

Lightweight Technology Workforce

Supply Demand Annual Update



ABOUT THIS REPORT

Lightweight Innovations for Tomorrow (LIFT) is a public-private partnership that develops and deploys advanced lightweight materials manufacturing technologies and implements education and training programs to prepare the workforce. An educated and skilled workforce is critical to the future of manufacturing. Under the direction of Emily Stover DeRocco, LIFT's Education & Workforce Director, LIFT's State Teams, engaging manufacturers, educators, workforce and economic developers, and state and local officials, are designing and implementing a cohesive strategy to deliver the talent necessary to the long-term health of the U.S. defense and commercial industrial bases.

Lightweight materials are increasingly important to the competitiveness of transportation manufacturing sectors, including suppliers in the automotive, aircraft, heavy truck, ship, rail, and defense manufacturing industries. Lighter vehicles for the military, industry, and consumer alike, have better performance and use less fuel.

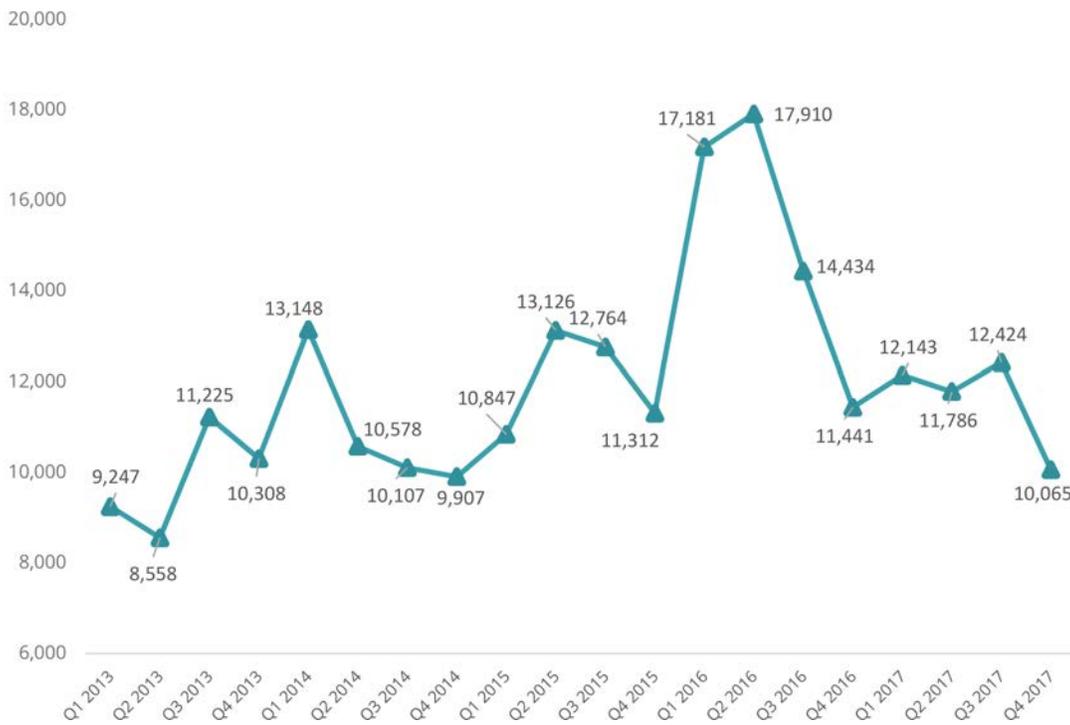
From welding to skilled metalwork, to logistics and mechanical and chemical engineering, to industrial design and manufacturing management, lightweighting-related jobs are found in nearly every manufacturing sector. This report provides an overview and examines the changing demand for workers in jobs that are related to lightweighting in Indiana. This analysis is meant to further enhance the future development of lightweighting workforce education and training in the region.

Of particular note, throughout this analysis and report, we rely not just on national databases related to traditional occupations and job families. The pace of change in the manufacturing industry, largely resulting from technology infusion and forces of globalization, is reflected in rapid-fire change in the knowledge, skills and abilities the manufacturing workforce requires. To provide the best available analyses, this report integrates intelligence gathered from the real time, transactional labor market reflecting the realities of demand and supply, the changing nature of manufacturing employment, and the competencies that are needed in the 21st century manufacturing workforce.



