

LEG. FINANCE - BILLS 1979 - 1980 1143

CSHB 645 cont. 1143

Part One

Water shortage. It is one of the major domestic problems now facing this nation. Its dimensions are long term and nationwide.

What impact does this fact have on your municipality's capacity for fire defense?

Somewhere in the United States a fire breaks out every 12 seconds. Over \$1.5 billion in property and contents are ravaged by flames annually.

On an average of once a day a "large loss" fire makes headlines. (A "large loss" fire is one that exceeds \$250,000.00.)

All this adds up to one conclusion:

Billions of gallons of water are needed daily to safeguard lives and property from fire.

A few years ago a "large loss" fire was sustained in downtown Saratoga Springs, New York. Population: 16,000. At the time of the fire the public water supply for this city was about five million gallons per day. The fire which occurred in the business district placed a demand of six million gallons of water a day to prevent conflagration.

Result: Demand exceeded supply. It was necessary to by-pass the filter beds to meet the total demand for ten million gallons of water needed to fight this fire. For several days, residents had to boil all water used to drink and cook as a health precaution.

THE JOURNAL OF AMERICAN INSURANCE, a monthly publication of the American Mutual Insurance Alliance, spotlighted the problem of inadequate public water in a feature story titled "OUR THIRSTY CITIES" in its December 1962 issue. It is a story of a serious national problem of which all too few Americans are aware. Carefully documenting its sources, the JOURNAL pointed out that in 1961 inadequate water supplies were largely responsible for 52 out of the 358 "large loss" fires that occurred in the United States and Canada. Water shortage "is at least partly responsible for the fact that the nation's annual fire loss has risen from \$5.50 per person in 1951 to \$8.60 per person in 1960. Even more shocking:

- One out of five water utilities was (according to a 1955 survey made by the U.S. Public Health Service) deficient in basic water supply.
 - Two out of five were deficient in transmission capacity.
 - One out of three lacked adequate pumping facilities to meet fire fighting needs.
 - Two out of five needed additional treatment plants to avoid having to pull untreated water into the system in fire emergencies.
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- Ground storage facilities were inadequate in 29 per cent of the cities; elevated storage was insufficient in 13 per cent.
- Distribution system improvements, such as eliminating dead-end mains, were needed in 57 per cent of the systems to assure adequate pressure and supply to all locations.

Poor water supplies seriously jeopardize the growth of our cities. From a municipal viewpoint, inadequate water prevents industries from locating in a city. Fire insurance rates are too high when water needed for important industrial progress is not available. For example: Springfield, Ohio had not attracted a new industry for 50 years. By improving its water supply facilities, its fire insurance rates dropped by 10 per cent and 11 new industrial plants moved in to provide needed employment.

The fact that water supply facilities must be improved is obvious. Many communities, using federal and state matching grants have already taken steps to alleviate this problem.

But meanwhile it seems essential that water used for fire protection purposes be conserved.

MORE MILES PER GALLON WITH WATER — FOR FIRE FIGHTING PURPOSES

Ironically many American communities are actually working against themselves. All available information indicates that a pernicious tax, known as the "stand-by charge" is gaining wider acceptance in American cities. The Stand-by Charge is a tax or charge, based on the size of a city water connection, the number of sprinklers, a flat rate, floor area, or a combination of any of these for the purpose of raising revenue to provide adequate water for private fire protection systems.

WHAT IS THE PRACTICE IN NORTH AMERICAN MUNICIPALITIES?

The Factory Mutual Engineering Division is part of the National Association of Mutual Fire Insurance Underwriters. Its decennial publication, PRIVATE FIRE SERVICE CONNECTIONS — SURVEY OF STAND-BY CHARGES AND METER REQUIREMENTS — 1959-1960, summarizes a survey based on 1,250 public and private water companies serving approximately 3,100 communities in the United States and Canada. Here are the results of that survey: 2

	UNITED STATES		CANADA
	(1) Municipal (1000)	Private (145)	(2) Municipal (105)
(3) METERS			
Required	28%	38%	18%
Not Required	72	62	82
Total	100%	100%	100%
(4) STAND-BY CHARGES			
Yes	51%	88%	39%
No	49	12	61
	100%	100%	100%
BASIS OF CHARGE			
Connection size	21%	27%	8%
Hydrants	3	3	5
Sprinklers	1	1	5
(5) Combination	21	57	17
Flat Rate	4	—	1
Floor Area	1/2	—	2
Other Basis	1/2	—	1
Total	51%	88%	50%

Let's examine the pros and cons of stand-by charges:

PRO *To provide adequate public water to supply private fire protection facilities, it is necessary to raise additional revenue by taxing owners of buildings protected by private fire protection facilities. Therefore, the cost of such expanded or improved facilities should be borne by owners of buildings protected by private fire protection systems.*

CON Fire Protection is a total municipal problem. The Fire Department and Fire Prevention Bureau (Fire Marshal), the Police Department, the Water Department and the fire insurance underwriters each have a part to play in the total fire security efforts of a community.

No single department operates in a vacuum. They must be viewed as an integral unit mutually concerned with the over-all fire protection-prevention effort of a municipality.

However, the major burden of municipal fire defense falls upon the shoulders of the Fire Department.

BUT...

1. Shorter work weeks result in the fact that fewer firemen are able to respond to a given alarm than at any previous time. This condition promises to worsen.
2. The ratio of firemen to population has dwindled steadily since World War II.
3. Firemen are charged with the responsibility of protecting higher valued properties, more buildings, more volatile and flammable contents each year. Because of the plight of the public fire services, the need for private fire protection is increasing. The backbone of private fire protection is the *automatic sprinkler system*.

Fire officials' associations have unanimously endorsed basement sprinkler ordinances and associations of fire chiefs have been extremely effective in obtaining automatic sprinkler ordinances in Fire Prevention Codes across the nation.

Most rank and file fire fighters know that no firemen has ever been killed in line of duty in a building protected by an approved automatic sprinkler system.

Building officials, too, acting through their large building code congresses, have recognized the important roll of automatic sprinklers, and have adopted provisions into building codes to strengthen automatic sprinkler requirements *for new construction*.

PRIVATE FIRE PROTECTION SERVES A PUBLIC PURPOSE

An owner who elects to install an automatic sprinkler system is serving a *public purpose*:

1. He precludes the possibility of exposure fires and conflagrations
2. He secures greater personal safety to firemen and offers the best possible safety to life to his employees and to the general public.
3. He safeguards continuity of business in his own plant.
4. He is generally a major taxpayer in a community. By installing automatic sprinklers, he insures a steady flow of taxes needed to support the various municipal departments which work together to protect his property and the property and lives of his neighbors.

In cities that have meter and stand-by requirements, he pays for water used to extinguish a fire in his property three times:

First: He pays for private water measured through his meter.

Second: He pays an annual stand-by charge whether he has a fire or not.

Third: He pays for public water should it be needed.

If his neighbor, the owner of an unsprinklered building, has a fire, both he and his neighbor pay for that water.

Water used to fight fires in unsprinklered buildings vs. sprinklered buildings is often consumed in the ratio of *ten thousand to one* gallons per minute. The consumption of two, three or four million gallons of water is not uncommon in the suppression of fires in unprotected properties.

CHARGES AGAINST PRIVATE FIRE PROTECTION —

REDUCE MUNICIPAL REVENUES

The installation of automatic sprinklers is clearly a property improvement. To the extent that buildings are improved, a direct taxable value is added to the total value of property effected and increased revenue to a municipality results.

Therefore, when private fire protection is discouraged, public revenue diminishes in direct proportion.

COST — PRIVATE VERSUS PUBLIC WATER

It is argued by some water departments that owners of private fire protection systems should pay above and beyond public water rates to expand and improve water facilities.

In view of the fact that private fire protection serves a public purpose by reducing the cost of public fire protection and because it spares the community tens of millions of gallons of water, he should be given water at the lower rate charged to the municipality for municipal fire protection.

It is further argued by some water department officials that the addition of a sprinklered plant to a community required adds expenditure to provide public water mains to the property.

Industry and population follow public water supplies. No water main laid to one sprinklered property in a municipality will remain unshared for long. Other industries, housing developments, shopping centers, will invariably move near public water mains; thus, dividing the cost of public water among many users.

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FIRE INSURANCE REDUCTIONS

PRO *Owners of sprinklered properties enjoy reduced fire insurance premiums which reduce the owner's operational cost and amortize the cost of private fire protection in a few years. Therefore, because of reduced overhead, owners of sprinklered properties are better able to carry the financial burden of providing adequate water supplies.*

CON *This is a non-sequiter.*

To impose a tax or charge against an owner of property protected by a private fire protection system because he has made a good business judgment, is discriminatory.

By installing sprinklers, he has diminished the demand placed upon the public fire services, the water supply system, police and traffic control.

Private fire protection must be viewed as a public aid. It should not be penalized.

OTHER UTILITIES HAVE STAND-BY CHARGES

PRO *Some public water officials justify stand-by charges because electric power and gas utilities have them.*

CON This comparison is misleading. Everyone uses electric power. Virtually every taxpayer uses gas or electricity for heating and cooking. Therefore, everyone pays his fair share and there is no inequity in raising revenue when all citizens enjoy equal benefits. In the case of stand-by charges against owners of sprinklered properties, we are discussing a tiny minority of the general population. Not more than a few hundred taxpayers out of a half million are required to pay these charges. Therefore, the stand-by charge against private fire protection is discriminatory.

METER REQUIREMENTS

Some cities require the use of full flow fire meters.

These meters are intended to measure the flow of water when a fire occurs.

Other communities require so-called detector check meters which are designed to detect leakage, waste or theft of water.

The requirement for full flow fire meters can be compared to a requirement for a speedometer on your automobile which costs nearly as much as the automobile itself.

Obviously full flow fire meter requirements discourage private fire protection installations. Fire and building officials who envision automatic sprinklers as an integral part of their city's fire fighting capabilities are hard put to justify fire protection and building codes which make sprinklers mandatory when they are confronted with mandatory requirements for full flow fire meters.

The cost of purchasing and installing such a meter could conceivably be equal to the cost of sprinklering a 4,000 square foot basement.

WHAT'S BEHIND THESE METER REQUIREMENTS?

Some public officials believe that water used to fight fires with private fire protection facilities should be measured and that owners should be charged. The reason is that the owner has benefited from reduced fire insurance premiums and can well afford to pay for the metering devices.

Nevertheless, public water used to extinguish a fire in an unsprinklered building is not metered and public fire protection water in the order of millions of gallons is frequently necessary to effect good fire control. But the water bill for this purpose is shared by everyone, including owners of sprinklered and unsprinklered buildings. Therefore, the requirement for full flow fire meters is *discriminatory* and ultimately results in reduced fire fighting capacity within a community when sprinklers are discouraged or eliminated.

From a fire fighting standpoint such meters result in needless "friction loss" which reduces water pressure and volume needed to fight fires.

"Friction loss" is the result of an impediment (within the metering device itself) which reduced the velocity and volume of water needed to fight fires.

One of the components found in sprinkler systems is a water flow alarm device. In effect it detects the flow of water and prevents waste and leakage within a system. It is a kind of built-in metering device.

Many sprinkler systems are connected to central station supervisory services which transmit an alarm indicating flow of water. The requirement for a meter in such cases is a duplication of cost without concomitant benefit.

SUMMARY:

It has been said that "the power to tax is the power to destroy". Any economic sanction levied against private fire protection is, in effect, a tax which results in a diminishment of the total fire security effort of a community and increases the burden of public fire protection in direct proportion.

Conversely to strengthen private fire protection by encouraging its expansion:

1. Decreases both the economic and physical burden of the Fire Department and concomitantly decreases the hazards of fighting fire.
2. Decreases total fire insurance costs because anyone's fire is everyone's loss.
3. Increases tax revenues by encouraging property improvement.
4. Encourages cost conscious industries to move into new communities.
5. Increases a community's total fire protection security, preventing conflagrations and exposure fires.
6. *Saves billions of gallons of water which is in chronic short supply in most cities.*

Part Two

Houston Shows 'Em How!

THE DEMISE OF A "STAND-BY CHARGE"

A scrappy little band of Houston businessmen known as the ASSOCIATION FOR ENCOURAGING FIRE PROTECTION has succeeded in showing us all how to deal with that pernicious phenomenon known as the "Stand-By Charge".

On February 21, 1961, the Houston City Council enacted an ordinance that provided in part for a *monthly charge* of \$1.00 per inch on all city water connections to automatic sprinkler systems. For example, the owner of a sprinklered building, served by an eight (8") inch city connection to his sprinkler system was required to pay \$8.00 per month or \$96.00 per year.

Then it all began. Mr. Russell Cummings, owner and manager of the leading storage and moving business in Houston asked, Why? Seriously. When the city mailed him a bill for a "stand-by charge", he was puzzled. "What am I getting for my money?" he asked. A chain of phone calls and correspondence led him up and down a labyrinth of municipal offices and he came up with an assortment of answers that didn't make sense to him. He knew he was being asked to pay for something, and he couldn't find out what he was getting for his money.

He began to think about some of the answers he had gotten back when he inquired of various public officials.

He had been told that it was necessary to tax his sprinkler system, a privately owned fire protection system, to raise revenue to expand or maintain public water supplies. But he also knew that the amount of water that could be used by a sprinkler system in case of a fire could only reduce the amount of water needed. If his neighbor who had an unsprinklered building had a fire, millions of gallons of water might be needed, and it would be paid for out of public taxes. But the immeasurably small amount of water that his sprinkler system could conceivably use had to be paid for by means of a "stand-by charge".

He also learned that there were probably in the order of 1,000 or more sprinkler systems in Houston and their very existence greatly reduced the burden of public fire protection. Without these sprinkler systems, far more Fire Department personnel and fire fighting equipment would be needed to cope with the hazards which would exist.

He had invested in a sprinkler system. He reasoned that by doing so he was safeguarding the future of his own business, protecting the lives of his employees and could amortize the cost of the sprinkler system in fire insurance rate reductions. It annoyed him to learn that his good business judgment was being penalized and it could take him

or other owners of sprinklered buildings as much as 200 years to amortize the cost of the system after paying his monthly and annual charge on his water connection.

Further, he had increased the value of his property by installing sprinklers, was paying a tax on the increased evaluation of his building and was now being double taxed for a property improvement which actually worked against the whole fire protection effort of the City of Houston.

THE ASSOCIATION TO ENCOURAGE FIRE PROTECTION

Russell Cummings was a realist. He had some experience in politics. He was a businessman, and he knew that alone he could do nothing.

He wrote a letter to Mayor Louie Welsh, to each City Councilman and to other public officials in the City. A telephone campaign followed and he invited representatives of the Insurance Agents Association (The Insurance Exchange of Houston), the Retail Grocers Association, the Chamber of Commerce Fire Prevention Committee, and the Junior Chamber of Commerce Safety Committee. He invited leading fire protection contractors in Houston and a meeting was called. Attendance was unanimous and an organization known as the Association to Encourage Fire Protection was formed. Russell Cummings was elected President.

