October 2020
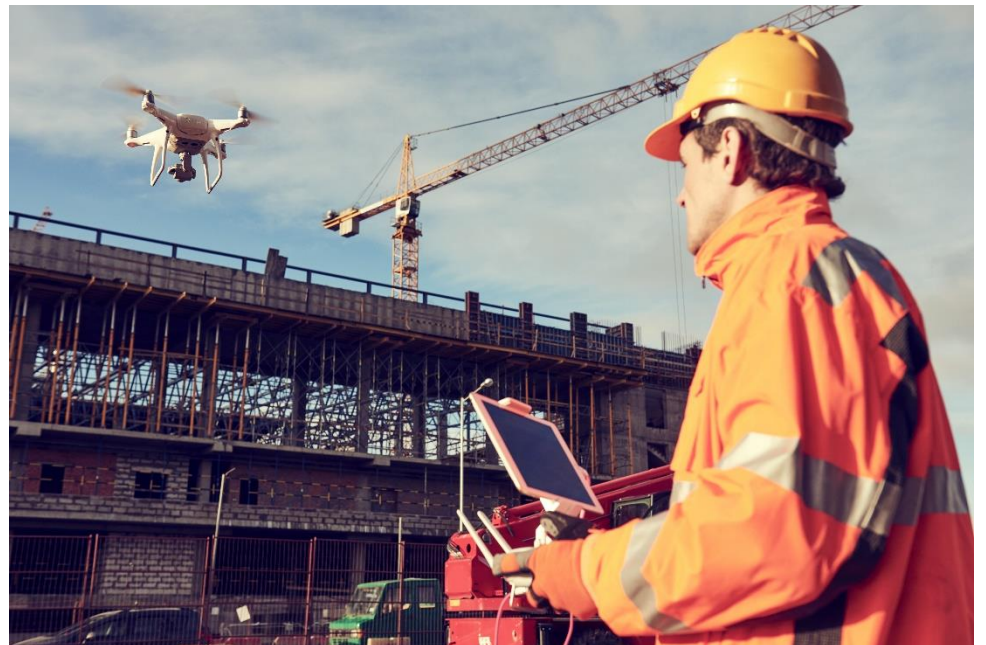
Labor Market Analysis

Drones

Prepared by the Central Valley/Mother Lode Center of Excellence

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COVID-19 Statement: This report includes employment projection data by EMSI. EMSI's projections are modeled on recorded (historical) employment figures and incorporate several underlying assumptions, including the assumption that the economy during the projection period will be at approximately full employment or potential output. To the extent that a recession or labor shock, such as the economic effects of COVID-19, can cause long-term structural change, they may impact the projections. At this time, it is not possible to quantify the impact of COVID-19 on projections of industry and occupational employment. Other measures such as unemployment rates and monthly industry employment estimates will reflect the most recent information on employment and jobs in the state and, in combination with input from local employers, may help validate current and future employment needs as depicted here.

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Summary

Please note the COVID-19 statement on page 2 when considering this report's findings.

This study conducted by the Central Valley/Mother Lode Center of Excellence examines labor market demand, wages, skills, and postsecondary supply for drones. Two occupations related to drones were identified for Merced College:

- 53-2012, Commercial Pilots
- 53-2011, Airline Pilots, Copilots, and Flight Engineers

Key findings:

- **Occupational demand —** Nearly 230 workers were employed in jobs related to drones in 2019 in the North Central Valley/Northern Mother Lode (NCV/NML) subregion. The largest occupation is commercial pilots with 144 workers in 2019, a projected growth rate of 10% over the next five years, and 19 annual openings.

- **Wages —** Airline pilots, copilots, and flight engineers earn the highest entry-level wages, $48.57/hour in the subregion and $48.05/hour in the region.

- **Employers —** Employers with the most job postings in the subregion are Air Methods, Northrop Grumman, and Cnic.

- **Occupational titles —** The most common occupational title in job postings in the subregion is commercial pilots. The most common job title is Pilot Ifr Rw - Rch.

- **Skills and certifications —** The top baseline skill is teamwork/collaboration, the top specialized skill is aviation regulations, and the top software skill is SAP. The most in-demand certification is security clearance.

- **Education —** A bachelor's degree is typically required for airline pilots, copilots, and flight engineers. A high school diploma or equivalent is typically required for commercial pilots.

