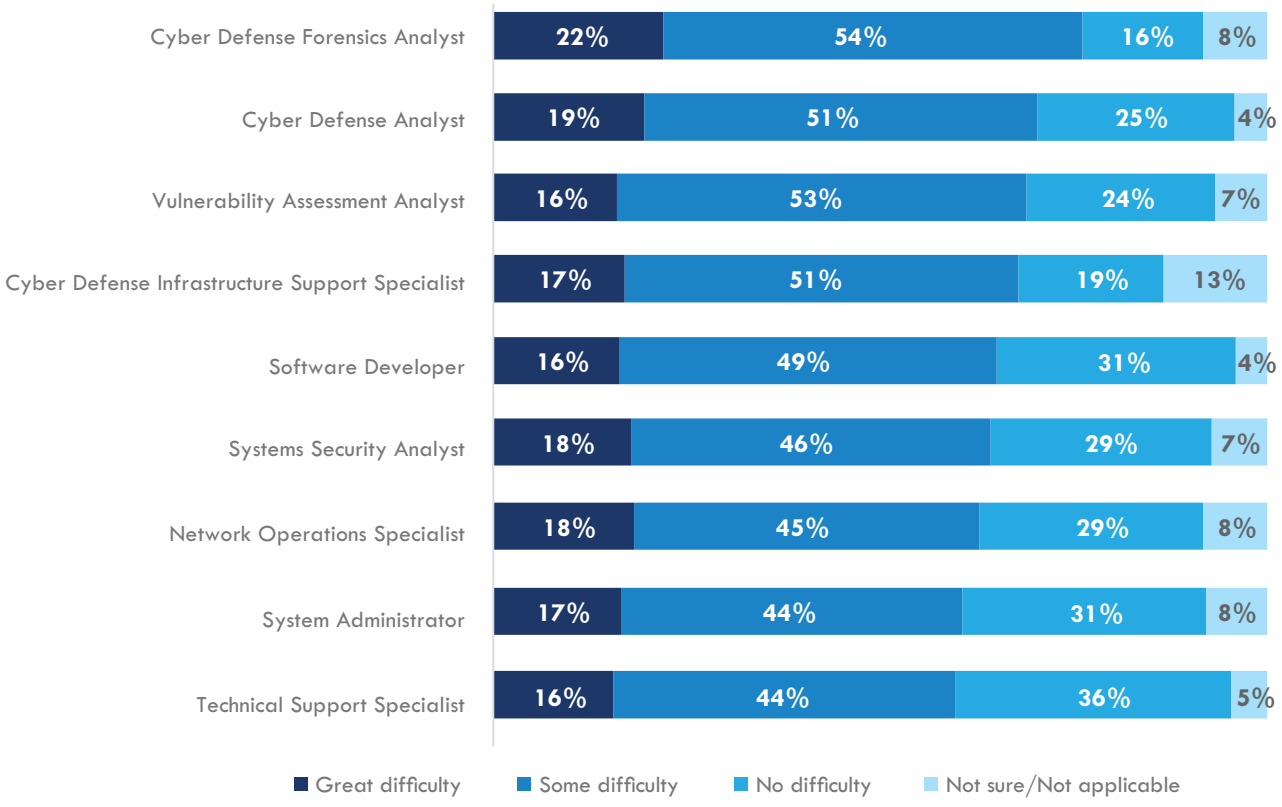
WORKFORCE CHALLENGES

Exhibit 7 displays the level of difficulty reported by employers in finding qualified cybersecurity workers in California. For all nine work roles, 60% or more of employers reported some or great difficulty finding qualified candidates. This demonstrates the significant challenge employers are facing finding the cybersecurity workers they need.

Employers were asked about their difficulty hiring for specific work roles. Work roles with the greatest difficulty include:

- Cyber Defense Forensic Analysts—76% of employers reported some or great difficulty.
- Cyber Defense Analysts—70% of employers reported some or great difficulty.
- Vulnerability Assessment Analysts—69% of employers reported some or great difficulty.
- Cyber Defense Infrastructure Support Specialists—68% of employers reported some or great difficulty.

