

SFPE Career Guide

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Introduction

Each year in the United States fire claims about 4,000 lives and injures nearly 25,000 others. In addition, over 8 billion dollars in direct property damage is caused by fire and some estimates value the total impact of fire on the economy at over \$100 billion per year. These statistics do not begin to address the pain and suffering of anyone who might in any manner be touched by a destructive fire or the indirect business losses and bankruptcies that often occur as a result of large fires.

Every community has firefighters, both career and volunteer, whose responsibility it is to respond to these emergencies. These dedicated men and women are the mainstay of the efforts to control the spread of fire and to mitigate against the loss of life and property from fire and similar emergencies. In addition, they often respond to emergency medical incidents and give advice as to how to prevent the start and spread of fire. Firefighters are a vital and valuable asset to our communities.

There is another group of professionals dedicated to the prevention of damage and loss of life from fire — fire protection engineers. Their work complements that of the firefighter and their main focus is both the prevention of fires before they start and limiting the consequences if they have already begun. They design building features, analyze activities in those buildings and research materials

and products to prevent fire hazards and limit its destructive effects. They use the basic tools of engineering and science to help protect people, property, information, and organizational operations from the effects of fire and explosion. Their work is challenging, interesting and essential to the well-being of the public.

This career guide describes the duties of fire protection engineers, details where they work and how they are trained, and provides resources for additional information.

The Society of Fire Protection Engineers has developed this publication to provide an overview of fire protection engineering so that you and others may explore opportunities in this important and rewarding career. The purpose of the Society is to advance the science and practice of fire protection engineering and its allied fields, to maintain a high ethical standard among its members in over 50 chapters worldwide and to foster fire protection engineering education.

The Society, its officers and over 4000 members stand ready to respond to any questions you may have regarding their profession, to offer scholarships for the study of fire protection engineering, and to assist with internships and co-operative education (“co-op”) related work experiences while pursuing your degree in fire protection engineering.

1. What Is Fire Protection Engineering?

Fire protection engineering is a unique profession that builds upon the basic tools of several other engineering disciplines, e.g., mechanical, electrical, chemical and civil engineering. The fire protection engineer may be the person responsible for determining what the fire hazards are in a proposed new or existing facility, and researching and designing fire safety systems such as alarms and sprinklers to reduce that hazard. They also often oversee the installation, maintenance, and operation of these systems and may be responsible for their approval by the government or other agency responsible for ensuring a safe environment for people, data and property.

Fire protection engineers deal with the problems of fire from an engineering and scientific viewpoint. They apply their knowledge to situations, usually before the fact, in order to prevent the outbreak of fire or to stop fire in its earlier, more manageable stages. This requires knowledge of the nature and characteristics of fire, how fire grows and develops and the products of combustion. It also requires an understanding of areas such as fire growth and development. A fire protection engineer is able to apply these principles to structures, processes, materials and systems to

protect people and their environment. Thus the domain of the fire protection engineer is diverse and ever-changing. Appendix A lists some of the technical areas about which a fire protection engineer is expected to be knowledgeable.

A fire protection engineer fulfills a broad range of duties, all in some way related to fire. This can range from designing fire protection for a space station, to protecting treasures such as the U.S. Constitution, to ensuring that the occupants of a high-rise building are safe from fire. Fire protection engineers have always been in great demand by corporations, educational institutions, consulting firms and government bodies around the world. Graduating from a fire protection engineering program usually guarantees an immediate place in the workforce, most likely at a high starting salary. The median salary for fire protection engineers is significantly above that of other engineering disciplines. Consistently in the last several years there have been more jobs than graduates to fill them.

A career in fire protection engineering provides not only financial, but personal benefits. The ultimate goal of the fire protection engineer is to use science to create and maintain a fire safe world.

2. What Fire Protection Engineers Do

The potential of fire is always present, and the catastrophic effects that fire can have on life, property and economics can be enormous. As a result, you will find fire protection engineers in almost

every sector of the work force. The following describes some of the ways in which fire protection engineers provide their services and a first hand look at some typical careers.

Fire Protection Engineering Consultant

The consulting engineer has a wide variety of challenges within the fire protection discipline and they serve a wide variety of clients with diverse fire problems. For example, consulting engineers are often involved in the design of large buildings. Their role as part of the design team is to address all fire safety concerns that arise during the design and construction of a building. In that role they work with engineers from other disciplines, as well as architects, technicians, and the building owners and managers to protect against the threat of fire. The fire protection engineer is also often the liaison with government officials who are charged with protection of the public interest with respect to fire. Fire protection engineering consultants also work with the building owner to analyze existing buildings to determine fire

safety criteria and design fire safety plans.

