



TORQ Analysis of Engineering Managers to Fire-Prevention and Protection Engineers

ANALYSIS INPUT					
Transfer	Title	O*NET	Filters		
From Title:	Engineering Managers	11-9041.00	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:					93
Ability TORQ		Skills TORQ		Knowledge TORQ	
Level		Level		Level	
	97		92		91

Gaps To Narrow if Possible				Upgrade These Skills				Knowledge to Add			
Ability	Level	Gap	Impt	Skill	Level	Gap	Impt	Knowledge	Level	Gap	Impt
Speech Clarity	55	4	72	Writing	72	6	82	Chemistry	59	30	69
Perceptual Speed	46	5	56	Reading Comprehension	79	5	87	Building and Construction	72	17	76
Visual Color Discrimination	44	5	50	Persuasion	56	4	74	Design	84	9	82
Selective Attention	46	4	56	Speaking	70	3	72	English Language	65	2	73
Flexibility of Closure	53	2	62	Critical Thinking	79	2	74				

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

ASK ANALYSIS			
Ability Level Comparison - Abilities with importance scores over 50			
Description	Engineering Managers	Fire-Prevention and Protection Engineers	Importance
Oral Expression	71 	66 	75 
Problem Sensitivity	66 	62 	75 
Deductive Reasoning	67 	66 	75 
Inductive Reasoning	62 	60 	75 
Oral Comprehension	76 	62 	72 



Speech Clarity	51	55	72
Written Comprehension	75	60	68
Information Ordering	62	59	68
Speech Recognition	53	51	68
Written Expression	64	62	65
Visualization	62	55	65
Near Vision	64	55	65
Category Flexibility	55	53	62
Flexibility of Closure	51	53	62
Far Vision	53	51	62
Originality	60	59	59
Fluency of Ideas	64	57	56
Perceptual Speed	41	46	56
Selective Attention	42	46	56
Speed of Closure	50	48	53
Mathematical Reasoning	60	44	50
Visual Color Discrimination	39	44	50

Skill Level Comparison - Abilities with importance scores over 69

Description	Engineering Managers	Fire-Prevention and Protection Engineers	Importance
Reading Comprehension	74	79	87
Writing	66	72	82
Critical Thinking	77	79	74
Persuasion	52	56	74
Speaking	67	70	72

Knowledge Level Comparison - Knowledge with importance scores over 69

Description	Engineering Managers	Fire-Prevention and Protection Engineers	Importance
Design	75	84	82
Building and Construction	55	72	76
English Language	63	65	73
Chemistry	29	59	69

Experience & Education Comparison

Related Work Experience Comparison			Required Education Level Comparison		
Description	Engineering Managers	Fire-Prevention and Protection Engineers	Description	Engineering Managers	Fire-Prevention and Protection Engineers



10+ years	28%	0%	Doctoral	0%	0%
8-10 years	15%	0%	Professional Degree	0%	0%
6-8 years	14%	7%	Post-Masters Cert	0%	0%
4-6 years	39%	25%	Master's Degree	11%	3%
2-4 years	0%	28%	Post-Bachelor Cert	16%	0%
1-2 years	1%	10%	Bachelors	54%	96%
6-12 months	0%	3%	AA or Equiv	1%	0%
3-6 months	0%	0%	Some College	1%	0%
1-3 months	0%	0%	Post-Secondary Certificate	13%	0%
0-1 month	0%	0%	High School Diploma or GED	0%	0%
None	0%	25%	No HSD or GED	0%	0%

Engineering Managers	Fire-Prevention and Protection Engineers
Most Common Educational/Training Requirement:	
Bachelor's or higher degree, plus work experience	Bachelor's degree
Job Zone Comparison	
5 - Job Zone Five: Extensive Preparation Needed	4 - Job Zone Four: Considerable Preparation Needed
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.	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 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).	Most of these occupations require a four - year bachelor's degree, but some do not.
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.	Employees in these occupations usually need several years of work-related experience, on-the-job training, and/or vocational training.

Tasks

Engineering Managers	Fire-Prevention and Protection Engineers
Core Tasks	Core Tasks
<p>Generalized Work Activities:</p> <ul style="list-style-type: none"> Communicating with Supervisors, Peers, or Subordinates - Providing information to supervisors, co-workers, and subordinates by telephone, in written form, e-mail, or in person. Making Decisions and Solving Problems - Analyzing information and evaluating results to choose the best solution and solve problems. Getting Information - Observing, receiving, and otherwise obtaining information from all relevant sources. 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. Updating and Using Relevant Knowledge - 	<p>Generalized Work Activities:</p> <ul style="list-style-type: none"> 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



Keeping up-to-date technically and applying new knowledge to your job.

Specific Tasks

Occupation Specific Tasks:

- Administer highway planning, construction, and maintenance.
- Analyze technology, resource needs, and market demand, to plan and assess the feasibility of projects.
- Confer with and report to officials and the public to provide information and solicit support for projects.
- Confer with management, production, and marketing staff to discuss project specifications and procedures.
- Consult or negotiate with clients to prepare project specifications.
- Coordinate and direct projects, making detailed plans to accomplish goals and directing the integration of technical activities.
- Develop and implement policies, standards and procedures for the engineering and technical work performed in the department, service, laboratory or firm.
- Direct the engineering of water control, treatment, and distribution projects.
- Direct, review, and approve product design and changes.
- Perform administrative functions such as reviewing and writing reports, approving expenditures, enforcing rules, and making decisions about the purchase of materials or services.
- Plan and direct the installation, testing, operation, maintenance, and repair of facilities and equipment.
- Plan, direct, and coordinate survey work with other staff activities, certifying survey work, and writing land legal descriptions.
- Prepare budgets, bids, and contracts, and direct the negotiation of research contracts.
- Present and explain proposals, reports, and findings to clients.
- Recruit employees, assign, direct, and evaluate their work, and oversee the development and maintenance of staff competence.
- Review and recommend or approve contracts and cost estimates.
- Set scientific and technical goals within broad outlines provided by top management.

Detailed Tasks

Detailed Work Activities:

- adhere to safety procedures
- advise clients or customers
- advise clients regarding engineering problems

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
- analyze technical data, designs, or



- analyze market conditions
- analyze operational or management reports or records
- analyze project proposal to determine feasibility, cost, or time
- approve product design or changes
- assign work to staff or employees
- bid engineering, construction or extraction projects
- communicate technical information
- conduct land surveys
- conduct or attend staff meetings
- conduct topographical surveys
- confer with customer representatives
- confer with engineering, technical or manufacturing personnel
- confer with management or users
- coordinate employee continuing education programs
- coordinate engineering project activities
- delegate authority for engineering activities
- determine project methods and procedures
- develop budgets
- develop management control systems
- develop policies, procedures, methods, or standards
- develop records management system
- develop safety regulations
- develop staffing plan
- direct and coordinate activities of workers or staff
- direct and coordinate civil engineering projects
- direct and coordinate construction of mine shafts or tunnels
- direct geological surveys
- direct personnel in support of engineering activities
- enforce laws, ordinances, or regulations
- establish employee performance standards
- estimate cost for engineering projects
- estimate time needed for project
- evaluate costs of engineering projects
- evaluate engineering data
- evaluate performance of employees or contract personnel
- explain rules, policies or regulations
- explore for oil or gas
- follow data security procedures
- identify training needs
- install water or sewer treatment plant equipment
- lead teams in engineering projects
- make decisions
- make presentations

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

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



- manage contracts
- monitor facilities or equipment
- monitor training costs
- orient new employees
- oversee execution of organizational or program policies
- perform statistical analysis in physical science or geological research
- plan testing of engineering methods
- prepare cost estimates
- prepare reports
- prepare reports for management
- prepare technical reports or related documentation
- provide customer service
- read blueprints
- read schematics
- read technical drawings
- recruit employees
- resolve engineering or science problems
- supervise engineering managers or staff
- supervise petroleum workers
- understand engineering data or reports
- understand technical operating, service or repair manuals
- use facility management techniques
- use intuitive judgment for engineering analyses
- use knowledge of water systems
- use long or short term production planning techniques
- use negotiation techniques
- use pollution control techniques
- use project management techniques
- use scientific research methodology
- use technical regulations for engineering problems
- write business project or bid proposals

Technology - Examples

Analytical or scientific software

- HEC RAS
- HEC-1
- Water surface pressure gradient WSPG software

Calendar and scheduling software

- Maintenance scheduling software
- Scheduling software

Computer aided design CAD software

- Autodesk AutoCAD software
- Computer aided design CAD 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



- Drawing and drafting software
- Hewlett-Packard HP SolidDesigner
- Pro-E CAD software
- SolidWorks CAD software

Data base user interface and query software

- Database software
- Structured query language SQL

Enterprise resource planning ERP software

- Made2Manage software

Industrial control software

- RTA Fleet Management

Internet browser software

- Web browser software

Inventory management software

- Inventory management software

Materials requirements planning logistics and supply chain software

- LSA Visual Easy Lean

Office suite software

- Microsoft Office

Project management software

- Microsoft Project
- Project management software
- Realization Project Flow
- The Gordian Group PROGEN Online

Spreadsheet software

- Microsoft Excel
- Spreadsheet software

Time accounting software

- Kronos Workforce Timekeeper

Word processing software

- Microsoft Word
- Word processing software

Tools - Examples

- Desktop computers
- Notebook computers
- Personal computers

- 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



- Personal digital assistants PDA
- Scanners
- Tablet computers

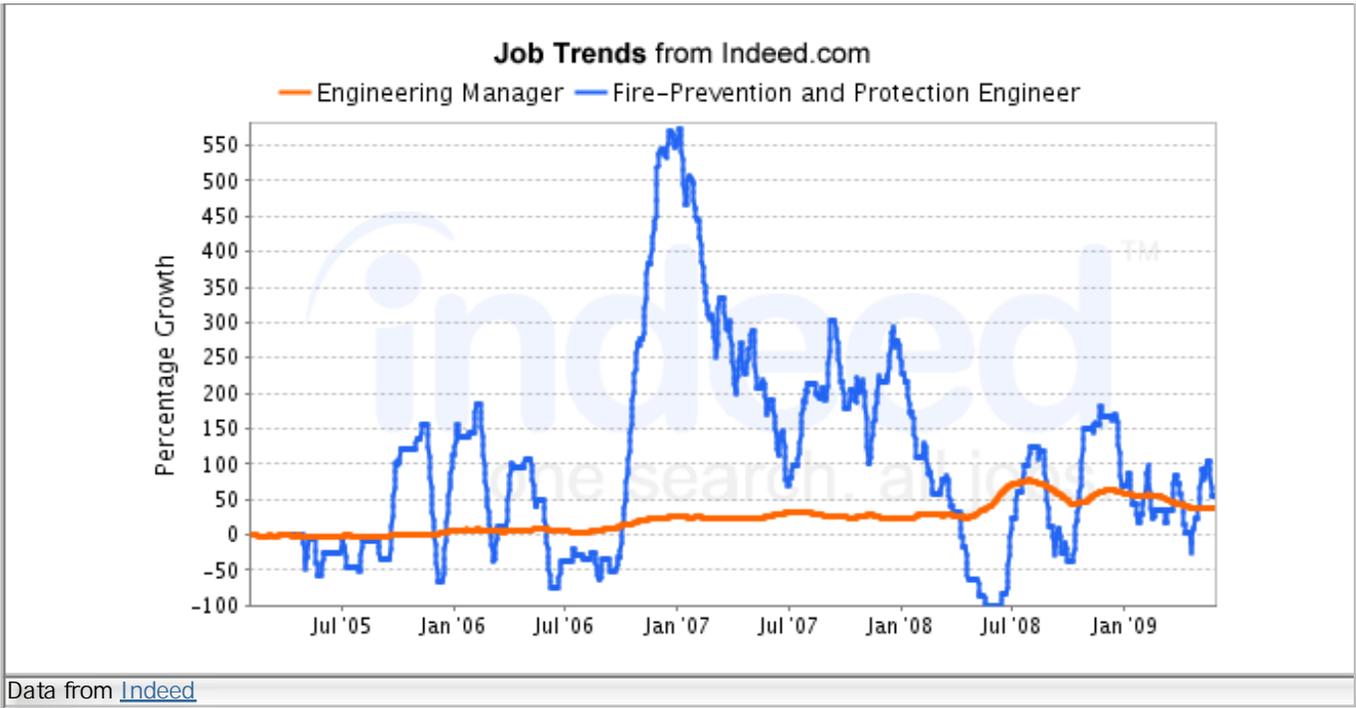
Labor Market Comparison

Maine Department of Labor.

