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Bridging the Labor GAP: Leveraging Immigration Policy to Address Workforce Shortages in the U.S. Naval Shipbuilding Industrial Base

June 2026

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Prepared for the Naval Postgraduate School, Monterey, CA 93943.

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ABSTRACT

The U.S. Naval shipbuilding industrial base faces a critical workforce crisis that undermines fleet readiness and strategic deterrence in an era of great-power competition. With major programs facing multi-year delays and domestic workforce initiatives falling short, this research explores how U.S. immigration policy can be leveraged to mitigate skilled-trade shortages. Using Bardach's Eightfold Path, this study analyzes three policy alternatives: creating a new sector-specific visa, expanding existing visa programs, and implementing bilateral labor agreements.

The alternatives were evaluated against criteria of legal feasibility, security considerations, and logistical challenges. The analysis finds that a bilateral labor agreement, executed in conjunction with an amended visa pathway, offers the most robust solution. This approach leverages pre-screened, skilled labor pools from allied nations that already support U.S. Navy maintenance overseas, minimizing security and logistical hurdles. The study recommends pursuing targeted bilateral agreements as a potentially more effective and efficient policy lever to supplement the domestic workforce, bridge critical skill gaps, and revitalize the U.S. shipbuilding industrial base.



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I. INTRODUCTION

A. PROBLEM STATEMENT

The U.S. Naval shipbuilding and maintenance industrial base faces an enduring workforce crisis that has become one of the most significant constraints on national defense readiness. Programs such as the Columbia-class submarine, Ford-class carrier, and Constellation-class frigate are years behind schedule, creating serious readiness risks at a time when China’s naval production far outpaces that of the United States (O’Rourke, 2024; Eckstein, 2024). The Congressional Budget Office (2021) projects a 4.6 percent annual labor shortfall for Navy maintenance—equating to approximately 295,000 more labor days than current shipyards can provide. These shortages are driven by an aging skilled workforce, insufficient training pipelines, and high attrition rates following the COVID-19 pandemic (Walsh, 2024). This workforce gap represents a critical bottleneck threatening defense acquisition performance and industrial-base resiliency.

The Department of Defense recognizes workforce resilience as one of the four pillars of the National Defense Industrial Strategy (LaPlante, 2024). However, most remedies to date—such as training subsidies and domestic trade-education programs—have not produced enough qualified workers to meet immediate demand for welders, pipefitters, and electricians (Cirone et al., 2023). A 2024 Navy industrial-base review projected the need for roughly 174,000 additional skilled workers over the next decade just to maintain current shipbuilding targets (Luckenbaugh, 2025). Historically, U.S. shipbuilding has relied heavily on skilled immigrant labor, such as during the industrial expansion at Newport News Shipbuilding in the early 20th century (Hanlon, 2018). Yet modern immigration policy remains largely disconnected from defense workforce planning, leaving a viable source of skilled labor untapped.

This gap in understanding how immigration policy could be integrated into defense workforce planning represents both a practical and a knowledge problem. While research on the defense industrial base often focuses on production capacity, supply-chain vulnerabilities, or acquisition reform, very few studies have examined the human-capital



dimension in relation to national immigration policy. The defense acquisition community lacks empirical analysis of how targeted visa programs or policy reforms might close skilled-labor gaps in defense manufacturing. As analysts in O'Brien and Kaushik (2024) and Brookings (2023) argue, aligning immigration with industrial strategy could significantly strengthen workforce resilience. Exploring this relationship can help the Department of Defense (DoD) diversify labor sources without compromising security or quality standards (Rendon & Snider, 2019).

This study contributes to the ongoing dialogue on national-security industrial-base revitalization by proposing immigration-based policy mechanisms to mitigate skilled-trade shortages in Naval shipbuilding and maintenance. By analyzing existing workforce-development programs, immigration pathways, and acquisition policy levers, this research aims to identify feasible frameworks for integrating foreign skilled labor into defense-critical industries. The findings may inform acquisition leaders, policymakers, and legislators on how to align workforce and immigration policy with fleet-expansion and maintenance objectives, ultimately reducing delays, increasing throughput, and strengthening U.S. maritime readiness.

B. RESEARCH QUESTIONS

1. Primary Research Question

How can U.S. immigration policy be leveraged to mitigate skilled-trade workforce shortages in the Naval shipbuilding and maintenance industrial base?

2. Supporting Research Questions

- What are the primary factors contributing to current and projected workforce shortfalls in U.S. Naval shipbuilding?
- In what ways have existing DoD and industry workforce-development programs succeeded or fallen short in addressing skilled-trade shortages, and what factors explain their outcomes?



- Which immigration programs or visa categories (e.g., H-2B, EB-3, or new policy mechanisms) could be adapted to meet defense-industry labor needs?
- What policy, legal, or security challenges must be addressed when integrating foreign skilled labor into Naval shipbuilding and maintenance?

C. RESEARCH METHODOLOGY

This study employs a qualitative policy analysis framework guided by Eugene Bardach’s Eightfold Path, a structured approach to identifying and evaluating solutions to public problems (Bardach & Patashnik, 2019). This methodology is particularly well-suited for this research because it provides a systematic process for moving from a complex problem—skilled-labor shortages in the Naval industrial base—to a set of feasible and well-reasoned policy recommendations. The framework’s sequential-but-iterative nature allows for a thorough analysis of the problem’s causes, the construction of viable alternatives, and a rigorous evaluation based on specified criteria (Bardach & Patashnik, 2019).

The research operationalizes this framework by first defining the problem and assembling evidence to understand its scope and causes, tasks that align with answering the first and second supporting research questions. Second, the research constructs alternative policy solutions by examining potential immigration pathways, directly addressing the third supporting research question. Finally, by selecting evaluative criteria such as policy feasibility, security, and legal compliance, the research projects outcomes and confronts the inherent trade-offs of each alternative. This analytical process, which corresponds to the fourth supporting research question, culminates in a final recommendation that directly answers the primary research question of how U.S. immigration policy can be leveraged to mitigate these critical workforce shortages.



D. LIMITATIONS AND SCOPE

1. Scope of the Study

The scope of this research is intentionally focused on the intersection of U.S. immigration policy and the skilled-trade workforce needs of the U.S. Naval shipbuilding and maintenance industrial base. The scope of our study is limited to the following:

- Focus specifically on skilled trades: The analysis concentrates on shortages in vocations such as welding, pipefitting, and electrical work, rather than engineering, project management, or other professional roles.
- Examine the naval sector: While workforce challenges exist across the entire Defense Industrial Base (DIB), this study limits its analysis to the naval sector, including both public and private shipyards involved in the construction and maintenance of U.S. Navy vessels.
- Analyze existing and adaptable policies: The research evaluates current immigration pathways (e.g., H-2B, EB-3 visas) and the potential for new, targeted mechanisms, rather than proposing a comprehensive overhaul of the entire U.S. immigration system.
- Employ a policy analysis framework: This is a qualitative study based on publicly available data and does not involve new quantitative modeling or statistical forecasting.

2. Limitations of the Study

Furthermore, the authors acknowledge the following limitations:

- Reliance on Publicly Available Information: This study is based exclusively on unclassified and publicly available sources, including government reports, academic literature, industry publications, and news media. It does not incorporate classified information or proprietary data from shipbuilding companies regarding specific workforce numbers or internal attrition rates.



- **Security Vetting Complexity:** While the study addresses security challenges as a key criterion for policy evaluation, it cannot offer a definitive counterintelligence or security risk assessment. The intricate processes of vetting foreign nationals for access to sensitive defense facilities are complex and fall outside the scope of this policy-focused research.
- **Political Feasibility:** The study proposes policy alternatives based on their potential effectiveness. However, it cannot fully account for the political dynamics and legislative hurdles inherent in passing any form of immigration-related reform. The political will to implement the study's recommendations is a significant variable beyond the scope of this analysis.

E. ORGANIZATION OF THE STUDY

This study is organized into five chapters, each dedicated to a specific component of the research process.

- **Chapter I: Introduction** provides a comprehensive overview of the study. It establishes the context and significance of the skilled-labor shortage in the U.S. Naval industrial base, presents the primary and supporting research questions, details the policy analysis methodology guided by Bardach's Eightfold Path, and defines the scope and limitations of the research.
- **Chapter II: Background** offers the foundational context necessary to understand the research problem. This chapter will review the history of the U.S. Naval shipbuilding industry, define key terms, and discuss the current strategic environment that makes workforce revitalization a national security imperative. It is distinct from the literature review and serves to ground the reader in the operational and historical realities of the topic.
- **Chapter III: Literature Review** systematically examines existing literature relevant to the research questions. It synthesizes scholarly articles, government reports,



and industry analyses in three primary areas: the causes and effects of the defense industrial base workforce crisis, the performance of existing workforce development programs, and the structure of the U.S. immigration system, with a focus on employment-based visa categories.

