SECTION 3 - FIRE PREVENTION
UNIT 1 - FIRE PREVENTION & PUBLIC EDUCATION

UNIT GOAL
To introduce the student to the concepts of preventing fire and initiatives to better educate the public to the dangers of fire and methods to limit or eliminate these dangers

UNIT OBJECTIVES
The Student by the End of the Semester Shall:
- Identify the three parts of the Fire Prevention Triangle
- Define the objectives of a fire prevention program
- Identify at least two essential parts of a fire prevention program
- Identify at least two fire prevention educational programs and their organizations

KEY TERMS
Operation EDITH
Lean Not To Burn
Fire Prevention Triangle
Public Fire Education
Engineering
Education
Enforcement

INTRODUCTION
Whether the fire is large or small it is possible for it to interrupt the operation of the business or industry that it occurs in. A fire can have an impact on not only the company itself in direct fire loss or interruption, but also on the surrounding community though indirect fire loss. A large scale fire can have an economical impact on the community by the very cost of extinguishing it. This can include use of manpower (overtime pay), materials expended (foam, other extinguishing agents), repairs to equipment damaged, and to medical costs for any possible injuries to emergency service personnel involved in the incident. Other impacts are to the tax base of the community. A fire can cause the loss of a ratable which can directly affect the taxes paid out by all other members of the community. The loss of employment either temporary or permanent to members of the community which can also have indirect effects on the local economy. A sound fire prevention program can protect the company and the surrounding community from many of the difficulties that arise from a commercial or industrial fire.

FIRE PREVENTION TRIANGLE
In fire prevention there are three areas to consider: engineering, education, and enforcement. For fire prevention to work effectively all three must be present. Each one is important in its own right. Education is the primary way to gain compliance with fire prevention. The more a person is educated to the hazards and the possible outcomes regarding fire, the more they will take steps to created a fire safe environment in the home, school and the workplace. Engineering is necessary to make sure that the

structure is properly designed against a fire threat and that it and it's occupants are properly protected through suppression and detection systems from the hazards of fire. Enforcement is needed to make sure that the buildings are constructed to a given standard and once built, that they are maintained to those same standards.

The order of importance in gaining fire safety is:

- Education
- Engineering
- Enforcement

ENGINEERING

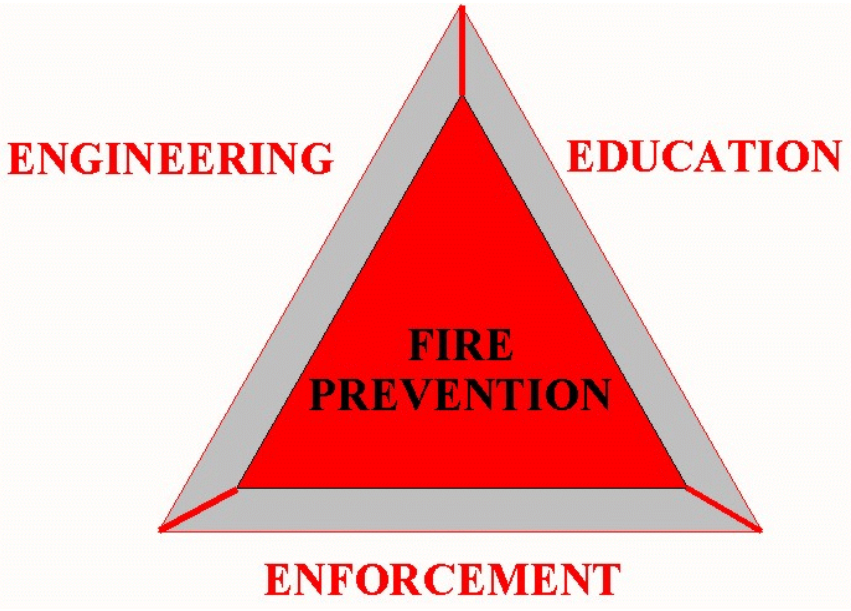
- Compartmentation
- Suppression systems
- Detection systems