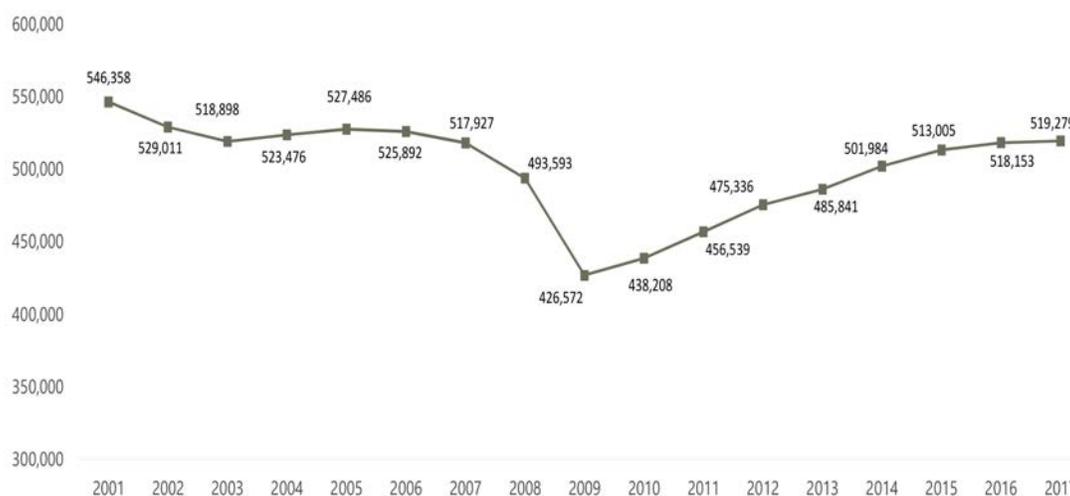
EMPLOYER DEMAND AND EMPLOYMENT TRENDS

Job postings for occupations related to lightweight advanced manufacturing in Indiana decreased in Q4 2017, declining 19 percent from 12,424 postings in Q3 to 10,065 postings in Q4. However, employment continues to grow after hitting a recession-related low of 421,000 workers in 2009. There were 519,279 Indiana workers employed in advanced manufacturing jobs related to lightweighting in 2017, marking the eighth consecutive year of employment growth.



