



2020 Engineering Industry Profile

ACECResearchInstitute.org

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Overview

Introduction

The ACEC Research Institute commissioned a study to profile and analyze performance in the Engineering, Architectural, and Surveying Services Industry (A/E Services). The study was conducted by Rockport Analytics, an independent market and economic research firm using both publicly and privately available data, as well as proprietary analysis. The study aims to describe, measure, and demonstrate the indispensable partnership between engineering, architects, and other related professional services to deliver the built environment of the United States. The built environment refers to all human-made surroundings that provide the setting for human activity, ranging in scale from buildings and parks/green space to neighborhoods and cities including their supporting infrastructure, such as water supply or energy networks.

The overarching goals of this research are to:

- Establish a definition of the Engineering & Architectural sector based upon published recurring data that can be continuously updated and called upon to track performance for ACEC's many constituencies.
- Provide a comprehensive view of the size, growth, and composition of the engineering and related professional services sector using the most current and comprehensive data available.
- Measure the economic contribution of the Engineering & Architectural industry using established metrics found in virtually all industry economic impact analysis.
- Analyze the key economic drivers of the Engineering & Architectural sector, build a statistical model using the strongest correlations between Engineering & Architectural performance and those drivers, and construct a recurring industry outlook. The outlook and modeling assets can be used to forecast future Engineering & Architectural performance and evaluate scenarios surrounding policy, geopolitical, and other future conditions.

This research is intended to be of value to ACEC members and their constituents. It will provide industry insight to members and can be leveraged as a planning and educational resource. It will also assist ACEC advocacy, communications, and other outreach efforts. This initial phase of the work focuses on developing a definition of the industry from a data perspective, then profiling its size, growth, and regional performance.

Engineering and Architectural Services Industry Definition

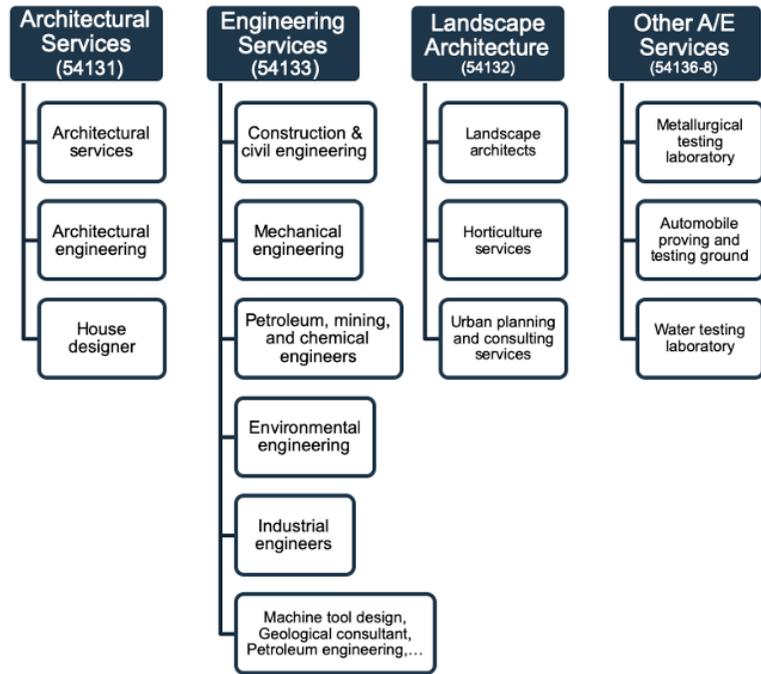
It is important to note that the definition of the Engineering & Architectural Services industry has been primarily developed based upon the ways in which public and private data sources collect and publish information from all businesses across the U.S. -the North American Industry Classification System, or NAICS. NAICS is a hierarchical industry taxonomy that provides classification standards for businesses according to their stated activities. Most public and private data collection conforms to these standards. This study focuses on engineering services first, given their dominant role (e.g., 67% of all jobs) in the overall Engineering & Architectural Services industry. Where other related professional services must be included due to data constraints will be noted throughout the report.

The NAICS code “5413, Architectural, Engineering, and Related Services” is part of the broad category, “54 - Professional, Scientific, & Technical Services” and includes both private and public sector organizations from a number of sub-sectors including:

- Architectural Services
- Landscape Architectural Services
- Engineering Services
- Drafting Services
- Building Inspection Services
- Geophysical Surveying and Mapping Services
- Surveying and Mapping (except Geophysical) Services
- Testing Laboratories

This study will focus on the all-inclusive NAICS 5413 category to define Engineering & Architectural activity for several reasons:

- More data with higher frequencies and greater regional detail are available at the 4-digit (5413) NAICS level. The deeper we drill into the NAICS structure, the less available and robust the data describing sector performance.
- Second, as a result of mergers and/or vertical integration strategies, more and more traditional ACEC members do operate across many of the sub-sectors within 5413.
- Third, given the economic and policy drivers of the Engineering and Architectural industry, it is likely that measured trends for NAICS 5413 will hold for most, if not all, of its member sub-sectors. Finally, a broader definition of A/E may bring more potential members into the ACEC family.



One important note regarding the analysis and interpretation of the results in this study. Our focus on NAICS 5413 in its entirety is not perfectly representative of board licensed professionals providing engineering services for the built environment (physical infrastructure) and the firms for which they work. Such firms are notable and different for a number reasons, including:

- Professional licensure creates direct moral and liability considerations for the licensed professional and their firms, regarding the safety and health of people and property.
- Federal, state, and local governments have laws and statutes which provide for separate procurement processes that involve the selection of providers of licensed professional and related services based on capability and experience criteria.
- Services can only be provided in disciplines (civil, mechanical, electrical, structural, environmental, etc.) the professionals are qualified to perform, and in many states, firm ownership is required to consist of all or a certain percentage of active professionals in the firm. This has the effect of also limiting the size of many such firms.
- Design work usually requires the teaming of firms with varied discipline capabilities and experience.

- Board licensing is for individual states or territories, resulting in geographical emphasis or limits on where work can be performed by individual firms.
- Since built environment involves facilities and infrastructure that are unique, due to the physical conditions involved, their designs must be correct when complete. Prototypes and beta testing are not an option since the initial construction costs and later corrections are prohibitive. The designs must be right the first time.

Since the definitions of NAICS Code 5413 and 541330 do not distinguish design of built environment from the design of equipment, systems, materials, instruments, software, and similar repeatable products and most data gathering surveys and processes allow for self-determination of NAICS Code reporting, many manufacturing, industrial, and management firms are included in the results. Often these are large enterprises that may skew the results.

While these firms may be “applying physical laws and principles of engineering in their design work”, they are essentially operating in a different business sector of the A/E industry. ACEC represents the business interests of firms across all of NAICS Code 5413, but recognizes the difference involved. We have attempted to provide context and insight where we have evidence that the more relevant data might deviate from the broader findings.

It must be emphasized that while the data contained in this report is suitable for many purposes, including understanding the size and impact of the A/E services industry, the data available and presented is not suitable for evaluating and establishing guidance for decisions on procurement practices or developing size standards for either the aggregate industry or the portion of the industry focused on design of the built environment. The latter portion is heavily concentrated in physical infrastructure design services provided to federal, state, and local governments and entities involved in public works. The firms operating in this sector of the A/E services industry make up the largest portion of ACEC membership.

Engineering and Architectural Services Data Sources

The data-driven effort to profile the Engineering and Architectural Services industry took advantage of a comprehensive set of published data from several public and private sources including:

- **U.S. Census Bureau** - Statistics of US Business (SUBS) - demographics, housing, income, employment and business establishment data and trends
- **Bureau of Labor Statistics (BLS)** - industry employment & earnings plus occupational employment and annual salary statistics
- **Bureau of Economic Analysis** - National Income & Product Accounts (GDP), employment, sales, wages, and supply chain purchases
- **Bureau of Economic Analysis** - RIMS II state-by-state industry impact multipliers
- **Dun & Bradstreet** - specific company-level data covering physical locations, jobs, sales, and ownership hierarchies
- **IMPLAN** - a non-proprietary input/output model of the U.S. economy
- **Dodge Data**
- **Other public and private sources**

Engineering and Architectural Services by the Numbers



\$386B

Industry Sales
This includes sales to all end-markets including construction, oil and gas, mining, utilities, manufacturing, government and exports.

Direct Annual Full & Part-Time Jobs
Combined with 3 million indirect jobs, that constitutes 3% of all U.S. jobs.



1.5M



\$44.7B

TAX

Direct Federal, State & Local Tax Collections
Engineering and Architectural Services contributes more total taxes per company and per employee than many other U.S. sectors.

Total Establishments
According to the U.S. Census Bureau, there were 140,000 business establishments operating in engineering and architectural services.



140,000



\$88,000

Average Wages
This well exceeds the average national salary of \$60,300.

Direct Economic Impact (Value Added)
This measure strips out double counting and assesses the engineering and architectural services' incremental contribution to overall U.S. GDP.



\$229B

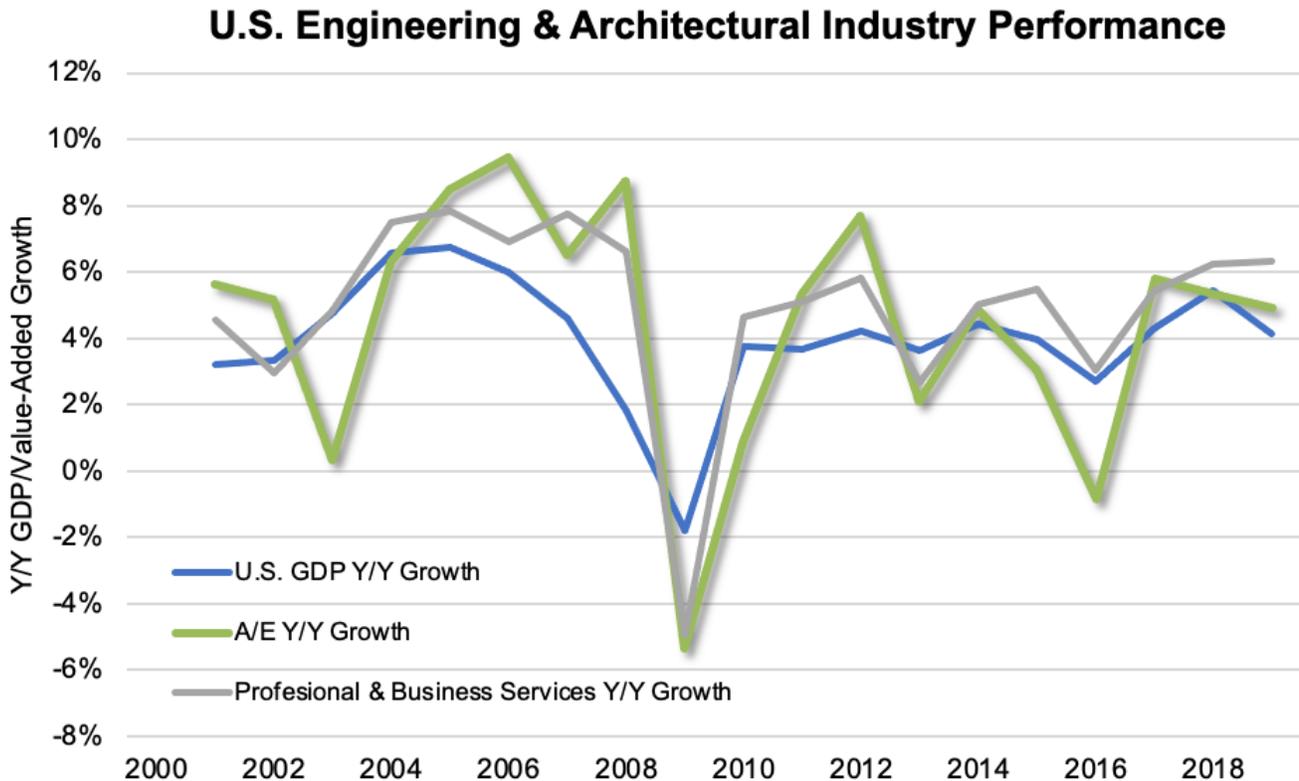
- **Total Engineering and Architectural Services industry revenue was \$386 billion in 2019.** This includes sales from any company designated as NAICS 5413 to all end-markets including construction, oil & gas, mining, utilities, manufacturing, government and exports.
- **Combined, the sector directly employed more than 1.5 million Americans in 2019,** including full and part-time workers. Combined with 3 million indirect jobs, this constitutes about 3% of all U.S. jobs.
- **According to the U.S. Census Bureau, there were 140,000 business establishments operating within engineering and related design services (NAICS 5413) at the end of 2019.** This number does not include self-employed or government locations dedicated to A/E. Establishments are physical locations, not companies. In fact, the ownership composition of the industry shows that a relatively small number of companies own a large proportion of these establishments. More on this later.
- **Engineering and architectural services workers are relatively well paid.** The average annual salary of a full-time A/E employee was \$88,000 per year in 2019, according to the Bureau of Labor Statistics. This includes a broad range of occupations and skill sets, everything from Civil Engineers to Accountants and Computer Systems Analysts to Administrative Assistants. Meanwhile, the average annual salary across all U.S. industries was only \$60,300.
- **Revenue or sales is one metric that measures industry but a better measure of the economic weight of the sector is value-added or GDP.** Value-added is a measure that strips out the double counting associated with the value of A/E's supply chain to focus solely on the value of A/E labor and capital used in producing the industry's sales. It measures the incremental contribution to overall U.S. GDP. **The sector's total value-added for 2019 reached \$229 billion.** Total U.S. GDP reached \$21.4 trillion that same year.
- **Engineering and architectural service activity generates a tremendous amount of tax revenue, about \$45 billion in 2019.** This includes transactional taxes such as sales and excise levies, income taxes, property taxes, and other licenses and fees at federal, state, and local levels. Having relatively higher compensation values, A/E Services contributes more total taxes per company and per employee than many other U.S. sectors.

