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INTERLINK

# FUTURE CONSTRUCTION INDUSTRY TRENDS TASK FORCE REPORT



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# INTRODUCTION

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According to the Associated General Contractors of America, employment opportunities throughout the Construction Industry are improving, especially in the North Central Texas

area. Construction unemployment has fallen sharply in the last four years, although from April 2010 to April 2014 there was a 1,123,000 decrease in construction employees. This in itself indicates opportunity because it is estimated that 674,000 construction employees left the industry during that time due to retirement, competition from other industry sectors and fewer veterans entering the industry. This has left widespread shortages in all facets of the industry.

The strength of the construction industry can be found in many segments such as:

- Multifamily
- Manufacturing, especially petrochemical, and oil and gas supply
- Oil & gas fields
- Pipelines
- Warehouses
- Lodging (hotels & resorts)
- Rail
- Data centers
- Highway and Roads

Discussion with the Construction Industry business community reflects concern that demand for highly skilled workers is greater than the supply.

In Texas, we have discovered a leak in the pipeline between the numbers of students who enter into college and the number who exit, which results in costly loss of expenditures and leads to a loss of skilled workers.

Since 1987, North Central Texas InterLink has been the leader in industry driven labor market forecasting for the North Central Texas region, to help influence the future of career and technical education programs at the secondary and post-secondary levels which prepares students for the workforce.

This report on the future of the Construction Industry is the third in a series of reports produced by InterLink about future trends in specific industries to help guide educators and students toward the next wave of knowledge, skills and technologies for education programs and practices. Previous Reports include the future of Information Technology and Health Care Industries. Subsequent reports will be published identifying the future of other industries.

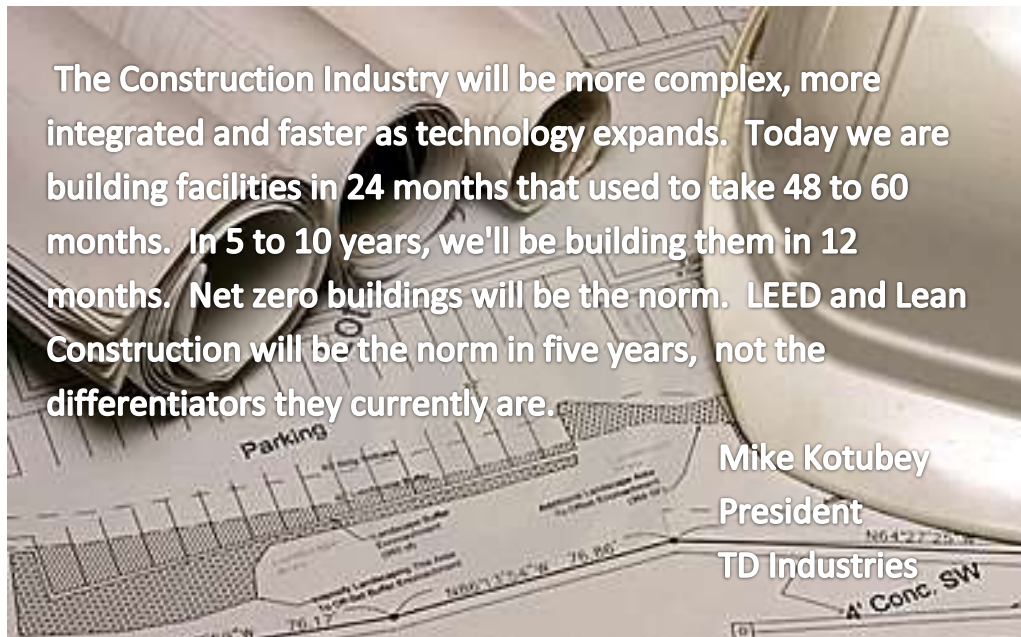
We were fortunate to have Construction Industry Partners involved with the endeavor whose members participated as Construction Industry Thought Leaders to identify future trends that will affect the industry.

This report identifies thirteen trends in the Construction Industry to help guide students in choosing a career and to assist

educators with the development of curriculum.

Participants who provided this information want to recognize the following:

- The timeline for these trends is current and change will be dynamic and constant.
- Quality, safety and ethics are integrated into every facet of the Construction Industry.
- It is important to have interdisciplinary understanding of the Construction Industry throughout the industry.



## METHODOLOGY

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The process used for this report was advancing foresight methodologies, using multiple techniques to aggregate expert opinions into the discipline of forecasting. By utilizing multiple sources of data collection such as forecast predictions, a thought leader work shop, an industry survey, and peer review, the Interlink task force was able to gather a comprehensive view of what industry leaders see as the future of the Construction Industry.

InterLink’s annual 26<sup>th</sup> Regional Employer Labor Market Five-Year Forecast began as a starting point.

The research was enhanced by a workshop with North Texas Construction Industry thought leaders from a diverse range of disciplines and professional backgrounds, engaging them in exercises to identify key drivers of change and how these will shape work skill requirements.

Thought Leaders were surveyed after the event for additional thoughts and input.

Finally, peer reviewers analyzed the results of the thought leader session to enrich and vet the research.

This structured and disciplined process will be followed for subsequent thought leader groups, as we research other industries, to ensure systematic and robust data collection.

It is with gratitude to InterLink’s partners in this endeavor: TEXO, AIA, CEF, the InterLink Industry Trends Task Force Leaders, and the Construction Industry Thought Leaders who made this study possible.

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## TASK FORCE MEMBERS

**Chair: Tu Huynh**, Vice President, Infrastructure Technology Services, Comerica Bank

**Vice Chair and Thought Leader Facilitator: Leon Kao**, Certified R6σ Expert, SAS Engineering North Texas Regional Lead, Raytheon

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**Candy Slocum**, InterLink

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**Adrienne Williams**, Pegasus Link Construction

## PROJECT PARTNER ORGANIZATIONS

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**Jan Blackmon**, American Institute of Architects (AIA) - Dallas

**Brad Brown**, TEXO

**Jane Hanna**, Construction Education Foundation (CEF)

**Candy Slocum**, InterLink



**American Institute of Architects AIA Dallas**, the seventh largest chapter of The American Institute of Architects, empowers architects to excel and impact their practice, profession and community. AIA Dallas has a membership base of more than 2,000 members and 300 architectural firms.



**Construction Education Foundation of North Texas** or better known as **CEF Inc** located near the DFW Airport is a college dedicated to providing students and employees in the construction industry avenues of broadening their skill levels and providing classes that will enable them to further advance within their current employment situation or to further advance their Construction Industry Careers.



**InterLink** is a nonprofit organization with 26 years of labor market and industry trend forecasting. InterLink acts as a bridge between business and education providing secondary and post-secondary education institutions in the Dallas/Fort Worth region industry driven forecasts for Career and Technical Education program planning and curriculum development to train a highly skilled regional workforce.



**TEXO** combines the two largest national construction associations to unify, advocate, and advance the construction industry in North and East Texas. Representing the leading general contractors and specialty contractors in our region, TEXO members are critical to the growth, economic standing, and improvement of our area.

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## CONSTRUCTION THOUGHT LEADERS

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**Glenn W. Anderson**, Turner Construction Co.  
**Katie Coyle**, Webber LLC  
**Alvaro Gomez –Muro**, North Tarrant Infrastructure, LLC (NTI)  
**John Hinson**, Marek Brothers Systems  
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**Adrienne Williams**, Pegasus Link Construction

## PEER REVIEWERS

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**Kim Hilt**, Walsh Group (Archer Western)  
**Lisa W. Lamkin**, BRW Architects (Brown Reynolds Watford Architects)

***Trend: Technology Process ~ Creating or modifying products, processes, systems, services or environments to meet needs and realize opportunities.***

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### **Necessary Skills**

Ability to analyze for value added  
Building Information Modeling (BIM) applications  
Computer rendering  
Computer technology  
Cost Estimating  
Drones/Robotic applications  
Technology applications  
Lidar scanning  
Mathematics  
Mobil technology (iPad, etc.)  
Development or proficiency of new industry related technology  
Scheduling  
Simulation analysis  
Technical writing  
Systems development & integration  
Value analysis

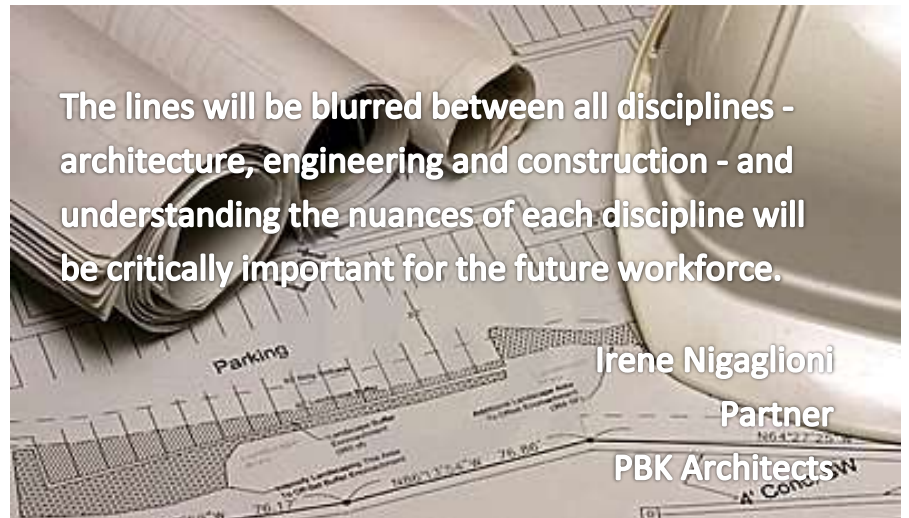


**Trend: Globalization** ~ The process of international integration arising from the interchange of world views, products, ideas, and other aspects of culture.

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## Necessary Skills

Administrative skills  
Bi-lingual or multi foreign language skills  
Communication/speaking skills  
Competition  
Contracts management  
International business and taxation issues  
Multicultural assimilation  
Multi-discipline studies  
National and international geography studies  
Procurement processes  
Supply Chain Management  
Sustainability  
Team building  
Water conservation



***Trend: Project Related Processes ~ Planning and controlling the performance or execution of a project.***

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## **Necessary Skills**

Administrative skills

Close out processes

Communication/speaking skills

Construction project scheduling

Cost control

Cost control

Engineering Degree - Civil or Construction Architectural, Engineering or Construction certifications

Excel proficiency

Integrated Form of Agreement

Integrated Project Delivery Process (PDP)

LEAN process applications

Power Point/ Visual/Graphic Design/Video Communication & Production skills

Quality

Set-based design skills - interior and exterior

Statistician/ Statistical Analysis

Teamwork/ Collaboration and Team Leadership skills

Technical writing

Value Engineering

Values matrix alignment - Spatial Program Development and Analysis

Visualization: Graphic Design

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***Trend: Education*** ~ The process of receiving or giving systematic instruction. For Construction, this includes the long history of the industry.

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### **Necessary Skills**

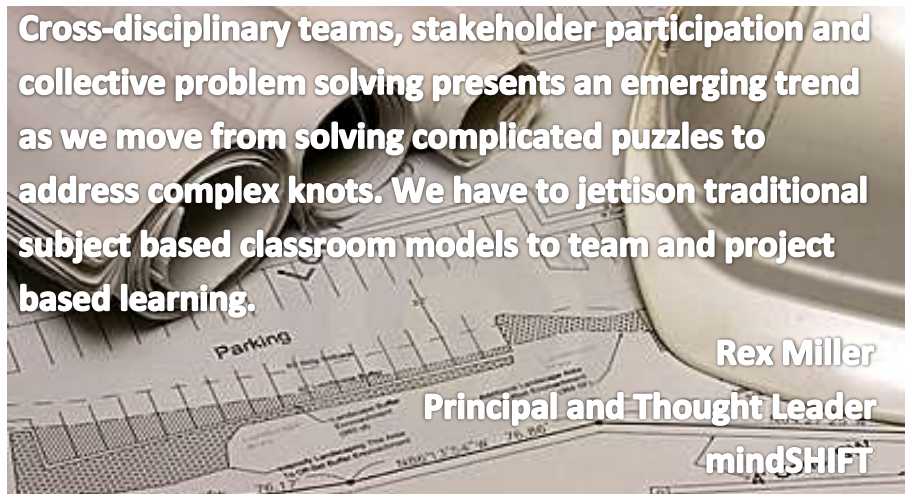
Accreditation/Certification requirements	Excel
Administrative skills	High performing teams
Attitude of continuous learning	Innovative and critical thinking
Change management	Leadership
Civil Engineers	LEED app
Communication skills/Public speaking/Presentation	Licensing
Construction materials	Licensing requirements and regulations
Construction math	Mentoring /shadowing program
Construction law	Methods and terminology
Cross training	Specialty trade tasks competency
Design History and Theory	Technical writing
Early internship participation	Tools
English and/or Spanish as a second language	Life Safety/Code Proficiency
	Video Design/Production

**Trend: Digital Systems and Automation** ~ A **digital system** includes any of the levels of operation for a digital computer, including the wires and mechanical parts, the logical elements, and the functional units for reading, writing, storing, and manipulating information, while **Automation** reduces the need for human work in the production of goods and services. They help to increase productivity and the quality of the goods produced.

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### Necessary Skills

3-D Printing	LEAN tools
4-D Modeling	Life cycle simulation
5-D Modeling and beyond	Mathematics
Automated Field Equipment - Computer Driven	Modify/Adapt existing tools
Building Information Modeling (BIM)	Mobile Technology Plan Grid System for file management
Drone inspection for safety	Process analysis and development
Drone survey and site review	(Process mopping)
Efficiency expertise	Quality assurance/control
Energy modeling	Quantity Estimating take off
Global Positional System (GPS)	Robotics
Industrial Design	Self driving vehicles



***Trend: Renewable Energy/Sustainability ~ meets the needs of the present without compromising the ability of future generations to meet their needs. Technologies that promote sustainable energy include renewable energy sources, such as bioenergy, hydroelectricity, solar energy, wind energy, wave power, geothermal energy, artificial photosynthesis, tidal power and also technologies designed to improve energy efficiency.***

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## **Necessary Skills**

Bio mimicry

Biophilia

Energy renewal

Engineering

Environmental regulations

Facility wellness

Funding sources

Green environments

Holistic design

Innovation

Materials – new and smart materials

Regenerative design

Return on investment analysis

Self-contained and Smart sustaining buildings independent of the grid

Smart buildings

Social Anthropology

Sustainability/maintenance of business and Project Life Span

Waste reduction

Zero carbon foot print design

***Trend: Pre Fabrication*** ~ The practice of assembling components of a structure in a factory or other manufacturing site, and transporting complete assemblies or sub-assemblies to the construction site where the structure is to be located.

