

CAREER GUIDE FOR HEALTH AND SAFETY ENGINEERS

SOC Code: 17-2111

Pay Band(s): 5 and 6 ([Salary Structure](#))

Standard Occupational Description: Promote worksite or product safety by applying knowledge of industrial processes, mechanics, chemistry, psychology, and industrial health and safety laws. Plan, implement, and coordinate safety programs, requiring application of engineering principles and technology, to prevent or correct unsafe environmental working conditions.

Health and Safety Engineer positions in the Commonwealth are assigned to the following Roles in the [Architecture and Engineering Career Group](#):

[Architect/ Engineer I](#)

[Architect/ Engineer II](#)

[Architecture/ Engineering Manager I](#)

[Architecture/ Engineering Manager II](#)

While Health and Safety Engineers within the Commonwealth are all located within the Architecture and Engineering Career Group, individuals may want to pursue other managerial opportunities within the Commonwealth depending upon individual training, education, knowledge, skills, abilities, and interests.

Other Career Group(s) that may be of interest are:

[General Administration](#)

[Program Administration](#)

SKILLS, KNOWLEDGE, ABILITIES AND TASKS

(Technical and Functional Expertise)

Skills

Note: *The technical and functional skills listed below are based on general occupational qualifications for Health and Safety Engineers commonly recognized by most employers. Typically, you will not be required to have all of the skills listed to be a successful performer. Recruitment and selection standards for an individual state job must be based on the specific knowledge, skills, and abilities for that job as indicated in the job announcement and job description in the Employee Work Profile.*

Skills

1. Using scientific methods to solve problems.
2. Generating or adapting equipment and technology to serve user needs.
3. Using logic and analysis to identify the strengths and weaknesses of different approaches.
4. Identifying the things that must be changed to achieve a goal.
5. Analyzing needs and product requirements to create a design.
6. Identifying the nature of problems.
7. Understanding written sentences and paragraphs in work related documents.
8. Using mathematics to solve problems.
9. Knowing how to find information and identifying essential information.
10. Inspecting and evaluating the quality of products.

11. Conducting tests to determine whether equipment, software, or procedures are operating as expected.
12. Developing approaches for implementing an idea.
13. Generating a number of different approaches to problems.
14. Talking to others to effectively convey information.
15. Communicating effectively with others in writing as indicated by the needs of the audience.
16. Teaching others how to do something.
17. Working with new material or information to grasp its implications.
18. Reorganizing information to get a better approach to problems or tasks.
19. Weighing the relative costs and benefits of a potential action.
20. Evaluating the likely success of an idea in relation to the demands of the situation.

Knowledge

Note: *The technical and functional knowledge statements listed below are based on general occupational qualifications for Health and Safety Engineers commonly recognized by most employers. Typically, you will not be required to have all of the knowledge listed to be a successful performer. Recruitment and selection standards for an individual state job must be based on the specific knowledge, skills, and abilities for that job as indicated in the job announcement and job description in the Employee Work Profile.*

The **Knowledge** of:

1. Equipment, tools, mechanical devices, and their uses to produce motion, light, power, technology, and other applications.
1. Weaponry, public safety, and security operations, rules, regulations, precautions, prevention, and the protection of people, data, and property.
2. Design techniques, principles, tools and instruments involved in the production and use of precision technical plans, blueprints, drawings, and models.
3. Physics and prediction of physical principles, laws, and applications including air, water, material dynamics, light, atomic principles, heat, electric theory, earth formations, and meteorological and related natural phenomena.
4. Principles and processes involved in business and organizational planning, coordination, and execution. This includes strategic planning, resource allocation, manpower modeling, leadership techniques, and production methods.
5. Numbers, their operations, and interrelationships including arithmetic, algebra, geometry, calculus, statistics, and their applications.
6. The structure and content of the English language including the meaning and spelling of words, rules of composition, and grammar.
7. Laws, legal codes, court procedures, precedents, government regulations, executive orders, agency rules, and the democratic political process.
8. Instructional methods and training techniques including curriculum design principles, learning theory, group and individual teaching techniques, design of individual development plans, and test design principles.
9. The composition, structure, and properties of substances and of the chemical processes and transformations that they undergo. This includes uses of chemicals and their interactions, danger signs, production techniques, and disposal methods.
10. Machines and tools, including their designs, uses, benefits, repair, and maintenance.
11. Materials, methods, and the appropriate tools to construct objects, structures, and buildings.
12. Plant and animal living tissue, cells, organisms, and entities, including their functions, interdependencies, and interactions with each other and the environment.
13. Media production, communication, and dissemination techniques and methods including alternative ways to inform via written, oral, and visual media.