Description	Engineering Managers	Fire-Prevention and Protection Engineers	Difference
Median Wage	\$ 91,030	\$ 49,940	\$(41,090)
10th Percentile Wage	\$ 60,520	\$ 33,890	\$(26,630)
25th Percentile Wage	N/A	N/A	N/A
75th Percentile Wage	\$115,430	\$ 61,800	\$(53,630)
90th Percentile Wage	\$145,420	\$ 81,900	\$(63,520)
Mean Wage	\$ 98,770	\$ 52,490	\$(46,280)
Total Employment - 2029	720	90	-630
Employment Base - 2006	705	104	-601
Projected Employment - 2038	691	107	-584
Projected Job Growth - 2006-2038	-2.0 %	2.9 %	4.9 %
Projected Annual Openings - 2006-2038	14	3	-11
Special			
Special Occupations:			

National Job Posting Trends

Trend for Engineering Managers and Fire-Prevention and Protection Engineers



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 Engineering Managers

O*NET Code	Title	Grand TORQ	Job Zone	Employment	Median Wage	Difference	Growth	Annual Job Openings	Special
11-9041.00	Engineering Managers	100	5	720	\$91,030.00	\$0.00	-2%	14	
19-2012.00	Physicists	84	5	50	\$93,210.00	\$2,180.00	-4%	1	
13-2052.00	Personal Financial Advisors	82	3	360	\$94,100.00	\$3,070.00	10%	13	
23-1023.00	Judges, Magistrate Judges, and Magistrates	75	5	80	\$115,160.00	\$24,130.00	1%	2	
29-1051.00	Pharmacists	75	5	1,190	\$112,550.00	\$21,520.00	22%	46	★
11-1011.00	Chief Executives	74	5	750	\$102,290.00	\$11,260.00	-6%	25	
29-1081.00	Podiatrists	72	5	40	\$101,210.00	\$10,180.00	5%	6	★
29-1041.00	Optometrists	69	5	90	\$107,740.00	\$16,710.00	19%	4	
29-1063.00	Internists, General	69	5	420	\$144,760.00	\$53,730.00	6%	12	★
29-1062.00	Family and General Practitioners	68	5	710	\$138,550.00	\$47,520.00	7%	20	★

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 Engineering Managers

Industry	NAICS	% of Industry	Employment	Projected Employment	% Change
Semiconductor and other electronic component manufacturing	334400	5.67%	10,607	10,198	-3.85%
Navigational, measuring, electromedical, and control instruments manufacturing	334500	5.64%	10,555	10,105	-4.26%
Aerospace product and parts manufacturing	336400	5.52%	10,328	11,571	12.03%
Federal government, excluding postal service	919999	4.46%	8,341	7,885	-5.47%
Research and development in the physical, engineering, and life sciences	541710	3.89%	7,272	7,759	6.69%
Management of companies and enterprises	551100	3.75%	7,022	8,095	15.28%
Computer systems design and related services	541500	3.29%	6,158	8,314	35.02%
Local government, excluding education and hospitals	939300	3.02%	5,648	6,345	12.34%
Computer and peripheral equipment manufacturing	334100	2.41%	4,504	2,948	-34.54%
Motor vehicle parts manufacturing	336300	2.12%	3,971	3,162	-20.39%
Electric power generation, transmission and distribution	221100	2.04%	3,823	3,516	-8.03%
Communications equipment manufacturing	334200	1.74%	3,259	3,285	0.79%
Management, scientific, and technical consulting services	541600	1.72%	3,219	5,747	78.52%

Nonresidential building construction	236200	1.54%	2,888	3,236	12.05%
State government, excluding education and hospitals	929200	1.33%	2,489	2,442	-1.87%



TORQ Analysis of Engineering Managers to Civil Engineers

ANALYSIS INPUT					
Transfer	Title	O*NET	Filters		
From Title:	Engineering Managers	11-9041.00	Abilities:	Importance Level: 50	Weight: 1
To Title:	Civil Engineers	17-2051.00	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				91	Level				90	Level					93
Gaps To Narrow if Possible				Upgrade These Skills				Knowledge to Add							
Ability	Level	Gap	Impt	Skill	Level	Gap	Impt	Knowledge	Level	Gap	Impt				
Deductive Reasoning	75	8	75	Science	86	23	84	Building and Construction	79	20	83				
Selective Attention	50	8	56	Social Perceptiveness	69	20	78	Design	92	15	89				
Information Ordering	67	5	68	Mathematics	95	14	77								
Visualization	67	5	68	Critical Thinking	86	9	72								
Category Flexibility	60	5	53	Writing	74	7	78								
Originality	64	4	65	Active Learning	79	7	74								
Inductive Reasoning	66	4	65	Complex Problem Solving	76	6	78								
Problem Sensitivity	67	1	75	Negotiation	69	6	75								
				Learning Strategies	62	5	77								
				Active Listening	81	4	82								
				Judgment and Decision Making	76	2	75								
LEVEL and IMPT (IMPORTANCE) refer to the Target Civil Engineers. GAP refers to level difference between Engineering Managers and Civil Engineers.															

ASK ANALYSIS			
Ability Level Comparison - Abilities with importance scores over 50			
Description	Engineering Managers	Civil Engineers	Importance
Oral Expression	71 	66 	75 
Problem Sensitivity	66 	67 	75 



Deductive Reasoning	67	75	75
Oral Comprehension	76	66	72
Written Comprehension	75	67	72
Near Vision	64	64	72
Information Ordering	62	67	68
Visualization	62	67	68
Speech Clarity	51	50	68
Originality	60	64	65
Inductive Reasoning	62	66	65
Written Expression	64	64	59
Fluency of Ideas	64	62	59
Speech Recognition	53	48	59
Mathematical Reasoning	60	60	56
Selective Attention	42	50	56
Category Flexibility	55	60	53
Flexibility of Closure	51	48	50
Far Vision	53	53	50

Skill Level Comparison - Abilities with importance scores over 69

Description	Engineering Managers	Civil Engineers	Importance
Science	63	86	84
Active Listening	77	81	82
Writing	67	74	78
Social Perceptiveness	49	69	78
Complex Problem Solving	70	76	78
Mathematics	81	95	77
Learning Strategies	57	62	77
Negotiation	63	69	75
Judgment and Decision Making	74	76	75
Active Learning	72	79	74
Critical Thinking	77	86	72

Knowledge Level Comparison - Knowledge with importance scores over 69

Description	Engineering Managers	Civil Engineers	Importance
Design	77	92	89



Building and Construction	59	79	83
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Experience & Education Comparison

Related Work Experience Comparison			Required Education Level Comparison		
Description	Engineering Managers	Civil Engineers	Description	Engineering Managers	Civil Engineers
10+ years	28%	7%	Doctoral	0%	0%
8-10 years	15%	6%	Professional Degree	0%	0%
6-8 years	14%	0%	Post-Masters Cert	0%	4%
4-6 years	39%	70%	Master's Degree	11%	0%
2-4 years	0%	8%	Post-Bachelor Cert	16%	0%
1-2 years	1%	6%	Bachelors	54%	89%
6-12 months	0%	0%	AA or Equiv	1%	6%
3-6 months	0%	0%	Some College	1%	0%
1-3 months	0%	0%	Post-Secondary Certificate	13%	0%
0-1 month	0%	0%	High School Diploma or GED	0%	0%
None	0%	0%	No HSD or GED	0%	0%

Engineering Managers Civil Engineers

Most Common Educational/Training Requirement:

Bachelor's or higher degree, plus work experience Bachelor's degree

Job Zone Comparison

<p>5 - Job Zone Five: Extensive Preparation Needed</p> <p>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.</p> <p>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).</p> <p>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.</p>	<p>4 - Job Zone Four: Considerable Preparation Needed</p> <p>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.</p> <p>Most of these occupations require a four - year bachelor's degree, but some do not.</p> <p>Employees in these occupations usually need several years of work-related experience, on-the-job training, and/or vocational training.</p>
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Tasks

Engineering Managers	Civil Engineers
Core Tasks	Core Tasks
<p>Generalized Work Activities:</p> <ul style="list-style-type: none"> • Communicating with Supervisors, Peers, or Subordinates - Providing information to supervisors, co-workers, and subordinates by telephone, in written form, e-mail, or in person. • Making Decisions and Solving Problems - Analyzing information and evaluating results to choose the best solution and solve problems. 	<p>Generalized Work Activities:</p> <ul style="list-style-type: none"> • Drafting, Laying Out, and Specifying Technical Devices, Parts, and Equipment - Providing documentation, detailed instructions, drawings, or specifications to tell others about how devices, parts, equipment, or structures are to be fabricated, constructed, assembled, modified, maintained, or used. • Making Decisions and Solving Problems -



- Getting Information - Observing, receiving, and otherwise obtaining information from all relevant sources.
- 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.
- Updating and Using Relevant Knowledge - Keeping up-to-date technically and applying new knowledge to your job.

Specific Tasks

Occupation Specific Tasks:

- Administer highway planning, construction, and maintenance.
- Analyze technology, resource needs, and market demand, to plan and assess the feasibility of projects.
- Confer with and report to officials and the public to provide information and solicit support for projects.
- Confer with management, production, and marketing staff to discuss project specifications and procedures.
- Consult or negotiate with clients to prepare project specifications.
- Coordinate and direct projects, making detailed plans to accomplish goals and directing the integration of technical activities.
- Develop and implement policies, standards and procedures for the engineering and technical work performed in the department, service, laboratory or firm.
- Direct the engineering of water control, treatment, and distribution projects.
- Direct, review, and approve product design and changes.
- Perform administrative functions such as reviewing and writing reports, approving expenditures, enforcing rules, and making decisions about the purchase of materials or services.
- Plan and direct the installation, testing, operation, maintenance, and repair of facilities and equipment.
- Plan, direct, and coordinate survey work with other staff activities, certifying survey work, and writing land legal descriptions.
- Prepare budgets, bids, and contracts, and direct the negotiation of research contracts.
- Present and explain proposals, reports, and findings to clients.
- Recruit employees, assign, direct, and

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 Supervisors, Peers, or Subordinates - Providing information to supervisors, co-workers, and subordinates by telephone, in written form, e-mail, or in person.
- Documenting/Recording Information - Entering, transcribing, recording, storing, or maintaining information in written or electronic/magnetic form.

Specific Tasks

Occupation Specific Tasks:

- Analyze survey reports, maps, drawings, blueprints, aerial photography, and other topographical or geologic data to plan projects.
- Compute load and grade requirements, water flow rates, and material stress factors to determine design specifications.
- Conduct studies of traffic patterns or environmental conditions to identify engineering problems and assess the potential impact of projects.
- Direct construction, operations, and maintenance activities at project site.
- Direct or participate in surveying to lay out installations and establish reference points, grades, and elevations to guide construction.
- Estimate quantities and cost of materials, equipment, or labor to determine project feasibility.
- Inspect project sites to monitor progress and ensure conformance to design specifications and safety or sanitation standards.
- Plan and design transportation or hydraulic systems and structures, following construction and government standards, using design software and drawing tools.
- Prepare or present public reports on topics such as bid proposals, deeds, environmental impact statements, or property and right-of-way descriptions.
- Provide technical advice regarding design, construction, or program modifications and structural repairs to industrial and managerial personnel.
- Test soils and materials to determine the adequacy and strength of foundations, concrete, asphalt, or steel.



evaluate their work, and oversee the development and maintenance of staff competence.

- Review and recommend or approve contracts and cost estimates.
- Set scientific and technical goals within broad outlines provided by top management.

