



TORO Analysis of Commercial and Industrial Designers to Mapping Technicians

INPUT SECTION:

Transfer	Title	O*NET	Filters		
From Title:	Commercial and Industrial Designers	27-1021.00	Abilities:	Importance Level: 50	Weight: 1
To Title:	Mapping Technicians	17-3031.02	Skills:	Importance Level: 69	Weight: 1
Labor Market Area:	Maine Statewide		Knowledge:	Importance Level: 69	Weight: 1

OUTPUT SECTION:

Grand TORQ:



88

Ability TORQ		Skills TORQ		Knowledge TORQ	
Level	91	Level	90	Level	81

Gaps To Narrow if Possible				Upgrade These Skills				Knowledge to Add			
Ability	Level	Gap	Impt	Skill	Level	Gap	Impt	Knowledge	Level	Gap	Impt
Flexibility of Closure	51	12	62	Active Learning	69	6	72	Geography	68	52	72
Mathematical Reasoning	51	10	65					Computers and Electronics	68	7	71
Near Vision	62	9	72								
Number Facility	51	9	56								
Perceptual Speed	42	7	59								
Speed of Closure	42	7	50								
Visual Color Discrimination	50	6	56								
Far Vision	50	6	50								
Finger Dexterity	46	5	59								
Information Ordering	59	2	68								
Written Expression	51	1	56								

LEVEL and IMPT (IMPORTANCE) refer to the Target Mapping Technicians. GAP refers to level difference between Commercial and Industrial Designers and Mapping Technicians.

ASK ANALYSIS

Ability Level Comparison - Abilities with importance scores over 50

Description	Commercial and Industrial Designers	Mapping Technicians	Importance



Near Vision	53	62	72
Written Comprehension	57	53	68
Information Ordering	57	59	68
Problem Sensitivity	50	48	65
Deductive Reasoning	55	53	65
Mathematical Reasoning	41	51	65
Flexibility of Closure	39	51	62
Inductive Reasoning	50	48	59
Perceptual Speed	35	42	59
Finger Dexterity	41	46	59
Oral Comprehension	57	55	56
Oral Expression	57	55	56
Written Expression	50	51	56
Number Facility	42	51	56
Visualization	51	50	56
Visual Color Discrimination	44	50	56
Category Flexibility	48	44	53
Selective Attention	37	37	53
Speech Clarity	46	42	53
Speed of Closure	35	42	50
Far Vision	44	50	50
Speech Recognition	44	44	50

Skill Level Comparison - Abilities with importance scores over 69

Description	Commercial and Industrial Designers	Mapping Technicians	Importance
Reading Comprehension	69	67	72
Active Learning	63	69	72
Critical Thinking	65	62	69
Time Management	67	59	69

Knowledge Level Comparison - Knowledge with importance scores over 69

Description	Commercial and Industrial Designers	Mapping Technicians	Importance
Geography	16	68	72
Computers and Electronics	61	68	71

Experience & Education Comparison

Related Work Experience Comparison				Required Education Level Comparison		
Description	Commercial and Industrial Designers		Mapping Technicians	Description	Commercial and Industrial Designers	Mapping Technicians
10+ years	0%	0%				



Experience Level	Commercial and Industrial Designers (%)	Mapping Technicians (%)
8-10 years	0%	0%
6-8 years	30%	0%
4-6 years	21%	16%
2-4 years	9%	18%
1-2 years	12%	27%
6-12 months	9%	12%
3-6 months	6%	2%
1-3 months	9%	0%
0-1 month	0%	5%
None	0%	17%

Education/Training	Commercial and Industrial Designers (%)	Mapping Technicians (%)
Doctoral	0%	0%
Professional Degree	0%	0%
Post-Masters Cert	0%	0%
Master's Degree	7%	5%
Post-Bachelor Cert	6%	6%
Bachelors	55%	14%
AA or Equiv	18%	28%
Some College	0%	12%
Post-Secondary Certificate	9%	23%
High School Diploma or GED	2%	9%
No HSD or GED	0%	0%

Commercial and Industrial Designers	Mapping Technicians
Most Common Educational/Training Requirement:	
Bachelor's degree	Moderate-term on-the-job training
Job Zone Comparison	
<p>4 - Job Zone Four: Considerable Preparation Needed A minimum of two to four years of work-related skill, knowledge, or experience is needed for these occupations. For example, an accountant must complete four years of college and work for several years in accounting to be considered qualified.</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>	<p>3 - Job Zone Three: Medium Preparation Needed 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.</p> <p>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.</p> <p>Employees in these occupations usually need one or two years of training involving both on-the-job experience and informal training with experienced workers.</p>

Tasks

Commercial and Industrial Designers	Mapping Technicians
Core Tasks	Core Tasks
<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, 	<p>Generalized Work Activities:</p> <ul style="list-style-type: none"> 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. Getting Information - Observing, receiving, and otherwise obtaining information from all relevant sources. Analyzing Data or Information - Identifying the underlying principles, reasons, or facts of information by breaking down information or data into separate parts. Identifying Objects, Actions, and Events - Identifying information by categorizing, estimating, recognizing differences or similarities, and detecting changes in circumstances or events.



estimating, recognizing differences or similarities, and detecting changes in circumstances or events.

