



Fire Protection: Primer for Political Decision Makers

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Fire Protection

PRIMER FOR POLITICAL DECISION MAKERS

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Fire Protection

FIRE PROTECTION PRIMER FOR POLITICAL DECISION MAKERS

PREFACE

This manual is intended for political decision makers, such as members of city councils and boards of supervisors, fire commissioners and directors of fire protection districts, who have to approve budgets, authorize expenditures for fire protection, and who may have to adopt or amend building and fire codes. You will need no technical background of any kind to be able to follow this text.

The intent is not to qualify you as fire chiefs or fire scientists or engineers, but to provide you with some basic insights about the factors that determine the likelihood and severity of unintended fires and about the means to prevent and combat fires. This should enable you to make decisions in a more informed manner.

Governmental agencies often face financial crises and budget cuts, situations which may affect delivery of services. Fire protection may be a major part of the budget and may have to take its lumps with the rest. The question is how to make such cuts:

- Close a fire station?
- Reduce the number of fire fighters on each engine?
- Reduce the number of fire inspectors?
- Hold off replacing apparatus that is no longer reliable?

Any such decision has consequences, and the decision makers should have at least a general understanding of the effect of such actions on fire prevention and fire fighting capability.

Building and fire codes have been changing in response to fire experience and to the introduction of new hazards and building materials. This manual can guide you in fulfilling that need.

While this manual will not give you a pat answer, it will alert you to what you should consider in arriving at your decision.

Political decision makers know what their constituents are paying in taxes for fire protection but have at best a vague notion about their community's fire insurance burden. The taxes are determined by the political entity while the insurance cost is a transaction between an individual property owner and an insurance company. Yet the actions of the political entity can have a significant effect on insurance rates. Every year, many property owners receive letters from their insurance carriers notifying them of non-renewal of policies, not because there is something wrong with their particular properties, but because the insurance industry has identified the community as risky due to inadequate fire departments, inadequate water supplies, poor code enforcement, climatic conditions, or any combination of the above.

This manual will give you some insight into the methods employed by the fire insurance industry in rating your community.

Some concepts relating to fire protection will be oversimplified here in order to make them easily comprehensible, but without leaving out any steps in the process. Hopefully, after reading this manual, you will feel more competent and confident when making policy decisions relating to fire protection. Assistance in coping with some of the issues raised in this manual may be available from the Diablo Fire Safe Council.



FIRE AND KNOWLEDGE

When Prometheus brought the fire down from the heavens, he did the same that Adam did when he bit into the apple and what Heinrich Faust did when he entered into the bargain with Mephistopheles. In each case, entering the forbidden domain resulted in both rewards and punishment. In the cases of Prometheus and Adam, the act was symbolic for the quest of knowledge; in Faust's case it was explicit.

The following is an attempt to harness the stolen fruit in order to temper the punishment.

THE FIRE TRIANGLE

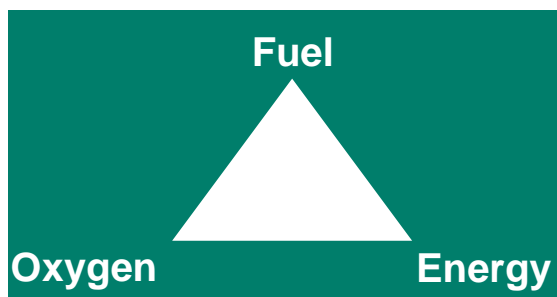


Figure 1 - Fire Triangle

Three components are required to start a fire, whether in a fireplace, inside an automobile engine or anywhere else:

- fuel,
- oxygen,
- source of energy.

They are required for either a beneficial fire or a harmful fire.

To prevent a fire, it is necessary to remove or isolate any one of these components. Figure 1 shows what is known



as the fire triangle; please keep this simple figure in mind when thinking about fire protection.

Fuel

The only fuels considered in this manual are hydrocarbon fuels, which consist of molecules primarily of the elements carbon and hydrogen. This group of fuels includes natural gas, all petroleum products and coals, paper, wood and plastics. Some metals, particularly powdered aluminum or magnesium, can act as fuels, but because they constitute a problem in very few jurisdictions, they will not be discussed here.

Chemical representations of common fuels are shown in Figure 2. Methane (Figure 2a) is the lightest hydrocarbon fuel. Methane, whose formula is CH_4 (one carbon and four hydrogens), is the main constituent of the natural gas burned in your furnace and water heater.