Job postings over time
Indiana
Q1 2013 - Q4 2017

Data: Burning Glass Technologies
Analysis: Workforce Intelligence Network

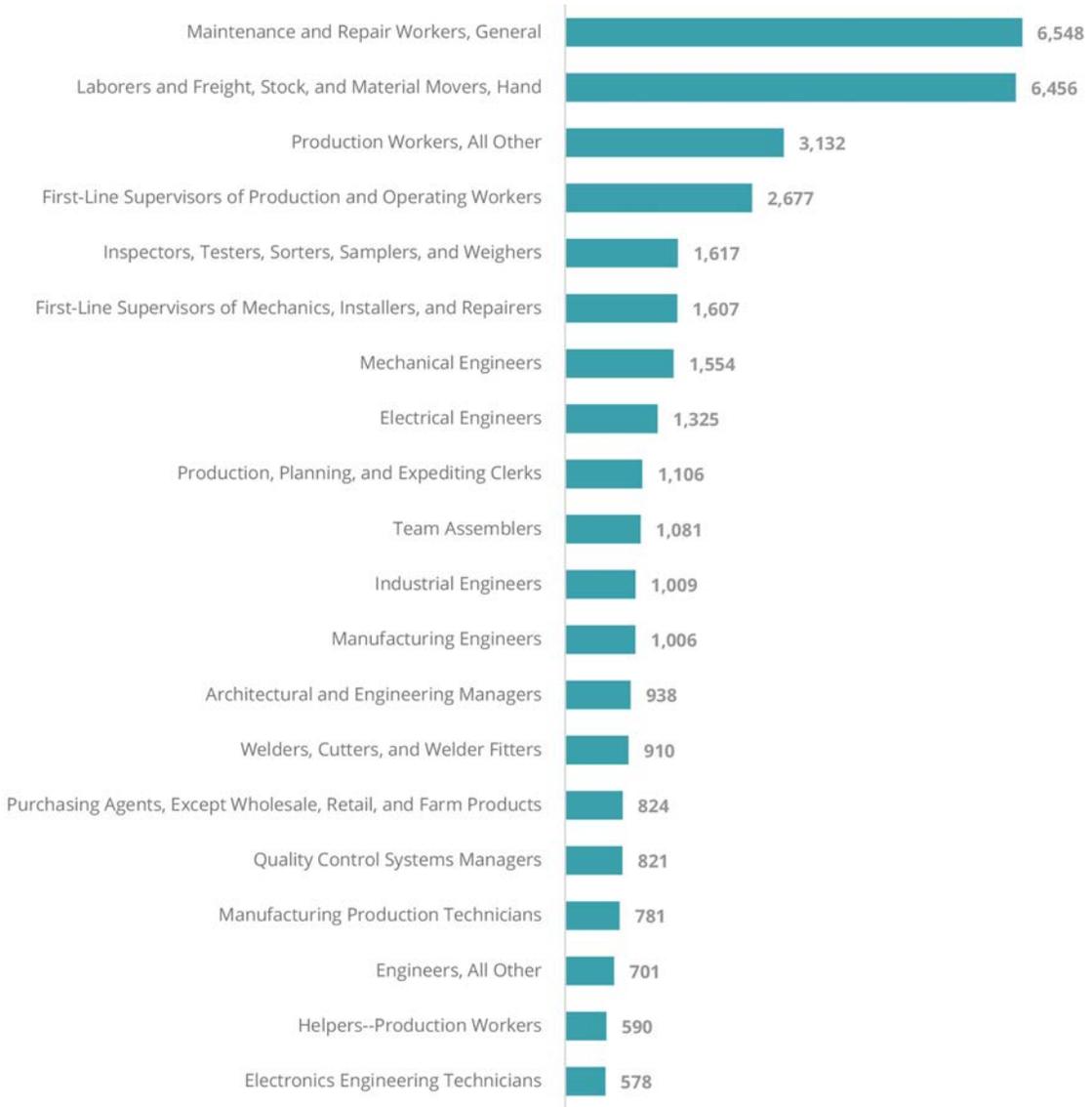


Employment over time
Indiana
2001 - 2017

Data: EMSI, QWI
Analysis: Workforce Intelligence Network

TOP JOBS

Maintenance and Repair Workers, General remain the most in-demand lightweighting-related occupation in Indiana with over 6,500 online job ads during 2017. Laborers and Freight, Stock and Materials Movers, Hand maintained their second-place position during 2017 with over 6,450 postings. Many engineering and supervisor occupations were also in high demand in Indiana during 2017, including mechanical, electrical, and industrial engineers.



Top posting jobs Indiana 2017

Data: Burning Glass
Technologies
Analysis: Workforce Intelligence
Network

9%
increase in
overall demand
since Q1 2013

10,065
total online job
ads in Q4 2017

8
years of
consecutive
employment growth



INTRODUCTION TO SKILLED TRADES

Skilled trades workers are the builders and makers of America. They work directly with advanced materials, assemble complicated products, and are experts in welding and machinery. They ensure that designs and plans are carried out to every detail and specification. These workers do everything from welding, to setting and managing computer-numerically-controlled machines, to overseeing manufacturing floors. These skilled workers are essential to manufacturing of lightweight materials.

The 71 individual occupations within this cluster can be split into three distinct occupation sub-groups; machinists, assembly & operations workers, and skilled materials workers.

Machinists

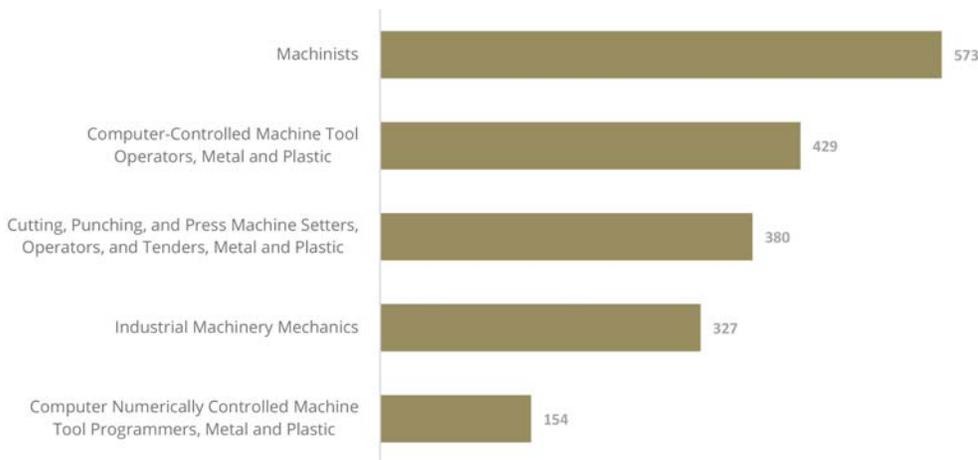
Machinists set up and operate a variety of machine tools to produce parts and instruments. Some work on traditional industrial machinery while others operate or develop programs for computer-controlled machinery.

Skilled Materials

Skilled Materials workers perform numerous roles from general maintenance to welding. All Skilled Materials workers must have intimate knowledge of lightweight metals and techniques in order to conduct proper repairs and/or assembly.

Assembly & Operation

Assembly & Operations workers assist other Skilled Trades workers during production. Some perform quality assurance inspections, assist with assembly, or perform supervisory duties on the factory floor.

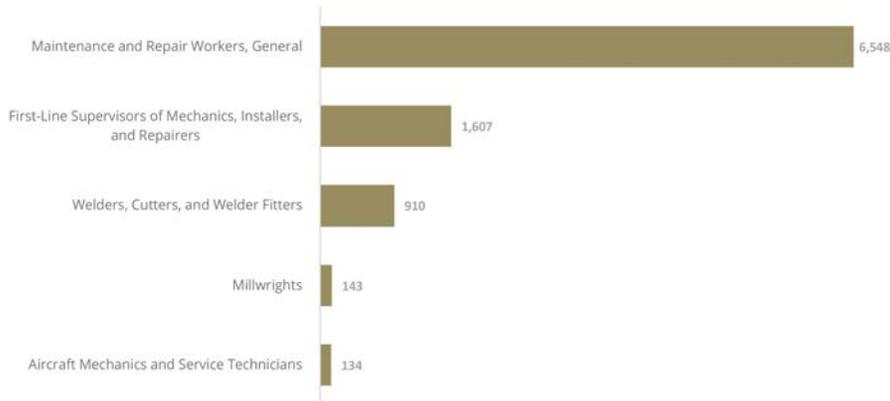


Top posting jobs Machinists 2017

Data: Burning Glass Technologies Analysis: Workforce Intelligence Network

General machinists were the most in-demand occupation in the Machinists sub-group during 2017 with 573 job postings, followed by Computer-Controlled Machine Tool Operators, Metal and Plastic with 429 job postings. Other top jobs included Cutting, Punching and Press Machine Setters, Operators, and Tenders, Metal and Plastic (380 postings) and Industrial Machinery Mechanics (327 postings).