EDUCATION

- Learn Not To Burn
- Operation EDITH
- Smokey The Bear

ENFORCEMENT

- Building Codes
- Fire Codes



FIRE PREVENTION TRIANGLE

UNITED STATES FIRE LOSS FOR 1996

FIRES

- PUBLIC FIRE DEPARTMENTS RESPONDED TO 1,975,000 FIRES
- 578,500 STRUCTURE FIRES
- *428,000 RESIDENTIAL FIRES (76% [80%] OF STRUCTURE FIRE)*
- 413,500 VEHICLE FIRES
- FIRES IN OUTSIDE PROPERTIES WERE 983,000
- SOUTH's FIRE INCIDENT RATE WAS 9.0 PER 1,000 POPULATION
- NORTHEAST's FIRE INCIDENT RATE WAS 7.0 PER 1,000 POPULATION

CIVILIAN DEATHS

- 4,990 FIRE DEATHS IN U. S.
- 4,035 FIRE DEATHS IN THE HOME
- *81% OF ALL FIRE DEATHS OCCURRED IN THE HOME*
- SOUTH HAD FIRE DEATH RATE OF 26.1 CIVILIAN DEATHS PER MILLION POPULATION
- NORTHEAST HAS FIRE DEATH RATE OF 15.1 CIVILIAN DEATHS PER MILLION POPULATION
- **A FIRE DEATH OCCURS EVERY 105 MINUTES IN U. S.**

CIVILIAN INJURIES

- 25,550 FIRE INJURIES IN U. S.
- *RESIDENTIAL PROPERTY ACCOUNTED FOR 19,300 FIRE INJURIES IN U.S. [76%]*
- NORTHEAST HAD HIGHEST RATE WITH 121.5 CIVILIAN FIRE INJURIES PER MILLION POPULATION
- **A CIVILIAN FIRE INJURY OCCURS EVERY 21 MINUTES IN U. S.**

PROPERTY DAMAGE

- *PROPERTY DAMAGE IS ESTIMATED AT $9.406 BILLION*
- STRUCTURE FIRES WERE 84% OF ALL PROPERTIES OR $7.933 BILLION
- *63% OF ALL STRUCTURE PROPERTY LOSS WAS IN RESIDENTIAL PROPERTIES OR $4.962 BILLION*
- SOUTH HAD THE HIGHEST LOSS OF $38.6 PER PERSON

INCENDIARY AND SUSPICIOUS FIRES

- *15% OR 85,500 STRUCTURES FIRES WERE DELIBERATELY SET*
- *INCENDIARY OR SUSPICIOUS FIRE CAUSED 520 CIVILIAN DEATHS [11%]*
- *PROPERTY LOSS WAS $1.405 BILLION*

LARGE LOSS FIRE DEFINITION:

A LARGE LOSS FIRE IS ANY FIRE WITH A DIRECT PROPERTY LOSS OF $5 MILLION OF HIGHER.

- 54 LARGE LOSS FIRES IN U. S. CAUSED $834,951,000
- ACCOUNT FOR 10.2% OF THE TOTAL DOLLAR LOSS
- 24 FIRE HAD A LOSS OF $10 MILLION OR MORE

