

Lightweight Technology Workforce

Supply Demand Quarterly 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.

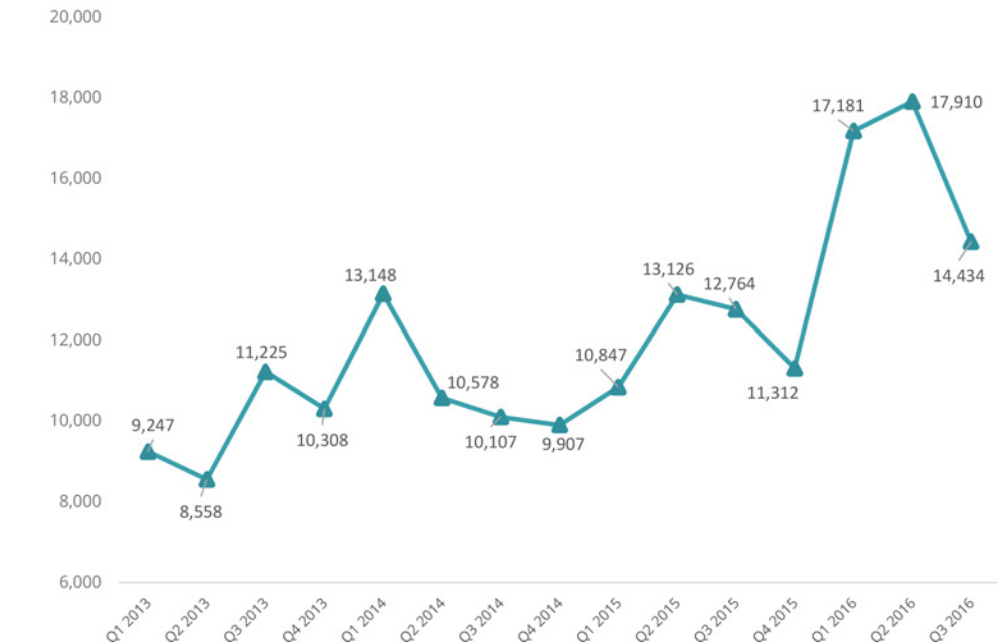
From welding to skilled metalwork, to logistics and mechanical and chemical engineering, to industrial design and manufacturing management, lightweighting-related jobs are found in nearly every manufacturing sector. This report provides an overview and examines the changing demand for workers in jobs 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

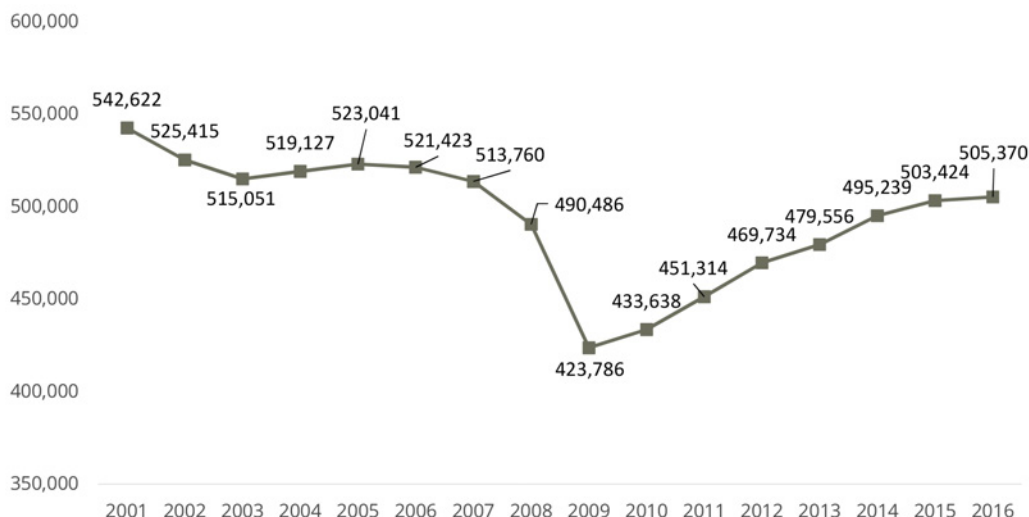
After reaching a record high in Q2 2016, online ads for advanced manufacturing jobs related to lightweighting in Indiana decreased nearly 20 percent between Q2 and Q3. Hoosier advanced manufacturing employers posted 14,434 online job ads for related occupations during Q3 2016, down from 17,910 in Q2. The 14,000 postings is still 13% higher than the 12,764 online job postings seen in Q3 2015, a year ago. Meanwhile, employment in the 140 occupations used in this analysis continues to grow since a recession low of 424,000 workers in 2009. There are 505,370 Indiana workers employed in advanced manufacturing jobs related to lightweighting in 2016, marking the sixth consecutive year of employment growth.