SKILLED TRADES



Top posting jobs Skilled Materials Workers 2017

Data: Burning Glass Technologies
Analysis: Workforce Intelligence Network

Maintenance and Repair Workers, General (6,548 postings) had nearly four times the number of postings as the next most in-demand job in the Skilled Materials sub-group during 2017. The number of job postings also remained high for First-Line Supervisors of Mechanics, Installers, and Repairers (1,607 postings), indicating the potential for career growth in this in-demand field. Welders, Cutters, and Welder Fitters also increased from Q3 to Q4 2017 with a total of 910 online job ads.



Top posting jobs Assembly & Operations 2017

Data: Burning Glass Technologies
Analysis: Workforce Intelligence Network

Production Workers, All Other led the Assembly and Operations sub-group with over 3,100 online ads while opportunities for First-Line Supervisors of Production and Operating Workers rose to 2,677 postings during 2017, continuing their upward trend from 2016. The high demand for both occupations indicates strong career growth potential in this lightweighting-related sub-group. Inspectors, Testers, Samplers, Sorters and Weighers were also an in-demand occupation in 2017 with 1,617 online job postings.

SKILLED TRADES

IN-DEMAND TECHNICAL SKILLS

The Skilled Trades group requires a wide array of high-level technical skills. While traditional skills like repair, inspection, and hand tool proficiency remain necessary, skills requiring post-secondary education and training have become more prevalent in Skilled Trades job postings. The increased frequency of requests for supervisory, scheduling, and budgeting skills reflects the increased demand for managers within the Skilled Trades.

- Repair, Inspection
- Supervisory Skills
- Scheduling
- Machinery
- Welding
- Hand Tools

- Microsoft Office
- Plumbing, HVAC
- Forklift Operation
- Computer Numerical Control (CNC)
- Cleaning
- Budgeting

IN-DEMAND EMPLOYABILITY SKILLS

While Skilled Trades workers need mastery of advanced technical skills, they also need to maintain more traditional employability skills critical to succeeding in a workplace. Employers hiring Skilled Trades workers often post employability skills like communication, problem solving, ability to perform physical labor, and planning and organizational abilities. These types of skills are crucial for Skilled Trades so that workers can collaborate effectively, especially in supervisor roles.

- Communication Skills
- Ability to Perform Physical Labor
- Troubleshooting, Problem Solving
- Preventative Maintenance
- Writing
- Organizational Skills

- Computer Skills
- Detail-Oriented
- Quality Assurance and Control
- Mathematics
- Planning
- Work Area Maintenance

IN-DEMAND EXPERIENCE & EDUCATIONAL ATTAINMENT

Online job postings for Skilled Trades workers in Indiana mainly advertise openings that require less than five years of experience. About half of the 2017 postings that specified a desired level were open to candidates with less than two years of experience (5,733 postings) while another 4,945 require three to five years. Despite the low levels of experience required for many Skilled Trades job postings, more employers now expect candidates to have relevant education or training, as evidenced by the 9,993 postings in 2017 requiring short-term post-secondary training (75 percent of postings with specified educational attainment). If potential candidates can learn valuable in-demand technical skills like welding, programming, or mathematics through a short-term training program, they can fill the entry-level openings that have such high demand among Indiana employers. Job postings requiring five or more years of experience most likely represent supervisory or management roles.

Experience in-demand 2017

Data: Burning Glass Technologies
Analysis: Workforce Intelligence Network



Education & training in-demand 2017

Data: Burning Glass Technologies
Analysis: Workforce Intelligence Network



WAGES

Advertised wages 2017

Data: Burning Glass Technologies
Analysis: Workforce Intelligence Network

The average advertised annual salary in online job postings during 2017 for Skilled Trades workers in Indiana was \$43,000 per year. While over half of postings advertising salaries offered less than \$35,000 per year, Indiana employers are hiring more workers in the higher wage brackets as well. The ability to complete the necessary training and education in less than two years alongside higher wage levels make Skilled Trades occupations an exciting option for Indiana workers.



