YOUR-

Smoke detectors protect your home

In selecting appropriate locations for smoke detectors elsewhere in the house there may be the additional consideration of the possibility of their being subjected to false or unwanted alarms such as might occur if they are located too close to a cooking area. In such cases it may be necessary to compromise on position, but not at the expense of safety.

Level of Protection:

In our attempt to place a perspective on fire protection in the home it is important that we should consider, for a moment, the question of what level of protection we are prepared to accept.

NFPA No. 74 comments to the effect that one smoke detector covering the escape route from the sleeping quarters offers a minimum level of protection. A higher level of protection is suggested by a system which contemplates the installation of one or more smoke detectors to protect each separate sleeping area and at the head of each basement stairway, as well as smoke or heat detectors in every other major area and room of the living unit. Additional protection may be achieved by the installation of detectors in such areas as the basement or attic.

Fire Detector Testing:

It is in the examination and testing of fire detectors that ULC attempts to bring together all of the considerations that we have made reference to so far and many more besides.

ULC subjects all types of detectors submitted for our certification to a comprehensive test programme which is designed to assess the performance of the device under normal and certain abnormal conditions of service. In addition, ULC examines and tests these devices for compliance with the requirements of the Canadian Electrical Code pertaining to the fire and shock hazards of the devices themselves.

As might be expected, one of the most difficult questions to resolve in the evaluation of the reaction or response of a material or device to fire exposure has to do with the specification of the "standard" fire to which it is to be exposed. We eventually settle upon "typical" and "representative" fire conditions which are "standard" in the sense that they are applied to all of the devices that are examined against their effects, hence providing a common "yard stick" for evaluation. Of necessity in our evaluation programme, we create a series of standard fires since the "fire signatures" produced by different burning materials vary in their composition and effect. (Here we are talking essentially of detectors responding to other than the energy release "signature"). We provide further variations on the theme because some smoke detectors respond differently to smoldering, flaming, "cool" and "hot" fires, and so on. Our philosophy of testing does, however, require an acceptable level of performance from each detector when exposed to each of the "standard" fires.

With "heat" detectors, the problem of evaluation by exposure to test fires is not so complex as it is for smoke detectors. Traditionally, the performance of heat detectors has been examined by exposing them to a "standard" fire of measured intensity and effect, from a pan of denatured alcohol, when they are installed on a smooth ceiling, approximately 12 feet above the pan and at a specified spacing from the fire location projected to a point on the ceiling. The operation of the heat detector within a specified time period qualifies the performance of the detector at the spacing schedule employed in the test. These spacing limitations, in effect, provide an indication of the relative sensitivity of the heat detector.

Heat detectors are also examined and tested to determine their performance under conditions of high and low temperature; corrosive and high humidity environments; conditions of unusual vibration and other treatment which may conceivably affect their normal response or sensitivity.

Similarly the test programme for a smoke detector begins with the determination of its normal operating characteristics and continues with an examination of the effects on these operating characteristics of subjecting the detector to unusual conditions and environments.

It will be appreciated from our discussion that one of the most critical of the requirements that are examined is that of the sensitivity characteristics. Although both the ionization or products of combustion type smoke detector and the photoelectric type smoke detector respond to an "aerosol" fire signature, the different principles involved in their operation have thus far necessitated a different approach in the assessment of this feature in regard to the respective types.

The sensitivity level of the combustion products type detector is related to the particle density obtained at a time interval in the burning of four different materials, while the sensitivity level of the photoelectric type detector is related to the degree of obscuration of a light beam. These relationships are brought together by establishing comparative sensitivity levels and a range of settings in the common environment of a laboratory smoke test box, with the smoke in this case, produced by smoldering cellulose materials such as cotton wick or the punk sticks used in lighting fireworks.

Each type of smoke detector is subjected to stability tests, which examine the change in sensitivity of the device when exposed to such environments as rapid changes of temperature, humidity, air velocity and air pressure, or the effect of interruption of the supply voltage. The sensitivity of the units is required to be such that they will not "false alarm" when subjected to this treatment.

At the present time, ionization type detectors are subjected to fire tests involving four different types of materials, the combustion of which results in a range of particle types and sizes. The materials burned are shredded newsprint, polystyrene type packing material, regular leaded gasoline and kiln-dried fir strips. The fire tests are conducted in a test room with dimensions of some 40 x 60 feet with a ceiling height of approximately 16 feet. The detectors are required to respond with an alarm to the test fire condition within two minutes when spaced on a 30 foot grid which places them at approximately 21 feet from a point over the top of the test fire.

As is the case with testing programmes on all classes of products, types of tests and testing methods are under continual scrutiny for further refinement and, in the case of smoke detectors, the possibility of additional fire tests, as well as for uniformity in the application of fire tests to both types of detectors, is currently under study.

Consideration is also being given to the inclusion of a "variable flow sensitivity test" and a "directionality test" to further evaluate the ability of detectors to respond to smoldering fires where little heat is produced and consequently slow smoke movements are involved.

Other parts of the current testing procedure are intended to examine the effect on the operation of the smoke detector of accumulations of dust or their performance in potentially corrosive environments or after the simulation of the effects of unusual abuse during handling or transit.