Job postings over time Indiana

Q1 2013 - Q3 2016

Data: Burning Glass Technologies
Analysis: Workforce Intelligence Network



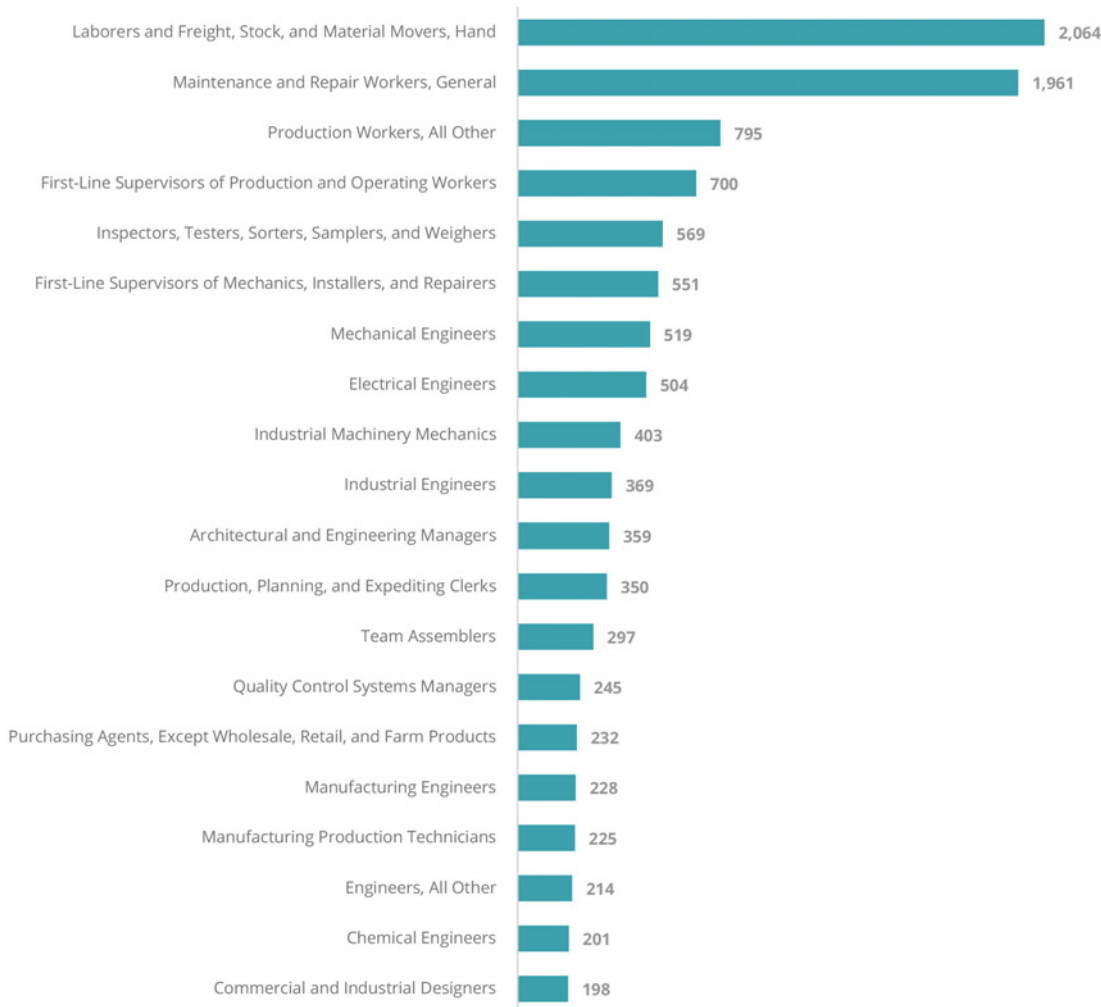
Employment over time Indiana

2001 - 2016

Data: EMSI, QWI
Analysis: Workforce Intelligence Network

TOP JOBS

Laborers and freight, stock, and material movers remain the most in-demand lightweighting-related occupation in Indiana with over 2,000 online job ads during Q3 2016. Maintenance and repair workers also kept their second place during Q3 with 1,961 postings. Many engineering occupations are also in high demand in Indiana during Q3: mechanical engineers garnered 519 job postings and electrical engineers saw 504 ads between July and September 2016.



