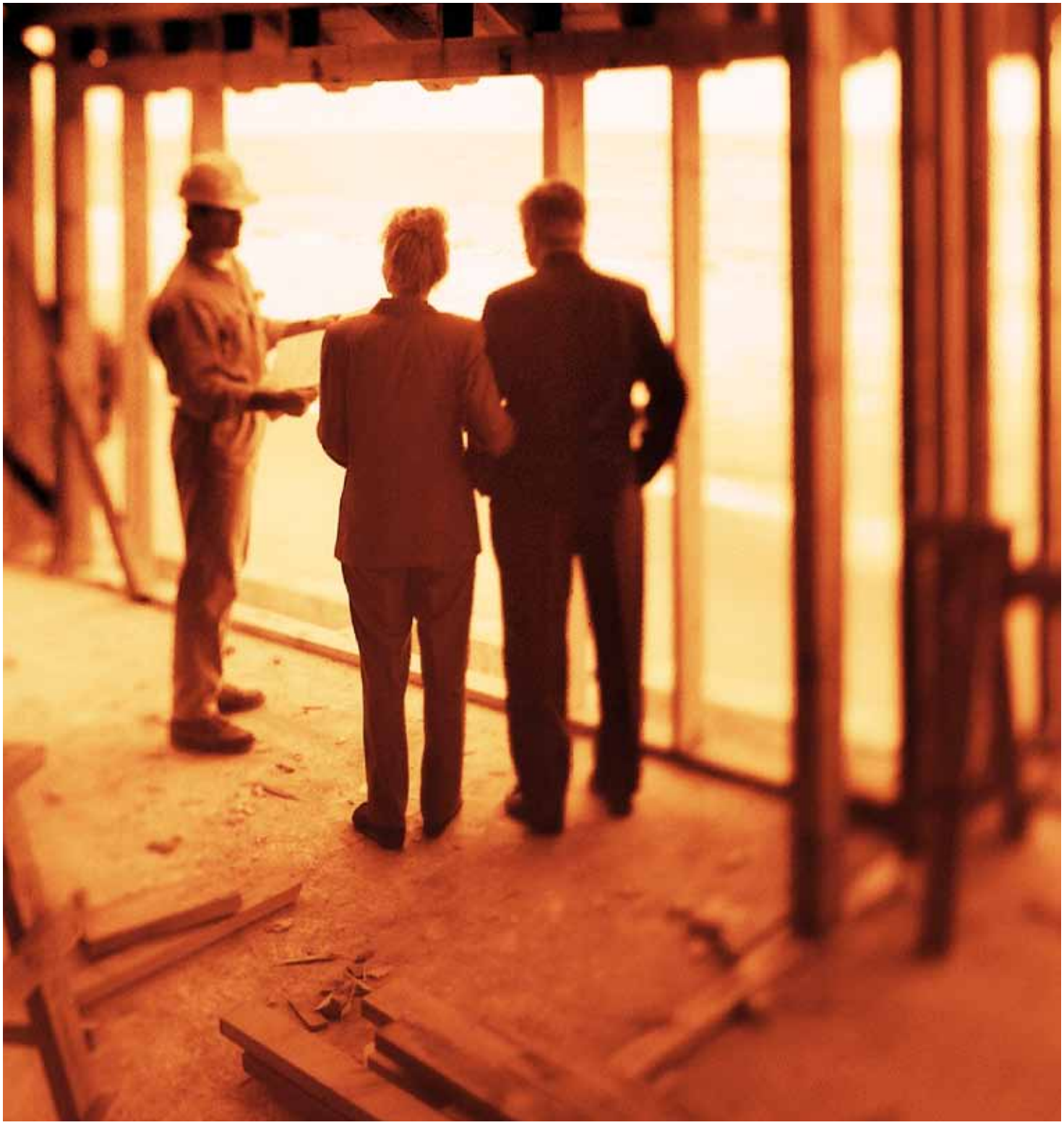
BE A PART OF Architecture & Construction



Build Your Success — Consider a Career in Architecture & Construction

"The vast fields of architecture and construction offer unique opportunities to match nearly every type of worker, from those who enjoy working alone to those who can manage a team, from people who would rather work indoors in an office to people who long to spend their days working actively outdoors. Plus, with all the latest advances in green building technology, professionals in this field can do work that really makes a difference on this planet."

