United States Government Accountability Office

Report to Congressional Committees

August 2020

NAVY SHIPYARDS

Actions Needed to Address the Main Factors Causing Maintenance Delays for Aircraft Carriers and Submarines

GAO-20-588

GAO Highlights

Highlights of GAO-20-588, a report to congressional committees

August 2020

NAVY SHIPYARDS

Actions Needed to Address the Main Factors Causing Maintenance Delays for Aircraft Carriers and Submarines

Why GAO Did This Study

For fiscal years 2015 through 2019, the Navy spent $2.8 billion in capital investments to address shipyard performance, among other things. However, the shipyards continue to face persistent and substantial maintenance delays that hinder the readiness of aircraft carriers and submarines.

The Senate Armed Services Committee, in a report accompanying a bill for the National Defense Authorization Act for Fiscal Year 2019, included a provision for GAO to review Navy shipyards' performance. GAO evaluated the extent to which the Navy (1) completed maintenance at its shipyards on time on aircraft carriers and submarines in fiscal years 2015 through 2019, (2) has identified the main factors leading to maintenance delays, and (3) has addressed the main factors affecting any delays in that maintenance. GAO reviewed data related to Navy shipyard maintenance for fiscal years 2015 through 2019, analyzed factors contributing to delays and plans to address them, visited all four Navy shipyards, and met with Navy and shipyard officials.

What GAO Recommends

GAO is making three recommendations to the Navy, including updating workforce planning requirements to avoid the consistent use of overtime; completing the development of shipyard performance metrics; and developing and implementing goals, action plans, milestones, and monitoring results. The Navy concurred with all three recommendations.

View GAO-20-588. For more information, contact Diana Maurer, (202) 512-9627, MaurerD@gao.gov, or Asif A. Khan, (202) 512-9869, KhanA@gao.gov.

What GAO Found

The Navy's four shipyards completed 38 of 51 (75 percent) maintenance periods late for aircraft carriers and submarines with planned completion dates in fiscal years 2015 through 2019, for a combined total of 7,424 days of maintenance delay. For each maintenance period completed late, the shipyards averaged 113 days late for aircraft carriers and 225 days late for submarines.

Maintenance Delays at Navy Shipyards for Fiscal Years 2015 through 2019

Aircraft Carriers
- 8 of 18 on time
- 1,128 days of maintenance delay

Submarines
- 5 of 33 on time
- 6,296 days of maintenance delay

Source: GAO analysis of Navy data (text); U.S. Navy/T. Nguyen (aircraft carrier); U.S. Navy/D. Amodo (submarine). | GAO-20-588

Unplanned work and workforce factors—such as shipyard workforce performance and capacity (having enough people to perform the work)—were the main factors GAO identified as causing maintenance delays for aircraft carriers and submarines. The Navy frequently cited both factors as contributing to the same days of maintenance delay. Unplanned work—work identified after finalizing maintenance plans—contributed to more than 4,100 days of maintenance delays. Unplanned work also contributed to the Navy's 36 percent underestimation of the personnel resources necessary to perform maintenance. The workforce factor contributed to more than 4,000 days of maintenance delay on aircraft carriers and submarines during fiscal years 2015 through 2019.

The Navy has taken steps but has not fully addressed the unplanned work and workforce factors causing the most maintenance delays. First, the Navy updated planning documents to improve estimates and plans to annually update these data, but knowing whether changes improve results may take several years. Second, the Navy has consistently relied on high levels of overtime to carry out planned work. GAO's analysis found that high overtime among certain production shops, such as painting or welding, averaged from 25 to 32 percent for fiscal years 2015 through 2019, with peak overtime as high as 45 percent. Furthermore, shipyard officials told us that production shops at all four shipyards are working beyond their capacity. Overtime at such rates has been noted as resulting in diminished productivity. Third, the Navy initiated the Shipyard Performance to Plan initiative in the fall of 2018 to address the unplanned work and workforce factors, but it has not yet developed 13 of 25 planned metrics that could improve the Navy's understanding of the causes of maintenance delays. In addition, the Shipyard Performance to Plan initiative does not include goals, milestones, and a monitoring process along with fully developed metrics to address unplanned work and workforce weaknesses. Without fully developing metrics and implementing goals, action plans, milestones, and a monitoring process, the shipyards are not likely to address unplanned work and workforce weaknesses and the Navy is likely to continue facing maintenance delays and reduced time for training and operations with its aircraft carriers and submarines.

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U.S. GOVERNMENT ACCOUNTABILITY OFFICE
441 G St. N.W.
Washington, DC 20548

August 20, 2020

Congressional Committees

Over the past 5 years the Navy has spent about $2.8 billion in capital investments at its shipyards to improve shipyard performance, among other things.[1] However, the Navy continues to face persistent and substantial maintenance delays that affect the majority of its maintenance efforts and hinder its attempts to restore readiness.[2] The Navy's four shipyards—Norfolk Naval Shipyard in Virginia, Pearl Harbor Naval Shipyard and Intermediate Maintenance Facility in Hawaii, Portsmouth Naval Shipyard in Maine, and Puget Sound Naval Shipyard and Intermediate Maintenance Facility in Washington—maintain the readiness of critical aircraft carriers and submarines required for military operations. Specifically, these shipyards provide the Navy with the capability to perform complex maintenance on ships, emergency repairs, and ship modernization, among other things. The ability of shipyards to complete this maintenance on time directly affects military readiness as maintenance delays reduce the amount of time the aircraft carriers and submarines are available for training and operations.

Since 2015, we have issued over 20 reports and testimonies examining Navy maintenance challenges, shipyard workforce and capital investment, ship crewing, scheduling, and force structure (see Related GAO Products at the end of this report). We recently testified in December 2019 that in fiscal years 2014 through 2019 aircraft carriers and submarines, as well as surface ships, had experienced significant maintenance delays.[3] Since 2015, we have made 37 unclassified recommendations to the Navy or to Department of Defense (DOD) components in coordination with the Navy about the need to maintain the workforces' critical skills and the condition of facilities and equipment, among other things, that impact the performance of the Navy's shipyards.

[1]GAO, *Naval Shipyards: Key Actions Remain to Improve Infrastructure to Better Support Navy Operations*, GAO-20-64 (Washington, D.C.: Nov. 25, 2019).

[2]GAO, *Navy Maintenance: Persistent and Substantial Ship and Submarine Maintenance Delays Hinder Efforts to Rebuild Readiness*, GAO-20-257T (Washington D.C.: Dec. 4, 2019).

[3]GAO-20-257T.

The Navy or DOD concurred, or partially concurred, with 35 recommendations and had implemented 10, as of June 2020.

In June 2018, the Senate Armed Services Committee noted that it is not clear the extent to which DOD is assessing and, to the extent possible, mitigating the risk of maintenance delays when planning for depot workload requirements. Senate Report 115-262, accompanying a bill for the National Defense Authorization Act for Fiscal Year 2019, included a provision for us to examine how the military services have addressed these risks, including at the Navy's four shipyards.[4] We examined the extent to which the Navy (1) completed maintenance at its shipyards on time on aircraft carriers and submarines in fiscal years 2015 through 2019, (2) has identified the main factors leading to maintenance delays, and (3) has addressed the main factors affecting any delays in that maintenance.

For our first objective, we reviewed data from the Naval Sea Systems Command (NAVSEA) on 51 maintenance periods—for regularly planned major repairs and overhauls needed for ships to reach their expected service life—completed, or planned for completion, for the most recent 5-year period from fiscal years 2015 through 2019 on all aircraft carriers and submarines at the Navy's four shipyards. Of the 51 planned maintenance periods, the shipyards completed 49 during fiscal years 2015 through 2019. The Navy delayed the completion of two maintenance periods until fiscal year 2020 and we included maintenance delays incurred for those two maintenance periods through the end of fiscal year 2019. We determined maintenance delays by identifying the elapsed time between the expected completion date and the actual completion date.[5] We also reviewed idle time (i.e., time when submarines are waiting to begin a maintenance period and unable to conduct normal operations) associated with maintenance periods completed during that time as well as for 13 maintenance periods on submarines still ongoing at the end of fiscal year 2019. We determined idle time by identifying the length of time during which a submarine awaiting maintenance was unable to conduct normal operations.

[4]S. Rep. No. 115-262, at 147 (2018). We performed separate reviews to examine maintenance timeliness and related issues at the Army, Marine Corps, Air Force, and Navy aviation depots.

[5]Our prior reports referred to maintenance delays as "lost operational days." To align with NAVSEA terminology, we refer to them in this and other recent reports as "days of maintenance delay." For example, see GAO-20-257T.

For our second objective, we identified 10 factors causing maintenance delays by reviewing our prior reports, meeting with Navy officials, and visiting the Navy's four shipyards. We then analyzed which factors caused the most delays in aircraft carrier and submarine maintenance periods based on documentation describing delays (specifically, letters from the shipyards to NAVSEA citing causes of delays), changes in schedules, or increases in cost, and determined that there were two main factors contributing to most of the delays related to the timely completion of aircraft carrier and submarine maintenance. We analyzed data and documents associated with the two factors cited in the vast majority of letters from the shipyards to NAVSEA describing the reasons for maintenance delays. We also conducted a survey of shipyard, NAVSEA, and other Navy officials asking them to rank the 10 factors in order from most likely to least likely to cause maintenance delays.

For our third objective, we analyzed the Navy's efforts to mitigate these delays as identified by officials from NAVSEA and the Navy's four shipyards involved in maintenance planning. We reviewed Navy data related to "core capability requirements"—maintenance capability (including personnel, equipment, and facilities) maintained by DOD at government-owned and -operated facilities—in support of DOD's biennial core report to Congress on May 23, 2018.[6] We compared the use of the shipyard workforce in meeting those requirements with related DOD instructions.[7] We also reviewed the documents related to NAVSEA's Shipyard Performance to Plan initiative.[8] We then compared the Shipyard Performance to Plan initiative and associated documents with key elements of a results-oriented management approach that had been

[6]The National Defense Authorization Act for Fiscal Year 2013 amended section 2464 to require DOD to submit to Congress a biennial report addressing three elements for each of the armed services, during each even-numbered year. Pub. L. No. 112-239, § 322 (2013).

[7]DOD Instruction 4151.20, *Depot Maintenance Core Capabilities Process* (May 4, 2018) (Change 1, Aug. 31, 2018) defines core capability requirement as the depot maintenance capability (including personnel, equipment, and facilities) maintained by DOD at government-owned and -operated facilities as the ready and controlled source of technical competence and resources necessary to ensure effective and timely response to a mobilization, national defense contingency situation, and other emergency requirements.

[8]In fiscal year 2019, the Navy began an initiative to improve Navy surface ship, submarine, and aviation readiness. This initiative, called Performance to Plan, designates Commander, Naval Surface Forces, and Commander, NAVSEA, to improve performance of ship maintenance in private and public shipyards. NAVSEA refers to this initiative as the Shipyard Performance to Plan initiative that includes efforts related to aircraft carriers and submarines, and also separately for surface ships.

identified from our prior work as critical to successful strategic planning, and determined whether these plans and the Navy's management approach included those key elements.[9] See appendix I for additional detail on our scope and methodology.

To assess the reliability of the data sources used to conduct our analyses, we interviewed Navy officials and reviewed documentation related to maintenance delays and idle time data, data sources, data definitions, and quality controls. We interviewed Navy officials to determine data quality and discussed data use, including how specific data had been used in previous GAO reports and were assessed as reliable. We found the data we used to be sufficiently reliable for the purposes of our reporting objectives.

We conducted this performance audit from July 2019 to August 2020 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.

Background

Maintenance Periods at the Navy's Four Shipyards

The Navy's four shipyards perform depot-level maintenance that involves comprehensive and time-consuming maintenance work, including ship overhauls, alterations, refits, restorations, nuclear refueling, and inactivations—activities crucial to supporting Navy readiness (see fig.1).

[9]See GAO, *Naval Shipyards: Actions Needed to Improve Poor Conditions That Affect Operations*, GAO-17-548 (Washington, D.C.: Sept. 12, 2017); *Managing For Results: Data-Driven Performance Reviews Show Promise but Agencies Should Explore How to Involve Other Relevant Agencies*, GAO-13-228 (Washington, D.C.: Feb. 27, 2013); *DOD's 2010 Comprehensive Inventory Management Improvement Plan Addressed Statutory Requirements, But Faces Implementation Challenges,* GAO-11-240R (Washington, D.C.: Jan. 7, 2011); *Results-Oriented Management: Strengthening Key Practices at FEMA and Interior Could Promote Greater Use of Performance Information,* GAO-09-676 (Washington, D.C.: Aug. 17, 2009); *Managing for Results: Enhancing Agency Use of Performance Information for Management Decision Making*, GAO-05-927 (Washington, D.C.: Sept. 9, 2005); and *Agency Performance Plans: Examples of Practices That Can Improve Usefulness to Decisionmakers, GAO/GGD/AIMD-99-69* (Washington, D.C.: Feb. 26, 1999).

