



December 2018

# DOD DEPOT WORKFORCE

## Services Need to Assess the Effectiveness of Their Initiatives to Maintain Critical Skills

This report was revised on December 26, 2018 to adjust the formatting of Appendix I on pages 31 to 47.

# GAO Highlights

Highlights of [GAO-19-51](#), a report to the Subcommittee on Readiness, Committee on Armed Services, House of Representatives

## Why GAO Did This Study

DOD employs over 80,000 civilian personnel at its 17 major maintenance depots to maintain weapon systems such as aircraft, combat vehicles, and ships. The depot workforce has unique skills, and the depots must compete with the private sector for qualified personnel. Increasing numbers of depot workers have been retiring, and the number eligible to retire is expected to increase. Because it takes 5 years or more to become proficient in some occupations, DOD must systematically plan and prepare to hire, train and retain the workforce it needs to support its vital maintenance and repair mission.

GAO was asked to review DOD's efforts to maintain critical skills at its maintenance depots. GAO examined (1) DOD's challenges in filling skilled occupations and maintaining critical skills in the depot workforce, and any potential effects of these challenges on maintenance activities and (2) actions DOD has taken to hire, train, and retain personnel with critical skills, including its efforts to determine the effectiveness of those actions. GAO analyzed personnel data from fiscal years 2013 through 2017, reviewed depot strategic plans, and met with depot officials responsible for developing initiatives to recruit and train depot personnel.

## What GAO Recommends

GAO recommends that the Army, Navy, Marine Corps, and Air Force assess the effectiveness of the actions they have taken to maintain critical skills in the depot workforce. The Department of Defense concurred with GAO's recommendations.

View [GAO-19-51](#). For more information, contact Diana Maurer at (202) 512-9627 or [maurerd@gao.gov](mailto:maurerd@gao.gov).

December 2018

## DOD DEPOT WORKFORCE

### Services Need to Assess the Effectiveness of Their Initiative to Maintain Critical Skills

## What GAO Found

The Department of Defense's 17 facilities that perform major depot-level maintenance on weapon systems, such as repairing tank engines or overhauling navy submarines, are generally able to fill occupations requiring personnel to possess certain critical skills ("skilled occupations"), such as machinery mechanic and sheet metal specialist. GAO's analysis of depot personnel data showed that most of the military services were generally able to fill skilled occupations to at least 80 percent of their authorization during fiscal years 2013 through 2017. According to Marine Corps officials, contractors are used to meet maintenance and repair workload requirements even when authorizations for skilled civilian workforce are not fully met.

However, the depots identified a variety of workforce challenges, such as hiring personnel in a timely manner and providing inexperienced personnel with the training necessary to become proficient in skilled occupations. According to DOD officials, these challenges contributed to delays in the maintenance of some weapon systems. DOD officials also identified weapon systems for which maintenance was delayed by shortages in skilled personnel. For example, at Pearl Harbor Naval Shipyard, two submarines were delayed approximately 23 and 20 months past their scheduled maintenance dates in part as a result of shortages in ship fitters and welders, among others. At Ogden Air Logistics Complex, shortages in avionics technicians delayed the maintenance of the F-16 aircraft, and shortages in low observable coater specialists delayed the maintenance of the F-22 aircraft.

Since 2008, all four military services have developed strategic plans that identify and address workforce challenges at the depots. However, some of these strategies are either outdated or have not been implemented. The service components told GAO that they plan to revise, update, and utilize them by the end of fiscal year 2019 at the latest. In the interim, the depots maintain their own planning processes and have taken a variety of actions to help maintain critical skills in their workforces, such as offering recruiting and hiring incentives to skilled workers, implementing training and apprenticeship programs and partnering with local vocational schools.

While the services have collected some data regarding these actions, the depots and the services do not know how effective they have been, because they have not assessed the results of these actions in helping the depots to hire, train, and retain skilled personnel—including determining whether the actions are cost effective. By assessing the cost and effectiveness of these actions, the services would be better able to identify the hiring, training, and retention actions that work, and identify those that are ineffective or cost prohibitive. This would allow them to better tailor their actions to ensure that the depots hire, train, and retain personnel for skilled occupations, and help ensure they are positioned to provide effective depot maintenance for DOD's weapon systems.

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## Abbreviations

|       |   |
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| ALC   | Air Force Air Logistics Complexes                 |
| DOD   | Department of Defense                             |
| FRC   | Navy Fleet Readiness Centers                      |
| MDMC  | Marine Depot Maintenance Command                  |
| STEM  | Science, technology, engineering, and mathematics |
| TACOM | Army Tank-automotive and Armaments Command        |

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December 14, 2018

The Honorable Joe Wilson  
Chairman  
The Honorable Madeleine Z. Bordallo  
Ranking Member  
Subcommittee on Readiness  
Committee on Armed Services  
United States House of Representatives

The Department of Defense (DOD) operates 21 primary government-owned facilities—maintenance depots, shipyards, fleet readiness centers, air logistics complexes, and production plants—across the United States. Of the 21 facilities, 17 perform complex depot-level activities; we refer to these as depots.<sup>1</sup> These depots perform maintenance on a wide range of vehicles and other military assets, including helicopters, combat vehicles, ships, aircraft, and engines. According to DOD, in fiscal year 2017, approximately 80,000 civilian personnel—including personnel in skilled occupations, such as machinists, technicians, and engineering technologists—performed maintenance at the 17 depots that perform complex depot-level activities. However, the depot workforce is aging and, according to depot officials, DOD faces challenges in hiring personnel with critical skills and ensuring that those retiring from skilled production jobs can be replaced in a timely manner. These workforce challenges may affect the department’s ability to meet future defense industrial activity and depot maintenance requirements.

You asked that we review DOD’s efforts to maintain critical skills at its depots. In response to this request, we examined (1) the extent to which DOD’s depots face challenges filling skilled occupations and maintaining critical skills in the depot workforce, and the effects of these challenges on maintenance activities; and (2) actions DOD has taken to hire, train, and retain personnel with critical skills and to maintain those skills in its depot workforce and the extent to which it has determined the

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<sup>1</sup>There are two levels of DOD maintenance: field level and depot level. Field-level maintenance includes organizational and intermediate maintenance and requires fewer skills, but it occurs more frequently. Depot-level maintenance occurs less frequently but requires greater skills. Depot-level maintenance ranges in complexity from daily system inspection, to rapid removal and replacement of components, to the complete overhaul or rebuild of a weapon system.

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effectiveness of those actions. In appendix I we provide information on the workforce challenges and the occupations requiring critical skills, among other things, for each of the 17 depots.

For our first objective, we analyzed data on DOD's depot workforce and met with officials from each of the services to identify the challenges the depots experience in hiring and training personnel for occupations that require certain critical skills and in retaining the personnel they have hired for these occupations. For the purposes of our report, we focused on occupations requiring skills that were identified by depot officials as (1) critical, or necessary, to accomplishing the department's current and future depot maintenance mission and goals, or (2) "hard to fill" because of challenges in hiring, training, or retention. These included occupations that are directly and indirectly responsible for the repair of weapon systems—including components, parts, end-items, and equipment. Each of the 17 depots provided us with information on the occupations it considers critical and hard to fill and information on the current and future workforce challenges that may contribute to delays in the maintenance of weapon systems. We also met with depot officials to understand the challenges they face in maintaining critical skills in their workforces. We obtained data from the military services and depots on the authorized and actual numbers of civilian personnel for occupations the depot identified as critical to current and planned depot maintenance activities. These data covered fiscal years 2013 through 2017.

For our second objective, we reviewed DOD's and the military services' depot maintenance strategic plans and collected information from DOD officials responsible for planning and managing recruitment and training initiatives at each of the 17 depots. To determine the extent to which the depot commands and the depots have assessed the effectiveness of actions they have taken to mitigate challenges to maintaining critical skills in the depot workforce, we conducted interviews with DOD officials responsible for workforce management at each of the depots to determine the extent to which the services have assessed the effectiveness of their recruiting, training, and retention initiatives. In addition, we compared the actions DOD officials told us the depots have taken to address workforce challenges to initiatives outlined in depot maintenance strategic plans and to information we obtained from the depots. Furthermore, we analyzed DOD human capital planning guidance and *Standards for Internal Control in the Federal Government* to determine the extent to which the depots were following this guidance

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during their assessment processes.<sup>2</sup> Appendix II provides further details on our scope and methodology.

We also conducted data reliability assessments on the data provided by each of the military services. To do this, we sent data reliability questionnaires to all four military services and to the depots they command. We reviewed each of the responses we received from the services and interviewed knowledgeable service officials to discuss the data. We concluded that all of the data we received from the depots and the services were sufficiently reliable for the purposes of our reporting objectives—except for the data from the Air Force and from Corpus Christi Army Depot, some of which was of undetermined reliability.

We conducted this performance audit from July 2017 to December 2018 in accordance with generally accepted government auditing standards. Those standards require that we plan and perform the audit to obtain sufficient, appropriate evidence to provide a reasonable basis for our findings and conclusions based on our audit objectives. We believe that the evidence obtained provides a reasonable basis for our findings and conclusions based on our audit objectives.

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## Background

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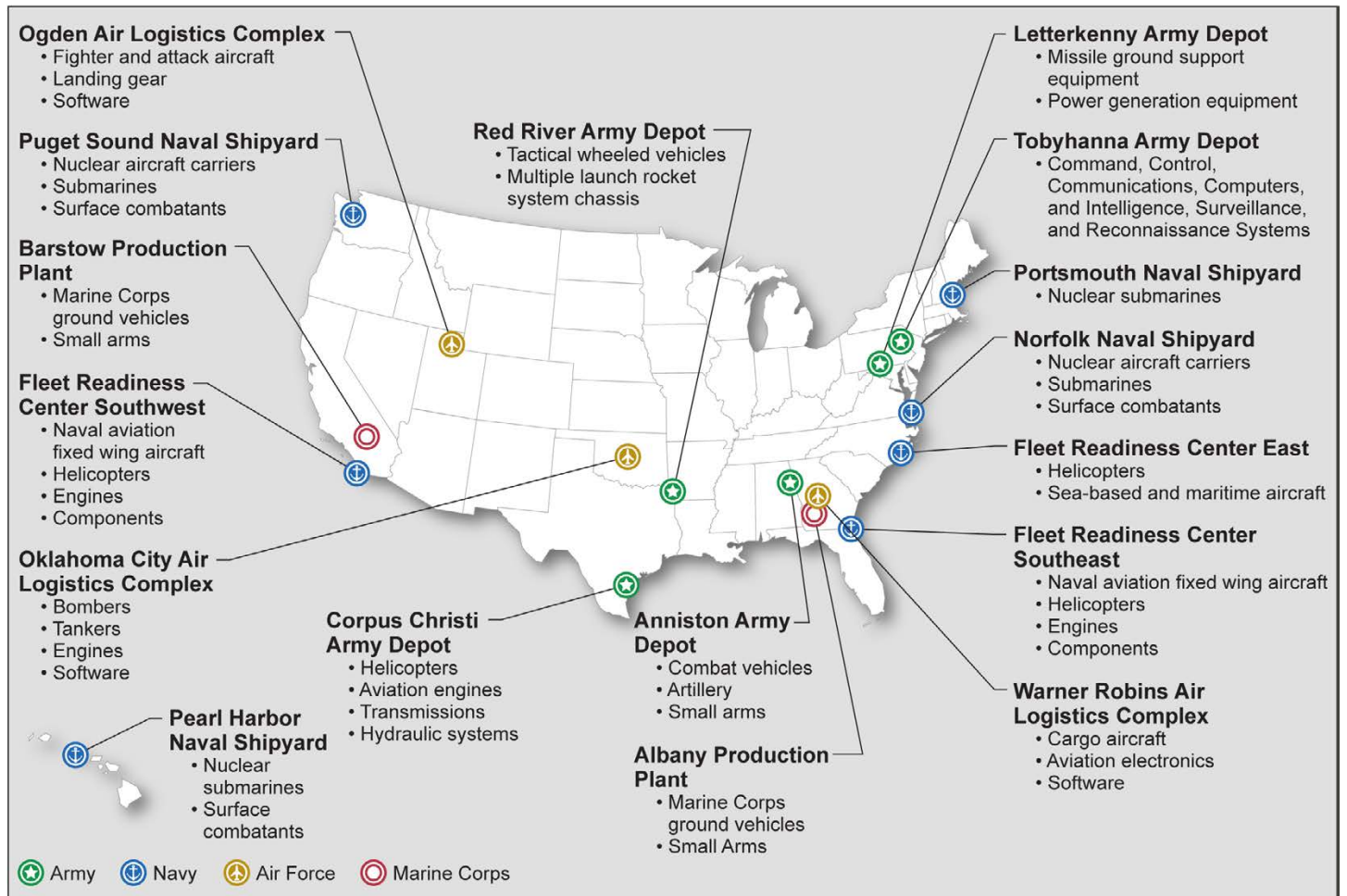
### DOD's Depots

The military services operate 17 primary government-owned maintenance facilities across the United States (see fig. 1)—including Anniston Army Depot at Anniston, Alabama; the Air Force's Air Logistic Complex at Ogden, Utah; Norfolk Naval Shipyard at Portsmouth, Virginia; and Marine Depot Maintenance Command at Albany, Georgia—that perform depot-level maintenance on a wide range of vehicles and other military assets, including helicopters, combat vehicles, ships, aircraft, engines, and software. According to DOD, the bulk of the depots' workload is associated with ships and aircraft, and the remaining work is associated with missiles, vehicles, and ground support equipment. Figure 1 shows the locations of DOD's maintenance depots, and provides a summary of the maintenance work primarily performed at each one.

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<sup>2</sup>GAO, *Standards for Internal Control in the Federal Government*, [GAO-14-704G](#) (Washington, D.C.: September 2014).

**Figure 1: Department of Defense's (DOD) Maintenance Depots and the Weapons Repaired and Maintained at Those Locations**



Source: GAO analysis of Department of Defense documents. | GAO-19-51

According to the 2018 *DOD Maintenance Fact Book*, maintenance spending in fiscal year 2016 was \$73.4 billion and included the maintenance of approximately 440,000 vehicles (including combat and tactical vehicles); 225 ships and submarines; 13,935 aircraft (both fixed wing and rotary wing); and 783 types of common equipment used by vehicles, ships, submarines, and aircraft. Maintenance expenditures for fiscal year 2016 associated with aircraft were the highest, at \$35.2 billion. The next highest expenditures were \$17.3 billion for ships and submarines. Approximately 55 percent of the depot workload in fiscal



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year 2016 was accomplished by the federal workforce at the DOD depots; the remaining work was done by private sector contractors.

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## Organization of DOD's Depots

Each of the military services has commands that are responsible for providing logistics and maintenance support within the service.

- **Army.** Army Materiel Command is located at Redstone Arsenal, Alabama. It develops and delivers materiel support to maintain combat equipment and is responsible for the five army depots—Anniston Army Depot, Corpus Christi Army Depot, Letterkenny Army Depot, Red River Army Depot, and Tobyhanna Army Depot.
- **Navy.** Naval Sea Systems Command is located in the Washington Navy Yard, District of Columbia. It is responsible for the operation of the four naval shipyards—Norfolk Naval Shipyard, Pearl Harbor Naval Shipyard, Portsmouth Naval Shipyard, and Puget Sound Naval Shipyard. Naval Sea Systems Command also has technical authority for ship maintenance operations. For naval aviation, Naval Air Systems Command provides full life-cycle support of naval aviation, weapons, and systems. It is responsible for operation of the three Fleet Readiness Centers—Fleet Readiness Center East, Fleet Readiness Center Southeast, and Fleet Readiness Center Southwest—providing aviation maintenance support to the Navy and Marine Corps.
- **Air Force.** The Air Force Sustainment Center, located at Tinker Air Force Base, Oklahoma is responsible for the sustainment of air and space weapon system readiness through depot maintenance, supply chain management, and installation support. The center directs the operations of the three Air Logistics Complexes—Ogden Air Logistics Complex, Oklahoma City Air Logistics Complex, and Warner Robins Air Logistics Complex.
- **Marine Corps.** Logistics Command, located in Albany, Georgia, directs Marine Depot Maintenance Command in repairing, rebuilding, and modifying all ground combat equipment and combat support and combat service support equipment. Marine Depot Maintenance Command operates one depot comprised of two production plants—Albany on the East Coast and Barstow on the West Coast.

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## DOD's Depot Workforce

Each DOD depot has a civilian workforce that possesses a wide range of skills and certifications, including critical skills, needed to conduct the repair and overhaul of DOD weapon systems and equipment. The civilian workforce, which includes approximately 80,000 civilian personnel, is

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responsible for performing the majority of depot-level maintenance activities. DOD depots' civilian occupations include welders, machinists, sheet metal mechanics, and aircraft mechanics, among others. The DOD depot workforce, like the rest of the federal government, has experienced increasing numbers of retirements as more of the depot workforce reaches retirement eligibility. According to DOD, 21 percent of DOD's depot workforce is projected to be eligible for retirement in fiscal years 2017 to 2019.

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## Prior Work on Human Capital Skill Gaps in the Federal Government

We have previously reported on the skills gaps challenges faced by the federal government and how these challenges can significantly affect an agency's ability to serve the public and achieve its missions. Since 2001, we have included strategic human capital management as a government high-risk area.<sup>3</sup> In 2002, we reported that DOD recognized that human capital strategic planning is fundamental to effective overall management. Because skills gaps within individual federal agencies—as well as across the federal workforce—can lead to costly, less efficient government, we designated agencies' mission-critical skills gaps as a high-risk area in February 2011.

We reported in 2015 that the lack of seasoned acquisition staff—whose responsibilities include procuring services, evaluating price proposals, and administering contracts—may contribute to significant delays in purchasing mission-critical goods and services, such as medical supplies, engineering support, and program management.<sup>4</sup> This issue is similar to some of the workforce issues DOD depots are currently facing—such as ensuring that enough skilled workers are properly trained to replace an aging skilled depot workforce. We also noted in the 2015 report that in addition to a potential wave of employee retirements across many federal government agencies, other human-capital related risks are threatening the performance of federal agencies, for example declining levels of employee satisfaction, the changing nature of federal work, and an increasing number of positions that require advanced degrees and other skills.

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<sup>3</sup>GAO, *High-Risk Series: An Update*, [GAO-01-263](#) (Washington, D.C.: January 2001).

<sup>4</sup>GAO, *Federal Workforce, OPM and Agencies Need to Strengthen Efforts to Identify and Close Mission-Critical Skills Gaps*, [GAO-15-223](#) (Washington, D.C.: Jan. 30, 2015)

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In 2017 we reported that DOD still faces mission-critical skill gaps that pose a risk to national security and impede cost-effectiveness in serving the public and achieving results.<sup>5</sup> For example, the need for skill sets such as cyber, intelligence, maintenance, and engineering, among other career fields, has increased, and the changing nature of federal work and a potential wave of employee retirements could produce gaps in leadership and institutional knowledge, which may aggravate the problems created by existing skill gaps.

