

ATLAS
CENTER

*Advancing Transportation
Leadership and Safety*

WIN WORKFORCE
INTELLIGENCE
NETWORK
for Southeast Michigan

MAGMA
Michigan Academy for Green Mobility Alliance

Transportation Safety Workforce Report 2015







Executive Summary

The research summarized in this report was carried out as a partnership between the Center for Advancing Transportation Leadership and Safety (ATLAS Center) at the University of Michigan Transportation Research Institute (UMTRI) and Workforce Intelligence Network for Southeast Michigan (WIN). WIN's custom occupational analysis focuses on job titles related to the ATLAS Center's transportation safety research goals that promote safer roadways, safer drivers, and safety for high-risk groups. Additional occupation codes included in the analysis highlight workers with knowledge of emerging intelligent transportation systems, connected, or automated vehicle technologies, a research and education focus of WIN partner Michigan Academy for Green Mobility Alliance (MAGMA).

For more information, please see:

- win-semich.org
- atlas-center.org
- migreenmobility.org

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Findings

1. One-eighth of Michigan's workers are employed in jobs related to transportation safety.

In Michigan, 564,477 people are employed in transportation safety-related occupations. These occupations include workers in Engineering & Design, Operations, and Planning, and account for about 13 percent of the state's total employment. See page 6.

2. The diversity of workers in transportation safety jobs in Michigan largely reflect the ethnic diversity of the Michigan workforce overall.

Transportation safety workers in Michigan are largely white and male. Eighty-two percent of workers in transportation safety-related occupations are white, 10 percent are black, and the remainder are Asian and Hispanic. See page 8-9.

3. Too few young workers are entering transportation safety occupations, signaling a future long-run worker shortage.

Twenty percent of transportation safety workers in Michigan are over 55 today. This means that 112,895 transportation safety-related workers will have to be replaced over the next 10 years. Workers under the age of 24 represent only 9 percent of the transportation safety-related workforce in the state. See page 9.

4. The top two most in-demand transportation safety-related workers in Michigan reflect both the traditional and changing nature of the field. Heavy and tractor-trailer truck drivers are the most in-demand transportation workers in

Michigan while the second most in-demand workers are software developers. Truck drivers are a more traditional transportation-related occupation yet still heavily in-demand by companies. Software developers are not traditionally related to transportation safety but as transportation systems become more automated, computerized, and connected, employers require a technical workforce trained in computer science and coding. See page 10.

5. Vehicle operator, logistics worker, and engineering occupation sub-groups employ 50 percent of the transportation-safety workforce in Michigan.

Half of Michigan's transportation safety-related workforce is comprised of vehicle operators, logistics workers, or engineers. These three occupation sub-groups represent the workers moving goods and people on roads, bridges, and other byways, those coordinating the movement of goods and people, and those designing the vehicles to move goods and people. See pages 11 and 13.

6. The gap between worker supply and demand is greatest for the top two in-demand occupations: heavy and tractor-trailer truck drivers and software developers.

Data on demand and credentials related to truck drivers and software developers indicate both a current workforce gap and looming one in the future. These two areas are the most in-demand by companies yet have some of the lowest degree and credential completion rates. More programs and innovative ways to train workers are needed to fill these gaps. See page 12.

Methods

This report was compiled using data from Burning Glass Technologies, the Integrated Postsecondary Data System (IPEDS), Bureau of Labor Statistics (BLS), Economic Modeling Specialists International (EMSI), Career Builder Supply & Demand Portal, and the Census Bureau. The data is for the state of Michigan unless otherwise noted. All data are focused on occupations categorized by the WIN research team with input from the ATLAS Center. For a complete list of occupations, please see Appendix A.

Glossary

- A. Occupation versus Industry** – Occupations are defined as jobs in which individuals are employed. Industries are defined as the line of work an entire company is engaged in. While a company may fit into a single industry, several occupations may be employed in a single company. This report focuses on occupations as it is an analysis of workers and not companies.
- B. Completions** – A completion is defined as a post-secondary certificate or degree awarded by an educational institution. The analysis uses completions as a measure of new workforce supply, individuals newly credentialed and ready to fill open jobs. All completions data are gathered by IPEDS.
- C. Job postings/Demand** – Online job postings are a proxy for employer demand, or the need for workers. These data are gathered by Burning Glass Technologies.
- D. Employment** – The number of individuals estimated to be employed in the defined occupations. Employment includes both full and part-time workers.
- E. Employers** – Companies or organizations that employer workers.

An aerial photograph of a city skyline, featuring a prominent skyscraper with a distinctive pointed top and a grid-like facade. The building is surrounded by other high-rise structures and lower commercial buildings. The sky is filled with large, white, fluffy clouds, and the horizon shows a distant view of the city and surrounding areas.

Introduction

Employment

In Michigan, 564,477 people are employed in transportation safety-related occupations. These occupations include workers in Engineering & Design, Operations, and Planning, and account for about 13 percent of the state's total employment.

While employment in these transportation safety-related occupations dropped considerably beginning in 2005 and reached a recession low in 2009, levels have rebounded in a near linear pattern since 2010. Employment returned to pre-recession levels in 2014, growing 13 percent from 498,274 to 564,447 between 2009 and 2014.

Transportation Safety-Related Employment

(Michigan, 2005 - 2014)



Occupational Clusters

WIN identified 96 occupational codes that are related to the ATLAS Center's transportation safety research and policy priorities. These occupations also align with MAGMA's initiatives aimed at advancing new technology in mobility and automobile manufacturing.

With so many occupations in a diversity of fields, they can be more easily analyzed if grouped into clusters. These clusters include:

1. **Engineering & Design:** highlighting the safety engineering in manufacturing vehicles and their safety components,
2. **Operations:** the occupations that ensure that the transportation system operates efficiently and safely, and
3. **Planning:** the planning and building of transportation systems that affect how people use the system.

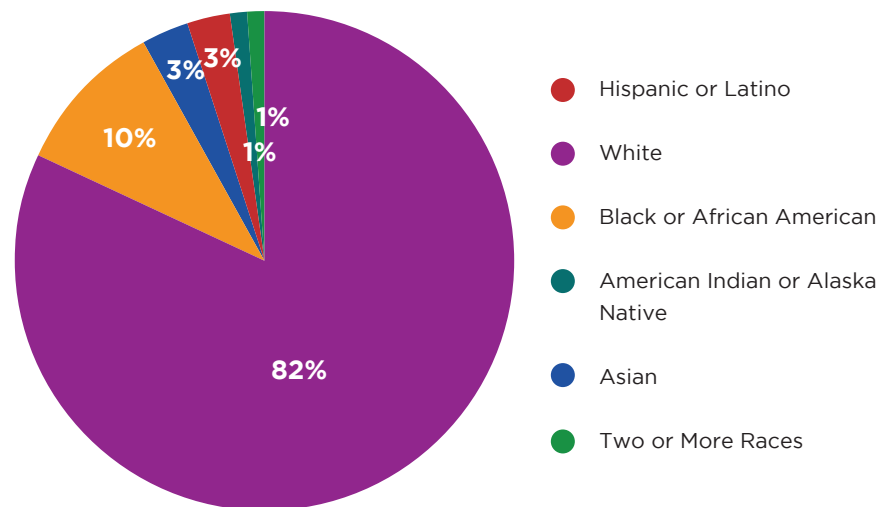
Each cluster is then further broken down into sub-groups for more detailed workforce analysis. Every job is unique and the following sub-group breakdowns allow the WIN research team to analyze the nuances of different types of jobs without needing to go into the detail of each of the 96 individual occupations.

- The Engineering & Design cluster encompasses occupations in Electrical, Mechanical, & Chemical Engineering; Information Technology; and Process Engineering & Testing.
- Workers in the Operations cluster contribute to transportation safety as Logistics Workers, Maintenance Workers, Regulatory Workers, and Vehicle Operators.
- Workers grouped into the Planning cluster are essential to safe roadway design either in Construction or in Urban Planning & Civil Engineering occupations.



Workforce Demographics

Transportation Safety-Related Worker Race/Ethnicity

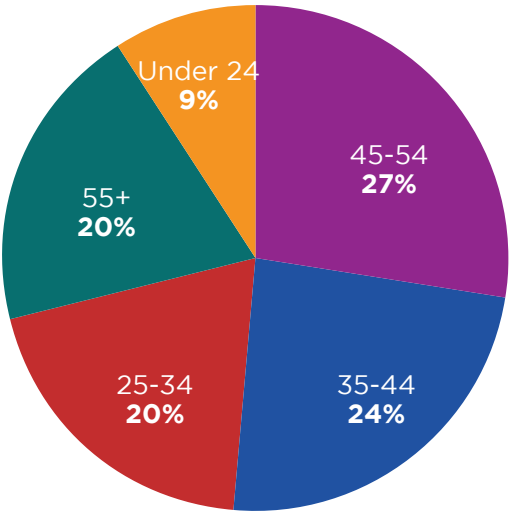


Data: EMSI, BLS
Analysis: Workforce Intelligence Networks

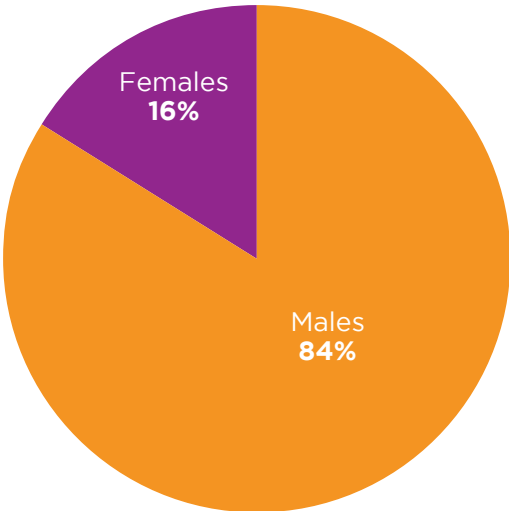
Transportation safety workers in Michigan are largely white and male. Eighty-two percent of workers in transportation safety-related occupations are white, 10 percent are black, and the remainder are Asian and Hispanic. Transportation safety employment in minority groups largely reflects the racial and ethnic breakdown of Michigan’s workforce as a whole. While the ethnic breakdown of the workforce is reflective of Michigan’s population, the gender breakdown tells a different story. Women are severely underrepresented in transportation safety jobs, comprising only 16 percent of the workforce, while 49 percent of workers across Michigan are female.

Many Michigan workers will reach retirement age in the next decade, with 27 percent of the state’s workers currently between the ages of 45 and 54. The same is true for the 20 percent of transportation safety workers over 55 today. This means that 112,895 transportation safety-related workers in Michigan will have to be replaced over the next 10 years. At the other end of the spectrum, workers under the age of 24 represent only 9 percent of the transportation safety-related workforce in the state, slightly lower than the 14 percent share this age group holds across all occupations. A disparity between workers close to retirement and those just entering the workforce signals a long-run gap in the number of workers going into related fields. This does provide opportunity for improvement, though; the wide reach of transportation safety-related occupations offers opportunities for young people with a range of skills to enter the workforce in these careers.

Transportation Safety-Related Worker Age Demographics



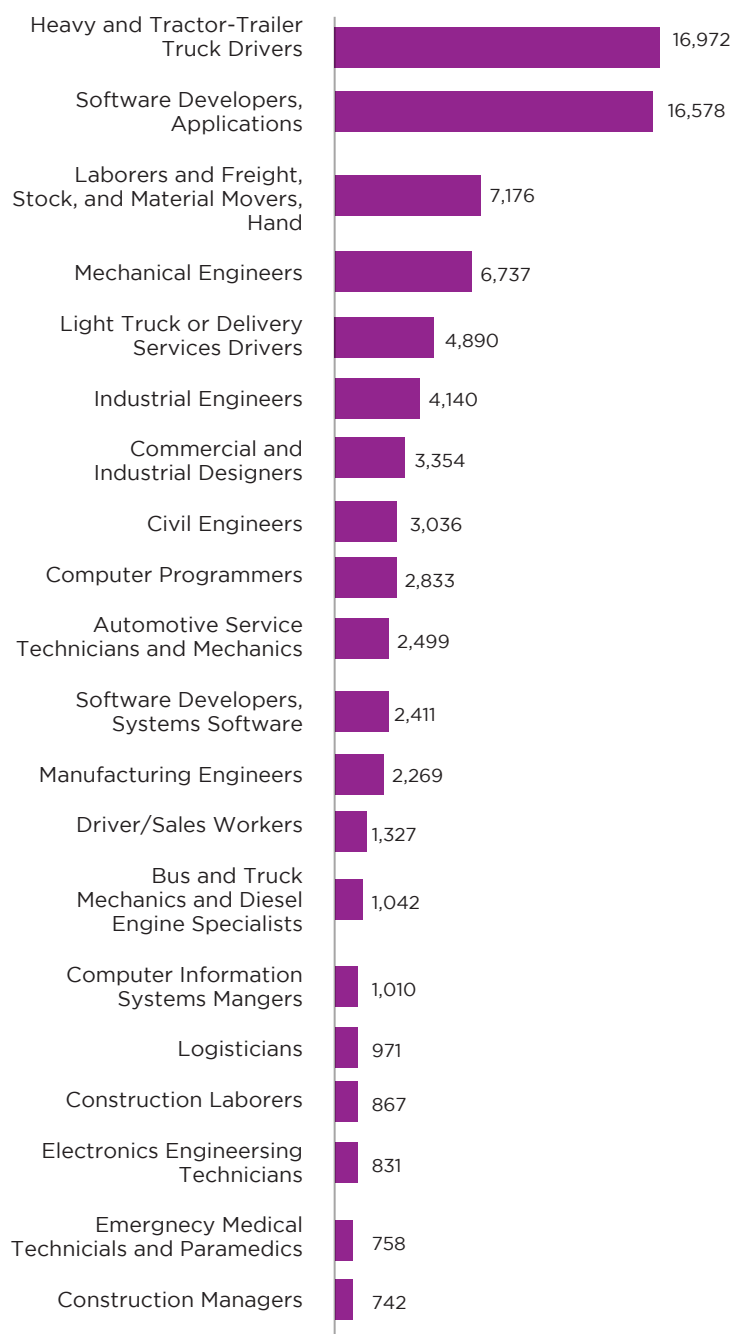
Transportation Safety-Related Worker Gender



Data: EMSI, BLS
Analysis: Workforce Intelligence Networks

Employer Demand

Transportation Safety-Related Worker Race/Ethnicity



Transportation safety depends on a vast number of workers and reaches a broad number of occupations. These occupations range from engineers and designers involved in designing vehicles and their safety components, Operations workers whose work is anything from enforcing traffic law to maintaining vehicles, and legislators, civil engineers, and construction workers who plan, design, and build roadways. The top in-demand transportation safety-related occupations in Michigan for 2014 demonstrate the diversity in the field.