Engineering and Architectural Industry Size, Growth, and Composition

The study collected many economic metrics that describe the A/E Services sector including revenue, employment, wages/salaries, and establishments. Moreover, sub-sector and regional detail was captured wherever possible. This next section will present A/E industry size and growth using each measure.

Revenue, Employment, Wages, and Establishment Counts

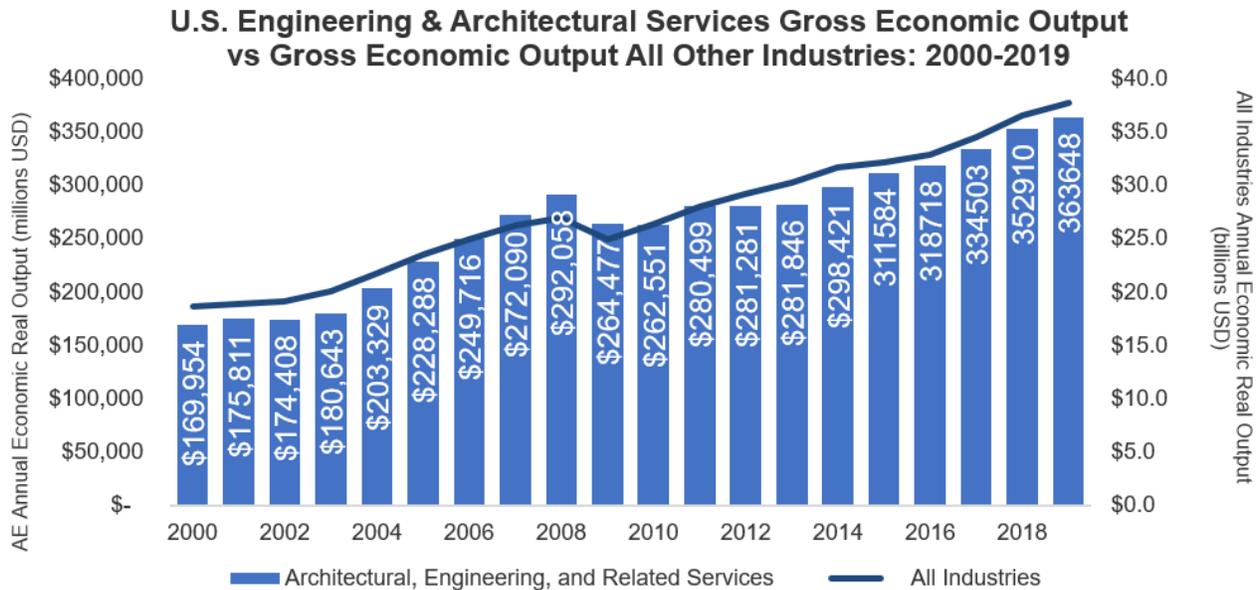
- During the past twenty years, the growth in the professional, scientific, and technical services industries has mostly outperformed the year-over-year growth in U.S. GDP. The A/E industry has followed a similar annual trajectory; however, it has had more dramatic declines in 2003 and in 2016. Growth was more pronounced for the A/E industry in 2006, 2008, 2012 and 2017.



Source: Rockport Analytics, Bureau of Economic Analysis, Bureau of Labor Statistics

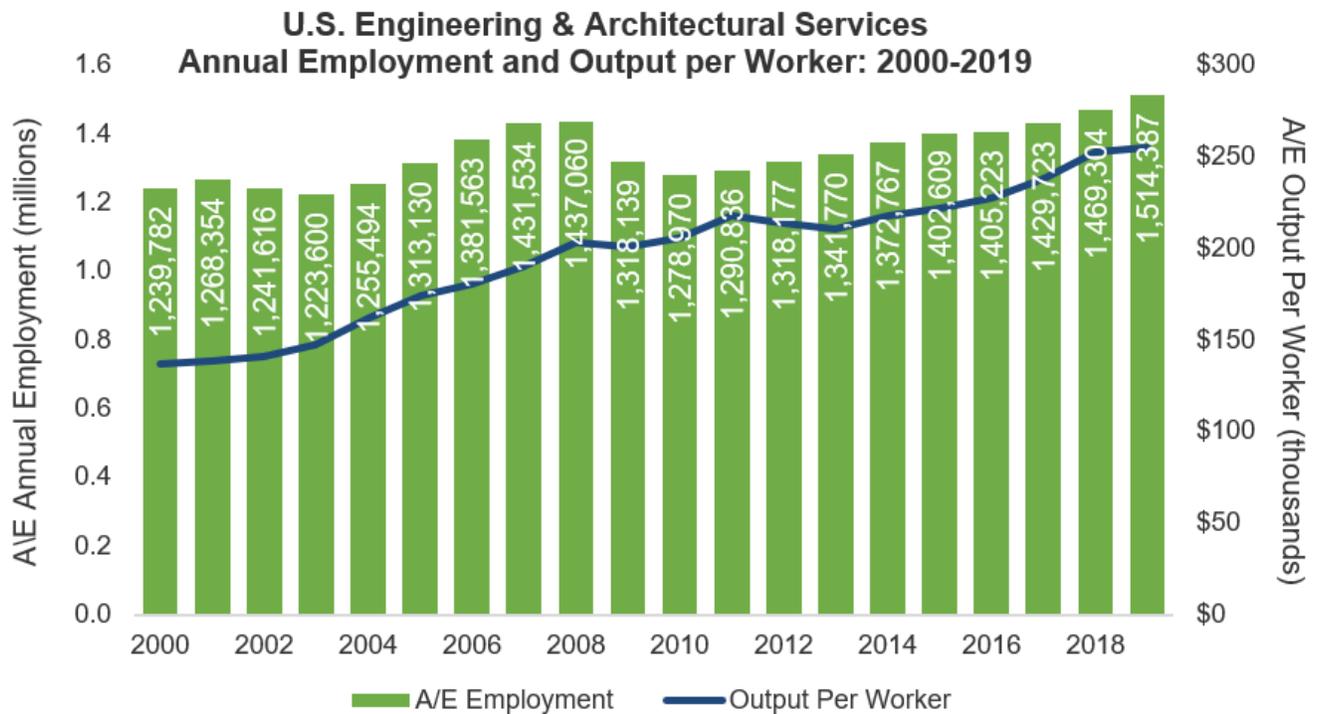
- A/E services revenue or output suffered dramatically from the Great Recession of 2009-2010. After a pre-recession peak of \$292 billion (blue bars in the chart on the next page), the sector experienced two consecutive years of decline, -9.4% and -0.7%, for 2009 and 2010 respectively. Since the 2010 trough, the industry has recovered significantly, slowly at first and then began to expand more rapidly in the last two years of the decade. Growth attained 9.2% in 2018 and 3.9% in 2019 to reach \$386 billion. Based upon output or revenue, A/E constitutes about 1.8% of the entire U.S. economy.

- Given the outsized impact that the Great Recession had on the Architectural Services side of A/E, **ACEC's constituency, much of which lies in Engineering Services, was not impacted to the same degree as the A/E industry as a whole.**
- Meanwhile, the overall economy** (blue line in the chart below) **declined only one year during the recession and began to recover sooner and more rapidly.** After a -7.7% decline in overall industry revenue during 2009, the general economy advanced for ten years in row at an average rate of 4.2% per year. With construction activity muted by the housing crisis and slower public investment, the corresponding 10-year growth rate for A/E Services was only 3.8% per year, much of that coming over the last two years.



Source: Rockport Analytics, Bureau of Economic Analysis, Bureau of Labor Statistics

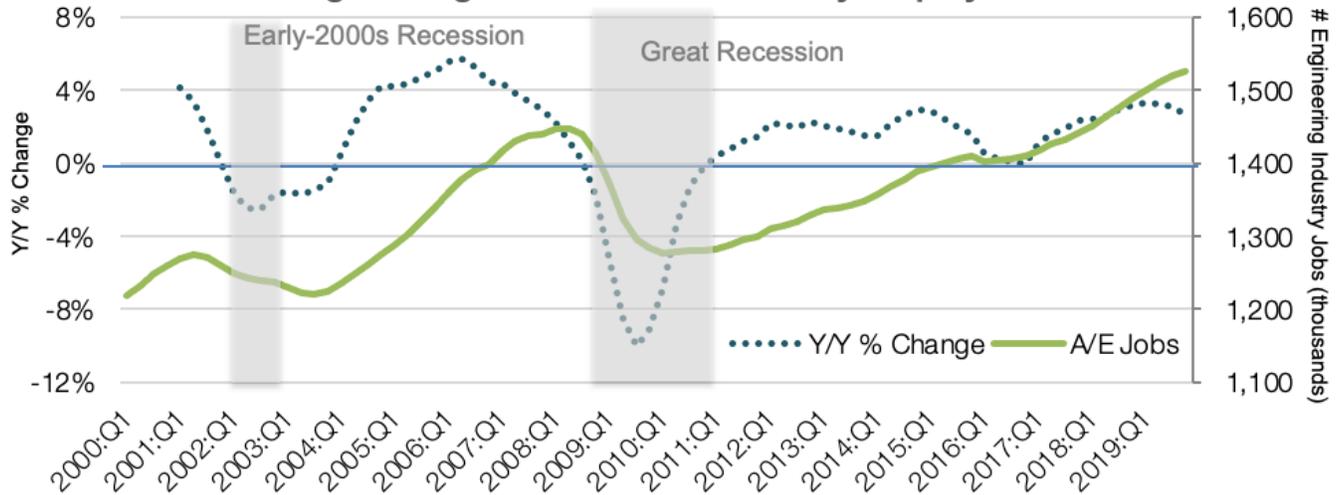
- As depicted in the chart on the following page, **A/E Employment trends have closely tracked those of revenue, albeit employment tends to be more stable than revenue over time.** After declining for two consecutive years during the Great Recession, job growth began to turn upward again in 2011. The Great Recession and the accompanying housing and financial crises cost the industry more than 160,000 jobs. As depicted in the chart below, job gains were slow but steady from 2011 through the end of the decade. In fact, it took until 2018 for total A/E employment to finally achieve its previous peak. **A/E firms employed more than 1.5 million Americans in 2019, up 3% versus year-earlier levels.**



Source: Rockport Analytics, Bureau of Economic Analysis, Bureau of Labor Statistics

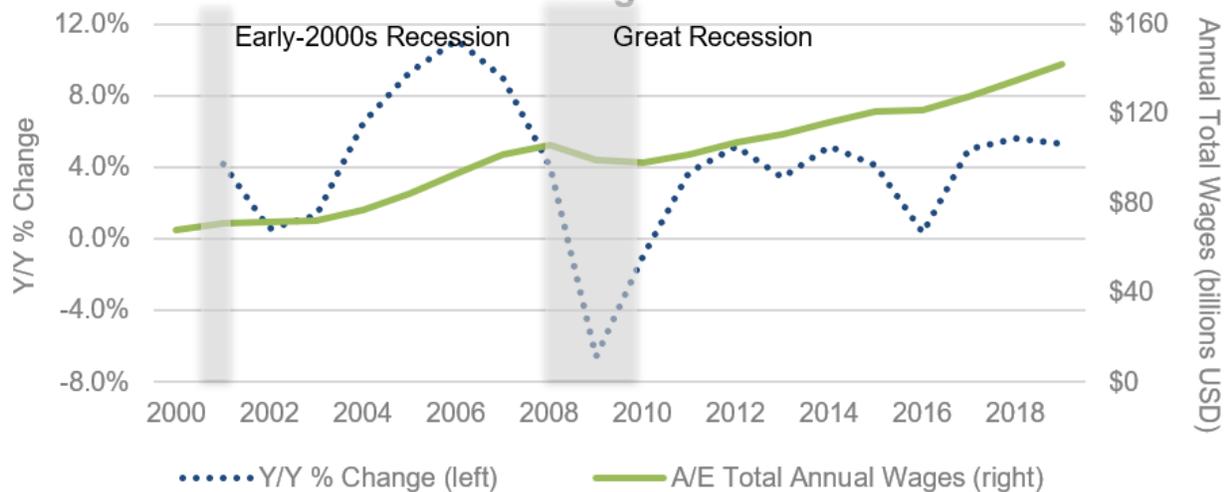
- A/E labor productivity, however, came through the Great Recession relatively unscathed.** Revenue-per-A/E worker (dark blue line) steadily advanced from \$137,000 in 2000 to a peak of \$254,690 in 2019. This represents a compound annual growth rate of 3.5% per year for that period. The industry compares favorably to the productivity of all U.S. workers, at \$238,000 and growing at only a 3% clip during that same period. A/E Services productivity gains are primarily a story of labor productivity growth. Investments in technologies in design, testing, implementation, and communications have driven these gains in labor productivity over the past two decades.
- The chart on the following page shows, **the Bureau of the Census, through its County Business Patterns (CBP) program, identified more than 140,000 business establishments engaged in A/E Services across the U.S. in 2019.** Business establishments are not analogous with companies, however, although they are related. Establishments refer to physical locations and include many A/E locations that have fewer than 5 employees. The chart below shows that establishment counts have grown steadily across the two decades, the exception being the five negative quarters associated with the Great Recession.