In addition, in September 2018, a DOD-led interagency taskforce published an assessment of America's manufacturing and defense industrial base—which included the 17 DOD depots we reviewed.<sup>6</sup> The assessment reported, among other findings, that diminishing science, technology, engineering, and mathematics (STEM) and trade skills was one of five significant factors shaping trends in manufacturing and the defense industrial base causing deterioration in U.S. capabilities. The assessment recommended, among other things, that the Departments of Defense, Education, Commerce, and Labor work together on efforts to accelerate workforce development to grow domestic STEM and critical trade skills in STEM occupations such as engineers, technicians, and scientists and in manufacturing occupations such as machinists, welders, and others.

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<sup>5</sup>GAO, *Department of Defense: Actions Needed to Address Five Key Mission Challenges*, [GAO-17-369](#) (Washington, D.C.: June 13, 2017).

<sup>6</sup>DOD, *Assessing and Strengthening the Manufacturing and Defense Industrial Base and Supply Chain Resiliency of the United States* (September 2018). The report was a result of a requirement in Executive Order 13,806, *Assessing and Strengthening the Manufacturing and Defense Industrial Base and Supply Chain Resiliency of the United States*, directing the Secretary of Defense to conduct a whole-of-government effort to assess risk, identify impacts, and propose recommendations in support of a healthy manufacturing and industrial base. 82 Fed. Reg. 34,597 (July 26, 2017).

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## Depots Can Generally Fill Skilled Occupations, but Workforce Challenges May Affect the Maintenance of Weapon Systems

The military service's 17 major maintenance depots are generally able to fill occupations requiring personnel to possess certain critical skills ("skilled occupations"). However, the depots have identified a variety of workforce challenges, such as hiring, training, and retaining personnel with critical skills. According to DOD officials, these challenges in hiring, training, and retaining personnel with these skills contribute to delays in the maintenance of weapon systems. For additional information on the occupations at the 17 DOD depots reviewed in this report, see appendix I.

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## Military Service Depots Are Generally Able to Fill Skilled Occupations

Based on our analysis of depot personnel data, most of the services were generally able to fill skilled occupations at their depots to at least 80 percent of their authorization during fiscal years 2013-2017. The Marine Corps Barstow Production Plant filled its occupations at 78 and 72 percent of its authorization in fiscal years 2016 and 2017. However, the Marine Depot Maintenance Command (MDMC) filled skilled occupations to above 80 percent of authorized levels in fiscal years 2013 through 2016. According to Marine Corps officials, as workload decreased over the last few years and reset workload requirements decreased, the Marine Depot Maintenance Command made a business decision to supplement the workforce with contractors instead of using its civilian workforce, based on the operational tempo and varying workload requirements between fiscal years.<sup>7</sup>

DOD officials from the four military services provided varying definitions of what constitutes a personnel shortage. For example, officials from Anniston Army Depot stated that their goal is to fill at least 80 percent of their personnel authorizations, while officials from Corpus Christi Army Depot stated that their goal was to fill 100 percent of their authorizations and would consider not meeting this goal to constitute a personnel shortage. Because the 17 major DOD maintenance depots use varying definitions to identify a personnel shortage, we used the lowest target for personnel fill rate (80 percent) identified among the services as a threshold to describe the extent to which the depots were generally able

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<sup>7</sup>Reset refers to a set of actions to restore equipment to a desired level of combat capability commensurate with a unit's future mission. This includes maintenance and supply activities that restore and enhance combat capability to equipment that was destroyed, damaged, stressed, or worn out during operations. Resets are normally initiated with the rotation and return of equipment from an area of responsibility.

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to fill occupations requiring critical skills. Although some depots consider not meeting their 100 percent personnel fill rate goal as a shortage, officials at these depots also acknowledged that many of the maintenance activities performed at the depots can still be completed by employees working overtime and by contractors. Table 1 shows the extent to which DOD's 17 depots filled skilled occupations from fiscal years 2013 through 2017.

**Table 1: Authorized (Auth.) and Actual Personnel for Depot Occupations with Certain Critical Skills and Percent of Authorized Positions Filled, by Military Service, Fiscal Years 2013 to 2017**

| Depot   | Fiscal Year 2013 |        |                | Fiscal Year 2014 |        |                | Fiscal Year 2015 |        |                | Fiscal Year 2016 |        |                | Fiscal Year 2017 |        |                |
|---|------------------|--------|----------------|------------------|--------|----------------|------------------|--------|----------------|------------------|--------|----------------|------------------|--------|----------------|
|   | Auth.            | Actual | Percent Filled | Auth.            | Actual | Percent Filled | Auth.            | Actual | Percent Filled | Auth.            | Actual | Percent Filled | Auth.            | Actual | Percent Filled |
| <b>Army Depots<sup>a</sup></b>                          |                  |        |                |                  |        |                |                  |        |                |                  |        |                |                  |        |                |
| Depots  | 7,237            | 6,570  | 91             | 7,003            | 6,362  | 91             | 6,869            | 6,216  | 90             | 6,752            | 5,867  | 87             | 5,710            | 5,632  | 99             |
| <b>Navy Fleet Readiness Centers (FRC) and Shipyards</b> |                  |        |                |                  |        |                |                  |        |                |                  |        |                |                  |        |                |
| FRCs  | 3,448            | 3,238  | 94             | 3,654            | 3,222  | 88             | 3,698            | 3,521  | 95             | 4,078            | 3,833  | 94             | 4,240            | 3,983  | 93             |
| Shipyards <sup>b</sup>                                  | 14,238           | 13,064 | 92             | 19,824           | 18,614 | 94             | 21,686           | 21,697 | 95             | 22,679           | 20,990 | 93             | 18,063           | 17,887 | 99             |
| Navy total  | 17,686           | 16,302 | 92             | 23,478           | 21,836 | 93             | 25,384           | 24,218 | 95             | 26,757           | 24,823 | 93             | 22,303           | 21,825 | 98             |
| <b>Air Force Air Logistics Complexes (ALC)</b>          |                  |        |                |                  |        |                |                  |        |                |                  |        |                |                  |        |                |
| ALCs  | 19,982           | 20,240 | 101            | 19,604           | 19,708 | 101            | 20,628           | 19,777 | 96             | 21,015           | 21,145 | 101            | 22,538           | 21,347 | 95             |
| <b>Marine Corps Production Plants</b>                   |                  |        |                |                  |        |                |                  |        |                |                  |        |                |                  |        |                |
| Production Plants                                       | 1,547            | 1,309  | 85             | 1,437            | 1,215  | 85             | 1,281            | 1,136  | 89             | 1,265            | 1,027  | 81             | 1,236            | 963    | 78             |

Source: GAO analysis of Department of Defense (DOD) Data | GAO-19-51

<sup>a</sup>The personnel data included in this table represent numbers of authorized and actual personnel for occupations considered critical by each depot. DOD and the military services do not have a corporate definition for what they consider a “critical occupation” at each of the maintenance depots, so the data presented for each depot is reflective of what that individual depot considers as a critical occupation needed to support its weapon system maintenance mission.

<sup>b</sup>No reliable data were available for fiscal year 2013 for Norfolk Naval shipyard, and it was not included in the total for that year. Complete personnel data were not available for Pearl Harbor and Portsmouth Naval Shipyards for fiscal year 2017 and not included in the total for that year.

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## The Depots Face Challenges in Hiring, Training, and Retaining a Skilled Workforce

DOD officials responsible for managing the military's depot workforce said that they face challenges in hiring, training, and retaining personnel with the critical skills necessary to perform current and planned depot maintenance activities. These challenges include the following:

**Hiring challenges:** The depots have been able to fill many of their skilled occupations. However, lengthy hiring processes and competition with the private sector for personnel with critical skills continue to cause challenges in hiring depot personnel. Officials from the six depots we visited told us that lengthy federal hiring processes make it difficult to hire skilled personnel in a predictable and timely manner, because many candidates have other employment options and can get hired by those employers faster than they can get hired by the depots.<sup>8</sup> For example, at Letterkenny Army Depot, it takes 6 to 9 months to hire and process personnel before they can begin working. Officials at Norfolk Naval Shipyard told us that it takes 6 months or longer to hire many shipyard employees, and officials at the Marine Corps' Albany Production Plant told us that it takes an average of 10 months to hire personnel. Officials at these and other depots stated that the human resources offices within the military services that are responsible for hiring civilians with critical skills do not have enough staff to process new hires within the government-wide standard goal of 80 days.<sup>9</sup>

According to U.S. Army Tank-automotive and Armaments Command (TACOM) officials, Army depots under their command—such as Anniston and Red River Army Depot—have experienced consistent challenges in hiring personnel with critical skills sets, and these challenges have affected the depot's ability to meet mission requirements. TACOM officials attributed these challenges to the lack of stable workload requirements at the depot that are needed to maintain these necessary skills sets. For example, officials at Red River and Letterkenny Army Depots stated that the uncertainty of the depot workload and the

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<sup>8</sup>We have previously reported on federal workforce challenges related to lengthy hiring processes. See GAO, *DOD Personnel: Further Actions Needed to Strengthen Oversight and Coordination of Defense Laboratories' Hiring Efforts*, [GAO-18-417](#) (Washington D.C.: May 30, 2018); *Oil and Gas: Interior Has Begun to Address Hiring and Retention Challenges but Needs to Do More*, [GAO-14-205](#) (Washington D.C.: Jan. 31, 2014); and *Human Capital: Transforming Federal Recruiting and Hiring Efforts*, [GAO-08-762T](#) (Washington D.C.: May 8, 2008).

<sup>9</sup>In 2008 the Office of Personnel Management issued End-to-End Hiring Initiative (Sept. 1, 2008) that established the 80 calendar day standard as a target for federal hiring.

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instability associated with hiring freezes and budgetary uncertainty have led to a loss of critical skills at their depots. At Red River Army Depot, critical skills were lost when the depot was unable to rehire temporary skilled workers at the end of their appointments. At Letterkenny Army Depot, the uncertainty of the depot workload caused personnel to leave the depot to work in private industry or other federal agencies. TACOM officials also stated that workload fluctuations usually result in an insufficient amount of workload needed to maintain proficiency in certain critical skill sets. In some cases, this results in some workers being reassigned to areas outside of their field of expertise or, in a worst case scenario, being laid off. This unstable employment environment makes it difficult to recruit qualified candidates, according to TACOM officials.

**Training Challenges.** Officials from at least 10 of the DOD depots we visited or spoke with said that personnel assigned to certain skilled occupations require years of training to become proficient in their occupation. Some depots report having a workforce comprised primarily of inexperienced, recently hired personnel. As a result, DOD depots face challenges in ensuring that their workforces have sufficient training and experience to perform current and planned depot maintenance activities. For example, at Fleet Readiness Center Southwest, officials stated that non-destructive inspectors and ordnance mechanics take 1-2 years after being hired to become certified and proficient in their trade.<sup>10</sup> Although this depot filled 78 percent of its authorization for non-destructive inspectors (a shortage of eight personnel) and 124 percent of its authorization for ordnance mechanics (an overage of four personnel) in fiscal year 2017, not all were certified to perform maintenance on aircraft. As a result, and as discussed in more detail below, it takes longer to get aircraft through the maintenance process.

At Portsmouth Naval Shipyard, it may take up to 5 years for a worker to become proficient at the full range of duties associated with trades such as electrician and marine machinists. At other depots personnel must have 5-10 years of training or experience before they can be considered proficient. For example, at Corpus Christi Army Depot, electroplaters

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<sup>10</sup>Non-destructive inspectors examine, inspect, or test an item (e.g., aircraft components, airframes, machined parts, welds) without impairing its future use. Inspections detect internal or external defects, such as fatigue cracks, corrosion, and weld defects, measure geometric characteristics; and determine material structure or composition. Ordnance mechanics remove, install, repair, overhaul, and trouble shoot aircraft ordnance and aviation life support systems and egress systems (i.e., ejection seats).



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require at least 5 years and non-destructive testers at least 6 years of training or experience before they can be considered proficient. Metalizing equipment operators require 10 years of experience or training to become proficient in this occupation.

Recognizing the need to hire additional workers to support their maintenance mission, in fiscal year 2016 the Navy depots began hiring thousands of additional personnel. This large influx of new personnel at some depots has contributed to a lack of experience in their workforces. For example, mass hiring at shipyards has resulted in 45 percent of the Puget Sound skilled workforce and 30 percent of the Portsmouth skilled workforce having less than 5 years of experience. At Fleet Readiness Center Southwest, mass hiring has resulted in 41 percent of the skilled workforce having 2 years or less of experience.

**Retention Challenges:** Officials from at least six of the depots we visited or met with stated that they have challenges in retaining personnel for certain skilled occupations. For example at the Norfolk Naval Shipyard, officials stated that it is challenging to recruit and retain personnel for skilled occupations such as engineers and technicians, contracting specialists, and apprentices for the production trades (e.g., welders, machinists, etc.), because they must compete for personnel with the private sector and other federal agencies. According to compensation data provided by the shipyard, entry-level electrical and nuclear engineers employed at the shipyard earn \$25,000 to \$30,000 a year less than their private-sector counterparts.<sup>11</sup>

The Air Logistics Complexes compete with private industry for their workforce, making it difficult to retain personnel in certain occupations requiring skilled personnel, such as engineers and scientists, according to Air Force Sustainment Command officials. For example, electrical and electronics engineers, materials engineers, computer engineers, and computer scientists are some of the greatest workforce needs among the complexes, but they are difficult to retain because they can receive higher pay in private industry. Officials also stated that personnel for other non-engineering skilled occupations that they need to fill, such as

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<sup>11</sup>At the Navy shipyards, nuclear engineers are typically responsible for the design, construction, and testing of nuclear plants on submarines and aircraft carriers. Private-sector nuclear engineers typically work in electrical power generation, scientific research and development services, engineering services, and manufacturing.

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nondestructive inspectors, are also in high demand in the airline, oil, and healthcare industries.

**Location-Specific Challenges.** At least five of the depots that we visited or spoke with experienced challenges in obtaining skilled personnel or maintaining the critical skills of their workforces because of their locations. For example, officials at Fleet Readiness Center – East told us that a contractor located at the depot is able to offer higher pay and constantly recruits their employees—such as aircraft electricians, sheet metal mechanics, and machinists—because they possess many of the critical skills that the contractor requires to complete its work. Depot officials from Fleet Readiness Center – East attribute nine personnel losses to higher paying jobs offered by contractors located at the depot over the last 2 years. Officials at Fleet Readiness Center Southwest told us that they have challenges filling positions because of the high cost of living in the San Diego area. Officials with the Marine Depot Maintenance Command told us that the Albany and Barstow production plants face challenges as a result of their locations. Barstow’s proximity to San Diego exposes it to increased competition with the private sector for workers, and Albany’s rural location makes recruitment more difficult.

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### Challenges in Hiring, Training, and Retaining a Skilled Depot Workforce Are Among Many Factors Contributing to Maintenance Delays

Officials across the various depots stated that challenges associated with hiring, training, and retaining a depot workforce with critical skills have contributed to delays in the maintenance of weapon systems. According to DOD officials from at least six depots, there are many factors that contributed to maintenance delays, including difficulties in receiving replacement parts on time, unexpected needed repairs, and lack of appropriate infrastructure. Officials noted that in many instances a variety of interrelated factors contribute to maintenance delays, making it difficult to directly link delays to one specific issue. Regardless, officials from individual depots were able to provide numerous examples where personnel issues resulted in delays in maintenance work.

**Army Depots.** Three of the five Army depots identified examples where challenges in maintaining certain critical skills contributed to delays in weapon system maintenance. Officials at the depots cited the following:

- Shortfalls in staffing and critical skills, such as painting, welding, and machining, contributed to delays to maintenance of the Patriot missile system, route clearance vehicles, the Multi Mission Launcher, and the Sentinel radar system at Letterkenny Army depot. Officials told us that the delay in maintenance of route clearance vehicles and Sentinel

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radar systems was due to a shortage of painters, which caused a delay of 2 weeks for each of these systems but did not affect program completion. Officials could not quantify the delay for the Multi Mission Launcher but asserted that the delay was caused in part by the lack of machinists needed to complete the maintenance work to the Multi Mission Launcher, and additional maintenance work needed for this weapon system at the depot.

- Shortages in mechanics and support personnel at Red River Army Depot contributed to maintenance delays for the Mine-Resistant Ambush Protected All-Terrain Vehicle during fiscal year 2013. The depot was requested to complete maintenance requirements on 12 vehicles per day but was unable to hire and train enough skilled personnel to meet that schedule. As a result, according to Red River Depot officials, the lack of technical skills and personnel needed to complete this maintenance request delayed the completion of the request by approximately 2 years, increasing the planned maintenance period from 3 years to 5 years.
- At Corpus Christi Army depot, a 2017 hiring freeze caused shortages of flight test pilots, who are responsible for test flights before returning aircraft to service after maintenance. This contributed to a 180-day delay in the maintenance of AH-64 Apache helicopters and an approximately 30-day delay in the maintenance of UH-60 Black Hawk helicopters at the depot.

**Navy Fleet Readiness Centers and Shipyards.** One of the three Navy Fleet Readiness Centers and all four Navy shipyards identified weapon systems for which challenges maintaining critical skills in the depot workforce have contributed to maintenance delays. Navy officials cited the following:

- Challenges in maintaining certain skilled personnel, such as sheet metal workers, machinists, and non-destructive inspectors have contributed to maintenance delays for the F/A-18 A-D aircraft at Fleet Readiness Center Southwest. Specifically, these workforce challenges have been one factor contributing to the Navy depots' repairing only 18 out of a planned 31 F/A-18 A-D aircraft in fiscal year 2017. In addition, a 2017 report from the Commander, Fleet Readiness Center, identified the lack of training and experience and the attrition of certain skilled personnel (machinists, non-destructive inspectors, and industrial engineering technicians) as some of the

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reasons that machining defects were detected in the landing gear for F/A-18, E-2, and C-2 aircraft.<sup>12</sup>

- According to shipyard officials, challenges maintaining the critical skills of the workforce have been a contributing factor to maintenance delays.
  - In fiscal year 2012 and 2013 two submarines, the USS Newport News and the USS Albany, were delayed approximately 7 and 14 months, respectively, at Norfolk Naval Shipyard, partly as a result of manning shortfalls. Officials explained that various occupations requiring critical skills were in short supply to perform maintenance for both submarines, including machinists, marine machinery mechanics, shipfitters, welders, pipefitters, boilermakers, and sheet metal mechanics. In addition, in 2016, plans to repair the USS Boise at the Norfolk Naval Shipyard were cancelled 4 months before the date originally planned for the submarine to arrive at the shipyard for maintenance, because personnel with the skills necessary to perform depot-level maintenance on this submarine were not available.
  - At Pearl Harbor Naval Shipyard, maintenance for two submarines, the USS Asheville and USS Jefferson City, was delayed over 20 months past the scheduled date. Maintenance scheduled for fiscal year 2014 for the USS Asheville was delay over 20 months, followed by an over 20-month maintenance delay for the USS Jefferson City, which was originally scheduled to begin in fiscal year 2015. According to shipyard officials, shortages of skilled personnel at the shipyard, such as shipfitters, sheet metal workers, welders, and pipefitters contributed to the maintenance delays for these submarines.
  - At Portsmouth Naval Shipyard, challenges in maintaining critical skills such as nuclear pipe welders and pipefitters across the depot workforce contributed to a 1-month delay in the maintenance of the USS Annapolis in fiscal year 2015. In addition, shortages in painters and plastic fabricators contributed to a 2-month delay in maintenance on the USS Hampton in fiscal year 2016 and a 7-month delay for the USS Springfield in fiscal year 2017.