1. Michigan employers posted almost 17,000 job ads for heavy and tractor-trailer truck drivers, whose knowledge of traffic safety and skilled driving is integral to maintaining a certain level of transportation safety in the state for all drivers on the road.
2. The second most in-demand occupation was software developers for applications (16,578 postings), whose skills with computer coding are transferrable to new intelligent transportation systems and connected and automated vehicle technologies coming on the scene.
3. Laborers and freight, stock, and material movers were Michigan's third most in-demand transportation safety occupation. Employers posted 7,176 online job ads for these workers with safety practices that contribute to traffic safety in similar ways to truck drivers.
4. Mechanical engineers (6,737 postings) are often essential, especially in Michigan's automobile manufacturing economy, to the design of safe automobiles and accessory automobile products. Mechanical engineers also have an educational background and professional skills that may be applicable to other areas of design for transportation safety.
5. Michigan employers posted 4,890 online job ads during 2014 for light truck or delivery services drivers. Traffic safety knowledge and experience in vehicle operation affects the safety of other road users significantly.

Data: Burning Glass Technologies
Analysis: Workforce Intelligence Networks

Supply and Demand

WIN researchers use online job posting data as a means to better understand immediate employer demand for workers. With rapidly shifting economies, traditional labor market information can become outdated quickly creating a need for more recent data on workforce needs.

Job postings on their own are helpful but context is important. Comparing job postings to employment levels provides context for both how many job postings there are relative to current employment in a specific field and how readily employers utilize job ads for certain occupations.

Transportation safety-related employment in Michigan is dominated by occupations in the Vehicle Operators, Logistics Workers, and Electrical, Chemical, & Mechanical Engineering sub-groups.

Employment in each occupation sub-group is important for analyzing which occupations are likely to need workers in the future just as postings are helpful to understand immediate workforce needs, however, there is often a mismatch between an occupation sub-group's share of postings and share of related employment. This can signal either heightened demand, if the posting share is much greater than employment, or can signal the opposite. For example, during 2014, Information Technology cluster jobs accounted for 26 percent of all transportation safety-related job postings in Michigan, but this sub-cluster only employs 8 percent of related workers. Because emerging IT cluster occupations employ so few workers in Michigan, the large number and greater proportion of job postings for IT workers indicates employment in these occupations is likely to grow soon.

On the other hand, postings in the Electrical, Chemical, & Mechanical Engineering cluster command a 10 percent share of related employer demand and employment in the cluster is a similarly sized 12 percent of transportation safety employment in Michigan. The implications of these similar employment and demand shares can be seen in the time series graphs for each data set – as employment in this cluster has nearly returned to pre-recession levels, the job postings for these occupations have leveled off.

Engineers & Designers

- Electrical, Chemical, & Mechanical Engineers
- Information Technology
- Process Engineering & Testing

Operations

- Logistics Workers
- Maintenance Workers
- Regulatory Workers
- Vehicle Operators

Planning

- Construction Workers
- Planners

Comparing job postings to recent graduates in related fields helps to signal whether or not the current workforce pipeline is strong enough to fill employer needs. Many degrees prepare workers for a variety of jobs but there is often a mismatch between what students study and what companies need.

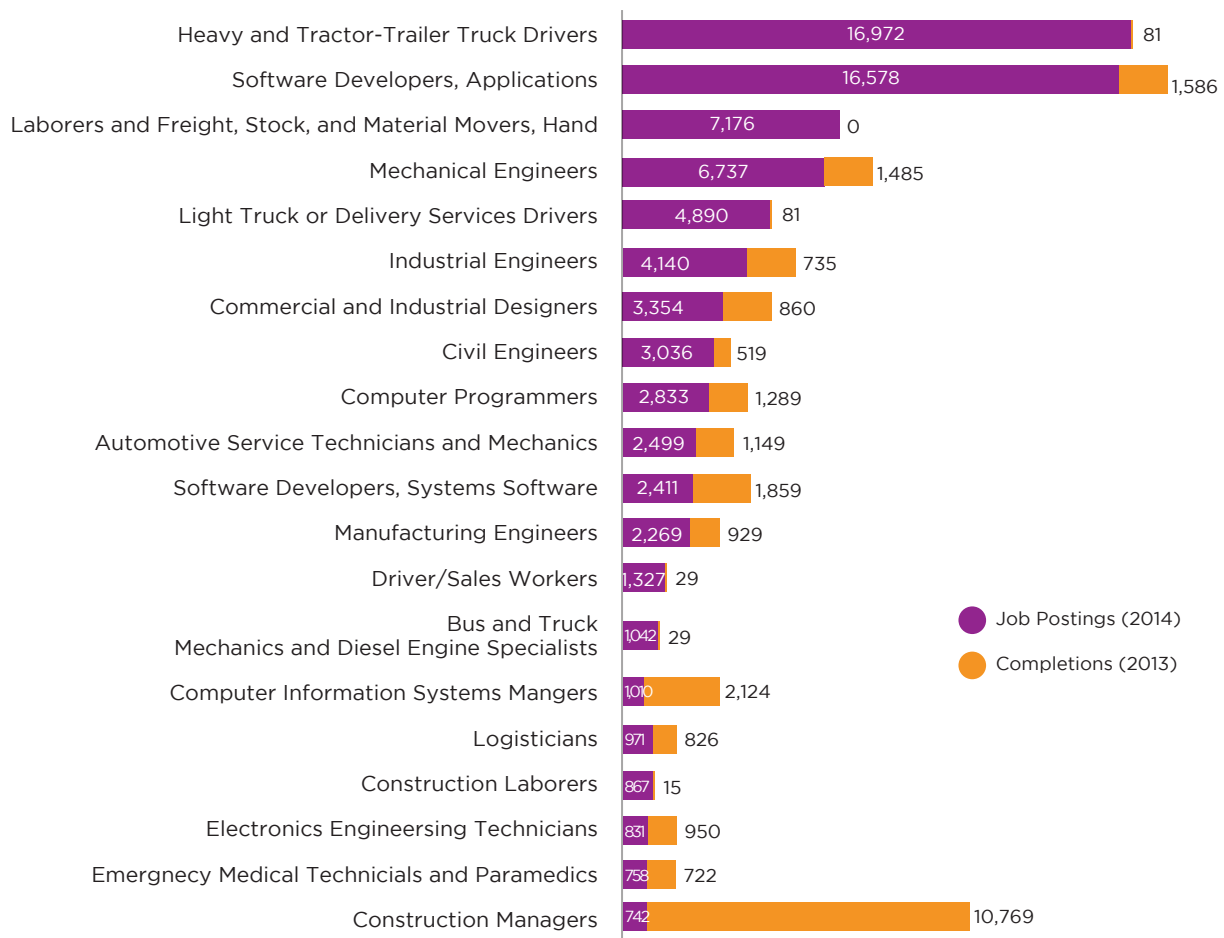
The number of job postings for transportation safety-related occupations in Michigan often far outweighs the number of graduates of related programs in the state. Heavy and tractor-trailer truck drivers were the top in-demand job in Michigan in 2014, with 16,972 online job ads posted. Meanwhile, only 81 people in the state graduated from a related educational program during 2013. Truck drivers in Michigan are not currently required to complete a training program in order to obtain a license, so completions data for this occupation does not necessarily indicate a drought of qualified workers, but may make an argument regarding current policies surrounding truck driver licensing.

Another high demand, related job is software developers for applications, which more often than not requires a bachelor's degree. Demand for these jobs (16,578 postings) still far outpaces the number of graduates in related programs (1,586 completions in 2013). This gap in supply and demand signals the onset of several issues:

- Rapidly increasing wages which will hopefully entice more workers to enter this field,
- Likely poaching of the current workforce among companies as they compete for talent, and
- Importing talent from other states and countries to fill open positions.

At the other end of the spectrum, regional completions of related educational programs exceed the number of available jobs, especially for some of the occupations with the fewest postings. For example, the graph shows that 2013 regional completions related to the biofuels/biodiesel technology and product development manager occupation (6,996 completions) were 636 times greater than the number of 2014 online postings for this job (11 postings). This illustrates an example of individuals with a degree related to many occupations but the niche occupation itself is not in very high demand. Many degree programs can prepare a worker for a certain occupation, and not all students earning advanced degrees in environmental, life, and other sciences required for a career in biofuels production will go on to seek employment as biofuels production managers. While high completion rates compared to low job demand for some of these occupations could warrant steering students away from specific careers, the opposite problem, high demand jobs with few graduates to fill them, is more concerning.

Transportation Safety-Related Supply-Demand Highest Job Postings and Related Grads

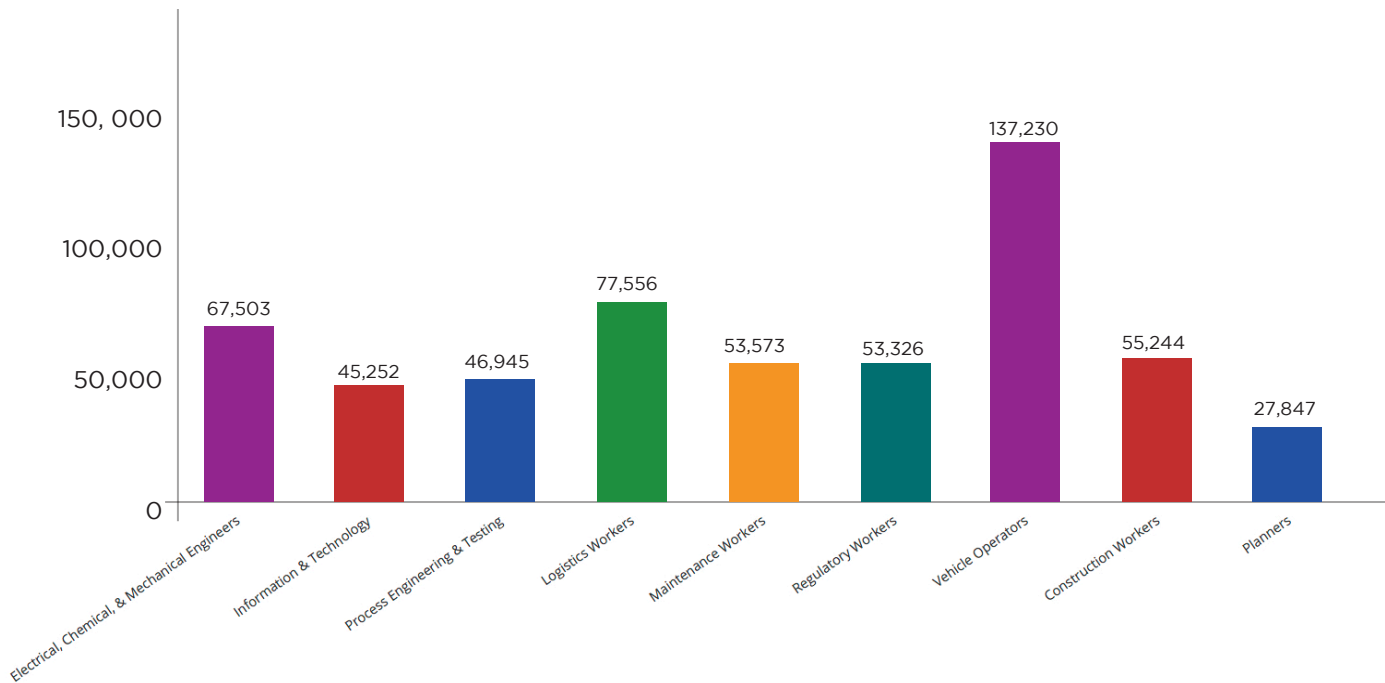


Data: EMSI, Burning Glass

Analysis: Workforce Intelligence Networks

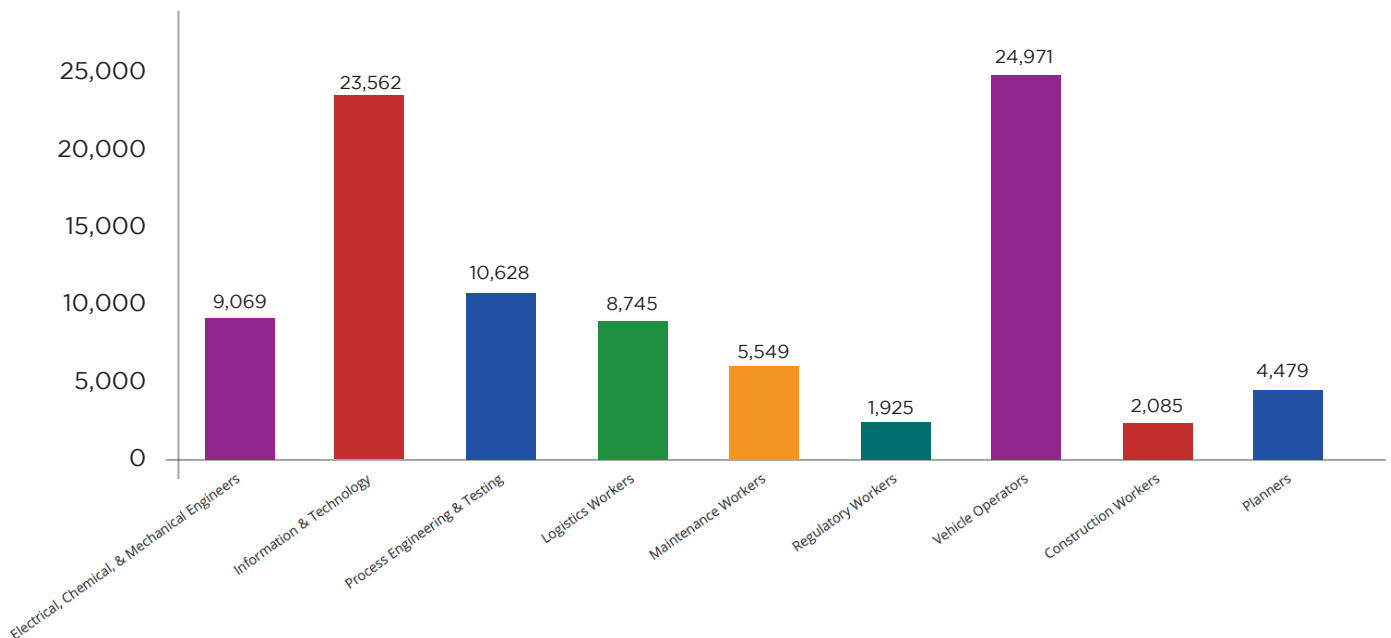
Transportation Safety-Related Employment by Sub-group