Each smoke detector is subjected to the test and examination normally conducted on items of electrical equipment for determination of compliance with electrical safety and fire hazard requirements such as consideration of the temperature rise of components under normal operating conditions as well as electrical overload tests, endurance tests and operation under variations of ambient conditions such as high and low temperature and dielectric withstand tests.

In the case of battery-powered devices, the ULC test programme of smoke detectors includes an assessment of the battery life and the feature in these devices which is designed to provide adequate warning of impending battery failure. The audibility of the alarm sounding device incorporated in the self contained units is also examined.

Detector Maintenance and Other Considerations:

Once we have decided upon the level of protection, made our selection of devices, and selected their location, there is at least one important aspect of their use remaining to be considered, that of their maintenance.

As mentioned previously each householder is furnished with maintenance instructions provided by the equipment supplier. Where economically feasible a maintenance contract with the installer should be considered. Further "tests and examinations, as recommended by the manufacturer, should be made periodically by the householder. It is good practice to establish a definite day for these tests".

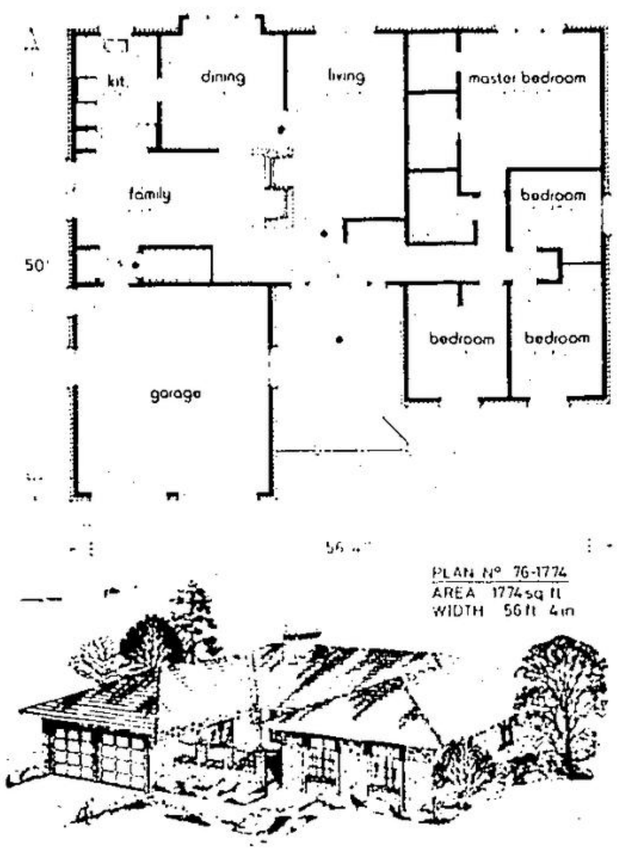
From our discussion it will be appreciated that there are a number of considerations which need to be taken into account if we are to achieve a measure of fire safety in the home. Apart from the judicious selection of devices which have demonstrated an acceptable level of performance as well as their appropriate installation and regular maintenance, NFPA No. 74 recommends that the potential fire hazards in the home be minimized, (these hazards can be related to the statistics referred to earlier in this article), and that each household adopt a family escape plan.

The Standard cautions that the warning offered by detectors may be wasted unless the family has planned in advance for rapid exit from their residence. It recommends that drills be held so that all family members know what to do and that each person plan for the possibility of an exit out of the bedroom window. The Standard also notes that an exit from the residence without requiring the opening of a bedroom door is essential.

To sum up, NFPA No. 74 notes that "reasonable fire safety" can be produced through a three-point programme of:

1. Minimizing fire hazards
2. Providing a fire warning system
3. Having and practicing an escape plan

NEW HOME OF THE WEEK



UNIQUE FOUR BEDROOM TRADITIONAL

Here's an exciting traditional design in brick veneer which is ideally suited to the wide lot with a rear view. The four bedrooms and a full basement make it a perfect choice for the larger or growing family which requires abundant space, combined with good formal design.

The main entry, through a brick and wrought-iron courtyard, is weather-sheltered and double-doored. The compact but open entrance foyer leads naturally forward and down two risers to the sunken living room, which features a large free-standing double fireplace and sliding glass doors to the rear patio. The double fireplace is in a back-to-back configuration, the other side facing the large and open family room.

The well-planned U-shaped kitchen is centrally positioned between the family room, for casual meals, and the dining room for more formal entertaining.

All four bedrooms are positioned around the master bath and all have good exposure for natural lighting and ample closet storage. The master bedroom has a full walk-in closet and a three-piece ensuite with tub, which is accessible via pocket door.

The full basement contains abundant space for the future development of additional bedrooms, family room and-or recreation room. It has roughed-in plumbing for a convenience bathroom, and a third fireplace, also in roughed-in form. A large utility room contains the side-by-side washer, dryer and laundry tub.

A double fully-enclosed garage, with adequate space for the development of a workbench and sculpted overhead doors completes the convenience features of this well-planned traditional design.

Plans for design No. 76-1774 may be purchased either by single set, at a cost of $70. for the first set and $10. for each additional set, or by the package. A five-set plan package, including the first set, is economically priced at $100. and an eight-set package, also including the first set is only $125.

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