

**National Transportation Career Pathways Initiative
Transportation Operations Discipline
Occupation Survey Summary**

Respondents

34 responses

Organization	Focus Area
Ryder Mississippi State University Titan Transfer, Inc. Schneider Employment Network Development IMC Companies	Freight Operations – 4 states
Maricopa County DOT City of Phoenix Street Transportation Dept. City of Mesa WSP USA WSDOT Delaware Valley Regional Planning Commission Arizona Department of Transportation Maryland Dept. of Transportation State Highway Administration MDOT SHA, Office of CHART & ITS Development Gannett Fleming, Inc. The Ohio Department of Transportation City of Overland Park, Public Works Maricopa County DOT ITE Kentucky Transportation Center Kentucky Transportation Center Metropolitan Transportation Commission Michigan Department of Transportation Kentucky Transportation Center Nevada Dept. of Transportation CA Dept. of Transportation Wisconsin DOT Southwestern Pennsylvania Commission North Carolina Department of Transportation Arizona Department of Transportation Monte Vista Associates, LLC	Traffic Operations – 16 states
OnTrack Group of Tennessee	Transit Operations

Industry experience:

- 60% more than 15 years experience
- 27% 10-15 years experience
- 13% 0-10 years experience

Traffic Operations

Priority: Critical Function	Priority: Number of Workers Needed	Priority: Difficulty in Recruiting/Retaining
Traffic Program Managers (5.7)	Traffic Signal / Maintenance Technicians (4.8)	Traffic Program Managers (5.1)
Traffic Incident Managers (4.5)	ITS Technicians (4.7)	ITS Technicians (5.1)
ITS Technicians (4.1)	Traffic Program Managers (4.2)	Traffic Signal / Maintenance Technicians (4.5)
Traffic Program Planners (3.6)	Traffic Incident Managers (4.2)	Traffic Incident Managers (4.5)
Traffic Signal / Maintenance Technicians (3.8)	Civil Engineers (4.1)	Traffic Program Planners (3.7)
Civil Engineers (3.7)	Traffic Program Planners (3.3)	Civil Engineers (2.9)
Field Safety / Service Operators (2.9)	Field Safety / Service Operators (3.3)	Field Safety / Service Operators (2.4)

(weighted average importance)

Describe the education/training and skillset requirements for the top 2-3 traffic operations occupations that are most critical to the function of your agency.

Systems Engineering Data Management and Analysis

Civil Engineers need to have AA or BA. PE, masters and background in traffic operations preferred. ITS Techs preferred to have BA and broad background in network, desktop, equipment, etc. Most training is OJT or adhoc as it can be found.

Knowledge of TSMO, ITS, and Traffic Incident Management from both a management and planning perspective.

Typically groom our people through training, etc. Having background is important, but having passion and drive is paramount.

Four year degree, one year of experience, special certifications/licenses

HS diploma/some college/degreed applicants. FCC Radio technician license Sensitive electronics equipment troubleshooting/repair. AC/DC electricity code and application. RF (LMR/Microwave/cellular) troubleshooting/repair

Logic skills, ability to communicate and present, understanding of performance management, ability to handle frequent changes in work scope.

Data analysis, network management, incident management

Degree in Transportation, Degree in IT areas, Traffic signal operations - signal timing development, Intelligent Transportation Systems (System Software Development, data analytics, LAN, WAN, System Maintenance), Incident Management Certifications, IMSA certifications

critical thinking and problem solving

Engineering, analytical skills, communication skills, technical understanding of technology and its applications.

Field integration experience. Finding a blend of experience with the traffic operations side of civil engineering with strong IT skills and practical experience with highway operations.

Transportation Engineering/Planning, Electrical Engineering, Field TIM experience, Organizational

Management, Leadership, TMC Tools & Techniques
A good understanding of how technology, data and systems interrelate to achieve a common goal of improving safety and mobility. These skills typically leverage database, data exchange, server and communications, IT security, electronics and electrical, software and hardware knowledge bases. Additionally, understanding of how these tools when paired with processes can be used to improve performance and resilience of the transportation network. These skills typically leverage understanding of performance management concepts and translation of data into performance measures.
Transportation planning, project management, writing, traffic engineering, contract management
Typically, an electrical background for the ITS and Signal technicians. I'm including the managers of ITS/Signals that need an electrical engineering or systems engineering background. Also not listed are the information technologies positions. Rarely do the IT and ITS knowledge exist in one candidate. In addition to these skills, finding candidates that understand traffic operations and planning for events/incidents is a skill set that has had to be taught in the world of operations. The closest to understanding this would be work zone traffic control engineers but typically engineers do not adjust well to the dynamic environment of operations.
Transportation and enforcement experience in a high volume, filled to capacity freeway is preferred. Command experience and program development.
Hands on experience managing traffic/systems, technical knowledge (electronic/software), traffic engineering principles
Electrical, communications, ITS
Transportation background related to Traffic Engineering and ITS
Have an understanding the traffic engineering, emergency management and traffic signals.