<5 years
of experience
required for
most jobs

\$43,000
average
advertised salary

**Post-secondary
training is
required for
most jobs**



INTRODUCTION TO ADMINISTRATION

Purchasing materials, ensuring worker safety around machines and with materials, and coordinating and analyzing material and goods movement are essential administration jobs related to lightweighting. Without workers focused on worker safety, production would slow down, and more workers would be injured. Procurement professionals require an extensive understanding of the materials that they purchase. Logistics workers range from materials movers to logistics analysts. While these jobs are focused on administration, all of the workers in this occupation category must have detailed knowledge of materials, goods movement, and worker safety to help ensure smooth and seamless production.

There are 17 individual occupations within this cluster, which can be split into three distinct occupation sub-groups: procurement & purchasing, human safety, and logistics workers.

Logistics

Logistics workers ensure transportation optimization of materials within organizations, from designing efficient supply chain processes to engaging in the actual transport of material and freight.

Procurement & Purchasing

Procurement & Purchasing workers ensure that all of the machinery, equipment, tools, and supplies necessary for metal manufacturers are ready and available for production.

Human Safety

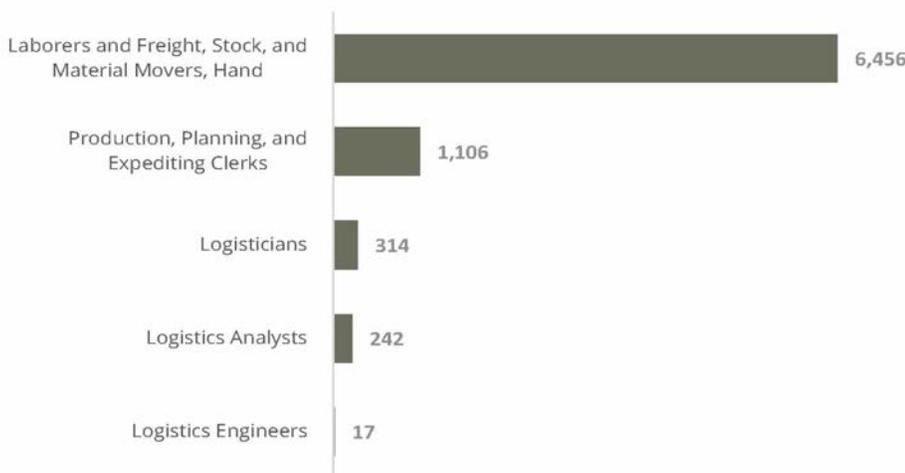
Human Safety workers plan, implement, coordinate, review, and inspect safety programs and protocols to ensure a safe workforce environment.

Top posting jobs

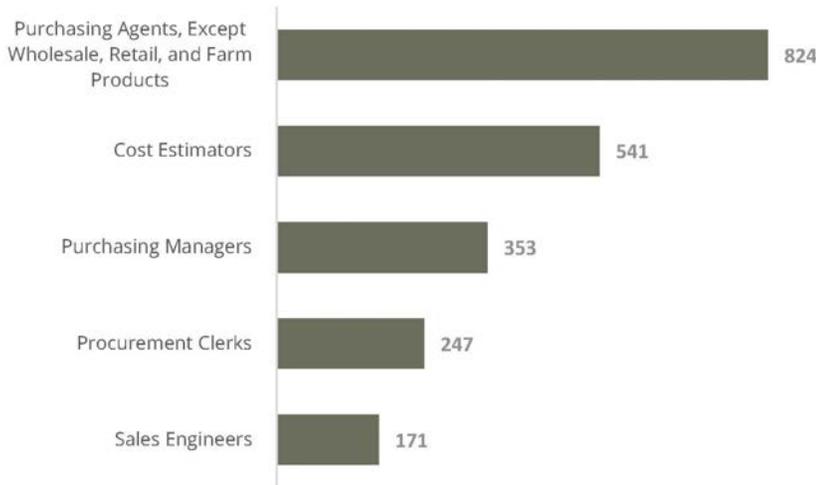
Logistics 2017

Data: Burning Glass Technologies Analysis: Workforce Intelligence Network

Laborers and Freight, Stock, and Material Movers, Hand dominated online job postings for this sub-group with over 5,000 more online ads than the next most in-demand job during 2017. Indiana employers posted 6,456 online job ads for these workers during 2017, making it one of the state's most in-demand lightweighting-related occupations overall. The next most in-demand occupation, Production, Planning, and Expediting clerks, garnered 1,106 online job postings in 2017.



