



Church safety solutions

Created in cooperation with the United Church of Christ Insurance Board

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The sense behind fire hazard prevention

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Coming soon:

Slip, trip and fall
prevention

Fire is part of everyday life. It heats our homes, water and food, and provides warmth in many ways. We read about devastating fires in the news nearly every day and many of us have been taught about the basic elements of fire safety. In spite of having this information, fires and burns continue to be the fifth most common cause of unintentional injury deaths in the United States (Center for Disease Control, 2006). While the number of fire related fatalities and injuries has gradually declined over the past several years, preventable fires continue to pose a public health risk. The message of fire safety must continue to be told, and this issue of Church Safety Solutions will cover the data behind fire events, how fire starts and steps to prevent fire loss.

- Fire departments responded to 1,451,500 fires in the United States.
- Most victims of fires die from smoke or toxic gases and not from burns.
- 3,320 civilians lost their lives due to fire in 2008.

U.S. Fire Administration - Data

- An average of 1,300 church fires are reported each year.
- Arson comprises 25% of church fires.
- 30% of church fires result from mechanical failures relating to faulty wiring and improperly functioning heating systems.
- 18% of fires originate in the walls and ceiling/roof areas of the church.
- 10% of fires originate in the large assembly areas of the church.
- 10% of fires originate in the kitchen areas of the church.
- Stoves are the leading source of equipment involved in church fires.
- 65% of churches that reported fires had no smoke alarms and 96% had no sprinkler system.

Center for Disease Control & Prevention - Data

In 2008:

- A fire related death occurred nearly every 2 hours.
- A fire related injury occurred every 31 minutes.



The sense behind fire hazard prevention - *continued*

The origin of fire is important when discussing fire prevention. If we can understand where common areas of fire start, energies can be focused in these areas to prevent fire. In this edition of Church Safety Solutions, we have outlined the basics steps to assist your organizations with fire prevention programs.



How does a fire start?

Fire is a very rapid chemical reaction between oxygen and a combustible material, which results in the release of heat, light, flames and smoke. In order for a fire to start or burn, the following elements must be present at the same time:

- Oxygen to sustain combustion
- Heat to raise the fuel to its ignition temperature
- Fuel or combustible material

Fire prevention basics

Preventing fires in a church property involves the elimination or control of conditions or substances that could ignite or fuel a fire. Maintaining a clean and organized church serves as an essential element of fire prevention. Church leadership should establish a fire prevention strategy that includes, at a minimum, the following elements:

1. Preventive maintenance program for electrical systems

Electrical systems and equipment, including wiring and switches, are major sources of fire ignition sparks or heating hazards. Overloaded, damaged or flawed electrical circuits generate heat in wiring that can reach a temperature sufficient to ignite adjacent materials. Conducting thermographic or infrared scans of the church's electrical system is recommended to ensure electrical systems are not endangering the property. Churches should only use licensed and insured electricians to perform electrical work on church properties.

2. Preventative housekeeping – extension cords and other electrical transmission systems

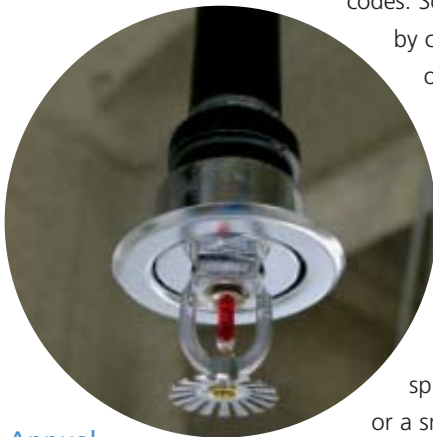
Keep materials at least three feet away from electrical panels and transformers. Many times circuit breaker panels are in storerooms and are easily blocked by items. Keep items away from electrical panels since heat generated from these panels may start a fire. Also, do not overload surge protector/power strips when plugging in items such as fans, computer equipment, and other electrical devices. It is also recommended that electrical extension cords only be used for temporary power.

3. Preventive maintenance program for mechanical systems, i.e., heating and ventilation

Heating and ventilation systems should be inspected by a licensed and insured contractor at least annually or more often depending upon the manufacturer recommendation. The inspections serve several purposes, but primarily will help ensure that the systems are running safely, efficiently and cost effectively.

Fire prevention basics - *continued*

For kitchens that have deep fat fryers, a UL 300 approved fire suppression system should be installed, and inspected regularly to ensure proper operation



Annual inspection should be conducted by a licensed and insured contractor in accordance with the local municipality fire and building codes to ensure functionality of the system.

