Reference Document for Fire Alarms Systems
by David Ricketts

Resource Directory

This Resource Directory has been created to aid you on a variety of risk management topics. Although the Finance and Insurance staff have attempted to supply the Parishes of the Diocese with the basics of risk management, this management discipline is comprised of a much wider scope of concerns than could be presented in the program materials. When searching for additional information on any risk management topic, remember to check for **local sources**. For example, your local power company may perform a free or low-cost energy audit for your buildings, and your local chapter of the Canadian Red Cross can more readily supply you with information on CPR and first aid classes in your area. Your local Fire Department may do an annual Inspection to look at the Life Safety Issues under the Ontario Fire Code.

Early Warning Alarm Systems - Fire Detection

What are they?

For a number of years now we have had a discount on the church insurance for having a fire early warning or monitoring system. We felt it was important to let you all know what is meant by the term " Monitoring or Early Warning".

For a system to be described as a Monitoring or Early Warning System there needs to be someone to do the monitoring. This is usually a private company, but in some circumstances it might be done by your local fire department.

Insurance underwriters often refer to an Early Warning System as being a help in adequately protecting property from a major loss. The Early Warning System will produce an alarm at an off-premises alarm receiving facility.

There are different types of approved alarm systems which are available in the marketplace. These are broken down into ULC and Non ULC alarms systems. ULC which stands for Underwriters Laboratories of Canada is the best as the entire system is installed in accordance with certain standards that are set down by the Underwriters Laboratories of Canada(ULC). The Quality of Service and Equipment can vary considerably from one alarm company to the other with some equipment being ULC certified and some not. So it is important that there be a standard method of quality of installation as well as there being a standard for the quality of the equipment.

Once we have the alarm installation done, it needs to be hooked up to one of the following:

1. Central Station. This service is one in which the signal will come into, be recorded and a trained operator will be on hand 24 hours and if necessary a guard will be dispatched.

2. Monitoring Station. This is almost identical to the Central Station with the exception to the fact that no guard will be dispatched. It may be possible to hook up the alarm directly to the fire hall as most are manned on a 24 hour basis, if it is allowed in your municipality.

3. Local Alarm. The most familiar type of system is basically an on-premises alarm. The alarm is connected directly to a bell or siren located on the roof or in the attic.

Some of these systems need to have direct dedicated telephone lines to be ULC approved while others may be able to use a telephone dialer to make the connection. Each of these methods have differing costs associated with them. It is important that the installation be the best for the situation that is called for, and this may vary according to the value and location of the building. A ULC installation means that

there is at least some guarantee that the system has met a standard of not only the equipment being ULC certified but that the method of installation is ULC certified by an outside independent body. This is important, because there are lots of companies in the market place today which are working as a business which do not have the qualifications to install these systems. Basically anyone, with a small amount of electrical knowledge, can install alarms. They can be prone to false alarms and possible failure. The false alarms can, in some municipalities, result in a charge or fee being levied against the owner of the property. U.L.C. companies are inspected by the Underwriters Laboratories of Canada and given certification by them to make installations that meet their standards.

We would suggest getting two or three quotes.

It is best to check with
1. The local fire department as to who they feel might be the best ones.
2. Check to see if the Fire Department have an alarm board and see if you can connect to it.
3. Give the Insurance and Risk Management Committee a call for clarification.

Securing Church Properties
Houses of worship have increasingly become targets of thieves, burglars, vandals and arsonists. This fact has brought forth the realization that many churches have taken inadequate security measures to prevent these types of losses. A good way to start a security program is to contact your local police department. Most police departments have a public service crime prevention program. Usually they will make arrangements to inspect the church's properties and make recommendations for security where appropriate. Even if your church doesn't have the funds to install a security and fire alarm system, there are many simple and inexpensive measures that can cut down on the possibility and severity of loss. Under certain circumstances, you may have to face the fact that your church cannot remain open and unattended, even during the daylight hours.

GENERAL SECURITY MEASURES
Following are 15 measures that should be discussed with your Property Committee and acted upon. Some of the measures can be implemented at little or no cost to the church, such as routine nightly checks by the local police department or a parishioner. Others require major budget planning decisions, such as the installation of a security and fire alarm system. All measures that can be implemented should be taken care of at the earliest possible date. Those that need additional planning or funding should be scheduled for implementation at a specific time in the future.