U.S. Engineering & Architectural Industry Employment 2000-2019



- The housing and financial crises of 2008-2010 wrought havoc on A/E Services business formation.** Growth in new A/E physical locations fell from a two-decade high of +3.8% at the end of 2006 to a low of -2.2% at the end of 2009. This tracked closely with A/E Services jobs during that same period. It took until the end of 2012 for A/E establishment counts to begin growing again and, since that time, they have steadily increased. In fact, year-on-year growth has registered above 2% for all eight quarters of 2018-2019.
- Total wages for employees in the A/E Services sector also suffered during the Great Recession.** Wages declined for three years in a row after reaching a peak in the earlier part of 2008. Wage growth after the housing and financial crisis has remained anemic, with year over year growth rates that have yet to recover their peak in 2006 when wage growth eclipsed 11%. **In the last five years, wages have grown at an annual average rate of only 4%.**

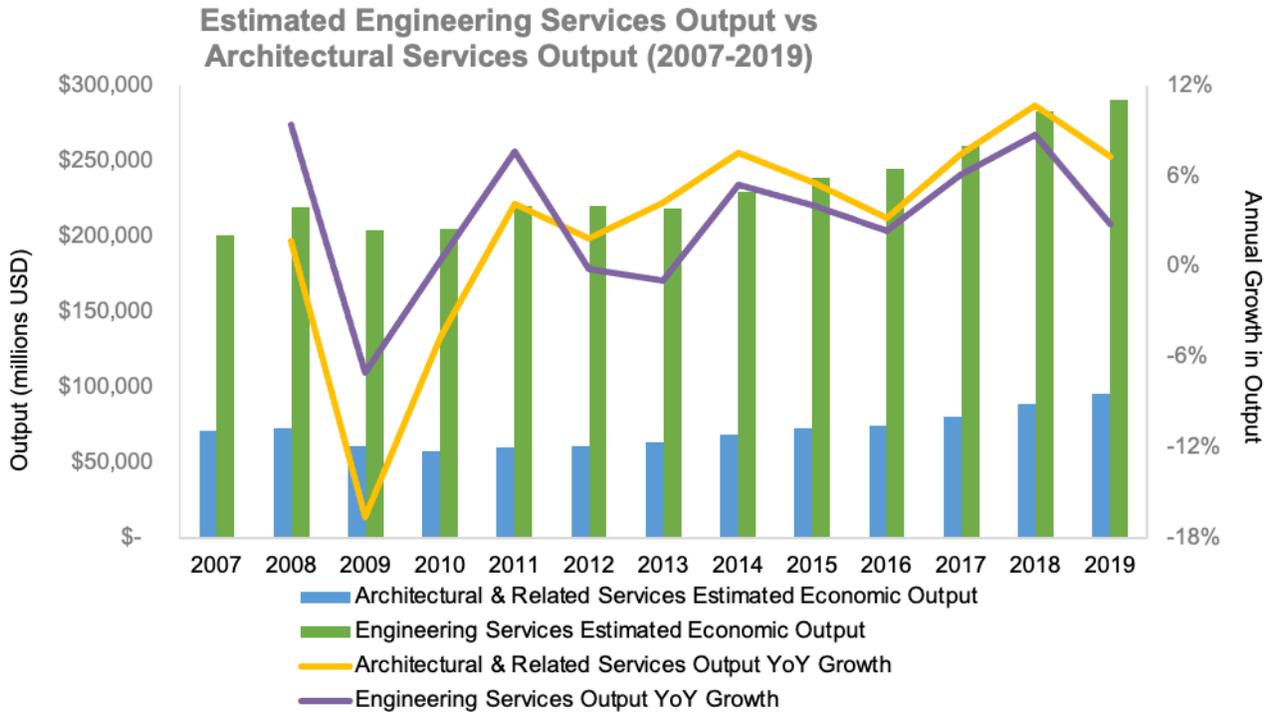
U.S. Engineering & Architectural Industry Annual Total Wages 2000-2019



Source: Rockport Analytics, Bureau of Economic Analysis, Bureau of Labor Statistics

Engineering and Architectural Services Industry Composition

- As illustrated in the chart below, the largest share of economic activity generated by the Architectural, Engineering and Related Services Industry group comes from the Engineering Services subsector. Compared to Architectural and Related Services, Engineering Services is a more diversified subsector that serves a broader set of end-markets.

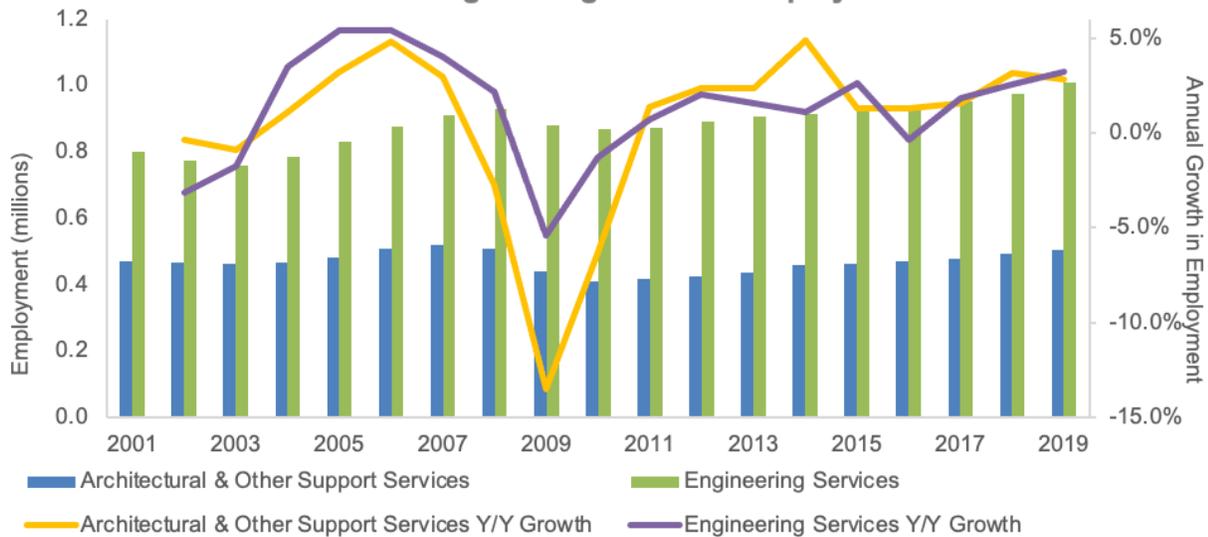


Source: Rockport Analytics, Bureau of Economic Analysis, Bureau of Labor Statistics

- During the financial and housing crises of 2009-2010 the annual growth in output for the Engineering Services (ES) subsector did not decline as dramatically as its Architectural & Related Services (ARS) counterpart.** ES revenue fell by -7% in 2009 while ARS declined -17% during that same period -a clear indication of ARS' deeper ties to the housing sector.
- Since the depths of the Great Recession, output in both the Architectural & Related and Engineering Services subsectors has steadily recovered, with Architectural Services increasing at a faster rate as construction rebounded. **According to the 2020 Firm Survey Report conducted by the American Institute of Architects (AIA), spending on buildings grew by more than \$200 billion between 2011-2019, an increase of 65% after bottoming out in 2009¹.**
- As illustrated in the chart below, **Engineering Services employment also tends to be more stable during business cycles than its Architectural Services counterpart.** This is partially due to Architectural Services greater correlation with residential construction, both new and remodeling. Engineering Services is more diversified and includes firms that serve industries beyond construction such as Oil & Gas, Manufacturing, and Mining.
- Architectural Services employment plummeted -18% during the Financial Crisis (2009-2010) while Engineering Services employment declined only -5.3% during that same period.** Conversely, in expansionary periods, Architectural Services tends to outperform Engineering Services, exhibited by its 2.4% compound annual growth rate over the last five years compared to the 1.7% average annual growth in ES.

¹The Business of Architecture 2020, Firm Survey Report pp.4-5

Architectural Services Employment Tends to Be More Cyclical Than Engineering Services Employment



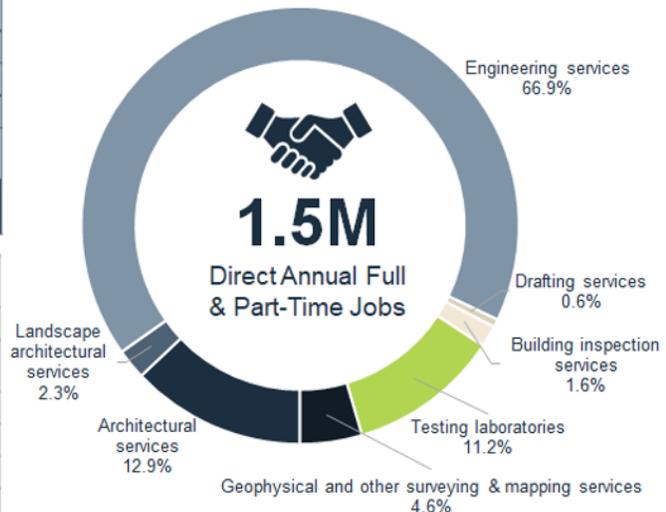
Source: Rockport Analytics, Bureau of Economic Analysis, Bureau of Labor Statistics

- **In 2019, total A/E Services industry employment totaled more than 1.5 million.** This was made up of firms operating in the Engineering Services sub-component (1.0 million, or 67%), Architectural Services (195,000, or 13%), Testing Laboratories (168,300, or 11%) and other related services.
- **Engineering Services sector was over 4 times the size of the Architectural Services sector in 2019** (see chart below). At more than 1 million jobs in 2019, Engineering Services comprises about 67% of the entire A/E Services category (NAICS 5413). In 2019, Engineering Services employment expanded by 3.2% over the previous year, while Architectural Services employment grew at a slower rate of 2.3%. Both, however, outpaced the 1.3% growth in total U.S. employment.

NAICS Code	NAICS Description	2019 Employment*
541310	Architectural services	195K
541320	Landscape architectural services	34K
541330	Engineering services	1 Million
541340	Drafting services	9K
541350	Building inspection services	24K
541380	Testing laboratories	168K
541360 & 541370	Geophysical and other surveying & mapping services	69K
5413	Architectural & Engineering Services	1.5 Million

NAICS Code	NAICS Description	State with Highest Employment
541310	Architectural services	California: 30.6K
541320	Landscape architectural services	California: 7.8K
541330	Engineering services	California: 118K
541340	Drafting services	Texas: 846
541350	Building inspection services	California: 3.4K
541380	Testing laboratories	Michigan: 24.5K
541360 & 541370	Geophysical and other surveying & mapping services	Texas: 14.9K

U.S. Engineering & Architectural 2019 Employment by 6-Digit NAICS

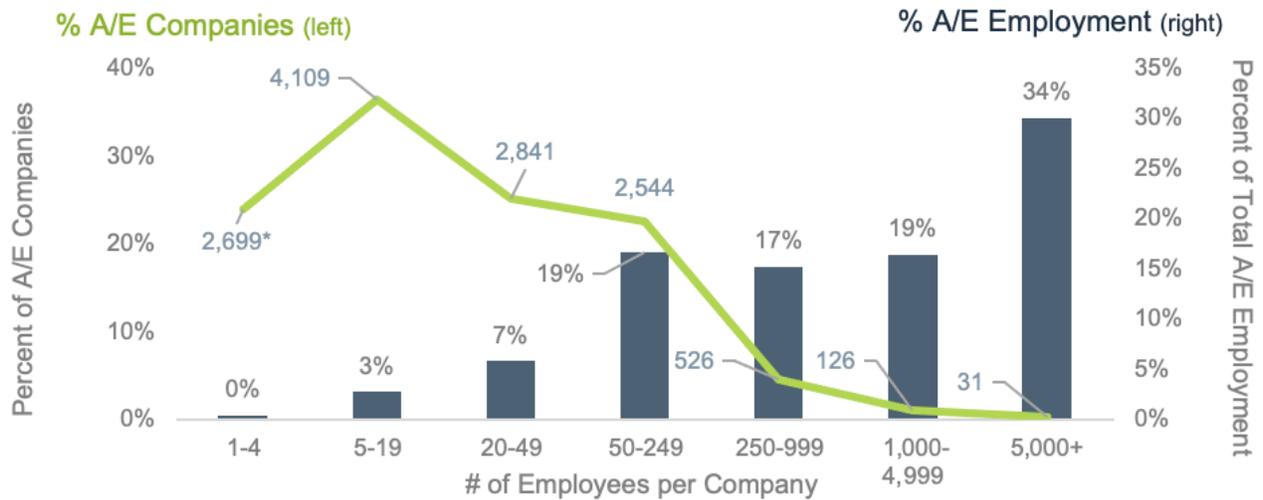


* The employment figures are preliminary and subject to revision.
Source: Rockport Analytics, Bureau of Labor Statistics

Engineering and Architectural Services Company Firmographics

- **Dun & Bradstreet’s database identified nearly 12,900 companies engaged in A/E Services activity (NAICS 5413) in 2019.** D&B includes both companies whose main and only business was A/E, along with firms engaged in different businesses yet having dedicated A/E locations, in their definition. For example, D&B included several defense contractors, such as Lockheed, Raytheon, and General Dynamics, each having more than 50 owned locations dedicated to A/E. Also included in the D&B A/E universe was the U.S. federal government with more than 640 A/E locations and employing over 61,000 individuals.
- **D&B’s A/E companies included large multi-regional players such as AECOM, Jacobs, and KBR, but most firms operated within a single region of the country.** In fact, the average A/E Services company had just three (3) locations with an average of 28 employees.
- **While most A/E companies were relatively small – nearly 2/3 of all companies had less than 20 employees – the largest thirty (30) firms employed more an 1/3 of all A/E workers.**
- Since A/E markets are inherently regional, **A/E Service offices tend to be smaller with an average location size of 28 employees** and a median size of 11.
- **According to AIA’s 2020 Firm Survey Report, the firm demographics for the Architectural Services subsector are similar to those of the broader A/E sector.** The average number of employees for each firm is 12. About 60% of AS firms had fewer than five employees while only 2.5% had 100 or more.

