

"HOW TO REDUCE YOUR FIRE INSURANCE RATES"

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## HOW TO REDUCE YOUR FIRE INSURANCE RATES

To correct any mistaken impressions that could result from the title of my address, I should make it clear that I am not an insurance rate technician. We have rating technicians who devote their entire time to the principles and applications of rating schedules and individual risk rate make-ups. My own involvement is limited to the broad general principles and overall results of the detailed rating system in our various property and casualty lines.

I might also remind you that insurance companies are in business to make money, although the level of profit we seek is modest. Nevertheless, we do have a profit--as well as a public service--motive, just as those of you who are in the construction trades or who are building and plant owners.

Fire insurance premiums are essentially the product of losses plus the necessary expenses of the insurance company to do business. In any major rating classification, the class itself establishes its own rates over long experience periods. I emphasize that the rating system recognizes long experience periods because in high-valued properties, a large single loss can distort the short-term averages. Of course an individual loss would not, in itself, have sufficient credibility for ratemaking purposes.

The important thing is that if losses go up, insurance rates are going to have to go up. So the simplest way to reduce your fire insurance rates is to reduce your fire insurance losses, and to get others to do likewise.

With that primer in ratemaking, let's take a closer look at how the insurance underwriter looks at property insurance.

Historically, the attitude of underwriters toward buildings of fire resistive construction has been quite favorable and the underwriting treatment accorded them quite liberal. Until recent years, most underwriters would not hesitate to freely commit their full capacity on fire resistive structures, subject to minimal inspection requirements.

The practices in the building trade were generally toward heavy masonry construction, the combustibility load of such things as high-rise office buildings was light and, generally, good fire cut-off standards were followed between floors. Consequently, subject to underwriting of the occupancy plus an assurance that any special hazards were adequately recognized and cared for, this was considered very desirable business. The loss experience was good and the rates reflected this until they reached almost minimal levels.

Today, things are different. During the past few years, we have seen some drastic changes in construction methods and materials. We are now seeing an increasing number of multi-million dollar fires in so-called fire resistive buildings occurring out of these changes in construction and materials.

Since the end of World War II, our booming economy has created a huge demand for more and better office, plant and storage space. Many new, attractive materials have been appearing on the market with resultant changes in building methods in order to utilize them. Sky-rocketing labor costs have resulted in the development of labor-saving construction techniques.

The financial squeeze put on municipal governments dictated a broader tax base, so it became politically expedient to allow building code variances in order to speed up development of commercial properties. In some major cities building codes have been completely revised, and not always for the better.

This combination of experimental designs, untried materials and relaxed code requirements has given us many buildings which no longer have the same high degree of fire resistance we once knew and which, in many cases, do not provide adequate life safety for occupants. /

Let me give you two examples of the new type fire losses we are experiencing in many so-called fire resistive buildings.

A typical, modern 50 story skyscraper in New York was completed in early 1970. The building has a reinforced concrete center core which contains the elevator

shafts, stair towers, rest rooms, utilities and air conditioning supply and return air shafts. Steel girders connect this core to columns at the outside wall of the building so that the floors are column-free except at the east and west sections.

Beams support the 2-1/2" thick concrete floor on fluted floor form units and are joined to the concrete floors by steel studs. Columns, girders, beams, and the underside of floors are protected by sprayed asbestos fibre to provide a four hour fire resistance for columns and three hour rating for filler beams and floors.

Walls are made up of aluminum panel window sections which also encase the outside columns. There is a 6" concrete block curtain wall 28" high built on the outer edge of the floor slab. This wall is located in line with the center of the wall columns so that the outer skin is 16" out from this wall. This separation creates vertical flues the height of the base of tower which is 143' maximum, which are interrupted at each floor level by an aluminum metal flashing designed to collect condensation and carry it through weep holes to the outside.

The inside face of the curtain wall, the space between the windows, and the space above the windows is insulated with 1" Dorvon FR 100 Polystyrene foam board. This insulation is covered on the inside by gypsum board only where visible. There is no covering on it above the hung ceiling. As a result, the protection between the concealed ceiling spaces of two floors consists of two 1" thick pieces of foamed polystyrene and a thin sheet of aluminum.

The concealed space between the hung ceiling and the floor above contains air supply ducts, lighting fixtures, power lines and conduit, telephone cables and communication cables.

During the application of finishing touches for occupancy of luxurious offices by a new tenant, on the 31st, 32nd, and 33rd floors, a guard on the 33rd floor saw smoke above the ceiling through an opening and reportedly pulled the fire alarm box on his floor. He then took the elevator to the first floor to notify the building guards of the fire.

