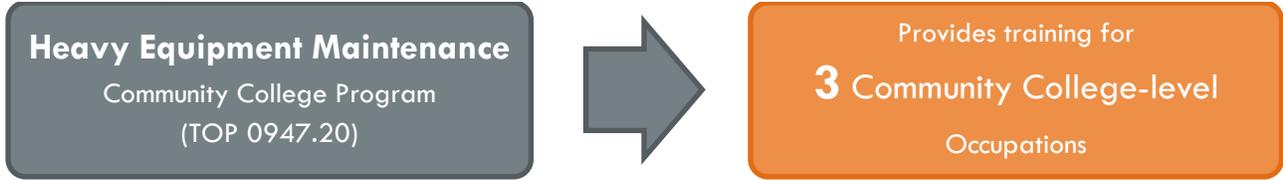


Hydraulic Systems for Mobile Equipment

Inland Empire/Desert Region (Riverside and San Bernardino counties)

Summary



Over the next five years (2021-2026), employment for hydraulic systems occupations is projected to



The Inland Empire/Desert Centers of Excellence

 **Recommends**

Heavy Equipment Maintenance Program Development to meet the need for more workers in the region

Introduction

This report provides labor market occupational demand and wage research and postsecondary program outcomes related to hydraulic systems for mobile equipment. Hydraulic systems use fluid under pressure to drive machinery or move mechanical components.¹ Mobile equipment with hydraulic systems are used in construction, transportation, agricultural, and forestry machinery.²

The California Community College program closely related to employment repairing and maintaining hydraulic systems in mobile equipment is the heavy equipment maintenance program (TOP 0947.20). Heavy equipment maintenance programs provide instruction related to the maintenance, repair, and overhaul of

¹ <https://skybrary.aero/articles/hydraulic-systems#:~:text=Definition,machinery%20or%20move%20mechanical%20components>.

² <https://www.rheintacho.de/en/applications/mobile-hydraulics/>

heavy equipment (Taxonomy of Programs, 2012). The knowledge, skills, and abilities trained by heavy equipment maintenance programs lead to the following occupations, further referred to as the hydraulic systems occupational group.

- Automotive Service Technicians and Mechanics (SOC 49-3023)
- Mobile Heavy Equipment Mechanics, Except Engines (49-3042)
- Recreational Vehicle Service Technicians (49-3092)

It is important to note that the three hydraulic systems occupations listed above repair and maintain hydraulic systems on mobile equipment as a skill or task. The use of hydraulic systems skills is highly dependent on the industries and employers hiring these workers; some employees may use these skills daily while others rarely use them. For example, employment counts and projections for all automotive services technicians are included, whether they perform work on hydraulic systems or not. As a result, job demand for hydraulic systems occupations may be overstated in traditional labor market data. Please see additional notes on occupation skills and tasks in the Appendix section of this report. We examine demand specifically for hydraulic systems workers in a job advertisement search later in this report.

In 2021, there were 13,973 jobs related to the hydraulic systems occupational group in the region. Employment for the hydraulic systems occupational group is projected to increase by 5% through 2026; 1,562 job openings are projected annually. Exhibit 1 displays the job counts, five-year projected job growth, job openings, and the share of incumbent workers aged 55 years and older in the region.

Exhibit 1: Five-year projections for the hydraulic systems occupational group, Inland Empire/Desert Region, 2021-2026

Occupation	2021 Jobs	2026 Jobs	5-Yr % Change	5-Yr Openings (New + Replacement Jobs)	Annual Openings (New + Replacement Jobs)	% of workers age 55+
Automotive Service Technicians and Mechanics	11,565	12,129	5%	6,367	1,273	19%
Mobile Heavy Equipment Mechanics, Except Engines	2,133	2,330	9%	1,279	256	27%
Recreation Vehicle Service Technicians	276	282	2%	166	33	20%
Total	13,973	14,741	5%	7,811	1,562	20%

Source: Lightcast 2022.3

An online job advertisement (ad) search for hydraulic systems jobs was conducted to reveal the employers seeking these workers, including the time it takes to fill positions, earnings information, and in-demand skills. Using a keyword filter, job ads were limited to those that specifically mentioned a desire for workers

experienced with or knowledgeable of hydraulics systems. Over the last twelve months, 1,212 total job ads were posted for the occupations in the hydraulic systems occupational group; approximately 12% of employer job ads (150 ads) sought workers with hydraulic systems knowledge or experience.