- Chapter IV: Analysis and Findings applies the research methodology to the evidence. This chapter constructs and analyzes policy alternatives by evaluating potential immigration pathways against key criteria, including legal feasibility, security considerations, and logistical challenges. It projects the outcomes of each alternative and confronts the trade-offs to identify the most promising avenues for reform.
- Chapter V: Conclusion and Recommendations presents the study's conclusions and offers actionable policy recommendations. This final chapter summarizes the research findings, directly answers the primary and supporting research questions, and proposes specific ways U.S. immigration policy can be leveraged to mitigate skilled-trade shortages. The chapter concludes by discussing implications for the Department of Defense and suggesting areas for future research.



II. BACKGROUND

This chapter provides the foundational background required to understand the contemporary crisis facing the U.S. Naval shipbuilding and maintenance industrial base. Before analyzing the specific drivers of the workforce shortage and potential policy solutions in subsequent chapters, it is necessary to first review the historical, structural, and strategic factors that have shaped the industry. The preceding chapter established the critical problem of skilled-labor shortfalls; this chapter answers the question of how the industrial base arrived at its current state of fragility and why its revitalization has become a pressing national security imperative.

To achieve this, the chapter traces the industry’s trajectory from its peak during the Second World War through its significant contraction following the Cold War. It then describes the modern structure of the industrial base, outlining the roles of its key public and private entities. This historical and strategic context is essential for appreciating the severity of the workforce crisis and for evaluating the feasibility of the solutions that are explored later in this study.

A. THE ARSENAL OF DEMOCRACY

The zenith of American shipbuilding capacity was reached during the Second World War, a period when the United States transformed into what President Franklin D. Roosevelt termed the “great arsenal of democracy” (Shepardson, 1941). In response to the existential threat of war and the need to project power and supply allies across two oceans, the nation undertook an industrial mobilization of unprecedented scale and speed as shown in Figure 1. At the heart of this effort was a revolutionary approach to shipbuilding, orchestrated by the U.S. Maritime Commission, which abandoned traditional, time-consuming methods in favor of mass production (Potter, 2025).



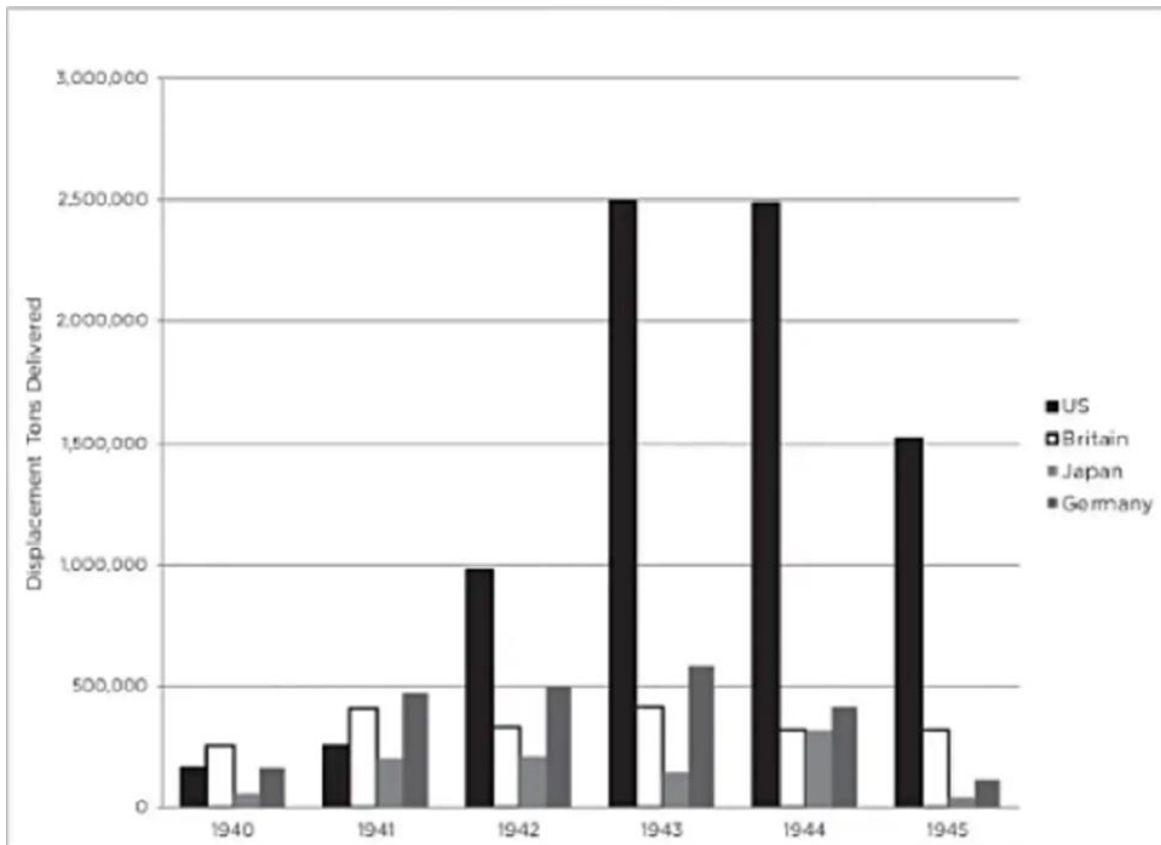


Figure 1. Naval Shipbuilding, 1940–1945. Source: Heinrich (2020).

Central to this industrial miracle were innovators like Henry J. Kaiser, whose shipyards in locations like the San Francisco Bay Area and the Pacific Northwest became epicenters of production (Gray, 2008). These “emergency shipyards” employed new techniques such as prefabrication and extensive use of welding over riveting, allowing for components to be built elsewhere and then brought to the slipway for final assembly (Potter, 2025). This assembly-line approach, mirroring the retooling seen in other major industrial centers, dramatically reduced construction times (Lane, 2001). The San Francisco Bay Area alone became the largest shipbuilding center in the world, producing nearly 45% of all U.S. cargo shipping tonnage during the war (National Park Service, n.d.).

This mobilization culminated in what has been described as the “WWII shipbuilding miracle.” Driven by the efficient manufacturing lessons of pioneers such as Admiral Emory “Jerry” Land and Henry J. Kaiser, American shipyards built nearly 6,000

merchant ships in five years—a feat that British Prime Minister Winston Churchill later acknowledged “saved Europe” (Gray, 2008). By the war’s conclusion, the United States was responsible for an astonishing 90% of global shipbuilding tonnage (Petitt, 2025). This historical peak, achieved through a combination of government direction, private sector innovation, and a vast, rapidly mobilized workforce, serves as a critical benchmark. After WWII, however, this capability was not maintained, and its subsequent decline stands in stark contrast to the industry’s wartime achievements.

B. THE POST-COLD WAR “PEACE DIVIDEND”

The industrial dominance achieved during the Second World War proved unsustainable in a peacetime environment. Immediately following the war, the “emergency shipyards” that had formed the backbone of the production miracle were closed, and the massive workforce was demobilized (Colton & Huntzinger, 2002). While the U.S. maintained a significant Naval industrial capacity throughout the Cold War, its commercial shipbuilding sector began a long and steady decline as illustrated in Figure 2. By the mid-1970s, facing stiff competition from more efficient and often state-subsidized shipyards in Asia, the domestic commercial industry withered. This was due to several factors that rendered it uncompetitive on the global market: shipbuilders accustomed to complex Navy projects carried high overhead costs and procedural burdens; U.S. labor rates were significantly higher than those in competing Asian nations; and stringent domestic environmental and safety regulations imposed additional costs not borne by international rivals (Board, 1996). As a result, the industrial base became almost entirely dependent on government contracts, particularly from the U.S. Navy, to survive.



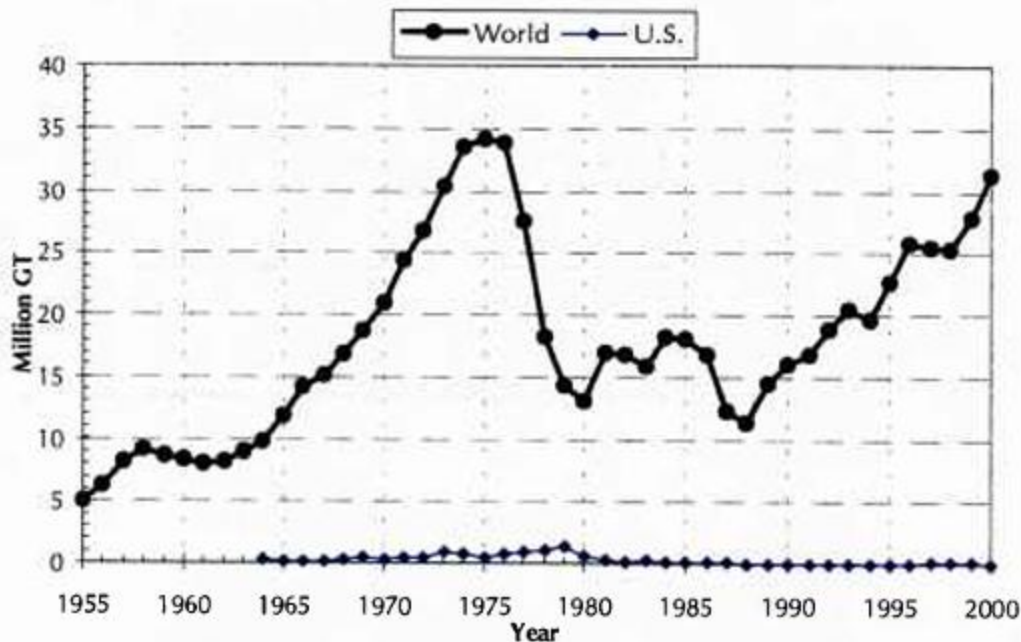


Figure 2. World and U.S. Merchant Ship Deliveries. Source: Colton & Huntzinger (2002).