– Pete Williams, President, Atherm Remodelers, Inc.

Are you fascinated by the design of buildings and outdoor landscapes? Do you enjoy working with your hands? A career in the architecture and construction field might be for you. Architects and construction professionals are behind every aspect of the structures and landscapes we see in our cities and suburbs, from the initial planning and design to physical construction to maintenance.

There are opportunities in architecture and construction available to match a wide variety of personality types and skill sets. A particularly creative individual may want to explore a career as an interior designer. If you're good with numbers, a math-oriented job such as computer-aided drafting or mechanical engineering might be suitable. Regardless of the type of work or work environment you enjoy, chances are there's an appropriate career for you in the field of architecture and construction.

Workers are needed in every phase of a construction project. In the pre-construction stage, professionals such as architects, landscape architects and surveyors are needed to plan the project. Then, the actual construction phase begins, which calls for numerous hands-on workers who can turn the plan into reality, from carpenters to plumbers to electricians. Down the road, maintenance and operations workers are needed to make repairs and updates to a completed project once it's in use.

With a constantly growing population in the U.S. comes a consistent need for new communities and buildings, as well as updates to and maintenance of those communities and buildings. As long as people have a need to live, work and play in the built world, experts in architecture and construction will be in demand.

THE ARCHITECTURE & CONSTRUCTION CLUSTER

Career clusters are tools that can help you decide which career path to follow and the education and training that are required to reach your chosen career goals. They provide an outline of what you'll learn in school to prepare for a career in a specific professional field.

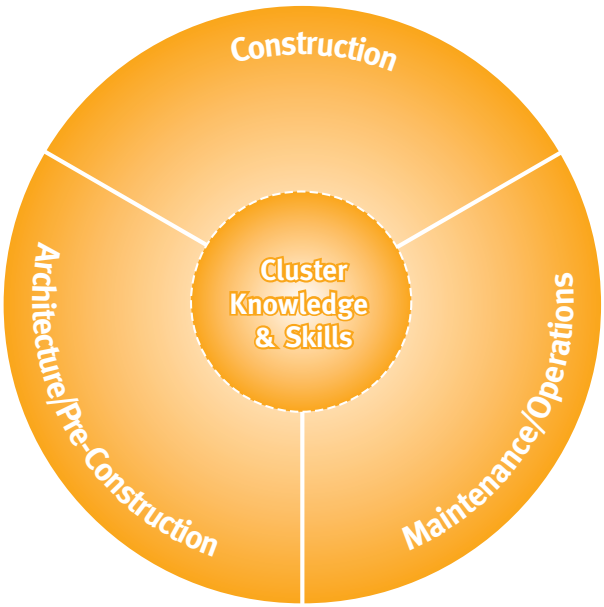
The Architecture and Construction Cluster is divided into three majors, each encompassing a group of professions that require similar talents, aptitudes and skills.