4. Property fire inspection and corrective action program

One strategy that can be used to prevent fires is a self-inspection of the interior and exterior of all church property, regardless of whether the property is owned or leased. Churches must remove excess combustibles, especially around heat sources. A sample checklist is attached to this newsletter that can assist churches in completing these inspections.

5. Sprinkler system testing and maintenance (where installed)

Testing and maintenance requirements including frequency depend largely on your type of exposures and local building and fire codes. Some functions can be conducted

by church personnel while many others should only be performed by a licensed and insured contractor. Typical tests that are conducted include:

Inspectors fire alarm test – designed to ensure that a signal is received by the central monitoring station when a sprinkler system has flowing water or a smoke alarm detects smoke (if monitored).

2-inch drain (main drain) test – used to measure water pressures in the sprinkler system when the drain valve is open and flowing and when closed.

Weekly fire pump churn test – used to maintain the functionality of an installed fire pump. Fire pumps boost the volume of water that will flow through the sprinkler system. Not all properties have fire pumps.

Annual inspection – completed by a licensed and insured contractor in accordance with the local municipality fire and building codes to ensure functionality of the system.

6. Installation, inspection and maintenance of fire extinguishers

The type, installation and placement of

portable fire extinguishers depend largely on your type of exposures and local building and fire codes. For instance, if your church does not have a commercial kitchen that is used for large events, several well-placed 15-pound ABC type fire extinguishers may be adequate to meet local codes and protect your property. Contact your local fire department's non-emergency number or city building code department to find out what is required for your church.

Portable fire extinguishers apply an extinguishing agent that will either cool (carbon dioxide or water) burning fuel, displace or remove oxygen (ABC powder), or stop the chemical reaction (Halon) so a fire cannot continue to burn.

When the handle of an extinguisher is compressed, the agent is sprayed out the nozzle. A fire extinguisher works much like an aerosol can. Portable fire extinguishers should be inspected every month to ensure that the tamper tie and safety pin are present and undisturbed. The gauge indicates that pressure is in the green or safe zone. Fire extinguishers should be inspected by a licensed and insured service company at least annually or as discharged. Typically, the fire extinguisher inspection tag indicates the expiration date is good for one year from the date punched or stamped. For more details about testing requirements, including the required six-year hydro-static test for certain types of extinguishers, contact your local service provider.

7. Installation, testing and maintenance of smoke detectors

The requirements for the installation of smoke alarms/detectors may vary from city to city. Contact your local fire department's non-emergency number or city building code department to find out what is required for your church. Many hardware, home supply, or general merchandise stores carry smoke alarms. Some fire departments offer smoke alarms for little or no cost. They come in

Fire prevention basics - *continued*



Once installed, the detector should be tested monthly or more frequently as required by the manufacturer.

battery operated or hard-wired styles. If you are required to install a hard-wired detector, it is best to have a licensed and insured contractor perform this for you. Once installed, the detector should be tested on a monthly basis or more frequent when required by the manufacturer. Install fresh batteries every year or more often if no signal is produced during testing

Regardless of local fire codes, Zurich recommends that all churches be protected with smoke detectors with off-site, third party monitoring, unless the property is protected by fire sprinklers.

8. Installation and maintenance of lightning rods

Lightning rods, now known as air terminals, are used to conduct electrical current generated by storms through a path of least resistance where it will terminate safely into the ground away from the property, internal structures and mechanical/electrical equipment, i.e., breakers, computers, phones, and HVAC. Grounding equipment should be installed by a licensed and insured contractor. Ground conductors should not be painted as this will decrease the rod's ability to direct the current.

Churches in lightning prone areas should have a lightning protection system that includes air terminals, conducting straps or wires, and grounding rod(s). The system should carry the UL Master Label and installed per the NFPA code #780 or to the Lightning Protection Institute's certification requirements. Although lightning protection systems do not guarantee prevention, they have proven to be the most effective means to protect against direct lightning strikes. The lightning protection system should be

inspected and maintained at least annually against corrosion or other deterioration.

9. Fire extinguisher training for key church personnel and volunteers

Church leaders should decide whether church personnel/employees should be directed to fight a small fire with a portable fire extinguisher or simply evacuate. A well-trained employee with a portable fire extinguisher can often quickly extinguish small fires at their early stages. However, to do this safely, the employee must understand the use and limitations of a portable fire extinguisher and the hazards associated with fighting fires. Evacuation plans that designate or require some or all of the employees to fight fires with portable fire extinguishers increase the level of complexity of the plan and the level of training that must be provided to employees.