Detailed Tasks

Detailed Work Activities:

- adhere to safety procedures
- advise clients or customers
- advise clients regarding engineering problems
- analyze market conditions
- analyze operational or management reports or records
- analyze project proposal to determine feasibility, cost, or time
- approve product design or changes
- assign work to staff or employees
- bid engineering, construction or extraction projects
- communicate technical information
- conduct land surveys
- conduct or attend staff meetings
- conduct topographical surveys
- confer with customer representatives
- confer with engineering, technical or manufacturing personnel
- confer with management or users
- coordinate employee continuing education programs
- coordinate engineering project activities
- delegate authority for engineering activities
- determine project methods and procedures
- develop budgets
- develop management control systems
- develop policies, procedures, methods, or standards
- develop records management system
- develop safety regulations
- develop staffing plan
- direct and coordinate activities of workers or staff
- direct and coordinate civil engineering projects
- direct and coordinate construction of mine shafts or tunnels
- direct geological surveys
- direct personnel in support of engineering activities
- enforce laws, ordinances, or regulations
- establish employee performance standards
- estimate cost for engineering projects

Detailed Tasks

Detailed Work Activities:

- adhere to safety procedures
- advise clients or customers
- advise clients regarding engineering problems
- 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
- assign work to staff or employees
- bid engineering, construction or extraction projects
- calculate engineering specifications
- collect scientific or technical data
- communicate technical information
- compile numerical or statistical data
- compute production, construction, or installation specifications
- conduct land surveys
- conduct plant location surveys
- conduct topographical surveys
- confer with engineering, technical or manufacturing personnel
- convert design specifications to cost estimates
- coordinate engineering project activities
- create mathematical or statistical diagrams or charts
- delegate authority for engineering activities
- design construction projects
- determine specifications
- 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 civil engineering projects
- direct and coordinate construction of mine shafts or tunnels
- direct personnel in support of engineering activities
- draw maps or charts
- 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
- evaluate performance of employees or contract personnel
- explain rules, policies or regulations
- explore for oil or gas
- follow data security procedures
- identify training needs
- install water or sewer treatment plant equipment
- lead teams in engineering projects
- make decisions
- make presentations
- manage contracts
- monitor facilities or equipment
- monitor training costs
- orient new employees
- oversee execution of organizational or program policies
- perform statistical analysis in physical science or geological research
- plan testing of engineering methods
- prepare cost estimates
- prepare reports
- prepare reports for management
- prepare technical reports or related documentation
- provide customer service
- read blueprints
- read schematics
- read technical drawings
- recruit employees
- resolve engineering or science problems
- supervise engineering managers or staff
- supervise petroleum workers
- understand engineering data or reports
- understand technical operating, service or repair manuals
- use facility management techniques
- use intuitive judgment for engineering analyses
- use knowledge of water systems
- use long or short term production planning techniques
- use negotiation techniques
- use pollution control techniques
- use project management techniques
- use scientific research methodology
- use technical regulations for engineering problems
- write business project or bid proposals

Technology - Examples

- estimate materials or labor requirements
- estimate time needed for project
- evaluate costs of engineering projects
- evaluate engineering data
- evaluate material specifications
- examine engineering documents for completeness or accuracy
- explain complex mathematical information
- follow confidentiality procedures
- inspect facilities or equipment for regulatory compliance
- inspect project operations, or site to determine specification compliance
- interpret aerial photographs
- interpret maps for architecture, construction, or engineering project
- judge distances
- judge soil conditions
- lead teams in engineering projects
- operate land or site surveying instruments
- perform safety inspections in construction or resource extraction setting
- plan construction of structures or facilities
- plan testing of engineering methods
- prepare reports
- prepare technical reports or related documentation
- provide analytical assessment of engineering data
- read blueprints
- read maps
- read technical drawings
- recognize construction industry codes or symbols on blueprints
- resolve engineering or science problems
- test equipment as part of engineering projects or processes
- test materials or solutions
- understand construction specifications
- understand engineering data or reports
- understand government construction contracting regulations
- understand property documents
- 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 intuitive judgment for engineering analyses



Analytical or scientific software

- HEC RAS
- HEC-1
- Water surface pressure gradient WSPG software

Calendar and scheduling software

- Maintenance scheduling software
- Scheduling software

Computer aided design CAD software

- Autodesk AutoCAD software
- Computer aided design CAD software
- Drawing and drafting software
- Hewlett-Packard HP SolidDesigner
- Pro-E CAD software
- SolidWorks CAD software

Data base user interface and query software

- Database software
- Structured query language SQL

Enterprise resource planning ERP software

- Made2Manage software

Industrial control software

- RTA Fleet Management

Internet browser software

- Web browser software

Inventory management software

- Inventory management software

Materials requirements planning logistics and supply chain software

- LSA Visual Easy Lean

Office suite software

- Microsoft Office

Project management software

- Microsoft Project
- Project management software
- Realization Project Flow
- The Gordian Group PROGEN Online

Spreadsheet software

- Microsoft Excel

- use knowledge or investigation techniques
- use knowledge of materials testing procedures
- use knowledge of regulations in surveying or construction activities
- use land surveying 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 scientific research methodology
- use spreadsheet software
- use technical regulations for engineering 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

- HEC-1
- HEC-HMS
- Hydraulic analysis software
- Hydraulic modeling software
- Trimble Geomatics Office
- WinTR-55

Calendar and scheduling software

- Scheduling software

Computer aided design CAD software

- Autodesk AutoCAD Civil 3D
- Autodesk AutoCAD software
- Autodesk Land Desktop
- Bentley Haestad Methods CivilStorm
- Bentley InRoads Site
- Bentley MicroStation
- Bridge design software
- Eagle Point Site Design
- GT STRUDL
- HydroCAD Software Solutions HydroCAD Stormwater Modeling System



- Spreadsheet software

Time accounting software

- Kronos Workforce Timekeeper

Word processing software

- Microsoft Word

- Word processing software

Tools - Examples

- Desktop computers

- Notebook computers

- Personal computers

- Personal digital assistants PDA

- Scanners

- Tablet computers

- Mathsoft Mathcad

- Research Engineers International STAAD.Pro

- Road design software

- Stormwater hydrology software

- Trimble Terramodel

Data base user interface and query software

- Data entry software

- Microsoft Access

Development environment software

- Formula translation/translator FORTRAN

Electronic mail software

- Email software

- Microsoft Outlook

Graphics or photo imaging software

- Graphics software

Internet browser software

- Microsoft Internet Explorer

- Web browser software

Map creation software

- Cartography software

- ESRI ArcInfo

- ESRI ArcView

- Geographic information system GIS software

- Intergraph MGE

Office suite software

- Microsoft Office

Presentation software

- Microsoft PowerPoint

Project management software

- Cost estimating software

- Microsoft Project

- The Gordian Group PROGEN Online

Spreadsheet software

- Microsoft Excel

- Spreadsheet software

Word processing software



- Corel WordPerfect software

- Microsoft Word

Tools - Examples

- Anemometers

- Compasses

- Desktop computers

- Digital cameras

- Electronic distance measuring devices

- Traffic counters

- Global positioning system GPS devices

- Transits

- Laser levels

- Planimeters

- Surveying rods

- Surveying wheels

- Microfilm readers

- Blueprint copiers

- Protractors

- Drafting scales

- Radar guns

- Steel rules

- Measuring tapes

- Theodolites

- Thickness gauges

- Drafting triangles

- Two way radios

Labor Market Comparison

Maine Department of Labor.

Description	Engineering Managers	Civil Engineers	Difference
Median Wage	\$ 91,030	\$ 60,480	\$(30,550)
10th Percentile Wage	\$ 60,520	\$ 42,800	\$(17,720)
25th Percentile Wage	N/A	N/A	N/A



75th Percentile Wage	\$115,430	\$ 73,660	\$(41,770)
90th Percentile Wage	\$145,420	\$ 91,080	\$(54,340)
Mean Wage	\$ 98,770	\$ 63,110	\$(35,660)
Total Employment - 2029	720	750	30
Employment Base - 2006	705	792	87
Projected Employment - 2038	691	841	150
Projected Job Growth - 2006-2038	-2.0 %	6.2 %	8.2 %
Projected Annual Openings - 2006-2038	14	26	12
Special			

Special Occupations:

National Job Posting Trends

Trend for Engineering Managers and Civil Engineers



Data from [Indeed](http://Indeed.com)

Programs

Related Programs

Civil Engineering, General

Civil Engineering, General. A program that generally prepares individuals to apply mathematical and scientific principles to the design, development and operational evaluation of structural, load-bearing, material moving, transportation, water resource, and material control systems; and environmental safety measures.

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



University of Maine		Orono	www.umaine.edu/
University of Maine		Orono	www.umaine.edu/
Civil Engineering, Other			
Civil Engineering, Other. Any instructional program in civil engineering not listed above.			
No information on schools for the program			
Geotechnical Engineering			
Geotechnical Engineering. A program that prepares individuals to apply mathematical and scientific principles to the design, development and operational evaluation of systems for manipulating and controlling surface and subsurface features at or incorporated into structural sites, including earth and rock moving and stabilization, land fills, structural use and environmental stabilization of wastes and by-products, underground construction, and groundwater and hazardous material containment.			
No information on schools for the program			
Structural Engineering			
Structural Engineering. A program that prepares individuals to apply mathematical and scientific principles to the design, development and operational evaluation of materials and systems used in building load-bearing structures for various purposes and in different environments, including buildings, roads, rail lines, bridges, dams, conduits, offshore platforms and work stations, and other structural shells; and the analysis of structural problems such as, failure, fabrication, safety, and natural hazards.			
No information on schools for the program			
Transportation and Highway Engineering			
Transportation and Highway Engineering. A program that prepares individuals to apply mathematical and scientific principles to the design, development and operational evaluation of total systems for the physical movement of people, materials and information, including general network design and planning, facilities planning, site evaluation, transportation management systems, needs projections and analysis, and analysis of costs.			
No information on schools for the program			
Water Resources Engineering			
Water Resources Engineering. A program that prepares individuals to apply mathematical and scientific principles to the design, development and operational evaluation of systems for collecting, storing, moving, conserving and controlling surface- and groundwater, including water quality control, water cycle management, management of human and industrial water requirements, water delivery, and flood control.			
No information on schools for the program			

Maine Statewide Promotion Opportunities for Engineering Managers

O*NET Code	Title	Grand TORQ	Job Zone	Employment	Median Wage	Difference	Growth	Annual Job Openings	Special
11-9041.00	Engineering Managers	100	5	720	\$91,030.00	\$0.00	-2%	14	
19-2012.00	Physicists	84	5	50	\$93,210.00	\$2,180.00	-4%	1	
13-2052.00	Personal Financial Advisors	82	3	360	\$94,100.00	\$3,070.00	10%	13	



23-1023.00	Judges, Magistrate Judges, and Magistrates	75	5	80	\$115,160.00	\$24,130.00	1%	2	
29-1051.00	Pharmacists	75	5	1,190	\$112,550.00	\$21,520.00	22%	46	★
11-1011.00	Chief Executives	74	5	750	\$102,290.00	\$11,260.00	-6%	25	
29-1081.00	Podiatrists	72	5	40	\$101,210.00	\$10,180.00	5%	6	★
29-1041.00	Optometrists	69	5	90	\$107,740.00	\$16,710.00	19%	4	
29-1063.00	Internists, General	69	5	420	\$144,760.00	\$53,730.00	6%	12	★
29-1062.00	Family and General Practitioners	68	5	710	\$138,550.00	\$47,520.00	7%	20	★

Special Occupations:

Top Industries for Civil Engineers

Industry	NAICS	% of Industry	Employment	Projected Employment	% Change
State government, excluding education and hospitals	929200	11.57%	29,669	29,114	-1.87%
Local government, excluding education and hospitals	939300	11.55%	29,599	33,251	12.34%
Nonresidential building construction	236200	5.47%	14,029	15,719	12.05%
Self-employed workers, primary job	000601	4.41%	11,307	12,046	6.54%
Federal government, excluding postal service	919999	3.84%	9,832	9,295	-5.47%
Management, scientific, and technical consulting services	541600	1.74%	4,473	7,985	78.52%
Colleges, universities, and professional schools, public and private	611300	1.19%	3,053	3,415	11.87%
Employment services	561300	1.10%	2,817	3,566	26.56%
Highway, street, and bridge construction	237300	1.06%	2,724	2,933	7.66%
Management of companies and enterprises	551100	0.99%	2,530	2,916	15.28%
Residential building construction	236100	0.84%	2,153	2,424	12.61%
Testing laboratories	541380	0.57%	1,455	1,792	23.12%
Electric power generation, transmission and distribution	221100	0.55%	1,404	1,291	-8.03%
Other heavy and civil engineering construction	237900	0.49%	1,267	1,361	7.41%
Self-employed workers, secondary job	000602	0.47%	1,196	1,191	-0.45%

