



BUILDING CONSTRUCTION & DESIGN VIEWPOINT

Addressing concerns of building, fire, and government officials, designers, developers,builders

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FORTY-TWO FAMILIES LOSE HOMES TO FIRE!

Four fires in one major metropolitan area destroyed a total of 42 homes over a span of 18 days. More than 40 families were made homeless and lost most of their possessions. Was this the result of a series of California brush fires? Otherwise, what cruel coincidence could bring about such tragedy?

Actually, these events were remarkably commonplace. But how could fires spread from one home to another in such large numbers? Very easily. These homes were in apartment buildings protected by one-hour combustible separation walls and floor/ceiling assemblies between living units. But if living units are protected from one another by one-hour fire-rated separations, how can such multi-unit fires occur? Again, very easily. One-hour fire-rated separations are "rated" one hour, but frequently allow fire to pass from one unit to another in 10 minutes or less.

Was the above scenario a coincidence that may never be expected to be repeated? In fact, it has been repeated hundreds of times, and may be expected to be repeated hundreds more times as long as building

codes permit one-hour combustible separations. The problem is not that one-hour fire-rated wood-framed separations **occasionally** fail to contain fires, but that they **routinely** fail to contain fires in 20 minutes, 10 minutes, or even less.

DATE: JANUARY 18, 1997
ALARM TIME: 12:35 P.M.
ARRIVE TIME: 12:38 P.M.
CAUSE: Believed to have started on porch

Shortly after Saturday noon, a fire broke out in a 3-story, 10-unit wood-framed apartment building. An off-duty policeman alerted those occupants at home. Within minutes all 10 units were ablaze. There were no human injuries, although some pets perished in the fire. Some residents had time to save one or two items as they escaped, but most lost everything including irreplaceable mementoes such as family photograph albums.

When the fire department arrived three minutes after the alarm was sounded, fire was through the roof and



Fire department response time -- 3 minutes.
Ten families homeless. Building -- total loss.



Vinyl siding melted from heat generated by a burning building 50 feet away

the top floor was fully involved. The fire was so intense that it melted the vinyl siding on the next-door building 50 ft. away. The entire roof collapsed, with fire partially burning through the top floor into the units below. The fire department remained on the site for 20 hours because of fear of further collapse of the building. All 10 apartment units were totally destroyed by fire. A number of automobiles parked nearby were damaged by radiant heat. Following the fire, all of the burned-out remains of the building were demolished and removed down to the ground floor slab to prepare for construction of a new building. Ten families lost their homes and most of their possessions. The building was built about 1980 and met the building codes of that day, which were substantially the same as current codes.

In fact, with regard to compartmentation and combustibility, some building codes are less strict today than in 1980. Most current codes require one-hour fire-rated separation walls and floor/ceiling assemblies between units. The above-described fire, as in hundreds of other apartment and condominium fires, demonstrates that one-hour fire-rated combustible separations do not provide one-hour protection.

Resident: "It all went up so fast!"

The above-described fire was followed within 18 days by three other major apartment fires which left another 32 families homeless.

DATE: JANUARY 20, 1997
ALARM TIME: 6:22 a.m.
ARRIVE TIME: 6:24 a.m.
CAUSE: Probable arson

The fire started on the first floor and rose vertically by window and entrance areas. The fire spread through the second floor and attic. Heavy fire was showing on the structure on arrival of the fire department. Although the Fire Station was less than 300 yards away, and the Fire Department arrived in less than 2 minutes, 5 units of this 2-story, 8-unit building were destroyed by fire; the remaining units were smoke and water damaged. All eight units were made uninhabitable.



Fire station within 300 yards. Response time 2 minutes. Eight families homeless

DATE: FEBRUARY 2, 1997
ALARM TIME: 6:57 p.m.
ARRIVE TIME: 7:04 p.m.
CAUSE: Kitchen grease fire

The fire started in the kitchen of a second floor unit of a 2-story, 12-unit building. The fire travelled to the attic and ran the length of the building. A back draft explosion occurred after the arrival of the fire department, blowing out the back wall of two units. The six second floor units burned; the six first floor units were smoke and water damaged. At least 3 automobiles parked near the structure were damaged by fire. Twelve families were made homeless.



Fire department response time -- 7 minutes.
Twelve families homeless.

DATE: FEBRUARY 6, 1997
ALARM TIME: 8:14 p.m.
ARRIVE TIME: 8:19 p.m.
CAUSE: Child playing with lighter

When the fire department arrived, heavy smoke was showing on a third floor apartment. Fire travelled up to the attic and down to the second floor, destroying or damaging 5 units; the remaining units were smoke and water damaged. Twelve families were forced from their homes.

Of the four fires described above, in no case was the fire contained to the unit of origin by the one-hour fire-rated separations permitted by the building code.