Exhibit 7. Percentage of employers reporting difficulty hiring for the nine identified work roles



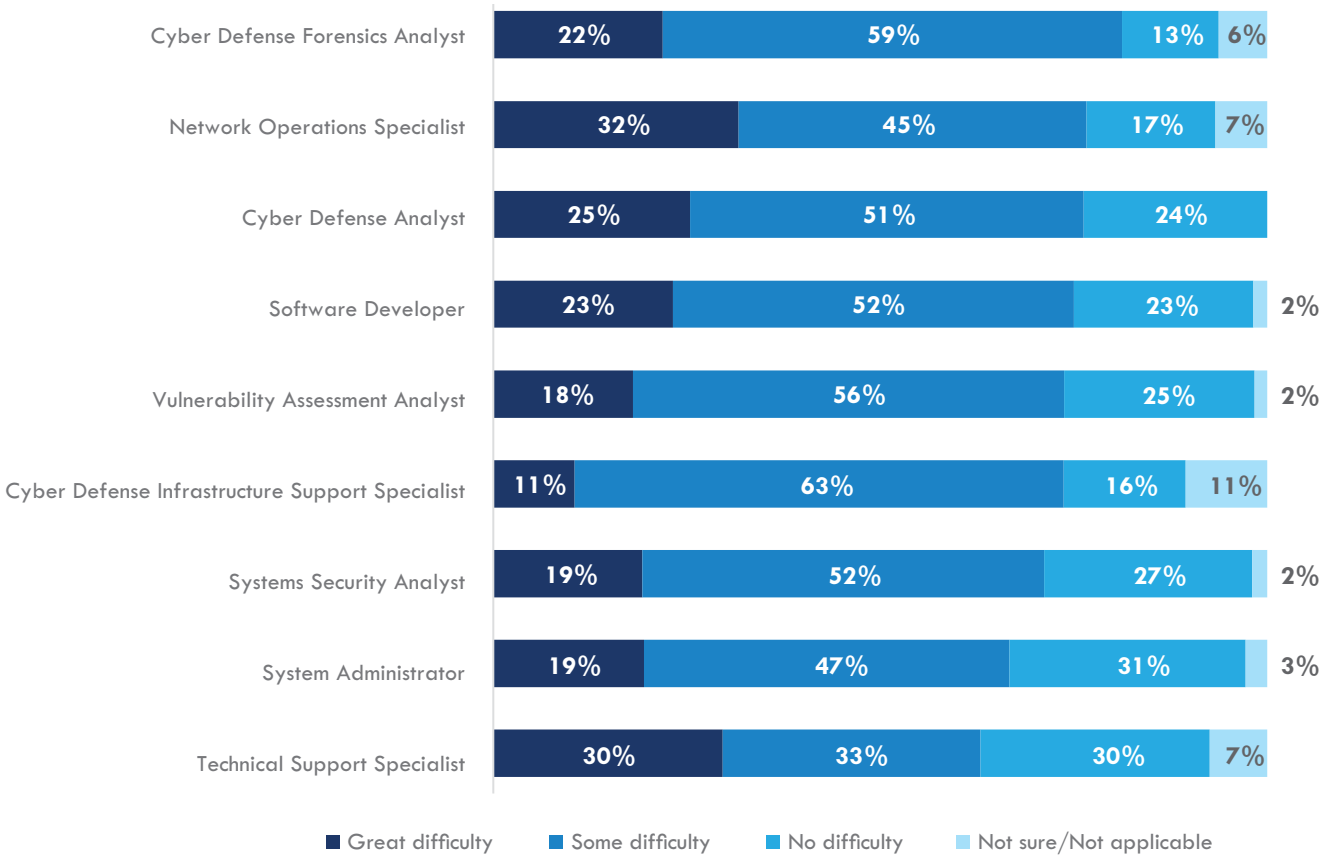
The percentage of defense contractors experiencing difficulty finding qualified candidates across the nine work roles is higher compared to all surveyed employers (Exhibit 8). The number of defense contractors who responded to this question ranges from 52 to 72 depending on the work role.

Work roles with the greatest difficulty reported by defense contractors include:

- Cyber Defense Forensics Analysts—81% of defense contractors reported some or great difficulty.
- Network Operations Specialists—77% of defense contractors reported some or great difficulty.
- Cyber Defense Analysts—76% of defense contractors reported some or great difficulty.
- Software Developers—75% of defense contractors reported some or great difficulty.

WORKFORCE CHALLENGES

Exhibit 8. Percentage of defense contractors reporting difficulty hiring for the nine identified work roles



For each work role, those employers who indicated they had some or great difficulty hiring qualified candidates, were asked how their business/organization responded to this workforce challenge. The number of employers who responded to this question ranged from 72 to 83, depending on the work role. Their responses are shown in the following subsections.

To address their hiring challenges, employers are clearly using proactive strategies—increasing recruitment, increasing overtime with current employees, and increasing wages to attract candidates or retain current employees.