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<sup>12</sup>Department of the Navy, *FRCSW Landing and Arresting Gear Quality Escape Investigation Report (May 11, 2017)*.

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- Puget Sound Naval Shipyard did not identify any specific weapon systems for which challenges maintaining critical skills may have contributed to maintenance delays. However, a general lack of personnel has caused some delays. Information on completed aircraft carrier and submarine schedules at the shipyard from fiscal year 2012 shows that challenges with the shipyard workforce, which could include skilled personnel with critical skills, contributed to a 4-month maintenance delay in fiscal year 2015 for the aircraft carrier USS Nimitz. In addition, workforce gaps in staffing and skillsets contributed to delays in depot-level maintenance completed in fiscal years 2012, 2015, and 2016 for submarines. Delays ranged from over 5 months to just over 31 months in scheduled depot-level maintenance. Puget Sound shipyard officials stated that the skills and experience of the workforce potentially affect maintenance project costs and schedules (e.g., depot-level maintenance takes longer to accomplish) but did not provide any specific examples. Officials also stated that the shipyard's most experienced workers are often assigned to work on higher-priority projects instead of projects they are currently assigned to. These adjustments can potentially lead to an undesirable mix of inexperienced workers on projects, which may contribute to delays.

**Air Force Air Logistics Complexes.** All three of the Air Force Logistics Complexes (ALCs) identified weapon systems that were affected by challenges in maintaining critical skills in their workforces. Officials at Oklahoma City ALC told us that challenges in maintaining the critical skills necessary to fill occupations such as electronic integrated systems mechanics, aircraft electricians, sheet metal mechanics, and aircraft mechanics have contributed to maintenance delays for the B-1 Lancer, B-52 Stratofortress, and KC-10 Extender weapon systems in fiscal years 2013 to 2017. For example, seven B-52 aircraft experienced an average of 16 days in maintenance delays in fiscal year 2017. Officials at Ogden ALC told us that the lack of avionics technicians and low observable coater specialists—two occupations requiring critical skills—have contributed to maintenance delays for the F-16 and F-22 fighter weapon systems.<sup>13</sup>

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<sup>13</sup>Low observable coater specialists are composite/plastic fabricator workers who repair, fabricate, modify, remove, and install composite and or plastic items, parts and assemblies. Low observable coating is a critical component that gives an aircraft, such as the F-22, stealth characteristics.

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According to Ogden ALC officials, in fiscal year 2017, maintenance for six F-22 fighters was delayed for a total of 66 days because of a shortage of avionics technicians to conduct depot-level maintenance activities.

Officials at Warner Robins ALC told us that the lack of aircraft mechanics and aircraft structural sheet metal mechanics contributed to maintenance delays for the C-5 Galaxy, C-17 Globe Master III, and C-130 Hercules aircraft weapon systems in fiscal year 2017. Officials told us this primarily affected the complex's ability to produce aircraft ahead of schedule and achieve the desired output of aircraft for fiscal year 2017. Officials from Warner Robins ALC also told us the lack of capacity within the depot workforce of aircraft mechanics and aircraft structural sheet metal mechanics affected depot maintenance activities for the F-15 fighter aircraft and resulted in delays in maintenance of 11 days in fiscal year 2017. In addition, these officials told us the depots face challenges with attrition of skilled personnel, and increased workload for software maintenance. However, unless the depot is able to recruit and sustain its software engineering workforce weapon system delays may occur in the future, according to depot officials.

**Marine Corps Production Plants.** During our discussions with Marine Corps officials responsible for managing the skilled workforce at each of the Marine Corps production plants, officials did not attribute delays in the maintenance of weapon systems to the challenges of maintaining critical skills in the depot workforce.

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## Depots Have Taken Actions to Hire, Train, and Retain a Skilled Workforce, but DOD Has Not Assessed Their Effectiveness

Since 2008, all four services have developed strategic plans that identify and address workforce challenges at the depots. However, these strategic plans are either outdated or have not been implemented. As a result, the depots are not using them to determine what actions they should take to address workforce challenges. Instead, individual depots have and taken a variety of actions to help maintain critical skills in their workforces—including offering recruiting and hiring incentives to skilled workers, implementing training and apprenticeship programs, and partnering with local vocational schools. The depots have also collected some data, such as numbers of personnel in apprenticeship programs and the number of career fairs attended by depot officials. However, the depots and the services have not assessed the results of these actions to determine how well they are helping the depots to hire, train, and retain skilled personnel in the depot workforce or determined the cost effectiveness of these actions.

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## Some of the Services' Depot Maintenance Strategic Plans Are Outdated or Not Used

Each of the military service components has a strategic plan that recognizes the importance of a skilled depot workforce and includes actions the service plans to take to help maintain the skills of its workforce. However, some of these plans are either outdated or not in use.

- The Army's depot maintenance strategic plan published in 2008 is outdated, according to Army officials. However, in February 2018 the Army submitted a report to Congress that states that the Army's strategic plan is currently in the process of being revised and is projected to be completed in December 2018.<sup>14</sup> This report states that the updated strategic plan will include a requirement that the Army complete a Human Capital Investment Plan. Although the overarching Army Depot maintenance plan is being updated, according to Army officials, some of the individual Army depots have their own strategic plans. Anniston Army depot's strategic plan states that the Anniston Army depot will acquire a viable, well trained, and equipped workforce. Tobyhanna Army depot officials stated they continually evaluate their human capital plan as part of their depot strategic plan.
- The Navy's 2013 Depot Maintenance Strategic Plan states that the Navy will continue hiring, using apprentice programs, and will standardize training across the Navy depots.<sup>15</sup> However, according to Navy officials, the strategic plan is outdated and the assessments mentioned in the plan, such as the depot annual workforce assessment, are not being conducted. Although the overarching Navy Depot maintenance strategic plan is outdated and not being used, the Naval Air Systems Command has a current human capital strategic plan for fiscal years 2018 – 2025 that states it will plan for, hire, and retain a highly qualified and diverse workforce by leveraging workforce planning to inform recruitment strategies and leveraging relationships with colleges and universities. In addition, in response to a congressional mandate, in March 2018 the Navy submitted its Naval Shipyard Development plan, which provides a plan to address

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<sup>14</sup>Army, *Department of the Army Report on Strategy to Revitalize Army Organic Industrial Base Response to Section 326 of the National Defense Authorization Act for Fiscal Year 2017 (Pub. L. 114-328)* (February 2018). As of the issuance of our report the Army's updated report was not yet available.

<sup>15</sup>Naval Air Systems Command, *Human Capital Strategic Plan Fiscal Year 2018-2025*.

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shortfalls of personnel in the public shipyards.<sup>16</sup> According to this report, the Navy plans to continue its aggressive approach to hiring, will use training and learning centers to provide newly hired workers with the experience needed to begin their maintenance mission, and will implement a civilian leadership development program to provide its workforce with the supervisory and leadership experience needed to supervise new employees.

- The Air Force's 2016–2025 Depot Maintenance strategic plan states that the Air Force will conduct targeted initiatives, including recruiting efforts to fill vacancies.<sup>17</sup> However, according to an Air Force official this plan was never finalized or implemented. Although the plan was never implemented, the Air Force depots use a process to plan for workload and workforce requirements that helps inform recruitment and future manpower decisions.<sup>18</sup> In addition, according to Air Force officials at the Air Force Sustainment Center, an in-depth gated-hiring process has also been developed that involves weekly discussions with stakeholders to identify constraints, measure hiring timelines, and identify upcoming recruitment and hiring event. It also includes a forum to identify skills gaps or other hiring challenges. Recruitment, retention, relocation, and student loan repayment incentives are also addressed at the quarterly civilian employment and cost management committee meetings, where Air Force Sustainment Center leadership reviews both forecasted and executed incentives. Exit surveys are also evaluated enterprise wide to review trends and overall retention concerns.
- The 2008 United States Marine Corps Depot Maintenance strategic plan states that the Marine Corps will replenish and revitalize the workforce by recruiting, promoting, and retaining personnel with critical skills; employ a focused effort on training and educating employees; increase partnerships with technical schools; and establish apprenticeship programs.<sup>19</sup> We found during our visit to the

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<sup>16</sup>Naval Sea Systems Command, *Report to Congress on Naval Shipyard Development Plan* (March 2018).

<sup>17</sup>Air Force, *U.S. Air Force Depot Maintenance Strategic Plan 2016-2025*.

<sup>18</sup>The Air Logistics Command uses its annual requirements review depot determination (R2D2) to project future manning requirements. During this review, workload planners provide projected changes in workload and also use this process to project future manpower requirements, which are used to plan the hiring for the following two fiscal years. These projections may be modified during the annual program mid-year review in the year of execution.

<sup>19</sup>Marine Corps, *Depot Maintenance Strategic Plan* (February 2008).



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Marine Depot Maintenance Command (MDMC) that some officials at the command were not familiar with this previously published strategic plan. However, after our visit, Marine Corps officials stated that the command had recently updated this plan and had begun disseminating it for use at both of the Marine Corps Production Plants.<sup>20</sup> Marine Corps officials mentioned that although some MDMC officials responsible for workforce management may not be fully aware of all aspects of the plan, collectively the command is using this plan to guide many workforce decisions at both of its production plants. MDMC officials said that the Marine Corps uses a combination of workload data and the recently updated strategic plan to help determine workforce needs and what recruitment and retention initiatives to pursue.

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### The Depots Have Taken Actions to Hire, Train, and Retain a Workforce with the Critical Skills They Need

Each of DOD's depots has taken various actions, such as recruiting, implementing training programs, and providing retention incentives, to help develop and maintain the critical skills of its workforce. However, neither the depots, their higher-level service component commands, nor the services have conducted an assessment to determine the effectiveness of these actions.

**Recruiting and Hiring:** Each of the depots has taken various recruiting and hiring actions to maintain critical skills in its workforce. These actions include recruitment and relocation incentives, partnering with local technical colleges to ensure that technical expertise is available to recruit in the local area, and developing outreach programs with high schools to get students interested in jobs at the depots. Some depots have also utilized the available direct hire authority.<sup>21</sup> For example, officials from the Navy Fleet Readiness Center – Southeast stated that they have used direct hire authority. From 2016, when this authority was granted, through November 2017, the center initiated 70 hiring actions using this authority. Additionally, according to Marine Corps depot officials, the Marine Corps depots have hired over 250 civilian employees since 2012 through the

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<sup>20</sup>Marine Corps, *Depot-Level Maintenance Strategic Plan*, (January 2017).

<sup>21</sup>Section 1125 of the *National Defense Authorization Act for Fiscal Year 2017* provided the Secretary of Defense with temporary direct hire authority for domestic DOD depots, arsenals, or shipyards during fiscal years 2017 and 2018. Pub. L. No. 114-328 (2016). Qualified candidates may be appointed to positions at defense industrial base facilities without regard to existing examination, certification and appointment requirements. Section 1101 of the *National Defense Authorization Act for Fiscal Year 2019* included an extension of the direct hire authority until 2025. Pub. L. No. 115-232 (2018).

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Pathways program, which requires students to successfully complete academic coursework and 640 hours of work experience, among other qualifications.<sup>22</sup> At Navy Fleet Readiness Center—Southwest, special pay rates were approved to increase the compensation for certain personnel with critical skills, such as aircraft engine mechanics and electronics mechanics. These increased rates allow the Navy to better compete with the private sector for skilled personnel and help to attract and retain skilled workers who might otherwise opt to work for a private sector employer that can offer a higher wage. Officials from Puget Sound Naval Shipyard stated that hiring actions that include incentives are necessary to facilitate the hiring of personnel with certain critical skills, such as engineers, contracting specialists, and cyber security specialist.

**Training:** Each of the depots has taken various actions to develop critical skills in the depot workforce through a variety of training programs for current staff, as well as efforts to train future staff. Officials from Letterkenny Army Depot stated that they have worked with local vocational schools and colleges to develop training programs to help depot personnel develop the critical skills they need. Officials from Puget Sound stated that training is a necessary cost to ensure that the shipyard sustains its capabilities. At Portsmouth Naval Shipyard, officials stated that they have developed learning centers and training labs to train new depot employees in a realistic setting. The training labs allow the shipyard to train a larger number of employees than they were able to in the past. Figure 1 shows some of the training labs established at Portsmouth Naval Shipyard.

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<sup>22</sup>DOD's Pathways program provides a way for students to gain education, experience, and—one day—a path to a career at the installation. The program began in 2001 as a cooperative education program under the Student Educational Employment Program. The program is designed to provide students enrolled in a wide variety of educational institutions, from high school to graduate level, with opportunities to work in agencies and explore federal careers while still in school and while getting paid for the work performed. Students who successfully complete the program may be eligible for conversion to a permanent job in the civil service.

**Figure 2: Training Labs at Portsmouth Naval Shipyard to Build Civilian Workforce's Proficiency in Specialized Skills**



**Skilled civilian workforce at Portsmouth Naval Shipyard participate in training at onsite workshops and learning centers.**

Source: Portsmouth Naval Shipyard. | GAO-19-51

**Retention:** Most of the depots have taken various actions to maintain critical skills in their workforces through retention efforts such as incentives, bonuses, and awards. For example, Navy Fleet Readiness Center – East officials stated they are currently providing a 10 percent retention bonus to its personnel in the air frames and sheet metal trades in Beaufort, South Carolina, since these trades have lost personnel to higher-paying contractor jobs over the last 3 years. An official from the Air Force Sustainment Center stated that retention incentives are useful, especially to retain engineers, but that these incentives have typically been used only when personnel were exploring other job opportunities and potentially were planning on leaving their government employment.

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## Depots are Collecting Some Data Related to Their Efforts to Hire, Train, and Retain Personnel with Critical Skills

**Army:** Officials from two of the five Army depots stated they have collected data on the actions they have taken to recruit, hire, train, and retain personnel to help maintain critical skills in their workforces. Anniston and Tobyhanna Army depots collect data on attrition levels and the number of positions filled. They also track the use of the direct hire authority and the number of students participating in the Pathways program. Though these data are collected, they are not used to determine how effective hiring, training, and retention efforts are for Anniston and Tobyhanna.

**Navy:** Most of the Navy depots collect data on the actions they have taken to recruit, hire, train, or retain their workforces. The three Navy Fleet Readiness Centers track information on hiring and retention incentives and the number of hires they make through training, apprentice, or Pathways programs and through direct hire authority. Officials from the Navy shipyards, with the exception of Pearl Harbor, stated that they collect data on hiring, attrition, and actions to maintain critical skills. However, although these data are collected, they are not used to determine how effective hiring, training, and retention efforts have been at the Navy depots, or the cost associated with these actions.

**Marine Corps:** The two Marine Corps depots collect data about retention awards that they give throughout the year and the number of employees they hire through the Pathways program. For example, the Marine Corps' Albany Production Plant gave over 80 retention awards to personnel during the year, including civilian-of-the-year awards, annual performance awards, and administrative assistant of the year award. However, although these data are collected, they are not used to determine how effective hiring, training, and retention efforts have been at the Marine Corps depots, or the cost associated with these actions.

**Air Force:** Each of the three Air Force depots collects data on recruiting, hiring, training, and retention actions that they use to maintain critical skills in the workforce. For example, Ogden Air Logistics Complex collects data on each of the actions it uses to obtain and maintain critical skills. Ogden officials stated that they want to pilot 26 recruitment approaches and are currently piloting 2 to 3 initiatives. The supporting documentation and data analysis needed to perform an assessment on the usefulness of these initiatives should be available by 2019 according to Air force officials.

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The Services and Depots Have Not Determined the Effectiveness of the Actions Taken by the Depots to Hire, Train, and Retain a Skilled Workforce

Although the depots have planning processes to inform recruitment and hiring and have taken actions to help maintain the critical skills of their workforce and collected some data, the services and depots have not used these data to determine how effective those actions have been.

**Army:** Army officials have not assessed how effective the depots have been at hiring, training, and retaining the critical skills of their workforce. According to Army officials we met with, depot commanders have been given the authority to manage their own workforce, and higher-level Army command will provide assistance if the depots request it.<sup>23</sup> Furthermore, in 2015 the Army developed a baseline assessment of the issues affecting its depot workforce. This baseline focused on identifying critical skill sets needed for the workforce, factors hindering the sustainability of those skill sets, and developing mitigation strategies to prevent the loss of those skill sets.<sup>24</sup> While the assessment included mitigation strategies to help maintain critical skills in the Army's depot workforce, it did not measure how effective these strategies have been. Likewise, the Army partners with local vocational schools to recruit some of its workforce and conducts career fairs to recruit employees. However, the Army depot commanders have not evaluated how effective these efforts have been or assessed the quality of the employees it has hired using these strategies. As a result, the Army does not have an understanding of whether these activities are effective for hiring a workforce with the required critical skills or whether these strategies are cost effective.

Additionally, neither the Army's Aviation and Missile Command, which has oversight responsibility for Letterkenny and Corpus Christi Army depot, nor the Communications-Electronics Command, which has oversight responsibility for Tobyhanna Army depot has developed an assessment to determine the effectiveness of its actions. Army officials in

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<sup>23</sup>The Army utilizes three higher level commands to provide oversight of the Army's five major maintenance depots. These higher level commands include the Army Tank-Automotive and Armaments Command; the Army Aviation and Missile Command; and the Army Communications-Electronics Command.

<sup>24</sup>Army Materiel Command, *Industrial Base Baseline Assessment Program Organic Industrial Base Workforce Fragility and Criticality Assessment* (September 16, 2015). This assessment was initiated on March 26, 2014 to focus on the relationship between workforce skill sets, industrial capabilities, and hiring/retention processes, with the intent to identify, evaluate, and resolve risks, issues, and process in identification of fragile and critical workforce skill set competencies, current and future factors hindering sustainability of workforce skill sets, and development of actionable mitigation strategies to prevent loss of critical workforce skill sets.

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the Life Cycle Management Command who are responsible for managing the Army's depots, told us that, considering the time and cost involved, they believe it is not necessary to conduct a formal assessment of these initiatives, because the depots have been given the flexibility to pursue the workforce management initiatives best suited for their unique circumstances and they believe that these methods have been working.

**Navy:** Navy officials have not assessed the effectiveness of the actions the Navy depots and shipyards have taken to hire, train, and retain a workforce with critical skills, including the cost of such actions. According to Navy officials, the individual depots and shipyards are given the flexibility to use all available hiring tools they deem necessary. These officials stated that since they allow the depots and shipyards to use all available tools, a Navy-wide assessment is not needed, because different tools work better in different situations for each fleet readiness center and shipyard.

**Marine Corps:** Marine Corps officials responsible for hiring and managing the civilian workforce at the Marine Corps' Albany and Barstow production plants stated they have not assessed how effective their actions to hire, train, and retain critical skills are, because they take actions—such as recruitment—on a case-by-case basis and have not been asked by their higher-level command—Marine Corps Logistics Command—to assess the effectiveness of these actions. In addition, according to Marine Corps depot officials, recruitment is based on business decisions and operational tempo. For example, depot officials told us that harder-to-fill positions, such as engineers, are normally recruited nationally, while personnel with other critical skills can be recruited locally.