(Michigan 2014)




Transportation Safety-Related Postings by Sub-group

(Michigan 2014)



Data: Economic Modeling Specialists, Intl.
Analysis: Workforce Intelligence Networks



Engineering & Design

Engineers and industrial designers contribute to transportation safety by designing for vehicle safety, as well as addressing emerging safety concerns in mobility, such as intelligent transportation systems and cyber security, as new technologies like connected and self-driving vehicles are developed, tested, and deployed. Over 150,000 workers in Michigan are employed in engineering and design occupations that are relevant to transportation safety. These workers represent 28 percent of the total transportation safety workforce in Michigan.

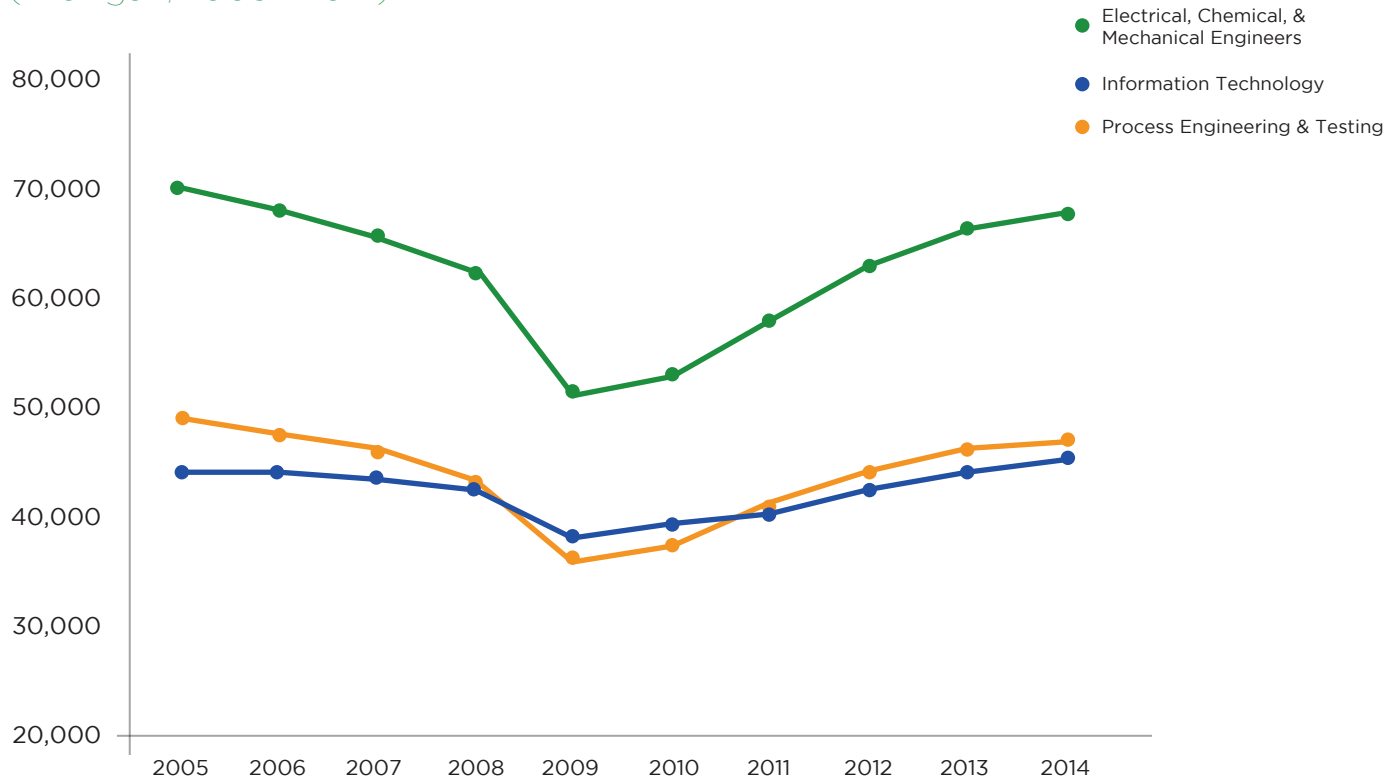
The 35 individual occupations within this cluster can be split into three occupation sub-groups: Electrical, Chemical, & Mechanical Engineering; Information Technology; and Process Engineering & Testing.

Overview

Engineering & Design is the second largest occupational cluster for transportation safety-related employment in Michigan, employing 158,146 people. Like most occupations, employment declined for engineers in Michigan during the recession, but employment in many of these occupation sub-groups has made a recovery.

Engineering & Design Employment

(Michigan, 2005 - 2014)



Engineering & Design Cluster, Wages and Education

Occupation Sub-Group	Typical Entry-Level Hourly Wage	Median Hourly Wage	Median Annual Salary	Typical Education for Entry-Level	Work Experience Required	Typical Training in Addition to degree
Electrical, Chemical & Mechanical Engineers	\$26.92	\$40.98	\$85,241	Bachelor's degree	None	None
Information Technology	\$26.04	\$39.32	\$81,788	Bachelor's degree	None	None
Process Engineering & Testing	\$20.99	\$33.58	\$69,838	Associate's degree	None	None

Of the three occupation sub-groups in this cluster, Electrical, Chemical, & Mechanical Engineers make up the bulk of employment with 66,510 employees in Michigan. This number translates to 12 percent of the total transportation safety workforce in the state. The engineers in this sub-group primarily contribute to transportation safety through safe vehicle design. Their large share of employment, then, makes sense in the context of Michigan's still-strong and recovering automobile manufacturing economy.

Engineering & Design occupations are well paying transportation safety jobs. Median hourly wages in each of the sub-groups are above \$30 per hour (\$70,000 annually), with wages for occupations in the Electrical, Chemical, & Mechanical Engineers sub-group above \$40 per hour (\$85,000 annually). These high paying jobs most often require a bachelor's degree, but some entry-level positions in the Process Engineering & Testing sub-group can be obtained with a relevant associate's degree.

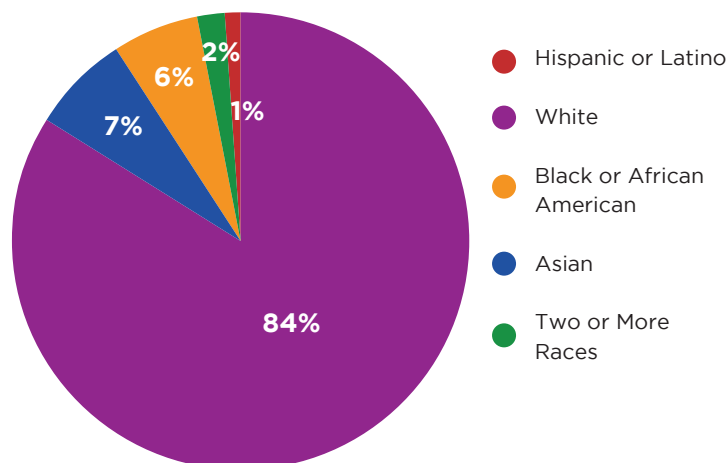
*Data: Economic Modeling Specialists, Intl., BLS
Analysis: Workforce Intelligence Networks*

Engineering & Design Workforce Demographics

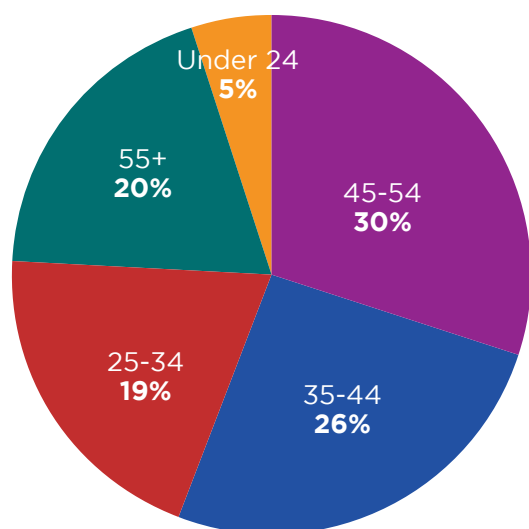
The transportation safety Engineering & Design workforce in Michigan is 84 percent white, and blacks are underrepresented in the engineering occupations compared to Michigan's overall workforce. Also alarming, demographically, is the underrepresentation of women in the Engineering & Design occupations. Just 15 percent of Michigan workers in these occupations are female, even though women are 49 percent of the state's overall workforce.

Similar to Michigan's workforce on the whole, 20 percent of transportation safety-related engineering workers are over the age of 55 and set to retire in the next 10 years. This opens up an opportunity for younger workers to enter into these rapidly growing occupations. In 2014, only 5 percent of this occupational cluster was under the age of 24. The subsequent analysis on Supply & Demand in the Engineering & Design occupations will shed more light on the educational attainment and training for young and returning engineers to enter into the most in-demand occupations.

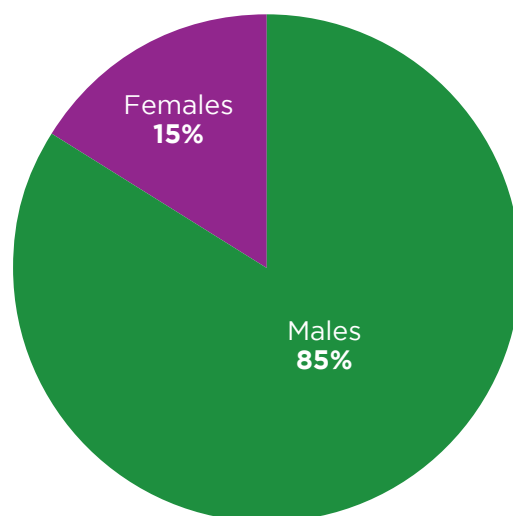
Engineering & Design Cluster Worker Race/Ethnicity



Engineering & Design Cluster Worker Age Cohorts



Engineering & Design Cluster Worker Gender



Data: EMSI

Analysis: Workforce Intelligence Networks

Supply & Demand

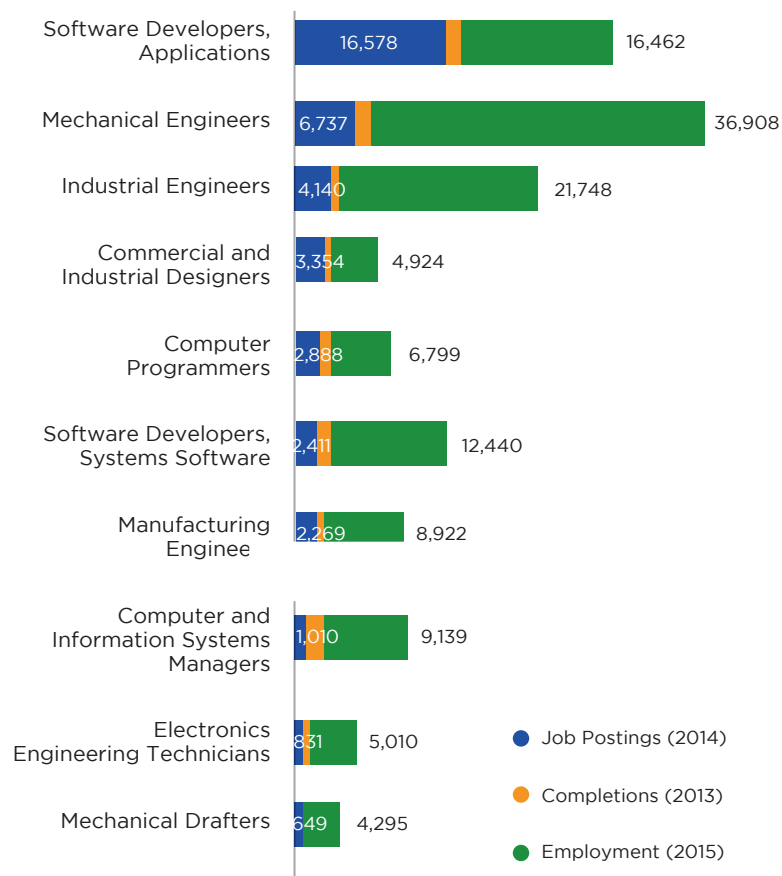
As discussed in the overall Supply & Demand analysis, transportation safety-related Engineering & Design occupations are some of the most in-demand from Michigan employers, and engineering employment is historically strong in the context of the state's automobile manufacturing industry. As the manufacturing economy rebounds and new vehicle technology is brought to market, employers will be seeking new engineers.