What is the most significant transportation operations workforce challenge faced by your organization? Please describe.
Finding a enough employees who in composite have the full set of skills in transportation operations: computer systems, systems engineering, data management and analysis, transportation operations, traffic engineering, transportation planning, etc.
The lack of recognition that traffic operations is a specific discipline (like structures, hydraulics, environmental, etc.) that requires specialized training and benefits from retaining individuals within the traffic organizations long term.
Prior experience in TSMO , ITS, Traffic Incident Management
FTE headcount cap. Competitive Compensation.
Ever increasing responsibilities with decline in available positions
Lack of comparable compensation package as compared to private sector. Pension and longevity less attractive to millennials when compared to salary and PTO
Availability of technical skilled workforce.
Civil engineers are not enough. We need engineering analysts and planners to help move towards an integrated TSMO environment.
Lack of operations staff trained in arterial operations. We either have to spend lot of effort in training. The universities, community colleges do not typically teach operations. The other challenge is cross-functional nature of the work and building a workforce across diverse functions - signal operations, IT, incident management etc.
not enough money
Understanding of what traffic operations is, and specific pre-employment education programs tailored to the unique blend of skills needed.
Increasing workload and programs with limited ability to expand the workforce. There also very few candidates out there with specialized experience when positions become available.
Changing the culture from an emphasis on designing and building roadways to managing them. Building

an understanding that **integrated corridors need to go hand-in-hand with integrated incident response.**

Organizational and cultural acceptance of the traffic and transportation operations business line can preclude access to qualified personnel. It is often viewed as a niche business line, rather than a baseline safety-focused service.

being able to provide a **competitive salary** in order to keep quality people

Funding and clearly understood and defensible return on investment data. Due to this the staffing is low for management level positions that have Traffic Operations experience. Electrical engineers that know how to get out in the field to **diagnose and can also manage** a program are very rare in our org.

Turnover and leadership

Experienced, qualified staff

Controller issues

Technology, connected vehicle and automated vehicle deployment

Many of the people do not have the skill sets, most at this time is from experience. **Education needs to understand the industry.**

Are there any other traffic operations occupations that were not included on our list of priorities that you think should have been included? If so, please describe the occupation and why it should be a priority consideration.

System Engineering Data Management and Operations Computer systems

Electrical Engineers. Many of our ITS project/network design would benefit from this knowledge set. Project Managers - Many of our projects do not necessarily need to be managed by a civil engineer. **Dedicated Workforce Development/Training Staff** - Traffic Ops is so specialized it cannot rely on general agency training to fulfill all of its training considerations/needs.

Computer scientists. System Engineering.

Training/Safety position. Continual training to internal and external customers with safety oversight is critical.

Suggest including **Data analytics** and management function. Currently and in the future the agencies will be managing and processing variety of data sets. The connected vehicles will be needing infrastructure messages and also providing BSMs. The whole area of data processing and warehousing will grow.

I believe they were covered for our organization. We generally have several positions that handle more than one of the given occupations due to limited staff.

Traffic Management Teams (CMS trucks, advance warning)

I would represent civil engineers more broadly to include **traffic engineers**. I believe **IT** plays a huge role (and growing) in the traffic operations realm and should be represented here somehow.

See answer above. **IT professionals and Systems engineers.**

Project managers for ITS, software developers

Freight Operations

Priority: Critical Function	Priority: Number of Workers Needed	Priority: Difficulty in Recruiting/Retaining
Commercial Drivers (8.0)	Commercial Drivers (8.0)	Commercial Drivers (8.0)
Diesel Mechanics / Diesel Shop Technicians (5.0)	Transportation Planners (6.2)	Diesel Mechanics / Diesel Shop Technicians (6.5)
Transportation Planners (4.8)	Diesel Mechanics / Diesel Shop Technicians (5.8)	Transportation Planners (5.6)
Project and Program Managers (4.4)	Project and Program Managers (4.2)	Operations Research / Modeling Analyst (3.3)
Operations Research / Modeling Analyst (4.0)	Industrial Engineers (3.7)	Project and Program Managers (3.0)
Industrial Engineers (3.5)	Operations Research / Modeling Analyst (3.5)	Data Science Analysts / Logisticians (3.0)
Data Science Analysts / Logisticians (3.3)	Data Science Analysts / Logisticians (3.0)	Service Assurance Advisors (2.2)
Service Assurance Advisors (3.0)	Service Assurance Advisors (2.2)	Industrial Engineers (2.0)

(weighted average importance)

Describe the education/training and skillset requirements for the top 2-3 freight operations occupations that are most important for your agency.

General vocational degrees are for labor and skill positions and engineering degrees are needed for the engineers. Less skillsets but more training required for the vocational positions. Typical IE skillsets expected of the engineers upon entry into the company.

High school education with possible secondary. College is not necessary in the most needed fields.

Permit for CDL CDL Skill Training

CDL; Analytics Knowledge; SQL; open source coding

What is the most significant transportation operations workforce challenge faced by your organization? Please describe.

Driver Shortage; ELD and HOS restrictions

The inability to attract, engage, and retain vocational labor for front line positions and skillsets. Turnover ranging anywhere between 70% to 200% at the more undesirable positions and the amount of money spent each year in training new hires that may quit the job after their very first shift at worst and are unlikely to stay more than a year at best.

Recruiting and retaining **commercial drivers**. Competition is very difficult between transportation companies. No real longevity or dedication between driver and company, because the driver can go to work elsewhere at any time.

Shortage of **CDL**

Recruiting and Retention of **Drivers**. Finding and recruiting Project/Program managers and other technical resources that have experience in the transportation industry

Are there any other freight operations occupations that were not included on our list of priorities that you think should have been included? If so, please describe the occupation and why it is a priority consideration.

Dev. ops capabilities; drone programing; AI programmer/technician

Operators for heavy equipment (i.e. fork lift and lift trucks) and material handlers of all kinds (pickers, putters, or functions associated with general asset tracking management)