An organization was formed, with letterhead, telephone number, officers and some of the leading businessmen of Houston as members.

It turned out that Mayor Louie Welsh; Councilmen A. I. "Curley" Miller, Frank Mann, Lee McLemore, Bill Elliott, Homer Ford, Bob Webb, Johnny Goyan and Frank Mancuso were also interested in fair play and, once the case for "encouraging good fire protection" was layed before them, they were in unanimous agreement: the "stand-by charge" was repealed, as any Texan would say, "*pronto*".

Less than 20 months after the law had been enacted, it was repealed.

AS WE SEE IT . . . The Houston story could be repeated anywhere. And it should be. Most city officials are fair minded men. But the business of financing a modern municipal government with its myriad of departments and bureaus is a complex business. A single voice, speaking alone at City Hall, would go unheard. Not because public officials are calloused or indifferent or unresponsive to the wishes of the electorate, but because, by the nature of politics, public officials must tune their ears to organizations; not to individuals.

A lot of work went into the repeal of this Houston "stand-by charge". It took leadership and hard work. But an injustice had been imposed, and that small band of willful men made their voices heard.

To Mayor Louie Welsh, the members of his City Council and other Houston officials, and to the Association to Encourage Fire Protection — *Well Done!*

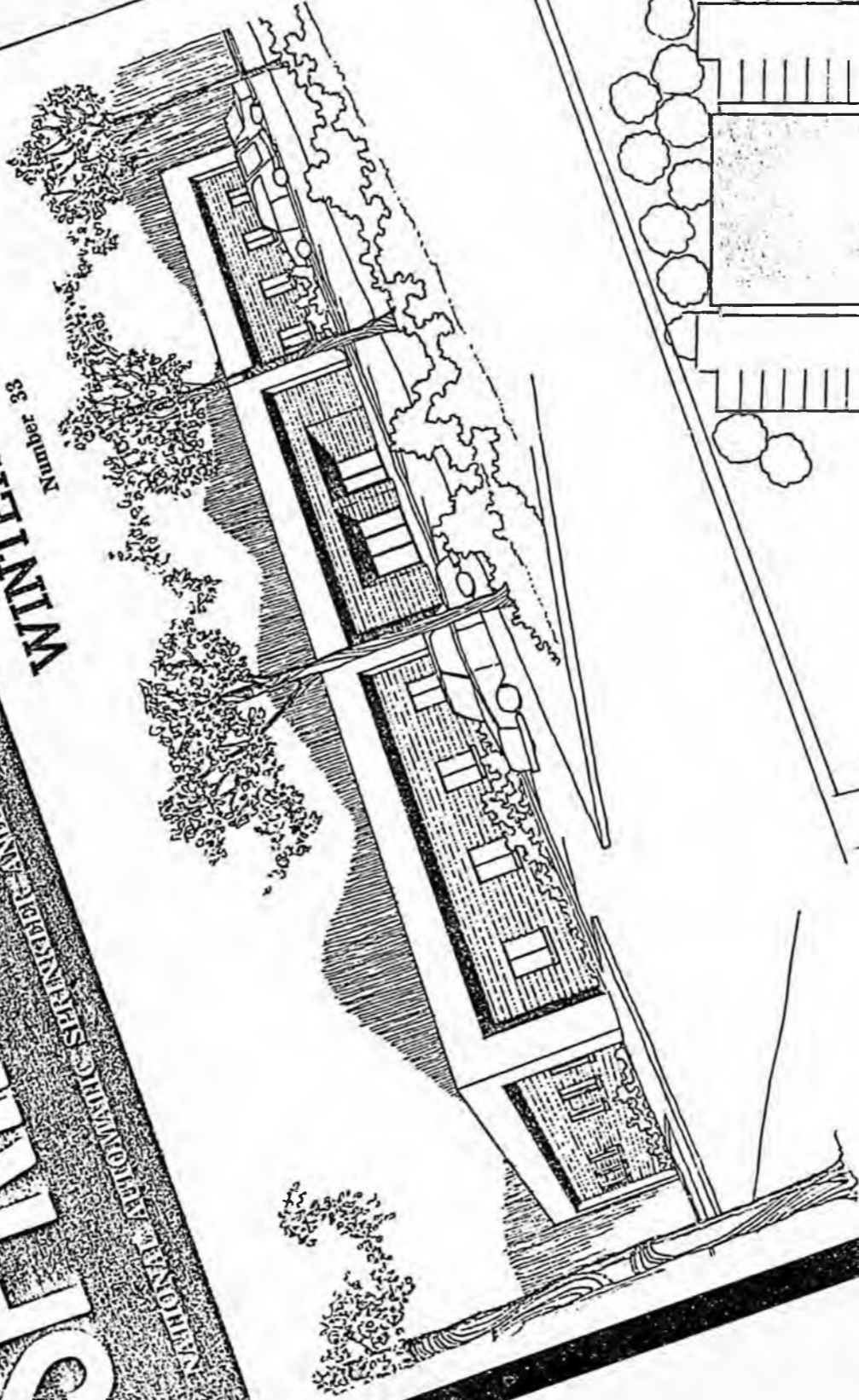
SPRINKLING OF MEN

NATIONAL FIRE SPRINKLER AND THE CONTROL ASSOCIATION INC.

1979-1980

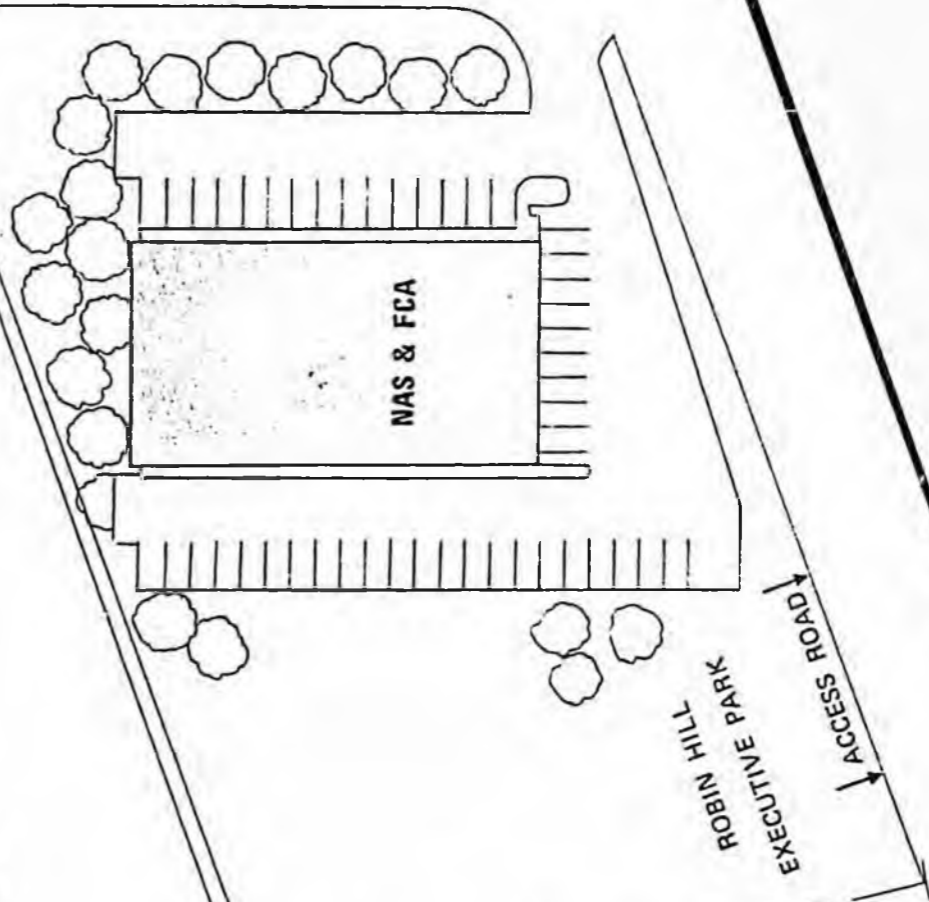
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Number 38



ROUTE 22
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Future Home
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Fire Protection Water Standby Charges: Not in the Public Interest

by BRIAN R. SHUTE

A high fire death rate is peculiarly an American problem. No other industrialized nation comes close to the American fire death rate. Fire deaths and injuries per million population in the United States are nearly three times that of Sweden, which has the next highest death and injury rate by fire.

In 1978 over 3 million fires caused over \$4 billion worth of fire losses. The dollar value of the damage and destruction by fire does not even begin to approximate the actual losses because serious fires create indirect business and community losses such as:

- (a) Loss of customers
- (b) Loss of profits
- (c) Cost of retaining key personnel during shutdown
- (d) Loss of taxes on destroyed property

Finally, there are indirect losses of a personal nature. These may be even more difficult to estimate, yet their importance should not be neglected. In addition to financial losses incurred through temporary unemployment and expenses incurred in finding and moving to new housing, there is the destruction of irreplaceable personal belongings.

Water is an indispensable commodity when it comes to fighting fire. Fires cause billions of gallons of water to be consumed putting them out. Consequently, given the compelling social goal of avoiding the catastrophic fire losses, together with the absolute necessity of water for basic human existence, a municipality should develop policies which maximize its ability to provide both fire protection and adequate water supplies.

According to the National Fire Protection Association, private fire protection systems (of which automatic sprinkler systems are the backbone) are the most effective means of controlling fires in buildings. Not only do private fire protection systems put out fires, they do not require nearly as much water to extinguish fires on the average as is required by the Fire Department. The expenses of the Fire Department incurred fighting sprinklered fires are much less, and the chance for injury to firemen as a result of fire is almost negligible in sprinklered buildings.

Brian R. Shute is an Anchorage, Alaska attorney. He represents the Water Conservation Association of Anchorage.

In Anchorage, Alaska, in 1977, the Public Utilities Commission approved a new tariff for the Anchorage Water Utility. As a result, the utility required owners of private fire protection systems to make a monthly payment for merely having an automatic sprinkler system connected to the utility water supply. The owner was required to pay even when he did not use any water at all.

It came to the attention of the Water Conservation Association that the monthly charges in some cases were so high that they were in excess of insurance savings realized through installation of the system. Consequently, some owners were deciding to turn off their fire protection system because it had become uneconomical to maintain. The Water Association was also aware of some new construction for which plans for installation of private fire protection systems had been cancelled because the stiff water standby charge was too high in relation to the savings which could be realized by having the systems installed.

The Water Conservation Association took the position that the standby charge which owners of private fire protection systems were being required to pay was not in the interest of conservative water usage, was not in the interest of increasing the fire worthiness of the general Anchorage municipal area, and did not further cooperative planning to solve the interrelated problems of providing adequate fire protection and water supplies to the City.

The Water Conservation Association prepared a memorandum to more fully explore whether the standby charge fire protection owners were being required to pay was in the public interest. A detailed fact digest was compiled. As a result of its study, the Water Conservation Association concluded that the standby charges were not in the public interest and, consequently, should either be eliminated or alternative methods found to restore the economic incentives for installing private fire protection systems so the water conserving and fire loss reducing characteristics can be promoted.

As a result of its efforts, the Water Conservation Association has apparently succeeded in getting the Municipality of Anchorage to agree to a potential of a reduction in standby charge of as much as 75 percent or more. However, the Association would like to see the charge eliminated completely for the following reasons:

PRIVATE FIRE PROTECTION SYSTEMS BOTH CONSERVE AVAILABLE WATER SUPPLIES AND GREATLY REDUCE LOSSES CAUSED BY FIRES.

1. Private fire protection systems conserve water supplies.

Statistics showing the effectiveness of automatic sprinkler protection are phenomenal. Only in rare instances do automatic sprinkler systems fail to control fires in sprinklered buildings. The failures are seldom due to the sprinklers, but rather the lack of water, often because the system has been turned off either intentionally or by vandals. A complete record of fires in sprinklered buildings would show that their efficiency probably approaches 100%. Of all the fires controlled by sprinklers more than 90% of them are controlled by three or less sprinkler heads.

The effectiveness of automatic sprinklers stems from their presence at the potential scene of a fire before the fire starts. They can apply water immediately where it is needed because there are no problems of access to the seat of the fire or interference with visibility for fire fighting due to smoke. Sprinklers can extinguish fires much earlier than a Fire Department could ever respond to an alarm. The amount of water necessary to put out a fire in its beginning stages is nowhere near the amount required for the Fire Department to put it out after it gets going.

Performance characteristics of sprinklers indicate that standard automatic sprinklers discharge anywhere from 15 to 55 gallons of water per minute, depending on the pressure at the sprinkler head. In comparison, a heavy-attack two and one-half inch mobile hose line in operation can consume more than two hundred gallons per minute. If the fire is not put out in its infant stages (as occurs over 90% of the time when automatic sprinklers are deployed), it may take a number of heavy-attack lines hours to control the fire, if the water supply holds out that long.

2. The total required fire flow for a municipality is reduced with the widespread installation of private fire protection systems.

The traditional method for estimating the water supply required to serve a municipality's fire protection needs is by computing fire flow requirements. The latest developments in estimating fire flow requirements are found in the (Guide for Determination of Required Fire Flow) published by the Insurance Services Office (ISO) in 1972. The fire flow formula reflects significant water conservation propensities of private fire protection. Depending upon the flammability of a given building, the fire flow required is reduced by twenty-five to fifty percent when a sprinkler system is present in a building.

The guide for determining required fire flow just referred to is a determination made for specific buildings. The ISO utilizes this formula for determining fire flow requirements for Anchorage as a City. The procedure for making a city-wide fire flow determination is more fully described in the ISO Municipal Grading Schedule.

The last analysis of Anchorage fire flow requirements was performed and summarized by ISO in a 1969 report.

ISO is presently in Anchorage reevaluating the fire flow requirements. The 1972 fire flow guide has been revised since the last fire flow study was done for Anchorage in 1969. ISO engineers indicated that the reduction in fire flow requirements for a building can be even greater than 50%, to as much as 75%, given the right kind of building construction.

It was the opinion of the ISO engineers that although the ISO methodology did not enable a precise computation of the reduction in Anchorage fire flow requirements caused by the private sprinkler protection, it was significant. ISO indicated that the sprinkler installation in the central business district alone made Anchorage's central business district a much better fire risk.

Finally, ISO engineers indicated that with all of the factors of the Municipal grading schedule taken into account, they were hopeful that the required fire flows for Anchorage would be less than the 1969 studies indicated. However, the investigation work for the study has not been completed, and consequently the fire flow requirement is still to be determined.

In 1969, ISO engineers completed a report on Anchorage. It is significant that one of the improvements recommended by ISO was installation of automatic sprinkler equipment in all basements exceeding 2,500 square feet.