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## Necessary Skills

Constructionability knowledge  
Cost reduction productivity improvement  
Design  
Digital fabrication  
Industrial design  
Innovation  
Logistics Management  
Logistics training - how to ship  
Multi-trade understanding  
Patent filing



***Trend: Virtual Process Management*** ~ A method of efficiently aligning an organization with the wants and needs of clients. It is a holistic management approach that promotes business effectiveness and efficiency while striving for innovation, flexibility and integration with technology. As organizations strive for attainment of their objectives they attempt to continuously improve processes - to define, measure and improve optimization.

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## Necessary Skills

Applications writing  
Cloud Network  
Computer savvy  
Data analysis  
LEAN tools  
Process understanding  
Programming



***Trend: Talent Acquisition Marketing*** ~ The process of finding and acquiring skilled human labor for organizational needs and to meet any labor requirement. When used in the context of the recruiting and HR profession, talent acquisition usually refers to the talent acquisition department or team within the Human Resources department. The talent acquisition team within a company is responsible for finding, acquiring, assessing, and hiring candidates to fill roles that are required to meet company goals and fill project requirements.

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### **Necessary Skills**

Cultural sensitivity

Engaging with others

Graphic design

Interpersonal skills

Listening and learning

Marketing education

Professional development

Public relations

Recruitment

Relationship Manager (Liaison)

Speaking skills communication

Writing skills



***Trend: Business Process*** ~ A business process or business method is a collection of related, structured activities or tasks that produce a specific service or product (serve a particular goal) for a particular customer or customers.

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### Necessary Skills

Accounting	Finance Manager
Administrative skills,	Health and welfare
Change management	Human resources
Choosing by advantages decision making	LEAN (A3)
	Letter/Email writing
Collaboration	Math
Communication and speaking skills	MBA
Construction law	Office management
DOLS	Office technicians
Equipment management;	Power Point
Estimating	Record keeping
Excel	Technical writing
	Time management

**Trend: Safety** ~ *The condition of being protected from or unlikely to cause danger, risk, or injury.*

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### Necessary Skills

Accountability

Behavioral based safety

Communication

Developing a safety mind set and culture

Ergonomics

Hazard recognition

Hazardous materials

Hazardous materials management;

Nano data analysis behavior focus

Nutrition and dietary skills;

OSHA 10

People skills

Physical fitness

Preventative care and wellness training

Required reporting and paperwork

Safety Data Sheets and Globally Harmonized Systems

Team building skills



***Trend: Trade Skills ~ In addition to "hands-on" skills and knowledge of building processes, traditional trade practitioners incorporate knowledge of historic preservation, materials science, historic architecture, and procuring replacement materials. Contemporary practitioners of traditional trades must also avail themselves of modern technologies, current materials science, and 21st century construction project management.***

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### **Necessary Skills**

Artisan vs Task	Materials Science
Basic Mobil applications	Math
Building Automation and Controls	Mechanical repair
Carpentry	Pipefitting
Commercial Driver's License (CDL)	Plumbing
Construction materials	Radioactive materials
Construction methods	Rod butting/busting
Equipment operation	Sheet Metal Fabrication and installation
Excel	
Facility type expertise	Splitter - Fiber Optics
Industry structure and terminology	Tools and equipment
Material Testing Technicians	Welding

***Trend: Virtual Design/Construction (VDC) Operations*** ~ The management of integrated multi-disciplinary performance models of design-construction projects, including the product (i.e., facilities), work flow and organization of the design - construction - operation team in order to support explicit business objectives.

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### ***Necessary Skills***

3-D Design

Architect

BIM Coordinator

Collaboration

Computer training

Concept based analysis

Conceptual job costing

Constructability

Design

Design Principles

Discipline coordination

Energy modeling

Ethnographics

Landscape design

Life cycle analysis

Materials and methods

Parametric modeling

Problem solving

Programming

Renderer

Team based work

Time management

Understanding the whole - not the discipline trade offs

Visualization



## Workplace Basic Skills and Attributes for Entry Level Workers

The following skills and attributes for entry level employees were identified by the Texas Workforce Commission. The Future Trends Participants ranked them by need in the workshop follow up survey. Not all Thought Leaders responded to the survey.

Skill/ Attribute	Percentage	No. Respondents
Oral Communication	100.0%	15
Teamwork	93.3%	14
Work Ethic	93.3%	14
Initiative	86.7%	13
Integrity	86.7%	13
Written Communication	80.0%	12
Pride in Work	80.0%	12
Following Directions	80.0%	12
Attention to Detail	80.0%	12
Adaptability	80.0%	12
Willingness to continue learning	80.0%	12
Dedication	66.7%	10
Professionalism	66.7%	10
Problem-solving	60.0%	9
Perseverance	60.0%	9
Time Management	60.0%	9
Technology and Tool Usage	60.0%	9
Numerical and Arithmetic Application	53.3%	8
Customer Service	53.3%	8
Creativity	53.3%	8
Information Gathering	53.3%	8
Decision-making	46.7%	7
Leadership	40.0%	6
Conflict Management	40.0%	6
Appreciation of Diversity	33.3%	5
Intellectual Risk-taking	26.7%	4
Organization	26.7%	4
Conflict Management	26.7%	4
Thoughtful Reflection	20.0%	3
Resource Allocation	20.0%	3
Multi-tasking	20.0%	3
Stress Management	20.0%	3

**Other suggestions:** Ability to overcome obstacles and challenges; entrepreneurial thinking, exhibit energy; moral foundation; positive attitude

# ARCHITECTURE AND CONSTRUCTION CAREERS

**Note: The following comprehensive list of careers may have inadvertently omitted occupation opportunities. Please confirm before completing career choices.**

**Source of information: Texas Workforce Commission ~ Compiled by InterLink**

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SOC 13-2011: Accountants and Auditors

Examine, analyze, and interpret accounting records to prepare financial statements, give advice, or audit and evaluate statements prepared by others. Install or advise on systems of recording COSTs or other financial and budgetary data. Excludes Tax Examiners and Collectors, and Revenue Agents (13-2081).

SOC 17-1011: Architects, Except Landscape and Naval

Plan and design structures, such as private residences, office buildings, theaters, factories, and other structural property. Excludes Landscape Architects (17-1012) and Marine Engineers and Naval Architects (17-2121).

SOC 17-3011: Architectural and Civil Drafters

Prepare detailed drawings of ARCHITECTURAL and structural features of buildings or drawings and topographical relief maps used in civil engineering projects, such as highways, bridges, and public works. Use knowledge of building materials, engineering practices, and mathematics to complete drawings.

SOC 11-9041: Architectural and Engineering Managers

Plan, direct, or coordinate activities in such fields as ARCHITECTURE and engineering or research and development in these fields. Excludes Natural Sciences Managers (11-9121).

SOC 25-1031: Architecture Teachers, Postsecondary

Teach courses in ARCHITECTURE and architectural design, such as architectural environmental design, interior ARCHITECTURE/design, and landscape ARCHITECTURE. Includes both teachers primarily engaged in teaching and those who do a combination of teaching and research.

SOC 47-2011: Boilermakers

Construct, assemble, maintain, and repair stationary steam boilers and boiler house auxiliaries. Align structures or plate sections to assemble boiler frame tanks or vats, following blueprints. Work involves use of hand and power tools, plumb bobs, levels, wedges, dogs, or turnbuckles. Assist in testing assembled vessels. Direct cleaning of boilers and boiler furnaces. Inspect and repair boiler fittings, such as safety valves, regulators, automatic-control mechanisms, WATER columns, and auxiliary machines.

SOC 43-3031: Bookkeeping, Accounting, and Auditing Clerks

Compute, classify, and record numerical data to keep financial records complete. Perform any combination of routine calculating, posting, and verifying duties to obtain primary financial data for use in maintaining accounting records. May also check the accuracy of figures, calculations, and postings pertaining to business transactions recorded by other workers. Excludes Payroll and Timekeeping Clerks (43-3051).

SOC 47-2021: Brickmasons and Blockmasons

Lay and bind building materials, such as brick, structural tile, concrete block, cinder block, GLASS block, and terra-cotta block, with mortar and other substances to construct or repair walls, partitions, arches, sewers,

and other structures. Excludes Stonemasons (47-2022). Installers of mortarless segmental concrete masonry wall units are classified in Landscaping and Groundskeeping Workers (37-3011).

SOC 51-7011: Cabinetmakers and Bench Carpenters

Cut, shape, and assemble wooden articles or set up and operate a variety of woodworking machines, such as power saws, jointers, and mortisers to surface, cut, or shape lumber or to fabricate parts for wood products. Excludes Woodworking Machine Setters, Operators, and Tenders (51-7040).

SOC 47-2031: Carpenters

Construct, erect, install, or repair structures and fixtures made of wood, such as concrete forms; building frameworks, including partitions, joists, studding, and rafters; and wood stairways, window and door frames, and hardwood floors. May also install cabinets, siding, drywall and batt or roll insulation. Includes brattice builders who build doors or brattices (ventilation walls or partitions) in underground passageways

SOC 17-3022: Civil Engineering Technicians

Apply theory and principles of civil engineering in planning, designing, and overseeing CONSTRUCTION and maintenance of structures and facilities under the direction of engineering staff or physical scientists.

SOC 17-2051: Civil Engineers

Perform engineering duties in planning, designing, and overseeing construction and maintenance of building structures, and facilities, such as roads, railroads, airports, bridges, harbors, channels, dams, irrigation projects, pipelines, power plants, and water and sewage systems. Includes ARCHITECTURAL, structural, traffic, ocean, and geo-technical engineers. Excludes Hydrologists (19-2043).

SOC 49-9092: Commercial Divers

Work below surface of **WATER**, using scuba gear to inspect, repair, remove, or install equipment and structures. May use a variety of power and hand tools, such as drills, sledgehammers, torches, and welding equipment. May conduct tests or experiments, rig explosives, or photograph structures or marine life. Excludes Fishers and Related Fishing Workers (45-3011), Athletes and Sports Competitors (27-2021), and Police and Sheriff's Patrol Officers (33-3051).

SOC 13-1041: Compliance Officers

Examine, evaluate, and investigate eligibility for or conformity with laws and regulations governing contract compliance of licenses and permits, and perform other compliance and enforcement inspection and analysis activities not classified elsewhere. Excludes Financial Examiners (13-2061), Tax Examiners and Collectors, and Revenue Agents (13-2081), Occupational Health and SAFETY Specialists (29-9011), Occupational Health and SAFETY Technicians (29-9012), Transportation Security Screeners (33-9093), Agricultural Inspectors (45-2011), Construction and Building Inspectors (47-4011), and Transportation Inspectors (53-6051).

SOC 47-2061: Construction Laborers

Perform tasks involving physical labor at CONSTRUCTION sites. May operate hand and power tools of all types: air hammers, earth tampers, cement mixers, small mechanical hoists, surveying and measuring equipment, and a variety of other equipment and instruments. May clean and prepare sites, dig trenches, set braces to support the sides of excavations, erect scaffolding, and clean up rubble, debris and other waste materials. May assist other craft workers. CONSTRUCTION laborers who primarily assist a particular craft worker are classified under Helpers, CONSTRUCTION Trades (47-3010). Excludes Hazardous Materials Removal Workers (47-4041).

SOC 11-9021: Construction Managers

Plan, direct, or coordinate, usually through subordinate supervisory personnel, activities concerned with the CONSTRUCTION and maintenance of structures, facilities, and systems. Participate in the conceptual development of a CONSTRUCTION project and oversee its organization, scheduling, budgeting, and implementation. Includes managers in specialized CONSTRUCTION fields, such as carpentry or plumbing.

SOC 47-4099: Construction and Related Workers, All Other

All CONSTRUCTION and related workers not listed separately.

SOC 47-4799: Construction and Related Workers, All Other

This OES occupation is a combination of data collected for the 2010 SOC occupations 47-2231 Solar Photovoltaic Installers, 47-4099 CONSTRUCTION and Related Workers, All Other and the 2000 SOC occupation 47-4099 CONSTRUCTION and Related Workers, All Other.

SOC 49-9012: Control and Valve Installers and Repairers, Except Mechanical Door

Install, repair, and maintain mechanical regulating and controlling devices, such as electric meters, gas regulators, thermostats, SAFETY and flow valves, and other mechanical governors.

SOC 13-1051: Cost Estimators

Prepare cost estimates for product manufacturing, CONSTRUCTION projects, or services to aid management in bidding on or determining price of product or service. May specialize according to particular service performed or type of product manufactured.

SOC 33-9091: Crossing Guards

Guide or control vehicular or pedestrian traffic at such places as streets, schools, railroad crossings, or CONSTRUCTION sites.

SOC 51-9031: Cutters and Trimmers, Hand

Use hand tools or hand-held power tools to cut and trim a variety of manufactured items, such as carpet, fabric, stone, GLASS, or rubber.

SOC 53-7031: Dredge Operators

Operate DREDGE to remove sand, gravel, or other materials in order to excavate and maintain navigable channels in waterways.

SOC 47-2081: Drywall and Ceiling Tile Installers

Apply plasterboard or other wallboard to ceilings or interior walls of buildings. Apply or mount acoustical tiles or blocks, strips, or sheets of shock-absorbing materials to ceilings and walls of buildings to reduce or reflect sound. Materials may be of decorative quality. Includes lathers who fasten wooden, metal, or rockboard lath to walls, ceilings or partitions of buildings to provide support base for plaster, fire-proofing, or acoustical material. Excludes Carpet Installers (47-2041), CARPENTERS (47-2031), and Tile and Marble Setters (47-2044)

SOC 47-5021: Earth Drillers, Except Oil and Gas

Operate a variety of drills such as rotary, churn, and pneumatic to tap sub-surface water and salt deposits, to remove core samples during mineral exploration or soil testing, and to facilitate the use of explosives in mining or CONSTRUCTION. May use explosives. Includes horizontal and earth boring machine operators.



**SOC 17-3012: Electrical and Electronics Drafters**

Prepare wiring diagrams, circuit board assembly diagrams, and layout drawings used for the manufacture, installation, or repair of electrical equipment.