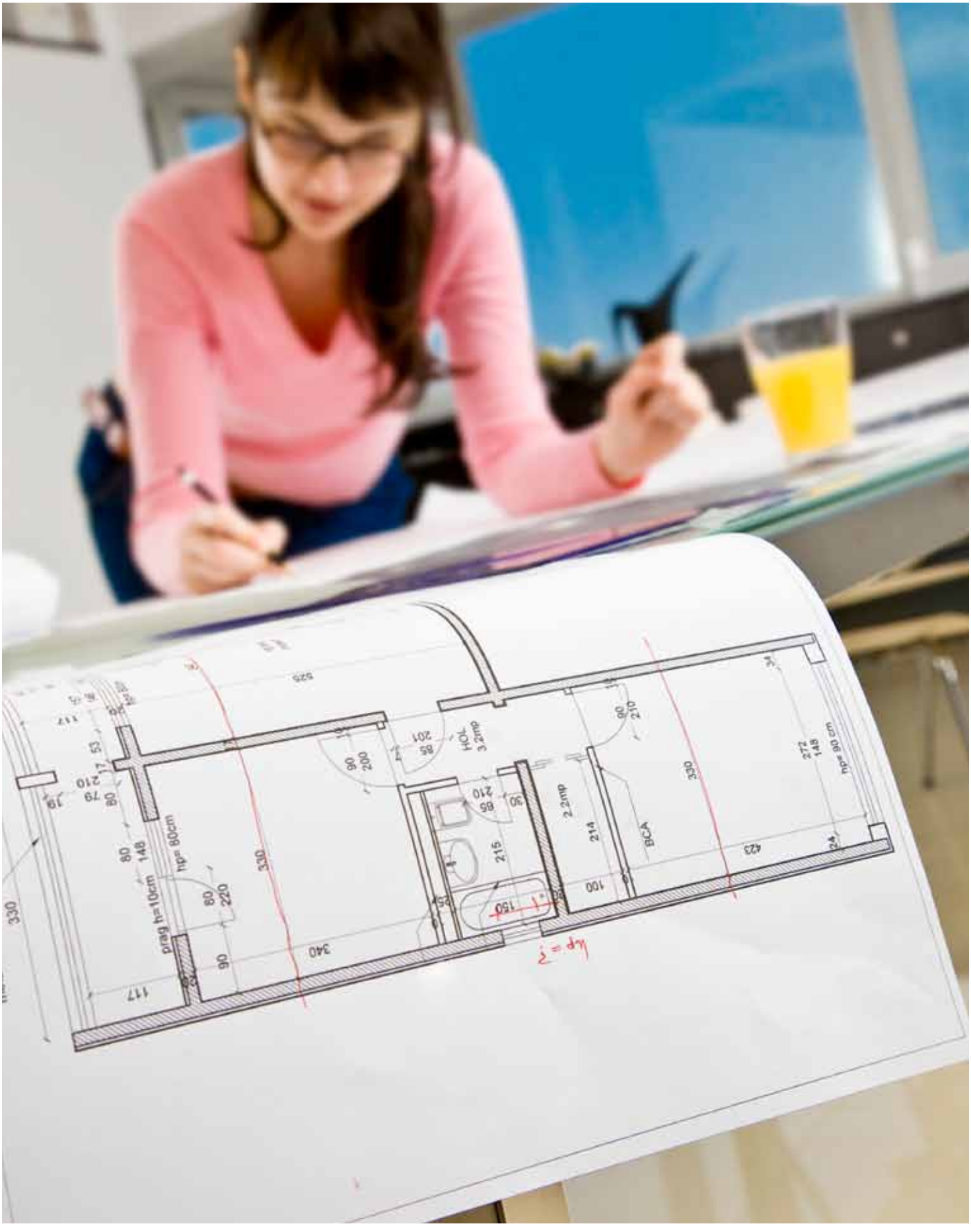
These three majors are Architecture and Pre-Construction, Construction and Maintenance and Operations. Each of these majors involves working with some aspect of a physical structure or outdoor area – be it a church, hospital, office building, golf course, garden or restaurant – but vary greatly in terms of job duties. Some mostly involve physical labor, such as with carpenters, plumbers and electricians.

Others require computer knowledge, artistic talents and/or management skills, such as with architects, landscape architects and construction managers.

Some professions in this cluster give workers the choice of being self-employed or working for a firm or company. Required education and training range from a high school diploma and on-the-job training to a master's degree and specialized licenses.

According to the Occupational Information Network (O*NET) there are nearly 100 occupations that fall under the Architecture and Construction Cluster, so students interested in this field have many choices to explore.

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ARCHITECTURE & PRE-CONSTRUCTION

Before a new structure and its grounds are physically constructed or installed, much thought goes into its planning. Individuals working in the architecture and pre-construction field not only ensure that buildings and their grounds look attractive – they also see that they're functional, safe and meet the needs of the people who will spend their time in and around them.