- **Supply —** Analysis of postsecondary completions in the region shows that on average 10 awards were conferred in the Central Valley/Mother Lode region each year.

Based on a comparison of occupational demand and supply, there is an undersupply of 28 trained workers in the subregion and 110 workers in the region. The Center of Excellence recommends that Merced College work with the regional director, the college's advisory board, and local industry in the development of programs to address the shortage of drones workers in the region.

Introduction

The Central Valley/Mother Lode Center of Excellence was asked by Merced College to provide labor market information for drones. Review of the Taxonomy of Programs (TOP) and Classification of Instructional Programs (CIP) found the following programs are appropriate for this analysis:

- 095000 - Aeronautical and Aviation Technology

The geographical focus for this report is the North Central Valley/Northern Mother Lode (NCV/NML) subregion, but regional demand and supply data has been included for broader applicability and use. The average living wage for a single adult in the North Central Valley/Northern Mother Lode (NCV/NML) subregion is $10.27/hour.[1] Analysis of the program and occupational data related to drones resulted in the identification of applicable occupations. The Standard Occupational Classification (SOC) System codes and titles used in this report are:

- 53-2012, Commercial Pilots
- 53-2011, Airline Pilots, Copilots, and Flight Engineers

The occupational titles, job descriptions, sample job titles, and knowledge and skills from the Bureau of Labor Statistics and O*NET OnLine are shown below.

Commercial Pilots
Job Description: Pilot and navigate the flight of fixed-winged aircraft on nonscheduled air carrier routes, or helicopters. Requires Commercial Pilot certificate. Includes charter pilots with similar certification, and air ambulance and air tour pilots.
Knowledge: Transportation, Customer and Personal Service, Geography, English Language, Public Safety and Security
Skills: Operation and Control, Operation Monitoring, Critical Thinking, Monitoring, Active Listening

Airline Pilots, Copilots, and Flight Engineers
Job Description: Pilot and navigate the flight of fixed-wing, multi-engine aircraft, usually on scheduled air carrier routes, for the transport of passengers and cargo. Requires Federal Air Transport Pilot certificate and rating for specific aircraft type used. Includes regional, National, and international airline pilots and flight instructors of airline pilots.
Knowledge: Transportation, Geography, Mathematics, English Language, Computers and Electronics
Skills: Operation and Control, Operation Monitoring, Active Listening, Critical Thinking, Monitoring

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[1] The term "living wage" in Center of Excellence reports is calculated by averaging the self-sufficiency wages from the Insight Center's California Family Needs Calculator for each county in the subregion: https://insightcced.org/tools-metrics/self-sufficiency-standard-tool-for-california/.

Occupational Demand

The North Central Valley/Northern Mother Lode subregion employed 225 workers in drone occupations in 2019 (Exhibit 1). The largest occupation is commercial pilots with 144 workers in 2019. This occupation is projected to grow by 10% over the next five years and has the greatest number of projected annual openings, 19.

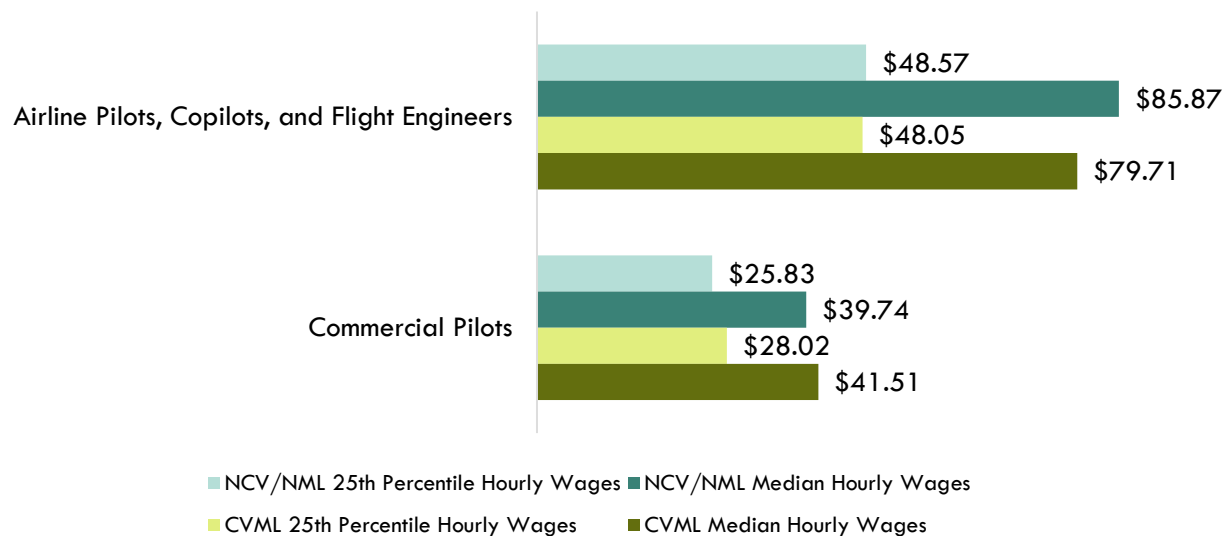**Exhibit 1. Drone employment and occupational projections in the NCV/NML subregion**

