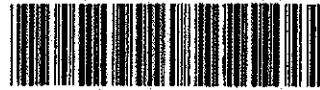


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HOW THE CITY OF FRESNO ACHIEVED BETTER FIRE PROTECTION

J. L. RANDALL, Deputy Director, Planning and Inspection,
Fresno, California

How did the city of Fresno reach a Class 2 ISO rating? The answer in its simplest terms is that Fresno improved the fire protection in its existing and new buildings and removed the highly hazardous structures within the central business district.

Three interrelated programs were used to produce these results:

- A major redevelopment project that included most of the principal business district outlined by the Insurance Service Office (ISO).
- A vigorous enforcement of the *Dangerous Building Code*.
- Amendments to the *Uniform Building Code* and the acceptance of automatic fire sprinkler systems in new buildings under Section 106 of the *Uniform Building Code* in lieu of other required fire protection.

As a result of these programs, principally, structural deficiency points were reduced by 88 points and superior construction credits were increased by 138 points.

One of the main objectives of these programs was to increase the installation of automatic fire extinguishing systems in the central business district. Figure 1 shows the status of buildings within the central business district, a summary of which is as follows:

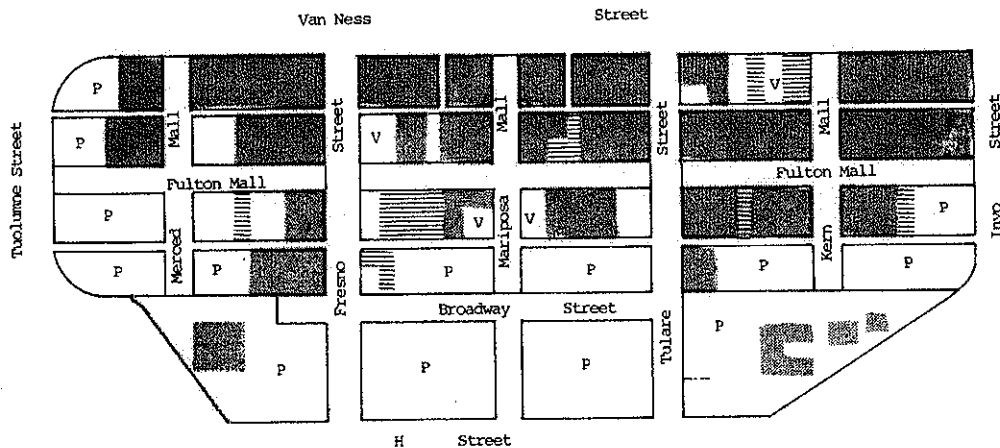
Status	Sq. Ft.	Percent
Protected by automatic sprinklers	2,643,000	81.5
Anticipated systems in process	389,600	12.0
Unprotected by automatic sprinklers	215,800	6.5
	3,248,400	100.0

A breakdown of how and when these sprinklers were installed is as follows:

	Percent
Installed prior to 1963	11.0
New buildings since 1963	37.0
Remodeling and renovating since 1963	52.0
	100.0

An address presented by the author November 20, 1974, to the NFPA Fall Meeting, held November 19-21, 1974, in Seattle, Washington.

Private fire protection in central business district, Fresno, California.



LEGEND

Sprinklered Buildings	Vacant Property
Unsprinklered Buildings	Surface Parking
Partially Sprinklered	

SCALE

1" = 300'

It is not practical to cover all of the details in the three programs listed above. Since the added protection provided by the automatic fire extinguishing systems was a major element in obtaining the Class 2 rating, each program will be discussed only as it affects the installation of such systems.

The redevelopment plan contained a simple one-paragraph requirement that all new construction must be provided with automatic fire-extinguishing systems that met the requirements of NFPA No. 13, *Standard for the Installation of Sprinkler Systems*. Since the redevelopment program triggered construction of 1,106,000 square feet of new buildings, this was a major element in the success of the program.

The redevelopment plan required that all existing buildings meet the minimum requirements of the Dangerous Building Ordinance.

The Dangerous Building Ordinance required that the older buildings be remodeled to provide a level of safety which was below that for new construction, but greater than that existing in many of the buildings. Many of these buildings were built in the early 1920s and contained open stairs and unprotected dead-end corridors. However, automatic fire-extinguishing systems were accepted in lieu of many of these requirements.