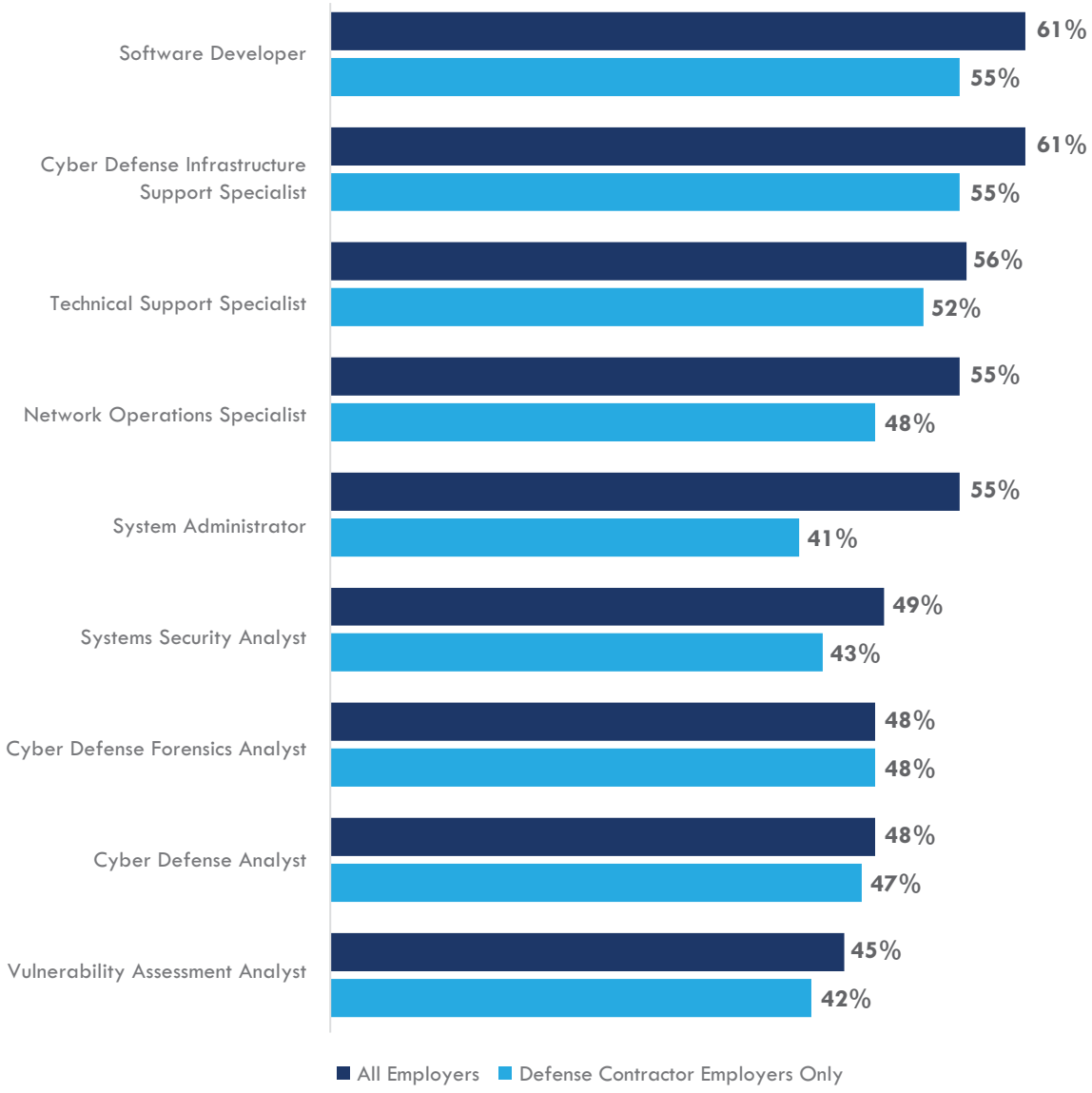
Defense contractors are also clearly using all three proactive strategies—increasing recruitment, increasing overtime with current employees, and increasing wages to attract candidates or retain current employees—to address their hiring challenges. The number of defense contractors who responded to this question ranged from 34 to 52, depending on the work role.

WORKFORCE CHALLENGES

Increased Recruitment

Increasing recruitment appears to be the preferred strategy used by employers (between 45% and 61% across all nine work roles) to address hiring challenges (Exhibit 9). Similarly, increasing recruitment efforts appears to be the most common strategy utilized by defense contractors across all nine work roles (between 41% and 55%) to address hiring challenges.