The final and most significant blow came with the dissolution of the Soviet Union in 1991. The end of the Cold War ushered in an era known as the “peace dividend,” where national priorities shifted away from defense spending (Intriligator, 1996). The impact on the U.S. defense sector was immediate and severe. As Gholz and Sapolsky (1999) documented, this period saw more than two million defense workers, military personnel, and civil servants lose their jobs as thousands of firms left the industry and weapons production fell considerably. For the Naval sector, this new strategic reality was codified in the “Base Force” plan, which called for a significant reduction to the military’s overall force structure. This policy directly translated into deep cuts in the defense budget and a sharp reduction in naval procurement, effectively concluding the large-scale Reagan-era buildup (Brady, 1992). For the shipyards and their vast network of suppliers, which were now wholly reliant on Navy contracts, the consequences of this large-scale reduction were devastating.

Without a commercial market to fall back on and facing a dramatic reduction in military orders, the industrial base experienced a rapid contraction. The tangible effects of

this contraction were stark, exemplified by the 1996 closure of the historic Philadelphia Naval Shipyard, which had been a cornerstone of naval power for decades (Hess, 2001). The aftermath of this single closure demonstrates the significant workforce dispersal that occurred across the industry. When a commercial shipbuilding company later reopened the yard, Hess (2001) explains, it discovered that a majority of the original, highly skilled naval workforce had not returned, having moved on to more stable employment. Hess (2001) adds that this departure created a significant knowledge gap, forcing state and local governments to spend nearly \$200 million on a massive retraining effort to build a new workforce, which included sending employees to Europe to learn new shipbuilding methods. The once-dominant U.S. shipbuilding industry shrank to a fraction of its former size, with its share of global cargo tonnage falling to a mere 0.2% in the modern era (Petitt, 2025). This period of atrophy created the structural weaknesses—including a diminished workforce, a brittle supply chain, and a loss of institutional expertise—that now constrain the nation’s ability to meet new strategic challenges.

C. HISTORICAL PRECEDENT OF IMMIGRANT LABOR

While the modern defense industrial base faces a domestic skilled-labor crisis, the use of foreign-born workers to build American naval and commercial power is not a new phenomenon. On the contrary, the history of U.S. shipbuilding is deeply intertwined with the contributions of skilled immigrants who filled critical labor gaps during previous eras of industrial expansion. This historical precedent demonstrates that leveraging global talent pools is a proven, effective strategy for overcoming domestic workforce shortages in this specific industry.

A prominent example can be found in the early history of Newport News Shipbuilding, one of today’s premier Naval shipyards. Hanlon (2018) discusses that in the late 19th and early 20th centuries, as the shipyard rapidly expanded, it faced a significant shortage of qualified domestic workers for essential trades. To solve this, the company actively recruited skilled metalworkers, riveters, and boilermakers from Great Britain. Hanlon (2018) further explains that these immigrant craftsmen were not merely supplemental labor; they formed a vital component of the shipyard’s expert workforce,



enabling its growth and success. Similarly, the shipbuilding and adjacent industries in Quincy, Massachusetts, historically relied on thousands of skilled immigrants from Ireland, Scotland, and Italy to power their operations throughout the 19th and 20th centuries (Johnson, 2014).

These historical examples establish that integrating foreign skilled labor into the shipbuilding industrial base is a strategy with a successful precedent in the American experience. The reliance on foreign-born craftsmen during previous periods of industrial need suggests that modern immigration policy, if properly aligned with industrial strategy, could again serve as a viable tool for revitalizing the nation's shipbuilding capacity.

D. THE MODERN U.S. NAVAL INDUSTRIAL BASE: STRUCTURE AND KEY PLAYERS

Following the significant contraction of the post-Cold War era, the U.S. Naval industrial base has settled into a highly specialized and consolidated ecosystem. The industry that remains is fundamentally different from the sprawling, commercially-driven enterprise of the mid-20th century. This section provides an overview of the modern industrial base's structure, delineating the roles of its primary state-owned and private entities and identifying the key corporate players. Understanding this structure—a complex web of a few large prime contractors and a vast, fragile network of smaller suppliers—is essential for appreciating how critical workforce shortages create systemic vulnerabilities across the entire naval construction and maintenance enterprise. To this end, the following discussion distinguishes between the functions of public and private shipyards, describes the effects of industry consolidation, and examines the nature of the lower-tier supplier base.

E. PUBLIC VS. PRIVATE SHIPYARDS

The modern U.S. Naval industrial base operates through a clear division of labor between a few government-owned public shipyards and a larger group of privately-owned shipyards. Generally, private yards build new ships, while public yards maintain them, particularly the Navy's nuclear-powered fleet. This separation of roles, however, belies a



deep interdependency; delays and capacity constraints in one sector directly impact the other.

The four public naval shipyards (see Figure 3)—Norfolk Naval Shipyard in Virginia, Portsmouth Naval Shipyard in Maine, Puget Sound Naval Shipyard in Washington, and Pearl Harbor Naval Shipyard in Hawaii—are government-owned and operated enterprises. The Naval shipyards perform depot-level maintenance, which involves the most comprehensive and time-consuming maintenance work, including ship overhauls, alterations, refits, restorations, nuclear refueling, and inactivations—activities crucial to supporting Navy readiness (U.S. Government Accountability Office, 2022). The immense government investment required to sustain and modernize these facilities, as seen in the multi-billion-dollar Shipyard Infrastructure Optimization Program (SIOP), underscores their status as unique national assets dedicated solely to fleet readiness (Naval Sea Systems Command, n.d.).

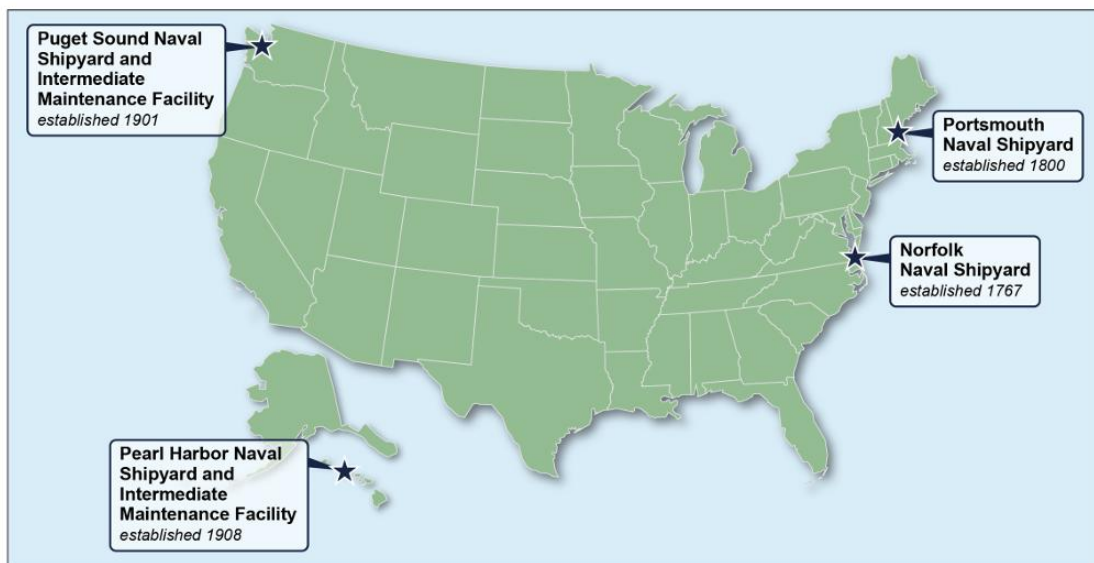


Figure 3. Map of Navy Shipyards. Source: U.S. Government Accountability Office (2022).

