TORQ Analysis of Industrial Safety and Health Engineers to Occupational Health and Safety Specialists

ANALYSIS INPUT

Transfer	Title	O*NET	Filters		
From Title:	Industrial Safety and Health Engineers	17-2111.01	Abilities:	Importance LeveL: 50	Weight: 1
To Title:	Occupational Health and Safety Specialists	29-9011.00	Skills:	Importance LeveL: 69	Weight: 1
Labor Market Area:	Maine Statewide		Knowledge:	Importance Level: 69	Weight: 1

TORQ RESULTS

Grand TORQ: 97

Ability TORQ		Skills TORQ		Knowledge TORQ	
Level	96	Level	97	Level	97

Gaps To Narrow if Possible

Ability	Level	Gap	Impt
Speech Clarity	55	7	72
Far Vision	51	7	59
Flexibility of Closure	50	6	62
Problem Sensitivity	66	4	81
Selective Attention	46	4	56
Speed of Closure	41	4	50
Auditory Attention	41	4	50
Oral Comprehension	62	2	75
Oral Expression	64	2	72
Deductive Reasoning	60	1	68
Near Vision	51	1	62

Upgrade These Skills

Skill	Level	Gap	Impt
Technology Design	53	3	75

Knowledge to Add

Knowledge	Level	Gap	Impt
No Knowledge Upgrades Required!			

LEVEL and IMPT (IMPORTANCE) refer to the Target Occupational Health and Safety Specialists. GAP refers to level difference between Industrial Safety and Health Engineers and Occupational Health and Safety Specialists.

ASK ANALYSIS

Ability Level Comparison - Abilities with importance scores over 50

Description	Industrial Safety and Health Engineers	Occupational Health and Safety Specialists	Importance
Problem Sensitivity	62	66	81
Oral Comprehension	60	62	75
Speech Recognition	53	51	75

Written Comprehension	59	55	72
Oral Expression	62	64	72
Inductive Reasoning	60	57	72
Speech Clarity	48	55	72
Deductive Reasoning	59	60	68
Written Expression	60	60	65
Information Ordering	53	50	62
Flexibility of Closure	44	50	62
Perceptual Speed	44	44	62
Near Vision	50	51	62
Category Flexibility	51	50	59
Far Vision	44	51	59
Fluency of Ideas	51	46	56
Originality	55	50	56
Selective Attention	42	46	56
Mathematical Reasoning	42	37	50
Speed of Closure	37	41	50
Visualization	46	46	50
Auditory Attention	37	41	50

Skill Level Comparison - Abilities with importance scores over 69

Description	Industrial Safety and Health Engineers	Occupational Health and Safety Specialists	Importance
Technology Design	50	53	75

Knowledge Level Comparison - Knowledge with importance scores over 69

Description	Industrial Safety and Health Engineers	Occupational Health and Safety Specialists	Importance

Experience & Education Comparison

Related Work Experience Comparison

Description	Industrial Safety and Health Engineers	Occupational Health and Safety Specialists
10+ years	5%	3%
8-10 years	2%	3%
6-8 years	2%	3%
4-6 years	18%	16%
2-4 years	42%	25%
1-2 years	10%	19%
6-12 months	2%	9%
3-6 months	5%	6%
1-3 months	0%	0%
0-1 month	0%	0%
None	10%	12%

Required Education Level Comparison

Description	Industrial Safety and Health Engineers	Occupational Health and Safety Specialists
Doctoral	0%	0%
Professional Degree	2%	3%
Post-Masters Cert	0%	0%
Master's Degree	5%	12%
Post-Bachelor Cert	13%	3%
Bachelors	78%	70%
AA or Equiv	0%	6%
Some College	0%	3%
Post-Secondary Certificate	0%	0%
High Scool Diploma or GED	0%	0%
No HSD or GED	0%	0%

Industrial Safety and Health Engineers — Occupational Health and Safety Specialists

Most Common Educational/Training Requirement:	
Bachelor's degree	Bachelor's degree
Job Zone Comparison	
4 - Job Zone Four: Considerable Preparation Needed	5 - Job Zone Five: Extensive Preparation Needed
A minimum of two to four years of work-related skill, knowledge, or experience is needed for these occupations. For example, an accountant must complete four years of college and work for several years in accounting to be considered qualified.	Extensive skill, knowledge, and experience are needed for these occupations. Many require more than five years of experience. For example, surgeons must complete four years of college and an additional five to seven years of specialized medical training to be able to do their job.
Most of these occupations require a four - year bachelor's degree, but some do not.	A bachelor's degree is the minimum formal education required for these occupations. However, many also require graduate school. For example, they may require a master's degree, and some require a Ph.D., M.D., or J.D. (law degree).
Employees in these occupations usually need several years of work-related experience, on-the-job training, and/or vocational training.	Employees may need some on-the-job training, but most of these occupations assume that the person will already have the required skills, knowledge, work-related experience, and/or training.

Tasks

Industrial Safety and Health Engineers

Core Tasks

Generalized Work Activities:

- Evaluating Information to Determine Compliance with Standards - Using relevant information and individual judgment to determine whether events or processes comply with laws, regulations, or standards.
- Getting Information - Observing, receiving, and otherwise obtaining information from all relevant sources.
- Making Decisions and Solving Problems - Analyzing information and evaluating results to choose the best solution and solve problems.
- Interacting With Computers - Using computers and computer systems (including hardware and software) to program, write software, set up functions, enter data, or process information.
- Communicating with Persons Outside Organization - Communicating with people outside the organization, representing the organization to customers, the public, government, and other external sources. This information can be exchanged in person, in writing, or by telephone or e-mail.
- Communicating with Supervisors, Peers, or Subordinates - Providing information to supervisors, co-workers, and subordinates by telephone, in written form, e-mail, or in person.

Specific Tasks

Occupation Specific Tasks:

- Advise architects, builders, and other construction personnel on fire prevention equipment and techniques, and on fire code and standard interpretation and compliance.
- Attend workshops, seminars, or conferences to present or obtain information regarding

Occupational Health and Safety Specialists

Core Tasks

Generalized Work Activities:

- Evaluating Information to Determine Compliance with Standards - Using relevant information and individual judgment to determine whether events or processes comply with laws, regulations, or standards.
- Getting Information - Observing, receiving, and otherwise obtaining information from all relevant sources.
- Communicating with Supervisors, Peers, or Subordinates - Providing information to supervisors, co-workers, and subordinates by telephone, in written form, e-mail, or in person.
- Provide Consultation and Advice to Others - Providing guidance and expert advice to management or other groups on technical, systems-, or process-related topics.
- Establishing and Maintaining Interpersonal Relationships - Developing constructive and cooperative working relationships with others, and maintaining them over time.
- Making Decisions and Solving Problems - Analyzing information and evaluating results to choose the best solution and solve problems.

Specific Tasks

Occupation Specific Tasks:

- Collaborate with engineers and physicians to institute control and remedial measures for hazardous and potentially hazardous conditions or equipment.
- Collect samples of dust, gases, vapors, and other potentially toxic materials for analysis.
- Collect samples of hazardous materials, or arrange for sample collection.
- Conduct audits at hazardous waste sites or

fire prevention and protection.

- Conduct research on fire retardants and the fire safety of materials and devices.
- Consult with authorities to discuss safety regulations and to recommend changes as necessary.
- Design fire detection equipment, alarm systems, and fire extinguishing devices and systems.
- Determine causes of fires, and ways in which they could have been prevented.
- Develop plans for the prevention of destruction by fire, wind, and water.
- Develop training materials, and conduct training sessions on fire protection.
- Direct the purchase, modification, installation, maintenance, and operation of fire protection systems.
- Evaluate fire department performance and the laws and regulations affecting fire prevention or fire safety.
- Inspect buildings or building designs to determine fire protection system requirements and potential problems in areas such as water supplies, exit locations, and construction materials.
- Prepare and write reports detailing specific fire prevention and protection issues such as work performed and proposed review schedules.
- Study the relationships between ignition sources and materials to determine how fires start.

Detailed Tasks

Detailed Work Activities:

- adhere to safety procedures
- advise clients regarding engineering problems
- analyze effectiveness of safety systems or procedures
- analyze technical data, designs, or preliminary specifications
- communicate technical information
- conduct fire hazard inspections
- conduct training for personnel
- design electronic equipment
- determine fire causes
- direct and coordinate fire prevention and suppression activities
- evaluate engineering data
- evaluate governmental regulations or laws
- evaluate manufacturing or processing systems
- explain complex mathematical information
- follow safe waste disposal procedures
- inspect facilities or equipment for regulatory compliance
- make presentations
- perform safety inspections in industrial, manufacturing or repair setting

industrial sites, and participate in hazardous waste site investigations.

- Conduct safety training and education programs, and demonstrate the use of safety equipment.
- Coordinate "right-to-know" programs regarding hazardous chemicals and other substances.
- Develop and maintain hygiene programs such as noise surveys, continuous atmosphere monitoring, ventilation surveys, and asbestos management plans.
- Develop and maintain medical monitoring programs for employees.
- Inspect and evaluate workplace environments, equipment, and practices, in order to ensure compliance with safety standards and government regulations.
- Inspect specified areas to ensure the presence of fire prevention equipment, safety equipment, and first-aid supplies.
- Investigate accidents to identify causes and to determine how such accidents might be prevented in the future.
- Investigate health-related complaints, and inspect facilities to ensure that they comply with public health legislation and regulations.
- Investigate the adequacy of ventilation, exhaust equipment, lighting, and other conditions that could affect employee health, comfort, or performance.
- Maintain and update emergency response plans and procedures.
- Maintain inventories of hazardous materials and hazardous wastes, using waste tracking systems to ensure that materials are handled properly.
- Order suspension of activities that pose threats to workers' health and safety.
- Perform laboratory analyses and physical inspections of samples in order to detect disease or to assess purity or cleanliness.
- Prepare hazardous, radioactive, and mixed waste samples for transportation and storage by treating, compacting, packaging, and labeling them.
- Provide new-employee health and safety orientations, and develop materials for these presentations.
- Recommend measures to help protect workers from potentially hazardous work methods, processes, or materials.

Detailed Tasks

Detailed Work Activities:

- analyze effectiveness of safety systems or procedures
- analyze medical data
- calibrate or adjust electronic equipment or instruments to specification
- collect clinical data
- collect samples for testing

- prepare technical reports or related documentation
- read blueprints
- read schematics
- read technical drawings
- recommend action to ensure compliance
- record test results, test procedures, or inspection data
- resolve engineering or science problems
- test equipment as part of engineering projects or processes
- understand engineering data or reports
- use chemical testing or analysis procedures
- use drafting or mechanical drawing techniques
- use government regulations
- use hazardous materials information
- use intuitive judgment for engineering analyses
- use pollution control techniques
- use scientific research methodology
- use technical information in manufacturing or industrial activities
- use technical regulations for engineering problems
- write product performance requirements

Technology - Examples

Analytical or scientific software

- Availability prediction modeling software
- Biomechanical imaging software
- Biomechanical injury risk analysis software
- Computational fluid dynamics CFD software
- Energy expenditure prediction EEP software
- Failure mode and effects analysis FMEA software
- Failure modes analysis software
- Failure reporting analysis and corrective action FRACAS software
- Fault tree analysis FTA software
- Geomechanical stress analysis software
- Hazard assessment software
- Human modeling software
- Industrial job assessment software
- Isograph Markov
- National Institute for Occupational Safety and

- communicate technical information
- compile numerical or statistical data
- conduct evaluations of worker exposure to radiation or noise
- confer with engineering, technical or manufacturing personnel
- develop safety regulations
- evaluate manufacturing or processing systems
- follow safe waste disposal procedures
- inspect facilities or equipment for regulatory compliance
- interpret employee's medical evaluations
- maintain dental or medical records
- make presentations on health or medical issues
- perform safety inspections in industrial, manufacturing or repair setting
- prepare safety reports
- prepare technical reports or related documentation
- recommend measures to ensure maximum employee protection
- set up or calibrate laboratory equipment
- test air quality, noise, temperature, or radiation
- understand engineering data or reports
- use chemical testing or analysis procedures
- use cost benefit analysis techniques
- use hazardous materials information
- use knowledge of investigation techniques
- use knowledge of materials testing procedures
- use pollution control techniques
- use scientific research methodology

Technology - Examples

Compliance software

- ESS Compliance Suite
- Mannus Compliance: EHS
- Primatech AUDITWorks

Data base user interface and query software

- Curtis Management Resources Training Management System
- Database software
- EcoLogic Systems ADAM Indoor Air Quality Management Software
- ImageWave MSDSFinder
- Medgate Occupational Health and Safety Software
- Microsoft Access

Health LaModel

- Predictive toxicology software
- Quantitative analysis software
- Reliability analysis software
- Reliability centered maintenance RCM software
- Root cause analysis software
- Static strength prediction software
- Survey software
- Vibration analysis software
- Virtual interaction simulator software

Compliance software

- Compliance software
- Fire safety inspection and testing software
- Hazard communication software
- Inspection management system
- Material safety data sheet MSDS software
- Safety integrity level SIL software
- Safety, health, and environmental management software

Computer aided design CAD software

- Computer aided design CAD software
- Electronic design automation EDA software
- Roof support design software

Computer based training software

- Computer based training software
- Hazardous waste operations and emergency response standard HAZWOPER training software

Data base user interface and query software

- Anthropometric databases
- Incident tracking software
- Microsoft Access

Document management software

- Records management software

License management software

- Permit administration software

Map creation software

- Quality Systems Incorporated Safety Tagging System
- RAE Systems HazRAE
- Safety Software OSHALOG 300

Internet browser software

- Web browser software

Presentation software

- Microsoft PowerPoint

Spreadsheet software

- Microsoft Excel

Word processing software

- Microsoft Word

Tools - Examples

- Gravimetric dust samplers
- Aerosol monitoring instruments
- Air sampling pumps
- Air flow monitors
- Anemometers
- Audiometers
- Barometers
- Chemical detection tubes
- Ultraviolet UV digital meters
- Colorimeters
- Compressed air guns
- Emergency shower stations
- Desktop computers
- Dissolved oxygen monitors
- Radiation monitoring instruments
- Protective ear muffs
- Emergency eye wash stations
- Fire extinguishers
- Flame ionization detectors
- Rotameters
- Wet test meters

- Geological mapping software

Presentation software

- Microsoft PowerPoint

Spreadsheet software

- Microsoft Excel

Video creation and editing software

- Multimedia video analysis software

Word processing software

- Microsoft Word

Tools - Examples

- Accelerometers
- Noise monitoring equipment
- Microbial contaminant measurement devices
- Aerosol sampling devices
- High-flow air sampling pumps
- Velometers
- Heart rate monitors
- Desktop computers
- Digital video recorders
- Digital cameras
- Digital dynamometers
- Magnetic field meters
- Electromyograph processing systems
- Force gauges
- Sorbent tubes
- Heat stress monitors
- Light meters
- Notebook computers
- Volatile organic compound VOC measurement devices
- Portable oxygen consumption meters
- Personal digital assistants PDA
- Discriminative reaction time apparatus
- Potentiometers
- Force platforms
- Gamma radiation survey meters
- Gas chromatographs GC
- Benzene detector tubes
- Combustible gas meters
- Geiger counters
- Safety goggles
- Handheld thermometers
- Personal protective suits
- Laboratory balances
- Volumetric flasks
- Smoke generating tubes
- Liquid leak testing equipment
- Luxmeters
- Manometers
- Humidity measurement equipment
- Multi gas detectors
- Notebook computers
- Laboratory transfer pipettes
- Peristaltic pumps
- Personal computers
- pH monitors
- Photometers
- Pressure measurement devices
- Psychrometers
- Self-contained breathing apparatus
- Respirators
- Protective safety shoes
- Sample vials
- Microliter syringes
- Chlorine monitors
- Soil testing kits
- X ray fluorescence XRF lead testing analyzers
- Spirometers