Examination of the respective quantities of water needed by the Fire Department versus sprinkler systems to extinguish fires, the 25% to 75% discount for fire flow required for a given building, and a study of the Municipal Grading Schedule all indicate that the amounts of water demanded to maximize Anchorage's fire protection efforts are reduced by widespread installation of private fire protection systems. The conservation aspects of private fire protection are significant and should be encouraged.

PRIVATE FIRE PROTECTION REDUCES THE COST OF OTHER PUBLIC SERVICES.

In addition to the water conservation aspects of automatic sprinkler systems, and the significant savings in life and property, there are other public benefits from widespread installation of private fire protection systems. Among these are:

① Both the economic and physical burden of the fire department are decreased since private fire protection generally puts out the fire before the fire department even arrives. This also decreases the hazards of fighting fire.

② The cost of manpower and time fighting fire is reduced and therefore the money necessary to operate the Fire Department itself is also lessened.

③ Private fire protection decreases fire insurance cost for the entire city.

④ Private fire protection increases municipal tax revenues by encouraging property improvement.

⑤ Private fire protection increases a community's total fire protection security, preventing conflagrations and exposure fires.

⑥ Private fire protection results in lessening the cost of capital improvements to the water utility since widespread installation of private fire protection decreases

the required fire flow necessary for adequate municipal fire protection.

⑦ Private fire protection saves billions of gallons of water which is in chronic short supply in most cities.

⑧ The encouragement of private fire protection systems is consistent with the State policy of encouraging fire protection devices (smoke alarms). Since private fire protection reduces the cost of the fire department for fighting fires in sprinklered buildings, State revenue sharing money can be used for other fire department purposes, making more efficient use of the State money.

9. The omission of automatic sprinklers imposes upon the architect more stringent rules governing compartmentalization, fire proofing, exit distance spacing, travel distance, and exterior design requirements. It costs more to construct without sprinklers.

BECAUSE WIDESPREAD INSTALLATION OF PRIVATE FIRE PROTECTION CONSERVES SCARCE WATER RESOURCES AS WELL AS SIGNIFICANTLY DECREASING LOSS OF LIFE AND PROPERTY FROM FIRE, THE MUNICIPALITY SHOULD ENCOURAGE WIDESPREAD INSTALLATION OF THE SYSTEMS BY PROVIDING NEW INCENTIVES FOR OWNERS TO INSTALL PRIVATE FIRE PROTECTION, AND BY CONTINUING EXISTING INCENTIVES.

The primary incentive for voluntary installation of private fire protection systems is the reduced insurance rates to the owner which enable him to amortize the cost of installation over a period of a few years.

Because of the safety factors accompanying installation of automatic sprinklers and the reduced fire flow characteristics, an owner installing private fire protection can reduce his insurance premiums when the installation has been approved by ISO. This incentive for voluntary installation of private fire protection had been largely eradicated by the implementation of a flat monthly charge by the Anchorage Water Utility of anywhere between \$7.10 to \$254.10 per month depending upon the size of pipe delivering water to the building. The most prevalent sizes of pipe are four, six and eight inch pipe for which charges were \$28.45 per month, \$63.55 per month and \$112.85 per month, respectively. These rates nearly eat up, and in some cases entirely eliminate, the savings on insurance an owner achieves by installing private fire protection. Even when the rates do not entirely eat up the insurance savings, they eat up so much of the insurance savings that it takes too long to amortize the cost of installation, and it is uneconomical to install private fire protection.

But when fire protection needs and water supply requirements are examined in the total picture, it appears that the widespread installation of private fire protection will alleviate rather than create additional fire protection demands upon the water supply; the water saving capacities of automatic sprinklers will reduce the total quantity of water required to fight any given number of fires. To levy a standby charge, whether water is used or not, which eliminates the insurance cost advantage is to create a disincentive and discourage voluntary installation of private fire protection systems. Obviously, this will result in a corresponding reduction

in water conservation and increase in total potential demand for water for fire protection.

Largely through the work and application of ISO's Municipal grading schedule, the Municipality of Anchorage receives a fire risk rating which determines fire insurance rates for the City. As has already been discussed, widespread installation of private fire protection systems contribute significantly to reducing fire flow requirements for Anchorage, and, therefore, play a part in reducing fire insurance premiums to property owners in the city generally. It is those owners who do not have private protection systems who raise insurance rates, not owners who have installed such systems. To penalize owners for installing private fire protection systems by requiring them to pay this standby charge is to penalize the wrong people. It is the person who fails to install the sprinkler system who contributes to increased insurance rates, who requires immeasurably greater quantities of water to be consumed in putting out fires, and who creates a public hazard, since a fire in a non-sprinklered building is much more likely to rage out of control and burn property of others nearby.

As owners and citizens of the Anchorage municipal area, private fire protection owners have a vested interest in the continuing viability of both the fire protection effort and the adequacy of the water supply. The members of the Water Conservation Association feel that since widespread installation of private fire protection systems not only makes Anchorage a safer place to live, but also reduces Fire Department costs and conserves precious water resources, that the incentive for voluntary installation of sprinklers should be restored. There are a number of options which can be looked at to achieve this purpose.

METHODS TO OPTIMIZE THE FIRE PROTECTION EFFORT AND PROVIDE ADEQUATE WATER SERVICE.

The Anchorage Area Borough Assembly is empowered by the Municipal Charter to prescribe rules and procedures for the operation and management of municipal utilities. Municipal Charter, Article XVI (C) (1975). The Water Conservation Association offers the following alternatives to the water standby charge as being more productive solutions to the total municipal problem of providing adequate fire protection and sufficient water supply.

① Grant a tax credit to owners who install private fire protection systems. This will indirectly make those who do not voluntarily install private fire protection systems pay for their counter productive and wasteful practice of depending upon the resources of the Fire Department to fight fires. This will also restore the incentive for owners to voluntarily install private fire protection systems, which is lost when insurance savings are eaten up by the standby charge.

② Simply stop the standby charge for private fire protection. The Water Utility will not have the benefit of the alternative source of revenue from the ad valorem property tax, but this lack of revenue will be more than made up by the savings which result from the public benefits created by the incentive to install private fire protection systems.

Alaska Fire Chiefs' Association

March 4, 1980



The Honorable Hugh Malone
Pouch V
Juneau, Alaska 99811

Dear Representative Malone:

Thank you for your sponsorship of House Bill 648. Enclosed is a position paper authored by the Alaska Fire Chiefs' Association and the Alaska State Firefighters Association providing additional data in support of the bill. Also enclosed is a Digest of factual material which conclusively and emphatically documents the effectiveness of private fire protection in controlling fires, and, therefore, local government costs.

Copies of the position paper have been sent to all Representatives and Senators. Copies of the Digest are provided to you and Representative Duncan as sponsors of House Bill 648, to Senators Colletta and Bradley as sponsors of Senate Bill 370, and to the Speaker of the House and President of the Senate.

If the above Associations can be of further assistance to you in promoting passage of this bill, please advise.

Very truly yours,

ALASKA FIRE CHIEFS' ASSOCIATION


James Evans, President

ROBERT R. SHIRNBERG
FIRE MARSHAL

NIKIKI FIRE DEPARTMENT
Phone 283-4202

P. O. Box 1167 — Kenai, Alaska 99611

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February 29, 1980

The Honorable Hugh Malone
Pouch V
Juneau, Alaska 99811

Dear Mr. Malone:

Re: Definitions of Fire Protection Systems in
House Bill 648

At the House Community and Regional Affairs Committee hearings on the above bill, a question concerning definition of fire protection systems was raised. The State Fire Chiefs Association explained their understanding of the bill was that it would cover those fire protection and fire alarm systems as defined in the National Fire Codes. What follows is a suggested definition of fire protection systems.

Fire protection systems are those systems as defined in the National Fire Codes, current edition, published by the National Fire Protection Association.

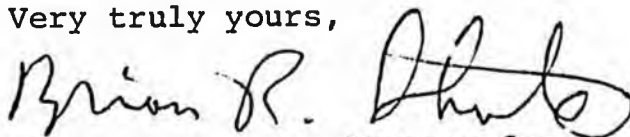
The systems include, but are not limited to, the following: Foam extinguishing systems, high expansion foam systems, carbon dioxide systems, Halon 1301 systems, Halon 1211 systems, dry chemical systems, water operation fixed systems, foam/water sprinkler and supply systems, standpipe and hose systems, hydraulic sprinkler systems, and associated pumps and tanks as required for the foregoing systems.

Fire alarm systems include, but are not limited to: supplemental station signalling systems, local protective signalling systems, auxilliary signalling systems, remote station signalling systems, proprietary signalling systems, automatic fire protection systems.

The growing public support for this bill is indicative of its benefit. The Alaska Fire Chiefs Association and the Alaska State Fire Fighters Association emphatically urge its enactment.

If you have any questions please do not hesitate to call.

Very truly yours,



Brian R. Shute, Attorney for
Alaska Fire Chiefs Association and
Alaska State Fire Fighters Association

COMMUNITY FIRE PROTECTION INCENTIVE PROGRAM

Prepared by Robert R. Shirnberg

October 20, 1979

Fire Marshal

Hickicki Fire Department

283-4202

P.O. Box 1167, Kenai 99611

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COMMUNITY FIRE PROTECTION INCENTIVE PROGRAM

This program is designed to provide the means and methods for the installation of private fire protection systems in private property and to enhance and support the public fire protection systems of the communities throughout the state of Alaska. This is to be accomplished through the combination of three approaches:

1. Establish a loan fund to provide loans to private property owners for the installation of fire protection systems.
2. A tax incentive for property owners by removing from the property tax rolls the assessed value of the private fire protection system.
3. Control the water standby rate charge, charged by water utilities for large diameter service to sprinkler systems. Such rate charges should be set at a level that will not discourage the installation of sprinkler systems.

What are the possible long term benefits from the Community Fire Protection Incentive Program?

It is apparent that if such a program is carried out to the ultimate, that most of our commercial and business properties could be protected by sprinkler systems. If this was the case, it will have a decided effect on the fire flow requirements of each community by reducing the flow requirements. This will affect the apparatus and equipment required, location and response distances of the companies, the number and location of fire stations, as well as the manning requirements of the fire departments.

There is no question that the State of Alaska is undergoing rather rapid growth in population. The oil industry is expanding, other industrial plants associated with the oil industry are planned and coming on line. The fishing industry is expanding into new products and plants. This is bringing additional population and businesses into many of our communities. This growth is impacting the fire protection systems of many of our cities and rural areas. Communities are being faced with providing additional fire protection services and with the costs of providing these services.

The community fire protection incentive program can provide an alternative to the increasing costs of fire protection. The fire service may well be able to hold the line in respect to increasing costs associated with the growth of the community, and may well be able to reduce the costs in relation to the mill rate required for fire protection.

I have enclosed a copy of an article by Harry E. Hickey, an associate professor with the University of Maryland, entitled "Built-In Fire Protection and Fire Department Manning." This was published in the Fire Management Review, a publication of the City Management Association. This is an area of interest to city managers, and will probably be discussed with the fire departments. The article is idealistic, but does indicate what effect providing sprinkler systems can have on the fire protection system of a community.

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I suspect that the greatest long term effects of the Community Fire Protection Incentive Program will be in the area of security of the community's assets. I look at these assets as the commercial property, the business within these properties, and the jobs created by these businesses. The community's assets are all the properties within their community, and the income for the community's programs are derived in the form of taxes on this property. With the property protected by sprinkler systems, the community's tax base and programs are protected from fire.

Such a system protects the economics of the community by providing security for the businesses that provide employment of those within the community. The immediate effect of fire on a business is often dramatic, in that amount of dollar loss attributed to the building and contents. The long-term effect of this fire is often overlooked in that the business and jobs lost, the former employees who often must leave the community to work elsewhere, and the effect of the lost payrolls. Few businesses recover from large fires; most often the fire destroys not only the building and contents, but along with that, the jobs and revenue from the business itself. This has the direct effect of removing the property from the tax rolls. We lose the tax generated by the former employees of the business. In many cases, the long-term effect is far more costly on the community than the dramatic immediate loss of the fire itself. In the long-term, this is probably the most important consideration for the establishment of a Private Fire Protection Systems Funding Program.

There have been a number of canneries in smaller communities that have been destroyed by fire. Most often they have not rebuilt, and in some cases the communities where this has happened have ceased to be. There have been a number of fires in commercial property in our larger communities that have destroyed a million dollar tax base, along with large numbers of jobs. These have long-term effects on the community.

The Community Fire Protection Incentive Program can reduce by a very large degree the economic effects of this type of fire.

FIRE PROTECTION REVOLVING LOAN FUND

The revolving loan fund should be funded at a level that will allow for rapid implementation and installation of private fire protection systems.

This fund will make loans to property owners that desire or are required by the uniform building code to install private fire protection systems. Interest rates and loan terms of such loans should be established at a level that encourages the property owner to install such systems.

Requests for loans shall be considered on a priority basis, with those properties that are required to retro-fit fire protection systems in existing properties having the highest priority.

Loan priorities shall be established by the State Fire Marshal's Office. The fire protection system to be installed shall meet the standards as required by the State Fire Marshal's Office.

Cities and municipalities that have code enforcement and standards administered by building department and fire prevention services shall establish the priority schedule for loans and shall review and approve fire protection systems that meet the required standards. Loan requests meeting their approval shall be forwarded to the State Fire Marshal's Office for review and approval.

The revolving loan fund shall be administered by the Department of Commerce, and loan requests that have been approved by the State Fire Marshal's Office shall be granted.

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LOAN PRIORITY

PRIORITY#1

Property that will be required under the Uniform Building Code (1976) or (1979) as adopted by the State of Alaska to be retro-fitted with sprinkler systems.

PRIORITY#2

Existing property that is not required by the Uniform Building Code to be retro-fitted with sprinkler systems, but where the property owner desires to install a sprinkler fire protection system.

PRIORITY#3

New construction that is not required by the Uniform Building Code to install sprinkler systems, but where the property owner desires to install a sprinkler fire protection system.

PRIORITY#4

New or existing dwelling units where the property owner desires to install a approved sprinkler protection system.

TAX INCENTIVE PROGRAM

What are we talking about when we speak of a tax incentive program for fire protection? In looking back over the years, and in particular to the fire protection systems that are provided by private property owners, business and industry, we find that through Fire Codes, Uniform Building Codes and ordinances we have insisted that these same property owners provide private fire protection systems.

In effect, what we are telling the property owner is that we in the fire service cannot provide or meet the fire protection requirements for their particular property, that we insist that they install a system that will provide for fire detection and extinguishment, and supplemented by our fire department, we can then possibly handle the fire problem in his building or property.

When the property owner provides for this private fire protection, we often overlook the fact that he is not only providing protection for his property, but in effect is providing a part of the overall fire protection system of the community. His system does provide for fire protection to nearby properties in that the chances of the fire extending beyond his property is practically eliminated through his built-in fire protection system.