In contrast to the government-owned maintenance depots, the nation's new warships are constructed by a robust private shipbuilding and repairing industry. This

sector is a significant economic force, comprising 154 private shipyards spread across 29 states and the Great Lakes region (see Figure 4) that are classified as active shipbuilders (Marine Administration, 2021). While this network is extensive, the construction of the Navy’s largest and most complex vessels is concentrated in a few key firms. The industry is anchored by major players such as General Dynamics—which operates yards like Bath Iron Works and Electric Boat—and Huntington Ingalls Industries, the builder of the nation’s aircraft carriers. These large shipyards are supported by a tiered system of smaller, but still vital, mid-sized yards that provide flexibility and additional capacity (Marine Administration, 2021). Although their primary role is new construction, the workload at the public yards has become so overwhelming that the Navy has considered sending more maintenance and repair work, such as for attack submarines, to these private yards to alleviate the bottleneck (NASEA, 2024). This dynamic highlights the systemic stress on the entire industrial base, where the distinct roles of public and private yards are becoming increasingly blurred by a shared capacity crisis.

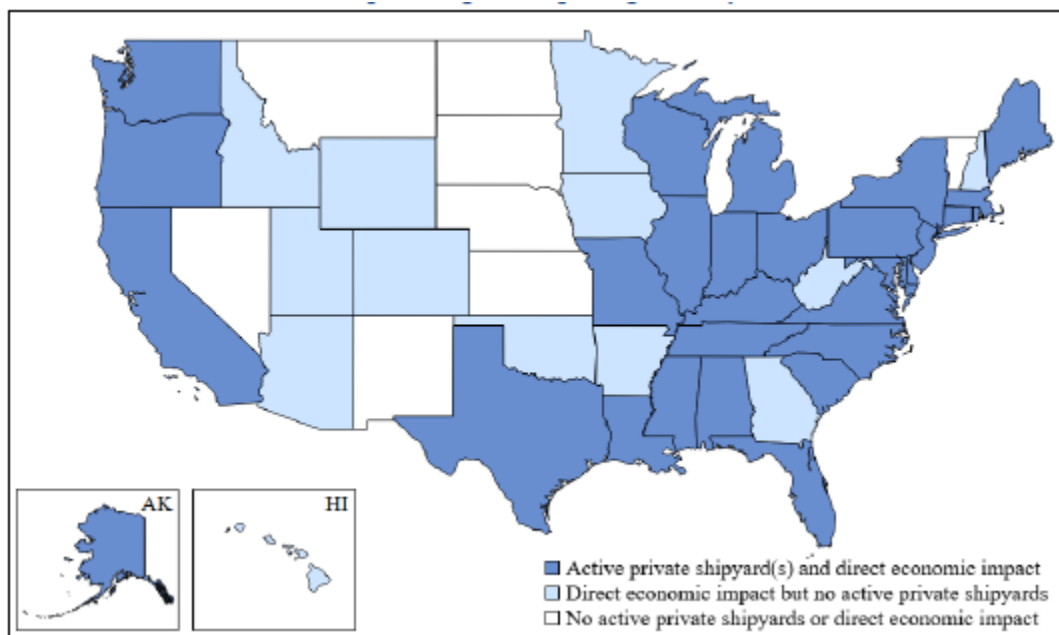


Figure 4. Map of Private Shipyards. Source: Marine Administration (2021).

F. GEOGRAPHIC CONCENTRATION OF THE SHIPBUILDING WORKFORCE

While the Naval industrial base includes shipyards across 29 states, the skilled workforce that powers it is not evenly distributed. Instead, it is highly concentrated in a few key coastal states where the nation's largest shipyards are located. This geographic clustering creates regional dependencies and distinct labor market dynamics that are critical to understanding the national workforce challenge. According to a 2021 analysis by the U.S. Maritime Administration, just five states account for nearly two-thirds (64%) of all direct private employment in the shipbuilding and repairing industry (Marine Administration, 2021).

The data reveals a stark hierarchy among these states. The Marine Administration (2021) report shows Virginia stands alone as the epicenter of Naval shipbuilding employment, with over 30,000 direct jobs, representing 28.2% of the entire U.S. total. This is primarily driven by the massive operations at HII's Newport News Shipbuilding. The next tier of states, while significant, have workforces that are substantially smaller. Connecticut, home to General Dynamics Electric Boat, and Mississippi, home to Ingalls Shipbuilding, each employ around 11,000 workers, accounting for approximately 11% and 10.4% of the national total, respectively. The top five is rounded out by California (7.9%) and Louisiana (6.2%), states with a mix of major repair and construction facilities (Marine Administration, 2021).

G. CONSOLIDATION AND KEY CONTRACTORS

The landscape of the private Naval shipbuilding industry is a direct result of a massive wave of defense industry consolidation that occurred in the 1990s. Following the end of the Cold War, the Pentagon actively encouraged mergers and acquisitions under the belief that a smaller number of larger, more stable companies would be better suited to a future of reduced defense spending. This policy led to fifty-one top-tier aerospace and defense firms consolidating into just five giants, drastically reducing competition across the entire defense sector (Department of Defense Report, 2022). Today, the top five defense contractors (see Table 1) account for over 30% of all Pentagon spending, creating



an environment that is often described as over-consolidated and under-competitive (Nicastro, 2024).

Table 1. Five Largest U.S. Defense Contractors. Source: Nicastro (2024)

Company	Location of Corporate HQ	FY2022 DOD Contract Obligations	Total Market Capitalization ^a	Employees
Lockheed Martin (LMT)	Bethesda, MD	\$44.5 billion	\$136.39 billion	122,000
RTX (RTX)	Arlington, VA	\$25.4 billion	\$160.03 billion	185,000
General Dynamics (GD)	Reston, VA	\$21.5 billion	\$83.09 billion	111,600
Boeing Co (BA)	Arlington, VA	\$14.2 billion	\$98.63 billion	171,000
Northrop Grumman (NOC)	Falls Church, VA	\$12.8 billion	\$76.04 billion	101,000

This trend had a profound effect on Naval shipbuilding. The construction of all major, complex U.S. Navy warships is now dominated by just two primary corporate entities: General Dynamics and Huntington Ingalls Industries (HII). These two conglomerates own the most critical private shipyards in the nation (Congressional Budget Office, 2023). General Dynamics controls three key yards: Electric Boat in Connecticut, the lead designer and builder of nuclear submarines; Bath Iron Works in Maine, a primary builder of surface combatants like destroyers; and National Steel and Shipbuilding Company (NASSCO) in California, which constructs auxiliary and support ships (O’Rourke, 2024).

The other major player, Huntington Ingalls Industries, owns Newport News Shipbuilding in Virginia—the sole designer and builder of the Navy’s nuclear-powered aircraft carriers—and Ingalls Shipbuilding in Mississippi, which produces amphibious assault ships and destroyers (O’Rourke, 2024). A third company, Italian shipbuilder Fincantieri, owns Wisconsin’s Marinette Marine, which has become a significant player by winning the contract for the Navy’s new Constellation-class frigate (Congressional Budget Office, 2023). This high degree of consolidation means the U.S. Navy is almost entirely dependent on the performance and capacity of these few key contractors, making any workforce or supply chain issue at one of their facilities a matter of national strategic importance.



H. CHAPTER SUMMARY

This chapter has provided the essential historical and structural context necessary to understand the modern U.S. Naval shipbuilding and maintenance industrial base. It began by tracing the industry’s dramatic trajectory from its peak as the “Arsenal of Democracy” during World War II—a period of unprecedented industrial might—to its sharp and sustained decline following the end of the Cold War. This post-war contraction, driven by the “peace dividend,” fundamentally reshaped the industry, leading to a loss of capacity, the atrophy of the skilled workforce, and the consolidation of key players.

The analysis then shifted to the present-day structure of this industrial base. The clear division of labor between the four government-owned public shipyards, focused on maintenance, and the few private shipyards responsible for new construction was established. It was shown that the private sector is dominated by just two primary contractors, Huntington Ingalls Industries and General Dynamics, creating a near-duopoly for complex warship construction.

In sum, the industrial base that exists today is a brittle, consolidated remnant of its former self. It is structurally ill-prepared to meet the demands of a new era of strategic competition. Having established this historical and structural context, the study must now turn to a detailed examination of the existing body of knowledge on this issue. The following chapter, the Literature Review, systematically analyzes the scholarly, government, and policy literature to explore the specific causes and consequences of the workforce crisis, evaluate the effectiveness of current workforce development programs, and investigate the structure of the U.S. immigration system as a potential source for policy solutions.



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III. LITERATURE REVIEW

The U.S. Naval shipbuilding industrial base is facing a critical labor shortage that threatens its ability to meet national defense objectives. This shortage is driven by a combination of factors, including an aging workforce, limited domestic training pipelines, and regional economic constraints. As the demand for skilled labor in shipbuilding continues to grow, traditional workforce development strategies have proven insufficient to close the gap.

