

CAREER GUIDE
TO THE SAFETY PROFESSION

Career Guide to the Safety Profession, Third Edition

©2007 by the American Society of Safety Engineers Foundation and the Board of Certfied Safety Professionals

ISBN 978-1-885581-50-1

Printed in the United States

This publication is funded by the American Society of Safety Engineers Foundation and the Board of Certified Safety Professionals.

For additional copies, contact:
American Society of Safety Engineers Foundation
1800 E. Oakton Street
Des Plaines, IL 60018
Phone: 847-699-2929; Fax: 847-296-3769; Email: assefoundation@asse.org

Or
Board of Certified Safety Professionals
208 Burwash Avenue
Savoy, IL 61874
Phone: 217-359-9263; Fax: 217-359-0055; Email: bcsp@bcsp.org

Career Guide to the Safety Profession

American Society of Safety Engineers Foundation
Des Plaines, Illinois

Board of Certified Safety Professionals
Savoy, Illinois

Contents

Page

Foreword v

Preface. vii

Introduction 1

What is the Safety Profession? 3

What Safety Professionals Do 5

Where Safety Professionals Work 7

Employment Outlook for Safety Professionals 11

Should I Become a Safety Professional? 15

How to Become a Safety Professional 17

Areas Where Safety Professionals Can Specialize 23

Profiles of Safety Professionals 35

Resources 45

Publishers of the *Career Guide to the Safety Profession* 49

Contributors 51

Foreword

The *Career Guide to the Safety Profession* is a great resource for those who want to make a real difference in safety in the U.S. and around the World. The guide provides an excellent overview of the challenging careers available to safety professionals. It also profiles some successful safety professionals now employed who are making important contributions in both the public and private sectors.

In addition, the guide gives critical information needed in selecting the right undergraduate and graduate academic programs that meet the individual needs for entering a career in safety as well as continuous professional growth.

Safety and health professionals are the critical link to assuring worker health and safety. Every workplace can benefit from the valued knowledge and experience safety professionals bring to an organization. Safety professionals not only help identify and reduce workplace hazards, they help reduce costs and optimize the contributions of all working men and women for the organization.

As a former Administrator for the Occupational Safety and Health Administration (OSHA), I can assure you OSHA values safety professionals and recognizes they are a critical element in achieving the Agency's mission. The Agency has partnered with ASSE, BCSP and others to deliver more effective information and tools to safety professionals so that greater safety and health performance can be realized around the country. OSHA also continues to improve its enforcement and standard-setting strategy and a key component of that effort is increasing the number of safety professionals on staff that are experienced and hold professional certifications.

The pain and suffering caused by thousands of workplace injuries and diseases each year is clearly unacceptable. There are over 7.5 million workplaces in this country and over 111 million workers. Workplace injuries and diseases cost the nation billions of dollars in workers' compensation and medical costs, reduced productivity and lost growth opportunities. New technologies and global economic pressures and the challenges of assuring worker safety and health will continue to increase. That creates a greater demand for highly trained, highly skilled and highly motivated safety professionals.

This guide is an essential tool for students entering the safety field and practicing professionals looking for new opportunities and professional growth.

John L. Henshaw, CIH, ROH
Former Assistant Secretary of Labor for
Occupational Safety and Health
U.S. Department of Labor

Preface

As we begin the twenty-first century, the safety profession requires highly educated, competent and motivated practitioners. It is estimated that employment opportunities for safety professionals will continue to be abundant in the next decade. Today's safety professional serves as a valued member of management, engineering and business teams, often as a leader for projects, initiatives and programs.

Job satisfaction in the profession remains high. Safety professionals are challenged and rewarded with broad responsibilities that play an essential role in managing hazards, implementing controls and helping companies maintain their profitability. In the 2006 National Safety Survey conducted by *Occupational Hazards* magazine, 70% of safety professionals found their jobs to be highly satisfying—a fact most attribute to making a positive difference in people's lives. Safety professionals take pride in knowing they work to prevent injuries and illnesses to their fellow employees and help them to return safely to their families each day.

To meet future challenges, safety professionals need a strong academic background. To maintain their competency, they must continue their professional development throughout their careers. Business, technology and legal changes demand that safety professionals stay abreast of the impacts on professional practice. The clear lines that once separated various safety disciplines in the past have faded as more safety professionals also assume health and environmental responsibilities in business, industry and governmental agencies. Safety professionals with a broad undergraduate background in science, engineering, business, health, education, law, government, and psychology are well prepared to function in today's employment environment.

Achieving a rewarding and successful career in safety is strongly related to education and certification. In a 2004 Board of Certified Safety Professionals salary survey of Certified Safety Professionals®, 22% of those holding the Certified Safety Professional (CSP®) certification earned over $100,000 per year. The average pay was about $84,245 per year with 53% of the respondents having advanced degrees. An ASSE Compensation Study conducted in 2003 revealed that those holding the CSP credential earn about $17,000 more per year than their non-certified peers.

The *Career Guide to the Safety Profession* contains a wealth of information about career options available in the safety profession and the educational preparation typically required. We hope that this vital information guides your steps as you consider a rewarding career as a safety professional.

Jeffrey L. Robinson, CSP, P.E.
President, Board of Certified Safety Professionals[1]

Kennith D. Brock, CSP
Chair, American Society of Safety Engineers Foundation[1]

® "Certified Safety Professional" and "CSP" are certification marks awarded to the Board of Certified Safety Professionals by the U.S. Patent and Trademark Office.

[1] See Page 49 for profiles of BCSP and the ASSE Foundation (established by and in partnership with ASSE).

Introduction

As society becomes more complex, there is a constant need for new and advanced goods and services. This, in turn, creates jobs and professions that were unheard of just one generation ago. Because of the very rapid changes in these jobs and professions, it is hard for students to learn about future job opportunities. It is even more difficult to know about the type of preparation that is needed for a particular profession—or the qualities and traits that might help individuals succeed in it.

The purpose of this booklet is to provide in-depth information about the safety profession that should help students considering a career in this challenging and rewarding field.

For over a century, safety professionals have protected the safety and health of the public by controlling hazards. While these efforts became more sophisticated and widespread during the twentieth century, real progress on a wide front did not occur in the U.S. until after World War II.

In 1970, a major development in safety came about when the U.S. Congress passed the Occupational Safety and Health Act (OSH Act). This legislation was important because it stressed the control of workplace hazards. This, in turn, defined a clear area of practice for the previously loosely organized safety profession. Other legislation passed during the next twenty years has increased the scope of safety practice into areas of environmental protection, product safety, hazardous materials management and designing safety into vehicles, highways, process plants and buildings.

With the increased emphasis on safety driven by laws, public concern and company values, more colleges today prepare people for careers in safety. The number of people preparing themselves for careers in the safety profession through safety degree programs is increasing. As a result, the safety profession has respect from other established professions such as engineering, medicine and law (all of which had traditionally been involved in hazard control, but had no special training in it).

In the past 25 years, employment in safety has grown and changed dramatically. The period of corporate downsizing in the 1990's and sustained cost pressures resulted in greater use of safety consultants and less reliance on large corporate staffs. Many safety professionals were asked to expand their roles, often taking on responsibility for environmental leadership, product stewardship, and/or security, in addition to traditional health and safety functions. Globalization and threats from terrorism, pandemics, and natural disasters resulted in opportunities to contribute in new settings and with greater prominence within organizations. Safety has become more complex, so that today's safety professionals must have better qualifications. Safety demands the best in all of its practitioners.

The information found in this booklet will explain what the safety profession is about and what to study to become part of it. The information in this booklet is intended to show that there is a place for students in the safety profession.

What is the Safety Profession?

The primary focus for the safety profession is prevention of harm to people, property and the environment. Safety professionals apply principles drawn from such disciplines as engineering, education, psychology, physiology, enforcement, hygiene, health, physics, and management. They use appropriate methods and techniques of loss prevention and loss control. "Safety science" is a twenty-first century term for everything that goes into the prevention of accidents, illnesses, fires, explosions and other events which harm people, property and the environment.

The U.S. has a lot to gain by reducing the number of these preventable events. The National Safety Council estimated that in the U.S., accidents alone cost our nation over $574.8 billion in 2004. Fire-related losses accounted for $9.8 billion of that total.

Illness caused by exposing people to harmful biological, physical and chemical agents produce great losses each year and accurate estimates of their impact are hard to make. In addition, pollution of all kinds causes damage to all forms of life. This generates skyrocketing cleanup costs and threatens the future habitability of our planet.

The term "safety science" may sound new, but many sources of safety science knowledge are hundreds of years old. All of the following are knowledge areas of safety science:

- ***Chemistry*** and ***biology*** provide knowledge about hazardous substances.
- ***Physics*** tells people about electricity, heat, radiation and other forms of energy that must be controlled to ensure safe use.
- ***Ergonomics*** helps people understand the performance limits of humans and helps them design tasks, machines, work stations and facilities which improve performance and safety.
- ***Environmental sciences*** provides knowledge about pollution sources and their control, waste disposal, impact studies, environmental alteration (heat, light, irrigation, erosion, etc.), and ecology.
- ***Psychology*** helps people understand human behaviors that can lead to or avoid accidents.
- ***Physiology, biomechanics*** and ***medicine*** help people understand the mechanisms of injury and illness and how to prevent them.
- ***Engineering***, ***business management***, ***economics***, and even ***sociology*** and ***geology*** give people the knowledge necessary to improve safety in our society and contribute to productivity and profitability.

The things that can cause or contribute to accidents, illnesses, fire and explosions, and similar undesired events are called "hazards." Safety science gives people the ability to identify, evaluate, and control or prevent these hazards. Safety science provides management methods for setting policy and securing funds to operate safety activities in a company.

Hazard control activities go on every day throughout the world. From the careful design and operation of nuclear power generating stations to the elimination of lead-based paints in homes, the efforts to reduce threats to public safety go on nonstop. The application of safety science principles occurs in many places: in the workplace, in all modes of transportation, in laboratories, schools, and hospitals, at construction sites, on oil drilling rigs at sea, in underground mines, in the busiest cities, in the space program, on farms, and anywhere else where people may be exposed to hazards.

Safety science helps people understand how something can act as a hazard. People must know how and when the hazard can produce harm and the best ways to eliminate or reduce the danger. If a hazard cannot be eliminated, we must know how to minimize exposures to the hazard. This costs money and requires assistance from designers, owners and managers. Safety professionals must know the most cost-effective ways to reduce the risk and how to advise employees, owners, and managers. By applying safety science, all of these activities can be effectively carried out. Without safety science, safety professionals rely on guesswork, mythology and superstition.

Safety professionals are the specialists in the fight to control hazards. To be called professionals, they must acquire the essential knowledge of safety science through education and experience so that others can rely on their judgments and recommendations. Top safety professionals demonstrate their competence through professional certification examinations. Regardless of the industry, safety professionals help to achieve safety in the workplace by identifying and analyzing hazards which potentially create injury and illness problems, developing and applying hazard controls, communicating safety and health information, measuring the effectiveness of controls, and performing follow-up evaluations to measure continuing improvement in programs.

What Safety Professionals Do

Wherever people run the risk of personal injury or illness, they are likely to find safety professionals at work. Safety professionals are people who use a wide variety of management, engineering and scientific skills to prevent human suffering and related losses. Their specific roles and activities vary widely, depending on their education, experience and the types of organizations for whom they work.

Safety professionals who have earned doctoral degrees are often found at the college and university level, teaching and doing research, public service and consulting. Most safety professionals, however, have bachelor's or master's degrees. These professionals may be found working for insurance companies, in a variety of industries, for state and federal agencies like the Occupational Safety and Health Administration (OSHA), and in hospitals, schools and nonprofit organizations.

An American national standard sets forth common and reasonable parameters of the professional safety position. This can be found in the ANSI/ASSE Z590.2-2003 *Criteria for Establishing the Scope and Functions of the Professional Safety Position* publication (**www.asse.org/shoponline/products/10511.php**).

Safety professionals' precise roles and responsibilities depend on the companies or organizations for whom they work. Different industries have different hazards and require unique safety expertise. However, most safety professionals do at least several of the following:

- ***Hazard Recognition***: identifying conditions or actions that may cause injury, illness or property damage.
- ***Inspections/Audits***: assessing safety and health risks associated with equipment, materials, processes, facilities or abilities.
- ***Fire Protection***: reducing fire hazards by inspection, layout of facilities and processes, and design of fire detection and suppression systems.
- ***Regulatory Compliance***: ensuring that mandatory safety and health standards are satisfied.
- ***Health Hazard Control***: controlling hazards such as noise, chemical exposures, radiation, or biological hazards that can create harm.
- ***Ergonomics***: improving the workplace based on an understanding of human physiological and psychological characteristics, abilities and limitations.
- ***Hazardous Materials Management***: ensuring that dangerous chemicals and other products are procured, stored, and disposed of in ways that prevent fires, exposure to or harm from these substances.
- ***Environmental Protection***: controlling hazards that can lead to undesirable releases of harmful materials into the air, water or soil.
- ***Training***: providing employees and managers with the knowledge and skills necessary to recognize hazards and perform their jobs safely and effectively.