- Radio frequency signal analyzers
- Three-dimensional laser scanners
- Acoustic calibrators
- Respiratory flow rate meters
- Strain gauges
- Sorbent dosimeters
- Temperature probes
- Anthropometers
- Torsionmeters
- Vibration analysis devices
- Measuring tapes
- Mold sampling equipment
- Turbidity monitors
- Vibration measurement equipment

Labor Market Comparison

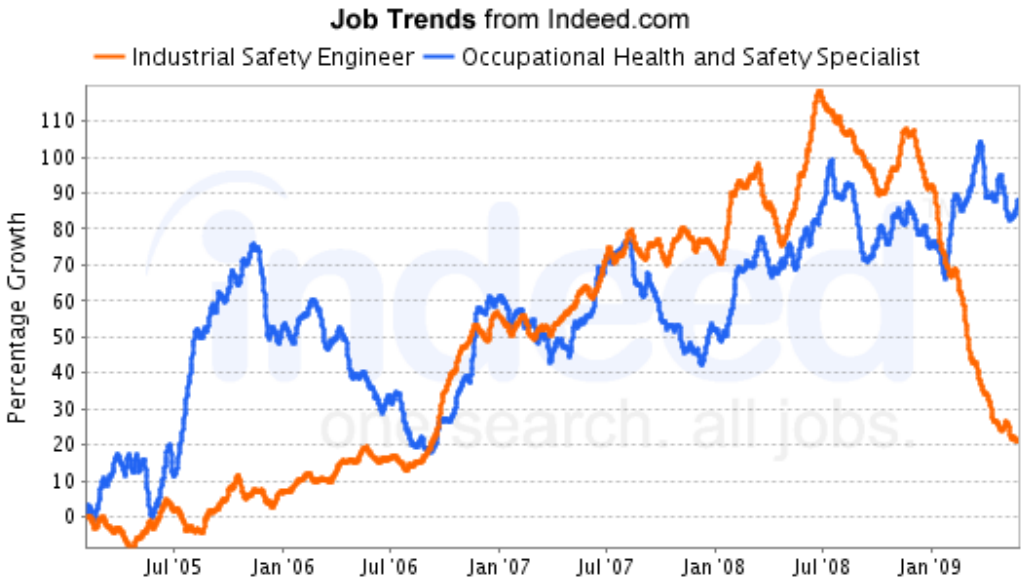
Maine Department of Labor.

Description	Industrial Safety and Health Engineers	Occupational Health and Safety Specialists	Difference
Median Wage	$ 49,940	$ 62,720	$ 12,780
10th Percentile Wage	$ 33,890	$ 44,880	$ 10,990
25th Percentile Wage	N/A	N/A	N/A
75th Percentile Wage	$ 61,800	$ 74,170	$ 12,370
90th Percentile Wage	$ 81,900	$ 83,360	$ 1,460
Mean Wage	$ 52,490	$ 63,210	$ 10,720
Total Employment - 2090	90	220	130
Employment Base - 2006	104	233	129
Projected Employment - 2099	107	229	122
Projected Job Growth - 2006-2099	2.9 %	-1.7 %	-4.6 %
Projected Annual Openings - 2006-2099	3	4	1
Special			

Special Occupations:

National Job Posting Trends

Trend for Industrial Safety and Health Engineers and Occupational Health and Safety Specialists



Data from Indeed

Programs

Related Programs

Diagnostic Medical Sonography

Diagnostic Medical Sonography/Sonographer and Ultrasound Technician. A program that prepares individuals, under the supervision of physicians, to utilize medical ultrasound techniques to gather sonographic data used to diagnose a variety of conditions and diseases. Includes instruction in obtaining, reviewing, and integrating patient histories and data; patient instruction and care; anatomic, physiologic and pathologic data recording; sonographic data processing; sonography equipment operation; and professional standards and ethics.

No information on schools for the program

Environmental Health

Environmental Health. A program that focuses on the application of environmental sciences, public health, the biomedical sciences, and environmental toxicology to the study of environmental factors affecting human health and related ecological issues, and prepares individuals to function as professional environmental health specialists. Includes instruction in epidemiology, biostatistics, toxicology, public policy analysis, public management, risk assessment, communications, environmental law and applications such as air quality, food protection, radiation protection, solid and hazardous waste management, water quality, noise abatement, housing quality, and environmental control of reacreational areas.

Institution	Address	City	URL
University of Southern Maine	96 Falmouth St	Portland	www.usm.maine.edu

Health Aide

Health Aide. A program that prepares individuals to provide routine care and assistance to patients under the direct supervision of other health care professionals, and/or to perform routine maintenance and general assistance in health care facilities and laboratories.

No information on schools for the program

Health and Medical Assistants, Other

Allied Health and Medical Assisting Services, Other. Any instructional program in allied health and medical assisting services not listed above.

No information on schools for the program

Health and Medical Diagnostic and Treatment Servic

Allied Health Diagnostic, Intervention, and Treatment Professions, Other. Any instructional program in allied health diagnostic, intervention, and treatment professions not listed above.

Institution	Address	City	URL
University of Southern Maine	96 Falmouth St	Portland	www.usm.maine.edu

Health Professions and Related Sciences, Other

Health Professions and Related Clinical Sciences, Other. Any instructional program in the health professions and related clinical sciences not listed above.

Institution	Address	City	URL
Wasington County Community College	One College Drive	Calais	www.wccc.me.edu

Industrial Safety Technology/Technician

Industrial Safety Technology/Technician. A program that prepares individuals to apply basic engineering principles and technical skills to assist engineers and other professionals in implementing and enforcing industrial safety standards. Includes instruction in industrial processes, industrial hygiene, toxicology, ergonomics, system and process safety, safety performance measurement, human factors, human behavior, and applicable law and regulations.

No information on schools for the program

Occupational Health and Industrial Hygiene

Occupational Health and Industrial Hygiene. A program that prepares public health specialists to monitor and evaluate health and related safety standards in industrial, commercial, and government workplaces and facilities. Includes instruction in occupational health and safety standards and regulations; health-related aspects of various occupations and work environments; health hazard testing and evaluation; test equipment operation and maintenance; industrial toxicology; worker health and safety education; and the analysis and testing of job-related equipment, behavior practices, and protective devices and procedures.

No information on schools for the program

Occupational Safety and Health Tech./Technician

Occupational Safety and Health Technology/Technician. A program that prepares individuals to apply basic engineering principles and technical skills in support of engineers and other professionals engaged in maintaining job-related health and safety standards. Includes instruction in safety engineering principles, inspection and monitoring procedures, testing and sampling procedures, laboratory techniques, applications to specific work environments, and report preparation.

Institution	Address	City	URL
Central Maine Community College	1250 Turner St	Auburn	www.cmcc.edu
Central Maine Community College	1250 Turner St	Auburn	www.cmcc.edu

Orthoptics

Orthoptics/Orthoptist. A program that prepares individuals, under the supervision of ophthalmologists, to analyze, evaluate, and treat specific disorders of vision, eye movement, and eye alignment in children and adults. Includes instruction in eye anatomy, neuroanatomy, physiology, pharmacology, ophthalmic optics, diagnostic testing and measurement, orthoptic treatment therapy, systemic ocular diseases and disorders, principles of surgery, examination techniques, patient education, child psychology and development, learning disabilities, medical writing, and record-keeping.

No information on schools for the program

Quality Control and Safety Technologies/Technicians, Other

Quality Control and Safety Technologies/Technicians, Other. Any instructional program in quality control and safety technologies not listed above.

No information on schools for the program

Maine Statewide Promotion Opportunities for Industrial Safety and Health Engineers

O*NET Code	Title	Grand TORQ	Job Zone	Employment	Median Wage	Difference	Growth	Annual Job Openings	Special
17-2111.01	Industrial Safety and Health Engineers	100	4	90	$49,940.00	$0.00	3%	3	
29-9011.00	Occupational Health and Safety Specialists	97	5	220	$62,720.00	$12,780.00	-2%	4	
17-2081.00	Environmental Engineers	92	5	390	$62,340.00	$12,400.00	10%	16	
17-2111.03	Product Safety Engineers	92	5	90	$49,940.00	$0.00	3%	3	
17-2111.02	Fire-Prevention and Protection Engineers	90	4	90	$49,940.00	$0.00	3%	3	
11-9033.00	Education Administrators, Postsecondary	89	5	600	$58,090.00	$8,150.00	7%	21	
11-9121.00	Natural Sciences Managers	89	5	180	$79,810.00	$29,870.00	8%	5	
11-9131.00	Postmasters and Mail Superintendents	88	3	420	$55,200.00	$5,260.00	-5%	10	
11-3041.00	Compensation and Benefits Managers	87	3	200	$68,560.00	$18,620.00	2%	5	
11-3051.00	Industrial Production Managers	87	4	690	$72,560.00	$22,620.00	-12%	24	
13-1081.00	Logisticians	87	4	190	$59,120.00	$9,180.00	4%	4	
41-1012.00	First-Line Supervisors/Managers of Non-Retail Sales Workers	87	4	930	$55,220.00	$5,280.00	-1%	19	
25-1193.00	Recreation and Fitness Studies Teachers, Postsecondary	87	5	60	$53,100.00	$3,160.00	8%	2	
11-2031.00	Public Relations Managers	87	4	290	$71,020.00	$21,080.00	9%	10	
11-3042.00	Training and Development Managers	87	4	140	$66,670.00	$16,730.00	7%	4	

Special Occupations:

Top Industries for Occupational Health and Safety Specialists

Industry	NAICS	% of Industry	Employment	Projected Employment	% Change
Local government, excluding education and hospitals	939300	14.60%	6,599	7,413	12.34%
Federal government, excluding postal service	919999	14.55%	6,578	6,218	-5.47%
State government, excluding education and hospitals	929200	13.25%	5,991	5,879	-1.87%
General medical and surgical hospitals, public and private	622100	5.58%	2,521	2,791	10.71%
Management, scientific, and technical consulting services	541600	4.59%	2,074	3,702	78.52%
Colleges, universities, and professional schools, public and private	611300	3.84%	1,738	1,944	11.87%
Management of companies and enterprises	551100	2.53%	1,143	1,317	15.28%
Self-employed workers, primary job	000601	2.39%	1,082	1,153	6.54%
Support activities for mining	213100	1.72%	778	732	-5.93%
Research and development in the physical, engineering, and life sciences	541710	1.70%	768	820	6.69%
Aerospace product and parts manufacturing	336400	1.59%	717	731	1.84%
Electric power generation, transmission and distribution	221100	1.53%	690	635	-8.03%
Employment services	561300	1.30%	590	746	26.56%
Oil and gas extraction	211100	0.87%	392	385	-1.68%
Postal service	491100	0.82%	369	376	1.80%

Top Industries for Industrial Safety and Health Engineers

Industry	NAICS	% of Industry	Employment	Projected Employment	% Change
Nonresidential building construction	236200	8.08%	2,051	2,298	12.05%
State government, excluding education and hospitals	929200	5.23%	1,327	1,302	-1.87%
Management, scientific, and technical consulting services	541600	5.05%	1,282	2,289	78.52%
Local government, excluding education and hospitals	939300	4.60%	1,166	1,310	12.34%
Basic chemical manufacturing	325100	3.61%	916	772	-15.67%
Management of companies and enterprises	551100	3.22%	818	943	15.28%
Support activities for mining	213100	3.13%	793	746	-5.93%
Research and development in the physical, engineering, and life sciences	541710	2.83%	718	766	6.69%
Pharmaceutical and medicine manufacturing	325400	2.49%	632	796	26.03%
Highway, street, and bridge construction	237300	2.45%	623	670	7.66%
Resin, synthetic rubber, and artificial synthetic fibers and filaments manufacturing	325200	2.44%	620	498	-19.73%

Federal government, excluding postal service	919999	2.42%	613	580	-5.47%
Aerospace product and parts manufacturing	336400	2.37%	602	613	1.84%
Power and communication line and related structures construction	237130	1.79%	455	479	5.20%
General medical and surgical hospitals, public and private	622100	1.75%	443	491	10.71%

TORQ Analysis of Industrial Safety and Health Engineers to Environmental Engineers

ANALYSIS INPUT

Transfer	Title	O*NET	Filters		
From Title:	Industrial Safety and Health Engineers	17-2111.01	Abilities:	Importance LeveL: 50	Weight: 1
To Title:	Environmental Engineers	17-2081.00	Skills:	Importance LeveL: 69	Weight: 1
Labor Market Area:	Maine Statewide		Knowledge:	Importance Level: 69	Weight: 1

TORQ RESULTS

Grand TORQ: 92

Ability TORQ		Skills TORQ		Knowledge TORQ	
Level	93	Level	92	Level	92

Gaps To Narrow if Possible

Ability	Level	Gap	Impt
Oral Comprehension	73	13	78
Oral Expression	73	11	81
Written Comprehension	67	8	75
Deductive Reasoning	67	8	75
Written Expression	67	7	68
Near Vision	57	7	65
Information Ordering	60	7	62
Selective Attention	48	6	53
Problem Sensitivity	66	4	78
Category Flexibility	53	2	50

Upgrade These Skills

Skill	Level	Gap	Impt
Writing	80	9	76
Science	72	7	78
Coordination	80	7	74
Technology Design	54	4	71

Knowledge to Add

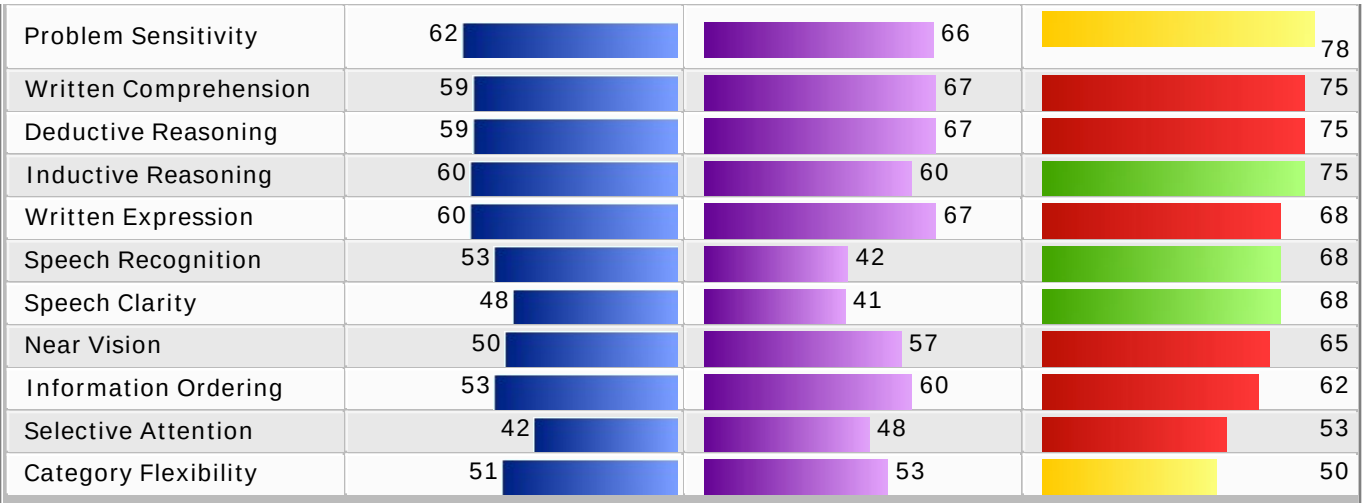
Knowledge	Level	Gap	Impt
No Knowledge Upgrades Required!			