After a fire has occurred, fire protection engineering consultants are often asked to perform an investigation to reconstruct the cause of the fire, carry out fire analyses of specific products, and sometimes give expert testimony in litigation.

Over twenty-five percent of fire protection engineers are employed as consultants. This is also a fast growing and high paying segment of the field. As fire protection engineering has evolved from being based primarily on practical experience to a discipline that incorporates state of the art science and computer capabilities, there is an even greater need for fire protection engineering consultants.

Interview with A Global Fire Protection Engineering Consultant

As a fire protection engineer in the consulting industry, Debbie McLellan has worked on a variety of projects including education facilities, aged care facilities, historic buildings, apartment buildings and larger commercial developments.



Debbie McLellan, ME Dist. (Fire)
Fire Protection Engineer
Cosgrove Major Lincolne Scott
Christchurch, New Zealand

She graduated from the University of Canterbury in New Zealand with a Chemical and Process Engineering degree in 1997, and earned a Masters of Fire Engineering in 1999. She had been working as a consulting engineer since the beginning of 1999 and currently works for Cosgrove Major Lincolne Scott in Christchurch, New Zealand.

As a fire protection engineer working with the New Zealand Building Code, Debbie is able to apply her skills to not only prescriptive,

code-based solutions but also to performance-based fire engineering design. Performance-based design uses fire engineering skills to prove equivalency or better to the code and provides cost effective and user-friendly solutions.

Written and oral communication skills are a vital skill for a consulting fire protection engineer. A large part of Debbie's position involves communicating with clients, architects, engineers in other disciplines, contractors, and local approving authorities.

Debbie's advice to someone considering a career in fire protection engineering is 'go for it.' Working in the fire protection profession is interesting, fun, challenging and very rewarding.

International Opportunities for Fire Protection Engineers

Fire protection engineering as a profession is rapidly expanding throughout the world, and opportunities for fire protection engineers in Europe, South America, Asia and the South Pacific, and the Middle East have never been better. Many of the larger United States consulting and insurance firms have expanded their growth to one or more foreign countries, and most of the developed nations of the world have seen the establishment of local engineering firms with fire protection engineering capability.

As the economy becomes more global, as business continues to cross international borders, as codes and standards become increasingly

internationally standardized, as fire protection engineering curricula continue to become established internationally, and as building construction and design challenges become more compelling, appreciation for the value of the contribution of fire protection engineers increases exponentially.

Traveling to exotic destinations and solving complex problems under sometimes unique conditions is the dream of most fire protection engineers, and making a positive difference in the level of safety for divergent cultures and nationalities is a blessing bestowed upon the international fire protection engineer.

Research and Testing

Research and testing within fire protection engineering are carried out by large corporations, fire equipment manufacturers, universities, government agencies, professional organizations, standards testing facilities, and insurance corporations. This research is conducted in every aspect of the field, from computer modeling of small room fires, to large-scale tests simulating fires in aircraft hangars. Testing a broad range of consumer products – for example furniture or clothing, is an important part of fire research. Fire



researchers also study how people respond to fire and how this affects the ability of the fire protection systems and personnel to perform in crises. An important part of fire protection engineering research is developing an understanding of all of the systems and human factors that go into protecting people and property from fire. Research must be done not only to keep up with changing fire problems, but also to advance our ability to design fire safe buildings.

Interview with A Fire Protection Engineer in Research

Like so many other engineers, Mr. Madrzykowski's interest in fire protection engineering started when he worked as a co-op student while attending college. He was enrolled in a course in mechanical engineering and worked part-time at the National Institute of Science & Technology (NIST) in its Building and Fire Research

Laboratory. After graduating, he took jobs working on the design of nuclear power plants, and later as a stress analyst in the defense industry. However, he felt that these fields did not offer the challenges that he found in the fire research laboratory. He returned to NIST and has been there ever since. He also went on to complete his Master of Science degree in fire protection engineering at the University of Maryland.

He now manages a group of researchers augmented by co-op students who investigate many different fire related problems for both government and industry. He continues to find fascination in his profession because he is helping to find solutions to prevent and mitigate fires. This includes such major challenges as the increase in wild land fires and how to protect the houses that they may threaten – and even finding a material better than water to prevent the spread of such fires.



Dan Madrzykowski, P.E.
Leader, Large Fire Research
National Institute of
Standards & Technology
Gaithersburg, MD

The reward of research he finds is, “helping people that really need help, whether or not they can afford it. This is especially true for the fire service and the public.” The results of his team's research also benefits regulators by providing data to assist them in developing new protective fire standards and regulations.