Top Industries for Engineering Managers



Industry	NAICS	% of Industry	Employment	Projected Employment	% Change
Semiconductor and other electronic component manufacturing	334400	5.67%	10,607	10,198	-3.85%
Navigational, measuring, electromedical, and control instruments manufacturing	334500	5.64%	10,555	10,105	-4.26%
Aerospace product and parts manufacturing	336400	5.52%	10,328	11,571	12.03%
Federal government, excluding postal service	919999	4.46%	8,341	7,885	-5.47%
Research and development in the physical, engineering, and life sciences	541710	3.89%	7,272	7,759	6.69%
Management of companies and enterprises	551100	3.75%	7,022	8,095	15.28%
Computer systems design and related services	541500	3.29%	6,158	8,314	35.02%
Local government, excluding education and hospitals	939300	3.02%	5,648	6,345	12.34%
Computer and peripheral equipment manufacturing	334100	2.41%	4,504	2,948	-34.54%
Motor vehicle parts manufacturing	336300	2.12%	3,971	3,162	-20.39%
Electric power generation, transmission and distribution	221100	2.04%	3,823	3,516	-8.03%
Communications equipment manufacturing	334200	1.74%	3,259	3,285	0.79%
Management, scientific, and technical consulting services	541600	1.72%	3,219	5,747	78.52%
Nonresidential building construction	236200	1.54%	2,888	3,236	12.05%
State government, excluding education and hospitals	929200	1.33%	2,489	2,442	-1.87%



TORQ Analysis of Engineering Managers to Civil Engineering Technicians

ANALYSIS INPUT					
Transfer	Title	O* NET	Filters		
From Title:	Engineering Managers	11-9041.00	Abilities:	Importance Level: 50	Weight: 1
To Title:	Civil Engineering Technicians	17-3022.00	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			94	Level			91	Level			92
Gaps To Narrow if Possible				Upgrade These Skills				Knowledge to Add			
Ability	Level	Gap	Impt	Skill	Level	Gap	Impt	Knowledge	Level	Gap	Impt
Number Facility	59	8	65	Instructing	57	7	69	No Knowledge Upgrades Required!			
Near Vision	67	3	75								
Selective Attention	46	4	56								
Deductive Reasoning	69	2	78								
Finger Dexterity	35	3	50								
Information Ordering	64	2	72								
Mathematical Reasoning	62	2	72								
Visualization	64	2	72								
Written Expression	66	2	68								
Category Flexibility	57	2	62								
LEVEL and IMPT (IMPORTANCE) refer to the Target Civil Engineering Technicians. GAP refers to level difference between Engineering Managers and Civil Engineering Technicians.											

ASK ANALYSIS			
Ability Level Comparison - Abilities with importance scores over 50			
Description	Engineering Managers	Civil Engineering Technicians	Importance
Written Comprehension	75	69	81



Deductive Reasoning	67	69	78
Oral Comprehension	76	71	75
Inductive Reasoning	62	59	75
Near Vision	64	67	75
Problem Sensitivity	66	55	72
Information Ordering	62	64	72
Mathematical Reasoning	60	62	72
Visualization	62	64	72
Oral Expression	71	66	68
Written Expression	64	66	68
Originality	60	53	68
Number Facility	51	59	65
Far Vision	53	53	65
Fluency of Ideas	64	53	62
Category Flexibility	55	57	62
Flexibility of Closure	51	50	62
Speech Recognition	53	53	62
Speech Clarity	51	46	62
Selective Attention	42	46	56
Perceptual Speed	41	39	50
Finger Dexterity	32	35	50

Skill Level Comparison - Abilities with importance scores over 69

Description	Engineering Managers	Civil Engineering Technicians	Importance
Instructing	50	57	69

Knowledge Level Comparison - Knowledge with importance scores over 69

Experience & Education Comparison					
Related Work Experience Comparison			Required Education Level Comparison		
Description	Engineering Managers	Civil Engineering Technicians	Description	Engineering Managers	Civil Engineering Technicians
10+ years	28%	0%	Doctoral	0%	0%
8-10 years	15%	0%	Professional Degree	0%	0%
6-8 years	14%	1%	Post-Masters Cert	0%	0%
4-6 years	39%	39%	Master's Degree	11%	0%
2-4 years	0%	2%	Post-Bachelor Cert	16%	0%
1-2 years	1%	15%	Bachelors	54%	18%
6-12 months	0%	3%	AA or Equiv	1%	17%
3-6 months	0%	0%	Some College	1%	4%
			Post-Secondary		



1-3 months	0%	6%	Certificate	13%	25%
0-1 month	0%	0%	High School Diploma or GED	0%	26%
None	0%	25%	No HSD or GED	0%	6%

Engineering Managers	Civil Engineering Technicians
Most Common Educational/Training Requirement:	
Bachelor's or higher degree, plus work experience	Associate degree
Job Zone Comparison	
5 - Job Zone Five: Extensive Preparation Needed	3 - Job Zone Three: Medium Preparation Needed
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.	Previous work-related skill, knowledge, or experience is required for these occupations. For example, an electrician must have completed three or four years of apprenticeship or several years of vocational training, and often must have passed a licensing exam, in order to perform the job.
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).	Most occupations in this zone require training in vocational schools, related on-the-job experience, or an associate's degree. Some may require a bachelor's degree.
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.	Employees in these occupations usually need one or two years of training involving both on-the-job experience and informal training with experienced workers.

Tasks

Engineering Managers	Civil Engineering Technicians
Core Tasks	Core Tasks
<p>Generalized Work Activities:</p> <ul style="list-style-type: none"> • Communicating with Supervisors, Peers, or Subordinates - Providing information to supervisors, co-workers, and subordinates by telephone, in written form, e-mail, or in person. • Making Decisions and Solving Problems - Analyzing information and evaluating results to choose the best solution and solve problems. • Getting Information - Observing, receiving, and otherwise obtaining information from all relevant sources. • 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. • Updating and Using Relevant Knowledge - Keeping up-to-date technically and applying new knowledge to your job. 	<p>Generalized Work Activities:</p> <ul style="list-style-type: none"> • Getting Information - Observing, receiving, and otherwise obtaining information from all relevant sources. • Interacting With Computers - Using computers and computer systems (including hardware and software) to program, write software, set up functions, enter data, or process information. • Processing Information - Compiling, coding, categorizing, calculating, tabulating, auditing, or verifying information or data. • Analyzing Data or Information - Identifying the underlying principles, reasons, or facts of information by breaking down information or data into separate parts. • Updating and Using Relevant Knowledge - Keeping up-to-date technically and applying new knowledge to your job.
Specific Tasks	Specific Tasks
<p>Occupation Specific Tasks:</p> <ul style="list-style-type: none"> • Administer highway planning, construction, and maintenance. • Analyze technology, resource needs, and market demand, to plan and assess the feasibility of projects. 	<p>Occupation Specific Tasks:</p> <ul style="list-style-type: none"> • Analyze proposed site factors and design maps, graphs, tracings, and diagrams to illustrate findings. • Calculate dimensions, square footage, profile and component specifications, and material quantities using calculator or computer. • Conduct materials test and analysis using tools and equipment and applying



- Confer with and report to officials and the public to provide information and solicit support for projects.
- Confer with management, production, and marketing staff to discuss project specifications and procedures.
- Consult or negotiate with clients to prepare project specifications.
- Coordinate and direct projects, making detailed plans to accomplish goals and directing the integration of technical activities.
- Develop and implement policies, standards and procedures for the engineering and technical work performed in the department, service, laboratory or firm.
- Direct the engineering of water control, treatment, and distribution projects.
- Direct, review, and approve product design and changes.
- Perform administrative functions such as reviewing and writing reports, approving expenditures, enforcing rules, and making decisions about the purchase of materials or services.
- Plan and direct the installation, testing, operation, maintenance, and repair of facilities and equipment.
- Plan, direct, and coordinate survey work with other staff activities, certifying survey work, and writing land legal descriptions.
- Prepare budgets, bids, and contracts, and direct the negotiation of research contracts.
- Present and explain proposals, reports, and findings to clients.
- Recruit employees, assign, direct, and evaluate their work, and oversee the development and maintenance of staff competence.
- Review and recommend or approve contracts and cost estimates.
- Set scientific and technical goals within broad outlines provided by top management.

Detailed Tasks

Detailed Work Activities:

- adhere to safety procedures
- advise clients or customers
- advise clients regarding engineering problems
- analyze market conditions
- analyze operational or management reports or records
- analyze project proposal to determine feasibility, cost, or time
- approve product design or changes
- assign work to staff or employees
- bid engineering, construction or extraction projects
- communicate technical information

engineering knowledge.

- Confer with supervisor to determine project details such as plan preparation, acceptance testing, and evaluation of field conditions.
- Develop plans and estimate costs for installation of systems, utilization of facilities, or construction of structures.
- Draft detailed dimensional drawings and design layouts for projects and to ensure conformance to specifications.
- Evaluate facility to determine suitability for occupancy and square footage availability.
- Inspect project site and evaluate contractor work to detect design malfunctions and ensure conformance to design specifications and applicable codes.
- Plan and conduct field surveys to locate new sites and analyze details of project sites.
- Prepare reports and document project activities and data.
- Read and review project blueprints and structural specifications to determine dimensions of structure or system and material requirements.
- Report maintenance problems occurring at project site to supervisor and negotiate changes to resolve system conflicts.
- Respond to public suggestions and complaints.

Detailed Tasks

Detailed Work Activities:

- analyze engineering design problems
- analyze scientific research data or investigative findings
- analyze technical data, designs, or preliminary specifications
- calculate engineering specifications
- communicate technical information
- conduct land surveys
- conduct plant location surveys
- confer with engineering, technical or manufacturing personnel
- determine material or tool requirements
- develop plans for programs or projects
- draw maps or charts
- 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
- evaluate product design
- examine engineering documents for completeness or accuracy
- explain complex mathematical information
- inspect facilities or equipment for regulatory compliance
- inspect project operations, or site to



- conduct land surveys
- conduct or attend staff meetings
- conduct topographical surveys
- confer with customer representatives
- confer with engineering, technical or manufacturing personnel
- confer with management or users
- coordinate employee continuing education programs
- coordinate engineering project activities
- delegate authority for engineering activities
- determine project methods and procedures
- develop budgets
- develop management control systems
- develop policies, procedures, methods, or standards
- develop records management system
- develop safety regulations
- develop staffing plan
- direct and coordinate activities of workers or staff
- direct and coordinate civil engineering projects
- direct and coordinate construction of mine shafts or tunnels
- direct geological surveys
- direct personnel in support of engineering activities
- enforce laws, ordinances, or regulations
- establish employee performance standards
- estimate cost for engineering projects
- estimate time needed for project
- evaluate costs of engineering projects
- evaluate engineering data
- evaluate performance of employees or contract personnel
- explain rules, policies or regulations
- explore for oil or gas
- follow data security procedures
- identify training needs
- install water or sewer treatment plant equipment
- lead teams in engineering projects
- make decisions
- make presentations
- manage contracts
- monitor facilities or equipment
- monitor training costs
- orient new employees
- oversee execution of organizational or program policies
- perform statistical analysis in physical science or geological research
- plan testing of engineering methods

- determine specification compliance
- interpret aerial photographs
- interpret maps for architecture, construction, or engineering project
- judge distances
- judge soil conditions
- operate land or site surveying instruments
- operate precision test equipment
- perform safety inspections in industrial, manufacturing or repair setting
- prepare safety reports
- prepare technical reports or related documentation
- read blueprints
- read maps
- read technical drawings
- recognize construction industry codes or symbols on blueprints
- resolve customer or public complaints
- resolve engineering or science problems
- understand construction specifications
- understand engineering data or reports
- understand property documents
- understand technical operating, service or repair manuals
- use building or land use regulations
- use chemical testing or analysis procedures
- use computer aided drafting or design software for design, drafting, modeling, or other engineering tasks
- use drafting or mechanical drawing techniques
- use electrical or electronic test devices or equipment
- use knowledge of materials testing procedures
- use knowledge of metric system
- use knowledge of regulations in surveying or construction activities
- use land surveying techniques
- use precision measuring tools or equipment
- use scientific research methodology
- use technical regulations for engineering problems

Technology - Examples

Analytical or scientific software

- Coordinate geometry COGO software

Computer aided design CAD software

- Autodesk AutoCAD Civil 3D
- Autodesk AutoCAD software
- Autodesk Land Desktop



- prepare cost estimates
- prepare reports
- prepare reports for management
- prepare technical reports or related documentation
- provide customer service
- read blueprints
- read schematics
- read technical drawings
- recruit employees
- resolve engineering or science problems
- supervise engineering managers or staff
- supervise petroleum workers
- understand engineering data or reports
- understand technical operating, service or repair manuals
- use facility management techniques
- use intuitive judgment for engineering analyses
- use knowledge of water systems
- use long or short term production planning techniques
- use negotiation techniques
- use pollution control techniques
- use project management techniques
- use scientific research methodology
- use technical regulations for engineering problems
- write business project or bid proposals