Specific Tasks

Occupation Specific Tasks:

- 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 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

Specific Tasks

Occupation Specific Tasks:

- Analyze aerial photographs in order to detect and interpret significant military, industrial, resource, or topographical data.
- Answer questions and provide information to the public and to staff members regarding assessment maps, surveys, boundaries, easements, property ownership, roads, zoning, and similar matters.
- Calculate latitudes, longitudes, angles, areas, and other information for mapmaking, using survey field notes and reference tables.
- Check all layers of maps in order to ensure accuracy, identifying and marking errors and making corrections.
- Compare topographical features and contour lines with images from aerial photographs, old maps, and other reference materials in order to verify the accuracy of their identification.
- Complete detailed source and method notes detailing the location of routine and complex land parcels.
- Compute and measure scaled distances between reference points in order to establish relative positions of adjoining prints and enable the creation of photographic mosaics.
- Create survey description pages and historical records related to the mapping activities and specifications of section plats.
- Determine scales, line sizes, and colors to be used for hard copies of computerized maps, using plotters.
- Enter GPS data, legal deeds, field notes, and land survey reports into GIS workstations so that information can be transformed into graphic land descriptions, such as maps and drawings.
- Form three-dimensional images of aerial photographs taken from different locations, using mathematical techniques and plotting instruments.
- Identify and compile database information in order to create maps in response to requests.
- Identify, research, and resolve anomalies in legal land descriptions, referring issues to title and survey experts as appropriate.
- Lay out and match aerial photographs in sequences in which they were taken, and identify any areas missing from photographs.
- Monitor mapping work and the updating of maps in order to ensure accuracy, the inclusion of new and/or changed information, and compliance with rules and regulations.
- Produce and update overlay maps in



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
- 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

order to show information boundaries, water locations, and topographic features on various base maps and at different scales.

- Produce representations of surface and mineral ownership layers, by interpreting legal survey plans.
- Redraw and correct maps, such as revising parcel maps to reflect tax code area changes, using information from official records and surveys.
- Research and combine existing property information in order to describe property boundaries in relation to adjacent properties, taking into account parcel splits, combinations, and land boundary adjustments.
- Research resources such as survey maps and legal descriptions in order to verify property lines and to obtain information needed for mapping.
- Supervise and coordinate activities of workers engaged in plotting data and drafting maps; or in producing blueprints, photostats, and photographs.
- Trace contours and topographic details in order to generate maps that denote specific land and property locations and geographic attributes.
- Train staff members in duties such as tax mapping, the use of computerized mapping equipment, and the interpretation of source documents.
- Trim, align, and join prints in order to form photographic mosaics, maintaining scaled distances between reference points.

Detailed Tasks

Detailed Work Activities:

- analyze spatial data
- analyze technical data, designs, or preliminary specifications
- communicate technical information
- develop or maintain databases
- direct and coordinate activities of workers or staff
- draw maps or charts
- draw prototypes, plans, or maps to scale
- interpret aerial photographs
- read maps
- read technical drawings
- research property records
- 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 drafting or mechanical drawing techniques
- use field notes in technical drawings



- 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
- 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

- use geographical information system (GIS) software
- use spreadsheet software

Technology - Examples

Analytical or scientific software

- Digital elevation model DEM software
- ESRI ArcGIS (analytical or scientific feature)
- ESRI ArcGIS Spatial Analyst
- ESRI ArcToolbox
- PCI Geomatics software
- Trimble GPS Pathfinder

Application server software

- ESRI ArcSDE

Categorization or classification software

- PCI Geomatics eCognition

Charting software

- Microsoft Office Visio

Computer aided design CAD software

- 3D Nature LLC Visual Nature Studio
- 3D Nature LLC World Construction Set
- Autodesk 3d Studio Viz
- Autodesk AutoCAD Blue Sky
- Autodesk AutoCAD MAP3D
- Autodesk AutoCAD software
- Autodesk Land Desktop
- Bentley MicroStation
- Carlson SurvCADD