- ***Accident and Incident Investigations***: determining the facts related to an accident or incident based on witness interviews, site inspections and collection of other evidence.
- ***Advising Management***: helping managers establish safety objectives, plan programs to achieve those objectives and integrate safety into the culture of an organization.
- ***Record Keeping***: maintaining safety and health information to meet government requirements, as well as to provide data for problem solving and decision-making.
- ***Evaluating***: judging the effectiveness of existing safety and health related programs and activities.
- ***Emergency Response***: organizing, training and coordinating skilled employees with regard to auditory and visual communications pertaining to emergencies such as fires, accidents or other disasters.
- ***Managing Safety Programs***: planning, organizing, budgeting, and tracking completion and effectiveness of activities intended to achieve safety objectives in an organization or to implement administrative or technical controls that will eliminate or reduce hazards.
- ***Product Safety:*** assessing the probability that exposure to a product during any stage of its lifecycle will lead to an unacceptable impact on human health or the environment and determining the appropriate auditory and visual hazard warnings.
- ***Security***: identifying and implementing design features and procedures to protect facilities and businesses from threats that introduce hazards.

No matter where people work, travel, live or play, conditions exist that can result in personal injury or illness. And wherever the possibility of personal injury or illness exists, they will find safety professionals dedicated to preventing human suffering and related losses.

Successful safety professionals are effective communicators with strong "people skills." Most people in this profession characteristically possess the desire to help and work with others. The safety professional faces new challenges almost daily. The satisfaction of knowing that people have been protected because harmful accidents and other incidents have been prevented is just one of the many rewards associated with professional safety practice or "what safety professionals do."

Where Safety Professionals Work

Since safety professionals provide technical assistance in identifying, evaluating and controlling hazards, safety professionals work virtually anywhere where people might be exposed to hazards. There are positions for safety professionals in every part of the United States and in other countries.

No matter what a company's business is, its employees can encounter some type of hazard, either at work, getting to and from work or at home or play. Even working at a computer terminal can be hazardous, producing long-term injuries to the hand and wrist, back or other parts of the body. Whether a company does manufacturing, mining, transportation, agriculture, chemicals, fuels production, construction, or provides services, it will always face hazards in some or all of its operations. It is likely that the company would employ or contract with one or more safety professionals.

It is common for companies to employ safety professionals at particular work sites. At corporate offices, safety professionals can coordinate the hazard control activities away from the work sites. Some college graduates in safety begin their careers as safety associates, coordinators or assistant managers at small plants or company work sites. After a period of training and successful performance, the graduates may advance to Safety Manager at a small plant. Later, they may advance to similar positions at larger facilities.

In recent years, safety professionals are working more and more in diverse and non-traditional worksites as many job opportunities have expanded to government, construction, transportation, service industries and consulting practices, among others. Such employment requires safety professionals to travel to different worksites to provide support to their internal and external clients.

Many companies have combined safety, industrial hygiene, environmental affairs, fire protection and ergonomics into a single function. A safety professional may advance by overseeing the work of all areas in the department.

International projects are on the rise and the number of companies operating outside the United States continues to increase. Safety professionals must now adapt to multi-language contexts.

Many safety professionals aspire to become a Corporate Safety Manager/Director/Vice President with responsibilities for leading and managing the safety function at the organization's corporate or division headquarters. There they have broader responsibilities and may have to travel often to visit various work sites. Other safety professionals prefer to remain at one work site where their responsibilities can be just as challenging, but where travel is light.

Figure 1. Industries in which Safety Professionals Work.
Based on a 2000 BCSP Salary Study.

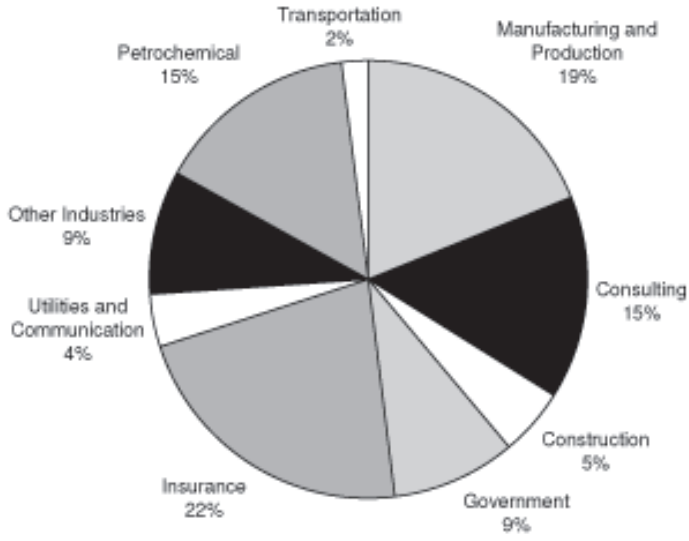


Table 1. Safety Professionals within Manufacturing and Production Industries (19%)

Industry	Percent
Apparel and other finished fabric products	<1
Chemicals and allied products	25
Crude petroleum and natural gas	9
Electrical machinery, equipment, and supplies	10
Fabricated metal products	3
Food products	4
Furniture and fixtures	<1
Leather and leather products	<1
Lumber and wood products	1
Machinery	2
Ordnance	2
Paper and allied products	3
Petroleum refining and related industries	10
Primary metal industries	3
Printing, publishing and allied industries	1
Professional, scientific, and controlling instruments	3
Rubber and plastic products	3
Stone, clay, and glass products	2
Textile mill products	1
Tobacco	1
Transportation equipment	6
Miscellaneous manufacturing	9
Total	**100**

Table 2. Safety Professionals within Other Businesses (9%)

Industry	Percent
Agricultural, forestry, and fisheries	2
Banking and real estate	1
Educational services (colleges, universities, libraries)	33
Hotels and miscellaneous personal services	5
Medical and health services	12
Mining	11
Nonprofit membership organizations	2
Retail trades	4
Wholesale trades	4
Non-classifiable establishments	24
Total	**100**

Table 3. Safety Professionals within Government (9%)

Level of Government	Percent
International	1
Federal	72
State	11
Local	16
Total	**100**

Table 4. Safety Professionals within Utilities and Communication (4%)

Industry	Percent
Utilities	76
Communication	24
Total	**100**

Table 5. Safety Professionals within Transportation Industries (2%)

Industry	Percent
Air	38
Local, suburban and urban passenger	5
Motor freight transportation and warehousing	14
Railroad	33
Water	10
Total	**100**

Figure 1 shows where safety professionals are employed in general. Tables 1 through 5 provide more details about employment for safety professionals.

A growing number of safety professionals who have performed very well in their safety positions are being promoted to other responsible positions which extend beyond safety. For example, they might be placed in charge of a department, unit or the entire operation at a site. Since safety is an important part of all successful operations, safety professionals are being recognized as people who can effectively contribute to other activities within the organization.

Some safety professionals work for consulting firms that are hired by organizations to provide specialized hazard control services, such as training of workers and engineers. Hazard control services might be provided on a one-time basis, or they might be performed on a regular basis. For example, NASA and other federal government agencies frequently contract with consulting firms for many of their engineering and other technical functions, including safety work. The consultants have offices on site and work side-by-side with federal employees on a long-term basis. Many large corporations are now using contractors in the same way. While some safety consultants provide their services to different clients all over the country, others work mainly in one city, state or area.

A safety professional may work in a large consulting firm with dozens of other consultants. However, many consultants work alone and are often self-employed on short-term assignments in their particular specialty.

Safety consulting work covers a wide spectrum of hazard control activities. Some consultants specialize in evaluating and controlling only specific types of hazards. For example, safety consultants working as industrial hygienists concentrate on health hazards such as vapor, noise, radiation, toxic dusts, gases, or other physical agents. Other safety consultants might specialize in construction hazards, or hazards of boilers, cranes, aircraft or chemical plants. A safety professional who gains a high degree of expertise with specific types of hazards, either through education or experience (and usually both) can have a satisfying and rewarding career as a safety consultant. Those involved in consulting work also need to be able to manage the day-to-day aspects of operating a private business.

Many safety consultants with professional skills or expertise in a specific area provide expert witness and litigation support.

Insurance companies often provide consulting services to the policy holders they insure. These safety professionals are known as loss control representatives. They work for an insurance company and visit the facilities of insured policy holders to assist them with hazard recognition, evaluation and control. Many safety professionals begin their careers as loss control representatives.

Because of the tragic losses caused by uncontrolled hazards, federal, state and local government have created laws or regulations regarding how and when hazards are to be controlled. To enforce these laws and regulations, government agencies employ

safety professionals as inspectors and accident investigators. They visit sites where uncontrolled hazards are thought to exist. These government-employed safety professionals usually work in one area of the country or within a state. They may also need to visit sites in that area, either on a regular or occasional basis. They provide the information needed to determine if government laws, regulations or standards have been met. From their recommendations, changes can be made to achieve better control of any hazard found to exist.

Employment Outlook for Safety Professionals

The employment outlook for safety professionals is bright. Depending on their education, communication skills, experience and professional certifications, safety professionals can expect to have a rewarding career far into the future. Specialists will be needed as advancements in technology, regulations and public expectations increase.

With a bachelor's or master's degree, graduates can expect to find rewarding employment in business settings or in the public sector. They may also find a career with federal, state and local safety agencies. Some have responsibility for emergency response planning and management. Individuals may find employment in research laboratories and at colleges and universities, although some of these positions may require doctoral degrees.

The safety profession includes many new job classifications. For example, the field of ergonomics (fitting the job to the person) has grown as injury rates have climbed in meat processing, manufacturing and at computer workstations. Also, there is an increased emphasis on highway and construction safety. All of these areas offer good employment opportunities.

Insurance and worker's compensation costs have escalated over the last two decades and have become economic concerns for many employers. This has led to a growing emphasis on safety for companies and more employment opportunities for safety professionals.

Responsible companies, concerned public and special interest groups have increased protection for our environment. The techniques and principles involved in achieving this are similar to those used in accident prevention. Safety professionals are often assigned responsibilities for environmental affairs. This increases the need for safety professionals in organizations with environmental hazards.

There is increased coverage in the print and broadcast media about hazardous waste spills, accidents, and other events that produce losses which could have been avoided through preventive measures and by better management. The adverse publicity creates opportunities for people trained to develop management systems that prevent losses. For some time, the career opportunities for innovative safety professionals have grown faster than the number of trained and qualified individuals available.

The need for safety professionals has continued to grow in spite of a shrinking U.S. manufacturing base. While many non-U.S. countries have safety standards less stringent than those found in the United States, responsible companies require their foreign plants to safeguard all employees. Many developing countries are also raising—and foreign countries are changing—their safety, health and environmental standards. In many cases, international standards now protect workers everywhere and U.S.-based safety professionals oversee safety at facilities outside the U.S.

Employment in the field of safety has continued to grow over the years. This growth has continued, even in bad economic times. There is no reason to believe that the need for more safety professionals will diminish in the near future. There is a need to replace those retiring from practice.

Salaries

Salaries range from lows of about $30,000 for safety inspectors to highs of $150,000 for highly qualified individuals in demanding positions.

The top people in the safety profession often earn salaries comparable to top people in law, medicine, engineering and accounting. The positions of those leading loss prevention efforts for large corporations or those managing or owning consulting firms often provide compensation well into six figures.

The Board of Certified Safety Professionals regularly monitors salaries of those safety professionals holding the Certified Safety Professional (CSP) designation. Summary data and details by gender, degree type and level, age, industry, state and other factors are available from BCSP.

Professional societies, such as ASSE, the National Safety Council (NSC) and the American Industrial Hygiene Association (AIHA), conduct periodic salary studies and publish the results. Contact these organizations to request a copy of their most recent salary surveys.

According to *Safety+Health*'s 2005 Salary Survey, 78% of survey respondents earn more than $50,000 per year. Of those with five to ten years of safety experience, 48% made between $50,000 and $79,999 per year. 36% of safety professionals with over 20 years of experience are making more than $100,000 a year.

Opportunities for Advancement

A person's ambition, level of education, experience, skills and certifications all affect career paths in safety. As with other professions, when people perform well over a period of time, they become candidates for positions of greater responsibility. More and more safety professionals have broad education, experience and professional credentials and are well qualified to move into different parts of business organizations. Also, experienced safety professionals usually have little trouble moving from one organization to another.

Some people may seek advanced degrees. Over one third of safety professionals today have advanced degrees in some field. Those with a doctoral degree may find a teaching career to their liking or find opportunities in research on specific safety issues as technical advisors. The National Institute for Occupational Safety and Health (NIOSH) has continuing needs for research on many kinds of workplace hazards.

Safety professionals may also attend professional schools and go into law practice or administration. Safety careers afford an individual experience that is far broader than many others. Safety professionals can, and often do, get involved in many aspects of a business.