Frequently, he conducts full scale tests outside the laboratory and examines the real-life effects of fire catastrophes. For instance, after being involved in small-scale laboratory studies of how to optimize the use of water to mitigate the hazards of oil well blowout fires on oil platforms, he traveled with the Army Corps of Engineers to Kuwait. The Gulf War had just ended and he helped to examine methods to measure the heat release rate from oil well fires, confirming in real conditions the results of his previous experiments.

His advice to those interested in a research career in fire protection is to develop your math skills, and your understanding of heat transfer and fluid dynamics. He also emphasizes the need to learn to communicate well. He states, “you need to continue your education after you get your degree, and always keep an open mind.”

Corporate Fire Protection Engineer

Fire protection engineers are hired by corporations to protect the interests of the company from fire losses, including life, property, data, and corporate image. The fire protection engineer in this environment works with engineers from other engineering disciplines to make recommendations to the company for cost effective fire protection solutions. It is the job of the fire protection engineer in industry to ensure that the facilities, the processes that are carried out in them, and the employees who work there are adequately protected. This is done through design, inspection, review, and modification of the facility and its systems. Whether the hazard involves a high-rise hotel, large manufacturing facility, or an offshore oil rig, the threat to life, property, and the entire company are protected by fire protection engineers.

Many large companies employ a fire protection engineer. With the size and expense of modern commercial facilities, a single fire could risk the future of an entire company. Thus the hiring of a fire protection engineer is not only wise, but also necessary in industry today. Bethlehem Steel, Boeing, Burger King, Chrysler, Dow Chemical, Eastman Kodak, General Motors, IBM, Marriott Corporation, 3M, Merck, Mobil, Owens-Corning, J.C. Penney, Polaroid, Scott Paper, Texaco, and Xerox are just a short list of companies that employ fire protection engineers. It just makes good business sense to hire professionals whose job it is to avoid the catastrophic effects of fire and keep the company in business.

Women in Fire Protection Engineering

Many women practice fire protection engineering today and their number is growing. As the interviews in this guide show, their duties can range from safety engineering to research to design of buildings. Women are attracted to the fire safety field not only because job opportunities and salaries are

higher than other fields, but because fire protection engineering provides an opportunity to make a direct and tangible improvement in the safety of the public. Fire protection engineers are frequently part of a fire safety team that, together work to improve the built environment.

Interview with a Corporate Fire Protection Engineer

Providing for the safety of an entire hotel full of guests is a monumental responsibility, but what if you were responsible for more than 700 hotel properties in 64 countries! That is the responsibility of a single fire protection engineer.

Ms. Berkol did not set out to be a fire protection engineer. Her first college degrees came in French literature and language. Upon looking for a job she found that positions of interest were not available to her. Through her father, a professor at Worcester Polytechnic Institute (WPI), she learned of their graduate program in fire protection engineering. After some thought she decided to go back to school to earn a Master of Science degree in Fire Protection Engineering.

During her time as a student at WPI she took advantage of the opportunities that are available to fire protection engineering students as interns, and held a co-operative work assignment with IBM. Her experience in that position, as plant fire protection engineer, helped her develop the confidence to move on to positions of even greater responsibility.

Upon graduation from college she worked as a consulting engineer on a variety of projects including the



April Berkol

*Corporate Director of Environment,
Safety, Health, Fire & Life Safety*
Starwood Hotels and Resorts
Worldwide. Inc.
White Plains, NY

Embassy Security Upgrade Program for the Department of State, consisting of the construction of 23 embassies at a cost of over \$782 million.

In her present position she has the opportunity to travel to many interesting and exciting destinations throughout the world inspecting and surveying hotels for life safety, fire safety and structural aspects.

She feels that it is important for fire protection engineers to have curiosity, to look for answers to problems, and to have patience because of the time it sometimes takes to find the answers and explain them to others. Her advice to those seeking to enter the profession: "Once you have decided to become an FPE, get yourself the best education you can and accept internships or co-op assignments so you can see what types of jobs are out there. Talk to people who are active in their professional society (Society of Fire Protection Engineers) to learn about their experiences and listen to their advice – you don't have to take it but you may learn something from it!"