LEVEL and IMPT (IMPORTANCE) refer to the Target Environmental Engineers. GAP refers to level difference between Industrial Safety and Health Engineers and Environmental Engineers.

ASK ANALYSIS

Ability Level Comparison - Abilities with importance scores over 50

Description	Industrial Safety and Health Engineers	Environmental Engineers	Importance
Oral Expression	62	73	81
Oral Comprehension	60	73	78



Skill Level Comparison - Abilities with importance scores over 69

Description	Industrial Safety and Health Engineers	Environmental Engineers	Importance
Science	65	72	78
Writing	71	80	76
Coordination	73	80	74
Technology Design	50	54	71

Knowledge Level Comparison - Knowledge with importance scores over 69

Description	Industrial Safety and Health Engineers	Environmental Engineers	Importance

Experience & Education Comparison

Related Work Experience Comparison

Description	Industrial Safety and Health Engineers	Environmental Engineers
10+ years	5%	16%
8-10 years	2%	0%
6-8 years	2%	22%
4-6 years	18%	18%
2-4 years	42%	29%
1-2 years	10%	7%
6-12 months	2%	0%
3-6 months	5%	0%
1-3 months	0%	0%
0-1 month	0%	0%
None	10%	6%

Required Education Level Comparison

Description	Industrial Safety and Health Engineers	Environmental Engineers
Doctoral	0%	0%
Professional Degree	2%	0%
Post-Masters Cert	0%	15%
Master's Degree	5%	42%
Post-Bachelor Cert	13%	0%
Bachelors	78%	22%
AA or Equiv	0%	0%
Some College	0%	17%
Post-Secondary Certificate	0%	0%
High Scool Diploma or GED	0%	0%
No HSD or GED	0%	0%

Industrial Safety and Health Engineers	Environmental Engineers
Most Common Educational/Training Requirement:	
Bachelor's degree	Bachelor's degree
Job Zone Comparison	
4 - Job Zone Four: Considerable Preparation Needed	5 - Job Zone Five: Extensive Preparation Needed

A minimum of two to four years of work-related skill, knowledge, or experience is needed for these occupations. For example, an accountant must complete four years of college and work for several years in accounting to be considered qualified.	Extensive skill, knowledge, and experience are needed for these occupations. Many require more than five years of experience. For example, surgeons must complete four years of college and an additional five to seven years of specialized medical training to be able to do their job.
Most of these occupations require a four - year bachelor's degree, but some do not.	A bachelor's degree is the minimum formal education required for these occupations. However, many also require graduate school. For example, they may require a master's degree, and some require a Ph.D., M.D., or J.D. (law degree).
Employees in these occupations usually need several years of work-related experience, on-the-job training, and/or vocational training.	Employees may need some on-the-job training, but most of these occupations assume that the person will already have the required skills, knowledge, work-related experience, and/or training.

Tasks

Industrial Safety and Health Engineers

Core Tasks

Generalized Work Activities:

- Evaluating Information to Determine Compliance with Standards - Using relevant information and individual judgment to determine whether events or processes comply with laws, regulations, or standards.
- Getting Information - Observing, receiving, and otherwise obtaining information from all relevant sources.
- Making Decisions and Solving Problems - Analyzing information and evaluating results to choose the best solution and solve problems.
- Interacting With Computers - Using computers and computer systems (including hardware and software) to program, write software, set up functions, enter data, or process information.
- Communicating with Persons Outside Organization - Communicating with people outside the organization, representing the organization to customers, the public, government, and other external sources. This information can be exchanged in person, in writing, or by telephone or e-mail.
- Communicating with Supervisors, Peers, or Subordinates - Providing information to supervisors, co-workers, and subordinates by telephone, in written form, e-mail, or in person.

Specific Tasks

Occupation Specific Tasks:

- Advise architects, builders, and other construction personnel on fire prevention equipment and techniques, and on fire code and standard interpretation and compliance.
- Attend workshops, seminars, or conferences to present or obtain information regarding fire prevention and protection.
- Conduct research on fire retardants and the fire safety of materials and devices.
- Consult with authorities to discuss safety regulations and to recommend changes as

Environmental Engineers

Core Tasks

Generalized Work Activities:

- Evaluating Information to Determine Compliance with Standards - Using relevant information and individual judgment to determine whether events or processes comply with laws, regulations, or standards.
- Getting Information - Observing, receiving, and otherwise obtaining information from all relevant sources.
- Monitor Processes, Materials, or Surroundings - Monitoring and reviewing information from materials, events, or the environment, to detect or assess problems.
- Making Decisions and Solving Problems - Analyzing information and evaluating results to choose the best solution and solve problems.
- Communicating with Supervisors, Peers, or Subordinates - Providing information to supervisors, co-workers, and subordinates by telephone, in written form, e-mail, or in person.

Specific Tasks

Occupation Specific Tasks:

- Advise corporations and government agencies of procedures to follow in cleaning up contaminated sites to protect people and the environment.
- Advise industries and government agencies about environmental policies and standards.
- Assess the existing or potential environmental impact of land use projects on air, water, and land.
- Assess, sort, characterize, and pack known and unknown materials.
- Assist in budget implementation, forecasts, and administration.
- Collaborate with environmental scientists, planners, hazardous waste technicians, engineers, and other specialists, and experts in law and business to address environmental problems.

regulations and to recommend changes as necessary.

- Design fire detection equipment, alarm systems, and fire extinguishing devices and systems.
- Determine causes of fires, and ways in which they could have been prevented.
- Develop plans for the prevention of destruction by fire, wind, and water.
- Develop training materials, and conduct training sessions on fire protection.
- Direct the purchase, modification, installation, maintenance, and operation of fire protection systems.
- Evaluate fire department performance and the laws and regulations affecting fire prevention or fire safety.
- Inspect buildings or building designs to determine fire protection system requirements and potential problems in areas such as water supplies, exit locations, and construction materials.
- Prepare and write reports detailing specific fire prevention and protection issues such as work performed and proposed review schedules.
- Study the relationships between ignition sources and materials to determine how fires start.

Detailed Tasks

Detailed Work Activities:

- adhere to safety procedures
- advise clients regarding engineering problems
- analyze effectiveness of safety systems or procedures
- analyze technical data, designs, or preliminary specifications
- communicate technical information
- conduct fire hazard inspections
- conduct training for personnel
- design electronic equipment
- determine fire causes
- direct and coordinate fire prevention and suppression activities
- evaluate engineering data
- evaluate governmental regulations or laws
- evaluate manufacturing or processing systems
- explain complex mathematical information
- follow safe waste disposal procedures
- inspect facilities or equipment for regulatory compliance
- make presentations
- perform safety inspections in industrial, manufacturing or repair setting

- Coordinate and manage environmental protection programs and projects, assigning and evaluating work.
- Design systems, processes, and equipment for control, management, and remediation of water, air, and soil quality.
- Develop and present environmental compliance training or orientation sessions.
- Develop proposed project objectives and targets, and report to management on progress in attaining them.
- Develop site-specific health and safety protocols, such as spill contingency plans and methods for loading and transporting waste.
- Develop, implement, and manage plans and programs related to conservation and management of natural resources.
- Inform company employees and other interested parties of environmental issues.
- Inspect industrial and municipal facilities and programs to evaluate operational effectiveness and ensure compliance with environmental regulations.
- Maintain, write, and revise quality assurance documentation and procedures.
- Monitor progress of environmental improvement programs.
- Obtain, update, and maintain plans, permits, and standard operating procedures.
- Prepare hazardous waste manifests and land disposal restriction notifications.
- Prepare, review, and update environmental investigation and recommendation reports.
- Provide administrative support for projects by collecting data, providing project documentation, training staff, and performing other general administrative duties.
- Provide environmental engineering assistance in network analysis, regulatory analysis, and planning or reviewing database development.
- Provide technical-level support for environmental remediation and litigation projects, including remediation system design and determination of regulatory applicability.
- Request bids from suppliers or consultants.
- Serve as liaison with federal, state, and local agencies and officials on issues pertaining to solid and hazardous waste program requirements.
- Serve on teams conducting multimedia inspections at complex facilities, providing assistance with planning, quality assurance, safety inspection protocols, and sampling.

Detailed Tasks

manufacturing or repair setting

- prepare technical reports or related documentation
- read blueprints
- read schematics
- read technical drawings
- recommend action to ensure compliance
- record test results, test procedures, or inspection data
- resolve engineering or science problems
- test equipment as part of engineering projects or processes
- understand engineering data or reports
- use chemical testing or analysis procedures
- use drafting or mechanical drawing techniques
- use government regulations
- use hazardous materials information
- use intuitive judgment for engineering analyses
- use pollution control techniques
- use scientific research methodology
- use technical information in manufacturing or industrial activities
- use technical regulations for engineering problems
- write product performance requirements

Technology - Examples

Analytical or scientific software

- Availability prediction modeling software
- Biomechanical imaging software
- Biomechanical injury risk analysis software
- Computational fluid dynamics CFD software
- Energy expenditure prediction EEP software
- Failure mode and effects analysis FMEA software
- Failure modes analysis software
- Failure reporting analysis and corrective action FRACAS software
- Fault tree analysis FTA software
- Geomechanical stress analysis software
- Hazard assessment software
- Human modeling software
- Industrial job assessment software
- Isograph Markov

Detailed Work Activities:

- adhere to safety procedures
- advise clients or customers
- advise clients regarding engineering problems
- advise governmental or industrial personnel
- analyze ecosystem data
- analyze engineering design problems
- analyze engineering test data
- analyze project proposal to determine feasibility, cost, or time
- analyze scientific research data or investigative findings
- analyze technical data, designs, or preliminary specifications
- analyze test data
- calculate engineering specifications
- collect scientific or technical data
- communicate technical information
- compile numerical or statistical data
- confer with engineering, technical or manufacturing personnel
- confer with scientists
- coordinate engineering project activities
- create mathematical or statistical diagrams or charts
- delegate authority for engineering activities
- design control systems
- design engineered systems
- design waste recovery methods
- develop or maintain databases
- develop plans for programs or projects
- develop policies, procedures, methods, or standards
- develop tables depicting data
- direct and coordinate activities of workers or staff
- direct and coordinate scientific research or investigative studies
- direct personnel in support of engineering activities
- draw prototypes, plans, or maps to scale
- estimate cost for engineering projects
- estimate time needed for project
- evaluate costs of engineering projects
- evaluate engineering data
- examine engineering documents for completeness or accuracy
- explain complex mathematical information
- follow safe waste disposal procedures
- interpret aerial photographs
- judge soil conditions
- lead teams in engineering projects

- National Institute for Occupational Safety and Health LaModel
- Predictive toxicology software
- Quantitative analysis software
- Reliability analysis software
- Reliability centered maintenance RCM software
- Root cause analysis software
- Static strength prediction software
- Survey software
- Vibration analysis software
- Virtual interaction simulator software

Compliance software

- Compliance software
- Fire safety inspection and testing software
- Hazard communication software
- Inspection management system
- Material safety data sheet MSDS software
- Safety integrity level SIL software
- Safety, health, and environmental management software

Computer aided design CAD software

- Computer aided design CAD software
- Electronic design automation EDA software
- Roof support design software

Computer based training software

- Computer based training software
- Hazardous waste operations and emergency response standard HAZWOPER training software

Data base user interface and query software

- Anthropometric databases
- Incident tracking software
- Microsoft Access

Document management software

- Records management software

License management software

- Permit administration software

- operate land or site surveying instruments
- plan construction of structures or facilities
- plan scientific research or investigative studies
- plan testing of engineering methods
- prepare environmental impact or related environmental reports
- prepare reports
- prepare safety reports
- prepare technical reports or related documentation
- provide analytical assessment of engineering data
- read maps
- read technical drawings
- resolve engineering or science problems
- supervise pollution control workers
- test air quality, noise, temperature, or radiation
- test equipment as part of engineering projects or processes
- understand construction specifications
- understand engineering data or reports
- understand government construction contracting regulations
- use building or land use regulations
- use computer aided drafting or design software for design, drafting, modeling, or other engineering tasks
- use computers to enter, access or retrieve data
- use drafting or mechanical drawing techniques
- use field notes in technical drawings
- use government regulations
- use hazardous disposal techniques
- use hazardous materials information
- use intuitive judgment for engineering analyses
- use knowledge of investigation techniques
- use knowledge of regulations in surveying or construction activities
- use land surveying techniques
- use library or online Internet research techniques
- use mathematical or statistical methods to identify or analyze problems
- use pollution control techniques
- use project management techniques
- use quantitative research methods
- use relational database software
- use research methodology procedures within manufacturing or commerce
- use scientific research methodology
- use spreadsheet software
- use technical regulations for engineering problems

Map creation software

- Geological mapping software

Presentation software

- Microsoft PowerPoint

Spreadsheet software

- Microsoft Excel

Video creation and editing software

- Multimedia video analysis software

Word processing software

- Microsoft Word

Tools - Examples

- Accelerometers
- Noise monitoring equipment
- Microbial contaminant measurement devices
- Aerosol sampling devices
- High-flow air sampling pumps
- Velometers
- Heart rate monitors
- Desktop computers
- Digital video recorders
- Digital cameras
- Digital dynamometers
- Magnetic field meters
- Electromyograph processing systems
- Force gauges
- Sorbent tubes
- Heat stress monitors
- Light meters
- Notebook computers
- Volatile organic compound VOC measurement devices
- Portable oxygen consumption meters
- Personal digital assistants PDA
- Discriminative reaction time apparatus
- Potentiometers

problems

- use word processing or desktop publishing software
- work as a team member
- write business project or bid proposals

Technology - Examples

Analytical or scientific software

- Air dispersion modeling software
- ANSYS software
- DHI Water and Environment MIKE SHE
- Ecological risk assessment software
- Finite element method FEM software
- Gas dispersion model software
- HEC RAS
- Hydrologic simulation program fortan HSPF software
- Image analysis software
- Insightful S-PLUS
- LINDO Systems software
- Maplesoft Maple
- RockWare MODFLOW
- Rockwell Automation Arena
- SAS software
- Simulation software
- Site remediation management software
- Stormwater runoff modeling software
- The Mathworks MATLAB
- WAM software
- Waste management software
- Water flow modeling software
- Wind flow modeling software
- XP Software XPSWMM

Compliance software

- Continuous emission management software
- Environmental health and safety documentation software
- Greenhouse gas management software

- Force platforms
- Radio frequency signal analyzers
- Three-dimensional laser scanners
- Acoustic calibrators
- Respiratory flow rate meters
- Strain gauges
- Sorbent dosimeters
- Temperature probes
- Anthropometers
- Torsionmeters
- Vibration analysis devices

- Greenhouse gas management software
- Hazardous materials management software
- Material safety data sheet MSDS software
- Regulatory compliance management software

Computer aided design CAD software

- Autodesk AutoCAD software
- Bentley Microstation
- Computer aided design CAD software
- Kubotek CADkey
- SofTech CADRA

Data base user interface and query software

- Microsoft Access

Development environment software

- Formula translation/translator FORTRAN

Graphics or photo imaging software

- Photogrammetric software
- Slam software

Industrial control software

- Fugitive emission leak detection software

Map creation software

- Geomechanical design analysis GDA software
- Oil mapping software

Object or component oriented development software

- C++
- Python

Presentation software

- Microsoft PowerPoint

Spreadsheet software

- Microsoft Excel

Word processing software

- Microsoft Word

Tools - Examples

- Sampling trains
- Sampling pumps
- Air velocity meters
- Anaerobic growth chambers