**SOC 47-2111: Electricians**

Install, maintain, and repair electrical wiring, equipment, and fixtures. Ensure that work is in accordance with relevant codes. May install or service street lights, intercom systems, or electrical control systems. Excludes Security and Fire Alarm Systems Installers (49-2098).

**SOC 47-4021: Elevator Installers and Repairers**

Assemble, install, repair, or maintain electric or hydraulic freight or passenger ELEVATORS, escalators, or dumbwaiters.

**SOC 51-2031: Engine and Other Machine Assemblers**

Construct, assemble, or rebuild machines, such as engines, turbines, and similar equipment used in such industries as CONSTRUCTION, extraction, textiles, and paper manufacturing.

**SOC 19-4091: Environmental Science and Protection Technicians, Including Health**

Perform laboratory and field tests to monitor the environment and investigate sources of pollution, including those that affect health, under the direction of an environmental scientist, engineer, or other specialist. May collect samples of gases, soil, WATER, and other materials for testing.

**SOC 53-7032: Excavating and Loading Machine and Dragline Operators**

Operate or tend machinery equipped with scoops, shovels, or buckets, to excavate and load loose materials. Excludes DREDGE Operators (53-7031).

**SOC 13-2061: Financial Examiners**

Enforce or ensure compliance with LAWS and regulations governing financial and securities institutions and financial and real estate transactions. May examine, verify, or authenticate records.

**SOC 33-2021: Fire Inspectors and Investigators**

Inspect buildings to detect fire hazards and enforce local ordinances and State LAWS, or investigate and gather facts to determine cause of fires and explosions.

**SOC 37-1012: First-Line Supervisors of Landscaping, Lawn Service, and Groundskeeping Workers**

Directly supervise and coordinate activities of workers engaged in landscaping or groundskeeping activities. Work may involve reviewing contracts to ascertain service, machine, and workforce requirements; answering inquiries from potential customers regarding methods, material, and price ranges; and preparing estimates according to labor, material, and machine COSTs.

**SOC 11-1021: General and Operations Managers**

Plan, direct, or coordinate the operations of public or private sector organizations. Duties and responsibilities include formulating policies, managing daily operations, and planning the use of materials and human resources, but are too diverse and general in nature to be classified in any one functional area of management or administration, such as personnel, purchasing, or administrative services. Excludes FIRST-LINE Supervisors.

**SOC 47-2121: Glaziers**

Install GLASS in windows, skylights, store fronts, and display cases, or on surfaces, such as building fronts, interior walls, ceilings, and tabletops

SOC 17-2111: Health and Safety Engineers, Except Mining Safety Engineers and Inspectors  
Promote worksite or product safety by applying knowledge of industrial processes, mechanics, chemistry, psychology, and industrial health and safety laws. Includes industrial product safety ENGINEERS.

SOC 49-9021: Heating, Air Conditioning, and Refrigeration Mechanics and Installers (HVAC)  
Install or repair heating, central air conditioning, or refrigeration systems, including oil burners, hot-air furnaces, and heating stoves.

SOC 47-3011: Helpers--Brickmasons, Blockmasons, Stonemasons, and Tile and Marble Setters  
Help brickmasons, blockmasons, stonemasons, or tile and marble setters by performing duties requiring less skill. Duties include using, supplying or holding materials or tools, and cleaning work area and equipment. CONSTRUCTION laborers who do not primarily assist brickmasons, blockmasons, and stonemasons or tile and marble setters are classified under CONSTRUCTION Laborers (47-2061). Apprentice workers are classified with the appropriate skilled CONSTRUCTION trade occupation (47-2011 through 47-2231).

SOC 47-3012: Helpers--Carpenters  
Help carpenters by performing duties requiring less skill. Duties include using, supplying or holding materials or tools, and cleaning work area and equipment. CONSTRUCTION laborers who do not primarily assist carpenters are classified under CONSTRUCTION Laborers (47-2061). Apprentice workers are classified with the appropriate skilled CONSTRUCTION trade occupation (47-2011 through 47-2231).

SOC 47-3019: Helpers, Construction Trades, All Other  
All CONSTRUCTION trades helpers not listed separately.

SOC 47-3013: Helpers--Electricians  
Help electricians by performing duties requiring less skill. Duties include using, supplying or holding materials or tools, and cleaning work area and equipment. CONSTRUCTION laborers who do not primarily assist electricians are classified under CONSTRUCTION Laborers (47-2061). Apprentice workers are classified with the appropriate skilled CONSTRUCTION trade occupation (47-2011 through 47-2231).

SOC 47-5081: Helpers--Extraction Workers  
Help extraction craft workers, such as earth drillers, blasters and explosives workers, derrick operators, and mining machine operators, by performing duties requiring less skill. Duties include supplying equipment or cleaning work area. Apprentice workers are classified with the appropriate skilled CONSTRUCTION trade occupation (47-2011 through 47-2231).

SOC 47-3014: Helpers--Painters, Paperhangers, Plasterers, and Stucco Masons  
Help painters, paperhangers, plasterers, or stucco masons by performing duties requiring less skill. Duties include using, supplying or holding materials or tools, and cleaning work area and equipment. CONSTRUCTION laborers who do not primarily assist painters, paperhangers, plasterers, or stucco masons are classified under CONSTRUCTION Laborers (47-2061). Apprentice workers are classified with the appropriate skilled CONSTRUCTION trade occupation (47-2011 through 47-2231).

SOC 47-3015: Helpers--Pipelayers, Plumbers, Pipefitters, and Steamfitters  
Help plumbers, pipefitters, steamfitters, or pipelayers by performing duties requiring less skill. Duties include using, supplying or holding materials or tools, and cleaning work area and equipment. CONSTRUCTION laborers who do not primarily assist plumbers, pipefitters, steamfitters, or pipelayers are

classified under CONSTRUCTION Laborers (47-2061). Apprentice workers are classified with the appropriate skilled CONSTRUCTION trade occupation (47-2011 through 47-2231).

SOC 47-3016: Helpers--Roofers

Help roofers by performing duties requiring less skill. Duties include using, supplying or holding materials or tools, and cleaning work area and equipment. CONSTRUCTION laborers who do not primarily assist roofers are classified under CONSTRUCTION Laborers (47-2061). Apprentice workers are classified with the appropriate skilled CONSTRUCTION trade occupation (47-2011 through 47-2231).

SOC 47-4051: Highway Maintenance Workers

Maintain highways, municipal and rural roads, airport runways, and rights-of-way. Duties include patching broken or eroded pavement, repairing guard rails, highway markers, and snow fences. May also mow or clear brush from along road or plow snow from roadway. Excludes Tree Trimmers and Pruners (37-3013).

SOC 53-7041: Hoist and Winch Operators

Operate or tend hoists or winches to lift and pull loads using power-operated cable equipment. Excludes CRANE and Tower Operators (53-7021).

SOC 17-2112: Industrial Engineers

Design, develop, test, and evaluate integrated systems for managing industrial production processes, including human work factors, quality control, inventory control, logistics and material flow, cost analysis, and production coordination. Excludes Health and SAFETY Engineers, Except Mining SAFETY Engineers and Inspectors (17-2111).

SOC 53-7051: Industrial Truck and Tractor Operators

Operate industrial trucks or tractors equipped to move materials around a warehouse, storage yard, factory, CONSTRUCTION site, or similar location. Excludes Logging Equipment Operators (45-4022).

SOC 49-9799: Installation, Maintenance, and Repair Workers, All Other

This OES occupation is a combination of data collected for the 2010 SOC occupations 49-9081 Wind Turbine Service Technicians, 49-9099 Installation, Maintenance, and Repair Workers, All Other and the 2000 SOC occupation 49-9099 Installation, Maintenance, and Repair Workers, All Other.

SOC 47-2131: Insulation Workers, Floor, Ceiling, and Wall

Line and cover structures with insulating materials. May work with batt, roll, or blown INSULATION materials.

SOC 47-2132: Insulation Workers, Mechanical

Apply insulating materials to pipes or ductwork, or other mechanical systems in order to help control and maintain temperature.

SOC 27-1025: Interior Designers

Plan, design, and furnish interiors of residential, commercial, or industrial buildings. Formulate design which is practical, aesthetic, and conducive to intended purposes, such as raising productivity, selling merchandise, or improving life style. May specialize in a particular field, style, or phase of interior design. Excludes Merchandise Displayers and Window Trimmers (27-1026).

SOC 17-1012: Landscape Architects

Plan and design land areas for projects such as parks and other recreational facilities, airports, highways, hospitals, schools, land subdivisions, and commercial, industrial, and residential sites.

SOC 37-3011: Landscaping and Groundskeeping Workers

Landscape or maintain grounds of property using hand or power tools or equipment. Workers typically perform a variety of tasks, which may include any combination of the following: sod laying, mowing, trimming, planting, watering, fertilizing, digging, raking, sprinkler installation, and installation of mortarless segmental concrete masonry wall units. Excludes Farmworkers and Laborers, Crop, Nursery, and Greenhouse (45-2092).

SOC 23-1011: Lawyers

Represent clients in criminal and civil litigation and other legal proceedings, draw up legal documents, or manage or advise clients on legal transactions. May specialize in a single area or may practice broadly in many areas of LAW.

SOC 49-9071 & 49-9042: Maintenance and Repair Workers, General

Perform work involving the skills of two or more maintenance or craft occupations to keep machines, mechanical equipment, or the structure of an establishment in repair. Duties may involve pipe fitting; boiler making; insulating; welding; machining; carpentry; repairing electrical or mechanical equipment; installing, aligning, and balancing new equipment; and repairing buildings, floors, or stairs. Excludes Maintenance Workers, Machinery (49-9043).

SOC 17-2131: Materials Engineers

Evaluate materials and develop machinery and processes to manufacture materials for use in products that must meet specialized design and performance specifications. Develop new uses for known materials.

Includes those ENGINEERS working with composite materials or specializing in one type of material, such as graphite, metal and metal alloys, ceramics and glass, plastics and polymers, and naturally occurring materials. Includes metallurgists and metallurgical ENGINEERS, ceramic ENGINEERS, and welding ENGINEERS.

SOC 49-9011: Mechanical Door Repairers

Install, service, or repair automatic door mechanisms and hydraulic doors. Includes garage door mechanics.

SOC 17-3013: Mechanical Drafters

Prepare detailed working diagrams of machinery and mechanical devices, including dimensions, fastening methods, and other engineering information.

SOC 17-2141: Mechanical Engineers

Perform engineering duties in planning and designing tools, engines, machines, and other mechanically functioning equipment. Oversee installation, operation, maintenance, and repair of equipment such as centralized heat, gas, WATER, and steam systems.

SOC 49-9044: Millwrights

Install, dismantle, or move machinery and heavy equipment according to layout plans, blueprints, or other drawings.

SOC 49-3042: Mobile Heavy Equipment Mechanics, Except Engines

Diagnose, adjust, repair, or overhaul mobile mechanical, hydraulic, and pneumatic equipment, such as cranes, bulldozers, graders, and conveyors, used in CONSTRUCTION, logging, and surface mining. Excludes Rail Car Repairers (49-3043) and Bus and Truck Mechanics and Diesel Engine Specialists (49-3031).

SOC 51-9195: Molders, Shapers, and Casters, Except Metal and Plastic

Mold, shape, form, cast, or carve products such as food products, figurines, tile, pipes, and candles consisting of clay, glass, PLASTER, concrete, stone, or combinations of materials.

SOC 29-9011: Occupational Health and Safety Specialists

Review, evaluate, and analyze work environments and design programs and procedures to control, eliminate, and prevent disease or injury caused by chemical, physical, and biological agents or ergonomic factors. May conduct inspections and enforce adherence to laws and regulations governing the health and SAFETY of individuals. May be employed in the public or private sector. Includes environmental protection officers.

SOC 29-9012: Occupational Health and Safety Technicians

Collect data on work environments for analysis by occupational health and SAFETY specialists. Implement and conduct evaluation of programs designed to limit chemical, physical, biological, and ergonomic risks to workers.

SOC 47-2073: Operating Engineers and Other Construction Equipment Operators

Operate one or several types of power CONSTRUCTION equipment, such as motor graders, bulldozers, scrapers, compressors, pumps, derricks, shovels, tractors, or front-end loaders to excavate, move, and grade earth, erect structures, or pour concrete or other hard surface pavement. May repair and maintain equipment in addition to other duties. Excludes Crane and Tower Operators (53-7021) and Extraction Workers (47-5000).

SOC 47-2141: Painters, Construction and Maintenance

Paint walls, equipment, buildings, bridges, and other structural surfaces, using brushes, rollers, and spray guns. May remove old paint to prepare surface prior to painting. May mix colors or oils to obtain desired color or consistency. Excludes Paperhangers (47-2142).

SOC 47-2142: Paperhangers

Cover interior walls or ceilings of rooms with decorative wallpaper or fabric, or attach advertising posters on surfaces such as walls and billboards. May remove old materials or prepare surfaces to be papered.

SOC 47-2071 Paving, Surfacing, and Tamping Equipment Operators

Operate equipment used for applying concrete, asphalt, or other materials to road beds, parking lots, or airport runways and taxiways, or equipment used for tamping gravel, dirt, or other materials. Includes concrete and asphalt paving machine operators, form tampers, tamping machine operators, and stone spreader operators.

SOC 43-3051: Payroll and Timekeeping Clerks

Compile and record employee time and payroll data. May compute employees' time worked, production, and commission. May compute and post wages and deductions, or prepare paychecks. Excludes Bookkeeping, Accounting, and Auditing Clerks (43-3031).

SOC 47-2072: Pile-Driver Operators

Operate pile drivers mounted on skids, barges, crawler treads, or locomotive CRANES to drive pilings for retaining walls, bulkheads, and foundations of structures, such as buildings, bridges, and piers.

SOC 47-2151: Pipelayers

Lay pipe for storm or sanitation sewers, drains, and WATER mains. Perform any combination of the following tasks: grade trenches or culverts, position pipe, or seal joints. Excludes Welders, Cutters, Solderers, and Brazers (51-4121).

SOC 47-2161: Plasterers and Stucco Masons

Apply interior or exterior PLASTER, cement, stucco, or similar materials. May also set ornamental PLASTER.

SOC 47-2152: Plumbers, Pipefitters, and Steamfitters

Assemble, install, alter, and repair pipelines or pipe systems that carry water, steam, air, or other liquids or gases. May install heating and cooling equipment and mechanical control systems. Includes sprinklerfitters.