**Air Force:** The Air Force has taken steps to track some of the actions it has taken to maintain the critical skills of its workforce. For example, the Air Force Sustainment Center has developed a health-of-the-organization template which tracks several metrics used to gauge whether it has effectively recruited and retained its skilled workforce, including tracking how many personnel have been hired using the direct hire authority. Additionally, according to Air Force officials, the Air Force Sustainment Center has developed an enterprise recruitment website. This recruitment site captures various metrics and data, including the number of outreach activities used and the number of incentives provided. This site also tracks job candidates as they move through the hiring process, and provides information about the viable candidate pool available to the depot. While the Air Force has begun developing measures to track some

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of its actions, it has not fully assessed all of its actions, because it has not finished developing measures to perform such an assessment.

Additionally, the Air Force's internal recruitment website, used to track hiring actions, is not yet available at all of the Air Force depots and is currently focused only on the Science and Engineering Field, rather than the full range of critical skilled occupations.

DOD's guidance on civilian strategic human capital planning assigns responsibility for developing and implementing strategies to mitigate identified workforce and competency gaps and assessing the effectiveness of strategies used to reduce gaps, among other tasks, to senior executives in the Office of the Secretary of Defense who are responsible for working with DOD components to monitor and track implementation of this guidance.<sup>25</sup> In addition, *Standards for Internal Control in the Federal Government* states that management should monitor internal control systems, such as DOD's workforce strategy efforts, through ongoing monitoring and evaluations.<sup>26</sup> According to these standards for internal control, evaluations should be used to provide continuous feedback on the effectiveness of ongoing monitoring and should be used to help design systems and determine effectiveness. The standards for internal control also says that once management completes its evaluation it should also determine the appropriate corrective actions to address any identified deficiencies.

Although each of the depots has identified and implemented actions to hire, train, and retain a workforce with critical skills, DOD does not know if these actions have been effective, because the services and depots have not assessed the extent to which the actions are helping them to hire, train, and retain a workforce with the required critical skills, and have not determined the cost to implement these actions. Without assessing the actions the depots have taken, and are currently taking, the services have limited assurance that these actions are helping to hire, train, and retain a workforce with the required critical skills and are helping to maintain those skills in the depot workforce in the most cost effective manner. Additionally, by assessing the effectiveness of the actions they are taking to hire, train and retain a workforce with the required critical skills to

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<sup>25</sup>DOD Instruction 1400.25, vol. 250, *DOD Civilian Personnel Management System: Civilian Strategic Human Capital Planning* (SHCP) (June 7, 2016).

<sup>26</sup>GAO, *Standards for Internal Control in the Federal Government*, [GAO-14-704G](#) (Washington, D.C.: September 2014).

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accomplish depot maintenance requirements, the services will be better positioned to identify actions that worked well at individual depots to help save time and money and to determine whether actions at one depot could be effective for hiring, training, and retaining critical skills at other depots.

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## Conclusions

DOD's 17 depots are instrumental in helping the department perform a wide range of maintenance on its military assets. The over 80,000 civilian personnel who perform the maintenance and other support services are essential to getting the maintenance completed. However, the challenges the depots face in recruiting, hiring, training, and retaining skilled personnel may affect the department's ability to meet future defense industrial activity and depot maintenance requirements. Additionally, these challenges may delay the maintenance of weapon systems that are needed to support the warfighter. While the depots have implemented many actions to address these challenges—such as incentives, bonuses, and training programs—neither the services nor the individual depots have conducted assessments of these actions to determine how effective they have been, or whether they have been implemented in the most cost effective manner. Without conducting assessments of the actions the depots have taken, and are currently taking, the services will not know how effective those actions are in helping to maintain critical skills in the depot workforce, or if the actions are cost effective to pursue. By assessing the overall effectiveness of these actions, including the associated costs, the services will be able to identify the hiring, training, and retention actions that work well, as well as those actions that are not effective, or are cost prohibitive, and should not be used to help maintain the critical skills of the depot workforce. To ensure that the depots are using their resources most effectively, an assessment of these actions should be conducted.

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## Recommendations for Executive Action

We are making the following four recommendations to DOD:

The Secretary of the Army, in conjunction with the U.S. Army Materiel Command, should assess the effectiveness of the Army depots' hiring, training, and retention programs. (Recommendation 1)

The Secretary of the Navy, in conjunction with the Naval Sea Systems Command and Naval Air Systems Command, should assess the effectiveness of the Navy's shipyards' and fleet readiness centers' hiring, training, and retention programs. (Recommendation 2)



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The Commandant of the Marine Corps, in conjunction with the Marine Corps Logistics Command, should assess the effectiveness of the Marine Corps depots' hiring, training, and retention programs. (Recommendation 3)

The Secretary of the Air Force, in conjunction with the Air Force Materiel Command, should assess the effectiveness of the Air Force air logistics complexes' hiring, training, and retention programs. (Recommendation 4)

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## Agency Comments

In written comments on a draft of this report, DOD concurred with all four of our recommendations and stated that each of the four services will take action to assess the effectiveness of the hiring, training, and retention programs at their respective depots, shipyards, fleet readiness centers, and air logistics complexes. DOD's comments are reprinted in appendix IV. DOD also provided technical comments, which we incorporated as appropriate.

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We are sending copies of this report to appropriate congressional committees, the Secretary of Defense, and the Secretaries of the Military Departments. In addition, the report is available at no charge on the GAO website at <http://www.gao.gov>.

If you or your staff have any questions about this report, please contact Diana Maurer at (202) 512-9627 or [maurerd@gao.gov](mailto:maurerd@gao.gov). Contact points for our Office of Congressional Relations and Public Affairs may be found on the last page of this report. GAO staff who made key contributions to this report are listed in appendix IV.



Diana Maurer, Director  
Defense Capabilities and Management

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# Appendix I: Profiles of the 17 Department of Defense (DOD) Depots that Perform Complex Depot-Level Activities

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The Department of Defense operates 17 depots that perform complex depot-level activities. Each of these depots has experienced challenges in hiring, training, and retaining skilled personnel to accomplish its maintenance mission. This appendix provides an overview of the challenges affecting each of the 17 depots, including the weapon systems affected by the shortage of skilled personnel and actions taken by each depot to hire, train, and retain skilled personnel. For each DOD depot, we included no more than the top 15 occupations that it identified as critical based on the highest number of authorized positions for fiscal year 2017.



## What This Depot Does

The Army has designated Anniston Army Depot as a Center of Industrial and Technical Excellence for the maintenance and repair of Combat Vehicles (Wheeled and Track—except the Bradley), including Assault Bridging, Artillery, and Small Caliber Weapons.

**Civilian workforce:** 2,643.

**Systems repaired:** Abrams Tanks, M88 Recovery Vehicles, M9 Armored Combat Earthmovers, Stryker Vehicles, M113 Carriers, Self-Propelled and Towed howitzers, Assault Bridge Vehicles, and small arms.

## Challenges This Depot Faces

Anniston Army Depot officials reported the following challenges to hiring and retaining a skilled workforce:

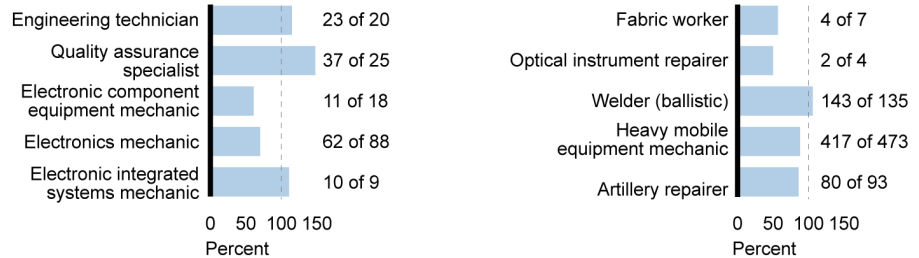
- **Hiring freezes.** Hiring freezes and the hiring process create lengthy vacancies.
- **Retirements.** A significant percentage of skilled workers in certain occupations have been eligible for retirement since 2014—for example, 53 percent of electronics integrated systems mechanics and 50 percent of engineering technicians.

# Anniston Army Depot

Anniston, Alabama

## Selected Occupations at This Depot Requiring Critical Skills

**Figure 3: Skilled Occupations Selected by Anniston Officials: Actual Number of Personnel, Number of Authorized Positions, and Percent of Authorized Positions Filled, Fiscal Year 2017**



Source: GAO analysis of Department of Defense data. | GAO-19-51

Note: This figure includes all 10 occupational series identified as critical by Anniston Army Depot.

## Weapon Systems Affected by Shortage of Skilled Personnel

**Figure 4: M88A1 Weapon System Affected by Shortage of Skilled Personnel**



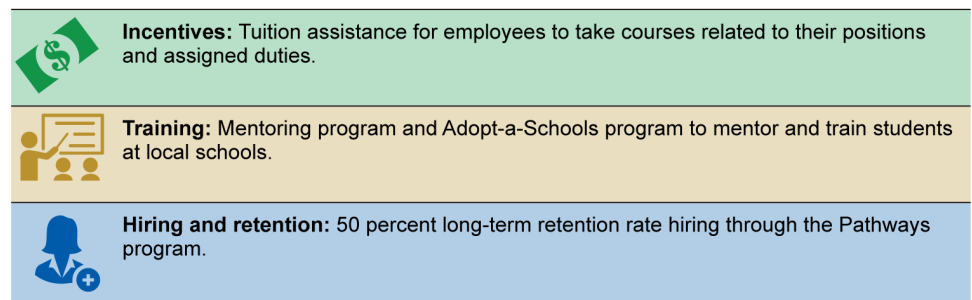
### M88A1

Lack of personnel familiar with this weapon system delayed the start of work.

Source: Defense Visual Information Distribution Service. | GAO-19-51

## Depot's Actions to Hire, Train, and Retain Skilled Personnel

**Figure 5: Anniston Army Depot's Actions to Maintain Critical Skills**



Source: GAO analysis of depot information. | GAO-19-51

Note: Pathway programs were created to ensure that the federal government continues to compete effectively for students and recent graduates.



## What This Depot Does

The Army has designated Corpus Christi Army Depot as a Center of Industrial and Technical Excellence for the maintenance and repair of structural helicopter airframes and blades; advanced composite technologies; flight controls and control surfaces; and aviation engines, transmissions, and hydraulic systems.

**Civilian Workforce:** 2,945.

**Systems repaired:** Helicopters (AH-64, AH-1, CH-47, OH-58, UH-60, and UH-1); engines and associated systems and subsystems.

## Challenges This Depot Faces

Corpus Christi Army Depot officials reported the following challenges to hiring and retaining a skilled workforce:

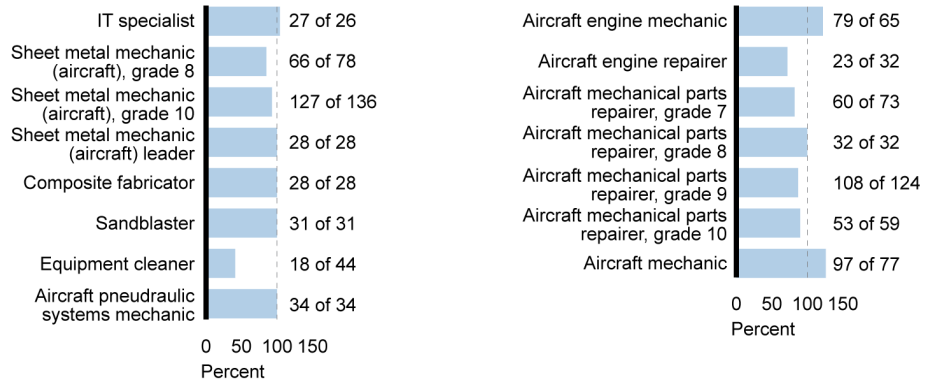
- **Aging workforce.** Retirements increase the possibility of loss of critical skills and limit the depot's ability to transfer knowledge.
- **Hiring constraints.** The depot lacks the ability to hire permanent employees, which creates difficulties in recruiting and maintaining an experienced workforce.
- **Hiring competition.** The depot competes with the private sector for the same skills and cannot compete successfully on pay and benefits.

# Corpus Christi Army Depot

## Corpus Christi, Texas

### Selected Occupations at This Depot Requiring Critical Skills

**Figure 6: Skilled Occupations Selected by Corpus Christi Officials: Actual Number of Personnel, Number of Authorized Positions, and Percent of Authorized Positions Filled, Fiscal Year 2017**



Source: GAO analysis of Department of Defense data. | GAO-19-51

Note: This figure includes 15 of the 59 occupational series identified as critical by Corpus Christi Army Depot.

### Weapon Systems Affected by Shortage of Skilled Personnel

**Figure 7: Helicopters Affected by Shortage of Skilled Personnel**



**AH-64 Apache Helicopter**

A shortfall in test pilots caused delays in the depot's ability to test the helicopters and return them to use.

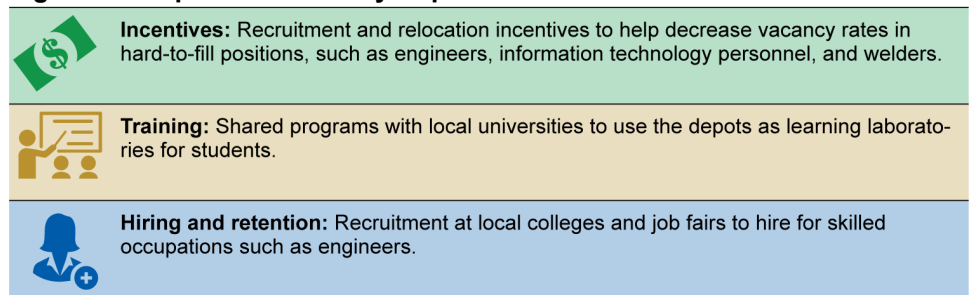


**UH-60 Black Hawk**

Source: Defense Visual Information Distribution Service. | GAO-19-51

### Depot's Actions to Hire, Train, and Retain Skilled Personnel

**Figure 8: Corpus Christi Army Depot's Actions to Maintain Critical Skills**



Source: GAO analysis of depot information. | GAO-19-51



## What This Depot Does

The Army has designated Letterkenny Army Depot as a Center of Industrial and Technical Excellence for the maintenance and repair of Air Defense and Tactical Missile Ground Support Equipment and Mobile Electric Power Generation Equipment.

**Civilian workforce:** 1,370.

**Systems repaired:** Air Defense and Tactical Missiles, Mobile Electric Power, Route Clearance Vehicles (RCV), and Material Handling Equipment (MHE).

## Challenges This Depot Faces

Letterkenny Army Depot officials reported the following challenges to hiring and retaining a skilled workforce:

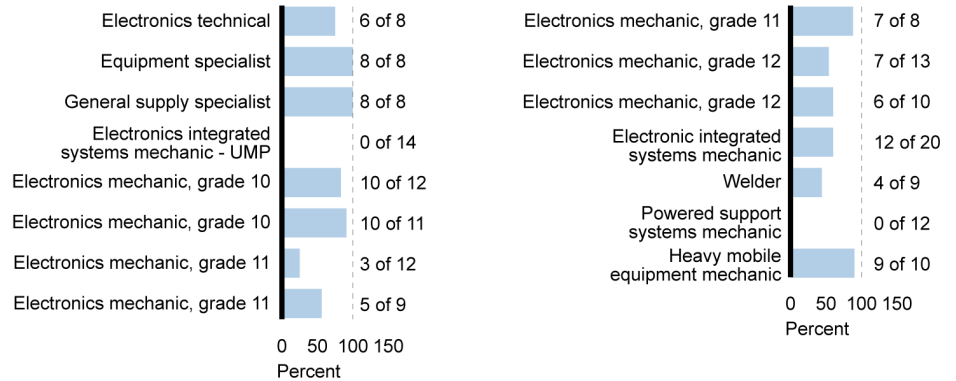
- **Hiring time lines.** It can take over a year to complete hiring actions through the human resources center, resulting in delays and difficulty filling critical positions.
- **Skilled personnel.** The depot's inability to test prospective personnel's skills makes it difficult to assess candidates.
- **Hiring competition.** The depot competes with the private sector for the same skills and cannot compete successfully on pay and benefits.

# Letterkenny Army Depot

Letterkenny, Pennsylvania

## Selected Occupations at This Depot Requiring Critical Skills

**Figure 9: Skilled Occupations Selected by Letterkenny Officials: Actual Number of Personnel, Number of Authorized Positions, and Percent of Authorized Positions Filled, Fiscal Year 2017**



UMP Upward Mobility Program  
Source: GAO analysis of Department of Defense data. | GAO-19-51

Note: This figure shows data for 15 of the 28 occupational series identified as critical by Letterkenny Army Depot.

## Weapon Systems Affected by Shortage of Skilled Personnel

**Figure 10: Multi Mission Launcher, Route Clearance Vehicles, and Sentinel Weapon Systems Affected by Shortage of Skilled Personnel**



**Multi Mission Launcher**  
A shortage of machinists delayed repair of the system.

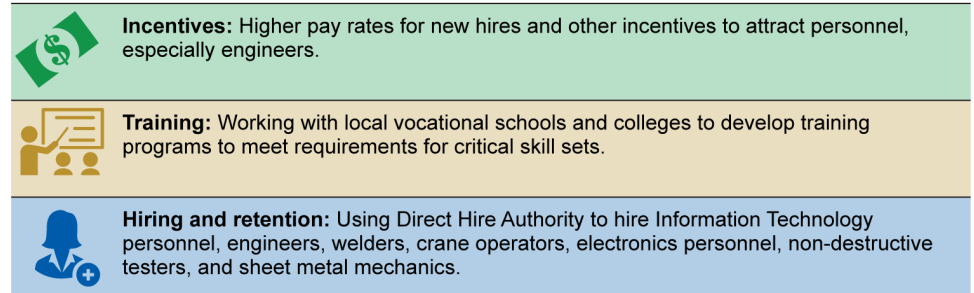
Source: Defense Visual Information Distribution Service. | GAO-19-51



**Route Clearance Vehicles and Sentinel**  
A shortfall in painting capacity delayed work on the vehicles.

## Depot's Actions to Hire, Train, and Retain Skilled Personnel

**Figure 11: Letterkenny Army Depot's Actions to Maintain Critical Skills**



Source: GAO analysis of depot information. | GAO-19-51

Note: Direct hire Authority expedites hiring by eliminating specific hiring rules.



# Red River Army Depot

Texarkana, Texas

## What This Depot Does

The Army has designated Red River Army Depot as a Center of Industrial and Technical Excellence for the maintenance and repair of Tactical Wheeled Vehicles, the Bradley Fighting Vehicle, Multiple Launch Rocket System chassis, and rubber products.

**Civilian workforce:** 2,395.

**Systems repaired:** Tactical wheeled vehicles—including Mine Resistant Ambush Protected (MRAP) vehicles, the High Mobility Multipurpose Wheeled Vehicle (HMMWV), the Family of Medium Tactical Vehicles (FMTV); the Bradley Fighting Vehicle; and the MLRS.