Occupation	2019 Jobs	2024 Jobs	5-Year Change	5-Year % Change	Annual Openings
Commercial Pilots	144	158	14	10%	19
Airline Pilots, Copilots, and Flight Engineers	82	87	5	6%	10
TOTAL	**225**	**245**	**20**	**9%**	**28**

Wages

Exhibit 2 compares the entry-level and experienced wages of the drone occupations.
Airline pilots, copilots, and flight engineers earn the highest entry-level wages, $48.57/hour in the subregion and $48.05/hour in the region.

Exhibit 2. Entry-level and experienced wage comparison in the NCV/NML subregion and region

Airline Pilots, Copilots, and Flight Engineers
- $48.57
- $85.87
- $48.05
- $79.71

Commercial Pilots
- $25.83
- $39.74
- $28.02
- $41.51

■ NCV/NML 25th Percentile Hourly Wages ■ NCV/NML Median Hourly Wages
■ CVML 25th Percentile Hourly Wages ■ CVML Median Hourly Wages

Job Postings

There were 111 job postings for the two occupations in the NCV/NML subregion from October 2019 to September 2020.[2] The employers with the most job postings are listed in Exhibit 3.

Exhibit 3. Top employers of drone occupations by number of job postings

Employer	Job Postings	% Job Postings
Air Methods	17	16%
Northrop Grumman	9	9%
Cnic	7	7%
Air Medical Group Holdings	5	5%
Reach Medical Holdings, Llc	5	5%
Federal Aviation Administration	4	4%
Flight Level Aviation	4	4%
Reach Air Medical	4	4%
Reach Medical Holdings	4	4%
Berry Aviation	3	3%

Exhibit 4 shows how job postings for the targeted occupations in the NCV/NML subregion are distributed across two O*NET OnLine occupations. The occupational title commercial pilots is listed in 88 job postings. Note how a higher proportion of job postings are for this occupational title. Common job titles in postings include Pilot Ifr Rw – Rch in 11 job postings, Pilot Rotor in eight job postings, and Airplane Pilot in six job postings.

Exhibit 4. Top occupational titles in job postings for drones

Occupational Title	Job Postings	% of Job Postings
Commercial Pilots	88	79%
Airline Pilots, Copilots, and Flight Engineers	23	21%

Salaries

Exhibit 5 shows the "Market Salaries" for drone occupations that are calculated by Burning Glass which uses a machine learning model built off of millions of job postings every year, and accounts for adjustments based on locations, industry, skills, experience, education requirements, among other variables.

Exhibit 5. Salaries for drones

Market Salary Percentile	Salary Amount
10th Percentile	$39,268
25th Percentile	$50,497
50th Percentile	$68,718
75th Percentile	$86,129
90th Percentile	$104,781

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[2] Other than occupation titles and job titles, the categories below can be counted one or multiple times per job posting, and across several areas in a single posting. For example, a skill can be counted in two different skill types, and an employer can indicate more than one education level.

Education

Of the 111 job postings, 51 listed an education level preferred for the positions being filled. Among those, 84% requested a bachelor's degree, 49% requested an associate degree, and 25% requested high school or vocational training (Exhibit 6). A job posting can indicate more than one education level; hence, the percentages shown in the chart below total more than 100%.

