Firefighter Safety

3

Section I - Firefighting Fundamentals

Accident & Injury Prevention

Regulatory Agencies

Non-Regulatory Agencies

Firefighting Hazards & Safety

General Health & Safety

Personal Protective Equipment

Revised - December 2018

IntentionallyLeft Blank

Chapter 3 Table of Contents

Objectives

- Define an accident and explain steps for prevention
- Explain the concept of Risk Managment and Risk Assessment
- Explain how OSHA and Cal-OSHA regulate firefighter safety
- Describe the role of the safety officer and the SDFD Safety Policy
- Explain the role of non-regulatory agencies such as NFPA and their roles in developing safety standards
- Identify the hazards associated with firefighting activities
- Define an IDLH atmosphere
- Describe Accountability and RIC functions
- Describe safe and healthy practices while training and at the fire station
- Explain the need for PPE and how to use, maintain, and clean garments
- Describe how to report and document an accident, injury or communicable disease

Introduction

Firefighting has, and always will be, a dangerous occupation. Although significant progress has been made to improve safety for firefighters during the last one hundred years, firefighting in the 21st century has become more complex and dangerous in many regards. Lightweight building construction, plastic and synthetic materials, and the use of new chemicals that are now common in our daily lives, are just a few of the new hazards in which firefighters are now confronted with.

The San Diego Fire-Rescue Department is an "all risk" department. In addition to all fire related incidents, we regularly respond to medical aids, traffic accidents, electrical hazards, hazardous material incidents and other miscellaneous rescues. These incidents place firefighters at risk of being burned, exposed to disease, pathogens and chemicals, as well as electrocution and potential for entrapment, Figure 3-1. It is only through the diligence of hazard identification, risk assessment and management, and safe practices that firefighters can function in these types of environments and still have long, healthy careers.

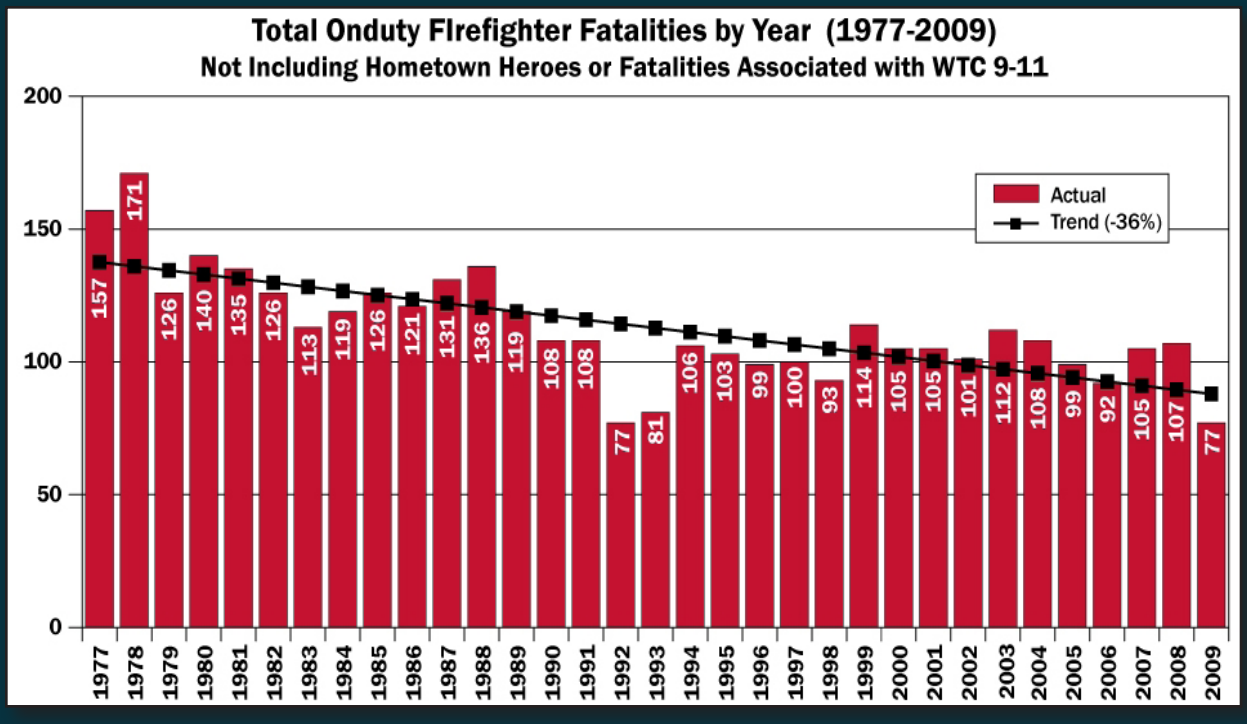
Figure 3-1 Firefighting Hazards

The ultimate goal of firefighter safety is to return home after the end of every shift and to end our careers as healthy as possible. Not only is it incumbent on each firefighter to stay vigilant for their own safety, it is of equal importance to provide safety for our fellow firefighters and the public to which we serve.

In order for this to occur, strict adherence to the principles set forth in this chapter as well as adherence to the department's Standard Operating Guidlines and Policies must be enforced by each member of the organization. Firefigher safety is not simply following a set of rules, it is a combination of safe thoughts, actions and attitudes.

This attitude towards safety of ones self and those around you must be advocated from the top down to ensure our own success and well being.

This chapter is dedicated to providing you with the knowledge and foundation to begin building your career as a safety oriented firefigher. The following



U.S. Fire Administration's 2009 Annual Report - Overview of Findings

90 firefighters died while on duty in 2009.

The firefighter fatalities comprised of 47 volunteer, 36 career and 7 wildland agency firefighters.

There were 6 firefighter fatality incidents where 2 or more firefighters were killed, claiming a total of 13 firefighters.

16 firefighters died performing duties associated with wildland fires, compared to 26 such fatalities in 2008.

Activities related to emergency incidents resulted in the deaths of 57 firefighters.

30 firefighters died while engaging in activities at the scene of a fire.

15 firefighters died while responding to or returning from 13 emergency incidents in 2009. This compares to 24 responding/returning fatalities in 2008.

10 firefighters died while they were engaged in training activities.

14 firefighters died after the conclusion of their on-duty activity.

Heart attacks were the most frequent cause of death with 39 firefighter deaths.

section details the laws, rules, regulations and agencies governing firefighter safety. It discusses the required Personal Protective Equipment (PPE) with guidelines for operating at various types of incidents, accident prevention and the documentation of accidents.

Accident & Injury Prevention

Accident

An unplanned or unsought event, or series of events resulting in death, injury, occupational illness, or damage to, or loss of equipment or property

An accident can be defined as an unplanned or unsought event, or series of events, resulting in death, injury, occupational illness, or damage to, or loss of, equipment or property. Accident prevention is a program directed toward the elimination of unsafe acts, unsafe equipment, or hazardous environments.

The key principle in accident prevention is controlling the relationship between man, machine, and media (environment). Safety authorities believe these are the three basic accident-causing agents, referred to as the "three M's." All three agents have one element in common, human beings. People cause the majority of accidents either by committing unsafe acts or by having knowledge of an unsafe condition and allowing it to go uncorrected. Machines and media can be controlled by engineering specifications, Standard Operating Procedures, and training, however, the human element is more difficult to control. Personal attitudes impact safety more than anything else. Attitudes can be defined as strong beliefs, opinions, and habitual ways of doing things. Misaligned attitudes towards safety can perpetuate the occurrence of accidents. A major responsibility of any safety program is to help people recognize, remember, and make allowances for their limitations of perception and reaction. People misjudging their capabilities and corresponding limitations cause accidents.

Before an accident occurs, there are hidden causes. Hazards don't just happen, they are caused by unsafe attitudes, unsafe behaviors and unsafe conditions:

- Unsafe attitudes: These are the seeds of an accident about to happen. They are thoughts and feelings of impatience, boredom, overconfidence, or recklessness. These attitudes are in control when you are distracted, rushed or inattentive.
- Unsafe behaviors: These are the driving forces of accidents. Unsafe behaviors are in control when you take unnecessary risks, do not use PPE, or use tools improperly.
- Unsafe conditions: These are accidents waiting to happen. Unsafe conditions are in control when you don't prevent, remove or report safety hazards.

The key to an effective safety program starts with the first line supervisor or company officer. The first level of supervision must train their personnel in the recognition of hazards, the potential injuries that can be received and methods by which to avoid those hazards. The first line supervisor sets the example. A proven concept of instruction is the ability of people to learn and retain more by what they see rather than by what they are told.

Remember, safe conditions can be created by using safe procedures. Identifying, removing and reporting hazards, as well as utilizing proper PPE and safety equipment will greatly reduce the chance for an accident or injury.

Hazard Analysis

A hazard is defined as an accident-causing opportunity or source of danger. Hazard analysis is a method of analyzing and identifying control measures to reduce or eliminate risk of operation. Hazard controls designed to eliminate or reduce the hazard can then be implemented. Hazard controls can be accomplished either by an administrative or engineering process. Administrative controls are established by management through developing and implementing policy. Engineering controls include isolation of hazards, procedural changes, specification changes, or warning equipment.

Hazard

An accident-causing opportunity or source of danger.

Reporting Hazards

All personnel have a responsibility to maintain a safe work area. This is accomplished by conducting inspections and reporting and/or eliminating hazards. Hazards can be reported verbally to your first-line supervisor or by using form FD 2223, Report of Unsafe Conditions, Hazards or Near Misses. Other methods to report hazards include the SDFD Occupational Safety and Health Committee, SDFD Safety Officer, or Risk Management Safety Division.

Risk Assessment & Management

The key to eliminating accidents is to identify hazards and risks before they can cause an injury. There is significant risk involved in fire fighting and emergency operations; firefighters are typically injured at a rate of four times that of private industry personnel.

Risk is defined as the measure of the probability that a hazard will result in an accident with definable consequences. Risk Management compares the potential for the accident to occur with the severity of injuries that could be received by such an accident (Risk vs. Gain). The degree of risk varies, depending on whether the operation is intended to save a life or to contain a fire. The degree of risk taken to save a life should not be the same degree of risk taken to confine a fire, Figure 3-2.

Figure 3-2 Risk vs Gain, is saving a bush worth your life?

When performing emergency operations, risk management shall be utilized based on the following principles:

- Activities that pose a significant risk to firefighters shall only be taken when there is potential to save lives. The protection of life is the highest priority of all firefighters.
- Inherent risks are risks that are typically encountered during our daily duties as a firefighter such as fire fighting, emergency medical care, training,

Risk

The measure of the probability that a hazard will result in an accident with definable consequences.

and emergency response driving. Action shall be taken to reduce or avoid risks associated with these activities.

- No risk is acceptable when there is no possibility to save lives or property.

Risk assessment is an extremely effective tool that can be used by all personnel to reduce accidents and injuries. Risk assessment is simply evaluating the hazards of a task compared to the potential benefits derived from the task.

As an example, the risk of attempting a rescue in a fully involved structure fire is much greater than the benefit received. The chances of a victim surviving in an atmosphere of extreme heat are minimal so the risk does not equal the gain. However, there is greater benefit in performing a rescue of a trapped victim inside a structure fire where only one room is involved with fire and the rest of the structure is filled with toxic smoke.