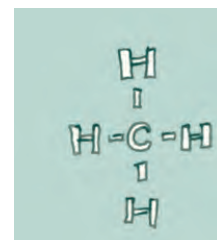


Figure 2a - Methane

Octane (Figure 2b) whose formula is C_8H_{18} (eight carbons and eighteen hydrogens) is a main component of gasoline. Octane is called an aliphatic hydrocarbon, meaning that its carbon atoms are arranged in a straight line.

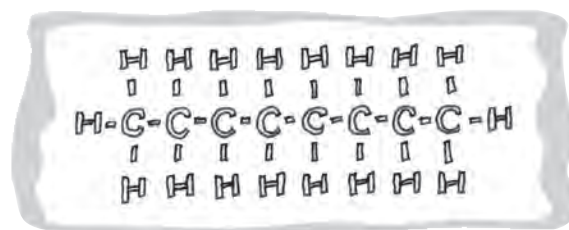


Figure 2b - Octane

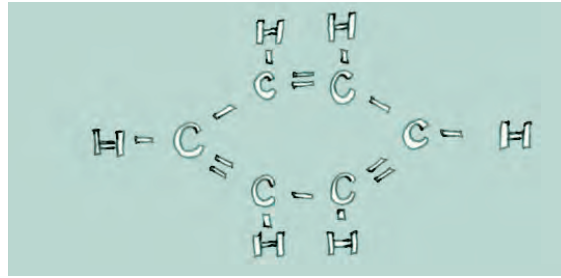


Figure 2c - Benzene

Benzene (Figure 2c), formula C_6H_6 (six carbons and six hydrogens), is called an aromatic hydrocarbon, meaning that its carbon atoms are arranged in a closed ring.

These illustrations are a bit misleading, because they make these molecules look two-dimensional. Methane, for instance, is more accurately shown in Figure 2d as a tetrahedron (a triangular pyramid) with a hydrogen at each corner and the carbon in the middle.

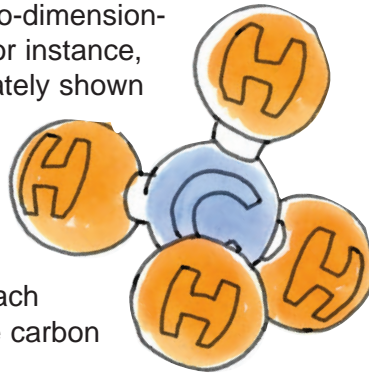


Figure 2d - Methane

The lightest hydrocarbons (few carbons) are gases under normal atmospheric conditions, although they can be liquified. Heavier hydrocarbons (more carbons), such as gasoline, are liquids but readily release vapor under normal atmospheric conditions. Still heavier hydrocarbons are liquid but release no significant vapor except when heated. Solid fuels represent a more complicated picture, since their composition may be far from uniform, but they too normally must be heated to release gas. At this point we come face to face with an anti-intuitive fact: liquids and solids don't burn, only gases do. When a pool of gasoline burns, it is actually the

gasoline vapor that burns. Gasoline is easier to ignite than heavier fuel oils because it evaporates more readily. This fact is important because it enables us to distinguish between the fire hazards represented by different kinds of potential fuels.

Different fuels behave differently under fire conditions. **Wood**, when heated, gives off a gas that will burn; **plastics** (polymers), on the other hand, may melt, may dissociate into their constituent monomers (building blocks), and the monomers may provide the gas that burns.

Knowledge about the behavior of different potential fuels is vital in drafting effective building and fire codes.

Oxygen

About 21% of the air we breathe is oxygen. The role of oxygen in a fire is very similar to its role in our bodies. It combines chemically with a fuel (food in the case of our bodies) to release carbon dioxide, water vapor and energy. We can survive in an atmosphere that contains less than 21% oxygen, but not much less. Similarly, fires depend on a fairly narrow range of oxygen concentration. Different fuels burn within different ratios of fuel to oxygen. Gasoline, for instance, will burn if it constitutes no less than about 11% and no more than 71% of the air/fuel mixture by volume. If there is less gasoline, the fuel is considered too lean to burn; if there is more, the mixture is considered too rich. In other words, we can control a fire either by reducing the fuel concentration below what is called the lower flammability limit (LFL) or by depriving it of air in order to exceed the upper flammability limit (UFL). The main purpose of firefighting foams is to put a blanket between a fire and its air supply.