Figure 1: The Navy's Four Shipyards Service Aircraft Carriers and Submarines, among Other Ships

Norfolk Naval Shipyard specializes in aircraft carriers (Nimitz class), submarines (Los Angeles class and Ohio class), and various surface combatants such as guided missile frigates and cruisers and amphibious assault ships.
Portsmouth, Virginia

Portsmouth Naval Shipyard specializes in submarines (Los Angeles class and Virginia class).
Kittery, Maine

Pearl Harbor Naval Shipyard and Intermediate Maintenance Facility specializes in submarines (Los Angeles class and Virginia class) and surface combatants such as guided missile frigates, cruisers, and destroyers.
Honolulu, Hawaii

Puget Sound Naval Shipyard and Intermediate Maintenance Facility specializes in aircraft carriers (Nimitz class), submarines (Los Angeles class, Seawolf class, and Ohio class), and guided missile destroyers.
Bremerton, Washington

Source: GAO analysis of Navy data. | GAO-20-588

This maintenance can include major repair, overhaul, or the complete rebuilding of systems needed for ships to reach their expected service life, and involves complex structural, mechanical, and electrical repairs. The Navy generally schedules these maintenance periods—referred to by the Navy as "availabilities"— every 2 to 3 years for each aircraft carrier and every 4 to 6 years for submarines—throughout a ship's service life. For example, in certain types of maintenance periods, ships are taken out of the water and put into a dry dock to perform maintenance on below-water parts of the ship (see fig. 2).

Figure 2: An Aircraft Carrier and a Submarine Undergoing Maintenance at Two Navy Shipyards

Aircraft carrier at Puget Sound Naval Shipyard and Intermediate Maintenance Facility

Submarine at Pearl Harbor Naval Shipyard and Intermediate Maintenance Facility

Source: GAO analysis of Navy data (text); U.S. Navy/T. Nguyen (aircraft carrier); U.S. Navy/D. Amodo (submarine). | GAO-20-588

The level of complexity of ship repair, maintenance, and modernization can affect the length of a maintenance period, which can range from 6 months to about 3 years for more complex and involved maintenance. The longer, more complex maintenance periods that are performed are designated in the Navy's Optimized Fleet Response Plan.[10] The plan is designed to maximize the fleet's operational availability to combatant commanders while ensuring adequate time for the training of personnel and maintenance of ships.

Maintenance Planning for Aircraft Carriers and Submarines at the Navy's Four Shipyards

NAVSEA—which is responsible for the program management of the shipyards—plans for the long-term maintenance of aircraft carriers and submarines. This planning focuses on capturing the timing and duration of the maintenance periods, resources needed to perform the maintenance, and the technical requirements for each class of ships. For example, a maintenance plan for a class of ships could identify resource needs for equipment overhauls, propulsion shaft replacement, and corrosion protection. Further, the maintenance plan identifies when the

[10]We previously reported in 2016 that successful implementation of the Optimized Fleet Response Plan depends, in part, on the shipyards completing maintenance on time and that maintenance delays reduce the time that ships are available for training and operations. See GAO, *Military Readiness: Progress and Challenges in Implementing the Navy's Optimized Fleet Response Plan*, GAO-16-466R (Washington, D.C.: May 2, 2016).

technical requirements are to be performed throughout the service life of the class of ships.

To identify the requirements for specific ships, NAVSEA coordinates the development of a "baseline availability work package," which represents the technical requirements needed to ensure a ship reaches its expected service life and meets its operational commitments. NAVSEA planners then use these technical requirements as a basis for developing the detailed work package, which describes the types of maintenance needed and the schedule for completion, among other things. According to Navy officials, planners start developing the detailed work package up to 30 months before the start of a maintenance period. Approximately 2 months prior to the start of work on the ships, these planners finalize the detailed work package and any changes to the detailed work package from that point forward are considered unplanned work.

To perform the tasks described in the detailed work packages, NAVSEA determines the workforce and funding requirements for aircraft carrier and submarine maintenance periods, and includes these requirements in the Navy's budget submissions. NAVSEA develops several planning documents to determine these requirements, such as the technical foundation papers and ship sheets. These planning documents include information on the duration and timing of ship maintenance periods, labor and material requirements for each ship maintenance period, and allowances for unplanned work. For example, NAVSEA included in one of its planning documents a 15-percent allowance in labor for unplanned work for a submarine maintenance period, in turn increasing its overall budget estimate. NAVSEA starts developing workforce and funding requirements for aircraft carrier and submarine maintenance periods to support the Navy's budget submission up to 2-½ years prior to the start of work on specific maintenance periods.

Navy Completed the Majority of Aircraft Carrier and Submarine Maintenance Periods Late

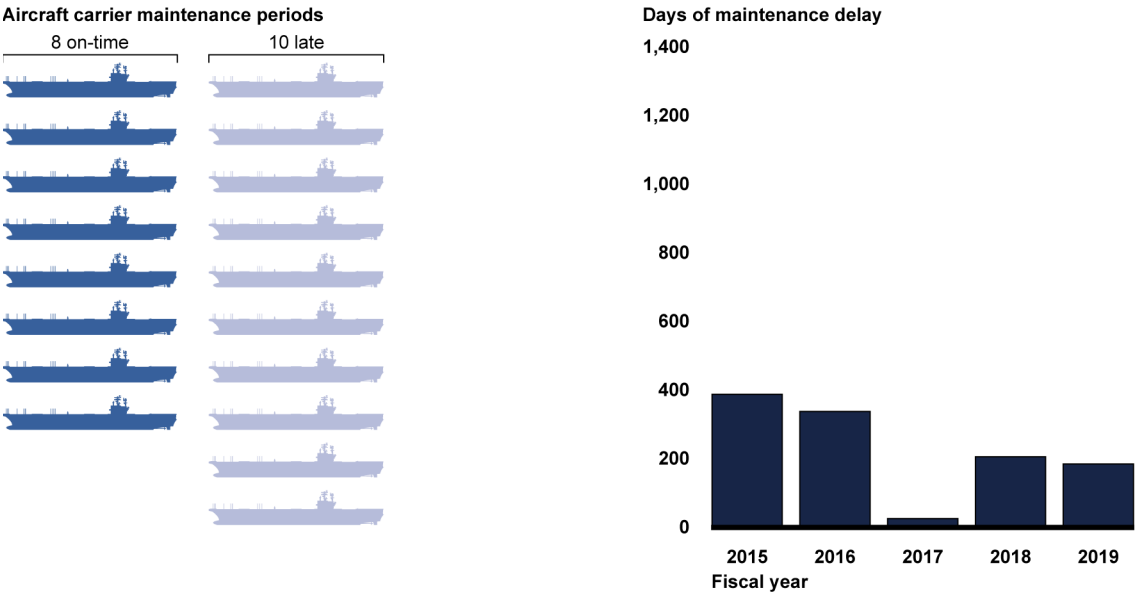
According to our review of NAVSEA data, the Navy's four shipyards completed 38 of 51 (75 percent) of maintenance periods late for aircraft carriers and submarines with completion dates planned for fiscal years 2015 through 2019, for a combined total of 7,424 days of maintenance

delay.[11] For the maintenance periods completed late, the shipyards completed maintenance periods an average of 113 days late for aircraft carriers and an average of 225 days late for submarines.[12] According to shipyard officials, circumstances unique to maintaining submarines are one reason for the difference in the average number of days of maintenance delays. In addition, idle time for submarines—time when submarines are waiting for available facilities to begin a maintenance period and unable to conduct normal operations—has grown in both frequency and duration each year from fiscal years 2015 through 2019.

Most Shipyard Maintenance Is Completed Late

According to our review of NAVSEA data, the Navy's shipyards completed 8 of 18 (44 percent) of aircraft carrier maintenance periods on time or early and completed the remaining 10 of 18 (56 percent) late from fiscal years 2015 through 2019 (see fig. 3).

Figure 3: Aircraft Carrier Maintenance Periods Completed On Time or Late and Days of Maintenance Delay for Fiscal Years 2015 through 2019



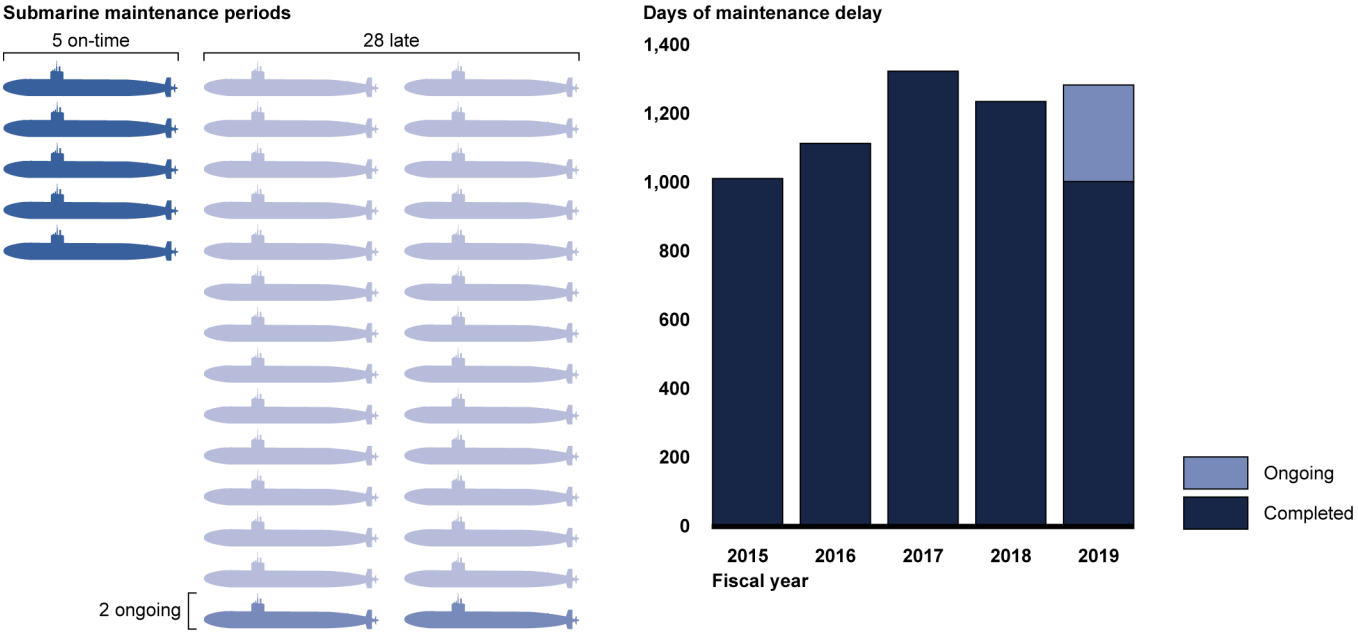
Source: GAO analysis of Navy data. | GAO-20-588

[11]We included two submarine maintenance periods that began in fiscal years 2015 and 2017, were planned for completion in fiscal year 2019, but experienced delays that resulted in the Navy completing the maintenance periods in December of fiscal year 2020. For more information on how we calculated days of maintenance delay see appendix I.

[12]For more information on how we calculated idle time see appendix I.

The shipyards completed maintenance periods a total of 1,128 days late for the aircraft carriers, with an average of 113 days late for each delayed aircraft carrier maintenance period. According to our review of NAVSEA data, the Navy's four shipyards completed five of 33 (15 percent) submarine maintenance periods planned for fiscal years 2015 through 2019 on time or early and 28 of 33 (85 percent) late (see fig. 4). Specifically, the four shipyards completed submarine maintenance periods a total of 6,296 days late for that time frame, with an average of 225 days late for each delayed submarine maintenance period.[13]

Figure 4: Submarine Maintenance Periods Completed On Time or Late and Days of Maintenance Delay for Fiscal Years 2015 through 2019



Source: GAO analysis of Navy data. | GAO-20-588

Note: A total of 31 submarine maintenance periods were completed at the Navy's four shipyards from fiscal years 2015 through 2019. Further, two additional submarine maintenance periods planned for completion in fiscal year 2019 were delayed by the Navy until fiscal year 2020. Though not shown on the bar chart, our overall calculation of days of maintenance delay included 341 days of maintenance incurred in fiscal year 2014 for four submarine maintenance periods that were completed in fiscal year 2015. As shown on the bar chart, we also included 281 days of maintenance delay associated with the two maintenance periods that were planned for completion in fiscal year 2019 and that the Navy delayed completion for until fiscal year 2020.