A risk assessment should be done on every incident you are involved. By following the criteria below, you can quickly determine your general course of action in regard to your personal safety.

- Significant Risk: We may risk our lives a lot within a structured plan to protect savable lives

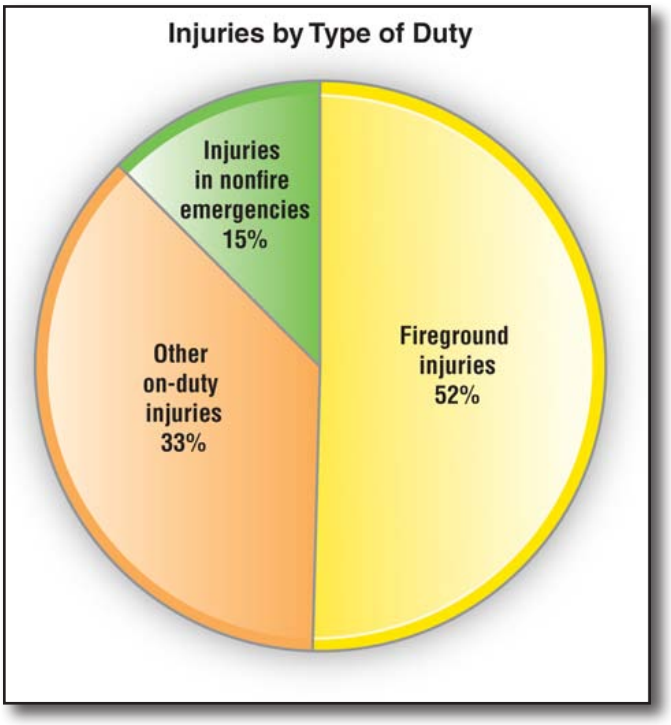


Figure 3-3 FF Injuries by Type of Duty

- Inherent Risk: We may risk our lives a little within a structured plan to protect savable property
- No Risk: We will not risk our lives at all to save a life or property that is already lost

Risk can be controlled through the implementation of safety policies, standard operating procedures, hazard analysis and continuous training. Each emergency incident is unique in its own right. No training manual or policy can cover all situations that you will encounter during your career as a firefighter. You must always perform a Risk vs. Gain Assessment prior to taking any action relying on your training, experience, department policies and instinct as a guide.

Regulatory Agencies

A regulatory agency is a public authority or government agency responsible for exercising autonomous authority over an area of human activity in a regulatory or supervisory capacity.

Regulatory agencies deal in the area of administrative law, enforcing rules and regulations and imposing supervision or oversight for the benefit of the public at large. The existence of regulatory agencies is justified by the complexity of certain regulatory and supervisory tasks that require expertise, the need for rapid implementation of public authority in certain sectors, and the drawbacks of political interference.

Regulatory agencies are part of the executive branch of the government, or they have statutory authority to perform their functions with oversight from the legislative branch such as Congress. Their actions are generally open to legal review. Regulatory authorities are commonly set up to enforce standards and safety, or to oversee use of public goods and regulate commerce.

Regulatory agencies are important to firefighters because they are the backbone and foundation for our policies and procedures that we are required by law to adhere to.

OSHA

In 1970 Congress passed the Williams-Steiger Act which created the Federal Occupational Safety and Health Administration. This act was passed to assure "so far as possible every working man and woman in the nation safe and healthy work conditions and to preserve our human resources." Prior to the enactment of Williams-Steiger, 80% of industrial accidents and occupational illnesses were the result of unsafe working conditions. Historically, the enactment of safety and health laws was the responsibility of the individual state. Issues like workers' compensation were subject to broad interpretation and in some states the concept was non-existent.

OSHA is the law nationwide and brings together, under one set of safety and health standards, 5 million businesses and 60 million workers. States are required to follow Fed-OSHA regulations unless they have a program that was "at least as effective as" Fed-OSHA. A state can implement safety and health regulations that can be more restrictive, but as a minimum must meet Fed-OSHA standards. California has in many cases served as the model for federal regulations.

CFR

Code of Federal Regulations

Cal-OSHA

In 1973 the Fenton Bill was passed in California. This act created the division of Industrial Safety, Cal-OSHA. Fed-OSHA requirements do not apply to local government employees. California has its own occupational safety and health program. As the nation transitioned from an industrial workforce to a more service-oriented workforce, the laws and regulations largely ignored unsafe conditions. In 1991, recognizing that the majority of injuries were caused by unsafe acts, the California Legislature passed the Green Bill (SB 198). This bill enhanced Labor Code Section 6400 which requires all employers to provide a safe and healthy work environment. SB 198 requires that every employer develop and implement an Injury and Illness Prevention Program. There are no Fed-OSHA regulations requiring implementation of this type of program on a national level.

Cal-OSHA is the governing agency for employer and employee safety regulations in the State of California. The Cal-OSHA program is responsible for enforcing California laws and regulations pertaining to workplace safety and health and for providing assistance to employers and workers with workplace safety and health issues. The California State Plan applies to all public and private sector places of employment in the state, with the exception of Federal employees, the United States Postal Service (USPS), private sector employers on Native American lands, maritime activities on the navigable waterways of the United States, private contractors working on land designated as exclusive Federal jurisdiction, and employers that require Federal security clearances.

The following are some of the more important and relevant California Code of Regulations which establish the required safety procedures for firefighters.

CCR

California Code of Regulations

CCR, Title 8, General Industry Safety Order, Section 3401 - 3410 Personal Protective Clothing and Equipment for Firefighters

Sections 3401 through 3410 establish minimum requirements for personal protective clothing and equipment for firefighters when exposed to structural and wildland fire fighting. These sections encompass and establish performance requirements for helmets, eye protection, personal alarm devices, protective clothing, foot protection, gloves, and self-contained breathing apparatus.

The general requirements are:

- Personal protective equipment and clothing must be provided to employees who are required to work in a hazardous environment which may be encountered during fire fighting operations.
- It is the employer's responsibility to provide, maintain, and ensure the proper use of all protective clothing and equipment required.

- Employees shall wear the appropriate protective equipment and clothing when directed to work in hazardous environments unless the officer in charge determines that protection is no longer required.
- Personal protective equipment and clothing that can no longer provide the required protection shall be removed from service.
- Firefighters engaged in emergency operations requiring special protective techniques and equipment shall be trained in those techniques and provided with the necessary protective equipment.
- The employer is required to develop a written plan covering the safe use, maintenance, and replacement of equipment as required in the General Industry Safety Order.
- Employers must ensure that new protective clothing and equipment purchases are accompanied by a statement of performance declaring the product meets the requirements of the Safety Order.

CCR, Title 8, General Industry Safety Order, Section 3203 Injury and Illness Prevention Program:

This program was established by the State of California to ensure employers provide a safe and healthy work environment. The regulation focuses on employee training and its importance in reducing accidents. Section 3203 requires each employer to:

- Establish and maintain an effective Illness and Injury Prevention Program.
- Provide as safe and healthy a work environment as possible for all employees.
- Reduce the human and financial losses resulting from accidents, injuries, and illnesses arising out of or occurring in the course of employment.
- Establish safety policies, committees and training which will contribute to the Injury and Illness Prevention Program.
- Investigate and evaluate hazards under the following situations:
    - Whenever new substances, processes, procedures or equipment is introduced into the workplace which represent a new safety and/or health hazard.
    - Whenever the employer is made aware of a new or previously unrecognized hazard.
- Include a procedure to investigate occupational injury or illness.
- Include methods and or procedures for correcting unsafe or unhealthy conditions and work practices based on the severity of the hazard.

- Provide training:
  - To all new employees.
  - To employees given new job assignments for which training has not been provided.
  - Whenever new substances, processes, procedures, or equipment are introduced into the workplace and represent a new safety and health hazard.
  - Whenever the employer is made aware of new or previously unrecognized hazards.
  - To supervisors to familiarize them with the safety and health hazards in which employees under their immediate supervision may be exposed.

The program requires that records be kept of all training and inspections for a period of three years. The City of San Diego has an Injury and Illness Prevention Program. Overall management of the program is the responsibility of the Department of Risk Management, Safety Division. Department Directors have the responsibility of implementing and maintaining an Injury and Illness Prevention Program within their respective departments.

CCR, Title 8, General Industry Safety Order, Section 5144 Respiratory Protective Equipment:

This section requires employers to provide written operating procedures governing the selection and use of respirators. This section also requires the surveillance of contaminants in the work area. It requires employees to be instructed and trained in the use, care, and limitations of respiratory protection equipment.

Where there are atmospheres that are immediately dangerous to life and health, at least two persons equipped with approved respiratory protective equipment are required to be on the scene. This section also requires an annual medical evaluation of personnel required to wear respiratory protective equipment.

CCR, Title 8, General Industry Safety Order, Section 5157 Confined Space:

This section details the requirements for practices and procedures to protect employees from the hazards of entry into confined spaces. A confined space is a space that meets one or more of the following criteria:

- Large enough and configured in such a way that an employee can bodily enter and perform assigned work.

- Has limited or restricted means for entry and exit.
- Is not designed for continuous occupancy.

CCR, Title 8, General Industry Safety Order, Section 5192 Hazardous Materials Response:

This section covers the safety, response, planning, and training requirements for a hazardous material incident. It also requires the presence of a Safety Officer at a hazardous material incident. It is the only regulation that stipulates, by title, the use of a Safety Officer.

CCR, Title 8, General Industry Safety Order, Section 5193 Bloodborne Pathogens, Interim Tuberculosis Enforcement Policy:

&

CCR, Title 8, General Industry Safety Order, Section 5197 Ryan White Comprehensive Aids Resources Emergency Act of 1990:

These standards establish the requirements for protection from airborne and bloodborne pathogens. Their purpose is to institute guidelines and procedures to minimize the risk of contracting and/or spreading infectious disease. San Diego Fire-Rescue Department has an established infection control policy for personnel to follow. The SDFD provides all members of the department with protective medical gloves, eye protection and respiratory protection. These items shall be utilized to minimize or prevent an exposure to blood or airborne pathogens.

Section 5193 and 5197 require the employer to :

- Provide all necessary personal protective equipment and clothing and control potential sources of infection.
- Provide an exposure management program for employees who have been exposed.
- Provide initial infectious control training to all newly-hired safety employees during the basic Fire Academy and refresher training to all safety employees and selected non-safety personnel on an annual basis.
- Identify a designated officer to serve as a contact point for assisting employees with exposures reporting and treatment procedures.
- Prohibit discrimination toward any employee because of their health status including infection and/or seroconversion with HIV or HBV.
- Protect the privacy rights of every employee by regarding all medical information as confidential.
- Provide voluntary tuberculosis testing and Hepatitis B vaccinations.

Investigation into the Death of a Firefighter

On April 23, 2005 at 10:00:23 PM, the Amarillo Fire Department received a report of a residential fire at 2600 South Polk Street. At 10:00:37 Amarillo Engine 1, Ladder 1, Unit 1 and Engine 5 were dispatched to the alarm.