Exhibit 6. Education levels requested in job postings for drone occupations

Education level	Job Postings	% of Job Postings
Bachelor's degree	43	84%
Associate degree	25	49%
High school or vocational training	13	25%
Doctoral degree	6	12%
Master's degree	4	8%

Baseline and Specialized Skills

Exhibit 7 depicts the top baseline and specialized skills for the targeted occupations. The three most important baseline skills are teamwork/collaboration, 35% of job postings, communication, 33%, and building effective relationships, 22%. The top three specialized skills are aviation regulations, 35% of job postings, federal aviation regulations, 35%, and flight training, 34%.
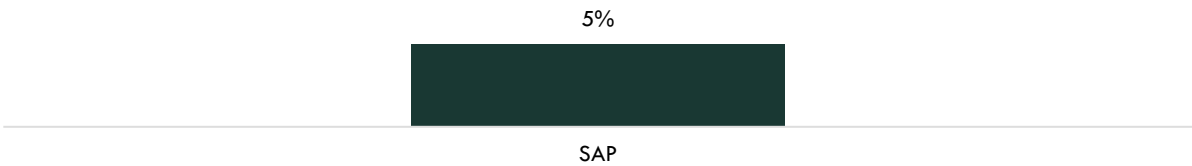
Exhibit 7. In-demand drone baseline and specialized skills
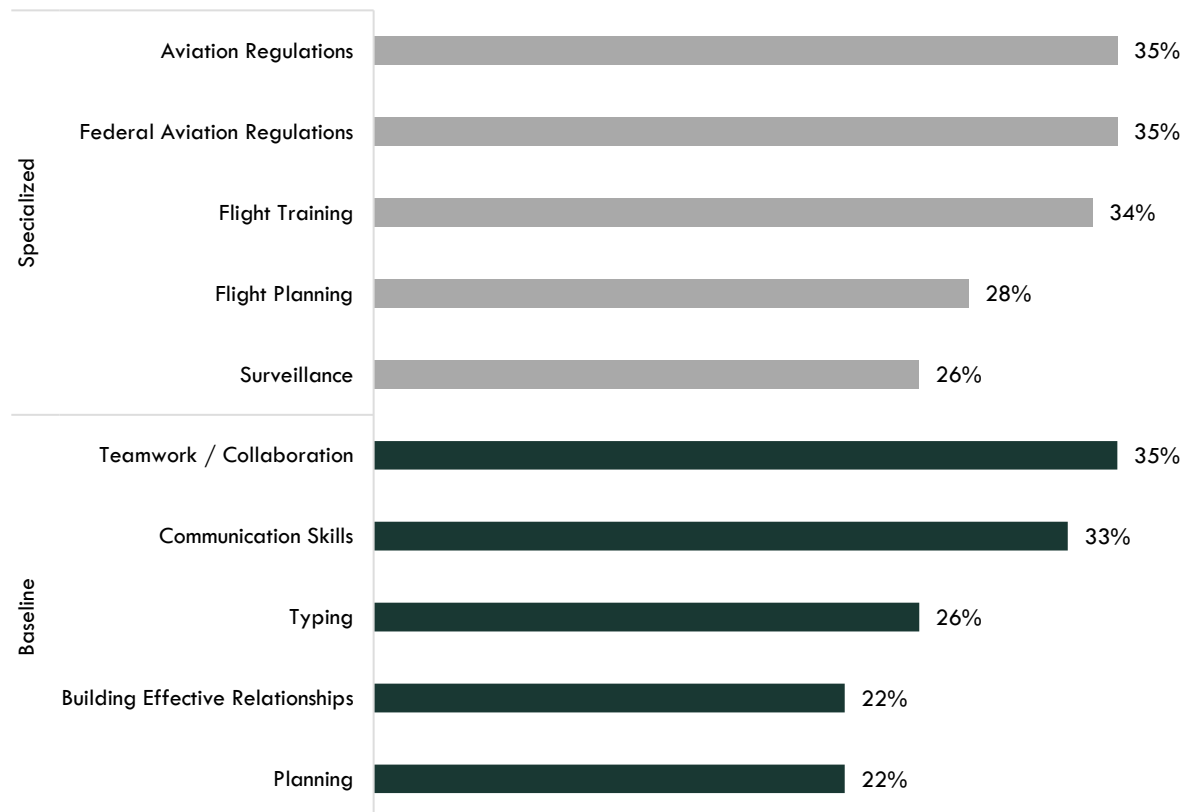
Software Skills

Analysis also included the software skills most in demand by employers. SAP was the only software skill identified in the job postings (Exhibit 8).