One major trend in vehicle safety design and engineering is the advent of automated and connected vehicles. The impact of the new technology can be seen in the transportation safety engineering and vehicle design labor market. Postings in the IT sub-group accounted for 26 percent of transportation safety-related employer demand in Michigan during 2014. The increased demand is especially evident in particular occupations like software developers for applications.

Software developers for applications were 2014's most in-demand Engineering & Design occupation, pulling in 16,578 online job postings over the year. Employment in this occupation is equal to the number of job ads posted but high demand will not grow employment without more training and education. Completions data show that only 1,555 degrees or certificates applicable to a career in software development were completed across the state in 2013.

Employment in engineering occupations more often associated with Michigan's automobile industry, like those in the Electrical, Chemical, & Mechanical Engineering sub-group, is larger and more established than for IT occupations like software developers. However, completions still pale in comparison to continued employer demand for these most in-demand workers.

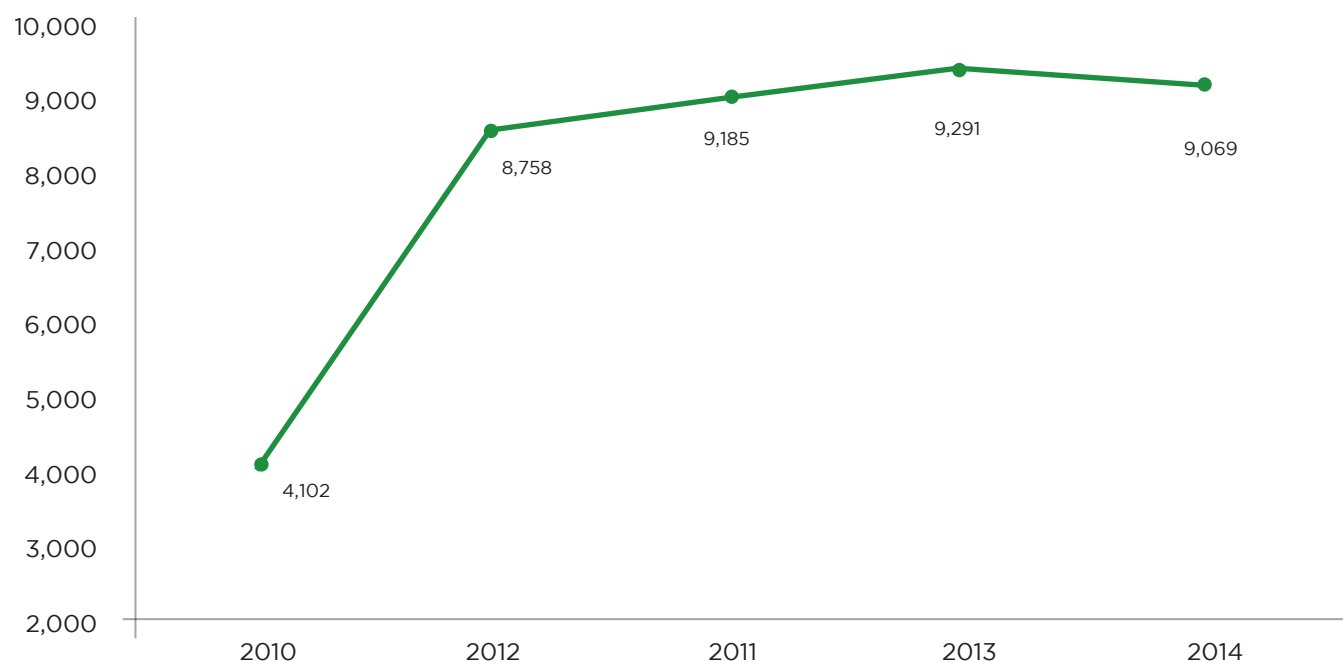
Engineering & Design Occupation Cluster Supply-Demand (Michigan)



Data: EMSI, Burning Glass
Analysis: Workforce Intelligence Networks

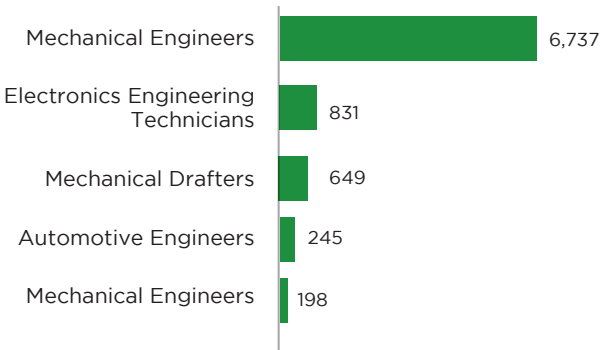
Electrical, Chemical, & Mechanical Engineers

Electrical, Chemical, & Mechanical Engineering Job Postings Over Time (Michigan 2010 - 2014)



Electrical, Chemical, & Mechanical engineers make up the bulk of engineering occupations that design for vehicle safety and ensure the quality of a vehicle's individual safety components. Postings for this sub-group are dominated by a need for mechanical engineers (6,737 postings in 2014), however employer demand for these occupations has leveled off after a post-recession increase in 2011.

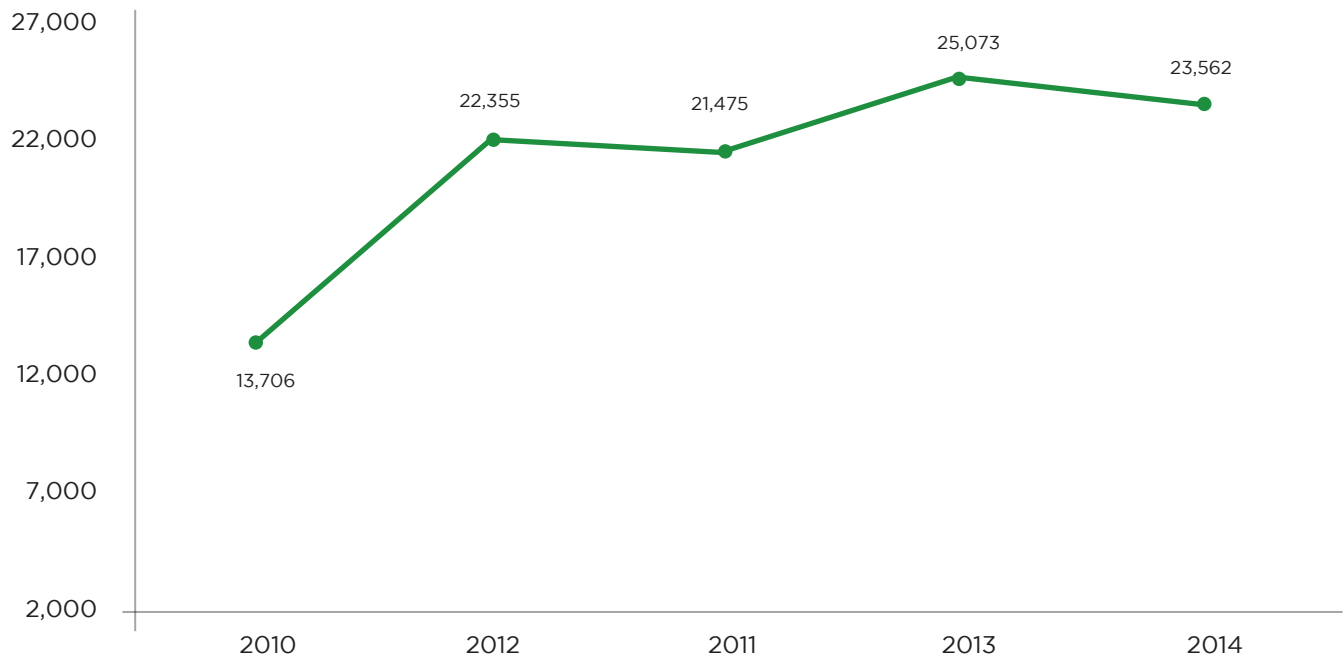
Top Electrical, Chemical, & Mechanical Engineering Job Postings (Michigan 2014)



Data: Burning Glass Technologies
Analysis: Workforce Intelligence Networks

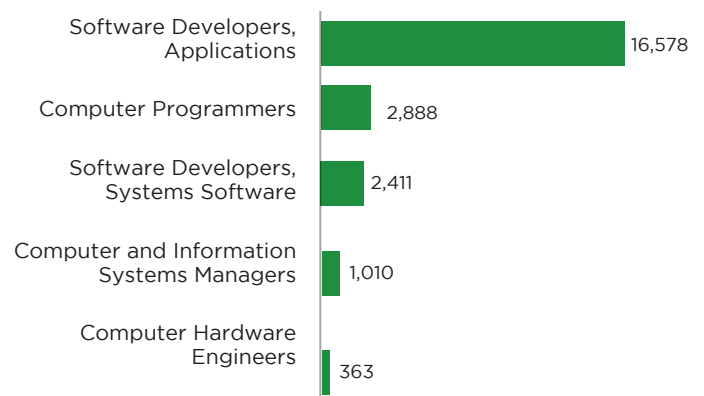
Information Technology

Information Technology Job Postings Over Time (Michigan 2010 - 2014)



Information Technology occupations are becoming more important to transportation safety as research and business strive to bring connected and automated vehicles to market. In order to do so, employers are seeking software developers for applications, posting 16,578 online job ads for these workers during 2014. Demand for computer programmers (2,888 postings) and software developers for systems software (2,411 postings) are also contributing to the growing need for IT occupations in Michigan.

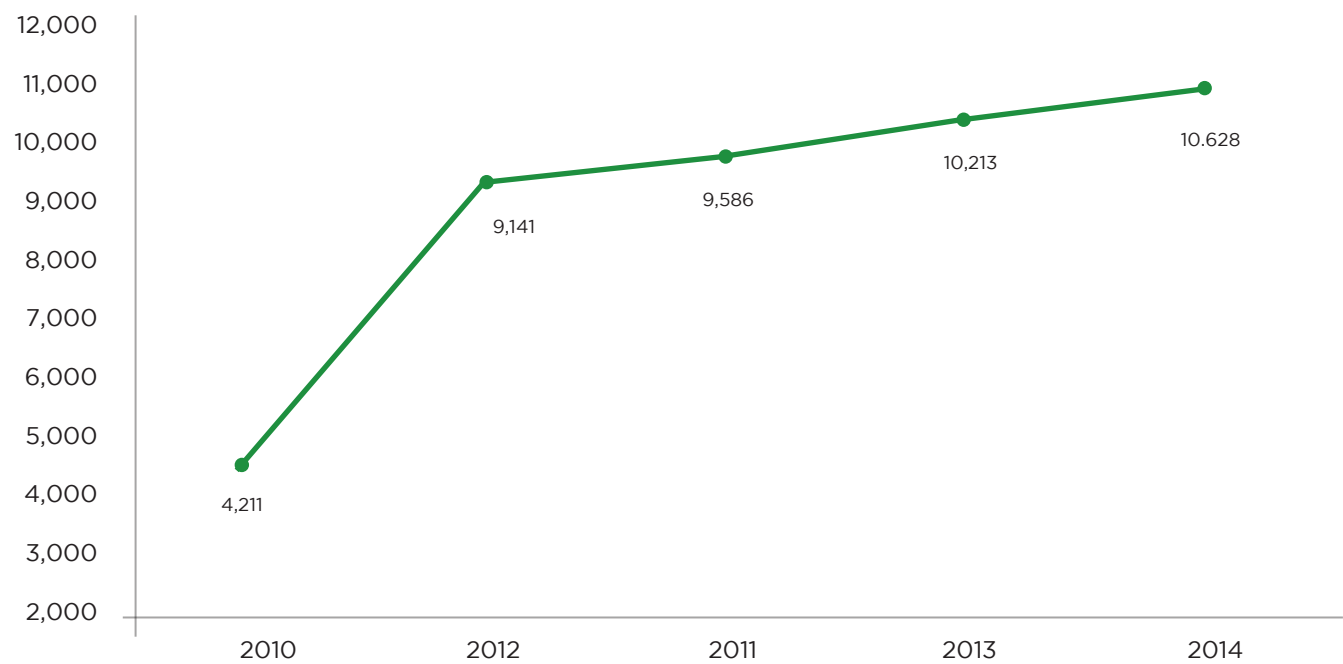
Top Information Technology Job Postings (Michigan 2014)



Data: Burning Glass Technologies
Analysis: Workforce Intelligence Networks

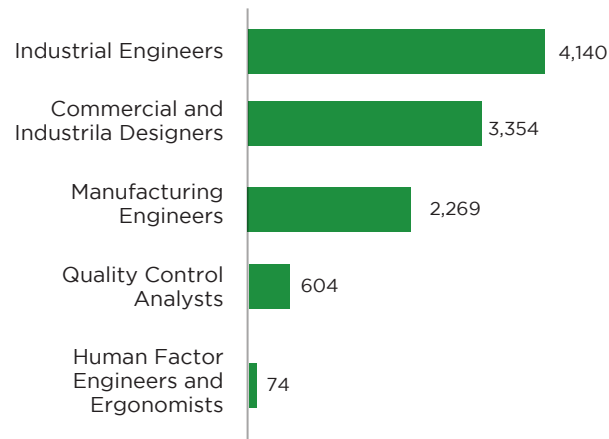
Process Engineering & Testing

Process Engineering & Testing Job Postings Over Time (Michigan 2010 - 2014)



Process Engineering & Testing occupations serve integral roles in human safety design and quality control for safe vehicles. Occupations like industrial engineers (4,140 postings in 2014), commercial and industrial designers (3,354 postings), and other occupations in this sub-group saw employer demand recover following the recession, though growth in postings has slowed.