ADMINISTRATION

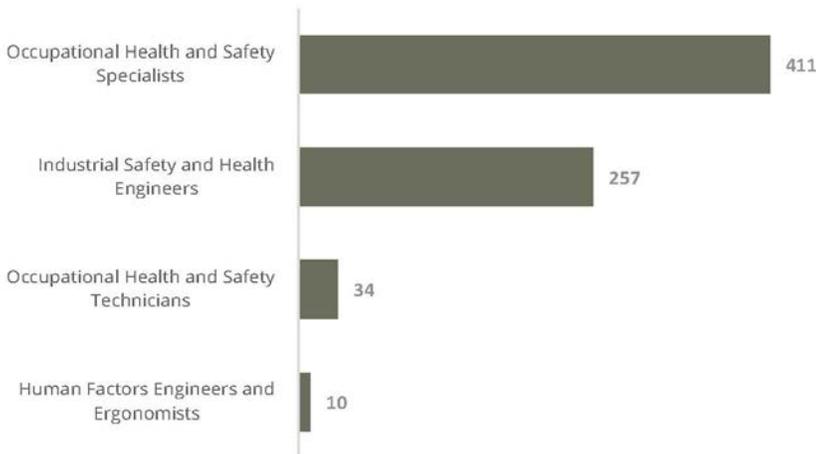


Top posting jobs

Procurement & Purchasing 2017

Data: Burning Glass Technologies Analysis: Workforce Intelligence Network

Postings in the Procurement and Purchasing sub-group are low compared to other lightweighting-related groups. Purchasing Agents, Except Wholesale, retail and Farm Products led the sub-group with 824 online ads during 2017. Cost estimators were also in high demand with 541 postings in 2017.



Top posting jobs

Human Safety 2017

Data: Burning Glass Technologies Analysis: Workforce Intelligence Network

Demand in the Human Safety sub-group tends to be split between Occupational Health and Safety Specialists (411 postings) and Industrial Safety and Health Engineers (257 postings).

ADMINISTRATION

IN-DEMAND TECHNICAL SKILLS

Occupations within the Administration group require a wide array of high-level technical and managerial skills. Traditional skills like forklift operation and inspection are present in many postings. The job postings for Administration workers reflect employer needs for more managers. Frequent requirements for project management experience communicate employer demand for talent in high-wage management occupations.

- Forklift Operation
- Microsoft Office
- Scheduling
- Purchasing, Procurement
- Inspection, Repair
- Labeling, Packaging

- Customer Service
- Scanners
- Project Management
- Inventory Management, Inventory Control
- Data Entry
- Contract Management

IN-DEMAND EMPLOYABILITY SKILLS

Like the Skilled Trades group, Indiana employers seek Administration workers with traditional employability skills such as the ability to communicate, organize, and solve problems. The inclusion of mathematics as a common baseline skill in postings reflects the technical nature of Administration occupations and the higher levels of education required for most openings. Due to the numerous business-oriented duties Administration workers have, strong computer and writing skills are necessary for success.

- Communication Skills, Teamwork/ Collaboration
- Ability to Perform Physical Labor
- Detail-Oriented
- Organizational Skills
- Computer Skills
- Writing

- Problem Solving
- Planning
- Mathematics
- Work Area Maintenance
- Building Effective Relationships
- Multitasking

ADMINISTRATION

IN-DEMAND EXPERIENCE & EDUCATIONAL ATTAINMENT

Of the online postings that advertised experience requirements, 57 percent required less than two years of experience (2,703 postings). Another 32 percent of postings required between three and five years of experience (1,536 postings), indicating that employers would like workers with prior experience and perhaps enough experience for management positions. The increase in this intermediate experience category is a good indicator of the growing demand for managers in Administration occupations overall. Of the online postings that advertised minimum education required, 66 percent required post-secondary training or a related associate's degree. The remaining 34 percent required higher educational attainment (generally a bachelor's degree, with a few requesting a master's or doctoral degrees) for management roles.

Experience in-demand

2017

Data: Burning Glass Technologies

Analysis: Workforce Intelligence Network



Education & training in-demand

2017

Data: Burning Glass Technologies Analysis:

Workforce Intelligence Network



WAGES

Advertised wages

2017

Data: Burning Glass Technologies

Analysis: Workforce Intelligence Network

Despite the substantial number of online ads requiring advanced levels of education, most 2017 postings advertised wages for Administration occupations amounting to less than \$35,000 per year. The median real-time salary advertised (\$28,000 per year) is equivalent to the median income for currently employed Administration workers in Indiana.



0-2 years

**of experience
required for most
jobs**

\$39,000

**average
advertised salary**

**Post-secondary
training is required
for most
Administrative jobs**



INTRODUCTION TO ENGINEERING & DESIGN

Engineers and industrial designers create the blueprints for all things manufacturing. These workers not only envision the products of the future but they also ensure that the products are functional, safe, reliable, and durable.

There are 52 individual occupations within this group which can be split into four distinct occupation sub-groups: Electrical & Mechanical Engineering, Chemical Engineering & Metallurgy, Industrial Designers & Drafters, and Process Engineering & Testing.

Process & Testing

Process & Testing workers design processes and test manufacturing machinery to ensure that production of lightweight metal materials meet both internal and external safety and quality requirements.

