SECTION 1 - FIRE & PEOPLE
UNIT 3 - AMERICA'S FIRE PROBLEM

UNIT GOAL
To introduce the students to where The United States is in relation to improving fire loss. The unit will look at the basic statistics and some of the causes of property loss, injuries, and deaths due to fire.

UNIT OBJECTIVES
The student by the end of the semester shall:
- Identify three [3] major areas where the United States leads the world in fire loss
- Describe the significance of the "America Burning" Report
- Define the terms
  - Indirect Fire Loss
  - Direct Fire Loss
- Identify reasons for fire loss in
  - Urban Areas
  - Rural Areas
- Describe the impact of fire on
  - Children
  - Elderly
  - Economically depressed areas
- Describe the impact of arson on the nation's fire problem
- Describe what effects alcohol has on fire deaths

KEY TERMS
America Burning
Arson
Careless Smoking
Heating Related Fires
Disposable income
Shelter poor
Direct Fire Loss
Indirect Fire Loss

INTRODUCTION
The United States is one of the most technologically advanced countries on the earth. It is also considered one of the wealthiest, yet it falls far short of being the safest when it comes to fire.

The United States historically has had one of the highest fire loss rates of the industrialized world – both in terms of fire deaths and dollar loss. This unenviable status has perplexed many experts in the fire world. The United States is health and safety conscious in many areas – automobiles, consumer products, food, and medical drugs, to name a few – and has a vast arsenal of technological resources to combat fire. For such a safety conscious and technologically advanced society to be a leader in fire losses is indeed puzzling.

Some believe this to be attitudinal and societal issues. Fire has always been considered a "local issue",

so there has never been a concerted effort to improve fire safety on a national level. As mentioned in Unit 2 of this section there are many groups that are involved in fire protection and safety, but there is no central focus. As a result form a statistical point of view our loss record has remained very high as compared to the rest of the industrialized world. The average death rate per million persons in industrialized countries is 15. In the United States that number is 17.1. This is based on 2001 to 2003 data.

In this unit we will look at the background of fire loss data in the United States, the type of data collected, findings based on the data, and some possible solutions to the fire loss problem.

BACKGROUND

Records of fire loss goes back over 200 years. Much of it was handled by the insurance industry to provide information on how much money was being paid out for fire loss. On a local level many of the larger fire departments in the United States kept records of the number of calls that were responded to. This was done for budget purposes and to determine manpower and equipment needs. Very little, if anything, was done on a state or national level since the fire problem was considered a "local problem".

In 1966 several national fire service organizations met to discuss the fire problem in the United States. There concern was the high fire loss nationally. These figures were determined by data kept by the **NFPA**. These statistics showed that over 170 firefighters were dying in the line of duty annually, 12,000 civilians were dying on an average, 300,000 civilians are injured annually, and the dollar loss was had reached 11.4 billion dollars. Among the organizations that met in 1966, at what was to be called the Wingspread Conference, were the

- National Fire Protection Association
- International Association of Fire Chiefs
- International Association of Firefighters
- International Society of Fire Service Instructors

As a result of this and other meeting over the next several years, a consensus of the fire problem was developed.

In 1968 Congress enacted Public Law 90-259 - "The Fire Research and Safety Act of 1968". Part of this is to create the National Commission on Fire Prevention and Control. This Commission was to look into the fire problem in the United States and present a report to the Administration on its findings.

In 1973 a report from the National Commission on Fire Prevention and Control was presented to President Nixon. The name of this report was **America Burning**. In the report was spelled out various areas where changes needed to be made to improve the fire problem in the United States. These included:

- The Fire Services
- The Built Environment
- The Rural Wildlands
- Fire Prevention

Some areas that needed to be looked at were the following:

- Firefighter health and Safety
- Causes of Fires

- Potential Hazards of Man-Made materials
- Fire Safety in the Home
- Protecting the Young, Old, and Infirm.

In each of these the only way to determine what the problem was, was to look at statistics. And this was an area where we were woefully lacking.. In order to determine what the problem is, we must understand what the problem was [past information]. If we understand what the problem is then we can identify solutions for the future.