With the installation of a sprinkler system or other fire protection system within the property, the value of the property increases. Up to now the increased value of the fire protection system has been added or included in the tax assessment bill on the property.

I strongly feel that to require a property owner to provide for private fire protection systems on his property and then increase his tax bill because he has installed such a system is again self-defeating. We must be able to encourage the property owner to install such systems. We well know that such a system adds directly to the over-all fire protection system of the community.

To encourage the installation of private fire protection systems in our communities throughout the state, with the direct long-range effect of reducing or at least being able to maintain the current level of public fire protection we should consider the following:

Inact legislation at the State level that will remove from the tax rolls the assessment against private fire protection systems. The net effect to the property owner will be that his property tax rate will be reduced by the value of the private fire protection system.

Presently, the property owner that provides private fire protection systems for his property receives the following benefits:

1. Protection for his building
2. Protection for the contents
3. Protection for the occupants
4. Protection for his business
5. A reduction in the insurance premiums

The public receives the following benefits when a private property provides fire protection systems:

1. The public that enters or resides within the building is protected.
2. The nearby property owners are protected from fire extending from the property in question.
3. The community's tax base is protected in the property
4. The community has assurance that this business will not be destroyed by fire.
5. The jobs provided within this property are secure from fire.
6. There is a lesser demand or requirement on the community public fire department because this property has a built in fire protection system.
7. The overall fire insurance rating will be enhanced by those properties protected by fire protection systems.

It is apparent that those property owners that install private fire protection systems not only receive certain benefits directly, but in respect to the community as a whole, that through their private efforts, provide a larger degree of benefit to the community in general.

Up until the present time, the property owner that provided private fire protection systems has received no direct benefits or credit from the community or local government for his effort. The community has in general not recognized what the private fire protection systems mean to a community.

It is apparent that if all private property owners could or would provide private fire protection systems, it will have a dramatic long-term effect on the total community fire protection system. It will certainly affect the costs of providing community fire protection in the future.

WATER SURCHARGE RATE

The standby water surcharge rate that is applied in some communities to those property owners that have or have been required to install full sprinkler protection for their property is in effect self defeating in respect to the fire protection system of the community.

It appears that the only consideration for this type of charge is to provide additional revenue for the utility.

This type of rate charge will result in property owners taking a second look at installations of sprinkler systems. Unless the property owner has a direct benefit that is cost effective he will not be interested in providing fire protection systems for his property.

The benefits that the property owners should receive in the event he provides a sprinkler system for his property would be a reduction in his insurance rate, that will pay back the cost of the sprinkler system within a reasonable time. Another benefit is the protection of his property and business from fire.

An additional water surcharge for sprinkler connection is contrary to the fire protection needs of the community. The community should rather assist and encourage the property owner to install such systems.

We in the fire service, and those that are in communities that have placed a surcharge for sprinkler systems, have often been silenced and are unable to protest this self-defeating development of our fire protection systems. Where the administration is dead set against such charges and they are unable to speak out, such organizations as the State Fire Fighters Association can take a stand and pursue legislation at the State level prohibiting such charges.

If we can encourage the state legislators either by law, or administrative action by the Public Utilities Commission, to eliminate or reduce to a reasonable charge, the service provided for sprinkler systems we will have accomplished much in providing a direction and guidance in meeting the needs for fire protection in our communities.

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The following examples compare cost figures
for an Incentive Program versus today's cost.

BASE FIRE INSURANCE RATES

Property Description 29,560 sq. ft. concrete block, retail shop complex.

Fire Protection Class Rural#8

Value of Building \$702,000

Insurance Carried \$700,000

Protected Rate .40 per 100

Unprotected Rate 2.65 per 100

Estimated cost of Sprinkler System \$42,000

Assesed value of Sprinkler System \$42,000

Property Tax Rate 5 mills

Fire Protection Loan 42,000 Interest 7% No. of Years 5:

Monthly Payment \$931 Annual Payment \$9979

Cost Unprotected Property:

Cost Protected Property

Insurance \$18,550

Insurance \$2,800

Tax (mill rate) \$3,500

Tax \$3,500

Tax Credit \$210

Loan Payment \$9,979

Total \$22,050

Total \$16,059

Annual saving to property owner \$5,931

Saving to property owner on completion of loan payments \$15,960

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BASE FIRE INSURANCE RATES

Property Description 20,000 square feet, wood frame, mercantile

Fire Protection Class Class #5

Value of Building \$500,000

Insurance Carried \$500,000

Protected Rate .143 per 100

Unprotected Rate 1.76 per 100

Estimated cost of Sprinkler System 26,000

Assesed value of Sprinkler System 26,000 .

Property Tax Rate 16 mills

Fire Protection Loan 26,000 Interest 7% No. of Years 5

Monthly Payment Annual Payment

\$514 - \$6,177

Cost Unprotected Property

Cost Protected Property

Insurance \$8,800

Insurance \$115

Tax (mill rate) 16 8,000

Tax \$3,000

Tax Credit -\$416

Loan Payment \$6,177

Total \$16,800

Total \$14,476

Annual saving to property owner \$2,324

Saving to property owner on completion of loan payments \$3,501

BASE FIRE INSURANCE RATES

Property Description 26,000 square foot, shop office and bus storage garage, wood frame construction

Fire Protection Class Unprotected Class #10

Value of Building 1,000,000

Insurance Carried 1,000,000

Protected Rate .40/.50 per \$100

Unprotected Rate 2.81 per hundred

Estimated cost of Sprinkler System \$72,500

Assesed value of Sprinkler System \$72,500

Property Tax Rate 5 mills

Fire Protection Loan 72,500 Interest 7% No. of Years 5

Monthly Payment \$1,435 Annual Payment \$17,226

There are two insert articles on the effect of sprinkler system installations on public fire protection systems.

<u>Cost Unprotected Property</u>		<u>Cost Protected Property</u>	
<u>Insurance</u>	\$28,100	<u>Insurance</u>	\$5,000
<u>Tax (mill rate)</u>	\$5,000	<u>Tax</u>	\$5,000
		<u>Tax Credit</u>	- \$362
		<u>Loan Payment</u>	\$17,226
<hr/>		<hr/>	
<u>Total</u>	\$33,100	<u>Total</u>	\$26,864
<u>Annual saving to property owner</u>	\$6,236		
<u>Saving to property owner on completion of loan payments</u>	\$23,462		

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The number of companies required and the manning levels for each company are directly related to the number of hazards in a community. Any community has a range of hazards. Therefore, the geographical location and the nature of these hazards are prime factors in determining the location of engine and ladder companies.

Build-In Fire Protection And Fire Department Manning

by
Harry E. Hevey
Associate Professor
University of Maryland



PROPERTY HAZARD LEVEL REDUCTION

Generally, property hazard levels should be used to determine the number and type of fire companies required and the manning levels for each.

One method of measuring property hazard levels is to determine the amount of water required to control and extinguish a fire in a building or a group of buildings. Required fire flow will vary according to a building's ground floor area, height, construction, occupancy, internal fire protection and alarm systems (automatic sprinklers and alarm transmission to emergency response service), and exposure conditions.

The Guide for the Determination of Required Fire Flow, which is published by the Insurance Services Office (ISO), can help to determine fire flow requirements for specific hazards (there is some question on the validity of the final computations). It is also helpful in assessing fire flow requirements according to a community's hazard variables. The guide states that by using these computations, fire flow requirements "may be reduced by up to 50% for complete automatic sprinkler protection. Where buildings are either fire resistive or non-combustible construction, the reduction may be up to 75%". Thus, established fire flow values can be cut drastically by requiring the installation of automatic sprinkler protection.

Regardless of the method used to compute required fire flow, there is general agreement that the public protection equipment requirement increases with the fire flow requirement. Conversely, as the property hazard is reduced, so is the required fire flow and thus, the level of fire department response.

A community policy to control and reduce property hazard levels by requiring automatic sprinklers can have a significant impact on holding the line with fire department manning requirements. In addition to improved life safety and property protection, automatic sprinklers may reduce property insurance premiums and the demand on the community's fire suppression delivery system. This may open new service delivery options, such as improvement of emergency medical services with existing personnel.

HYPOTHETICAL CASE STUDY

The community of Newtown, which covers approximately 12.75 square miles, has 5 primary hazards characterized by: ordinary construction, four stories, ground floor areas from 43,000 to 50,000 sq. ft., occupancy at the moderate hazard level, and normal exposure conditions. It is assumed that these buildings are the worst fire hazards in the community, and that the level of fire protection required for them will be equal or better for the rest of the community.

Without automatic sprinkler protection, the ISO guide sets a required fire flow of 8,000 gallons per minute for each fire. However, using the water supply section of the ISO Grading Schedule, the basic fire flow for

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Newtown is 7,500 gallons per minute. The guide makes a clear distinction between required fire flow and basic fire flow.

If each of the primary hazards were retrofitted with a hydraulic automatic sprinkler system, the peak required fire flow for each fire demand zone would be reduced from 8,000 gallons per minute to 4,000 gallons per minute. This would reduce the basic fire flow for Newtown to 3,500 gallons per minute.

The reduction in fire flow requirements has a dramatic effect on manning levels. Fire suppression manning requirements were calculated on the following assumptions:

- a 48 hour work week
- average vacation and sick leave of 4 hours per week for each individual
- 38 persons are required to staff a suppression position 24 hours a day
- engine and ladder companies each require one officer on duty at all times

The ISO Grading Schedule was used to determine the number of engine and ladder companies required, based upon the response distance and the established required fire flows, and the manning requirements for each company.

Company and manning requirements were calculated with and without automatic sprinklers.

	Without Automatic Sprinklers	With Automatic Sprinklers
Stations	5	3
Engines	7	4
Ladders	3	1
Officers	42	15
Firefighters	209	76

Annual personnel costs (including fringe benefits) were estimated on the basis of \$24,000 for each officer and \$18,000 for each firefighter.

	Without Automatic Sprinklers	With Automatic Sprinklers
Officers	\$1,008,000	\$ 360,000
Firefighters	3,762,000	1,368,000
TOTAL	4,770,000	1,728,000

The reduction in personnel costs alone is \$3,042,000. This hypothetical case does not consider the cost factors for installing automatic sprinkler community water system design, deactivation of two fire stations, or the potential savings on community insurance premiums.

It has been established that the property hazard level is the primary factor affecting manning levels for fire companies. When the hazard is reduced, so is the manning requirement. This is only one method of assessing the difference between protection from specific hazards with a complement of fire suppression personnel and increased private protection to lower the demand for public protection.

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Sprinklers Required in New Buildings

BY R. J. COLEMAN
Director of Fire Protection

and

G. L. CARMICHAEL
Fire Marshal
San Clemente, Calif., Fire Dept.

Faced with a tremendous increase in the residential fire problem as its population doubles in the next 10 years, San Clemente, Calif., has passed an ordinance requiring sprinkler systems to be installed in new residential construction. The ordinance also applies to the remodeling of more than 50 percent of a building.

There has been a great deal of talk over the years about residential fires, which account for the largest number of structural fires and take the most lives, but San Clemente has done something about the residential fire problem. The sprinkler ordinance is also aimed at restraining the cost of public fire protection while maximizing fire department services and putting technology to work for us.

What prompted the passage of the residential sprinkler ordinance was a unique growth situation in the city and preparatory work by the staff of the San Clemente Fire Department.

Land to be developed

San Clemente covers 15 square miles with a population of 25,000. Two thirds of the city, about 10 square miles, is vacant land. The three corporations which own this land are prepared to fully develop it within the next 10 years. The population of San Clemente is due to double by 1990.

The fire department staff several years ago realized that it faced this potential and instituted a fire department master plan project. One of the elements of the master plan was to examine alternative methods of providing fire protection during this period of unprecedented growth. Initially, the department received most of its information and training on the master plan project from attending the National Fire Academy fire protection master planning course.

Historically, 90 percent of the fire loss in San Clemente has occurred in single and multiple residential buildings. The five-year fire record also showed that the largest percentage of fires started in kitchens and living rooms. The result of this statistical data was the formulation of a master plan goal to "reduce the loss of life and property in dwelling fires

by building fire protection into new construction."

Three objectives were:

Research during the master plan project developed a great deal of information on studies of residential sprinkler systems, and detectors and early warning systems. These systems were immediately identified as possible means of mitigating the fire problem.

The first of these systems that was integrated into the city's codes was that of smoke detectors. A comprehensive smoke detector ordinance, patterned after the San Carlos one, was adopted in 1976. This ordinance requires the installation of smoke detectors in all new homes and in existing homes when they are sold or by 1981, whichever comes first.

Members of the fire department took some of their basic information on residential sprinkler tests from United States Department of Commerce studies. With the aid of several local automatic sprinkler companies, the department conducted a series of controlled burns, experimenting with a wide range of heads and installation specifications suggested by the Department of Commerce studies. These tests were run in cooperation with local building contractors and developers. Interested parties were allowed to witness the tests and make suggestions on how to incorporate sprinkler systems into their construction projects.

Four sprinkler goals

The residential sprinkler ordinance was developed with four major goals:

1. That it be low cost.
2. That it be aesthetically acceptable to homeowners.
3. That it be aimed at reducing liability in providing fire services.
4. That it speed the response of extinguishing agents in a dwelling fire.

One thing became apparent right away. The state of the art in residential sprinkler protection was not perfect. But, to draw an analogy, the fire department staff felt "that if the Wright Brothers had waited for the Concorde to be invented, they probably never would have built the first aircraft." The decision was made to take what information we had and move forward with the development of a comprehensive sprinkler ordinance for dwellings.

The San Clemente Fire Department operates with an attack pumper that is backed up by reserve fire fighters. Based on this operational situation, it was our intent to provide residential

sprinkler systems with three objectives in mind. The first objective was to contain 75 percent of all dwelling occupancy fires to the room of origin. The second was to utilize the sprinkler system to prevent flash-over from extending a fire into rooms adjacent to the room of origin. The third objective was to provide fire suppression capability for the first 15 minutes of an alarm.

Fire department support

These three objectives recognized that these systems must be supported by fire suppression forces if they were to be 100 percent effective. These three objectives also recognized that the residential sprinkler system was primarily a tool to mitigate against fire spread during the reflex time period.

The department already had a partial track record on these systems. Due to the other problems in the community, such as limited access, underground garages, etc., the department had already required several apartment houses and condominiums to be sprinklered to NFPA Pamphlet 13-D requirements. Prior to passage of the ordinance, the fire prevention bureau had required these systems in approximately six of these occupancies. Three had been completed prior to the final drafting of the ordinance.

Consideration of this alternative was given a tremendous boost with the passage of proposition 13. This tax-limiting initiative highlighted the general problem of eroding revenue to support fire departments.