Energy

No matter what the nature and concentration of fuel, there will be no fire without a source of energy to start it off. If the pilot on your stove is out, turning on the burner will not do anything except to release gas to the atmosphere. Similarly, if you disconnect your spark plugs, the cylinders of your automobile will not fire. It may take as little as the friction from striking a match or the electric spark in your engine, but it requires an application of external energy.



Once the fire is started, either desired or undesired, it will in all probability release enough heat of combustion that no more external source of energy will be needed. This fact is of considerable importance in fire protection. While it is possible to control and extinguish a fire by depriving it of fuel or oxygen after it has started, removing the external energy source once the fire has started is likely to have no effect. Extensive cooling and fire prevention are the only ways to control fire at the energy corner of the fire triangle.

FIRE PREVENTION

An ounce of prevention is worth a pound of cure. This is particularly true in regard to fire. Unfortunately, people in the real estate business, including real estate newspaper columnists, frequently advise that the best way for property owners to protect themselves against fire loss is to buy fire insurance. Although most property owners have good reason to carry fire insurance, that is at best inadequate advice. The best way for a community to

minimize fire losses is to enact and enforce codes that reduce fire risks.

The best insurance against fire loss is avoiding unnecessary fire risks, such as smoking in bed, wood shake roofs and dead vegetation near structures.

There are trade-offs involved in fire prevention. The choice for a new subdivision may be between building and staffing a new fire station or requiring residential fire sprinklers throughout, because the holding action of the sprinklers would compensate for the longer response time from an existing station. Similarly, while stricter codes can increase construction costs, they can also result in lower fire insurance rates. Although it is your responsibility to be aware that such trade-offs exist, and in most cases it will require the work of professionals to evaluate costs and benefits. Your building inspection department or your fire department may have such capability; otherwise, it is worth retaining appropriate consultants to advise you.

FIRE FIGHTING DIMENSIONS

Success in fire suppression depends on a number of dimensions: **length of the fire front, flame height, time between ignition and first attack on the fire, and a rather complicated concept called 'defensible space.'** These dimensions are present in structural fires, in vehicular fires, in wildfires, in garbage dump fires, and in all other types of fires. Their significance may differ for a variety of reasons, but these dimensions are there and have to be taken into account in code development, in planning of fire protection facilities, in fire fighter training and in carrying out of fire suppression.

Time

Other than fire prevention, there is no more important objective in fire protection than the ability to attack any fire in the shortest time possible.

Fire does not grow at a steady rate but exponentially. One fire engine may be able to control a fire if it arrives at the scene of the fire within five minutes after ignition; but after ten minutes, even three or four engines may not be enough. Spacing of fire stations to enable quick response, even during peak traffic conditions, is therefore a vital consideration.



Flame Length

The height of the flames is an indicator of the amount of heat a fire is releasing, and the relationship between flame height and energy release is not linear. A fire with 8-foot flames is much more than twice as hot as one with 4-foot flames. By the time the flames are eleven feet tall, it is impossible for fire fighters to get close enough for a direct attack. Again, the sooner a fire is confronted, the shorter the flames and the greater the chance of success, i.e. the less losses can be anticipated.



Length of Flame Front

The flame front concept is quite simple. Other things being equal, the longer the flame front, the more resources are required to control and extinguish the fire. If two houses are burning, it will take twice as many fire engines and twice as much water to suppress the fire as when one house is involved.

Defensible Space

If there are too few firefighters or there is too little water, the fire is liable to surround and trap the firefighters. The fire fighters must retreat in order not to be trapped. The area that they must abandon is no longer defensible. Fire suppression is often more effective if fire fighting crews yield space potentially not defensible in the first place and set up their defenses along a line further back that promises better chances of being permanently defensible.

Whether fire fighters will be able to defend a home may be determined by whether the homeowner has created Defensible Space.

ON SCENE OBJECTIVES

Life Safety

The first priority on the scene of a fire is the safeguarding of human life and limb. This includes the rescue of occupants of burning or exposed premises and the provision of appropriate medical services by qualified personnel. This raises staffing questions. Given the distances to hospitals and the response time of ambulance services in your community, you must decide whether you should pro-

vide for the presence of emergency medical technicians, or even paramedics, in your fire department.