Fire Protection Engineers in the Insurance Industry

Fire protection engineers are hired by the insurance industry to analyze the potential consequences of fire losses to insured facilities and recommend how best to prevent these losses. They may work for a corporation that insures large industrial complexes, office buildings, automobile and aerospace manufacturing facilities, oil refineries or even grocery stores. The fire protection engineer in this position uses the knowledge and skills of the profession to minimize fire and hazardous conditions and thus protect the interests of both the insured and the insurance company. This is done through surveys of facilities, research, testing and analysis, and plan review of new installations.

A typical property loss control inspection looks at many aspects of fire protection. Building construction needs to be evaluated for its fire hazard characteristics and its suitability to the occupancy. Water supplies must be tested. The fire protection engineer must be able to understand fire pumps and their design, and must be knowledgeable of the operations, controls, and functions of the pump and driver to troubleshoot problems.

The engineer also tests and analyzes fixed sprinkler and water spray systems, complex fire detection and alarm systems and evaluates contents and processes for their contribution to the fire risk at the facility. Fire protection engineers develop a sound understanding of the manufacturing process, its controls, and the hazards it creates. In the end, the fire protection engineer must bring all this information together in a risk evaluation that reflects the relative fire risk of the property and provides practical and technically sound recommendations to reduce the risk, if necessary. A comprehensive and coherent report must be provided for the insurer and the insured.

As facilities changes with the introduction of new technologies, products, and systems, the insurance industry must keep abreast of these changes in order to understand the fire hazard potential of what they are insuring. Fire protection engineers analyze and assess the consequences of each change, and as such provide necessary expertise to the company.

Interview with a Professional Engineer in the Insurance Industry

Mr. Holmes writes, "I was totally unaware of the profession of fire protection engineering, until I was a senior in college in mechanical engineering. During job interviews, a recruiter from an insurance company visited

campus. I learned that large property insurance organizations use the technical skills of engineers to assess fire hazards and develop creative, engineering solutions to reduce the risk of fire losses at large commercial and industrial facilities. I had no idea, at that time, that what I thought to be very simple and natural fire phenomena could be analyzed and attacked by engineering principles. I had thought that fire and fire protection was something that only fire fighters dealt with."

His education consisted of a Bachelor of Science degree in mechanical engineering (BSME) from Worcester Polytechnic Institute (WPI) and then job experience that he considered invaluable. Fifteen years after his BSME degree, he earned a Master of Science degree in Fire Protection Engineering from WPI.

In his current position with HSB Professional Loss Control he is



Wayne Holmes, P.E.

Vice President of Business Development
HSB Professional Loss Control
Hartford, CT

responsible for seeking and developing innovative yet practical ways of solving fire protection related problems for customers. In part, those services are provided to numerous insurance firms seeking to reduce their exposure to financial loss due to fire and allied perils.

These services include inspection of large commercial and industrial facilities and processes as a loss control specialist.

He states, "The types of occupancies and processes that the loss control engineer might encounter are as broad as one can possibly imagine. That's the real interesting part of the job. One day baby food, the next day a brewery. One day a toy plant, the next day nuclear weapons. The challenge is to evaluate the fire risk in the proper context, evaluate reasonable risk reduction schemes, and make appropriate recommendations to reduce the fire risk." He adds, "It is very rewarding to look back at projects that once looked like there was no practical way of providing increased fire safety and say, 'I've done my job, I found a practical solution where one was not apparent, and I've made the world a little safer from fire.'"

The Fire Protection Engineer in Government

Federal Government

The vital importance of fire protection engineering has been recognized by the federal government, and fire protection engineers are employed in just about every federal agency. Their role is to provide for the protection of the employees, property and operating systems against the potential hazards of fire. In addition, their mandate includes the protection of the public using their facilities. Each federal agency requires the fire protection engineer to focus on particular aspects of their discipline relative to the function of the agency. For example, a fire protection engineer employed by the Bureau of Alcohol, Tobacco and Firearms might participate in fire investigations, while a fire protection engineer employed by the



General Services Administration would be responsible for the protection of all types of government buildings and their occupants from fire. In many of these government jobs, the fire protection engineers often participate in research. In NASA, for example, the fire protection engineer may participate in cutting edge, specialized research on fire related to space travel.

The federal government is also responsible for many of the great historic treasures of our nation. Since the federal government is a large owner who self insures, some of the jobs in fire protection in the federal government are similar to those in the insurance and corporate sector.

Interview with a Fire Protection Engineer in the Federal Government

The responsibilities of Ms. Willard's present position are as impressive as the length of her title. She supervises a staff of 14 individuals and provides program oversight and advisory responsibilities for approximately 500 government buildings, comprising over 90 million square feet of space.