In 1999 FEMA formally decommissioned America Burning in order to look at where we as a nation stood in regards to the national fire problem. The new study was called America at Risk and was published in 2000.

Since the 1970s we have come along way in determining the causes of the fire problem. But, we still have a long way to go.

THE NATIONAL FIRE PROBLEM

In 2004 there were

- 1,550,500 reported fires in the United States
- 3,900 civilian fire deaths in the United States
- 17,875 civilian fire injuries in the United States
- The Direct Fire Loss in U.S. dollars was 9.794 billion
- Firefighter Deaths were 119
- Firefighter Injuries were 75,840

Fires

The vast majority of the 1,550,500 reported fires were small. Only a small amount of fires have a large dollar loss. But it is the large fire people read about, the small fire usually go unnoticed by the media and the population at large. As a result when we look at the fire problem we don't see it in the big picture. What we see is a local problem.

When we consider the cost of the fire services to fight the fire [career and volunteer], insurance costs and other direct and indirect fire losses the total fire loss in this country exceeds 100 billion dollars a year. This is equivalent to 1 to 2 percent of our Gross Domestic Product.

Fire Deaths and Injuries

The highest fire death rates are in the southeast with a rate of over 25 deaths per million population. Also high is the northeast with an average of 11 to 17 deaths per million population. A notable exception in the northeast is New Jersey, with a rate of under 11 deaths per million population.

Men have twice the fire death rate of women. Men average 60 percent of the deaths and injuries while women average only 39 percent. Some of the considered reason for this are:

- Men are more likely to be intoxicated
- Men participate in more dangerous occupations
- Men use gasoline and other flammable liquids more than women

- Men have more injuries in the way they react to fire than women

Age has a direct impact on fire deaths and injuries. People of 55 and children under 5 have a higher risk of death or injury due to fire. The following is data from 1996

- The deaths by percent for children under 5 is about 7
- The injuries by percent for children under 2.4 is about 5
- The deaths by percent for Adults over 55 is between 6.3 and 7.7
- The injuries by percent for Adults over 55 is between 1.6 and 5.3

Fire has no understanding of race or color, but fire death and injury rates are higher for others. African-Americans and American Indians have a disproportionate share of fire deaths. The national fire rate is 13.6 deaths per million people, the following is a breakdown by race

- White males have a rate of 15
- White females have a rate of 9.6
- African American males have a rate of 31.9
- African American females have a rate of 19.4
- American Indian males have a rate of 26.9
- American Indians females have a rate of 15.6
- Asian males have a rate of 6.9
- Asian females have a rate of 5.9

Property Loss Due to Fire

The majority of fire in 2004 occurred outside [38%]. Injuries and deaths were greatest in residential fire [74% & 73.9.% respectively]. Dollar loss was highest in residential and non-residential fires [56.5% & 29.4% respectively]. Only 3% of fire deaths occurred in commercial and public property. The high life loss in residential properties is in keeping with the 10 year trend form 1987 to 1996.

Loss due to fires can be categorized ad direct or indirect fire loss

Direct fire loss is those items damaged or destroyed as a direct result of the fire

- Contents
- Structure
- Cost of fire services
- Cost of internal fire protection - structure & equipment

Indirect fire loss is those items not directly damaged by the fire, but impacted by the results

- Business interruption
- Temporary displacement expenses
- Long-term loss in market share
- Secondary loss in dependent business
- Temporary lodging
- Litigation
- Impact from death and injury
- Cost of regulatory, research, & testing
- Disaster recovery

Causes of Fires and Fire Losses

The top two causes of fire deaths in 2004 were Smoking [18%], **Arson** [28%], and Heating [11%]. Fire

injuries were Cooking [24%], Open Flame [18%], and **Arson** [17]. Males had a higher rate of fire deaths due to open flame and other heat, while women had higher rates due to cooking, electrical, and children playing.