Safeguarding human life includes the lives of your firefighters. The risks to which they are exposed should never exceed the possibility of saving the lives of others. Regulations of OSHA, or the state agency authorized to act in lieu of OSHA, provide a minimum standard for the safety of firefighters, but good judgment by properly trained incident commanders is a necessary complement to those regulations.

Fire Suppression

Fire suppression consists of:

- containment,
- control,
- extinguishment.

Containment is a term relevant only to very large fires with undefined boundaries. These are usually wildfires or conflagrations, and containment consists of firefighting forces surrounding the fire to the point that it is unlikely to escape the encirclement.

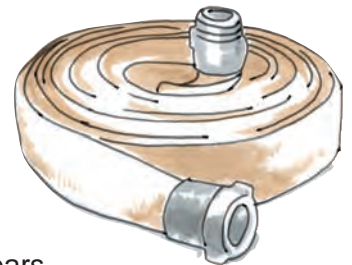
Control applies to more limited fires, like a single structure burning. It may sometimes be achieved without human intervention, as in the case where fire sprinklers, or often a single fire sprinkler, control the fire, and arriving firefighters only have to apply the coup-de-grace.

Extinguishment is the last phase of suppression, and it includes making sure that there is no chance that the fire could reignite.

The resources available for fighting fires vary greatly. A metropolitan fire department may be able to hit the fire with dozens of firefighting companies and millions of gallons of water. The Forest Service may be limited to hand tools and the amount of water in the tank on the truck in halting a wildfire. Of course, the fire in the metropolis can probably inflict more damage by razing one block than the wildfire could cause by burning hundreds of acres.

Overhaul

Overhaul is a critical phase after the fire is extinguished, or appears to be extinguished, a period during which the fire department has to make absolutely certain that there is no chance of reignition. This may involve opening up walls and ceilings, securing flammable materials, replacing fire sprinklers that had opened during the fire and reactivating the sprinkler system, and possibly setting a fire watch on the premises.



Salvage

Even after the fire is out, there is a risk of further property damage. If windows have been broken or if the roof has been opened up to vent smoke, the premises are subject to the vagaries of the weather, and suitable steps must be taken to control that exposure. Similarly, reasonable steps must be taken to protect property within the building from dust raised during overhaul and from water used for fire suppression.

Fire Investigation

Every fire has a cause or a combination of causes, and finding these causes is important for the prevention of future fires, for settling of insurance claims and for apprehending arsonists. Sometimes the cause is obvious, such as grease on a stove or smoking in bed. At other times, determining the cause or causes of a fire may be a grueling process. Your fire department may have personnel adequately trained to identify the causes of most fires, but there may be cases requiring highly qualified experts as well as computer modeling capabilities.



NATURE

Climate and Contour

The type and quantity of resources required to contain, control and extinguish a fire depends on a variety of factors beyond the fire triangle. Climatic conditions, such as temperature, humidity and wind conditions, can make the difference between an easily controlled fire and a potential conflagration. The big wildfires usually occur during the summer and fall, after the heat has dried out vegetation.

Lightning storms can constitute a special problem because they may start fires in remote areas not easily accessible to fire fighting forces. As human habitation and construction spreads into such areas, it is important to recognize the reduced probability of fire fighters reaching the scene of a fire in a short time. Adequate fuel breaks around structures and fire resistive building materials are more important here than in a city block.

Hillsides are likely to constitute a greater fire risk than flat terrain, especially if they are covered with dense vegetation. There is great variation in fire hazard between different plants, and the degree of fire protection should reflect the specific hazard.

Wildland-Urban Interface

As cities continue to impinge on heavily vegetated wildlands, these cities have to be prepared for fires that originate beyond their boundaries.

These preparations may consist of establishing a low-fuel zone between nature and development, of acquiring fire engines that can travel on unpaved terrain and/or of providing larger water mains along the wildland-urban interface than would be needed for domestic consumption.

FIRE FIGHTING RESOURCES

Fires are fought by personnel, equipment and extinguishing agents. In order for fire fighting efforts to be effective, these resources must be balanced. When a fire department meets its financial crunch by reducing the number of fire fighters on an engine, the effectiveness of the engine is reduced. Similarly, the best fire fighting crew can be stymied by unreliable equipment. The best engine with the best personnel will be frustrated if not enough water is available at the fire hydrant.