One of the most important elements in the study was that of cost. With home construction costs spiraling rapidly, one of the objectives of the study was to develop a system that would be economically feasible during construction. With single family dwelling construction costs running at \$40,000, the installation of a truly domestic residential system was a relatively insignificant amount. The staff estimated the cost to be only \$700 to \$900 during the construction of a home of about 2100 square feet.

Early warning system

The third system that has yet to be required by ordinance is the early warning alarm system to tie together the other systems. The fire department communications officer, Captain Bill Bondy, has authored an ordinance and designed specifications for an alarm system that will allow the fire department to monitor both smoke detectors and residential sprinkler systems with

ordinance. It is anticipated that the ordinance will soon be enacted.

There are many other elements of the residential sprinkler system too lengthy to discuss in this article. Two of the major construction requirements, however, will be tightly controlled by the fire department.

First, the system must be installed according to proper design. Through a series of inspections and testing, the fire department will examine every installation and compare it against the standards and engineering drawings.

Secondly, the quality of construction will be controlled through a series of permits authorized under the ordinance, which in summary states, "No one shall install a residential sprinkler system in San Clemente without a fire department permit." These permits can be obtained through the office of the fire chief. It will be his obligation, prior to issuance of a permit, to be satisfied that the applicant has adequate training and knowledge in sprinkler system plumbing practices.

One-year sprinkler installer permits are issued for a \$10 fee that covers the administration costs of the fire department.

Premium cut sought

The fire prevention bureau is soliciting input from the insurance industry in an attempt to get a reduction in insurance premiums for occupancies that are protected by all three built-in systems. The results of that study are incomplete at this time.

In summary, the enactment of these amendments to the Uniform Fire Code should allow our city to maximize our fire suppression forces without facing spiraling costs or reduced revenue. It will not prevent our department from growing in terms of additional staff and equipment. As a matter of fact, the master plan also calls for two new fire stations.

It is still too soon to determine if the standards and the ordinances produce a statistically significant level of reduction in the fire problem. The fire department staff is continuing to build a partnership of the fire service, the sprinkler industry, the insurance industry, the building industry and the local citizenry to upgrade the ordinances if that becomes necessary.

Hopefully, when the development of the three vacant land areas is completed, we will have an environment that is considerably safer from a fire loss point of view than the average community. We really don't know that for sure. To compare to our early analogy about the Wright Brothers, we have now built in a system that is flying, but we are really not sure how it's going to land. Only time will tell! □ □

TAX INCENTIVE PROGRAM

What are we talking about when we speak of a tax incentive program for fire protection? In looking back over the years, and in particular to the fire protection systems that are provided by private property owners, business and industry, we find that through Fire Codes, Uniform Building Codes and ordinances we have insisted that these same property owners provide private fire protection systems.

In effect, what we are telling the property owner is that we in the fire service cannot provide or meet the fire protection requirements for their particular property, that we insist that they install a system that will provide for fire detection and extinguishment, and supplemented by our fire department, we can then possibly handle the fire problem in his building or property.

When the property owner provides for this private fire protection, we often overlook the fact that he is not only providing protection for his property, but in effect is providing a part of the overall fire protection system of the community. His system does provide for fire protection to nearby properties in that the chances of the fire extending beyond his property is practically eliminated through his built-in fire protection system.

With the installation of a sprinkler system or other fire protection system within the property, the value of the property increases. Up to now the increased value of the fire protection system has been added or included in the tax assessment bill on the property.

I strongly feel that to require a property owner to provide for private fire protection systems on his property and then increase his tax bill because he has installed such a system is again self-defeating. We must be able to encourage the property owner to install such systems. We well know that such a system adds directly to the over-all fire protection system of the community.

To encourage the installation of private fire protection systems in our communities throughout the state, with the direct long-range effect of reducing or at least being able to maintain the current level of public fire protection we should consider the following:

Inact legislation at the State level that will remove from the tax rolls the assessment against private fire protection systems. The net effect to the property owner will be that his property tax rate will be reduced by the value of the private fire protection system.

Presently, the property owner that provides private fire protection systems for his property receives the following benefits:

1. Protection for his building
2. Protection for the contents
3. Protection for the occupants
4. Protection for his business
5. A reduction in the insurance premiums

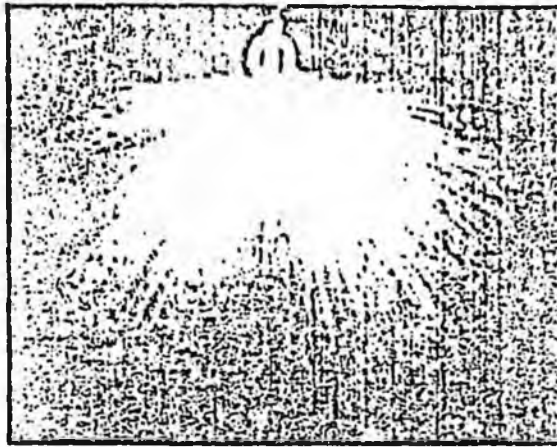
The public receives the following benefits when a private property provides fire protection systems:

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7. The overall fire insurance rating will be enhanced by those properties protected by fire protection systems.

It is apparent that those property owners that install private fire protection systems not only receive certain benefits directly, but in respect to the community as a whole, that through their private efforts, provide a larger degree of benefits to the community in general.

Up until the present time, the property owner that provided private fire protection systems has received no direct benefits or credit from the community or local government for his efforts. The community has in general not recognized what the private fire protection systems mean to a community.

It is apparent that if all private property owners could or would provide private fire protection systems, it will have a dramatic long-term effect on the total community fire protection system. It will certainly affect the costs of providing community fire protection in the future.



Sprinklers Cut Fresno's Fire Losses and Budget

EDWARD J. REILLY and JOHN A. VINIELLO

IN THE 1960s, the city of Fresno, California began the process of basing its municipal firesafety program on the installation of automatic sprinklers. As a result, the city decreased its fire losses, decreased the percentage of the municipal budget allocated to its fire department, and improved its insurance rating.

Many of the details of the Fresno program were explained in a March 1975 *FIRE JOURNAL* article entitled "How the City of Fresno Achieved Better Fire Protection." A major element of the program was the enactment by the Fresno City Council in 1961 of the Dangerous Building Ordinance, which focused on the central business district and gave city officials the power to remedy the hazards resulting from unsafe buildings or structures. City officials were empowered to condemn those buildings or order their repair, renovation, or restoration so that they would meet the requirements of the *Fresno Building Code*.

Under the provisions of the Dangerous Building Ordinance, buildings owners could choose among several alternatives to bring their buildings up to the requirements of the *Building Code*. Most owners found that the most economical way to comply with the *Code* was to install automatic sprinklers.

The city coupled the Dangerous Building Ordinance with a funding plan that city officials arranged with the local agency that administered the federal urban renewal program in Fresno. Federal funds were provided to the

city by the US Department of Housing and Urban Development for the acquisition of property and the demolition of buildings not worth saving. The city's agreement with the urban renewal agency specified that any new construction in the city's urban renewal area would be sprinklered in accordance with NFPA 13, *Standard for the Installation of Sprinkler Systems*. Finally, the urban renewal agency agreed to help interested owners find loans for building renovation. The agency did not, however, provide funds to owners or guarantee loans made to owners.

As a result of these two actions by the city — enactment of the Dangerous Building Ordinance and the agreement with the federal urban renewal agency — sprinkler protection became almost universal in the 18-block central business district and a separate 22-block area once considered a slum. More than 95 percent of all the buildings in both areas ultimately were protected by automatic sprinklers.

Representatives of the National Automatic Sprinkler and Fire Control Association (NAS), which was involved in the initial discussions that resulted in the Fresno program, revisited the city in 1977 to study the results produced by the program. What follows is a recounting of the effects that the organization found the program had made on the fire department and fire losses.

Fire Department Results

In 1955, Fresno's population stood at 115,000. By 1977, 69,500 people had been added to its population, a

Mr. Reilly is President of the National Automatic Sprinkler and Fire Control Association, Inc. Mr. Vinello is that organization's Vice-President of Field Operations.

5 percent increase. In 1955, Fresno covered only 21 square miles. By 1977, through a process of annexation, its area had jumped to 58 square miles. During the same period, the number of Fresno's engine companies increased from 9 to 11, a 22 percent increase. Total paid fire-fighting personnel increased from 215 men in 1955 to 276 men in 1977, a 26 percent increase. The number of fire fighters on duty around the clock remained unchanged: 66 men on duty during any 24-hour period in 1955, and 68 men on duty around the clock in 1977.

The burden per fire fighter had increased enormously between 1955 and 1977. In 1955, there were 3.2 fire fighters per square mile of area to protect. By 1977, the number of fire fighters per square mile was reduced to 1.2 men per square mile. Therefore, each fire fighter was required to protect more than 2½ times the number of square miles of area in 1977 than he was required to protect in 1955.

The number of fire fighters on duty during any 24-hour period decreased from 6.04 men per 10,000 in 1955 to 3.64 men per 10,000 in 1977. So the fire department was protecting almost twice as many people and property in 1977 as it had predicted in 1955, and had to cover over 2½ times the geographical area with only 20 percent more equipment, and virtually no increase in manpower.

In 1955, Fresno's fire department received so few deficiency points that it was rated as a Class 1 department. If the fire department were to maintain its Class 1 rating, 14 new fire stations would have to have been added between 1955 and 1976. Assuming a cost of \$1 million per station, including land and construction costs, this \$14 million acquisition would have cost the taxpayers about \$2.2 million per year, assuming a 6 percent municipal bond issue floated over a 20-year period.

Fourteen pumpers would have to have been added to maintain a zero deficiency point rating. At \$65,000 per truck this additional cost would add about \$145,000 per year to the fire department budget with the same 6 percent municipal bond float for the same 20-year period.

It is difficult to calculate with precision the impact of additional manpower required to maintain a zero increment in deficiency points resulting from a manpower shortfall. However, in 1955, the Fresno Fire Department was up to full complement: six men per company, on duty 24 hours a day. By 1976, only four men could roll on a call during any hour of the day or night.

If the three-platoon system (three men working 56-hour shifts around the clock) had been in existence in 1955, 84 new fire fighters would have been required to meet full manpower needs of the department. To say it another way, Fresno's 1977 department of 276 men would have to have been increased to 360 men if the department were to maintain its Class 1 rating. This would have added about \$1.26 million per year to Fresno's fire department budget. This would have increased the 1977 fire department budget from about \$9 million

per year to about \$12.6 million. About a 40 percent increase. If the fire department budget came to 13 percent of the total in 1955, it would have come to about 11 percent in 1977 if manpower, fire stations, and equipment were to be maintained at zero deficiency point levels.

Fire Losses

Between 1956 and 1966, per capita fire losses averaged \$4.71. In the decade immediately following, per capita fire losses averaged \$8.11. However, construction cost more than doubles every decade. NAS wanted to measure the cost of replacing buildings destroyed by fire, so it adjusted per capita fire losses to the Building Construction figures published by *Engineering News Record*. Adjusting per capita fire losses to the Building Code Index, "real losses" dropped 22.4 percent in that decade.

Of even greater significance is the fact that nonresidential losses averaged 62.1 percent at the beginning of the 20-year period. By 1976, nonresidential losses had plunged to 43.5 percent of the total, and it was these buildings that became the object of the intensive automatic sprinkler master plan.

Conclusions

The Fresno program is a comprehensive fire defense master plan.

In the decade that followed its implementation, the city's fire losses (adjusted for inflation) were cut by 22 percent.

The fact that 95 percent of two urban renewal areas covering 40 square blocks were protected throughout by automatic sprinklers under a combination of ordinances made it possible for the fire department to take full advantage of the 50 percent reductions permitted under the "fire flow" standards of the Insurance Service Office (ISO) grading schedule and the additional 25 percent credit given by ISO for superior construction. This resulted in the imposition of almost zero deficiency points against the water department.

Intelligent planning based upon a thorough understanding of the ISO grading schedule enabled the building and fire departments to take the steps needed to upgrade the city from an ISO Class 3 to Class 2 city.

The implementation of the plan resulted in economies in fire department operations of up to 40 percent of the total operating budget for that department. The 1977 fire department budget of \$9 million would probably range up to about \$12.6 million if the 84 added fire fighters, 14 pumpers, and 14 fire stations required to maintain a zero

(Continued on page 91)

deficiency point rating had been implemented as a solution to the fire defense strategy.

Real losses (measured in replacement cost of buildings destroyed) were reduced by 22 percent. While most cities in the United States are operating with fewer fire stations, fewer pumpers and ladders, fewer fire fighters, and less equipment than they had 20 years ago (and many are protecting more land area), Fresno chose to do

so out of an intelligent master concept. Its results: a more efficient municipal government, more fire protection for its citizens at less cost, lower insurance rates, and a smaller, more efficient, higher paid, and well-trained fire department, plus a planning and inspection department with the proven capability to develop and execute a "cost-effective" master plan for municipal fire defense. Δ

Light-Wall and Special Light-Weight Pipe in Automatic Sprinkler Systems (continued from page 61)

Table 1.

Internal Diameter (Inches)

Pipe Trade Size	Schedule 40	Schedule 10 ¹	% of Reduction in Friction Loss
1"	1.049	1.097	20%
1 1/4"	1.380	1.442	19%
1 1/2"	1.610	1.682	19%
2"	2.068	2.157	19%
2 1/2"	2.469	2.635	27%
3"	3.068	3.260	26%
4"	4.026	4.260	21%
5"	5.047	5.295	21%
6"	6.065	6.357 ²	20%
8"	8.071 ³	8.249 ⁴	10%

¹ Schedule 30.

² 0.131" wall thickness — light-wall pipe.

³ 0.155 wall thickness — light-wall pipe.

⁴ ASTM A-135 light-wall steel pipe.

An illustration of the effect of specifying light-wall pipe as a substitute for standard-weight pipe in an automatic sprinkler system follows. A warehouse with high-piled storage of a type requiring 0.38 gpm per square foot over 2,000 square feet of floor area uses 1 7/32-inch orifice automatic sprinklers. The pressures required for this automatic sprinkler system are illustrated in Table 2 for both standard-weight and light-wall pipe.

Fire pump power demand in this example can be reduced by as much as 13 percent, depending on pump efficiency. Table 2 illustrates that this water supply will be required to deliver 16.7 psi less pressure at 760 gpm.

Smooth Interior Pipe Walls

Friction loss is a function of interior wall roughness. Light-wall pipe, manufactured in accordance with ASTM A-135 specifications, is made by the electric-

resistance weld process. The steel used to form this pipe is rolled, either cold or hot, and has a smooth surface. The pipe is generally formed cold, and thus has little opportunity for scale formation and roughening of the surfaces. Standard-weight pipe is often formed hot, and may include scale and other imperfections on its surfaces. Ten percent improvement in surface finish can result in a 16 percent reduction in friction loss.