14. Transmission, broadcasting, switching, control, and operation of telecommunications systems.

Abilities

Note: *The technical and functional abilities listed below are based on general occupational qualifications for Health and Safety Engineers commonly recognized by most employers. Typically, you will not be required to have all of the abilities listed to be a successful performer. Recruitment and selection standards for an individual state job must be based on the specific knowledge, skills, and abilities for that job as indicated in the job announcement and job description in the Employee Work Profile.*

The **Ability** to:

1. Listen to and understand information and ideas presented through spoken words and sentences.
2. Read and understand information and ideas presented in writing .
3. Communicate information and ideas in writing so others will understand.
4. Understand and organize a problem and then to select a mathematical method or formula to solve the problem.
5. Combine separate pieces of information, or specific answers to problems, to form general rules or conclusions. It includes coming up with a logical explanation for why a series of seemingly unrelated events occur together.
6. Apply general rules to specific problems to come up with logical answers. It involves deciding if an answer makes sense.
7. Tell when something is wrong or is likely to go wrong. It does not involve solving the problem, only recognizing there is a problem.
8. Communicate information and ideas in speaking so others will understand.
9. Add, subtract, multiply, or divide quickly and correctly
10. Speak clearly so that it is understandable to a listener.
11. Correctly follow a given rule or set of rules in order to arrange things or actions in a certain order. The things or actions can include numbers, letters, words, pictures, procedures, sentences, and mathematical or logical operations.
12. See details of objects at a close range (within a few feet of the observer).
13. Imagine how something will look after it is moved around or when its parts are moved or rearranged.
14. Come up with a number of ideas about a given topic. It concerns the number of ideas produced and not the quality, correctness, or creativity of the ideas.
15. Come up with unusual or clever ideas about a given topic or situation, or to develop creative ways to solve a problem.
16. Remember information such as words, numbers, pictures, and procedures.
17. Produce many rules so that each rule tells how to group (or combine) a set of things in a different way.
18. Quickly make coordinated movements of one hand, a hand together with its arm, or two hands to grasp, manipulate, or assemble objects.
19. Identify and understand the speech of another person.
20. Quickly make sense of information that seems to be without meaning or organization. It involves quickly combining and organizing different pieces of information into a meaningful pattern.

Tasks

Note: *The following is a list of sample tasks typically performed by Health and Safety Engineers. Employees in this occupation will not necessarily perform all of the tasks listed.*

1. Devises and implements safety or industrial health program to prevent, correct, or control unsafe environmental conditions.
2. Examines plans and specifications for new machinery or equipment to determine if all safety requirements have been included.
3. Conducts or coordinates training of workers concerning safety laws and regulations, use of safety equipment, devices, and clothing, and first aid.
4. Inspects facilities, machinery, and safety equipment to identify and correct potential hazards, and ensure compliance with safety regulations.
5. Conducts or directs testing of air quality, noise, temperature, or radiation to verify compliance with health and safety regulations.
6. Provides technical guidance to organizations regarding how to handle health-related problems, such as water and air pollution.
7. Compiles, analyzes, and interprets statistical data related to exposure factors concerning occupational illnesses and accidents.
8. Installs or directs installation of safety devices on machinery.
9. Investigates causes of industrial accidents or injuries to develop solutions to minimize or prevent recurrence.
10. Conducts area surveys to determine safety levels for exposure to materials and conditions.
11. Checks floors to ensure they are strong enough to support heavy machinery.
12. Prepares reports of findings from investigation of accidents, inspection of facilities, or testing of environment.
13. Maintains liaison with outside organizations, such as fire departments, mutual aid societies, and rescue teams.

INTERESTED?

Like people, occupations have traits or characteristics. These characteristics give important clues about the nature of the work and work environment, and give you an opportunity to match your own personal interests to a specific occupation. When you choose a job in an occupation that matches your own interests you have taken an important step in planning a successful and rewarding career.