Occupations range from architects and landscape architects, who plan and design structures and their grounds; to surveyors, who analyze land features to determine a property's placement and boundaries; to interior designers, who design and furnish the indoor spaces of structures.

Education/Credentials

Most jobs in the architecture and pre-construction major require a four-year bachelor's degree, such as interior designer, civil engineer, landscape architect or surveyor. However, civil engineering technicians and computer-aided drafters can find work with an associate's degree, career and technology school training or on-the-job training.

A career in non-landscape architecture requires the most education. Most jobs in non-landscape architecture call for a graduate degree, and some positions even require a Ph. D., M.D. or J.D. Additionally, architects must be licensed in order to work professionally.

Jobs Outlook & Growth Potential

According to the U.S. Bureau of Labor Statistics, (BLS) architecture jobs are expected to grow by 16 percent by 2018 as the U.S. population increases. Additionally, the demand for architects with knowledge of green building technology will continue to grow.

Surveyor jobs are expected to grow by 19 percent by 2018, and work in the interior design field is expected to grow faster than the average for all occupations.

Sample Tasks & Responsibilities

- Prepare information about design, structure specifications, materials, color, equipment, estimated costs and construction time.
- Calculate dimensions, square footage, profile and component specifications and material quantities using calculators and computers.
- Inspect project sites to monitor progress and ensure conformance to design specifications and safety or sanitation standards.
- Select or design, and purchase furniture, artwork and accessories.
- Prepare site plans, specifications and cost estimates for land development, coordinating arrangement of existing and proposed land features.
- Calculate heights, depths, relative positions, property lines and other characteristics of terrain.

Required Skills

- Critical Thinking – Using logic and reasoning to identify the strengths and weaknesses of alternative solutions, conclusions or approaches to problems.
- Complex Problem Solving – Identifying complex problems and reviewing related information to develop and evaluate options and implement solutions.
- Management of Personnel Resources – Motivating, developing, and directing people as they work, identifying the best people for the job.
- Coordination – Adjusting actions in relation to others' actions.
- Operations Analysis – Analyzing needs and product requirements to create a design.
- Technology Design – Generating or adapting equipment and technology to serve user needs.

Sample Career Options

Associate's Degree or Less	Bachelor's Degree		Bachelor's Degree Plus Graduate Degrees and/or Certifications
Annual Salary Range $30,000-$50,000	**Annual Salary Range $50,000-$100,000**		**Annual Salary Range $100,000 +**
• Technician • Computer-Aided Drafter	• Civil Engineer • Interior Designer • Landscape Architect • Surveyor	• Computer Information System Manager • Mechanical Engineer • Preservationist	• Architect • Urban Planner

CONSTRUCTION

When the planning and design of a new structure and/or its grounds have been completed, physical construction begins. Construction involves the hands-on work of building the structures we see in our cities and suburbs, from airport terminals to parks, from systems that are installed underground to skyscrapers that reach a thousand feet into the air.

Jobs in the construction field include those that involve the physical construction or installation of structural elements, such as carpenters, carpet and floor installers, electricians, roofers and plumbers. Others require specific expertise and/or management skills, such as construction and project managers, safety directors and project inspectors.

Education/Credentials

A high school diploma is required for most positions in the construction field, including education and training directors, construction managers, superintendents, foremen, safety directors and verifiers. In addition, workers may complete a career and technology education program, technical college program or apprenticeship. Federal and state regulations require specific types of on-the-job training for some jobs, such as for hazardous material removal workers. Inspector positions may require a state license or certification.

Jobs Outlook & Growth Potential

The BLS predicts that jobs in the construction field are expected to grow through 2018 by 19 percent, with the most jobs being added in road, bridge and tunnel construction.

Strong demand also is expected for construction laborers, hazardous material removal workers, insulation workers and plumbers. Jobs for inspectors are expected to grow by 17 percent through 2018.