Exhibit 2 shows the number of job ads posted during the last twelve months and the regional and statewide average time to fill this job. On average, employers in the local region fill online job ads for the hydraulic systems occupational group in 36 days, one day longer than the statewide average. Time to fill information indicates that employers in the region likely face similar challenges filling open positions as other employers in California.

Exhibit 2: Job ads and time to fill, Inland Empire/Desert Region, August 2021 through July 2022

Occupation	Job Ads	Regional Average Time to Fill (Days)	Statewide Average Time to Fill (Days)
Automotive Service Technicians and Mechanics	88	36	35
Mobile Heavy Equipment Mechanics, Except Engines	62	37	35
Recreation Vehicle Service Technicians	0	-	37
Total	150	36	35

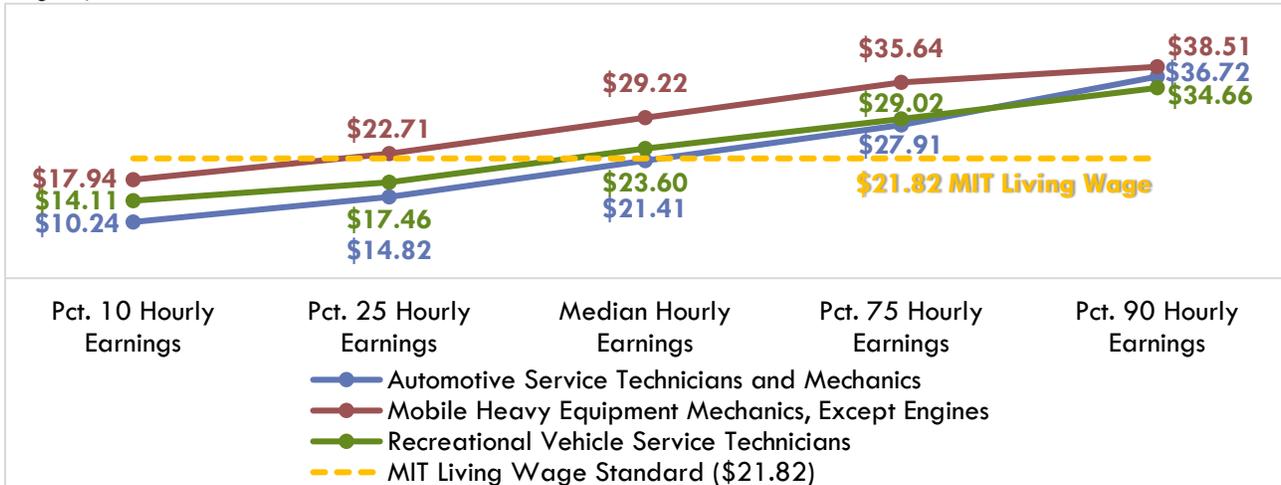
Source: Burning Glass – Labor Insights

Earnings and Benefits

Community colleges should ensure their training programs lead to employment opportunities that provide a living wage. The MIT living wage calculator estimates that an individual must earn \$21.82 per hour or \$45,386 annually in California (Glasmeier, 2022).

Exhibit 3 displays the hourly earnings for the hydraulic systems occupational group. The median hourly earnings for mobile heavy equipment mechanics, except engines and recreational vehicle service technicians are above the living wage standard. The hourly earnings for automotive service technicians and mechanics and maintenance and repair workers, general do not surpass the living wage standard until the 75th percentile, indicating that only the top 25% of workers earn a living wage.

Exhibit 3: Hourly earnings by percentile for the hydraulic systems occupational group, Inland Empire/Desert Region, 2021



Source: Lightcast 2022.3

Benefits information, provided in the occupational guides developed by the California Labor Market Information Division, reveals that employers typically provide workers in the hydraulic systems occupational group with health insurance, paid holidays, and vacation. Benefits information is not available for mobile heavy equipment mechanics, except engines (Detailed Occupational Guides, 2022).