- Computer aided design CAD software

- ESRI ArcView 3D Analyst

- MicroSurvey software

Data base user interface and query software

- Database software

- ESRI ArcCatalog

- ESRI ArcEditor

- ESRI Personal Geodatabase

- Microsoft Access



- 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

- Desktop computers

- Compact digital cameras

- Universal serial bus USB flash drives

- Liquid crystal display LCD video projectors

- Laptop computers

- Personal computers

- Oracle software

- Structured query language SQL

- Trimble TerraSync

Desktop publishing software

- QuarkXpress Passport

Development environment software

- Microsoft Visual Basic

- Microsoft Visual Basic for Applications VBA

- Microsoft Visual Basic Scripting Edition VBScript

Graphics or photo imaging software

- Adobe Systems Adobe Freehand

- Adobe Systems Adobe Illustrator

- Adobe Systems Adobe Photoshop software

- Graphics software

Internet browser software

- Web browser software

Map creation software

- Bentley InRoads

- CARIS software

- ESRI ArcGIS (map creation feature)

- ESRI ArcIMS

- ESRI ArcInfo

- ESRI ArcView

- ESRI Maplex

- ESRI MapObjects

- IMAGINE OrthoBASE

- Intergraph software

- Leica Geosystems ERDAS IMAGINE

- Leica photogrammetry suite LPS software

- MapInfo software

- Mapping software

- RockWare ArcMap

- Trimble GPS software

- Tripod Data Systems COGO



Office suite software
<ul style="list-style-type: none"> • Microsoft Office
Presentation software
<ul style="list-style-type: none"> • Microsoft PowerPoint
Spreadsheet software
<ul style="list-style-type: none"> • Microsoft Excel
Web platform development software
<ul style="list-style-type: none"> • Hypertext markup language HTML • JavaScript
Word processing software
<ul style="list-style-type: none"> • Adobe Systems Adobe Writer
Tools - Examples
<ul style="list-style-type: none"> • Drafting compasses • Desktop computers • Digital cameras • Drafting kits • Global positioning system GPS devices • Laser printers • Notebook computers • Personal computers • Pocket personal computers PC • Plotters • Protractors • Engineering scales • Digitizers • T-squares • Tablet computers • Drafting templates • Triangles for drafting

Labor Market Comparison

Description	Commercial and Industrial Designers	Mapping Technicians	Difference
Median Wage	\$ 49,170	\$ 33,210	\$(15,960)



10th Percentile Wage	\$ 29,790	\$ 24,430	\$(5,360)
25th Percentile Wage	N/A	N/A	N/A
75th Percentile Wage	\$ 72,210	\$ 39,510	\$(32,700)
90th Percentile Wage	\$ 81,030	\$ 85,200	\$ 4,170
Mean Wage	\$ 53,870	\$ 39,320	\$(14,550)
Total Employment - 2007	140	190	50
Employment Base - 2006	153	200	47
Projected Employment - 2016	160	210	50
Projected Job Growth - 2006-2016	4.6 %	5.0 %	0.4 %
Projected Annual Openings - 2006-2016	5	5	0