Engineering & Architectural Companies, Jobs by Size Class



*The number of A/E companies are noted for each size class

*Source: Dun & Bradstreet

Engineering and Architectural Services Top Company Rankings

- Five of the companies in the Dun & Bradstreet list of Top 20 A/E companies ranked by employment are also on ENR's list of the Top 500 Design Firms² ranked by 2019 revenue. **AECOM and Jacobs are within the top 3 in both lists and combined they employ more than 116,000 employees with AECOM employing nearly 79,000.**
- **Most of the companies in the Dun & Bradstreet list are in the Engineering services subsector.** Defense contractors Lockheed Martin, Raytheon, and General Dynamics combined employ more than 60,000 individuals in A/E services.

Dun & Bradstreet Top 20 Companies	Ranked by Jobs at A/E- Designated Establishments
AECOM	78,718
GOVERNMENT OF USA	61,367
JACOBS	37,647
LOCKHEED MARTIN	24,960
RAYTHEON COMPANY	18,172
GENERAL DYNAMICS	17,204
BECHTEL	16,747
KBR INC	15,259
ENGILITY HOLDINGS INC	15,254
STANTEC, INC.	12,659
BRICKMAN PARENT LP	12,305
BOEING COMPANY	12,195
GENERAL ELECTRIC CO	12,022
CHICAGO BRIDGE & IRON CO DEL	9,547
CH2M HILL COMPANIES LTD	9,430
HDR INC	9,318
PARSONS CORPORATION	9,072
MICHAEL BAKER INTL LLC	8,517
LEIDOS HOLDINGS INC	7,957
UNDERWRITERS LABORATORIES INC	7,539
Total U.S. in 2017	1,346,888

*Source: Dun & Bradstreet

Top 20 Design Firms (2020 Top 500 List)	Ranked by 2019 Revenue in Millions \$
JACOBS	\$9,676.8
AECOM	\$7,967.5
KBR, INC	\$3,331.0
TETRA TECH INC.	\$3,179.0
WOOD	\$2,680.6
HDR	\$2,325.6
WSP USA	\$1,984.3
STANTEC, INC.	\$1,881.0
BURNS & MCDONNELL	\$1,795.9
GENSLER	\$1,523.1
BLACK & VEATCH	\$1,510.6
PARSONS	\$1,510.3
ARCADIS NORTH AMERICA/CALLISON RTKL	\$1,492.0
HNTB COS	\$1,414.9
INTERTEK-PSI	\$1,395.6
SNC-LAVALIN, INC	\$1,143.9
KIMLEY-HORN	\$1,120.6
GOLDER	\$1,109.3
BECHTEL	\$1,037.0
TRC COS	\$999.0

*Source: Engineering News-Record (enr.com)

² <https://www.enr.com/toplists/2019-Top-500-Design-Firms1>

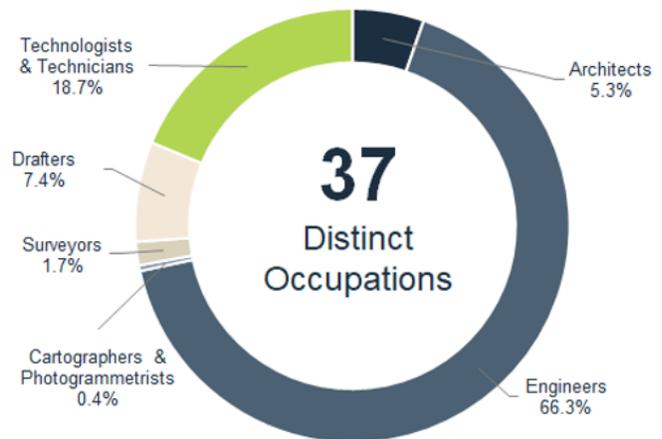
Industry Occupations

The Standard Occupational Classification (SOC) is a system used by federal agencies to classify workers into occupational categories. The Architecture and Engineering Occupation category (SOC 17-0000) is comprised of 37 distinct occupations.

A/E Occupations According to the Standard Occupational Classification (SOC) System

Architects	Drafters
Landscape	Architectural & Civil
Naval Architects & Marine Engineers	Electrical & Electronics
Architects, all other	Mechanical
	Drafters, all other
Engineers	Technologists & Technicians
Aerospace	Aerospace
Agricultural	Civil Engineering
Biomedical	Electrical & Electronic
Chemical	Electro-Mechanical & Mechatronics
Civil	Environmental
Computer Hardware	Industrial
Electrical	Mechanical
Electronics, except computer	Technicians, all other
Environmental	Surveying and Mapping
Health & Safety, except mining safety	Calibration
Industrial	
Materials	Other
Mechanical	Cartographers & Photogrammetrists
Mining & Geological, including mining safety	Surveyors
Nuclear	
Petroleum	
Engineers, all other	

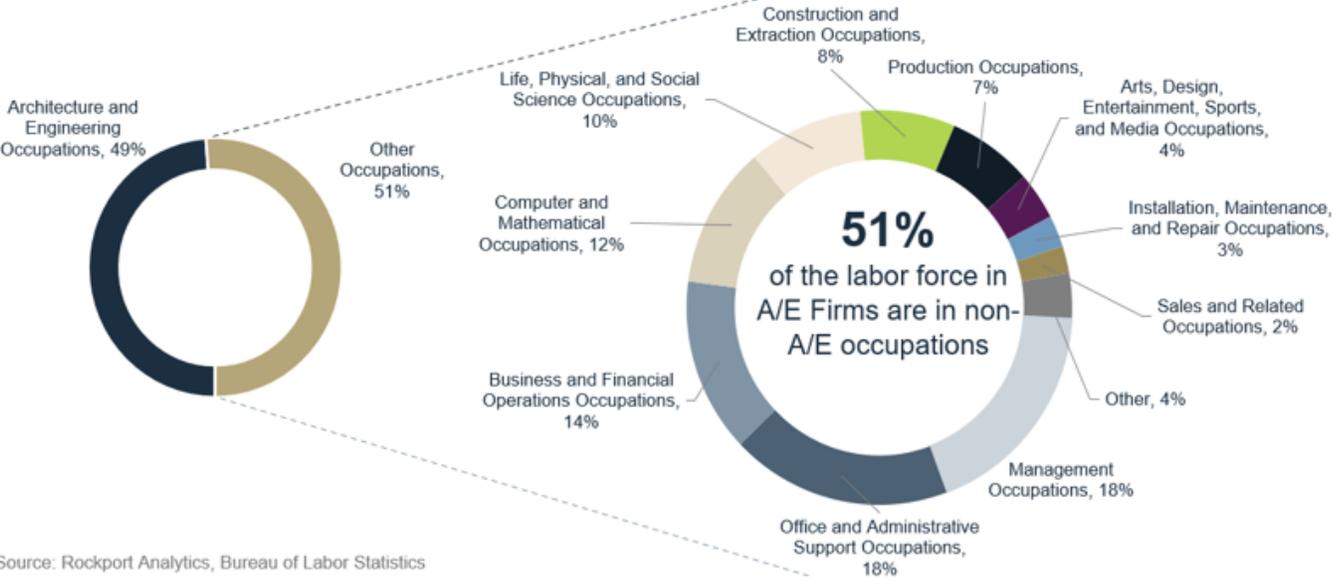
2019 Engineering & Architectural Occupations by Major Category



Source: Rockport Analytics, Bureau of Labor Statistics

- **The Engineering occupations are the most diverse and make up the largest share (66%) of employment.** Many of these occupations serve industries beyond construction such as manufacturing, oil & gas, mining, health care and IT. The Architects occupational grouping, which include landscape architects, makes up about 5.3% of total employment in A/E occupations.
- As depicted in the chart on the next page, **about half (49%) of the workforce employed by A/E firms (those classified as NAICS Code 5413, Architectural, Engineering, and Related Services), is comprised of A/E occupations.** The A/E occupation group should not be confused with those workers who are generally considered billable within an A/E firm. While many of these A/E workers are engaged in billable activities, this grouping would not include all billable employees.
- **Meanwhile, the remaining 51% is made up of support, sales, operations, IT, production, and other occupations.** About half of these non-A/E occupation workers are engaged in Management (18%), Office Administration (18%) or Financial Operations (14%).

Occupations in Architectural, Engineering, and Related Services Firms (NAICS 5413)



Source: Rockport Analytics, Bureau of Labor Statistics

Benchmarking State-Level Activity

This section explores A/E Services data on a state-by-state basis with a particular focus on ranking industry size and growth over time.

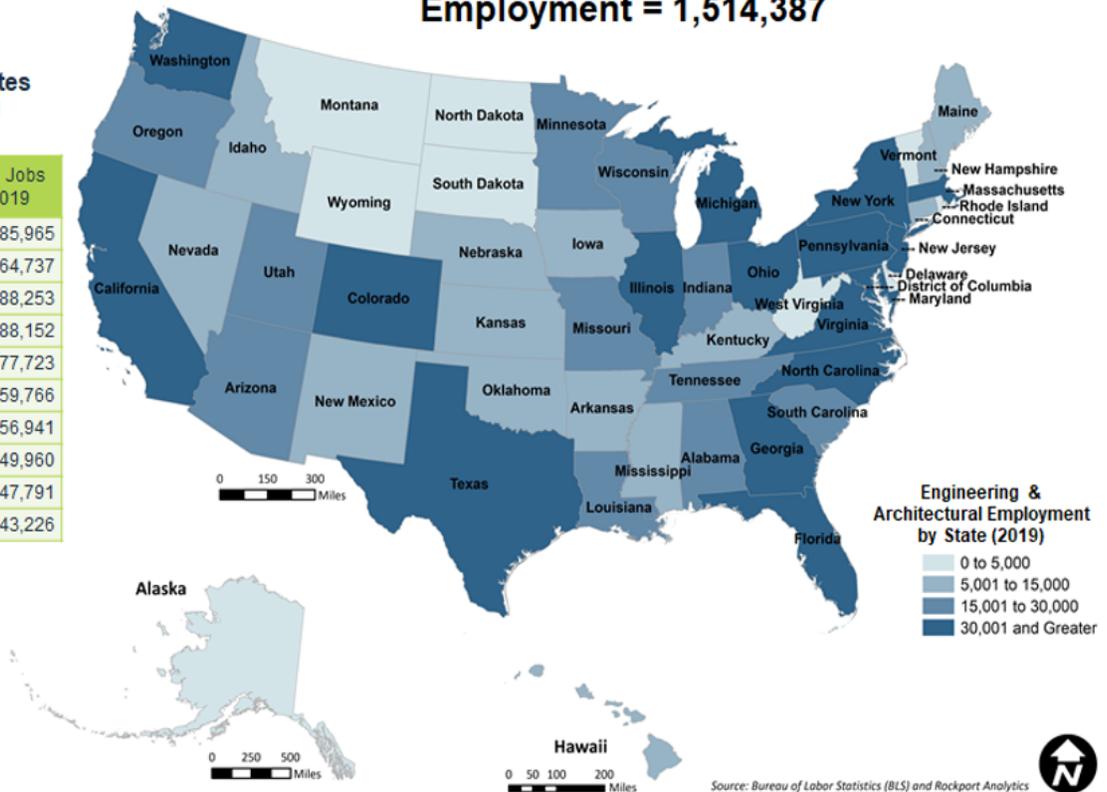
Engineering and Architectural Services Employment

- **The top 5 states comprise more than 40% of total U.S. A/E industry employment.** California and Texas are far and away the leaders in A/E activity with a combined 23% of total jobs. This is driven by large populations, outsized construction activity, and, in the case of Texas, the large footprint of the oil & gas industry.
- **Of the top 5 states, California also tops the list with the most employment in all of the industry subsectors except for Drafting Services and Geophysical Surveying and Mapping Services.** New York has the second largest Architectural services workforce in the country while Michigan has the largest workforce in the Testing Laboratories subsector (driven by the presence of automotive proving grounds).
- **Combined A/E employment in the bottom 10 states makes up only 2.5% of the total A/E employment in the U.S.** Lower A/E employment levels are mainly correlated to low population levels in those states. On a per capita basis, Montana, Alaska and North Dakota's employment levels are all ranked in the top 50% of states.