If a church decides to make fire extinguishers available for employee use, it is the church leadership's responsibility to educate employees on the principles and practices of using a fire extinguisher and the hazards associated with fighting small or developing fires. This education must be provided annually and when a new employee is first hired¹.

10. Exterior exposures - Firescaping

Firescaping is preventing the landscaping around the structure from adding to an external fire such as a wildfire. Firescaping is a relatively new term in the field of landscaping. It means creating non-burn zones around your buildings. While no landscape is "fire-proof", proper planning and consistent maintenance can assist in creating a fire-resistant landscape that can help protect against devastating property loss. See attached Risktopic on firescaping that will provide strategies on how to create safety zones around your church.

¹ As under the Code of Federal Regulations 29 CFR 1910.157, where the employer has provided portable fire extinguishers for employee use in the workplace, the employer shall also provide an educational program to familiarize employees with the general principles of fire extinguisher use and the hazards involved with incipient stage fire fighting. The employer shall provide the education upon initial employment and at least annually thereafter.

Lessons of loss

The following “Lessons of loss” are taken from real events reported to Zurich. Certain details have been changed to protect the anonymity of those involved.

The baseboard register fire

A fire started in a sleeping area of a church property where bedding, clothing, and other materials were stored too close to baseboard heating registers.

Lessons learned:

Keep bedding and other materials away from heat sources. Conduct inspections of these areas to ensure materials are kept away from heat sources such as electrical panels, radiators, wall mounted heaters, and floor registers.

The candle fire

A fire started in a sanctuary of a church where candles were being used. The candle fell off the table and onto the floor, which resulted in a \$100,000 loss.

Lessons learned:

Check with the local fire protection district to learn what regulations apply to open flame sources. Consider using, battery operated candles, “no drip candles”, or contained candles that have glass higher than the flame. Do not allow burning candles in rooms that are unattended. It is also wise to keep an approved fire extinguisher close to the locations where candles are commonly used.

The improperly discarded cigarette

An improperly discarded cigarette led to a \$10,000 claim that damaged the entranceway to a church.

Lessons learned:

Place cigarette disposals near entrances and monitor areas when visitors are entering and leaving the building.

Exhaust/ chimney fire

Build up of grease and foreign materials led to a fire loss of approximately \$1,000,000 at a church property.

Lessons learned:

Keep grease/ventilation systems clean. Inspect hoods, filters and chimneys on a regular basis to ensure build up in kitchen areas do not play a contributing role in a fire event.

The electrical junction box fire

A fire started from an improperly installed junction box and electrical conduit in a mechanical room, which housed the church’s heating system. Electrical arcing started the fire. Additionally, church leaders indicated that they believed they had purchased a service contract for central monitoring with an alarm company; however, the fire department never received an alarm system call. Since the fire department did not get this signal, response to the fire was delayed and a total loss of the church resulted.

Lessons learned:

The fire alarm system should have been tested on a monthly basis, which could have made sure that the signal would have been received sooner. The church had hired several electrical contractors, but lost the records in the fire making it difficult to determine who serviced what part of the property. An inspection process had not been established that might have been able to spot the damaged conduit and junction box.



Sample Fire Inspection Checklist

Fire safety inspections can be effective in preventing fires on church properties. No one form can be designed to fit all conditions, so we urge you to use this sample as a guide in developing your own form. The suggested frequencies are recommended minimums. Some situations will call for more frequent inspections. Additionally, all floors and areas of the church should be considered when conducting the inspection.