Since installing the extinguishing system reduced the fire insurance rate, it was often the option chosen by the property owners.

Under Section 106 of the *Uniform Building Code*, sprinkler systems were accepted in lieu of one-hour construction as required in the Number-One Fire Zone. In addition, in other cases, the fire rating of other portions of the building was allowed to be reduced by one hour. In no case were the corridors or stairs allowed to be less than one-hour protected. The Appeals Board in one case allowed party walls to be used where occupancies on both sides of the wall were protected by automatic fire-extinguishing systems.

The policies encouraging automatic fire-extinguishing systems in programs (b) and (c) were also followed in all portions of the city.

The last major step taken by the City Council was to require that all new buildings not only in the redevelopment area but also in the Number-One Fire Zone be equipped with automatic fire-extinguishing systems.

It should be pointed out at this time that because of the success of these programs in 1966, the city of Fresno

determined that it was feasible to relocate one of the downtown fire stations to the outer growth areas. It is estimated that this move has saved the city of Fresno \$1.8 million. This station was relocated prior to the last rating of the city.

A careful analysis of these programs will show that the programs did one of two things: they *either mandated automatic fire-extinguishing systems* or they created an *economic balance* that made the systems feasible or attractive.

Because of the success of the economic balance approach, two new programs are in the process of being adopted in Fresno to encourage the installation of automatic fire-extinguishing systems: (1) a Revolving Building Incentive Fund, and (2) a Fire Service Demand Charge.

The fundamental reason for a governmental jurisdiction to start a Revolving Building Incentive Fund is to improve the fire protection of the community and to increase the efficiency of public fire service. It is generally accepted that the installation of automatic fire-extinguishing systems will reduce the anticipated loss of property and jobs resulting from fire.

The ordinance establishes a procedure under which the city will provide low-interest loans for the installation of automatic fire-extinguishing systems. The intent is that the Fund, once established, will be self supporting and revolving.

It is anticipated that an interest rate of two to three percent will cover the cost of servicing such loans and, if loans are carefully screened, will provide funds to cover anticipated losses and expenses. It is obvious that a three percent construction loan will be attractive, even when it may be only on five to ten percent of the total cost of the building.

The installation of the sprinkler system can also save in the initial cost of the building. For example, if a Type V one-hour building is required, the estimated cost is \$18.60 per square foot.¹ A Type V nonrated sprinklered building will cost \$17.55 per square foot.

The third obvious advantage is the reduction in fire insurance. This savings is not reflected in the first cost of the building, but is used as a source of income to amortize the loans made under the Revolving Building Incentive Fund.

¹ See *Building Standards Monthly* (May-June, 1974).

Finally, a new source of funds is available for constructing a building. Finding construction funds in these days of high interest can make or break many construction projects.

This program, as a city program, will be new, and as a result, no prior experience can be cited. It has the support of the construction industry, and the number of applicants for the loans seems to be more than adequate.

Two spin-off benefits to a city include encouragement for industry and business to locate within the city and encouragement for property owners to annex existing property.

The city of Tacoma, Washington, under a grant from the National Science Foundation, is developing a concept referred to as a Fire Service Demand Charge. The same concept has been reviewed by the Citizens' Fire Control Task Force for the city of Fresno, and that group has recommended its adoption to the City Council. It is presently being reviewed by the staff. In both cases, the charge is limited to commercial and industrial buildings. Under this program, the Fire Service Demand of each commercial or industrial building is established. This may be measured by the required fire flow of each building or by the insurance premium of the building and/or equipment and/or inventory.

In equation form, the program is as follows:

$$\begin{aligned} \Sigma F &= \bar{F}_1 + \bar{F}_2 - F_n \\ C_1 &= F_1 \\ &\quad - R \\ &\quad \Sigma F \end{aligned}$$

F_1 = Fire Service Demand of Building 1 in terms of gpm or dollars of premium.

ΣF = The Fire Service Demand for the entire city.

C_1 = Fire Service Demand Charge for Building 1 in terms of dollars.

R = Total revenue required by the jurisdiction from the program.

The amount of revenue to be produced and the use of this revenue is important. For example, if the revenue is to be used to provide capital for the Revolving Building Incentive Fund, the charge would vary as the demand for loans varied. If used for the Revolving Building Incentive Fund, it would in effect be a method for each property owner to provide funds to eventually reduce his fire insurance.