[13]We included in our analysis 341 days of maintenance delay incurred in fiscal year 2014 on four submarine maintenance periods that were completed in fiscal year 2015. We also included 281 days of maintenance delay associated with the two maintenance periods that were planned for completion in fiscal year 2019 and that the Navy delayed completion for until fiscal year 2020.

According to NAVSEA and shipyard officials, the lower average number of days of maintenance delays for aircraft carriers as compared with submarines can be attributed to which ships are considered highest priority while maintenance is being performed, as well as to circumstances relative to the size of the aircraft carriers and their crew compared with the size of submarines and their crews.[14] According to NAVSEA and shipyard officials, the completion of maintenance periods on aircraft carriers is a higher priority than the completion of maintenance periods on Los Angeles and Virginia class submarines. Additionally, according to shipyard officials, the larger size of aircraft carriers allows for greater access to spaces within the ship to conduct maintenance activities whereas space on submarines is severely limited. Given the limited space, shipyard officials said that any disruptions to the sequence of work on the submarines can lead to maintenance delays.

Further, there are significantly more crew who contribute to the work performed during an aircraft carrier maintenance period—approximately 3,000 crew on an aircraft carrier during a maintenance period compared with about 150 crew on a submarine. According to officials at the Puget Sound Naval Shipyard, aircraft carrier crews are expected to contribute to as much as 10 percent of the planned work on an aircraft carrier during a maintenance period. Subsequently, maintenance periods for aircraft carriers are more likely to be completed on time, or with fewer days of maintenance delay. However, the Navy reported in June 2020 that one aircraft carrier had recently completed its maintenance period late and projected another aircraft carrier completing its maintenance period later in fiscal year 2020 would also be completed late.

Idle Time for Submarines Has Grown in Both Frequency and Duration

We found that idle time for submarines waiting to start a maintenance period has grown every year since fiscal year 2015. Idle time occurs when the Navy's four shipyards do not have the facilities available to begin maintenance on submarines whose safety certifications have expired or will soon expire. Without the safety certification to submerge,

[14]According to both Navy guidance and officials, certain classes of ships generally receive higher or lower priority of the resources available to perform maintenance at the shipyards. Other than exigent circumstances, the priorities are the following: (1) ballistic missile submarines, (2) aircraft carriers, and (3) attack submarines such as the Los Angeles and Virginia class submarines. The majority of submarine maintenance periods completed at the Navy's four shipyards from fiscal years 2015 through 2019 were for attack submarines. See OPNAV Instruction 4700.7M, *Maintenance Policy for Navy Ships* (May 8, 2019).

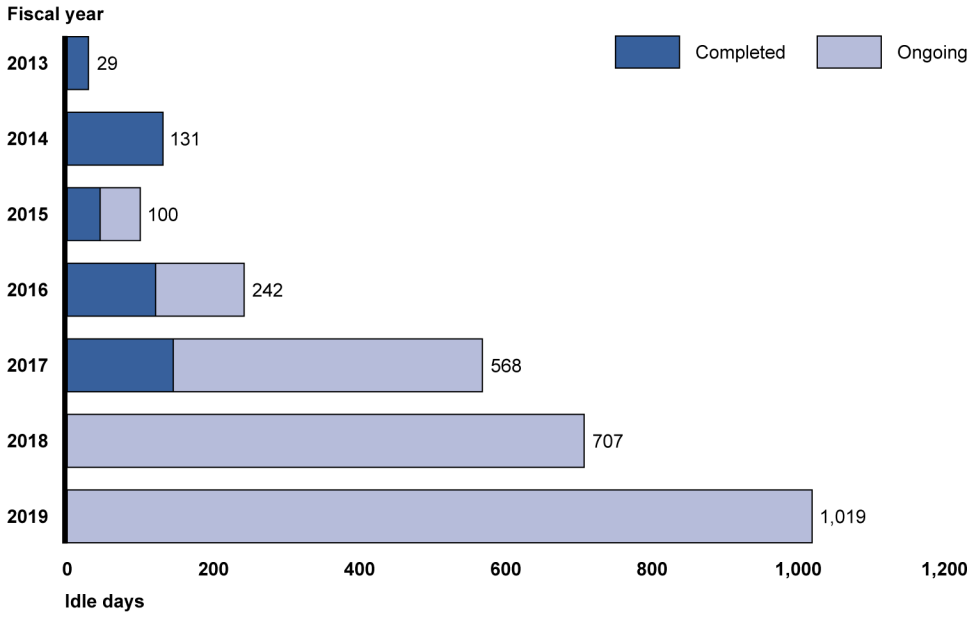
submarines are unable to perform their operations.[15] Submarines with completed or ongoing maintenance periods from fiscal years 2015 through 2019 incurred 2,796 days of idle time—the equivalent of nearly 8 years.[16]

Idle time grew substantially from fiscal years 2015 through 2019 (see fig. 5). Specifically, five of 31 completed submarine maintenance periods incurred 471 days of idle time. However, 10 of 13 submarine maintenance periods that remained ongoing at the end of fiscal year 2019 incurred 2,325 days of idle time. We found that idle time increased each year from 100 days in fiscal year 2015 to 1,019 days in fiscal year 2019—a 919 percent increase.

[15]This submarine safety program is discussed in GAO-19-229.

[16]We include both ongoing and completed maintenance periods from fiscal years 2015 through 2019 in our calculation of idle time. For more information on how we calculated idle time see appendix I.

Figure 5: Idle Time Incurred on Completed and Ongoing Submarine Maintenance Periods from Fiscal Years 2015 through 2019



Source: GAO analysis of Navy data. | GAO-20-588

Note: Idle time occurs on submarines whose safety certifications have expired or will soon expire and prevent the submarines from performing submerged operations while awaiting available facilities to begin a maintenance period. Our analysis included idle time incurred in fiscal years 2013 and 2014 on two of the five submarine whose maintenance periods were completed from fiscal years 2015 through 2019.

We previously testified that the Navy continues to spend money to support submarines that have provided no operational capability—submarines sitting idle no longer certified to conduct normal operations—while waiting to enter the shipyards.[17] The increase in idle time in both frequency and duration before the start of maintenance periods means longer overall times that submarines are not available to conduct training or operations. Further, according to Navy officials, due to the finite amount of docks available to perform maintenance at the Navy's four shipyards, any delays in starting and completing maintenance can lead to a "bow wave effect" because delays in completing one maintenance period may impact the start time of the next scheduled maintenance period. This "bow wave effect," coupled with ongoing maintenance delays, may lead to continued high rates of idle time for submarines.

[17]GAO-20-257T.

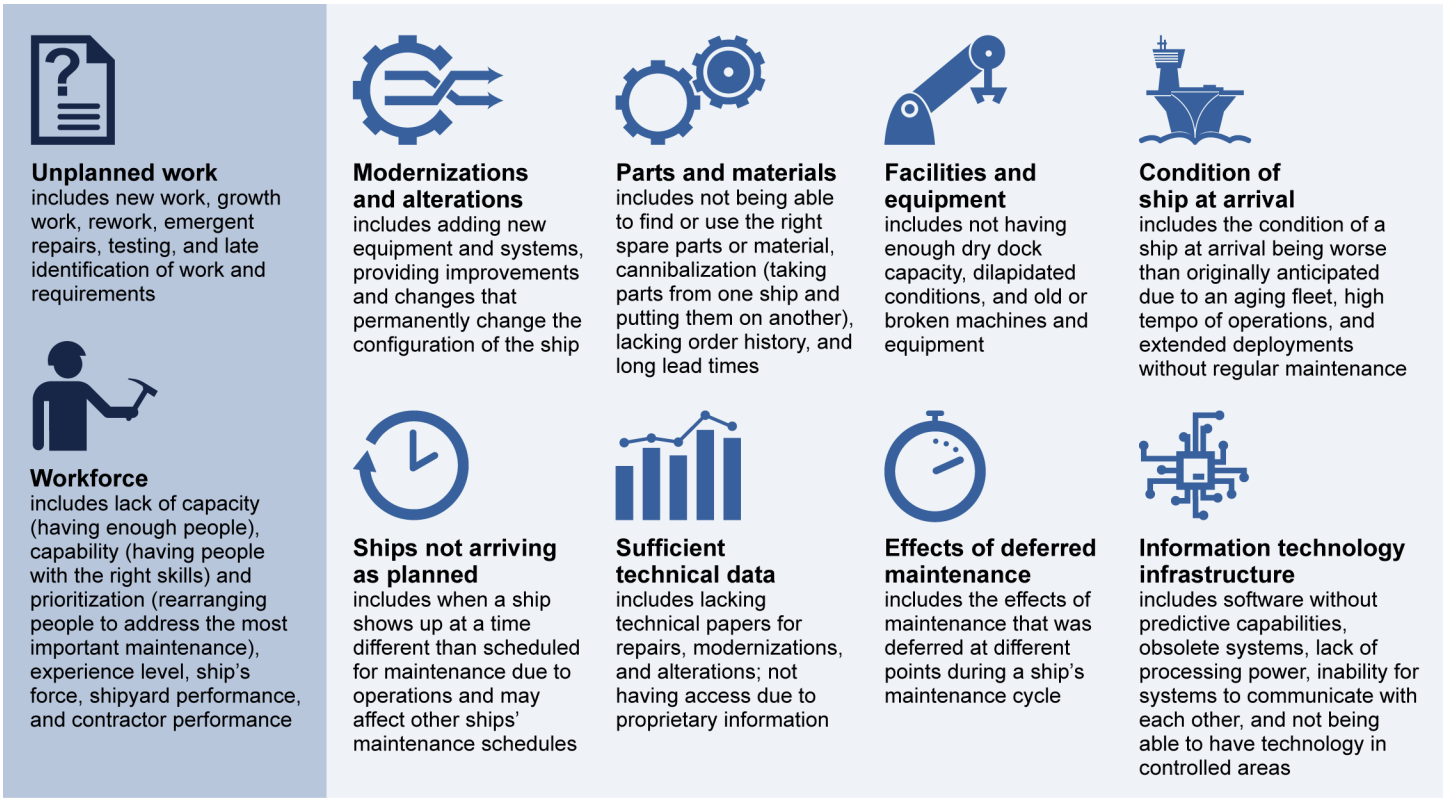
According to Navy officials, they expect the number of days of idle time to continue to increase for the next 2 fiscal years. In a February 2020 briefing, the Navy projected that most of the submarine maintenance periods under way at the time, or planned to begin before the start of fiscal year 2021, would likely be completed later than planned. As of June 2020, according to NAVSEA officials, of the four submarines planned for completion in fiscal year 2020, one submarine completed its maintenance period later than planned, two submarines were on track for delayed completion, and one submarine had completed its maintenance period 5 days earlier than planned. According to the Navy, additional shipyard maintenance delays may also occur as a result of circumstances associated with the coronavirus pandemic.

Unplanned Work and Workforce Factors Caused the Majority of Maintenance Delays for Aircraft Carriers and Submarines

On the basis of our prior work and interviews with Navy headquarters and shipyard officials, we identified 10 factors as the causes for the Navy's four shipyards not completing maintenance periods on time for aircraft carriers and submarines.[18] Of these 10 factors, we analyzed documentation describing delays—letters from the shipyards to NAVSEA citing causes of delays—and surveyed Navy headquarters and shipyard officials and determined that unplanned work and workforce were the main factors causing delays during aircraft carrier and submarine maintenance periods (see fig. 6).

[18]See Related GAO Products at the end of the report.

Figure 6: Two of the 10 Factors That Contributed to the Majority of Shipyard Maintenance Delays for Aircraft Carriers and Submarines



Source: GAO analysis of Navy data. | GAO-20-588

Specifically, we identified 70 letters that described causes of delays in the completion of maintenance and found that the Navy identified unplanned work and workforce factors as the cause or causes of delay for 30 of the 31 maintenance periods. Similarly, on the basis of 90 out of 171 responses to our survey, we found that unplanned work and workforce factors were among the top factors Navy officials identified as most likely to cause delays in the completion of aircraft carrier and submarine maintenance periods (see text box for examples of survey responses from Navy officials).[19]

[19]Our survey identified unplanned work and workforce as the top two causes for maintenance delays for aircraft carriers while for submarines the survey results identified unplanned work and workforce as the first and third factors, respectively, with parts identified as the second highest factor causing maintenance delays.