Health and Safety Engineering work is called mainly a “Realistic Occupation” because it involves work activities that include practical, hands-on problems and solutions. They often deal with plants, animals, and real-world materials like wood, tools, and machinery. Many of the occupations require working outside, and do not involve a lot of paperwork or working closely with others. It can also be “Investigative” since it may frequently involve working with ideas, require an extensive amount of thinking, and can involve searching for facts and figuring out problems mentally. It is also be referred to as “Conventional” since it may frequently involve following set procedures and routines, include working with data and details more than with ideas, and usually there is a clear line of authority to follow.

LICENSURE, REGISTRATION, OR CERTIFICATION REQUIREMENTS

Generally this is not required for Health and Safety Engineer positions in state government. However, to improve career advancement opportunities, you should consider the advantages of certification and include this step in your self-development plan. The Professional Engineer license is required for some Health and Safety Engineer positions. These positions are identified by each state agency.

Licensing information can be found on the Department of Professional & Occupational Regulations' web site at <http://www.dpor.state.va.us>

EDUCATIONAL, TRAINING, AND LEARNING OPPORTUNITIES

Professional occupations like Health and Safety Engineering usually require a college degree and may require some job-specific training.

Sources of educational, training, and learning opportunities include:

1. Graduate from an engineering curriculum accredited by the Accreditation Board for Engineering and Technology.
2. Join professional organizations.
3. Specific data regarding a number of engineering disciplines follows:

ENGINEERING, GENERAL: An instructional program that generally prepares individuals to apply mathematical and scientific principles to solve a wide variety of practical problems in industry, social organization, public works, and commerce.

ENVIRONMENTAL HEALTH ENGINEERING: An instructional program that prepares individuals to apply mathematical and scientific principles to the design, development and operational evaluation of systems for controlling contained living environments and for monitoring and controlling factors in the external natural environment, including pollution control, waste and hazardous material disposal, health and safety protection, conservation, life support, and requirements for protection of special materials and related work environments.

COMMONWEALTH COMPETENCIES

Competencies are a set of identified behaviors, knowledge, skills, and abilities that directly and positively impact the success of employees and the organization. Competencies can be observed and measured. When consistently demonstrated, competencies make employees particularly effective in their work. Competencies help lay out a road map to career success. You can use the Commonwealth Competencies to help improve your individual performance by adopting behaviors that make high performing employees successful in their jobs. In this way, you can use the Commonwealth Competencies for your further professional development.

The Commonwealth Competencies are:

1. Technical and Functional Expertise
2. Understanding the Business
3. Achieving Results
4. Serving the Customer

5. Teamwork
6. Interpersonal and Communication Skills
7. Leadership and Personal Effectiveness

The above competencies may be applied to employees throughout the Commonwealth of Virginia. They can be rank-ordered by agencies and hiring managers to represent the needs of a specific job. The rank ordering will change depending upon the occupation, an organization's priorities, the actual job requirements, and the supervisor's preferences.

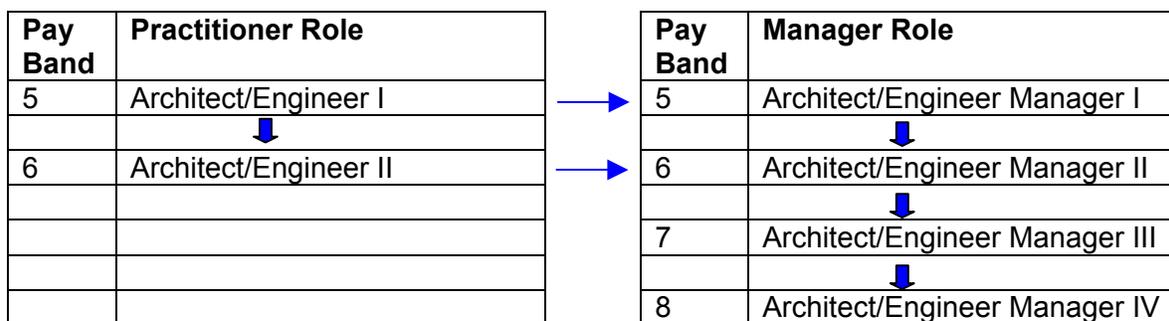
Career success is both about what you do (applying your technical knowledge, skills, and ability) and how you do it (the consistent behaviors you demonstrate and choose to use) while interacting and communicating with others. Hopefully, by studying the Commonwealth competencies, identifying your developmental opportunities, and working to refine your own competence, you can take charge of your career!