Top posting jobs Indiana Q3 2016

Data: Burning Glass
Technologies
Analysis: Workforce Intelligence
Network

20%
*decrease in demand
for advanced
manufacturing
workers*

14,434
*Total online job
ads in Q3 2016*

6
*The number of 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

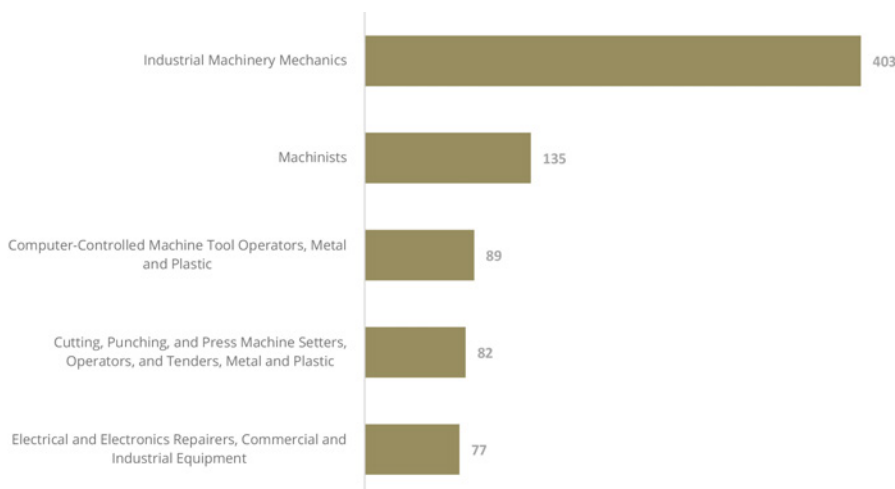
Machinists set up and operate a variety of machine tools to produce parts and instruments. Some work on traditional industrial machinery while others operate or develop programs for computer-controlled machinery.

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

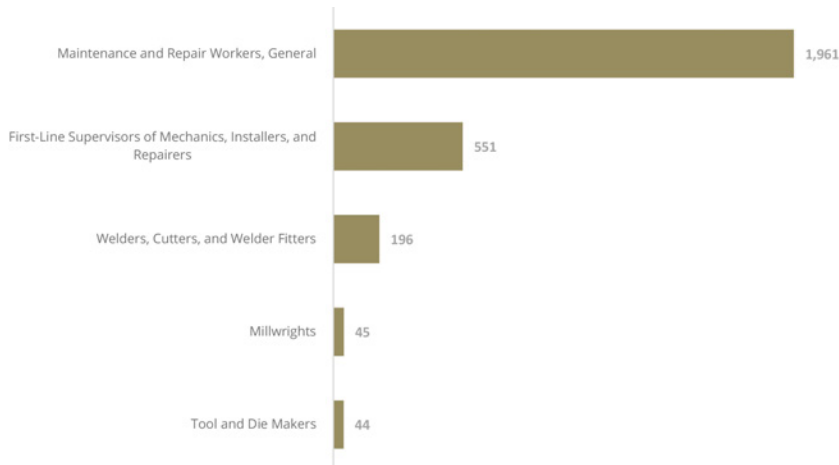
Q3 2016

Data: Burning Glass Technologies

Analysis: Workforce Intelligence Network

Industrial machinery mechanics moved to first in-demand from second place for the machinists sub-group during Q3 2016 with 403 online job ads. Traditional machinists were the second most in-demand workers in this sub-group. Other occupations garnered less than 100 postings during Q3 2016.