Technology - Examples

Analytical or scientific software

- HEC RAS
- HEC-1
- Water surface pressure gradient WSPG software

Calendar and scheduling software

- Maintenance scheduling software
- Scheduling software

Computer aided design CAD software

- Autodesk AutoCAD software
- Computer aided design CAD software
- Drawing and drafting software
- Hewlett-Packard HP SolidDesigner
- Pro-E CAD software
- SolidWorks CAD software

Data base user interface and query software

- Computer aided design CAD software

Electronic mail software

- Email software
- Microsoft Outlook

Graphics or photo imaging software

- Graphics software

Internet browser software

- Web browser software

Map creation software

- Digital terrain modeling software
- Geographic information system GIS software

Spreadsheet software

- Microsoft Excel
- Spreadsheet software

Word processing software

- Microsoft Word

Tools - Examples

- Analytical balances
- Bucket augers
- Hand-operated boring machines
- Compression testing machines
- Metal cones
- Nuclear densometers
- Blueprint machines
- Dropping pipettes
- Drying ovens
- Filter papers
- Global positioning system GPS devices
- Sledgehammers
- Handheld digital thermometers
- Dessicators
- Rotary rock drills
- Hydrometers
- Laboratory balances



- Database software

- Structured query language SQL

Enterprise resource planning ERP software

- Made2Manage software

Industrial control software

- RTA Fleet Management

Internet browser software

- Web browser software

Inventory management software

- Inventory management software

Materials requirements planning logistics and supply chain software

- LSA Visual Easy Lean

Office suite software

- Microsoft Office

Project management software

- Microsoft Project

- Project management software

- Realization Project Flow

- The Gordian Group PROGEN Online

Spreadsheet software

- Microsoft Excel

- Spreadsheet software

Time accounting software

- Kronos Workforce Timekeeper

Word processing software

- Microsoft Word

- Word processing software

Tools - Examples

- Desktop computers

- Notebook computers

- Personal computers

- Personal digital assistants PDA

- Scanners

- Tablet computers

- Glass beakers

- Glass burets

- Evaporating dishes

- Wide-mouthed funnels

- Graduated glass cylinders

- Laboratory mechanical convection ovens

- Laboratory vials

- Small-gauge surface drilling rigs

- Transits

- Precision levels

- Load cells

- Machetes

- Magnetic stirrers

- Rubber mallets

- Surveying rods

- Soil moisture meters

- Stream gauges

- Mechanical sieve shakers

- Pocket penetrometers

- Soil density testers

- Personal computers

- Field data collectors

- pH testers

- Picks

- Inclinometers

- Plotter printers

- Precipitation gauges

- Safety gloves

- Pycnometers

- Dilatometers

- Safety glasses

- Laboratory bulb syringes

- Computer scanners



- Seismographs
- Torvanes
- Soil sampling tubes
- Soil resistivity test kits
- Straightedges
- Strain gauges
- Tamping rods
- Measuring tapes
- Laboratory test sieves
- Engineers' transits
- Brickmasons' trowels
- Two way radios
- Vibration monitors
- Kneading compactors
- Water sampling kits

Labor Market Comparison

Maine Department of Labor.

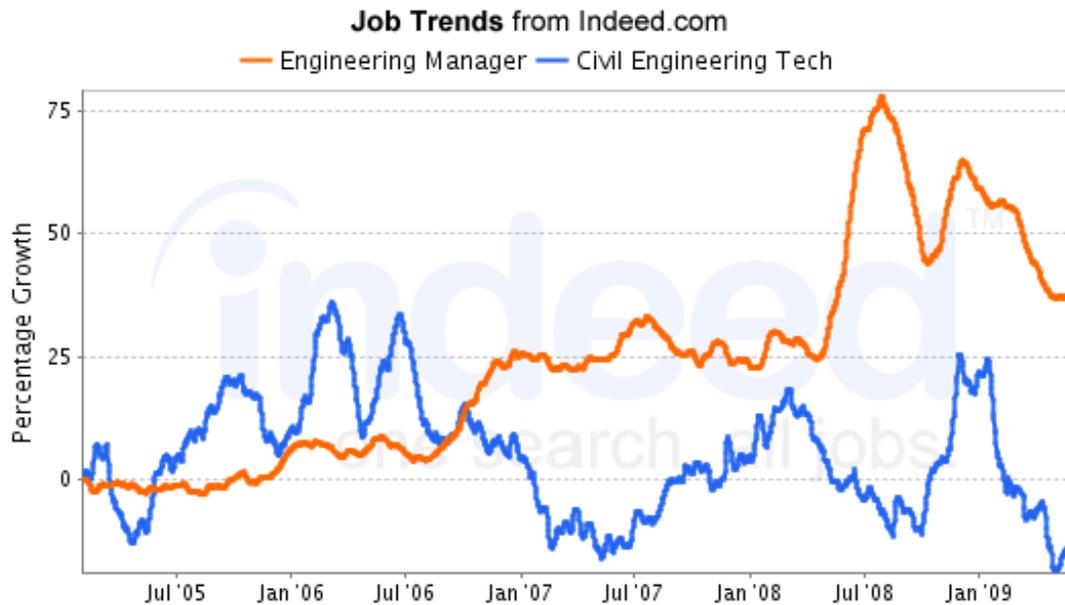
Description	Engineering Managers	Civil Engineering Technicians	Difference
Median Wage	\$ 91,030	\$ 41,170	\$(49,860)
10th Percentile Wage	\$ 60,520	\$ 29,010	\$(31,510)
25th Percentile Wage	N/A	N/A	N/A
75th Percentile Wage	\$115,430	\$ 48,970	\$(66,460)
90th Percentile Wage	\$145,420	\$ 57,080	\$(88,340)
Mean Wage	\$ 98,770	\$ 41,880	\$(56,890)
Total Employment - 2029	720	520	-200
Employment Base - 2006	705	520	-185
Projected Employment - 2038	691	518	-173
Projected Job Growth - 2006-2038	-2.0 %	-0.4 %	1.6 %
Projected Annual Openings - 2006-2038	14	10	-4
Special			

Special Occupations:



National Job Posting Trends

Trend for Engineering Managers and Civil Engineering Technicians



Data from [Indeed](http://Indeed.com)

Programs

No information on programs or the occupation.

Maine Statewide Promotion Opportunities for Engineering Managers

O*NET Code	Title	Grand TORQ	Job Zone	Employment	Median Wage	Difference	Growth	Annual Job Openings	Special
11-9041.00	Engineering Managers	100	5	720	\$91,030.00	\$0.00	-2%	14	
19-2012.00	Physicists	84	5	50	\$93,210.00	\$2,180.00	-4%	1	
13-2052.00	Personal Financial Advisors	82	3	360	\$94,100.00	\$3,070.00	10%	13	
23-1023.00	Judges, Magistrate Judges, and Magistrates	75	5	80	\$115,160.00	\$24,130.00	1%	2	
29-1051.00	Pharmacists	75	5	1,190	\$112,550.00	\$21,520.00	22%	46	★
11-1011.00	Chief Executives	74	5	750	\$102,290.00	\$11,260.00	-6%	25	
29-1081.00	Podiatrists	72	5	40	\$101,210.00	\$10,180.00	5%	6	★



29-1041.00	Optometrists	69	5	90	\$107,740.00	\$16,710.00	19%	4	
29-1063.00	Internists, General	69	5	420	\$144,760.00	\$53,730.00	6%	12	★
29-1062.00	Family and General Practitioners	68	5	710	\$138,550.00	\$47,520.00	7%	20	★

Special Occupations:

Top Industries for Civil Engineering Technicians

Industry	NAICS	% of Industry	Employment	Projected Employment	% Change
State government, excluding education and hospitals	929200	25.45%	23,072	22,640	-1.87%
Local government, excluding education and hospitals	939300	17.54%	15,899	17,861	12.34%
Testing laboratories	541380	3.33%	3,017	3,715	23.12%
Colleges, universities, and professional schools, public and private	611300	1.54%	1,395	1,560	11.87%
Self-employed workers, primary job	000601	0.86%	776	827	6.54%
Highway, street, and bridge construction	237300	0.70%	636	684	7.66%
Nonresidential building construction	236200	0.67%	605	678	12.05%
Natural gas distribution	221200	0.42%	383	314	-18.16%
Electric power generation, transmission and distribution	221100	0.42%	381	350	-8.03%
Employment services	561300	0.34%	305	386	26.57%
Management of companies and enterprises	551100	0.32%	294	338	15.28%
Management, scientific, and technical consulting services	541600	0.27%	248	442	78.53%
Power and communication line and related structures construction	237130	0.21%	186	196	5.20%
Residential building construction	236100	0.15%	136	154	12.61%
Land subdivision	237200	0.14%	129	129	-0.15%

Top Industries for Engineering Managers

Industry	NAICS	% of Industry	Employment	Projected Employment	% Change
Semiconductor and other electronic component manufacturing	334400	5.67%	10,607	10,198	-3.85%
Navigational, measuring, electromedical, and control instruments manufacturing	334500	5.64%	10,555	10,105	-4.26%
Aerospace product and parts manufacturing	336400	5.52%	10,328	11,571	12.03%



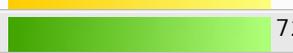
Federal government, excluding postal service	919999	4.46%	8,341	7,885	-5.47%
Research and development in the physical, engineering, and life sciences	541710	3.89%	7,272	7,759	6.69%
Management of companies and enterprises	551100	3.75%	7,022	8,095	15.28%
Computer systems design and related services	541500	3.29%	6,158	8,314	35.02%
Local government, excluding education and hospitals	939300	3.02%	5,648	6,345	12.34%
Computer and peripheral equipment manufacturing	334100	2.41%	4,504	2,948	-34.54%
Motor vehicle parts manufacturing	336300	2.12%	3,971	3,162	-20.39%
Electric power generation, transmission and distribution	221100	2.04%	3,823	3,516	-8.03%
Communications equipment manufacturing	334200	1.74%	3,259	3,285	0.79%
Management, scientific, and technical consulting services	541600	1.72%	3,219	5,747	78.52%
Nonresidential building construction	236200	1.54%	2,888	3,236	12.05%
State government, excluding education and hospitals	929200	1.33%	2,489	2,442	-1.87%



TORQ Analysis of Engineering Managers to Marine Architects

ANALYSIS INPUT					
Transfer	Title	O*NET	Filters		
From Title:	Engineering Managers	11-9041.00	Abilities:	Importance Level: 50	Weight: 1
To Title:	Marine Architects	17-2121.02	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				95	Level				88	Level				92
Gaps To Narrow if Possible				Upgrade These Skills				Knowledge to Add						
Ability	Level	Gap	Impt	Skill	Level	Gap	Impt	Knowledge	Level	Gap	Impt			
Number Facility	59	8	68	Science	74	11	82	Mechanical	57	20	87			
Visualization	66	4	68	Equipment Selection	56	10	72	Engineering and Technology	92	8	71			
Deductive Reasoning	69	2	72	Writing	74	7	83							
Information Ordering	64	2	68	Mathematics	88	7	70							
Mathematical Reasoning	62	2	68	Critical Thinking	80	3	74							
Far Vision	55	2	62	Active Learning	75	3	73							
Selective Attention	44	2	59											
LEVEL and IMPT (IMPORTANCE) refer to the Target Marine Architects. GAP refers to level difference between Engineering Managers and Marine Architects.														