Process Engineering & Testing Job Postings (Michigan 2014)



Data: Burning Glass Technologies
Analysis: Workforce Intelligence Networks



Operations

A significant part of transportation safety is contingent upon daily operations of the transportation system. The Operations cluster is the largest of the ATLAS Center's occupation clusters in Michigan, employing over 320,000 workers, or 57 percent of the transportation safety-related workforce. WIN has selected 39 occupations that work within the realm of transportation operations. The occupations can be split into the following sub-groups: Logistics Workers who manage the movement of goods and people, Maintenance Workers whose skills in mechanics maintain the safety of vehicles on the road, Regulatory Workers who enforce traffic safety laws, and Vehicle Operators whose performance affects other road users.

Overview

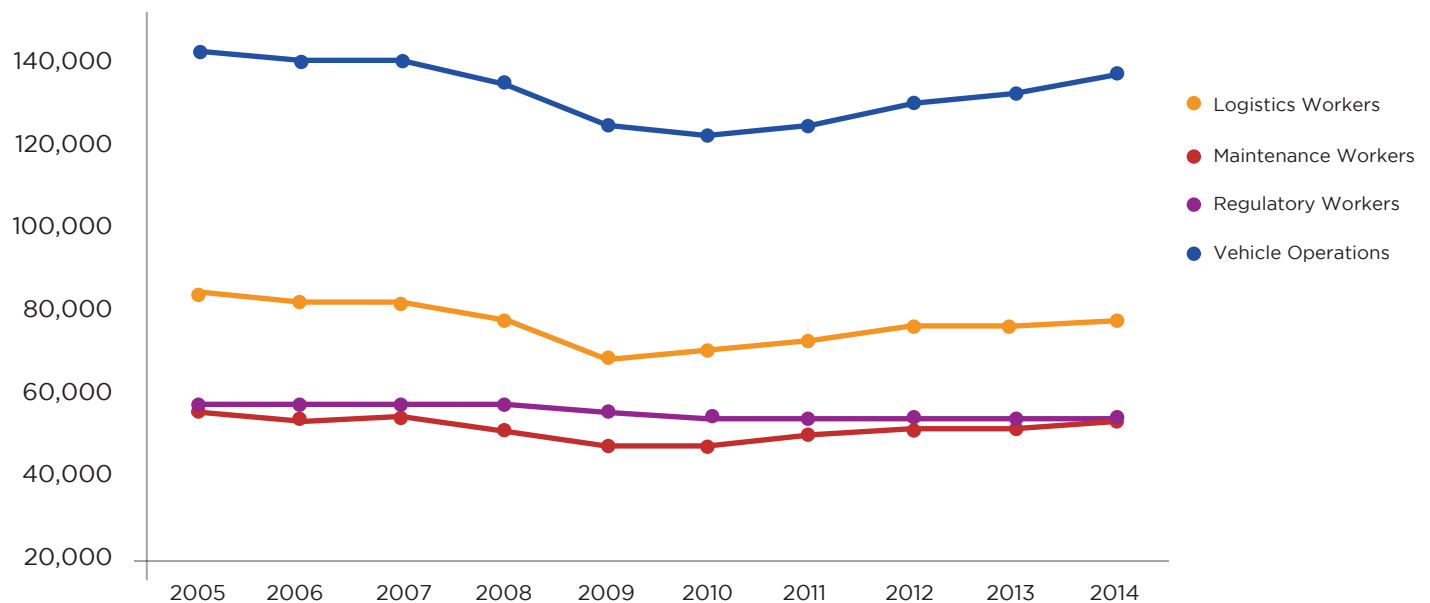
The Operations occupations make up the largest transportation safety cluster in Michigan, with 321,685 workers employed in 2014. Unlike other occupational clusters, such as engineers, Operations jobs were not as hard-hit by the recession; daily transportation operations did not halt.

The Operations cluster is organized into four sub-groups (listed from largest to smallest): Vehicle Operators, Logistics Workers, Regulatory Workers, and Maintenance Workers. The Vehicle Operators sub-group, including occupations like heavy and tractor-trailer truck drivers and light truck or delivery services drivers, employs the largest share of Operations workers (136,964), and the largest share of transportation safety workers in Michigan overall (24

percent). In observing employment over time for the Operations cluster, there were small dips in employment during the recession except for Regulatory workers, likely because occupations included in this sub-group like emergency medical technicians and paramedics and police, fire, and ambulance dispatchers are government or government-contracted workers.

Operations cluster occupations are often low-skill jobs that can be obtained with a high school diploma or some post-secondary education in conjunction with on-the-job training. Typical entry-level wages (10th percentile) are not high, starting at \$9.83 per hour in the Maintenance sub-group, but median hourly wages in all the Operations sub-groups are above a living wage of \$15 per hour. Median hourly wages in the Regulatory sub-group are highest (\$21.18 per hour, on average across occupations), offering workers an annual salary of about \$44,000.

Operations Employment (Michigan, 2005 - 2014)



Operations Cluster, Wages and Education

Occupation Sub-Group	Typical Entry-Level Hourly Wage	Median Hourly Wage	Median Annual Salary	Typical Education for Entry-Level	Work Experience Required	Typical Training in Addition to degree
Logistics Workers	\$10.50	\$16.13	\$33,554	High School Diploma	< 5 Years	None
Maintenance Workers	\$9.83	\$15.67	\$32,585	High School Diploma	None	Long-Term On-the-Job Training
Regulatory Workers	\$13.54	\$21.18	\$44,054	Post-secondary Non-degree	None	Moderate On-the-Job Training
Vehicle Operators	\$10.34	\$15.25	\$31,714	High School Diploma	None	Short-Term On-the-Job Training

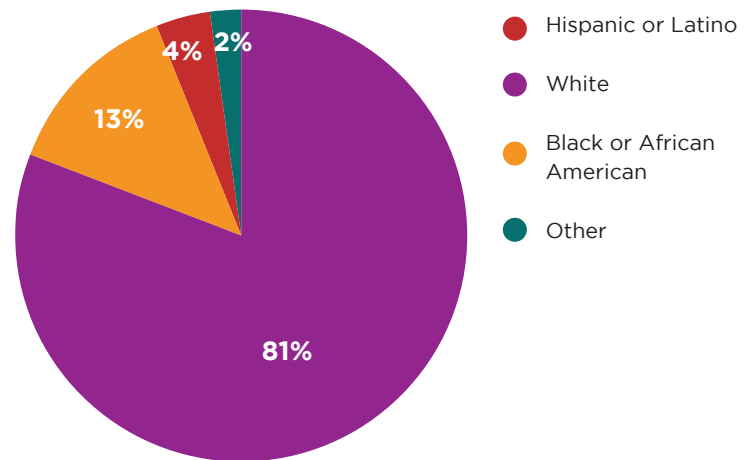
Data: Economic Modeling Specialists, Intl., BLS
Analysis: Workforce Intelligence Networks

Operations Workforce Demographics

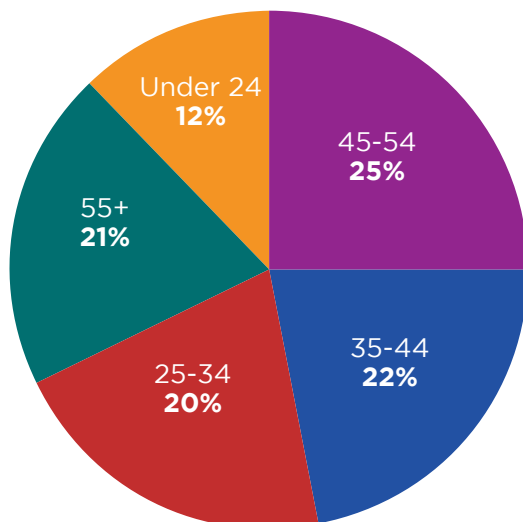
The Operations occupational cluster is the most racially and ethnically diverse of the transportation safety clusters in Michigan. With 81 percent of Operations workers being white and 13 percent black, the racial and ethnic breakdown of this cluster closely resembles the proportions in the whole of the Michigan workforce. On the other hand, female workers only make up 16 percent of this group, compared to a 49 percent female workforce overall.

Similar to the rest of the Michigan workforce, 21 percent of Operations workers are over the age of 55 and set to retire within the next 10 years. Other age cohorts are represented well; workers under the age of 24 make up 12 percent of the Operations workforce. Many occupations in this cluster offer Michigan workers of all ages an opportunity to join the workforce with some on-the-job training and a credential.

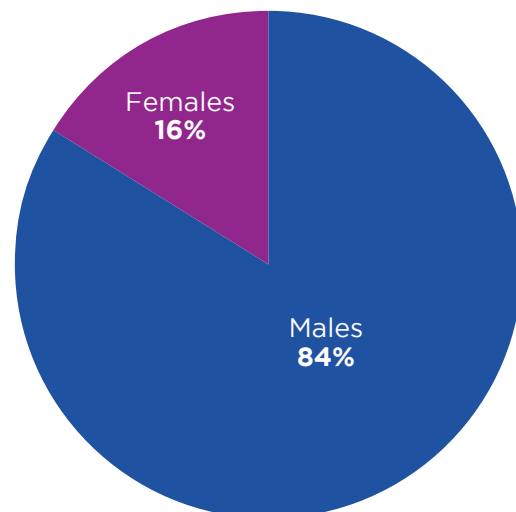
Operations Cluster Worker Race/Ethnicity



Engineering & Design Cluster Worker Age Cohorts



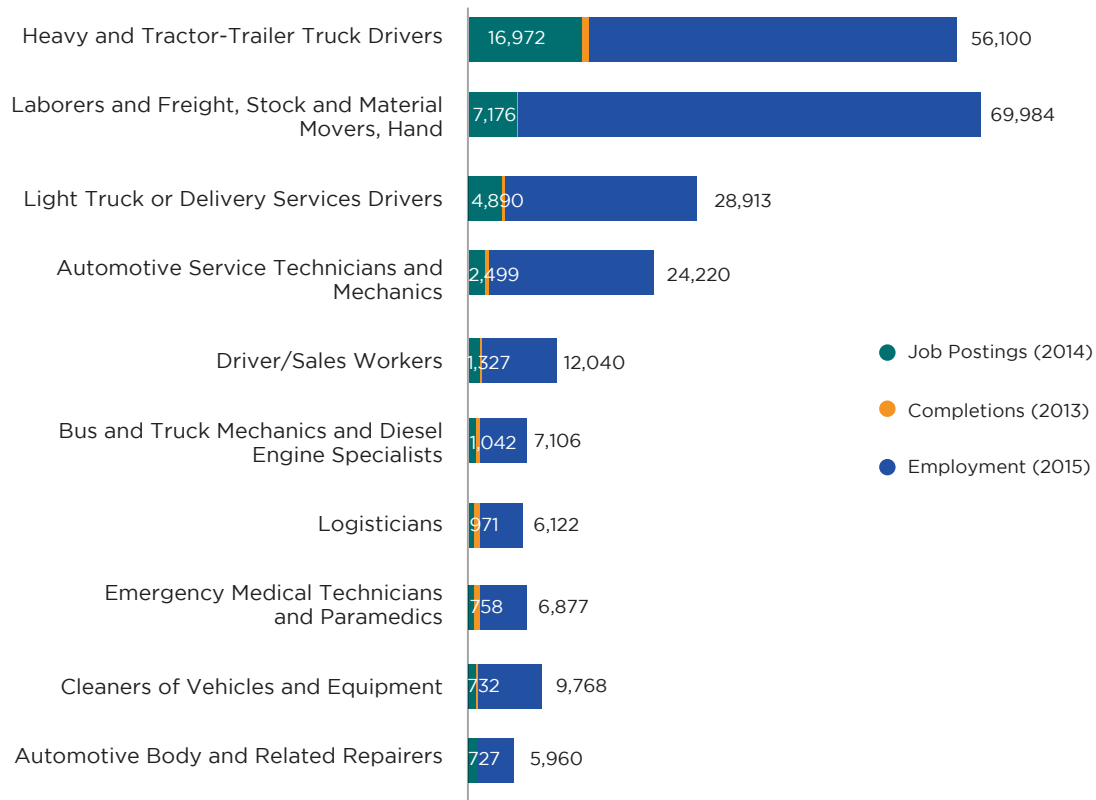
Engineering & Design Cluster Worker Gender



Data: EMSI
Analysis: Workforce Intelligence Networks

Supply & Demand

Operations Occupation Cluster Supply-Demand (Michigan)



Employer demand in the Operations occupational cluster accounted for 45 percent of transportation safety-related online job postings in Michigan during 2014. The cluster commands a similarly large share of related employment in the state: 57 percent. Comparing the demand for workers along with the supply of employed and newly trained or graduated potential workers helps provide a more complete view of the workforce.

While Operations occupations, on average, do not require higher educational attainment, there are many occupations, especially in the Regulatory Workers and Vehicle Operators sub-groups that require post-secondary certificates in order to maintain a certain level of skill, and thus safety. Heavy and tractor-trailer truck drivers were the most in-demand Operations occupation in Michigan in 2014, with almost 17,000 online job postings and 56,000 Michigan workers already working in the field. Despite high levels, sustained high employer demand for truck drivers does not guarantee that employment in this occupation will grow, especially if training for Michigan workers falls behind other states.