Exhibit 9. Increased recruitment effort, all employers and defense contractors

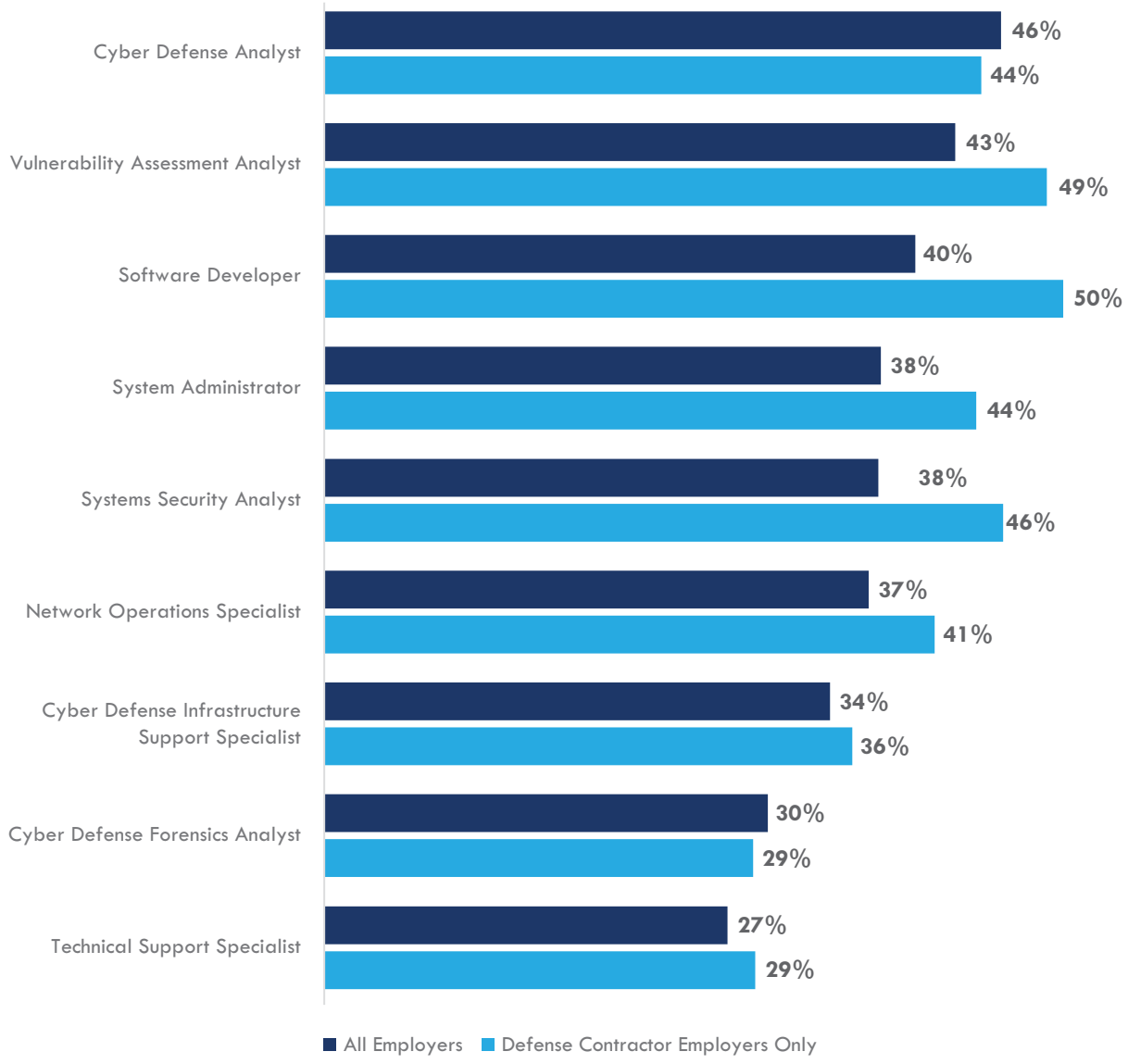


WORKFORCE CHALLENGES

Increased Wages

Increasing wages to attract candidates or retain current employees is used by employers and defense contractors as a retention strategy more for some work roles than others (Exhibit 10). For example, this strategy is not commonly used for cyber defense forensics analysts or technical support specialists. For seven of the nine work roles, defense contractors are utilizing this strategy more than employers in the overall sample.

Exhibit 10. Increased wages to attract candidates or retain current employees, all employers and defense contractors