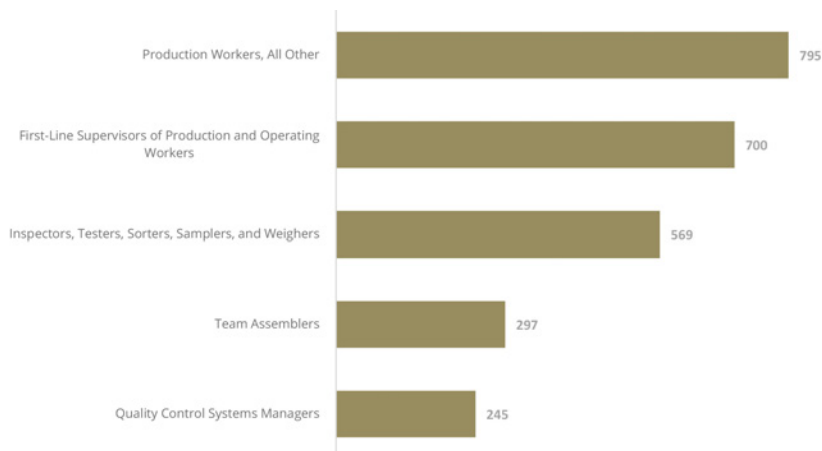
SKILLED TRADES



Top posting jobs Skilled Materials Workers Q3 2016

Data: Burning Glass Technologies
Analysis: Workforce Intelligence Network

Maintenance and repair workers (1,961 postings) had nearly four times the number of postings than the next most in-demand job in this sub-group. Postings also remain high for first-line supervisors of mechanics, installers, and repairers (551 postings), indicating career growth potential in this in-demand field.



Top posting jobs Assembly & Operations Q3 2016

Data: Burning Glass Technologies
Analysis: Workforce Intelligence Network

Production workers led the sub-group with nearly 800 online ads while first-line supervisors of production and operating workers saw 700 postings during Q3 2016. The high demand for both these occupations indicate strong career growth potential in the Assembly & Operations sub-group.

SKILLED TRADES

IN-DEMAND TECHNICAL SKILLS

The Skilled Trades group requires a wide array of high-level technical skills. While more traditional skills remain necessary, such as repair and inspection and the ability to use hand tools, more skills requiring post-secondary education and training have become prevalent in Skilled Trades job postings. With increased demand for managers, too, the Skilled Trades job postings require more supervisory skills, scheduling, and budgeting experience.

- | | |
|--|---|
| <ul style="list-style-type: none">• Repair, inspection• Scheduling• Supervisory skills• Machinery• Welding• Industrial operations industry experience | <ul style="list-style-type: none">• Hand tools• Plumbing, HVAC• Packaging• Cleaning• Forklift operation• Budgeting |
|--|---|

IN-DEMAND EMPLOYABILITY SKILLS

While Skilled Trades workers now need 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 the ability to communicate, problem solving, ability to perform physical labor, planning, and organizational abilities. These types of skills are crucial for Skilled Trades so that workers can collaborate effectively, especially in supervisor roles.

- | | |
|--|---|
| <ul style="list-style-type: none">• Troubleshooting, problem solving• Communication skills• Ability to perform physical labor• Preventative maintenance• Writing• Computer skills | <ul style="list-style-type: none">• Detail-oriented• Organizational skills• Quality assurance and control• Mathematics• Planning• Leadership |
|--|---|

IN-DEMAND EXPERIENCE & EDUCATIONAL ATTAINMENT

Advertised experience in online job postings for Skilled Trades workers in Indiana reveals that a majority of openings require less than five years of experience. The high number of job postings indicating little to no experience required indicates that entry-level jobs are available for qualified workers (1,921 postings). 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 nearly 3,000 postings in Q3 2016 requiring short-term post-secondary training. If potential candidates can learn valuable in-demand technical skills like welding, programming, or mathematics through a short-term training program, they can begin to fill the low-level experience openings that have such high demand amongst Indiana employers. Job postings requiring five or more years of experience most likely represent supervisor or management positions.

Experience in-demand

Q3 2016

Data: Burning Glass Technologies

Analysis: Workforce Intelligence Network



Education & training in-demand

Q3 2016

Data: Burning Glass Technologies

Analysis: Workforce Intelligence Network



WAGES

Advertised wages

Q3 2016

Data: Burning Glass Technologies

Analysis: Workforce Intelligence Network

The average advertised salary in online job postings during Q3 2016 for Skilled Trades workers in Indiana was \$46,880, up 13% from Q2's mean salary, \$41,625. While the majority of postings advertising salaries offered less than \$35,000, Indiana employers are hiring for more workers in the higher wage brackets as well. The ability to gain training and education in less than two years paired with the higher wage levels make Skilled Trades occupations an exciting option for Indiana workers.