Ladder 1 departed Fire Station 1 at 10:01:52 and turned left (north) on South Van Buren Street, following Engine 1 and Unit 1. Ladder 1 was driven by Dee LaGrone, with Lieutenant Ed Selman in the right front seat, firefighter Brian Hunton in the left rear facing crew seat and firefighter Michael Stennett in the right rear facing crew seat. As the apparatus approached the stop sign at the corner of South Van Buren Street and East 3rd Avenue, driver LaGrone slowed the apparatus to a crawl due to limited visibility and a dip in the roadway. As driver Lagrone turned right (east) onto East 3rd Avenue at a slow speed, he stated he looked in his mirror and saw the left rear door open and firefighter Hunton fall from the apparatus. Simultaneously, firefighter Stennett called out that firefighter Hunton had fallen out. Firefighter Stennett stated he saw firefighter Hunton land on the back of his head. Driver LaGrone immediately stopped the apparatus, set the parking brake, and did not move the vehicle prior to police arriving at the scene.

The crew of Ladder 1 dismounted and ran back to firefighter Hunton, who lay supine on the roadway in the intersection. Firefighter Hunton had sustained a severe head injury and had lost a large amount of blood.

Lieutenant Selman contacted his dispatcher by radio at 10:03 PM to report the incident and request police and ambulance. Engine 1 and Unit 1 heard Lieutenant Selman's radio call and returned to the incident scene to assist the crew of Ladder 1 in providing first aid to firefighter Hunton. Amarillo Emergency Medical Services was summoned and arrived at 10:09 PM. Firefighter Hunton was transported to Amarillo Medical Center where he was admitted in extremely critical condition and taken to emergency surgery.

SFMO Firefighter Fatality Investigation # 05-307-04 Page 4Firefighter Hunton's did not regain consciousness and his medical condition continued to deteriorate after the emergency surgery. Firefighter Hunton was pronounced dead at 9:53 AM on April 25, 2005. Potter County Justice of the Peace ordered an autopsy and firefighter Hunton's body was transferred to the Texas Tech University Health Sciences Center Division of Forensic Pathology for postmortem examination.

Amarillo Police Department investigated the motor vehicle incident. There is conflicting information in the incident report as to the wearing of safety belts by Ladder 1's crew. The police report states that none of the crew members were wearing their safety belts, but driver LeGrone's after-incident statement reflected he had his safety belt on. The written statements of Lieutenant Selman and firefighter Stennett do not address their use of safety belts.

City of San Diego Risk Management Office

Link 3-1 San Diego City Risk Managment

The role of the Risk Management office is to effectively prevent, control, and minimize the City's financial risk while providing optimum services to the City's employees and its citizens through the centralized administration of health care, safety, loss control, employee benefit, and other risk management programs. This department not only manages benefits such as workers compensation and mandates workplace safety for the city, but is responsible for employee benefit programs such as employee savings, flex benefits, and the Employee Assistance Program. EAP helps employees with external problems that can affect work performance such as financial issues, family issues or personal issues.

EAP can be located or contacted at:

1200 3rd Ave. #1000
San Diego, CA 92101
(619) 236-7300

SDFD Training & Safety Division

The SDFD Training and Safety Division is responsible for educating San Diego Fire-Rescue personnel in a safe and efficient manner with the performance of assigned duties.

Major activities include planning and conducting in-service training (IST), basic fire academy training, driver training, community education, supervisor and leadership training, oversight of the joint apprenticeship training program and maintenance of the San Diego Regional Public Safety Training Institute (formerly known as NTC). In addition to training, the division provides Safety Officers for large incidents.

San Diego Fire Training and Safety Division is located at:

2580 Kincaid Rd.
San Diego, CA 92101
(619) 692-4980

SDFD Safety Policy

The SDFD Safety Policy has been developed to ensure that personnel are trained in the awareness and abatement of occupational hazards and to comply with Cal-OSHA regulations. The goal of the San Diego Fire-Rescue Department is to provide a safe and healthy work environment for all employees. The prevention and reduction of accidents, injuries, and occupational illnesses is the principal objective of the department's Safety Policy. Safety procedures and policies shall be a primary consideration at all times. Safety concepts will

be integrated into all emergency and non-emergency operations of the San Diego Fire-Rescue Department.

The responsibility for implementing and maintaining the Injury and Illness Prevention Program (Safety Policy) rests with the Fire Chief. Division Directors are required to ensure that safe practices and procedures are followed within their areas of responsibility.

Company Officers and supervisors will conduct and coordinate appropriate safety training; they will be responsible for the safety of their personnel and will enforce all safety rules, procedures, and policies. In addition, they will correct unsafe conditions and practices and ensure all tools, equipment, and protective devices are properly maintained and utilized.

Employees will be responsible for following all written and verbal safety instructions. They shall report all injuries, accidents, exposures, and unsafe conditions to their supervisor. Employees may report unsafe conditions anonymously and without fear of reprisal.

The Safety Policy does not preclude employees from using safe operating procedures not contained herein. Everyone must, at all times, use good judgment based on experience, training, and common sense.

The Safety Policy is contained in the SDFD Operations Manual, Standard Instruction 01, Section II.

Safety Officer

Link 3-2 SDFD Safety Policy SI 01 Sec 02

The Safety Policy establishes the position of Safety Officer and Assistant Safety Officer. It also outlines the Safety Officer's responsibilities as well as delineate the duties and functions of the department's Occupational Safety and Health Committee.

The SDFD has designated the position of Battalion Chief of Training and Education as the department's official Safety Officer. This title should not be confused with the Safety Officer position held in the Incident Command System, which will be discussed in future chapters. In non-emergency situations, the Safety Officer ensures that safety and health standards are implemented, maintained, reviewed, and revised on a regular basis. The Safety Officer also investigates and analyzes accidents to identify causes. The Safety Officer co-chairs the Occupational Safety and Health Committee with a member of the executive board of Union Local 145.

Occupational Safety and Health Committee

The Occupational Safety and Health Committee reviews, evaluates, and makes recommendations to senior staff on safety issues involving apparatus, equipment, protective clothing, facilities, and procedures. The Safety Policy defines the responsibilities of all levels of management within the department and illuminates the process of Hazard Analysis and Risk Assessment. The policy highlights typical hazards found at incidents and affects procedures that must

be implemented to reduce those hazards. The Safety Policy is not meant to be an all-inclusive document. This policy has been adopted and implemented to provide basic guidelines for personnel safety on the San Diego Fire-Rescue Department.

"Tailboard Safety" Program

As a requirement under the employee communications section of SB 198, the department has established a "Tailboard Safety Talk" program. These are short 10 to 15 minute presentations conducted on a company level on various safety issues. These "safety discussions" are required once every 4 shift cycle.

The company officer must document the topic and list the individuals present. Cal-OSHA requires the records of these talks be maintained in the station files for a period of three years. These records must be presented to the Cal-OSHA inspector if requested.

Non-Regulatory Agencies

National Fire Protection Association (NFPA)

Link 3-3 NFPA Standards

The National Fire Protection Association (NFPA) is an organization consisting of manufacturers, testing and certifying agencies, regulatory agencies, consultants, and firefighters. Representatives from these groups meet to develop and publish consensus standards outlining the performance requirements of a product. The standard does not specify how the product is to be designed, nor specify a particular brand, but makes recommendations based on its findings. Agencies can choose to adopt or not adopt NFPA guidelines. Agencies expose themselves to liability if they are not adhering to standards if accidents happen despite recommendations.

For products to be NFPA compliant, they must pass several performance tests. The NFPA requires a label to be attached to the product stating what the product is to be used for and that it meets NFPA standards. When a laboratory certifies a manufacturer's product, that testing agency must affix its label or mark on the product. The NFPA now requires third party certification. The certifying agency must also affix its label or mark to the product, otherwise it is not considered NFPA compliant.

The following is a list of standards that pertain to fire fighting and the specific topic covered by each, Link 3-3:

NFPA Standards

Topic	
1500	Occupational Safety and Health Program
1501	Fire Department Safety Officer
1911	Service Tests of Pumps on Fire Department Apparatus
1914	Testing Aerial Devices
1932	Use, Maintenance, and Service Testing of Ground Ladders
1961	Fire Hose
1962	Fire Hose Couplings
1971	Protective Clothing and Equipment for Firefighters
1972	Helmets for Structural Fire fighting
1973	Gloves for Structural Fire fighting
1974	Protective Footwear for Structural Fire fighting

1975 Station and Work Uniforms

1976 Proximity Fire fighting Clothing

1977 Wildland Fire fighting Protective Clothing and Equipment

1981 SCBA

1982 Personal Alarms Safety Systems

1983 Fire Service Life Safety Ropes

The NFPA not only develops equipment standards, but the organization has developed an extensive document on Firefighter Occupational Safety and Health, NFPA 1500. This standard provided guidelines on establishing and administering a health and safety program. In California, an NFPA standard is advisory only, and organizations may or may not choose to follow its recommendations. However, turnout clothing specified in Title 8, Section 3406 shall meet NFPA 1971-1981 edition. Also, helmets specified in Cal OSHA, CCR, Title 8, Section 3403 shall meet NFPA 1972-1985 Edition. There are some states that are NFPA states. This means that they must follow all standards published by the NFPA. Each standard is on a five year revision cycle.

American National Standards Institute(ANSI)

ANSI is a consensus standard organization similar to the NFPA. The major difference is that ANSI focuses on the development of test methods but also establishes requirements for Personal Protective Equipment. The NFPA cites many ANSI standard test methods in its documents.

National Safety Council (NSC)

The National Safety Council (NSC) is an organization that publishes information on a variety of topics. These deal mostly with office and industrial settings but many of these concepts can be incorporated into our occupation. The topics vary from preventing back injury, ergonomics, fire extinguisher training, to confined space training. The NSC publishes many posters and pamphlets on safety.

Southern Area Fire Equipment Research (S.A.F.E.R.)

S.A.F.E.R. is an organization consisting of fire departments, vendors and manufacturers throughout southern California. The organization meets on a monthly basis to discuss safety issues facing firefighters. It provides a forum to identify safety problems and potential methods of resolving those problems. It provides an excellent network whereby departments can seek input on a variety of safety concerns.

S.A.F.E.R. has produced an extensive document on the care, cleaning, and maintenance of personal protective clothing.

National Institute for Occupational Safety and Health (NIOSH)

NIOSH is a branch of the US Centers for Disease Control and prevention (CDC) who is tasked with research related to workplace health and safety. Created with the Occupational Safety and Health Act of 1970, its goal is to conduct scientific studies in the fields of occupational health and safety and make recommendations as a result of their research. NIOSH employs scientists from various fields such as psychology, engineering, chemistry, statistics, economics, and lends support to academic institutions.

Every year NIOSH studies firefighter fatalities and makes recommendations on steps that can be taken to reduce similar events in the future. NIOSH's Fire Fighter Fatality Investigation Program has made over 1000 recommendations on over 300 investigations since its inception in 1998.

Underwriters Laboratories

UL is an independent product safety certification organization who develops standards and test procedures for products, materials, components, assemblies, tools and equipment, that deal with product safety.

Reliability of equipment is critical for the successful operation of fire fighting tactics and safety of the firefighters. UL provides testing services for a variety of equipment for compliance with the requirements of the appropriate NFPA standards of the fire service.