Electrical & Mechanical

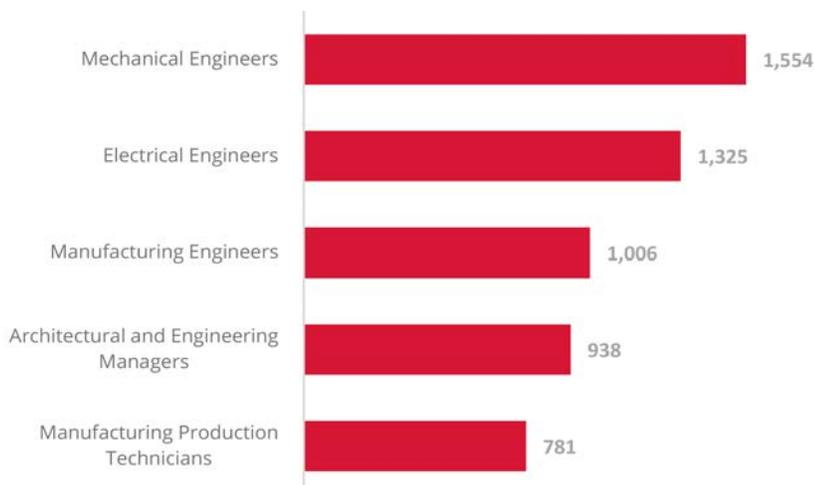
Electrical & Mechanical Engineers perform duties related to the research, design, development, and testing of mechanical functioning, electrical, and manufacturing equipment, components, or systems for commercial, industrial, military, or scientific use.

Chemical & Metallurgy

Chemical & Metallurgy workers perform duties related to the research, design, development, and testing of chemicals and metal materials. These workers often lead the charge in finding cutting-edge uses of lightweight metal materials.

Designers & Drafters

Designers & Drafters collaborate with other workers within the Engineer group to prepare detailed diagrams and designs of machinery, devices, and manufactured products. They combine their artistic talents and knowledge of lightweight metal capabilities to create both functional and appealing product designs.



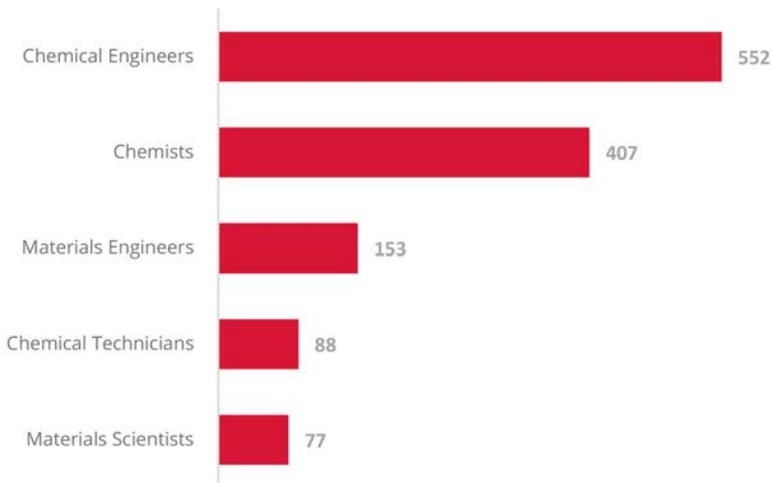
Top posting jobs

Electrical & Mechanical 2017

Data: Burning Glass Technologies Analysis: Workforce Intelligence Network

This sub-group represents the largest in the Engineering and Design group in terms of employer demand. High demand for Mechanical (1,554 postings) and Electrical Engineers (1,325 postings) continually pushes these occupations to the top of the in-demand list for their sub-group.

ENGINEERING & DESIGN

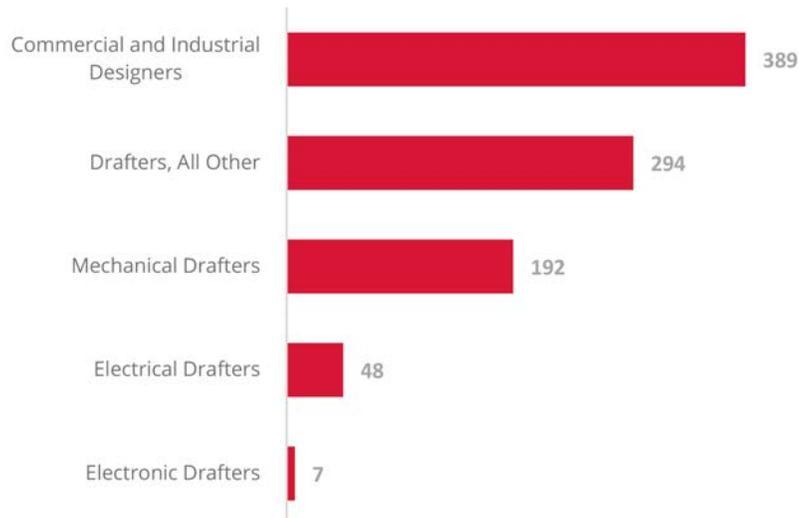


Top posting jobs

Chemical & Metallurgy 2017

Data: Burning Glass Technologies Analysis: Workforce Intelligence Network

Chemical engineers led this sub-group during 2017 with 552 online ads. Demand for chemists also remained high with 407 online job ads. Other occupations in this sub-group had fewer than 200 postings each between January and December 2017.