THE 9 LARGEST FIRE LOSSES IN U. S. HISTORY IN 1994 DOLLARS	
FIRE	**ADJUSTED LOSSES**
SAN FRANCISCO EARTHQUAKE AND FIRE, APRIL 18, 1906 (LOSS IN YEAR OF OCCURRENCE - $350 MILLION)	$5,748,000,000.00
GREAT CHICAGO FIRE, OCTOBER 8, 1871 (LOSS IN YEAR OF OCCURRENCE - $168 MILLION)	$2,069,000,000.00
OAKLAND FIRESTORM, OCTOBER 20, 1991 (LOSS IN YEAR OF OCCURRENCE - $1,500 MILLION	$1,631,000,000.00
GREAT BOSTON FIRE, NOVEMBER 9, 1872 (LOSS IN YEAR OF OCCURRENCE - $75 MILLION)	$924,000,000.00
POLYOEFIN PLANT, PASADENA, CA., OCTOBER 23, 1989 (LOSS IN YEAR OF OCCURRENCE - $750 MILLION)	$897,000,000.00
BALTIMORE CONFLAGRATION, FEBRUARY 7, 1904 (LOSS IN YEAR OF OCCURRENCE - $50 MILLION)	$821,000,000.00
LOS ANGLES CIVIL DISTURBANCE, APRIL 29 to MAY 1, 1992 (LOSS IN YEAR OF OCCURRENCE - $567 MILLION)	$599,000,000.00
S.S. NORMANDIE, FEBRUARY 9, 1942 (LOSS IN YEAR OF OCCURRENCE - $53 MILLION)	$482,000,000.00
S. S. GRANDCAMP AND MONSANTO CHEMICAL COMPANY PLANT, TEXAS CITY, TX., APRIL 16, 1947 (LOSS IN YEAR OF OCCURRENCE - $67 MILLION)	$445,000,000.00

OBJECTIVES OF A FIRE PREVENTION PROGRAM

The primary goal of the program is to reduce or eliminate fire in the workplace by increasing the awareness of fire safety among the employees. It is usually the responsibility of one person in the organization to oversee the fire prevention activities, but a fire prevention program should work towards having all employees provided with the information to be able to recognize hazardous conditions and take the appropriate actions to mitigate the conditions before a fire occurs.

Role of the Facility Firesafety Officer

It is important that any manufacturing or industrial facility have a firesafety officer to oversee the fire prevention program. In larger facilities the firesafety officer may be in charge of a firesafety committee that is made up of members from the different divisions. Some of the area that the firesafety officer should be in charge of are the following.

- Coordinating code compliance with the local fire department.
- Establishing and practicing evacuation plans.
- The proper handling and storage of flammable liquids and other materials.
- Ensuring the proper installation and operation of detection and suppression systems.
- The firesafety officer may also be in charge of the plant fire brigade.

The plant firesafety officer must a broad background of the inherent fire hazards of the industry that he

works for. Some of the items that he should have a background in are the following.

- Fire and explosion hazards of specific manufacturing processes.
- The behavior of the employees who work in the facility and what possible fire hazards they could create.
- What period of the day, week or month are more susceptible to fire (shipments f hazardous material, times when large amounts of combustible stock is stored in warehouse).
- Keep abreast of current fire prevention programs by working with the local fire department.

The firesafety officer should invite the local fire department to visit the facility so they can "pre-plan" for a possible fire.

Once a firesafety program has been adopted, it must be monitored to be sure it works and adjusted as necessary. Part of this program is to conduct regular inspections of the facility on a regular basis. Some of the areas to consider during the inspection are the following.

- Smoking habits of employees.
- Electrical equipment, wiring and controls.
- Fire alarm systems.
- Fire extinguishing equipment.
- integrity of plant construction.
- HVAC systems.
- Storage of combustible materials.
- Housekeeping practices.
- Use and storage of flammable and combustible liquids and gases.
- Security.
- Industrial processes.
- Removable of industrial waste.

It is also important that the firesafety officer keep adequate records of inspections, deficiencies, and their corrections.

ESSENTIALS OF A FIRESAFETY TRAINING PROGRAM

The firesafety officer should try to develop an attitude of safety among the employees. This is sometimes easier said than done. The goal is to have the employees buy into the concept of fire prevention and firesafety. This can be done by developing a training program for the facility and recognizing the efforts of the employees.