Advertised Salary from Online Job Ads

Exhibit 4 displays online job ad salary data for the hydraulic systems occupational group over the last 12 months. Online job ad salary information reveals that employers are willing to pay the hydraulic systems occupational group an average of \$59,000 annually, above the region's \$45,386 annual (\$21.82 hourly) living wage standard. Consider the salary information with caution since only 35% (53 out of 150) of online job ads for these occupations provided salary information. The salary figures are prorated to reflect full-time, annual wage status.

Exhibit 4: Advertised salary information, Inland Empire/Desert Region, August 2021 through July 2022



Source: Burning Glass – Labor Insights

Job Titles, Employers, Skills, Education, and Work Experience

Exhibit 5 displays the job titles most frequently included in ads for the hydraulic systems occupational group during the last 12 months. Displaying employer names provides insight into where students may find employment after completing a program. The most frequently requested job title over the previous 12 months was fleet mechanic.

Exhibit 5: Employers posting the most job ads for the hydraulic systems occupational group, Inland Empire/Desert Region, August 2021 through July 2022

Top Job Titles	Job Ads
Fleet Mechanic	21
Heavy Equipment Mechanic	16
Automotive Mechanic	7
Mechanic	6
Heavy Equipment Technician	5
All other job titles	95
Total	150

Source: Burning Glass – Labor Insights

Exhibit 6 displays the employers that posted the most job ads during the last 12 months. Displaying employer names provides insight into where students may find employment after completing a program. United Road posted the most job ads for the hydraulic systems occupational group.

Exhibit 6: Employers posting the most job ads for the hydraulic systems occupational group, Inland Empire/Desert Region, August 2021 through July 2022

Top Employers	Job Ads
United Road	21
Riverside County	12
Edison International	9
Waste Management	6
Western Pacific Crane and Equipment	4
All other job titles	98
Total	150

Source: Burning Glass – Labor Insights

Exhibit 7 lists a sample of specialized and employability skills employers seek when looking for workers to fill positions in the hydraulic systems occupational group. Specialized skills are occupation-specific skills that employers request for industry or job competency. Employability skills are foundational skills that transcend industries and occupations; this category is often referred to as "soft skills." The skills requested in job ads may be utilized to guide curriculum development.

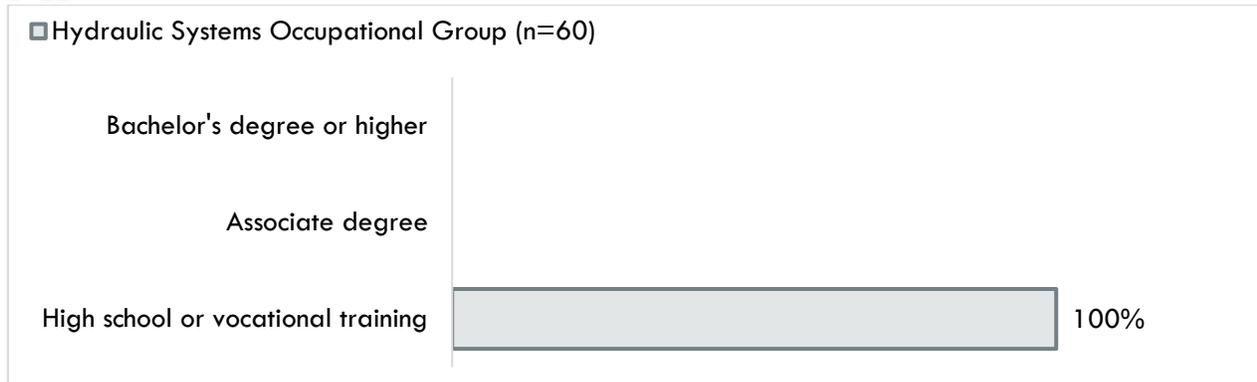
Exhibit 7: Sample of in-demand skills from employer job ads, Inland Empire/Desert Region, August 2021 through July 2022

Specialized skills (n=150)	Employability skills
Repair	Troubleshooting
Welding	Physical Abilities
Predictive/Preventative Maintenance	Computer Literacy
Heavy Equipment	Communication Skills
Electrical Systems	Writing
Hydraulics	Teamwork/Collaboration

Source: Burning Glass – Labor Insights

Exhibit 8 displays the minimum advertised education requirements for the hydraulic systems occupational group. All the job ads for the hydraulic systems occupational group sought candidates with a high school diploma or vocational training.