This literature review explores the potential of immigration policy as a strategic tool to address workforce shortages in the Naval shipbuilding sector. By examining existing research across labor economics, defense industrial policy, and immigration frameworks, the review aims to identify actionable insights that could inform future policy decisions.

To guide this inquiry into the literature, the following questions are posed:

1. What are the primary labor shortages affecting the U.S. Naval shipbuilding industrial base?
2. How have immigration policies historically influenced skilled labor availability in defense-related industries?
3. What policy mechanisms could be leveraged to attract and retain skilled immigrant labor in shipbuilding?
4. What are the potential risks and barriers to implementing immigration-based workforce solutions in this sector?

The literature is organized into four thematic sections, each aligned with a thesis research question:

- **The Current State of the Naval Shipbuilding Workforce:** Examines labor market trends, skill gaps, and demographic challenges.



- **Immigration Policy Frameworks Relevant to Skilled Labor:** Reviews historical and contemporary immigration policies and their impact on industrial labor supply.
- **Comparative Case Studies from Allied Nations:** Analyzes successful immigration-based workforce strategies in similar defense contexts.
- **Integration Challenges and Opportunities:** Discusses political, cultural, and operational barriers to implementing immigration solutions in the U.S. shipbuilding sector.

By synthesizing findings across these themes, the review establishes a foundation for evaluating how immigration policy can be leveraged to strengthen the Naval shipbuilding workforce and enhance industrial readiness.

A. THEORETICAL FRAMEWORK

This study is grounded in Human Capital Theory, a foundational concept in labor economics that views individuals' skills, education, and experience as forms of capital that contribute to economic productivity (Becker, 1964). From this perspective, the current shortage of skilled tradespeople in the Naval industrial base represents a critical depletion of human capital, directly constraining industrial output and national security. While various strategies can build domestic human capital, such as training and education, this study explores the use of immigration as a tool to rapidly inject specialized human capital into a constrained market.

A standard prediction in labor economics is that a significant increase in the labor supply, such as through immigration, can exert downward pressure on the wages of domestic workers (Edo, 2019). According to Borjas (2016), the magnitude of this wage effect and the likelihood of displacing native-born workers ultimately depend on whether immigrant and domestic laborers compete for the same jobs. If immigrant workers have skills that are easily substitutable for those of domestic workers, they will compete for the same jobs, potentially lowering wages. Conversely, if immigrant workers possess skills



that are complementary to the domestic workforce, they fill gaps and can increase the overall productivity and the demand for native workers.

The U.S. Naval shipbuilding industry represents a unique, tightly constrained labor market where skills are not easily substitutable. The specialized abilities required of a pipefitter, nuclear-qualified welder, or master electrician on a naval vessel are acquired through years of dedicated training and experience; for instance, it can take several years for a new hire to progress through an apprenticeship to become a fully proficient journeyman (U.S. Government Accountability Office, 2020). In such an occupation-specific market, a shortage implies that there are simply not enough qualified individuals to fill available roles. Therefore, this study proceeds from the theoretical prediction that skilled immigrants in these trades would act as complements to, rather than substitutes for, the existing domestic workforce. As Borjas (2019) argues, high-skilled immigration contributes positively to economic output and fills critical gaps in labor supply, especially in sectors where domestic pipelines are insufficient. Rather than displacing native workers, they would fill empty billets, enabling shipyards to meet production schedules, which in turn sustains and potentially increases the demand for all workers, including supervisors, trainees, and workers in adjacent logistical roles. By applying this framework, the research analyzes how immigration policy can be leveraged not to replace the domestic workforce, but to augment it, thereby rebuilding the human capital required for naval industrial readiness.

This framework also helps explain the limitations of current domestic workforce development efforts. Despite investments in vocational training and education, the persistent labor gap in shipbuilding indicates that the supply of qualified workers is not meeting demand. Human Capital Theory supports the argument that immigration policy can serve as a complementary mechanism to domestic workforce strategies, particularly when immediate labor needs outpace the rate of domestic skill development (Ehrlich & Kim, 2015).

Moreover, Human Capital Theory provides a basis for evaluating the long-term value of skilled immigrant labor in defense-critical industries. Adda et al. (2022) demonstrate that immigration policies directly influence immigrants' decisions to invest in



skills, which in turn affects their labor market outcomes and integration. This insight is particularly relevant for Naval shipbuilding, where technical proficiency and reliability are essential to maintaining production schedules and fleet readiness.

By applying this framework, Human Capital Theory moves from a descriptive tool to a predictive one, generating clear expectations for the study's analysis. It predicts that expanding access for skilled foreign labor in bottleneck occupations, such as welding and pipefitting, should directly reduce workforce vacancies and, in turn, increase overall production capacity and throughput in the shipyards. However, the theory also acknowledges a potential trade-off: a downward pressure on wages within those specific trades. The magnitude of these positive and negative effects is not pre-determined. Instead, it depends critically on the degree to which immigrant artisans act as complements to the domestic workforce, filling empty roles, versus substitutes for them. Furthermore, the ultimate outcome will also be shaped by the responsiveness of the shipbuilding firms themselves, particularly concerning their future investments in domestic training and apprenticeship programs. This theoretical framework thus provides a clear lens for analyzing the policy alternatives and their potential consequences.

B. THE CURRENT STATE OF THE NAVAL SHIPBUILDING WORKFORCE

While the previous chapters established the existence of a critical workforce shortage in the Naval industrial base, academic and policy literature offers deeper insights into its systemic causes and quantitative dimensions. Scholars and government agencies have extensively documented the key factors driving these shortages, moving beyond the top-level problem to diagnose the underlying demographic shifts, training pipeline deficiencies, and post-pandemic labor market dynamics (Cirone et al., 2023; U.S. Department of Defense, 2024; Walsh, 2024). This section reviews the existing body of research that quantifies the current and projected shortfalls and analyzes the primary contributing factors. By synthesizing this literature, this research can build a more granular understanding of the specific challenges that any proposed policy solution, including immigration reform, must be designed to address.



The Congressional Budget Office (2021) projected a 4.6 percent annual labor shortfall for Navy maintenance, equating to approximately 295,000 more labor days than current shipyards can provide. This shortfall is compounded by an aging workforce, high post-pandemic attrition rates, and limited throughput in domestic training pipelines (Cirone et al., 2023). The Navy's own industrial base review estimates a need for 174,000 additional skilled workers over the next decade to meet current shipbuilding targets (Luckenbaugh, 2025).

Historical reliance on immigrant labor in shipbuilding—such as the industrial expansion at Newport News Shipyard in the early 20th century—demonstrates that foreign-born workers have long played a critical role in sustaining U.S. maritime manufacturing (Hanlon, 2018). However, modern workforce planning has largely overlooked immigration as a strategic labor source, despite mounting evidence that domestic recruitment and training efforts alone are insufficient.

Recent scholarship reinforces the urgency of this labor crisis. Kalejaiye (2023) identifies systemic barriers to attracting and retaining skilled technical workers in the U.S., including wage stagnation, limited career mobility, and inadequate vocational education infrastructure. Furthermore, the qualitative nature of shipyard work is changing, compounding the quantitative shortage of personnel. As Baum-Talmor and Kitada. (2022) highlight, the integration of advanced manufacturing technologies into the maritime sector—often referred to as Industry 4.0 —requires tradespeople to possess new digital competencies alongside traditional physical skills. Because domestic training programs have been slow to adapt to these rapid technological shifts, the gap between the advanced skills modern shipyards requires and the skills the domestic pipeline produces is widening.

The literature also highlights regional disparities in workforce availability. Because the U.S. Naval shipbuilding industry is highly consolidated, its labor demands are geographically clustered around major prime contractors in a handful of coastal states, such as Virginia, Connecticut, and Mississippi (Marine Administration, 2021). Consequently, national workforce shortages manifest as acute, localized labor crises, where shipyards exhaust their regional talent pools and struggle to attract specialized tradespeople from outside their immediate geographic areas (U.S. Department of Defense, 2024).



In summary, the current state of the Naval shipbuilding workforce is characterized by chronic shortages, structural inefficiencies, and a lack of strategic integration between labor policy and industrial planning. This section establishes the foundation for exploring immigration policy as a potential lever to address these challenges in subsequent sections.

C. IMMIGRATION POLICY FRAMEWORKS RELEVANT TO SKILLED LABOR

Immigration policy plays a critical role in shaping the availability of skilled labor across U.S. industries, including defense manufacturing. Despite its strategic potential, immigration policy remains largely disconnected from workforce planning in the Naval shipbuilding sector. This section reviews key immigration frameworks and visa categories relevant to skilled labor, drawing on both historical precedent and contemporary policy analysis.

Historically, immigrant labor has contributed significantly to industrial growth in the United States. Hanlon (2018) documents the role of skilled immigrants in the expansion of Newport News Shipyard, illustrating how foreign-born workers helped build the foundation of U.S. Naval manufacturing. More recent studies, such as Capoani et al. (2024), show that immigration continues to drive innovation and productivity in industrial sectors, reinforcing its relevance to shipbuilding.