ASK ANALYSIS			
Ability Level Comparison - Abilities with importance scores over 50			
Description	Engineering Managers	Marine Architects	Importance
Oral Comprehension	76 	73 	78 
Written Comprehension	75 	73 	78 
Problem Sensitivity	66 	62 	78 
Oral Expression	71 	67 	75 
Deductive Reasoning	67 	69 	72 
Inductive Reasoning	62 	62 	72 
Information Ordering	62 	64 	68 



Mathematical Reasoning	60	62	68
Number Facility	51	59	68
Visualization	62	66	68
Near Vision	64	55	68
Speech Recognition	53	50	68
Speech Clarity	51	46	68
Originality	60	59	65
Written Expression	64	55	62
Far Vision	53	55	62
Fluency of Ideas	64	64	59
Selective Attention	42	44	59
Category Flexibility	55	51	53

Skill Level Comparison - Abilities with importance scores over 69

Description	Engineering Managers	Marine Architects	Importance
Writing	67	74	83
Science	63	74	82
Critical Thinking	77	80	74
Active Learning	72	75	73
Equipment Selection	46	56	72
Mathematics	81	88	70

Knowledge Level Comparison - Knowledge with importance scores over 69

Description	Engineering Managers	Marine Architects	Importance
Mechanical	37	57	87
Engineering and Technology	84	92	71

Experience & Education Comparison

Related Work Experience Comparison			Required Education Level Comparison		
Description	Engineering Managers	Marine Architects	Description	Engineering Managers	Marine Architects
10+ years	28%	18%	Doctoral	0%	0%
8-10 years	15%	0%	Professional Degree	0%	0%
6-8 years	14%	14%	Post-Masters Cert	0%	0%
4-6 years	39%	8%	Master's Degree	11%	18%
2-4 years	0%	16%	Post-Bachelor Cert	16%	0%
1-2 years	1%	5%	Bachelors	54%	71%
6-12 months	0%	0%	AA or Equiv	1%	0%
3-6 months	0%	0%	Some College	1%	0%
1-3 months	0%	0%	Post-Secondary	13%	9%



O-1 month	0%	0%	Certificate	0%	0%
None	0%	36%	High School Diploma or GED	0%	0%
			No HSD or GED	0%	0%
Engineering Managers			Marine Architects		
Most Common Educational/Training Requirement:					
Bachelor's or higher degree, plus work experience			Bachelor's degree		
Job Zone Comparison					
5 - Job Zone Five: Extensive Preparation Needed			4 - Job Zone Four: Considerable Preparation Needed		
<p>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.</p> <p>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).</p> <p>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.</p>			<p>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.</p> <p>Most of these occupations require a four - year bachelor's degree, but some do not.</p> <p>Employees in these occupations usually need several years of work-related experience, on-the-job training, and/or vocational training.</p>		

Tasks

Engineering Managers	Marine Architects
Core Tasks	Core Tasks
<p>Generalized Work Activities:</p> <ul style="list-style-type: none"> • Communicating with Supervisors, Peers, or Subordinates - Providing information to supervisors, co-workers, and subordinates by telephone, in written form, e-mail, or in person. • Making Decisions and Solving Problems - Analyzing information and evaluating results to choose the best solution and solve problems. • Getting Information - Observing, receiving, and otherwise obtaining information from all relevant sources. • 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. • Updating and Using Relevant Knowledge - Keeping up-to-date technically and applying new knowledge to your job. 	<p>Generalized Work Activities:</p> <ul style="list-style-type: none"> • 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. • Thinking Creatively - Developing, designing, or creating new applications, ideas, relationships, systems, or products, including artistic contributions. • Updating and Using Relevant Knowledge - Keeping up-to-date technically and applying new knowledge to your job.
Specific Tasks	Specific Tasks
<p>Occupation Specific Tasks:</p> <ul style="list-style-type: none"> • Administer highway planning, construction, and maintenance. 	



- Analyze technology, resource needs, and market demand, to plan and assess the feasibility of projects.
- Confer with and report to officials and the public to provide information and solicit support for projects.
- Confer with management, production, and marketing staff to discuss project specifications and procedures.
- Consult or negotiate with clients to prepare project specifications.
- Coordinate and direct projects, making detailed plans to accomplish goals and directing the integration of technical activities.
- Develop and implement policies, standards and procedures for the engineering and technical work performed in the department, service, laboratory or firm.
- Direct the engineering of water control, treatment, and distribution projects.
- Direct, review, and approve product design and changes.
- Perform administrative functions such as reviewing and writing reports, approving expenditures, enforcing rules, and making decisions about the purchase of materials or services.
- Plan and direct the installation, testing, operation, maintenance, and repair of facilities and equipment.
- Plan, direct, and coordinate survey work with other staff activities, certifying survey work, and writing land legal descriptions.
- Prepare budgets, bids, and contracts, and direct the negotiation of research contracts.
- Present and explain proposals, reports, and findings to clients.
- Recruit employees, assign, direct, and evaluate their work, and oversee the development and maintenance of staff competence.
- Review and recommend or approve contracts and cost estimates.
- Set scientific and technical goals within broad outlines provided by top management.

Detailed Tasks

Detailed Work Activities:

- adhere to safety procedures
- advise clients or customers
- advise clients regarding engineering problems
- analyze market conditions
- analyze operational or management reports or records
- analyze project proposal to determine feasibility, cost, or time
- approve product design or changes
- assign work to staff or employees

Occupation Specific Tasks:

- Confer with marine engineering personnel to establish arrangement of boiler room equipment and propulsion machinery, heating and ventilating systems, refrigeration equipment, piping, and other functional equipment.
- Design complete hull and superstructure according to specifications and test data, in conformity with standards of safety, efficiency, and economy.
- Design layout of craft interior, including cargo space, passenger compartments, ladder wells, and elevators.
- Evaluate performance of craft during dock and sea trials to determine design changes and conformance with national and international standards.
- Oversee construction and testing of prototype in model basin and develop sectional and waterline curves of hull to establish center of gravity, ideal hull form, and buoyancy and stability data.
- Study design proposals and specifications to establish basic characteristics of craft, such as size, weight, speed, propulsion, displacement, and draft.

Detailed Tasks

Detailed Work Activities:

- advise clients or customers
- advise clients regarding engineering problems
- 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
- assign work to staff or employees
- collect scientific or technical data
- communicate technical information
- compile numerical or statistical data
- conduct performance testing
- confer with engineering, technical or manufacturing personnel
- convert design specifications to cost estimates
- coordinate engineering project activities
- create mathematical or statistical diagrams or charts
- delegate authority for engineering activities
- design construction projects
- design office layout
- develop mathematical simulation models



- bid engineering, construction or extraction projects
- communicate technical information
- conduct land surveys
- conduct or attend staff meetings
- conduct topographical surveys
- confer with customer representatives
- confer with engineering, technical or manufacturing personnel
- confer with management or users
- coordinate employee continuing education programs
- coordinate engineering project activities
- delegate authority for engineering activities
- determine project methods and procedures
- develop budgets
- develop management control systems
- develop policies, procedures, methods, or standards
- develop records management system
- develop safety regulations
- develop staffing plan
- direct and coordinate activities of workers or staff
- direct and coordinate civil engineering projects
- direct and coordinate construction of mine shafts or tunnels
- direct geological surveys
- direct personnel in support of engineering activities
- enforce laws, ordinances, or regulations
- establish employee performance standards
- estimate cost for engineering projects
- estimate time needed for project
- evaluate costs of engineering projects
- evaluate engineering data
- evaluate performance of employees or contract personnel
- explain rules, policies or regulations
- explore for oil or gas
- follow data security procedures
- identify training needs
- install water or sewer treatment plant equipment
- lead teams in engineering projects
- make decisions
- make presentations
- manage contracts
- monitor facilities or equipment
- monitor training costs
- orient new employees
- oversee execution of organizational or program policies
- perform statistical analysis in physical

- 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 personnel in support of engineering activities
- draw prototypes, plans, or maps to scale
- estimate time needed for project
- evaluate costs of engineering projects
- evaluate engineering data
- evaluate product design
- explain complex mathematical information
- inspect facilities or equipment for regulatory compliance
- lead teams in engineering projects
- obtain information from individuals
- plan construction of structures or facilities
- plan testing of engineering methods
- prepare reports
- prepare technical reports or related documentation
- read blueprints
- read technical drawings
- recognize construction industry codes or symbols on blueprints
- resolve engineering or science problems
- supervise engineering managers or staff
- test equipment as part of engineering projects or processes
- understand construction specifications
- understand engineering data or reports
- understand government construction contracting 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 creativity in designing interior spaces
- use creativity in graphics
- use drafting or mechanical drawing techniques
- use field notes in technical drawings
- use government regulations
- use graphic arts techniques
- use knowledge of regulations in surveying or construction activities
- use library or online Internet research techniques
- use mathematical or statistical methods to identify or analyze problems
- use project management techniques
- use relational database software



- science or geological research
- plan testing of engineering methods
- prepare cost estimates
- prepare reports
- prepare reports for management
- prepare technical reports or related documentation
- provide customer service
- read blueprints
- read schematics
- read technical drawings
- recruit employees
- resolve engineering or science problems
- supervise engineering managers or staff
- supervise petroleum workers
- understand engineering data or reports
- understand technical operating, service or repair manuals
- use facility management techniques
- use intuitive judgment for engineering analyses
- use knowledge of water systems
- use long or short term production planning techniques
- use negotiation techniques
- use pollution control techniques
- use project management techniques
- use scientific research methodology
- use technical regulations for engineering problems
- write business project or bid proposals

Technology - Examples

Analytical or scientific software

- HEC RAS
- HEC-1
- Water surface pressure gradient WSPG software

Calendar and scheduling software

- Maintenance scheduling software
- Scheduling software

Computer aided design CAD software

- Autodesk AutoCAD software
- Computer aided design CAD software
- Drawing and drafting software
- Hewlett-Packard HP SolidDesigner
- Pro-E CAD software
- SolidWorks CAD software

- use spreadsheet software
- use technical regulations for engineering problems
- use word processing or desktop publishing software
- work as a team member
- write product performance requirements

Technology - Examples

Analytical or scientific software

- ALGOR software
- ANSYS AQWA
- ANSYS ASAS
- ANSYS FLUENT
- Creative System GHS
- Herbert Software Solutions HECSALV
- HydroComp NavCad
- MSC Software Nastran
- Proteus Engineering FastShip
- Seasafe Marine Software Seasafe
- Strand7

Computer aided design CAD software

- AeroHydro MultiSurf
- Autodesk AutoCAD software
- Intergraph SmartMarine 3D
- ShipConstructor
- Siemens PLM Software NX
- SolidWorks CAD software

- The Napa Group NAPA

Data base user interface and query software

- Microsoft Access

Electronic mail software

- Microsoft Outlook

Office suite software

- Microsoft Office

Presentation software

- Microsoft PowerPoint

Project management software

- Microsoft Project



Data base user interface and query software

- Database software
- Structured query language SQL

Enterprise resource planning ERP software

- Made2Manage software

Industrial control software

- RTA Fleet Management

Internet browser software

- Web browser software

Inventory management software

- Inventory management software

Materials requirements planning logistics and supply chain software

- LSA Visual Easy Lean

Office suite software

- Microsoft Office

Project management software

- Microsoft Project
- Project management software
- Realization Project Flow
- The Gordian Group PROGEN Online

Spreadsheet software

- Microsoft Excel
- Spreadsheet software

Time accounting software

- Kronos Workforce Timekeeper

Word processing software

- Microsoft Word
- Word processing software

Tools - Examples

- Desktop computers
- Notebook computers
- Personal computers
- Personal digital assistants PDA
- Scanners
- Tablet computers

Spreadsheet software

- Microsoft Excel

Word processing software

- Microsoft Word

Tools - Examples

- Desktop computers
- Hard hats
- Laptop computers
- Personal computers
- Plotting printers
- Protective safety glasses



Labor Market Comparison

Maine Department of Labor.

Description	Engineering Managers	Marine Architects	Difference
Median Wage	\$ 91,030	\$ 75,520	\$(15,510)
10th Percentile Wage	\$ 60,520	\$ 52,050	\$(8,470)
25th Percentile Wage	N/A	N/A	N/A
75th Percentile Wage	\$115,430	\$ 90,850	\$(24,580)
90th Percentile Wage	\$145,420	\$ 99,780	\$(45,640)
Mean Wage	\$ 98,770	\$ 74,500	\$(24,270)
Total Employment - 2029	720	60	-660
Employment Base - 2006	705	55	-650
Projected Employment - 2038	691	50	-641
Projected Job Growth - 2006-2038	-2.0 %	-9.1 %	-7.1 %
Projected Annual Openings - 2006-2038	14	1	-13
Special			

Special Occupations:

National Job Posting Trends

Trend for Engineering Managers and Marine Architects



Data from [Indeed](http://Indeed.com)

Programs



Related Programs

Naval Architecture and Marine Engineering

Naval Architecture and Marine Engineering. A program that prepares individuals to apply mathematical and scientific principles to the design, development and operational evaluation of self-propelled, stationary, or towed vessels operating on or under the water, including inland, coastal and ocean environments; and the analysis of related engineering problems such as corrosion, power transfer, pressure, hull efficiency, stress factors, safety and life support, environmental hazards and factors, and specific use requirements.