Firefighting Hazards & Safety

Fire fighting has become a very complex and broad based profession. Firefighters consistently find themselves in a variety of situations which can each bring about their own unique hazards and risks.

When operating at any type of incident, always look for "safety clues" or signs that tell you potential dangers exist. The key to identifying clues is to stay aware of your surroundings, don't fall into complacency and don't take unnecessary shortcuts. Never expose yourself to a dangerous situation where there is no possibility of saving life or property.

Codifying every possible safety hazard that confronts firefighters would require a lengthy document and is simply not possible. Instead, early recognition of the "safety clues" associated with the hazards described in this chapter will provide you with a measure of protection. Although this list is not inclusive, through experience and continuous training you will become more adept at recognizing potential safety hazards and the risks involved with fire fighting.

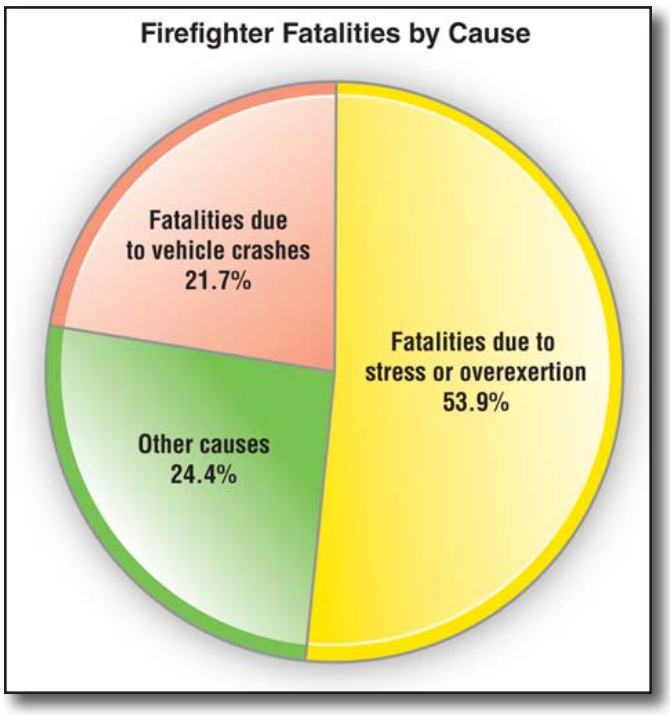


Figure 3-4 Firefighter Fatalities by Cause

Key Concepts

Before we begin describing the different hazards associated with the job of fire fighting, it is important to understand some basic terminology and safety concepts that have been implemented into the fire service.

IDLH

In performance of our duties, firefighters are required to place themselves in atmospheres that are considered Immediately Dangerous to Life or Health (IDLH). IDLH atmospheres are defined as any atmosphere that poses an immediate threat to life, would cause irreversible adverse health effects, or would impair an individual's ability to escape from a dangerous atmosphere. A smoke-filled room in a burning building, an underground electrical vault, or an area around a gas line break could all be considered an IDLH atmosphere.

Due to the high number of injuries and casualties associated with IDLH incidents, Federal Regulations and Standards have been created and mandated for operations at these types of incidents. Fire departments are required by law to comply with these new standards described below.

Accountability Tags

Engine Co Tag

Truck Co Tag

Chief Staff Tag

Specialty Co Tag

EMS Tag

Accountability Clipboard

Accountability

Good communication on the fire ground is essential to firefighter safety. Due to the stressful and chaotic nature of emergency incidents and fire fighting, breakdowns in communications are common and often result in tragedy. For this reason, a physical system for tracking personnel and their activities is mandated by OSHA anytime personnel enter an IDLH atmosphere.

In order to meet this OSHA requirement, the SDFD has created aluminum accountability tags which are clipped to the shoulder strap of every SCBA on the department. These accountability tags are color coded by apparatus type and engraved with the apparatus ID and crew number.

Color Codes:

- Red – Engine
- Black – Truck
- Purple – Chief Officers & ICS Command Staff Positions
- Green – Specialty (Rescue, Haz-Mat, Light & Air, etc.)
- Blue – Ambulance Personnel / EMS

In addition to the accountability tags, an orange accountability clipboard is carried on all fire apparatus containing the following items to assist in tracking personnel:

- Accountability tracking reports / Pens / Pencils
- LCD clock
- Training Bulletin #00-01

Accountability Officer

An accountability officer is required at all utilized entrance and exit points of an IDLH atmosphere in order to ensure accurate accountability. The accountability officer is tasked with collecting the tags of the firefighters upon their entrance and exit from the IDLH atmosphere as well as recording their time and location of assignment on the orange accountability clipboard.

It is ultimately the responsibility of all firefighters to report to the accountability officer with their tags upon entrance and exit from an IDLH atmosphere. The importance of this cannot be stressed enough as your life may depend upon the information held by the accountability officer.

More detailed information on accountability procedures will be covered in the "RIC & Accountability" chapter of this manual.

"2 in 2 out"

In addition to accountability, OSHA mandates the adherence to the "Two-in, Two-out" policy when working within an IDLH atmosphere. The first part of this policy states that a firefighter shall never enter into an IDLH atmosphere alone. There should always be (at least) two firefighters together when they enter a location. In the event one firefighter needs to exit, both or all shall exit together so that no one firefighter is left alone.

The second part of this policy, the "Two-out," refers to a safety system to protect firefighters. Where two or more firefighters enter a structure with an IDLH environment, at least two more firefighters must remain outside, ready to help in case of an emergency. When a team enters an IDLH atmosphere (the "two in"), two more firefighters (the "two out") will be standing by at the entrance in full personal protective equipment and SCBA, ready with rescue tools, in order to rapidly enter the building if the team inside becomes endangered, lost, or trapped.

The only exceptions to the "Two-in, Two-out" rule are if the first arriving crew receives a report of a **known** rescue or when the fire is still in the incipient phase and can be extinguished with an extinguisher.

Figure 3-5 RIC Bag Contents

Rapid Intervention Crew

A Rapid Intervention Crew, or RIC, is based on the principal of the two in two out system, only it takes it a step further. RIC calls for the establishment of a crew of four firefighters to be standing by,

In 2009, 30 firefighters were killed while performing the extinguishment of structure fires

outside the structure, ready to enter the building to rescue a trapped or downed firefighter. RIC is also tasked with preparing the building for an emergency escape, which is known as "softening the structure." This calls for removing bars off windows, unlocking doors, and placing ladders to windows in case the crews inside need to escape in a hurry. RIC is also responsible for gathering a cache of emergency rescue equipment and spare air bottles outside the structure in the event of a downed or lost firefighter, Figure 3-5.

The idea of RIC was born out of the failures of crews to save trapped or downed firefighters inside due to not being prepared, aware, or trained in rapid intervention techniques. Other agencies often use terms such as Rapid Intervention Team (RIT), Rapid Entry Team (RET), or Firefighter Assist and Search Team (FAST) to describe the function of RIC. Regardless of the name, the aforementioned teams perform basically the same tasks.

Figure 3-6 Heavily Involved Structure Fire

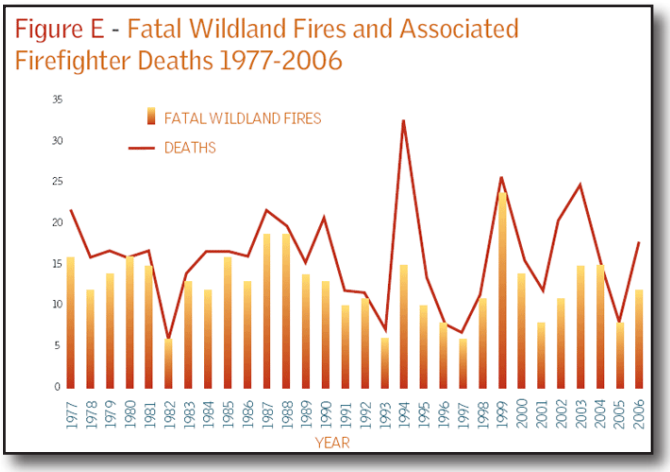


Figure 3-7 Wildland Firefighting Fatalities

RIC and accountability policies and techniques are covered in more detail in the "RIC & Accountability" chapter of this manual.

Structural Firefighting

Structural fire fighting is the extinguishment of fire within a building or structure, Figure 3-6. Structural fire fighting is a dangerous but fundamental duty provided by the fire service. It requires firefighters to put their lives and health at risk to protect lives, property, and the environment. This task requires firefighters to go inside buildings. We must be aware of the hazards present and the risks that are associated in completing this task, such as building collapse, flashover, toxic atmospheres and entrapment.

The best way to minimize the dangers of structural fire fighting is through ongoing education, training, and experience. This drill manual is dedicated to giving firefighters the necessary knowledge and tools to minimize the risk and hazards of structural fire fighting.

Wildland Fire fighting

Wildland fire fighting poses a high level of risk to firefighters due to the highly dynamic nature of wildfires. Three main factors contribute to the behavior of wildfires, weather, topography and fuel. Weather is the most unpredictable of the three and is a significant reason why wildland fire fighting is so dangerous, Figure 3-7.

Burns are at the forefront of a wildland firefighters concerns with a majority of accidents occurring in low, flashy deceptively light fuel. In addition to burns, firefighters must be aware of other dangers such as snags, falling rocks, and snake bites.

In 2009 16 firefighters were killed on wildland fires according to the US Fire Administration.

To assist firefighters in safely performing their duties during wildland fires, several acronyms have been created to remind us all of the dangers and safety considerations of wildland fire fighting.

10 FIRE ORDERS

18 Situations that shout "Watch Out"

LCES (Lookout, Communications, Escape Routes, and Safety Zones)

The Wildland Fire fighting Chapter of this Drill Manual contains detailed and specific information that covers the safe practices of wildland fire fighting.

Vehicle Fires

Figure 3-8 Tractor Trailer on fire

Vehicle fires pose a significant risk to firefighters for a variety of reasons. One of the most significant dangers relating to vehicle fire fighting is roadway safety. Because these fires often occur on active streets and highways, great care should be taken to protect yourself from traffic and other vehicles. The SDFD has experienced fatal accidents on the freeway with motorists striking and killing fire and EMS personnel. As a direct result of these line of duty deaths, policies are in place to have apparatus block to protect fire and EMS workers on scene of an incident. It is very easy for firefighters to become focused on the task of fighting a fire or conducting a rescue to overlook the fact that they are exposed or at risk of being struck by an oncoming vehicle.

In addition to the risk other moving vehicles pose, cars are becoming more and more technologically advanced. A higher degree of expertise is required to avoid injury, Figure 3-8. Firefighters must be mindful of special hazards that vehicle fires pose such as exploding bumpers and tires, fuel leaks, advanced air bag systems and hazardous materials such as batteries and alternative fuels, Media 3-1. Keeping informed of changes in technology and adhering to department training and SOG's will help reduce risk at vehicle fires.

Media 3-1 Exploding Bumper

Traffic Accidents & Vehicle Rescues

Traffic accidents are a very common call for firefighters. Because of the high frequency of these incidents, it is easy for us to become complacent and feel a sense of false security in these highly dangerous environments, Figure 3-9.