2019 Total Engineering & Architectural Employment = 1,514,387

Top Ten A/E States
(Ranked By Total Employment)

Rank	State	A/E Jobs 2019
1	California	185,965
2	Texas	164,737
3	Florida	88,253
4	Michigan	88,152
5	New York	77,723
6	Pennsylvania	59,766
7	Virginia	56,941
8	Colorado	49,960
9	Illinois	47,791
10	Ohio	43,226



Top 10 States Ranked by Total 2019 Engineering and Architectural Employment

State	Architectural Services	Landscape Architectural Services	Engineering Services	Drafting Services	Building Inspection Services	Geophysical Surveying & Mapping Services	Other Surveying & Mapping Services	Testing Laboratories	Total A/E
6-Digit NAICS*	541310	541320	541330	541340	541350	541360	541370	541380	5413
California	30,620	7,800	118,510	829	3,371	883	3,623	20,329	185,965
Texas	15,771	2,916	107,791	846	2,323	5,642	9,291	20,157	164,737
Florida	9,894	3,996	59,020	762	2,546	592	5,933	5,509	88,252
Michigan	3,684	664	56,912	149	533	304	1,388	24,518	88,152
New York	22,372	1,712	40,409	773	1,482	516	1,887	8,573	77,724
Pennsylvania	6,530	976	39,717	365	1,335	281	1,377	9,186	59,767
Virginia	4,137	644	47,027	122	628	188	1,864	2,331	56,941
Colorado	5,024	1,032	37,239	401	608	1,650	1,581	2,425	49,960
Illinois	9,086	1,892	28,300	191	559	208	1,124	6,431	47,791
Ohio	5,592	482	27,803	355	800	236	1,146	6,811	43,225

Source: Rockport Analytics, Bureau of Labor Statistics

Bottom 10 States Ranked by Total 2019 Engineering and Architectural Employment

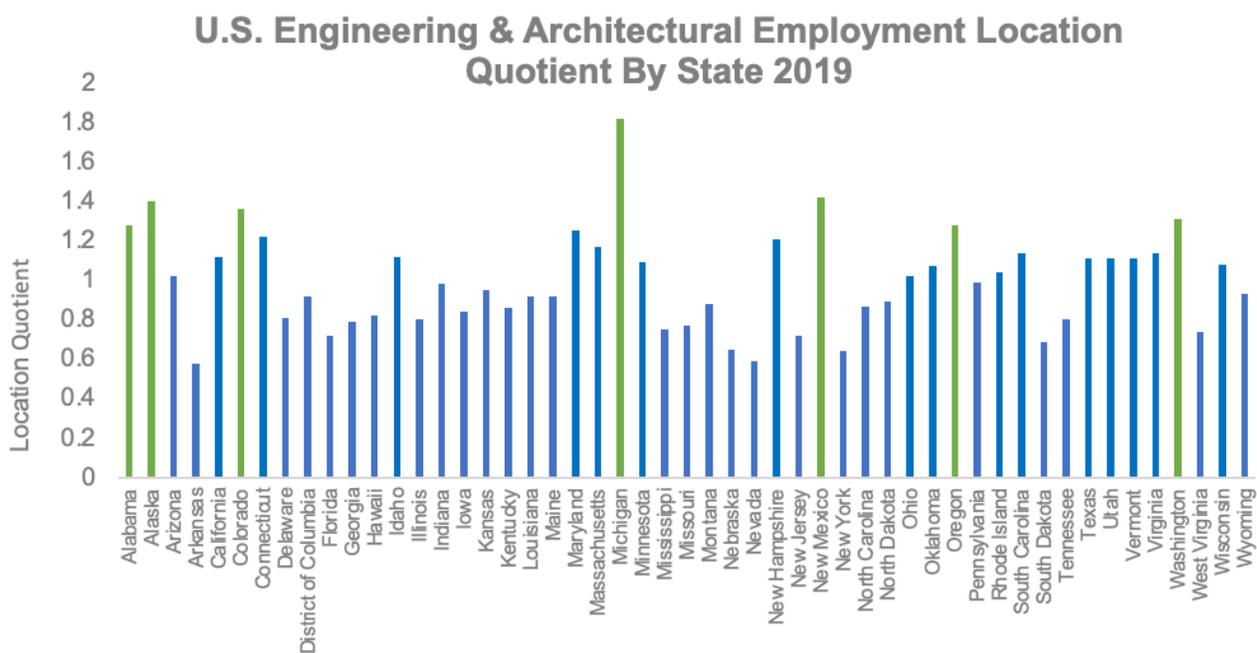
State	Architectural Services	Landscape Architectural Services	Engineering Services	Drafting Services	Building Inspection Services	Geophysical Surveying & Mapping Services	Other Surveying & Mapping Services	Testing Laboratories	Total A/E
6-Digit NAICS*	541310	541320	541330	541340	541350	541360	541370	541380	5413
Maine	697	63	3,710	86	82	19	368	279	5,304
Montana	901	107	3,210	61	52	86	201	339	4,957
Alaska	301	ND	3,557	ND	108	127	296	311	4,700
North Dakota	356	ND	3,158	0	25	0	133	551	4,223
Rhode Island	460	62	3,095	ND	72	0	111	322	4,122
West Virginia	202	18	3,144	0	106	66	416	0	3,952
Delaware	166	78	2,787	ND	135	0	130	304	3,600
South Dakota	278	34	2,074	18	33	68	124	385	3,014
Vermont	379	93	1,537	ND	38	0	107	172	2,326
Wyoming	200	22	1,162	0	29	84	221	0	1,718

Source: Rockport Analytics, Bureau of Labor Statistics

ND=not reported by the BLS due to non-disclosure requirements

High Low

- A location quotient (LQ) is an analytical statistic that measures a region's industrial specialization relative to a larger geographic unit (usually the nation). **The Employment Location Quotient is a ratio that measures the concentration of A/E employment across states and compares it to the A/E employment in the U.S.**
- **States with relatively high employment LQs have a higher concentration of A/E employment compared to the U.S.** and in the chart below, the states highlighted in green have a LQ > 1.3, which means that their employment concentration in A/E services is 30%+ greater than the national average.
- **States with a high A/E employment specialization include Michigan (1.8), New Mexico (1.4), Alaska (1.4), Colorado (1.6) and Washington (1.3).** Not surprisingly, a number of states with high specialization in terms of employees are usually highly concentrated when it comes to firm location. Examples of these states include New Mexico, Alaska and Colorado.



Source: Rockport Analytics, Bureau of Labor Statistics

Engineering and Architectural Services Wages

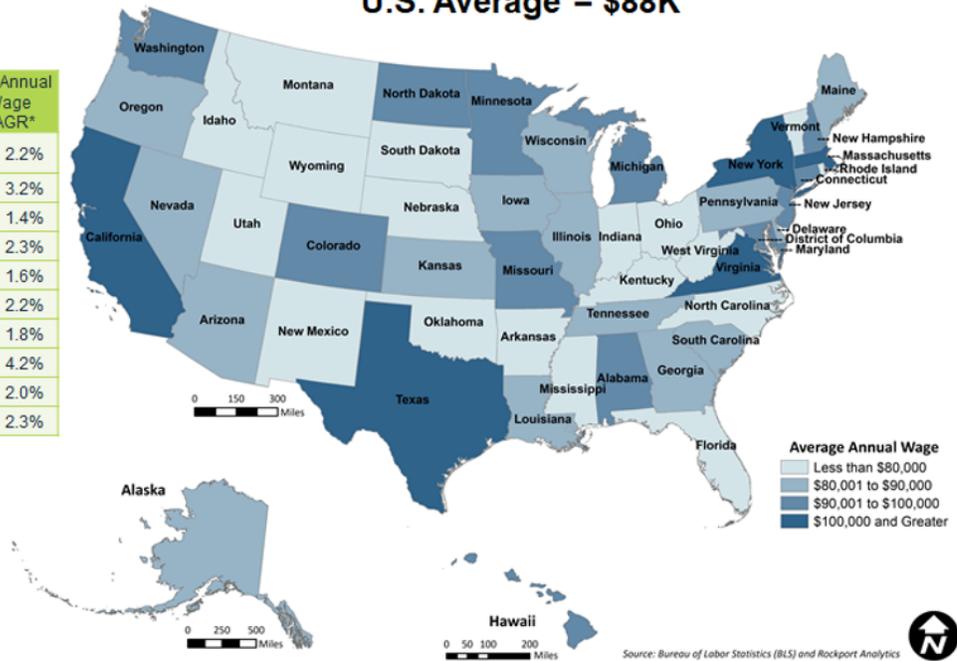
- **In 2019, the U.S. average annual wage in the A/E sector was \$88,000.** The annual average wages ranged from the highest at \$120K in Washington, D.C. to the lowest at \$66K in West Virginia.
- **A/E Services workers are relatively well paid** compared to the average annual salary across all U.S. industries which was \$60,300.
- A/E wages in all eight Census Divisions exceeded the national average wage among all sectors and were reflective of overall cost of living differences with the highest annual wages in the Mid-Atlantic, Pacific, New England and South Atlantic Divisions leading the way. **The Mountain Census Division had the lowest average wage (\$81k) and the Mid-Atlantic the highest (\$96k).**

2019 Engineering & Architectural Average Wages by State U.S. Average = \$88K

Top Ten Engineering & Architectural States
(Ranked By Average Wages)

Rank	State	Avg Annual Wage 2019	Avg Annual Wage CAGR*
1	District of Columbia	\$120,510	2.2%
2	Massachusetts	\$110,097	3.2%
3	California	\$107,315	1.4%
4	Virginia	\$103,636	2.3%
5	Texas	\$103,272	1.6%
6	New York	\$101,348	2.2%
7	Colorado	\$99,996	1.8%
8	Michigan	\$99,268	4.2%
9	New Jersey	\$98,696	2.0%
10	North Dakota	\$97,487	2.3%

* Compound Annual Growth Rate



2019 Engineering & Architectural Services Average Wage by Census Division

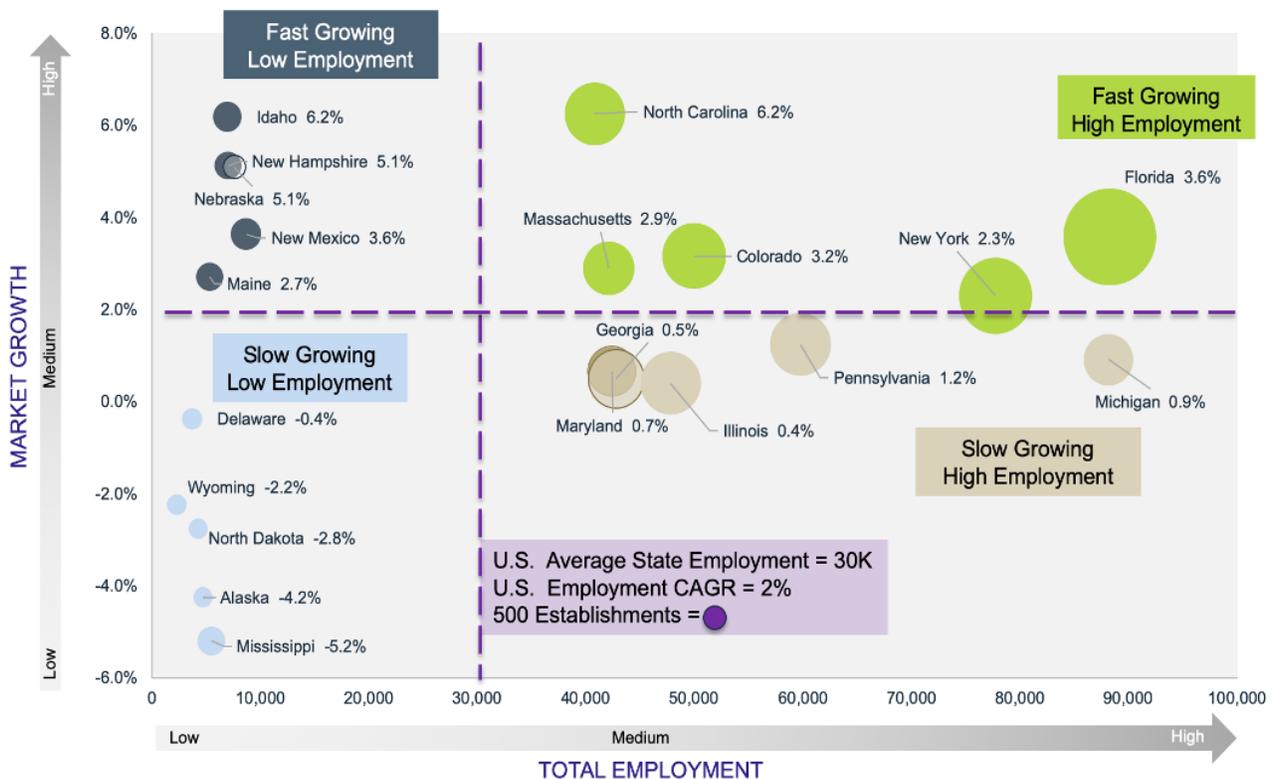


Source: Rockport Analytics, Bureau of Labor Statistics

Differences in the Size & Performance of Engineering and Architectural Services Across the U.S.

- Florida, New York, and Colorado not only have high A/E services employment relative to the national average, but also have annual growth rates in employment that are above the 2% growth rate in national A/E employment. States like Pennsylvania, Michigan and Illinois, on the other hand, are among the Top 10 in terms of the size of their workforces but have grown their A/E workforces at a slower rate than the national average.
- Annual growth rates in Idaho, Nebraska and New Hampshire have averaged over 5% over the last five years but these states have fewer establishments and relatively small labor forces (below the average per state of 30,000).
- North Carolina stands out for its ability to grow its already sizable A/E workforce (over 40,000) by 6.2% on average over the last five years. This is triple the national compound annual growth rate over the period.
- In recent years, most of the states with negative employment growth rates (slow growing) are also states that have lower employment and fewer establishments.