Institution	Address	City	URL
Landing School of Boat Building and Design	286 River Rd	Arundel	www.landingschool.edu
Maine Maritime Academy	C3	Castine	www.mainemaritime.edu

Maine Statewide Promotion Opportunities for Engineering Managers

O* NET Code	Title	Grand TORQ	Job Zone	Employment	Median Wage	Difference	Growth	Annual Job Openings	Special
11-9041.00	Engineering Managers	100	5	720	\$91,030.00	\$0.00	-2%	14	
19-2012.00	Physicists	84	5	50	\$93,210.00	\$2,180.00	-4%	1	
13-2052.00	Personal Financial Advisors	82	3	360	\$94,100.00	\$3,070.00	10%	13	
23-1023.00	Judges, Magistrate Judges, and Magistrates	75	5	80	\$115,160.00	\$24,130.00	1%	2	
29-1051.00	Pharmacists	75	5	1,190	\$112,550.00	\$21,520.00	22%	46	★
11-1011.00	Chief Executives	74	5	750	\$102,290.00	\$11,260.00	-6%	25	
29-1081.00	Podiatrists	72	5	40	\$101,210.00	\$10,180.00	5%	6	★
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29-1063.00	Internists, General	69	5	420	\$144,760.00	\$53,730.00	6%	12	★
29-1062.00	Family and General Practitioners	68	5	710	\$138,550.00	\$47,520.00	7%	20	★

Special Occupations:

Top Industries for Marine Architects

Industry	NAICS	% of Industry	Employment	Projected Employment	% Change
Self-employed workers, primary job	000601	12.38%	1,138	1,213	6.54%



Federal government, excluding postal service	919999	9.69%	891	843	-5.47%
Research and development in the physical, engineering, and life sciences	541710	7.85%	722	770	6.69%
Deep sea, coastal, and great lakes water transportation	483100	4.78%	439	540	22.88%
Inland water transportation	483200	1.79%	164	185	12.29%
Computer systems design and related services	541500	1.31%	120	162	35.02%

Top Industries for Engineering Managers

Industry	NAICS	% of Industry	Employment	Projected Employment	% Change
Semiconductor and other electronic component manufacturing	334400	5.67%	10,607	10,198	-3.85%
Navigational, measuring, electromedical, and control instruments manufacturing	334500	5.64%	10,555	10,105	-4.26%
Aerospace product and parts manufacturing	336400	5.52%	10,328	11,571	12.03%
Federal government, excluding postal service	919999	4.46%	8,341	7,885	-5.47%
Research and development in the physical, engineering, and life sciences	541710	3.89%	7,272	7,759	6.69%
Management of companies and enterprises	551100	3.75%	7,022	8,095	15.28%
Computer systems design and related services	541500	3.29%	6,158	8,314	35.02%
Local government, excluding education and hospitals	939300	3.02%	5,648	6,345	12.34%
Computer and peripheral equipment manufacturing	334100	2.41%	4,504	2,948	-34.54%
Motor vehicle parts manufacturing	336300	2.12%	3,971	3,162	-20.39%
Electric power generation, transmission and distribution	221100	2.04%	3,823	3,516	-8.03%
Communications equipment manufacturing	334200	1.74%	3,259	3,285	0.79%
Management, scientific, and technical consulting services	541600	1.72%	3,219	5,747	78.52%
Nonresidential building construction	236200	1.54%	2,888	3,236	12.05%
State government, excluding education and hospitals	929200	1.33%	2,489	2,442	-1.87%

TORQ Analysis of Engineering Managers to Commercial and Industrial Designers

ANALYSIS INPUT					
Transfer	Title	O*NET	Filters		
From Title:	Engineering Managers	11-9041.00	Abilities:	Importance Level: 50	Weight: 1
To Title:	Commercial and Industrial Designers	27-1021.00	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	94	Level	91	Level	89				
Gaps To Narrow if Possible			Upgrade These Skills		Knowledge to Add				
Ability	Level	Gap	Impt	Skill	Level	Gap	Impt		
Finger Dexterity	41	9	56	No Skills Upgrade Required!		Mechanical	50	13	77
Visual Color Discrimination	44	5	50						
<p>LEVEL and IMPT (IMPORTANCE) refer to the Target Commercial and Industrial Designers. GAP refers to level difference between Engineering Managers and Commercial and Industrial Designers.</p>									

ASK ANALYSIS			
Ability Level Comparison - Abilities with importance scores over 50			
Description	Engineering Managers	Commercial and Industrial Designers	Importance
Oral Comprehension	76	57	72
Oral Expression	71	57	68
Written Comprehension	75	57	65
Fluency of Ideas	64	55	65
Originality	60	55	65
Deductive Reasoning	67	55	65
Problem Sensitivity	66	50	62
Inductive Reasoning	62	50	62
Information Ordering	62	57	62
Near Vision	64	53	62
Speech Recognition	53	44	62



Visualization	62	51	59
Speech Clarity	51	46	59
Category Flexibility	55	48	56
Selective Attention	42	37	56
Finger Dexterity	32	41	56
Written Expression	64	50	53
Perceptual Speed	41	35	53
Far Vision	53	44	53
Mathematical Reasoning	60	41	50
Number Facility	51	42	50
Flexibility of Closure	51	39	50
Visual Color Discrimination	39	44	50

Skill Level Comparison - Abilities with importance scores over 69

Description	Engineering Managers	Commercial and Industrial Designers	Importance
Knowledge Level Comparison - Knowledge with importance scores over 69			
Description	Engineering Managers	Commercial and Industrial Designers	Importance
Mechanical	37	50	77

Experience & Education Comparison

Related Work Experience Comparison			Required Education Level Comparison		
Description	Engineering Managers	Commercial and Industrial Designers	Description	Engineering Managers	Commercial and Industrial Designers
10+ years	28%	0%	Doctoral	0%	0%
8-10 years	15%	0%	Professional Degree	0%	0%
6-8 years	14%	30%	Post-Masters Cert	0%	0%
4-6 years	39%	21%	Master's Degree	11%	7%
2-4 years	0%	9%	Post-Bachelor Cert	16%	6%
1-2 years	1%	12%	Bachelors	54%	55%
6-12 months	0%	9%	AA or Equiv	1%	18%
3-6 months	0%	6%	Some College	1%	0%
1-3 months	0%	9%	Post-Secondary Certificate	13%	9%
0-1 month	0%	0%	High School Diploma or GED	0%	2%
None	0%	0%	No HSD or GED	0%	0%

Engineering Managers	Commercial and Industrial Designers
Most Common Educational/Training Requirement:	
Bachelor's or higher degree, plus work experience	Bachelor's degree
Job Zone Comparison	
5 - Job Zone Five: Extensive Preparation Needed	4 - Job Zone Four: Considerable Preparation Needed



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.	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 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).	Most of these occupations require a four - year bachelor's degree, but some do not.
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.	Employees in these occupations usually need several years of work-related experience, on-the-job training, and/or vocational training.

Tasks

Engineering Managers	Commercial and Industrial Designers
<p>Core Tasks</p> <p>Generalized Work Activities:</p> <ul style="list-style-type: none"> • Communicating with Supervisors, Peers, or Subordinates - Providing information to supervisors, co-workers, and subordinates by telephone, in written form, e-mail, or in person. • Making Decisions and Solving Problems - Analyzing information and evaluating results to choose the best solution and solve problems. • Getting Information - Observing, receiving, and otherwise obtaining information from all relevant sources. • 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. • Updating and Using Relevant Knowledge - Keeping up-to-date technically and applying new knowledge to your job. 	<p>Core Tasks</p> <p>Generalized Work Activities:</p> <ul style="list-style-type: none"> • Getting Information - Observing, receiving, and otherwise obtaining information from all relevant sources. • Interacting With Computers - Using computers and computer systems (including hardware and software) to program, write software, set up functions, enter data, or process information. • Thinking Creatively - Developing, designing, or creating new applications, ideas, relationships, systems, or products, including artistic contributions. • Updating and Using Relevant Knowledge - Keeping up-to-date technically and applying new knowledge to your job. • Communicating with Supervisors, Peers, or Subordinates - Providing information to supervisors, co-workers, and subordinates by telephone, in written form, e-mail, or in person. • Identifying Objects, Actions, and Events - Identifying information by categorizing, estimating, recognizing differences or similarities, and detecting changes in circumstances or events.
<p>Specific Tasks</p> <p>Occupation Specific Tasks:</p> <ul style="list-style-type: none"> • Administer highway planning, construction, and maintenance. • Analyze technology, resource needs, and market demand, to plan and assess the feasibility of projects. • Confer with and report to officials and the public to provide information and solicit support for projects. • Confer with management, production, and marketing staff to discuss project specifications and procedures. • Consult or negotiate with clients to prepare project specifications. • Coordinate and direct projects, making detailed plans to accomplish goals and directing the integration of technical 	<p>Specific Tasks</p> <p>Occupation Specific Tasks:</p> <ul style="list-style-type: none"> • Advise corporations on issues involving corporate image projects or problems. • Confer with engineering, marketing, production, or sales departments, or with customers, to establish and evaluate design concepts for manufactured products. • Coordinate the look and function of product lines. • Design graphic material for use as ornamentation, illustration, or advertising on manufactured materials and packaging or containers. • Develop industrial standards and regulatory



activities.

- Develop and implement policies, standards and procedures for the engineering and technical work performed in the department, service, laboratory or firm.
- Direct the engineering of water control, treatment, and distribution projects.
- Direct, review, and approve product design and changes.
- Perform administrative functions such as reviewing and writing reports, approving expenditures, enforcing rules, and making decisions about the purchase of materials or services.
- Plan and direct the installation, testing, operation, maintenance, and repair of facilities and equipment.
- Plan, direct, and coordinate survey work with other staff activities, certifying survey work, and writing land legal descriptions.
- Prepare budgets, bids, and contracts, and direct the negotiation of research contracts.
- Present and explain proposals, reports, and findings to clients.
- Recruit employees, assign, direct, and evaluate their work, and oversee the development and maintenance of staff competence.
- Review and recommend or approve contracts and cost estimates.
- Set scientific and technical goals within broad outlines provided by top management.

Detailed Tasks

Detailed Work Activities:

- adhere to safety procedures
- advise clients or customers
- advise clients regarding engineering problems
- analyze market conditions
- analyze operational or management reports or records
- analyze project proposal to determine feasibility, cost, or time
- approve product design or changes
- assign work to staff or employees
- bid engineering, construction or extraction projects
- communicate technical information
- conduct land surveys
- conduct or attend staff meetings
- conduct topographical surveys
- confer with customer representatives
- confer with engineering, technical or manufacturing personnel
- confer with management or users
- coordinate employee continuing education programs

guidelines.

- Develop manufacturing procedures and monitor the manufacture of their designs in a factory to improve operations and product quality.
- Direct and coordinate the fabrication of models or samples and the drafting of working drawings and specification sheets from sketches.
- Evaluate feasibility of design ideas, based on factors such as appearance, safety, function, serviceability, budget, production costs/methods, and market characteristics.
- Fabricate models or samples in paper, wood, glass, fabric, plastic, metal, or other materials, using hand or power tools.
- Investigate product characteristics such as the product's safety and handling qualities, its market appeal, how efficiently it can be produced, and ways of distributing, using and maintaining it.
- Modify and refine designs, using working models, to conform with customer specifications, production limitations, or changes in design trends.
- Participate in new product planning or market research, including studying the potential need for new products.
- Prepare sketches of ideas, detailed drawings, illustrations, artwork, or blueprints, using drafting instruments, paints and brushes, or computer-aided design equipment.
- Present designs and reports to customers or design committees for approval, and discuss need for modification.
- Read publications, attend showings, and study competing products and design styles and motifs to obtain perspective and generate design concepts.
- Research production specifications, costs, production materials and manufacturing methods, and provide cost estimates and itemized production requirements.
- Supervise assistants' work throughout the design process.

