TORONTO

STAFF REPORT
ACTION REQUIRED

Use Of Residential Fire Sprinklers In New Housing Projects

Date:	May 22, 2007
To:	Community Development and Recreation
From:	Toronto Fire Services
Wards:	All Wards
Reference Number:	p:\2007\ClusterB\FIR\cd07011

SUMMARY

Toronto Fire Services is committed to achieving a high level of public safety.
Although residential sprinkler systems in residential occupancies will most importantly save many lives, the following additional benefits can be expected:

- Significant reductions in property losses
- Reduced impact on the environment due to limited release of toxic and other hazardous combustion products
- Reduced construction costs due to offsets

Advocating for their use also provides an opportunity for the City to show leadership on the issue of fire safety.

RECOMMENDATIONS

The Toronto Fire Chief recommends that:

1. Fire Services staff work with the Toronto Community Housing and other non-profit housing corporations to promote the life safety benefits of residential fire sprinklers and the ability to reduce the potential release of toxic smoke into the air caused by fire.
2. Fire Services explore with Toronto Community Housing the most cost effective method to install Residential Fire Sprinklers.

Financial Impact

There are no financial impacts on Toronto Fire Services to advocate the use of residential fire sprinklers to reduce injuries and fatalities by fires in residential buildings.

DECISION HISTORY

Following the Deputy City Manager's presentation to the Community Development and Recreation Committee January 22, 2007 on the strategic issues, the Fire Chief was asked in the next three months to report on the issue of mandating fire sprinklers in Toronto Community Housing Company facilities. City Council, at its meeting in June 2005, supported the proposal to submit legislation to amend the Ontario Building Code requiring residential fire sprinklers in all new residential dwellings and authorized the Fire Chief to advocate to the public the additional fire safety provided by residential fire sprinklers

ISSUES BACKGROUND

Fire Losses in Toronto

While Toronto Fire Services has been diligent in its pursuit of fire protection, Toronto continues to suffer preventable deaths and injuries from fire. Deadly fires usually occur late at night in people's homes. The large majority of fire deaths and injuries in Toronto are due to residential fires, rather than fires in commercial or industrial properties.

Table 1 sets out deaths, injuries and losses due to residential fires in the City of Toronto from 1994 to 2005. While there have been 273 fire fatalities in Toronto, 237 deaths and 2,825 injuries have occurred in residential fires during that time. Residential fires accounted for 87 percent of all fire-related deaths and 75 percent of fire-related injuries. During the same period, residential fires also accounted for significant property losses valued at over $314 million (not adjusted for inflation).

Table 1:
Residential Fire Deaths, Injuries and Property Losses in Toronto, 1994 - 2005

Year	Fire Injuries	Fire Deaths	Fire Losses ($) (Not Adjusted For Inflation)
1994	384	17	21,837,929
1995	340	25	22,106,697
1996	342	22	19,104,486
1997	356	24	21,981,973
1998	245	24	18,532,998
1999	184	32	26,985,336
2000	173	15	21,153,913
2001	178	16	42,179,769
2002	158	15	26,219,597
2003	163	22	27,314,551
2004	172	12	20,729,772
2005	130	13	46,180,981
Total	2,825	237	314,328,002

In 2006, 13 of 14 fire fatalities were in residential units accounting for 93 percent of fire fatalities.

COMMENTS

Addressing Fire Risk

Residential fire sprinklers are a logical response to fire risk. Because the large majority of fire deaths and injuries occur in residential fires, fire protection measures which target residential properties have potential to prevent injuries and save lives.

Residential fire sprinklers suppress fires to complement the early warning capabilities of smoke alarms and other required fire suppression and containment measures. When a fire starts, the heat sensitive element in the sprinkler detects heat and releases water in a fine mist. Each sprinkler head responds independently. The sprinkler suppresses or extinguishes fire, preventing its spread and preventing the production and spread of lethal smoke. Appendix 1 clearly outlines the myths and realities of residential fire sprinklers and reveals the important technology now available to save lives.

Estimates for cost of residential fire sprinklers in 13 developments from recent Affordable Housing RFP submissions

The data that was considered reliable and submitted by Affordable Housing to Fire Services was based on 854 housing units in 13 developments. The estimated cost for installing full sprinkler systems throughout the units was costed out by the housing proponents as a total of $1,553,500.00 or about $1,820.00 per unit. Added to this would be architect's and mechanical fees and GST on the construction, bringing the total to approximately $2,000.00 per unit. This cost is based on the average size of the 854 units at 562 (ft^2).