The leading cause of injuries for both sexes was cooking, but more women [28%] than men were injured [18%]. For women the next two leading causes were children and **arson**. For men **arson** was second leading cause with smoking and open flame tied for third.

Social and Economic Issues impacting Fire Safety

The United States has been known as a country that considers suppression over prevention in the attempt to curb the fire problem. Most other countries with a lower fire rate than ours are the exact opposite, the push prevention more than suppression. Some may say "why can't we do the same?" But it is not a simple question. A lot of it deals with a countries social and value systems.

In many European countries as well as Asian there is a strong centralized government system that controls public safety. In this social setting it easier have a central focus on many social issues. In the United States we tend to prefer a decentralized form of government. Some areas where other countries are different from us are the following

- Regulating the level of fire protection in the built environment through building codes.
- Regulating the types of structures covered by building codes.
- Providing high levels of training for firefighters, especially fire officers.
- Encouraging high education levels of fire service members.

One of the major problems the United States has is described in this quote from "Fire Death Rate Trend - An International Perspective" from the USFA "***U.S. "Accepts" Fire as a Fact of Life*** *- The lack of a strong cultural norm around preventing fires may explain another aspect of U.S. attitudes towards fire. Americans tend to view fires as an inevitable part of life and, unlike citizens in other countries, are more prone to characterize fires as unfortunate "accidents". When fires happen, those who lose their homes and possessions are compassionately termed "fire victims," even in cases where the fire was a direct consequence of human behaviors. These attitudes may be reinforced by insurance practices, which generally allow home owners to insure up to 100 percent of the value of their property. In the event of a fire, owners are reimbursed for the full value of their loss, which may have the unintended affect of making people less concerned about taking precautions to minimize the risk of fire. Insurance industry practices can also importantly affect* ***arson*** *rates, a subject not reviewed here.*

In contrast to the U.S., many countries view fire as a preventable and shameful occurrence. In many of the United States' peer countries, families who have careless fires are ostracized, and parents are expected to make sure that their children are well aware of fire hazards. People who have fires in their homes or businesses are looked at with raised eyebrows – the implied question is whether they are reliable people. In some nations, those responsible for starting fires can receive criminal sanctions, and in others insurance practices only allow residents to recoup a portion of their property losses. In Japan, the cultural rejection of fire as an accident is a function of the susceptibility to fire of their many tightly packed wood and paper structures."

The value system that the United States has towards fire can be seen in this quote from the USFS Report

entitled **America Burning - Revisted** "Examples of views and attitudes that people have which contribute to our relatively poor fire safety record (especially compared with other industrialized nations) include:

- *"It Can't Happen to Me"*
- *"Odds Are That it Won't Happen to Me"*
- *"the Insurance Company Will Take Care of Me"*
- *"It Is Not a Disgrace to Have a Fire"*
- *"I Can Set Fires for Revenge"*
- *"People Come out Better after a Fire"*
- *"I Will Help Those Unfortunate People Who Had a Fire"*
- *"They're Just Children Playing, They Didn't Know Any Better"*

The consensus of the task force was that a high level of fire safety will not be achieved until these views and attitudes are changed."

With this in mind, here are some social and economic issues in the United States that have an impact on fire safety. Virtually every study of socioeconomic characteristics has shown that lower levels of income are either directly or indirectly tied to an increased risk of fire.

In order to see the impact we must look at three areas

- the Level of the **Neighborhood**
- the Level of the **Household,** Including Housing Unit Characteristics and Characteristics of the Household Members Themselves
- the Level of the **Individual**

Level of the Neighborhood

- Vacant & Abandoned Buildings
  - Represent a more severe fire hazard than occupied buildings
  - Occupancy by homeless persons during winter months may cause fires form use of illegal heating devices
  - **Careless Smoking** due to use of alcohol
- Neighborhood Decline
  - Vacant building may discourage potential investors form investing in the neighborhoods.
  - Lack of maintenance of both occupied and unoccupied buildings increases the fire risk.
  - **Arson** may increase due to owners trying to "sell" back their property to the insurance company to get out of the area.
  - **Arson** seems to increase in areas where the economic depression is more common. In studies done the number of **arson** fires is over 14 times greater than in poorer areas as compared to areas with a higher median income. In these same areas we also tend to find a higher crime rate. This impacts fire safety in that people will tend to barricade themselves in their homes to be protected from crime, but this also limits their escape from a structure if a fire occurs