- Atomic absorption AA spectrometers
- Mercury/hybrid atomizers
- Stem augers
- Headspace autosamplers
- Chemostats
- Interferometeric refractormeters
- Centrifuges
- Surface area analyzers
- Fluorescence detectors
- Liquid chromatography detectors
- Colorimeters
- Conductivity meters
- Drill rigs
- Universal fractionators
- Desktop computers
- Soil modulus failure testing devices
- Respirometers
- Dissolved oxygen meters
- Electron capture detectors ECD
- Particle counters
- Environmental probe systems
- Supercritical fluid extractors
- Particulate filters
- Flame emission detectors
- Flow meters
- Epifluorescence microscopes
- Air incubators
- Freeze dryers
- Fume hoods
- Gas chromatographs GC
- Multi gas detector tubes
- Gas meters

- Global positioning system GPS devices
- Capillary electrophoresis systems
- Ion chromatographs
- Argon ionization detectors
- Glove box systems
- Balances
- Ovens
- Microwave digestion instruments
- Liquid scintillation counters
- Mass spectrometers
- Electric pumps
- Soil carbon-nitrogen CN analyzers
- Notebook computers
- Current meters
- Water level gauges
- Shakers
- Organic carbon analyzers
- Ozonators
- California bearing ratio CBR testing devices
- Consolidometers
- pH meters
- Charge-coupled device CCD cameras
- Laser photometers
- Scanning potentiostats
- Graphite furnaces
- Mud rotary drills
- Whole air canisters
- Biological oxidizers
- Seismographs
- Direct shear testing devices
- Combustible gas meters
- Geoprobes

	• Atomic absorption AA spectrophotometers
	• Autoclaves
	• Thermal conductivity detectors
	• Thermocouples
	• Automatic titrators
	• Water purification systems
	• Sample concentrators
	• Liquid ring pumps
	• Multi-parameter water quality monitoring instruments
	• Stormwater samplers

Labor Market Comparison

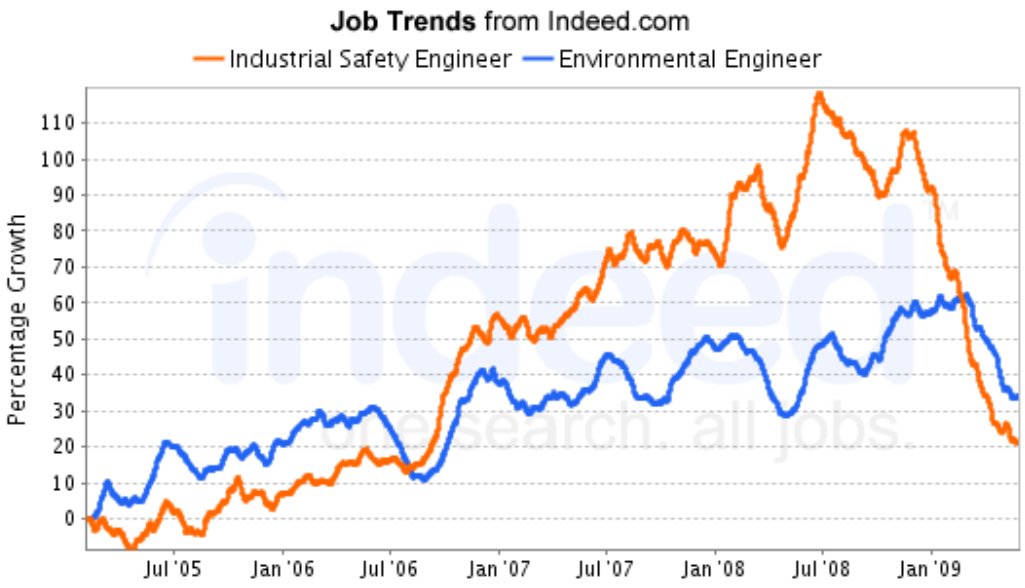
Maine Department of Labor.

Description	Industrial Safety and Health Engineers	Environmental Engineers	Difference
Median Wage	$ 49,940	$ 62,340	$ 12,400
10th Percentile Wage	$ 33,890	$ 41,940	$ 8,050
25th Percentile Wage	N/A	N/A	N/A
75th Percentile Wage	$ 61,800	$ 76,680	$ 14,880
90th Percentile Wage	$ 81,900	$ 93,850	$ 11,950
Mean Wage	$ 52,490	$ 65,020	$ 12,530
Total Employment - 2090	90	390	300
Employment Base - 2006	104	391	287
Projected Employment - 2099	107	429	322
Projected Job Growth - 2006-2099	2.9 %	9.7 %	6.8 %
Projected Annual Openings - 2006-2099	3	16	13
Special			

Special Occupations:

National Job Posting Trends

Trend for Industrial Safety and Health Engineers and Environmental Engineers



Data from Indeed

Programs

Related Programs

Engineering Physics

Engineering Physics. A program with a general focus on the general application of mathematical and scientific principles of physics to the analysis and evaluation of engineering problems. Includes instruction in high- and low-temperature phenomena, computational physics, superconductivity, applied thermodynamics, molecular and particle physics applications, and space science research.

Institution	Address	City	URL
University of Maine		Orono	www.umaine.edu/
University of Maine		Orono	www.umaine.edu/

Engineering Science

Engineering Science. A program with a general focuses on the general application of various combinations of mathematical and scientific principles to the analysis and evaluation of engineering problems, including applied research in human behavior, statistics, biology, chemistry, the earth and planetary sciences, atmospherics and meteorology, and computer applications.

No information on schools for the program

Environmental/Environmental Health Engineering

Environmental/Environmental Health Engineering. A 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.

No information on schools for the program

Maine Statewide Promotion Opportunities for Industrial Safety and Health Engineers

O*NET Code	Title	Grand TORQ	Job Zone	Employment	Median Wage	Difference	Growth	Annual Job Openings	Special
17-2111.01	Industrial Safety and Health Engineers	100	4	90	$49,940.00	$0.00	3%	3	
29-9011.00	Occupational Health and Safety Specialists	97	5	220	$62,720.00	$12,780.00	-2%	4	
17-2081.00	Environmental Engineers	92	5	390	$62,340.00	$12,400.00	10%	16	
17-2111.03	Product Safety Engineers	92	5	90	$49,940.00	$0.00	3%	3	
17-2111.02	Fire-Prevention and Protection Engineers	90	4	90	$49,940.00	$0.00	3%	3	
11-9033.00	Education Administrators, Postsecondary	89	5	600	$58,090.00	$8,150.00	7%	21	
11-9121.00	Natural Sciences Managers	89	5	180	$79,810.00	$29,870.00	8%	5	
11-9131.00	Postmasters and Mail Superintendents	88	3	420	$55,200.00	$5,260.00	-5%	10	
11-3041.00	Compensation and Benefits Managers	87	3	200	$68,560.00	$18,620.00	2%	5	
11-3051.00	Industrial Production Managers	87	4	690	$72,560.00	$22,620.00	-12%	24	
13-1081.00	Logisticians	87	4	190	$59,120.00	$9,180.00	4%	4	
41-1012.00	First-Line Supervisors/Managers of Non-Retail Sales Workers	87	4	930	$55,220.00	$5,280.00	-1%	19	
25-1193.00	Recreation and Fitness Studies Teachers, Postsecondary	87	5	60	$53,100.00	$3,160.00	8%	2	
11-2031.00	Public Relations Managers	87	4	290	$71,020.00	$21,080.00	9%	10	
11-3042.00	Training and Development Managers	87	4	140	$66,670.00	$16,730.00	7%	4	

Special Occupations:

Top Industries for Environmental Engineers

Industry	NAICS	% of Industry	Employment	Projected Employment	% Change
Management, scientific, and technical consulting services	541600	14.42%	7,838	13,992	78.52%
State government, excluding education and hospitals	929200	12.46%	6,772	6,646	-1.87%
Local government, excluding education and hospitals	939300	8.86%	4,816	5,410	12.34%

Federal government, excluding postal service	919999	7.84%	4,258	4,026	-5.47%
Remediation and other waste management services	562900	2.98%	1,619	2,356	45.48%
Self-employed workers, primary job	000601	2.66%	1,444	1,538	6.54%
Testing laboratories	541380	1.90%	1,034	1,273	23.12%
Management of companies and enterprises	551100	1.67%	908	1,047	15.28%
Waste treatment and disposal	562200	0.94%	512	643	25.61%
Iron and steel mills and ferroalloy manufacturing	331100	0.87%	473	318	-32.68%
Electric power generation, transmission and distribution	221100	0.67%	363	334	-8.03%
Aerospace product and parts manufacturing	336400	0.57%	308	314	1.84%
Colleges, universities, and professional schools, public and private	611300	0.49%	267	299	11.88%
Petroleum and coal products manufacturing	324100	0.47%	257	194	-24.51%
Pharmaceutical and medicine manufacturing	325400	0.43%	236	297	26.03%

Top Industries for Industrial Safety and Health Engineers

Industry	NAICS	% of Industry	Employment	Projected Employment	% Change
Nonresidential building construction	236200	8.08%	2,051	2,298	12.05%
State government, excluding education and hospitals	929200	5.23%	1,327	1,302	-1.87%
Management, scientific, and technical consulting services	541600	5.05%	1,282	2,289	78.52%
Local government, excluding education and hospitals	939300	4.60%	1,166	1,310	12.34%
Basic chemical manufacturing	325100	3.61%	916	772	-15.67%
Management of companies and enterprises	551100	3.22%	818	943	15.28%
Support activities for mining	213100	3.13%	793	746	-5.93%
Research and development in the physical, engineering, and life sciences	541710	2.83%	718	766	6.69%
Pharmaceutical and medicine manufacturing	325400	2.49%	632	796	26.03%
Highway, street, and bridge construction	237300	2.45%	623	670	7.66%
Resin, synthetic rubber, and artificial synthetic fibers and filaments manufacturing	325200	2.44%	620	498	-19.73%
Federal government, excluding postal service	919999	2.42%	613	580	-5.47%
Aerospace product and parts manufacturing	336400	2.37%	602	613	1.84%
Power and communication line and related structures construction	237130	1.79%	455	479	5.20%
General medical and surgical hospitals, public and private	622100	1.75%	443	491	10.71%

TORQ Analysis of Industrial Safety and Health Engineers to Occupational Health and Safety Technicians

ANALYSIS INPUT

Transfer	Title	O*NET	Filters		
From Title:	Industrial Safety and Health Engineers	17-2111.01	Abilities:	Importance LeveL: 50	Weight: 1
To Title:	Occupational Health and Safety Technicians	29-9012.00	Skills:	Importance LeveL: 69	Weight: 1
Labor Market Area:	Maine Statewide		Knowledge:	Importance Level: 69	Weight: 1

TORQ RESULTS

Grand TORQ: 92

Ability TORQ		Skills TORQ		Knowledge TORQ	
Level	86	Level	95	Level	96

Gaps To Narrow if Possible

Ability	Level	Gap	Impt
Speech Clarity	53	5	65
Flexibility of Closure	46	2	56
Selective Attention	44	2	50

Upgrade These Skills

Skill	Level	Gap	Impt
No Skills Upgrade Required!			

Knowledge to Add

Knowledge	Level	Gap	Impt
Computers and Electronics	54	6	69

LEVEL and IMPT (IMPORTANCE) refer to the Target Occupational Health and Safety Technicians. GAP refers to level difference between Industrial Safety and Health Engineers and Occupational Health and Safety Technicians.

ASK ANALYSIS

Ability Level Comparison - Abilities with importance scores over 50

Description	Industrial Safety and Health Engineers	Occupational Health and Safety Technicians	Importance
Oral Expression	62	59	81
Oral Comprehension	60	59	75
Written Comprehension	59	53	72
Problem Sensitivity	62	55	72
Inductive Reasoning	60	50	68
Deductive Reasoning	59	50	65
Speech Clarity	48	53	65
Written Expression	60	53	62
Speech Recognition	53	42	62
Near Vision	50	50	59
Flexibility of Closure	44	46	56
Information Ordering	53	48	53

Category Flexibility	51	46	53
Perceptual Speed	44	41	53
Selective Attention	42	44	50

Skill Level Comparison - Abilities with importance scores over 69

Description	Industrial Safety and Health Engineers	Occupational Health and Safety Technicians	Importance

Knowledge Level Comparison - Knowledge with importance scores over 69

Description	Industrial Safety and Health Engineers	Occupational Health and Safety Technicians	Importance
Computers and Electronics	48	54	69

Experience & Education Comparison

Related Work Experience Comparison

Description	Industrial Safety and Health Engineers	Occupational Health and Safety Technicians
10+ years	5%	0%
8-10 years	2%	0%
6-8 years	2%	4%
4-6 years	18%	16%
2-4 years	42%	50%
1-2 years	10%	20%
6-12 months	2%	8%
3-6 months	5%	0%
1-3 months	0%	0%
0-1 month	0%	0%
None	10%	0%

Required Education Level Comparison

Description	Industrial Safety and Health Engineers	Occupational Health and Safety Technicians
Doctoral	0%	0%
Professional Degree	2%	0%
Post-Masters Cert	0%	0%
Master's Degree	5%	0%
Post-Bachelor Cert	13%	8%
Bachelors	78%	29%
AA or Equiv	0%	33%
Some College	0%	16%
Post-Secondary Certificate	0%	4%
High Scool Diploma or GED	0%	8%
No HSD or GED	0%	0%

Industrial Safety and Health Engineers	Occupational Health and Safety Technicians
Most Common Educational/Training Requirement:	
Bachelor's degree	
Job Zone Comparison	
4 - Job Zone Four: Considerable Preparation Needed	-
A minimum of two to four years of work-related skill, knowledge, or experience is needed for these occupations. For example, an accountant must complete four years of college and work for several years in accounting to be considered qualified.	
Most of these occupations require a four - year bachelor's degree, but some do not.	
Employees in these occupations usually need several years of work-related experience, on-the-job training, and/or vocational training.	

Tasks

Industrial Safety and Health Engineers	Occupational Health and Safety Technicians
Core Tasks	Core Tasks

Generalized Work Activities:

- Evaluating Information to Determine Compliance with Standards - Using relevant information and individual judgment to determine whether events or processes comply with laws, regulations, or standards.
- Getting Information - Observing, receiving, and otherwise obtaining information from all relevant sources.
- Making Decisions and Solving Problems - Analyzing information and evaluating results to choose the best solution and solve problems.
- Interacting With Computers - Using computers and computer systems (including hardware and software) to program, write software, set up functions, enter data, or process information.
- Communicating with Persons Outside Organization - Communicating with people outside the organization, representing the organization to customers, the public, government, and other external sources. This information can be exchanged in person, in writing, or by telephone or e-mail.
- Communicating with Supervisors, Peers, or Subordinates - Providing information to supervisors, co-workers, and subordinates by telephone, in written form, e-mail, or in person.

Specific Tasks

Occupation Specific Tasks:

- Advise architects, builders, and other construction personnel on fire prevention equipment and techniques, and on fire code and standard interpretation and compliance.
- Attend workshops, seminars, or conferences to present or obtain information regarding fire prevention and protection.
- Conduct research on fire retardants and the fire safety of materials and devices.
- Consult with authorities to discuss safety regulations and to recommend changes as necessary.
- Design fire detection equipment, alarm systems, and fire extinguishing devices and systems.
- Determine causes of fires, and ways in which they could have been prevented.
- Develop plans for the prevention of destruction by fire, wind, and water.
- Develop training materials, and conduct training sessions on fire protection.
- Direct the purchase, modification, installation, maintenance, and operation of fire protection systems.
- Evaluate fire department performance and the laws and regulations affecting fire prevention or fire safety.
- Inspect buildings or building designs to determine fire protection system requirements and potential problems in areas

Generalized Work Activities:

- Communicating with Supervisors, Peers, or Subordinates - Providing information to supervisors, co-workers, and subordinates by telephone, in written form, e-mail, or in person.
- Evaluating Information to Determine Compliance with Standards - Using relevant information and individual judgment to determine whether events or processes comply with laws, regulations, or standards.
- Establishing and Maintaining Interpersonal Relationships - Developing constructive and cooperative working relationships with others, and maintaining them over time.
- Getting Information - Observing, receiving, and otherwise obtaining information from all relevant sources.
- Inspecting Equipment, Structures, or Material - Inspecting equipment, structures, or materials to identify the cause of errors or other problems or defects.
- Making Decisions and Solving Problems - Analyzing information and evaluating results to choose the best solution and solve problems.
- Training and Teaching Others - Identifying the educational needs of others, developing formal educational or training programs or classes, and teaching or instructing others.