Table 2

Pressure Required	Standard-Weight	Light-Weight in 10'
To obtain sprinkler discharge	22.6	22.6
Friction Loss		
Branch Line	32.0	26.1
Mains	15.0	34.2
Underground	15.0	15.0
Elevation	10.5	10.5
TOTAL	125.1	108.7

SUMMARY

1. Sprinkler system designers have an added option of using Schedule 10 light-wall pipe.
2. Substitution of Schedule 10 light-wall pipe for Schedule 40 pipe will significantly reduce the total pressure and power demand on the water supply.
3. Reduction in pressure requirements can save installed and operating costs as follows:
 - Less horsepower required to deliver water;
 - Smaller pumps or the ability to supply sprinkler systems from existing water supplies;
 - Smaller pipe sizes — lower pipe cost — less weight — less labor and freight costs. Δ



Greater Ketchikan Chamber of Commerce

2415 Hemlock - 110 — Ketchikan, Alaska 99901

Telephone (907) 225-3184

Community and Regional Affairs Committee
House of Representatives
Alaska State Legislature
Pouch V
Juneau, AK 99811

February 14, 1980

Dear Sirs:

The Board of Directors of the Greater Ketchikan Chamber of Commerce would like to go on record as fully supporting House Bill 648 and Senate Bill 370, regarding "An Act relating to fire prevention".

Best regards,

Sally Smith
President
Greater Ketchikan Chamber of Commerce

cc: Community and Regional Affairs Committee
Senate
Alaska State Legislature

Representative Terry Gardiner
Representative Oral Freeman
Senator Robert H. Ziegler, Sr.



KETCHIKAN RAINBIRD



CITY OF KETCHIKAN

334 FRONT STREET

P. O. BOX 7300

TELEPHONE 907 225-3111

February 22, 1980

Representative Hugh Malone
Pouch V
Juneau, Alaska

Dear Representative Malone:

On behalf of the City of Ketchikan, I wish to add support to passage of House Bill 648, an act relating to fire protection.

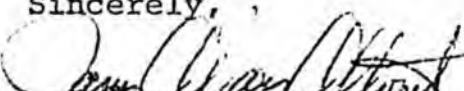
Approved automatic fire protection systems are obviously and definitely advantageous to the building in which they are installed. However, the benefits of those systems go far beyond the individual structures. They also benefit the entire community.

Essentially, installation of such systems decreases a community's "fire flow requirement" which is the community's ability to deliver water to control fires. A decrease in the "fire flow requirement", in effect, reduces the need for fire fighting equipment, facilities to house that equipment and staff to operate and maintain that equipment and facilities without reducing the level of fire protection in the community. Therefore, the entire community can benefit because of a reduction in the cost necessary to provide a given level of fire protection.

Because the entire community can benefit from the installation of approved fire protection systems in individual building, building owners should be given an incentive to install such systems rather than suffer additional fees or taxes because they installed those systems. Therefore, the City of Ketchikan supports House Bill 648.

If you have questions about the City's position on this issue, please contact me.

Sincerely,


James R. Van Alvoerst
City Manager

JAVA:gw

Greater Juneau Chamber of Commerce

"Serving Alaskas' Capital"

200 North Franklin St.

• (907) 586-2201 •

Juneau, Alaska 99801

February 25, 1980

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Bob Kofler

Exec. Vice President

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Mike Paradise
Jerry Rasler
Richard Roper
Bobby Topley
Jan Houttree
Martin Swaska
Lyle Smith
Jim Wells

Mr. Robert R. Shirnberg
Fire Marshall
Nikiski Fire Department
P.O. Box 1167
Kenai, Alaska 99611


Dear Bob:

It was a real pleasure to have the opportunity to meet with you. Your proposals for legislation that will help Alaskan communities improve their ability to implement a greater degree of fire prevention systems certainly has merit. The program is deserving of enthusiastic support from all business organizations throughout our State.

I will be sending copies of this letter to the key legislators involved in Senate Bill 362 and House Bill 648 so they will be aware that the Greater Juneau Chamber of Commerce is very interested in the passage of this legislation, and would be able to testify on behalf of the bills, if necessary.

Bob, thanks again for taking time to enlighten us. We think you have a very good approach to solving a longstanding problem.

kindest regards,



Dave Fremming
Executive Vice-President

DF/wj

cc: Senator Arliss Sturgelewski
Representative Bill Parker
Senator Bill Ray
Representative Mike Miller
Representative Jim Duncan

II. SERVICE CHARGES (Cont'd).

REGISTRY
MAY 23 1979

Schedule E - Private fire protection (cont'd)

<u>Service Size</u>	<u>Monthly Rate</u>	<u>Baily & Mason</u>
2"	\$.18	(R)
3"	.41	(R)
4"	.72	(R)
6"	1.62	(R)
8"	2.89	(R)
10"	4.51	(R)
12"	6.50	(R)

Schedule F - Bulk water sales

All bulk water sales will be handled by special contracts.

Tariff Advice No. 19-122

Effective: _____

Issued by: Anchorage Water Utility

By: J. L. HARSHMAN, P.E.

Title: General Manager

MUNICIPALITY OF ANCHORAGE

ASSEMBLY MEMORANDUM

No. AM 359-78

Meeting Date: April 11, 1978

From: Mayor

Subject: Demand Charge on Sprinkler Systems


In the process of reviewing the cost of service study, the administration contacted the ISO Office in San Francisco to verify the demand allocations for both private and public protection. It was learned that the demand allocation for public fire protection remains the same as used in the rate preparation. The demand allocation for private fire protection has been reduced from 6000 to 3000 gpm. This reduction in demand relates to a 40% reduction in the rate for each size of sprinkler line. This reduction in revenue is a total of \$90,000 or 1½% of the total revenue requirements of the Water Utility.

Based upon the above rate reduction, the new rate for each line size will be:

<u>Line Size</u>	<u>Present Rate</u>	<u>New Proposed Rate</u>
2"	\$ 7.10	\$ 4.26
3"	15.90	9.54
4"	28.45	17.07
6"	63.55	38.13
8"	112.85	67.71
10"	176.40	105.84
12"	254.10	152.46

The administration recommends that the private fire line rates be reduced by the percentage indicated above and the reduction in revenue be absorbed by the Utility until such time as the Water Utility recomputes its cost of service study which is proposed to be early in 1979. The administration will, upon approval of this action, proceed with filing proper tariff-related documents to the Alaska Public Utilities Commission. The new rate will become effective upon approval by the Alaska Public Utilities Commission.

cost of service study
utility absorbs charge —
APUC —



Cancelling

First Revision

Sheet No. 51

MAR 25 1977

II. SERVICE CHARGES (CONTINUED)

Schedule E - Private fire protection (continued)

Service Size	Monthly Rate	
2"	\$ 7.10	(N)
3"	15.90	(N)
4"	28.45	(N)
6"	63.55	(N)
8"	112.85	(N)
10"	176.40	(N)
12"	254.10	(N)

Schedule F - Bulk water sales

All bulk water sales will be handled by special contracts.

Pursuant to Order No. 4, U-76-66
Tariff Advice No. 8-122(L)

FEB 28 1977

Effective:

Issued By: Anchorage Water Utility

[Handwritten Signature]

Utility Manager



Alaska State Legislature

SENATOR MIKE COLLETTA



SENATE FLOOR LEADER

Senate

MEMORANDUM

FEBRUARY 27, 1980

TO: SENATOR JOHN SACKETT, CHAIRMAN
SENATE FINANCE

FROM: SENATOR MIKE COLLETTA *MC*

RE: SB 370/HB 648 Fire Prevention

The attached letter from James A. Van Altvorst, City Manager of Ketchikan is forwarded for your review.

Your attention to this matter is appreciated.

SB 370
full p.w.
FEB 26 1980



CITY OF KETCHIKAN

334 FRONT STREET

P. O. BOX 7300

TELEPHONE 907 225-3111

February 22, 1980

Senator Mike Colletta
Pouch V
Juneau, Alaska 99811

Dear Senator Colletta:

On behalf of the City of Ketchikan, I wish to add support to passage of Senate Bill 370, an act relating to fire prevention.

Approved automatic fire protection systems are obviously and definitely advantageous to the building in which they are installed. However, the benefits of those systems go far beyond the individual structures. They also benefit the entire community.

Essentially, installation of such systems decreases a community's "fire flow requirement" which is the community's ability to deliver water to control fires. A decrease in the "fire flow requirement", in effect, reduces the need for fire fighting equipment, facilities to house that equipment and staff to operate and maintain that equipment and facilities without reducing the level of fire protection in the community. Therefore, the entire community can benefit because of a reduction in the cost necessary to provide a given level of fire protection.

Because the entire community can benefit from the installation of approved fire protection systems in individual building, building owners should be given an incentive to install such systems rather than suffer additional fees or taxes because they installed those systems. Therefore, the City of Ketchikan supports Senate Bill 370.

If you have questions about the City's position on this issue, please contact me.

Sincerely,


James A. Van Altvorst
City Manager

JAVA:gw

REDUCE ESCALATING INFLATION OF LOCAL GOVERNMENT COSTS

SAVE LIVES AND PROPERTY

ENCOURAGE SUSTAINED RESPONSIBLE BUSINESS
AND ECONOMIC ACTIVITY IN ALASKAN COMMUNITIES

SUPPORT COMMUNITY FIRE PROTECTION
INCENTIVE PROGRAM

A Legislative Incentive Program
Which Will Save Your Taxes,
Provide Low Interest
Capitalization Loans and
Reduce Fire Department and
Your Water Utility Costs
and, at the same time,
Increase Fire Safety

Prepared For
Alaska Fire Chiefs Association
and
Alaska State Firefighters' Association
by
Brian R. Shute
Attorney At Law

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I. THE PROBLEM: ALASKA'S EXPANDING AND DEVELOPING COMMUNITIES WITH UNDERDEVELOPED PUBLIC SERVICES ARE PARTICULARLY VULNERABLE TO CATASTROPHIC FIRE LOSSES.

A high fire death rate is peculiarly an American problem. No other industrialized nation comes close to the American fire death rate. Fire deaths and injuries per million population in the United States are nearly three times that of Sweden which has the next highest death and injury rate by fire.

In 1974 nearly 3 million fires caused nearly \$4 billion worth of fire losses. The dollar value of the damage and destruction by fire does not even begin to approximate the actual losses because serious fires create indirect business and community losses such as:

- (a) Loss of customers
- (b) Loss of profits
- (c) Cost of retaining key personnel during shutdown
- (d) Loss of taxes on destroyed property.

Finally, there are indirect losses of a personal nature. These may be even more difficult to estimate, yet their importance should not be neglected. In addition to financial losses incurred through temporary unemployment and expenses incurred in finding and moving to new housing, there is the destruction of irreplaceable personal belongings. With its vast expanses and small communities with

underdeveloped public services, Alaska has a particularly dismal experience with fire losses. Tragic reminders of this are the New England Fish Company and Alaska Steamship dock fire in Cordova, the fires in Sitka which destroyed the priceless Russian cathedral, and the Sitka Cold Storage Company and dock facility. Perhaps most tragic are the cannery fires in small communities (most recently in Craig, Alaska, in 1980). Most often the canneries have not been rebuilt, and in some cases, the communities, which relied on the canneries as their sole means of economic support have ceased to exist. Canneries have plenty of water by virtue of the business they are in, and private fire protection would have eliminated the monetary losses, and in some cases, assured the continued existence of the community itself.

Water is an indispensable commodity when it comes to fighting fire. Fires cause billions of gallons of water to be consumed putting them out. Providing adequate water supplies constitutes a major community expense. Residents of the Anchorage and Matanuska-Susitna boroughs are certainly aware of the Susitna hydroelectric project, as part of the ongoing efforts to assure that area with adequate and safe water supplies. The residents of Juneau learned of the exigencies of having adequate water supplies in January of 1980, when climatic conditions temporarily depleted their water supply.

The State of Alaska will undergo rapid growth in population as development of its resources progresses. The oil industry is expanding, other industrial plants associated with the oil industry are planned and coming on line. The fishing industry is expanding into new products and plants. This is bringing increasing population and business to many of our communities. The growth is impacting the fire protection and water supplies of these growing areas. Communities are being faced with providing additional fire protection services, and with the costs of providing these services. See, Shirnberg, Robert R., Community Fire Protection Incentive Program, October 20, 1979.

Consequently, given the compelling social goal of avoiding catastrophic fire losses, together with the absolute necessity to provide water for basic human existence, a community must develop policies which maximize its ability to provide both fire protection and adequate water supplies.

II. THE SOLUTION: MAXIMUM UTILIZATION OF PRIVATE FIRE PROTECTION SYSTEMS MINIMIZES FIRE LOSSES AND MINIMIZES COSTS OF OPERATING FIRE DEPARTMENTS AND WATER UTILITIES.

Private fire protection systems (the backbone of which are automatic sprinkler systems) are the most effective means of controlling fires in buildings. Not only do private fire protection systems put out fires, they do not require nearly as much water to extinguish fires as would be required for the Fire Department to put out the same fire. Nor do sprinkler systems require as much or as expensive equipment to fight a given fire as a Fire Department. Where private fire protection systems are deployed the expense and cost of the Fire Department are much less, and the chance for injury to firemen as a result of fire is almost negligible in sprinklered buildings. Sprinkler systems are the most technologically advanced fire fighting weapon, and their use should be maximized to reduce and hold down costs of the Fire Department.

We must accept the fact that public fire departments can control a fire only in its early development stages. For the most part, fire departments can only combat fire by directly overwhelming it with massive amounts of expensive equipment, manpower and water. When the fire is small, the fire department is still on the way. Even with the best response time, it is fact that many small fires are out of control by the time the fire departments arrive.

By contrast, the private fire protection system has no response time. It is on scene before the fire starts, and usually has put out the fire before the fire department ever arrives.

III. LEGISLATION CREATING INCENTIVES FOR THE INSTALLATION OF PRIVATE FIRE PROTECTION SYSTEMS WILL ENCOURAGE A STATEWIDE SHIFT TOWARD MAXIMIZING UTILIZATION OF MORE EFFICIENT, LESS COSTLY FIREFIGHTING TECHNOLOGY, THEREBY HOLDING DOWN OR REDUCING COSTS OF WATER UTILITIES AND FIRE DEPARTMENTS.

Private fire protection is an alternative. Its technology is ready to be implemented, and, through legislative incentive, it will reduce the increasing burden of fire protection costs. Within a few short years of implementing legislative incentives, private fire protection systems will become increasingly prevalent in communities statewide. As Alaskan communities expand and grow, the legislative incentives will alleviate the necessity to expand the manpower, equipment, and water supplies for the fire department as in the past. Fire departments won't need to open as many new stations, buy as much firefighting equipment, or hire as many firefighters to meet the fire protection needs of the state's expanding communities. Costs of water supplies will be reduced as existing supplies go farther as a result of the water conservative propensities of private fire protection systems are realized. By moving now to take advantage of proven fire protection technology huge savings in property loss, jobs, insurance costs, building costs, life, and indeed even entire communities (in cases of unprotected cannery fires) will result and those savings will continue to accrue and continue to accelerate as the incentives prompt more and more property

to be protected. (For a hypothetical case study of savings a community can realize as a result of widespread sprinkler installation see, Hackey, Associate Professor, Univ. Maryland, Built In Fire Protection and Fire Department Manning (Appendix A).