0-2 years
Experience most
in-demand by
Indiana
employers

\$46,880
average
advertised salary

**Post-secondary
training is
required**



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

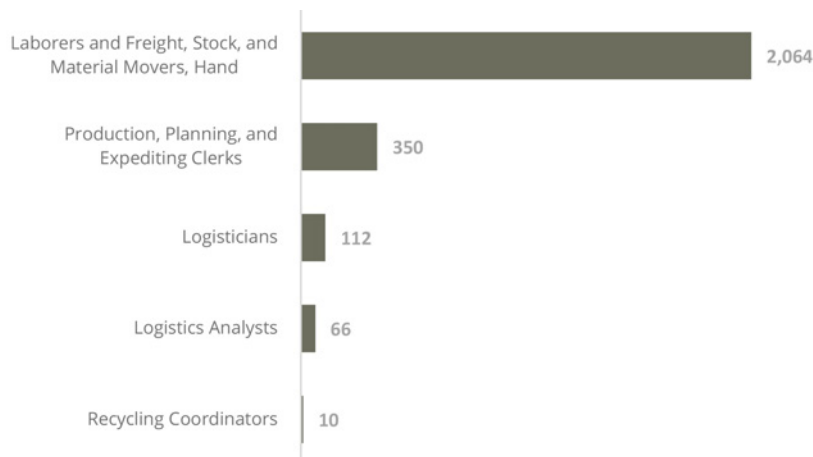
Logistics workers ensure transportation optimization of materials within organizations, from designing efficient supply chain processes to engaging in the actual transport of material and freight.

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.



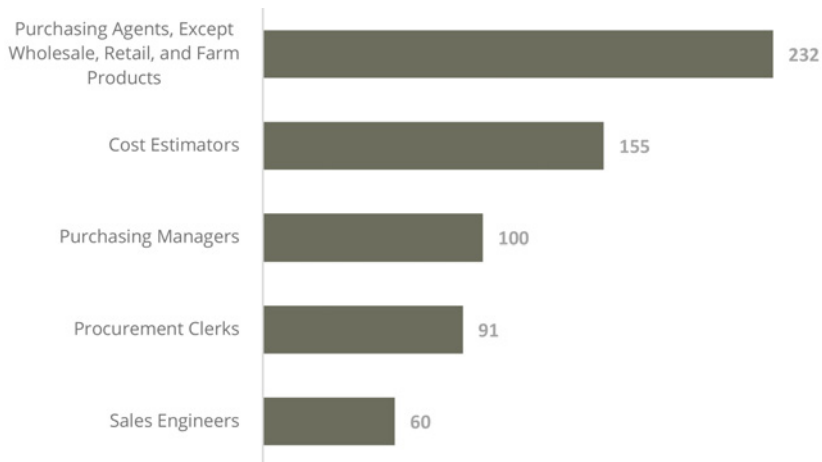
Top posting jobs

Logistics Q3 2016

Data: Burning Glass Technologies Analysis: Workforce Intelligence Network

Laborers and material movers dominated online postings for this sub-group with more than five times the number of online ads than the next most in-demand job during Q3 2016. Indiana employers posted over 2,000 online job ads for these workers during Q3, 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 350 online job postings in Q3 2016.

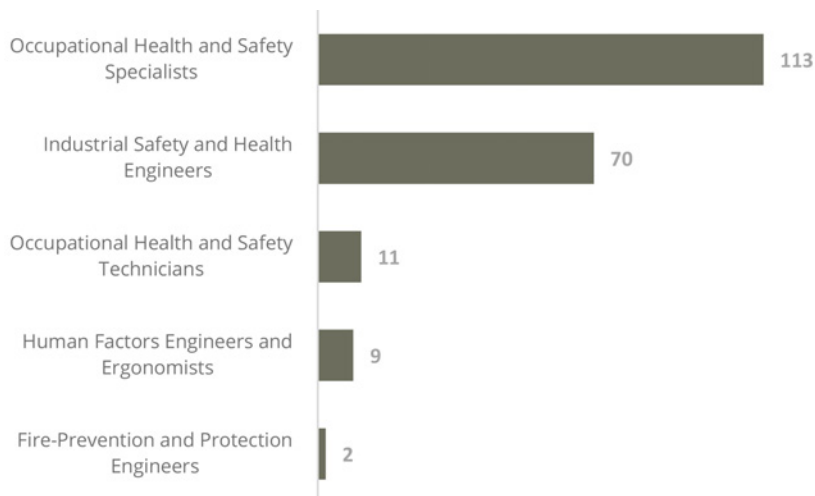
ADMINISTRATION



Top posting jobs *Procurement & Purchasing Q3 2016*

Data: Burning Glass Technologies Analysis: Workforce Intelligence Network

Purchasing agents led the Procurement & Purchasing sub-group with 232 online ads during Q3 2016. Cost estimators and purchasing managers were also in high demand with over 100 postings each.



Top posting jobs *Human Safety Q3 2016*

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 (113 postings) and industrial safety and health engineers (70 postings) from quarter to quarter. Other occupations in this sub-group garnered small postings during Q3 – Indiana employers posted just 11 online job ads for occupational health and safety technicians.