SOC 43-5061: Production, Planning, and Expediting Clerks

Coordinate and expedite the flow of work and materials within or between departments of an establishment according to production schedule. Duties include reviewing and distributing production, work, and shipment schedules; conferring with department supervisors to determine progress of work and completion dates; and compiling reports on progress of work, inventory levels, costs, and production problems. Excludes Weighers, Measurers, Checkers, and Samplers, Recordkeeping (43-5111).

SOC 13-1023: Purchasing Agents, Except Wholesale, Retail, and Farm Products

Purchase machinery, equipment, tools, parts, supplies, or services necessary for the operation of an establishment. Purchase raw or semi-finished materials for manufacturing. Excludes Buyers and Purchasing Agents, Farm Products (13-1021) and Wholesale and Retail Buyers, Except Farm Products (13-1022).

SOC 11-3061: Purchasing Managers

Plan, direct, or coordinate the activities of buyers, purchasing officers, and related workers involved in purchasing materials, products, and services. Includes wholesale or retail trade merchandising managers and procurement managers.

SOC 53-4013: Rail Yard Engineers, Dinkey Operators, and Hostlers

Drive switching or other locomotive or dinkey engines within railroad yard, industrial plant, quarry, CONSTRUCTION project, or similar location.

SOC 47-2171: Reinforcing Iron and Rebar Workers

Position and secure STEEL bars or mesh in concrete forms in order to reinforce concrete. Use a variety of fasteners, rod-bending machines, blowtorches, and hand tools. Includes rod busters.

SOC 49-9096: Riggers

Set up or repair rigging for CONSTRUCTION projects, manufacturing plants, logging yards, ships and shipyards, or for the entertainment industry.

SOC 47-2181: Roofers

Cover roofs of structures with shingles, slate, asphalt, aluminum, wood, or related materials. May spray roofs, sidings, and walls with material to bind, seal, insulate, or soundproof sections of structures.

SOC 49-2098: Security and Fire Alarm Systems Installers

Install, program, maintain, and repair security and fire alarm wiring and equipment. Ensure that work is in accordance with relevant codes. Excludes ELECTRICIANS (47-2111) who do a broad range of electrical wiring.

SOC 27-1027: Set and Exhibit Designers

Design special exhibits and movie, television, and theater sets. May study scripts, confer with directors, and conduct research to determine appropriate ARCHITECTURAL styles.

SOC 47-2211: Sheet Metal Workers

Fabricate, assemble, install, and repair SHEET METAL products and equipment, such as ducts, control boxes, drainpipes, and furnace casings. Work may involve any of the following: setting up and operating fabricating machines to cut, bend, and straighten SHEET METAL; shaping metal over anvils, blocks, or forms using hammer; operating soldering and welding equipment to join SHEET METAL parts; or inspecting, assembling, and smoothing seams and joints of burred surfaces. Includes SHEET METAL duct installers who install prefabricated SHEET METAL ducts used for heating, air conditioning, or other purposes.

SOC 47-2022: Stonemasons

Build stone structures, such as piers, walls, and abutments. Lay walks, curbstones, or special types of masonry for vats, tanks, and floors.

SOC 47-2221: Structural Iron and Steel Workers

Raise, place, and unite iron or STEEL girders, columns, and other structural members to form completed structures or structural frameworks. May erect metal storage tanks and assemble prefabricated metal buildings. Excludes Reinforcing Iron and Rebar Workers (47-2171).

SOC 47-1011: Supervisors of Construction and Extraction Workers

Directly supervise and coordinate activities of CONSTRUCTION or extraction workers.

SOC 17-3031: Surveying and Mapping Technicians

Perform surveying and mapping duties, usually under the direction of an engineer, surveyor, cartographer, or photogrammetrist to obtain data used for CONSTRUCTION, mapmaking, boundary location, mining, or other purposes. May calculate mapmaking information and create maps from source data, such as surveying notes, aerial photography, satellite data, or other maps to show topographical features, political boundaries, and other features. May verify accuracy and completeness of maps. Excludes Surveyors (17-1022), Cartographers and Photogrammetrists (17-1021), and Geoscientists, Except Hydrologists and Geographers (19-2042).

SOC 17-1022: Surveyors

Make exact measurements and determine property boundaries. Provide data relevant to the shape, contour, gravitation, location, elevation, or dimension of land or land features on or near the earth's surface for engineering, mapmaking, mining, land evaluation, CONSTRUCTION, and other purposes.

SOC 47-2082: Tapers

Seal joints between Plasterboard or other wallboard to prepare wall surface for painting or papering.

SOC 47-2053: Terrazzo Workers and Finishers

Apply a mixture of cement, sand, pigment, or marble chips to floors, stairways, and cabinet fixtures to fashion durable and decorative surfaces.

SOC 47-2044: Tile and Marble Setters

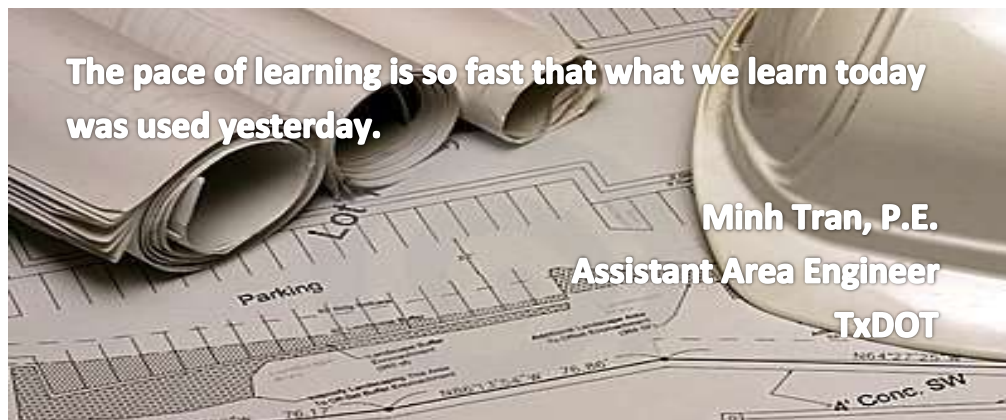
Apply hard tile, marble, and wood tile to walls, floors, ceilings, and roof decks.

SOC 23-2093: Title Examiners, Abstractors, and Searchers

Search real estate records, examine titles, or summarize pertinent legal or insurance documents or details for a variety of purposes. May compile lists of mortgages, contracts, and other instruments pertaining to titles by searching public and private records for LAW firms, real estate agencies, or title insurance companies.

SOC 51-4121: Welders, Cutters, Solderers, and Brazers

Use hand-welding, flame-cutting, hand soldering, or brazing equipment to weld or join metal components or to fill holes, indentations, or seams of fabricated metal products.





# GLOSSARY OF TERMINOLOGY OF NECESSARY SKILLS

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**3-D Printing** - 3D printing or additive manufacturing (AM) is any of various processes for making a three-dimensional object of almost any shape from a 3D model or other electronic data source primarily through additive processes in which successive layers of material are laid down under computer control. Source: AiA.org

**4-D Modeling** - 4D BIM, an acronym for 4D Building Information Modeling and a term widely used in the CAD industry, refers to the intelligent linking of individual 3D CAD components or assemblies with time- or schedule-related information. The use of the term 4D is intended to refer to the fourth dimension: time, i.e. 4D is 3D + schedule (time). The construction of the 4D models enables the various participants (from architects, designers, contractors to owners) of a construction project, to visualize the entire duration of a series of events and display the progress of construction activities through the lifetime of the project. This BIM-centric approach towards project management technique has a very high potential to improve the project management and delivery of construction project, of any size or complexity. Source: AiA.org

**5-D Modeling** - More than model-based estimating. It's a new way of working with the Owner and the project stakeholders, bringing a wealth of information and experience to the project in a visually communicative way. Source: AiA.org

**Ability to learn and relearn** - To succeed today you must be in a constant state of adaptation – continually unlearning old ‘rules’ and relearning new ones. That requires continually questioning assumptions about how things work, challenging old paradigms, and ‘relearning’ what is now relevant in your job, your industry, your career and your life. Source: Forbes

**Accountability** - The obligation of an individual or organization to account for its activities, accept responsibility for them, and to disclose the results in a transparent manner. It also includes the responsibility for money or other entrusted property. Source: BusinessDirectory.com

**Accounting** - A systematic process of identifying, recording, measuring, classifying, verifying, summarizing, interpreting and communicating financial information. It reveals profit or loss for a given period, and the value and nature of a firm's assets, liabilities and owners' equity. Source: www.businessdictionary.com

**Accreditation/Certification requirements** - Certification of competence in a specified subject or areas of expertise, and of the integrity of an agency, firm, group, or person, awarded by a duly recognized and respected accrediting organization. Source: www.businessdictionary.com

**Administrative skills** - Skills that are required for success in administration, such as communicating, computing, organizing, planning, scheduling, or staffing. Source: www.businessdictionary.com

**Applications writing** - Form or paper which indicates interest in a particular place of employment, position within a company, product or service. Typically requests personal or business identification information, such as name, address and phone number, as well as a history of job experience, financial strength, ability to perform a skill or use of knowledge. Source: www.businessdirectory.com

**Architectural, Engineering or Construction certifications** - Professional certification, trade certification, or professional designation, often called simply certification or qualification, is a designation earned by a person to assure qualification to perform a job or task. Not all certifications that use post-nominal letters are an acknowledgement of educational achievement, or an agency appointed to safeguard the public interest. Source: [www.businessdirectory.com](http://www.businessdirectory.com)

**Artificial photosynthesis** - A chemical process that replicates the natural process of photosynthesis, a process that converts sunlight, water, and carbon dioxide into carbohydrates and oxygen. The term is commonly used to refer to any scheme for capturing and storing the energy from sunlight in the chemical bonds of a fuel (a solar fuel). Photocatalytic water splitting converts water into protons (and eventually hydrogen) and oxygen, and is a main research area in artificial photosynthesis. Light-driven carbon dioxide reduction is another studied process, replicating natural carbon fixation. Source: [www.businessdirectory.com](http://www.businessdirectory.com)

**Artisan vs Task** - Narrow specialization of tasks within a production process so that each worker can become a specialist in doing one thing, especially on an assembly line. In traditional industries, division of labor is a major motive force for economic-growth. However, in the era of mass customization (which requires multiple skills and very short machine change-over time), division of labor has become much more flexible. Also called specialization of labor. Source: [www.businessdictionary.com](http://www.businessdictionary.com)

**Attitude of continuous learning** - Ongoing learning process that seeks to incorporate the lessons learnt (from the results of already implemented changes) into a continuous improvement program that includes ongoing learning throughout one's life. Source: [www.businessdictionfry.com](http://www.businessdictionfry.com)

**Automated field equipment** - The technique, method, or system of operating or controlling a process by highly automatic means, as by electronic devices, reducing human intervention to a minimum. Can be Computer Driven. Source: [Dictionary.com](http://Dictionary.com)

**Basic Mobil applications** - Most commonly referred to as an app, is a type of application software designed to run on a mobile device, such as a smartphone or tablet computer. Mobile applications frequently serve to provide users with similar services to those accessed on PCs. Each app provides limited and isolated functionality which allow consumers to hand-pick what their devices are able to do. Source: [Wikipedia](http://Wikipedia)

**Behavior Based Safety (BBS)** - Is a process that creates a safety partnership between management and employees that continually focuses people's attentions and actions on theirs, and others, daily safety behavior. It "focuses on what people do, analyzes why they do it, and then applies a research-supported intervention strategy to improve what people do". At its very core BBS is based on a larger scientific field called Organizational behavior management. Source: [Wikipedia](http://Wikipedia)

**Bi-lingual or Multi Foreign language skills** - speaking more than one language fluently. May include writing in the second language. Source: [Wikipedia](http://Wikipedia)

**Bioenergy** - Is renewable energy made available from materials derived from biological sources. Biomass is any organic material which has stored sunlight in the form of chemical energy. As a fuel it may include wood, wood waste, straw, manure, sugarcane, and many other byproducts from a variety of agricultural processes. Source: [Wikipedia](http://Wikipedia)

**Biomimicry** - Biomimicry (from bios, meaning life, and mimesis, meaning to imitate) is a new discipline that studies nature's best ideas and then imitates these designs and processes to solve human problems. Source: [Biomimicry Institute](http://Biomimicry Institute)

**Biophilia** -A love of life and the living world; the affinity of human beings for other life forms. Source: [www.businessdictionary.com](http://www.businessdictionary.com)

**Building Automation Systems (BAS)** - Centralized, interlinked, networks of hardware and software, which monitor and control the environment in commercial, industrial, and institutional facilities. While managing various building systems, the automation system ensures the operational performance of the facility as well as the comfort and safety of building occupants. Source: KMCCcontrols.com

**Building Information Modeling (BIM)** - Is a process involving the generation and management of digital representations of physical and functional characteristics of places. Source: AiA.org

**Carpentry** - A skilled trade in which the primary work performed is the cutting, shaping and installation of building materials during the construction of buildings, ships, timber bridges, concrete formwork, etc. Carpenters traditionally worked with natural wood and did the rougher work such as framing, but today many other materials are also used<sup>[1]</sup> and sometimes the finer trades of cabinetmaking and furniture building are considered carpentry. Carpenters are usually the first tradesmen on a job and the last to leave. Carpenters normally framed post-and-beam buildings until the end of the 19th century; now this old fashioned carpentry is called timber framing. Carpenters learn this trade by being employed through an apprenticeship training—normally 4 years—and qualify by taking the successfully completing that country's department of labor competency test. Source: BLS.gov

**Change management** - an approach to transitioning individuals, teams, and organizations to a desired future state. In a project management context, change management may refer to a project management process wherein changes to the scope of a project are formally introduced and approved. Source: changemanagement.com

**Choosing by Advantages decision making** - Choosing By Advantages (CBA) is a tested and effective system for determining the best decision by looking at the advantages of each option. Source: www.businessdictionary.com

**Civil Engineers** - Design, construct, supervise, operate, and maintain large construction projects and systems, including roads, buildings, airports, tunnels, dams, bridges, and systems for water supply and sewage treatment. Source: Bureau of Labor Statistics