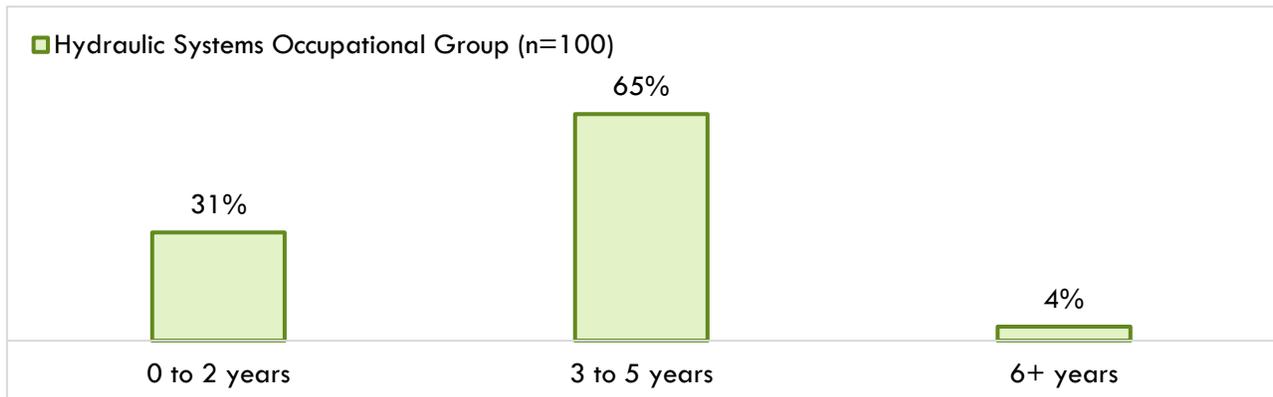
Exhibit 8: Minimum advertised education requirements, Inland Empire/Desert Region, August 2021 through July 2022



Source: Burning Glass – Labor Insights

Exhibit 9 displays the work experience typically required to enter each occupation and the real-time work experience requirements from employer job ads. Approximately 65% of employers sought hydraulic systems workers with three to five years of previous work experience.

Exhibit 9: Work experience required and real-time work experience requirements, Inland Empire/Desert Region, August 2021 through July 2022



Source: Burning Glass – Labor Insights

Student Completions and Programs Outcomes

Regional community colleges do not currently offer heavy equipment maintenance programs (0947.20). Other postsecondary educational institutions in the region have not issued awards in programs related to heavy equipment maintenance.

Students seeking hydraulics system employment in a manufacturing setting may prefer training from an industrial systems technology and maintenance program (0945.00). In industrial systems technology and maintenance programs, students learn the design, construction, maintenance, and operation of mechanical, hydraulic, pneumatic, and electrical equipment and related systems, such as production machinery. These programs include building and plant maintenance (Taxonomy of Programs, 2012). While community college industrial systems technology and maintenance programs may equip students with skills related to heavy equipment maintenance, none of the regional programs provide instruction specific to hydraulic systems for mobile equipment.

Chaffey College's mechatronics programs (0935.00) include courses such as hydraulics fundamentals and electrical control of hydraulic systems that may prepare students for hydraulic systems employment in an industrial setting. Over the last three academic years (2018-21), Chaffey's mechatronics programs issued an annual average of one award. None of the mechatronics courses offered provide hydraulic systems for mobile equipment training.

Summary of Findings

The knowledge, skills, and abilities trained by heavy equipment maintenance programs (TOP 0947.20) lead to three distinct occupations, collectively referred to as the hydraulic systems occupational group. The hydraulic systems occupational group is expected to have 1,562 annual job openings and increase employment by 5% over the next five years. Demand for hydraulic systems workers alone may be overstated

in traditional labor market data because these workers may work on hydraulic systems daily or rarely, depending on the hiring employer's industry specialty.