Specific Tasks

Occupation Specific Tasks:

- Conduct fire drills, and inspect fire suppression systems and portable fire systems to ensure that they are in working order.
- Conduct interviews to obtain information and evidence regarding communicable diseases or violations of health and sanitation regulations.
- Confer with school and state authorities and community groups to develop health standards and programs.
- Educate the public about health issues, and enforce health legislation in order to prevent disease, to promote health, and to help people understand health protection procedures and regulations.
- Evaluate situations where a worker has refused to work on the grounds that danger or potential harm exists, and determine how such situations should be handled.
- Examine credentials, licenses, or permits to ensure compliance with licensing requirements.
- Help direct rescue and firefighting operations in the event of a fire or an explosion.
- Maintain all required records and documentation.
- Maintain logbooks of daily activities, including areas visited and activities performed.
- Plan emergency response drills.

such as water supplies, exit locations, and construction materials.

- Prepare and write reports detailing specific fire prevention and protection issues such as work performed and proposed review schedules.
- Study the relationships between ignition sources and materials to determine how fires start.

Detailed Tasks

Detailed Work Activities:

- adhere to safety procedures
- advise clients regarding engineering problems
- analyze effectiveness of safety systems or procedures
- analyze technical data, designs, or preliminary specifications
- communicate technical information
- conduct fire hazard inspections
- conduct training for personnel
- design electronic equipment
- determine fire causes
- direct and coordinate fire prevention and suppression activities
- evaluate engineering data
- evaluate governmental regulations or laws
- evaluate manufacturing or processing systems
- explain complex mathematical information
- follow safe waste disposal procedures
- inspect facilities or equipment for regulatory compliance
- make presentations
- perform safety inspections in industrial, manufacturing or repair setting
- prepare technical reports or related documentation
- read blueprints
- read schematics
- read technical drawings
- recommend action to ensure compliance
- record test results, test procedures, or inspection data
- resolve engineering or science problems
- test equipment as part of engineering projects or processes
- understand engineering data or reports
- use chemical testing or analysis procedures
- use drafting or mechanical drawing techniques
- use government regulations
- use hazardous materials information
- use intuitive judgment for engineering analyses
- use pollution control techniques
- use scientific research methodology

- Prepare and calibrate equipment used to collect and analyze samples.
- Prepare and review specifications and orders for the purchase of safety equipment, ensuring that proper features are present and that items conform to health and safety standards.
- Prepare documents to be used in legal proceedings, testifying in such proceedings when necessary.
- Provide consultation to organizations or agencies on the application of safety principles, practices, and techniques in the workplace.
- Report the results of environmental contaminant analyses, and recommend corrective measures to be applied.
- Review physicians' reports, and conduct worker studies in order to determine whether specific instances of disease or illness are job-related.
- Review records and reports concerning laboratory results, staffing, floor plans, fire inspections, and sanitation in order to gather information for the development and enforcement of safety activities.
- Supply, operate, and maintain personal protective equipment.
- Test workplaces for environmental hazards such as exposure to radiation, chemical and biological hazards, and excessive noise.
- Verify that safety equipment such as hearing protection and respirators is available to employees, and monitor their use of such equipment to ensure proper fit and use.

Detailed Tasks

Detailed Work Activities:

- analyze effectiveness of safety systems or procedures
- collect samples for testing
- communicate technical information
- evaluate engineering data
- evaluate manufacturing or processing systems
- examine engineering documents for completeness or accuracy
- explain complex mathematical information
- follow safe waste disposal procedures
- perform safety inspections in industrial, manufacturing or repair setting
- prepare safety reports
- prepare technical reports or related documentation
- record test results, test procedures, or inspection data
- test air quality, noise, temperature, or radiation
- understand engineering data or reports
- use hazardous materials information
- use knowledge of materials testing

- use technical information in manufacturing or industrial activities
- use technical regulations for engineering problems
- write product performance requirements

Technology - Examples

Analytical or scientific software

- Availability prediction modeling software
- Biomechanical imaging software
- Biomechanical injury risk analysis software
- Computational fluid dynamics CFD software
- Energy expenditure prediction EEP software
- Failure mode and effects analysis FMEA software
- Failure modes analysis software
- Failure reporting analysis and corrective action FRACAS software
- Fault tree analysis FTA software
- Geomechanical stress analysis software
- Hazard assessment software
- Human modeling software
- Industrial job assessment software
- Isograph Markov
- National Institute for Occupational Safety and Health LaModel
- Predictive toxicology software
- Quantitative analysis software
- Reliability analysis software
- Reliability centered maintenance RCM software
- Root cause analysis software
- Static strength prediction software
- Survey software
- Vibration analysis software
- Virtual interaction simulator software

Compliance software

- Compliance software
- Fire safety inspection and testing software

procedures

- use pollution control techniques
- use scientific research methodology
- use technical information in manufacturing or industrial activities
- use technical regulations for engineering problems

Technology - Examples

- Hazard communication software
- Inspection management system
- Material safety data sheet MSDS software
- Safety integrity level SIL software
- Safety, health, and environmental management software

Computer aided design CAD software

- Computer aided design CAD software
- Electronic design automation EDA software
- Roof support design software

Computer based training software

- Computer based training software
- Hazardous waste operations and emergency response standard HAZWOPER training software

Data base user interface and query software

- Anthropometric databases
- Incident tracking software
- Microsoft Access

Document management software

- Records management software

License management software

- Permit administration software

Map creation software

- Geological mapping software

Presentation software

- Microsoft PowerPoint

Spreadsheet software

- Microsoft Excel

Video creation and editing software

- Multimedia video analysis software

Word processing software

- Microsoft Word

Tools - Examples

- Accelerometers
- Noise monitoring equipment
- Microbial contaminant measurement devices
- Aerosol sampling devices

- High-flow air sampling pumps
- Velometers
- Heart rate monitors
- Desktop computers
- Digital video recorders
- Digital cameras
- Digital dynamometers
- Magnetic field meters
- Electromyograph processing systems
- Force gauges
- Sorbent tubes
- Heat stress monitors
- Light meters
- Notebook computers
- Volatile organic compound VOC measurement devices
- Portable oxygen consumption meters
- Personal digital assistants PDA
- Discriminative reaction time apparatus
- Potentiometers
- Force platforms
- Radio frequency signal analyzers
- Three-dimensional laser scanners
- Acoustic calibrators
- Respiratory flow rate meters
- Strain gauges
- Sorbent dosimeters
- Temperature probes
- Anthropometers
- Torsionmeters
- Vibration analysis devices

Labor Market Comparison

Maine Department of Labor.

Description	Industrial Safety and Health Engineers	Occupational Health and Safety Technicians	Difference
Median Wage	$ 49,940	$ 39,170	$(10,770)
10th Percentile Wage	$ 33,890	$ 27,180	$(6,710)
25th Percentile Wage	N/A	N/A	N/A
75th Percentile Wage	$ 61,800	$ 48,450	$(13,350)
90th Percentile Wage	$ 81,900	$ 56,320	$(25,580)
Mean Wage	$ 52,490	$ 40,170	$(12,320)
Total Employment - 2090	90	40	-50
Employment Base - 2006	104	43	-61
Projected Employment - 2099	107	46	-61
Projected Job Growth - 2006-2099	2.9 %	7.0 %	4.1 %
Projected Annual Openings - 2006-2099	3	1	-2
Special			

Special Occupations:

National Job Posting Trends

Trend for Industrial Safety and Health Engineers and Occupational Health and Safety Technicians

Data from Indeed

Programs

Related Programs

Diagnostic Medical Sonography

Diagnostic Medical Sonography/Sonographer and Ultrasound Technician. A program that prepares individuals, under the supervision of physicians, to utilize medical ultrasound techniques to gather sonographic data used to diagnose a variety of conditions and diseases. Includes instruction in obtaining, reviewing, and integrating patient histories and data; patient instruction and care; anatomic, physiologic and pathologic data recording; sonographic data processing; sonography equipment operation; and professional standards and ethics.

No information on schools for the program

Environmental Health

Environmental Health. A program that focuses on the application of environmental sciences, public health, the biomedical sciences, and environmental toxicology to the study of environmental factors affecting human health and related ecological issues, and prepares individuals to function as professional environmental health specialists. Includes instruction in epidemiology, biostatistics, toxicology, public policy analysis, public management, risk assessment, communications, environmental law and applications such as air quality, food protection, radiation protection, solid and hazardous waste management, water quality, noise abatement, housing quality, and environmental control of reacreational areas.

Institution	Address	City	URL
University of Southern Maine	96 Falmouth St	Portland	www.usm.maine.edu

Health Aide

Health Aide. A program that prepares individuals to provide routine care and assistance to patients under the direct supervision of other health care professionals, and/or to perform routine maintenance and general assistance in health care facilities and laboratories.

No information on schools for the program

Health and Medical Diagnostic and Treatment Servic

Allied Health Diagnostic, Intervention, and Treatment Professions, Other. Any instructional program in allied health diagnostic, intervention, and treatment professions not listed above.

Institution	Address	City	URL
University of Southern Maine	96 Falmouth St	Portland	www.usm.maine.edu

Health Professions and Related Sciences, Other

Health Professions and Related Clinical Sciences, Other. Any instructional program in the health professions and related clinical sciences not listed above.

Institution	Address	City	URL
Wasington County Community College	One College Drive	Calais	www.wccc.me.edu

Occupational Health and Industrial Hygiene

Occupational Health and Industrial Hygiene. A program that prepares public health specialists to monitor and evaluate health and related safety standards in industrial, commercial, and government workplaces and facilities. Includes instruction in occupational health and safety standards and regulations; health-related aspects of various occupations and work environments; health hazard testing and evaluation; test equipment operation and maintenance; industrial toxicology; worker health and safety education; and the analysis and testing of job-related equipment, behavior practices, and protective devices and procedures.

No information on schools for the program

Occupational Safety and Health Tech./Technician

Occupational Safety and Health Technology/Technician. A program that prepares individuals to apply basic engineering principles and technical skills in support of engineers and other professionals engaged in maintaining job-related health and safety standards. Includes instruction in safety engineering principles, inspection and monitoring procedures, testing and sampling procedures, laboratory techniques, applications to specific work environments, and report preparation.

Institution	Address	City	URL
Central Maine Community College	1250 Turner St	Auburn	www.cmcc.edu
Central Maine Community College	1250 Turner St	Auburn	www.cmcc.edu

Orthoptics

Orthoptics/Orthoptist. A program that prepares individuals, under the supervision of ophthalmologists, to analyze, evaluate, and treat specific disorders of vision, eye movement, and eye alignment in children and adults. Includes instruction in eye anatomy, neuroanatomy, physiology, pharmacology, ophthalmic optics, diagnostic testing and measurement, orthoptic treatment therapy, systemic ocular diseases and disorders, principles of surgery, examination techniques, patient education, child psychology and development, learning disabilities, medical writing, and record-keeping.

No information on schools for the program

Radiation Protection/Health Physics Technician

Radiation Protection/Health Physics Technician. A program that prepares individuals, under the supervision of health physicists, occupational safety and health specialists, and public health officials, to monitor and control radiation exposure and implement preventive measures in health care, work, and natural environments. Includes instruction in radiation physics, environmental radioactivity, radiological instrumentation, electronics of radiation detection equipment, radioactive waste management and control, safety and handling procedures, decontamination procedures, radioactivity testing and analysis, and communications skills.

No information on schools for the program

Maine Statewide Promotion Opportunities for Industrial Safety and Health Engineers

O*NET Code	Title	Grand TORQ	Job Zone	Employment	Median Wage	Difference	Growth	Annual Job Openings	Special
17-2111.01	Industrial Safety and Health Engineers	100	4	90	$49,940.00	$0.00	3%	3	
29-9011.00	Occupational Health and Safety Specialists	97	5	220	$62,720.00	$12,780.00	-2%	4	
17-2081.00	Environmental Engineers	92	5	390	$62,340.00	$12,400.00	10%	16	
17-2111.03	Product Safety Engineers	92	5	90	$49,940.00	$0.00	3%	3	
17-2111.02	Fire-Prevention and Protection Engineers	90	4	90	$49,940.00	$0.00	3%	3	
11-9033.00	Education Administrators, Postsecondary	89	5	600	$58,090.00	$8,150.00	7%	21	
11-9121.00	Natural Sciences Managers	89	5	180	$79,810.00	$29,870.00	8%	5	
11-9131.00	Postmasters and Mail Superintendents	88	3	420	$55,200.00	$5,260.00	-5%	10	

11-3041.00	Compensation and Benefits Managers	87	3	200	$68,560.00	$18,620.00	2%	5	
11-3051.00	Industrial Production Managers	87	4	690	$72,560.00	$22,620.00	-12%	24	
13-1081.00	Logisticians	87	4	190	$59,120.00	$9,180.00	4%	4	
41-1012.00	First-Line Supervisors/Managers of Non-Retail Sales Workers	87	4	930	$55,220.00	$5,280.00	-1%	19	
25-1193.00	Recreation and Fitness Studies Teachers, Postsecondary	87	5	60	$53,100.00	$3,160.00	8%	2	
11-2031.00	Public Relations Managers	87	4	290	$71,020.00	$21,080.00	9%	10	
11-3042.00	Training and Development Managers	87	4	140	$66,670.00	$16,730.00	7%	4	

Special Occupations:

Top Industries for Occupational Health and Safety Technicians

Industry	NAICS	% of Industry	Employment	Projected Employment	% Change
Local government, excluding education and hospitals	939300	16.38%	1,715	1,926	12.34%
Colleges, universities, and professional schools, public and private	611300	9.98%	1,045	1,169	11.87%
Management, scientific, and technical consulting services	541600	9.61%	1,006	1,795	78.52%
General medical and surgical hospitals, public and private	622100	9.16%	959	1,062	10.71%
State government, excluding education and hospitals	929200	6.20%	649	636	-1.87%
Employment services	561300	4.80%	503	636	26.56%
Support activities for mining	213100	4.15%	435	409	-5.93%
Electric power generation, transmission and distribution	221100	3.01%	315	290	-8.03%
Federal government, excluding postal service	919999	2.19%	229	216	-5.46%
Management of companies and enterprises	551100	1.65%	173	199	15.28%
Research and development in the physical, engineering, and life sciences	541710	1.65%	173	184	6.68%
Office administrative services	561100	1.23%	128	163	26.79%
Aerospace product and parts manufacturing	336400	0.83%	87	89	1.85%
Semiconductor and other electronic component manufacturing	334400	0.70%	73	64	-12.60%