The 854 units proposed are in low, medium and high-rise formats with all but 81 concrete framing. There were no town homes or single family dwellings. The units proposed are of modest size and are approximately 60% one-bedroom, 35% two bedroom and 5% three bedroom. Estimated annual maintenance costs vary, but most are listed in the range of $56.00 to $70.00 per unit.

For an additional average price of approximately $2,000.00 inclusive of architect’s and mechanical fees and GST on construction per unit, citizens can live in homes that will not allow the spread of fire to harm individuals and add to the deterioration of the environment. Fire Services leaders suggest the range for residential fire sprinklers is $1.50 to $3.00 depending on the size of the units. It is estimated that Insurance savings for units with sprinklers can range from 10 to 15 percent.

The Canadian Automatic Sprinkler Association (CASA) reported as of April 2007 there were approximately 400-450 residential dwelling units voluntarily being sprinklered through out the city of Toronto based on the accepted NFPA 13D. There may be

additional units that have installed residential fire sprinklers by non CASA installers and not accounted for. CASA reported the price to the builder was on average $1.50 per sq. ft. which is still well within the 1-1.5% of construction cost. Additional units in one residential building or subdivision would reduce the cost of installation per unit.

Working with developers, non-profits and housing authorities in Toronto

Toronto Fire Services acknowledges that Toronto Community Housing is a leader in providing sustainable housing as outlined in their Community Management Plan 2007-2009. They are proactive in community revitalization projects, future use of co-generation technology (a way of generating heat and electric power at the same time from the same energy source), creative use of new housing builds and the best use of buildings to serve their tenants.

Toronto Community Housing is committed to the safety of its tenants and communities. They collaborate with Fire Services on a number of pilot projects geared at reducing false alarms and increasing safety. They are committed to providing safe and affordable housing to low income earners.

Toronto Fire Services would value collaboration with Toronto Community Housing in dealing with fire safety issues and advocating residential fire sprinklers in new suitable housing projects to provide safe housing and a green culture that will reduce the impact of housing on the environment.

Support for Residential Sprinklers

The Canadian Association of Fire Chiefs (CAFC), the Ontario Association of Fire Chiefs (OAFC) and the Canadian Council of Fire Marshals and Fire Commissioners (CCFM/FC) support the need for residential fire sprinklers in all residential occupancies.

Increased speed of the spread fire and vulnerable victims

Flashovers in home fires lead to many of the injuries and deaths in residences. Over the years, increased use of combustible furnishings in homes has reduced the period of time between the start of a free-burning fire and flashover – between 2.2 and 4.3 minutes. This means that flashover can easily occur in a home fire prior to the arrival of Fire Services. Residential sprinklers suppress the fire before flashover occurs.

Fatal residential fires most often occur between the hours of midnight and 6:00 am, when victims are asleep. Victims are also disproportionately children and the elderly, who are vulnerable because they are physically less capable of escaping. When a fire occurs, occupants of a house may not be able to respond to smoke alarms and escape in the few minutes before flashover occurs. A study from the Ontario Fire Marshal's office indicates that 43% of smoke detectors did not operate. When provided, fire sprinklers add a layer of protection to prevent the growth of fire to deadly proportions.

Experience in North American Jurisdictions

Many other jurisdictions in North America have adopted requirements for residential fire sprinklers in residential buildings. With the exception of Ontario, sprinklers are required in high-rise residential buildings across Canada. In addition to provincial requirements, Vancouver has adopted by-laws requiring residential sprinklers in all new residential buildings (including low density housing), under the City's statutory authority in British Columbia.

Over 220 jurisdictions in North America have adopted requirements for residential fire sprinklers in residential buildings. The large majority of these jurisdictions are municipalities and other local governments in the United States, where building regulations tend to be under the jurisdiction of local rather than state government. Prominent experience with requirements has been gained in Scottsdale, Arizona and Prince George's County, Maryland. New York and Chicago have recently implemented requirements for residential fire sprinklers in high-rise residential buildings.