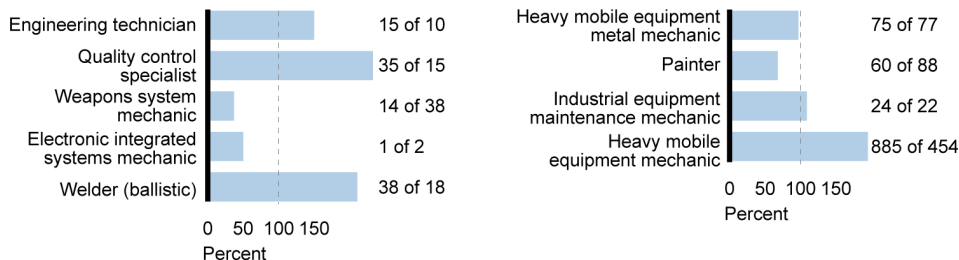
## Challenges This Depot Faces

Officials at Red River Army Depot reported the following challenges to hiring and retaining skilled personnel:

- **Retirements.** A significant percentage of skilled workers in certain occupations have been eligible for retirement since 2014, such as 80 percent of sheet metal mechanics and 71 percent of engineering technicians.
- **Loss of temporary worker experience.** As a result of various constraints on government hiring, experienced temporary skilled workers are lost when their appointments are not extended.
- **Hiring competition.** The depot competes with oil, tire, and paper manufacturing industries for certain skilled occupations, such as welders.

## Selected Occupations at This Depot Requiring Critical Skills

**Figure 12: Skilled Occupations Selected by Red River Officials: Actual Number of Personnel, Number of Authorized Positions, and Percent of Authorized Positions Filled, Fiscal Year 2017**



Source: GAO analysis of Department of Defense data. | GAO-19-51

Note: This figure includes all nine occupational series identified as critical by Red River Army Depot.

## Weapon Systems Affected by Shortage of Skilled Personnel

**Figure 13: Mine-Resistant Ambush Protected All-Terrain Vehicle Affected by Shortage of Skilled Personnel**



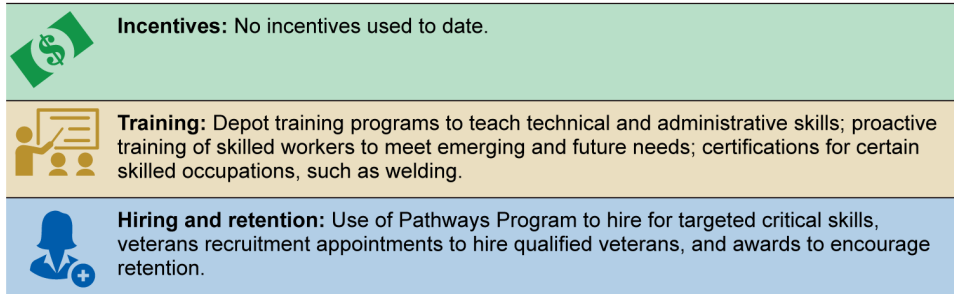
### Mine-Resistant Ambush Protected All Terrain Vehicle

Shortages in mechanics and support personnel contributed to production delays in fiscal year 2013, and repairs took 5 instead of 3 years to complete.

Source: Defense Visual Information Distribution Service. | GAO-19-51

## Depot's Actions to Hire, Train, and Retain Skilled Personnel

**Figure 14: Red River Army Depot's Actions to Maintain Critical Skills**



Source: GAO analysis of depot information. | GAO-19-51

Note: Pathway programs were created to ensure that the federal government continues to compete effectively for students and recent graduates.



## What This Depot Does

The Army has designated Tobyhanna Army Depot as a Center of Industrial and Technical Excellence for the maintenance and repair of systems associated with Command, Control, Communications, and Computers; Intelligence, Surveillance, and Reconnaissance; Electronics; Avionics; and Missile Control.

**Civilian workforce:** 2,499.

**Systems repaired:** Command, control, and communications; computers; intelligence, surveillance and reconnaissance systems; electronics; avionics; and missile guidance and control systems.

## Challenges This Depot Faces

Tobyhanna Army Depot officials reported the following challenges to hiring and retaining a skilled workforce:

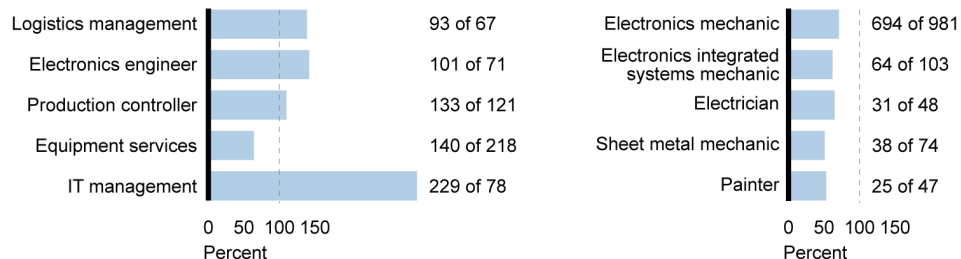
- **Travel requirements.** Because certain positions require extensive travel—for example, engineers and electronics technicians—candidates are hesitant to apply for or accept employment.
- **Certification requirements.** Positions with certification or specialized requirements are difficult to hire for.

# Tobyhanna Army Depot

Tobyhanna, Pennsylvania

## Selected Occupations at This Depot Requiring Critical Skills

**Figure 15: Skilled Occupations Selected by Tobyhanna Officials: Actual Number of Personnel, Number of Authorized Positions, and Percent of Authorized Positions Filled, Fiscal Year 2017**



Source: GAO analysis of Department of Defense data. | GAO-19-51

Note: This figure includes all 10 of the occupational series identified as critical by Tobyhanna Army Depot.

## Weapon Systems Affected by Shortage of Skilled Personnel

**Figure 16: Firefinder Radar, UH-60, Minehound, and other Weapon Systems Affected by Shortage of Skilled Personnel**



**Firefinder Radar**  
A shortage of skilled workers to handle workload led to reassigning experienced workers in order to meet the delivery schedule.



**UH-60 and Minehound (pictured)**  
Also AN/MPN-14, AN/MST-T1, AN/TPQ-37, AN/USM-488, FBCB2, AN/VPQ-1, AN/VSQ-6, CN-1314, FRN-43/44/45, and AN/TPS-75  
Seventy items related to these weapons systems were returned to the depot because of poor workmanship, including improper soldering, crossed wires, improperly connected wires, and incorrectly installed parts.



Source: Defense Visual Information Distribution Service. | GAO-19-51

## Depot's Actions to Hire, Train, and Retain Skilled Personnel

**Figure 17: Tobyhanna Army Depot's Actions to Maintain Critical Skills**



**Incentives:** Infrequent use of higher pay rates for new hires and other incentives to attract personnel, especially engineers.



**Training:** Training expenditures of \$13 million in fiscal year 2017 for about 22 hours of training per employee, including supervisory training and annual mandatory training in such areas as safety/cybersecurity, professional development, and non-duty developmental training.



**Hiring and retention:** Aggressive hiring of former military with knowledge and skills to perform depot work (34 percent of depot workers former military).

Source: GAO analysis of depot information. | GAO-19-51



## What This Depot Does

The Air Force has designated Ogden Air Logistics Complex as a Center of Industrial and Technical Excellence for the maintenance and repair of missiles, landing gear, and fighters.

**Civilian workforce:** 7,495.

**Systems repaired:** Fighters and attack aircraft (A-10, F-16, F-22, and F-35), Tester aircraft (T-38), Cargo aircraft (C-130), landing gear, missile systems, and software.

## Challenges This Depot Faces

Officials at Ogden Air Logistics Complex reported the following challenges to hiring and retaining a skilled workforce:

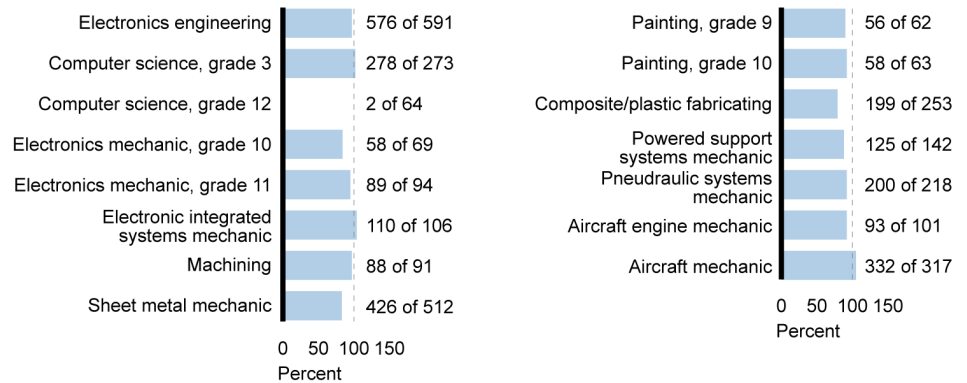
- **Competition with private industry.** Hard to hire electronics engineers and computer scientists.
- **Hiring timelines.** It takes up to 180 days from submission of a hiring action to bring on new hires.
- **Location.** Low unemployment in the State of Utah decreases the number of personnel available to hire.

# Ogden Air Logistics Complex

Ogden, Utah

## Selected Occupations at This Depot Requiring Critical Skills

**Figure 18: Skilled Occupations Selected by Ogden Officials: Actual Number of Personnel, Number of Authorized Positions, and Percent of Authorized Positions Filled, Fiscal Year 2017**



Source: GAO analysis of Department of Defense data. | GAO-19-51

Note: This figure includes 15 of the 25 occupational series identified as critical by Ogden Air Logistics Complex.

## Weapon Systems Affected by Shortage of Skilled Personnel

**Figure 19: F-16 and F-22 Affected by Shortage of Skilled Personnel**



### F-16

Shortages of avionics technicians in fiscal year 2017 caused delays that were not quantified by the depot.



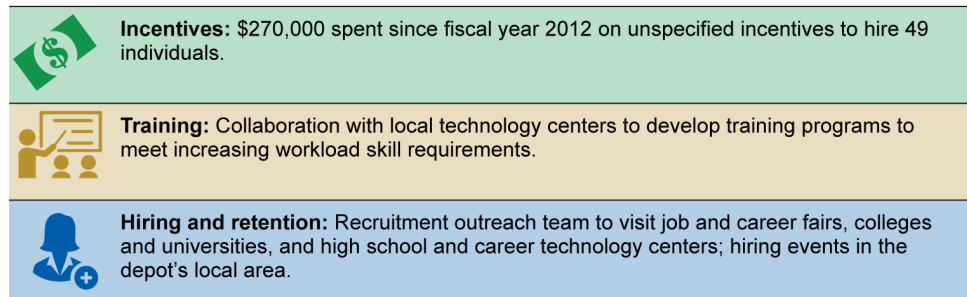
### F-22

A shortage of avionics technicians in fiscal year 2017 caused delays totaling 66 days to six aircraft.

Source: Defense Visual Information Distribution Service. | GAO-19-51

## Depot's Actions to Hire, Train, and Retain Skilled Personnel

**Figure 20: Ogden Air Logistics Complex's Actions to Maintain Critical Skills**



Source: GAO analysis of depot information. | GAO-19-51





# Oklahoma City Air Logistics Complex

Oklahoma City, Oklahoma

## What This Depot Does

The Air Force has designated Oklahoma City Air Logistics Complex as a Center of Industrial and Technical Excellence for the maintenance and repair of bombers, tankers, Airborne Warning and Control Systems, and engines.

**Civilian workforce:** 9,102.

**Systems repaired:** Bombers (B-1 and B-52), Tankers (KC-10 and KC-135), E3 AWACS, engines, and software.

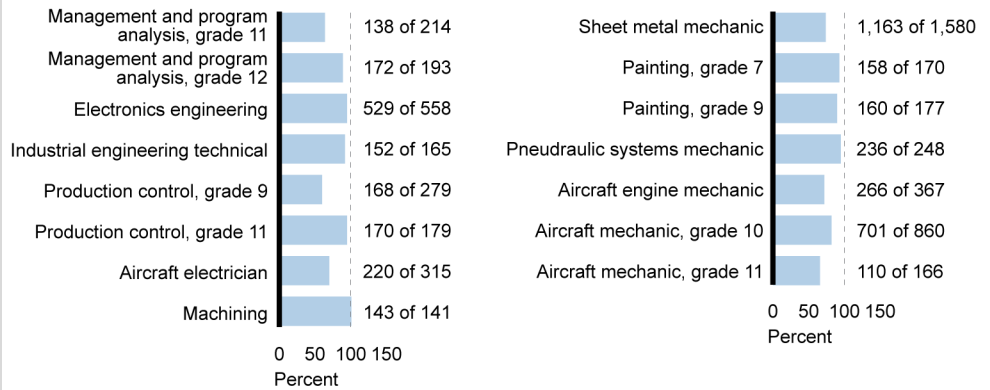
## Challenges This Depot Faces

Officials at Oklahoma City Air Logistics Complex reported the following challenges to hiring and retaining a skilled workforce:

- **Competition with private industry.** Competition with local industries, such as Boeing, Northrup Grumman, and the oil industry, makes hiring difficult for certain occupations, such as engineers.
- **Hiring timelines.** Hiring takes an average of 111 days.
- **Workforce training.** Mass hiring in fiscal year 2016 and 2017 resulted in challenges to training new hires.

## Selected Occupations at This Depot Requiring Critical Skills

**Figure 21: Skilled Occupations Selected by Oklahoma City Officials: Actual Number of Personnel, Number of Authorized Positions, and Percent of Authorized Positions Filled, Fiscal Year 2017**



Source: GAO analysis of Department of Defense data. | GAO-19-51

Note: This figure includes 15 of the 73 occupational series identified as critical by Oklahoma City Air Logistics Complex.

## Weapon Systems Affected by Shortage of Skilled Personnel

**Figure 22: F-16 and F-22 Affected by Shortage of Skilled Personnel**

Shortages in aircraft mechanics, aircraft electricians, sheet metal mechanics, and electronic integrated system mechanics delayed these weapons systems from fiscal year 2013 to 2017.



**B-1**  
Eight B-1s were delayed an average of 67 days in fiscal year 2015.



**B-52**  
Seven B-52s were delayed an average of 16 days in fiscal year 2017.



**KC-10**  
One KC-10 was delayed 5 days in fiscal year 2013.

Source: Defense Visual Information Distribution Service. | GAO-19-51

## Depot's Actions to Hire, Train, and Retain Skilled Personnel

**Figure 23: Oklahoma City Air Logistics Complex's Actions to Maintain Critical Skills**



**Incentives:** Retention incentives for engineers, including pay bonuses of up to 25 percent of salary, student loan repayment, and relocation reimbursements.



**Training:** Outreach to local technology centers and high schools to ensure a steady pipeline of aviation career technical students, internships, and outreach to engineering schools for hard-to-fill engineer occupations.



**Hiring and retention:** Fiscal years 2016 and 2017 "1,000 Hires in 100 Days" initiative to address identified shortages in depot personnel.

Source: GAO analysis of depot information. | GAO-19-51



## What This Depot Does

The Air Force has designated Warner Robins Air Logistics Complex as a Center of Industrial and Technical Excellence for the maintenance and repair of cargo aircraft, the F-15, and aviation electronics.

**Civilian workforce:** 6,483.

**Systems repaired:** Cargo aircraft (C-5, C-17, and C-130), Fighter aircraft (F-15), aviation electronics, and software.

## Challenges This Depot Faces

Officials at Warner Robins Air Logistics Complex reported the following challenges to hiring and retaining a skilled workforce:

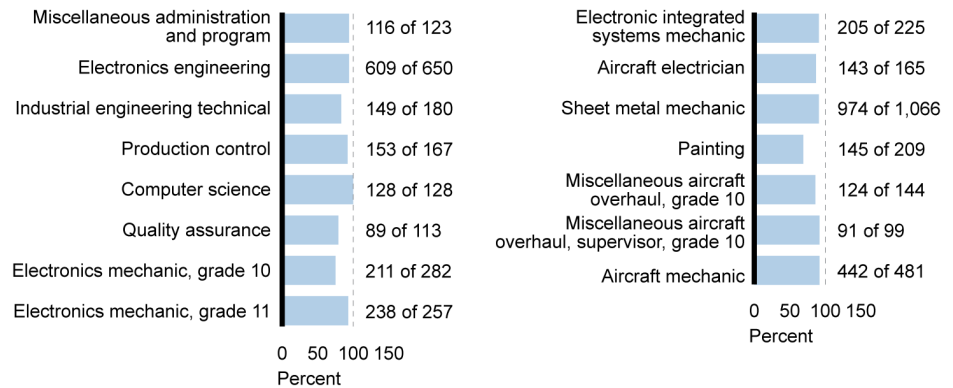
- **Hiring competition.** The depot is unable to match private sector salaries for certain occupations, such as electronics and computer engineers and computer scientists.
- **Hiring timelines.** Long timelines bringing new personnel on board.

# Warner Robins Air Logistics Complex

Warner Robins, Georgia

## Selected Occupations at This Depot Requiring Critical Skills

**Figure 24: Skilled Occupations Selected by Warner Robins Officials: Actual Number of Personnel, Number of Authorized Positions, and Percent of Authorized Positions Filled, Fiscal Year 2017**



Source: GAO analysis of Department of Defense data. | GAO-19-51

Note: This figure includes 15 of the 98 occupational series identified as critical by Warner Robins Air Logistics Complex.

## Weapon Systems Affected by Shortage of Skilled Personnel

**Figure 25: C-5, C-17, C-130, and F-15 Affected by Shortage of Skilled Personnel**



C-5

C-17

C-130

F-15

Shortages of aircraft mechanics and sheet metal mechanics contributed to delays in fiscal year 2017 that resulted in reduced output and increased program depot maintenance targets.

Source: Defense Visual Information Distribution Service. | GAO-19-51

## Depot's Actions to Hire, Train, and Retain Skilled Personnel

**Figure 26: Warner Robins Air Logistics Complex's Actions to Maintain Critical Skills**



**Incentives:** Use of 25 percent hiring bonuses for certain skilled occupations, such as electronics engineer, computer engineers and computers scientists, accelerated promotions, and increased annual leave.



**Training:** Collaboration with local career technology centers to ensure that students develop skills needed at the complex.



**Hiring and retention:** Use of Expedited Hiring Authority and Pathways Program to meet critical skill needs; recruitment outreach team to visit job/career fairs, colleges and universities, high school and career technology centers to recruit candidates; and social media to promote job opportunities at the depot and provide updated hiring information to the public.

Source: GAO analysis of depot information. | GAO-19-51

Note: Expedited Hiring Authority permits the Secretary of Defense to designate any category of position in the acquisition workforce as positions for which there exists a shortage of candidates or there is a critical hiring need. Pathway programs were created to ensure that the federal government continues to compete effectively for students and recent graduates.



## What This Depot Does

The Navy has designated Fleet Readiness Center – East as a Center of Industrial and Technical Excellence for the maintenance and repair of sea-based and maritime aircraft and related aeronautical systems.

**Civilian workforce:** 3,650.

**Systems repaired:** Helicopters (AH-1, CH-53E, MH- 53E, UH-1Y), Airplanes (AV-8B and EA-6B), Fighter aircraft (F/A- 18 A, C, and D variants), the MV- 22 Osprey, and various engines and components.