Opportunities for Minorities and Other Groups

Minority safety practitioners have been among the ranks of safety professionals since the 1800s, yet their participation was not well recognized until recently. Early examples include Alice Hamilton, MD, who began her research into toxic substances and workplace diseases at the turn of the century. Garret A. Morgan and Andrew J. Beard are early

examples of African-Americans whose engineering designs and patents significantly enhanced the safety and health of Americans. Beard, in the late 1800s, invented the automatic linking coupler, which improved a very hazardous job performed by railroad yard workers. Morgan invented the gas mask used in the early 1900s in underground mines. He also patented the electric traffic signal.

As the safety profession began to gain credibility in the 1970s, there were very few women in the profession. Today, it is estimated from recent studies that about 15% to 20% of those entering the safety profession are women.

The number of women, minorities and people with disabilities who are entering the safety profession is growing. Some evidence of this growth can be found in recent studies of minorities graduating with undergraduate degrees in the allied fields of industrial engineering and public health. It is estimated that in the future, about one fourth to one third of all degreed entry-level safety professionals will be from a minority population of the United States.

Careers in safety are available and open to men and women of every racial and ethnic background. Having a physical disability is not a barrier to success in the safety profession. There is a trend toward diversity in the work place.

Under the Americans with Disabilities Act (ADA), employers must provide access to employment for those with disabilities. Not only is the safety profession open to those with disabilities, many safety professionals need to evaluate and control hazards which may impact those with disabilities.

Updates on Job Opportunities

One annual reference that projects job opportunities in many fields, including safety, is the *Occupational Outlook Handbook*, published by the Bureau of Labor Statistics of the U.S. government. The listing of occupations includes safety engineers, safety inspectors, safety and health practitioners, and safety specialists and technicians.

Should I Become a Safety Professional?

When choosing a future profession, as a student, what should I look for? Probably all of the following considerations are important: a profession that is respected, one that is associated with important work, one that gives you a feeling of accomplishment, and one that provides growth and the potential to advance in responsibility. You should also seek a profession where compensation reflects skills and accomplishments. A desirable profession provides stable employment, variety in the daily routine, while keeping interest high and stress low. These are characteristics of an ideal profession. While no profession is ideal for everyone, the safety profession scores very high on nearly all of these factors.

You may wonder if you have what it takes to be a successful safety professional. Here are some important things to consider. Are you motivated by a desire to help others? Do you believe that it is important to serve your neighbors and the community? Do you place a high value on health and the quality of life? Such motivation would help you be a successful safety professional, and at the same time, provide a great sense of satisfaction in a job well done.

Successful safety professionals must develop good skills in working with people and communicating with them. Many of these skills are gained during college and after a degree is completed. As a safety professional, you work with practically everyone in an organization. You should feel comfortable in talking and working with people of all ages and backgrounds.

Safety science is challenging, and the college course work can be difficult, but interesting. You will do quite well if you have good study habits and are willing to work hard. A college degree is essential for most safety professional positions. The more safety science courses you complete, the better prepared you will be for a safety career. Safety professionals must understand many technical concepts, so if you like science and mathematics, you will probably find safety science interesting.

You may be one of those students who are not especially outstanding in any one particular academic area, but you are an excellent organizer. You may enjoy planning and carrying out activities of all sorts, and when one event is completed, you are off to start planning the next one. These are interests and skills that can help you become a successful manager in an organization. Managers set up programs to achieve agreed-upon objectives and draw together other parts of the organization to work on carrying them out. Many safety professionals hold positions as managers, so planning and organization skills are very important.

You may be absolutely certain about the career you want to pursue. You may not be sure even after you graduate from college. Being uncertain about a career is normal. It is quite common to change majors after starting college.

While you may view the safety profession as being rather specialized, an undergraduate safety curriculum is actually rather broad.

Many colleges have a program that exposes you to a broad range of courses and fields of study. Such a program can help you find those activities and ideas that interest you the most. Undergraduate safety curriculums require a relatively wide assortment of courses. This provides a reasonably good preparation for entering business or industry in any functional area.

You will complete business courses as well as mathematics and science courses if you are a student in safety science. You will also take courses in communications and in the use of computers. These are subjects that will have a high value, even if you should later decide to switch majors.

Most safety science curriculums offer internship possibilities so that you can work in a safety-related position before you graduate. Internships also create opportunities to strengthen a resume, to be more competitive for positions, and to demonstrate your capabilities to potential employers.

An internship is the ultimate test that you can use to answer the question, "Should I become a safety professional?"

ASSE publishes guidelines for academic safety internship programs. The ASSE standard covers scope/purpose/application/ exceptions, definitions, general requirements, development of evaluation criteria, internship compensation and legal implications, and program evaluation. Employers should refer to the "Guidelines for a Safety Internship Program in Industry" article by Lon H. Ferguson in the April 1998 issue of *Professional Safety*.

Many people change to the safety profession from other departments or fields, such as human resources, engineering, quality control, nursing, and production management. Mid-career changes to safety are common.

University courses offered in the evening, on weekends, and online enable adult learners to pursue masters degrees in safety. This road to professionalism provides opportunities to both broaden and deepen skills demanded by the marketplace. It also provides an effective path for those entering the field from other career areas.

How to Become a Safety Professional

This section details the stages of education and training necessary to become a safety professional and how to continue practicing to accelerate the rate of success after entering the field.

The Board of Certified Safety Professionals offers a *Career Paths in Safety* brochure that addresses the education, experience, typical job roles, and recommended certification options at various levels (e.g., basic, technician/technologist, and professional) of a safety career. This brochure is located online at **www.bcsp.org/downloads** or may be requested from BCSP.

High School Preparation

Any young person considering a career as a safety professional should take college preparation courses while in high school. Since the safety professional position is interdisciplinary, it is important to have a broad background in science and mathematics, and to develop good communication skills. Safety professionals need knowledge in biology, chemistry and physics. They often use problem-solving skills to identify, analyze, and control hazards, and frequently work with engineering specialists.

Here are some good ways to learn about the safety profession:

- Talk to safety professionals about their work.
- Visit safety professionals at their places of work and see what the job is all about.
- Read about safety problems, accidents or disasters in newspapers and magazines and consider how these events could have been prevented.
- Do a science project on workplace safety or health, consumer product safety, traffic safety, fire protection, safety signs/equipment, or some similar subject.
- Visit industrial plants on field trips and ask questions about safety programs.

In selecting an academic program, one should consider whether the college or university holds institutional accreditation from an accreditation body recognized by the Council for Higher Education Accreditation (**www.chea.org**) or the U.S. Department of Education (**www.ope.ed.gov/accreditation**). In addition, specific degree programs may hold accreditation as a safety degree from a commission of the Accreditation Board for Engineering and Technology or ABET (**www.abet.org**).

Degrees, and the institutions that offer them, should be chosen carefully. There are degrees from colleges and universities that do not hold accreditation from a body recognized by the U.S. Department of Education or CHEA. There are also unrecognized degrees from institutions identified as diploma mills (or similar unacceptable institutions) by the U.S. government or any U.S. state government. The safety profession views use of diploma mill degrees as unethical. The following URLs may be helpful as individuals research

degrees, colleges, and universities: **www.ed.gov/students/prep/college/diplomamills/index.html**, **www.chea.org/degreemills/frmStates.htm**, **www.michigan.gov/documents/Non-accreditedSchools_78090_7.pdf**, and **www.osac.state.or.us/oda/unaccredited.html**.

There are a number of colleges that offer degrees in safety and related specialties. Students may visit the American Society of Safety Engineers web site to search the *College and University Directory, Safety and Related Degree Programs* (**www.asse.org/colluni_directory.htm**). It lists colleges that offer degrees in safety and related fields and tells which safety programs are accredited by a commission of ABET.

The Board of Certified Safety Professionals offers the *BCSP Database of Safety and Related Academic Programs in the United States* (**www.bcsp.org/schools**) online. Individuals can look up academic programs by field, program level, or state. The database assists those preparing for or advancing in the safety profession to locate academic programs at accredited U.S. colleges and universities.

Directories of college and university programs that are found in bookstores may not list safety degree programs, but may provide other valuable information about a school. Today, most schools offer details about their campus, programs, and courses on their web sites. Information about costs, facilities, entrance requirements and other details can help students select a school. Students can write to or email the schools and safety degree programs that interest them. The schools will provide additional information about their requirements, programs and faculty.

Students can talk to their guidance counselors, teachers and others who have been to college for advice in selecting one. They can help students decide whether a community college (two-year programs leading to an associate degree) or a college or university (four-year programs leading to a bachelor's degree) is right for them.

Community and Technical Colleges

A number of community and junior colleges offer an associate degree in safety or a related field (such as fire protection). People graduating from these programs are hired for limited positions in safety. They may help manufacturers, construction companies or other industries meet OSHA's hazard control standards.

For some people, two-year degree programs are a good choice. They allow individuals to start working in a field at an earlier stage of education. They provide a way for many to begin a career change. There is usually a more flexible class schedule for those who work while going to school. Many workers attain an associate degree on a part-time basis and their employer may even pay for their studies. Community and technical colleges usually cost less than four-year colleges and universities. However, a two-year degree may not allow advancement to the more challenging positions in this field.

If students transfer to a four-year safety program, they may not get full credit for associate degree courses. Students should check with the four-year programs they might want to attend later. These programs advise students what courses they require and how much credit they allow. Also, they can advise students about standards they use in accepting transfer students from two-year programs.

Four-Year Colleges and Universities

A number of four-year colleges and universities offer undergraduate degrees in safety. According to a BCSP Salary Survey conducted in 2000, over 90% of those CSPs in the safety profession have earned at least a bachelor's degree. About 30% of those entering the field have a bachelor's degree in safety, while many move into safety from other disciplines (engineering, business, physical sciences, etc.) and later pursue safety studies.

A bachelor's degree in safety provides a solid foundation for work as a safety professional. A major in safety typically includes preparatory courses and professional courses outside of the major. To prepare for the safety professional courses, college students are normally required to take courses in mathematics through beginning calculus, statistics, chemistry with laboratory work, physics with laboratory work, human physiology or biology, and introductory courses in business management, engineering mechanics and processes, speech, composition and psychology. Students in safety must also acquire good computer skills, including the ability to use the Internet and important business and safety software packages.

Most preparatory courses are taken during freshmen and sophomore years. Professional courses are usually taken during junior and senior years, along with some electives. Professional safety courses include safety and health program management, design of engineering hazard controls, industrial hygiene and toxicology, fire protection, ergonomics, environmental safety and health, system safety, accident/incident investigation, product safety, construction safety, educational and training methods, assessment of safety performance, and behavioral aspects of safety. Students may also elect to take specialty courses beyond the required courses.

Most safety degree programs offer experiential education courses. These courses provide opportunities for students to work with safety professionals in companies or in positions that offer developmental experience. These internship programs usually involve academic credit and may include pay from the company or organization with whom the student works.

Students seeking to enter safety degree programs should carefully review several schools, their program offerings, entrance requirements and the financial assistance provided. Some programs have enrollment caps and are quite selective in the numbers of students accepted.

Graduate Study in Safety Science

About 40% of today's safety professionals have advanced degrees. Some of those with an advanced degree in safety graduated with a bachelor's degree in a non-safety field. They may use a master's degree in safety to prepare for and enter the safety profession. Some who get their safety preparation at the bachelor's level also pursue graduate study in safety or a safety-related specialty, such as industrial hygiene, environmental science, public health or ergonomics. Some people work toward advanced degrees in related fields, such as business and engineering, that will enhance their career opportunities.

Several master's degree programs in safety are accredited by the Applied Sciences Accreditation Commission of ABET or

another of its commissions. Typically, students entering these programs must have completed certain undergraduate safety courses, or they will be required to complete some undergraduate courses to adequately prepare themselves for advanced courses in safety.

Graduate programs can offer different safety specialties besides advanced preparation in safety science. These specialties may be in management, engineering and technology, environmental health, fire protection, ergonomics, industrial hygiene, or other areas of safety science.

A few schools offer doctoral studies in safety science or related subjects such as industrial hygiene, public health, fire protection engineering, environmental health or environmental studies. Most safety positions do not require a doctoral degree. However, teaching positions at universities and colleges, research positions, and some high-level advisory positions for large employers and government agencies may require a doctoral degree. Doctoral programs, including those in safety, are not accredited because each student has a customized program. Schools are free to develop their own specializations and degree requirements, but most involve some training in research methods and teaching theory.

Financial assistance at the graduate level varies considerably by program. In some programs, nearly all graduate students have teaching or research assistantships with tuition and fee waivers included. Some programs offer scholarships or tuition and fee waiver assistance. Some have work-study programs, or have links with government agencies or companies that allow students to work and attend school at the same time.

Certificate Programs

Certificate programs are a relatively new kind of academic program. A student must complete a sequence of courses defined by the school. Upon finishing, the student receives a certificate of completion. These are not academic degrees or certifications. They focus on helping people get started in or convert to a particular field of study. There are undergraduate certificate programs that are typically shorter and involve less than the requirements for an associate degree. There are also graduate certificate programs that help someone with a degree in one field of study to learn the basics of another field of study without committing to all requirements for a master's degree. During the last several years, several schools have started to offer certificate programs.