No.	Area/Condition to Observe	A = Acceptable U = Unacceptable	Corrective Action (Include Person responsible and anticipated date of correction)
1	All exit corridors are free of storage items and furniture allowing free access to exits.		
2	All stairwells are free of combustible materials and storage items.		
3	All fire extinguishers are accessible, show a charge and have the inspection tag, security zip tie and pin installed.		
4	All exits and directional signs are present and illuminated along with emergency lighting operational.		
5	Building exit doors are free of key operated deadbolts, open easily without special knowledge and allow free access to the exterior of the building.		
6	Office areas are organized and permit accessibility to fire exits.		
7	Kitchen areas are clean and allow free access to exits. Range hoods are cleaned regularly and free of grease build-up.		
8	If this kitchen has a deep fat fryer, it should be protected by a UL 300 approved extinguishing system and checked twice a year.		
9	Smoke alarms are operating properly (batteries up-to-date if battery operated).		
10	There is a three foot clearance maintained in front of all circuit breakers, transformers, and other electrical panels.		
11	An infrared testing scan has been completed of the facility that analyzes electrical panels and internal power distribution lines.		
12	There is an emergency plan in place and practiced annually.		
13	Laundry dryers are vented to the exterior of the building through metal conduit.		
14	The heating system and water heater are free of storage materials and are inspected by a licensed and insured contractor at least annually.		
15	Paint supplies and flammable liquids are stored in flame proof storage containers and/or cabinets.		
Automatic sprinklers / fire pumps (where available):			
16	Sprinkler heads show no signs of damage, paint, or hanging storage.		
17	Inspectors fire alarm test – designed to ensure that a signal is received by the central monitoring station when a sprinkler system has flowing water or a smoke alarm detects smoke (if monitored).		
18	2-inch drain (main drain) test – used to measure water pressure in the sprinkler system when the drain valve is open and flowing and when closed.		
19	Weekly fire pump churn test – used to maintain the functionality of an installed fire pump. Fire pumps boost the volume of water that will flow through the sprinkler system. Not all properties have fire pumps.		
20	Annual inspection – completed by a licensed and insured contractor in accordance with the local municipality fire and building codes to ensure functionality of the system.		

Fire safety: Firescaping

According to the National Interagency Fire Center, more than five million acres of U.S. forests have burned so far in 2009. We have all watched a wildfire sweep across a landscape or through a neighborhood on TV. For some of us, these fires are all too real and have directly affected our communities. Over the last two years, wildfires have sprung up in Virginia, the Carolinas, Florida, Texas, Colorado, Nevada, Oklahoma, Indiana and California, destroying communities and leaving billions of dollars in property damage in their path.

Have you ever wondered why some buildings burn down to the ground while others are left untouched?

In many cases, it is because the buildings that burned, and the landscapes around them, became fuel for the fires. The ones that survived did not. Firescaping is a relatively new term in the field of landscaping. It means creating non-burn zones around your buildings. While no landscape is "fire-proof", proper planning and consistent maintenance can assist in creating a fire-resistant landscape that can help protect against devastating property loss.

When a wildfire comes through, it takes everything in its path, unless there is no path for the fire to follow. The idea behind firescaping is to minimize the path a fire can take. Using non-combustible materials and construction methods can give your buildings and property a better chance of resisting the three types of hazards associated with wildfires:

- Flames
- Burning embers carried on the wind
- Radiant heat, which can ignite combustible materials

So, what are some things we can do to protect our churches, schools and even homes from a wildfire?

1. Create a fire safe zone around the building. Ideally, there are three firescaping zones:

- **Zone 1 is the 30-foot area around your building.** Cut all trees and brush that could easily lead a fire up to the building. Remove any branches that are within 15 feet of roofs, windows and doors. This also includes removing vines, which may be growing from building walls, fences or trees. Avoid using organic mulch; consider rock, gravel or decomposed granite instead. Concrete or brick patios in this area are ideal. However, if there is a wood deck make sure it is provided with a solid skirt to enclose the underside. This is the zone to plant deciduous trees as well as low ornamental shrubs.
- **Zone 2 moves out to 70 feet and is called the mid-zone.** This area is for orchards and gardens. The lower limbs of trees should be pruned to 15 feet off the ground. On steep slopes keep plantings far apart to discourage a wildfire from climbing up a hill; fire travels uphill fast.
- **Zone 3 is 100 feet from the building.** Thin trees in this area so their crowns are at least 10 to 20 feet apart. Prune branches to a height of 10 feet from the ground. The goal of doing this is to prevent fire from "laddering." Laddering is when low brush ignites lower tree branches. Then those flaming branches climb a tree and jump to the crown, the treetops. When this happens, fires are out of control. Create fuel breaks wherever possible with pools, fountains and non-flammable fences. Lay rock, gravel, brick and paving in wide-open areas. If you are located in the mountains, rake up the pine needles.