**Close out processes** - The contract close-out process is usually a simple but detailed administrative procedure. The purpose is to verify that both parties to the contract have fulfilled their contractual obligations and there are not responsibilities remaining. In addition, contract close-out is the time to assess the success of the contract and determine if there are any lessons learned for future contracting. A contract is completed when all goods or services have been received and accepted; all reports have been delivered and accepted; all administrative actions have been accomplished; all agency furnished equipment and material have been returned; and final payment has been made to the contractor. Source: Texas Comptroller

**Cloud Network** - The delivery of computing as a service rather than a product, whereby shared resources, software, and information are provided to computers and other devices as a utility (like the electricity grid) over a network (typically the Internet). Source: Wikipedia

**Collaboration** - A working practice whereby individuals work together to a common purpose to achieve business benefit. -Source: AIM.org

**Collaboration and Team Leadership skills** - The ability to work effectively with others on a common task; taking actions which respect the needs and contributions of others; contributing to and accepting the consensus; negotiating a win-win solution to achieve the objectives of the team. The ability to work effectively with others on a common task; taking actions which respect the needs and contributions of others; contributing to and accepting the consensus; negotiating a win-win solution to achieve the objectives of the team. Source: businessinsider.com

**Commercial Driver's License (CDL)** - A driver's license required in the United States to operate any type of vehicle weighing more than 10,001 lb. (4536 kg) for commercial use, or transports quantities of hazardous materials that require warning placards under Department of Transportation regulations, or that is designed to transport 9 or more passengers (including driver) for compensation, or 16 or more passengers (including the driver), for non-compensation. This includes, but is not limited to, tow trucks, tractor trailers, and buses. Source: Texas Department of Transportation

**Communication** - The imparting or exchanging of information or news. Source: Wikipedia

**Competition**- An event or contest in which people compete. Source: Wikipedia

**Computer Rendering** - Rendering is the process of generating an image from a model (or models in what collectively could be called a scene file), by means of computer programs. Also, the results of such a model can be called a rendering. Source: Wikipedia

**Computer savvy** - Advanced skills in the use of computers. Source: Reverso.net

**Computer technology** - The study of the hardware and software that are the foundations of modern computer systems which are a fundamental part of everyday lives. Source: [www.businessdictionary.com](http://www.businessdictionary.com)

**Construction ability knowledge** - Complex skills and abilities that can be used in real life are the true goal of learning. Being able to construct complex buildings shows an understanding of mathematical concepts and complex engineering concepts. Source: [www.businessdictionary.com](http://www.businessdictionary.com)

**Construction Law** - A branch of law that deals with matters relating to building construction, engineering and related fields. It is in essence an amalgam of contract law, commercial law, planning law, employment law and tort. Source: Wikipedia

**Construction materials** - Article, item, material, or supply consumed or used in a construction project and incorporated in the constructed building or structure. Source: [www.businessdictionary.com](http://www.businessdictionary.com)

**Construction math** - Construction workers must use math in a variety of ways while practicing their trade, including taking measurements, converting quantities and solving equations. While it is not necessary for construction workers to have an advanced education, they must be comfortable with basic mathematics and capable of performing several simple operations. Construction workers must be able to add, subtract, divide and multiply as well as work with fractions.

Taking accurate measurements is a mathematical skill, and it is crucial that construction workers are able to do so. Additionally, construction workers must be able to convert between various units of measure, which requires the use of equations. For example, if a construction worker must convert millimeters to inches, he must divide the number of millimeters by 25.4 to obtain its equivalent number of inches. Construction workers must also use ratios frequently. For example, when figuring out the proportions of the roof's length to its height, a construction worker must be able to divide the length by the height to obtain the correct ratio. Some construction workers must also understand the principles of geometry. For example, it is often important to know the length of a triangle's hypotenuse in cases where it is difficult to measure. But by using the Pythagorean theorem, the construction worker can deduce the length of the hypotenuse by measuring the other sides of the triangle. Source: [www.constructionknowledge.net](http://www.constructionknowledge.net)

**Construction methods** - The procedures and techniques utilized during construction. Construction operations are generally classified according to specialized fields. These include preparation of the project site, earth-moving, foundation treatment, steel erection, concrete placement, asphalt paving, and electrical and mechanical installations. Procedures for each of these fields are generally the same, even when applied to different projects, such as buildings, dams, or airports. However, the relative importance of each field is not the same in all cases. Source: [thefreedictionary.com](http://thefreedictionary.com)

**Construction project scheduling** - The tool that communicates what work needs to be performed, which resources of the organization will perform the work and the timeframes in which that work needs to be performed. The project schedule should reflect all of the work associated with delivering the project on time. Source: [www.businessdictionary.com](http://www.businessdictionary.com)

**Contracts management** - Or contract administration is the management of contracts made with customers, vendors, partners, or employees. Contract management includes negotiating the terms and conditions in contracts and ensuring compliance with the terms and conditions, as well as documenting and agreeing on any changes or amendments that may arise during its implementation or execution. It can be summarized as the process of systematically and efficiently managing contract creation, execution, and analysis for the purpose of maximizing financial and operational performance and minimizing risk. Source: [Wikipedia.com](http://Wikipedia.com)

**Cost control** - The practice of managing and/or reducing business expenses. Cost controls starts by the businesses identifying what their costs are and evaluate whether those costs are reasonable and affordable. Then, if necessary, they can look for ways to cut costs through methods such as cutting back, moving to a less expensive plan or changing service providers. The cost-control process seeks to manage expenses ranging from phone, internet and utility bills to employee payroll and outside professional services. Source: [Businessdirectory.com](http://Businessdirectory.com)

**Cost Estimating** - The cost estimate is the product of the cost estimating process. The cost estimate has a single total value and may have identifiable component values. A problem with a cost overrun can be avoided with a credible, reliable, and accurate cost estimate. An estimator is the professional who prepares cost estimates. Source: [Businessdirectory.com](http://Businessdirectory.com)

**Cost reduction productivity improvement** - The process used by companies to reduce their costs and increase their profits. Depending on a company's services or Product, the strategies can vary. Every decision in the product development process affects cost. Source: [Businessdirectory.com](http://Businessdirectory.com)

**Critical thinking**- The disciplined process in which you analyze, reflect and apply prior knowledge (making connections and using schema) to get the best answer possible. Your explanation of the ways in which aspects of structure/style/language contribute to the meaning/effect/impact of the chosen text(s). There is also a sequential, convergent nature to critical thinking. Each stage or step of the thought process must be analyzed and found to be correct before moving on to the next steps, and so on toward a purposeful end. This is a structured process. For example: "If A then B, if B then C, if C then D." If each step is reasoned and correct then also: "if A then D follows." This patterned process is different than creative thinking or intuitive thinking. Source: [www.wiki.answers.com](http://www.wiki.answers.com)

**Cross training** - Involves teaching an employee who was hired to perform one job function the skills required to perform other job functions. Employees involved in cross-training programs become skilled at tasks outside the usual parameters of their jobs and thus become greater assets for the company while gaining knowledge and skills that benefit them personally. Source: [www.inc.com](http://www.inc.com)

**Cultural sensitivity** - Encompasses the knowledge, awareness and acceptance of other cultures. [Www.businessdirectory.com](http://Www.businessdirectory.com)

**Data analysis** - the process of systematically applying statistical and/or logical techniques to describe and illustrate, condense and recap, and evaluate data. Source: [hhs.gov](http://hhs.gov)

**Design History and Theory** - Theoretical questions related to cities, urbanization, urbanism and urban planning, whether in historical or contemporary contexts to foster critical thinking regarding the social, economic, political and spatial processes that have produced urbanized built environments, and their consequences for everyday life, social reproduction, politics, and environmental conditions. Source: Harvard.edu

**Design** - Is the creation of a plan or convention for the construction of an object or a system (as in architectural blueprints, engineering drawings, business processes, circuit diagrams and sewing patterns). Design has different connotations in different fields. Source: AiA.org

**Design skills** - Interior and Exterior -Evaluation of principles, traditions, and requirements of building in all its aspects, interior and exterior by combining ethical judgment and technical proficiency in pursuit of excellence, whether the product of our expertise is a physical or intellectual construction through sensitivity to the aesthetic and social responsibilities of environmental intervention; the life-long cultivation of a broad, synthesizing, and humanistic world view; respect for the benefits of research and innovation; deepened commitment to specific lines of inquiry; and an advanced understanding of the culture of practice. Source: AiA.org

**Developing a safety mind set and culture** - A new focus has emerged, based on the insight that the actual behavior of employees is influenced by more than the ability to act in a certain way. Safe behavior depends on having a safety mindset, and a team culture that supports communication and cooperation between individuals. That way of working involves people seeing safety as part of their professionalism. Achieving sustainable improvements in safety performance often requires a change in the way an organization approaches and thinks about safety. To succeed, a safety management improvement process must address all three fundamental elements of the safety management triangle: Work Environment: This includes equipment, housekeeping and engineered systems; People: The knowledge, skills, abilities, values and attitudes of the people in the workplace; and Behaviors: This encompasses the performance of assignments, observations, communications, etc. Source: SafetySmart.com

**Digital Fabrication** - Digital modeling and fabrication is a process that joins design with the Construction/ Production through the use of 3D modeling software and additive and subtractive manufacturing processes. These tools allow designers to produce digital materiality, which is something greater than an image on screen, and actually tests the accuracy of the software and computer lines. Computer milling and fabrication integrate the computer assisted designs with that of the construction industry. In this process, the sequence of operations becomes the critical characteristic in procedure. Architects can propose complex surfaces, where the properties of materials should push the design. Source: Wikipedia

### **DOLS - Department of Labor?**

**Drone applications** - "Drones" are probably the most advanced equipment in the field of robotics, aeronautics and electronics. The technical name of drones is "Unmanned Aerial Vehicles" (UAVs). They are aerial vehicles which come in wide varieties of sizes, shapes and functions, which are controlled either by remote or control systems from the ground. They are generally used to carry out tasks in which manned flight is considered to be risky. In the future drones could be used by the construction industry to survey properties, inspect buildings and workplaces for safety. Source: eadanddigest.com

**Efficiency** - Generally describes the extent to which time, effort or cost is well used for the intended task or purpose. It is often used with the specific purpose of relaying the capability of a specific application of effort to produce a specific outcome effectively with a minimum amount or quantity of waste, expense, or unnecessary effort. Source: Wikipedia

**Energy modeling** - Assess the energy use of a building and to quantify the savings attributable to the proposed design. Properly used, energy modeling can help optimize the building design and allow the design team to prioritize investment in the strategies that will have the greatest effect on the building's energy use. Source: [www.businessdictionary.com](http://www.businessdictionary.com)

**Engaging with others** - Is a milestone on the way to becoming an effective leader. Armed with a deeper understanding of yourself, your motivations your talents and areas of 'non-talent' you are in a much better position to develop your ability to work effectively with and to inspire and lead others. [Engagingminds.biz](http://Engagingminds.biz)

**Engineering** - The branch of science and technology concerned with the design, building, and use of engines, machines, and structures. Source: [BLS.gov](http://BLS.gov)

**English and/or Spanish** - The use or study of English or Spanish by speakers with different native languages. Source: Wikipedia

**Environmental regulations** - The U.S. Environmental Protection Agency (EPA) and state environmental agencies regulate the impact of businesses on the environment. The EPA develops and enforces regulations that implement environmental laws enacted by Congress. [www.sba.gov](http://www.sba.gov)

**Equipment management** - Is responsible for procedures related to the management and control of all inventorial equipment under the care and custody of the organization.

**Equipment operation** - Using the appropriate equipment or machines in the minimum amount of time, safely with unnecessary wear and tear. Source: [NCCER.org](http://NCCER.org)

**Ergonomics** - Or human factors - is the scientific discipline concerned with the understanding of interactions among humans and other elements of a system, and the profession that applies theory, principles, data and methods to design in order to optimize human well-being and overall system performance. Source: The International Ergonomics Association

**Estimating** - Computation of a price with regard to time and resource requirements upon which a firm quotation is based. Source: [www.businessdictionary.com](http://www.businessdictionary.com)

**Excel** - Software developed and manufactured by Microsoft Corporation that allows users to organize, format, and calculate data with formulas using a spreadsheet system broken up by rows and columns. Source: [www.businessdictionary.com](http://www.businessdictionary.com)

**Facility wellness** - Detailed study based on environmental assessment (EA) to determine the type and level of effects an existing facility is having, or a proposed project would have on the facility. [www.businessdictionary.com/.../environmental-impact-assessment-EIA.html](http://www.businessdictionary.com/.../environmental-impact-assessment-EIA.html)

**Finance Manager** - Financial managers are responsible for the financial health of an organization. They produce financial reports, direct investment activities, and develop strategies and plans for the long-term financial goals of their organization. Source: Bureau of Labor Statistics

**Funding sources** - When starting a business or growing existing business, you almost certainly will need money. This money can come from many different sources. Roughly speaking, investments break down into two forms: debt and equity. Debt is taken on when money is borrowed from a lender, and interest is paid on that investment over time. Or, one can take on an equity investment -- in which a portion of the company or product is sold to an investor in return for cash or something else of value. New businesses often find it easier to get money from individuals or groups of individuals, while companies which have a track record of success are more apt to find an audience with institutional lenders. Source: Small business association

**Geothermal energy** - Thermal energy generated and stored in the Earth. Thermal energy is the energy that determines the temperature of matter. The geothermal energy of the Earth's crust originates from the original formation of the planet (20%) and from radioactive decay of minerals (80%). The geothermal gradient, which is the difference in temperature between the core of the planet and its surface, drives a continuous conduction of thermal energy in the form of heat from the core to the surface.

**Global Harmonized Systems** - An internationally accepted system for standardizing and harmonizing the classification and labelling of chemicals. It is a logical and comprehensive approach to: Defining health, physical and environmental hazards of chemicals; Creating classification processes that use available data on chemicals for comparison with the defined hazard criteria; and Communicating hazard information, as well as protective measures, on labels and Safety Data Sheets (SDS). Source: [www.OSHA.gov](http://www.OSHA.gov)

**Global Positional System (GPS)** - A space-based satellite navigation system that provides location and time information in all weather conditions, anywhere on or near the Earth where there is an unobstructed line of sight to four or more GPS satellites. Source: Wikipedia

**Graphic design** - A creative process that combines art and technology to communicate ideas. The designer works with a variety of communication tools in order to convey a message from a client to a particular audience. The main tools are image and typography. Source: AIGA.org

**Green environments** - Are generally healthier, more comfortable, more durable, and more energy efficient and have a much smaller environmental footprint than conventional buildings. Sustainable properties are the future and demand, residential builders, federal government incentives, and local government policy are making driving the initiative for green environments.