Examples of Survey Responses

- We, as a shipyard, need to work on getting more out of our workforce. Our training and workforce development has to improve in order to improve our productive capacity.
- The amount of people that the shipyard is allowed to hire is based on planned work—without any reserve or surge capacity. Therefore, any unplanned work must be executed by the authorized amount of people.
- There are a lot of co-dependencies among the various factors causing maintenance delays. For example, unplanned work can be the result of insufficient supply system support, technical documentation, planning, overseeing, executing modernization, and the effects of deferred maintenance.

Source: GAO analysis of survey responses. | GAO-20-588

Unplanned work factor: We found that unplanned work—any changes made to the detailed work package after it has been finalized prior to the start of a maintenance period—contributed to the most delays in aircraft carrier and submarine maintenance periods. Letters from Navy officials that documented causes for delays in the completion of maintenance identified unplanned work as a cause of days of maintenance delay in 28 of the 31 maintenance periods that had identifiable causes, and our survey also identified it as a top factor. Specifically, we found that unplanned work contributed to at least 4,100 days of maintenance delay from fiscal years 2015 through 2019.[20] Within the unplanned work factor, new work—that is, additional work not included in the final detailed work package—contributed to the overwhelming majority of unplanned work reported in the Navy letters.[21] For example, a maintenance period on a submarine at Puget Sound Naval Shipyard and Intermediate Maintenance Facility was delayed 193 days in fiscal year 2016 because of new work related to the propeller shaft, among other things. Overall, new work contributed to more than 3,800 days of maintenance delay within the unplanned work factor.

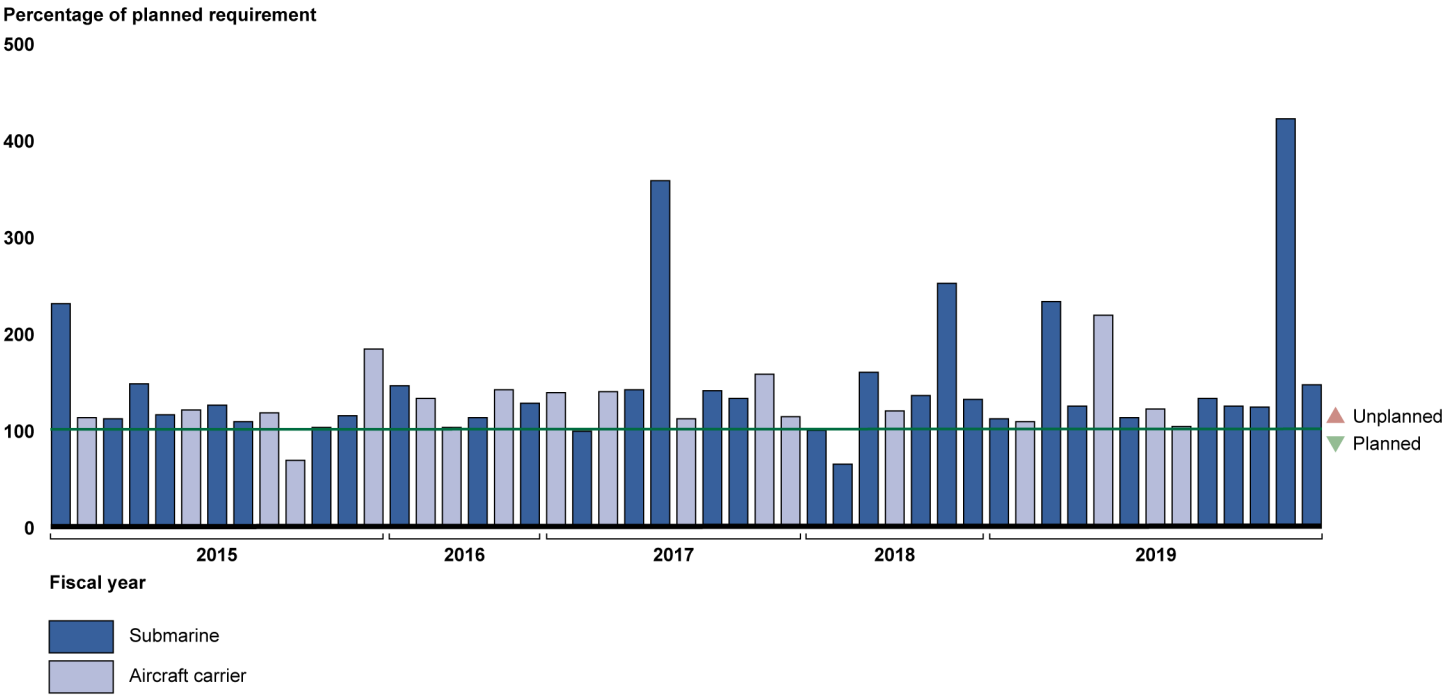
Further, we also found that the Navy underestimated the "resource days"—the number of work days per person—by 36 percent for aircraft carrier and submarine maintenance periods completed from fiscal years 2015 through 2019.[22] Specifically, the Navy underestimated the resources needed to complete 45 of the 49 maintenance periods by about 3.9 million resource days, or by an average of 87,299 additional resource days per maintenance period than planned. Figure 7 shows the percentage of planned versus actual workforce resource days for aircraft carrier and submarine maintenance periods completed in fiscal years 2015 through 2019.

[20]Letters that had identifiable factors contributing to maintenance delays frequently cited more than one factor, including unplanned work and workforce, as collectively contributing to days of maintenance delay. As a result, the number of days individual factors, such as unplanned work and workforce, contributed to maintenance delays do not sum up to the 7,424 days of maintenance delay for fiscal years 2015 through 2019.

[21]According to the Navy, detailed work packages include a reserve for new work, typically 5 to 10 percent, to account for unplanned work that is expect to materialize after the planning is completed. Further, the actual new work often exceeds this reserve, which contributes to causing maintenance delays.

[22]According to Navy officials, resource days reflect not only the work, but also the services and management costs associated with the work.

Figure 7: Percentage of Planned Versus Unplanned Workforce Resource Days for Each Aircraft Carrier and Submarine Maintenance Period Completed in Fiscal Years 2015 through 2019



Source: GAO analysis of Navy data. | GAO-20-588

Note: We compared Navy maintenance data used to prepare the Navy's budget submissions with actual data from 49 completed aircraft carrier and submarine maintenance periods for fiscal years 2015 through 2019. According to Navy officials, aircraft carrier and submarine maintenance period estimates that support the Navy's budget submissions are developed as early as 2-½ years prior to the start of a ship's maintenance period.

We have previously reported on the Navy's difficulty in planning and executing shipyard maintenance, including maintenance delays caused by unplanned work. For example, we reported in 2016 that aircraft carrier work performed at the Navy's shipyards from fiscal years 2011 through 2014 required on average 17 percent more work than estimated, which contributed to the Navy's shipyards taking longer than planned to complete maintenance periods and decreased the number of days ships were available for training and operations.[23] Navy officials attributed the increase in unplanned work that led to maintenance delays to difficulties

[23]GAO-16-466R. Our prior audit compared Navy maintenance data used to prepare the Navy's maintenance period work packages with actual results for work performed in three aircraft carrier maintenance periods from fiscal years 2011 through 2014.

in estimating required work, high operational tempo, and deferred maintenance over the past decade, among other things.

Officials from NAVSEA and the shipyards confirmed that unplanned work continues to cause maintenance delays and contributes to the Navy's inability to present accurate estimates for shipyard maintenance in Navy budgets. Further, NAVSEA officials stated that accurately planning workload requirements and the cost for maintenance periods to support Navy budgets is difficult because the Navy relies on estimates that are developed as much as 2-½ years prior to the actual beginning of work on the maintenance period. The Navy has reported in its annual risk and internal control assessments its inability to accurately plan for shipyard maintenance.[24] Beginning in 2016, the Navy reported a trend in underestimating the overall cost of ship maintenance in annual risk and internal control assessments.[25] The assessments stated that the Navy's policies for defining work requirements, developing cost estimates, and executing shipyard maintenance resulted in inaccurate cost and duration estimates.

Specifically, an August 2016 Navy report stated that material weaknesses in planning for ship maintenance led to the Navy spending more than the enacted ship maintenance budgeted amounts for 7 consecutive years by a total of $5.7 billion. According to the Navy, shortfalls in the Navy's shipyards accounted for approximately 50 percent of the $5.7 billion, which led to transfers from other DOD accounts and requests for supplemental appropriations from Congress to support continued shipyard operations.[26] The Navy's 2019 risk and internal control assessment indicates that these issues have persisted, stating that shipyards have had longer depot maintenance durations than expected,

[24]The Navy's Statements of Assurance were conducted as required under the *Federal Managers' Financial Integrity Act of 1982 (FMFIA*), and the *Federal Financial Management Improvement Act of 1996 (FFMIA).* The *Standards for Internal Control in the Federal Government* and the Office of Management and Budget (OMB) Circular No. A-123, *Management's Responsibility for Enterprise Risk Management and Internal Control*, establish the standards against which assessments are made.

[25]DOD, The Secretary of the Navy, *Annual Statement Required Under the Federal Managers' Financial Integrity Act for Fiscal Year 2016* (Aug. 29, 2016).

[26]A "transfer" is the shifting of budget authority from one appropriation or fund account to another. Agencies may transfer budget authority only as authorized by law.

increased overhead costs, and reduced operational availability of Navy ships.[27]

Workforce factor. We found that the workforce factor contributed to the second most delays in aircraft carrier and submarine maintenance periods. Letters from Navy officials that documented causes for delays in maintenance identified the workforce factor as a cause in 25 of the 31 maintenance periods that had identifiable causes, and our survey also identified it as one of the top factors. Overall, the workforce factor contributed to more than 4,000 days of maintenance delay on aircraft carriers and submarines.[28] The workforce factor includes specific causes identified in the Navy letters including shipyard workforce performance, capacity (that is having enough people to perform the work), and ship's crew (e.g., testing, training, qualifications, and performance), among other things.[29] For example, within the workforce factor:

- We found that shipyard workforce performance contributed to more than 3,700 days of maintenance delay.[30] For example, during an aircraft carrier maintenance period in fiscal year 2015, there were "workmanship issues" that contributed to 63 days of maintenance delay.

[27]DOD, The Secretary of the Navy, *Annual Statement Required Under the Federal Managers' Financial Integrity Act for Fiscal Year 2019* (Sept. 30, 2019).

[28]Letters that had identifiable factors contributing to maintenance delays frequently cited more than one factor, including unplanned work and workforce, as collectively contributing to days of maintenance delay. As a result, the number of days individual factors, such as unplanned work and workforce, contributed to maintenance delays do not sum up to the 7,424 days of maintenance delay for fiscal years 2015 through 2019.

[29]The Navy letters frequently identified multiple causes for delays, and our analysis revealed that overall, the workforce factor contributed to more than 4,000 days of maintenance. Because the Navy letters sometime specified multiple causes as part of the workforce factor, our analysis determined the numbers of days of maintenance delay each contributed to the workforce factor; however, these numbers cannot be added together. For example, a Navy letter explaining a maintenance period that had 217 days of maintenance delay identified both shipyard performance and capacity as causes of the delay. Subsequently, we identified that letter as contributing an overall 217 days of maintenance delay to the workforce factor for which both shipyard performance and capacity were identified as contributing to the 217 days of maintenance delay.

[30]According to NAVSEA officials, shipyard performance can include delays to work progress associated with job- specific material and equipment issues and work stoppages awaiting technical resolution. However, in our analysis, we identified multiple letters that specifically identified parts or materials as the cause of delays rather than shipyard performance.

- We found that capacity—not having enough shipyard workers—contributed to more than 2,500 days of maintenance delay. For example, during a submarine maintenance period in fiscal year 2019, there were not enough workers available, which contributed to an additional 217 days of maintenance delay.
- We found that the ship's crew contributed to more than 1,550 days of maintenance delay. For example, during a submarine maintenance period in fiscal year 2017, delays due to the ship's crew performance and the need to obtain qualifications, among other things, contributed to 98 days of maintenance delay.