1. Shrubbery and trees surrounding buildings should be continually trimmed so there is an unobstructed view of all entrances and windows.
2. All exterior doors, except fire exits, should be equipped with a "pick resistant" double cylinder dead bolt locks.
3. All windows should be equipped with "tamper proof" locking mechanisms that are designed for specific window types (i.e. sash, casement, sliding).
4. When not being used, gold, silver and other valuable items should be stored out of sight in the sacristy, either in a safe or cabinet equipped with an appropriate locking mechanism.
5. The sacristy door should be equipped with a dead bolt lock. The door itself should be of solid construction or metal reinforced. Lexan®, Plexiglas® or bars should be permanently installed over any ground floor or basement sacristy windows.
6. Doors and windows in other areas that contain valuable equipment (e.g. church or school office) should be similarly protected.
7. Keys to doors, cabinets, closets and combinations to safes should not be left on the premises. A limited number of keys should be given out. In most instances five sets of keys should be adequate. The keys could be held, for example, by the secretary, rector, senior warden, junior warden and sexton. This may or may not be the solution in your parish.

8. Outdoor lights should be installed to illuminate the exteriors of the buildings and the grounds immediately surrounding them.
9. A person should be assigned to check exits, entrances and windows each night to make sure they are secured before leaving.
10. When not in use, store irreplaceable, one of a kind, antique and very valuable items in a local bank vault.
11. Arrange with your local police department to have them make routine checks of the church premises during the night hours.
12. All offerings should be deposited immediately. Use your bank's night depository if necessary. Never leave cash or cheques on the premises overnight or permit anyone to take offerings home for deposit the next day.
13. Bolt down all office equipment to furniture. For example, adding machines and typewriters should be bolted to office desks. Smaller items such as calculators should be locked either in a safe or cabinet with an appropriate locking device.
14. The church should have a written inventory of all contents, include serial numbers and bills of sale whenever possible. Photographs should be taken of unique or valuable items; include a ruler in the photographs to indicate the proper size of the items. Also photograph any hallmark, trademark or other identifying mark on valuable items. If a theft or burglary should occur this information will not only be helpful to the police in tracking stolen articles, but also to your insurance company in determining the full extent of the loss.
15. Seriously consider installing a security and fire alarm system connected to either the local authorities or a central station operated by a security firm. The security portion of the alarm system should monitor; if not the entire premises, at least the sacristy and office areas.

ALARM SYSTEMS

Security and fire alarm systems are no longer special risk control devices feasible only for large office buildings, manufacturing firms and public buildings. Alarm systems have become common risk control devices for small businesses and residential properties. This increase in usage has resulted in a market situation that has not only created more types of devices, but also lowered the cost of some systems. These new developments have made alarm systems financially feasible for many churches. Price is a major consideration, since such a system can cost anywhere from hundreds to thousands of dollars, depending on the type of alarm system chosen and the size and layout of the structure. The installation of such a system is, however; an investment in the future that will, over time, offset the price of the system in controlled losses
from theft, vandalism, fire and arson. Even if your church cannot afford, at this time, to alarm all of its properties, installation of a security alarm system in the sacristy and office areas and smoke detectors in all residential properties should be completed at the earliest possible date.

Early Warning Alarm Systems - Burglary Detection
The following information on alarm Systems has been compiled to familiarize you with some of the equipment and features available for protecting the church against theft, burglary, vandalism and arson.

SELF-CONTAINED ALARMS
A self-contained alarm is a device with the sensor or detector with the alarm itself in the same unit. This type of alarm has no remote control unit, thus the on/off switch is located on the unit itself. Because churches are generally unoccupied at night, the accessibility of the on/off switch makes this type of alarm a poor security device for churches. A self-contained alarm may startle an inexperienced intruder into leaving, but an experienced intruder will simply switch the device off. The only type of self-contained alarms suggested are smoke detectors, whose purpose is to alert persons in the building of a fire so they can exit safely.

CENTRAL ALARM SYSTEMS

A central alarm system is made up of three basic components, the detectors or sensors, the control unit and the alarm itself. The sensors or detectors are activated by an intruder or a fire. When tripped these sensors send a signal either wired or wireless (radio transmitted) to the control unit which in turn sounds the alarm and/or dials an appropriate agency or central security control firm.

SENSORS AND DETECTORS

The sensors or detectors can be part of a perimeter system that detects an intruder in the act of entry, or motion detectors that detect the intruder once inside the building. "Motion" is used as a description for a variety of detectors, including not only those that detect motion, but also those that detect light, sound, vibration and heat. In residential properties with pets, motion detectors either need to be in an area secured from pets or, if possible, adjusted over the heads of pets at their most active, as can sometimes be done with photoelectric sensors. Following is a variety of different types of detectors for security and fire.