Animal slaughtering and processing	311600	0.67%	70	80	14.12%

Top Industries for Industrial Safety and Health Engineers

Industry	NAICS	% of Industry	Employment	Projected Employment	% Change
Nonresidential building construction	236200	8.08%	2,051	2,298	12.05%
State government, excluding education and hospitals	929200	5.23%	1,327	1,302	-1.87%
Management, scientific, and technical consulting services	541600	5.05%	1,282	2,289	78.52%
Local government, excluding education and hospitals	939300	4.60%	1,166	1,310	12.34%
Basic chemical manufacturing	325100	3.61%	916	772	-15.67%
Management of companies and enterprises	551100	3.22%	818	943	15.28%
Support activities for mining	213100	3.13%	793	746	-5.93%
Research and development in the physical, engineering, and life sciences	541710	2.83%	718	766	6.69%
Pharmaceutical and medicine manufacturing	325400	2.49%	632	796	26.03%
Highway, street, and bridge construction	237300	2.45%	623	670	7.66%
Resin, synthetic rubber, and artificial synthetic fibers and filaments manufacturing	325200	2.44%	620	498	-19.73%
Federal government, excluding postal service	919999	2.42%	613	580	-5.47%
Aerospace product and parts manufacturing	336400	2.37%	602	613	1.84%
Power and communication line and related structures construction	237130	1.79%	455	479	5.20%
General medical and surgical hospitals, public and private	622100	1.75%	443	491	10.71%

TORQ Analysis of Industrial Safety and Health Engineers to Emergency Management Specialists

ANALYSIS INPUT

Transfer	Title	O*NET	Filters		
From Title:	Industrial Safety and Health Engineers	17-2111.01	Abilities:	Importance LeveL: 50	Weight: 1
To Title:	Emergency Management Specialists	13-1061.00	Skills:	Importance LeveL: 69	Weight: 1
Labor Market Area:	Maine Statewide		Knowledge:	Importance Level: 69	Weight: 1

TORQ RESULTS

Grand TORQ: 91

Ability TORQ		Skills TORQ		Knowledge TORQ	
Level	97	Level	89	Level	88

Gaps To Narrow if Possible

Ability	Level	Gap	Impt
Speech Clarity	60	12	78
Fluency of Ideas	62	11	65
Near Vision	59	9	65
Far Vision	51	7	56
Speed of Closure	44	7	53
Speech Recognition	57	4	75
Originality	59	4	65
Oral Comprehension	62	2	78
Oral Expression	64	2	78
Selective Attention	44	2	59
Written Comprehension	60	1	72
Deductive Reasoning	60	1	72

Upgrade These Skills

Skill	Level	Gap	Impt
Programming	23	3	77

Knowledge to Add

Knowledge	Level	Gap	Impt
Telecommunications	61	40	75
Transportation	48	8	84
Public Safety and Security	88	8	78

LEVEL and IMPT (IMPORTANCE) refer to the Target Emergency Management Specialists. GAP refers to level difference between Industrial Safety and Health Engineers and Emergency Management Specialists.

ASK ANALYSIS

Ability Level Comparison - Abilities with importance scores over 50

Description	Industrial Safety and Health Engineers	Emergency Management Specialists	Importance
Oral Comprehension	60	62	78

Oral Expression	62	64	78
Problem Sensitivity	62	62	78
Speech Clarity	48	60	78
Written Expression	60	60	75
Speech Recognition	53	57	75
Written Comprehension	59	60	72
Deductive Reasoning	59	60	72
Inductive Reasoning	60	57	68
Information Ordering	53	53	68
Fluency of Ideas	51	62	65
Originality	55	59	65
Near Vision	50	59	65
Category Flexibility	51	50	62
Selective Attention	42	44	59
Far Vision	44	51	56
Speed of Closure	37	44	53
Flexibility of Closure	44	44	50
Perceptual Speed	44	44	50

Skill Level Comparison - Abilities with importance scores over 69

Description	Industrial Safety and Health Engineers	Emergency Management Specialists	Importance
Programming	20	23	77

Knowledge Level Comparison - Knowledge with importance scores over 69

Description	Industrial Safety and Health Engineers	Emergency Management Specialists	Importance
Transportation	40	48	84
Public Safety and Security	80	88	78
Telecommunications	21	61	75

Experience & Education Comparison

Related Work Experience Comparison

Description	Industrial Safety and Health Engineers	Emergency Management Specialists
10+ years	5%	15%
8-10 years	2%	10%
6-8 years	2%	2%
4-6 years	18%	13%
2-4 years	42%	30%
1-2 years	10%	4%
6-12 months	2%	15%
3-6 months	5%	1%

Required Education Level Comparison

Description	Industrial Safety and Health Engineers	Emergency Management Specialists
Doctoral	0%	0%
Professional Degree	2%	0%
Post-Masters Cert	0%	0%
Master's Degree	5%	2%
Post-Bachelor Cert	13%	6%
Bachelors	78%	43%
AA or Equiv	0%	3%
Some College	0%	31%

1-3 months	0%	0%	Post-Secondary Certificate	0%	1%
0-1 month	0%	0%	High Scool Diploma or GED	0%	7%
None	10%	7%	No HSD or GED	0%	3%

Industrial Safety and Health Engineers	Emergency Management Specialists
Most Common Educational/Training Requirement:	
Bachelor's degree	Work experience in a related occupation
Job Zone Comparison	
4 - Job Zone Four: Considerable Preparation Needed	4 - Job Zone Four: Considerable Preparation Needed
A minimum of two to four years of work-related skill, knowledge, or experience is needed for these occupations. For example, an accountant must complete four years of college and work for several years in accounting to be considered qualified.	A minimum of two to four years of work-related skill, knowledge, or experience is needed for these occupations. For example, an accountant must complete four years of college and work for several years in accounting to be considered qualified.
Most of these occupations require a four - year bachelor's degree, but some do not.	Most of these occupations require a four - year bachelor's degree, but some do not.
Employees in these occupations usually need several years of work-related experience, on-the-job training, and/or vocational training.	Employees in these occupations usually need several years of work-related experience, on-the-job training, and/or vocational training.

Tasks

Industrial Safety and Health Engineers

Core Tasks

Generalized Work Activities:

- Evaluating Information to Determine Compliance with Standards - Using relevant information and individual judgment to determine whether events or processes comply with laws, regulations, or standards.
- Getting Information - Observing, receiving, and otherwise obtaining information from all relevant sources.
- Making Decisions and Solving Problems - Analyzing information and evaluating results to choose the best solution and solve problems.
- Interacting With Computers - Using computers and computer systems (including hardware and software) to program, write software, set up functions, enter data, or process information.
- Communicating with Persons Outside Organization - Communicating with people outside the organization, representing the organization to customers, the public, government, and other external sources. This information can be exchanged in person, in writing, or by telephone or e-mail.
- Communicating with Supervisors, Peers, or Subordinates - Providing information to supervisors, co-workers, and subordinates by telephone, in written form, e-mail, or in person.

Specific Tasks

Emergency Management Specialists

Core Tasks

Generalized Work Activities:

- Communicating with Persons Outside Organization - Communicating with people outside the organization, representing the organization to customers, the public, government, and other external sources. This information can be exchanged in person, in writing, or by telephone or e-mail.
- Communicating with Supervisors, Peers, or Subordinates - Providing information to supervisors, co-workers, and subordinates by telephone, in written form, e-mail, or in person.
- Establishing and Maintaining Interpersonal Relationships - Developing constructive and cooperative working relationships with others, and maintaining them over time.
- Getting Information - Observing, receiving, and otherwise obtaining information from all relevant sources.
- Making Decisions and Solving Problems - Analyzing information and evaluating results to choose the best solution and solve problems.

Specific Tasks

Occupation Specific Tasks:

- Apply for federal funding for emergency management related needs; administer such grants and report on their progress.
- Attend meetings, conferences, and

Occupation Specific Tasks:

- Advise architects, builders, and other construction personnel on fire prevention equipment and techniques, and on fire code and standard interpretation and compliance.
- Attend workshops, seminars, or conferences to present or obtain information regarding fire prevention and protection.
- Conduct research on fire retardants and the fire safety of materials and devices.
- Consult with authorities to discuss safety regulations and to recommend changes as necessary.
- Design fire detection equipment, alarm systems, and fire extinguishing devices and systems.
- Determine causes of fires, and ways in which they could have been prevented.
- Develop plans for the prevention of destruction by fire, wind, and water.
- Develop training materials, and conduct training sessions on fire protection.
- Direct the purchase, modification, installation, maintenance, and operation of fire protection systems.
- Evaluate fire department performance and the laws and regulations affecting fire prevention or fire safety.
- Inspect buildings or building designs to determine fire protection system requirements and potential problems in areas such as water supplies, exit locations, and construction materials.
- Prepare and write reports detailing specific fire prevention and protection issues such as work performed and proposed review schedules.
- Study the relationships between ignition sources and materials to determine how fires start.

Detailed Tasks

Detailed Work Activities:

- adhere to safety procedures
- advise clients regarding engineering problems
- analyze effectiveness of safety systems or procedures
- analyze technical data, designs, or preliminary specifications
- communicate technical information
- conduct fire hazard inspections
- conduct training for personnel
- design electronic equipment
- determine fire causes
- direct and coordinate fire prevention and suppression activities
- evaluate engineering data
- evaluate governmental regulations or laws
- evaluate manufacturing or processing systems

workshops related to emergency management in order to learn new information and to develop working relationships with other emergency management specialists.

- Collaborate with other officials in order to prepare and analyze damage assessments following disasters or emergencies.
- Conduct surveys to determine the types of emergency-related needs that will need to be addressed in disaster planning, or provide technical support to others conducting such surveys.
- Consult with officials of local and area governments, schools, hospitals, and other institutions in order to determine their needs and capabilities in the event of a natural disaster or other emergency.
- Coordinate disaster response or crisis management activities such as ordering evacuations, opening public shelters, and implementing special needs plans and programs.
- Design and administer emergency/disaster preparedness training courses that teach people how to effectively respond to major emergencies and disasters.
- Develop and implement training procedures and strategies for radiological protection, detection, and decontamination.
- Develop and maintain liaisons with municipalities, county departments, and similar entities in order to facilitate plan development, response effort coordination, and exchanges of personnel and equipment.
- Develop and perform tests and evaluations of emergency management plans in accordance with state and federal regulations.
- Develop instructional materials for the public, and make presentations to citizens' groups in order to provide information on emergency plans and their implementation process.
- Inspect facilities and equipment such as emergency management centers and communications equipment in order to determine their operational and functional capabilities in emergency situations.
- Inventory and distribute nuclear, biological, and chemical detection and contamination equipment, providing instruction in its maintenance and use.
- Keep informed of activities or changes that could affect the likelihood of an emergency, as well as those that could affect response efforts and details of plan implementation.
- Keep informed of federal, state and local regulations affecting emergency plans, and ensure that plans adhere to these regulations.
- Maintain and update all resource materials associated with emergency preparedness plans.
- Prepare emergency situation status reports that describe response and recovery efforts, needs, and preliminary damage assessments.
- Prepare plans that outline operating

- explain complex mathematical information
- follow safe waste disposal procedures
- inspect facilities or equipment for regulatory compliance
- make presentations
- perform safety inspections in industrial, manufacturing or repair setting
- prepare technical reports or related documentation
- read blueprints
- read schematics
- read technical drawings
- recommend action to ensure compliance
- record test results, test procedures, or inspection data
- resolve engineering or science problems
- test equipment as part of engineering projects or processes
- understand engineering data or reports
- use chemical testing or analysis procedures
- use drafting or mechanical drawing techniques
- use government regulations
- use hazardous materials information
- use intuitive judgment for engineering analyses
- use pollution control techniques
- use scientific research methodology
- use technical information in manufacturing or industrial activities
- use technical regulations for engineering problems
- write product performance requirements

Technology - Examples

Analytical or scientific software

- Availability prediction modeling software
- Biomechanical imaging software
- Biomechanical injury risk analysis software
- Computational fluid dynamics CFD software
- Energy expenditure prediction EEP software
- Failure mode and effects analysis FMEA software
- Failure modes analysis software
- Failure reporting analysis and corrective action FRACAS software
- Fault tree analysis FTA software
- Geomechanical stress analysis software
- Hazard assessment software

procedures to be used in response to disasters/emergencies such as hurricanes, nuclear accidents, and terrorist attacks, and in recovery from these events.

- Propose alteration of emergency response procedures based on regulatory changes, technological changes, or knowledge gained from outcomes of previous emergency situations.
- Provide communities with assistance in applying for federal funding for emergency management facilities, radiological instrumentation, and other related items.
- Review emergency plans of individual organizations such as medical facilities in order to ensure their adequacy.
- Study emergency plans used elsewhere in order to gather information for plan development.
- Train local groups in the preparation of long-term plans that are compatible with federal and state plans.

Detailed Tasks

Detailed Work Activities:

- advise authorities in procedures for radiation incidents or hazards
- conduct training for personnel
- confer with other departmental heads to coordinate activities
- coordinate emergency requests or response units
- determine response needed to dispatch to emergency
- develop policies, procedures, methods, or standards
- direct and coordinate activities of workers or staff
- follow police or emergency radio regulations
- oversee execution of organizational or program policies
- practice emergency firefighting or rescue preparedness procedures
- prepare long term or short term plans
- recognize public safety hazards
- use hazardous disposal techniques
- use hazardous materials information
- use rescue procedures

Technology - Examples

Analytical or scientific software

- Statistical software

Data base user interface and query software

- Federal Emergency Management Information System FEMIS
- Relational database software
- SoftRisk Technologies SoftRisk SQL

- Human modeling software
- Industrial job assessment software
- Isograph Markov
- National Institute for Occupational Safety and Health LaModel
- Predictive toxicology software
- Quantitative analysis software
- Reliability analysis software
- Reliability centered maintenance RCM software
- Root cause analysis software
- Static strength prediction software
- Survey software
- Vibration analysis software
- Virtual interaction simulator software

Compliance software

- Compliance software
- Fire safety inspection and testing software
- Hazard communication software
- Inspection management system
- Material safety data sheet MSDS software
- Safety integrity level SIL software
- Safety, health, and environmental management software

Computer aided design CAD software

- Computer aided design CAD software
- Electronic design automation EDA software
- Roof support design software

Computer based training software

- Computer based training software
- Hazardous waste operations and emergency response standard HAZWOPER training software

Data base user interface and query software

- Anthropometric databases
- Incident tracking software
- Microsoft Access

Document management software

Desktop publishing software

- Desktop publishing software

Electronic mail software

- Email software
- IBM Lotus Notes

Graphics or photo imaging software

- Graphics software

Internet browser software

- Web browser software

Map creation software

- Digital Engineering Corporation E-MAPS
- ESRI ArcGIS software
- Geographic information system GIS software
- MapInfo Professional

Office suite software

- Microsoft Office

Presentation software

- Microsoft PowerPoint

Project management software

- Alert Technologies OpsCenter
- Emergency Services Integrators ESi WebEOC
- Environmental Support Solutions ESS Crisis
- National Center for Crisis and Continuity Coordination NC4 E Team
- Strohl Systems Incident Manager

Spreadsheet software

- Microsoft Excel
- Spreadsheet software

Word processing software

- Microsoft Word
- Word processing software

Tools - Examples

- Emergency alert notification systems
- Desktop computers
- Hard hats
- Chemical protective clothing
- Chemical protective boots

- Records management software

License management software

- Permit administration software

Map creation software

- Geological mapping software

Presentation software

- Microsoft PowerPoint

Spreadsheet software

- Microsoft Excel

Video creation and editing software

- Multimedia video analysis software

Word processing software

- Microsoft Word

Tools - Examples

- Accelerometers
- Noise monitoring equipment
- Microbial contaminant measurement devices
- Aerosol sampling devices
- High-flow air sampling pumps
- Velometers
- Heart rate monitors
- Desktop computers
- Digital video recorders
- Digital cameras
- Digital dynamometers
- Magnetic field meters
- Electromyograph processing systems
- Force gauges
- Sorbent tubes
- Heat stress monitors
- Light meters
- Notebook computers
- Volatile organic compound VOC measurement devices
- Portable oxygen consumption meters
- Personal digital assistants PDA
- Laptop computers
- Personal computers
- Safety gloves
- Radiation detection meters
- Self-contained breathing equipment
- Protective hoods
- Two way radios