Her first exposure to fire protection was through her father who was a volunteer fire fighter. However, she did not decide to become a fire protection engineer until after she became disillusioned with aerospace engineering and went looking for a different engineering discipline. Once she learned about fire protection engineering, she "instantly knew where I belonged...and never looked back." She received a Bachelor of Science degree in Fire Protection Engineering from the University of Maryland and later received a Master's degree in Public Administration from American University.

She finds that the most rewarding aspect of being a fire protection engineer "is knowing that you positively and directly affect the life safety of individuals that you don't



Deidre Willard, P.E.

*Acting Chief of the Safety, Environment, and
Fire Protection Branch, Service Delivery
Support Team, Public Building Service,
National Capital Region
General Services Administration
Washington, DC*

even know." Another rewarding aspect of her job is being able to work as a team with other fire protection engineers, both in her office and with outside consultants, to find a realistic and cost effective solution to a problem while meeting both

legal and code requirements.

When asked about what skills, characteristics and abilities are important in her field, she believes that "a fire protection engineer must care about people and their safety" and must "have an instinct to protect others." She adds that a fire protection engineer must also be properly trained and must understand how fire protection devices work. She feels that in addition to a degree in fire protection engineering, courses in writing and communications, economics and statistics are important.

She suggests that someone interested in fire protection engineering should talk to participants in all aspects of the profession and "be prepared to continually educate yourself and ask 'why'". She adds, "last but not least, have fun and know that we are a family of engineers that work together for a common goal."

Local Agencies and Code Administration

All buildings are regulated by a system of codes that protect the life, health, and safety of the public. Besides organizations that develop and maintain these codes, there are state and local government bodies charged with enforcing the codes. With today's high-tech, complex building systems, the skill and knowledge of a fire protection engineer has become an essential part of code development and enforcement and state and municipal planning.

Fire protection engineers are usually employed in the code enforcement division of the local government.

Duties might include:

- advising a government agency about fire safety codes,
- reviewing building plans to ensure that they meet those codes and are properly thought out with respect to fire,
- working with architects, engineers, insurance representatives, builders, and developers on fire protection issues, and
- providing training and assistance to field

The Fire Service

The fire service offers exciting and challenging careers in fire protection. In this capacity the fire protection engineer may have a broad range of responsibilities including:

- working with city planners and code officials,
- researching new technologies,
- investigating and analyzing significant fires,
- training personnel in technical issues, and

- communicating the latest fire prevention knowledge to the department and the public.

A fire protection engineer has a special place in the fire service. Because of specialized training in engineering, the fire protection engineer becomes a technical resource for others and can serve as the bridge between technology and the essential role in life safety and property protection that the fire service plays.

Interview with a Fire Protection Engineer in the Fire Service

Graduating from Arizona State University with a Bachelor of Science degree in Mechanical Engineering, Ozzie Mirkhah was unaware of the fire protection engineering field. However, he

learned fast, as his first job as an engineer was to design fire suppression and detection systems. He later went on to receive a Master's degree in Public Administration from the University of Nevada Las Vegas and is a graduate of the Executive Fire Officer Program at the National Fire Academy.

In his present position he manages the Fire Protection Engineering Section of the Las Vegas Fire Department. His responsibilities include the analysis, review, evaluation and approval of all the submitted fire and life safety designs in his jurisdiction as well as the enforcement of state and local fire and life safety codes and ordinances. Since there are many unique projects being constructed in Las Vegas, with complex fire and life safety issues, he is kept quite busy.

He cites as a particularly challenging project, his involvement in



Azarang (Ozzie) Mirkhah, P.E.
Fire Protection Engineer
Las Vegas Fire Department

reviewing, approval and coordination of the unique fire protection and life safety systems for the 1,149 foot high Stratosphere Tower. He served as the Authority Having Jurisdiction (AHJ) to ensure that the

project was in full compliance with the approved fire and life safety guidelines. He was further involved in training the Las Vegas fire suppression crews to familiarize them with the complex systems installed in the project.

In general, he feels that fire protection engineers can help the fire service by learning firefighters' concerns and helping them to accomplish their goals. He adds, "It is important to remember that we are part of a team of fire experts with different specialties in the fire service."

His advice to someone thinking about a career in fire protection engineering is clear and enthusiastic. "I would say go for it: the sky is the limit. Right now we are pioneers in this field, and the next millenium holds tremendous opportunities for us."

Equipment Manufacture

There are many companies that design, fabricate, distribute and install fire related products and systems to respond to building owners' requirements and federal codes.