Traffic accidents occur in a variety of locations such as freeways, streets, parking lots, into power poles, fire hydrants and buildings. No matter the location of the incident, care must be maintained to ensure that scene safety is at the forefront of everyone's mind. Being mindful of traffic is paramount. Taking steps to ensure crew and patient safety can include steps such as strategic apparatus placement, deploying cones or flares, and wearing high visibility PPE.

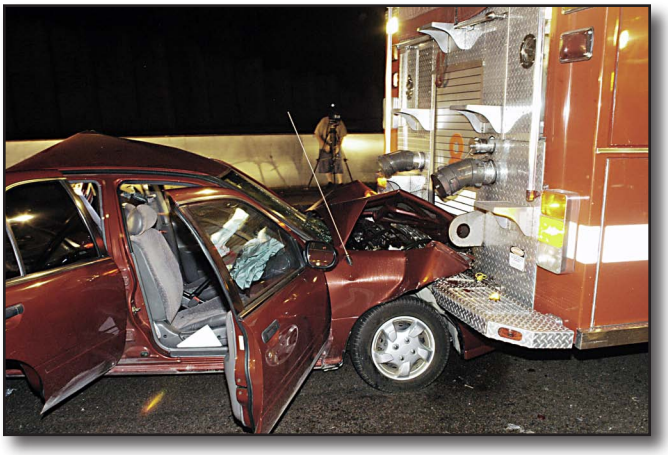


Figure 3-9 Engine 8 rear-ended on the freeway

With the advent of sophisticated airbag systems and electric cars, vehicle rescues are no longer just a matter of prying back sheet metal to extricate a patient, Media 3-2. We now must carefully coordinate and plan the removal of hazards around the patient to ensure that neither the rescuer or patient become seriously injured. The proper use of PPE , equipment, and adherence to our training and SOG's will help in minimizing the risk during these types of incidents.

Medical Aid Incidents

As the fire service continues into the twenty first century, the role of the firefighter has transitioned from a predominantly fire based service to one that provides emergency medical service too. As a result, firefighters must take steps to minimize exposure to pathogens, communicable diseases, and illnesses that are frequently encountered while responding to these types of incidents. Each firefighter is provided with Personal Protective Equipment that is to be used on these types of calls in order to minimize risk.

Media 3-2 Air Bag Deployment During Vehicle Rescue

As health care providers, we are called in to homes, businesses, and a variety of other environments to help the sick and injured. It is unknown how many firefighter illnesses or deaths nation-wide have been caused by exposure to communicable disease while on medical aids, but the threat is real. Through strict adherence to the PPE policies and safety procedures established by the SDFD, it is possible to significantly lower the risk associated with these types of incidents.

Hazardous Materials Incidents

As firefighters, we are often called upon to investigate and mitigate known and unknown hazardous materials. A hazardous material is defined as any

substance or material that could adversely affect the safety of the public, handler or carrier. Because of the dangers involved with hazardous materials, a significant amount of training is administered to firefighters on this topic. In addition to this training, a team of highly trained specialists know as the Haz-Mat Team have been formed to assist all firefighters with the mitigation of these incidents.

The San Diego Fire-Rescue Department has also been entrusted to provide the emergency hazardous material response for the entire County of San Diego.

Airport Rescue Fire fighting – ARFF

Airport Rescue Fire fighting (ARFF) provides for the fire protection and rescue of incidents involving aircraft at airports.

Although these types of incidents occur very infrequently, when emergencies are encountered, there is a high casualty potential as hundreds of people may be on board the aircraft.

Due to the large amount of aviation gasoline or jet fuel carried on aircraft, the potential for an exceptionally hot or explosive fire is a real concern. ARFF firefighters must undergo special training, wear special protective equipment, and use specifically designed apparatus to combat aircraft fires and perform rescues, Figure 3-10.

Figure 3-10 ARFF activities require special safety gear

Miscellaneous Rescue Incidents

As an all risk department, the San Diego Fire-Rescue Department is responsible for responding to all types of incidents such as confined space rescue, trench rescue, water rescue and rope & cliff rescues. Other common emergencies that firefighters respond to are those dealing with electrical, gas, and water utilities, victims trapped in elevators, ringing alarms, and fire sprinkler activations. Each of these types of emergencies brings its own sets of risks and hazards. Due to the infrequent occurrence of some of these types of incidents, many firefighters lack adequate experience to rely on and safely perform when placed in these situations. It is essential crews continuously train, educate and prepare themselves for these types of events, so that when called upon to act, you will perform safely and successfully.

Emergency Response

Surprisingly, one of the most dangerous activities that firefighters encounter is that of responding to emergency incidents, Media 3-3. Every year numerous firefighter fatalities occur due to emergency vehicles involved in traffic accidents. There are a variety of causes for these accidents, mechanical fail-

Vehicle Accidents

Houston Fire Truck Rollover

Armington Fire Engine Rollover

SDFD E31 Rear-ended on Freeway

SDFD M11 Rollover on Freeway

ure, weather, excessive speed, and poor driving judgement. Regardless of the cause, due to the size and weight of fire apparatus, the end result of these accidents is often tragic.

Media 3-3 Fire Truck Collision

The most common trend noted in firefighter fatalities caused by traffic accidents is that of not wearing a seat belt. It is state law and SDFD policy that all personnel riding on a fire apparatus shall be seated and seat belted in anytime the apparatus is in motion. Many firefighters have been killed and injured by "suiting up" while responding to an incident and not wearing their seat belts.

The San Diego Fire-Rescue Department is committed to safe driving practices and driving with due regard. The policies and procedures for driving fire apparatus are detailed within the Code 3 Driving Policy contained in the Operations Manual.

General Health & Safety

Fire Station & Daily Hazards

A majority of a firefighters time is not spent on incidents, but rather in between calls, either at the station, training or performing duties with the public. While at the fire station, the potential for injury is elevated due to the amount of time spent working there and because many firefighters often become complacent. Duties such as station maintenance, equipment repair and cooking cause many firefighter injuries. Taking the time to minimize hazards such as keeping equipment in proper order, wearing proper safety gear and uniforms, and removing or replacing items which have the potential for injury will protect not only you, but those around you.

While performing station and vehicle maintenance, be aware of your surroundings and follow safety warnings. Never disable safety devices. Common injuries such as cuts, scrapes or strains occur while working on or around apparatus while they are parked in the station. When climbing on or around fire apparatus, always have three points of contact to minimize slipping or falling. Always remain diligent and aware potential for injury.

As firefighters, we strive to be constant professionals. This means maintaining and properly storing and organizing items such as tools and equipment. By having a general hazard awareness, this will help avoid common but easily preventable accidents such as slipping on puddles or tripping over hazards such as cords or tools.

In addition to equipment storage, chemical storage has the potential to cause injury or harm if not stored properly. Chemicals can perform a variety of functions, but without proper identification they are a potential risk to the user. They shall be stored in an approved container with a label clearly identifying its contents and stored in an approved location to minimize potential hazards. Stations are required to have a Material Safety Data Sheet (MSDS) for the employees to reference in the event of an accident. Proper PPE should always be worn as required when handling such cleaners or products containing potentially harmful chemicals, acids or alkalis.

Lastly, training is an essential aspect of our duty as a firefighter. We dedicate ourselves to a minimum of 2 hours of required training every shift. Because of the nature of our job, a level of danger is always present. Every year thousands of firefighters are injured while training. A majority of these injuries could have been prevented or avoided if proper consideration to the risks and adherence to safety policies were followed. It is imperative individuals understand there is no great benefit at stake to necessitate a risky maneuver. If a task is deemed risky, it should be avoided or performed in a manner which minimizes the risk. It is essential that we adhere to the policies and training principals presented in this manual to safely perform our training exercises.

Personal Health

As previously stated, fire fighting can be a hazardous job. We are continuously exposed to flammable and poisonous gases, chemicals, roadways, extreme temperatures and the potential for structural collapse. While hazards are encountered during the performance of our duties on incidents, we must also recognize the dangers associated while working in non-emergency situations, such as training and our daily routine around the fire station.

Work hours of firefighters are much different than most other occupations. Our long, irregular hours may cause adverse health issues due to lack of sleep, food irregularities, and physical stresses placed on the body.

To combat these risks and stresses, firefighters must be diligent about minimizing the toll they place on their bodies. Physical fitness is a pertinent part of everyday life at the firehouse. Being physically fit and eating healthy food can help to aid in performance on the fire ground and reduce the risk of injury.

Physical Health Hazards

Stress placed on the body from responding to emergency incidents increases the risk of cardiovascular disease, including coronary artery disease, hypertension, and heart attacks. Strokes and heart attacks comprise almost half of firefighter line of duty deaths. To minimize this trend, firefighters must be aware of the stress the job places on the body and how to combat its negative effects. As a reaction to stress, the body releases cortisol, a stress hormone, which over time, may lead to illness, weight gain and decreased cardiac function.

Firefighters are at a greater risk of developing different types of cancer than the general population, Figure 3-11. Researchers believe there is a direct correlation between the chemical exposures firefighters experience on the job and their increased risk for cancer.

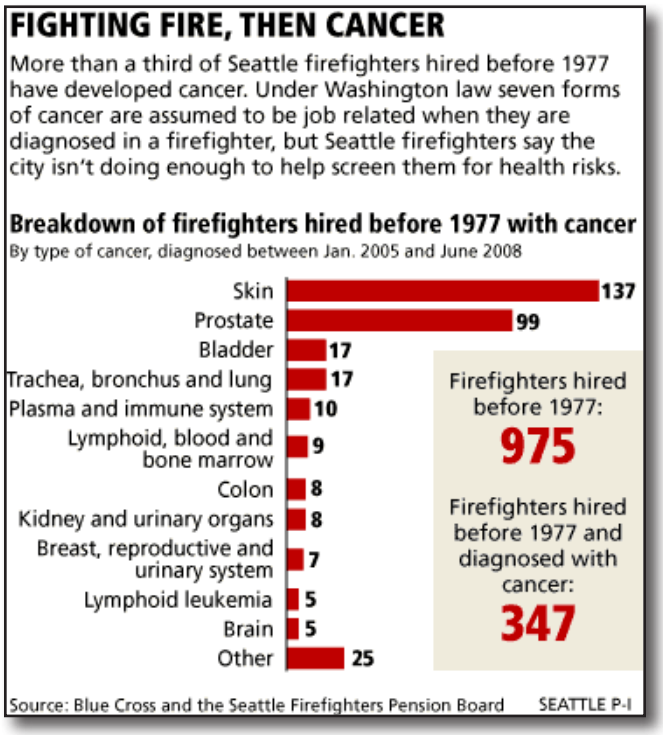


Figure 3-11 Firefighting and Cancer

Back strains are the most common injury received in the fire service. According to the National Institute of Science and Technology, almost half of all firefighter injuries are sprains and strains. Proper lifting techniques must be employed, always lift with your legs and not with your back. If the load is heavy or awkward, get assistance. Keep the load close to the body as this will prevent undue strain on the back.

Hydration is another important aspect to firefighter health that is often neglected. The effects of dehydration are cumulative and many people don't even recognize the symptoms of dehydration until it has significantly set in. A

study of on-duty firefighters was conducted and found that 91% were dehydrated before starting fire suppression activities, making it almost impossible for the body to perform at peak performance during a fire. To combat this, it is important that you drink water often. The sensation of thirst is not a good indicator of body fluid levels. As a rule by, the time you feel thirsty, you are already low on fluid. A sign of proper hydration is urine output that is very light in color or clear.