For additional information about the **Commonwealth Competencies** go to: http://jobs.state.va.us/cc_planningctr.htm. For the competencies, we first list the competencies and then define each. Finally, we list competency indicators; to describe what successful performance looks like.

COMMONWEALTH CAREER PATH

Career opportunities in the Commonwealth are not limited to moving “up” to the next highest role and pay band, changing positions, or to becoming a supervisor. That’s because most roles describe a broad group of occupationally related positions that perform a range of work that requires increased knowledge and skills. For that reason, Commonwealth roles describe the career paths within the same or higher-level role for the same or different Career Group. The broad salary range and the Commonwealth’s pay practices provide flexibility in recognizing career development and advancement. ([Salary Structure](#))

For example:



Sample Career Path

[Architect/Engineer I](#)

The Architect/Engineer I role provides career tracks for architects or engineers whose expertise levels range from trainee to advanced level. Responsibilities include applying architecture/engineering principles and practices to projects of varying complexity in specialty areas. Specialty areas include those requiring knowledge of civil, environmental, structural,

mechanical, electrical, transportation, traffic, safety, materials, or rehabilitation engineering and architecture.

Architect/Engineer II

The Architect/Engineer II role provides career tracks for architects or engineers who serve as an expert or first line supervisor. Duties include evaluating the plans and specifications for capital outlay projects prepared by other architects and engineers; or for applying related engineering principles and practices to complex, extensive and diversified engineering projects in specialty areas.

Architecture/Engineering Manager I

The Architecture/Engineering Manager I role provides career tracks for managers who manage various administrative, budgetary, planning, scheduling and technical activities related to multiple complex architectural/engineering projects or programs and the staff performing related functions. These functions draw upon knowledge of specialty engineering; capital outlay or other construction projects, transportation, water and wastewater projects or programs and health and safety related operations.

Architecture/Engineering Manager II

The Architecture/Engineering Manager II role provides career tracks for managers who manage, coordinate, and direct the activities of one or more specialized transportation or environmental engineering or health and safety related program operations in their assigned geographic or divisional area. This role also provides career tracks for managers who manage staff and resources related to the procurement, design, construction or renovation of capital projects or non-capital outlay for an entire agency's construction and maintenance reserve programs. This includes budgetary, planning, scheduling, public relations, human resource functions, and technical activities related to a broad range of engineering, administrative and other projects or programs.

Architecture/Engineering Manager III

The Architecture/Engineering Manager III role provides career tracks for managers who direct the transportation engineering, construction, maintenance, administrative and other operations and programs of a defined geographic transportation district. This role provides career tracks for managers who serve as an assistant to the Commissioner for Transportation and direct the operations of divisions and/or districts in areas such as administration, planning and operations. In addition, this role provides career tracks for executive level of Engineering and Buildings, and Facilities Management managers for the Commonwealth and for managers of an agency's design and construction projects that involve multiple facilities with special requirements, such as security provisions and long-term development and evaluation of programs.

Architecture/Engineering Manager IV

The Architecture/Engineering Manager IV role provides a career track for the executive manager who serves as the agency's chief engineer responsible for planning and directing large-scale, multi-division preliminary engineering and construction programs for transportation operations with statewide scope. Directs areas such as location and design, structure and bridge, right of way and utilities, materials and transportation construction. Interfaces with state

and federal officials and executives on agency issues and with the Commonwealth Transportation Board.

ADDITIONAL OCCUPATIONAL INFORMATION CAN BE FOUND AT:

O*NET (Occupational Network)

http://online.onetcenter.org/gen_search_page

Virginia Employment Commission

<http://www.alex.vec.state.va.us/>

Department of Professional & Occupation Regulation

http://www.state.va.us/dpor/conNEW_reg.pdf

Career One Stop

<http://www.careeronestop.org/>

Virginia Career Resource Network

<http://www.vacrn.net/>