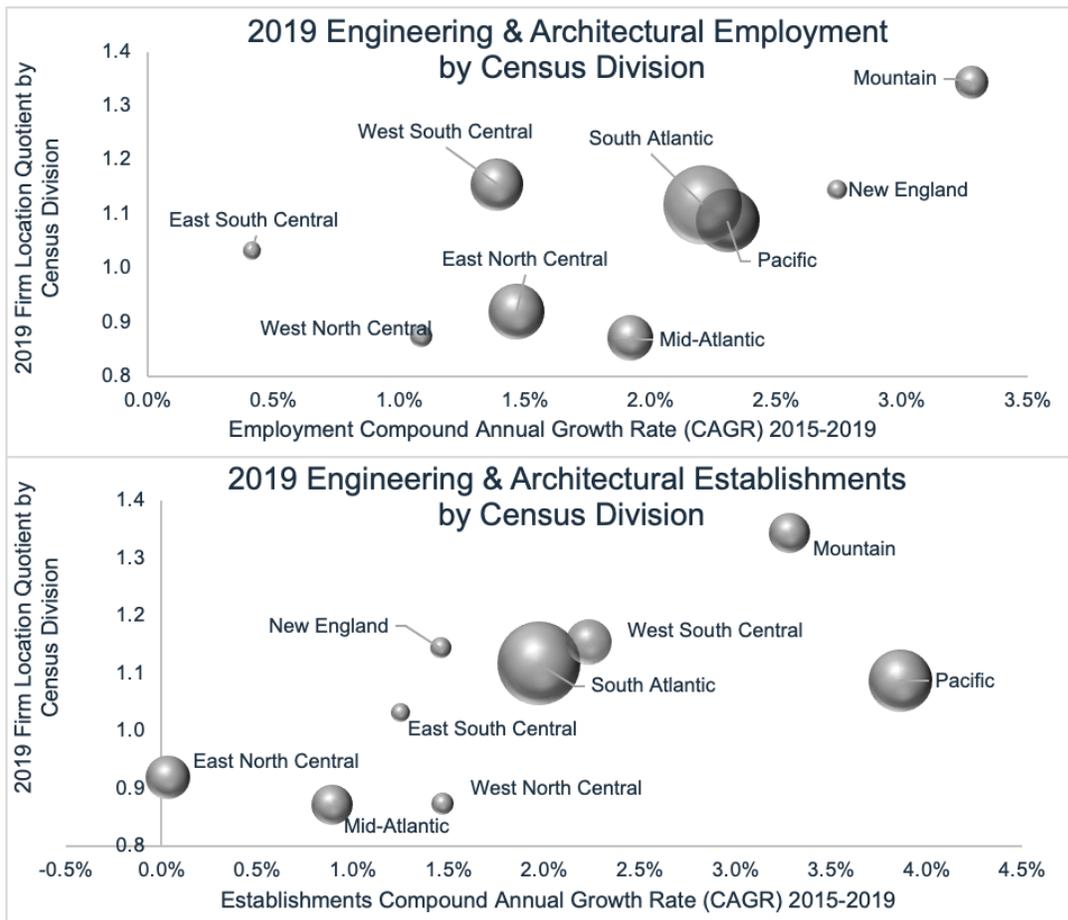
State Engineering & Architectural Employment: Size of Workforce and Growth



Source: Rockport Analytics, Bureau of Labor Statistics

Engineering and Architectural Services Performance by Region

- In the last five years, the Mountain Census Division has experienced rapid compound average annual growth rates in A/E employment with states like Colorado, Idaho and New Mexico achieving growth rates well above the U.S. average of 2%. While Wyoming's declining A/E employment has been a slight drag on the region.
- Several states in the New England Census Division- New Hampshire, Maine and Massachusetts- have also achieved average annual growth rates in employment in excess of the national average. Despite their growth in employment, most of the states in this region had employment levels below the U.S. average of nearly 30,000.
- Since 2015, the South Atlantic Census Division has also witnessed accelerated growth in both A/E employment and A/E establishments. North Carolina and Florida have led employment growth with annual growth rates of 6.2% and 3.6% respectively.
- The East South Central Division has the lowest growth in employment in the U.S. with states like Mississippi, Tennessee and Kentucky remaining relatively flat or seeing declines in A/E employment during the last few years. Decreases in employment in North Dakota, Kansas and Missouri have also contributed to a below average growth rate in the West North Central Census Division.



Study Appendix: State Metrics, Glossary & Definitions and Map of U.S. Census Divisions

Appendix 1: State by State Heat Map Tables

2019 Employment, Average & Annual Wages and Establishments by State

State	Employment	Employment CAGR 2015-2019	Average Annual Wage	Average Annual Wage CAGR 2015-2019	Total Annual Wage (Millions \$)	Annual Total Wage CAGR 2015-2019	Establishments	Total Establishments CAGR 2015-2019
Alabama	27,384	3.6%	\$94,146	2.4%	\$645	6.1%	2,248	1.6%
Alaska	4,714	-4.2%	\$89,128	-0.5%	\$105	-4.6%	464	0.5%
Arizona	26,574	3.3%	\$87,932	-0.8%	\$584	2.4%	3,148	5.8%
Arkansas	6,386	2.3%	\$66,950	2.2%	\$107	4.5%	1,046	2.5%
California	185,965	2.6%	\$107,315	1.4%	\$4,993	4.0%	16,963	4.7%
Colorado	49,960	3.2%	\$99,996	1.8%	\$1,249	5.0%	5,097	2.2%
Connecticut	13,321	1.4%	\$90,870	2.0%	\$303	3.5%	1,438	0.6%
Delaware	3,674	-0.4%	\$88,075	-13.1%	\$81	-13.3%	525	5.8%
District of Columbia	8,012	0.8%	\$120,510	2.2%	\$241	2.9%	659	2.0%
Florida	88,253	3.6%	\$79,482	2.5%	\$1,756	6.2%	10,959	2.6%
Georgia	42,760	0.5%	\$89,609	3.5%	\$958	4.0%	4,106	-0.4%
Hawaii	5,771	2.1%	\$92,417	2.8%	\$134	5.0%	788	1.7%
Idaho	6,943	6.2%	\$71,656	2.7%	\$125	9.0%	1,048	4.4%
Illinois	47,791	0.4%	\$88,647	2.2%	\$1,058	2.6%	4,611	-3.1%
Indiana	20,567	3.0%	\$73,216	2.9%	\$377	6.0%	2,292	1.3%
Iowa	8,035	1.3%	\$83,499	2.4%	\$168	3.7%	1,034	1.9%
Kansas	13,925	-0.7%	\$86,307	1.0%	\$300	0.2%	1,103	0.1%
Kentucky	12,014	0.5%	\$79,976	2.3%	\$240	2.8%	1,419	-0.5%
Louisiana	23,974	-1.4%	\$88,296	1.4%	\$529	0.0%	2,451	1.9%
Maine	5,305	2.7%	\$83,148	4.5%	\$110	7.3%	904	1.3%
Maryland	42,393	0.7%	\$96,421	1.4%	\$1,022	2.1%	3,020	1.0%
Massachusetts	42,112	2.9%	\$110,097	3.2%	\$1,159	6.2%	3,374	1.3%
Michigan	88,152	0.9%	\$99,268	4.2%	\$2,187	5.1%	3,129	-0.5%
Minnesota	23,666	3.2%	\$91,507	2.9%	\$541	6.1%	1,979	2.1%
Mississippi	5,473	-5.2%	\$68,718	1.4%	\$94	-3.8%	986	-0.8%
Missouri	22,634	-0.4%	\$90,740	2.7%	\$514	2.3%	2,298	2.1%

Source: Rockport Analytics, Bureau of Labor Statistics

2019 Employment, Average & Annual Wages and Establishments by State Continued

State	Employment	Employment CAGR 2015-2019	Average Annual Wage	Average Annual Wage CAGR 2015-2019	Total Annual Wage (Millions \$)	Annual Total Wage CAGR 2015-2019	Establishments	Total Establishments CAGR 2015-2019
Montana	4,958	1.5%	\$77,363	2.5%	\$96	4.0%	919	3.4%
Nebraska	7,589	5.1%	\$77,961	0.1%	\$144	4.5%	725	1.3%
Nevada	12,274	3.6%	\$84,448	2.4%	\$259	6.1%	1,178	1.0%
New Hampshire	7,007	5.1%	\$94,874	3.1%	\$166	8.3%	890	2.7%
New Jersey	40,236	2.2%	\$98,696	2.0%	\$993	4.2%	3,399	0.2%
New Mexico	8,664	3.6%	\$78,650	2.3%	\$170	6.0%	1,172	2.4%
New York	77,723	2.3%	\$101,348	2.2%	\$1,970	4.5%	6,786	1.1%
North Carolina	40,804	6.2%	\$78,845	1.7%	\$804	8.0%	4,576	2.1%
North Dakota	4,256	-2.8%	\$97,487	2.3%	\$104	-0.5%	483	-2.0%
Ohio	43,226	1.8%	\$78,741	2.2%	\$851	4.0%	3,882	1.0%
Oklahoma	12,669	0.7%	\$74,620	0.6%	\$236	1.3%	1,955	3.0%
Oregon	17,292	5.4%	\$84,682	3.4%	\$366	8.9%	1,973	3.2%
Pennsylvania	59,766	1.2%	\$87,126	2.0%	\$1,302	3.2%	4,626	1.2%
Rhode Island	4,143	2.6%	\$79,625	2.6%	\$82	5.2%	588	2.8%
South Carolina	20,838	-0.9%	\$80,860	0.9%	\$421	0.0%	2,317	3.8%
South Dakota	3,013	2.1%	\$70,005	1.2%	\$53	3.4%	464	2.2%
Tennessee	22,550	-1.6%	\$86,619	3.2%	\$489	1.6%	2,328	3.1%
Texas	164,737	1.9%	\$103,272	1.6%	\$4,258	3.6%	11,340	2.2%
Utah	15,763	3.5%	\$76,986	1.8%	\$304	5.4%	1,884	4.1%
Vermont	2,390	1.6%	\$79,404	2.7%	\$47	4.4%	531	1.9%
Virginia	56,941	1.7%	\$103,636	2.3%	\$1,475	4.1%	4,115	2.2%
Washington	34,343	0.5%	\$94,588	3.5%	\$812	4.1%	3,109	1.2%
West Virginia	4,823	1.4%	\$66,391	1.3%	\$80	2.7%	598	0.1%
Wisconsin	20,347	4.5%	\$80,574	3.0%	\$410	7.6%	2,152	5.9%
Wyoming	2,280	-2.2%	\$71,331	2.8%	\$41	0.5%	482	1.9%
U.S. TOTAL	1,514,387	1.9%	\$87,981	2.1%	\$35,516	4.0%	139,551	2.0%

Source: Rockport Analytics, Bureau of Labor Statistics

States Ranked by Total 2019 Engineering and Architectural Sub-Sector Employment

State	Architectural Services	Landscape Architectural Services	Engineering Services	Drafting Services	Building Inspection Services	Geophysical Surveying & Mapping Services	Other Surveying & Mapping Services	Testing Laboratories	Total A/E
6-Digit NAICS*	541310	541320	541330	541340	541350	541360	541370	541380	5413
California	30,620	7,800	118,510	829	3,371	883	3,623	20,329	185,965
Texas	15,771	2,916	107,791	846	2,323	5,642	9,291	20,157	164,737
Florida	9,894	3,996	59,020	762	2,546	592	5,933	5,509	88,252
Michigan	3,684	664	56,912	149	533	304	1,388	24,518	88,152
New York	22,372	1,712	40,409	773	1,482	516	1,887	8,573	77,724
Pennsylvania	6,530	976	39,717	365	1,335	281	1,377	9,186	59,767
Virginia	4,137	644	47,027	122	628	188	1,864	2,331	56,941
Colorado	5,024	1,032	37,239	401	608	1,650	1,581	2,425	49,960
Illinois	9,086	1,892	28,300	191	559	208	1,124	6,431	47,791
Ohio	5,592	482	27,803	355	800	236	1,146	6,811	43,225
Georgia	5,336	928	31,029	254	682	171	1,685	2,675	42,760
Maryland	3,279	643	34,565	157	667	155	846	2,081	42,393
Massachusetts	7,859	1,079	27,999	65	450	101	905	3,654	42,112
North Carolina	4,414	1,258	27,069	166	650	241	2,559	4,448	40,805
New Jersey	4,741	953	24,631	99	379	258	1,145	8,029	40,235
Washington	6,397	442	22,801	0	501	315	916	0	31,372
Alabama	1,461	169	23,365	138	144	105	628	1,373	27,383
Arizona	3,263	762	17,664	186	459	96	699	3,446	26,575
Louisiana	1,626	218	15,318	246	209	273	1,368	4,718	23,976
Minnesota	3,911	210	15,098	131	405	53	521	3,337	23,666
Missouri	3,821	442	15,146	140	312	166	921	1,685	22,633
Tennessee	2,714	709	15,411	120	306	126	969	2,197	22,552
South Carolina	1,780	450	14,684	382	246	171	1,082	2,043	20,838
Indiana	2,057	286	13,368	96	437	58	988	3,277	20,567
Wisconsin	2,465	245	14,048	ND	322	69	472	ND	17,621
Oregon	3,223	483	10,934	153	281	253	625	1,341	17,293