The median hourly earnings for mobile heavy equipment mechanics, except engines and recreational vehicle service technicians are above the living wage standard (\$21.82 per hour). The hourly earnings for automotive service technicians and mechanics do not surpass the living wage standard until the 75th percentile, indicating that only the top 25% of workers earn a living wage.

Over the last twelve months, approximately 16% (601 ads) of the total 3,857 total ads for the hydraulic systems occupational group sought workers with hydraulic systems knowledge or experience. Online job ad salary information reveals that employers are willing to pay workers in the hydraulic systems occupational group between \$57,000 and \$69,000 annually, above the region's \$45,386 annual (\$21.82 hourly) living wage standard.

Regional community colleges do not currently offer heavy equipment maintenance programs (TOP 0947.20). Other postsecondary education institutions in the region have not issued awards related to hydraulic systems over the last three academic years (2018-21). In the previous three academic years, Chaffey's mechatronics programs, which contain courses related to hydraulic systems, issued an annual average of one award.

The Centers of Excellence recommends developing programs related to hydraulic systems to meet the demand for these workers in the region. Colleges considering this program should have a strong partnership with the appropriate employers to document their demand for workers and the skills needed for students to work in this field shortly after exiting the program.

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References

Burning Glass Technologies. (2022). *Labor Insights/Jobs*. Retrieved from <https://www.burning-glass.com/>

California Community Colleges Chancellor's Office. (2022). *Chancellor's Office Curriculum Inventory (COCI), version 3.0*. Retrieved from <https://coci2.ccctechcenter.org/programs>

California Community Colleges Chancellor's Office Management Information Systems (MIS) Data Mart. (2022). *Data Mart*. Retrieved from <https://datamart.cccco.edu/datamart.aspx>

California Community Colleges Chancellor's Office, Curriculum and Instructional Unit, Academic Affairs Division. (2012). *Taxonomy of Programs, 6th Edition, Corrected Version*. Retrieved from <https://www.cccco.edu/-/media/CCCCO-Website/About-Us/Divisions/Digital-Innovation-and-Infrastructure/Research/Files/TOPmanual6200909corrected12513.ashx?la=en&hash=94C709CA83C0380828415579395A5F536736C7C1>

Carnevale, A. P., Jayasundera, T., & Repnikov, D. (n.d.). Understanding Online Job Ads Data. Retrieved from <https://cew.georgetown.edu/wp-content/uploads/2014/11/OCLM.Tech.Web.pdf>

Glasmeyer, A. K. (2022). Massachusetts Institute of Technology. Living Wage Calculator. *Living Wage Calculation for California*. Retrieved from <https://livingwage.mit.edu/states/06>

Labor Market Information Division. Employment Development Department of California. (2022). *Detailed Occupational Guides*. Retrieved from <https://www.labormarketinfo.edd.ca.gov/OccGuides/Search.aspx>

Lightcast. (2022). *Datarun 2022.3*. Retrieved from <https://www.economicmodeling.com/>

National Center for O*NET Development. (2022). O*NET OnLine. Retrieved from <https://www.onetonline.org/>

Appendix: Occupation definitions, sample job titles, five-year projections, and earnings for hydraulic systems occupations

Occupation Definitions (SOC code), Education and Training Requirement, Community College Education Attainment

Automotive Service Technicians and Mechanics (49-3023)

Diagnose, adjust, repair, or overhaul automotive vehicles.

Sample job titles: Automobile Mechanic (Auto Mechanic), Automotive Drivability Technician (Auto Drivability Tech), Automotive Mechanic (Auto Mechanic), Automotive Service Technician (Auto Service Tech), Heavy Line Technician, Lube Technician, Master Automotive Technician (Master Auto Tech), Mechanic, Quick Service Technician (Quick Service Tech), Service Technician (Service Tech)

Entry-Level Educational Requirement: Postsecondary nondegree award

Training Requirement: Less than one month on-the-job training

Work Experience: None

Incumbent workers with a Community College Award or Some Postsecondary Coursework: 36%

Mobile Heavy Equipment Mechanics, Except Engines (49-3042)

Diagnose, adjust, repair, or overhaul mobile mechanical, hydraulic, and pneumatic equipment, such as cranes, bulldozers, graders, and conveyors, used in construction, logging, and mining.