**Hazard recognition** - The act of recognizing a chance or condition of being injured or harmed. Source: <http://www.fdrsafety.com>

**Hazardous materials** - Any substance or material could adversely affect the safety of the public, handlers or carriers during transportation. The Department of Transportation identified nine classes of hazardous materials: Explosives, Compressed Gases, Flammable Liquids, Flammable Solids, Oxidizers and Organic Peroxides, Toxic Materials, Radioactive Material, Corrosive Material, Miscellaneous. Source: [USDOT.gov](http://USDOT.gov)

**Hazardous materials management** - Comprehensive regulations addressing the generation, storage, collection, transport, treatment, disposal, use, reuse and recycling of hazardous waste and material. Source: [www.nahmma.org/](http://www.nahmma.org/)

**Health and Welfare** - The general well-being of individuals and societies. It has a wide range of contexts, including the fields of international development, healthcare, politics and employment. It includes the built environment, physical and mental health, education, recreation and leisure time, and social belonging. Source: [www.dol.gov](http://www.dol.gov)

**High performing teams** - A concept within organization development referring to teams, organizations, or virtual groups that are highly focused on their goals and that achieve superior business results. High-performance teams outperform all other similar teams and they outperform expectations given their composition. [www.highperformanceteams.com](http://www.highperformanceteams.com)



**Historic preservation** - Is an endeavor that seeks to preserve, conserve and protect buildings, objects, landscapes or other artifacts of historical significance. It tends to refer specifically to the preservation of the built environment, and not to preservation of, for example, primeval forests or wilderness.

**Holistic design** - Holistic design is an approach to design which considers the system being designed as an interconnected whole which is also part of something larger. Holistic concepts can be applied to architecture as well as the design of mechanical devices, the layout of spaces, and so forth. This approach to design often incorporates concerns about the environment, with holistic designers considering how their design will impact the environment and attempting to reduce environmental impact in their designs. Source: [www.wisegeek.com](http://www.wisegeek.com)

**Human behavior** - The range of actions and mannerisms exhibited by humans in conjunction with their environment, responding to various stimuli or inputs, whether internal or external, conscious or subconscious, overt or covert, and voluntary or involuntary. It refers to the range of behaviors exhibited by humans and which are influenced by culture, attitudes, emotions, values, ethics, authority, rapport, hypnosis, persuasion, coercion and genetics. Read more: <http://www.mbabrief.com>

**Human Resources** - The resource that resides in the knowledge, skills, and motivation of people. Source: <http://www.businessdictionary.com>

**Hydroelectricity** - Refers to electricity generated by hydropower; the production of electrical power through the use of the gravitational force of falling or flowing water.

**Industrial design** - Creation and development of concepts and specifications aimed at optimizing the functions, value, and appearance of products, structures, and systems. Source: [www.businessdictionary.com/definition/industrial-design.html#ixzz396VaHpSn](http://www.businessdictionary.com/definition/industrial-design.html#ixzz396VaHpSn)

**Industry Structure and Terminology** - In addition to understanding who your competition is, it is important to understand how the industry is structured, who the suppliers and customers are and what the barriers to entry are. In essence, one needs to answer the question as to what kind of competitive threats you will experience and what are the substitutes for your product. Source: [info.umuc.edu](http://info.umuc.edu)

**Innovation** - Innovation is about finding a better way of doing something. It can be viewed as the application of better solutions that meet new requirements, in-articulated needs, or existing market needs. This is accomplished through more effective products, processes, services, technologies, or ideas that are readily available to markets, governments and society. The term innovation can be defined as something original and, as a consequence, new, that "breaks into" the market or society. Source: [www.wikipedia.com](http://www.wikipedia.com)

**Integrated Form of Agreement** - Standard Form of Agreement Between Owner and Contractor for Integrated Project Delivery. Source: [www.aia.org](http://www.aia.org)

**Integrated Project Delivery (IPD)** - Integrated project delivery (IPD), is a collaborative alliance of people, systems, business structures and practices into a process that harnesses the talents and insights of all participants to optimize project results, increase value to the owner, reduce waste, and maximize efficiency through all phases of design, fabrication, and construction. Source: [www.AIA.org](http://www.AIA.org)

**International business** - Focuses on trade between different countries and includes various areas of global business such as law, marketing, business, investments, financial analysis, strategic planning and resource management. Today's world is rapidly transforming into a global village, and economic boundaries are being replaced with trade agreements such as NAFTA and GATT in order to boost the influence and outreach of businesses across the world, however, they may adversely affect the sovereignty of countries and the stability of their local markets and industries. The convenience of transportation and communication has also led companies to create branches and supply chains based in many different countries. International business has truly transformed the global economy and is responsible for creating thousands of jobs in the United States and strengthening the national economy. Source: [businessdirectory.com](http://businessdirectory.com)

**International taxation** - The study or determination of tax on a person or business subject to the tax laws of different countries or the international aspects of an individual country's tax laws. Governments usually limit the scope of their income taxation in some manner territorially or provide for offsets to taxation relating to extraterritorial income. The manner of limitation generally takes the form of a territorial, residency, or exclusionary system. Some governments have attempted to mitigate the differing limitations of each of these three broad systems by enacting a hybrid system with characteristics of two or more. Many governments tax individuals and/or enterprises on income. Such systems of taxation vary widely, and there are no broad general rules. These variations create the potential for double taxation (where the same income is taxed by different countries) and no taxation (where income is not taxed by any country). Income tax systems may impose tax on local income only or on worldwide income. Generally, where worldwide income is taxed, reductions of tax or foreign credits are provided for taxes paid to other jurisdictions. Limits are almost universally imposed on such credits. Multinational corporations usually employ international tax specialists, a specialty among both lawyers and accountants, to decrease their worldwide tax liabilities. Source: Wikipedia

**Internships** - An opportunity offered by an employer to potential employees, called "interns", to work at a firm for a fixed, limited period of time. Interns are usually undergraduates or students, and most internships last for any length of time between one week and 12 months. Source: Wikijobs

**Interpersonal skills** - Interpersonal skills refer to the process by which people exchange information and feelings through verbal and nonverbal communication. Interpersonal skills entail elements that focus on the channel of communication and the level of feedback. Good interpersonal skills facilitate good communication. Source: Wikipedia

**LEAN (A3)** - The A3 process is a simple way of getting a problem, an analysis, a corrective action or an action plan written down on a single sheet of large paper, often with the use of graphics. An A3 report is a generic name applied to a document written on a large sheet of paper. It refers to the international standard for 11-by-17-inch paper. The A3 process is a Toyota-pioneered practice of getting a problem, an analysis, a corrective action, and an action plan written down on a single sheet of large paper, often with the use of simple graphics. The automaker uses it as a powerful lean management tool. The A3 process standardizes a methodology for innovating, planning, problem-solving, and building foundational structures. Source: Assembly Magazine

**LEAN Process Applications** - Means creating more value for customers with fewer resources. A lean organization understands customer value and focuses its key processes to continuously increase it. The ultimate goal is to provide perfect value to the customer through a perfect value creation process that has zero waste. Source: [www.lean.org](http://www.lean.org)

**LIDAR** (light detection and ranging) scanning - There are two basic types of Lidar sensors: fixed, ground-based Lidar sensors, such as CSIRO's ECHIDNA™ (ECHIDNA: ground-based laser scanning) instrument and moving sensors, such as those attached to satellites and aircraft. It is a technology that uses laser pulses to generate large amounts of data about the physical layout of terrain and landscape features. The data can be analyzed and used in diverse applications such as: mapping areas for building and structures in the construction industry; generation of digital terrain maps for use in geographic information systems; and generation of digital vegetation maps for use in the forestry and land management industries. All varieties of lidar operate using the same basic principle. The lidar instrument fires rapid pulses of light (laser pulses) at the landscape and a sensor mounted on the instrument measures the amount of time taken for each light pulse to bounce back. Because light moves at a constant and known speed, the lidar instrument can then calculate the distance between itself and the target with high accuracy. By rapidly repeating the process, the lidar instrument builds up a complex 'picture' of the terrain it is measuring. The lidar instrument fires rapid pulses of light and measures the amount of time taken for each light pulse to bounce back. Source: CSIRO

**Life cycle simulation** - The use of engineering and scientific simulation techniques to understand and predict the real-world behavior of physical phenomena is widespread across a number of diverse industries. This is true for simulations involving product performance attributes, manufacturing processes, or fundamental research. Their ability to create virtual worlds that closely mirror the physical world enables them to optimize performance, reduce material use, and detect and correct errors at a level almost inconceivable with today's physical prototyping. Source: Industry Week

**Life Safety/Code Proficiency** - As the built environment and risks evolve throughout the life cycle of a building, so do the challenges to protect people from fire and related hazards. Life Safety Code provides a flexible approach that adapts to nontraditional use of buildings; innovative designs; and new technologies, materials, and construction practices in both new and existing structures with strategies for occupant safety. Source: NFPA.org

**Listening and learning** - A learning style in which a person learns through listening. An auditory learner depends on hearing and speaking as a main way of learning. Auditory learners must be able to hear what is being said in order to understand and may have difficulty with instructions that are drawn but if the writing is in a logical order it can be easier to understand. They also use their listening and repeating skills to sort through the information that is sent to them. Various types of learning styles includes: visual learners, auditory learners, reading/writing-preference learners, and kinesthetic learners (also known as "tactile learners"). Source: Wikipedia

**Logistics Management** -Logistics management is the part of supply chain management that plans, implements, and controls the efficient, effective, forward, and reverse flow and storage of goods, services, and related information between the point of origin and the point of consumption in order to meet customer's requirements. Source: Wikipedia

**Marketing education** - Marketing education is a program designed to prepare secondary and postsecondary students to conduct the critical business functions associated with directing the flow of products and services from the producer to the consumer. Source: <https://www.acteonline.org>

**Masonry** - is the building of structures from individual units laid in and bound together by mortar; the term masonry can also refer to the units themselves. The common materials of masonry construction are brick, stone, marble, granite, travertine, limestone, cast stone, concrete block, glass block, stucco, tile, and cob. Masonry is generally a highly durable form of construction. However, the materials used, the quality of the mortar and workmanship, and the pattern in which the units are assembled can significantly affect the durability of the overall masonry construction.

**Material Testing Technicians** - Performs more difficult and responsible sampling and testing of a variety of soils and construction materials in the field or laboratory; has responsibility for explaining and enforcing regulations, policies and legal provisions related to sampling and testing of construction materials; oversees the work testing aides in the field or laboratory; and records log of daily work performed and time and materials expended. Source: [www.jobaps.com](http://www.jobaps.com)

**Materials Science** - An interdisciplinary field which deals with the discovery and design of new and smart materials. This relatively new scientific field involves studying materials through the materials paradigm (synthesis, structure, properties and performance). Source: [wikipedia.com](http://wikipedia.com)

**Mathematics** - The abstract science of number, quantity, and space. Mathematics may be studied in its own right (pure mathematics), or as it is applied to other disciplines such as physics and engineering (applied mathematics). Source: [wikipedia.com](http://wikipedia.com)

**MBA** - The Master of Business Administration (MBA) is an internationally-recognized degree designed to prepare students and further develop the skills required for careers in business and management. Source: [find-mba.com](http://find-mba.com)

**Mechanical Repair** - Perform work involving the skills of two or more maintenance or craft occupations to keep machines, mechanical equipment, or the structure of an establishment in repair. Duties may involve pipe fitting; boiler making; insulating; welding; machining; carpentry; repairing electrical or mechanical equipment; installing, aligning, and balancing new equipment; and repairing buildings, floors, or stairs. A job as a Mechanical Repair Worker falls under the broader career category of Maintenance and Repair Workers, General. Source: [Mymajors.com](http://Mymajors.com)

**Mobil technology** - Technology that is portable; it refers to any device that you can carry with you to perform a wide variety of "tasks". It is technology that allows those tasks to be performed via cellular phone, PDA, vehicles, laptops, etc. A standard mobile device has gone from being no more than a simple two-way pager to being a cellular phone, a GPS navigation system, a web browser, and instant messenger system, a video gaming system, and much more. It includes the use of a variety of transmission media such as: radio wave, microwave, infra-red, GPS and Bluetooth to allow for the transfer of data via voice, text, video, 2-dimensional barcodes and more. Source: Strategic Growth Concepts

**Modify/Adapt existing tools**- To change tools so that they function better or are better suited for your purpose. Source: Merriam-Webster

**Multicultural** - Relating to, or constituting several cultural or ethnic groups within a society. Source: Wikipedia

**Multi-discipline studies** - Multidisciplinary studies programs are not a pre-determined course of study like most degree programs, but instead consist of a unique combination of courses chosen by a student based upon his or her specific educational and career interests. Students may pursue these programs at the associate's, bachelors and master's degree levels. Source: [education-portal.com](http://education-portal.com)

**Multi-trade** - Understanding of the many different types of trades such as Electrical, Plumbing, Carpentry, Plastering, Tiling, Painting and Decorating, Joinery and more. Source: Wikipedia

**Nano data analysis behavior focus** - Motivated by increased concern over energy consumption in modern data centers, a new computing platform called Nano Data Centers (NaDa) uses ISP-controlled home gateways to provide computing and storage services and adopts a managed peer-to-peer model to form a distributed data center infrastructure. These savings stem from energy-preserving properties inherent to NaDa such as the reuse of already committed baseline power on underutilized gateways, the avoidance of cooling costs, and the reduction of network energy consumption as a result of demand and service co-localization in NaDa. NaDa (Nanodatacenters) is the next step in data hosting and in the content distribution paradigm. By enabling a distributed hosting edge infrastructure, NaDa can enable the next generation of interactive services and applications to flourish, complementing existing data centers and reaching a massive number of users in a much more efficient manner. Source: NanoDataCenters

**National and International geography studies** - Geography is the study of Earth's landscapes, peoples, places and environments. It is, quite simply, about the world in which we live. Geography puts this understanding of social and physical processes within the context of places and regions - recognizing the differences in cultures, political systems, economies, landscapes and environments across the world, and the links between them. Understanding the causes of differences and inequalities between places and social groups underlie much of the newer developments in human geography. It is in the broadest sense, an education for life and for living. Learning through geography – whether gained through formal learning or experientially through travel, fieldwork and expeditions – helps us all to be more socially and environmentally sensitive, informed and responsible citizens and employees. Source: Geographical Society