Personnel

Fire fighting is an inherently dangerous occupation, and fire fighters risk life and limb to save those of others.

Nevertheless, fire fighters should not be put at greater risk than necessary. Proper training enables fire fighters to carry out their task at minimum risk, and such training should be continuous. Training should not end with graduation from an academy.

Not only do fire fighters, like the rest of us, gradually forget what they learned in school, but conditions change with time. New building materials are introduced, high-rise buildings appear where none had been before, hazardous materials enter a community with new industries. Training must be continuous and alert to change.

Morale is important in any organization, but it is particularly important in an organization whose members are expected to put their lives on the line for their peers and for strangers.

After the 1991 "Tunnel Fire" in Oakland, California, which destroyed three thousand homes, fire fighters were subjected to a lot of abuse when they allowed some houses to burn. Actually, the fire fighters did the right thing; their first duty was to stop the conflagration and, if some homes had to be sacrificed in the process, that could not be helped. The damage to the morale of the fire department from the public abuse was still there after the homes were rebuilt.

Equipment

Fire fighting equipment is different from other road vehicles. You will never get 100,000 miles out of a fire engine. The motor does its hardest work when pumping, not when in transit. Also, the engine

may not have time to warm up before doing its heaviest work. Fire engine motors put in many hours of work while traveling few miles and, after fifteen years, the chance of finding spare parts will be slim.

Fire fighting equipment is not limited to rolling stock. If you want to keep your Workers' Compensation and overtime costs down, make sure your department has adequate safety equipment in good condition. Items such as breathing protection masks should be regularly fit tested on each individual fire fighter.

Extinguishing Agents



Most fires are put out with water. Computer room fires used to be extinguished with a group of chemicals called halons, but these have now been outlawed by international convention because of their role in depleting the ozone layer; so be prepared for new systems and extinguishing agents for computer installations. Ship fires are often put out by filling the hold with carbon dioxide; the carbon dioxide disrupts the fire triangle by keeping oxygen from reaching the fuel.

Water is used so extensively to fight fires because it is cheap, it is available under every street in the pipes that supply our homes, and it is an excellent energy absorber. When water is heated to 212°F it turns into steam, and this conversion from liquid to steam absorbs a great deal of heat energy. If more heat is absorbed than generated by the fire, the fire will ultimately go out. The finer the water spray, the more readily is steam generated and

the less water is wasted running off. The ability of the water mains in your streets to supply adequate fire flows is at least as important as the quality of your fire crews and equipment. Where buildings are provided with fire sprinklers, a fire may be controlled, if not extinguished, before the fire department arrives on the scene.

The pipes under the street are usually your main source of water for fire protection, but there are other resources to be considered, especially if these underground mains are not adequately sized for fire protection. Private water storage, such as swimming pools, can become emergency water supplies by means of a relatively inexpensive suction connection. Where the cost of improving water mains would be exorbitant, underground water cisterns or tanks, dedicated for fire protection, should be considered.



The effectiveness of water as a fire suppression medium can be greatly enhanced by the addition of any of a variety of foams, which primarily function to increase the stream's ability to put a barrier between fuel and air.

TO ENTER, NOT TO ENTER, NOT TO EXIT

Not too long ago, fire fighters prided themselves as 'smoke eaters.' Then they found out that yesterday's smoke eater is today's cancer victim because, lo, the smoke experienced at fires is very similar to cigarette smoke, only denser.

Today's smoke is a lot more poisonous than that of half a century ago. A single plastic foam cushion, something that did not exist back then, can produce lethal quantities of hydrogen cyanide.

The Occupational Safety and Health Administration (OSHA) now requires fire fighters to don self-contained breathing apparatus (SCBA) before entering a burning building. The corollary is that they must leave the building when their air tanks are empty.

There are many other reasons why fire fighters may have to leave a building that is still burning. Roofs supported by light-weight trusses have a habit of collapsing early and suddenly during fires. It is unreasonable to risk burying fire fighters under a burning roof unless they are involved in rescuing human occupants.

There are situations in which fire fighters should never be allowed to even enter burning premises. If hazardous materials are used, stored or generated on the site, only properly trained and equipped personnel should enter. If there are compressed gas cylinders present, the only safe attack on the fire may be from outside the building because, even if the cylinders contain only nonflammable nontoxic gases, they can become rockets when heated.