Online Courses and Degrees

With the growth of the Internet, more and more schools are offering their academic courses and complete programs online. The number available continues to rise. This delivery method allows students who must continue to work or who do not have a suitable academic safety program nearby to complete preparation for work as a safety professional. By checking with a school, one can find out if courses and programs or degrees are available online.

Licensing and Certification

Because the work of safety professionals has a direct impact on public safety and health, government organizations, employers and those awarding contracts are concerned that safety professionals be fully qualified and competent to do their jobs. Safety professionals may therefore need other

credentials in addition to their educational degree. These credentials might include licenses, registration and professional certification. To date, no state requires safety professionals to be licensed in order to practice. However, some states require fire protection engineers to be registered.

The safety profession has established its own professional certification program to provide some means for assessing professional competency. The Board of Certified Safety Professionals, established in 1969, sets competency standards for professional safety practice, evaluates candidates' qualifications, tests their knowledge through examinations and offers the Certified Safety Professional® (CSP®) certification to those who meet all requirements.

Applicants who meet the model academic requirement (a bachelor's degree in safety from an ABET-accredited program), have needed experience, and pass a two-level examination receive the CSP credential. Applicants must have at least an associate's degree in safety or a bachelor's degree in any field. In addition, candidates not meeting the model education requirement must have more than the minimum of four years of professional safety experience.

The first examination (Safety Fundamentals) toward the CSP certification is designed to test basic knowledge appropriate to professional safety practice. Students graduating from accredited four-year safety degree programs are permitted to take this examination during their last semester. Certain program graduates are granted a waiver of this examination and receive the Graduate Safety Practitioner (GSP) designation. The second examination (Comprehensive Practice) focuses on applications of typical professional practice.

Those holding the CSP certification must be recertified every five years, either through re-examination or by meeting standards for continuing education and professional practice. These standards encourage the safety professional to be active in the profession and to maintain the necessary professional skills to practice effectively.

Today, professional certification through the CSP credential has become important to safety professionals. A majority of employers prefer or require applicants for safety positions to hold the CSP certification, particularly for mid-career or senior positions. An ASSE Compensation Study conducted in 2003 shows that those holding the CSP earn about $17,000 more per year than their non-certified peers.

More and more government laws, regulations and standards include the CSP certification. Contracts involving construction and other services often include requirements that contractors employ safety professionals with the CSP certification. While there are many titles and designations in safety, industrial hygiene, environmental practice and ergonomics in the United States only a few are accredited by national organizations which set standards for voluntary, peer certifications. The CSP credential holds accreditation under national and international organizations including the National Commission for Certifying Agencies (NCCA), and ANSI/ISO/IEC 17024. Many employers and government agencies rely on accredited certifications in standards for employment and contracts.

The Occupational Health and Safety Technologist (OHST)/Certified Loss Control Specialist (CLCS) and Construction Health and Safety Technician (CHST) are paraprofessional certifications which can serve as stepping stones to the CSP

credential (see more information about these certifications on page 50 or at **www.cchest.org**).

Professional Societies

A good way to stay current in safety is to belong to a professional society. Such organizations have journals, conferences, symposiums and continuing education courses, while some may have local chapters. Some societies, such as the American Society of Safety Engineers, have student sections at schools offering safety degrees. These sections have activities to help students learn about the safety profession. Some activities in local chapters create opportunities to meet practicing safety professionals. These contacts often lead to internships and permanent jobs. At a minimum, these contacts offer insight into current practice or the ability to visit safety professionals in their job settings.

Areas Where Safety Professionals Can Specialize

Safety professionals work in many different industries, job settings and specialties. The summaries below give examples for many of them.

Occupational Safety

Many safety professionals work in manufacturing and production operations to help ensure that working conditions and work methods are safe and healthful for employees. Nearly every large plant or industrial facility employs at least one full-time safety professional. Once safety professionals recognize hazards, they evaluate them, develop recommendations for controlling them and advise members of the management team. They also must be able to advise management about the best means for complying with regulations.

Occupational safety professionals must observe work activities and identify hazards in a wide variety of operations, such as lifting, working in high places, handling chemicals, operating machinery, storing explosives, excavating and repairing or maintaining equipment. They try to formulate plans and programs to prevent these hazards from happening. Occupational safety professionals must know health, safety and fire protection regulations which apply to any operations.

Occupational safety professionals preserve and protect human and facility resources in the workplace and security is a key issue and a growing concern. The occupational safety professional may be called upon to establish security guidelines and take precautions to protect property and workers.

They must prepare recommendations and advise managers about the best means for complying with standards, reducing hazards and making production activities safer. Occupational safety professionals need to be good communicators, since they often interact with employees, supervisors and managers when checking for hazards or working on options to control them. They often enlist employee participation in these activities. Frequently, they seek to persuade managers and employees to change operations or procedures and to spend money to make people safer.

In addition, to be effective, the occupational safety professional must be a part of the management team which improves productivity at the facility.

Industrial Hygiene

Industrial hygienists specialize in workers' exposure to chemical and physical hazards created by industrial processes. For example, they might evaluate exposure to airborne lead created by a battery manufacturing process, or they might measure the exposure to noise produced by a ripsaw in a furniture manufacturing shop.

Most safety professionals have some responsibilities in their practice for industrial hygiene that may not make them a specialist.

An industrial hygienist is trained to recognize health hazards, to evaluate their extent and to control them if an overexposure exists. An industrial hygienist evaluates hazards by studying the process, measuring the exposure and comparing samples to acceptable exposure levels.

The control of overexposure might involve changing the process to eliminate the hazard, substituting a less hazardous material, isolating the process or the worker, ventilating the process, or providing personal protection (for example, gloves and respirators) to the worker.

Industrial hygienists generally have an undergraduate degree in engineering or the physical, chemical, biological or safety sciences. Most industrial hygienists have a master's degree in industrial hygiene. They most often work for industries, government agencies and environmental consulting firms. A few industrial hygienists work in academic settings as teachers and researchers. Working in this setting generally requires a doctoral degree.

Industrial hygienists do not generally need to be licensed to pursue their profession. However, most industrial hygiene specialists hold the Certified Industrial Hygiene (CIH) certification. This requires at least five years of relevant experience before the successful completion of an examination. CIHs must maintain their certification (e.g., recertify every five years) by attending professional meetings, courses, conferences or other similar professional development activities.

Environmental Safety

Protecting the environment in the U.S. is a massive effort being conducted on several fronts. Businesses of all sorts are trying to either eliminate the release of materials that can harm the public or damage the environment or recover and recycle excess materials for environmental conservation. Another effort is being made all across America to clean up waste sites where toxic substances were spilled or have been dumped in the past. These efforts require the control of environmental safety and health hazards. Environmental safety work requires extensive knowledge of OSHA standards, other government or client safety regulations, and an understanding of hazards and controls (that is, construction, ergonomics, fire protection, occupational safety, industrial hygiene and environmental health). In addition, environmental safety requires a working knowledge of environmental laws and regulations, such as the Comprehensive Environmental Response Compensation and Liability Act (CERCLA), the Resource Conservation and Recovery Act (RCRA), the Toxic Substances Control Act (TSCA) and others. Environmental safety professionals can gain this knowledge from undergraduate or graduate studies, extensive on-site experience, or a combination of both.

There are three general areas where the environmental safety professional can pursue career opportunities:

- ***Industrial/Government Sector:*** People can serve as environmental safety professionals for a specific facility or organization involved with OSHA, Department of Transportation (DOT), and Environmental Protection Agency (EPA) compliance, and state health and safety and environmental regulations. Additional duties may include overseeing the health and safety of on-site contractors.
- ***Consulting:*** People can work for design engineering firms and perform health and safety functions for their government or industrial projects. They can sell health and safety services to outside clients,

including the private and public sector. Additional health and safety responsibilities may involve overseeing the health and safety of contractors when an engineering firm provides construction management or engineering services to a client.

- ***Contracting:*** This role involves being employed by and providing in-house health and safety services to remediation contractors who actually clean up hazardous waste sites. Working in this arena requires an extensive construction background, since it involves hazardous waste activities coupled with heavy construction work.

In all three situations, it is desirable for the environmental safety professional to pursue professional certifications, specifically the Certified Industrial Hygienist (CIH) and the Certified Safety Professional (CSP). Many government and private sector remediation projects require that the person administering the health and safety program be certified as a CIH or a CSP. Consulting firms also value certifications because it makes the individual, and hence the firm, more attractive when selling services.

It is desirable to have these certifications in any situation where an organization is overseeing contractors and the project specifications require contractors to have certified personnel. Although not always required, it adds credibility if the primary contractor also employs certified personnel.

Environmental safety specialists need comprehensive knowledge of safety, industrial hygiene and environmental areas. With this wide range of knowledge, they can pursue a career in other health and safety specialties.

Fire Protection Engineering

Fire protection engineering is one of many interesting and challenging professional safety specialty areas. These safety specialists use the basic tools of engineering and science to help protect people, property and operations from fire and explosions. Employers and personnel recruiters consistently report good job opportunities with competitive starting salaries for fire protection engineers.

Fire protection engineers can be called on to provide a broad range of services. Some perform fire safety evaluations of buildings and industrial complexes to determine the risk of fire losses and how best to prevent them. Others design systems that automatically detect and suppress fires and explosions, as well as fire alarm, smoke control, emergency lighting, communication and exit systems. Fire protection engineers perform research on materials and consumer products, or do computer modeling of fire and smoke behavior. Others investigate fires or explosions that have occurred, prepare technical reports or provide expert courtroom testimony in legal cases.

Fire protection engineers work at the nerve centers of large corporations. They oversee the design and operational fire safety of complex manufacturing facilities in multi-national business networks. They also work for insurance companies, surveying major facilities and performing research, testing and analysis.

Fire protection engineers can be found at all levels of government, including civilian and military agencies, local fire departments, building code departments and state fire marshal offices. They work for architectural and engineering firms and specialty consulting groups. Interesting jobs are

available in trade associations, testing laboratories and at colleges and universities.

Thanks to the extensive fire research done in recent decades, fire protection engineering is making the transition from being based only on practical experience to an exciting engineering discipline that incorporates state-of-the-art science and computer capabilities. A few universities offer fire protection or fire protection engineering degree programs at the bachelor's, master's and doctoral levels. To obtain information on fire protection careers, students may contact the Society of Fire Protection Engineers. (See Resources, page 45.)

Ergonomics

Ergonomics is the science of fitting the job to the person. Most safety professionals must deal with ergonomics in general safety practice. Ergonomics can be a specialty as well. Ergonomists (also called human factors engineers) specialize in the relationships between people and their work. They design the work environment (such as facilities, machines, furniture, equipment, work-stations, tools and work methods) to match job demands with workers' capabilities, limitations and expectations. A fundamental principle of ergonomics is to design equipment and jobs to prevent errors, accidents, injuries or harm.

Ergonomists work on a wide variety of safety and health hazards. Many ergonomists deal with the physical aspects of work, such as:

- Designing lifting tasks to reduce the risk of back injuries.
- Designing machines and equipment to reduce the force, frequency and flexion of repeated tasks that eventually injure joints, muscles and nerves. An example is designing machine guards that protect workers while still allowing smooth, efficient motion.
- Designing chairs that promote comfortable and healthy work postures.
- Designing work-rest schedules on physically demanding jobs to prevent excessive fatigue.

Ergonomists who specialize in solving these problems usually have a strong background in engineering, with additional course work in physiology, anatomy and biomechanics.

Other ergonomists focus on the psychological and mental aspects of work such as:

- Designing effective warning labels to promote the safe operation of machines and tools.
- Designing displays (gauges, dials, alarms, etc.) and controls (buttons, knobs, steering wheels, etc.) for vehicles and other complex machines to reduce the chance of operator error and accidents.
- Designing training aids (instruction books, videos, simulators, etc.) to teach workers the proper and safe way to perform their jobs.

These ergonomists usually have a strong background in psychology with additional training in engineering or design.

Most ergonomists have at least a master's degree, since there are few undergraduate programs in ergonomics. Typically, ergonomists have undergraduate degrees in engineering or psychology before pursuing specialization in ergonomics at the graduate level. However, students with undergraduate training in safety sciences can also be considered for graduate training in ergonomics.

Career opportunities exist in industry (product design, work process and methods design), government (OSHA compliance officers), insurance companies (loss control

representatives), private consulting and academic settings (research and teaching).

System Safety

System safety specialists typically work with major new technological programs. Aerospace, military, medical, scientifically advanced projects and high-tech industries have relied on the system safety specialist to develop concepts, designs and products that have a high reliability of operation and low level of risk.

Have you ever marveled at the complexity of the space shuttle? Have you read about the complexity of software that manages the controls in today's aircraft and guides a plane safely through the skies? Have you ever thought about the management of materials flowing through chemical plants and the range of temperatures, pressures and chemical steps they experience while achieving the desired material? Each of these devices and processes works due to a high degree of reliability. In each case, system safety specialists reviewed the concept, design and construction of these magnificent machines and processes to ensure that they work correctly every time, without harm to users, operators or the equipment itself.