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
- Purchasing, procurement
- Scheduling
- Customer service
- Labeling, packaging
- Inspection, repair

- Logistics
- Scanners
- Inventory management, inventory control
- Project management
- Data entry
- Supply chain management

IN-DEMAND EMPLOYABILITY SKILLS

Similar to 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, multi-tasking
- Computer skills
- Writing

- Planning
- Problem solving
- Mathematics
- Building effective relationships
- Research
- Quality assurance and control

ADMINISTRATION

IN-DEMAND EXPERIENCE & EDUCATIONAL ATTAINMENT

Of the online postings that advertised experience required, a majority stated that little to no experience was required for job openings for Administration workers (823 postings for less than 2 years of experience). Another sizeable share of postings required between 3 and 5 years of experience (429 postings), possibly indicating that employers would like workers with previous experience or enough experience for management positions. Of the online postings that advertised minimum education required, 61 percent required post-secondary training of less than two years. An additional 35 percent of those ads required a bachelor's degree, most likely for high-wage sales, logistics, and management positions.

Experience in-demand

Q3 2016

Data: Burning Glass Technologies

Analysis: Workforce Intelligence Network



Education & training in-demand

Q3 2016

Data: Burning Glass Technologies Analysis:

Workforce Intelligence Network



WAGES

Advertised wages

Q3 2016

Data: Burning Glass Technologies

Analysis: Workforce Intelligence Network

Despite the substantial number of online ads requiring advanced levels of education, most Q3 postings advertising wages for Administration occupations offered less than \$35,000 per year. The average salary advertised (\$39,062) decreased from Q2 and was just 5% above the median incomes for currently employed Administration workers in Indiana (\$37,000).



0-2 years
Experience most
in-demand by
Indiana employers

\$39,062
average
advertised salary

**Post-secondary
training and
education are
required**



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 groups 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

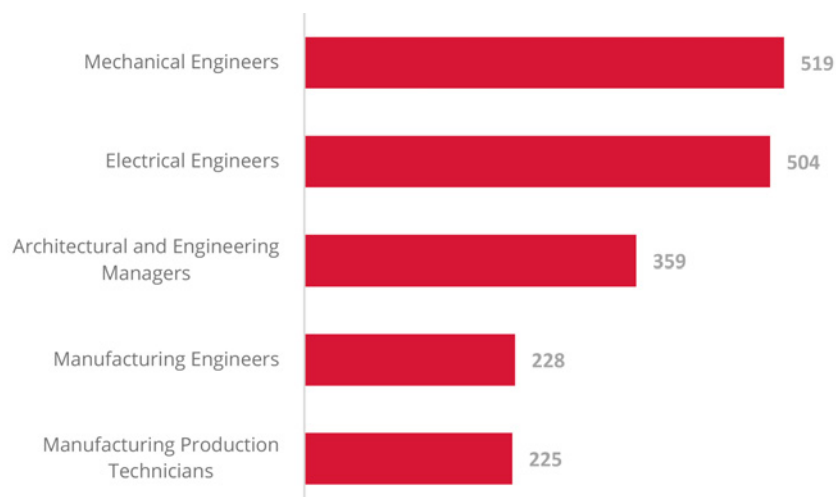
Electrical & Mechanical Engineers perform duties related to the research, design, development, and testing of mechanical functioning, electrical, and manufacturing equipment, components, or systems for commercial, industrial, military, or scientific use.

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.



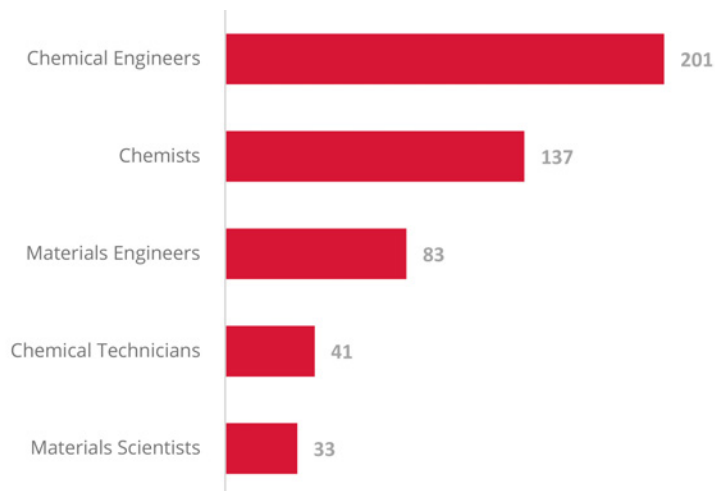
Top posting jobs

Electrical & Mechanical Q3 2016

Data: Burning Glass Technologies Analysis:
Workforce Intelligence Network

Demand for mechanical (519 postings) and electrical engineers (504 postings) continually pushes these occupations to the top of the in-demand list for their sub-group. Architectural and engineering managers also garnered over 300 postings during Q3 2016 and could be seen alongside mechanical and electrical engineers in the state's overall top jobs list.