Level of the Household

- Housing Quality
  - Lower income people tend to live in older and in many cases run down buildings.
  - In these older buildings you will find older heating, plumbing and electrical systems that

may not be able safely work

- Older wiring was not designed to carry the electrical loads placed upon it by modern appliances, such as microwave ovens, televisions, stereo equipment, etc., and excessive loads may lead to electrical fires.
- fire risk increases for households that try to compensate for a building's inadequate heating system using stop-gap measures such as space heaters. Space heaters and other types of alternate heating devices can increase fire risk in many ways: if they are older and have not been adequately maintained; if they are used incorrectly, too close to combustibles, or with inadequate ventilation; or if they are used in a household with children, especially very young children, who may interfere with the safe use of a space heater or other alternate heating device.
- The quality of the furnishings also has an impact. If the occupants don't have the ability to buy newer furniture they will then have to do with older ones. This increases the fire risk, since the older furnishings were not built to the newer fire safety standards.
- Smoke detectors use and operability are directly impacted by the economic well-being of the occupant. If a person can't afford some of the basic necessities of life they won't be able to afford adequate fire safety devices and it is very likely that the units won't be maintained.

- Housing Affordability
  - Housing affordability is another factor that affects a household's fire risk. Households are "**shelter poor**" if they are able to make their rent payments, but do not have enough left over to cover other basic needs, such as adequate food, clothing, and other household necessities. It is this factor that impacts fire safety. If the person can't afford to maintain the housing system [heat, plumbing, electrical, etc.] they most likely won't be able to afford to purchase fire safety devices.
  - Shelter poverty can affect a household's fire risk in several ways. Most importantly, the lack of truly "**disposable income**" means that households are unlikely to invest in fire protection devices, such as smoke detectors or batteries for existing smoke detectors. This is referred to as the "positive income elasticity of demand for fire safety": the higher a household's income, the more it is willing to spend money on fire safety. Shelter poverty can also effect a household's fire risk if it cannot afford to make utility payments. If one or more of a household's utilities are shut off, the household is likely to compensate with other, less fire-safe devices. For example if a household heats with gas and the gas is shut off, the household may turn to electrical space heaters or other methods to keep warm. Compared to central heating, these heating methods pose a much higher fire risk.
- Household Structure
  - The household characteristics most often included in studies of increased fire risk are the presence of single parent households (usually headed by females), the presence of children, the presence of elderly persons, and household crowding. The relevance of single parent households for increased fire risk is tied to the presence of children in the home, so these two topics are addressed together.
  - Single Parent Households - These are usually less affluent [less disposable money] since there is usually only a single income that is coming in. These households usually are less equipped to deal with household and child care contingencies. It is more common that children are left unattended. [previously it was shown that children playing with fire is a

common cause of fire loss]. When this happens a child's curiosity about fire and a propensity to play with matches increase the risk of fire. And if there are no operational smoke detectors in the dwelling the risk is even greater.

- Fire Risks to Elderly Persons - These persons in many cases may live alone, live on a limited income [shelter poor, lack of disposable income], and may be on medication that could limit or prevent them from escaping from a fire situation. Be cause of their advanced age their mental capabilities diminish which can lead to potential fire problems involving cooking and smoking.
- Overcrowded Households - This is usually considered when there is more than one person per room per dwelling unit. This seems to be more of a problem in lower income areas It is suggested that the more people there are in a household the greater the wear and tear on a dwelling unit's mechanical systems, and this may increase the risk of fire. One way low income families deal with the lack of affordable housing is by doubling up in homes with extended family members or friends. By increasing the number of people in a given household, the number of potential victims of a fire also rises. Also, the more people there are in a household, the more difficult if can be to get everyone out of a burning unit. This is especially true for households with very young or very old household members who may be unable to escape flames or smoke on their own. In addition, households without operational smoke detectors have less time to escape a fire, and their ability to access all areas in the home to alert or retrieve other household members is diminished.