System safety is an analytical field, born of a high-tech need to develop quality products that have a minimum potential for failure. The system safety specialist reviews the design concept to identify the hazards associated with a human or machine failure. During design, the specialist (sometimes referred to as a system safety engineer) prescribes modifications to the design, or identifies the need to install redundant or backup systems to ensure reliability during operation. During testing, system safety specialists observe tests-in-progress or test results to see firsthand how a system interfaces with its environment. In recent years, this specialist has also been called on to ensure that safe decommissioning of outmoded systems occurs. Today they also analyze software for potential faults which can cause harm to people or the systems. Some specialize in analyzing electrical circuits and electrical systems and equipment for harmful events. Some work mainly with mechanical equipment and powered systems. Others work with chemical process plants to ensure that failures do not cause fire, explosions or releases of hazardous materials into the community.

The system safety specialist uses a variety of tools to identify possible system faults or other hazards that may lead to the failure of a product during its use. These traditional analytical tools consist of preliminary hazard analyses (PHA), failure mode and effects analyses (FMEA) and fault tree analysis (FTA). Newer tools, such as hazard and operability studies (HAZOPS), have been developed to meet the demands of new applications such as chemical processes and industrial manufacturing methods.

If you enjoy asking "who, what, when, where, why, how, and if," you may have an aptitude for system safety work.

You will also need a technical background that is either general or involves special areas of knowledge, such as mechanical equipment, electrical equipment and electronics, computer hardware and software, chemical processes, management methods and procedures, maintenance, etc. System safety specialists combine knowledge of the systems and knowledge of analytical methods with hazard recognition, evaluation and control knowledge.

The system safety specialist will be in demand in the foreseeable future to protect employees and the public, the environment and the organization's investment in equipment, processes and facilities. This specialist will have opportunities to advance through technical or management career ladders.

Risk Management

Organizations of all kinds must minimize the adverse effects of accidental losses at the most reasonable cost. To do this, they rely on the knowledge and services of risk managers. Virtually all large organizations, and many smaller ones, maintain a risk management department to reduce the likelihood and size of losses (known as risk control) and to pay for those losses that cannot be prevented (also known as risk finance). Risk management is an integral part of modern organizational management. By protecting a company against loss, the risk manager helps it to boost its operating efficiency and meet its strategic goals.

Risk managers are employed by industrial, service, non-profit and public sector organizations. For example, they serve airlines, banks, chemical and other manufacturers, government agencies, municipalities, retailers, hospitals, school districts and universities.

As organizations differ, so do the types of risks and losses they may encounter. For example, in addition to protecting people, physical premises, and inventory, a retail store risk manager seeks to minimize shoplifting and vandalism. A factory using hazardous equipment or substances is concerned with employee safety and health. It may issue protective clothing and equipment and provide specialized training to employees.

The basic skills required of the risk manager include communications, analysis and problem solving, management and leadership. First and foremost, risk managers must be good communicators. They must be capable of coordinating and interacting with other departments. The position requires regular contact with such departments as auditing, engineering, finance, human resources, legal, research and development, safety and security.

Risk management also involves working with external sources, such as attorneys, brokers, consultants, insurance agents, insurers and other service providers. In addition to understanding these varied specialties, the risk manager must master the complexities of the organization's own operations.

A sound knowledge of insurance fundamentals and risk financing mechanisms is also essential. The risk manager must know which potential losses can be retained through some form of self-insurance and which risks need to be insured, for how much and with which vendor. They recognize whether claims are being handled properly or not, and if appropriate insurance coverage is available.

The risk manager must also thoroughly grasp loss control issues such as employee health, worker and product safety, property safeguards, security, fire prevention and environmental protection. The risk manager must be able to manage time and people skillfully by setting goals, planning strategies, delegating tasks and forecasting and measuring results.

For a career in risk management, a bachelor's degree with a broad business background is recommended. A major in risk management or insurance is highly desirable. Many

additional fields of study are also appropriate, including safety and health, accounting, economics, engineering, finance, law, management and political science. In addition, many firms require candidates to have a master's degree in business administration (MBA) and to earn an Associate in Risk Management (ARM) or other insurance or risk designation.

Risk managers work for corporations, service providers, government administrations and numerous other public and private organizations. Some risk managers join insurance companies, insurance brokerage firms or consulting firms that provide risk management services to clients. The structure of risk management departments varies with the nature and size of the organization.

Loss Control, Loss Prevention, and Risk Control

Loss control, loss prevention, and risk control are terms primarily used in the insurance industry. Insurance companies selling workers' compensation, property, auto, liability, and other forms of business insurance employ safety professionals to conduct risk assessments to support underwriting (business selection and pricing process) and help their clients prevent incidents and accidents that lead to insurance claims.

Each insurance company develops its own process of risk assessment and safety consulting services around the kinds of businesses that it insures. Insurance company safety representatives provide these services to policyholders based on the terms and conditions of the insurance contract and service agreement. The emphasis of this service is the prevention of injuries and illnesses to workers and the public, preventing company vehicle crashes, and avoiding property losses. This reduces costs, benefiting both the policyholder and the insurance company. Consulting strategies typically include identifying and evaluating hazardous exposures, developing plans to control them, and providing follow-up services to assist the customer with successful implementation.

To identify accident exposures, loss control representatives analyze accidents or incident trends, and conduct work site risk assessments to identify potential hazard exposures. Their knowledge, research, and vast database of injury trends across a wide variety of industries and operations help identify potential loss exposures where the exposures may not be evident. The loss control representative then evaluates the exposures and develops recommendations to eliminate or reduce them. Once these recommendations are implemented, the loss control representative follows up to evaluate effectiveness and to determine if more changes might be needed to further reduce the exposure.

Loss control representatives engage in a wide array of consulting activities, such as training employees at all levels on safety, providing industrial hygiene services, developing and evaluating safety programs, investigating incidents, and providing technical advice on ergonomics, construction safety, product safety, environmental safety, fleet safety, and fire protection. Some loss control representatives specialize in these areas.

Another responsibility of insurance safety representatives is to assist the insurance company's underwriting department in evaluating the risk and level of control of the policyholders' operations for specific types of insurance coverage. This responsibility allows the insurance company to select, price, and provide the appropriate coverages for the business. This involves a continual evaluation

of the policyholder's accident rates and exposures, as well as their efforts to reduce the problems identified.

Because clients may be involved in a wide range of business activities, loss control representatives become familiar with many different types of businesses and their associated hazards. The opportunity to specialize in a variety of safety activities, as well as to obtain experience in several types of industries, makes loss control a very rewarding career for safety professionals.

Chemical Process Safety

Many of the modern materials and essential products we take for granted everyday are made possible by the chemical industry. Fuels, food ingredients, pharmaceuticals, textiles, paper products, plastics and industrial chemicals are some chemical industry products. Each chemical product involves a very different chemical process, which is one of the reasons why the chemical industry is very dynamic. Each process has its own starting materials, processing equipment and operating temperatures and pressures—because of this, each process has a unique set of hazards.

While manufacturing chemical products, it is the responsibility of the chemical manufacturer to maintain a safe working environment for employees and a safe environment for the people and communities surrounding their plants. The chemical process safety professional plays a key role in this responsibility.

Chemical process safety involves analyzing chemical processes to identify the potential for accidents. It also involves planning for the control of unexpected releases and reactions to avoid catastrophic losses. This is done so that chemical companies can act to prevent these accidents, and so that nearby communities can respond appropriately to incidents. And if they should happen, the companies and emergency response organizations are better prepared to handle the consequences. Contingency planning also helps companies recover quickly and continue a reliable supply of vital products to the marketplace.

This discipline can be broken into four general areas: assessment, technical support, training and management. It is the job of chemical process safety professionals to assess a chemical process in order to identify potential hazards. They also provide technical support to those who design new processes, and those who operate existing processes, so that they can be aware of process hazards and take steps to prevent chemical accidents from occurring. Chemical process safety also involves training employees who work with the processes on how to recognize chemical hazards, and prevent or respond to accidents.

These safety professionals may also become involved in process safety management. This means that they coordinate a company's safety efforts and work with other managers to help chemical process safety become more efficient and effective.

Chemical process safety is still a fairly new field. Its modern version began in the early 1970s. It gained momentum in 1984 after a chemical process disaster in Bhopal, India resulted in the death of thousands of citizens.

Because this profession is so new, practitioners entering the field still have an opportunity to truly impact and shape the future of the discipline. Much progress has been made within the last few years, but much more progress will occur in the near future. Students entering the field now can be a part of this development.

Chemical process safety benefits industry by preventing the types of accidents that otherwise make the headlines and damage the environment, destroy chemical processing plants, and cause serious injuries to employees. Chemical process safety benefits society by reducing the possibility of hazardous chemical releases upon communities or the environment. It also helps the chemical industry to find ways to safely manufacture the products that are in demand by modern society.

In summary, chemical process safety is a good career area to consider because it provides many benefits to industry and to society and offers many job opportunities, both technical and managerial. It also will be rewarding to the person who chooses to enter this safety-related specialty.

Construction Safety

Construction sites are as different from one another as are people. They vary in size from small road repair jobs and building renovations to the construction of huge skyscrapers, enormous bridges and massive power plants. But, they have at least one thing in common: large pieces of equipment, tons of structural materials and dangerous heights which create safety and health hazards that can take a life in the blink of an eye. They also require the presence of construction workers, whose health and well-being depend on the effectiveness of hazard control programs designed by construction safety professionals.

Construction safety professionals recognize and control a wide variety of safety, health and fire hazards in unique and ever-changing work environments. The need for construction safety professionals continues to expand since construction is one of the most hazardous industries.

A construction safety practitioner could be employed by a medium to large construction company, a contractor trade organization, an organized labor group, a government agency, an insurance company, an engineering firm or a consulting firm.

An undergraduate degree in safety combined with general construction management courses or construction experience will help individuals begin a career in this specialty. Working for a large construction company will generally require periodic relocation or frequent travel to project sites. Many large construction companies also operate outside the U.S. With the expansion of the global construction market, the need for construction safety professionals at sites outside the U.S. will increase.

Eight-hour days are normal for safety professionals employed in the construction industry. But weather conditions, performance and completion deadlines frequently dictate extended work hours.

A large construction workplace is typically supervised by a management/engineering company that employs a general contractor (GC) to erect, renovate or demolish a structure. The GC then employs and schedules the necessary specialty contractors, such as excavation, steel erection, masonry, mechanicals, roofing, carpentry, painters and others, to perform specified tasks. Large projects could have ten or more sub-contractors working at one site at the same time.

Because construction site organizations vary, a construction safety professional must possess the ability to communicate effectively within an organization having a variety of management styles and a diverse work force.

Construction methods, equipment, working conditions and materials continually change on a construction site. Through weekly or monthly work planning sessions and continuous monitoring of job sites and work groups, safety professionals can identify hazards early and ensure that controls for them are in place as each kind of work begins.

If you enjoy fast-paced activities, constant daily challenges outdoors, hands-on working conditions, and minimal time working at a desk, you are likely to enjoy working in construction safety. If you can work effectively with a variety of tradespeople, you will appreciate the financial and personal rewards associated with good hard work and will do well as a safety professional in the construction industry.

Institutional Safety Management

A career in institutional safety can present a variety of exciting and rewarding challenges. Institutional safety typically encompasses hazard control in organizations such as hospitals, correctional facilities (prisons and jails), research facilities or schools at all levels.

Hospitals, correctional facilities and universities are typically large employers and are often part of large organizations. This presents the trained safety professional with the opportunity for career enhancement and growth.

Hospitals and nursing homes face a wide range of government and industry regulations. For example, the Joint Commission on Accreditation of Healthcare Organizations has numerous self-regulating standards, including safety standards, for the industry. National fire and building codes for hospitals and nursing homes have many safety provisions and become law when adopted by federal, state and local government. In addition, OSHA and EPA regulations affect this industry, as well.

The hospital safety professional also has the unique opportunity to work with people from diverse backgrounds and interests. A hospital provides a wide array of experience, from the surgeon who is concerned about exposing employees to an infectious plume during laser surgery and the nursing supervisor attempting to prevent back injuries while handling patients, to the laboratory technicians seeking to control the emission of chemicals used in preparing tissue samples. The hospital safety professional must constantly assess the environment, seeking methods to minimize hazards that could result in injury or loss.

Colleges and universities have safety professionals who help protect students, faculty and staff from harm during laboratory classes and research projects. They manage risks for maintenance, food service and office employees. They handle the disposal of chemicals and other hazardous materials used in laboratory work or in maintenance of building and grounds. They deal with campus traffic safety and other risks.

One of the major concerns for the institutional safety professional is fire prevention and suppression. Whether it's a hospital, where many of the patients are unable to walk, a university dormitory, or a correctional facility, where the inmates' safety has to be balanced against the need for confinement, the safety professional must continually assess the environment, and look for ways to prevent fires.

Many institutions maintain state-of-the-art fire detection and suppression systems, which the safety professional will help to design and maintain. Employees must also be highly trained in procedures for suppressing fires,

and recovering from them, all the while minimizing any possible disruptions to service.