ENGINEERING & DESIGN

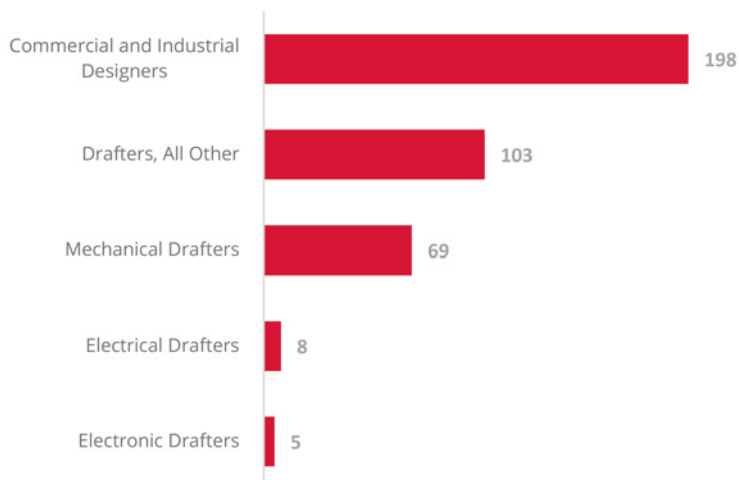


Top posting jobs

Chemical & Metallurgy Q3 2016

*Data: Burning Glass Technologies Analysis:
Workforce Intelligence Network*

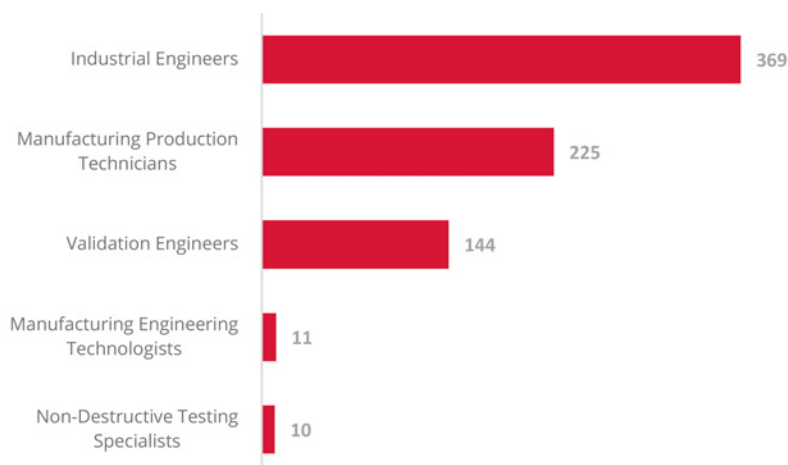
Chemical engineers led this sub-group again during Q3 2016 with 201 online ads. Demand for chemists also remained high during Q3 with 137 online job ads. Other occupations in this sub-group saw fewer than 100 postings each between July and September.



Top posting jobs *Designers & Drafters* Q3 2016

*Data: Burning Glass Technologies Analysis:
Workforce Intelligence Network*

Commercial and industrial designers retained the top spot in the Designers & Drafters sub-group during Q3 with 198 postings, though down from 450 in Q2. Drafters (all other) and mechanical drafters held the second and third spots for the sub-group in Q3.



Top posting jobs *Process & Testing* Q3 2016

*Data: Burning Glass Technologies Analysis:
Workforce Intelligence Network*

Industrial engineers remained the top in-demand occupation for the Process Engineering & Testing sub-group in Q3 2016 (369 postings). Manufacturing production technicians (225 postings) and validation engineers (144 postings) were also in high demand while other occupations in this sub-group saw few postings between July and September.

ENGINEERING & DESIGN

IN-DEMAND TECHNICAL SKILLS

STEM-related skills dominate the technical proficiency list for the Engineers group such as mechanical and electrical engineering, AutoCAD, and experience in manufacturing processes. Business and management-related skills such as project management, budgeting, and Six Sigma were also prevalent in Q3 postings for Indiana Engineers.