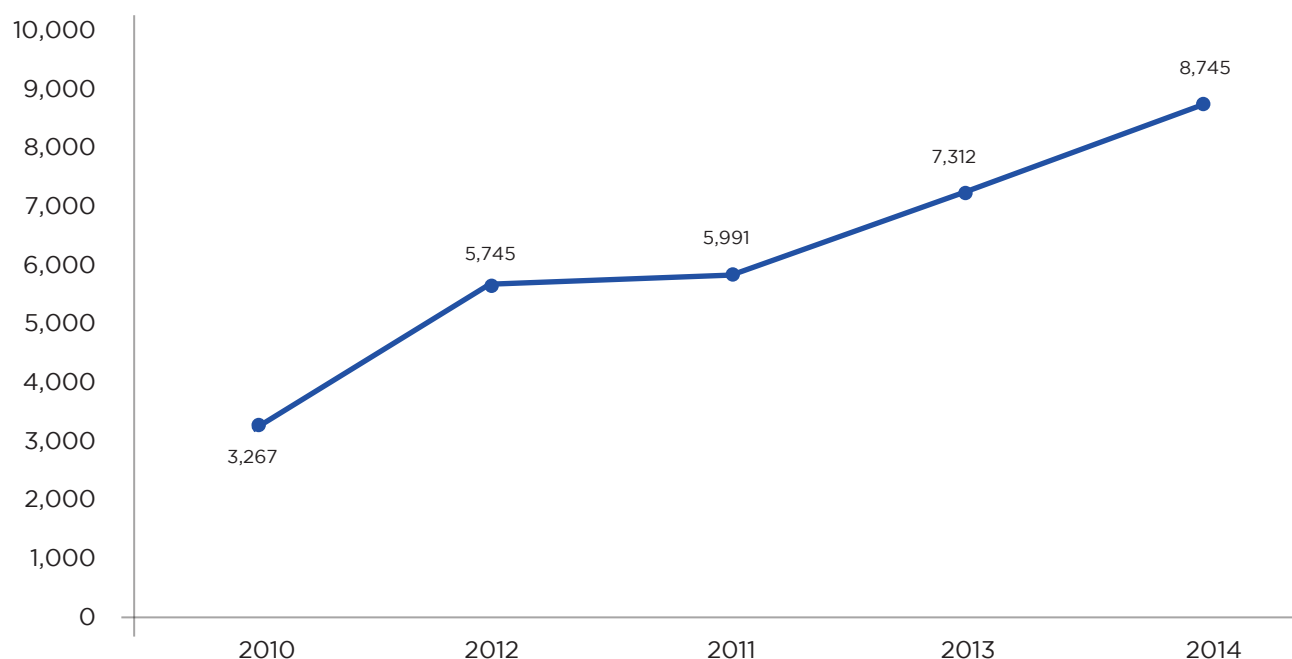
Data: EMSI, Burning Glass

Analysis: Workforce Intelligence Networks

Logistics Workers

Logistics Workers Job Postings Over Time

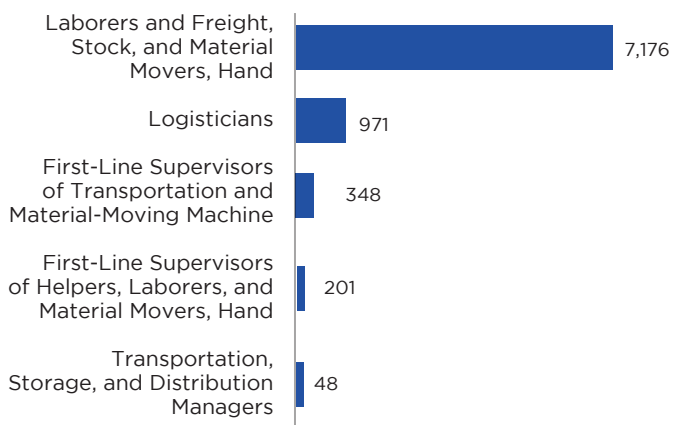
(Michigan 2010 - 2014)



Employer demand for workers in transportation, distribution, and logistics is growing. Demand for the occupations in the Logistics Worker sub-group more than doubled from 2010 to 2014, with Michigan employers posting 8,745 online job ads during 2014. The top in-demand occupation was laborers and freight, stock, and material movers, with 7,176 postings.

Top Logistics Worker Job Postings

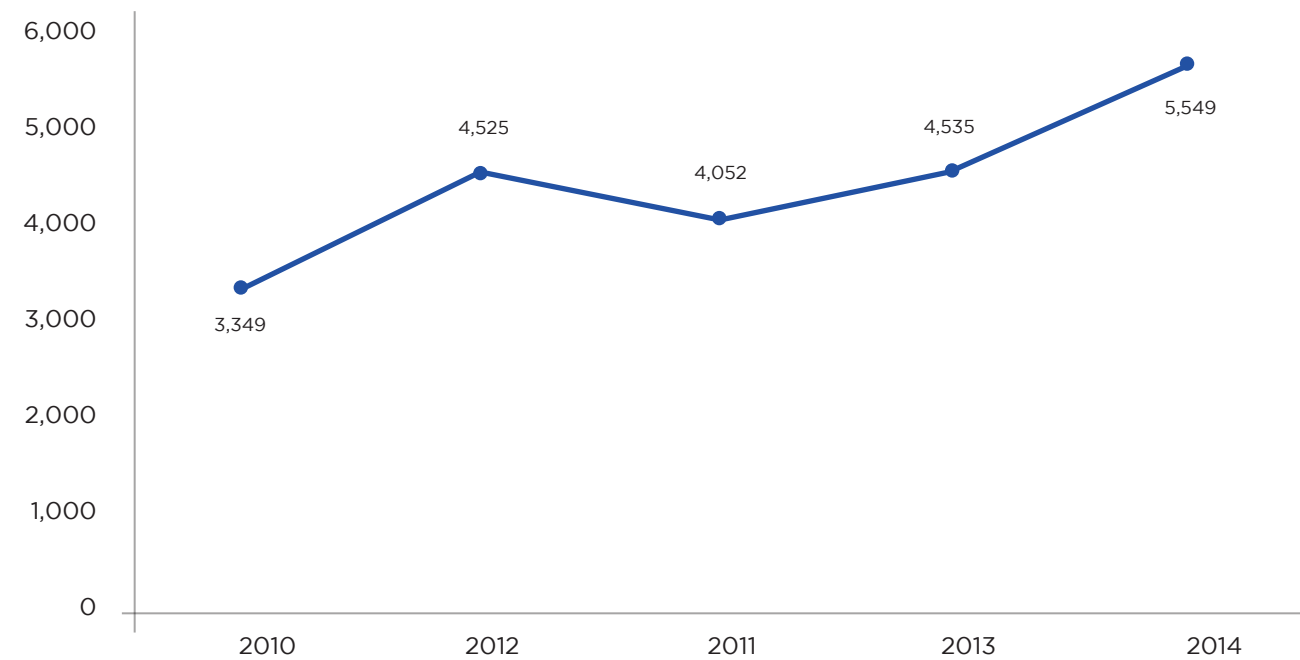
(Michigan 2014)



Data: Burning Glass Technologies
Analysis: Workforce Intelligence Networks

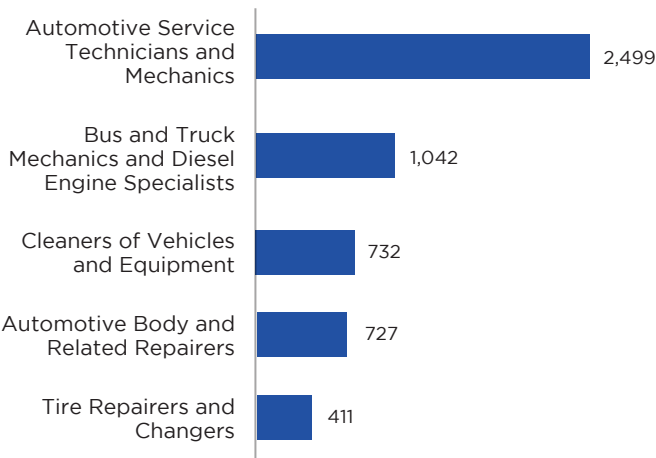
Maintenance Workers

Maintenance Workers Job Postings Over Time (Michigan 2010 - 2014)



Maintenance Workers play an important role in maintaining a certain level of quality and safety for vehicles on the road today. Workers with knowledge for careers such as automotive service technicians and mechanics (2,499 postings) and bus and truck mechanics and diesel engine specialists (1,042 postings) are in high demand. Employers posted 66 percent more online job ads for occupations in this sub-group during 2014 than in 2010.

Top Maintenance Workers Job Postings (Michigan 2014)

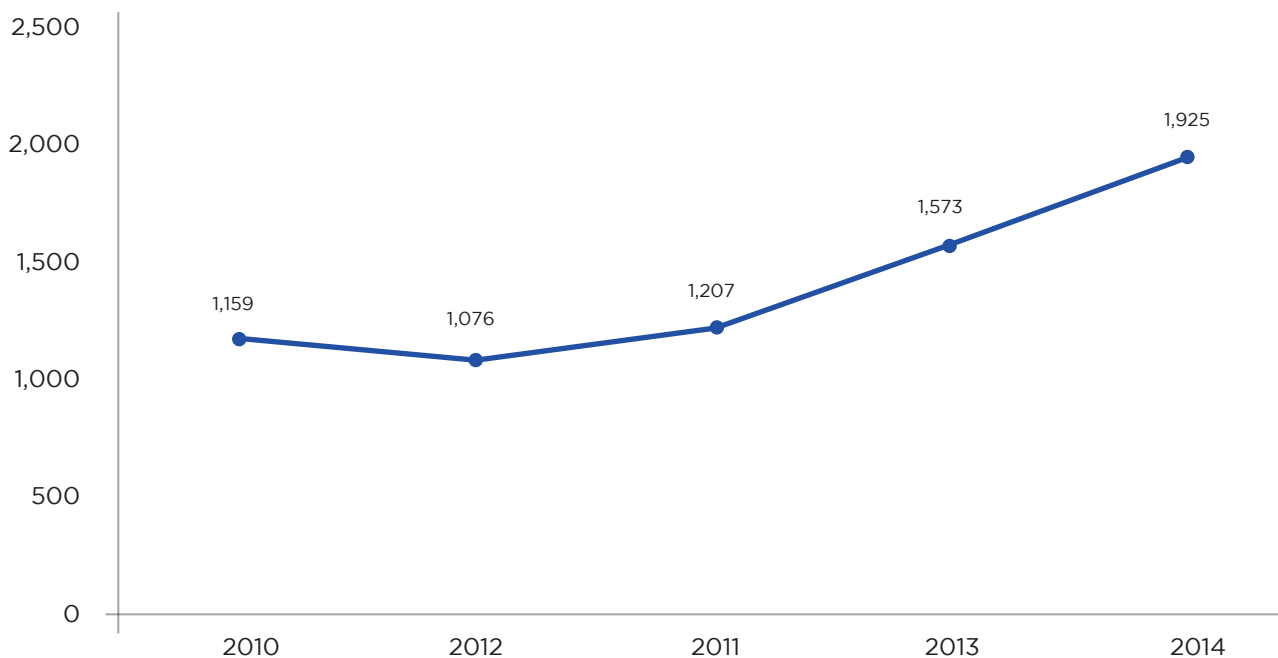


Data: Burning Glass Technologies
Analysis: Workforce Intelligence Networks

Regulatory Workers

Regulatory Workers Job Postings Over Time

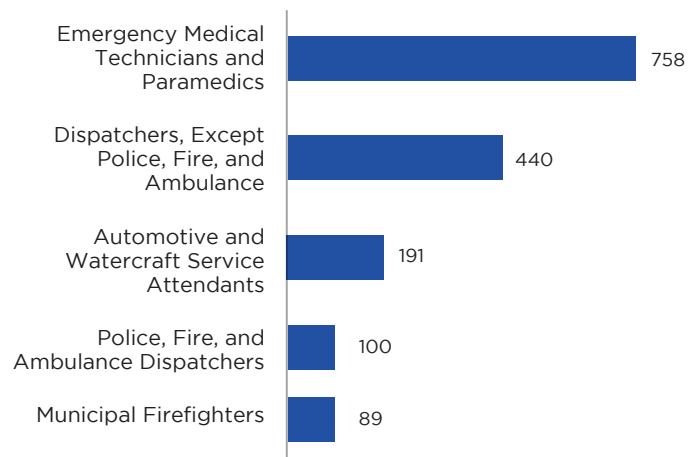
(Michigan 2010 - 2014)



Employer demand for Regulatory Workers, workers that enforce traffic safety laws and respond to vehicle crashes or other incidents, has been slowly and steadily increasing in Michigan since 2011, and 2014 postings data showed a 44 percent increase in demand over 2011 totals. The top in-demand occupations in this sub-group were emergency medical technicians and paramedics (758 online job postings in 2014) and dispatchers (except police, fire, and ambulance) (440 online job postings).