There have been reviews of the effectiveness of residential fire sprinklers in two large North American jurisdictions, one in Canada and the other in the United States. Scottsdale, Arizona has had a sprinkler ordinance in place since 1986, and Vancouver, British Columbia has had a by-law since 1990. Both require all new residential developments to be sprinklered. Since the regulations in each jurisdiction came into effect, there have been no fire deaths in sprinklered homes, and over 90 percent of all fires in these homes were contained by the operation of a single sprinkler. The cost of fire damage or loss has also been significantly reduced. In Scottsdale, the damage in the average sprinklered incident was $2,166.00 compared with $45,019.00 in homes without sprinklers. The Vancouver experience has been similar. The average fire loss in a home with sprinklers was $1,065.00 compared with $13,937.00 in a home without sprinklers.

Bill 2, Home Fire Sprinkler Act 2005

Bill Two is a private member's bill currently before the Ontario Provincial Parliament. The Home Fire Sprinkler Act 2005 was introduced by Brampton M.P.P. Linda Jeffreys. The Bill would amend the Ontario Building Code to require that all new residential dwellings require residential fire sprinklers in Ontario. The Bill has been referred to the Standing Committee of the Legislative Assembly on November 3rd, 2005. This vital piece of legislation calling for a change to the Ontario Building Code may not be debated before the upcoming election.

Conclusion

Fire Services would welcome the opportunity to work with TCHC and other non-profit housing providers to promote the benefits of fire sprinklers in protecting families in future new residential developments.

CONTACT

Jim Stoops, Executive Officer
Toronto Fire Services
Phone: 338-9550, Fax: 338-9060
E-mail: jstoops@toronto.ca

SIGNATURE

_____

William A. Stewart
Fire Chief

Attachment – Appendix One Myths and Realities of Residential Fire Sprinklers

Appendix One
Myths and Realities of Residential Fire Sprinklers

Question: Do sprinklers go off accidentally?

Answer: No. The odds of a sprinkler going off by accident because of a manufacturing defect are 1 in 16 million. You have a better chance of being hit by lightening than for a properly installed residential fire sprinkler to go off by accident.

Question: What about water damage?

Answer: One of the myths about sprinklers is that they will cause significant water damage. While this may seem logical (after all, they spray water), fire records show that the reverse is actually true. Here is why:

A residential fire sprinkler typically discharges less than 20 gallons per minute in a fine spray that is quite efficient at fire extinguishment. A firefighter's hose line on the other hand discharges more than 200 gallons a minute. In general, a sprinkler system will use between 1/10th and 1/100th of the water used by the Fire Department. The combination of the sprinkler's quick response, the smaller water flow and lower pressure will significantly reduce water and property damage.

Question: Will fire sprinklers leak?

Answer: No. Sprinklers and their piping are tested at the pressures two to three times higher than your plumbing system, even though they use the same pressure as your plumbing. Therefore, the chance of a leaking sprinkler is practically non-existent. Like your plumbing pipes, sprinkler pipes are not exposed to cold areas so they are protected from freezing. They do not leak because, unlike faucets and other fixtures that are operated often throughout their lives, fire sprinklers remain closed until needed and thus do not receive the wear and tear of daily use.

Question: Aren't they unsightly?

Answer: Residential fire sprinklers are much smaller than ones that you see in stores and offices. All residential models come in colors to match popular ceiling and wall colours, and manufacturers will even custom-paint them for you. Many models are partially recessed into the ceiling with about ¼ inch – ¾ inch below the ceiling.

If you want them completely recessed, these models are also available. A cover plate that is painted to match the ceiling hides them. The cover is held in place by a metallic link that melts in a fire and exposes the sprinkler. It is common to find that visitors do not notice the sprinklers at all unless you point them out, even the ones that are not recessed into the ceiling.

Question: How do sprinklers operate?

Answer: Fire sprinklers are individually heat-activated and connected to a network of water pipes. When the heat from a fire raises the sprinkler to its operating temperature (usually 165^{o}F), only that sprinkler activates delivering water directly to the source of the heat.

Question: Won't they all go off together?

Answer: No! Each sprinkler reacts individually to a fire, so only the sprinkler nearest the fire will open. If that is not sufficient to control the fire then the next nearest will open, and so on. In over 95 percent of cases only one sprinkler operates and this is enough to control or extinguish the fire.