Sample Tasks & Responsibilities

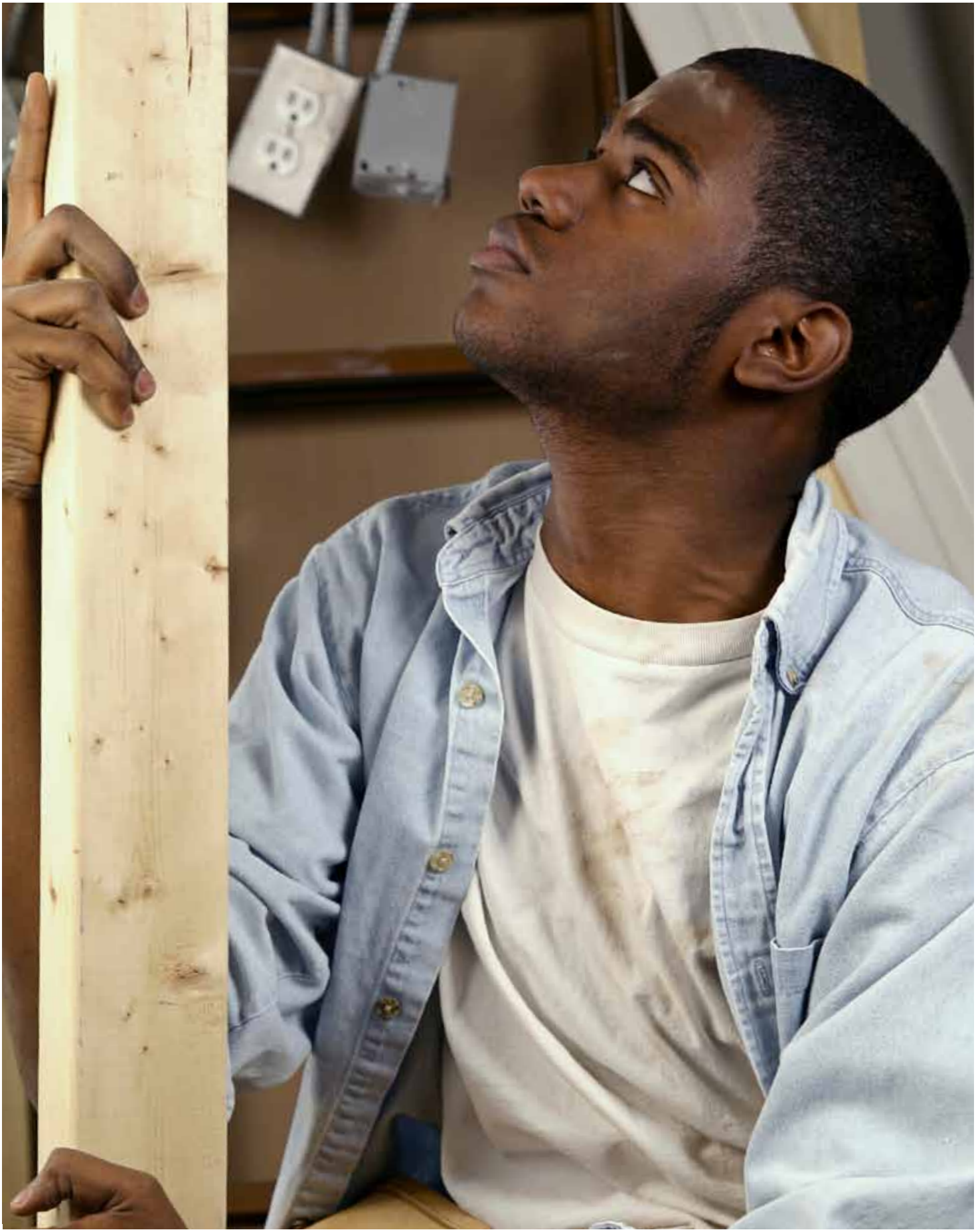
- Study specifications in blueprints, sketches or building plans to prepare project layout and determine dimensions and materials required.
- Position, join, align and seal structural components, such as concrete wall sections and pipes.
- Load, unload and identify building materials, machinery and tools, and distribute them to the appropriate locations, according to project plans and specifications.
- Assemble, install, test, and maintain electrical or electronic wiring, equipment, appliances, apparatus and fixtures, using hand tools and power tools.
- Plan, organize and direct activities concerned with the construction and maintenance of structures, facilities and systems.
- Inspect bridges, dams, highways, buildings, wiring, plumbing, electrical circuits, sewers, heating systems and foundations during and after construction for structural quality, safety and conformance to specifications and codes.