Top Regulatory Worker Job Postings

(Michigan 2014)

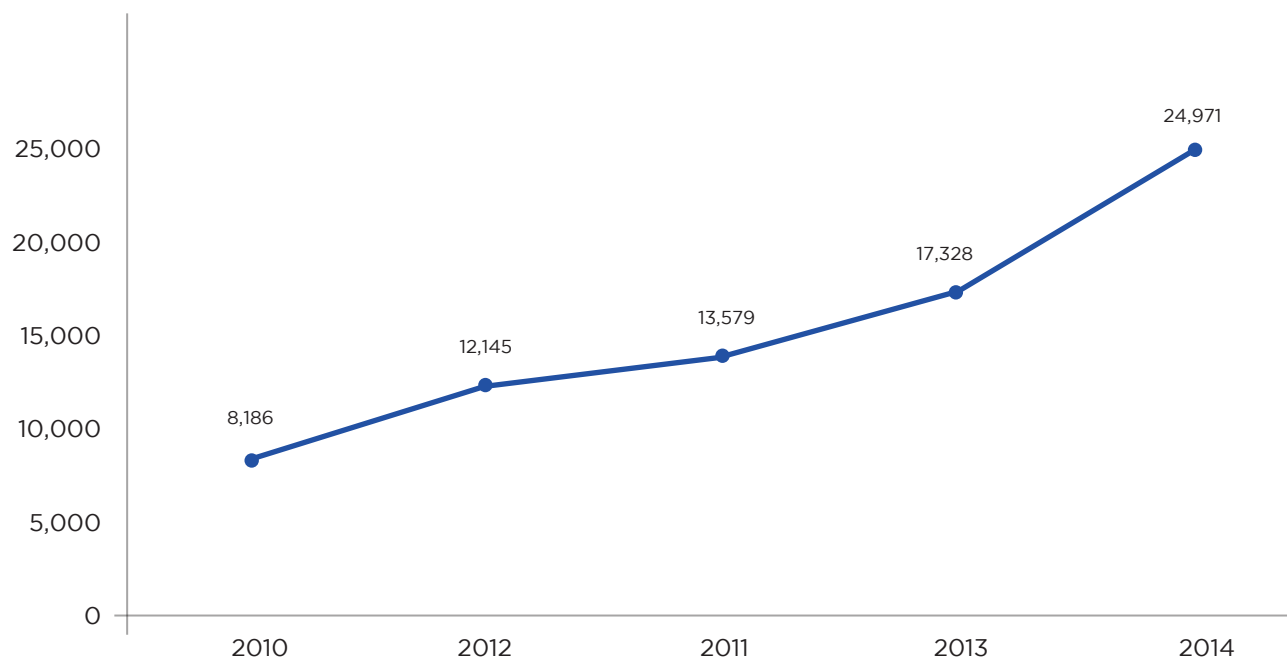


Data: Burning Glass Technologies
Analysis: Workforce Intelligence Networks

Vehicle Operators

Vehicle Operator Job Postings Over Time

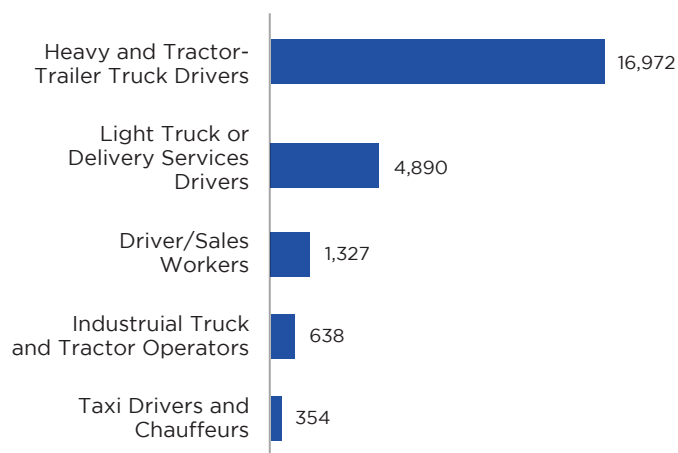
(Michigan 2010 - 2014)



Vehicle Operators job postings were dominated by employer demand for heavy and tractor-trailer truck drivers. Michigan employers posted 16,972 online job ads for these workers during 2014. The massive demand for these workers outpaced demand for the next top occupations by more than three times. Employers posted 4,890 ads for light truck or delivery services drivers in 2014, and demand was also high for Vehicle Operators in industry as well as private transportation, such as taxi drivers and chauffeurs.

Vehicle Operator Job Postings

(Michigan 2014)



Data: Burning Glass Technologies

Analysis: Workforce Intelligence Networks



Planning

The Planning occupational cluster is the smallest transportation safety cluster in Michigan, employing 83,091 workers, or almost 15 percent of the state's related workforce. Occupations in the Planning cluster contribute to the transportation safety goal of improved roadway design. The burden of creating safer roadways is placed on engineers and designers in urban planning and civil engineering, as well as on construction workers. WIN researchers designated 21 occupations that fall into either the Urban Planners & Civil Engineers or Construction Workers sub-groups.

Overview

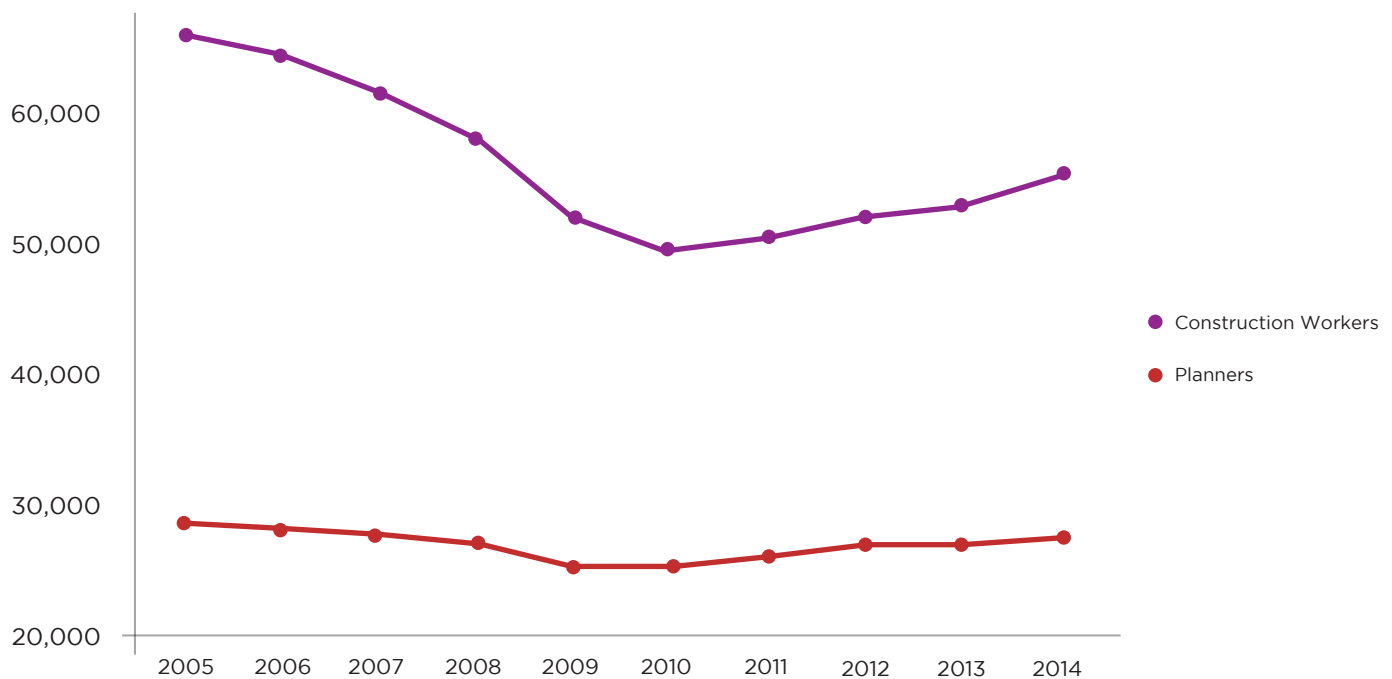
The Planning occupational cluster is the smallest of the transportation safety-related clusters in Michigan, in terms of employment, with just over 83,000 workers. The two occupational sub-groups in this cluster, Construction Workers and Urban Planners & Civil Engineers, were affected differently by economic recession.

Urban Planning & Civil Engineers are the smallest transportation safety occupational sub-group in Michigan. The almost 28,000 workers in this sub-group make up about 5 percent of the state's related workforce. Although the group is small, employment for Urban Planners & Civil Engineers has remained stable at about 28,000 workers during the last decade, even through the period of economic recession.

On the other hand, Construction Workers were hit hard by the recession. There were over 65,000 Construction Workers in Michigan in 2005 and that number dipped below 50,000 in 2010. While employment in many other transportation safety occupational sub-groups has largely returned to pre-recession levels, only 55,244 Michigan workers were employed in the Construction sub-group in 2014.

Construction occupations are often attainable with a high school diploma and require moderate on-the-job training. Entry-level (10th percentile) wages are low, but workers can earn \$38,000 a year at the median. Wages are better for Urban Planning & Civil Engineering occupations. Planners & Civil Engineers can earn above what is considered a living wage (\$15 per hour) as entry-level workers, and median incomes for these occupations are above \$55,000 a year, comparable to regional median incomes.

Planning Employment (Michigan, 2005 - 2014)



Planning Cluster, Wages and Education

Occupation Sub-Group	Typical Entry-Level Hourly Wage	Median Hourly Wage	Median Annual Salary	Typical Education for Entry-Level	Work Experience Required	Typical Training in Addition to degree
Construction Workers	\$12.40	\$18.30	\$38,059	High School Diploma	None	Moderate On-the-Job Training
Planners	\$17.56	\$27.09	\$56,338	Bachelor's degree	None	Moderate On-the-Job Training

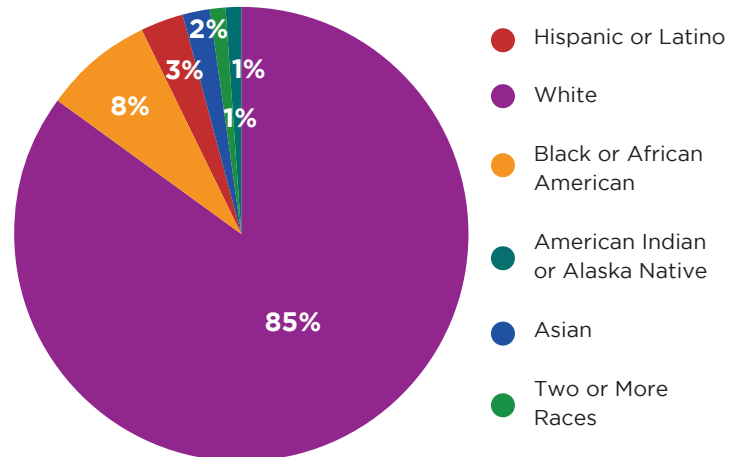
Data: Economic Modeling Specialists, Intl., BLS
Analysis: Workforce Intelligence Networks

Planning Workforce Demographics

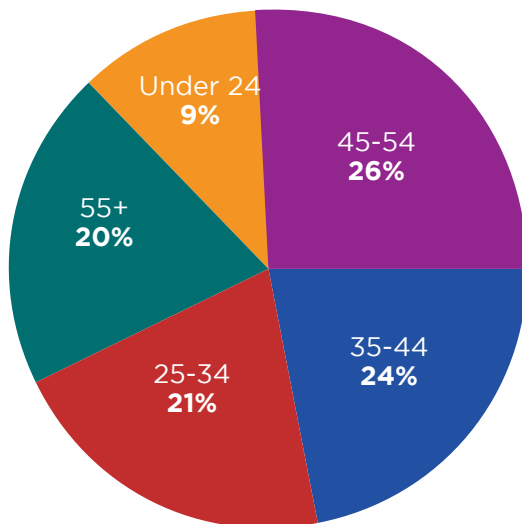
The racial and ethnic breakdown of the transportation safety Planning cluster is comparable to the overall Michigan workforce, with 85 percent white workers, 8 percent black, and other racial categories similarly represented. As in the other transportation safety occupation clusters, female workers are underrepresented in the Planning cluster. Just 12 percent of the workers in this group are female, while females make up 49 percent of the Michigan workforce overall.

Much like the other clusters analyzed and the total Michigan workforce, 20 percent of Planning cluster workers in the state are over the age of 55 and set to retire in the next decade. This opens up employment opportunities for young workers in Urban Planning & Civil Engineering occupations or as Construction Workers.

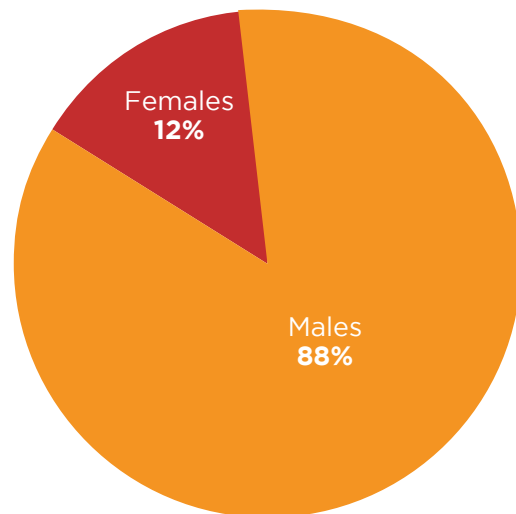
Planning Cluster Worker Race/Ethnicity



Planning Cluster Worker Age Cohorts



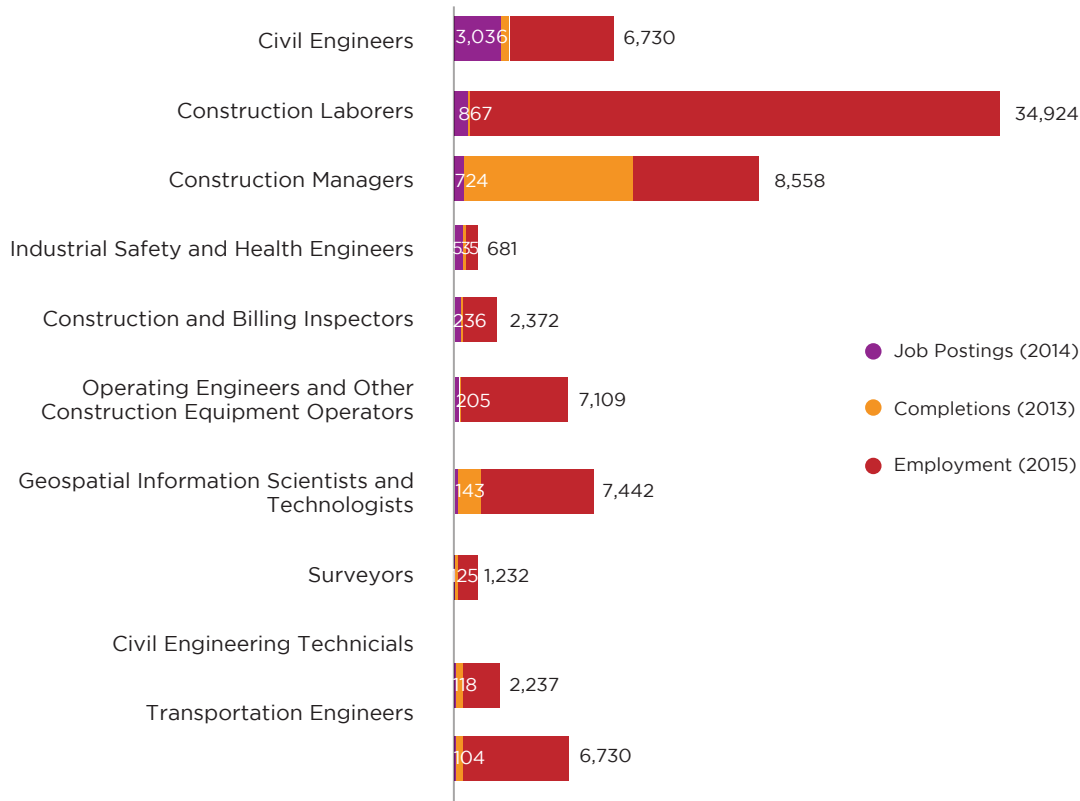
Planning Cluster Worker Gender



Data: EMSI
Analysis: Workforce Intelligence Networks

Supply & Demand

Planning Cluster Supply-Demand (Michigan)



Comparing online job postings to related degree and certificate completions and employment by occupation helps bring employer demand into perspective. Workers in the two Planning sub-groups, Urban Planning & Civil Engineering and Construction Workers, accounted for 15 percent of the total transportation safety-related employment in Michigan. The 6,564 postings in this cluster during 2014 were just 7 percent of related postings, but represent a growing share of transportation safety employer demand. This is evident when examining supply and demand at the occupation level.