Competition demands each manufacturer develop the best and most cost effective product possible to meet field requirements using the latest research methods and materials. Their products have to work effectively in a wide range of environments and under harsh conditions. Since life safety is often the primary mission of their product, reliability must come first in design and installation.

Fire protection engineers must follow a product from development through its entire life. Once a product has been qualified by responsible



laboratories, the engineer must ensure the product is properly manufactured and installed, and must resolve any field issues. Product development requires working closely with many

different entities within the company, including marketing, manufacturing, and technical sales; and outside the company, including approval laboratories, fire service personnel, and standards committees. To all of this must be added the fact that the product must be competitive in price and be capable of producing a positive economic return to the company. In the process of learning every detail about their own job, the fire protection engineer must also understand the needs of those in the industry where his company's products are used.

Interview with a Fire Protection Engineer in a Fire Protection Equipment Manufacturing Firm

Mr. LeBlanc's interest in fire protection started as an undergraduate in mechanical engineering at Worcester Polytechnic Institute. He states, "I had the opportunity to work on a project to develop a computer program that could predict the manner in which a fire would develop within a room. Because this project initially started as a master's thesis by a student in the fire protection program I got a great deal of exposure to many aspects of fire protection engineering. I found the field to be fascinating and exciting because of the great number of unanswered questions and resulting opportunities for a single individual to make a substantial contribution to the field."

And so, after receiving a Bachelor of Science degree in Mechanical Engineering with an emphasis on thermodynamics and fluid mechanics from WPI, he enrolled in their graduate program leading to a Master of Science degree in Fire Protection Engineering.

In his current position he is responsible for developing new products, such as new sprinkler heads



David LeBlanc
Project Engineer
Grinnell Corporation – R & D Center
Cranston, RI

and new piping systems, or redesigning existing products produced by his company. The fundamental objective is to develop products that improve public safety. The second objective is to develop products that will improve the market position, market share, or profitability of the

company. David finds that being a fire protection engineer is "exceptionally rewarding" in two ways. "The ability to help people and save lives, albeit indirectly, is a powerful motivating factor in my work. I also find the job rewarding at a professional level because of the number of unanswered questions and the resulting opportunity to make significant contributions to the field." He feels that the most important skill for a fire protection engineer to have is the ability to solve complex problems, using math, science and creative thinking. He suggests that anyone contemplating fire protection engineering as a career should talk to those already in the field to help them select the curriculum best suited to the jobs that interest them.

3. How To Become A Fire Protection Engineer

As the interviews with various fire protection engineers reveal, there are many paths to a career in fire protection engineering. Because the profession covers so many different aspects of contemporary life, the variety of opportunities within the profession allows for individuals from many different backgrounds to become part of it. The first important step is to learn what the profession is all about and then pursue a course toward reaching that goal.

Ways to learn about a career in fire protection engineering include:

- Talk to fire protection engineers and learn about their experiences.
- Visit professionals at work.
- Visit fire protection engineering schools.
- Seek opportunities to do science projects related to fire, and participate in internship programs, field trips, etc.
- Read about fire disasters and consider how they may have been avoided.
- Join a volunteer fire company and gain first hand knowledge of how fires spread and are suppressed.
- Contact the Society of Fire Protection Engineers headquarters at the address in Chapter 4 of this Guide to find the local SFPE chapter in your area.

High School Preparation

Proper preparation for a career in fire protection engineering is important. You should take college preparation seriously and include pre-engineering courses, e.g., mathematics, chemistry, physics, and computer science if offered.

Now is the time to learn more about the career of fire protection engineering using the suggestions in this Guide.

College Preparation

Many fire protection engineers start by earning a bachelor's degree in civil, electrical, chemical or mechanical engineering. In the United States, most of these degrees are based on an Accreditation Board of Engineering and Technology (ABET) curriculum, which can be an important factor in obtaining state Professional Engineering registration. There are several universities outside the United States that offer the opportunity to study fire protection engineering; a partial list is included in Chapter 4 of this Guide.

The University of Maryland currently offers the only ABET accredited undergraduate fire protection engineering degree in the United States. A four-year curriculum in fire protection engineering provides a strong background for becoming a fire protection engineer. The bulk of the first two years focus on engineering fundamentals: mathematics, chemistry, physics, and fundamental engineering applications. The second two years of college focus on fire protection engineering. This includes courses such as heat and mass transfer, fire risk assessment, fluid mechanics, fire dynamics, water based fire protection

systems design, and design of other fire protection features such as smoke control and fire alarm systems. After completion of this program you can choose either to pursue a career in fire protection engineering from that point or to continue your education at the graduate level; either option can lead to a highly rewarding career.