Required Skills

- Equipment Selection – Determining the kind of tools and equipment needed to do a job.
- Management of Material Resources – Obtaining and seeing to the appropriate use of equipment, facilities and materials needed to do certain work.
- Installation – Installing equipment, machines, wiring or programs to meet specifications.
- Operation Monitoring – Watching gauges, dials or other indicators to make sure a machine is working properly.
- Systems Analysis – Determining how a system should work and how changes in conditions, operations and the environment will affect outcomes.
- Management of Material Resources – Obtaining and seeing to the appropriate use of equipment, facilities and materials needed to do certain work.

Sample Career Options

Associate's Degree or Less	Bachelor's Degree	Bachelor's Degree Plus Graduate Degrees and/or Certifications
Annual Salary Range $30,000-$50,000	**Annual Salary Range $50,000-$100,000**	**Annual Salary Range $100,000 +**
• Carpenter • Electrician • Iron/Metal Worker • Pipe Fitter • Project Inspector	• Education and Training Director • Safety Director • Construction Manager • Foreman • Superintendent • Project Manager • Verifier	• Company Owner • Company CEO • General Contractor



MAINTENANCE & OPERATIONS

Individuals who work in the maintenance and operations field are responsible for maintaining the quality of the structures planned, designed and built by workers in the architecture and pre-construction and construction majors. They work to preserve and extend the lives of buildings and their grounds, as well as prevent damages from occurring that could be costly down the road.

Some professionals in this field are in charge of the planning and scheduling of maintenance work. Other positions involve mostly physical labor, such as boilermakers, HVAC technicians, equipment operators, millwrights and thermal control technicians. Other positions require specialized knowledge – for example, environmental engineers solve environmental problems caused by construction projects.

Education/Credentials

Most jobs in the maintenance and operations major require at least a high school diploma. On-the-job training is also a common way to gain experience in this field. Additionally, many potential maintenance and operations workers complete training at a career and technology school or technical college or through an apprenticeship.

Other positions, such as maintenance planners and environmental engineers, may require a four-year bachelor's degree. Some engineering positions require graduate school completion. Engineers who offer their services to the public must also be licensed in order to work professionally.

Jobs Outlook & Growth Potential

According to the BLS, in the general maintenance and repair field, a growth rate of 11 percent is expected through 2018. Environmental engineers should see higher than average growth, with a 31 percent growth rate predicted; boilermaker jobs will grow at a faster than average rate of 19 percent; and HVAC technician jobs will also grow sharply, with a 28 percent growth rate expected through 2018.

Sample Tasks & Responsibilities

- Examine boilers, pressure vessels, tanks and vats to locate defects such as leaks, weak spots and defective sections so that they can be repaired.
- Repair or replace defective heating and air conditioning equipment, components or wiring.
- Collaborate with environmental scientists, planners, hazardous waste technicians, engineers and other specialists, and experts in law and business to address environmental problems.
- Dump, spread and tamp asphalt, using pneumatic tampers, to repair joints and patch broken pavement on roads.
- Replace defective parts of machines or adjust clearances and alignment of moving parts.

Required Skills

- Equipment Maintenance – Performing routine maintenance on equipment and determining when and what kind of maintenance is needed.
- Repairing – Repairing machines or systems using the needed tools.
- Troubleshooting – Determining causes of operating errors and deciding what to do about it.
- Equipment Selection – Determining the kind of tools and equipment needed to do a job.
- Systems Analysis – Determining how a system should work and how changes in conditions, operations and the environment will affect outcomes.
- Systems Evaluation – Identifying measures or indicators of system performance and the actions needed to improve or correct performance, relative to the goals of the system.