During fiscal years 2015 through 2019, the Navy's four shipyards increased their workforce from 33,501 to 37,368 people by hiring engineers, naval architects, supervisors, and apprentices, among other occupations.[31] In December 2018, we reported that it is challenging to recruit, train, and retain personnel for skilled occupations such as engineers and technicians, contracting specialists, and apprentices for the production trades (i.e., welders, machinists, etc.).[32] Although the overall shipyard workforce has grown by 3,867 people, officials from all four shipyards told us the shipyards are working beyond their capacity and do not have enough fully trained production personnel to perform work in a timely manner.

[31]These figures are expressed in "end strength," which in terms of full time equivalent personnel, the shipyards increased from 31,305 to 36,162, (or by 4,857) personnel from fiscal year 2015 to fiscal year 2019. A "full-time equivalent" is a standard measure of labor that equates to 1 year of full-time work. The full-time equivalent calculation includes the total number of regular hours worked and includes annual leave, sick leave, compensatory time off, and other approved leave categories are considered in the "hours worked" calculation for purposes of defining full-time equivalent employment. Therefore it may require more than one end strength person to provide the productive capacity of a single worker for 40 hours a week 52 weeks per year.

[32]GAO, *DOD Depot Workforce: Services Need to Assess the Effectiveness of Their Initiative to Maintain Critical Skills*, GAO-19-51, (Washington, D.C.: Dec. 14, 2018). According to Navy officials, hourly wage workers in a limited number of categories are responsible for direct production at the shipyards. Fully-trained production personnel figures do not include supervisors, hourly workers in a supporting role (production-facilitating personnel), and apprentices or trainees. We recommended that the military services 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 concurred with our recommendation, but as of November 2019, the Navy stated that it was in the process of collecting information to assess the effectiveness of hiring, training, and retention programs and considers these efforts ongoing.

All four shipyards increased the number of apprentices to develop new capacity in the production trades. According to Navy officials, it can take up to 4 years for apprentices to become journeymen in their trade, and 5 to 7 years to become fully trained production personnel in a given trade. According to Navy officials, the shipyards have taken steps to reduce the time it takes for new hires to become production personnel by increasing the use of learning centers to train their inexperienced workforce. For fiscal years 2015 through 2019, the number of fully trained, non-supervisory production personnel (i.e., mechanics, welders, pipe-fitters, etc.) at shipyards increased by 431 people, and supervisors for production personnel increased by 408.[33] According to Navy officials, supervisors engage in direct production to some extent and also provide on-the-job training to apprentices.

Three of the Navy's shipyards increased the number of fully trained production personnel and one decreased the number of fully trained production personnel. Specifically, for fiscal years 2015 through 2019 the number of fully trained production personnel at Portsmouth Naval Shipyard, Puget Sound Naval Shipyard and Intermediate Maintenance Facility, and Pearl Harbor Naval Shipyard and Intermediate Maintenance Facility increased by 371, 149, and 144 people respectively, but the number of fully trained production personnel at Norfolk Naval Shipyard decreased by 233 people (see table 1).

[33]According to Navy officials, hourly wage workers in a limited number of categories are responsible for direct production at the shipyards. Fully-trained production personnel figures do not include supervisors, hourly workers in a supporting role (production-facilitating personnel), and apprentices.

Table 1: Production Workforce Personnel Changes at the Navy's Four Shipyards for Fiscal Years 2015 through 2019

		Fiscal year					Difference
Shipyard	**Category**	**2015**	**2016**	**2017**	**2018**	**2019**	**+ or (-)**
Norfolk Naval Shipyard	Apprentice	872	916	988	1,050	1,185	313
	Fully trained	3,807	3,810	3,611	3,839	3,574	(233)
	Supervisor	681	703	742	758	735	54
Portsmouth Naval Shipyard	Apprentice	490	424	426	434	416	(74)
	Fully trained	1,929	2,015	2,015	2,329	2,300	371
	Supervisor	294	321	356	358	401	107
Puget Sound Naval Shipyard and Intermediate Maintenance Facility	Apprentice	904	995	1,039	1,017	992	88
	Fully trained	6,107	5,808	5,764	6,131	6,256	149
	Supervisor	1,373	1,442	1,431	1,467	1,523	150
Pearl Harbor Naval Shipyard and Intermediate Maintenance Facility	Apprentice	696	806	1,050	927	947	251
	Fully trained	1,643	1,623	1,472	1,620	1,787	144
	Supervisor	542	572	575	601	639	97
Total	**Fully trained**	**13,486**	**13,256**	**12,862**	**13,919**	**13,917**	**431**

Source: GAO analysis of Navy data. | GAO-20-588

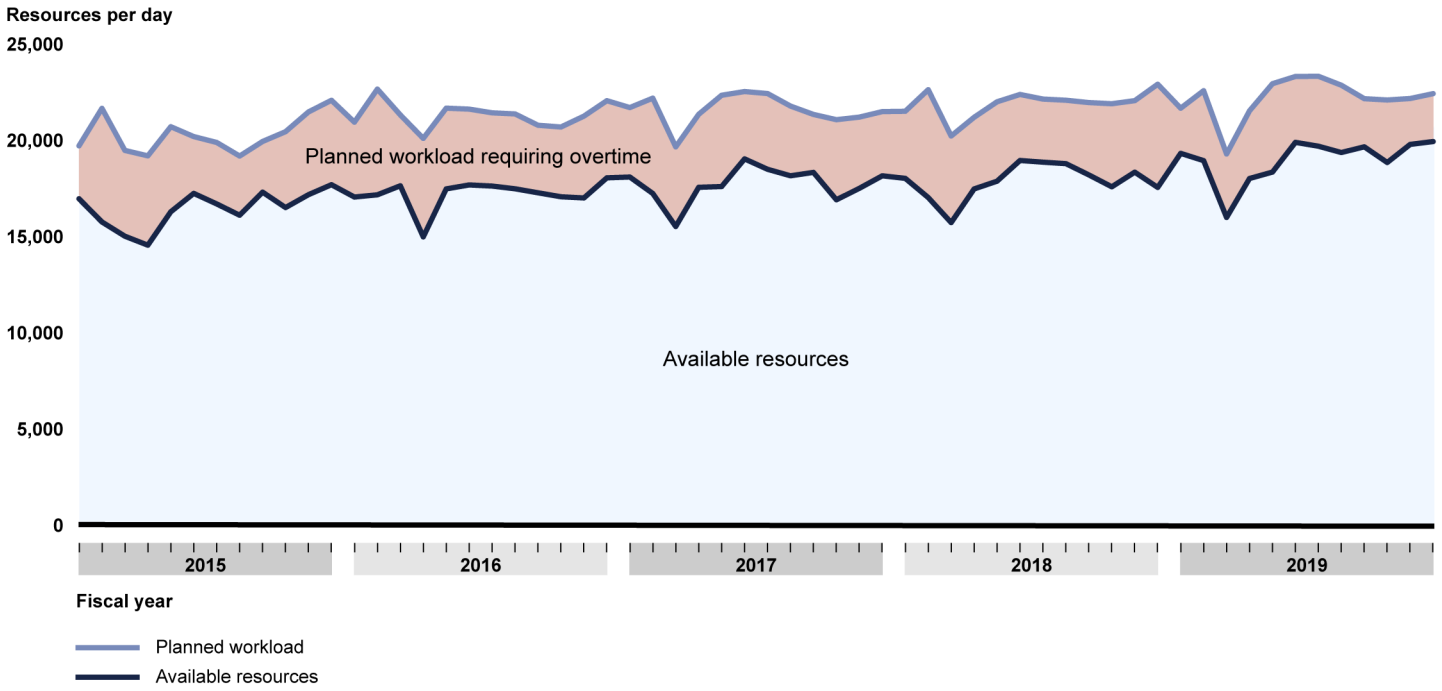
Note: The table is based on end strength data provided by the Naval Sea Systems Command. Production personnel figures include hourly wage workers involved in direct production activities such as welding, pipefitting, and painting and blasting, but do not include hourly support personnel that facilitate direct production work.

We also found that the amount of workload planned for the shipyards for fiscal years 2015 through 2019 consistently exceeded shipyards' capacity in terms of the workforce available to perform the work without using overtime.[34] Specifically, we found that planned work was 23 percent more than might be expected to be completed without the use of overtime. According to the Navy, completing the daily workload without the use of overtime would require 4,160 more shipyard personnel per day. For fiscal years 2015 through 2019, NAVSEA guidance acknowledged a mismatch between the shipyards' workforce capacity and their planned workload, and required shipyards to use overtime to bridge the gap (see fig. 8).[35]

[34]"Resources per day" is derived from the Navy's estimate of total mandays budgeted for each maintenance period.

[35]NAVSEA issues annual memorandums with required overtime parameters such as NAVSEA Memorandum *FY 2015 Execution Guidance for Naval Shipyards* (April 17, 2015), which acknowledged the mismatch between shipyard workforce capacity and workload plans for shipyards, referred to as Workload Allocation and Resource Reports.

Figure 8: Navy's Use of Overtime to Address Planned Workload at the Four Shipyards for Fiscal Years 2015 through 2019



Source: GAO analysis of Navy data. | GAO-20-588

Note: Guidance is provided to the Navy's four shipyards in terms of resources per day. Resources per day is derived from the Navy's estimate of total mandays budgeted for each maintenance period, which is then totaled across the shipyards.

Navy Has Taken Steps to Improve Shipyard Performance, but Has Not Effectively Addressed Unplanned Work and Workforce Factors Causing Maintenance Delays

The Navy has taken steps, but has not fully addressed the two most frequently cited factors of unplanned work and workforce factors causing maintenance delays for aircraft carriers and submarines. Specifically, the Navy has updated some planning documents and has consistently used overtime to meet planned work and workforce factors; however, maintenance delays for aircraft carriers and submarines have persisted. While NAVSEA has begun its Shipyard Performance to Plan initiative to help address both the unplanned work and workforce factors, the initiative does not include key elements of a results-oriented management approach such as fully-developed quantitative metrics, goals, and milestones.

To Address Unplanned Work the Navy Has Begun Planning for Longer Maintenance Periods and Improving Related Cost Estimates

In order to improve ship maintenance planning and better account for unplanned work, the Navy conducted studies during fiscal years 2016 and 2017. In determining the parameters used to forecast ship maintenance requirements, the Navy relied upon (1) outdated or inaccurate estimates in planning documents such as the technical foundation papers used to plan maintenance for specific ship classes, and (2) planning factors used to forecast ship maintenance that did not reflect actual shipyard performance.[36]

In February 2017, NAVSEA hosted a planning summit to discuss potential improvements to accurately planning ship maintenance. According to NAVSEA officials, prior to this summit, planning documents were formally updated on an infrequent basis when substantial changes had been identified. The planning summit revealed the need to revisit planning documents on a more regular basis. Following the summit, NAVSEA established procedures for reviewing and updating planning documents on an annual basis, and immediately began updating planning documents based on the most recent 3 years of historical data to support shipyard maintenance planning and budgeting processes.

According to shipyard and fleet officials, aircraft carriers and submarines undergoing maintenance had longer planned durations than similar previous maintenance periods. For example, shipyard officials stated that they recently updated workload requirements estimates to extend the duration of a certain type of planned maintenance for submarines from 27 months to 31.2 months. In addition, NAVSEA officials stated that they revised planning factors for ship maintenance to improve estimated workload requirements and cost factors. NAVSEA officials stated they plan to analyze the results from the revised planning factors annually to monitor whether the changes improve estimates and to make adjustments as needed. According to NAVSEA officials, they will not know whether the changes they are making result in improved estimates until work on ship maintenance periods using the revised planning documents and planning factors is complete—a process that may take several years.

[36]DOD, The Secretary of the Navy, *Annual Statement Required under the Federal Managers' Financial Integrity Act for Fiscal Year 2019* (Sept. 30, 2019).