Oklahoma State University offers a four-year Bachelor of Science degree in Fire Protection and Safety Engineering Technology. This is a multi-discipline degree where the graduates are knowledgeable in the areas of fire protection, safety, industrial hygiene and hazardous materials. It is fully accredited by the Accreditation Board for Engineering Technology/Technology Accreditation Commission (ABET/TAC) and is the only degree of its type in the United States. The curriculum includes fundamental engineering coursework as well as degree-related work in system design, safety, loss prevention and other specialties. The Engineering Technology program enables the student to gain practical knowledge through rigorous laboratory projects.

Graduate Level Fire Protection Engineering Degrees

Graduates from undergraduate engineering programs can pursue a degree in fire protection engineering at the graduate level. There is an easy, direct transition from most engineering disciplines to fire protection engineering. Other science backgrounds such as chemistry and physics are also appropriate.

In the United States, both the University of Maryland and Worcester Polytechnic Institute offer graduate degrees in fire protection engineering. Individuals with degrees in any science or engineering or engineering technology discipline may apply for

these programs. In addition, each has special programs that allow qualified high school students to obtain both a bachelor's degree in engineering and a master's degree in fire protection engineering in five years.

Fire protection engineering graduate programs offer practice-oriented classes in topics such as water-based fire suppression; detection, alarm and smoke control; exit systems; failure analysis; fire dynamics; and risk management. In addition, students have the option of selecting specialized topics in which to pursue individual research interests.

Professional Engineering Licensure in the United States

State laws require that many engineering projects be overseen by registered (licensed) professional engineers (PE's). Professional Engineer registration is awarded by state registration boards based upon written examination, college education and professional experience. The written exam is usually taken in specific engineering disciplines, such as mechanical, electrical, chemical or civil. Fire protection engineering is a recognized engineering discipline through the National Council of Examiners for Engineering and Surveying (NCEES). In over 40 states,

the P.E. examination can be taken in fire protection engineering.

If an engineer intends to practice fire protection engineering as a consultant, or work for a firm which requires a registered P.E., it is wise to follow a path leading to the attainment of professional engineering registration.

General information on the profession of engineering and on engineering licensure is available through the National Society of Professional Engineers website, www.nspe.org.

4. Resources For Further Information

Organizations

For more information about fire protection engineering contact the following sources:

**The Society of
Fire Protection Engineers**
7315 Wisconsin Ave., Suite 1225W
Bethesda, MD 20814
(301) 718-2910
www.sfpe.org

The Society of Fire Protection Engineers was established in 1950. It is a professional society representing those practicing in the field of fire protection engineering. The Society has over 4000 members in the United States and abroad, and 51 regional chapters, 10 of which are outside the United States.

The purpose of the Society is to advance the science and practice of fire protection engineering and its allied fields, to maintain a high ethical standard among its members and to foster fire protection engineering education.

The Society supports the development of the annual Professional

Engineering licensing exam in fire protection and the grading of those exams under the auspices of the National Council of Examiners for Engineering and Surveying (NCEES). Several volunteer committees and task groups work under the Society's auspices on technical projects to further advance the state of the art.

The Society's activities include a series of educational seminars and short courses, technical symposia and conferences, and books and publications, designed to advance the state of the art of fire protection engineering and provide technical information to the fire protection community. The Society publishes a bimonthly newsletter, a peer reviewed quarterly journal, and a quarterly technical magazine, *Fire Protection Engineering*.

The Society offers a variety of resources for students including a careers video and student chapters at several of the schools mentioned below. If you would like to become a student member of the Society, contact SFPE.

Schools

For specific information about programs leading to a degree in fire protection engineering contact:

University of Maryland at College Park

Department of Fire Protection
Engineering

0151 Engineering Classroom Building

University of Maryland
College Park, MD 20742-3031
(301) 405-3992

www.enfp.umd.edu

Offers both undergraduate and graduate degrees in fire protection engineering. Candidates for the master's degree program may choose either a thesis or non-thesis program. In addition, a Professional Masters or Master of Engineering degree is offered for practicing engineers.

Worcester Polytechnic Institute

Center for Firesafety Studies
Worcester Polytechnic Institute
100 Institute Road
Worcester, MA 01609

(508) 831-5593

www.wpi.edu/~fpe

Offers the dual-degree five year program for high school graduates as well as the MS and Ph.D. in fire protection engineering. Thesis and non-thesis options are both available. The masters degree, graduate certificate and advanced certificate are available to practicing engineers. Fully paid graduate internships are available.