The growing demand for Planning cluster occupations was exemplified by the supply and demand of civil engineers in Michigan. During 2014, there were approximately 6,700 civil engineers employed in the state, yet employers still posted over 3,000 online job ads for these workers. This high level of posting could signal that employment in this occupation is set to grow in the future. However, completions data show that less than 500 students graduated with degrees applicable to a career in civil engineering in 2013. As demand for workers in the Planning cluster, especially in the Urban Planning & Civil Engineering sub-group, continues to grow, students should be counseled to pursue the necessary education and training. In the meantime, employers must import workers from other states and even other countries to fill immediate talent needs.

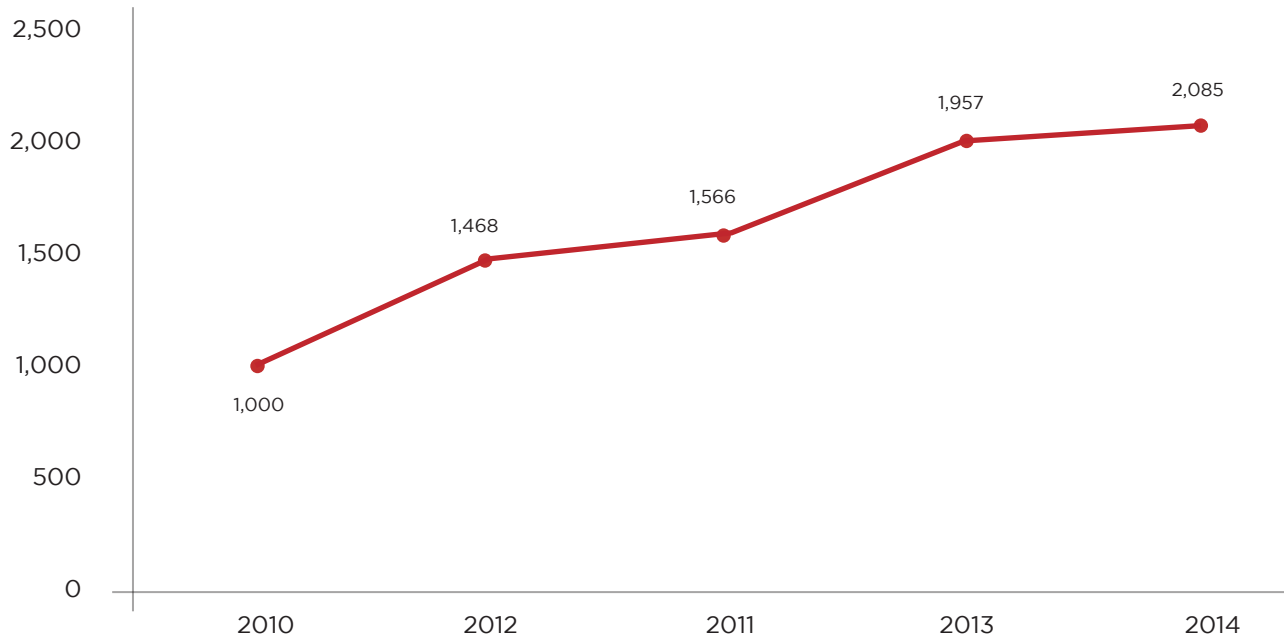
Data: EMSI, Burning Glass

Analysis: Workforce Intelligence Networks

Construction Workers

Construction Workers Job Postings Over Time

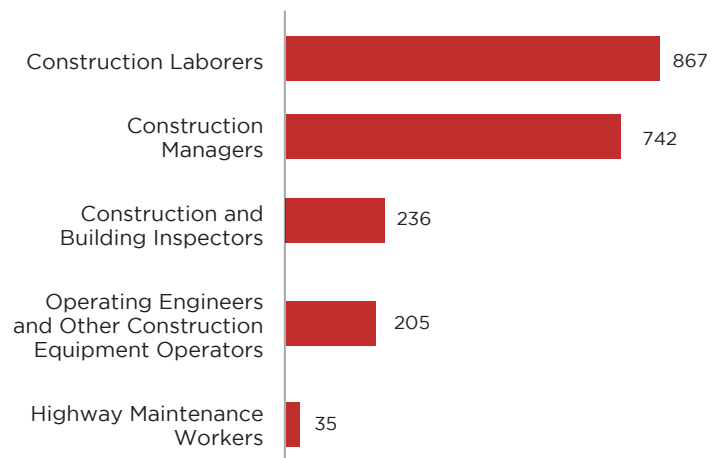
(Michigan 2010 - 2014)



While employment in the Construction sub-group fell dramatically during the recession and has not recovered like some other transportation safety areas, employer demand for these workers is slowly and steadily increasing. Michigan employers posted 2,085 online job ads for construction laborers, construction managers, construction and building inspectors, and related occupations during 2014. This level of postings represents a more-than doubling over the 1,000 online postings in the state during 2010. Construction workers still only represent 2 percent of transportation safety-related employer demand.

Top Construction Worker Job Postings

(Michigan 2014)

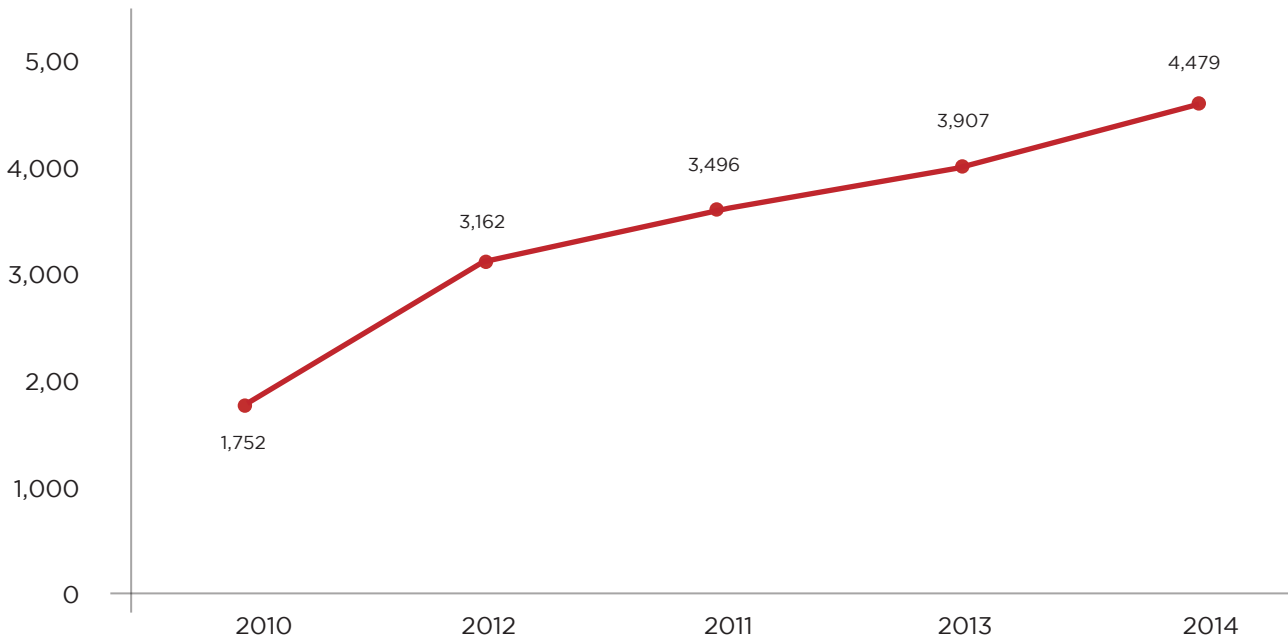


Data: Burning Glass Technologies
Analysis: Workforce Intelligence Networks

Urban Planners & Civil Engineers

Planner Job Postings Over Time

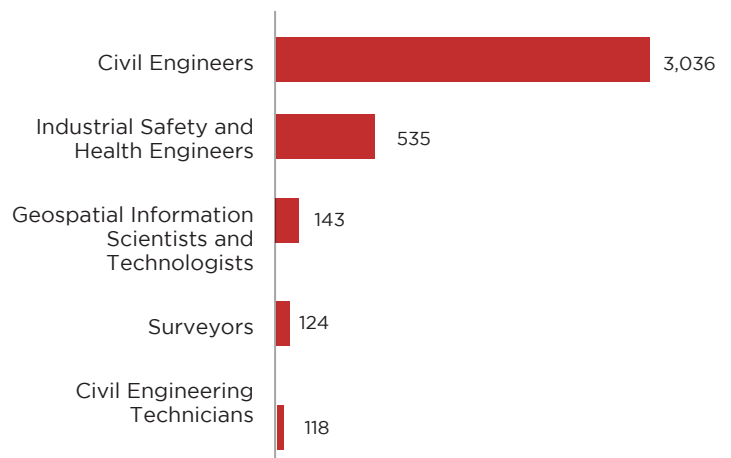
(Michigan 2010 - 2014)



Michigan employers posted 4,479 online job ads in the Urban Planning & Civil Engineering occupation subgroup in 2014. Demand for workers with knowledge in areas such as roadway design or traffic planning has increased year over year since 2010. Postings for civil engineers drove this trend during 2014 with 3,036 ads, almost 6 times as many as postings for the second most in-demand Civil Engineering & Planning occupation, industrial health and safety specialists.

Top Planner Job Postings

(Michigan 2014)



Data: Burning Glass Technologies
Analysis: Workforce Intelligence Networks

About the partners

Workforce Intelligence Network for Southeast Michigan *win-semich.org*

WIN is a partnership of ten community colleges and six Michigan Works! Agencies in Southeast Michigan. Southeast Michigan Community Alliance (SEMCA), a 501(c) 3, is WIN's fiduciary. WIN's mission is to cultivate a talent system dedicated to helping employers find the talent they need for success. WIN was launched in May 2011, with funding from the New Economy Initiative, a partnership of 10 foundations. WIN specializes in high-quality, advanced talent analysis and fostering collaboration among talent partners, including workforce development, community colleges, four-year postsecondary institutions, K-12 schools, economic development organizations, government, community based organizations, employers, and others. WIN manages data-driven cluster strategies in the areas of advanced manufacturing, information technology, and defense, and works with over 100 major employers and dozens of talent partners through its cluster initiatives.

WIN has unique expertise related to talent, including federal and state policy, innovative practice, and the economics of education and workforce. WIN's team is comprised of individuals with expertise in labor market data, industry sectors, strategic career pathways, career awareness and readiness, communications, collaboration, facilitation, and resource development. Together, WIN's experience in data-driven solutions, partner engagement and collaboration, and expertise in consulting, ensure that talent partners and their supporters have the tools needed to support Michigan's growing economy.

Advancing Transportation Leadership and Safety *atlas-center.org*

The Center for Advancing Transportation Leadership and Safety (ATLAS Center) is a Tier 1 University Transportation Center led by the University of Michigan Transportation Research Institute (UMTRI) in collaboration with the Texas A&M Transportation Institute (TTI). The Center is a nationally recognized leader in research, education/workforce development, and technology transfer dedicated to finding and promoting integrated solutions for transportation safety. The Center uses a multidisciplinary, systems approach to advance knowledge in critical areas of transportation safety, with faculty from engineering, behavioral science, logistics, urban planning, economics, public health, medicine, and other disciplines.

This research was supported by ATLAS Center. The ATLAS Center is supported by a grant from the U.S. Department of Transportation, Office of the Assistant Secretary for Research and Transportation, University Transportation Centers (UTC) Program (DTRT13-G-UTC54).

Michigan Academy for Green Mobility Alliance *migreenmobility.org*

In response to the rapid growth in the renewable energy sector, the Workforce Development Agency, State of Michigan collaborated with automotive manufacturing employers and educational institutions to establish the Michigan Academy for Green Mobility Alliance (MAGMA).

Automotive manufacturers and their suppliers are in need of engineering and technical talent to support hybrid and electric vehicle design and manufacturing. The existing workforce within automotive manufacturers and their suppliers also require updated skills to effectively operate within the emerging electrified vehicle environment. The purpose of MAGMA is to ensure the automotive industry has the trained workers they need to grow and prosper in the emerging green economy. In response to industry's requirements, education and training institutions support MAGMA by developing learning opportunities that are targeted, innovative, flexible, and have a strong focus on hands-on practical experience.