To Address Maintenance Delays Related to Workforce, the Navy Primarily Relies on Overtime

Navy officials told us that the use of overtime is the Navy's primary response to addressing the workforce factor that causes maintenance delays. We have reported that working overtime is often used to mitigate schedule problems.[37] Overtime can be appropriately used to meet temporary needs during emergencies or for special projects that cannot be completed during normal working hours. According to Navy officials, some amount of overtime is necessary due to the nature of work and an inability to complete certain jobs within a single shift. Also, according to these officials, a certain level of overtime helps shipyard productivity in some cases, or allows the shipyards to meet priority schedule objectives. Consequently, NAVSEA issues a memorandum each year establishing the maximum overtime for each shipyard. For fiscal years 2015 through 2019, NAVSEA set maximum overtime rates at each shipyard ranging from 12 percent to 18.2 percent more hours than a standard 40-hour workweek.[38]

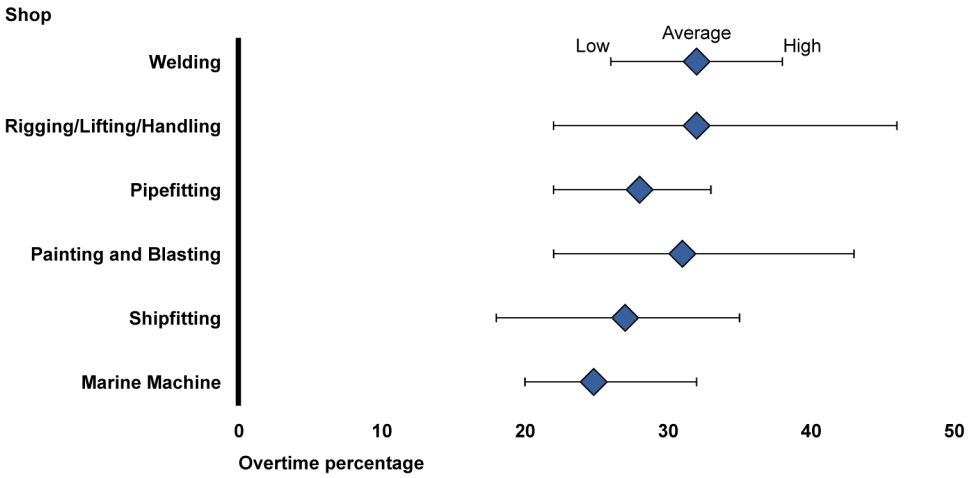
However, we found that every shipyard had exceeded the maximum overtime rates for every fiscal year we reviewed, with actual overtime rates ranging from 15.6 percent to 26.9 percent, and production shops within the shipyards—that is, the skilled workforce that provides welding, painting and blasting, and pipefitting, among other things—consistently exceeding maximum overtime rates established in guidance. Specifically, shipyard officials told us that personnel from the shipyards' production shops are working well beyond their capacity. Our analysis of production shops across all four of the Navy's shipyards for fiscal years 2015 through 2019 revealed average overtime among certain critical production shops

[37]GAO, *Cost Estimating and Assessment Guide: Best Practices for Developing and Managing Program Costs*, GAO-20-195G (Washington, D.C.: Mar 12, 2020).

[38]Department of the Navy, Commander Naval Sea Systems Command Memorandum, *FY 2015 Execution Guidance for Naval Shipyards* (April 17, 2015). The memorandum establishes direct overtime parameters of 12 to 17 percent, and required shipyards to obtain approval prior to deviating from those parameters. Direct overtime includes the costs for labor in excess of 40 hours per week that can be charged to a specific job order, or ship maintenance period. Indirect overtime includes overhead costs that are not readily identifiable with a specific job order or maintenance period. For the purposes of this report we will refer to direct overtime simply as "overtime." The memorandum states that, "The Naval Shipyards are required to operate outside NAVSEA's optimal parameters due to a capacity/workload mismatch" at the shipyards, and NAVSEA guidance for following years required direct overtime parameters from 14 to 18.2 percent—required amounts higher than those specified for fiscal year 2015.

at each shipyard ranging from 25 to 32 percent with peak overtime rates as high as 45 percent (see fig. 9).[39]

Figure 9: Sample of Overtime Rates across the Navy's Four Shipyards in Critical Production Shops for Fiscal Years 2015 through 2019



Source: GAO analysis of Navy data. | GAO-20-588

Note: The information above represents the shops most frequently included among the top five production shops reporting the highest amount of overtime at all shipyards for fiscal years 2015 through 2019. The figure does not include production shops that consistently reported high overtime rates at a single shipyard.

Navy officials at all four shipyards also told us that the majority of overtime at the shipyards is performed by personnel from these production shops. Workload that exceeds the available workforce and reliance on overtime as the solution has persisted for many years. According to a study prepared for the Navy in 2008, the Navy's four shipyards "have been using overtime to an extent that diminishes productivity" and each "relies on what might be considered excessive

[39]A shop working 45 percent overtime in a 40-hour work week would mean an average of 58 hours worked that week per person in the shop. A shop that worked at a 37 percent overtime rate would be averaging 54.8 hours per person for that work week, and a shop that worked 29 percent overtime in a 40-hour work week would mean that, on average, each person in that shop worked 51.6 hours per week.

overtime."[40] Our analysis found that overtime reported for fiscal years 2015 through 2019 is comparable to overtime rates reported in the 2008 study.

The consistent use of high levels of overtime to meet planned workloads at the Navy's four shipyards has not alleviated the persistent and ongoing maintenance delays and may, instead, be contributing to these delays. We have reported that working overtime can make staff less efficient.[41] Shipyard officials stated that too much overtime can also increase the likelihood of accidents and rework, among other things. We found that the concentration of inefficient work in production shops correlates with production shops that have consistently experienced high rates of overtime use such as at the machine, shipfitting, and painting and blasting shops. For example, the shipfitting shop at Puget Sound—which experienced overtime of 25 percent in fiscal year 2019—was cited by the Navy as a source of inefficiencies that could be resolved by providing additional staff. In addition, marine machine shops—which averaged 25 percent overtime for fiscal years 2015 through 2019—were cited as among the top shops degrading performance across all four shipyards due to systematic planning problems and poor execution.

Though the Navy has performed some analysis of overtime rates in production shops, it did not fully analyze the use of overtime among shipyard production shops to determine the impact of consistent, high-levels of overtime on the timely completion of maintenance. Nor has the Navy updated its workforce requirements based on a full analysis of its use of overtime. Specifically, the Navy reported in February 2020 that it had performed an analysis of overtime at the shipyards and found its overtime rates to be above industry standards in addition to being consistently higher than planned. For example, the Navy indicated that for multiple years some production shops averaged 40 percent overtime (56-hour weeks). The Navy also identified inefficiencies in its production shops, but did not link the consistent, high-use of overtime in these same shops to the inefficiencies. Further, the Navy indicated that it did not analyze potential links between consistent, high-levels of overtime and

[40]Riposo, Jessie, Brien Alkire, John F. Schank, Mark V. Arena, James G. Kallimani, Irv Blickstein, Kimberly Curry Hall, and Clifford A. Grammich, *U.S. Navy Shipyards: An Evaluation of Workload- and Workforce-Management Practices,* RAND Corporation (Santa Monica, CA: 2008). According to the report, excessive overtime levels can result in large decreases in worker productivity due to fatigue, and high and sustained levels of overtime can also lead to safety concerns.

[41]GAO-20-195G.

the delays in completion of maintenance periods and attrition of its workforce, among other things.

Furthermore, according to shipyard officials, the Navy's reliance on overtime to complete planned workloads at shipyards prevents them from having the capability to respond effectively to surge requirements through expanded work hours or additional shifts during emergency operations. Specifically, DOD depots—including the Navy's four shipyards—are required to size maintenance activities to satisfy core requirements using a single-shift, 40-hour workweek standard (i.e., without the use of overtime) to preserve "the capability to respond effectively to surge requirements through expanded work hours or additional shifts during emergency operations."[42] The Navy reported in February 2020 that continuing to consistently rely on overtime for planned workload and other risk factors is not likely to improve shipyard productivity, cost-effectiveness, and the timeliness of ship maintenance, or allow the Navy to respond to changing needs and provide surge capacity through the use of overtime in the future. However, as of June 2020, the Navy had not taken steps to update its workforce requirements to minimize the use of overtime. By fully analyzing its use of overtime and updating workforce requirements to reduce or avoid the use of overtime to accomplish planned work, the Navy can better position itself to improve shipyard performance.

Navy's Shipyard Performance to Plan Initiative to Address Unplanned Work and Workforce Factors Does Not Include Key Elements of a Results-Oriented Management Approach

NAVSEA, through its Shipyard Performance to Plan initiative, has taken steps to address both the unplanned work and workforce factors, but has made limited progress. The initiative includes the proposed development of analytically based metrics to measure various aspects of shipyard maintenance that could support the development of potential solutions to address them. Specifically, the initiative includes 25 metrics being developed to improve the Navy's understanding of the causes of maintenance delays. We found that nearly all—22 of the 25 potential metrics—are intended to measure various aspects specific to the unplanned work and workforce factors we found to be the main causes of maintenance delays for aircraft carriers and submarines at the Navy's four shipyards.

[42]DOD Instruction 4151.20, *Depot Maintenance Core Capabilities Determination Process*, (May 4, 2018) (Change 1, Aug. 31, 2018). In the biennial core report, aircraft carriers and submarine maintenance accounts for 77 percent of the Navy's core capability workload requirement, and 76 percent of the Navy's total public depot workload.

- **Metrics to measure the unplanned work factor:** We found that, as of February 2020, 10 of the 25 metrics being developed in the initiative focused on addressing various aspects of the unplanned work factor. For example, a forecast and planning efficiency metric is being developed to measure the accuracy of 3-year planning ship maintenance forecasts as compared with actual results. In addition, metrics are being developed to quantify the main causes of ship maintenance planning inaccuracy, such as new work, which have led to schedule delays and cost increases at the shipyards.
- **Metrics to measure the workforce factor:** We found that, as of February 2020, 12 of the 25 metrics being developed in the initiative focused on addressing various aspects of the workforce factor. For example, a metric is being developed to measure task duration while another is to measure work throughput. In addition, metrics are being developed to identify whether tasks were started on time, among other things.

NAVSEA's Shipyard Performance to Plan initiative has been underway since the fall of 2018. However, as of February 2020, more than half—13 of 25—of the proposed metrics remained undeveloped. Specifically, each proposed metric included six categories of information: definition of the metric, data owner, data source, status of the data (complete/incomplete), way ahead (next steps), and correlation (to maintenance delays). Twelve of the proposed metrics appear to be fully developed because they include information in each category. For example, for schedule execution efficiency, a definition of the metric, the data owner, and data source were identified and the status of the data, the way ahead, and the correlation to maintenance delays were all described. However, we found that 13 of the 25 proposed metrics were not fully developed. For example, as of February 2020:

- Two proposed metrics related to unplanned work intended to measure both discoverable and undiscoverable new work included the identification of a data owner, but the metrics have not been defined, and the data source, status of the data, way ahead, and correlation to delays categories are characterized as "to be determined."
- The proposed metrics for both planned and actual manning included definitions, data owners, data sources, and way ahead, but the status of correlation to maintenance delays is identified as "to be determined."
- The proposed metrics, "start tasks on time" and "workforce experience," had planned completion dates of October 2019 and these dates were not updated in two subsequent briefings.

As of February 2020 the Navy had not identified when the undeveloped metrics were to be completed. According to the Navy, the Shipyard Performance to Plan initiative is intended to focus leadership attention on a prioritized set of "metrics that matter" to align to strategic objectives while establishing how metrics are defined and reported. Having fully developed metrics would help the Navy improve the timeliness of maintenance, and increase the Navy's overall readiness.

In addition to the lack of fully developed metrics, or timeframes for completing them, the Navy has not fully developed goals, milestones, action plans, and a monitoring process—key elements in a result-oriented management approach—to use metrics to address the main factors for maintenance delays and cost increases at the Navy's four shipyards.[43] For example, at the beginning of fiscal year 2019 the Navy stated it would produce Shipyard Performance to Plan instructions in support of aviation, surface, undersea, safety, and information warfare improvements to focus its efforts on improving readiness, among other things.[44] However, the Navy did not address the need to provide instructions for the Shipyard Performance to Plan initiative at its four shipyards to ensure that progress was made, or that quarterly updates to senior leadership to monitor the development of NAVSEA's Shipyard Performance to Plan initiative will continue. Our prior work on results-oriented management has shown that performance information and analytic capacity can strengthen the use of data for process improvements.[45] Further, while having a complete set of metrics would help the Navy better address the main factors causing maintenance delays, metrics on their own would not resolve those issues. Unless the Navy fully develops its metrics as part of the Shipyard Performance to Plan initiative and then, based on these metrics, implements related goals, action plans, milestones, and a monitoring process to address unplanned work and workforce weaknesses, the Navy is likely to continue to face persistent maintenance delays at Navy shipyards that require more resources than planned.