**Nutrition and dietary skills** -Understanding and practicing food and nutrition services, food preparation, planning, menu development, and nutritional education. Source: [www.Nutrition411.com](http://www.Nutrition411.com)

**Office management** - Organize and supervise all of the administrative activities that facilitate the smooth running of an office through a range of administrative and IT-related tasks with the responsibility for ensuring that the office runs efficiently. Source: [www.businessdictionary.com](http://www.businessdictionary.com)

**Office technicians** - Work with office technology. They work to install, upgrade, repair and troubleshoot computer systems, software packages, copiers, fax machines, printers and other commonly used pieces of office technology. Some office technicians work as information technologist specialists for medium and large businesses and governmental agencies. Other office technicians work for companies, which provide technical services to many small businesses in a local or regional area. In addition, some office technicians are self-employed and act as technicians for one or more businesses. Office technicians are often required to drive from location to location during a day's work and some may also attempt to sell additional products or services to their clients as needed. Source: [bls.gov](http://bls.gov)

**OSHA 10** - The OSHA 10 Hour Construction Industry Outreach Training Program is intended to provide an entry level construction worker's general awareness on recognizing and preventing hazards on a construction site. OSHA requires employees throughout the US to complete training by December 1, 2013 to be in compliance with new GHS standards. Source: [OSHA.com](http://OSHA.com)

**Patent filing/application** - A request pending at a patent office for the grant of a patent for the invention described and claimed by that application. An application consists of a description of the invention (the patent specification), together with official forms and correspondence relating to the application. Source: Wikipedia

**People skills** - The ability to communicate effectively with people in a friendly way, especially in business. The term "people skills" is used to include both psychological skills and social skills. Source: [www.businessdictionary.com](http://www.businessdictionary.com)

**Physical fitness** - A general state of health and well-being or specifically the ability to perform aspects of sports or occupations. Physical fitness is generally achieved through correct nutrition, exercise, hygiene and rest. [www.wikipedia.com](http://www.wikipedia.com)

**Pipefitting** - A tradesperson, who installs, assembles, fabricates, maintains and repairs mechanical piping systems. Pipefitters usually begin as helpers or apprentices. Journeyman pipefitters deal with industrial/commercial/marine piping and heating/cooling systems. Source: [www.bls.gov](http://www.bls.gov)

**Plan Grid System for file management:** PlanGrid is a free construction app that lets contractors and architects collaborate with all their project plans, specs and photos on the iPad. Upload your PDF drawings to [plangrid.com](http://plangrid.com) and they will automatically sync to all your teams iPads in real time! Any markups you make can also easily be shared with everyone on your construction project. Source: [www.plangrid.com](http://www.plangrid.com)

**Plumbing** - The system of pipes, tanks, fittings, and other apparatus required for the water supply, heating, and sanitation in a building. Plumbers install and maintain plumbing systems. Source: [www.bls.gov](http://www.bls.gov)

**Power Point** - PowerPoint is a complete presentation graphics package. It gives you everything you need to produce a professional-looking presentation. PowerPoint offers word processing, outlining, drawing, graphing, and presentation management tools--all designed to be easy to use and learn. Source: [www.microsoft.com](http://www.microsoft.com)

**Preventative care and wellness training** - Taking good care of your body before disease, illness or injury strike is a great way to stay healthy. While many health conditions cannot be prevented, understanding risks and genetic predisposition as it relates to specific conditions is extremely important. Common conditions impacted by family history include: heart disease, high blood pressure, diabetes, arthritis and certain cancers, among others. Preventative medicine includes: physical exams, weight management, exercise programs, nutrition counseling, and stress management. Source: [www.aafp.com](http://www.aafp.com)

**Process analysis and development (Process mopping)** - Ever-more complex business processes have left managers struggling not just to collect the process data that's relevant to their operations, but to extract meaning from such data, locate the sources of problems, and ultimately act on what they've learned. Process analysis and development includes: Operational insight, Root cause analysis, Timeliness, Data-source aggregation, Actionability, Perceptive Process Analytics, Process monitoring, Process analysis, and Process mining. The ability to analyze processes and identify the source of problems in a visual way represents one of the unique capabilities of the Perceptive Process family. Source: [www.businessdictionary.com](http://www.businessdictionary.com)

**Procurement processes** - The activities involved in the selection of suppliers and the purchase of goods or services. Source: [www.businessdictionary.com](http://www.businessdictionary.com)

**Professional development** - The Professional Development is the continuous process of acquiring new knowledge and skills that relate to one's profession, job responsibilities, or work environment. Source: [www.businessdictionary.com](http://www.businessdictionary.com)

**Programming** - The action or process of writing computer programs. Source: [www.businessdictionary.com](http://www.businessdictionary.com)

**Project Life Span** - A period of time from idea to closure. Source: Wikipedia

**Public Private Partnership (P3)** - The partnership is based on a negotiated contract between a public organization and a private company. Source: [www.businessdictionary.com](http://www.businessdictionary.com)

**Public relations** -The professional maintenance of a favorable public image by a company or other organization or a famous person. Source: [www.businessdictionary.com](http://www.businessdictionary.com)

**Public works** - (or internal improvements historically in the United States) are a broad category of infrastructure projects, financed and constructed by the government, for recreational, employment, and health and safety uses in the greater community. They include public buildings (municipal buildings, schools, hospitals), transport infrastructure (roads, railroads, bridges, pipelines, canals, ports, airports), public spaces (public squares, parks, beaches), public services (water supply, sewage, electrical grid, dams), and other, usually long-term, physical assets and facilities. Though often interchangeable with public infrastructure and public capital, public works does not necessarily carry an economic component, thereby being a broader term. Source: [www.businessdictionary.com](http://www.businessdictionary.com)

**Quality** - The standard of something as measured against other things of a similar kind; the degree of excellence of something. Source: [www.businessdictionary.com](http://www.businessdictionary.com)

**Quality Assurance** - The maintenance of a desired level of quality in a service or product, especially by means of attention to every stage of the process of delivery or production. Source: [www.businessdictionary.com](http://www.businessdictionary.com)

**Quality control** - A system of maintaining standards in manufactured products by testing a sample of the output against the specification. Source: [www.businessdictionary.com](http://www.businessdictionary.com)

**Quantity Estimating** - Accurate Quantity Surveys are the basis of budgeting, estimating and assessing projects which includes evaluating the scope of work, labor, man-hours, equipment and material required for each project adapted to the projects unique location and local conditions. It is imperative to understand exact dimensions, forms and configurations of project elements of all project sizes. Source: garoviBRIDGE

**Quantity Take Off** - A process in which BIM can be used to assist in the generation of accurate quantity take-offs and cost estimates throughout the lifecycle of a project. This process allows the project team to see the cost effects of their changes, during all phases of the project, which can help curb excessive budget overruns due to project modifications. Specifically, BIM can provide cost effects of additions and modifications, with potential to save time and money and is most beneficial in the early design stages of a project. Source: <http://bim.psu.edu>

**Radioactive materials** - Radioactive wastes are wastes that contain radioactive material. Radioactive wastes are usually by-products of nuclear power generation and other applications of nuclear fission or nuclear technology, such as research and medicine. Radioactive waste is hazardous to most forms of life and the environment, and is regulated by government agencies in order to protect human health and the environment. Radioactivity naturally decays over time, so radioactive waste has to be isolated and confined in appropriate disposal facilities for a sufficient period of time until it no longer poses a hazard. The period of time waste must be stored depends on the type of waste and radioactive isotopes. It can range from a few days for very short-lived isotopes to millions of years for spent nuclear fuel. Current major approaches to managing radioactive waste have been segregation and storage for short-lived waste, near-surface disposal for low and some intermediate level waste, and deep burial or partitioning / transmutation for the high-level waste. Source: [www.world-nuclear.org](http://www.world-nuclear.org)

**Recognition of new technology** - From drones and robots to 3D printing and human enhancement, new “game-changing” technologies are changing the way construction jobs function. It is important for workers in the industry to embrace these new technologies that will be implemented into the industry. Source: InterLink

**Record keeping** - Required reporting and paperwork - The construction of the project is the phase where the goals identified during the planning and defined during the design are implemented. Transforming a project from two dimensional paper images to three dimensional steel and concrete forms requires the incorporation of materials, equipment, and skills into an orderly sequence of activities designed to achieve the finished project. As the three dimensional form emerges, it is constantly evaluated against the images created in the minds of the client during the planning and design. How well the finished project matches these images is the criteria against which the project will be evaluated. As the project enters the construction phase, the construction manager assigned to the project becomes the primary contact for the client, architect and consultants and the successful prime contractor. The construction manager monitors contractor performance through field observations, shop drawing review, etc. If deviations are noted, they are reviewed with the appropriate project professionals, reported to the contractor, and corrective action is tracked until the work is corrected. The construction manager maintains a daily journal that documents the activities on the projects that are assigned to them which may include: Job Site Observations, Contractor Payments, Shop Drawing and Submittal Review, Construction Project Meetings, Change and Budget Management, Close-out and Post Construction. The vehicle that is used to identify and document changes during construction is a Change Request which may be initiated in the following three ways: Request for Proposal; Time and Material Work Order; Contractor Proposed Change. Source: InterLink

**Recruitment** - The overall process of attracting, selecting and appointing suitable candidates to one or more jobs within an organization, either permanent or temporary. The term may sometimes be defined as incorporating activities which take place ahead of attracting people, such as defining the job requirements and person specification, as well as after the individual has joined the organization, such as induction and onboarding. Source: [www.businessdictionary.com](http://www.businessdictionary.com)

**Regenerative Design** - Regenerative design is a process-oriented systems theory based approach to design. The term "regenerative" describes processes that restore, renew or revitalize their own sources of energy and materials, creating sustainable systems that integrate the needs of society with the integrity of nature. The basis is derived from systems ecology with a closed loop input–output model or a model in which the output is greater than or equal to the input with all outputs viable and all inputs accounted for. Regenerative design is the bio mimicry of ecosystems that provide for all human systems to function as a closed viable ecological economics system for all industry. It parallels ecosystems in that organic (biotic) and synthetic (abiotic) material is not just metabolized but metamorphosed into new viable materials. Ecosystems and Regeneratively designed systems are holistic frameworks that seeks to create systems that are absolutely waste free. The model is meant to be applied to many different aspects of human habitation such as urban environments, buildings, economics, industry and social systems. Simply put, it is the design of ecosystems and human behavior, or culture that function as human habitats. Source: [www.wikipedia.com](http://www.wikipedia.com)

**Relationship Manager (Liaison)** - An employment position with the main responsibility of improving the relationship between an organization and its clients using methods such as efficient communication means and implementing measures to improve customer services provided. Other roles include managing disputes raised by customers and conflict resolution between customer and company. Source: [www.businessdictionary.com](http://www.businessdictionary.com)



**Renewable energy** -Is energy generated from natural resources—such as sunlight, wind, rain, tides and geothermal heat—which are renewable (naturally replenished). Renewable energy technologies range from solar power, wind power, hydroelectricity/micro hydro, biomass and biofuels for transportation. Source: energy.gov

**Return on Investment Analysis** - A performance measure used to evaluate the efficiency of an investment or to compare the efficiency of different investments. A traditional financial measure to determine benefit to the business such as: benefit of training, benefit of asset purchase decisions (computer systems or a fleet of vehicles), or marketing, recruiting programs. It is also a metric that yields some insights into how to improve business results in the future. Source: www.businessdictionary.com

**Robotics** - Robotics is the branch of mechanical engineering, electrical engineering and computer science that deals with the design, construction, operation, and application of robots, as well as computer systems for their control, sensory feedback, and information processing. These technologies deal with automated machines that can take the place of humans in dangerous environments or manufacturing processes, or resemble humans in appearance, behavior, and/or cognition. Many of today's robots are inspired by nature contributing to the field of bio-inspired robotics. Source: Wikipedia

**Robotics Applications** - The use of robots in industry continues to grow and companies that integrate robots into their workflow become more efficient and more competitive. Construction robots are often used in the industry for fabrication. A few robots exist on the construction job site, but the majority of robots used in fabrication in the construction industry are not on the job site. Instead, they are used in building construction machinery, arc welding metal components, applying adhesives, and assembling doors and windows. Construction robots are also used in the handling and manipulation of bricks and other heavy blocks. Brick and concrete block laying can be challenging both physically and mentally when performed through human labor. While not many robots have been utilized on the job yet, trials have shown how robot use in this field could prove beneficial. Robotic systems can also be utilized to dispense concrete on the job site. Instead of human labor applying the concrete, a robot can layer concrete vertically to form a structure. This process is similar to the application of adhesive process, except that concrete is much heavier than typical adhesives. Source: www.businessdictionary.com

**Rod butting/busting** - Iron rods reinforce or stabilize concrete structures. The rod buster, or rebar worker, shapes the iron rods and mesh for placement in cement. This role requires strength and dexterity, even with the many power tools used to complete projects. Source: www.ehow.com

**Safety Data Sheets** - An important component of product stewardship and occupational safety and health. It is intended to provide workers and emergency personnel with procedures for handling or working with that substance in a safe manner, and includes information such as physical data (melting point, boiling point, flash point, etc.), toxicity, health effects, first aid, reactivity, storage, disposal, protective equipment, and spill-handling procedures. MSDS formats can vary from source to source within a country depending on national requirements. Source: Wikipedia

**Scheduling** - A plan of procedure, usually written, for a proposed objective, especially with reference to the sequence of and time allotted for each item or operation necessary to its completion. Source: www.businessdictionary.com

**Self Contained and Smart Sustaining buildings independent of the grid** - An autonomous building designed to be operated independently from infrastructural support services such as the electric power grid, gas grid, municipal water systems, sewage treatment systems, storm drains, communication services, and in some cases, public roads. Advocates of autonomous building describe advantages that include reduced environmental impacts, increased security, and lower costs of ownership. Some cited advantages satisfy tenets of green building. Source: [www.businessdictionary.com](http://www.businessdictionary.com)

**Self Driving Vehicles** - An autonomous vehicle capable of fulfilling the human transportation capabilities of a traditional car. As an autonomous vehicle, it is capable of sensing its environment and navigating without human input. Robotic cars exist mainly as prototypes and demonstration systems. Source: Wikipedia