Level of the Individual

- **Careless Smoking** and Alcohol and Drug Abuse - Alchol is believed to be involved in 40% of all residential fire deaths. **Careless smoking** is considered a leading cause of fire deaths and injuries in the United States. Studies have shown that cigarette smoking is inversely related to income, so low income households are arguably at greater risk from fires caused by **careless smoking**. The rate of **careless smoking** fires for the group with the lowest median income was 8.5 times as high as the rate for the group with the highest median income. Intoxicated persons are at greater risk of falling asleep while smoking, and improperly discarded or dropped cigarettes are a dangerous ignition source. The proximity of the sleeping person to the origin of the fire illustrates why these fires tend to be so deadly, particularly if the victim is too inebriated to recognize the danger or successfully escape.
- Lower Levels of Education - It is suggested that those with lower levels of education are less likely to understand the importance of fire safety messages, understand the warning labels and instructions that come with cooking and heating devices. It has be shown that those with lower levels of education are also more likely yo have lower incomes.
- Housing Tenure and Fire Risk - Several studies have found that lower rates of owner-occupation, which are more typical in low income communities, are related to increased fire rates. Owning a home makes people have a tendency to better maintain their homes, thereby reducing the likelihood of mechanically-caused fires, and they may be more careful in their everyday routines, reducing the likelihood of cooking, **careless smoking**, or other types of fires that result from human carelessness. Owner-occupiers may also have more of a vested interest in purchasing and maintaining fire protection devices such as smoke detectors as a means of protecting their equity investments.
- Social Pathology and Fire Risk - It is suggested that higher rates of incendiary and suspicious

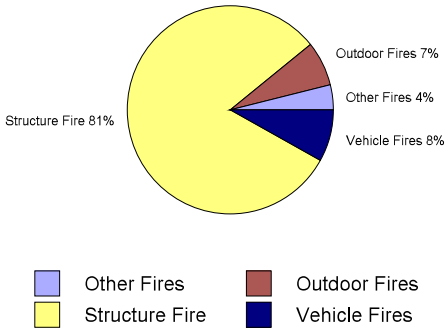
fires may be manifestations of the complex and often overwhelming problems people are more likely to experience in these neighborhoods. It is also suggested that the stresses of living in disadvantaged communities may lead to higher rates of child playing fires and fires set by juveniles. These areas are all in need of further study.

The Urban and Rural Fire Problem

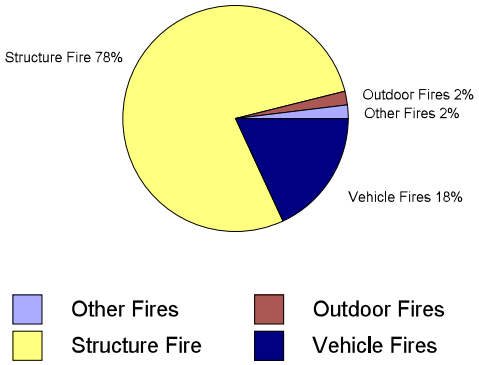
Urban Fires

- 42% of fires were outdoor fires
- The leading cause of outdoor fires in urban areas was incendiary or suspicious origin.
- Structure fires accounted for the vast majority of fire deaths, fire injuries, and property loss associated with urban fires.
  - **Non-residential Structures***:* Fires of incendiary or suspicious origin predominated among non-residential structure fires, accounting for 30 percent of fires.
  - **Residential Structures***:* Cooking fires accounted for over one-quarter of all home fires. Incendiary and suspicious origin ranked second, followed by heating and electrical distribution.
- Smoking was the leading cause of fatal home fires in every region except the West, where fires of incendiary or suspicious origin ranked first.
- A higher proportion of residential structure fires occurred in apartments in urban areas compared to the U.S. as a whole. This is likely due to the fact that more of the urban housing stock is comprised of multifamily housing.
- A majority (54 percent) of urban home fires occurred where no working smoke detectors were present. Similarly, 69 percent of fires with one or more fatalities occurred in homes not protected by operating detectors. These rates are similar to, though slightly lower than, rates for the U.S. as a whole.