Exhibit 8. In-demand drone software skills

Certifications

Of the 111 job postings, 48 contained certification data. Among those, 63% indicated a need for security clearance. The next top certifications are driver's license and Airline Transport Pilot License (Exhibit 9). (Due to the low number of job postings with certifications listed, the chart below may not be representative of the full sample.)

Exhibit 9. Top drone certifications requested in job postings
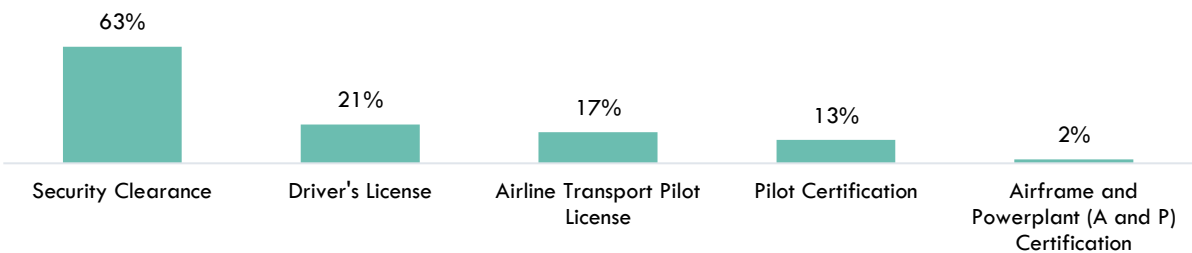
Education, Work Experience & Training

A bachelor's degree is typically required for airline pilots, copilots, and flight engineers (Exhibit 10). A high school diploma or equivalent is typically required for commercial pilots. In addition, the Federal Aviation Administration requires all drone operators to have a remote pilot certification.

Exhibit 10. Education, work experience, training, and Current Population Survey results for drone occupations[3]

Occupation	Typical Entry-level Education	Work Experience Required	Typical On-The-Job Training	CPS
Airline Pilots, Copilots, and Flight Engineers	Bachelor's degree	Less than 5 years	Moderate-term	20.6%
Commercial Pilots	High school diploma or equivalent	None	Moderate-term	20.6%

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[3] "Labor Force Statistics from the Current Population Survey," Bureau of Labor Statistics, https://www.bls.gov/cps/.

Supply

Analysis of program data from the California Community Colleges Chancellor's Office Data Mart included the TOP code: 095000 - Aeronautical and Aviation Technology. Analysis of the last three years of TOP code data shows that, on average, 10 awards were conferred in the Central Valley/Mother Lode region each year (Exhibit 11).
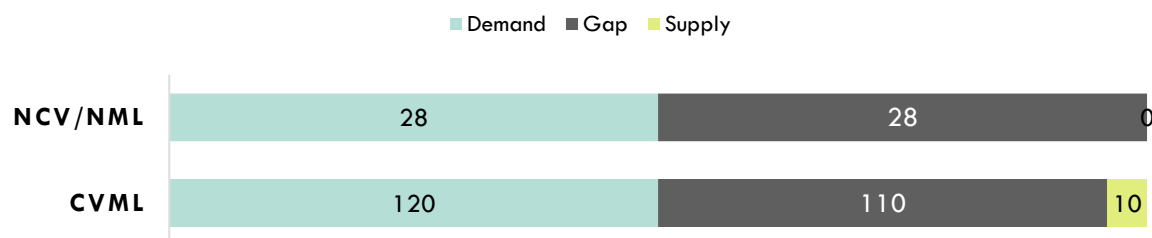
Exhibit 11. Postsecondary supply for drone occupations in the region

TOP Title-Code	College	Associate Degree	Certificate 60+ units	Subtotal
095000 - Aeronautical and Aviation Technology	Reedley College	3	6	9
	Sequoias	0		0
TOTAL		**3**	**6**	**10**

Gap Analysis

There is an undersupply of 28 drones workers in the NCV/NML subregion and 110 workers in the region (Exhibit 12).