Institutional safety professionals must have a true generalist's background, with training in occupational safety, fire safety, industrial hygiene, chemical safety, radiation safety and ergonomics. Employers are looking for candidates who have attained a minimum of a bachelor's in safety. Employers are also increasingly seeking Certified Safety Professionals (CSPs).

The long-term outlook for professionals specializing in institutional safety looks promising. With the onset of managed care and competition in health care, hospital administrators are realizing that to succeed, they must manage extremely efficient operations. Safety has been integrated as a key management strategy aimed at reducing losses and claims. As a result, the safety professional has been teamed with other key hospital administrators whose function is to manage risk. Safety professionals are also moving into management roles in correctional facilities and universities as these organizations seek to control their risks more effectively.

Transportation Safety

Safety professionals play an important role in the safety of all forms of transportation: railroads, auto, trucking, aviation, maritime shipping and oil and gas pipelines. There are safety professionals working for companies and government agencies associated with each transportation mode. Some work with designers of vehicles, highways and the transportation systems themselves. A degree in civil or mechanical engineering is most useful in this role. A few work in research and studies of accidents and injuries related to transportation.

Some of the federal agencies involved in transportation safety include: National Highway Traffic Safety Administration (auto), Federal Highway Administration (highways and trucking), Federal Aviation Administrations (aviation), Federal Railroad Administration (rail systems), U.S. Coast Guard (maritime) and Research and Special Programs Administration (pipelines). These and other agencies are part of the U.S. Department of Transportation (DOT). A separate agency, the National Transportation Safety Board (NTSB) investigates major transportation accidents and makes recommendations for preventing transportation accidents. NTSB safety specialists have advanced training in accident investigation.

The majority of safety professionals involved in transportation safety work for private companies, such as airlines, railroads, large trucking firms or oil and gas pipeline companies.

Safety Research & Risk Assessment

As with any discipline, the body of knowledge that guides the science and practice of safety continues to grow. Much of what is regarded as good theory and practice was discovered by practitioners through trial and error, or was simply borrowed from related disciplines. Relying on these traditional methods is changing, because more people are entering the profession with formal academic training.

Undergraduate and graduate educations are exposing professionals to the subtleties of research questions and methodology. This heightened awareness, in turn, produces a demand for better research-based knowledge as these educated professionals go about their duties. The demand for more sophisticated

research is being met by several different groups of researchers.

Much research is performed by government agencies such as the National Institute for Occupational Safety and Health (NIOSH) or the Environmental Protection Agency (EPA). These agencies, as well as other organizations, also fund research projects that are carried out at universities and private research organizations. For example, the American Society of Safety Engineers Foundation is one professional organization that sponsors safety research projects. Large companies often fund research which benefits their own safety functions, products or services.

Actual research topics can fall into several broad areas. Much research is performed in technical areas, such as the design and reliability of safety equipment, ergonomics or fire safety. Other research promotes the understanding of management theory and practices applied to safety. A third area of research is in the decision sciences, where questions involving risk assessment and policy analysis techniques are explored. Another area of study involves how well hazard controls work.

Those interested in pursuing a career in safety research will need a strong academic background (master's or doctorate degree) combined with practical experience in safety. Research specialists usually work for government agencies with a research responsibility, at large universities or in company sponsored laboratories. There are also a few industry sponsored laboratories, such as Underwriters Laboratories (UL), Factory Mutual (FM), the Insurance Institute for Highway Safety and the Liberty Mutual Insurance Research Center.

Profiles of Safety Professionals

This section contains career summaries of selected individuals in the safety profession. The profiles provide a cross section of career options and illustrate advancement opportunities. The profiles represent three groups: early career level (people in their first decade of practice), mid-career level (10 to 15 years of practice), and senior career level (20 or more years of practice). Some also represent specialty practice areas discussed in the previous section.

EARLY CAREER LEVEL

Justin B. Walker

Justin Walker learned about the safety profession through a friend in the safety program at West Virginia University. After earning a bachelor's in business at WVU, Mr. Walker pursued a master's degree in safety management. After graduating, Mr. Walker was hired by The Hartford Financial Services Group—one of the largest investment and insurance companies in the U.S. He finds that getting to meet people and to help them make their workplaces safer and more efficient to be most rewarding in his current position.

During his academic training, Mr. Walker was involved in WVU's ASSE student chapter and served as Vice President. Upon graduation, he earned the Graduate Safety Practitioner (GSP) designation from the Board of Certified Safety Professionals (BCSP).

Degrees:

- BS, Business Management, 2003, West Virginia University
- MS, Safety Management, 2006, West Virginia University

Time in Safety Profession:
One and a half months

Current Position:
Loss Control Trainee, The Hartford

Memberships:
American Society of Safety Engineers

Certifications:
Certified Hazard Control Manager (CHCM)

Marcia Ann Kraemer

Marcia Kraemer found out about safety through the management positions she held in the past. She had experience with safety issues and found them to be a better fit and more interesting than business. Her internships through Murray State University gave Ms. Kraemer her start in safety. Her internships helped reinforce her book knowledge and this knowledge then translated into the workplace.

While at Murray State, Ms. Kraemer was active in ASSE and AIHA. Upon graduation, she earned the Graduate Safety Practitioner (GSP) designation.

Ms. Kraemer gives credit to her Murray State degree for her career success thus far. She finds that getting to use and apply what she learned in school to be greatly rewarding.

Degrees:

BS, Occupational Safety and Health, 2006, Murray State University

Time in Safety Profession:

Two years

Current Position:

ES&H Specialist, Washington Group International

Memberships:

American Society of Safety Engineers

Certifications:

Pursuing the Certified Safety Professional certification

Joseph T. White

Joseph White discovered safety while thumbing through the undergraduate programs catalog at Marshall University and through word of mouth from friends and family in the industry. He got started in safety after being enrolled in an Introduction to Safety class as a freshman.

While pursuing a safety technology degree, Mr. White was involved with the ASSE student chapter at Marshall University. He also became an intern at a local safety consulting firm working part-time during the school year assisting a safety director at a major scrap metal recycling facility. The firm hired Mr. White full-time during the summers where he worked on everything from workers' compensation audits to industrial outages at a steel mill to large construction projects.

Upon graduation, Mr. White became the Safety Director at the scrap metal recycling facility he worked at while interning, but quickly obtained a position as a Safety Engineer with AK Steel.

Mr. White feels that the ability to communicate with people has been his key to success. He believes safety professionals must be able to deliver the importance of safety to all levels of management and to the workers in the field. They must feel responsible for their safety and others to truly foster a safe working environment. Knowing that something he does or says could keep someone from being injured or becoming ill from a workplace exposure is the most rewarding part of safety for Mr. White.

Perseverance is essential to being a safety professional. Mr. White believes that safety professionals must always do what's right for the safety of others—even though it might not be the most popular decision.

Degrees:

BS, Safety Technology, 2006, Marshall University

Time in Safety Profession:

Two years (while in college)
Four months (since graduation)

Current Position:

Safety Engineer, AK Steel Corporation

Memberships:

American Society of Safety Engineers

Certifications:

- OSHA 30-Hour Construction and 10-Hour General Industry Certified
- CSX Roadway Worker Protection Certification
- Red Cross Adult, Infant and Child CPR
- Red Cross Community First Aid and Safety Certifications

Courtney Youngblood

While in the Pre-Physical Therapy program at Oakland University, Courtney Youngblood learned about how mold and asbestos was

tested for through a friend's internship. Curious about what kind of major encompassed this kind of work, she researched further and changed her major to Industrial Health and Safety. One year later, the program name changed to Occupational Safety and Health.

During her academic training at Oakland, Ms. Youngblood was president of the student section of ASSE and was exposed to numerous speakers and possibilities in the safety profession through student section conferences. Upon graduation, she earned the Graduate Safety Practitioner (GSP) designation.

Ms. Youngblood interned at Toyota Technical Center where she conducted ergonomic assessments, developed and conducted monthly safety trainings, conducted building inspections, and documented issue progress. She was then hired by Washington Group International (WGI) as a construction safety intern.

After graduating, Ms. Youngblood was hired full-time by WGI and supports their sites in the Industrial Process division, mainly automotive. She conducts audits and is a resource to project managers on the sites. Ms. Youngblood helped update the company's safety talk booklet. She also implemented a Safety Team, improving communication between management and the craft, at the DuPont Mt. Clemens site. Here she conducted more detailed audits and was involved with abatement. This site was able to reach two years without a recordable injury and was recognized for two safety awards within the company.

Ms. Youngblood credits her internships and the supervisors who were patient and willing to guide her toward becoming a safety professional with her career success. She also values the opportunity to have instructors at Oakland who also worked in the field. She believes that you can never go wrong with the attitude of continuous improvement. The most rewarding part of her job is helping employees go home to their family in one piece.

Degrees:

BS, Occupational Safety and Health, 2006, Oakland University

Time in Safety Profession:

Two and a half years

Current Position:

Environmental Safety & Health Specialist I (Safety Supervisor), Washington Group International

Memberships:

American Industrial Hygiene Association

Certifications:

- Safety Trained Supervisor (STS)
- Currently pursuing the Construction Health and Safety Technician (CHST)

MID-CAREER LEVEL

R. Brent Lawrence

Brent Lawrence started with the National Institute of Occupational Safety and Health (NIOSH) as a junior in high school in the Hi-Step program earning a stipend of $2.50 per hour. He stayed with NIOSH while pursuing his undergraduate degree through a work study program and as a summer hire. After graduating, Mr. Lawrence took a job at NIOSH with a private contractor and moved into an Engineering Technician position. Mr. Lawrence was encouraged to look into safety by his current Branch Chief and pursued a graduate level education in the field with the support of NIOSH.

Mr. Lawrence feels that the support and encouragement from his employers, co-workers, and family and friends has allowed him to obtain the success he has experienced.

The feeling of helping people and knowing that he makes a difference in someone's life, in a professional safety position, is especially fulfilling.

If he had to offer advice to someone in the safety profession, Mr. Lawrence would say to pay close attention to detail and not to overlook anything. No detail is too small. What seems like minutia can turn into something much bigger in the end.

Degrees:

- BS, Journalism, 1993, West Virginia University
- MS, Safety Management, 2006, West Virginia University

Time in Safety Profession:

Nine years

Current Position:

Engineering Technician, Laboratory Research Branch, Division of Respiratory Disease Studies, National Institute of Occupational Safety and Health

Certifications:

Pursuing the Certified Safety Professional certification

Jessica Bohan

Jessica Bohan found out about safety through a sibling. Her older sister is a Certified Industrial Hygienist. Ms. Bohan found her sister's career to be exciting—she was always helping people and held a good job in private industry.

Even though Ms. Bohan was not armed with a safety degree, she became more involved with safety through her work. She began her career in environmental health and safety for the local public health department. Here, she designed septic systems, inspected public pools, investigated foodbourne complaints, and childcare facilities. She also inspected migrant labor camps for compliance with OSHA regulations.

She found she could make a positive difference in people's lives working in the agriculture industry. She began researching regulations for the different industries and took every safety class she could. She also attended safety and health professional conferences and meetings and networked with others in safety.

Ms. Bohan also worked for the State of Florida Division of Safety in the Public Sector Enforcement Program. She currently works as a consultant with the OSHA Consultation Program—a fun and challenging job.

Ms. Bohan believes that communication skills are the key to success in safety. Being a good listener is very important. Many times you have to motivate people to want to increase their safety performance. Being able to understand where they are coming from and to connect with them is essential to enhancing the safety and health efforts of a company and the employees. Also, presenting safety and health deficiencies in a positive, challenging way is imperative.

She also feels that continuous learning is an absolute must. Never stop challenging yourself to learn more, because the safety and health field is constantly changing. Ms. Bohan recommends taking formal classes, attending seminars, reading safety articles and publications, and meeting with other safety and health professionals—excellent sources of information.

One of the greatest benefits of Ms. Bohan's job is working with a variety of businesses with unique products and processes and to see them experience success in safety and health (e.g., better injury data or cost savings due to reduced workers' compensation costs). The biggest reward has been testimonials

from employees whose lives have been positively impacted or saved by the changes made in safety and health to make their workplace safer.

Degrees:

BS, Social Science (Geology Minor), 1993, Florida State University

Time in Safety Profession:

10 years

Current Position:

Safety and Health Compliance Specialist, University of South Florida, OSHA Consultation Program

Memberships:

- American Society of Safety Engineers
- National Association for Women in Construction

Certifications:

- Certified Safety Professional
- Certified Utility Safety Administrator
- Occupational Health and Safety Technologist

Henry Lane III

Henry Lane currently serves on the Fire Department's Occupational Safety, Health and Wellness Team in Arlington, Virginia. He has always had an interest in firefighter safety and a desire to do more with safety in the fire service. His success stems from not giving up and pursuing his own goals to reduce injuries and fatalities. Mr. Lane continually takes proactive steps to improve safety. His advice to others? Strive to make a difference.