[43]See GAO-17-548; GAO-13-228; GAO-11-240R; GAO-09-676; GAO-05-927; and GAO/GGD/AIMD-99-69.

[44]Department of the Navy, *Business Operations Plan Fiscal Years 2019-2021*, Version 1.2 (October, 2018).

[45]See GAO-17-548; GAO-13-228; GAO-11-240R; GAO-09-676; GAO-05-927; and GAO/GGD/AIMD-99-69.

Conclusions

The ability of the Navy's four shipyards to complete aircraft carrier and submarine maintenance on time directly affects military readiness because maintenance delays reduce the amount of time aircraft carriers and submarines are available to perform their missions and protect our national security. The Navy's four shipyards have continued to face chronic and substantial delays in over half of aircraft carrier and more than three-quarters of submarine maintenance periods, and the Navy has experienced substantial growth in idle time for submarines awaiting the start of maintenance periods. In February 2020 the Navy projected that most submarines whose maintenance periods had already begun or would be started by the beginning of fiscal year 2021 would likely also be completed late. Additionally, the Navy reported in June 2020 that one aircraft carrier had recently completed its maintenance period late and projected another aircraft carrier completing its maintenance period later in fiscal year 2020 would also be completed late. These projections predate any impact of the coronavirus pandemic on the ability of the Navy's shipyards to complete aircraft carrier and submarine maintenance on time.

The Navy has recognized the factors associated with maintenance delays and has begun focusing upon the unplanned work and workforce factors that are contributing to most aircraft carrier and submarine maintenance delays. However, even though the Navy has taken steps, such as attempting to more accurately project the duration and resource requirements for planned maintenance on aircraft carriers and submarines, continuing to routinely and consistently use overtime to meet planned maintenance is untenable. The Navy's consistent use of overtime has diminished productivity, has not been cost effective, and does not maintain the capacity for the shipyards to use overtime to respond to changing needs and provide surge capacity as required by DOD guidance. By more fully analyzing the use of overtime among shipyard production shops and updating workforce requirements to avoid the consistent use of overtime, the Navy could better meet planned maintenance requirements or respond to emergency requirements without further degrading the readiness of the fleet.

Finally, the Shipyard Performance to Plan initiative may help NAVSEA and shipyard leadership better understand factors contributing to maintenance delays and inform decisions to address them. However, NAVSEA has not developed over half of its metrics for measuring the impact of the unplanned work and workforce factors or implemented related goals, action plans, milestones, and a monitoring process to improve the timely completion of maintenance. Though having a complete

set of metrics would help the Navy better address the main causes of maintenance delays, metrics on their own would not resolve those issues. Unless NAVSEA uses the key elements of a results-oriented management approach to address factors contributing to maintenance delays such as unplanned work and workforce issues at the Navy shipyards, delays in maintenance periods and idle time are likely to persist. Completing these actions as soon as possible could increase the overall availability of aircraft carriers and submarines to perform needed training and operations in support of their various missions and improve readiness.

Recommendations for Executive Action

We are making three recommendations to the Secretary of the Navy.

The Secretary of the Navy should ensure that the Naval Sea Systems Command fully analyzes the use of overtime among shipyard production shops, and updates workforce requirements to avoid the consistent use of overtime to meet planned maintenance requirements.
(Recommendation 1)

The Secretary of the Navy should ensure that the Naval Sea Systems Command identify a timeframe for completing the development of metrics for its Shipyard Performance to Plan initiative and complete the development of metrics to address the main factors contributing to maintenance delays and improve the timely completion of ship maintenance at Navy shipyards**.**
(Recommendation 2)

The Secretary of the Navy should ensure that the Naval Sea Systems Command develop and implements goals, action plans, milestones, and a monitoring process for its Shipyard Performance to Plan initiative to address the main factors contributing to maintenance delays and improving the timely completion of ship maintenance at Navy shipyards.
(Recommendation 3)

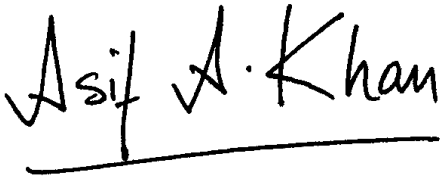
Agency Comments

We provided a draft of this report to DOD for review and comment. In written comments provided by the Navy (reproduced in appendix II), DOD concurred with our recommendations. The Navy also provided technical comments, which we have incorporated as appropriate.

We are sending copies of this report to the appropriate congressional committees, the Secretary of Defense, the Secretary of the Navy, and other interested parties. In addition, the report is available at no charge on the GAO website at http://www.gao.gov.

If you or your staff have questions about this report, please contact us at MaurerD@gao.gov or (202) 512-9627, or KhanA@gao.gov or (202) 512-9869. Contact points for our Offices 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 III.

Diana Maurer
Director, Defense Capabilities and Management



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Committee on Armed Services
United States Senate

The Honorable Richard C. Shelby
Chairman
The Honorable Dick Durbin
Ranking Member
Subcommittee on Defense
Committee on Appropriations
United States Senate

The Honorable Adam Smith
Chairman
The Honorable Mac Thornberry
Ranking Member
Committee on Armed Services
House of Representatives

The Honorable Pete Visclosky
Chairman
The Honorable Ken Calvert
Ranking Member
Subcommittee on Defense
Committee on Appropriations
House of Representatives

Appendix I: Scope and Methodology

For the first objective, to assess the extent to which the Navy completed maintenance at its shipyards on time on aircraft carriers and submarines for the most recent 5-year period from fiscal years 2015 through 2019, we analyzed maintenance delay and idle time data from offices within the Naval Sea Systems Command (NAVSEA) and we reviewed our prior work on shipyard maintenance delays.[1] The Navy determines days of maintenance delay by counting each day in which a maintenance period extends beyond the planned completion date. Two Navy offices within NAVSEA—that is, the Logistics, Maintenance, and Industrial Operations Command and the Program Executive Office Submarines—track days incurred from depot-level maintenance delays for aircraft carriers and submarines, and idle time for submarines.

- To determine the total number of days of maintenance delay for each fiscal year within our scope, we subtracted the planned completion date from the actual completion date to produce the number of days of maintenance delays for each maintenance period.[2] We added together the days of maintenance delays across all aircraft carriers and submarines for each fiscal year, and then added the fiscal year totals to determine the overall total. We also tracked the total number of days that the Navy had completed maintenance periods ahead of schedule—that is, 144—but we noted these separately instead of subtracting them from the total number of days of maintenance delays.

  To be able to report days of maintenance delay on aircraft carriers and submarines, we used data from maintenance periods for which maintenance was completed during fiscal years 2015 through 2019, which in some cases began as early as fiscal year 2012. We included the days of maintenance incurred on the 49 completed maintenance periods and the days of maintenance incurred from two maintenance periods originally scheduled for completion in fiscal year 2019 but that experienced delays that pushed their completion dates into fiscal year 2020.
- The Program Executive Office Submarines provided days of idle time data—idle time is incurred when a submarine lacks the safety

[1]GAO, *Navy Readiness*: *Actions Needed to Address Costly Maintenance Delays Facing the Attack Submarine Fleet,* GAO-19-229 (Washington, D.C.: Nov. 19, 2018).

[2]For some maintenance periods, this resulted in 0 days, indicating that the maintenance was completed on time. For other periods, this resulted in a negative number, indicating that the maintenance was completed ahead of schedule. We did not subtract days completed ahead of schedule from the total number of days of maintenance delays.

certification necessary to operate and must idle at the shipyard while waiting for an available dry-dock prior to the start of a maintenance period. We calculated total days of idle time by combining the idle time incurred from the maintenance periods that were completed during fiscal years 2015 through 2019 with the idle time incurred from ongoing maintenance periods which began during fiscal years 2015 through 2019. According to Navy officials, aircraft carriers do not incur idle time.

For the second objective, to identify the main factors causing maintenance delays, we identified a list of 10 factors that caused maintenance delays from our prior work (see Related GAO Products at the end of the report) in addition to previously unreported factors that we identified during interviews and site visits to the Navy's four shipyards. We then analyzed which factors caused the most delays in aircraft carrier and submarine maintenance periods based on documentation describing delays, specifically, letters from the shipyards to NAVSEA citing causes of delays, among other things. The Navy's four shipyards issue these letters, known as "rebaselining letters," to communicate delays in the completion of maintenance, schedule changes, and changes in the cost of a maintenance period.[3]

We assessed more than 300 documents, including these letters, provided by NAVSEA and identified 70 letters that described the causes for delays in the completion of 31 aircraft carrier and submarine maintenance periods.[4] Our review included 51 maintenance periods: 49 completed on aircraft carriers and submarines from fiscal years 2015 through 2019 and two submarine maintenance periods that were planned for completion before the end of fiscal year 2019 but whose completion of maintenance was delayed until fiscal year 2020. Due to the average delays for aircraft carriers and submarines of 113 and 225 days, respectively, there were

[3]Rebaselining letters are submitted to NAVSEA headquarters by the shipyards and contain qualitative explanations for the various causes of maintenance delays, among other things.

[4]There were letters associated with maintenance periods that ultimately completed maintenance on time or earlier than planned as well as other maintenance periods that had letters indicating an increase in cost only. We did not include those letters in our analysis. Further, three maintenance periods had delays of 14 days or fewer and would not be required to generate a letter explaining the delay. Finally, not all letters identified causes of delays while in other cases, not all changes in the duration of a maintenance period included a letter describing the delay. When asked about this, Navy officials indicated that some changes to the duration of maintenance periods occurred via execution reports and that no other rebaselining documents had been generated.

several instances where the planned completion date for individual maintenance periods was changed via these letters multiple times.

We used the list of 10 factors to categorize the reasons for delay that the Navy identified in the rebaselining letters. Two team members independently categorized each cause for rebaselining and addressed any discrepancies in the categorizations. For each factor, we also tabulated the number of times each specific cause was identified and the number of days of maintenance delay associated with each occurrence in the letters, and determined for each factor contributing to maintenance delays any associated sub-factor (more specific reason for the delay). For example, shipyard performance, capacity, and ship's crew, among others, were counted as sub-factors within the workforce factor, and contributed to the tabulation for that factor.

In addition, we conducted a survey that asked Navy officials to rank the 10 factors that we had identified as causes for delays in maintenance from most likely to least likely for aircraft carriers, submarines, or both. We identified Navy maintenance leaders during interviews with staff and site visits to the Navy's four shipyards. We also obtained contact information for staff in leadership roles with global knowledge of the maintenance process for aircraft carriers, submarines, or both. This resulted in a sample of 171 Navy officials from a range of roles, offices, and locations across the Navy. Specifically, the sample included leaders from NAVSEA headquarters, type commanders from the U.S. Fleet Force and Pacific Fleet, planning organizations like PMS312, and department heads across the Navy's four shipyards.

We conducted pretests with four Navy officials—who were selected because of their varying job roles and locations—to check that the directions were clear and that terminology was used correctly. We revised our questionnaire based on their feedback. We fielded the survey from late January through mid-February 2020. We also followed up with respondents who filled out the survey incorrectly. Of the 101 out of 171 Navy officials who responded to the survey, 90 out of 101 respondents completed the questionnaire correctly and are included in our results. This resulted in an overall response rate of 53 percent (90 out of the 171 officials who responded). We assigned points to determine a score for each factor with more points given to responses indicating that a factor was more likely to lead to delays and fewer points given to responses indicating that a factor was less likely to lead to delays. We multiplied the points by the frequency of the responses to create the score. We completed this process for both aircraft carriers and submarines, which

resulted in a list of the 10 factors ranked from most likely to least likely, for each.

We focused our review on the two factors identified as the causes of the overwhelming majority of maintenance delays in the completion of aircraft carrier and submarine maintenance periods—unplanned work and workforce. We analyzed Navy data on regularly scheduled maintenance periods that occurred at the Navy's four shipyards for aircraft carriers and submarines from fiscal years 2015 through 2019 to compare planned maintenance workload with actual results.[5] We used these data, our prior reports, and the Navy's annual risk and internal control assessments to determine how unplanned work contributed to the maintenance delays and cost increases.[6] To determine how unplanned work and workforce contributed to delays in ship maintenance, we analyzed Navy data on regularly scheduled maintenance periods that occurred at the Navy's four shipyards for aircraft carriers and submarines completed from fiscal years 2015 through 2019. We also evaluated data and documents associated with shipyard personnel, planned workload at the shipyards, overtime rates, and prior reports associated with workforce factors identified as leading to maintenance delays.