## Challenges This Depot Faces

Officials at Fleet Readiness Center – East reported the following challenges to hiring and retaining a skilled workforce:

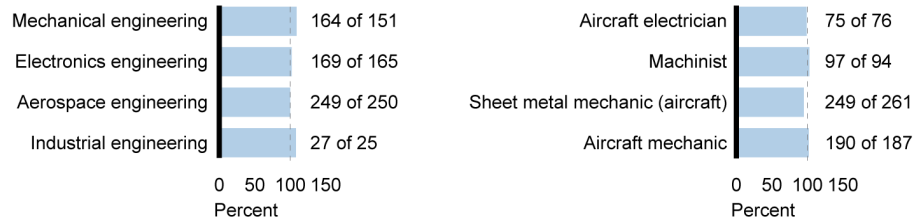
- **Hiring competition.** Higher wages in the private sector make it difficult to keep skilled personnel at the Beaufort, SC site.
- **Hiring freeze.** The January—April 2017 hiring freeze caused rework in job offers because of the high declination rate resulting from delays in the hiring process.

## Fleet Readiness Center – East

Cherry Point, North Carolina

### Selected Occupations at This Depot Requiring Critical Skills

Figure 27: Skilled Occupations Selected by Fleet Readiness Center – East Officials: Actual Number of Personnel, Number of Authorized Positions, and Percent of Authorized Positions Filled, Fiscal Year 2017



Source: GAO analysis of Department of Defense data. | GAO-19-51

Note: This figure includes data for all 8 of the occupational series identified as critical by Fleet Readiness Center – East.

### Weapon Systems Affected by Shortage of Skilled Personnel

Figure 28: F-18 Affected by Shortage of Skilled Personnel



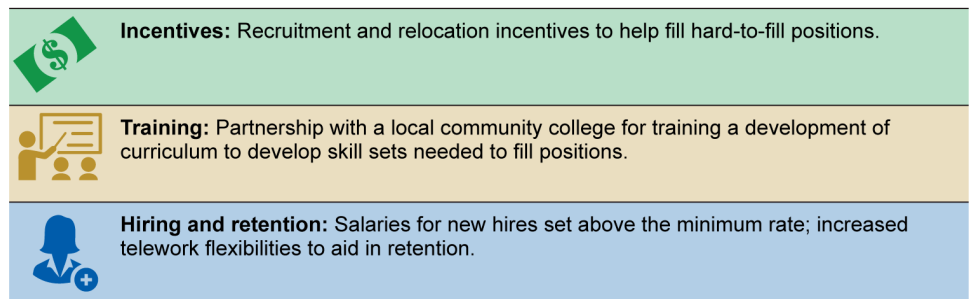
#### F-18

The F-18 has experienced minimal maintenance delays of 2 to 7 days as a result of high loss of skilled personnel.

Source: Defense Visual Information Distribution Service. | GAO-19-51

### Depot's Actions to Hire, Train, and Retain Skilled Personnel

Figure 29: Fleet Readiness Center – East's Actions to Maintain Critical Skills



Source: GAO analysis of depot information. | GAO-19-51



## What This Depot Does

The Navy has designated Fleet Readiness Center – Southeast as a Center of Industrial and Technical Excellence for the maintenance and repair of sea-based and maritime aircraft and the related aeronautical systems and equipment.

**Civilian workforce:** 3,180.

**Systems repaired:** Helicopters (MH-60R and S) Aircraft (C-2A and E-2 C and D, EA-6B, P-3), Fighter Aircraft (F/A- 18 A-F variants), Trainers (T-6, T- 34, T-44), and various components.

## Challenges This Depot Faces

Officials at Fleet Readiness Center – Southeast reported the following challenges to hiring and retaining a skilled workforce:

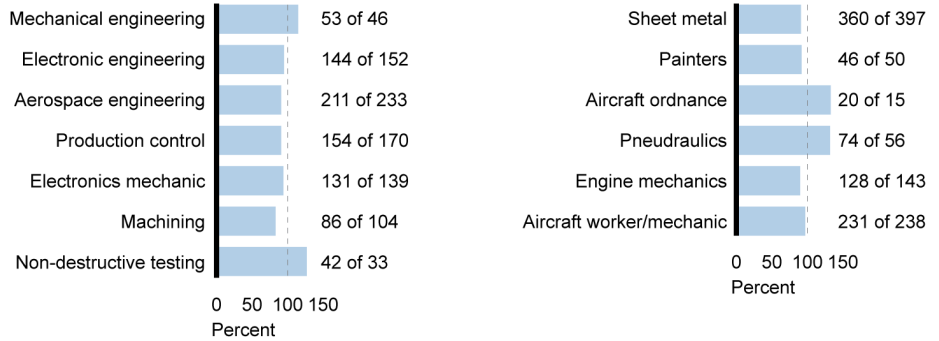
- **High declination rate.** In 2017, the declination rate for hard-to-fill depot positions was 35 percent.
- **Increased hiring demand.** Increases in hiring result in a greater need for training for new personnel.
- **Reduced candidate pool.** There is a reduced pool of candidates to choose from, since many were hired between fiscal years 2015 and 2017.

# Fleet Readiness Center – Southeast

Jacksonville, Florida

## Selected Occupations at This Depot Requiring Critical Skills

**Figure 30: Skilled Occupations Selected by Fleet Readiness Center - Southeast Officials: Actual Number of Personnel, Number of Authorized Positions, and Percent of Authorized Positions Filled, Fiscal Year 2017**



Source: GAO analysis of Department of Defense data. | GAO-19-51

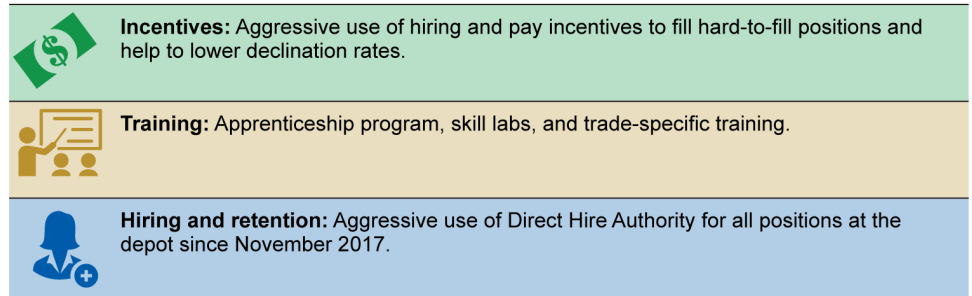
Note: This figure includes data for all 13 of the occupational series identified as critical by Fleet Readiness Center – Southeast.

## Weapon Systems Affected by Shortage of Skilled Personnel

According to Navy officials, none of the weapon systems this depot repairs have been affected by a shortage of skilled personnel.

## Depot's Actions to Hire, Train, and Retain Skilled Personnel

**Figure 31: Fleet Readiness Center – Southeast's Actions to Maintain Critical Skills**



Source: GAO analysis of depot information. | GAO-19-51

Note: Direct Hire Authority expedites hiring by eliminating specific hiring rules.



# Fleet Readiness Center-Southwest

North Island, California

## What This Depot Does

The Navy has designated Fleet Readiness Center – Southwest as a Center of Industrial and Technical Excellence for the maintenance and repair of sea-based and maritime aircraft and related aeronautical systems and equipment.

**Civilian workforce:** 2,847.

**Systems repaired:** Helicopters (AH-1, CH-53E, HH-60, MH-60, and UH-1Y), airplanes (C-2A, E-2C, E-2D, and EA-18G), fighter aircraft (F/A-18 A-F variants), MV-22 Osprey, and various engines and components.

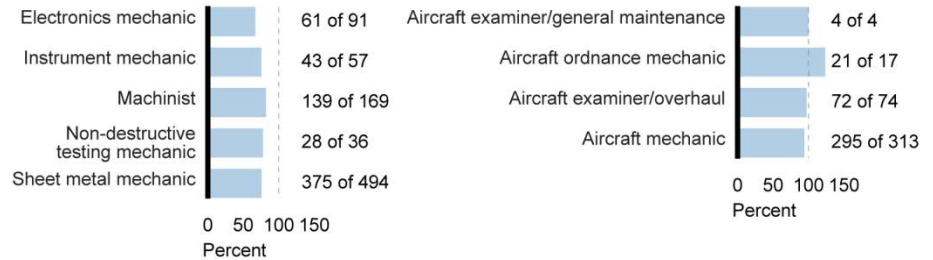
## Challenges This Depot Faces

Officials at Fleet Readiness Center – Southwest reported the following challenges to hiring and retaining a skilled workforce:

- **Location.** The San Diego area has a high cost of living and the depot faces hiring competition from private industry.
- **Lack of skilled workforce.** Forty one percent of the depot's personnel have 2 years or less of experience.
- **Hiring freezes.** In 2013, 2014, and January through April of 2017, various hiring freezes caused delays or prevented the depot from bringing on skilled personnel.
- **High declination rate.** Thirty-six percent of candidates do not accept employment offers.

## Selected Occupations at This Depot Requiring Critical Skills

**Figure 32: Skilled Occupations Selected by Fleet Readiness Center - Southwest Officials: Actual Number of Personnel, Number of Authorized Positions, and Percent of Authorized Positions Filled, Fiscal Year 2017**



Source: GAO analysis of Department of Defense data. | GAO-19-51

Note: This figure includes data for all 9 of the occupational series identified as critical by Fleet Readiness Center – Southwest.

## Weapon Systems Affected by Shortage of Skilled Personnel

**Figure 33: E-2/C-2, F/A-18, and EA-18G Affected by Shortage of Skilled Personnel**



**E-2/C-2**  
The landing and arresting gear for this aircraft were improperly repaired.



**F/A-18**  
Of 31 aircraft scheduled for repair in fiscal year 2017, 18 were not repaired.

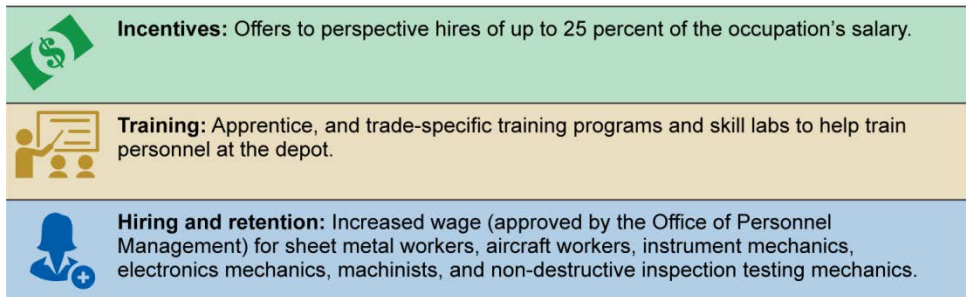


**EA-18G**  
There were issues with the quality of work on landing, arresting, and catapult systems overhaul.

Source: Defense Visual Information Distribution Service. | GAO-19-51

## Depot's Actions to Hire, Train, and Retain Skilled Personnel

**Figure 34: Fleet Readiness Center-Southwest's Actions to Maintain Critical Skills**



Source: GAO analysis of depot information. | GAO-19-51



## What This Depot Does

The Navy has designated Norfolk Naval Shipyard as a Center of Industrial and Technical Excellence for maintenance and repair, modernization, disposal, and emergency repair of ships, systems, and components.

**Civilian workforce:** 10,535.

**Systems repaired:** Nuclear Aircraft Carriers (Nimitz Class), Submarines (Los Angeles Class and Ohio Class), and Various Surface Combatants (CGs, LHDs, LPDs, LCCs, FFGs, and AS Tenders).

## Challenges This Depot Faces

Officials at Norfolk Naval Shipyard reported the following challenges to hiring and retaining a skilled workforce:

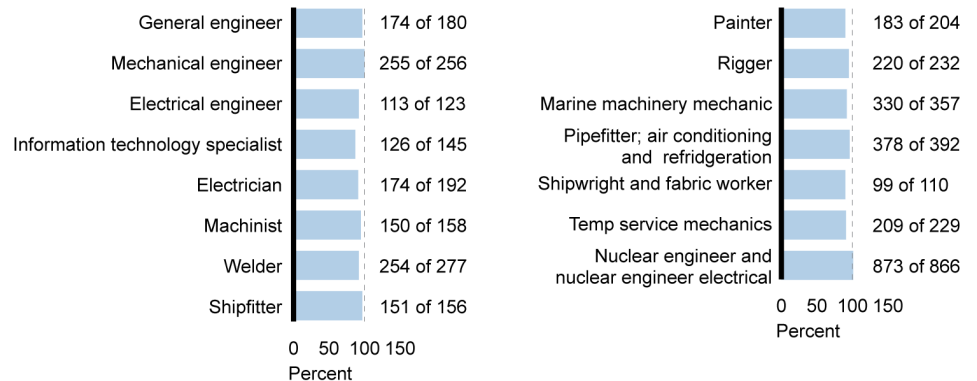
- **Hiring competition.** The shipyard competes with both the private sector and other government agencies for certain skilled occupations, such as engineers, technicians, Information Technology specialists, and contracting specialists.
- **Hiring timelines.** It typically takes 6 months or longer to bring on new personnel for all occupations at the shipyard.
- **Workforce skills and experience.** Mass hiring has reduced the skill and experience of the shipyard workforce; approximately 30 percent of the workforce has less than 5 years of experience and or training.

# Norfolk Naval Shipyard

Portsmouth, Virginia

## Selected Occupations at This Depot Requiring Critical Skills

**Figure 35: Skilled Occupations Selected by Norfolk Naval Shipyard Officials: Actual Number of Personnel, Number of Authorized Positions, and Percent of Authorized Positions Filled, Fiscal Year 2017**



Source: GAO analysis of Department of Defense data. | GAO-19-51

Note: This figure includes 15 of the 25 occupational series identified as critical by Norfolk Naval Shipyard. Temp services mechanics include Air Condition Equipment mechanics, electricians, high-voltage electricians, stationary-engine operators, pipefitting, general maintenance and operations, industrial equipment mechanics, and sheet metal mechanics.

## Weapon Systems Affected by Shortage of Skilled Personnel

**Figure 36: Submarines Affected by Shortage of Skilled Personnel**



### Los Angeles class submarines

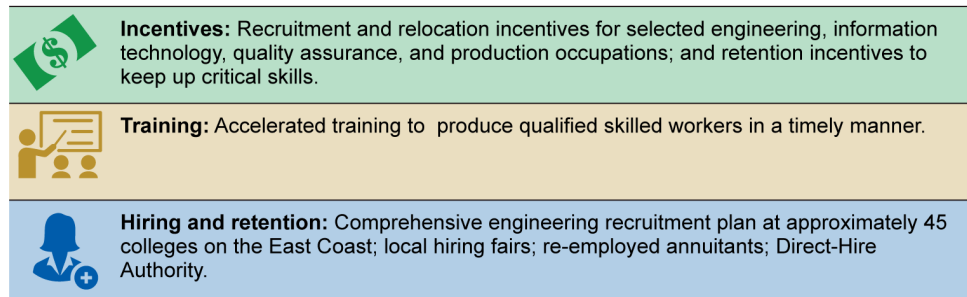
Shortages in certain skilled occupations, such as ship fitters, welders, and marine machinery mechanics, contributed to delays in maintenance for the following submarines:

- USS *Newport News*—approximately 7 months
- USS *Albany*—approximately 14 months
- USS *Rhode Island*—approximately 1 year (before start)
- USS *Boise*—removed from the shipyard's workload 4 months after it arrived

Source: Defense Visual Information Distribution Service. | GAO-19-51

## Depot's Actions To Hire, Train, and Retain Skilled Personnel

**Figure 37: Norfolk Naval Shipyard's Actions to Maintain Critical Skills**



Source: GAO analysis of depot information. | GAO-19-51

Note: Direct Hire Authority expedites hiring by eliminating specific hiring rules.



## What This Depot Does

The Navy has designated Pearl Harbor Naval Shipyard as a Center of Industrial and Technical Excellence for the maintenance and repair, modernization, disposal, and emergency repair of ships, systems, and components.

**Civilian workforce:** 5,081.

**Systems repaired:** Nuclear Submarines (Los Angeles Class and Virginia Class) and Surface Combatants (CGs, DDGs, LPDs, FFGs, AS, Tenders).

## Challenges This Depot Faces

Officials at Pearl Harbor Naval Shipyard reported the following challenges to hiring and retaining a skilled workforce:

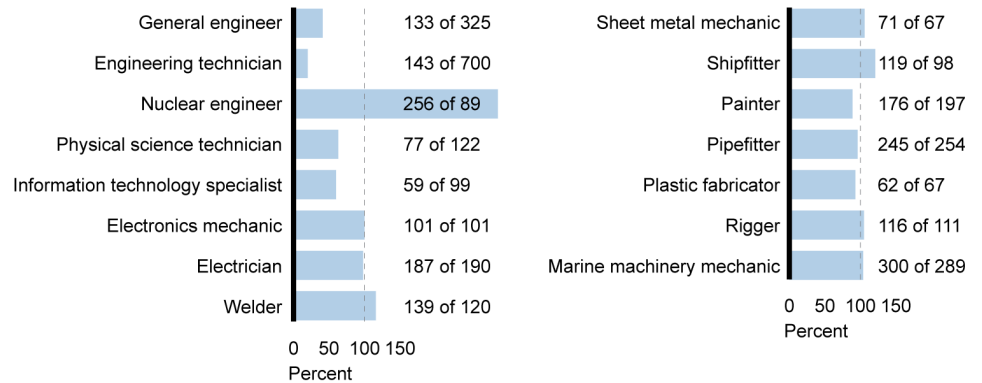
- **Location.** Applicants are hesitant to relocate to Hawaii, which has a high cost of living, a shortage of housing, and a small pool of qualified applicants.
- **Hiring timelines.** It typically takes 8-9 months to bring on new personnel. The shipyard human resource center and medical center do not have sufficient resources to handle increased hiring demands of the shipyard.
- **Workforce skills and experience.** Retirements and Mass hiring have reduced the skill and experience of the workforce; approximately 41 percent of the workforce has 3 years or less of experience and/or training.

# Pearl Harbor Naval Shipyard

Honolulu, Hawaii

## Selected Occupations at This Depot Requiring Critical Skills

**Figure 38: Skilled Occupations Selected by Pearl Harbor Naval Shipyard Officials: Actual Number of Personnel, Number of Authorized Positions, and Percent of Authorized Positions Filled, Fiscal Year 2017**



Source: GAO analysis of Department of Defense data. | GAO-19-51

Note: This figure includes 15 of the 27 occupational series identified as critical by Pearl Harbor Naval Shipyard.