Source: Rockport Analytics, Bureau of Labor Statistics

ND=not reported by the BLS due to non-disclosure requirements

States Ranked by Total 2019 Engineering and Architectural Sub-Sector Employment Continued

State	Architectural Services	Landscape Architectural Services	Engineering Services	Drafting Services	Building Inspection Services	Geophysical Surveying & Mapping Services	Other Surveying & Mapping Services	Testing Laboratories	Total A/E
6-Digit NAICS*	541310	541320	541330	541340	541350	541360	541370	541380	5413
Utah	2,036	283	10,562	286	408	43	204	1,941	15,763
Kansas	1,516	111	10,553	27	121	226	205	1,166	13,925
Connecticut	1,867	243	8,538	99	382	41	356	1,795	13,321
Oklahoma	1,581	215	7,588	85	324	952	909	1,015	12,669
Nevada	1,227	82	7,535	173	253	73	484	2,446	12,273
Kentucky	1,005	141	8,561	519	150	77	382	1,179	12,014
New Mexico	856	176	5,914	54	77	143	512	932	8,664
Iowa	1,001	111	5,765	64	113	11	157	813	8,035
DC	3,466	143	4,306	ND	29	0	5	46	7,995
Nebraska	1,402	31	4,612	48	89	13	812	582	7,589
New Hampshire	422	89	5,037	55	260	29	466	650	7,008
Idaho	749	157	4,746	83	110	30	311	758	6,944
Arkansas	1,235	135	3,289	92	101	61	390	1,083	6,386
Hawaii	1,067	163	3,978	ND	64	0	262	205	5,739
Mississippi	567	66	3,816	67	53	43	400	462	5,474
Maine	697	63	3,710	86	82	19	368	279	5,304
Montana	901	107	3,210	61	52	86	201	339	4,957
Alaska	301	ND	3,557	ND	108	127	296	311	4,700
North Dakota	356	ND	3,158	0	25	0	133	551	4,223
Rhode Island	460	62	3,095	ND	72	0	111	322	4,122
West Virginia	202	18	3,144	0	106	66	416	0	3,952
Delaware	166	78	2,787	ND	135	0	130	304	3,600
South Dakota	278	34	2,074	18	33	68	124	385	3,014
Vermont	379	93	1,537	ND	38	0	107	172	2,326
Wyoming	200	22	1,162	0	29	84	221	0	1,718
U.S. Total	194,994	34,014	1,008,092	8,943	23,849	15,303	53,505	168,310	1,507,010

Source: Rockport Analytics, Bureau of Labor Statistics

ND=not reported by the BLS due to non-disclosure requirements

States Ranked by 2019 Engineering and Architectural Services Employment Per Capita

State	2019 Employment	2019 US Population	Employees per 100,000
District of Columbia	8,012	705,749	1,135
Michigan	88,152	9,986,857	883
Colorado	49,960	5,758,736	868
Maryland	42,393	6,045,680	701
Virginia	56,941	8,535,519	667
Alaska	4,714	731,545	644
Massachusetts	42,112	6,892,503	611
Texas	164,737	28,995,881	568
Alabama	27,384	4,903,185	558
North Dakota	4,256	762,062	558
Louisiana	23,974	4,648,794	516
New Hampshire	7,007	1,359,711	515
Utah	15,763	3,205,958	492
Kansas	13,925	2,913,314	478
California	185,965	39,512,223	471
Pennsylvania	59,766	12,801,989	467
Montana	4,958	1,068,778	464
New Jersey	40,236	8,882,190	453
Washington	34,343	7,614,893	451
Minnesota	23,666	5,639,632	420
New Mexico	8,664	2,096,829	413
Florida	88,253	21,477,737	411
Oregon	17,292	4,217,737	410
Hawaii	5,771	1,415,872	408

Source: Rockport Analytics, Bureau of Labor Statistics

States Ranked by 2019 Engineering and Architectural Services Employment Per Capita Continued

State	2019 Employment	2019 US Population	Employees per 100,000
South Carolina	20,838	5,148,714	405
Georgia	42,760	10,617,423	403
New York	77,723	19,453,561	400
Nevada	12,274	3,080,156	398
Maine	5,305	1,344,212	395
Wyoming	2,280	578,759	394
Nebraska	7,589	1,934,408	392
Rhode Island	4,143	1,059,361	391
North Carolina	40,804	10,488,084	389
Idaho	6,943	1,787,065	388
Vermont	2,390	623,989	383
Delaware	3,674	973,764	377
Illinois	47,791	12,671,821	377
Connecticut	13,321	3,565,287	374
Ohio	43,226	11,689,100	370
Missouri	22,634	6,137,428	369
Arizona	26,574	7,278,717	365
Wisconsin	20,347	5,822,434	349
South Dakota	3,013	884,659	341
Tennessee	22,550	6,829,174	330
Oklahoma	12,669	3,956,971	320
Indiana	20,567	6,732,219	305
West Virginia	4,823	1,792,147	269
Kentucky	12,014	4,467,673	269
Iowa	8,035	3,155,070	255
Arkansas	6,386	3,017,804	212
Mississippi	5,473	2,976,149	184

Source: Rockport Analytics, Bureau of Labor Statistics

Performance and Value of Construction Activity by State

State	Value of All Construction (Thousands \$)	Value of All Construction CAGR 2015-2019	Value of Infrastructure Construction (Thousands \$)	Value of Infrastructure Construction CAGR 2015-2019	Value of Commercial/ Non-Residential Construction (Thousands \$)	Value of Commercial/ Non-Residential CAGR 2015-2019	Value of Residential Construction (Thousands \$)	Value of Residential Construction CAGR 2015-2019
Alabama	\$11,387	12.4%	\$1,662	0.0%	\$5,107	22.1%	\$4,618	9.8%
Alaska	\$1,740	-7.1%	\$839	-11.8%	\$526	-4.5%	\$375	3.8%
Arizona	\$19,969	12.2%	\$2,924	11.4%	\$5,555	17.7%	\$11,490	10.2%
Arkansas	\$6,446	10.5%	\$1,398	0.4%	\$2,537	23.5%	\$2,511	7.8%
California	\$77,036	5.9%	\$21,751	4.1%	\$28,124	9.8%	\$27,161	3.8%
Colorado	\$18,542	2.7%	\$2,861	-1.5%	\$5,038	0.2%	\$10,643	5.3%
Connecticut	\$5,348	-2.8%	\$1,073	-9.1%	\$2,292	-3.0%	\$1,983	2.0%
Delaware	\$2,220	14.8%	\$435	6.2%	\$844	34.3%	\$941	8.6%
District of Columbia	\$4,948	6.8%	\$269	-18.8%	\$2,322	5.9%	\$2,357	15.2%
Florida	\$70,675	8.1%	\$12,061	3.3%	\$19,178	11.8%	\$39,436	8.2%
Georgia	\$27,887	10.1%	\$4,209	3.1%	\$11,531	19.7%	\$12,146	6.1%
Hawaii	\$5,628	5.5%	\$1,851	20.3%	\$1,436	-5.7%	\$2,341	6.1%
Idaho	\$5,951	12.9%	\$1,421	24.8%	\$1,245	7.3%	\$3,284	11.4%
Illinois	\$24,228	4.9%	\$9,155	11.0%	\$8,770	1.3%	\$6,303	2.9%
Indiana	\$13,970	7.5%	\$2,867	-2.3%	\$5,594	14.1%	\$5,509	8.2%
Iowa	\$11,289	8.3%	\$4,630	26.2%	\$4,115	2.9%	\$2,545	-1.7%
Kansas	\$6,664	-2.4%	\$2,333	6.7%	\$2,511	-8.3%	\$1,820	-2.4%
Kentucky	\$7,648	4.5%	\$1,707	0.0%	\$3,472	6.0%	\$2,468	6.0%
Louisiana	\$17,464	-10.1%	\$9,355	-5.9%	\$4,754	-19.8%	\$3,354	0.8%
Maine	\$2,588	6.7%	\$890	-0.9%	\$779	20.7%	\$919	6.8%
Maryland	\$12,523	-1.6%	\$1,972	-17.9%	\$5,749	10.4%	\$4,803	-1.7%
Massachusetts	\$21,638	8.5%	\$3,165	-5.7%	\$12,639	19.1%	\$5,835	2.3%
Michigan	\$16,616	9.8%	\$5,061	14.8%	\$6,725	13.7%	\$4,831	1.8%
Minnesota	\$17,284	13.4%	\$5,622	20.6%	\$5,507	11.5%	\$6,155	9.7%
Mississippi	\$3,628	0.5%	\$1,043	2.2%	\$1,035	-4.8%	\$1,551	3.7%
Missouri	\$14,184	8.8%	\$4,039	20.7%	\$5,727	9.6%	\$4,417	1.0%

Source: Rockport Analytics, Dodge Data & Analytics

Performance and Value of Construction Activity by State Continued

State	Value of All Construction (Thousands \$)	Value of All Construction CAGR 2015-2019	Value of Infrastructure Construction (Thousands \$)	Value of Infrastructure Construction CAGR 2015-2019	Value of Commercial/ Non-Residential Construction (Thousands \$)	Value of Commercial/ Non-Residential Construction CAGR 2015-2019	Value of Residential Construction (Thousands \$)	Value of Residential Construction CAGR 2015-2019
Montana	\$2,335	7.2%	\$831	7.6%	\$597	12.4%	\$907	4.1%
Nebraska	\$6,453	8.2%	\$2,672	15.3%	\$2,334	8.0%	\$1,448	-0.6%
Nevada	\$8,170	0.5%	\$1,473	-14.4%	\$2,926	5.8%	\$3,771	6.7%
New Hampshire	\$1,948	6.1%	\$448	7.3%	\$739	8.2%	\$762	3.7%
New Jersey	\$16,524	6.5%	\$3,256	-3.1%	\$6,350	8.5%	\$6,918	11.0%
New Mexico	\$4,329	4.7%	\$2,399	11.5%	\$818	-6.1%	\$1,112	2.8%
New York	\$50,595	-2.0%	\$8,621	3.8%	\$23,410	-0.9%	\$18,564	-5.4%
North Carolina	\$29,029	8.6%	\$5,503	3.2%	\$7,786	11.7%	\$15,739	9.3%
North Dakota	\$5,028	-1.1%	\$2,563	-1.0%	\$1,934	5.0%	\$531	-14.6%
Ohio	\$22,778	4.8%	\$6,064	-2.1%	\$10,378	10.0%	\$6,336	5.1%
Oklahoma	\$9,729	0.6%	\$3,931	2.4%	\$2,738	0.3%	\$3,060	-1.4%
Oregon	\$12,991	13.2%	\$1,746	8.9%	\$6,600	23.6%	\$4,645	4.8%
Pennsylvania	\$19,513	3.3%	\$5,281	-5.7%	\$8,560	10.9%	\$5,673	4.4%
Rhode Island	\$1,662	3.1%	\$489	-6.4%	\$760	8.7%	\$413	9.5%
South Carolina	\$13,796	1.3%	\$1,967	-1.6%	\$3,048	-5.8%	\$8,781	5.3%
South Dakota	\$4,416	18.1%	\$2,769	35.9%	\$864	5.6%	\$783	0.6%
Tennessee	\$17,870	9.1%	\$2,296	7.7%	\$6,216	10.7%	\$9,358	8.5%
Texas	\$117,106	4.2%	\$31,702	-2.6%	\$43,161	9.9%	\$42,243	5.2%
Utah	\$9,588	0.9%	\$1,435	-19.7%	\$2,944	8.3%	\$5,209	9.1%
Vermont	\$923	0.0%	\$360	7.7%	\$309	-2.9%	\$254	-4.7%
Virginia	\$23,559	15.1%	\$4,242	13.1%	\$11,740	29.8%	\$7,577	3.1%
Washington	\$23,963	8.4%	\$5,228	17.5%	\$7,747	7.2%	\$10,988	5.8%
West Virginia	\$2,881	9.9%	\$1,583	7.5%	\$760	22.0%	\$537	4.7%
Wisconsin	\$12,820	9.5%	\$3,106	8.0%	\$5,375	14.2%	\$4,340	5.7%
Wyoming	\$4,573	17.5%	\$3,463	63.8%	\$556	-19.7%	\$554	-1.0%
U.S. TOTAL	\$850,082	5.4%	\$208,019	2.7%	\$311,766	8.0%	\$330,298	4.8%

Source: Rockport Analytics, Dodge Data & Analytics

Appendix 2: Glossary & Definitions

Glossary of Economic Terms

Built Environment: The human-made surroundings that provide the setting for human activity, ranging in scale from buildings and parks or green space to neighborhoods and cities that can often include their supporting infrastructure, such as water supply or energy networks.

End Market: The term end market is used to indicate where the final transaction takes place in a value chain. Typically it is where the end-user is located, meaning the individual or organization for whom the product or service has been created, and who is not expected to resell that product or service. For a business-related product or service, the end market is where the sale occurs to the organization that will use the product or service in its own operations.

Establishment: An economic unit—business or industrial—at a single geographic location, where business is conducted or where services or industrial operations are performed. An establishment is not necessarily identical to an enterprise or company, which may consist of one or more establishments.