Security Detectors

* Magnetic Switch Detectors - These perimeter devices detect an intruder in the act of entry. Doors and windows are equipped with magnetic switches that when separated send a signal to the control unit. These types of sensors can be either wired or wireless, and they can also be installed on inside doors, such as the sacristy or office door.

* Foil and Screens - These perimeter devices work the same as the magnetic detectors, except instead of separating the magnets to break the circuit and trigger the alarm, the alarm is activated when the circuit is broken by an intruder breaking the glass or cutting the protective screen.

* Ultrasonic Motion Detector - This motion device fills an area with sound waves too high for most humans to hear. Motion in the room disturbs the waves, which triggers the sensor and activates the alarm. The high pitched sound created by some of these devices may disturb some persons or animals. So, if used in a residence or office, a demonstration with persons and pets occupying the area should be arranged prior to installation.

* Photoelectric Sensor - This motion device projects an invisible light beam between two terminals. Interruption of the beam triggers the signal to the alarm.

* Microwave Detector - This motion device works in the same fashion as an ultrasonic motion detector. Movement within the protected area disturbs the wave pulses. This device, however, has an increased range over ultrasonic detectors and can penetrate glass, wood and plaster, but not brick or concrete. This allows the device to be placed out-of-sight in a cabinet or closet, such as in the church office or sacristy. Due to the nature of this device it has limited application in an area with windows.

* Passive Infrared Detector - This motion device is triggered when the detectors sense a change in the infrared energy levels caused when a human body moves. These detectors basically measure heat changes caused by movement. This device has limited use in areas near roadways or with windows, since outside movement and infrared light can trigger the alarm.

* Audio-Sound and Vibration Shock Detectors - These devices come with a variety of options. One option is to set the device to detect the sound of breaking glass. Another option is to set the device to pick-up the subtler sounds of voices or movement. An advantage of the sound detector over the vibration detector, is that one sound sensor may protect one or more areas with extensive glass; whereas a vibration sensor may be needed for each window or door with glass.

* Proximity Detector - This type of detector creates an electric field around a specific object to be protected, such as a safe or metal filing cabinet. An intruder entering the electric field will change the field and trigger the alarm.

* Panic Buttons - These are buttons or switches that can be used to trigger an alarm in a situation where an intruder is seen or heard by a resident, night watchman or employee. Panic buttons are also known as hold-up devices and are used in banks, jewelry stores and other high security areas.

* Pressure Mat - This type of detector is used to protect a specific area. The mat is placed under a carpet or rug in front of an entry way, access corridor, stairway or safe. When the pressure of a footfall makes the contacts within the mat meet, a signal is sent to activate an alarm.

FIRE DETECTORS
* Ionization Smoke Detector - This device is a common smoke detector found in many homes. Bits of harmless radioactive material fill a gap between two terminals with a cloud of electrically charged particles. Smoke causes a disturbance in the conductivity of the particles and triggers the alarm. These smoke detectors have been found to be extremely sensitive to false alarms and are prohibited by fire departments in some jurisdictions.

* Photo-electric Smoke Detector - Again, this is a device found in many homes. A beam of light is passed between two terminals within the detector. Smoke causes deflection of the beam and triggers the alarm.

* Heat Detectors - There are two types of heat detectors, fixed temperature detectors and rate-of-rise detectors. Heat detectors are most frequently used in furnace, boiler rooms, kitchens, attics and rooms with heat generating devices (e.g. laundry rooms, hi-fi equipment rooms, etc.). The fixed temperature device triggers an alarm and/or sprinklers when the temperature in the room reaches a preset level, usually between 1350 F to 2000 F. The rate-of-rise detector measures the rate at which the temperature has risen to trigger the alarm/sprinklers.

* Ultraviolet and Infrared Flame Detectors - These fire detection devices are triggered by light waves emitted by flames. These types of devices should, however only be used in residential and church properties in combination with a smoke detector. A photoelectric smoke detector will trigger an alarm while the fire is smoldering and before it bursts into flames.

The above list gives you an idea of what types of detectors are available for protecting church properties. There are, however others you may want to consider, such as detectors that will trigger alarms for gas leaks or flooding. If you feel either of these detectors are advantageous to your situation, consult a local security or fire alarm dealer for more information.

CENTRAL CONTROL UNITS
Control units perform a variety of functions. Following is a list of the different functions you may want a central unit to perform.
* Signal a physical alarm, such as a bell or horn.
* Send either a wired or wireless signal to a central station, such as the police, fire department or a
   security firm.
* Send a signal to both a physical alarm and to a central station.
* Activate microphones to allow remote listening-in of the activity in the protected area at the central
   station.
* Send a signal to a central station which pin-points the exact location of the problem in the building,
   (e.g. second floor, basement, kitchen etc.).
* Send a signal to a central station which designates whether the problem is security or fire in nature.