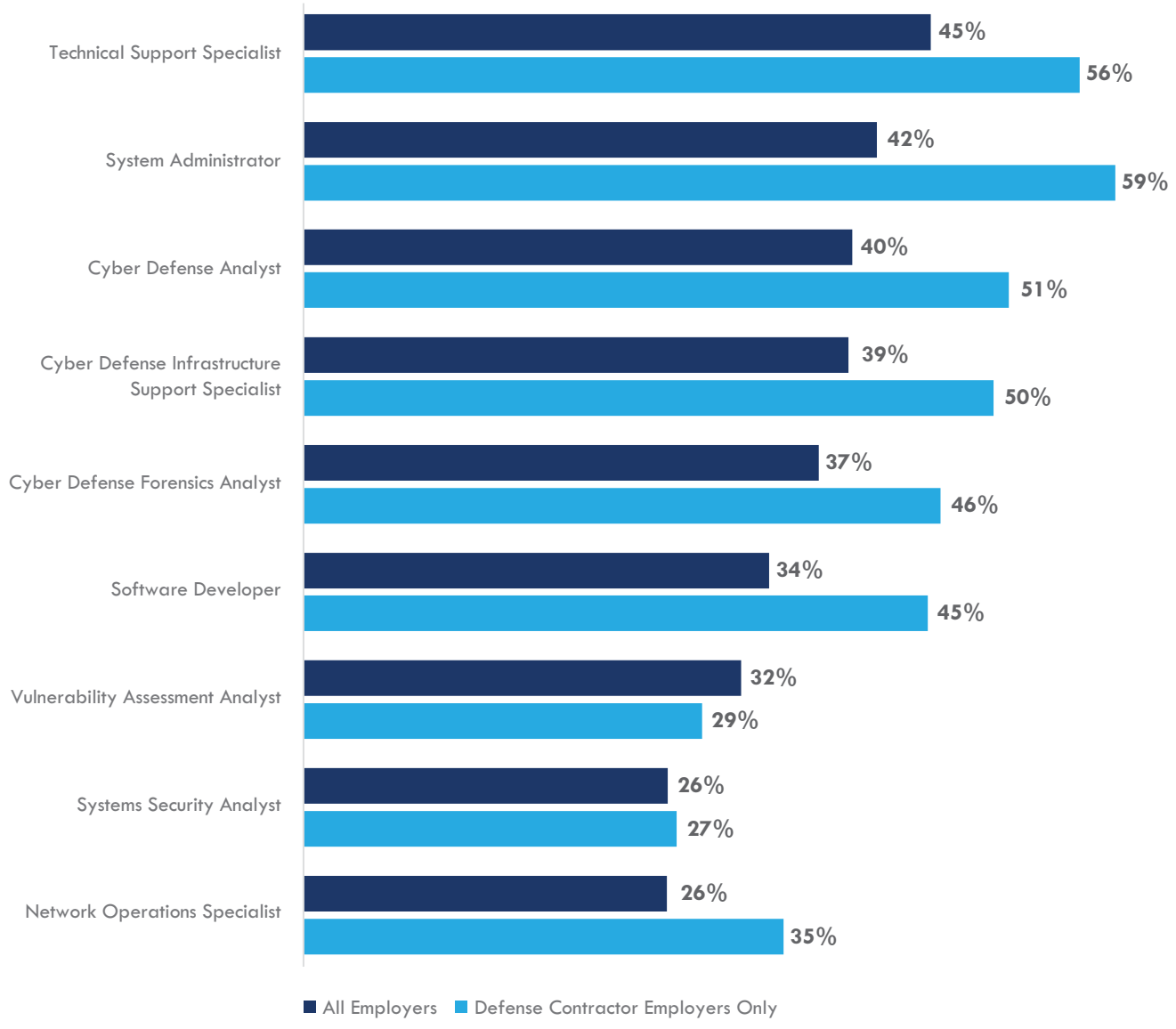


WORKFORCE CHALLENGES

Increased Overtime

As a strategy employers are using when facing hiring challenges, increased overtime for current employees to accommodate workload is roughly comparable to increased wages. Of all the work roles analyzed, increased overtime is more commonly used for technical support specialists and system administrators by employers and defense contractors (Exhibit 11). For eight of the nine work roles, defense contractors are utilizing this strategy more than employers in the overall sample.

Exhibit 11. Increased overtime for current employees to accommodate workload, all employers and defense contractors