Prior to taking prescription medications, always ask your doctor what effects the medication may have with regards to your duties as a firefighter. While many firefighters do not show obvious warning signs and appear to be in good health, the stress and work conditions of the job may be creating additional risk factors that are much harder to detect.

Firefighter Health Statistics

- From January 1994 to December of 2004 there were 1144 on-duty firefighter deaths in the U.S.
- Cardiovascular events, account for over 45% of all on-duty deaths among firefighters.
- 32% of deaths from coronary heart disease, associated with fire suppression activity.
- Associated risk of death from coronary heart disease 10 to 100 times as high as the risk with non-emergency duties.
- BURNS account for about 1-2% of all injuries among firefighters

Source - New England Journal of Medicine

Mental Health Hazards

Firefighters are placed in some of the most physically and mentally stressful situations imaginable throughout their careers. Firefighters are exposed to horrific images and scenes that can take an emotional toll on a person's life if not recognized early and handled properly. Due to this stress, firefighters are at a high risk for mental and depressive illness

Depressive symptoms are frequently associated with PTSD (Post Traumatic Stress Disorder) and can occur in anyone following an emotional disturbing or threatening event. It is crucial that firefighters be aware not only of incidents that carry an increased risk for disorders, but also the warning signs of a problem and how to ask for help.

Substance abuse is common among Firefighters due to stresses and incidents involving high PTSD related events. Studies indicate that there is a direct correlation between alcohol abuse and high-stress occupations.

The majority of PTSD symptoms can be divided into four categories:

1. **Cognitive**: intrusive thoughts and reliving the incident, reduced ability to concentrate, or mental confusion.
2. **Behavioral**: substance use, withdrawal, or acting-out behaviors.
3. **Physical**: fatigue, recurring headaches, or inability to sleep or eat.
4. **Emotional**: unfounded or unusual anger, depressive feelings, or anxiety reactions.

Early recognition of these symptoms and participation in treatment is often the key to a successful recovery. The San Diego Fire-Rescue Department has

several avenues available for employees who are seeking help with any of the above mental or physical conditions.

Physical and Mental Health Resources

San Diego Firefighter's Regional Wellness Center

The San Diego Fire Fighter Regional Wellness Program was initiated from a grant received from the Federal Emergency Management Agency (FEMA). The center is now fully funded by the City of San Diego along with other local fire departments. The wellness center provides a proactive health assessment of risk factors that commonly affect firefighters and recommends healthy solutions, Figure 3-12.

Link 3-4 Wellness Center

San Diego Firefighter's Regional Wellness Center
6699 Alvarado Road, Ste. 101
San Diego, CA 92120
(619) 286-7333

Figure 3-12 Firefighter Wellness Exam

Employee Assistance Program

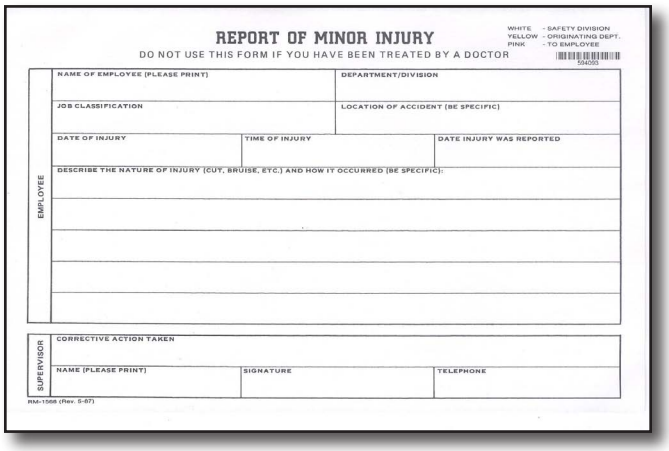
EAP is the employee assistance program that provides counseling and referral services that assist employees in solving personal and workplace problems that effect productivity, job performance, and workplace safety.

EAP provides training for supervisors on early intervention skills to recognize signs and symptoms and provide assistance to employees to address problems including drug and alcohol abuse.

San Diego City Risk Management Office
Employee Assistance Program (EAP)
1200 Third Ave, Suite 1000
San Diego, CA 92101
Phone: (619) 236-7300

Accident and Injury Documentation

OSHA and the City of San Diego mandate employees and supervisors document all accidents and injuries that occur while on duty. Below is a brief overview of the different types of documentation utilized by the San Diego Fire-Rescue Department.



REPORT OF MINOR INJURY

DO NOT USE THIS FORM IF YOU HAVE BEEN TREATED BY A DOCTOR

WHITE - SAFETY DIVISION
YELLOW - ORIGINATING DEPT.
PINK - TO EMPLOYEE

NAME OF EMPLOYEE (PLEASE PRINT) | DEPARTMENT/DIVISION

JOB CLASSIFICATION | LOCATION OF ACCIDENT (BE SPECIFIC)

DATE OF INJURY | TIME OF INJURY | DATE INJURY WAS REPORTED

EMPLOYEE

DESCRIBE THE NATURE OF INJURY (CUT, BRUISE, ETC.) AND HOW IT OCCURRED (BE SPECIFIC):

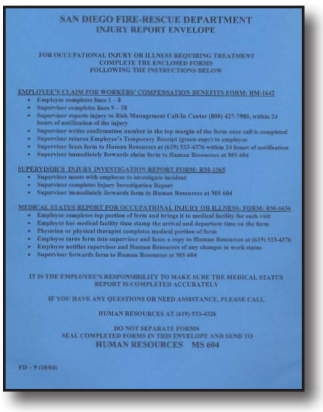
SUPERVISOR

CORRECTIVE ACTION TAKEN

NAME (PLEASE PRINT) | SIGNATURE | TELEPHONE

RM-1568 (Rev. 5-87)

Figure 3-13 RM-1568 Report of Minor Injury


SAN DIEGO FIRE-RESCUE DEPARTMENT
INJURY REPORT ENVELOPE

FOR OCCUPATIONAL INJURY OR ILLNESS REQUIRING TREATMENT
COMPLETE THE ENCLOSED FORMS
FOLLOWING THE INSTRUCTIONS BELOW

EMPLOYEE'S CLAIM FOR WORKERS' COMPENSATION BENEFITS FORM: RM-1642

- Employee completes lines 1 – 8
- Supervisor completes lines 9 – 18
- Supervisor reports injury to Risk Management Call-In Center (800) 427-7980, within 24 hours of notification of the injury
- Supervisor writes confirmation number in the top margin of the form once call is completed
- Supervisor returns Employee's Temporary Receipt (green copy) to employee
- Supervisor faxes form to Human Resources at (619) 533-4376 within 24 hours of notification
- Supervisor immediately forwards claim form to Human Resources at MS 604

SUPERVISOR'S INJURY INVESTIGATION REPORT FORM: RM-1565

- Supervisor meets with employee to investigate incident
- Supervisor completes Injury Investigation Report
- Supervisor immediately forwards form to Human Resources at MS 604

MEDICAL STATUS REPORT FOR OCCUPATIONAL INJURY OR ILLNESS: FORM: RM-1634

- Employee completes top portion of form and brings it to medical facility for each visit
- Employee has medical facility time stamp the arrival and departure times on the form
- Physician or physical therapist completes medical portion of form
- Employee turns form into supervisor and faxes a copy to Human Resources at (619) 533-4376
- Employee notifies supervisor and Human Resources of any changes in work status
- Supervisor forwards form to Human Resources at MS 604

IT IS THE EMPLOYEE'S RESPONSIBILITY TO MAKE SURE THE MEDICAL STATUS REPORT IS COMPLETED ACCURATELY

IF YOU HAVE ANY QUESTIONS OR NEED ASSISTANCE, PLEASE CALL:

HUMAN RESOURCES AT (619) 533-4326

DO NOT SEPARATE FORMS
SEAL COMPLETED FORMS IN THIS ENVELOPE AND SEND TO
HUMAN RESOURCES MS 604

FD – 9 (10-94)

Figure 3-14 FD-9 Injury Report Envelope

RM-1568 Minor Injury Documentation

This Report of Minor Injury form is to be utilized when an employee has incurred an injury or illness that is considered to be minor in nature and will most likely not result in a physician's treatment or care, Figure 3-13. Some common examples of this types of injury would be a minor cut or abrasion, eye irritation from smoke, sore muscle, minor burn or rash.

FD-9 SDFD Injury Report Envelope

Whenever an injury occurs and results in the necessity of evaluation or treatment by a physician, the blue FD-9 Injury Report Envelope must be completed by the employee's immediate supervisor, Figure 3-14. The envelope is imprinted with detailed instructions for the employee and supervisor to follow and contains the following forms.

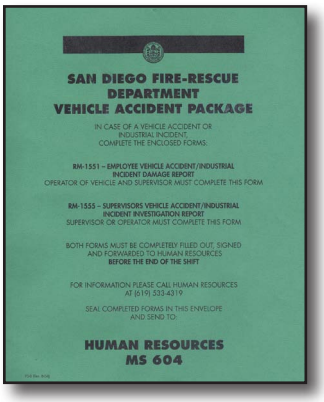
RM-1642 Employees claim for workman compensation benefits forms

RM-1565 Supervisors injury investigation report form

RM-1634 Medical status report for occupational injury or illness form

Communicable Disease Exposure Report Form

Anytime an employee has had an indirect or direct exposure to a patient with a suspected or known communicable disease, a Communicable Disease Exposure Report Form must be completed by the supervisor. This form allows for the department to follow up with the patient and crew to determine if additional tests or treatment are necessary to prevent any adverse health effects to the employee.


SAN DIEGO FIRE-RESCUE
DEPARTMENT
VEHICLE ACCIDENT PACKAGE

IN CASE OF A VEHICLE ACCIDENT OR
INDUSTRIAL INCIDENT,
COMPLETE THE ENCLOSED FORMS:

RM-1551 – EMPLOYEE VEHICLE ACCIDENT/INDUSTRIAL
INCIDENT DAMAGE REPORT
OPERATOR OF VEHICLE AND SUPERVISOR MUST COMPLETE THIS FORM

RM-1555 – SUPERVISORS VEHICLE ACCIDENT/INDUSTRIAL
INCIDENT INVESTIGATION REPORT
SUPERVISOR OR OPERATOR MUST COMPLETE THIS FORM

BOTH FORMS MUST BE COMPLETELY FILLED OUT, SIGNED
AND FORWARDED TO HUMAN RESOURCES
BEFORE THE END OF THE SHIFT

FOR INFORMATION PLEASE CALL HUMAN RESOURCES
AT (619) 533-4319

SEAL COMPLETED FORMS IN THIS ENVELOPE
AND SEND TO:

HUMAN RESOURCES
MS 604

Figure 3-15 FD-8 Vehicle Accident Envelope

FD-8 SDFD Vehicle Accident Documentation Envelope

Anytime an employee is involved in a vehicle or industrial accident, the green FD-8 Vehicle Accident Envelope must be completed by the employee's immediate supervisor, Figure 3-15. The envelope is imprinted with detailed instructions for the employee and supervisor to follow and contains the following forms.