Oklahoma State University

Department of Fire Protection and
Safety Engineering Technology
303 Campus Fire Station
Oklahoma State University
Stillwater, OK 74078
(405) 744-5721

www.fireprograms.okstate.edu/firet

Offers a Bachelor of Science degree in Fire Protection and Safety Engineering Technology and a fire protection certificate program which includes a distance learning option.

All three schools offer internships and undergraduate co-cop jobs for full-time students.

University of New Haven

Fire Science Programs
(202) 932-7424

Lead to Certificate, Bachelor of Science and Master of Science degrees in Fire Science and Fire Protection Engineering. Contact Robert Sawyer, Director of Fire Sciences.

University of California at Berkeley

firesafe@euler.berkeley.edu

Offers a Doctoral program in Fire Protection Engineering.

International Universities that offer studies in Fire Protection Engineering

Hong Kong Polytechnic University

Hong Kong
www.polyu.edu.hk

Lund University

Lund, Sweden
www.lu.se

South Bank University

London, England
www.sbu.ac.uk

Swiss Federal Institute of Technology

Zurich, Switzerland
www.ethz.ch

Carleton University

Ottawa, Canada
www.carleton.ca

University of Canterbury

Christchurch, New Zealand
www.canterbury.ac.nz

University of Edinburgh

Edinburgh, Scotland
www.ed.ac.uk

University of Greenwich

London, England
www.gre.ac.uk

University of New Brunswick

Fredericton, New Brunswick, Canada
www.unb.ca

University of Central Lancashire

Preston, U.K.
www.uclan.ac.uk

University of Ulster

Carrickfergus, Northern Ireland
www.ulst.ac.uk

Victoria University of Technology

Melbourne, Victoria, Australia
ian.thomas@vu.edu.au

Additional Sources Of Information

SFPE local chapters have information on certificate programs and new engineering programs which are being formed. Contact SFPE Headquarters for information on the chapter nearest you.

American Society of Safety Engineers

1800 East Oakton Street
Des Plaines, IL 60018-2187
(847) 699-2929
www.asse.org

National Fire Protection Association

1 Batterymarch Park
P.O. Box 9101
Quincy, MA 02269-9101
(617) 770-3000
www.nfpa.org

National Society of Professional Engineers

1420 King Street
Alexandria, VA 22314
703-684-2800
www.nspe.org

Junior Engineering Technical Society

1420 King Street, Suite 405
Alexandria, VA 22314-2794
703-548-5387
Jets@nae.edu

National Institute for Certification in Engineering Technologies

1420 King Street, Suite 408
Alexandria, VA 22314-2794
703-548-1518
www.nicet.org

5. *The Next Step*

As described by the interviews with the engineers featured in this brochure, the fire protection engineering profession can be rewarding in many ways:

- It is dedicated to preserving the life, health and safety of people and the conservation of property.
- It provides a broad variety of challenges.
- It is a growing profession, with an expanding future of opportunity.
- It pays well in both monetary compensation and personal satisfaction.

If you feel that you have an interest in finding out more about the profession, contact SFPE to get local chapter information and attend an SFPE chapter meeting. Talk to fire protection engineers about what they do. Read about the latest information on fire prevention and mitigation in your local newspaper and library. Contact a fire protection engineering student at one of the schools listed in Chapter 4. The Society of Fire Protection Engineers and the other resources listed in this booklet can assist you to answer questions you may have.

If you are interested in pursuing fire protection engineering, you must also have an aptitude for math and science, an interest in learning how things work – and how to make them better. Fire protection is a people-oriented profession: almost every

interview with practicing fire protection engineers stressed the importance of teamwork and communication. Development of these skills is important.

Most importantly, you should achieve a strong college-level foundation in engineering, including mathematics and the physical sciences. This can be achieved at hundreds of American universities with a Bachelor of Science or Engineering degree in disciplines such as civil, mechanical, chemical, or electrical. As described in this guide, several schools offer specialized studies in the fire protection engineering discipline. You can earn the BS in fire protection engineering or engineering technology; or you can enroll in a five year dual degree program; or you can build on a BS engineering degree with a masters degree in fire protection engineering...there are lots of options! However, it is also important to follow the advice of so many of the interviewees to keep on learning and reading throughout your professional life.

To those who decide to pursue a career in fire protection engineering, we repeat the advice of Ozzie Mirkhah, Fire Protection Engineer in the Las Vegas Fire Department, "...go for it, (the) sky is the limit. Right now we are pioneers in this field, and the next millenium holds tremendous opportunities for us," and for those of you who will become the future of fire protection engineering.