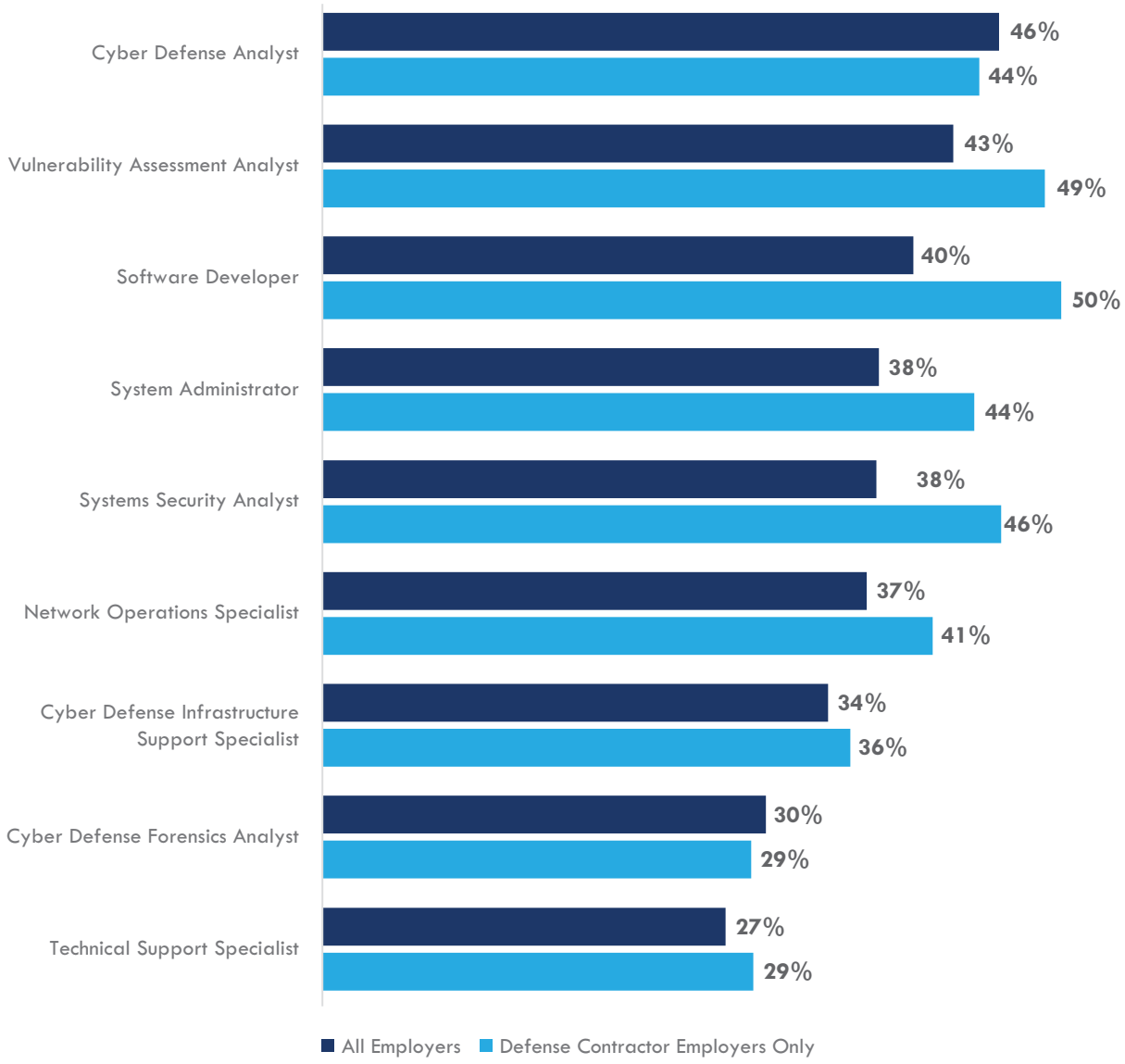


WORKFORCE CHALLENGES

Unfilled Positions

It is important to note that between 11% and 20% of employers, depending on the work role, indicated they did not fill the position when they could not find qualified candidates (Exhibit 12). Similar to all employers surveyed, between 12% and 19% of defense contractors (depending on the work role) are also not filling positions, when facing hiring challenges. This is a troubling sign regarding the shortage of cybersecurity workers in the labor market.

Exhibit 12. Positions left unfilled, all employers and defense contractors



CANDIDATE CHALLENGES

Five key issues or challenges were explored to better understand the range of workforce challenges employers face in finding qualified cybersecurity workers. The number of employers who responded to this question ranged from 72 to 83, depending on the work role.

Employers were asked if their business/organization was experiencing any of the following issues or challenges. They could select more than one option for the work role for which they were answering:

- Lack of qualified candidates with necessary security clearances,
- Candidates lack required educational attainment,
- Candidates lack relevant work experience,
- Candidates lack required technology skills, or
- Lack of qualified candidates in general.

On average, across all nine work roles, the top three issues or challenges businesses are facing related to hiring are:

1. Lack of qualified candidates in general,
2. Lack of relevant work experience, and
3. Lack of required technology skills.

The top work roles that **lack qualified candidates in general** are software developer (48%), vulnerability assessment analyst (43%), cyber defense analyst (42%), and system administrator (42%).

The top work roles for which **candidates lack relevant work experience** are cyber defense infrastructure support specialist(46%), technical support specialist (45%), and systems security analyst (42%).

The top work roles for which **candidates lack the required technology skills** are cyber defense infrastructure support analyst (49%), software developer (48%), and network operations specialist (41%).

This information was also collected from the defense contractors subgroup and the findings are displayed alongside the findings for all employers in Exhibits 13-17. The number of defense contractors who responded to this question ranged from 34 to 52, depending on the work role.

On average, across all nine work roles, the top three issues or challenges that defense contractors face when hiring are:

1. Candidates lack required technology skills,
2. Lack of qualified candidates with necessary security clearances, and
3. Lack of qualified candidates in general.