RM-1551 Employee vehicle accident industrial incident damage report

RM-1555 Supervisors vehicle accident/industrial incident investigation report

Personal Protective Equipment

The proper selection, use, and care of PPE can significantly reduce the number and severity of injuries due to accidents. PPE includes turnout clothing, brush gear, boots, gloves, helmets, hoods, SCBA's, and goggles in addition to other specialized equipment. PPE is your first line of defense. It is a tool at your disposal to provide protection and to allow you to safely perform your job. As a tool, it must have the proper maintenance to provide maximum benefit. PPE encompasses more than the traditional turnouts worn by firefighters. Medical incident PPE includes goggles, gloves, and masks. PPE is specialized for the type of incident the firefighter encounters. It also can include the special protective clothing worn by hazardous material and explosive device team personnel.

Figure 3-16 Helmet Failure Due to Heat

Structure Fire PPE

Standard structure PPE is designed to protect the wearer from extreme heat, moisture and trauma enabling him to safely attack fire while remaining safe from injury. This protection is not without its limitations and the user must be aware of its proper use to maximize its protection and understand its failure points, Figure 3-16. Full PPE includes helmet, hood, flash hood, SCBA with face piece, turnout coat and pants, gloves, and boots.

Turnout clothing is traditionally constructed of three layers. The outer shell, the moisture barrier, and the thermal liner. The outer shell is normally constructed of Nomex, PBI and provides protection against mechanical and physical hazards. The moisture barrier is a micro porous permeable membrane that allows perspiration moisture to escape but does not permit moisture to enter from the outside. The thermal liner provides protection against the intrusion of heat. The three layers combined provide the rated thermal protection performance (TPP). As you increase the weight and thickness of the material the TPP increases, however, the effects of fatigue and heat exhaustion also increase. The TPP is decreased by compression of the garment. This frequently occurs in the shoulder area when wearing an SCBA. In California, Cal-OSHA allows the moisture and thermal barrier to be detachable from the shell. However, the shell can not be worn as a single garment for fire fighting.

In regards to turnout clothing, a factor considered in the protection it provides is known as Thermal Protection Performance (TPP). This number is a measurement of the time between flashover and second degree burn. The NFPA has established, as a minimum, a TPP of 35 for turnout clothing. This means that a firefighter has 17 seconds to escape under flashover conditions before a second degree burn is sustained. Typically the escape time is half the rated TPP.

Media 3-4 Structural PPE

In direct contrast to TPP is Total Heat Loss (THL), or the ability of the fabric to let heat dissipate. Generally the higher the TPP, the lower the THL and

Structural Firefighting PPE

Helmet

Nomex Hood

Jacket, Pants, Suspenders

Eye Protection

Boots

Gloves

Lumber Crayon

Utility Webbing

Pocket Knife

Flashlight

Door Chock

Pocket Spanner

Wildland Firefighting PPE

Helmet

Shroud or Nomex Hood

Long Sleeve Undershirt

Brush Jacket

Brush Pants/Belt

Wildland Boots

Wildland Gloves

Eye Protection

Hot Shield

Web Gear

Fire Shelter

Hose Clamp

bulkier the material, driving manufacturers to come up with advanced fabrics that maximize multiple criteria in their fabric selection.

Wildland Fire PPE

Like structure fires, wildland fires are dynamic and have the potential to change suddenly and radically. This potential makes PPE very important for our protection in the instance of a burn over, but also keeps firefighters protected from constant exposures such as direct flame contact, smoke inhalation, falling debris, and protection from injuries from tools as well as other dangers.

While fighting a wildland fire, Nomex brush pants and jacket, a class C uniform and undergarments made of natural fabrics (cotton) is recommended. A long sleeve T- shirt is also recommended. Synthetic materials can be dangerous when exposed to high heat causing them to stick to skin causing burns to be severe than natural fibers.

Wildland boots with an appropriate sole (no steel shanks) and gloves to protect from burns and trauma shall be worn. Helmets with goggles, shroud, and respiratory protection also ensure that firefighters are best prepared to stay healthy and safe. Fire shelters are to be carried at all times and shall be used in the event of a possible burn over.

Additionally, wildland fires are often fought during hot and dry weather. This exposes firefighters to a high risk for dehydration, making water bottles, hydration packs and canteens essential on fires of any significant duration.

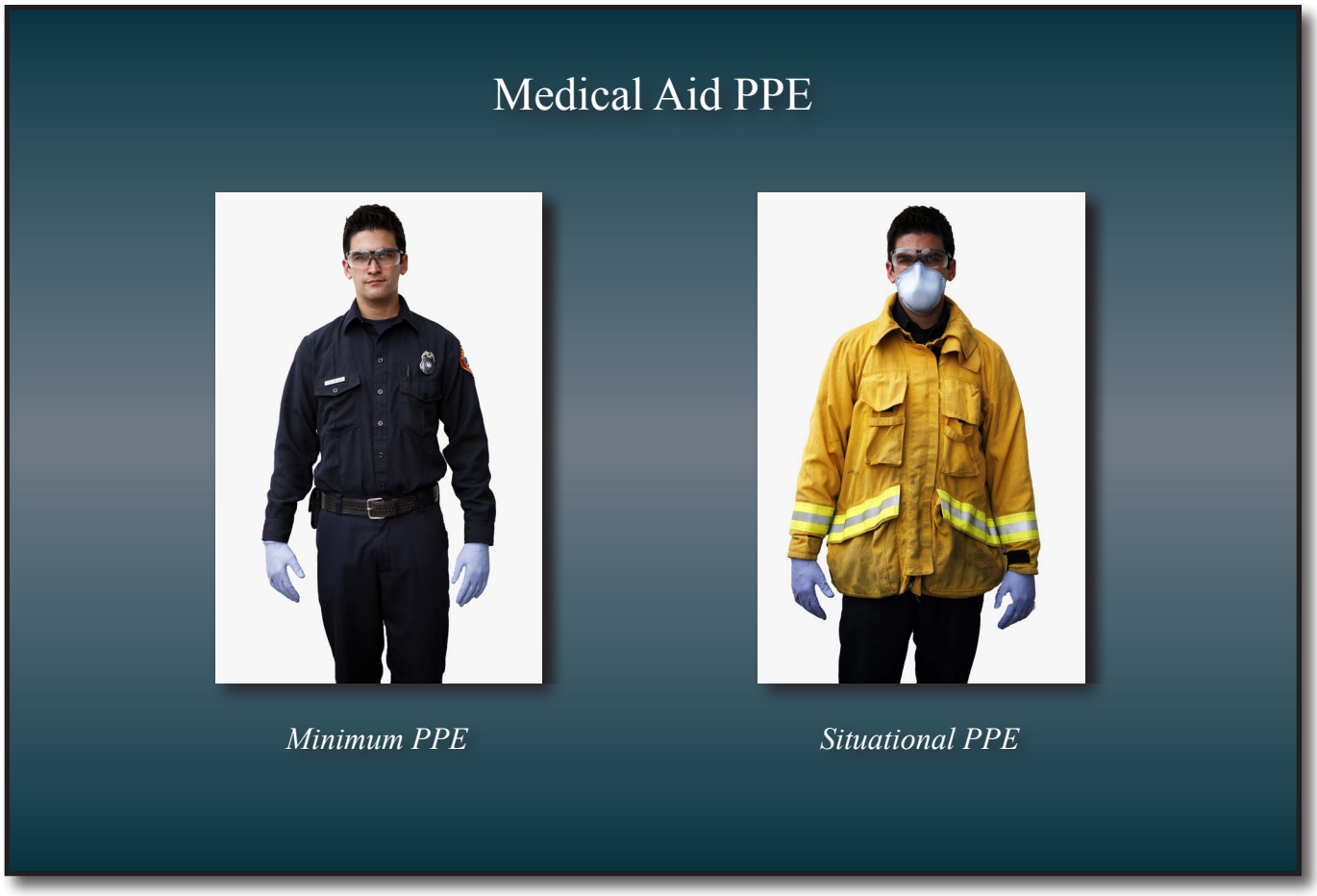
Vehicle Fire PPE

Vehicle fires require the use of full personal protective equipment including an SCBA.

Never wear a raincoat over your turnouts when operating in inclement weather. These are not fire resistive and they inhibit the reflective trim from being seen by oncoming traffic. In addition, never wear the reflective high visibility vest when engaged in any type of fire fighting, as these vests are not constructed of fire resistive material.

Traffic Accident & Vehicle Rescue PPE

Traffic accidents and vehicle rescues pose risks to firefighters in a number of different ways. The initial concern and risk is that of fire, requiring full structure PPE including helmet, turnout jacket and pants, structure boots, flash hood, and possibly the use of an SCBA. The need for rescue requires firefighters to also wear eye protection such as safety glasses when not wearing a face mask to provide protection from flying and protruding debris. Medical aid gloves should be worn underneath structure gloves to ensure protection from pathogens when treating patients.



Medical Aid PPE

As medical care providers we are constantly subjected to unknown pathogens but can greatly reduce the risk to ourselves and our family by taking general precautions. Body Substance Isolation (BSI) is the level of PPE required on a medical aid call to ensure the exposure is nearly eliminated. Treat all blood and certain body fluids as if they were known to be infected with HIV, HBV or other pathogens. Appropriate levels of protection will be worn for different situations such as masks for suspected TB patients or eye protection when airborne secretions are suspected. This requires crews to not only use information provided by dispatch, but also to be prepared to don additional PPE as indicated upon arrival. Have appropriate PPE accessible at all times.

The following PPE shall be utilized by personnel when performing patient care:

Medical aid gloves, safety eye glasses/goggles, and when reasonably anticipated safety face shields for splash protection of body fluids. Respiratory masks for splashes of body fluids, High Efficiency Particulate Air (HEPA) mask for airborne droplet exposure including suspected TB. Brush jacket/turnout coat for gross contamination from blood or secretions, and a surgical gown for extended contact with potentially infectious bodily fluids.

Hazardous Materials PPE

Hazmat PPE can be broken down generally in to four groups level D through A, with level A being fully encapsulated.

- Level D protection is limited in that it simply covers the wearer from minimal exposure and is satisfied by wearing turnouts and chemical boots or protective coveralls and gloves.
- Level C involves a garment such as a Tyvec chemical suit to protect from splashes including sealed gloves and boots and a respirator for airway protection.

- Level B is the same as a level C suit, with the addition of an SCBA (not respirator) for use in oxygen deficient atmospheres.
- Level A is a fully encapsulated suit offering an airtight seal for the wearer protecting him from the elements outside by sealing all parts of the suit including gloves boots and providing a clear hood with SCBA worn inside the suit. The suit is sealed causing temperatures to increase 20-30 degrees along with humidity making health monitoring essential for wearers even after short duration operations.

ARFF PPE

Due to the potential for extreme heat generated by large aviation fuel fires Proximity ensembles (PrPPE) are used to withstand exposure of radiant heat of 932 for five minutes or more. The suits are constructed similar to standard turnouts with an aluminum reflective coating to the outside enabling them to reflect substantially more radiant heat. This coating also makes them susceptible to tears and abrasions and should not be used for structural fire fighting.