Several visa programs offer pathways for skilled labor to enter the U.S. workforce, each tailored to different educational requirements and employment durations. While the well-known H-1B visa is strictly reserved for ‘specialty occupations’ requiring at least a bachelor’s degree—such as naval architects or engineers (Finnegan-Kennel, 2025)—the H-2B visa does not require a degree, instead allowing temporary non-agricultural workers, including tradespeople, to fill seasonal labor gaps (U.S. Department of Labor, n.d.). To address more sustained labor requirements, the EB-3 visa program offer a route to permanent residency for a wide range of applicants, including skilled workers, professionals, and other types of laborers (U.S. Citizenship and Immigration Services, n.d.). Research indicates that optimizing these pathways can yield significant economic benefits; for instance, Kerr & Lincoln (2010) demonstrate that reforms to skilled visa



programs, such as the H-1B, have historically improved labor flexibility and contributed to technological innovation, suggesting that similar policy attention to trade-focused visas could yield comparable industrial benefits.

However, defense-related industries face unique challenges in leveraging these programs. Security clearance requirements and strict citizenship restrictions—mandated by Executive Order 12968—generally limit access to classified information and sensitive facilities to U.S. citizens (Exec. Order No. 12,968, 1995). Even after becoming naturalized citizens, foreign-born workers often face significant hurdles under the National Security Adjudicative Guidelines, as enduring ties to foreign relatives can raise disqualifying concerns over foreign influence (Office of the Director of National Intelligence, 2017). Consequently, these stringent, necessary security protocols often limit the integration of immigrant labor into sensitive sectors of the industrial base. Richwine (2022) highlight skill deficits and credentialing barriers among foreign-educated immigrants, suggesting that onboarding processes must be carefully designed to ensure quality and compliance.

Policy scholars such as Peri (2012, 2014) and Mandelman et al. (2025) argue that immigration frictions—such as visa delays, quotas, and administrative burdens—can reduce industrial productivity and hinder small business formation. These frictions are particularly problematic in shipbuilding, where production timelines are tightly coupled with labor availability.

Despite these challenges, immigration remains a viable and underutilized tool for addressing skilled labor shortages. Kerr (2020) outlines actionable policy levers, including targeted visa expansions, credential recognition, and regional labor matching programs, that could be adapted to support defense workforce needs.

In summary, immigration policy frameworks offer both opportunities and constraints for Naval shipbuilding. A strategic approach—one that aligns visa programs with industrial needs while safeguarding national security—could help close critical labor gaps and enhance workforce resilience.



D. COMPARATIVE CASE STUDIES FROM ALLIED NATIONS

U.S. Navy ships that are “forward deployed” or stationed overseas typically conduct their maintenance periods overseas. Operationally, this affords more operational time as the ship does not need to return to the United States to receive maintenance and then transit back to the deployed area of responsibility (AOR). Logistically, this provides additional locations for multiple ships to simultaneously undergo repairs. These locations overseas are in the Fifth, Sixth, and Seventh Fleet AOR and based on the repairs needed, the U.S. Navy uses host nation skilled workers to conduct these repairs (U.S. Government Accountability Office, 2020b). Locations such as U.S. Naval Ship Repair Facility (SRF) and Japan Regional Maintenance Center in Yokosuka, Japan and a detachment in Sasebo, Japan, Forward Deployed Regional Maintenance Center (FDRMC) with detachments in Manama, Bahrain, and Rota Spain, and finally, Ship Repair Unit (SRU) in Singapore regularly maintain and repair U.S. Navy Ships (U.S. Government Accountability Office, 2020b, Naval Sea Systems Command, n.d.). These ship repair facilities employ host nation skilled workers to conduct unclassified and core engineering and structural repairs, also known as Hull, Mechanical, and Electrical (HM&E). Due to their nationality, they are ineligible to work on classified equipment and materiel (Exec. Order No. 12,968, 1995). However, despite the limitation of additional security measures, such as access control and required escorts, repairs conducted overseas have been critical to sustaining Naval operations abroad and allows for shipyard availability to support force generation back home. Growing and expanding the current U.S. Navy Industrial Base to produce and repair ships on par with a near-peer competitor is critical.

China’s shipyard production has outpaced the United States due to limited shipyards and skilled workers (London, 2025). Earlier in 2025, the United States and South Korea signed a memorandum of understanding to develop an additional path to bolster ship production for the U.S. Navy (LaGrone, 2025). If approved, Hyundai Heavy Industries which produces South Korea’s AEGIS ships, like the Arleigh Burke-class Destroyer, would potentially start production for a U.S. Navy Ship in their shipyard. Hyundai Heavy Industries uses a combination of vocational or apprenticeship programs under their visa programs to address a shortage of skilled workers in countries such as Indonesia,



Philippines, and Thailand. These programs focus on safety, Korean language, and specializations such as welding, fitting, and machining. Under South Korea's E-7 visa, Hyundai Heavy Industries investment in overseas pre-training facilities and continued vocational training once in South Korea, ensures that there are enough skilled workers available to deliver ships on time or early (Seo, 2023).

The United States does not have a visa program that resembles South Korea's E-7 visa for skilled workers. The U.S. H-1B requires a bachelor's degree or equivalent and the H-2B is seasonal for non-agricultural low skilled workers. Alterations to U.S. visas or the creation of a visa like South Korea's E-7 and an investment in foreign workers can bolster the shortage of skilled workers such as welders and pipefitters in U.S. shipyards. The dual path investment by Hyundai Heavy Industries in foreign workers and South Korean citizens creates the workforce needed to support their workload. This model suggests that a similar approach could be adopted by U.S. government and private companies such as General Dynamics, Hunting Ingalls Industries, Austal USA, Vigor Industrial, BAE Systems, Ingalls, and Bath Iron Works to produce a workforce of skilled workers that can deliver ships per the national defense requirements. This investment in the people, infrastructure, and materiel of "The Foundry" aligns with Chief of Naval Operations, ADM Caudles' C-Note #2 (Caudle, 2025).

E. INTEGRATION CHALLENGES AND OPPORTUNITIES

South Korea's E-7 program demonstrates that immigration can be a strategic asset in defense industrial planning. By adapting best practices from allied nations, the U.S. can develop policy mechanisms that both expand its labor pool and uphold national security standards.

While immigration offers a promising solution to labor shortages in Naval shipbuilding, its implementation within defense-critical industries presents unique challenges. Security clearance requirements, citizenship restrictions, and concerns over foreign influence often limit the integration of immigrant labor into sensitive sectors (Richwine, 2022). These barriers are compounded by credentialing issues, where foreign-trained workers face delays in skill recognition and onboarding (Capoani et al., 2024).



Political resistance to expanded immigration—particularly in defense contexts—further complicates policy reform. Public perception of foreign labor in national security roles remains cautious, despite evidence that immigrant workers complement rather than substitute native labor (Peri & Sparber, 2009). Additionally, visa frictions such as quotas, processing delays, and administrative burdens reduce the responsiveness of immigration systems to industrial needs (Mandelman et al., 2025).

F. SYNTHESIS AND LITERATURE GAPS

The literature reviewed across workforce trends, immigration policy, and international case studies reveals a consistent theme: domestic labor pipelines alone are insufficient to meet the demands of Naval shipbuilding. Human Capital Theory supports the strategic use of immigration to expand skilled labor capacity, and empirical studies confirm its positive impact on productivity and innovation (Borjas, 2019; Ehrlich & Kim, 2015).

However, gaps remain in the literature regarding the integration of immigration policy into defense acquisition planning. Few studies directly address the intersection of skilled visa programs and national security workforce needs. Additionally, while international models offer valuable insights, comparative analyses specific to shipbuilding are limited.

There is also a lack of research on stakeholder perspectives—such as unions, policymakers, and defense contractors—regarding foreign labor in sensitive industries. Understanding these viewpoints is critical to designing policies that are both effective and politically viable.

This capstone applied project aims to fill these gaps by evaluating immigration-based workforce solutions tailored to the U.S. Naval shipbuilding context, incorporating lessons from allied nations and grounding recommendations in both theory and practice.

G. CHAPTER SUMMARY

This literature review has examined the labor challenges facing the U.S. Naval shipbuilding industrial base and explored immigration policy as a strategic lever to address



workforce shortages. Through the lens of Human Capital Theory, the review synthesized findings across labor economics, policy frameworks, and international case studies.

Key insights include the persistent nature of skilled labor gaps, the underutilization of immigration in defense workforce planning, and the potential for targeted visa programs to enhance industrial readiness.

The review also identified critical gaps in the literature, particularly around policy implementation and stakeholder engagement. These gaps underscore the need for further research and informed policy development.