Nor is this sequence of four disastrous apartment fires in 18 days unusual. In a study made in this same metropolitan area 10 years earlier, it was shown that in 14 apartment and condominium fires over a period of 100 days, in only one instance was the fire contained to the unit of origin. Of the 153 living units

involved in these 14 fires, 82 were destroyed or damaged by fire and 59 were made uninhabitable by smoke and water damage; only 12 units remained undamaged.

Why do these fires rage out of control? Look at these apartments under construction. The very fire-rated separations themselves add fuel to the fire.



Apartments under construction illustrate why one hour combustible separations do not confine fires. The one-hour separations themselves add fuel to the fire

WHAT DO ALL THESE BURNED-OUT BUILDINGS HAVE IN COMMON?

THEY WERE ALL PROTECTED BY ONE-HOUR COMBUSTIBLE FIRE SEPARATIONS!

It is difficult to believe that Building, Fire and Code Officials say, "This is good enough." Year after year the same story is repeated. **One-hour combustible separations do not adequately contain fires to the area of origin.** And yet an effective, economical solution is available -- **two hour non-combustible separations of concrete and masonry.**

Two-hour non-combustible separations of concrete and masonry are Effective:

They do not burn; they do not add fuel to the fire.

They do not burn; they do not create noxious fumes that can cause death even before heat and flame reach the victim.

They do contain the fire, usually within the area of origin.

They maintain the structural integrity of the building, allowing safe exit of the occupants and access for firefighters.

Compare the concrete and masonry apartment buildings on the right with the wood apartment above. Both conform to the minimum fire rating

required by most building codes, but it is evident that they are not equally fire safe. The concrete and masonry building provides non-combustibility and fire separation that cannot be matched by wood-framed construction.

Fire separations made of concrete and masonry are Economical:

Studies have shown that two-hour non-combustible separations add only 2%- 4% to the initial cost of the total project, and



These concrete and masonry residential buildings cannot add fuel to a fire, and will confine fire to the area of origin

savings on insurance offset the small differential in initial cost in from 0 to 5 years, resulting in increased profits for the apartment developer or savings for the condominium homeowner.

Some fire-safety experts question whether it is really enough to design a building at a “life-safety” performance level. Although most occupants are able to get out of burning apartment buildings, most are unable to return. Their life’s possessions are gone and they suddenly are homeless— not just one family, but generally from six to twelve families, even up to 36 families, from a single apartment fire.

Review of National Fire Protection Association (NFPA) annual fire loss statistics shows that, while for the most recent three years, fire deaths in apartments decreased 23 percent from the same period a decade earlier, **injuries in apartments rose 43 percent**. (Injuries in one- and two-family detached dwellings **decreased 8 percent**) Apartment deaths are at the 645 per year level and injuries at 5,660 per year.

Automatic sprinklers and early warning devices have done much over the last 20 years to reduce deaths in all types of dwellings, although injuries in low-rise multifamily homes have increased dramatically. But the death and injury rates remain unacceptably high. Sprinklers can fail to be effective because sprinkler valves were shut off, pipes were frozen, the fire started in unsprinklered areas of the building, or other reasons. And some studies have shown that one-third of smoke alarms fail to give adequate early warning. These levels of failure of sprinklers and smoke alarms do not justify abandoning them as major components of multifamily residential fire protection systems. But they do justify the use of masonry walls and precast hollow-core concrete floors as non-combustible separations between tenant occupancies. **Both life and property are then protected by Balanced Design**. And the added advantages of sound separation and lower maintenance come as a bonus.

Low-rise multifamily residential buildings built to code minimums are the least firesafe of all dwellings, providing neither the isolation of single family residences, nor the fire-resistive construction and compartmentation of high-rise apartments and

condominiums. Low-rise apartment buildings built to the same standards as detached single family dwellings create a dangerous potential of fire tragedy; their residents are many times more vulnerable to the actions of their neighbors than are people in single family homes.

We know from the performance of masonry firewalls in otherwise all-frame construction that they **do** confine fires to the area of origin.

We know that the premium cost of all-two-hour non-combustible tenant separations of concrete and masonry in low-rise multifamily buildings is usually from 2% to 4% (sometimes even less than wood frame separations).

We know that insurance cost savings of 2-hour non-combustible separations mitigate any premium construction cost.

Two-hour masonry and concrete tenant separations provide non-combustibility and compartmentation, increasing safety to life and reducing property damage loss, and will result in increased long-term profits for the apartment owner/developer through reduced insurance premiums (or savings for the individual condominium owner). Even more apparent to the occupant is the greatly improved sound transfer performance of concrete and masonry separations

What reason remains for building codes to not require two-hour non-combustible tenant separations in low-rise multifamily construction?

What reason remains for owner/developers to not use concrete and masonry for low-rise apartments and condominiums?

Two-hour non-combustible separations of masonry and concrete can provide the safety which is lacking in multifamily construction built to current building code minimums, and should be required by modern codes, and selected by apartment developers both for life safety and maximum profits.

We would like to hear your comments. Send them to: VIEWPOINT EDITOR: 100 Crescent Center Parkway Suite 110 Tucker, GA 30084 (770) 621-9324