For the third objective, to determine the extent to which the Navy has addressed the main factors contributing to maintenance delays, we reviewed Office of the Secretary of Defense and Navy guidance on sustainment and data related to the factors most frequently cited as causing maintenance delays in our review of Navy documents and from our survey—unplanned work and workforce factors. We reviewed Navy data related to core capability requirements—maintenance capability (including personnel, equipment, and facilities) maintained by the Department of Defense (DOD) at government-owned and -operated facilities—in support of DOD's biennial core report to Congress on May

[5]This regularly scheduled depot-level maintenance is referred to by the Navy as maintenance availabilities, but for the purpose of this report we refer to them as maintenance periods.

[6]DOD, The Secretary of the Navy, *Annual Statement Required Under the Federal Managers' Financial Integrity Act for Fiscal Year 2016* (September 30, 2016). Statement of Assurance is an annual statement required under the *Federal Managers' Financial Integrity Act of 1982 (FMFIA*), and the *Federal Financial Management Improvement Act of 1996 (FFMIA)*. It is an annual risk and internal control assessment completed in accordance with the Office of Management and Budget (0MB) Circular No. A-123, *Management's Responsibility for Enterprise Risk Management and Internal Control,* and the GAO's *Standards for Internal Control in the Federal Government*.

23, 2018.[7] We compared the use of the shipyard workforce in meeting those requirements with related DOD instructions.[8] We then analyzed plans issued from fiscal years 2015 through 2019 with additional information from each shipyard and NAVSEA updated through February 2020. To determine how workforce factors contributed to maintenance delays we evaluated data and documents associated with shipyard personnel, planned workload at the shipyards, overtime rates, and prior reports associated with workforce factors identified as leading to maintenance delays. We interviewed Navy headquarters and shipyard officials and reviewed documents to determine what actions the Navy has taken to address maintenance delays that were the result of unplanned work and the workforce factors.

NAVSEA provided us with two briefings describing the status of the aircraft carrier and submarine portion of NAVSEA's Shipyard Performance to Plan initiative from November 2019 and February 2020. Using the same list of 10 factors, we categorized the 25 potential metrics identified in the briefing that the Navy had developed or plans to develop to better understand the reasons for maintenance delays. We also analyzed the documents to determine whether NAVSEA had collected data for each metric and what progress, if any, was made from November 2019 through February 2020. We then compared the aircraft carrier and submarine portions of the NAVSEA Shipyard Performance to Plan initiative with key elements of a results-oriented management approach that had been identified from our prior work as critical to successful

[7]The National Defense Authorization Act for Fiscal Year 2013 amended section 2464 to require DOD to submit to Congress a biennial report addressing three elements for each of the armed services, during each even-numbered year. Pub. L. No. 112-239, § 322 (2013).

[8]DOD Instruction 4151.20, *Depot Maintenance Core Capabilities Process* (May 4, 2018) (Change 1, Aug. 31, 2018) defines "core capability requirement" as the depot maintenance capability (including personnel, equipment, and facilities) maintained by DOD at government-owned and -operated facilities as the ready and controlled source of technical competence and resources necessary to ensure effective and timely response to a mobilization, national defense contingency situation, and other emergency requirements.

strategic planning, and determined whether these plans and the Navy's management approach included those key elements.[9]

To address all three objectives, we interviewed or obtained documentation from:

Department of Defense

- The Office of the Under Secretary of Defense, Acquisition and Sustainment

Department of the Navy

- U.S. Fleet Forces Command
  - Commander, Naval Air Force, U.S. Atlantic Fleet
  - Commander, Submarine Force, U.S. Atlantic Fleet
- U.S. Pacific Fleet
  - Commander, Naval Air Force, U.S. Pacific Fleet
  - Commander, Submarine Force, U.S. Pacific Fleet
- Program Executive Office, Aircraft Carriers-Carrier Planning Activity
- Program Executive Office Submarines
- Naval Sea Systems Command (NAVSEA)
  - Logistics, Maintenance, and Industrial Operations
  - Attack Submarine Program Office
  - Submarine Maintenance Engineering, Planning, and Procurement
- Public Shipyards
  - Norfolk Naval Shipyard, Portsmouth, Virginia
  - Portsmouth Naval Shipyard, Kittery, Maine

[9]GAO, *Military Depots: Actions Needed to Improve Conditions of Facilities and Equipment That Affect Maintenance Timeliness and Efficiency*, GAO-19-242 (Washington, D.C.: Apr 29, 2019); *Managing for Results: Data-Driven Performance Reviews Show Promise but Agencies Should Explore How to Involve Other Relevant Agencies*, GAO-13-228 (Washington, D.C.: Feb. 27, 2013); and *Government Performance: Strategies for Building a Results-Oriented and Collaborative Culture in the Federal Government*, GAO-09-1011T (Washington, D.C.: Sept. 24, 2009).

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

To assess the reliability of the data sources used to conduct our analyses, we interviewed Navy officials and reviewed documentation that they provided on both the days of maintenance delay and idle time data. Navy officials provided information that included an overview of the data sources, how the information was collected, definitions for various dates and variables, data quality controls, and perceptions of overall data quality. We interviewed Navy officials to obtain further clarification and discussed our plans for how we intended to use the data. We also conducted our own error checks and reconciled the irregularities we found. Some of the data had been used in our prior reports and were assessed as reliable. We also ensured the data were reliable for our purposes by assessing new data that we received and determined that they were sufficiently reliable for the purposes of our reporting objectives.

We conducted this performance audit from July 2019 to August 2020 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.

Appendix II: Comments from the Department of the Navy

THE ASSISTANT SECRETARY OF THE NAVY
Research, Development and Acquisition
1000 Navy Pentagon
Washington DC 20350-1000

4 Aug 20

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

Dear Ms. Maurer,

Attached is the Department of Defense (DoD) response to the GAO Draft Report, GAO-20-588SU, "NAVY SHIPYARDS: Actions Needed to Address the Main Factors Causing Maintenance Delays for Aircraft Carriers and Submarines" dated June 24, 2020 (GAO Code 103670). This report is unclassified and cleared for open publication.

Sincerely,

GEURTS.JAMES.F.1034185286 Digitally signed by GEURTS.JAMES.F.1034185286 Date: 2020.08.04 16:27:33 -04'00'

James F. Geurts

Attachments:
As Stated

GAO DRAFT
GAO-20-588 (GAO CODE 103670)

"NAVY SHIPYARDS: ACTIONS NEEDED TO ADDRESS THE MAIN FACTORS CAUSING MAINTENANCE DELAYS FOR AIRCRAFT CARRIERS AND SUBMARINES"

NAVAL SEA SYSTEMS COMMAND'S COMMENTS
DRAFT REPORT RECOMMENDATIONS FOR GAO-20-588

RECOMMENDATION 1: The Secretary of Navy should ensure that Naval Sea Systems Command fully analyzes the use of overtime among shipyard production shops, and updates workforce requirements to avoid the consistent use of overtime to meet planned maintenance requirements.

DON RESPONSE: Concur. Naval Sea Systems Command (NAVSEA) strives to achieve the optimum balance in shipyard capacity to fleet workload requirements, which includes the judicious use of overtime and contracting support to augment capacity when workload increases. The use of overtime cannot be avoided due to the fluctuating nature of the maintenance workload, the latency for hiring and developing new workers, and the undesirable consequences associated with reductions in force (RIFs) when workload dips. On an annual basis, NAVSEA conducts a comprehensive and detailed review of workload requirements and available public shipyard capacity. This review informs decision making for sizing and balancing the capacity at the shipyards to the projected workload, and includes helps identify future operational parameters, such as hiring, overtime usage, and contracting support. As the Navy programs future naval shipyard capacity, it also takes into consideration and seeks to balance future workload requirements across the entire industrial base, both public and private.

RECOMMENDATION 2: The Secretary of Navy should ensure that Naval Sea Systems Command identify timeframe for completing the development of metrics for its Shipyards Performance-to-Plan initiatives and completes the development of metrics to address the main factors contribution to maintenance delays and improve the timely completion of ship maintenance at Navy shipyards.

DON RESPONSE: Concur. NAVSEA will continue its Shipyards Performance-to-Plan initiative in its identification of maintenance drivers and their associated metrics, improvement goals and forecasts. A formal plan of action has been developed to complete this effort and is regularly briefed to senior Navy leadership.

RECOMMENDATION 3: The Secretary of Navy should ensure that Naval Sea Systems Command develops and implements goals, actions plans, milestones and monitoring process for its Shipyard Performance-to-Plan initiative to address the main factors contribution to maintenance delays and improving the timely completion of ship maintenance at Navy shipyards.

DON RESPONSE: Concur. NAVSEA has developed an improvement plan addressing maintenance delays and required actions for improving the timely completion of ship maintenance. NAVSEA continues to progress the completion of these actions. As previously addressed, NAVSEA also developed a formal action for the Shipyards Performance-to-Plan initiative and regularly briefs senior Navy leadership on its progress.

Appendix III: GAO Contacts and Staff Acknowledgments

GAO Contacts:

Diana Maurer at (202) 512-9627 or MaurerD@gao.gov

Asif A. Khan at (202) 512-9869 or KhanA@gao.gov

Staff Acknowledgements:

In addition to the contacts named above, Jodie Sandel (Assistant Director), Doris Yanger (Assistant Director), Scott M. Behen (Analyst-in-Charge), Gina M. Hoover, David L. Jones, Mae F. Jones, Lauren A. Lochocki, Felicia Lopez, Keith E. McDaniel, and John E. “Jet” Trubey made key contributions to this report.

Related GAO Products

Report numbers with a C or RC suffix are classified. Classified and sensitive but unclassified reports are available to personnel with the proper clearances and a need to know, upon request. Report numbers with a T suffix are testimonies.

Military Depots: The Navy Needs Improved Planning to Address Persistent Aircraft Maintenance Delays While Air Force Maintenance Has Generally Been Timely. GAO-20-390. Washington D.C.: June 23, 2020.

Navy Shipbuilding: Increasing Focus on Sustainment Early in the Acquisition Process Could Save Billions. GAO-20-2. Washington, D.C.: March 24, 2020.

Navy Maintenance: Persistent and Substantial Ship and Submarine Maintenance Delays Hinder Efforts to Rebuild Readiness. GAO-20-257T. Washington, D.C.: December 4, 2019.

Naval Shipyards: Key Actions Remain to Improve Infrastructure to Better Support Navy Operations. GAO-20-64. Washington, D.C.: November 25, 2019.

Military Depots: Actions Needed to Improve Poor Conditions of Facilities and Equipment That Affect Maintenance Timeliness and Efficiency. GAO-19-242. Washington, D.C.: April 29, 2019.

DOD Depot Workforce: Services Need to Assess the Effectiveness of Their Initiatives to Maintain Critical Skills. GAO-19-51. Washington, D.C.: December 14, 2018.

Navy and Marine Corps: Rebuilding Ship, Submarine, and Aviation Readiness Will Require Time and Sustained Management Attention. GAO-19-225T. Washington, D.C.: December 12, 2018.

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Navy Readiness: Actions Needed to Address Costly Maintenance Delays Affecting the Attack Submarine Fleet. GAO-19-192C. Washington, D.C.: October 31, 2018.

Military Readiness: Update on DOD's Progress in Developing a Readiness Rebuilding Plan. GAO-18-441RC. Washington, D.C.: August 10, 2018. (SECRET)

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Department of Defense: Actions Needed to Address Five Key Mission Challenges. GAO-17-369. Washington, D.C.: June 13, 2017.

Navy Force Structure: Actions Needed to Ensure Proper Size and Composition of Ship Crews. GAO-17-413. Washington, D.C.: May 18, 2017.

Military Readiness: DOD's Readiness Rebuilding Efforts May Be at Risk without a Comprehensive Plan. GAO-16-841. Washington, D.C.: September 7, 2016.

Navy and Marine Corps: Services Face Challenges to Rebuilding Readiness. GAO-16-481RC. Washington, D.C.: May 25, 2016. (SECRET//NOFORN)

Military Readiness: Progress and Challenges in Implementing the Navy's Optimized Fleet Response Plan. GAO-16-466R. Washington, D.C.: May 2, 2016.

Navy Force Structure: Sustainable Plan and Comprehensive Assessment Needed to Mitigate Long-Term Risks to Ships Assigned to Overseas Homeports. GAO-15-329. Washington, D.C.: May 29, 2015.