## Weapon Systems Affected by Shortage of Skilled Personnel

**Figure 39: Submarines Affected by Shortage of Skilled Personnel**



### Los Angeles class submarines

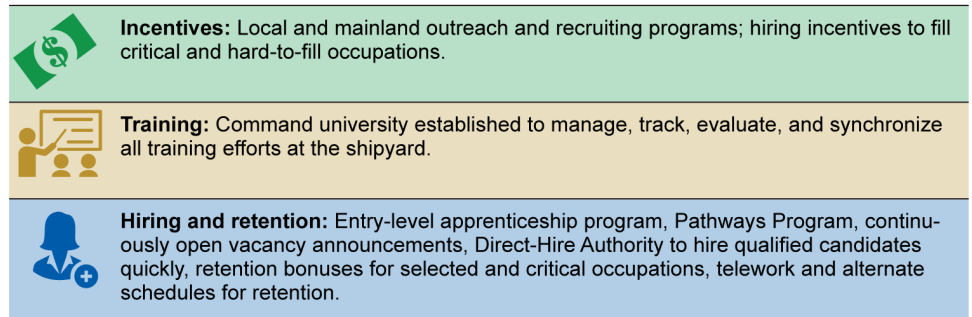
Shortages in skilled occupations, such as ship fitters, sheet metal mechanics, welders, and pipefitters contributed to delays in maintenance for the following submarines:

- USS *Asheville*—approximately 23 months, completed in 2017
- USS *Jefferson City*—approximately 20 months, completion expected in 2019
- USS *Columbus*—removed from the shipyard's workload and work contracted out to the private sector in 2017

Source: Defense Visual Information Distribution Service. | GAO-19-51

## Depot's Actions to Hire, Train, and Retain Skilled Personnel

**Figure 40: Pearl Harbor Naval Shipyard's Actions to Maintain Critical Skills**



Source: GAO analysis of depot information. | GAO-19-51

Note: Pathway programs were created to ensure that the federal government continues to compete effectively for students and recent graduates. Direct Hire Authority expedites hiring by eliminating specific hiring rules.



## What This Depot Does

The Navy has designated Portsmouth Naval Shipyard as a Center of Industrial and Technical Excellence for the maintenance and repair, modernization, disposal, and emergency repair of ships, systems, and components.

**Civilian Workforce:** 5,476 personnel.

**Systems repaired:** Nuclear submarines (Los Angeles class and Virginia class).

## Challenges This Depot Faces

Officials at Portsmouth Naval Shipyard reported the following challenges to hiring and retaining a skilled workforce:

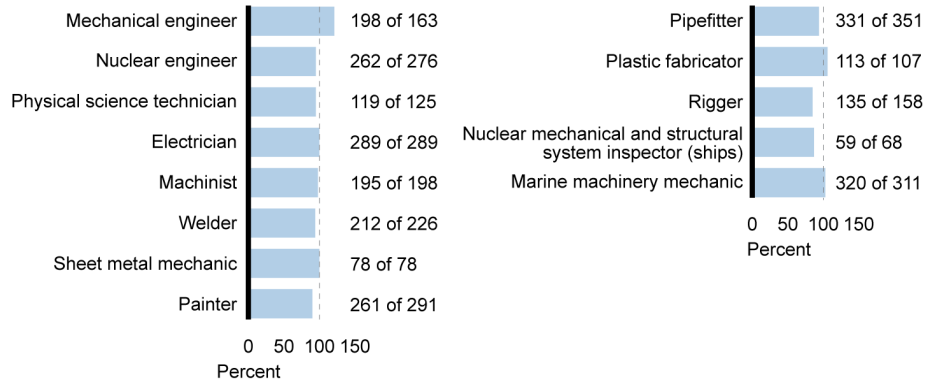
- **Competition with private industry.** The shipyard competes with the private sector to hire and retain certain types of engineers, such as electrical/electronics, welding, and information technology and cyber security engineers.
- **Hiring timelines.** It typically takes up to 6 months to bring on new personnel in certain occupations, such as engineers. The shipyard human resource center and medical center also do not have resources to handle increased hiring demands of the shipyard.
- **Workforce skills and experience.** Mass hiring has reduced the skill and experience of the shipyard workforce. Approximately 47 percent of the workforce in critical trades has less than 5 years of experience and or training.

# Portsmouth Naval Shipyard

Kittery, Maine

## Selected Occupations at This Depot Requiring Critical Skills

**Figure 41: Skilled Occupations Selected by Portsmouth Naval Shipyard Officials: Actual Number of Personnel, Number of Authorized Positions, and Percent of Authorized Positions Filled, Fiscal Year 2017**



Source: GAO analysis of Department of Defense data. | GAO-19-51

Note: This figure includes 13 of the 29 occupational series identified as critical by Portsmouth Naval Shipyard.

## Weapon Systems Affected by Shortage of Skilled Personnel

**Figure 42: Submarines Affected by Shortage of Skilled Personnel**



### Los Angeles class submarines


Shortages in certain skilled occupations contributed to delays in maintenance for the following submarines:

- USS *Annapolis*—2 months in fiscal year 2015 because of shortages in nuclear pipe welders and pipefitters
- USS *Hampton*—2 months in fiscal year 2016 because of shortages in painters and plastic fabricators
- USS *Springfield*—7 months in fiscal year 2017 because of shortages in painters and plastic fabricators


Source: Defense Visual Information Distribution Service. | GAO-19-51

## Depot's Actions to Hire, Train, and Retain Skilled Personnel


**Figure 43: Portsmouth Naval Shipyard's Actions to Maintain Critical Skills**



**Incentives:** Recruiting incentives for certain skilled occupations and retention and relocation incentives, including student loan repayment, for engineers.



**Training:** Multiple learning centers for industrial trades with rotating staff of experienced industrial trade mechanics; alignment of training with first-year training plans for new hires.



**Hiring and retention:** Diverse approaches to hiring, including entry-level apprentice programs, the Pathways Program, and new career progression positions for engineers; extensive outreach and recruiting program in the local area and Northeast Region, and Direct-Hire Authority for engineers.

Source: GAO analysis of depot information. | GAO-19-51

Note: Pathways programs were created to ensure that the federal government continues to compete effectively for students and recent graduates. Direct Hire Authority expedites hiring by eliminating specific hiring rules.





# Puget Sound Naval Shipyard

Bremerton, Washington

## What This Depot Does

The Navy has designated Puget Sound Naval Shipyard as a Center of Industrial and Technical Excellence for the maintenance and repair, modernization, disposal, and emergency repair of ships, systems, and components.

**Civilian workforce:** 13,548.

**Systems repaired:** Nuclear carriers (Nimitz Class), Submarines (Los Angeles Class, Seawolf Class, and Ohio Class), and surface combatants (DDG-51 Class).

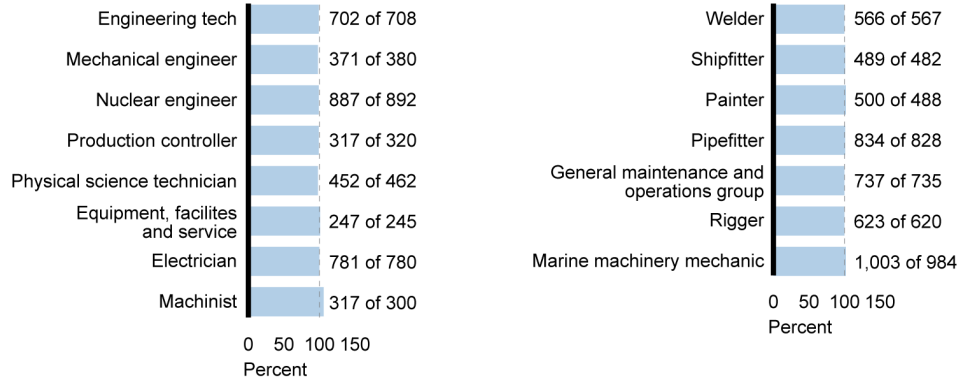
## Challenges This Depot Faces

Officials at Puget Sound Naval Shipyard reported the following challenges to hiring and retaining a skilled workforce:

- **Hiring competition.** Shipyard competes with the private sector in the region for certain skilled occupations, such as engineers.
- **Outdated shipyard infrastructure.** Shipyard layout and facilities are outdated and affect the ability of the shipyard to efficiently and effectively deploy and train skilled workers.
- **Workforce skills and experience.** Retirements and mass hiring have reduced the skill and experience of the shipyard workforce; approximately 45 percent of the production workforce has less than 5 years of experience and/or training.

## Selected Occupations at This Depot Requiring Critical Skills

**Figure 44: Skilled Occupations Selected by Puget Sound Naval Shipyard Officials: Actual Number of Personnel, Number of Authorized Positions, and Percent of Authorized Positions Filled, Fiscal Year 2017**



Source: GAO analysis of Department of Defense data. | GAO-19-51

Note: This figure includes 15 of the 135 occupational series identified as critical by Puget Sound Naval Shipyard.

## Weapon Systems Affected by Shortage of Skilled Personnel

**Figure 45: Aircraft Carrier and Submarines Affected by Shortage of Skilled Personnel**



**USS Nimitz**  
Shortages in skilled personnel and critical skills contributed to a delay of over 4 months.

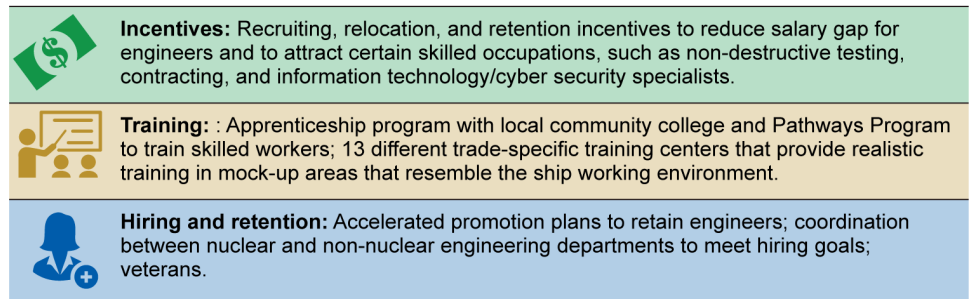


**Los Angeles- (pictured), Seawolf-, and Ohio-class submarines**  
Shortages in skilled personnel and critical skills contributed to delays ranging from approximately 6 months to over 31 months for five difference submarines.

Source: Defense Visual Information Distribution Service. | GAO-19-51

## Depot's Actions to Hire, Train, and Retain Skilled Personnel

**Figure 46: Puget Sound Naval Shipyard's Actions to Maintain Critical Skills**



Source: GAO analysis of depot information. | GAO-19-51

Note: Pathways programs were created to ensure that the federal government continues to compete effectively for students and recent graduates. Veterans Recruitment Appointment authority allows for certain exceptions from the competitive examining process. Specifically, agencies may appoint eligible veterans without competition under limited circumstances. Direct Hire Authority expedites hiring by eliminating specific hiring rules.



## What This Depot Does

The Marine Corps has designated Albany Production Plant as a Center of Industrial and Technical Excellence for the maintenance and repair of ground vehicles and their associated components.

**Civilian workforce:** 1,376, including personnel at both production plants.

**Systems Repaired:** Amphibious Assault Vehicles (AAV), Light Armored Vehicles (LAV), High Mobility Multipurpose Wheeled Vehicles (HMMWV), Mine Resistant Ambush Protected Vehicles (MRAP), Medium Tactical Vehicle Replacements (MTVR), communications/electronics equipment, and small arms.

## Challenges This Depot Faces

Marine Corps officials reported the following challenges to hiring and retaining a skilled workforce:

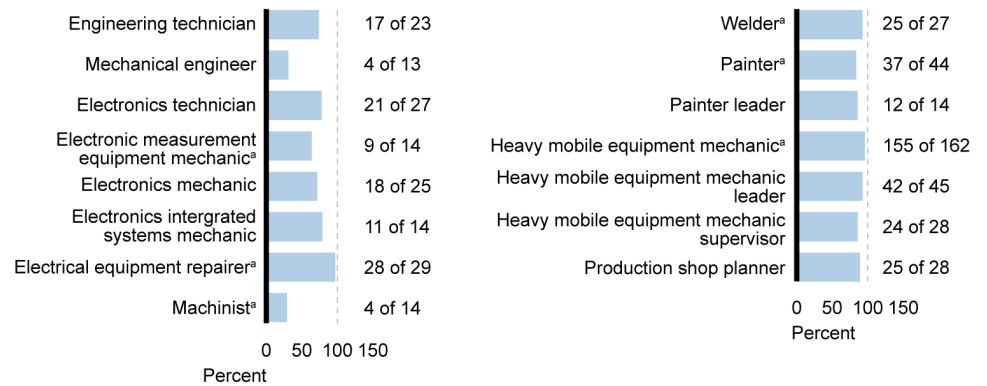
- **Location.** The depot's rural location makes it difficult to attract non-local hires.
- **Hiring time lines.** It takes an average of 10 months to complete the hiring process, because there are personnel shortages in the human resources office.

# Albany Production Plant

## Albany, Georgia

### Selected Occupations at This Depot Requiring Critical Skills

**Figure 47: Skilled Occupations Selected by Albany Officials: Actual Number of Personnel, Number of Authorized Positions, and Percent of Authorized Positions Filled, Fiscal Year 2017**



Source: GAO analysis of Department of Defense data. | GAO-19-51

<sup>a</sup>Includes trainee positions.

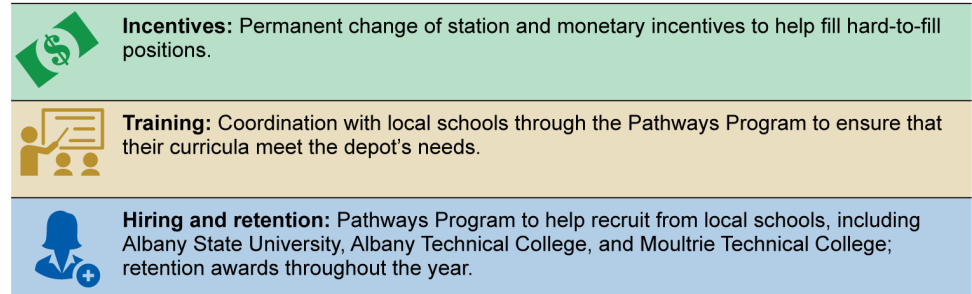
Note: This figure includes data for 15 of the 28 occupational series identified as critical by Albany Production Plant.

### Weapon Systems Affected by Shortage of Skilled Personnel

According to Marine Corps officials, none of the weapon systems this depot repairs have been affected by a shortage of skilled personnel.

### Depot's Actions to Hire, Train, and Retain Skilled Personnel

**Figure 48: Albany Production Plant's Actions to Maintain Critical Skills**



Source: GAO analysis of depot information. | GAO-19-51

Note: Pathways programs were created to ensure that the federal government continues to compete effectively for students and recent graduates.



## What This Depot Does

The Marine Corps has designated Barstow Production Plant as a Center of Industrial and Technical Excellence for the maintenance and repair of ground vehicles and their associated components.

**Civilian workforce:** 1,376, including personnel at both production plants.

**Systems repaired:** Amphibious Assault Vehicles (AAV), Light Armored Vehicles (LAV), High Mobility Multipurpose Wheeled Vehicles (HMMWV), Mine Resistant Ambush Protected vehicles (MRAP), Medium Tactical Vehicle Replacements (MTVR), howitzers, communications/electronics equipment, and small arms.

## Challenges This Depot Faces

Marine Corps officials noted the following challenge to hiring and retaining a skilled workforce:

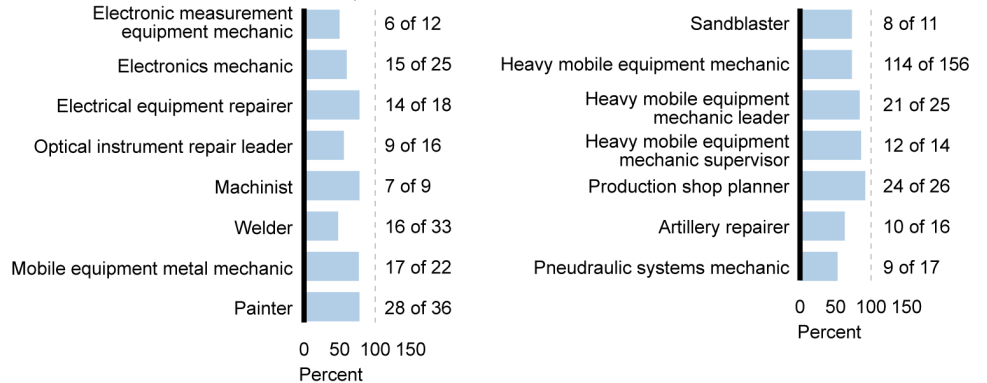
- **Hiring competition.** The depot competes with the local private sector industry for engineers and is unable to compete on pay and benefits.

# Barstow Production Plant

Barstow, California

## Selected Occupations at This Depot Requiring Critical Skills

**Figure 49: Skilled Occupations Selected by Barstow Officials: Actual Number of Personnel, Number of Authorized Positions, and Percent of Authorized Positions Filled, Fiscal Year 2017**



Source: GAO analysis of Department of Defense data. | GAO-19-51

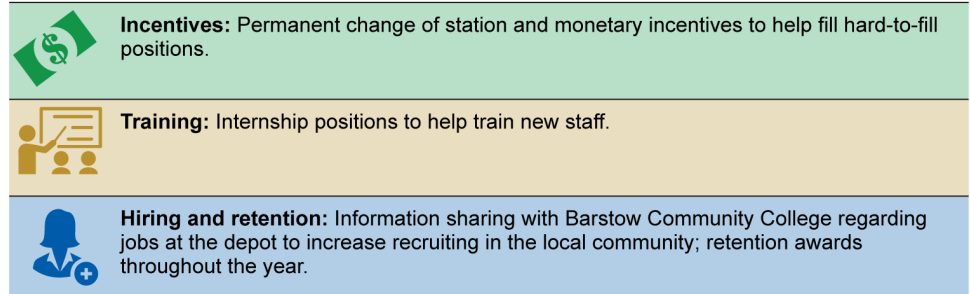
Note: This figure includes data for 15 of the 33 occupational series identified as critical by Barstow Production Plant.

## Weapon Systems Affected by Shortage of Skilled Personnel

According to Marine Corps officials, none of the weapon systems this depot repairs have been affected by a shortage of skilled personnel.

## Depot's Actions to Hire, Train, and Retain Skilled Personnel

**Figure 50: Barstow Production Plant's Actions to Maintain Critical Skills**



Source: GAO analysis of depot information. | GAO-19-51

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# Appendix II: Scope and Methodology

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To examine the extent to which the Department of Defense's (DOD) depots face challenges filling skilled occupations and maintaining critical skills in the depot workforce, including any potential effects of these challenges on maintenance activities, we obtained information from depot officials from all 17 DOD depots that perform depot-level activities.<sup>1</sup> This information identified which civilian depot occupations are critical to depot maintenance activities at each depot, as well as depot occupations that are hard to fill because of challenges in hiring, training, and retention.

DOD does not have a corporate definition of a "critical depot occupation," so rather than providing a definition or selecting the occupations ourselves, we provided the depots with parameters on how each depot could identify these occupations. For example, we asked each depot to identify occupations such as, but not limited to machinists, mechanics, and engineers that were directly responsible for the depots' repair or maintenance mission; however, each depot was given the flexibility to identify its own list. The occupations that depots identified included civilian General Schedule and Wage Grade occupations, such as artisans, machinists, technicians, welders, painters, and engineers, among others, that are either directly or indirectly responsible for the repair, sustainment, and maintenance of weapon systems and equipment—including components, parts, and end items at the depots.