Degrees:

- BS, Fire Administration, 2000, University of Maryland
- MS, Safety Management, West Virginia University

Time in Safety Profession:

10 years

Current Position:

Firefighter/Paramedic, Arlington Virginia Fire Department

Certifications:

Pursuing the Certified Safety Professional certification

SENIOR CAREER LEVEL

Thomas Ryan

Thomas Ryan became interested in safety after witnessing an on-the-job fatality. Mr. Ryan started getting involved in safety as an ironworker in construction. At that time, he also served as the union steward, recording secretary, and Executive Board member of Ironworkers Local 496. As a union steward, he represented worker rights.

His first professional job was with the Maine Labor Group on Health—the safety and health advocacy group for the Maine AFL-CIO.

A passion to prevent worker injury and death has been the key to Mr. Ryan's success as a safety professional. Seeing graduates succeed is the most rewarding part of his current position at Central Maine Community College.

Degrees:

- BA, History, 1974, Siena College
- MBA, 1988, Thomas College
- MS, Work Environment Policy, 1995, University of Massachusetts Lowell

Time in Safety Profession:

17 years

Current Position:

Department Chair, Occupational Health & Safety, Central Maine Community College

Memberships:

American Society of Safety Engineers

Certifications:

- Certified Safety Professional
- Construction Health and Safety Technician
- Occupational Health and Safety Technologist
- Safety Trained Supervisor

Larry Jones

Larry Jones discovered safety through a friend who was a Certified Safety Professional. He started in safety putting his systems engineering skills to work at a job supporting NASA. Mr. Jones was indoctrinated into safety through job assignments and training in system safety aspects. He was recognized by the NASA Manned Flight Awareness Team with the Silver Snoopy Award for his hard work and dedication to safety. Mr. Jones continually advanced his work skills, became involved in professional organizations, and progressed to management safety roles. Today, he manages safety, reliability, quality, and manufacturing efforts for a large corporation.

Dedication to the safety profession and involvement in safety activities have always been the keys to his success. For example, he volunteers on the Board of Certified Safety Professionals Board of Directors and served as BCSP President in 2006. The results of a job well done, while making life safer for customers, is extremely enriching. His advice to others considering safety as a career field? Focus on others and not yourself.

Degrees:

BS, Industrial Engineering, 1969, Tennessee Technological University

Time in Safety Profession:

18 years

Current Position:

Specialty Engineering Department Manager, Dynetics, Inc.

Memberships:

System Safety Society
(President from July 1, 2005 through June 30, 2007)

Certifications:

Certified Safety Professional

Michael W. Pitts

Michael Pitts discovered safety through his college studies in management/HR theory and through previous employers and individuals already in the profession. He worked in safety at a power generation plant during his summers at Clemson University and began full-time as a Safety Assistant upon graduation. Mr. Pitts was promoted to a safety & health consultant position and then accepted a transfer into a corporate training role—providing EHS training delivery and consulting to the entire company and domestic and international customers.

After obtaining his master's degree and the CSP certification, Mr. Pitts started work at another company as a Corporate Safety Coordinator. This position soon expanded and he became Safety & Technical Training Manager with responsibilities for corporate leadership for safety and training at three companies.

Mr. Pitts credits education, certification, a dedication to the profession, quality professional development, involvement/interactions with peer networks, flexibility and ability to adapt to change, personality, and a willingness to learn to his career success. He is rewarded through his work knowing that he has the daily opportunity to lead/influence individuals and organizations. This ensures actions are taken and processes are implemented to eliminate the potential for

incidents involving personnel and property as much as possible.

Degrees:

- BS, Management, Safety & Health, 1988, Clemson University
- Masters in Human Resource Development, 1999, Clemson University

Time in Safety Profession:

18 years

Current Position:

Manager, Safety & Technical Training, Oglethorpe Power Corporation

Memberships:

- American Society of Safety Engineers
- National Safety Council (Utilities Division)

Certifications:

- Certified Safety Professional
- Certified Utility Safety Administrator

Jan Simon Clark

Jan Simon Clark can recall an interest in safety as early as high school. As a reporter for her school newspaper, she wrote several investigative articles on fire safety issues.

Ms. Simon Clark originally sought out a chemistry degree, but changed her major to chemical engineering and landed at Texas A&M. Here, after two semesters of class work and one semester as a co-op chemical engineer with a major chemical company, she decided to pursue a degree that would allow more interaction with people. She stumbled across safety when researching various engineering curriculums. Upon talking to two major professors in the Safety Engineering Department, Ms. Simon Clark realized safety was her calling—a mixture of chemistry, engineering, and interaction with people.

During Ms. Simon Clark's career as a safety professional, she has worked for an oil/gas company, a chemical company, as a consultant, and for a pipeline company. She has had the opportunity to work in the oil field, both onshore and offshore, to work inside a chemical plant and refineries, to conduct industrial hygiene monitoring at fiberglass pipe manufacturing facilities, to serve as the Evidence Coordinator for a major multiple fatality incident investigation, to serve as the on-site Health & Safety Officer at an environmental remediation site (removing contaminated soil from a housing project without relocating residents), and to go to Guantanamo Bay Naval Air Station.

In addition to honing her professional safety and health skills, Ms. Simon Clark has been able to develop project management skills and learned how to "sell" safety to top management.

Ms. Simon Clark has been heavily involved with professional societies (AIHA and ASSE), serving as various officers.

Diversity, working for varied employees and gaining experience in a wide range of industries and operations, and having several mentors have been the keys to Ms. Simon Clark's success as a safety professional.

Throughout her career, ensuring that employees leave the work site every day in the same condition as they arrived, from both a health and safety standpoint, has been a guiding principle for this safety professional. Ms. Simon Clark offers the following advice to those considering a career in the safety profession: gain as much experience as possible in diverse workplaces or situations early in your career, become certified in whichever aspect of safety and health you pursue, and give back to your profession through active involvement in professional societies. It's also important to support scholarships for students pursuing safety and health degrees.

Degrees:
- BS, Safety Engineering, 1985, Texas A&M University
- MS, Industrial Hygiene, 1989, Texas A&M University

Time in Safety Profession:
21 years

Current Position:
Risk Specialist, Chevron Pipe Line Company

Memberships:
- American Industrial Hygiene Association
- American Society of Safety Engineers

Certifications:
- Certified Industrial Hygienist
- Certified Safety Professional

Sam Gualardo

Sam Gualardo was introduced to safety by his father (who was responsible for safety in his own job). He got started in the field through an internship at Bethlehem Steel Corporation.

Before taking on the consultant and instructor roles he holds today, Mr. Gualardo was a loss control representative in the insurance industry, a safety specialist, corporate safety engineer, and safety manager in food manufacturing, and a manager and director of safety and health in the electric and gas utility field.

Mr. Gualardo served on the American Society of Safety Engineers Board of Directors for nine years and held all elected offices at local, regional, and national levels, ultimately serving as National President. He is currently a Board of Certified Safety Professionals Director.

Mr. Gualardo has a passion for achieving excellence fueled by the desire to prevent needless injuries, illnesses and deaths of workers. Helping others attain success has been the most rewarding part of his current work.

Degrees:
- BS, Safety Sciences, 1980, Indiana University of Pennsylvania
- MA, 1985, Labor/Industrial Relations, Saint Francis University

Time in Safety Profession:
26 years

Current Positions:
- Consultant
- Instructor, Indiana University of Pennsylvania

Certifications:
Certified Safety Professional

Rick Callor

Rick Callor got his start in safety as a Mine Rescue Instructor at a junior college in Utah under a Mine Safety and Health Administration (MSHA) grant. He initially found out about the safety profession through MSHA.

Since that first job, Mr. Callor has been a safety supervisor and a trainer and safety supervisor for coal companies. He was Safety Manager at Kaiser Coal in Utah—the largest and oldest underground coal mine in the U.S. at the time. Mr. Callor was also a Manager of Safety and Health and then promoted to Manager of Health, Safety and Human Resources at a small gas utility company.

He was recruited by Morrison Knudsen (MK) Corporation and worked on several projects, including removal of the plutonium process lines and materials at Rocky Flats in Denver. While at MK, now Washington Group International, Mr. Callor made his way from Safety Manager to Health and Safety Manager to Corporate Safety Training Director. He also traveled the country to

train other employees in construction safety and OSHA regulations.

Mr. Callor firmly believes that hard work, obtaining a degree, and achieving certification were keys to his success in safety. He believes that education and certification go hand in hand.

His employment has allowed Mr. Callor to travel the world, work in war zones and train employees in several different countries. It has been rewarding for him to meet people all over the world.

Degrees:

AAS, 1995, Trinidad State Junior College

Time in Safety Profession:

29 years

Current Position:

Corporate Safety Training Director, Washington Group International

Memberships:

- American Institute of Mining Engineers
- American Society of Safety Engineers

Certifications:

- Certified Safety Professional
- Safety Trained Supervisor

Adrian Hertog

Adrian Hertog worked for Burlington Northern Santa Fe Railway during his entire career in safety. He discovered safety through a transfer into BNSF's Operations Staff Division and officially got started in safety as a staff assistant in the Safety and Rules Division. Since that time, Mr. Hertog has held various corporate and field positions with BNSF.

Mr. Hertog has been actively involved with the American Society of Safety Engineers at the local and national level and currently presides as President of the Council on Certification of Health, Environmental and Safety Technologists.

Ask Mr. Hertog what has been key to his own success and he will say that developing and implementing safety processes resulting in reduced accidents and injuries and improving compliance with operating and safety rules and procedures that yielded substantial cost savings.

Knowing that the time and effort commitment benefits workers by returning them home safely to loved ones is the most gratifying part of his safety career.

If asked for advice, Mr. Hertog says that you will achieve the level of safety you demonstrate you want. If you have a genuine and sincere interest in worker safety, then the safety profession is where you need to be.

Degrees:

AA, 1963, University of Minnesota

Time in Safety Profession:

30 years

Current Position:

Retired from Burlington Northern Santa Fe Railroad

Memberships:

American Society of Safety Engineers

Certifications:

- Certified Safety Professional
- Occupational Health and Safety Technologist

Mark M. Brauer

Mark Brauer found out about safety when he almost blew up a high school classroom while following procedures on an Electrical Shop project. He vowed to never be in such a situation again.

Nine years later, while in the United States Air Force, Dr. Brauer caught a design flaw in the B-58 Hustler Voice Warning System (VWS) and designed an engineering solution which was implemented across the entire fleet. For this, he was given the Northrop Corporate Management Improvement Medal. This led to a promotion and responsibility for the design of Ground Support Equipment (GSE) and shelter system design safety. Dr. Brauer was again promoted, to Division Safety Engineer this time, and was in charge of safety for the 18 pieces of GSE on President Carter's aircraft.

His next government service assignment involved the safety of the U.S. Army Serial Bullet Rifle. Dr. Brauer solved a "fallback" problem on the self-propelled howitzer with a design safety correction. He also invented the Synthesized Target System (STS) safety system that eliminated significant losses in down-range accidents.

Dr. Brauer went on to become a Lockheed staff scientist. Here he was in charge of many design safety issues across a broad range of military/space systems. He changed operational procedures and was responsible for life support and escape on the USAF/NASA National AeroSpace Plane. Dr. Brauer redeveloped the crew cabin to facilitate safe escape and extraction of any crew from the launch pad through space—never achieved before. For this, he received USAF and NASA commendations.

Next, Dr. Brauer was appointed to Texas A&M-Kingsville as Associate Professor of Industrial Engineering. At TAMU-K he was assigned to chair the College of Engineering's Ethics Committee, he invented the Safety Cube (a new, third dimension for human safety in safety analyses), and he taught the college's first safety engineering class.

Dr. Brauer has recently authored safety chapters in the U.S. Government HEB-1 guidelines document and has numerous systems at various stages of commercial, medical, and military development.

He credits life-saving design creativity, ethics, management tenacity, and corporate support for his success and finds working with the most creative, ethical, and intelligent engineers to be extremely rewarding.

Degrees:

- BS, 1968, University of Southern California
- MS, 1971, University of Dallas
- Ph.D., 1975, Texas A&M University

Time in Safety Profession:

45 years

Current Positions:

Director of Safety, Amencie Consultants

Memberships:

- Department of Defense - Human Factors Engineering - Technical Advisory Group (DoD-HFE-TAG)—elected Emeritus Member
- Institute of Industrial Engineering (IIE)—past chapter president of three chapters and elected Fellow
- Institute for the Advancement of Engineering (IAE)—elected Fellow
- Human Factors and Ergonomics Society (HFES)—founded the Brazos Chapter and elected Fellow

Certifications:

- Certified Safety Professional
- Professional Registered Engineer (Texas)

Resources

Those seeking more information about the safety profession and the nature of work done by safety professionals may obtain additional help from the sources below.

Organizations

American Conference of Governmental Industrial Hygienists

www.acgih.org
1330 Kemper Meadow Drive, Suite 600
Cincinnati, OH 45250
513-742-2020

For over 60 years, ACGIH has been a special organization for special people. From an initially limited membership base to the all-encompassing categories of today, ACGIH has grown and expanded without losing sight of its original goal: "To encourage the interchange of experience among industrial hygiene workers and to collect and make accessible such information and data as might be of aid to them in the proper fulfillment of their duties."