* Operate an automatic routine test for proper functioning of all sensors.
* Switch to an auxiliary power source in the event of a power failure.
* Act as a central point for turning the alarm system on and off, with a built-in time lapse to allow the person arming the alarm to leave the building once the alarm has been set and to disarm the system within a pre-determined time period after entering the building.

Control units operate on both wireless (radio receivers/transmitters) and wired (electrical wiring) systems. A wired protection system is usually less expensive to maintain than a wireless system. But, a wired system frequently cost more to install than a wireless system.

In the past, a wired control unit had to operate on either an open or closed circuit. This meant that all sensors had to operate on either an all-closed or all-open electrical circuit. For example, you could not use a pressure mat device (open circuit) on the same system with magnetic door and window devices (closed circuit).

Today, control units exist that can operate both closed and open circuit devices. These control units are, however, sometimes expensive and may require a professional to re-arm the system once an alarm has been activated. When purchasing a control unit, make sure it is compatible with all your present and future sensor needs.

PHYSICAL ALARMS
Perhaps the easiest part of choosing an alarm system is picking the type of physical alarm you wish to have: a bell, blast horn, shrill electronic siren, raucous buzzer and/or a transmitted digital signal. Digital signals are usually meant for the central station to identify the location of the alarm and summon help. Government buildings sometimes use recorded messages advising the intruder not to attempt to leave the area, obvious high security protection not normally required in church properties.

The church's physical alarm will most likely be a bell or siren. These physical alarms are placed inside and/or outside the building, depending on the type of alarm system you choose. If you have an alarm system that notifies a central station directly, you may want to place the alarm inside where it will cause the most distress to the intruder and least distress to neighbours. If the church is not directly connected to a central station, the alarm may be placed on the outside of the building to alert nearby neighbours to call the authorities or your security firm. Some of these physical alarms are extremely loud, and whether placed inside or outside the building, the alarm will be heard by the intruder. Churches are not advised to have silent alarms. Vandalism and arson are serious reasons for alarming church properties; a silent alarm allows time for the destruction of property to take place before help arrives. In these situations it is much better to have a loud physical alarm that will drive intruders from the building. Your alarm dealer can show you the physical alarms compatible with your overall alarm system.

GENERAL PROPERTY PROTECTION

BUILDING SERVICES
* Heating, Ventilation and Air Conditioning Systems - these systems should be serviced annually by qualified contractors. Service reports should be maintained and available for review.

* Electrical System - depending on the age, the electrical system should be evaluated to ensure.
a. There is sufficient capacity for the demand.
b. Good condition of the wiring.
c. There is no over fusing of breakers or fuse panels.
d. Good housekeeping in electrical service rooms. These rooms should not be used for miscellaneous storage.

* Plumbing - Identify any galvanized piping and check condition of older cast iron pipes. These older pipes may need replacement.

<u>FIRE SAFETY SYSTEMS</u>
* Fire Alarm System - ensure system provides adequate coverage and meets all applicable fire codes.

* Sprinkler Systems - must be tested annually by a qualified contractor.

* Standpipe Systems/ Portable Fire Extinguishers - check that they are kept in good working condition and are serviced annually.

* Stairwells - should have adequate access with proper lighting and self-closing fire doors.

* Exit Signs - adequate placement and well-illuminated.

* Hallways - should be well-lit.

* Emergency Lighting - adequate number and placement of emergency lights which are regularly checked to ensure that they are in good working order.

<u>GENERAL THEFT PROTECTION</u>
Exterior Physical Protection

Exterior lighting- complete perimeter coverage with protection against breakage.
Door Types

Metal solid core - where permitted, doors should have double cylinder deadbolt locks. Otherwise, single cylinder deadbolt locks.

Glass in Aluminum Frame - where permitted, doors should have double cylinder deadbolt locks. Otherwise doors should have additional thumb protection.

Overhead Doors - Solid metal construction is preferred. If wooden, doors should have iron bar reinforcements or interior metal bars.

All Doors - hinges should be pinned or welded in place if on the exterior.

Glass Windows and Doors
Iron work should be mounted inside all glass or as an alternative, ULC listed polycarbonate material (Lexan) should cover all glass surfaces.

Skylights, Transoms, Heating Ventilation and Air Conditioning Openings
All these openings should be protected with bars or metal screens.

Alarm protection
Complete interior motion protection with all accessible and inaccessible openings contacted or protected. A ULC listed installing and monitoring company and components or best available service if the ULC company is not available.

Line security is recommended.