Two guards and a telephone installer supervisor took the elevator to the 39th floor to notify other employees of the fire. Their elevator stopped at the 33rd floor, and smoke and flames rushed in. The elevator would not move from the floor with the result that the two guards perished and the telephone foreman was barely alive when rescued by firemen two hours later.

The Fire Department responded within three minutes from the time the alarm was received, but when they arrived, the 33rd and 34th floors were raging infernos with so much smoke and heat that the firemen could only operate on the floor for a short time.

It was five hours before the fire was brought under control and in those five hours, two lives were lost, 30 men were injured and damage totaled ten million dollars.

The 33rd, 34th, and 35th floors were burned out, with varying degrees of smoke and heat damage to many additional floors above and below. The fire spread to the exposed polystyrene foam in the south and east walls and emerged from the concealed space in the form of flaming droplets of flaming gases.

As the heat involved furniture stuffed with feather or foamed polyurethane, its progress accelerated because of the amount of combustibles and flammable gases given off. Tests made after the fire showed that the polyurethane foam gave off flammable gases at 212°F.

I would like to read to you excerpts from the official investigation report of this fire by the New York Board of Fire Underwriters.

"The reason for the severe fire in this fire resistive building can be understood if it is realized that the building classification is a misnomer. Buildings of this type erected in this plastic age should more correctly be called 'semi-combustible.' Except for the concrete and metal, almost everything in the building is combustible to some degree - foam plastic wall insulation, electrical cables, ceiling tiles, partitions and insulation on air handling units. The degree in some cases is small but added to the severe fire hazard caused by foamed plastic furniture, there is the recipe for this conflagration.

"The degree of damage to the steel frame is the result of several factors. It is reported that this steel came from England and became severely oxidized in transit. As a result, the sprayed asbestos fibre did not adhere well in many places and fell off along with the scale shortly after application. As a second factor, this insulation was removed in many locations where partitions were run to the underside of beams, where air ducts ran under beams, where clamps are attached, where wires scrape it. The situation that exists in a laboratory when this material is tested is not the same situation that exists in the field."

That last point is important. Time and time again we have blindly and in good faith accepted laboratory tests of the fire resistance of new materials, only to have the materials not prove out when it really counted. Well, I think underwriters have been burned once too often. We are going to be taking a much more critical look at both the design and materials characteristics of new construction, and we are going to be much more cautious in accepting and rating risks. The report I just referred to puts it this way:

"This fire has provided a major full scale test for new methods of construction. The transmission of fires between floors, the distribution of smoke throughout the building and the failure of structural elements prove the necessity of reviewing the present requirements and practices.

"Since this building is typical of a large number of buildings now being built, recommendations are being made on a general basis rather than applying specifically to this building."

The report lists 14 recommendations which I will not read now because of their length. I do have two or three copies which you may pass around, however, and additional copies may be obtained by writing to me at Fireman's Fund American Insurance Companies in San Francisco.

The second example involves a building in California in the course of construction. The structure had a total floor area of approximately 332,000 square feet. This was a one equals two story building of 6 inch reinforced concrete tilt-up walls

with reinforced concrete pilasters which were to have been divided into four fire divisions separated by 6 inch reinforced concrete fire walls with fire doors and dampers covering openings. The floor was concrete and the roof was composition on wood decking on wood truss.

The building was to be for a fruit processing and cold storage operation. The entire east side of the building was divided into cold storage and cooler rooms constructed of half-inch plywood on 2 X 4 wood stud framing extending from floor to roof, with polyurethane foam insulation sprayed on all walls and dividers and on the underside of both the equipment decks and the roof.

At the time of the fire, the building was almost complete, with one section occupied and cut off from the other three sections. The three sections not yet occupied were not separated from each other in that the fire doors were not in operation.

The fire was caused by a welder's torch while sweating a water pipe to cooling equipment, igniting polyurethane foam insulation in the area of the cold storage rooms. The polyurethane foam insulation, while a good insulating agent, was of such high combustibility characteristics that the entire three uncompleted sections of the building were totally engulfed in flames within approximately nine minutes from the time the fire started.

Several workmen on scaffolding at the opposite end of the building from which the fire originated were barely able to escape in time to avoid injury. The three sections of the building which were still not occupied were practically a total loss. The ultimate loss was in excess of \$4,000,000 on a building with a cost of \$5,500,000.

Unfortunately, these two examples do not represent uncommon losses. A look at statistics for recent years reveals an ominous trend: a \$15,000,000 grocery warehouse fire in Boston; a \$3,000,000 fire at a school under construction in New Hampshire-- and so the list continues.