Sample job titles: Construction Equipment Mechanic, Equipment Mechanic, Equipment Technician, Field Mechanic, Field Service Technician, Field Technician, Heavy Equipment Mechanic, Heavy Equipment Technician, Mechanic, Mobile Heavy Equipment Mechanic

Entry-Level Educational Requirement: High school diploma or equivalent

Training Requirement: More than twelve months on-the-job training

Work Experience: None

Incumbent workers with a Community College Award or Some Postsecondary Coursework: 37%

Recreational Vehicle Service Technicians (49-3092)

Diagnose, inspect, adjust, repair, or overhaul recreational vehicles including travel trailers. May specialize in maintaining gas, electrical, hydraulic, plumbing, or chassis/towing systems as well as repairing generators, appliances, and interior components. Includes workers who perform customized van conversions.

Sample job titles: Hitch Technician, Master Certified RV Technician (Master Certified Recreational Vehicle Technician), Mobile Service RV Technician (Mobile Service Recreational Vehicle Technician), RV Body Mechanic (Recreational Vehicle Body Mechanic), RV Repair Technician (Recreational Vehicle Repair Technician), RV Service Technician (Recreational Vehicle Service Technician), RV Technician (Recreational Vehicle Technician), RVDA Master Certified RV Technician (Recreational Vehicle Dealer Association Master Certified Recreational Vehicle Technician), Service Technician

Entry-Level Educational Requirement: High school diploma or equivalent

Training Requirement: More than twelve months on-the-job training

Work Experience: None

Incumbent workers with a Community College Award or Some Postsecondary Coursework: 26%

Appendix: Occupation specialties, skills, and tasks

Hydraulic systems skills and tasks are highly dependent on the industries and employers hiring these types of workers; some employees may use these skills daily while others rarely or never use them. Traditional labor market information quantifies the types of occupations that utilize specific skills and tasks but does not quantify how often workers use the skill or task or how many more workers need this skill or task. For example, employment counts and projections for all automotive services technicians are included, whether they perform work on hydraulic systems or not. Due to the lack of clarity regarding hydraulic systems skills usage, traditional labor market information likely overstates demand for workers with hydraulic systems skills.

Appendix: Methodology

Job ad data is limited to the information provided by employers and the ability of artificial intelligence search engines to identify this information. Additionally, preliminary calculations by Georgetown Center on

Education and the Workforce found that "just 30 to 40 percent of openings for candidates with some college or an associate degree, and only 40 to 60 percent of openings for high school diploma holders appear online" (Carnevale et al., 2014). Online job ads often do not reveal employers' hiring intentions; it is unknown if employers plan to hire one or multiple workers from a single online job ad or collecting resumes for future hiring needs. A closed job ad may not be the result of a hired worker.

Table 1. 2021 to 2026 job growth, wages, entry-level education, training, and work experience required for the hydraulic systems occupational group in the Inland Empire/Desert Region (Riverside and San Bernardino Counties combined)

Occupation (SOC)	2021 Jobs	5-Year Change	5-Year % Change	Annual Openings (New + Replacement Jobs)	Entry-Experienced Hourly Wage (10 th to 90 th percentile)	Median Hourly Wage (50 th percentile)	Average Annual Earnings	Entry-Level Education & On-The-Job-Training	Work Experience Required
Automotive Service Technicians and Mechanics (49-3023)	11,565	565	5%	1,273	\$10.24 to \$36.72	\$21.41	\$48,300	Postsecondary nondegree award & One month	None
Mobile Heavy Equipment Mechanics, Except Engines (49-3042)	2,133	197	9%	256	\$17.94 to \$38.51	\$29.22	\$62,800	High school diploma or equivalent & More than 12 months	None
Recreational Vehicle Service Technicians (49-3092)	276	7	2%	33	\$14.11 to \$34.66	\$23.60	\$52,000	High school diploma or equivalent & More than 12 months	None
Total	13,973	768	5%	1,562	-	-	-	-	-

Source: Lightcast 2022.3