Many jurisdictions are concerned about high Workers' Compensation costs and overtime costs for replacing injured fire fighters. State legislatures have enacted firefighter presumptive cancer laws, which basically label any firefighter's cancer as work-related unless proven otherwise. Establishing and enforcing policies that keep fire fighters out

of buildings with unreasonable risks and enforcing the use of appropriate protective gear can reduce those costs.

NON-FIRE ACTIVITIES

This manual is dedicated to fire and fire protection only, but your fire department is likely to be required to participate in other activities, activities that will influence major decisions:

- training requirements,
- equipment needs,
- relations with other agencies,
- budgets.

The fire department gets summoned to a lot of non-fire emergencies because it can usually get there fast. The first arriving officer must then decide whether the responding company can handle the incident and what other resources within or outside the department are needed:

- medical support,
- traffic control,
- sand bags,
- the hazmat (hazardous materials) team,
- etc.

Emergency Medical Response

Your fire department is likely to respond to more medical emergencies than fires, so you must decide how much assistance your firefighters should be prepared to give. If you can count upon the ambulance



being not far behind, training in First Aid and CPR may be sufficient. If your community is small and rather isolated, you may want to always have a qualified emergency medical technician or paramedic on board. Even such a minor-sounding item like a bee sting may call for a prompt injection of adrenaline in order to stave off anaphylactic shock, and it requires a legally qualified individual to carry this out.

Hazardous Materials

Since the end of World War II, the quantity and variety of organic chemicals in our environment has mushroomed, and so has the number of hazardous materials spills and other incidents.



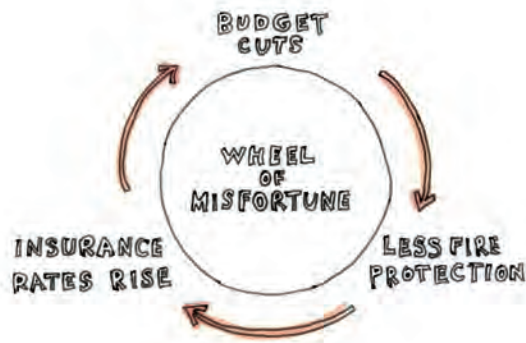
The fire department is likely to be the first responder on the scene. Until the 1970s, their likely action would have been to hose the spilled substance, identified or not, into the nearest sewer catchbasin. Today, they may deploy sandbags to prevent the spilled material from reaching the sewer. Trucks carrying hazardous materials are now marked with placards, and your fire engine carries a booklet issued by the U.S. Department of Transportation that translates the number on the placard into information about the chemical: fire and explosion risks, how to treat a leak or spill, first aid and evacuation advice, and what protective clothing to wear.

Depending upon the size and industrial base of your jurisdiction, your fire department will either have its own hazardous materials unit, properly trained and equipped, or have a mutual aid arrangement with another organization. Mishandling of a hazardous materials incident can result in catastrophe. One spark can turn a non-fire incident into a conflagration, and the spread of a toxic substance can become a major health or environmental disaster. So your fire department has to be trained to at least be able to determine who should take charge of the scene.

POLITICAL DECISIONS

Cost-Benefit Analysis

There is no surefire way (pardon the pun) to predict what investments in fire protection will pay for themselves. The Grading Schedule for Municipal Fire Protection of the Insurance Services Office



(ISO) may provide some guidance about the factors that determine fire insurance rates in your community, but there's no telling how individual insurance companies will apply your grade to their rates. Today, insurance companies are more likely to set rates on the basis of loss experience than on ISO's report card. **Your first consideration, therefore, should be evaluation**

of significant fires in or near your jurisdiction, what caused them, can they happen again, how can they be prevented in the most cost-effective way?

Tightening codes may not put an immediate strain on the city's coffers but may hinder development, thus reducing future tax revenues. New protective gear and training for firefighters requires cash now but can reduce Workers' Compensation costs in the future, etc.

Code Adoption and Enforcement

Local jurisdictions normally don't write their own codes; they adopt model codes developed by national organizations, possibly amending them to fit local conditions. Some of these organizations, such as the National Fire Protection Associations, publish codes covering a wide range of subjects, while others, like the American Society of Mechanical Engineers, may restrict themselves to a few specialties, such as boiler codes and welding standards.