- Discriminative reaction time apparatus
- Potentiometers
- Force platforms
- Radio frequency signal analyzers
- Three-dimensional laser scanners
- Acoustic calibrators
- Respiratory flow rate meters
- Strain gauges
- Sorbent dosimeters
- Temperature probes
- Anthropometers
- Torsionmeters
- Vibration analysis devices

Labor Market Comparison

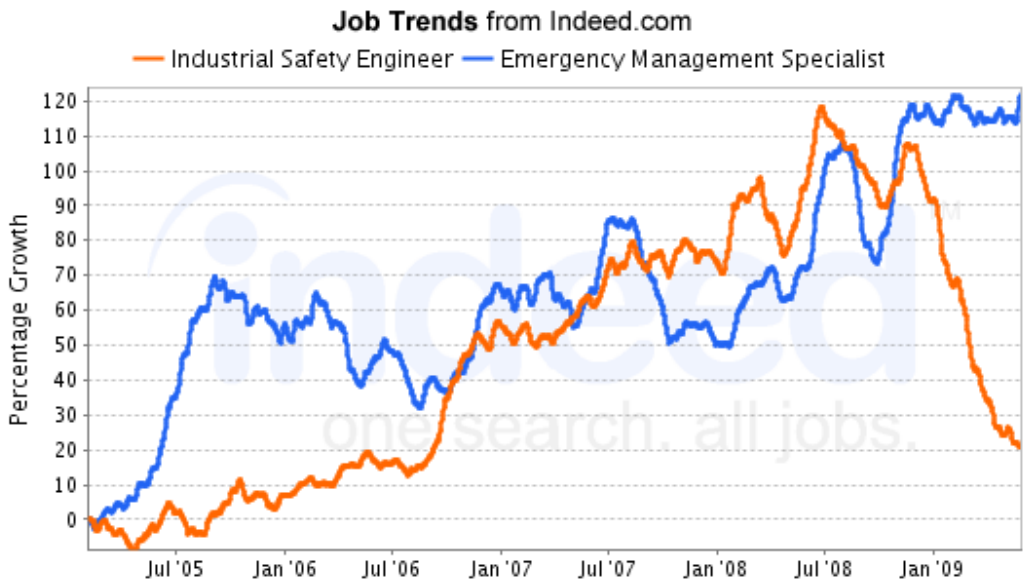
Maine Department of Labor.

Description	Industrial Safety and Health Engineers	Emergency Management Specialists	Difference
Median Wage	$ 49,940	$ 41,790	$(8,150)
10th Percentile Wage	$ 33,890	$ 29,080	$(4,810)
25th Percentile Wage	N/A	N/A	N/A
75th Percentile Wage	$ 61,800	$ 60,970	$(830)
90th Percentile Wage	$ 81,900	$ 77,270	$(4,630)
Mean Wage	$ 52,490	$ 48,160	$(4,330)
Total Employment - 2090	90	90	0
Employment Base - 2006	104	90	-14
Projected Employment - 2099	107	104	-3
Projected Job Growth - 2006-2099	2.9 %	15.6 %	12.7 %
Projected Annual Openings - 2006-2099	3	2	-1
Special			

Special Occupations:

National Job Posting Trends

Trend for Industrial Safety and Health Engineers and Emergency Management Specialists



Data from Indeed

Programs

Related Programs

Administrative Assistant/Secretarial Science, Gene

Administrative Assistant and Secretarial Science, General. A program that generally prepares individuals to perform the duties of administrative assistants and/or secretaries and stenographers. Includes instruction in business communications, principles of business law, word processing and data entry, office machines operation and maintenance, office procedures, public relations, secretarial accounting, filing systems and records management, and report preparation.

Institution	Address	City	URL
Central Maine Community College	1250 Turner St	Auburn	www.cmcc.edu
Central Maine Community College	1250 Turner St	Auburn	www.cmcc.edu
Eastern Maine Community College	354 Hogan Rd	Bangor	www.emcc.edu
Eastern Maine Community College	354 Hogan Rd	Bangor	www.emcc.edu
Beal College	99 Farm Road	Bangor	bealcollege.edu
Beal College	99 Farm Road	Bangor	bealcollege.edu
Andover College	901 Washington Ave	Portland	WWW.ANDOVERCOLLEGE.edu
Andover College	901 Washington Ave	Portland	WWW.ANDOVERCOLLEGE.edu

Community Organization and Advocacy

Community Organization and Advocacy. A program that focuses on the theories, principles, and practice of providing services to communities, organizing communities and neighborhoods for social action, serving as community liaisons to public agencies, and using community resources to furnish information, instruction, and assistance to all members of a community. May prepare individuals to apply such knowledge and skills in community service positions.

No information on schools for the program

Executive Assistant/Secretary

Executive Assistant/Executive Secretary. A program that prepares individuals to perform the duties of special assistants and/or personal secretaries for business executives and top management. Includes instruction in business communications, principles of business law, public relations, scheduling and travel management, secretarial accounting, filing systems and records management, conference and meeting recording, report preparation, office equipment and procedures, office supervisory skills, and professional standards and legal requirements.

Institution	Address	City	URL
Kennebec Valley Community College	92 Western Ave	Fairfield	www.kvcc.me.edu
Kennebec Valley Community College	92 Western Ave	Fairfield	www.kvcc.me.edu
Northern Maine Community College	33 Edgemont Dr	Presque Isle	www.nmcc.edu

Public Administration

Public Administration. A program that prepares individuals to serve as managers in the executive arm of local, state, and federal government; and that focuses on the systematic study of executive organization and management. Includes instruction in the roles, development, and principles of public administration; the management of public policy; executive-legislative relations; public budgetary processes and financial management; administrative law; public personnel management; professional ethics; and research methods.

Institution	Address	City	URL
University of Maine at Augusta	46 University Dr	Augusta	www.uma.maine.edu/
University of Maine at Augusta	46 University Dr	Augusta	www.uma.maine.edu/
University of Maine at Fort Kent	23 University Drive	Fort Kent	www.umfk.maine.edu
University of Maine		Orono	www.umaine.edu/
University of Maine		Orono	www.umaine.edu/
University of Maine		Orono	www.umaine.edu/
University of Maine		Orono	www.umaine.edu/

Public Policy Analysis

Public Policy Analysis. A program that focuses on the systematic analysis of public policy issues and decision processes. Includes instruction in the role of economic and political factors in public decision-making and policy formulation; microeconomic analysis of policy issues; resource allocation and decision modeling; cost/benefit analysis; statistical methods; and applications to specific public policy topics.

Institution	Address	City	URL
University of Southern Maine	96 Falmouth St	Portland	www.usm.maine.edu

Maine Statewide Promotion Opportunities for Industrial Safety and Health Engineers

O*NET Code	Title	Grand TORQ	Job Zone	Employment	Median Wage	Difference	Growth	Annual Job Openings	Special
17-2111.01	Industrial Safety and Health Engineers	100	4	90	$49,940.00	$0.00	3%	3	

29-9011.00	Occupational Health and Safety Specialists	97	5	220	$62,720.00	$12,780.00	-2%	4	
17-2081.00	Environmental Engineers	92	5	390	$62,340.00	$12,400.00	10%	16	
17-2111.03	Product Safety Engineers	92	5	90	$49,940.00	$0.00	3%	3	
17-2111.02	Fire-Prevention and Protection Engineers	90	4	90	$49,940.00	$0.00	3%	3	
11-9033.00	Education Administrators, Postsecondary	89	5	600	$58,090.00	$8,150.00	7%	21	
11-9121.00	Natural Sciences Managers	89	5	180	$79,810.00	$29,870.00	8%	5	
11-9131.00	Postmasters and Mail Superintendents	88	3	420	$55,200.00	$5,260.00	-5%	10	
11-3041.00	Compensation and Benefits Managers	87	3	200	$68,560.00	$18,620.00	2%	5	
11-3051.00	Industrial Production Managers	87	4	690	$72,560.00	$22,620.00	-12%	24	
13-1081.00	Logisticians	87	4	190	$59,120.00	$9,180.00	4%	4	
41-1012.00	First-Line Supervisors/Managers of Non-Retail Sales Workers	87	4	930	$55,220.00	$5,280.00	-1%	19	
25-1193.00	Recreation and Fitness Studies Teachers, Postsecondary	87	5	60	$53,100.00	$3,160.00	8%	2	
11-2031.00	Public Relations Managers	87	4	290	$71,020.00	$21,080.00	9%	10	
11-3042.00	Training and Development Managers	87	4	140	$66,670.00	$16,730.00	7%	4	

Special Occupations:

Top Industries for Emergency Management Specialists

Industry	NAICS	% of Industry	Employment	Projected Employment	% Change
Local government, excluding education and hospitals	939300	52.54%	6,161	6,921	12.34%
State government, excluding education and hospitals	929200	11.28%	1,323	1,298	-1.87%
General medical and surgical hospitals, public and private	622100	6.12%	718	795	10.71%
Community food and housing, and emergency and other relief services	624200	5.80%	681	788	15.80%
Electric power generation, transmission and distribution	221100	4.03%	473	435	-8.03%

Computer systems design and related services	541500	3.35%	393	530	35.02%
Management, scientific, and technical consulting services	541600	2.70%	316	564	78.52%
Colleges, universities, and professional schools, public and private	611300	1.58%	185	207	11.87%
Management of companies and enterprises	551100	1.01%	118	136	15.28%
Psychiatric and substance abuse hospitals, public and private	622200	0.80%	94	74	-21.36%
Other fabricated metal product manufacturing	332900	0.74%	87	77	-11.38%

Top Industries for Industrial Safety and Health Engineers

Industry	NAICS	% of Industry	Employment	Projected Employment	% Change
Nonresidential building construction	236200	8.08%	2,051	2,298	12.05%
State government, excluding education and hospitals	929200	5.23%	1,327	1,302	-1.87%
Management, scientific, and technical consulting services	541600	5.05%	1,282	2,289	78.52%
Local government, excluding education and hospitals	939300	4.60%	1,166	1,310	12.34%
Basic chemical manufacturing	325100	3.61%	916	772	-15.67%
Management of companies and enterprises	551100	3.22%	818	943	15.28%
Support activities for mining	213100	3.13%	793	746	-5.93%
Research and development in the physical, engineering, and life sciences	541710	2.83%	718	766	6.69%
Pharmaceutical and medicine manufacturing	325400	2.49%	632	796	26.03%
Highway, street, and bridge construction	237300	2.45%	623	670	7.66%
Resin, synthetic rubber, and artificial synthetic fibers and filaments manufacturing	325200	2.44%	620	498	-19.73%
Federal government, excluding postal service	919999	2.42%	613	580	-5.47%
Aerospace product and parts manufacturing	336400	2.37%	602	613	1.84%
Power and communication line and related structures construction	237130	1.79%	455	479	5.20%
General medical and surgical hospitals, public and private	622100	1.75%	443	491	10.71%

TORQ Analysis of Industrial Safety and Health Engineers to Fire-Prevention and Protection Engineers

ANALYSIS INPUT

Transfer	Title	O*NET	Filters		
From Title:	Industrial Safety and Health Engineers	17-2111.01	Abilities:	Importance LeveL: 50	Weight: 1
To Title:	Fire-Prevention and Protection Engineers	17-2111.02	Skills:	Importance LeveL: 69	Weight: 1
Labor Market Area:	Maine Statewide		Knowledge:	Importance Level: 69	Weight: 1

TORQ RESULTS

Grand TORQ: 90

Ability TORQ	Skills TORQ	Knowledge TORQ
Level 95	Level 92	Level 81

Gaps To Narrow if Possible

Ability	Level	Gap	Impt
Visualization	55	9	65
Speed of Closure	48	11	53
Flexibility of Closure	53	9	62
Deductive Reasoning	66	7	75
Speech Clarity	55	7	72
Far Vision	51	7	62
Information Ordering	59	6	68
Fluency of Ideas	57	6	56
Near Vision	55	5	65
Oral Expression	66	4	75
Originality	59	4	59
Selective Attention	46	4	56
Oral Comprehension	62	2	72
Written Expression	62	2	65
Category Flexibility	53	2	62
Perceptual Speed	46	2	56
Mathematical Reasoning	44	2	50
Written Comprehension	60	1	68

Upgrade These Skills

Skill	Level	Gap	Impt
Mathematics	78	15	79
Science	74	6	74
Operations Analysis	64	2	70

Knowledge to Add

Knowledge	Level	Gap	Impt
Design	84	30	82
Engineering and Technology	85	19	89
Building and Construction	72	13	76
Mathematics	73	8	77
Physics	64	4	69

LEVEL and IMPT (IMPORTANCE) refer to the Target Fire-Prevention and Protection Engineers. GAP refers to level difference between Industrial Safety and Health Engineers and Fire-Prevention and Protection Engineers.

ASK ANALYSIS

Ability Level Comparison - Abilities with importance scores over 50

Description	Industrial Safety and Health Engineers	Fire-Prevention and Protection Engineers	Importance
Oral Expression	62	66	75
Problem Sensitivity	62	62	75
Deductive Reasoning	59	66	75
Inductive Reasoning	60	60	75
Oral Comprehension	60	62	72
Speech Clarity	48	55	72
Written Comprehension	59	60	68
Information Ordering	53	59	68
Speech Recognition	53	51	68
Written Expression	60	62	65
Visualization	46	55	65
Near Vision	50	55	65
Category Flexibility	51	53	62
Flexibility of Closure	44	53	62
Far Vision	44	51	62
Originality	55	59	59
Fluency of Ideas	51	57	56
Perceptual Speed	44	46	56
Selective Attention	42	46	56
Speed of Closure	37	48	53
Mathematical Reasoning	42	44	50
Visual Color Discrimination	44	44	50

Skill Level Comparison - Abilities with importance scores over 69

Description	Industrial Safety and Health Engineers	Fire-Prevention and Protection Engineers	Importance
Mathematics	63	78	79
Science	68	74	74
Operations Analysis	62	64	70

Knowledge Level Comparison - Knowledge with importance scores over 69

Description	Industrial Safety and Health Engineers	Fire-Prevention and Protection Engineers	Importance
Engineering and Technology	66	85	89
Design	54	84	82
Mathematics	65	73	77
Building and Construction	59	72	76
Physics	60	64	69

Experience & Education Comparison

Related Work Experience Comparison

Description	Industrial Safety and Health Engineers	Fire-Prevention and Protection Engineers
10+ years	5%	0%
8-10 years	2%	0%
6-8 years	2%	7%
4-6 years	18%	25%
2-4 years	42%	28%
1-2 years	10%	10%
6-12 months	2%	3%
3-6 months	5%	0%
1-3 months	0%	0%
0-1 month	0%	0%
None	10%	25%

Required Education Level Comparison

Description	Industrial Safety and Health Engineers	Fire-Prevention and Protection Engineers
Doctoral	0%	0%
Professional Degree	2%	0%
Post-Masters Cert	0%	0%
Master's Degree	5%	3%
Post-Bachelor Cert	13%	0%
Bachelors	78%	96%
AA or Equiv	0%	0%
Some College	0%	0%
Post-Secondary Certificate	0%	0%
High Scool Diploma or GED	0%	0%
No HSD or GED	0%	0%

Industrial Safety and Health Engineers	Fire-Prevention and Protection Engineers
Most Common Educational/Training Requirement:	
Bachelor's degree	Bachelor's degree
Job Zone Comparison	
4 - Job Zone Four: Considerable Preparation Needed	4 - Job Zone Four: Considerable Preparation Needed
A minimum of two to four years of work-related skill, knowledge, or experience is needed for these occupations. For example, an accountant must complete four years of college and work for several years in accounting to be considered qualified.	A minimum of two to four years of work-related skill, knowledge, or experience is needed for these occupations. For example, an accountant must complete four years of college and work for several years in accounting to be considered qualified.
Most of these occupations require a four - year bachelor's degree, but some do not.	Most of these occupations require a four - year bachelor's degree, but some do not.
Employees in these occupations usually need several years of work-related experience, on-the-job training, and/or vocational training.	Employees in these occupations usually need several years of work-related experience, on-the-job training, and/or vocational training.