ACGIH is noted for its publication of allowable exposure standards for chemical and physical agents and for establishing methods for measuring environments for contaminants of various kinds.

American Industrial Hygiene Association

www.aiha.org
2700 Prosperity Avenue, Suite 250
Fairfax, VA 22031
703-849-8888

AIHA is the essential source for information on occupational and environmental health and safety issues. Founded in 1939, AIHA is an organization of more than 11,500 professional members dedicated to the anticipation, recognition, evaluation, and control of environmental factors arising in or from the workplace that may result in injury, illness, impairment, or affect the well-being of workers and members of the community.

American Society of Safety Engineers

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

Founded in 1911, the non-profit American Society of Safety Engineers (ASSE) is the oldest and largest professional safety organization. Based in Des Plaines, Illinois, ASSE has 30,000 occupational safety, health and environmental (SH&E) members who manage, supervise, research and consult on safety, health, transportation and environmental issues in all industries, government, labor and education. ASSE is a global organization that works to advance the technical, scientific, managerial and ethical knowledge and skills of occupational SH&E professionals, and is committed to protecting people, property and the environment. Within eight U.S. regions, ASSE has 151 chapters, 30 sections and 61 student sections. There are members in 64 countries, including Saudi Arabia, Kuwait, the United Kingdom, Ecuador and Egypt. Chapters offer localized

membership services, issue advocacy, networking and professional development opportunities through seminars, conferences, meetings, websites and newsletters. ASSE provides such services as education, public affairs, government affairs, and involvement in national and international safety standards development, technical publications, and timely communications on safety advancements worldwide. SH&E professionals help prevent workplace injuries and illnesses, create safer work and leisure environments, and develop safer products.

American Society of Safety Engineers Foundation

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

For more information, see the Publishers of the *Career Guide to the Safety Profession* chapter.

Board of Certified Safety Professionals

www.bcsp.org
208 Burwash Avenue
Savoy, IL 61874
217-359-9263

For more information, see the Publishers of the *Career Guide to the Safety Profession* chapter.

National Fire Protection Association

www.nfpa.org
1 Batterymarch Park
Quincy, MA 02169-7471
617-770-3000

The mission of the international nonprofit NFPA is to reduce the worldwide burden of fire and other hazards on the quality of life by providing and advocating consensus codes and standards, research, training, and education. NFPA membership totals more than 79,000 individuals from around the world and more than 80 national trade and professional organizations.

Established in 1896, NFPA serves as the world's leading advocate of fire prevention and is an authoritative source on public safety. In fact, NFPA's 300 codes and standards influence every building, process, service, design, and installation in the U.S., as well as many of those used in other countries. NFPA's focus on true consensus has helped the association's code-development process earn accreditation from the American National Standards Institute (ANSI).

National Safety Council

www.nsc.org
1121 Spring Lake Drive
Itasca, IL 60143-3201
630-285-1121

Founded in 1913, the National Safety Council has served as the premier source of safety and health information in the United States. The Council started in the workplace—in factories, warehouses, construction sites—making businesses aware of ways to prevent unintentional injuries on the job. Subsequently, its efforts were expanded to include highway, community and recreation safety. Its mission now encompasses all major causes of preventable injuries and deaths, including occupational and environmental health and general wellness. Along with its national responsibilities, the Council carries out its mission on the community level through a network of more than 60 local Chapters. The Council and its Chapters are committed to promoting safety and health in all walks of life, 24 hours a day.

Occupational Safety & Health Administration

www.osha.gov
200 Constitution Avenue, NW
Washington, DC 20210
800-321-OSHA (6742)

President Richard M. Nixon signed the Occuaptional Safety and Health Act in 1970. One of the three agencies established by this Act in 1971was the Occupational Safety & Health Administration within the Labor Department. OSHA's mission is to assure the safety and health of America's workers by setting and enforcing standards; providing training, outreach, and education; establishing partnerships; and encouraging continual improvement in workplace safety and health.

Society of Fire Protection Engineers

www.sfpe.org
7315 Wisconsin Avenue
Suite 1225W
Bethesda, MD 20814
301-718-2910

The Society of Fire Protection Engineers was established in 1950 and incorporated as an independent organization in 1971. It is the professional society representing those practicing in the field of fire protection engineering. The Society has approximately 4,100 members in the United States and abroad, and 51 regional chapters, 10 of which are outside the U.S.

System Safety Society

www.system-safety.org
P.O. Box 70
Unionville, VA 22567-0070
540-854-8630

The System Safety Society was organized in 1962 and incorporated in 1973 as an entity that promotes education and enhancement of the system safety discipline. System safety is an engineering and management discipline that emphasizes preventing accidents rather than reacting to them. In general, it does so by identifying, evaluating, analyzing, and controlling hazards throughout the life cycle of a system. The discipline is an outgrowth of the aerospace industry and was first applied to missile systems and the Apollo Program to land a man on the moon. Currently, system safety practitioners are contributing to safety in industry, government, and academia throughout the world.

The Society's objectives are to:

- Advance the System Safety state-of-the-art.
- Contribute to an understanding of System Safety and its applications.
- Disseminate newly developed knowledge about System Safety.
- Further professional development.
- Improve public perception of hazards and the System Safety discipline.
- Improve communications between the System Safety discipline and other professional groups.
- Establish standards for the System Safety discipline.
- Assist federal, state, and local government bodies concerned with safety.
- Establish standards for System Safety educational programs.

The System Safety Society publishes the *Journal of the System Safety Society* and texts, including the *System Safety Analysis Handbook*. It also honors its members annually for achievements and provides a vast networking opportunity for members to solve problems and identify job opportunities.

The Society is a worldwide organization with members from more than 20 countries outside the U.S. Each year the Society sponsors an International System Safety Conference and exhibition, which is attended by hundreds of safety professionals.

Others

There are other organizations with members involved in varying degrees of hazard recognition, evaluation and control.

- American Board of Health Physics (ABHP)
  www.hps1.org/aahp/abhp/abhp.htm
- American Chemical Society (ACS)
  www.acs.org
- American Institute of Chemical Engineers (AICH)
  www.aiche.org
- American Society of Mechanical Engineers (ASME)
  www.asme.org
- Board of Certification in Professional Ergonomics (BCPE)
  www.bcpe.org
- Human Factors and Ergonomics Society (HFES)
  www.hfes.org
- Institute of Hazardous Materials Management (IHMM)
  www.ihmm.org
- Institute of Industrial Engineers (IIE)
  www.iienet.org
- Institute of Professional Environmental Practice (IPEP)
  www.ipep.org
- Risk and Insurance Management Society (RIMS)
  www.rims.org

Honor Societies

Rho Sigma Kappa

This honor society was established to:

- Honor and recognize those students who distinguish themselves through achievement and exemplary character.
- Foster scholarship and promote student leadership.
- Contribute to the advancement of professionalism in safety.

Rho Sigma Kappa may be established at four-year universities that offer safety-related bachelor's degrees. The society chapter is a student-run organization that gives students the opportunity to gain important organizational and leadership experience. Each society chapter must establish its own annual objectives, but all society activities must support the academic program and must seek to serve the student majors in safety.

Rho Sigma Kappa mainly selects undergraduate students for membership. It also selects graduate students and practicing safety professionals. Normally, students can become eligible for selection during their junior year, but there is a minimum number of credit hours (of safety courses) that must be completed and a minimum grade point average (GPA) in safety courses in order to qualify for consideration. The overall GPA requirement for candidacy is usually set so that less than 20% of all students in the safety-related major at a given institution will be eligible for selection in any given term.

For more information, contact:

President, Rho Sigma Kappa
c/o Safety Sciences Department
Indiana University of Pennsylvania
Indiana, PA 15705
412-357-3018

Salamander Honor Society

The Salamander Honor Society is an honor society for fire protection engineering. More information about this society can be obtained by contacting:

Society of Fire Protection Engineers
7315 Wisconsin Avenue
Suite 1225W
Bethesda, MD 20814
301-718-2910

Publishers of the *Career Guide to the Safety Profession*

American Society of Safety Engineers Foundation

Recognizing growth in the profession, as well as a need for more comprehensive services, the ASSE Board of Directors chartered the ASSE Foundation in 1990.

The ASSE Foundation, a 501 (c) (3) charitable organization, generates funding and provides resources for scholarship, applied research, academic accreditation, and related academic initiatives in order to advance the safety, health, and environmental profession.

Funding comes from ASSE, its chapters and regions, individual members and corporations.

For more information, visit **www.asse.org/foundation**.

Board of Certified Safety Professionals

Advancing the Safety, Health and Environmental Professional Since 1969

The Board of Certified Safety Professionals (BCSP) is a not-for-profit organization established in 1969 and devoted solely to setting standards for safety professionals and evaluating individuals against those standards. It grew out of a study by the American Society of Safety Engineers. BCSP is not a membership organization. BCSP sets academic standards and experience standards, examinations which test knowledge of professional safety practice, and standards which require individuals to keep current with professional practice. Individuals who meet initial and continuing requirements may use the certification titles awarded by BCSP. Participation in BCSP certifications is voluntary.

The Certified Safety Professional® (CSP®) is BCSP's main certification. Candidates who meet some requirements toward the CSP certification receive the title Associate Safety Professional (ASP), which can be held for a limited period of time. An applicant for the CSP certification must have an acceptable degree (the minimum is an associate degree in safety or a bachelor's degree in any field). An applicant must also present at least four years of professional safety experience and pass two examinations: Safety Fundamentals and Comprehensive Practice. Those holding the CSP certification must recertify every five years through continuing education, retaking the Comprehensive Practice examination or other professional development activities.

Currently, over 11,000 individuals hold the CSP certification and about 1,500 are in the process of achieving it. The CSP certification is nationally accredited by the National Commission for Certifying Agencies (NCCA) which sets national standards for peer certifications. The CSP certification is internationally accredited through ANSI/ISO/IEC 17024 administered by the American National Standards Institute (ANSI) in the U.S. Many employers and

federal, state and local government agencies recognize the CSP in job positions and qualifications for certain safety functions and in contracts.

BCSP is independent of, but sponsored by the following societies and organizations:

- American Industrial Hygiene Association
- American Society of Safety Engineers
- Institute of Industrial Engineers
- National Fire Protection Association
- National Safety Council
- Society of Fire Protection Engineers
- System Safety Society

BCSP operates jointly with the American Board of Industrial Hygiene to offer certifications for safety and health technologists, technicians, supervisors and workers through CCHEST, the Council on Certification of Health, Environmental and Safety Technologists (**www.cchest.org**). This organization currently offers the following certifications:

- Occupational Health and Safety Technologist® (OHST)/Certified Loss Control Specialist (CLCS)
- Construction Health and Safety Technician® (CHST)
- Safety Trained Supervisor (STS)

For more information about BCSP and the CSP certification, visit **www.bcsp.org**.

Contributors

The American Society of Safety Engineers Foundation, together with the Board of Certified Safety Professionals, is honored to dedicate the *Career Guide to the Safety Profession* to Robert E. McClay, CSP. Professor McClay is a past director and president of the Board of Certified Safety Professionals and a past chairman of ASSE's Technical Publications Advisory Committee. While chairman, he initiated and developed, with others, the First Edition of the *Career Guide*, which was published jointly by the ASSE Foundation and the Board of Certified Safety Professionals in 1997. Mr. McClay has served as a faculty member both at Indiana University of Pennsylvania (IUP) and East Carolina University. He is currently Emeritus Professor of Safety Sciences at IUP. He is a private Safety Consultant and an ASSE Fellow. He began his first term as a member of ASSE's Board of Directors in 2008 and has served as an ASSE Area Director and on ASSE's Council on Professional Development, as well as other academic and educational entities of the Society.

The individuals listed below contributed to the development or update of the *Career Guide to the Safety Profession.* Their assistance is greatly appreciated.

Paul S. Adams
Mark W. Beck
John (Jack) Beno*
Kathleen S. Brady
Roger L. Brauer
Thomas Bresnahan
Dan B. Brockman
Lisa M. Brosseau
Dennis Buck
Michael Burditt
Thomas F. Cecich
Donald J. Eckenfelder
Newton Ellis
Lon Harrison Ferguson
Mark Friend
Mary Goranson
Richard J. Hornfeck
Karl Jacobson
W. Monroe Keyserling
James P. Kohn*
David A. Lucht
Albert Mims
Heather Murphy
W. M. O'Brien
Patrick T. Ragan
Robert Semonisck
Linda M. Tapp
Janice L. Thomas
Anthony Veltri
Clifford Watson
Jerome W. Witherill

* Deceased

Special thanks is also extended to many individuals who submitted profile information about their careers. Unfortunately, limited space in this publication permitted using only a few.









AMERICAN SOCIETY OF
SAFETY ENGINEERS FOUNDATION

BOARD OF CERTIFIED
SAFETY PROFESSIONALS

ISBN 978-1-885581-50-1