Exhibit 12. Drone workforce annual demand and supply in the NCV/NML subregion and region

Legend: ■ Demand ■ Gap ■ Supply

NCV/NML: Demand 28, Gap 28, Supply 0
CVML: Demand 120, Gap 110, Supply 10

Student Outcomes

Exhibit 13 summarizes employment and wage outcomes from the California Community College Chancellor's Cal-PASS Plus LaunchBoard for the TOP code related to drones. Twenty-three aeronautical and aviation technology students received a degree, certificate, or attained apprenticeship journey status, 45% reported a median change in earnings, and 68% attained a living wage.

Exhibit 13. Regional metrics for the TOP code related to drones

Metric	Aeronautical and Aviation Technology-095000
Students Who Got a Degree or Certificate or Attained Apprenticeship Journey Status	23
Number of Students Who Transferred	*
Job Closely Related to Field of Study	*
Median Change in Earnings	45%
Attained a Living Wage	68%
* denotes data not available.	

Conclusion

The entry-level wages of the two occupations exceed the NCV/NML subregion's average living wage. There were 111 job postings in the past 12 months for occupations related to drones in the subregion. Analysis of skills and certification requirements in job postings indicates:

- The top baseline skill is teamwork/collaboration, and the top specialized skill is aviation regulations.

- The top software skill is SAP.

- The top certification is security clearance.

There is an undersupply of trained workers, a shortage of 28 in the NCV/NML subregion and 110 in the region.

Recommendation

Based on these findings, it is recommended that Merced College work with the regional director, the college's advisory board, and local industry in the development of programs to address the shortage of drones in the region.

Appendix A: Methodology & Data Sources

Data Sources

Labor market and educational supply data compiled in this report derive from a variety of sources. Data were drawn from external sources, including the Economic Modeling Specialists, Inc., the California Community Colleges Chancellor's Office Management Information Systems Data Mart and the National Center for Educational Statistics (NCES) Integrated Postsecondary Education Data System (IPEDS). Below is the summary of the data sources found in this study.

Data Type	Source
Labor Market Information/Population Estimates and Projections/Educational Attainment	Economic Modeling Specialists, Intl. (EMSI). EMSI occupational employment data are based on final EMSI industry data and final EMSI staffing patterns. Wage estimates are based on Occupational Employment Statistics (QCEW and Non-QCEW Employees classes of worker) and the American Community Survey (Self-Employed and Extended Proprietors). Occupational wage estimates also affected by county-level EMSI earnings by industry: economicmodeling.com.
Typical Education Level and On-the-job Training	Bureau of Labor Statistics (BLS) uses a system to assign categories for entry-level education and typical on-the-job training to each occupation for which BLS publishes projections data: https://www.bls.gov/emp/tables/educational-attainment.htm.
Labor Force, Employment and Unemployment Estimates	California Employment Development Department, Labor Market Information Division: labormarketinfo.edd.ca.gov.
Job Posting and Skills Data	Burning Glass: burning-glass.com/.
Additional Education Requirements/ Employer Preferences	The O*NET Job Zone database includes over 900 occupations as well as information on skills, abilities, knowledge, work activities and interests associated with specific occupations: onetonline.org.

Key Terms and Concepts

Annual Job Openings: Annual openings are calculated by dividing the number of years in the projection period by total job openings.

Education Attainment Level: The highest education attainment level of workers age 25 years or older.

Employment Estimate: The total number of workers currently employed.

Employment Projections: Projections of employment are calculated by a proprietary Economic Modeling Specialists, Intl. (EMSI) formula that includes historical employment and economic indicators along with national, state and local trends.

Living Wage: The cost of living in a specific community or region for one adult and no children. The cost increases with the addition of children.

Occupation: An occupation is a grouping of job titles that have a similar set of activities or tasks that employees perform.

Percent Change: Rate of growth or decline in the occupation for the projected period; this does not factor in replacement openings.

Replacements: Estimate of job openings resulting from workers retiring or otherwise permanently leaving an occupation. Workers entering an occupation often need training. These replacement needs, added to job openings due to growth, may be used to assess the minimum number of workers who will need to be trained for an occupation.

Total Job Openings (New + Replacements): Sum of projected growth (new jobs) and replacement needs. When an occupation is expected to lose jobs, or retain the current employment level, number of openings will equal replacements.

Typical Education Requirement: represents the typical education level most workers need to enter an occupation.

Typical On-The-Job Training: indicates the typical on-the-job training needed to attain competency in the skills needed in the occupation.