The good news is that the authors of these model codes are often the most knowledgeable professionals in their respective fields; the bad news is that these experts are often in the pay of special interests and may insert code provisions in the best interest of their clients rather than of fire safety and cost effectiveness.

There have been antitrust convictions for actions at these model code organizations. So let the buyer — or code adopter — beware.

There are two basic types of code. **Building codes**, including plumbing codes, electrical codes, etc., apply during the planning and construction of a building. Their enforcement can be paid for out of permit fees. **Police codes, health codes, traffic codes** and yes, **fire codes** have to be enforced forever. When adopting fire codes, the legislative body should ask itself whether it is committed to funding enforcement of all the provisions into the indefinite future. If not, there should be triage between sections that will always be enforced, those for which there is commitment for the time being and which are calendared for revisiting, and those that everyone likes but nobody is willing to pay to enforce.

Here are some controversial code provisions that should be adopted only if meaningful enforcement is expected:

- tow-away parking on narrow streets in order to ensure fire department access,
- fire hazard abatement by government or government contractor at property owner's expense,
- outlawing of fireworks,
- revocation of business permits for repeat fire code violations.

Capital Investments



There is always a conflict between today's needs and tomorrow's. You may know that the fire station will collapse and bury engines and crew when the big earthquake hits, but it will take big bucks to stiffen

the building and — cross your fingers — the big one isn't likely to come on your watch. On the other hand, that fire engine has been spending too much time in the shop and should be replaced — now. If that reasoning is carried on from budget year to budget year, that fire station is doomed. And the fire station will not be the only necessary project that will never be funded, unless...

The traditional answer, of course, is the bond issue. That has to be approved by the voters. The voters are generally willing to pay for something they can see, so a fire station will probably have a good chance. There's a lot of equally important infrastructure that's not visible. While the homeowner may notice the fire hydrant a hundred feet from his door, the fact that the water main under the street is inadequate to supply the hydrant attracts no attention. When drafting a bond issue, it may be wise to package the invisible with the highly visible.

Fire Department Operations, Training and Discipline



Of course, you expect the Chief to run the fire department, but somebody has to legislate the scope of the department's operations. A Mission Statement (see next section) can lay out the philosophy for said scope, but legislation has to translate philosophy into marching orders. Under what circumstances do you want your fire department's units to leave the boundary

of your jurisdiction? The answer to that question will have to be spelled out in a mutual aid agreement. Do you want the fire department to respond to other emergencies than fires? How are legal and budgetary controls to be exercised? The Chief doesn't need politicians to micro-manage his/her department, but he/she has to have a well-defined administrative framework within which to do his job.

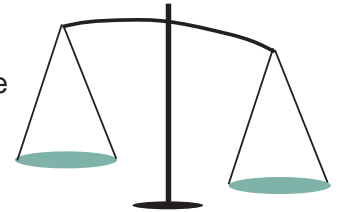
We have previously mentioned the importance of continuous training. There are relevant courses offered at the National Fire Academy, at university extension programs, and at community colleges, and you should do whatever is within your power to encourage and fund participation of your firefighters in these courses. **The most important learning experience for firefighters, however, consists of surveying their communities, noting locations of hazardous materials, identifying key switches and shut-off valves, and replanning how to fight fires on the various premises.** Some property owners may be reluctant to admit firefighters to "snoop" around, and it may require support from the political sector to make it happen.

The head of any organization has to enforce the standards of that organization while remaining on good terms with those in the ranks. This is particularly true for an organization in which the lives of members of the team may depend on the condition and actions of the other members. Occasionally, members of the fire department will be in violation of rules and regulations, and the Chief will require clear guidance from political superiors and from Counsel as to what level supervisors can impose what level of discipline. Usually, the

most common problem involves substance abuse, and the boundary between remedial and disciplinary action must be set and the Chief must be assured that the political body will not make her/him a scapegoat for enforcing the policy.

Trade-offs: Taxes vs. Insurance Rates

Americans are tax-averse, and the elected political decision-makers know it. The office-holders may also know that the fire insurance industry is looking over their shoulder, but that knowledge is tempered by the fact that the voters are not in on that information. So the legislators must decide how much heat they are willing to take to fund the fire protection that the insurance industry expects. If, for instance, the Insurance Services Office (ISO) gives you a bad report card because much of your equipment is old and unreliable, are you willing to raise taxes to replace it? And if ISO says the average age of your fire fighters is too high, are you prepared to establish a more generous fire fighter retirement system to encourage earlier retirement? If you answer 'no' to these questions, your constituents, and particularly the business community, may get hit with increases in their insurance rates exceeding the avoided tax increases, but the voters will not hold the politicians responsible and punish them for the new outlays.