The top work roles for which **candidates lack the required technology skills** are cyber defense infrastructure support specialist (57%), software developer (45%), and network operations specialist (41%).

The top work roles that lack qualified candidates with the necessary security clearances are cyber defense infrastructure support specialist (52%), systems security analyst (49%), and software developer (40%).

The top work roles that lack qualified candidates in general are software developer (50%), system administrator (44%), and technical support specialist (44%).

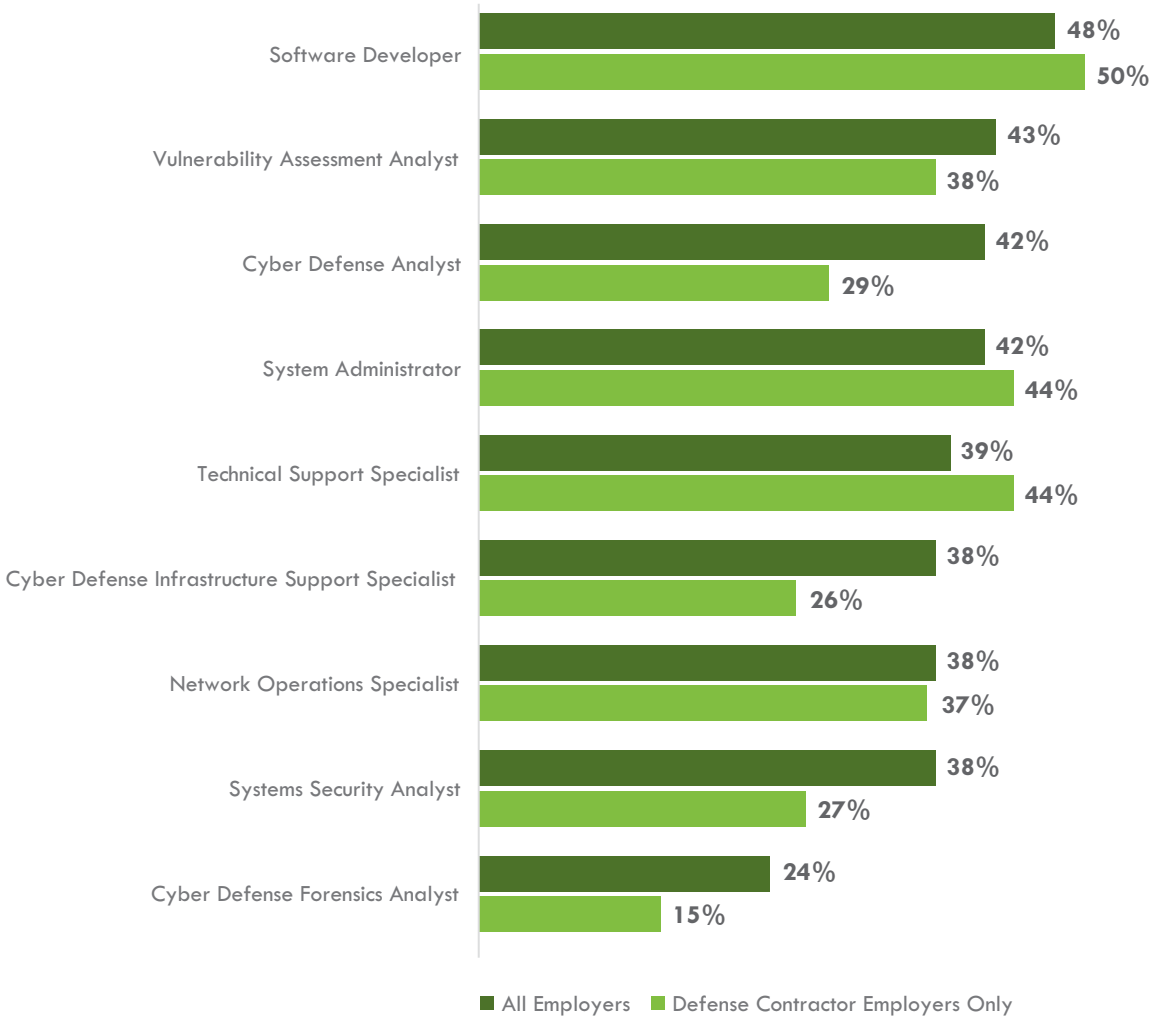
CANDIDATE CHALLENGES

Responses for two other issues or challenges also were collected from all employers and the defense contractors subgroup: "lack of qualified candidates with necessary security clearances" and "candidates lack required educational attainment" for all nine work roles. These responses are analyzed further in the following charts.

Lack of Qualified Candidates

Software developer was the top work role with a lack of qualified candidates reported by all employers and defense contractors (Exhibit 13). Employers in the overall sample also report a lack of vulnerability assessment analysts, while defense contractors report a lack of system administrators.