Detailed Tasks

Detailed Work Activities:

- analyze market conditions
- analyze project proposal to determine feasibility, cost, or time
- analyze technical data, designs, or preliminary specifications
- communicate visually or verbally
- confer with client or staff regarding theme
- confer with other departmental heads to coordinate activities
- consult with customers concerning needs
- coordinate activities of assistants
- create art from ideas



- coordinate engineering project activities
- delegate authority for engineering activities
- determine project methods and procedures
- develop budgets
- develop management control systems
- develop policies, procedures, methods, or standards
- develop records management system
- develop safety regulations
- develop staffing plan
- direct and coordinate activities of workers or staff
- direct and coordinate civil engineering projects
- direct and coordinate construction of mine shafts or tunnels
- direct geological surveys
- direct personnel in support of engineering activities
- enforce laws, ordinances, or regulations
- establish employee performance standards
- estimate cost for engineering projects
- estimate time needed for project
- evaluate costs of engineering projects
- evaluate engineering data
- evaluate performance of employees or contract personnel
- explain rules, policies or regulations
- explore for oil or gas
- follow data security procedures
- identify training needs
- install water or sewer treatment plant equipment
- lead teams in engineering projects
- make decisions
- make presentations
- manage contracts
- monitor facilities or equipment
- monitor training costs
- orient new employees
- oversee execution of organizational or program policies
- perform statistical analysis in physical science or geological research
- plan testing of engineering methods
- prepare cost estimates
- prepare reports
- prepare reports for management
- prepare technical reports or related documentation
- provide customer service
- read blueprints
- read schematics
- read technical drawings

- distinguish details in graphic arts material
- draw designs, letters, or lines
- draw prototypes, plans, or maps to scale
- estimate production costs
- evaluate product design
- evaluate product quality for sales activities
- fabricate craft or art objects
- follow manufacturing methods or techniques
- identify color or balance
- identify problems or improvements
- maintain consistent production quality
- make presentations
- organize commercial artistic or design projects
- prepare artwork for camera or press
- read blueprints
- recommend improvements to work methods or procedures
- recommend solutions of administrative problems
- schedule work to meet deadlines
- sketch or draw subjects or items
- understand artistic crafts production methods
- use characteristics of graphic design materials
- use computer aided drafting or design software for design, drafting, modeling, or other engineering tasks
- use computer graphics design software
- use computers to enter, access or retrieve data
- use creativity in graphics
- use creativity in industrial artistry
- use creativity to art or design work
- use drafting or mechanical drawing techniques
- use graphic arts techniques
- use hand or power tools
- use marketing techniques
- use product knowledge to market goods

Technology - Examples

Computer aided design CAD software

- Ashlar-Vellum Cobalt
- Autodesk AliasStudio
- Autodesk AutoCAD software
- Autodesk Maya software
- Dassault Systemes CATIA software
- PTC Pro/ENGINEER software



• use technical drawings

- recruit employees
- resolve engineering or science problems
- supervise engineering managers or staff
- supervise petroleum workers
- understand engineering data or reports
- understand technical operating, service or repair manuals
- use facility management techniques
- use intuitive judgment for engineering analyses
- use knowledge of water systems
- use long or short term production planning techniques
- use negotiation techniques
- use pollution control techniques
- use project management techniques
- use scientific research methodology
- use technical regulations for engineering problems
- write business project or bid proposals

Technology - Examples

Analytical or scientific software

- HEC RAS
- HEC-1
- Water surface pressure gradient WSPG software

Calendar and scheduling software

- Maintenance scheduling software
- Scheduling software

Computer aided design CAD software

- Autodesk AutoCAD software
- Computer aided design CAD software
- Drawing and drafting software
- Hewlett-Packard HP SolidDesigner
- Pro-E CAD software
- SolidWorks CAD software

Data base user interface and query software

- Database software
- Structured query language SQL

Enterprise resource planning ERP software

- Made2Manage software

Industrial control software

- RTA Fleet Management

- Siemens PLM Software UGS NX

- SolidWorks CAD software

Data base user interface and query software

- Microsoft Access

Desk top publishing software

- Adobe Systems Adobe InDesign
- Microsoft Publisher

- QuarkXpress

Document management software

- Adobe Systems Adobe Acrobat software

Electronic mail software

- Email software

Graphics or photo imaging software

- Adobe Systems Adobe FreeHand
- Adobe Systems Adobe Illustrator
- Adobe Systems Adobe Photoshop software

- Corel CorelDraw Graphics Suite

- Corel Painter

- McNeel Rhino software

- Xara Xtreme

Internet browser software

- Web browser software

Office suite software

- Microsoft Office

Presentation software

- Microsoft PowerPoint

Spreadsheet software

- Microsoft Excel

Video creation and editing software

- Autodesk 3ds Max
- Chaos Group V-Ray
- MAXON CINEMA 4D

- Softimage XSI

Word processing software

- Microsoft Word

Tools - Examples



Internet browser software	• Desktop computers
• Web browser software	• Compact digital cameras
Inventory management software	• Universal serial bus USB flash drives
• Inventory management software	• Liquid crystal display LCD video projectors
Materials requirements planning logistics and supply chain software	• Laptop computers
• LSA Visual Easy Lean	• Personal computers
Office suite software	
• Microsoft Office	
Project management software	
• Microsoft Project	
• Project management software	
• Realization Project Flow	
• The Gordian Group PROGEN Online	
Spreadsheet software	
• Microsoft Excel	
• Spreadsheet software	
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Labor Market Comparison

Maine Department of Labor.

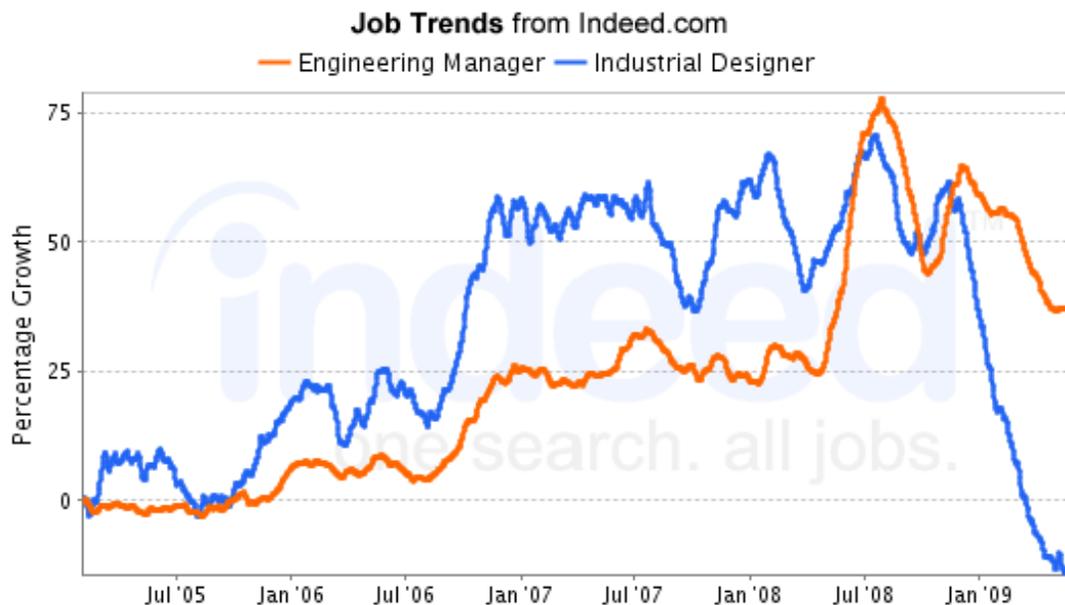
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Projected Employment - 2038	691	160	-531
Projected Job Growth - 2006-2038	-2.0 %	4.6 %	6.6 %
Projected Annual Openings - 2006-2038	14	5	-9
Special			
Special Occupations:			

National Job Posting Trends

Trend for Engineering Managers and Commercial and Industrial Designers



Data from [Indeed](http://Indeed.com)

Programs

Related Programs

Commercial and Advertising Art



Commercial and Advertising Art. A program in the applied visual arts that prepares individuals to use artistic techniques to effectively communicate ideas and information to business and consumer audiences via illustrations and other forms of digital or printed media. Includes instruction in concept design, layout, paste-up, and techniques such as engraving, etching, silkscreen, lithography, offset, drawing and cartooning, painting, collage, and computer graphics.

No information on schools for the program

Design and Applied Arts, Other

Design and Applied Arts, Other. Any instructional program in design and applied arts not listed above.

No information on schools for the program

Design and Visual Communications

Design and Visual Communications, General. A program in the applied visual arts that focuses on the general principles and techniques for effectively communicating ideas and information, and packaging products, in digital and other formats to business and consumer audiences, and that may prepare individuals in any of the applied art media.

Institution	Address	City	URL
Maine College of Art	97 Spring St	Portland	www.meca.edu
York County Community College	112 College Drive	Wells	www.yccc.edu

Fashion Design and Illustration

Fashion/Apparel Design. A program that prepares individuals to apply artistic principles and techniques to the professional design of commercial fashions, apparel, and accessories, and the management of fashion development projects. Includes instruction in apparel design; accessory design; the design of men's, women's, and children's wear; flat pattern design; computer-assisted design and manufacturing; concept planning; designing in specific materials; labor and cost analysis; history of fashion; fabric art and printing; and the principles of management and operations in the fashion industry.

No information on schools for the program

Industrial Design

Industrial Design. A program in the applied visual arts that prepares individuals to use artistic techniques to effectively communicate ideas and information to business and consumer audiences via the creation of effective forms, shapes, and packaging for manufactured products. Includes instruction in designing in a wide variety of plastic and digital media, prototype construction, design development and refinement, principles of cost saving, and product structure and performance criteria relevant to aesthetic design parameters.

No information on schools for the program

Technical Theater/Theater Design and Stagecraft

Technical Theatre/Theatre Design and Technology. A program that prepares individuals to apply artistic, technical and dramatic principles and techniques to the communication of dramatic information, ideas, moods, and feelings through technical theatre methods. Includes instruction in set design, lighting design, sound effects, theatre acoustics, scene painting, property management, costume design, and technical direction and production and use of computer applications to support these functions above.

No information on schools for the program

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Special Occupations:

Top Industries for Commercial and Industrial Designers

Industry	NAICS	% of Industry	Employment	Projected Employment	% Change
Self-employed workers, primary job	000601	25.29%	12,136	12,929	6.54%
Specialized design services	541400	8.84%	4,243	5,678	33.81%
Management of companies and enterprises	551100	5.03%	2,414	2,783	15.28%
Self-employed workers, secondary job	000602	4.50%	2,158	2,148	-0.45%
Motor vehicle parts manufacturing	336300	2.70%	1,296	1,032	-20.39%
Employment services	561300	2.16%	1,038	1,314	26.56%
Plastics product manufacturing	326100	1.90%	910	965	6.00%
Miscellaneous durable goods merchant wholesalers	423900	1.40%	674	774	14.80%
Advertising and related services	541800	1.37%	657	741	12.83%
Navigational, measuring, electromedical, and control instruments manufacturing	334500	1.13%	541	518	-4.26%
Research and development in the physical, engineering, and life sciences	541710	1.11%	533	569	6.69%
Other general purpose machinery manufacturing	333900	0.94%	452	408	-9.73%
Medical equipment and supplies manufacturing	339100	0.91%	437	447	2.29%
Ventilation, heating, air-conditioning, and commercial refrigeration equipment manufacturing	333400	0.90%	430	396	-8.01%
Household appliance manufacturing	335200	0.86%	410	311	-24.33%



Top Industries for Engineering Managers

Industry	NAICS	% of Industry	Employment	Projected Employment	% Change
Semiconductor and other electronic component manufacturing	334400	5.67%	10,607	10,198	-3.85%
Navigational, measuring, electromedical, and control instruments manufacturing	334500	5.64%	10,555	10,105	-4.26%
Aerospace product and parts manufacturing	336400	5.52%	10,328	11,571	12.03%
Federal government, excluding postal service	919999	4.46%	8,341	7,885	-5.47%
Research and development in the physical, engineering, and life sciences	541710	3.89%	7,272	7,759	6.69%
Management of companies and enterprises	551100	3.75%	7,022	8,095	15.28%
Computer systems design and related services	541500	3.29%	6,158	8,314	35.02%
Local government, excluding education and hospitals	939300	3.02%	5,648	6,345	12.34%
Computer and peripheral equipment manufacturing	334100	2.41%	4,504	2,948	-34.54%
Motor vehicle parts manufacturing	336300	2.12%	3,971	3,162	-20.39%
Electric power generation, transmission and distribution	221100	2.04%	3,823	3,516	-8.03%
Communications equipment manufacturing	334200	1.74%	3,259	3,285	0.79%
Management, scientific, and technical consulting services	541600	1.72%	3,219	5,747	78.52%
Nonresidential building construction	236200	1.54%	2,888	3,236	12.05%
State government, excluding education and hospitals	929200	1.33%	2,489	2,442	-1.87%

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)