Together, these findings establish a foundation for the thesis's subsequent chapters, which will analyze immigration-based workforce solutions and propose actionable recommendations for strengthening the Naval shipbuilding labor force.



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IV. ANALYSIS AND FINDINGS

Delays in Naval shipbuilding and maintenance periods constrain the U.S. Navy's operational readiness. This challenge is further compounded by a persistent and worsening shortage of skilled labor in the Naval shipbuilding sector. While the infrastructure and training pipeline for certifying domestic skilled workers are being developed, immigration presents a potential policy lever to help address the skilled workforce gap in Naval shipbuilding. Existing U.S. immigration pathways prioritize highly educated workers and do not adequately address skilled workers necessary to support U.S. Navy shipbuilding and maintenance. This policy misalignment contributes to the workforce gap in an industry that is critical to national defense. Following Bardach's (2019) structured policy analysis approach, this analysis identifies the workforce shortage as the core problem and evaluates relevant evidence. In this chapter, we proceed to outline immigration policy alternatives to address the workforce shortage problem and evaluate each alternative based on select criteria including legal feasibility, security considerations, and logistical challenges associated to each alternative. This analysis then compares these options and offers recommendations to address the skilled workforce shortage.

A. CONSTRUCTING ALTERNATIVES

This research identifies three potential policy alternatives that leverage immigration policy to address the problem associated with the skilled workforce gap in United States shipbuilding.

1. Sector-Specific Visa for Shipbuilding

This alternative immigration policy would require an amendment to the Immigration and Nationality Act to establish a worker visa category that covers skilled workers with certifications and skills that are critical to Naval shipbuilding. These certifications and skills include pipefitters, welders, and electricians. Creating a sector-specific visa for Shipbuilding would enable shipyards and Defense contractors to apply for labor certification with the Department of Labor and accept applicants to supplement their workforce.



2. Expansion of Existing Visa Programs

This alternative immigration policy is similar to Alternative #1: Sector-Specific visa for Shipbuilding with the exception that instead of creating a new temporary work visa to address the skill gap eligibility between the H-1B and H-2B work visas, this expansion of an existing temporary work visa pathway would require that the applicant possess the necessary certifications and skills needed for Naval shipbuilding. The H-2B work visa is for temporary non-agricultural workers but does not specifically call out any skills or certifications needed for the applicant. Expanding this visa category and the number of work visas issued per year could provide additional skilled workers for Naval shipbuilding.

3. Bi-lateral Labor Agreements

Bilateral labor agreements would involve formal partnerships between the U.S. and specific countries with strong shipbuilding or maritime labor forces. The U.S. Navy already executes these agreements overseas to support ship repairs in foreign ports. An expansion of these agreements to recruit, train, and deploy these skilled workers to U.S. shipyards on temporary contracts can help bolster shipbuilding within the United States.

To support repairs overseas, maintenance facilities and contracts include pre-screening and skills certification that is agreed upon by the host nation, host nation maintenance contractor, and the U.S. Navy. Expansions of these agreements to extend to the continental U.S. can be designed to be a rotational system, where workers return home after a set period which would reduce long-term immigration concerns. This alternative immigration policy reform could provide a reliable and scalable labor pipeline while strengthening international economic relationships.

B. SELECTING THE CRITERIA

The fourth step of Bardach's method, "Selecting The Criteria," Bardach has effectiveness as an evaluative criterion (Bardach & Patashnik, 2019). This is the ability of the policy alternative to achieve the desired outcome. This study is limited by the reliable open-source quantitative data regarding skilled worker shortages in shipyards and short-term and long-term economic impacts of immigration. Because of the limited resources,



the criteria selected for policy alternative evaluation and analysis rely on projected outcomes and assumptions resulting from the literature review and case studies such as Hyundai Heavy Industries rather than data-driven.

Bardach's eightfold path focuses on the "evaluative plotline" to analyze and compare the benefits and consequences of a policy alternative. (Bardach & Patashnik, 2019). For this research, each suggested immigration policy alternative will be evaluated on its legal feasibility, security considerations, and logistical challenges. These categories were ranked using Likert scale, a rating system from one to five, with one being most unfavorable and five being the most favorable outcome. Each alternative is evaluated on its ability to support both short-term and long-term Navy shipbuilding goals.

1. Legal Feasibility

Legal feasibility refers to whether a proposed alternative to immigration policy can be implemented within the boundaries of existing law and legal processes. The overarching document for immigration for the U.S. is the Immigration and Nationality Act (U.S. Citizenship and Immigration Services [USCIS], n.d.). This document outlines the requirements for existing work visas such as the H-1B and H-2A and the number of these visas that can be issued. Immigration policy alternatives to bolster United States shipbuilding goals are evaluated on the ease of implementation of an amendment to the Immigration and Nationality Act. These legal actions include whether an alternative requires a new provision to be added to the Immigration and Nationality act and/or modifications to existing provisions governing work visas and their numerical limit.

Table 2 summarizes the criteria that the policy alternatives will be assessed on for legal feasibility:



Table 2. Legal Feasibility Criteria

Legal Feasibility Criteria Table		
Scale	Rating	Definition
1	Highly infeasible	The policy has no realistic path through Congress for approval, there exists major constitutional or political barriers that would prevent congressional approval, and/or this policy alternative is considered non-viable under current immigration policies and restrictions.
2	Low feasibility	The policy requires significant political shifts or rare alignment of interests with congressional approval possible under unusual circumstances. Additionally, this policy can also be assessed to be procedurally difficult in execution.
3	Moderate feasibility	The policy has potential to be approved by Congress but is at high-risk for amendment after negotiations between all stakeholders.
4	High feasibility	There is a strong legislative pathway that exists for the policy to be approved by Congress with or without minor adjustments and that the policy has manageable procedural barriers.
5	Highly feasible	There is a clear legal pathway with minimal opposition or a high probability of passage in near term.

2. Security Considerations

Security considerations for permitting non-citizen workers aboard U.S. Navy ships primarily involve safeguarding national security, protecting classified information, and ensuring operational integrity. Any immigration policy alternative to support United States shipbuilding, specifically for the U.S. Navy, would require strict eligibility criteria with enhanced background investigations or vetting process, and limitations on workers' roles and workplace accessibility. The elevated risks of espionage, insider threats, and unauthorized disclosures of classified information, would result in support only being available during a limited window within the ship's construction. As a result, security concerns are a major limiting factor in any proposal allowing non-citizen workers aboard Navy ships.

Table 3 summarizes the criteria that the policy alternatives will be assessed on for Security Concerns:



Table 3. Security Concerns Criteria

Security Concerns Criteria Table		
Scale	Rating	Definition
1	High risk / Severe security concern	This policy could compromise national security and/or present a major threat to the integrity of classified material.
2	High security concern	This policy presents clear and significant risks to enforcement of off-limit areas and vetting processes. There is an increased potential for security concerns due to fraud and negligence. This policy would require substantial oversight to enforce.
3	Moderate security concern	This policy presents some identifiable risks or enforcement challenges that require additional resources or monitoring. This policy is manageable with policy adjustments.
4	Low security concern	This policy presents low risk that can be easily mitigated through existing enforcement systems.
5	Negligible security concern	This policy has no meaningful impact on national or public security. There are existing enforcement systems in place that are adequate to manage and identify any risks produced by this policy.

3. Logistical Challenges

The effectiveness of any immigration policy alternative is limited by logistical challenges in executing the policy. There are multiple administrative and operational barriers that reduce the practicality and impact of the proposed policy alternatives. Logistical challenges include visa processing delays, worker credential mismatch and appeal processing, and training to the Navy's Shipbuilding and Repair Standards (NAVSEA). These logistical challenges make it difficult for policy changes to respond quickly to urgent labor demands in shipyards but can improve long-term labor supply.

Table 4 summarizes the criteria that the policy alternatives will be assessed on for logistical challenges:



Table 4. Logistical Challenges

Logistical Challenges Criteria Table		
Scale	Rating	Definition
1	Severe logistical challenges	This policy presents severe logistical challenges that would make it impossible to implement without major administrative and logistical structure overhauls. This policy is at high risk for delays, backlogs, and/or non-compliance. There is high potential for this policy to not be able to provide skilled workers to alleviate near and long-term workforce shortages.
2	High logistical challenges	This policy presents a significant strain on administrative processing and enforcement systems. This policy has the potential for backlogs and/or delays without major administrative reforms, and/or high coordination burden across multiple agencies and defense contractors. There is high potential for this policy to not be able to provide skilled workers to alleviate near-term workforce shortages.
3	Moderate logistical challenges	This policy could place a noticeable strain on administrative processing capacity without additional staffing and infrastructure upgrades to process and verify visa applications to address the skilled workforce shortage.
4	Low logistical challenges.	This policy will require minor administrative adjustments to implement the policy and/or expect minor increases in workload or processing times to process and verify applicants, manage defense contractors, and visa holders employed.
5	Minimal logistical challenges	This policy would not place any additional burdens on existing systems. There is an administrative infrastructure in place that is sufficient to process and verify applicants, manage defense contractors, and employ visa holders.