Exhibit 13. Lack of qualified candidates in general, all employers and defense contractors

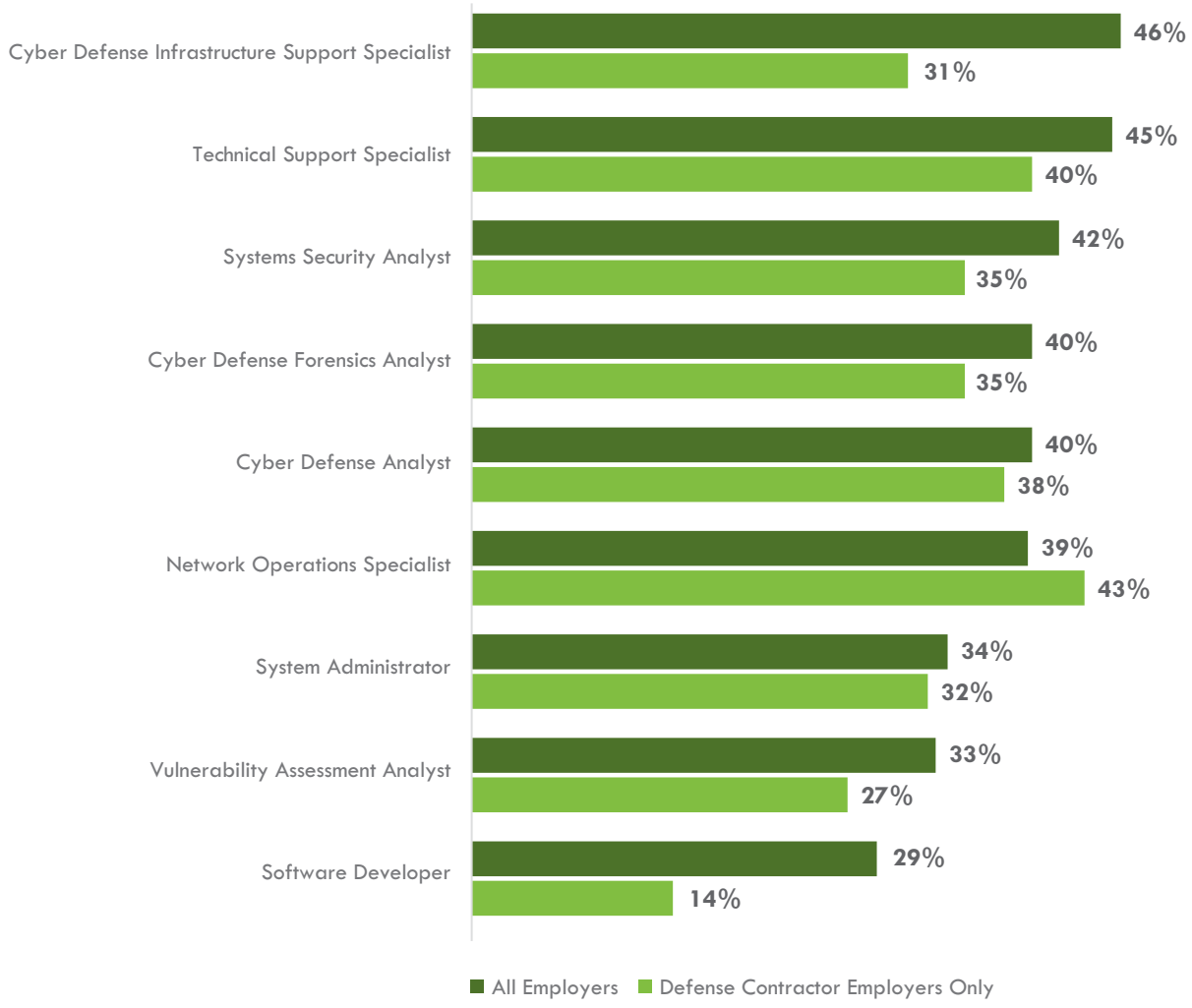


CANDIDATE CHALLENGES

Lack of Work Experience

The work roles for which job candidates lacked relevant work experience varied between all employers and defense contractors (Exhibit 14). All employers reported the top work role was cyber defense infrastructure support specialist, while defense contractors reported network operations specialist.

Exhibit 14. Lack of relevant work experience, all employers and defense contractors



CANDIDATE CHALLENGES

Lack of Technology Skills

The top three work roles for which job candidates lack required technology skills are the same for all employers and defense contractors: cyber defense infrastructure support specialist, software developer and network operations specialist (Exhibit 15).

Exhibit 15. Lack of required technology skills, all employers and defense contractors