IV THE SAVINGS IN LIFE, PROPERTY, CONSERVATION OF WATER, AND REDUCED COST OF LOCAL GOVERNMENT SERVICES FROM WIDESPREAD INSTALLATION OF PRIVATE FIRE PROTECTION SYSTEMS.

Statistics showing the effectiveness of automatic sprinkler systems are phenomenal. Only in rare instances do automatic sprinkler systems fail to control fires in sprinklered buildings. The failures are seldom due to the sprinklers, but rather, the lack of water, often because the system has been turned off, either unintentionally, intentionally, or by vandals. A complete record of fires in sprinklered buildings would show that their efficiency probably approaches 100%. National Fire Protection Association, Fire Protection Handbook, pp. 14-1 through 14-48, 14th edition, 1976. Given the billions of dollars in fire losses, the potential for savings resulting from widespread installation of sprinklers cannot be ignored. Of all the fires controlled by sprinklers, more than 90% of them are controlled by three or less sprinkler heads. Fire Protection Handbook, supra.

The effectiveness of automatic sprinklers stems from their presence at the scene of a potential fire before it starts. They can apply water immediately where it is needed because there are not problems of access to the seat of the fire, or interference with visibility for fire fighting due to smoke. Fire Protection Handbook, supra. Sprinklers extinguish fires much earlier than a fire department could

ever respond to an alarm. Automatic sprinklers are particularly effective for life safety because they give warning of the existence of fire, and at the same time apply water to the burning area.

The only fatalities in fully sprinklered properties reported to the National Fire Protection Association were caused by explosions or flash fires; by ignition of the bedding or clothing of a person who was too young, too old, too intoxicated, or too handicapped in some other way to protect himself properly. . . .

In those isolated instances of fatalities to sleeping, handicapped, or intoxicated persons, ignition of clothing or bedding caused fatal burns or asphyxiation either because the small fire did not generate sufficient heat to fuse the sprinkler, or because the victim had suffered fatal injuries before the sprinkler operated. In these later instances, however, the sprinklers protected the lives of persons in adjoining areas. Fire Protection Handbook, supra.

See, also, Horne, B.G., Fire Chief, Controlling the Cost of Fire Protection in the City of San Buenaventura.

Water necessary to put out a fire in its beginning stages is nowhere near the water required for the fire department to put it out after it once gets blazing. Performance characteristics of sprinklers indicate that standard automatic sprinklers discharge anywhere from 18 to 58 gallons of water per minute, depending on the pressure at

the sprinkler head. Fire Protection Handbook, supra, at pp. 14-42 through 14-48. By comparison, a heavy-attack two and one-half inch mobile fire department hose line in operation can consume as much as 250 gallons of water per minute. If the fire is not put out in its infant stages (as occurs over 90% of the time when automatic sprinklers are deployed), it may take a number of heavy-attack lines hours to control the fire - if the water supply holds out that long.

Sprinklers do not cause excessive water damage. Damage by sprinklers is negligible compared to that caused by fighting the same fire with a hose stream. Most fires are controlled by a small number of sprinklers, while many hose streams are required to combat a fire which is out of control. Sprinklers, in most cases, control the fire immediately. The water damage which does occur is negligible compared to the damage which would have resulted if the building should have been completely or substantially consumed by a fire fought by conventional means. See, Horne, B. G., Fire Chief, Controlling the Cost of Fire Protection in the City of San Buenaventura.

V. THE SIZE OF A COMMUNITY'S WATER SYSTEM CAN BE REDUCED BY WIDESPREAD INSTALLATION OF PRIVATE FIRE PROTECTION SYSTEMS IN THE COMMUNITY.

A major part of the cost of the developing community's water supply is the additional reservoir of water which must be on hand for major fires, and the high pressure distribution lines from the reservoir to assure the fire department will have enough water pressure to project many hose streams onto a raging major fire. Nowhere near the same quantity of water or water pressure would be required for automatic sprinklers to do the same job.

The traditional method for estimating the water supply required to serve a community's fire protection needs is by computing fire flow requirements. The criteria to estimate fire flow requirements are found in the Guide for Determination of Required Fire Flow, Insurance Service Organization, 1972. The fire flow formula reflects significant water conservation propensities of private fire protection. Depending on the flammability of a given building, the fire flow required is reduced by 25% to 75% when a sprinkler system is present in a building. Fire Protection Handbook, supra, at pp. 11-2 through 11-6.

The fire flow formula developed by ISO can be utilized to determine the community-wide fire flow requirements. This procedure is more fully described in ISO's Municipal Grading Schedule, copies of which are available in many

community Fire Department and Fire Department Protection offices.

Although the methodology in the Municipal Grading Schedule does not enable a precise computation of the reduction in community fire flow requirements caused by widespread sprinkler installation, it is significant. Anchorage, Alaska, is a specific case in point, where ISO engineers indicate installation of sprinklers in the Central Business District, alone, made Anchorage a more fireworthy community, and caused a reduction in fire flow requirements.

VI. PRIVATE FIRE PROTECTION REDUCES THE COST OF OTHER PUBLIC SERVICES.

In addition to the water conserving properties of automatic sprinkler systems, and the significant savings in life and property, there are other public benefits from widespread installation of private fire protection systems.

Among these are:

1. Both the economic and physical burden of the Fire Department are decreased since private fire protection generally puts out the fire before the fire department even arrives. This also decreases the hazards of fighting fire.
2. The cost of manpower and time fighting the fire is reduced and therefore the money necessary to operate the Fire Department can be reduced, stabilized, and diverted to other essential Fire Department or community expenditures.
3. Private fire protection decreases fire insurance costs not only for the person installing it, but also for an entire community where the installations are widespread. Many rural communities have little or no fire protection. These communities may not be able to afford the expensive fire-fighting equipment more urbanized communities have. Commercial construction moneys are also difficult to obtain because insurance rates are too high. By installing private fire protection, great reductions in insurance premiums can be achieved, which will enable property owners to get reasonable insurance premiums needed to obtain financing for construction.

4. Construction without sprinklers imposes higher insurance costs and imposes on the architect more stringent rules governing compartmentalization, fire proofing, exit distance spacing, travel distance, and exterior design requirements. It costs more to construct without sprinklers. 242 News Bulletin, Automatic Sprinkler Fire Control Association, Inc., pp. 1316 (1973). Providing incentives to construct with sprinklers will lower construction costs and then insurance costs, enabling construction to go forward that otherwise would have been too costly. The resulting stabilization and expansion of a community's economic base, not to mention expanded tax base, is obvious.
5. Private fire protection increases municipal tax revenues by encouraging property development.
6. Private fire protection increases a community's total fire protection security, preventing conflagrations and exposure fires.
7. Private fire protection results in lessening the cost of capital improvements to the community's water supply since widespread installation of private fire protection decreases the required fire flow necessary for adequate municipal fire protection.
8. Private fire protection saves billions of gallons of water, which is in chronic short supply in many communities.
9. Encouragement of private fire protection is consistent with the State policy of encouraging installation of fire protection devices (smoke alarms).
10. Since private fire protection can reduce the cost of the Fire Department and the water utility, Municipal tax

dollars and State revenue sharing monies can be expended for other essential services, making more efficient use of government dollars.

These benefits are substantial and should be encouraged by the incentive legislative programs hereinafter described.

VII. TAX CREDITS, LOW INTEREST LOANS FOR PRIVATE FIRE PROTECTION, INSTALLATION, AND ELIMINATION OF WATER STANDBY CHARGES WILL PROVIDE THE LEGISLATIVE INCENTIVE TO MOVE TOWARD UTILIZATION OF THE BEST AND MOST ECONOMICAL FIRE SAFETY TECHNOLOGY - PRIVATE FIRE PROTECTION.

A. Why Legislative Incentives?

The decision to install or not to install private fire protection hinges on two variables. First, the Uniform Building Code requires building materials with a higher fire rating for higher fire rating for higher risk occupancies. If construction is without sprinkler systems the construction costs may be too high, and the increased cost could prevent the decision to construct from even being made. Second, the reduction in insurance rates for buildings with sprinklers will be greater for some kinds of buildings than for others. The size of the reduction is largely determinative of how long it will take the property owner to amortize the cost of the sprinkler system. If the insurance reduction is too small, it will take too long to amortize the cost of installing the system, and the decision to install it may not be made, with the resultant loss in fire safety. Legislative incentives in the form of low interest loans which can be obtained to finance sprinkler installation, additional tax credits to buildings that have sprinklers, and legislative elimination of water standby charges will make the decision to install private protection economical and, thus, voluntary. A significant trend would develop

wherein water guzzling fire companies would be replaced by water efficient sprinkler systems, reducing both losses caused by fire and costs to local government.

B. Low Interest Loans Will Cause Financing to be Available so that Sprinklers can be Installed in Both New and Pre-existing Construction.

Funds for low interest loans to finance installation of private fire protection systems should be available in amounts that will allow for a rapid implementation and installation of private fire protection systems by those who qualify for the loans. Many small businesses in our state do not have access to financing at reasonable rates. The current level of interest rates simply does not make it economical for the property owner to consider the installation of private fire protection. Loan qualifications should be established on the basis of need similar to that required for small business loans. But, in addition, loans should also be made available to property owners who are required to install private fire protection by the community building codes, with some consideration given to those property owners desiring to install a system in a pre-existing structure. Making funds available to owners of pre-existing structures will accelerate the move towards utilizing private fire protection technology instead of the more costly and riskier Fire Department.

C. Tax Credits for Installation of Private Fire Protection Will Encourage, not Penalize the Owner who Adopts Better Fire Safety Technology, and Will Not Cause Cities to Lose Tax Revenue.

Installation of private fire protection systems causes property valuations to increase. Up to now the increase has been included in the property's assessed and the community's mill rate has been applied accordingly, thus raising the owner owner's taxes. This penalizes the property owner for installing fire protection systems. A property owner who does not install such a system is the one to penalize, because he increases the potential for disastrous fires in the community, and causes escalating costs for the Fire Department and Water System. Enacting State legislation will remove from tax rolls the penalizing assessment against private fire protection systems. This approach does away with counterproductive taxing practices, and maximizes the cost savings of better fire safety technology.

Local governments will not lose tax revenue as a result of the tax credit for fire protection systems. First, as the incentives induce increasing numbers of fire protection systems to be installed, fire departments will save literally millions of dollars because their requirements for manpower, equipment, and additional fire stations will be drastically reduced, to maintain a given level of fire safety. Attached as Appendix II is an actual case study of great savings which resulted in fire department costs in

the City of Fresno, California. By inducing widespread installation on of private fire protection systems, the City of Fresno's fire department saved literally millions of dollars, according to the study. Reilly and Viniello, Sprinklers Cut Fresno's Fire Losses and Budget, Fire Journal, November 1979 (See Appendix II). Appendix I empirically documents the huge savings which will result to the Fire Department from a program of this sort.

Second, the assessed value of a sprinkler system, when compared to the value of the rest of a building, is minimal. Without the sprinkler system a fire will destroy the building, and the corresponding loss from municipal tax rolls of the entire valuation of the building will be many-fold greater than the minimum value of the sprinkler system. The City's tax base will grow more rapidly if it is not being consumed by destructive fires, which will not occur when a City's property tax base is protected by sprinklers. It is a certainty that the loss of tax-assessable property will be many times greater in a community that does not have widespread sprinkler installation.

Third, the major component of a City's water supply cost is the necessity to have water available to combat fire. Widespread installation of private fire protection systems will drastically reduce the fire flow demand, with a correspondent cost reduction to the water

utility. In sum, then, the savings to the fire department and the water utility, together with the increased tax base that will result from the increased fire safety, induced by exemption of fire protection systems from the tax base, all culminate to provide increased, rather than decreased, revenue to municipalities. The tax credit incentive in Senate Bill 370 and House Bill 648 will insure this result.

D. Elimination Of Water Standby Charges

One of the most invidious disincentives to the installation of private fire protection systems has been the water standby charge levied by water utilities. The charge is levied when a private fire protection system is connected to the water system, regardless of whether it consumes water or not. The theory of the charge is that the connection of the system creates demand that the Utility must meet. Nothing can be further from the truth, however. By connection to the water supplies, the required fire flow, and, therefore, demand, is reduced. Sprinklers simply do not demand anywhere near as much water to fight fires as do Fire Departments. See, p. 6 supra; see, also, Fire Protection Handbook, supra, at 14-42 through 14-48. The cumulative effect if widespread sprinkler installation is reservoir requirements which are stabilized or reduced when compared to the requirements without the sprinklers.

Water demand charges eat up or completely eliminate any

insurance savings to the property owner which would otherwise go towards amortizing the cost of installing the system. The demand charge makes it uneconomical to install the sprinklers. The water demand charge eliminates the only source of cost saving to be realized by installation of the sprinkler system. The demand charge should be exposed for what it is--a disincentive to installation of private fire protection that is counter productive to the goal of having adequate water supplies, and to the goal of making our communities safe from destructive fires. In the interests of conserving scarce water resources and maximizing the public fire protection dollar, then, legislation banning imposition of water demand charges on private fire protection systems should be enacted.

VIII. CONCLUSION

For the foregoing reasons support of this legislative program is urgently solicited. Senators, Representatives, local governments, and the public are urged to support these legislative incentives. The Alaska State Firefighter's Association and the Alaska State Fire Chiefs Association believe it's time to stop utilizing expensive, dangerous, and outmoded fire safety technology to protect our communities. These legislative incentives promote utilization of the best firefighting technology, while at the same time saving money. It will save the public and local government

money, and conserve scarce water resources, thereby saving
in water supply construction.

Fire

MAY 16 1979

DIRECTOR'S OFFICE
OF FIRE PREVENTION
AND CONTROL
ALBANY, N.Y.



management review

A QUARTERLY NEWSLETTER FOR LOCAL GOVERNMENT OFFICIALS WINTER 1979

Reducing Manning Costs For Fire Suppression

"Manning policy for fire suppression personnel is a very controversial issue. At a time when taxpayers are demanding budget stringency, fire department manning practices require further examination and evaluation. To date, no significant research has been done on the fundamental question of how many fire fighters are optimally required for fire suppression duty. As a priority issue, the U.S. Fire Administration is planning to initiate a manning study this year. In this issue of Fire Management Review, Dr. Harry Hickey makes some important observations on how built-in fire protection can affect ISO water flow requirements and therefore, fire suppression manning levels."