Sample Career Options

Associate's Degree or Less	Bachelor's Degree	Bachelor's Degree Plus Graduate Degrees and/or Certifications
Annual Salary Range $30,000-$50,000	**Annual Salary Range $50,000-$100,000**	**Annual Salary Range $100,000 +**
• Boilermaker • HVAC Technician • Equipment Operator • Highway Worker • Millwright • Specialty Contractor • Thermal Control Technician	• Maintenance Planner/ Scheduler	• Demolition Engineer • Environmental Engineer • CEO

BY THE NUMBERS | Architecture & Construction

Here is a look at employment specifics from the BLS:

Occupation	Annual Median Salary (2010)	Hourly Pay (2010)	2010 Employment	2020 Projected Employment	Employment Change	Percentage Change
Environmental Engineers	$78,740	$37.86	51,400	62,700	11,300	22
Civil Engineers	$77,560	$37.29	262,800	313,900	51,100	19
Architects	$72,550	$34.88	113,700	141,600	27,900	24
Landscape Architects	$62,090	$29.85	21,600	25,100	3,500	16
Surveyors	$54,880	$26.39	51,200	64,200	13,000	25
Boilermakers	$54,640	$26.27	19,800	24,000	4,200	21
Millrights	$48,360	$23.25	36,500	34,700	-1,800	-5
Electricians	$48,250	$23.20	577,000	710,700	133,700	23
Plumbers	$46,660	$22.43	419,900	527,500	107,600	26
Interior Designers	$46,280	$22.25	56,500	67,400	10,900	19
HVAC Technicians	$42,530	$20.45	267,800	358,100	90,300	34
Sheet Metal Workers	$41,710	$20.05	136,100	160,000	23,900	18
Carpenters	$39,530	$19.00	1,001,700	1,197,700	196,000	20
Roofers	$34,220	$16.45	136,700	161,100	24,400	18

RESOURCES

MEBA
Midlands Education & Business Alliance

Alliance of Construction Trades: www.actaz.net

American Academy of Environmental Engineers and Scientists: www.aaees.org

American Institute of Architects: www.aia.org

American Institute of Constructors and Constructor Certification Commission: www.professionalconstructor.org

American Society of Civil Engineers: www.asce.org

American Society of Interior Designers: www.asid.org

American Society of Landscape Architects: www.asla.org

Associated Builders and Contractors: www.abc.org

Associated General Contractors of America: www.agc.org

Career Technical Education (CTE): www.careertech.org

Carolinas Associated General Contractors: www.cagc.org

Clemson — School of Architecture: www.clemson.edu/caah/architecture

Home Builders Association of Greater Columbia: www.columbiabuilders.com

Maintenance and Construction Technology Alliance: www.mctasc.com

Midlands Education and Business Alliance: www.mebasc.com

Midlands Regional Education Center: http://recs.sc.gov

Midlands Technical College — Building Construction Technology: www.midlandstech.edu/cover/constructiontech

National Center for Construction Education and Research: www.nccer.org

National Joint Apprenticeship and Training Committee: www.njatc.org

National Society of Professional Surveyors: www.nsps.us.com

O*NET Online: www.onetonline.org

Skills USA: www.skillsusa.org

South Carolina Career Information System: sccis.intocareers.org

U.S. Bureau of Labor Statistics: www.bls.gov

USC — Civil and Environmental Engineering: www.ce.sc.edu

Midlands Education and Business Alliance does not discriminate on the basis of race, color, national origin, sex or disability in admission to or employment in its programs and activities.

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Experience Architecture and Construction Job Shadows Online

Want to learn more about the Architecture and Construction industry? Then, check out these interactive and informative online job shadows, called MicroCareerBursts, at www.microburstlearning.org/login.html or link using the QR Code.

Below are some of the MicroCareerBursts job shadowing lessons available that apply to Architecture and Construction:

- Carpentry
- Controls and Low Voltage Wiring
- Electrician
- Green Building Contractor
- HVAC
- Masonry
- Pipefitter
- Plumber
- Residential Energy Efficiency Technician
- Rigger & Crane Operator
- Sheet Metal Fabrication
- Solar Panel Designer and Installer
- Welding

MEBA

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