone chain of individuals that would notify key staff and members of the congregation in an emergency and identify meeting places.
3. Gather phone numbers of providers of emergency services, such as water and smoke extraction, dehumidification, and stained glass window stabilization, and file this information in an off-site location.
4. Plan security measures to prevent accidents and deter vandals. These may include a temporary guard, blocking off sidewalks, and securing openings.
5. Prepare a list of tasks and committees that may be necessary, such as settling the insurance claim, securing and cleaning up the site, public communications, crisis counseling, developing restoration plans, and fundraising.

## Fire Prevention Checklist - Daily Inspection

### Ignition Sources

Close doors on wood stoves; assure fires out and fireplace screens closed; inspect used candle holders.

### Electrical Equipment/Appliances

Unplug equipment; inspect plugs and area where located; inspect temporary wiring.

### Smoking

If allowed on site, inspect for extinguishment of all paraphernalia.

### Security

Inspect to ensure building is secure against arson.

### Kitchen

Inspect equipment.

### Maintenance

Inspect at end of day where: maintenance or repair work has occurred; portable heaters were used;\* oily rags/other spent materials are stored.

### Storage/Interior

Inspect to assure combustible materials (janitorial equipment, special events materials, etc.) stored safely within building.

### Storage/Exterior

Inspect to assure refuse and combustible materials not accumulated outside of building.

## Weekly Inspection

Fire Protection Equipment Inspect that all equipment is operational.

### Ignition Sources

Inspect for clearances between fire sources and adjacent combustibles.

### Electrical

Inspect electrical equipment in: areas of corrosive conditions, office and maintenance areas.

### Storage

Inspect areas of storage for flammable decorations, furnishings, and materials.

#### Water Supply

Inspect to ensure availability of water supply.

#### Fire Extinguishers

Inspect location of extinguishers Annual Inspection by others.

#### Fire Marshall

Inspect to identify life safety hazards (egress paths, etc.) and hazardous building conditions; provide refresher site orientation for fire marshall and fighting personnel; organize fire drill.

#### Heating

Clean, lubricate, maintain and adjust equipment; inspect for condition of chambers, belts, fuel, and supply lines, flues, ductwork, electrical, areas of excessive wear, etc.

#### Electrical

Inspect entire building for adequacy of service, number of receptacles and fixtures, quality, and condition of wiring, where observable.

#### Lightning Protection

Inspect for condition of ground connections, lightning rods below ground, general system integrity Equipment Inspect kitchen appliances and equipment (ducts, range hoods, etc.) for condition

#### Fire Protection

Inspect fire extinguishers, manual alarm stations, smoke and heat detectors, fire alarm panels and cabling, sprinklers, standpipes, water sources; inspect appliances including kitchen duct hoods.

#### Chimneys/Flues

Clean or repair chimney flues and masonry.

#### Annual Training and Evaluation Training

Conduct staff and volunteer training on: inspections, use of extinguishers, disaster planning/ recovery Improvements Review budget opportunities for purchase of fire protection systems, lightning protection equipment at building and adjacent trees, and new or upgraded mechanical equipment, and architectural improvements\*\*

During Construction Work Fire Protection Plan Establish fire protection plan for contractor's use, posted at construction office. Plan to assure: monitoring of temporary heating units; flame or heat producing equipment only used where alternate means not available; construction assistant and fire extinguisher on hand during hot or open flamework; inspection of hot work areas occurs within one hour of concluding work, and at end of day; entire project site inspected at end of day; combustible materials in work area protected with heat shield; hot roofing equipment and flammable materials stored away from building; no-smoking policy exists

#### Enforcement

Hold weekly meetings with contractor to evaluate implementation of plan.

\* Note: using portable heaters is generally not recommended

\*\* Architectural improvements may include the installation of: fire-rated enclosure around heating equipment; fire proofing at pipe chases, utility holes, and ductwork; fire stops at concealed spaces; walls to partition open attic spaces; fire closers at doors; non-combustible materials in front of operating fireplaces and stoves; and repair, relining, or rebuilding of masonry chimneys.