In developing this program it must be remembered that the major cause of fires in any facility is mankind. This is either through deliberate setting or through ignorance or negligence. Employees must be made aware that a fire in the workplace can not only cause them physical harm, but may mean a loss of income until repairs are made. The best way to approach the training program is not to tell the employee of a threat to his or her security but to convince them that fire safety commitment will enhance their workplace environment. A successful training program can be seen in a reduction of violations found in the fire inspection reports.

A firesafety training program is important for all employees, this includes industrial workers and the office and administrative staff. Some elements that all employees should understand are the following items

- Location and proper use of fire extinguishers.
- How to activate the facility fire alarm.
- Familiarity with the facility evacuation plan.

Some elements that are important to the administrative and office employees are the following.
- Use and disposal of smoking materials.
- Checking for frayed electrical cords and faulty appliances.
- Proper use of electrical equipments and appliances.
- Unplugging coffee pots and other heat-producing equipment when not in use.
- Proper storage of flammable and combustible materials.

Some of the elements that are important to operators of mechanical equipment are the following.
- Variation in operating pressure and temperature of equipment from levels recommended by the manufacturer.
- Potential sources of ignition form cutting, welding, faulty wiring, friction due to belts operating at wrong tension, poorly lubricated bearings, and mechanical sparks caused by fault or poorly maintained machinery.
- Corrosion of motor parts or buildup of dust or lint around machinery.

Any of these problems that are encountered by employees should be reported to their supervisors for correction.

Another area where all employees should be trained to be aware of potential fire hazards is general housekeeping. Some elements that all employees should be aware of are.
- Trash and other waste should be stored in covered metal containers.
- Work areas should be kept clean and free of flammable debris.
- Hazardous materials should only be stored in designated locations and in properly capped and ventilated containers.
- Gas cylinder valves should be closed and cylinders secured when not in use.
- Trash should be prevented from collecting in corners, under machinery, in stairwells, and in other out-of-the-way locations.

One more area to consider in a firesafety training program is to discuss substance abuse with employees. Substance abuse can cause careless attitudes in employees that can lead to possible fires being started.

PUBLIC FIRE EDUCATION

As can be seen the need for public fire education is paramount. Nearly 80% of our fire loss in structures is in the home. It is this area that is the most difficult to regulate because of our constitutional rights. We can provide some protection by the way houses are designed and the requirements for product of combustion detectors. If we are going to make an impact on the fire loss problem in homes it must be through education and some engineering, not enforcement.

Fire safety education is something that must be accomplished in the schools, workplace, and especially, the home. Some of the more popular programs and methods that are out there are the following.
- Learn Not To Burn®
  - Designed by the NFPA
  - Used in Elementary and secondary schools [some states have adopted it under the

standard schools curriculum.
    - Teaches children basic fire safety skills that can be used in the home, on vacation, and at school
- Operation E.D.I.T.H. [Exit Drill In The Home]
    - Provides a means where the family develops an escape plane of the home.
    - Includes the following
        - Setting up primary and secondary escape routes
        - Checking for fire extension before entering a hallway
        - Calling the fire department
        - Establishing a meeting place for all members of the family
        - Making sure everyone is out of the house
        - Making sure that no one reenters the house after they have left
- Smokey The Bear
    - Developed by the U. S. Department of the Interior
    - Designed to educate the people about the dangers of forest fires and the potential ways that they can be started
- Smoke Detector Programs
    - Through public and private grants and donations many fire department have been able to provide smoke detectors to people who would not normally be able to afford them
    - One part of the part programs reinforces the need to change the batteries in the smoke detector on a regular schedule. One successful slogan has been the "change the batteries when you change your clocks" during the fall and spring.
- Fire Prevention Week
    - Began in 1922, it is used to commemorate the Great Chicago Fire of 1871, on October 8th. Fire Prevention Week is always the week when the 8th occurs.
    - Fire departments and other organizations put on educational programs, conduct tours, help schools conduct evacuation drills, and other fire safety events.