We obtained data on authorized and actual personnel for the entire depot workforce for fiscal years 2013 to 2017 from the military services and depots. To assess the reliability of the personnel data we obtained from the military services and depots, we developed a data reliability questionnaire and received responses from knowledgeable officials. Based on the responses from these officials, our analysis of the data, and follow-up discussions with DOD officials, we determined that the data provided to us on depot civilian workforce authorization and filled positions for fiscal years 2013 through 2017 were sufficiently reliable for our reporting purposes, except for data we received from the Air Force and for Corpus Christi Army Depot. In addition, we did not include authorized and actual personnel data for fiscal year 2017 for Pearl Harbor

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<sup>1</sup>The 17 DOD depots are Anniston Army Depot; Corpus Christi Army Depot; Letterkenny Army Depot; Red River Army Depot; Tobyhanna Army Depot; Ogden Air Logistics Complex; Oklahoma City Air Logistics Complex; Warner Robins Air Logistics Complex; Fleet Readiness Centers East, Southeast, and Southwest; Norfolk Navy Shipyard; Pearl Harbor Naval Shipyard; Portsmouth Naval Shipyard; Puget Sound Naval Shipyard; and Marine Corps Production Plants Albany and Barstow.

and Portsmouth Naval Shipyards because Navy officials were unable to provide complete data for some of the skilled occupations identified in that fiscal year.

The Air Force and Corpus Christi Army Depot provided some data that were of undetermined reliability. For example, the Air Force noted that the system it used to identify its authorized civilian workforce figures—Manpower Programming and Execution System—had some data gaps in the years we requested, so even though the Air Force conducts routine data quality reviews to check for errors, and logic rules are built into the system, we concluded that the Air Force data were of undetermined reliability. However because this system was the system that could provide the best data available applicable to the years we requested and provided civilian personnel data for all of the Air Force depots included in our review, we are using this information to provide an overview of how the Air Force filled occupations that required certain critical skills from fiscal year 2013 through 2017. Additionally, Corpus Christi Army Depot officials did not provide enough information to describe the steps it had taken to ensure the system used to provide personnel authorization data—Resource Management Online—was reliable. Until we receive sufficient information, we must conclude that the data are of undetermined reliability. However, because this system was used by decision makers at Corpus Christi Army Depot to determine personnel authorization counts for the years we requested, we are using the data provided to us to provide an overview of how well Corpus Army Depot was able to fill occupations that required certain critical skills from fiscal year 2013 through 2017.

To identify any workforce trends, and to provide the most complete and readily available data at the time of our review, we compared data on depot civilian personnel authorizations for occupations identified by the depot to be critical to the number of personnel who actually filled these positions in fiscal years 2013 through 2017. In addition, we analyzed the data to identify any personnel shortages, based on the difference between authorized and filled numbers for fiscal years 2013 through 2017 for each depot. We also calculated the aggregate authorized and actual personnel counts, including the percentage of authorization filled and difference between authorized and actual rates, for depot occupations identified as critical for each of the depots. We conducted site visits to 6 depots and conducted interviews with depot officials to hear about any delays to the maintenance of weapons systems that resulted from lack of personnel with critical skills.

To examine any actions DOD has taken to hire, train, and retain personnel with critical skills and maintain those skills in the depot workforce, including the extent to which DOD has determined the effectiveness of those actions, we obtained and reviewed the military service's depot maintenance strategic plans to identify what actions and initiatives the military services planned to implement to address hiring, training, and retention in the depot workforce. We obtained information from depot officials at all 17 depots on what actions and initiatives they have taken to hire, train, and retain personnel in skilled occupations in order to maintain critical skills in their workforces. We also reviewed documentation on any data collected and assessments completed in regards to military service and depot recruiting, hiring, training, and retention actions and initiatives.

We compared the actions and initiatives identified in the strategic plans to the actions taken by the depots to determine whether the actions were aligned to the strategic plans and then interviewed military service officials to determine the current status of those actions and initiatives. Furthermore, we analyzed DOD human capital planning guidance and Standards for Internal Control in the Federal Government to determine the extent to which the depots were following this guidance during their assessment processes. During our depot site visits, depot officials provided us with an overview of some of these initiatives, including material used during career fairs and information sessions held at college campuses. In addition, we interviewed knowledgeable military service officials from the depots and officials from their respective higher-level commands to determine the extent to which the depots or higher-level commands have assessed the effectiveness of actions they have taken to mitigate challenges to maintaining critical skills in the depot workforce—including initiatives identified in depot maintenance strategic plans and information provided by the depots.

For this review, we visited and met with depot officials at the following 6 depot locations:

- Anniston Army Depot, Anniston, Alabama
- Albany Production Plant, Albany, Georgia
- Fleet Readiness Center Southwest, San Diego, California
- Oklahoma City Air Logistics Complex, Oklahoma City, Oklahoma
- Portsmouth Naval Shipyard, Kittery, Maine

- Puget Sound Naval Shipyard and Intermediate Maintenance Facility, Bremerton, Washington

We selected these depots because this sample gave us the ability to visit depots from each service component spread across each region of the United States and provided a broad mix of weapon systems to review. During our site visits, we met with depot officials to understand challenges faced by the depots related to hiring, training, and retaining personnel in skilled occupations. We also conducted interviews and collected information on the depot workforce from the following DOD offices:

- Office of the Assistant Secretary of Defense, Logistics & Materiel Readiness
- Defense Civilian Personnel Advisory Service
- Air Force Sustainment Center
- Army G-4, Sustainment Maintenance Division – Organic Industrial Base
- Naval Sea Systems Command
- Naval Air Systems Command
- Marine Depot Maintenance Command

We conducted this performance audit from July 2017 to December 2018 in accordance with generally accepted government auditing standards. Those standards require that we plan and perform the audit to obtain sufficient, appropriate evidence to provide a reasonable basis for our findings and conclusions based on our audit objectives. We believe that the evidence obtained provides a reasonable basis for our findings and conclusions based on our audit objectives.

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# Appendix III: Authorized and Actual Personnel Levels for Skilled Depot Occupations

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Table 2 shows the authorized and actual levels for depot personnel with certain critical skills from fiscal year 2013 to 2017 that we obtained from the military services and depots. This table also shows the combined authorized and actual personnel levels by depot for the occupations identified as critical, including an aggregated total for the military service and the percentage of the authorization that was filled. DOD and the military services do not have a corporate definition for “critical occupation” at each of the maintenance depots, so the data presented for each depot reflect what depot officials at that individual depot consider critical occupations needed to support the depot’s weapon system maintenance mission.



**Table 2: Authorized and Actual Levels of Personnel with Certain Critical Skills and Percent of Authorized Positions Filled, Fiscal Years 2013 – 2017**

| Department of Defense Depots                      | Fiscal Year 2013               |        |                | Fiscal Year 2014 |        |                | Fiscal Year 2015 |        |                | Fiscal Year 2016 |        |                | Fiscal Year Y2017 |        |                |
|---|--------------------------------|--------|----------------|------------------|--------|----------------|------------------|--------|----------------|------------------|--------|----------------|-------------------|--------|----------------|
|   | Authorized                     | Actual | Percent Filled | Authorized       | Actual | Percent Filled | Authorized       | Actual | Percent Filled | Authorized       | Actual | Percent Filled | Authorized        | Actual | Percent Filled |
| <b>Army Depots</b>                                |                                |        |                |                  |        |                |                  |        |                |                  |        |                |                   |        |                |
| Anniston  | 996                            | 984    | 99%            | 1054             | 990    | 94%            | 946              | 858    | 91%            | 823              | 766    | 93%            | 872               | 789    | 90%            |
| Corpus Christi                                    | 2132                           | 2145   | 101%           | 2125             | 2057   | 97%            | 2125             | 1852   | 87%            | 2125             | 1734   | 82%            | 1644              | 1616   | 98%            |
| Letterkenny                                       | 691                            | 627    | 91%            | 650              | 596    | 92%            | 647              | 554    | 86%            | 655              | 540    | 82%            | 662               | 532    | 80%            |
| Red River <sup>a</sup>                            | 978                            | 1022   | 104%           | 942              | 1072   | 114%           | 932              | 1339   | 144%           | 930              | 1194   | 128%           | 724               | 1147   | 158%           |
| Tobyhanna   | 2440                           | 1792   | 73%            | 2232             | 1647   | 74%            | 2219             | 1613   | 73%            | 2219             | 1633   | 74%            | 1808              | 1548   | 86%            |
| TOTAL ARMY  | 7237                           | 6570   | 91%            | 7003             | 6362   | 91%            | 6869             | 6216   | 90%            | 6752             | 5867   | 87%            | 5710              | 5632   | 99%            |
| <b>Navy Fleet Readiness Centers and Shipyards</b> |                                |        |                |                  |        |                |                  |        |                |                  |        |                |                   |        |                |
| Fleet Readiness Center East                       | 1,027                          | 1,045  | 102%           | 1,093            | 1,123  | 103%           | 1,247            | 1,166  | 94%            | 1,263            | 1,227  | 97%            | 1,209             | 1,220  | 101%           |
| Fleet Readiness Center Southeast                  | 1,420                          | 1,344  | 95%            | 1,398            | 1,289  | 92%            | 1,460            | 1,454  | 100%           | 1,670            | 1,632  | 98%            | 1,776             | 1,680  | 95%            |
| Fleet Readiness Center Southwest                  | 1,001                          | 849    | 85%            | 1,163            | 810    | 70%            | 991              | 901    | 91%            | 1,145            | 974    | 85%            | 1,255             | 1,038  | 83%            |
| TOTAL Fleet Readiness Centers                     | 3,448                          | 3,238  | 94%            | 3,654            | 3,222  | 88%            | 3,698            | 3,521  | 95%            | 4,078            | 3,833  | 94%            | 4,240             | 3,938  | 93%            |
| Norfolk Naval Shipyard                            | No Reliable Data Before FY2014 |        |                | 4,770            | 4,126  | 86%            | 4,472            | 4,248  | 95%            | 4,800            | 4,425  | 92%            | 4,523             | 4,281  | 95%            |
| Pearl Harbor Naval Shipyard                       | 2,412                          | 1,933  | 80%            | 2,338            | 2140   | 92%            | 2,915            | 2394   | 82%            | 3,741            | 2,487  | 66%            | Data Unavailable  |        |                |
| Portsmouth Naval Shipyard                         | 379                            | 255    | 59%            | 357              | 300    | 84%            | 569              | 611    | 107%           | 519              | 531    | 102%           | Data Unavailable  |        |                |

Appendix III: Authorized and Actual Personnel Levels for Skilled Depot Occupations

| Department of Defense Depots             | Fiscal Year 2013 |              |                | Fiscal Year 2014 |              |                | Fiscal Year 2015 |              |                | Fiscal Year 2016 |              |                | Fiscal Year Y2017 |              |                |
|--|------------------|--------------|----------------|------------------|--------------|----------------|------------------|--------------|----------------|------------------|--------------|----------------|-------------------|--------------|----------------|
|  | Authorized       | Actual       | Percent Filled | Authorized       | Actual       | Percent Filled | Authorized       | Actual       | Percent Filled | Authorized       | Actual       | Percent Filled | Authorized        | Actual       | Percent Filled |
| Puget Sound Naval Shipyard               | 11447            | 10922        | 95%            | 12359            | 12048        | 97%            | 13730            | 13444        | 98%            | 13619            | 13547        | 99%            | 13540             | 13606        | 100%           |
| <b>Total Shipyards<sup>b</sup></b>       | <b>14238</b>     | <b>13080</b> | <b>92%</b>     | <b>19824</b>     | <b>18614</b> | <b>94%</b>     | <b>21686</b>     | <b>20697</b> | <b>95%</b>     | <b>22679</b>     | <b>20990</b> | <b>93%</b>     | <b>18063</b>      | <b>17887</b> | <b>99%</b>     |
| <b>Total NAVY</b>                        | <b>17686</b>     | <b>16318</b> | <b>92%</b>     | <b>23478</b>     | <b>21836</b> | <b>93%</b>     | <b>25384</b>     | <b>24218</b> | <b>95%</b>     | <b>26757</b>     | <b>24823</b> | <b>93%</b>     | <b>22303</b>      | <b>21825</b> | <b>98%</b>     |
| <b>Air Force Air Logistics Complexes</b> |                  |              |                |                  |              |                |                  |              |                |                  |              |                |                   |              |                |
| Oklahoma City Air Logistics Complex      | 8820             | 8678         | 98%            | 8485             | 8286         | 98%            | 9518             | 8649         | 91%            | 9424             | 9624         | 102%           | 10412             | 9732         | 93%            |
| Ogden Air Logistics Complex              | 3739             | 3944         | 105%           | 3765             | 4062         | 108%           | 4246             | 4133         | 97%            | 4422             | 4558         | 103%           | 4516              | 4554         | 101%           |
| Warner Robins Air Logistics Complex      | 7423             | 7618         | 103%           | 7354             | 7360         | 100%           | 6864             | 6995         | 102%           | 7169             | 6963         | 97%            | 7610              | 7061         | 93%            |
| <b>Total Air Force</b>                   | <b>19982</b>     | <b>20240</b> | <b>101%</b>    | <b>19604</b>     | <b>19708</b> | <b>101%</b>    | <b>20628</b>     | <b>19777</b> | <b>96%</b>     | <b>21015</b>     | <b>21145</b> | <b>101%</b>    | <b>22538</b>      | <b>21347</b> | <b>95%</b>     |
| Warner Robins Air Logistics Complex      | 7423             | 7618         | 103%           | 7354             | 7360         | 100%           | 6864             | 6995         | 102%           | 7169             | 6963         | 97%            | 7610              | 7061         | 93%            |
| <b>Marine Corps Production Plants</b>    |                  |              |                |                  |              |                |                  |              |                |                  |              |                |                   |              |                |
| Albany Production Plant                  | 893              | 771          | 86%            | 802              | 719          | 90%            | 760              | 677          | 89%            | 726              | 604          | 83%            | 669               | 557          | 83%            |
| Barstow Production Plant                 | 654              | 538          | 82%            | 636              | 498          | 78%            | 521              | 459          | 88%            | 539              | 419          | 78%            | 567               | 406          | 72%            |
| <b>Total Marine Corps</b>                | <b>1547</b>      | <b>1309</b>  | <b>85%</b>     | <b>1438</b>      | <b>1217</b>  | <b>85%</b>     | <b>1281</b>      | <b>1136</b>  | <b>89%</b>     | <b>1265</b>      | <b>1023</b>  | <b>81%</b>     | <b>1236</b>       | <b>963</b>   | <b>78%</b>     |

Source: GAO Analysis of Department of Defense data. | GAO-19-51

<sup>a</sup>No authorized and actual personnel data were provided for the Painter occupation at Red River Army Depot for fiscal years 2013 to 2016.

<sup>b</sup>No reliable data were available for fiscal year 2013 for Norfolk Naval shipyard. Complete personnel data were unavailable for fiscal year 2017 for Pearl Harbor and Portsmouth Naval shipyards.

# Appendix IV: Comments from the Department of Defense



ASSISTANT SECRETARY OF DEFENSE  
3500 DEFENSE PENTAGON  
WASHINGTON, DC 20301-3500

SUSTAINMENT

Ms. Diana Maurer  
Director, Defense Capabilities and Management  
U.S. Government Accountability Office  
441 G Street, N.W.  
Washington, DC 20548

DEC 04 2018

Dear Ms. Maurer:

This is the Department of Defense (DoD) response to the Government Accountability Office (GAO) Draft Report, GAO-19-51, "DOD DEPOT WORKFORCE: Services Need to Assess the Effectiveness of Their Initiatives to Maintain Critical Skills" dated October 31, 2018 (GAO Code 102136). Detailed comments on the Report's recommendations are enclosed.

Sincerely,

A handwritten signature in blue ink, appearing to read "Robert H. McMahon", is written over a horizontal line.

Robert H. McMahon

Enclosure:  
As stated

GAO DRAFT REPORT DATED OCTOBER 31, 2018  
GAO-19-51 (GAO CODE 102136)

“DOD DEPOT WORKFORCE: SERVICES NEED TO ASSESS THE EFFECTIVENESS  
OF THEIR INITIATIVES TO MAINTAIN CRITICAL SKILLS”

DEPARTMENT OF DEFENSE COMMENTS  
TO THE GAO RECOMMENDATION

**RECOMMENDATION 1:** The GAO recommends that the Secretary of the Army, in conjunction with the U.S. Army Materiel Command, should assess the effectiveness of the Army depots’ hiring, training, and retention programs.

**DoD RESPONSE:** Concur with recommendation. The Secretary of the Army, in conjunction with the U.S. Army Materiel Command, will assess the effectiveness of the Army depots’ hiring, training, and retention programs to ensure the Army can meet future defense industrial activity and depot maintenance requirements. This assessment will evaluate current actions taken, the cost effectiveness of current actions taken, and identify hiring, training, and retention actions that work well to help maintain the critical skills of the depot workforce.

**RECOMMENDATION 2:** The GAO recommends that the Secretary of the Navy, in conjunction with the Naval Sea Systems Command and Naval Air Systems Command, should assess the effectiveness of the Navy’s shipyards’ and fleet readiness centers’ hiring, training, and retention programs.

**DoD RESPONSE:** Concur with recommendation. The Secretary of the Navy, in conjunction with the Naval Sea Systems Command and Naval Air Systems Command, will assess the effectiveness of the hiring, training, and retention programs in the shipyards and fleet readiness centers to ensure the Navy can meet future defense industrial activity and shipyard and fleet readiness center maintenance requirements. These assessments will evaluate current actions taken, the cost effectiveness of current actions taken, and identify hiring, training, and retention actions that work well to help maintain the critical skills of the workforce in the shipyards and fleet readiness centers.

**RECOMMENDATION 3:** The GAO recommends that the Commandant of the Marine Corps, in conjunction with the Marine Corps Logistics Command, should assess the effectiveness of the Marine Corps depots’ hiring, training, and retention programs.

**DoD RESPONSE:** Concur with recommendation. The Commandant of the Marine Corps, in conjunction with the Marine Corps Logistics Command, will assess the effectiveness of the Marine Corps depots’ hiring, training, and retention programs to ensure the Marine Corps can meet future defense industrial activity and depot maintenance requirements. This assessment will evaluate current actions taken, the cost effectiveness of current actions taken, and identify

hiring, training, and retention actions that work well to help maintain the critical skills of the depot workforce.

**RECOMMENDATION 4:** The GAO recommends that the Secretary of the Air Force, in conjunction with the Air Force Materiel Command, should assess the effectiveness of the Air Force air logistics complexes' hiring, training, and retention programs.

**DoD RESPONSE:** Concur with recommendation. The Secretary of the Air Force, in conjunction with the Air Force Materiel Command, will assess the effectiveness of the Air Force air logistics complexes' hiring, training, and retention programs to ensure the Air Force can meet future defense industrial activity and maintenance requirements. This assessment will evaluate current actions taken, the cost effectiveness of current actions taken, and identify hiring, training, and retention actions that work well to help maintain the critical skills of the air logistics complexes' workforce.

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# Appendix V: GAO Contact and Staff Acknowledgments

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## GAO Contacts:

Diana Maurer, (202) 512-9627 or [maurerd@gao.gov](mailto:maurerd@gao.gov)

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## Staff Acknowledgments:

In addition to the named contact above, Marilyn Wasleski, Assistant Director; Chanee Gaskin, Jason Jackson, Joanne Landesman, Moira Lenox, Amie Lesser, Felicia Lopez, Michael Pose, Michael Silver, and Allen Westheimer contributed to this report.

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