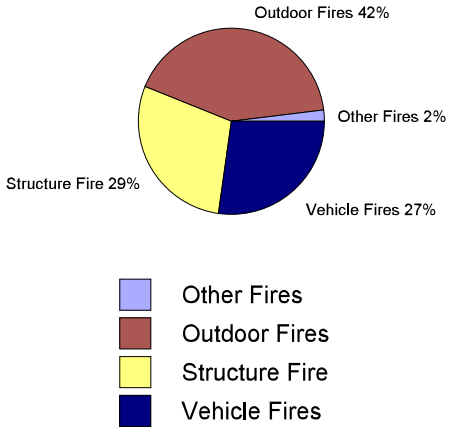
Urban Fires Injuries



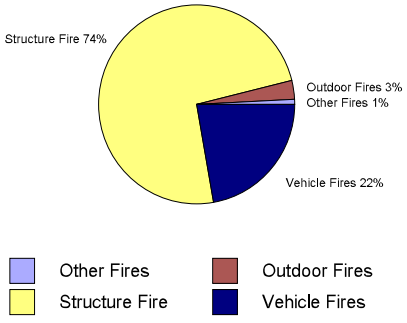
Urban Fires Deaths



Urban Fires



Urban Fires Estimated Dollar Loss



Rural Fires

- The U.S. Census defines the rural population as those living in areas not categorized as urban. The urban population is those people living in an “urbanized area”, or outside of an urbanized area in "places" with more than 2,500 residents; the rural population is then composed of those living outside of these areas.
- Fires
  - Fires occur in the same types of locations in rural areas as in non-rural areas.
  - Heating is the leading cause of residential structure fires in rural areas and causes 34 percent of rural residential fires.
  - The leading cause of fatal fires in rural areas is heating [25%], **careless smoking** [21%], and electrical distribution [17%]
  - The lack of maintenance of heating devices is a serious cause of residential **heating fires** in rural areas.
  - Stationary heating units are the leading type of equipment involved in ignition of rural residential **heating fires**.
  - Because of the prevalence of **heating fires**, the most common area of fire origin in rural fires is chimneys. The next most common areas are cooking areas and lounge areas.
  - The lack of working smoke detectors is a significant problem in rural areas. Smoke detectors were present and operational in only 27 percent of rural residential fires.
- Fire Deaths
  - Fire death rates are significantly higher (35 percent higher) in rural areas compared to non-rural areas. These differences are even greater when comparing fire death rates across race and ethnicity groups.
  - Within rural areas, the majority of annual fire death victims are White. In per capita terms, however, African Americans and Native Americans have higher risks of dying as a result of fires than do Whites.
  - While the death rate is higher in rural areas and for certain subgroups of the population, the distributions of fire deaths by age, race, and gender are similar in “rural” and “non-rural” areas.
  - More males died in fire than females, thus keeping with national averages.
  - The younger population has higher death rates than older in rural areas.

RECOMMENDED REFERENCES

- Fire Death Rate Trends: An International Perspective, 1997, USFA
- International Concepts in Fire Protection: Ideas From Europe That Could Improve U. S. Fire Safety, Schaemann, 1982, TriData
- International Concepts in Fire Protection: New Ideas From Europe, Schaemann, 1983, TriData
- Socioeconomic Factors and the Incidence of Fire, 1997, USFA
- Fire In The United States, 10th to 14th ed., 1997 - 2004, USFA, by Tridata Corp
- Profile of the Urban Fire Problem in the United States, 1999, USFA
- The Rural Fire Problem in the United States, 1998, USFA
- Establishing a Relationship Between Alcohol and Casualties of Fire, 1998, USFA
- America Burning, 1973, USFA
- America at Risk, 2000, USFA