**Set-based design** - Involves exploring many design alternatives up-front to allow for trade-offs particularly important for integrated systems with competing requirements. A key principle underlying set based design involves delaying design decision later in the design process to achieve optimal trade-offs by eliminating inferior or sub-optimal design alternatives. Although counter intuitive while the design decisions are delayed set based design involves front end loading the design stages of the project to develop the design alternatives. The front end loading facilitates early learning, early identification of risks, and early mitigation of risks. A key success factor is the discipline to identify all possible design alternatives up-front without allowing the design to move on with a favorite alternative – creativity, innovation, and practicality under pin this step. Source: <http://alopexoninnovation.com>

**Sheet Metal Fabrication and Installation** - Sheet metal workers fabricate or install products that are made from thin metal sheets, such as ducts used for heating and air conditioning. Source: [www.bls.gov](http://www.bls.gov)

**Simulation Analysis** - A problem solving technique used to approximate the probability of certain outcomes by running multiple trial runs, called simulations, using random variables. The use of numerical methods to simulate the behavior of engineered systems during operations and accidents brings major benefits in understanding, which is essential to decision makers. It includes Complex situations involving statics, dynamics, non-linearity, laminar flows, turbulence, thermal effects, shocks and impacts. Source: National Infrastructure Simulation and Analysis Center (NISAC)

**Smart buildings** - Smart buildings deliver useful building services that make occupants productive (e.g. illumination, thermal comfort, air quality, physical security, sanitation, and many more) at the lowest cost and environmental impact over the building lifecycle. Reaching this vision requires adding intelligence from the beginning of design phase through to the end of the building's useful life. Smart buildings use information technology during operation to connect a variety of subsystems, which typically operate independently, so that these systems can share information to optimize total building performance. Smart buildings look beyond the building equipment within their four walls. They are connected and responsive to the smart power grid, and they interact with building operators and occupants to empower them with new levels of visibility and actionable information. Source: Institute for Building Efficiencies

**Social Anthropology** - By living with people in different cultures and learning to talk and behave like them ('fieldwork'), social anthropologists produce in-depth descriptions of their customs and ways of life ('ethnographies'). They also compare different cultures and societies to explore their similarities and differences, to test the generalizations of historians, social scientists and philosophers, and to produce theories of how best to study and understand human nature. In Architecture, The principal aim is to challenge notions of 'space' as a reified entity which is conceptualized and inhabited in a universal manner, and to cultivate a more complex understanding of the processes of human agency which manipulate, produce and re-produce space as perhaps the most significant and crucial component of any material culture. Source: [www.bloomsbury.com](http://www.bloomsbury.com)

**Software developer** - A software developer is a person concerned with facets of the software development process. In short developers "make software for the world to use." Their work includes researching, designing, implementing, and testing software. A software developer may take part in design, computer programming, or software project management. They may contribute to the overview of the project on the application level rather than component-level or individual programming tasks. Software developers are often still guided by lead programmers but the description also encompasses freelance software developers. Source: Wikipedia

**Software proficiency**- Proficient means that you are comfortable with computer programs particularly those expected to be used in a line of work or industry. Competent means you can use them but you are not completely skilled in them. Source: [Wikianswers.com](http://Wikianswers.com)

**Solar energy** - Is radiant light and heat from the sun harnessed using a range of ever-evolving technologies such as solar heating, solar photovoltaics, solar thermal electricity, solar architecture and artificial photosynthesis. Solar technologies are broadly characterized as either passive solar or active solar depending on the way they capture, convert and distribute solar energy. Active solar techniques include the use of photovoltaic panels and solar thermal collectors to harness the energy. Passive solar techniques include orienting a building to the Sun, selecting materials with favorable thermal mass or light dispersing properties, and designing spaces that naturally circulate air. [www.AiA.com](http://www.AiA.com)

**Speaking skills communication** - In the information age, we have to send, receive, and process huge numbers of messages every day. But effective communication is about more than just exchanging information; it's also about understanding the emotion behind the information. Effective communication can improve relationships at home, work, and in social situations by deepening your connections to others and improving teamwork, decision-making, and problem solving. It enables you to communicate even negative or difficult messages without creating conflict or destroying trust. Effective communication combines a set of skills including nonverbal communication, attentive listening, the ability to manage stress in the moment, and the capacity to recognize and understand your own emotions and those of the person you're communicating with. Source: [helpguide.org](http://helpguide.org)

**Splitter - Fiber Optics** - The Fiber Optic Splitter, also named beam splitter, is based on a quartz substrate of integrated waveguide optical power distribution device, the same as coaxial cable transmission system, The optical network system also needs to be an optical signal coupled to the branch distribution, which requires the fiber optic splitter, Is one of the most important passive devices in the optical fiber link, is optical fiber tandem device with many input terminals and many output terminals, Especially applicable to a passive optical network (EPON, GPON, BPON, FTTX, FTTH etc.) to connect the MDF and the terminal equipment and to achieve the branching of the optical signal. Source: Wikipedia

**Statistical Analysis** - Statistical analysis is a component of data analytics. In the context of business intelligence (BI), statistical analysis involves collecting and scrutinizing every single data sample in a set of items from which samples can be drawn. Statistical analysis can be broken down into five discrete steps, as follows: Describe the nature of the data to be analyzed; Explore the relation of the data to the underlying population; Create a model to summarize understanding of how the data relates to the underlying population; Prove (or disprove) the validity of the model; Run un scenarios that will help guide future actions. The goal of statistical analysis is to identify trends. Source: [www.whatis.techtarget.com](http://www.whatis.techtarget.com)

**Statistician** - Use statistical methods to collect and analyze data and help solve real-world problems in business, engineering, the sciences, or other fields. Source: [www.bls.gov](http://www.bls.gov)

**Supply Chain Management** - Supply chain management (SCM) is the management of the flow of goods. It includes the movement and storage of raw materials, work-in-process inventory, and finished goods from point of origin to point of consumption. Source: Wikipedia

**Sustainability** - The endurance of systems and processes. Source: Wikipedia

**Systems Development & Integration** - System Development – Insuring that the system to be developed will fit correctly in the customer’s infrastructure, that the technology used is consonant to that used by the organization, and that maintenance will not represent a burden to the operation. Systems Integration –Systems can no longer perform independently, the information infrastructure of any given organization will be most valuable when it acts as one, as though one set of information traverses from domain to domain (system to system) seamlessly, reducing the end-user’s effort on maintaining “multiple systems”. Source: NCR

**Team building** - A philosophy of job design in which employees are viewed as members of interdependent teams instead of as individual workers. It is said to have benefits of self-development, positive communication, leadership skills and the ability to work closely together as a team to solve problems. Source: [www.businessdictionary.com](http://www.businessdictionary.com)

**Team building skills** - Team building is an ongoing process that helps a work group evolve into a cohesive unit. The team members not only share expectations for accomplishing group tasks, but trust and support one another and respect one another's individual differences. Examples of skills to Building an Effective Team: Establish your leadership with each team member; Consider each employee's ideas as valuable; Be aware of employees' unspoken feelings; Act as a harmonizing influence; Be clear when communicating; Encourage trust and cooperation among employees on your team; Encourage team members to share information; Delegate problem-solving tasks to the team; Facilitate communication; Establish team values and goals; evaluate team performance; Make sure that you have a clear idea of what you need to accomplish; Use consensus; Set ground rules for the team; Establish a method for arriving at a consensus; Encourage listening and brainstorming; Establish the parameters of consensus-building sessions. Source: [HumanResources.com](http://HumanResources.com)

**Teamwork** - The combined action of a group of people, especially when effective and efficient. Source: Wikipedia

**Technical writing** - Technical writing is any written form of technical communication used in a variety of technical and occupational fields, such as computer hardware and software, engineering, chemistry, aeronautics, robotics, finance, consumer electronics, and biotechnology. Source: Wikipedia

**Technology Applications** - Use technology-related terms, concepts, data input strategies and ethical practices to make informed decisions about current technologies and their applications. Source: <http://www.businessdictionary.com>

**Tidal power** - Also called tidal energy, is a form of hydropower that converts the energy of tides into useful forms of power, mainly electricity. Although not yet widely used, tidal power has potential for future electricity generation. Tides are more predictable than wind energy and solar power. Among sources of renewable energy, tidal power has traditionally suffered from relatively high cost and limited availability of sites with sufficiently high tidal ranges or flow velocities, thus constricting its total availability. However, many recent technological developments and improvements, both in design (e.g. dynamic tidal power, tidal lagoons) and turbine technology (e.g. new axial turbines, cross flow turbines), indicate that the total availability of tidal power may be much higher than previously assumed, and that economic and environmental costs may be brought down to competitive levels.

**Timber framing and "post-and-beam" construction** - are methods of building with heavy timbers rather than "dimension lumber" such as 2"x4"s. Traditional timber framing is the method of creating structures using heavy squared-off and carefully fitted and joined timbers with joints secured by large wooden pegs (larger versions of the mortise and tendon joints in furniture). It is commonplace in wooden buildings from the 19th century and earlier. The method comes from making things out of logs and tree trunks without modern high tech saws to cut lumber from the starting material stock. Using axes, adzes and draw knives, hand-powered auger drill bits (bit and brace), and laborious woodworking, artisans or farmers could gradually assemble a building capable of bearing heavy weight without excessive use of interior space given over to vertical support posts. Since this building method has been used for thousands of years in many parts of the world, there are many styles of historic framing. These styles are often categorized by the type of foundation, walls, how and where the beams intersect, the use of curved timbers, and the roof framing details. Three basic types of timber frames in English-speaking countries are the box frame, cruck frame, and aisled frame.

**Time management** - the act or process of planning and exercising conscious control over the amount of time spent on specific activities, especially to increase effectiveness, efficiency or productivity. Source: Wikipedia

**Tools and equipment** - Any tool is any physical item that can be used to achieve a goal, especially if the item is not consumed in the process. Informally the word is also used to describe a procedure or process with a specific purpose. Tools that are used in particular fields or activities may have different designations such as "instrument", "utensil", "implement", "machine", or "apparatus". The set of tools needed to achieve a goal is "equipment". The knowledge of constructing, obtaining and using tools is technology. Source: Wikipedia

**Value added** - The amount by which the value of an article is increased at each stage of its production, exclusive of initial costs. Source: Wikipedia

**Value Engineering** - Value engineering (VE) is a systematic method to improve the "value" of goods or products and services by using an examination of function. Value, as defined, is the ratio of function to cost. Value can therefore be increased by either improving the function or reducing the cost. Source: Wikipedia

**Values matrix alignment** - Maps the value of your recommendations for features and services across business needs and defines the criteria by which you would judge each recommendation successful. The Value Matrix communicates with product stakeholders and business owners in a language they understand. "The Value Matrix succinctly communicates to all stakeholders the reason—not just the business objective, but also the specific customer need—for each feature or process." The process of creating the Value Matrix can fill that gap. The Value Matrix succinctly communicates to all stakeholders the reason—not just the business objective, but also the specific customer need—for each feature or process. In essence, the Value Matrix provides a means of summarizing and applying your customer research. The Value Matrix is not a magic bullet. It provides a summary of a variety of documents and

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assumptions already in existence. And it takes quite a bit of collaboration to create one. - See more at:  
Source: <http://www.uxmatters.com>

**Video Design/Production** - Video design or projection design is a creative field of stagecraft. It is concerned with the creation and integration of film and motion graphics into the fields of theatre, opera, dance, fashion shows, concerts and other live events. Video production is the process of creating video by capturing moving images (videography), and creating combinations and reductions of parts of this video in live production and post-production (video editing). Source: Wikipedia

**Visual/Graphic Design/Video Communication & Production Skills** - Graphic design is the art of communication, stylizing, and problem-solving through the use of type, space and image. The field is considered a subset of visual communication and communication design, but sometimes the term "graphic design" is used interchangeably with these due to overlapping skills involved. Graphic designers use various methods to create and combine words, symbols, and images to create a visual representation of ideas and messages. A graphic designer may use a combination of typography, visual arts and page layout techniques to produce a final result. Graphic design often refers to both the process (designing) by which the communication is created and the products (designs) which are generated. Source: Wikipedia

**Visualization** - To recall or form mental images or pictures to make perceptible to the mind or imagination. Source: Wikipedia

**Waste reduction** - Waste reduction (or prevention) is the preferred approach to waste management because waste that never gets created doesn't have waste management costs. An example of waste reduction is reducing unnecessary packaging from manufactured products and produce. Source: Wikipedia

**Water conservation** - Encompasses the policies, strategies and activities to manage fresh water as a sustainable resource, to protect the water environment, and to meet current and future human demand. Population, household size and growth and affluence all affect how much water is used. Factors such as climate change will increase pressures on natural water resources especially in manufacturing and agricultural irrigation. Source: Wikipedia

**Wave power** - The transport of energy by ocean surface waves, and the capture of that energy to do useful work – for example, electricity generation, water desalination, or the pumping of water (into reservoirs). Machinery able to exploit wave power is generally known as a wave energy converter (WEC).

**Welding** - Welding is a fabrication or sculptural process that joins materials, usually metals or thermoplastics, by causing coalescence. This is often done by melting the workpieces and adding a filler material to form a pool of molten material (the weld pool) that cools to become a strong joint, with pressure sometimes used in conjunction with heat, or by itself, to produce the weld. This is in contrast with soldering and brazing, which involve melting a lower-melting-point material between the workpieces to form a bond between them, without melting the work pieces. There are many different types of welds and certifications. Source: Wikipedia

**Wind power** - The conversion of wind energy into a useful form of energy, such as using wind turbines to produce electrical power, windmills for mechanical power, windpumps for water pumping or drainage, Large wind farms consist of hundreds of individual wind turbines which are connected to the electric power transmission network.

**Workflow** - consists of an orchestrated and repeatable pattern of business activity enabled by the systematic organization of resources into processes that transform materials, provide services, or process information. It can be depicted as a sequence of operations, declared as work of a person or group, an organization of staff, or one or more simple or complex mechanisms.

**Writing skills** - Communicating a point quickly and professionally by identifying the intended audience before creating the document, using grammatical and stylistic techniques to help write more clearly, and proof reading the final document. Source: [www.businessdictionary.com](http://www.businessdictionary.com)

**Zero Carbon Foot Print Design** - A Carbon Footprint is the measure given to the amount of green house gases produced by burning fossil fuels, measured in units of carbon dioxide (i.e. Kg). Zero carbon design results in buildings and homes that result in reduction in power consumption which offset the carbon footprint and reduce carbon emissions. Source: Wikipedia

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