Firm: A firm is a commercial enterprise, a company that buys and sells products and/or services to consumers with the aim of making a profit. In the world of commerce, the term is usually synonymous with 'company,' or 'business.' A firm can be any of the following entity types, corporation, limited liability company, public limited company, sole proprietorship, or partnership.

Gross Domestic Product: The market value of goods and services produced by labor and property in the United States, regardless of nationality.

Gross Output: Gross output (GO) is the value of the goods and services produced by the nation's economy. It is principally measured using industry sales or receipts, including sales to final users (GDP) and sales to other industries (intermediate inputs).

NAICS: The standard classification system used by Federal statistical agencies in classifying business establishments for the purpose of collecting, analyzing, and publishing statistical data related to the U.S. business economy. This system was developed jointly by the U.S., Canada, and Mexico to provide improved comparability in industrial statistics across North America.

Occupation: A set of activities or tasks that employees are paid to perform. Employees that perform essentially the same tasks are in the same occupation, whether or not they work in the same industry. Some occupations are concentrated in a few particular industries; other occupations are found in many industries.

Standard Occupational Classification System: This system is being adopted by Federal statistical agencies to classify workers into occupational categories for the purpose of collecting, calculating, or disseminating data. All workers are classified into 1 of more than 800 occupations according to their occupational definition. To facilitate classification, occupations are combined to form 23 major groups, 96 minor groups, and 449 broad occupations. Each broad occupation includes detailed occupations requiring similar job duties, skills, education, or experience.

Value Added: The gross output of an industry or a sector less its intermediate inputs; the contribution of an industry or sector to gross domestic product (GDP). Value added by industry can also be measured as the sum of compensation of employees, taxes on production and imports less subsidies, and gross operating surplus.

Engineering and Architectural Industry NAICS Definitions

541310 Architectural Services: This industry comprises establishments primarily engaged in planning and designing residential, institutional, leisure, commercial, and industrial buildings and structures by applying knowledge of design, construction procedures, zoning regulations, building codes, and building materials.

541320 Landscape Architectural Services: This industry comprises establishments primarily engaged in planning and designing the development of land areas for projects, such as parks and other recreational areas; airports; highways; hospitals; schools; land subdivisions; and commercial, industrial, and residential areas, by applying knowledge of land characteristics, location of buildings and structures, use of land areas, and design of landscape projects.

541330 Engineering Services: This industry comprises establishments primarily engaged in applying physical laws and principles of engineering in the design, development, and utilization of machines, materials, instruments, structures, processes, and systems. The assignments undertaken by these establishments may involve any of the following activities: provision of advice, preparation of feasibility studies, preparation of preliminary and final plans and designs, provision of technical services during the construction or installation phase, inspection and evaluation of engineering projects, and related services.

541340 Drafting Services: This industry comprises establishments primarily engaged in drawing detailed layouts, plans, and illustrations of buildings, structures, systems, or components from engineering and architectural specifications.

541350 Building Inspection Services: This industry comprises establishments primarily engaged in providing building inspection services. These establishments typically evaluate all aspects of the building structure and component systems and prepare a report on the physical condition of the property, generally for buyers or others involved in real estate transactions. Building inspection bureaus and establishments providing home inspection services are included in this industry.

541360 Geophysical Surveying and Mapping Services: This industry comprises establishments primarily engaged in gathering, interpreting, and mapping geophysical data. Establishments in this industry often specialize in locating and measuring the extent of subsurface resources, such as oil, gas, and minerals, but they may also conduct surveys for engineering purposes. Establishments in this industry use a variety of surveying techniques depending on the purpose of the survey, including magnetic surveys, gravity surveys, seismic surveys, or electrical and electromagnetic surveys.

541370 Surveying and Mapping (except Geophysical) Services: This industry comprises establishments primarily engaged in performing surveying and mapping services of the surface of the earth, including the sea floor. These services may include surveying and mapping of areas above or below the surface of the earth, such as the creation of view easements or segregating rights in parcels of land by creating underground utility easements.

541380 Testing Laboratories: This industry comprises establishments primarily engaged in performing physical, chemical, and other analytical testing services, such as acoustics or vibration testing, assaying, biological testing (except medical and veterinary), calibration testing, electrical and electronic testing, geotechnical testing, mechanical testing, nondestructive testing, or thermal testing. The testing may occur in a laboratory or on-site.

Engineering and Architectural Industry Standard Occupational Classification System (SOC) Definitions

17-1011 Architects, Except Landscape and Naval Occupation: Plan and design structures, such as private residences, office buildings, theaters, factories, and other structural property.

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.

17-1021 Cartographers and Photogrammetrists: Research, study, and prepare maps and other spatial data in digital or graphic form for one or more purposes, such as legal, social, political, educational, and design purposes. May work with Geographic Information Systems (GIS). May design and evaluate algorithms, data structures, and user interfaces for GIS and mapping systems. May collect, analyze, and interpret geographic information provided by geodetic surveys, aerial photographs, and satellite data.

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.

17-2011 Aerospace Engineers: Perform engineering duties in designing, constructing, and testing aircraft, missiles, and spacecraft. May conduct basic and applied research to evaluate adaptability of materials and equipment to aircraft design and manufacture. May recommend improvements in testing equipment and techniques.

17-2021 Agricultural Engineers: Apply knowledge of engineering technology and biological science to agricultural problems concerned with power and machinery, electrification, structures, soil and water conservation, and processing of agricultural products.

17-2031 Bioengineers and Biomedical Engineers: Apply knowledge of engineering, biology, chemistry, computer science, and biomechanical principles to the design, development, and evaluation of biological, agricultural, and health systems and products, such as artificial organs, prostheses, instrumentation, medical information systems, and health management and care delivery systems.

17-2041 Chemical Engineers: Design chemical plant equipment and devise processes for manufacturing chemicals and products, such as gasoline, synthetic rubber, plastics, detergents, cement, paper, and pulp, by applying principles and technology of chemistry, physics, and engineering.

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, and geotechnical engineers. Excludes "Hydrologists"

17-2061 Computer Hardware Engineers: Research, design, develop, or test computer or computer-related equipment for commercial, industrial, military, or scientific use. May supervise the manufacturing and installation of computer or computer-related equipment and components. Excludes "Software Developers" (15-1252) and "Web Developers" (15-1254).

17-2071 Electrical Engineers: Research, design, develop, test, or supervise the manufacturing and installation of electrical equipment, components, or systems for commercial, industrial, military, or scientific use.

17-2072 Electronics Engineers, Except Computer: Research, design, develop, or test electronic components and systems for commercial, industrial, military, or scientific use employing knowledge of electronic theory and materials properties. Design electronic circuits and components for use in fields such as telecommunications, aerospace guidance and propulsion control, acoustics, or instruments and controls.

17-2081 Environmental Engineers: Research, design, plan, or perform engineering duties in the prevention, control, and remediation of environmental hazards using various engineering disciplines. Work may include waste treatment, site remediation, or pollution control technology

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.

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.

17-2121 Marine Engineers and Naval Architects: Design, develop, and evaluate the operation of marine vessels, ship machinery, and related equipment, such as power supply and propulsion systems.

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.

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.

17-2151 Mining and Geological Engineers, Including Mining Safety Engineers: Conduct subsurface surveys to identify the characteristics of potential land or mining development sites. May specify the ground support systems, processes, and equipment for safe, economical, and environmentally sound extraction or underground construction activities. May inspect areas for unsafe geological conditions, equipment, and working conditions. May design, implement, and coordinate mine safety programs.

17-2161 Nuclear Engineers: Conduct research on nuclear engineering projects or apply principles and theory of nuclear science to problems concerned with release, control, and use of nuclear energy and nuclear waste disposal.

17-2171 Petroleum Engineers: Devise methods to improve oil and gas extraction and production and determine the need for new or modified tool designs. Oversee drilling and offer technical advice.

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.

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.

17-3013 Mechanical Drafters: Prepare detailed working diagrams of machinery and mechanical devices, including dimensions, fastening methods, and other engineering information.

17-3021 Aerospace Engineering and Operations Technologists and Technicians: Operate, install, adjust, and maintain integrated computer/communications systems, consoles, simulators, and other data acquisition, test, and measurement instruments and equipment, which are used to launch, track, position, and evaluate air and space vehicles. May record and interpret test data.

17-3022 Civil Engineering Technologists and 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.

17-3023 Electrical and Electronic Engineering Technologists and Technicians: Apply electrical and electronic theory and related knowledge, usually under the direction of engineering staff, to design, build, repair, adjust, and modify electrical components, circuitry, controls, and machinery for subsequent evaluation and use by engineering staff in making engineering design decisions

17-3024 Electro-Mechanical and Mechatronics Technologists and Technicians: Operate, test, maintain, or adjust unmanned, automated, servomechanical, or electromechanical equipment. May operate unmanned submarines, aircraft, or other equipment to observe or record visual information at sites such as oil rigs, crop fields, buildings, or for similar infrastructure, deep ocean exploration, or hazardous waste removal. May assist engineers in testing and designing robotics equipment.

17-3025 Environmental Engineering Technologists and Technicians: Apply theory and principles of environmental engineering to modify, test, and operate equipment and devices used in the prevention, control, and remediation of environmental problems, including waste treatment and site remediation, under the direction of engineering staff or scientists. May assist in the development of environmental remediation devices.

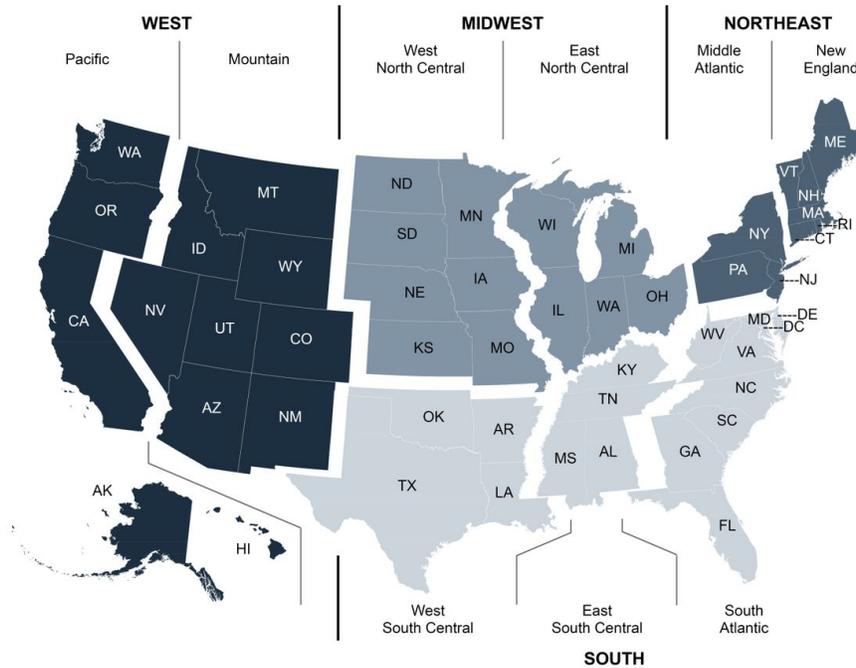
17-3026 Industrial Engineering Technologists and Technicians: Apply engineering theory and principles to problems of industrial layout or manufacturing production, usually under the direction of engineering staff. May perform time and motion studies on worker operations in a variety of industries for purposes such as establishing standard production rates or improving efficiency.

17-3027 Mechanical Engineering Technologists and Technicians: Apply theory and principles of mechanical engineering to modify, develop, test, or adjust machinery and equipment under direction of engineering staff or physical scientists.

17-3028 Calibration Technologists and Technicians: Execute or adapt procedures and techniques for calibrating measurement devices, by applying knowledge of measurement science, mathematics, physics, chemistry, and electronics, sometimes under the direction of engineering staff. Determine measurement standard suitability for calibrating measurement devices. May perform preventive maintenance on equipment. May perform corrective actions to address identified calibration problems. Excludes "Medical Equipment Preparers" (31-9093) and "Timing Device Assemblers and Adjusters" (51-2061).

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 "Cartographers and Photogrammetrists" (17-1021), "Surveyors" (17-1022), and "Geoscientists, Except Hydrologists and Geographers" (19-2042).

Appendix 3: Census Divisions Overview



About ACEC Research Institute

The ACEC Research Institute is the research arm of the American Council of Engineering Companies – the business association of the nation’s engineering industry. The ACEC Research Institute’s mission is to deliver knowledge and business strategies that guide and elevate the engineering industry and to be the leading source of knowledge and thought leadership for creating a more sustainable, safe, secure and technically advanced built environment.

About Rockport Analytics

Rockport Analytics is a research and analytical consulting firm providing high quality quantitative and qualitative research solutions to business, government, and non-profit organization clients across the globe. We provide fast, nimble service in a completely transparent environment.

Capabilities include:

- Industry/Market Analysis and Forecasting
- Economic Impact Assessment and Economic Development
- Market Modeling and Decision Support Tools
- Project Feasibility Assessment
- Primary and Secondary Research Synthesis
- Recent client examples include: American Express, Boeing, Carson Wagonlit, Cushman Wakefield, Visit Florida, Minnesota Super Bowl Host Committee, Global Business Travel Association, LaSalle Investment Management, Delaware Economic Development Office, Capital Improvement Board of Indiana, U.S. Travel Association, Indiana Destination Development Corporation, Visa, IHG, Marriott.