Tasks

Industrial Safety and Health Engineers

Core Tasks

Generalized Work Activities:

- Evaluating Information to Determine Compliance with Standards - Using relevant information and individual judgment to determine whether events or processes comply with laws, regulations, or standards.
- Getting Information - Observing, receiving, and otherwise obtaining information from all relevant sources.
- Making Decisions and Solving Problems - Analyzing information and evaluating results to choose the best solution and solve problems.
- Interacting With Computers - Using computers and computer systems (including hardware and software) to program, write software, set up functions, enter data, or

Fire-Prevention and Protection Engineers

Core Tasks

Generalized Work Activities:

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process information.

- Communicating with Persons Outside Organization - Communicating with people outside the organization, representing the organization to customers, the public, government, and other external sources. This information can be exchanged in person, in writing, or by telephone or e-mail.
- Communicating with Supervisors, Peers, or Subordinates - Providing information to supervisors, co-workers, and subordinates by telephone, in written form, e-mail, or in person.

Specific Tasks

Occupation Specific Tasks:

- Advise architects, builders, and other construction personnel on fire prevention equipment and techniques, and on fire code and standard interpretation and compliance.
- Attend workshops, seminars, or conferences to present or obtain information regarding fire prevention and protection.
- Conduct research on fire retardants and the fire safety of materials and devices.
- Consult with authorities to discuss safety regulations and to recommend changes as necessary.
- Design fire detection equipment, alarm systems, and fire extinguishing devices and systems.
- Determine causes of fires, and ways in which they could have been prevented.
- Develop plans for the prevention of destruction by fire, wind, and water.
- Develop training materials, and conduct training sessions on fire protection.
- Direct the purchase, modification, installation, maintenance, and operation of fire protection systems.
- Evaluate fire department performance and the laws and regulations affecting fire prevention or fire safety.
- Inspect buildings or building designs to determine fire protection system requirements and potential problems in areas such as water supplies, exit locations, and construction materials.
- Prepare and write reports detailing specific fire prevention and protection issues such as work performed and proposed review schedules.
- Study the relationships between ignition sources and materials to determine how fires start.

Detailed Tasks

Detailed Work Activities:

- adhere to safety procedures
- advise clients regarding engineering problems
- analyze effectiveness of safety systems or procedures

process information.

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- Study the relationships between ignition sources and materials to determine how fires start.

Detailed Tasks

Detailed Work Activities:

- adhere to safety procedures
- advise clients regarding engineering problems
- analyze effectiveness of safety systems or procedures

- analyze technical data, designs, or preliminary specifications
- communicate technical information
- conduct fire hazard inspections
- conduct training for personnel
- design electronic equipment
- determine fire causes
- direct and coordinate fire prevention and suppression activities
- evaluate engineering data
- evaluate governmental regulations or laws
- evaluate manufacturing or processing systems
- explain complex mathematical information
- follow safe waste disposal procedures
- inspect facilities or equipment for regulatory compliance
- make presentations
- perform safety inspections in industrial, manufacturing or repair setting
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- use government regulations
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- use intuitive judgment for engineering analyses
- use pollution control techniques
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- use technical information in manufacturing or industrial activities
- use technical regulations for engineering problems
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Technology - Examples

Analytical or scientific software

- Availability prediction modeling software
- Biomechanical imaging software
- Biomechanical injury risk analysis software
- Computational fluid dynamics CFD software

Technology - Examples

Administration software

- Network flow modeling software

Analytical or scientific software

- A Large Outdoor Fire plume Trajectory model Flat Terrain ALOFT-FT software
- Analysis of Smoke Control Systems ASCOS software

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- Root cause analysis software
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- Survey software
- Vibration analysis software
- Virtual interaction simulator software

Compliance software

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- Material safety data sheet MSDS software
- Safety integrity level SIL software
- Safety, health, and environmental management software

Computer aided design CAD software

- Computer aided design CAD software
- Electronic design automation EDA software
- Roof support design software

Computer based training software

- ANSYS software
- Atria smoke management engineering tools ASMET software
- Available Safe Egress Time ASET software
- Berkeley Algorithm for Breaking Window Glass in a Compartment Fire BREAK1 software
- Building Research Establishment BRE Jasmine
- CESARE Risk software
- Computational fluid dynamics CFD software
- Consolidated compartment fire model CCFM software
- Consolidated fire and smoke transport model CFAST
- Crows Dynamics Simulex
- Data acquisition software
- Detector Actuation Quasi Steady DETACT-QS
- Egress Allsafe
- Egress EVACS
- Egress EXITT
- Elevator evacuation ELVAC software
- Evacuation modeling software
- Finite element method FEM software
- Fire dynamics simulators
- Fire Protection Engineering Tools FPETool software
- Fire Response of Structures Thermal FIRES-T software
- Fire Simulation Technique FIRST software
- FIRECALC fire zone modeling software
- Fluent FloWizard
- Human modeling software
- Interconsult Brann G-JET
- JET
- Large eddy simulation LES software
- Link actuated vents LAVENT software
- Load-bearing analysis software

- Computer based training software
- Hazardous waste operations and emergency response standard HAZWOPER training software

Data base user interface and query software

- Anthropometric databases
- Incident tracking software
- Microsoft Access

Document management software

- Records management software

License management software

- Permit administration software

Map creation software

- Geological mapping software

Presentation software

- Microsoft PowerPoint

Spreadsheet software

- Microsoft Excel

Video creation and editing software

- Multimedia video analysis software

Word processing software

- Microsoft Word

Tools - Examples

- Accelerometers
- Noise monitoring equipment
- Microbial contaminant measurement devices
- Aerosol sampling devices
- High-flow air sampling pumps
- Velometers
- Heart rate monitors
- Desktop computers
- Digital video recorders
- Digital cameras
- Digital dynamometers
- Magnetic field meters
- Electromyograph processing systems
- Force gauges

- Mean time to failure MTTF software
- Simulation of fires in enclosures SOFIE software
- Zone modeling software

Computer aided design CAD software

- Computational Dynamics STAR-CD
- Computer aided design CAD software

Tools - Examples

- Sampling probes
- Cone calorimeters
- Desktop computers
- Digital cameras
- Oxygen meters
- Silica-carbide fiber sensors
- Flow tunnels
- Collection hoods
- Counter-flow slot burners CSB
- Heat sinks
- Flame spread testers
- Radiant heaters
- Helium-neon lasers
- Load cells
- Notebook computers
- Orifice-plate flowmeters
- Oxygen analyzers
- Photoelectric cells
- Silicon photodiodes
- Heat flux transducers
- Thermocouples
- Steiner tunnel furnaces
- Optical filters

- Sorbent tubes
- Heat stress monitors
- Light meters
- Notebook computers
- Volatile organic compound VOC measurement devices
- Portable oxygen consumption meters
- Personal digital assistants PDA
- Discriminative reaction time apparatus
- Potentiometers
- Force platforms
- Radio frequency signal analyzers
- Three-dimensional laser scanners
- Acoustic calibrators
- Respiratory flow rate meters
- Strain gauges
- Sorbent dosimeters
- Temperature probes
- Anthropometers
- Torsionmeters
- Vibration analysis devices

Labor Market Comparison

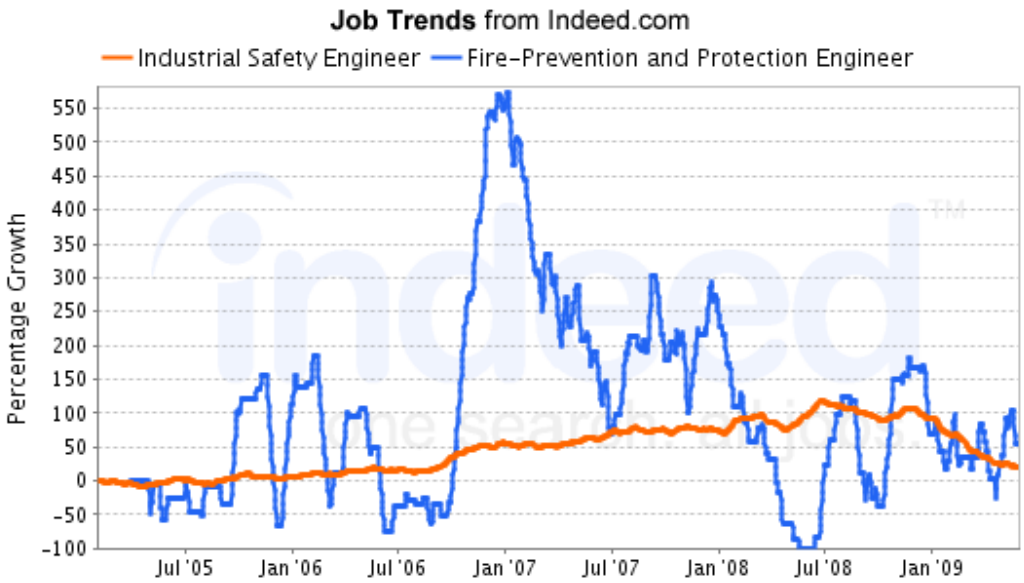
Maine Department of Labor.

Description	Industrial Safety and Health Engineers	Fire-Prevention and Protection Engineers	Difference
Median Wage	$ 49,940	$ 49,940	$ 0
10th Percentile Wage	$ 33,890	$ 33,890	$ 0
25th Percentile Wage	N/A	N/A	N/A
75th Percentile Wage	$ 61,800	$ 61,800	$ 0
90th Percentile Wage	$ 81,900	$ 81,900	$ 0
Mean Wage	$ 52,490	$ 52,490	$ 0
Total Employment - 2090	90	90	0
Employment Base - 2006	104	104	0
Projected Employment - 2099	107	107	0

Projected Job Growth - 2006-2099	2.9 %	2.9 %	0.0 %
Projected Annual Openings - 2006-2099	3	3	0
Special			
Special Occupations:			

National Job Posting Trends

Trend for Industrial Safety and Health Engineers and Fire-Prevention and Protection Engineers



Data from Indeed

Programs

Related Programs

Engineering, General

Engineering, General. A 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.

Institution	Address	City	URL
Bates College	2 Andrews Road, 2 Lane Hall	Lewiston	www.bates.edu/
Bates College	2 Andrews Road, 2 Lane Hall	Lewiston	www.bates.edu/

Environmental/Environmental Health Engineering

Environmental/Environmental Health Engineering. A 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.

No information on schools for the program

Occupational Safety and Health Tech./Technician

Occupational Safety and Health Technology/Technician. A program that prepares individuals to apply basic engineering principles and technical skills in support of engineers and other professionals engaged in maintaining job-related health and safety standards. Includes instruction in safety engineering principles, inspection and monitoring procedures, testing and sampling procedures, laboratory techniques, applications to specific work environments, and report preparation.

Institution	Address	City	URL
Central Maine Community College	1250 Turner St	Auburn	www.cmcc.edu
Central Maine Community College	1250 Turner St	Auburn	www.cmcc.edu

Taxation

Taxation. A program that prepares individuals to provide tax advice and management services to individuals and corporations. Includes instruction in tax law and regulations, tax record systems, individual and corporate income taxation, tax planning, partnerships and fiduciary relationships, estates and trusts, property depreciation, capital gains and losses, dispositions, transfers, liquidity, valuation, and applications to specific tax problems.

Institution	Address	City	URL
Thomas College	180 W River Rd	Waterville	www.thomas.edu

Maine Statewide Promotion Opportunities for Industrial Safety and Health Engineers

O*NET Code	Title	Grand TORQ	Job Zone	Employment	Median Wage	Difference	Growth	Annual Job Openings	Special
17-2111.01	Industrial Safety and Health Engineers	100	4	90	$49,940.00	$0.00	3%	3	
29-9011.00	Occupational Health and Safety Specialists	97	5	220	$62,720.00	$12,780.00	-2%	4	
17-2081.00	Environmental Engineers	92	5	390	$62,340.00	$12,400.00	10%	16	
17-2111.03	Product Safety Engineers	92	5	90	$49,940.00	$0.00	3%	3	
17-2111.02	Fire-Prevention and Protection Engineers	90	4	90	$49,940.00	$0.00	3%	3	
11-9033.00	Education Administrators, Postsecondary	89	5	600	$58,090.00	$8,150.00	7%	21	
11-9121.00	Natural Sciences Managers	89	5	180	$79,810.00	$29,870.00	8%	5	
11-9131.00	Postmasters and Mail Superintendents	88	3	420	$55,200.00	$5,260.00	-5%	10	
11-3041.00	Compensation and Benefits Managers	87	3	200	$68,560.00	$18,620.00	2%	5	
11-3051.00	Industrial Production Managers	87	4	690	$72,560.00	$22,620.00	-12%	24	
13-1081.00	Logisticians	87	4	190	$59,120.00	$9,180.00	4%	4	

41-1012.00	First-Line Supervisors/Managers of Non-Retail Sales Workers	87	4	930	$55,220.00	$5,280.00	-1%	19	
11-2031.00	Public Relations Managers	87	4	290	$71,020.00	$21,080.00	9%	10	
11-3042.00	Training and Development Managers	87	4	140	$66,670.00	$16,730.00	7%	4	
25-1193.00	Recreation and Fitness Studies Teachers, Postsecondary	87	5	60	$53,100.00	$3,160.00	8%	2	

Special Occupations:

Top Industries for Fire-Prevention and Protection Engineers

Industry	NAICS	% of Industry	Employment	Projected Employment	% Change
Nonresidential building construction	236200	8.08%	2,051	2,298	12.05%
State government, excluding education and hospitals	929200	5.23%	1,327	1,302	-1.87%
Management, scientific, and technical consulting services	541600	5.05%	1,282	2,289	78.52%
Local government, excluding education and hospitals	939300	4.60%	1,166	1,310	12.34%
Basic chemical manufacturing	325100	3.61%	916	772	-15.67%
Management of companies and enterprises	551100	3.22%	818	943	15.28%
Support activities for mining	213100	3.13%	793	746	-5.93%
Research and development in the physical, engineering, and life sciences	541710	2.83%	718	766	6.69%
Pharmaceutical and medicine manufacturing	325400	2.49%	632	796	26.03%
Highway, street, and bridge construction	237300	2.45%	623	670	7.66%
Resin, synthetic rubber, and artificial synthetic fibers and filaments manufacturing	325200	2.44%	620	498	-19.73%
Federal government, excluding postal service	919999	2.42%	613	580	-5.47%
Aerospace product and parts manufacturing	336400	2.37%	602	613	1.84%
Power and communication line and related structures construction	237130	1.79%	455	479	5.20%
General medical and surgical hospitals, public and private	622100	1.75%	443	491	10.71%

Top Industries for Industrial Safety and Health Engineers

Industry	NAICS	% of Industry	Employment	Projected Employment	% Change
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Industry & Occupational Data Sources

TORQ Results: The TORQ Scores is based upon an proprietary algorithm applied against Knowledge, Skills and Ability levels and importance derived from O*NET 12.

ASK Analysis, Experience & Education Levels and Tasks: O*Net 12

Labor Market Comparisons Occupational Projections data from Maine Department of Labor

National Posting Trends Indeed.com

Labor Pool & Promotions Opportunities: Occupational Projections data from Maine Department of Labor

Top Industries: Occupational Employment Statistics program (U.S. Bureau of Labor Statistics)