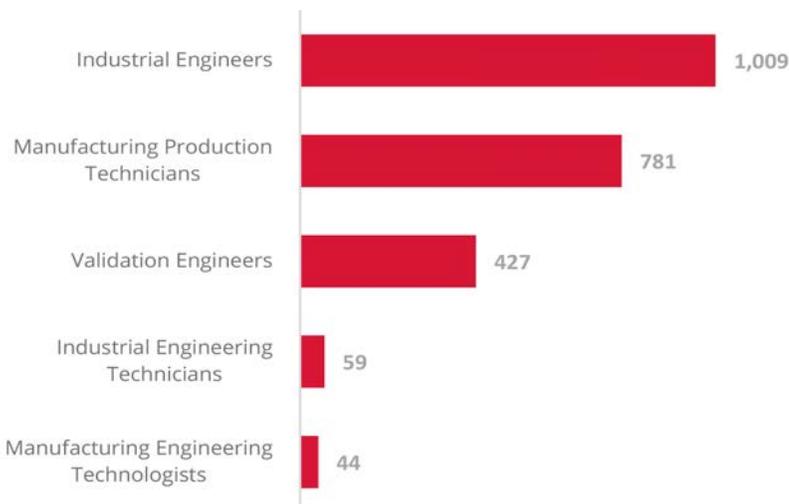


Top posting jobs

Designers & Drafters 2017

Data: Burning Glass Technologies Analysis: Workforce Intelligence Network

Industrial Designers maintained the top position in the Designers and Drafters sub-group during 2017 with 389 postings. Drafters, (All Other) and Mechanical Drafters held the second and third spots for the sub-group in 2017.



Top posting jobs

Process & Testing 2017

Data: Burning Glass Technologies Analysis: Workforce Intelligence Network

Industrial Engineers were the top in-demand occupation for the Process Engineering and Testing sub-group with 1,009 postings in 2017. Manufacturing Production Technicians (781 postings) and Validation Engineers (427 postings) showed increased demand while other occupations in this sub-group had fewer postings during 2017.

ENGINEERING & DESIGN

IN-DEMAND TECHNICAL SKILLS

STEM-related skills such as mechanical and electrical engineering, AutoCAD, and experience in manufacturing processes dominate the technical proficiency list for the Engineers group. Business and management-related skills such as project management, budgeting, and scheduling were also prevalent throughout 2017 in job postings made for Indiana Engineers.

- Project Management
- Mechanical Engineering
- Microsoft Office
- Scheduling
- AutoCAD
- Manufacturing Processes
- Electrical Engineering

- Inspection, Repair
- Budgeting
- Six Sigma
- Manufacturing Engineering
- Validation
- Computer Aided Drafting/ Design (CAD)
- Programmable Logic Controller (PLC) Programming

IN-DEMAND EMPLOYABILITY SKILLS

While Engineers and Designers require critical technical skills learned through rigorous, advanced education, employers also require these workers to have foundational skills necessary to function efficiently on a team such as communication, planning, and teamwork. They must also have important project-oriented skills like writing, research, and quality assurance experience. Overall, the top employability and technical skills reflect that Indiana employers seek well-rounded candidates for Engineering and Design job openings.

- Communication Skills, Teamwork/Collaboration
- Problem Solving, Troubleshooting
- Writing
- Planning
- Research
- Organization Skills

- Computer Skills
- Quality Assurance and Control
- Detail-Oriented
- Ability to Perform Physical Labor
- Leadership
- Mathematics

ENGINEERING & DESIGN

IN-DEMAND EXPERIENCE & EDUCATIONAL ATTAINMENT

Of online job postings advertising a preferred level of experience in 2017, most (54 percent) preferred candidates with three to five years of experience. The entry level experience range, less than two years, also had a high share of postings (28 percent). This indicates that employers prefer Engineer and Design workers with previous experience but opportunities do exist at the entry-level.

Employers seeking to hire workers in this group overwhelmingly desire candidates with a bachelor's degree. Of the 8,535 postings for Engineers and Designers in Indiana during 2017 that advertised an education requirement, 80 percent required a bachelor's degree. Some engineering technician positions in the group are open to candidates with some post-secondary training or a related associate's degree.

Experience in-demand 2017

Data: Burning Glass Technologies
Analysis: Workforce Intelligence Network



Education & training in-demand 2017

Data: Burning Glass Technologies
Analysis: Workforce Intelligence Network



WAGES

Advertised wages 2017

Data: Burning Glass Technologies
Analysis: Workforce Intelligence Network

The higher experience and education requirements for Engineers and Designers translate into higher, more competitive wage advertisements by employers in Indiana. Seventy-three percent of the postings that included wage information advertised salaries above \$50,000 annually. The average advertised annual salary in postings during 2017 was \$68,000.



3-5 years

*of experience
required by
most employers*

\$68,000

*average
advertised salary*

**Bachelor's degree
most often
required**



For more information about LIFT and additional workforce data visit www.lift.technology