- | | |
|---|---|
| <ul style="list-style-type: none">• Project management• Mechanical engineering• Manufacturing processes• Electrical engineering• AutoCAD• Validation | <ul style="list-style-type: none">• Budgeting• Inspection, repair• Scheduling• Product development• Six Sigma• Technical support |
|---|---|

IN-DEMAND EMPLOYABILITY SKILLS

While Engineers & 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 & Design job openings.

- | | |
|--|--|
| <ul style="list-style-type: none">• Communication skills, teamwork, collaboration• Problem solving, troubleshooting• Writing• Planning• Computer skills• Research | <ul style="list-style-type: none">• Organization skills• Quality assurance and control• Ability to perform physical labor• Detail-oriented• Creativity• Mathematics |
|--|--|

ENGINEERING & DESIGN

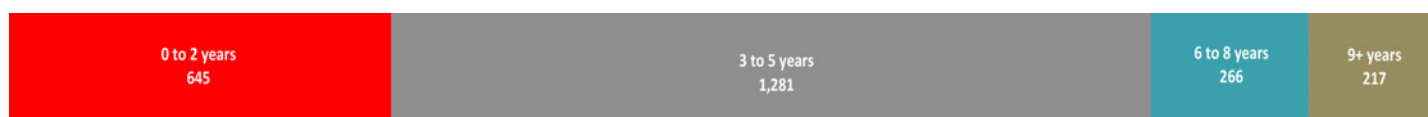
IN-DEMAND EXPERIENCE & EDUCATIONAL ATTAINMENT

The most advertised experience range for Engineers and Designers in Indiana during Q3 2016 was three to five years with 1,281 online ads. The low experience range, zero to two years, also had a high share of postings with 645 job ads. This indicates that employers mostly want Engineer and Designer workers with previous experience but opportunities do exist at the entry-level.

Employers seeking to hire workers in this group overwhelmingly want candidates with a bachelor's degree. Of the nearly 3,000 postings for Engineers and Designers in Indiana during Q3 that advertised an education requirement, 83% required a bachelor's degree.

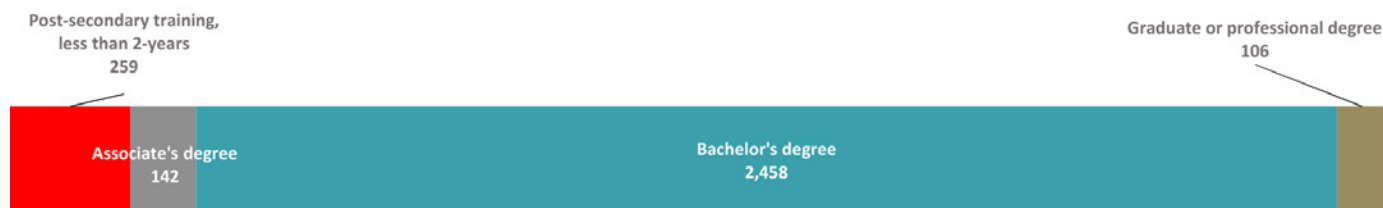
Experience in-demand Q3 2016

Data: Burning Glass Technologies
Analysis: Workforce Intelligence Network



Education & training in-demand Q3 2016

Data: Burning Glass Technologies
Analysis: Workforce Intelligence Network

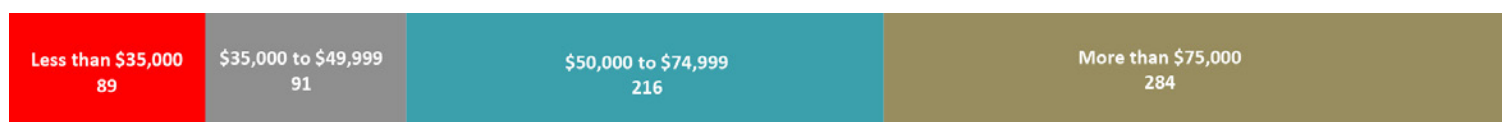


WAGES

Advertised wages Q3 2016

Data: Burning Glass Technologies
Analysis: Workforce Intelligence Network

The higher experience and education requirements for Engineers & Designers translate into higher, more competitive wage advertisements by employers in the Hoosier state. A majority of the postings that included wage information advertised salaries above \$50,000 annually. The average advertised annual salary in postings during Q3 2016 was \$67,500, down from \$72,000 in Q2.



3-5 years
Experience
most in-demand
by Indiana
Employers

\$67,567
average
advertised salary

**Bachelor's
Degree most
often required**



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