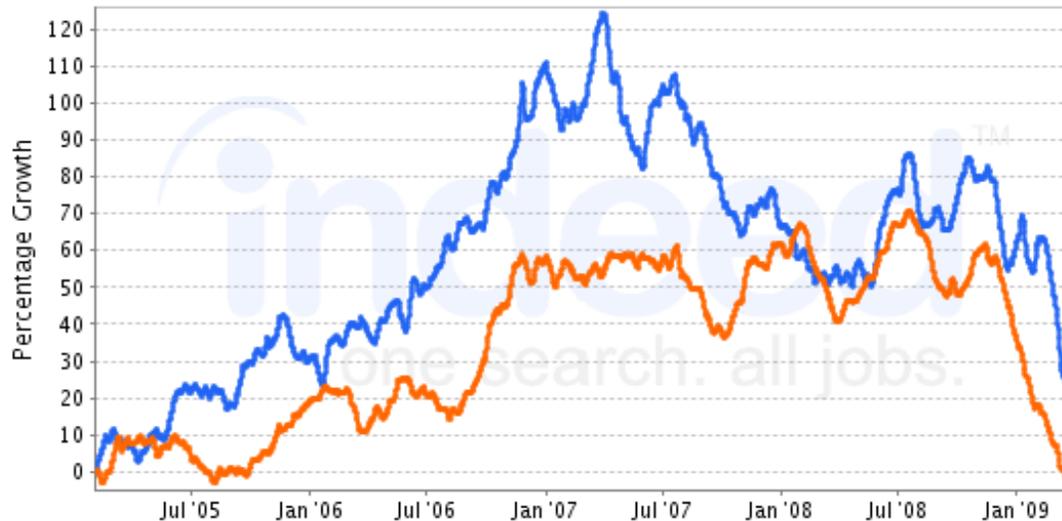
National Job Posting Trends

Trend for Commercial and Industrial Designers

Trend for
Mapping
Technicians

Job Trends from Indeed.com

— Industrial Designer — Mapping Technician

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

Recommended Programs

Surveying

Surveying Technology/Surveying. A program that prepares individuals to apply mathematical and scientific principles to the delineation, determination, planning and positioning of land tracts, land and water boundaries, land contours and features; and the preparation of related maps, charts and reports. Includes instruction in applied geodesy, computer graphics, photointerpretation, plane and geodetic surveying, mensuration, traversing, survey equipment operation and maintenance, instrument calibration, and basic cartography.

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



Cartography

Cartography. A program that focuses on the systematic study of map-making and the application of mathematical, computer, and other techniques to the science of mapping geographic information. Includes instruction in cartographic theory and map projections, computer-assisted cartography, map design and layout, photogrammetry, air photo interpretation, remote sensing, cartographic editing, and applications to specific industrial, commercial, research, and governmental mapping problems.

No schools available for the program

Maine Statewide Promotion Opportunities for Commercial and Industrial Designers

O*NET Code	Title	Grand TORQ	Job Zone	Employment	Median Wage	Difference	Growth	Annual Job Openings
27-1021.00	Commercial and Industrial Designers	100	4	140	\$49,170.00	\$0.00	5%	5
17-3026.00	Industrial Engineering Technicians	87	3	370	\$51,700.00	\$2,530.00	6%	9
17-2072.00	Electronics Engineers, Except Computer	87	4	210	\$76,420.00	\$27,250.00	-26%	4
17-2112.00	Industrial Engineers	87	4	580	\$68,350.00	\$19,180.00	11%	22
27-1022.00	Fashion Designers	87	3	60	\$71,370.00	\$22,200.00	19%	1
17-2121.02	Marine Architects	86	4	60	\$75,520.00	\$26,350.00	-9%	1
17-2111.03	Product Safety Engineers	85	5	90	\$49,940.00	\$770.00	3%	3
17-2131.00	Materials Engineers	85	4	40	\$70,250.00	\$21,080.00	-7%	1
11-9041.00	Engineering Managers	84	5	720	\$91,030.00	\$41,860.00	-2%	14
17-2071.00	Electrical Engineers	84	4	260	\$73,050.00	\$23,880.00	-10%	6
15-1051.00	Computer Systems Analysts	84	4	1,650	\$69,340.00	\$20,170.00	20%	78
17-2141.00	Mechanical Engineers	84	4	620	\$67,210.00	\$18,040.00	-9%	14
27-1011.00	Art Directors	83	4	90	\$66,570.00	\$17,400.00	10%	7
17-2111.02	Fire-Prevention and Protection Engineers	83	4	90	\$49,940.00	\$770.00	3%	3
15-1061.00	Database Administrators	82	4	300	\$60,260.00	\$11,090.00	20%	11

Top Industries for Mapping Technicians



Industry	NAICS	% in Industry	Employment	Projected Employment	% Change
Local government, excluding education and hospitals	939300	10.31%	7,789	8,750	12.34%
Self-employed workers, primary job	000601	4.17%	3,152	3,358	6.54%
State government, excluding education and hospitals	929200	3.24%	2,449	2,404	-1.87%
Electric power generation, transmission and distribution	221100	2.35%	1,773	1,630	-8.03%
Federal government, excluding postal service	919999	1.86%	1,405	1,328	-5.47%
Natural gas distribution	221200	0.99%	750	614	-18.15%
Management, scientific, and technical consulting services	541600	0.84%	633	1,131	78.52%
Oil and gas extraction	211100	0.35%	267	262	-1.68%
Employment services	561300	0.34%	259	328	26.56%
Testing laboratories	541380	0.34%	259	319	23.12%
Management of companies and enterprises	551100	0.31%	235	271	15.28%
Activities related to real estate	531300	0.21%	159	202	27.44%
Highway, street, and bridge construction	237300	0.19%	144	154	7.67%
Colleges, universities, and professional schools, public and private	611300	0.18%	137	154	11.87%
Support activities for mining	213100	0.18%	133	125	-5.93%

Top Industries for Commercial and Industrial Designers

Industry	NAICS	% in 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%