MISSION STATEMENT

"Every fire department has the need to explicitly express its mission in the form of a mission statement."^[1] While there

are certain responsibilities shared by all fire departments, there are many other tasks within the scope of some, but not all such departments. Some provide emergency medical response, some respond to hazardous materials spills, some provide water rescue, etc., and others do not. Furthermore, different departments face different jurisdictional limits. The local fire inspector may or may not be welcome at the gate of the federal, State or industrial facility. Even response to a fire may be by invitation only. There may also be specific times, such as in the case of mutual aid response, when the mission statement of the host department will influence the assisting department's mission.

The mission statement has to be a concise document of what the department is charged to do and when and where it is to do so. Details beyond that point may be included in appendices or support documents.

A draft mission statement should be prepared by individuals familiar with fire department operations, with the specific operational scope of the department and with the hazards encountered by the fire service, as well as capable of writing a clear unambiguous document. The first draft should be carefully reviewed by the fire chief and his/her staff, and the second draft should be reviewed by the department's legal counsel prior to submission for enactment by the political body having jurisdiction.

It should be noted that subsequent failure to live up to the mission statement may subject the department to legal exposure.

SUMMARY

Fire has been a basic building block of civilization. It heats our homes, propels our automobiles and airplanes, generates our electricity and serves many other useful functions. But fire is a two-edged sword. Every year, it kills thousands of Americans, injures tens of thousands, and causes many billion of dollars in property damage.

Elected officials and public policy decision-makers can play a significant role in reducing these losses. An ounce of prevention is worth a pound of cure, and good building codes and fire codes can reduce the chance of fire and prevent fires from becoming conflagrations. Controlling vegetation and outlawing wood-shake roofs, for instance, can prevent wildfires from becoming urban tragedies.

Infrastructure plays a major role in fire protection. Narrow road widths slow down the response of fire engines and cause conflicts between evacuating civilians and arriving fire companies. Overhead powerlines can be a fire hazard and can interfere with fire department ladders. Water mains sized only for domestic demand will not provide sufficient water for fighting fires. All of these points should be considered when approving new developments or significant modifications to existing ones.

Awareness of fire hazards and the methods of controlling them can make you, the elected decision maker, a key actor in dealing with the fire next time.

ABOUT THE AUTHOR

Gilbert G. Bendix is a California-licensed civil, mechanical and fire protection engineer. He has dealt with fire prevention and protection challenges as superintendent of engineering and water supply of the San Francisco Fire Department, as an elected director of the Kensington Fire Protection District, and as a private consultant.

Gil is eighty-three years old and has witnessed fire problems change drastically over the years, sparked by (pardon the pun) the advent of plastics, which burn differently and produce more toxic smoke than wood; the introduction of air conditioning, which can expose people to toxic combustion products far from the actual fire; the proliferation of hazardous materials; and the encroachment of urban development upon heavily vegetated wildlands. He has been involved in the development of mitigation measures for each of these problems.

Gil has also witnessed the emergence of new technologies and has put them to use in fire protection. He introduced the first computer programs in the San Francisco Fire Department, helped to set up that department's first computerized dispatching system, and brought about remote push button control of underground valves instantly to increase the available water for fire fighting.

Gil is the official representative to the Diablo FireSafe Council of the Northern California-Nevada Chapter of the Society of Fire Protection Engineers.

Gil is passionate about fire protection and is willing to share his knowledge. If you, your political entity, or your staff want to consult with him at no cost about fire protection in your jurisdiction, please contact the Diablo FireSafe Council at 1-877-725-6803.

If he needs to travel, he does ask that you pick him up from your nearest BART station.

ABOUT THE PUBLISHER

The Diablo FireSafe Council is a coalition of public and private sector organizations that share a common, vested interest in wildfire prevention and loss mitigation.

The mission of the FireSafe Council is to preserve California's natural and manmade resources by mobilizing all Californians to make their homes, neighborhoods and communities fire safe.

This mission is being fulfilled through the combined expertise, resources and distribution channels of FireSafe Council members. For additional information, please visit www.diablofiresafe.org.



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