Cleaning of inner shells is the same as that of turnouts. The aluminized outer shell should not be washed as it will readily break down and is to be wiped down by hand and hung in a shaded area to dry.

Figure 3-17 ARFF PPE

Miscellaneous Rescue & Special Service PPE

As mentioned previously, a miscellaneous rescue or special service can be classified as anything from a confined space rescue, swift water rescue, someone trapped in an elevator, or a gas line break. It is a very broad category that can bring forward a whole host of challenges and hazards. As such, the appropriate choice of PPE will be highly situational. Your choice of PPE may range from class "C" uniform with tennis shoes, which is what is recommended for swift water rescue situation, to full PPE & SCBA for a gas line break.

Regardless of the incident, a full risk assessment should be completed and the appropriate level of PPE should be selected based upon the SDFD Chart of Required PPE. When there is any question as to the level of PPE for the incident, error on the side of safety and refer to your supervisor.

PPE Inspection, Maintenance, and Cleaning

Soiled PPE exposes firefighters to toxins and carcinogens that can enter the body through inhalation and absorption. Repeated small exposures to contaminants can accumulate over time and cause a synergistic effect in health problems. Although a great emphasis is placed on safety to avoid injury or inhalation hazards when working at an incident, many toxins which lead to health risks are being carried away from the scene on PPE. When clothing and equipment becomes laden with particles and chemicals, other problems are faced in addition to exposure to toxins.

- Soiled PPE reflects less radiant heat. After materials are saturated with hydrocarbons, they will tend to absorb heat rather than reflect radiant heat.
- PPE heavily contaminated with hydrocarbons are more likely to conduct electricity.
- Clothing materials impregnated with oil, grease, and hydrocarbon deposits from soot and smoke can ignite and cause severe burns and injuries. Turn-out clothing is not fire proof. It is fire resistive and when these qualities are compromised, it can ignite.

PPE should be laundered of heavy contamination after every incident, on a regular basis, or as directed.

PPE Cleaning & Washing Instructions

- Do not overload washing machine. One outer shell or inner lining of complete ensemble maximum.
- Separate and wash the shell from the liner.
- Heavily soiled or spotted areas shall be pre-treated, with mild laundry soap, stock number: 40322. Chlorine bleach, chlorinated solvents shall not be used.
- Fasten all closures, including pocket closures, hook and loop, snaps and zippers.
- When washing thermal liner turn garment inside out.
- Wash temperature not to exceed 105 degrees (washer setting on cold or warm).
- Add detergent and run one complete cycle.
- Inspect and rewash if necessary.
- If the coat element has a Drag Rescue Device (DRD), the DRD shall be removed prior to the coat being laundered. If the DRD also requires cleaning it shall be placed in a separate mesh bag for washing and drying.
- When the washing machine is used to wash items other then protective ensemble elements, it shall be rinsed out by running the machine without a laundry load through a complete cycle filled to the maximum level with water and detergent at a temperature of 120 – 125 degrees.

SDFD General PPE Policies

- Supervisors shall be responsible for fully training the members of their crew(s) in the care, use, inspection, maintenance, and limitations of assigned personal protective equipment (PPE). Company Officers and Incident Commanders shall be responsible for ensuring that all personnel under their command adhere to these policies.
- All personnel who are directly engaged in emergency operations, or can reasonably anticipate that they may become involved on short notice, shall be attired in PPE specific to the incident type detailed in the PPE Chart of Required Personal Protective Equipment.
- SCBA's shall be used by all personnel working in areas where the quality of the atmosphere is unknown, or is known or suspected to be hazardous (IDLH), or may rapidly become hazardous.
- Personnel who are directly involved in providing patient care shall don the required PPE prior to making patient contact. Note: Medical-aid fanny packs are no longer issued by Store Room 42.
- All fire engineers, when out of the driver's seat and working on or around the apparatus at emergency incidents, shall be attired in the level of PPE required of other firefighting personnel for the incident type. An SCBA does not have to be worn but must be immediately available for use if required.
- All personnel, except battalion chiefs and drivers, shall don the required PPE for the emergency prior to boarding the apparatus. Chief officers should don the required and situational PPE prior to reporting into the command post. Engineers should don turnout pants, or brush pants as appropriate for the incident, prior to boarding the apparatus.
- If a response is dispatched while the apparatus is in motion, the Engineer, when safe to do so, shall pull to the side of the roadway and allow personnel to don their PPE. Once all personnel are seated and seat belted, the apparatus may resume the response. At no time shall personnel remove seatbelts to don PPE or wear structural helmets while the apparatus is in motion. (brush and rescue helmets are approved to wear in the apparatus)
- At no time shall personnel wear rain gear over protective clothing while engaged in fire suppression operations or operating in or near traffic lanes. Turnouts and brush gear are fire resistive and provide retro-reflective properties that rain gear lacks. Rain gear is only to be worn during non-emergency operations being conducted outside of traffic lanes e.g. company training, FCIP, pre-fire inspections, and community events.
- Personnel performing traffic control functions shall wear a helmet and turnout coat or brush jacket, and utilize a portable stop sign and light wand.
- Personnel performing manipulative testing or training shall wear a level of PPE that is appropriate for the testing scenario.

San Diego Fire-Rescue Department
Chart of Required Personal Protective Equipment

Note: These PPE requirements are for initial response and operations. Company Officers and/or Incident Commanders may add or reduce PPE based on current or expected conditions at scene.

Response/Incident Type	Minimum Required PPE	Situation PPE
Structure/Vehicle/Rubbish/Ringing Alarms/Hazmats (including fuel spills)*	Structural helmet and hood Turnout coat, pants, structure boots and gloves	SCBA Hearing protection Appropriate eye protection
Wildland/Grass/Brush/Vegetation Structural Protection in Urban Interface (Upgrade to full turnouts if conducting interior operations)	Structural helmet and hood or wildland helmet with shroud Brush jacket and pants over Class B/C uniform Wildland boots & gloves Appropriate eye protection Web gear with fire shelter and canteen	Hot Shield wildand mask, Model HS-2 Long sleeve Class C tee shirt recommended Hearing protection Chaps with chainsaw use
Vehicle Accident or Rescue	Structural helmet and hood Turnout coat, pants, structural boots, and gloves with medical aid gloves (under work gloves) Appropriate eye protection	SCBA Hearing protection Appropriate eye protection Medical aid face shield HEPA mask
Vertical/Industrial/Trench	Helmet, Brush jacket Class B/C uniform Utility boots Structure, wildland, or specialty gloves*** Appropriate eye protection	Turnouts Hearing protection Medical aid gloves (under work gloves) Brush / rescue helmet Brush pants
Water Rescue	Class C uniform Tennis Shoes or Utility Boots (No Structure Helmets or Turnouts)	PFD if available Work Gloves Dry Suit Rescue Helmet
Special Service (non fire) e.g. Elevator Rescue, Lock-outs, Assist P.D. etc.	Class B uniform or Class C uniform w/brush jacket or turnout coat Any approved boot	Helmet, brush or structure Work gloves Appropriate eye protection, hearing protection

Medical Aid/Pedestrian Traffic Accidents ****	Class B uniform or Class C uniform Any approved boot Medical aid gloves Medical aid safety glasses	Medical aid face shield HEPA mask Disposable gown Hearing protection Brush jacket or turnouts
*__Warning:__ Full turnout structural firefighting PPE is the minimum level of protection for HazMat Incidents and may not provide adequate protection under all conditions.		
**__SCBA's:__ are required to be worn and "operating" anytime you enter a potential IDLH atmosphere and will continue to be worn until the company officer or IC determines they are no longer required.		
***__Specialty Gloves:__ Gloves used by Rescue 4 and Lifeguard River Rescue Unit.		
**** __Retro reflective material:__ All personnel shall wear clothing and or equipment which has retro reflective material whenever operating in/near the roadway.		
Specialty units shall wear PPE specific to their specialty, as approved by the Deputy Chief of Operations.		

PPE Drying Instructions

- Do not overload dryer. One outer shell or one inner lining of complete ensemble maximum.
- Fasten all closures.
- Turn garments inside out. Adjust dryer setting to air dry/no heat or hung dry shaded from direct sunlight. NEVER USE HEAT TO DRY TURNOUTS.
- Gloves shall not be machine dried.

Summary

The underlying theme of this chapter is to always be diligent and understand that safety never ends. It extends far beyond the limited examples contained herein, but with this information you will begin to build a strong foundation as a firefighter with the San Diego Fire-Rescue Department. Each day firefighters come to work to serve their community, they knowingly put their health and lives at risk. However, through training, education, and experience, we can greatly reduce or eliminate that risk.

Every person in the department has a duty to themselves and to those who serve alongside them to stay diligent and safe. Safety is not merely a set of rules or regulations that are issued in a mandate or directive. Safety is an attitude. In order to be safe, we must all commit ourselves to a career of professionalism based upon the training and rules that are provided to us. These standard operating guidelines must be adhered to by all members of the department to achieve a common goal, serve the community to the best of our ability and to live a long and healthy life.

This drill manual is filled with information and data that has been compiled to keep our organization as safe and healthy as possible. The information contained within is the collective experience of those who have come before us. We must learn from their mistakes and successes. As new research is discovered to identify a higher level of safety, it will be brought to the attention of all San Diego Fire-Rescue personnel. As policies and procedures change to reflect a greater level of safety, they will immediately be instituted to require personnel adherence.

Act safe, be safe, live safe!

Media & Link Index

- Exploding Bumper Injures Firefighters
- Air Bag Deployment During Vehicle Rescue
- Fire Truck Collision
- Kaymar Fire Report - SDFD
- "My Last Dying Breath" - LAFD *(Download may take several minutes)*
- Wildland Burnover - Orange County Fire Authority
- Donning Structural PPE

- San Diego City Risk Management
- SDFD Safety Policy SI 01 Section 02
- NFPA Standards
- Wellness Center
- OSHA
- California Department of Occupational Safety & Health
- Underwriters Laboratory
- NIOSH - National Institute for Occupational Safety & Health
- FEMA SAFER Grants
- NSC - National Safety Council
- ANSI - American National Standards Institute

References

1. SDFD Drill Manual, 1994, Firefighter Safety
2. www.ansi.org
3. www.nsc.org
4. www.fema.gov/firegrants/
5. http://www.cdc.gov/niosh/fire/
6. http://www.ul.com/global/eng/pages/
7. http://www.dir.ca.gov/dosh/
8. http://www.osha.gov/
9. http://www.sandiego.gov/riskmanagement/
10. http://www.nfpa.org/aboutthecodes/list_of_codes_and_standards.asp
11. SDFD Safety Committee

Credits

Writers:

Randy Wilkinson, Andrea Dominguez

Layout & Editing:

John Brubaker, Tim Stevenson

Media:

Paul Perreria, Shawn Johnson, John Brubaker

Grammatical Editing:

Shannon Mueller, Eric Matteson

NOTE: If you have any additional information or content that you feel would be appropriate to contribute to this Chapter or would like to report any errors or misrepresentations, please contact the SDFD Training Division or email the Drill Manual Revision Staff at

SDFDDrillManualTeam@SanDiego.gov

Revisions/Updates

Date	*Revision/Update Description*