The result of this can only be substantially increased fire and liability insurance rates, because of the exposure to life and property. It is not surprising



that many insurance companies--including my own--are taking a closer look at the so-called fire resistive buildings which we have considered superior risks eligible for premium discounts under commercial package policies.

Instead of giving discounts, we may be asking for surcharges on some of these buildings, particularly until we are satisfied that the lag in rate making has caught up to the new loss trend. Indeed, in some cases, I would not be surprised to see available insurance capacity become an acute problem in some hazardous type construction unless there is considerable improvement in construction methods.

But the picture is not so bleak as it might seem. Rates can be reduced, and the key to reducing them lies in incorporating the many existing fire protection methods into the initial stages of building planning, with diligent follow-through in the construction phases. It is then that fire protection is least expensive and most effective--not when it is thrown in as an ill-planned afterthought.

I would call upon you to exercise your leadership in making fire protection an integral part of building design and construction, both through your own expertise and with the help of qualified engineering personnel readily available to assess the weaknesses and strengths of design. Most major insurance companies have experts ready to assist and advise in connection with proposed construction plans, and Fire Rating Bureaus in practically all jurisdictions have experts who will respond, upon request, in connection with building design and construction.

A prime example of the benefits to be reaped from advance planning is a recent fire at the University of California at Santa Cruz. Although losses totaled \$150,000, fire prevention experts revealed that losses could have been substantially reduced if the building had been sprinklered--at a cost of \$6,000.

A second method of reducing fire insurance rates is, of course, reduction of loss potential in existing structures. Essential to the success of any such program is installation and maintenance of adequate fire protection systems, combined with emergency-procedure training of personnel and pre-planning with local fire departments.

Equally essential is a periodic inspection of the premises, followed by correction of hazardous conditions--in other words, good housekeeping. Most important of all, perhaps, is proper use of the facility--a building should not be used for a purpose more hazardous than its design and construction permit.

Again, both insurance companies and Fire Rating Bureaus stand ready to provide assistance--and I would urge you to take advantage of the advice.

In view of the location of this conference and because I am sure many of you are from California and other West Coast areas, I would remiss if I did not mention the fire hazard in the aftermath of earthquakes. The danger is a very real one, as evidenced by such tragedies as the San Francisco disaster of 1906, but present building standards seem destined to increase, rather than reduce, the exposure from earthquakes.

We were very surprised to learn of the collapse or failure of several recently constructed modern buildings in both the Santa Rosa earthquake in 1969 and the San Fernando Valley quake which just occurred in February of this year. The distressing part is that investigation by eminently qualified engineers following the failure and collapse of some of these buildings clearly indicated they should not have been a surprise.

I would like to quote from page 58 of a study released by the United States Department of Commerce on the Santa Rosa, California earthquake of October 1, 1969.

"Research on materials has led to their more effective use in buildings, but not without side effects. Sprayed-on fireproofing around steel frames in lieu of poured-in-place concrete fireproofing has greatly reduced the inherent lateral force resistance of many structures, since the mathematically neglected concrete with the steel frame members formed, in effect, composite members.

"Research on concrete members has changed design practice to the extent that allowable unit-design stresses have increased as much as fivefold in recent years, creating new design problems such as overturning, multiple types of stress, concentration, and concrete splitting. Metal and glass skin exteriors have replaced

brick and concrete panel walls, thereby reducing inherent strength and damping.

Many other examples can be cited.

"The net effect of all of these developments has been to substantially reduce the inherent lateral force resistance of buildings, unless the designer included noncode-required bracing. This extra bracing is too often opposed on the basis of costs or a lack of understanding.

"In essence then, a designer who follows the letter of the law as expressed in the building code, but lack experience judgement when extrapolating code values to new types of structures, can inadvertently design a collapse-hazard structure which is legally safe. Collapse is more probable today than it was several decades ago, before changed practice had reduced a structure's uncounted strengths."

Thus, it is possible for a planned building to be considered legally safe, while it is, in reality, a collapse-hazard structure. Equally disturbing is the fact that code requirements have so changed within recent years that a framed concrete building today is permitted to have about half the lateral force resistance--earthquake bracing, if you will--than that required ten years ago.

On top of all this, we understand that the International Conference of Building Officials, publishers of the uniform building code, now has before it a proposal to further reduce the safety factor on concrete construction.

Gentlemen, as underwriters, we are concerned. I must tell you in all candor that it is not a function of insurance to insure deficiency in design or construction method.