The revenue could be used to finance improvements in the Fire Department as a part of an objective budget program.

One important characteristic of the program is that this is a service charge similar to water or sewer service. Because it is a service charge, tax-exempt property is not exempt from this charge. In many jurisdictions, tax-exempt property can represent from 15 to 30 percent of the property protected. This will equalize the costs and not load the burden of fire protection on a relatively few property owners.

This proposed service charge could encourage the construction of high-quality buildings where the property owners look at the long-term cost of operating the building.

SUMMARY

The experience in the central business district of Fresno has shown that close to 100 percent protection of existing and new buildings in a small area can be achieved. It is the author's belief that an entire city could be protected over a reasonable period of time if the management team would establish this as an objective. Such a program would require new ideas and a comprehensive approach to include all elements of that community. The benefits to the community in savings of property and life over a long term would be well worth the effort.

* * * * *

The following are excerpts from the question-and-answer session that concluded Mr. Randall's presentation in Seattle:

Question: What effect has built-in protection had on Fresno's fire losses? What was the percent of reduction in fire insurance cost over the last 10 years?

Answer: The percent of fire insurance cost reduction has never been calculated in the city as a whole. We do know that in most cases where they have installed sprinkler systems, it has been economically feasible for individual units. That is the basis on which they were installed.

Regarding fire losses, the area has had practically no fire losses in the last few years . . . before we started the redevelopment project and the upgrading of the area, that was one of our worst areas.

. . . Our experience with sprinkler protection has been that it is very, very efficient . . . we did make a study about a year ago of the trend of our fire losses. . . . Taking the inflation factor out and referring everything back to a base dollar, our fire losses have dwindled. . . .

(Continued on page 27)

How the City of Fresno Achieved Better Fire Protection *(continued from page 16)*

Question: Has Fresno been able to reduce the downtown fire companies due to the prominence of sprinklered buildings? How have manpower requirements been reduced?

Answer: This is a team approach, and I wish the other half of the team was here right now, because I can't answer all those questions. The fire chief and the fire marshal could give you dollar-for-dollar exactly what the difference is. But I can say this: Since 1963, we have only added one fire station, but since 1963, the city has grown approximately 40 percent. . . . The fire marshal did have a figure showing that we have fewer fire fighters per square mile on duty now than we had in 1952, but our fire losses have been reduced. So we have reduced the fire personnel because of it.

Question: Has consideration been given to provision of incentives leading to improved residential fire protection in Fresno?

Answer: Yes, there has been some consideration of that. . . . We are opening up our first apartment houses with sprinklers in them in the next month or so. . . . A lot of things are being discussed by the Fire Control Task Force that are not city policy . . . there are programs under which district service charges can be implemented that will encourage automatic fire protection in residences. But there is no city or county I know of that is doing it at the present time. Incidentally, we consider apartment houses more like businesses and treat them the same so far as code enforcement and so forth are concerned.

Question: What is the water supply in the community? What size are the mains? You speak of automatic fire protection. This must mean sprinkler systems.

Where does all the water come from, and do you have standpipe charges by the water bureau?

Answer: Fresno is a designer's dream, because underlying Fresno is a fine water table . . . the water supply in Fresno is supplied by 68 wells interconnected on one system with three different sources of power. . . . We normally connect our wells with 12-inch mains, no main less than six inches. . . .

Question: With 90 percent sprinklered buildings, do you think the maximum fire flow and fire department requirements should be reduced?

Answer: Basically we use the ISO criteria to evaluate that; and the criteria do take that into consideration, and it does reduce them. The main thing is that we already have our water system built in. In our downtown area, every street has a 12-inch main. . . . Even if we reduce it, it wouldn't make any difference because we already have the capacity.

Question: How is reliability of the sprinkler system insured from a maintenance and supervision standpoint?

Answer: We have a fine Fire Department and we have a fine Fire Marshal's office. The Fire Marshal's office surveys every commercial-industrial building at least every six months and, of course, at that time they do check out the condition of the sprinkler system and make sure that the valves are open. They go through the building and make sure that someone hasn't built up partitions or something of that type.

We also have a very close correlation between building permits and the Fire Marshal's office. They have a chance to review every building permit, so we make sure that they don't invalidate an automatic protection with partitions. . . . △