Fire safety – Firescaping - *continued*

2. Pay attention to building construction features. Key in on the roof, exterior walls, windows and doors.

- The roof is a critical component. It is the perfect place for those burning embers carried on the wind, to land, smolder and start to burn. Keep the roof clear of leaves or pine needles. Also check gutters and under eaves for bird nests. Consider using Class-A roofing materials when possible. Concrete, slate and clay tile offer up the best protection. Some types of fiberglass-reinforced asphalt shingles are Class A-rated as well. Metal, aluminum and copper are also Class-A materials, but can conduct radiant heat and require sheathing underneath.
- Exterior walls are key components as well. They can be susceptible to flames and radiant heat from burning materials. Fire-resistant siding materials include stucco, cement, plaster and concrete masonry like brick, stone and block. Metal is noncombustible, but it conducts heat, so they should always been underlain with solid sheathing.
- Windows and doors are also key entry points for burning embers. Windows can break from the extreme radiant heat and poorly sealed doors can allow embers to be blown under them. Of course, double and triple pained windows are more protection than single-pained because they offer more layers of protection. Smaller windows tend to perform better than larger ones due to the smaller radiant heat surface area. Window frames should be wood, metal, or reinforced vinyl frames. Stay away from unreinforced vinyl frames as they can melt under these extreme conditions allowing the window to just fall out. Do not forget the screens. Metal screens perform better than fiberglass.

Do not forget about the doors. They are important fire barriers as well. Solid wood doors are good fire barriers as well as metal doors. If the doors have windows, they should be small. Most importantly, make sure the doors are properly sealed. Good weather-stripping can help keep hot gases and embers out. Also, consider fire-resistant doormats and keeping combustible materials in entryways to a minimum.

3. Proper routine maintenance is important too.

Check over the building carefully, sealing all cracks and holes on the exterior before fire season begins. Check over exterior landscaping as well. Clear away leaves, pine needles and other debris from the area around the building, and from the roofs, eaves and gutters. Clear plants and combustible material from around LPG (propane) tanks.

While no landscape is fireproof, planning and consistent maintenance can create a fire-resistant landscape that can help protect against devastating property loss. For more information on firescaping and choosing fire-resistant plants, contact your local fire department and nursery.



Firescaping self-inspection checklist

Make a note of anything that needs improvement and make corrections before the beginning of fire season. If you have any questions, contact your local fire department.

Physical conditions	Yes	No	Corrective action	Date completed
Firescaping				
Zone 1 (0 to 30 feet): Vegetation with high moisture content				
Zone 2 (30 to 70 feet): Lawn, ground covers, erosion control grasses, succulents				
Zone 3 (70 to 100 feet): Thinned native vegetation with shrubs in groups 20 feet apart minimum				
All zones				
Avoid planting highly flammable vegetation (Pine trees, junipers and others)				
Remove fuel ladders				
The lower limbs of trees pruned to 10 to 15 feet off the ground				
Trees kept away from power lines				
Trees trimmed at least 15 ft. away from window door and chimney openings				
18 ft. minimum separation between groups of shrubs				
Brush, weeds & grass trimmed to 3" or less within 10 ft. away of roadways				
Plants cleared 10 ft. from LPG tanks				
Weeds removed or mowed to height of 3"				
Pine needles, leaves and other combustible debris removed				
Landscape structures				
Fire resistive materials used (stone, concrete, etc. best)				
Solid skirting enclosing underside of decks				
Wood/mulch piles located away from structures				
Pool or pond available for emergency water supply				

Physical conditions	Yes	No	Corrective action	Date completed
Roof				
Clear of leaves or pine needles				
Gutters and eaves are clear of bird nests				
Roof vents screened				
Windows and doors				
Double or triple pained windows				
Wood, metal, or reinforced vinyl frames				
Metal screens				
Doors are properly sealed with good weather-stripping				
Use of fire-resistant doormats and combustible materials kept to minimum in entryways				

References:

Occupational Safety and Health Administration (OSHA):

http://www.osha.gov/SLTC/etools/evacuation/portable_relation.html

http://www.osha.gov/SLTC/etools/evacuation/portable_about.html#Operation

Center for Disease Control (CDC):

Fact sheet - <http://www.cdc.gov/ncipc/factsheets/fire.htm>

Ron Aguiar, *Keeping Your Church Safe* (Xulon Press, 2008)

U.S. Fire Administration Topical Fire Research Series:

<http://www.usfa.dhs.gov/downloads/pdf/tfrs/v2i7-508.pdf>

http://www.usfa.dhs.gov/citizens/all_citizens/home_fire_prev/alarms/

If you have any questions or if you would like to receive electronic copies of any of the referenced materials above, please write to us via email at: churchsafety.solutions@zurichna.com.

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Risk Engineering



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Quality-Assured Solutions Provider

The information provided here is not intended to be used as a legal guide or to be inferred as a form of legal advice. The first step your church should take is to seek legal counsel for contracts or agreements with volunteers who will be on your premises. Zurich Services Corporation cannot direct you on specifics of these or other types of agreements. Instead, we will be discussing some common situations that involve volunteers and related risk management practices in this newsletter. These points can be used for discussion topics to work through church leaders.

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*Because change happenz*SM