Gordon Vickery, Administrator, U.S. Fire Administration

Built-In Fire Protection And Fire Department Manning

by
Harry E. Hickey
Associate Professor
University of Maryland



The number of companies required and the manning levels for each company are directly related to the number of hazards in a community. Any community has a range of hazards. Therefore, the geographical location and the nature of these hazards are *prima facie* factors in determining the location of engine and ladder companies.

Property Hazard Level Reduction

Generally, property hazard levels should be used to determine the number and type of fire companies required and the manning levels for each.

One method of measuring property hazard levels is to determine the amount of water required to control and extinguish a fire in a building or group of buildings. Required fire flow will vary according to a building's ground floor area,

height, construction, occupancy, internal fire protection and alarm systems (automatic sprinklers and alarm transmission to an emergency response service), and exposure conditions.

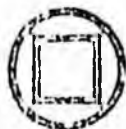
The *Guide for the Determination of Required Fire Flow*, which is published by the Insurance Services Office (ISO), can help to determine fire flow requirements for specific hazards (there is some question on the validity of the final computations). It is also helpful in assessing fire flow requirements according to a community's hazard variables. The guide states that by using these computations, fire flow requirements "may be reduced by up to 50 percent for complete

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automatic sprinkler protection. Where buildings are either fire resistive or non-combustible construction, the reduction may be up to 75 percent." Thus, established fire flow values can be cut drastically by requiring the installation of automatic sprinkler protection.

Regardless of the method used to compute required fire flow, there is general agreement that the public protection equipment requirement increases with the fire flow requirement. Conversely, as the property hazard is reduced, so is the required fire flow and thus, the level of fire department response.

A community policy to control and reduce property hazard levels by requiring automatic sprinklers can have a significant impact on holding the line with fire department manning requirements. In addition to improved life safety and property protection, automatic sprinklers may reduce property insurance premiums and the demand on the community's fire suppression delivery system. This may open new service delivery options, such as improvement of emergency medical services with existing personnel.

Hypothetical Case Study

The community of Newtown, which covers approximately 12.75 square miles, has 5 primary hazards characterized by: ordinary construction; four stories; ground floor areas from 43,000 to 50,000 sq. ft.; occupancies of the moderate hazard level and normal exposure conditions. It is assumed that these buildings are the worst fire hazards in the community, and that the level of fire protection required for them will be equal or better for the rest of the community.

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Without automatic sprinkler protection the ISO guide sets a required fire flow of 8,000 gallons per minute for each fire. However, using the water supply section of the ISO Grading Schedule, the basic fire flow for Newtown is 7,500 gallons per minute. The guide makes a clear distinction between required fire flow and basic fire flow.

If each of the primary hazards were retrofitted with a hydraulic automatic sprinkler system, the peak required fire flow for each fire demand zone would be reduced from 8,000 gallons per minute to 4,000 gallons per minute. This would reduce the basic fire flow for Newtown to 3,500 gallons per minute.

The reduction in fire flow requirements has a dramatic effect on manning levels. Fire suppression manning requirements were calculated on the following assumptions:

- a 48 hour work week
- average vacation and sick leave of 4 hours per week for each individual
- 3.8 persons are required to staff a suppression position 24 hours a day, and
- engine and ladder companies each require one officer on duty at all times.

The ISO Grading Schedule was used to determine the number of engine and ladder companies required, based upon the response distance and the established required fire flows, and the manning requirements for each company.

Company and manning requirements were calculated with and without automatic sprinklers.

	Without Automatic Sprinklers	With Automatic Sprinklers
Stations	5	3
Engines	7	4
Ladders	3	1
Officers	42	15
Fire fighters	209	76

Annual personnel costs (including fringe benefits) were estimated on the basis of \$24,000 for each officer and \$18,000 for each fire fighter.

	Without Automatic Sprinklers	With Automatic Sprinklers
Officers	\$1,008,000	\$360,000
Fire fighters	3,762,000	1,368,000
TOTAL	4,770,000	1,728,000

Please turn to page

deficiency point rating had been implemented as a solution to the fire defense strategy.

Real losses (measured in replacement cost of buildings destroyed) were reduced by 22 percent. While most cities in the United States are operating with fewer fire stations, fewer pumpers and ladders, fewer fire fighters, and less equipment than they had 20 years ago (and many are protecting more land area), Fresno chose to do

so out of an intelligent master concept. Its results: a more efficient municipal government, more fire protection for its citizens at less cost, lower insurance rates, and a smaller, more efficient, higher paid, and well-trained fire department, plus a planning and inspection department with the proven capability to develop and execute a "cost-effective" master plan for municipal fire defense. △

Light-Wall and Special Light-Weight Pipe in Automatic Sprinkler Systems (continued from page 61)

Table 1.

Pipe Trade Size	Internal Diameter (Inches)		% of Reduction in Friction Loss
	Schedule 40	Schedule 10 ^a	
1"	1.049	1.097	20%
1½"	1.380	1.442	19%
1½"	1.610	1.682	19%
2"	2.068	2.157	19%
2½"	2.469	2.635	27%
3"	3.068	3.260	26%
4"	4.026	4.260	24%
5"	5.047	5.295	21%
6"	6.065	6.357 ^b	20%
8"	8.071 ^c	8.249 ^d	10%

¹ Schedule 30.

² 0.134" wall thickness — light-wall pipe.

³ 0.168 wall thickness — light-wall pipe.

⁴ ASTM A-135 light-wall steel pipe.

An illustration of the effect of specifying light-wall pipe as a substitute for standard-weight pipe in an automatic sprinkler system follows. A warehouse with high-piled storage of a type requiring 0.38 gpm per square foot over 2,000 square feet of floor area uses 1½-inch orifice automatic sprinklers. The pressures required for this automatic sprinkler system are illustrated in Table 2 for both standard-weight and light-wall pipe.

Fire pump power demand in this example can be reduced by as much as 13 percent, depending on pump efficiency. Table 2 illustrates that this water supply will be required to deliver 16.7 psi less pressure at 700 gpm.

Smooth Interior Pipe Walls

Friction loss is a function of interior wall roughness. Light-wall pipe, manufactured in accordance with ASTM A-135 specifications, is made by the electric-

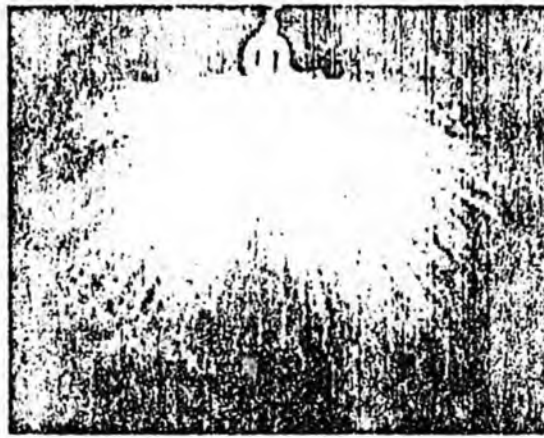
resistance weld process. The steel used to form this pipe is rolled, either cold or hot, and has a smooth surface. The pipe is generally formed cold, and thus has little opportunity for scale formation and roughening of the surfaces. Standard-weight pipe is often formed hot, and may include scale and other imperfections on its surfaces. Ten percent improvement in surface finish can result in a 16 percent reduction in friction loss.

Table 2

	Pressure Required	Standard- Weight	Light-Weight in 30'
To obtain sprinkler discharge		22.6	22.6
Friction Loss			
Branch Line		32.0	26.1
Main		45.0	34.2
Underground		15.0	15.0
Elevation		10.5	10.5
TOTAL:		125.4	108.7

SUMMARY

1. Sprinkler system designers have an added option of using Schedule 10 light-wall pipe.
2. Substitution of Schedule 10 light-wall pipe for Schedule 40 pipe will significantly reduce the total pressure and power demand on the water supply.
3. Reduction in pressure requirements can save installed and operating costs as follows:
 - Less horsepower required to deliver water;
 - Smaller pumps or the ability to supply sprinkler systems from existing water supplies;
 - Smaller pipe sizes — lower pipe cost — less weight — less labor and freight costs. △



Sprinklers Cut Fresno's Fire Losses and Budget

EDWARD J. REILLY and JOHN A. VINIELLO

IN THE 1960s, the city of Fresno, California began the process of basing its municipal firesafety program on the installation of automatic sprinklers. As a result, the city decreased its fire losses, decreased the percentage of the municipal budget allocated to its fire department, and improved its insurance rating.

Many of the details of the Fresno program were explained in a March 1975 *FIRE JOURNAL* article entitled "How the City of Fresno Achieved Better Fire Protection." A major element of the program was the enactment by the Fresno City Council in 1961 of the Dangerous Building Ordinance, which focused on the central business district and gave city officials the power to remedy the hazards resulting from unsafe buildings or structures. City officials were empowered to condemn those buildings or order their repair, renovation, or restoration so that they would meet the requirements of the *Fresno Building Code*.

Under the provisions of the Dangerous Building Ordinance, buildings owners could choose among several alternatives to bring their buildings up to the requirements of the *Building Code*. Most owners found that the most economical way to comply with the *Code* was to install automatic sprinklers.

The city coupled the Dangerous Building Ordinance with a funding plan that city officials arranged with the local agency that administered the federal urban renewal program in Fresno. Federal funds were provided to the

city by the US Department of Housing and Urban Development for the acquisition of property and the demolition of buildings not worth saving. The city's agreement with the urban renewal agency specified that any new construction in the city's urban renewal area would be sprinklered in accordance with NFPA 13, *Standard for the Installation of Sprinkler Systems*. Finally, the urban renewal agency agreed to help interested owners find loans for building renovation. The agency did not, however, provide funds to owners or guarantee the loans made to owners.

As a result of these two actions by the city -- enactment of the Dangerous Building Ordinance and the agreement with the federal urban renewal agency -- sprinkler protection became almost universal in the 18-block central business district and a separate 22-block area once considered a slum. More than 95 percent of all the buildings in both areas ultimately were protected by automatic sprinklers.

Representatives of the National Automatic Sprinkler and Fire Control Association (NAS), which was involved in the initial discussions that resulted in the Fresno program, revisited the city in 1977 to study the results produced by the program. What follows is a recounting of the effects that the organization found the program had made on the fire department and fire losses.

Fire Department Results

In 1955, Fresno's population stood at 115,000. By 1977, 69,500 people had been added to its population, a

Mr. Reilly is President of the National Automatic Sprinkler and Fire Control Association, Inc. Mr. Vinello is that organization's Vice President of Field Operations.

65 percent increase. In 1955, Fresno covered only 21 square miles. By 1977, through a process of annexation, its area had jumped to 58 square miles. During the same period, the number of Fresno's engine companies increased from 9 to 11, a 22 percent increase. Total paid fire-fighting personnel increased from 215 men in 1955 to 276 men in 1977, a 26 percent increase. The number of fire fighters on duty around the clock remained unchanged: 68 men on duty during any 24-hour period in 1955, and 68 men on duty around the clock in 1977.

The burden per fire fighter had increased enormously between 1955 and 1977. In 1955, there were 3.2 fire fighters per square mile of area to protect. By 1977, the number of fire fighters per square mile was reduced to 1.2 men per square mile. Therefore, each fire fighter was required to protect more than 2½ times the number of square miles of area in 1977 than he was required to protect in 1956.

The number of fire fighters on duty during any 24-hour period decreased from 6.04 men per 10,000 in 1955 to 3.64 men per 10,000 in 1977. So the fire department was protecting almost twice as many people and property in 1977 as it had predicted in 1955, and had to cover over 2½ times the geographical area with only 20 percent more equipment, and virtually no increase in manpower.

In 1955, Fresno's fire department received so few deficiency points that it was rated as a Class 1 department. If the fire department were to maintain its Class 1 rating, 14 new fire stations would have to have been added between 1955 and 1976. Assuming a cost of \$1 million per station, including land and construction costs, this \$14 million acquisition would have cost the taxpayers about \$2.2 million per year, assuming a 6 percent municipal bond issue floated over a 20-year period.

Fourteen pumpers would have to have been added to maintain a zero deficiency point rating. At \$65,000 per truck, this additional cost would add about \$145,600 per year to the fire department budget with the same 6 percent municipal bond float for the same 20-year period.

It is difficult to calculate with precision the impact of additional manpower required to maintain a zero increment in deficiency points resulting from a manpower shortage. However, in 1955, the Fresno Fire Department was up to full complement: six men per company, on duty 24 hours a day. By 1976, only four men could roll on a call during any hour of the day or night.

If the three-platoon system (three men working 56-hour shifts around the clock) had been in existence in 1955, 84 new fire fighters would have been required to meet full manpower needs of the department. To say it another way, Fresno's 1977 department of 276 men would have to have been increased to 360 men if the department were to maintain its Class 1 rating. This would have added about \$1.26 million per year to Fresno's fire department budget. This would have increased the 1977 fire department budget from about \$9 million

per year to about \$12.6 million. About a 40 percent increase. If the fire department budget came to 13 percent of the total in 1955, it would have come to about 11 percent in 1977 if manpower, fire stations, and equipment were to be maintained at zero deficiency point levels.

Fire Losses

Between 1956 and 1966, per capita fire losses averaged \$171. In the decade immediately following, per capita fire losses averaged \$8.11. However, construction cost more than doubles every decade. NAS wanted to measure the cost of replacing buildings destroyed by fire, so it adjusted per capita fire losses to the Building Construction figures published by *Engineering News Record*. Adjusting per capita fire losses to the Building Code Index, "real losses" dropped 22.4 percent in that decade.

Of even greater significance is the fact that nonresidential losses averaged 62.1 percent at the beginning of the 20-year period. By 1976, nonresidential losses had plunged to 43.5 percent of the total, and it was these buildings that became the object of the intensive automatic sprinkler master plan.

Conclusions

The Fresno program is a comprehensive fire defense master plan.

In the decade that followed its implementation, the city's fire losses (adjusted for inflation) were cut by 22 percent.

The fact that 95 percent of two urban renewal areas covering 40 square blocks were protected throughout by automatic sprinklers under a combination of ordinances made it possible for the fire department to take full advantage of the 50 percent reductions permitted under the "fire flow" standards of the Insurance Services Office (ISO) grading schedule and the additional 25 percent credit given by ISO for superior construction. This resulted in the imposition of almost zero deficiency points against the water department.

Intelligent planning based upon a thorough understanding of the ISO grading schedule enabled the building and fire departments to take the steps needed to upgrade the city from an ISO Class 3 to Class 2 city.

The implementation of the plan resulted in economies in fire department operations of up to 40 percent of the total operating budget for that department. The 1977 fire department budget of \$9 million would probably range up to about \$12.6 million if the 84 added fire fighters, 14 pumpers, and 14 fire stations required to maintain a zero

(Continued on page 91)