C. PROJECT THE OUTCOMES

United States immigration policy changes to address the workforce shortages in U.S. shipbuilding include options such as introducing a sector-specific visa, targeted



expansions of existing United States immigration visa programs, and/or expansion of bilateral labor partnerships in conjunction with an expansion in U.S. visa programs. These options offer ways to strengthen the shipbuilding workforce while maintaining regulatory control and overall feasibility. The analysis of these policy alternatives is limited by open-source metrics for skilled workforce shortages in Naval shipyards and macroeconomic impacts. As a result, the analysis and projected outcomes of these policy alternatives rely on qualitative assumptions.

1. Project The Outcomes: New Sector-Specific Visa for Shipbuilding

A sector-specific visa would create a targeted immigration pathway designed exclusively for skilled workers that are critical to ship construction. This is modeled closely after South Korea's E-7 visa and would allow U.S. shipyards to recruit and train foreign workers. This has been observed as successful in South Korea, specifically in Hyundai Heavy Industries' ability to produce and deliver ships on time (Seo, 2023).

A proposal to amend the Immigration and Nationality Act would need to include strong labor protections to include prevailing wage requirements and non-displacement provisions before it can be put before congress for approval. These wage requirements and non-displacement provisions ensure that the domestic workforce is supplemented by foreign skilled workers as opposed to depressing wages and displacing the domestic skilled workforce. Additionally, these provisions have the potential to address concerns from skilled-worker labor unions. Overall, the legal feasibility of this alternative immigration policy would be slow as it goes through the congressional approval process. Additionally, it has uncertainties attached to security concerns and the logistical challenges of recruiting and training a foreign workforce.

From a security perspective, this visa would require robust background checks and could potentially restrict skilled work visa holders to non-sensitive work and/or only during certain availabilities in the ship's life cycle. The requirement for background checks to ensure applicants pose no threat to national security is a significant factor limiting how quickly this policy can bridge the workforce gap in United States Naval shipbuilding.



Logistical challenges would include the recognition and standardization of foreign certifications in skilled trades such as welding, pipefitting, and marine electrical work. Hyundai Heavy Industries establishes training programs abroad to circumvent these equivalent certifications. Additionally, Hyundai Heavy Industries' provide cultural, safety, and industry standards training (Seo, 2023). It may be inferred that, if implemented, this policy would require defense shipbuilding companies to establish similar training pipelines abroad for the skilled worker visa to be successful in addressing the skilled workforce shortage. These training pipelines must be universal to all domestic shipyards as to not introduce any further certification equivalencies disputes. It would also allow the skilled workers to remain competitive with competing shipyards. Another logistical challenge would be the required number of workers fluctuates based on the domestic workforce and the shipyard's capacity based on current and projected government contracts. Aligning skilled worker visa allocations with defense contracts can be difficult to time appropriately, especially if classified systems are present onboard and manage. Finally, the administrative capacity for the United States government to process these visa requests will require additional infrastructure and staffing. Delays and backlogs in the approval process hinders the effectiveness and efficiency of this immigration policy alternative.

Overall, the proposed skilled worker visa provides a solution to the shortage of skilled workers in the U.S. Naval shipbuilding workforce. The policy alternative addresses the problem of a workforce shortage in skilled workers and provides groundwork for work visas between the H-1B and H-2B. However, its effectiveness is dependent on deliberate legislative design to overcome political resistance and appease labor union and immigration policy concerns. This alternative is significantly dependent on administrative coordination to address security concerns with background checks, establish certification equivalencies with various other countries and company standards, train the workforce, and review and approve the skilled worker visa. These legal, security, and logistical challenges complicate the effective and efficient implementation of this policy, but it is not unrealistic.

Table 5 summarizes the evaluation of Policy Alternative #1: Sector-Specific Visa for Shipbuilding, according to legal feasibility, security concerns, and logistical challenges.



This analysis indicates that the policy demonstrates low feasibility in regard to seeking congressional approval to establish a new immigration policy and increase the number of visa applicants and holders annually. Additionally, Alternative #1 presents a threat to the domestic workforce if legal protections are not implemented as well to maintain or increase the training and job opportunities to domestic workers. In terms of security concerns, this policy alternative presents potential risks associated with screening, oversight, and based on the required security clearance levels, can limit the effectiveness of a foreign national skilled laborer. This policy alternative presents moderate security concern to address the workforce shortage as the vetting process and expected backlogs to delay visa approval. Logistically, this policy alternative poses high logistical challenges and may require substantial coordination among government agencies, defense companies, and foreign nations to align not only skilled worker certifications between a foreign nation and the shipbuilder but also to align the skilled worker demand based on ship building capacity. Unlike seasonal work, shipyard capacity is dictated by contracts to build and maintain Navy ships. Implementing this policy to adequately align immigrant skilled worker capability with Navy shipyard capacity can lead to periods where this policy alternative produces an abundance of workers or fails to address the workforce shortage. Overall, the tradeoffs associated with a Sector-specific visa for shipbuilding as a policy lever to address the skilled workforce shortage presents moderate risk to implementation with challenges related to its legal feasibility, security concerns, and logistical challenges.



Table 5. Immigration Policy Evaluation Table for New Sector-Specific Visa

New Sector-Specific Visa for Shipbuilding			
Criteria	Score	Rating	Notes
Legal Feasibility	2	Low feasibility	This policy requires congressional approval. This policy threatens the domestic workforce if protections are not properly put in place. This presents legislative and political barriers to create new policy by amending the Immigration and Nationality Act to create a new visa category.
Security Concerns	3	Moderate security concern	This policy presents security concerns due to the vetting process and background checks required for this policy to be implemented. There exists further concerns about the clearance levels that are required and escort requirements for those that do not meet certain clearance levels to work in or around classified spaces.
Logistical Challenges	2	High logistical challenges	This policy presents an administrative burden on stakeholders to ensure that applicants hold or have similar credentials that align with NAVSEA standards.
Overall	7		This policy presents significant challenges to congressional approval and implementation.

2. Project the Outcomes: Expansion of Existing Visa Programs

Instead of creating a new visa category, the U.S. Government could modify and expand existing pathways to better serve shipbuilding needs. Security considerations and logistical challenges would remain the same for the expansion of an existing visa program and/or the development of a sector-specific visa for shipbuilding. Additionally, this alternative also requires congressional approval to make amendments to the Immigration and Nationality Act. However, modifying an existing immigration pathway could potentially be more feasible legally and quicker to implement vice establishing a new visa category specifically for skilled workers for ship building.



Unlike a sector-specific visa, expanding an existing immigration pathway requires only modifications. Modifications can be made to either the H1-B to cover bachelor's degrees and skilled workers or the H2-B to cover skilled workers and seasonal farm work. Regardless of which category is modified, any amendment to these work visas would require an increase in the number of visas issued each year or this policy will be met with resistance from economic sectors that are reliant on H1-B and H2-B visa approvals remaining steady or increasing each year.

While an amendment to an existing immigration policy may be more likely to gain congressional approval, there is still the opportunity for congressional resistance if the number of annual visas is not increased. If there is no increase, this policy can potentially harm other economic sectors that are reliant on existing work visa numbers. The current H1-B cap is "65,000 new statuses or visas each fiscal year" and the H2-B cap is "66,000 new statuses or visas each fiscal year" (USCIS.Gov). This policy alternative could remedy the problem of a workforce shortage for shipbuilding but also has the potential to create new problems in other economic sectors.

With a potentially easier approval process, this policy can address urgent ship force work shortages quicker than Alternative #1 but also support long-term workforce shortages. Employers and applicants must apply under a peak load need based on defense contracts vice seasonal work and/or an intermittent need to temporarily employ skilled workers once it is deemed that the domestic workforce is not able to address the workforce gap.

Table 6 shows the evaluation of Policy Alternative #2: Expansion of Existing Visa Programs, according to legal feasibility, security concerns, and logistical challenges. This analysis indicates that the policy demonstrates moderate legal feasibility. Modifications to an existing immigration pathway appear to be more feasible legally than establishing an entirely new category. Additionally, it presents a smaller threat to the domestic workforce than Policy Alternative #1 of a sector-specific visa. However, an expansion of an existing immigration pathway presents fair-share challenges with other competing sectors that would fall under this work visa modification. Due to the cap on visa holders, this policy can potentially be detrimental to another work visa-dependent sector or fail to allocate



enough visas to certified skilled workers for Naval shipbuilding. Policy Alternative #2 presents the same security and logistical challenges as Policy Alternative #1 and ranks similarly with moderate security concern and high logistical challenges. Overall, the tradeoffs associated with an expansion of an existing visa program as a policy lever to address the skilled workforce shortage presents moderate risk, leaning low to implementation with challenges related to its slightly easier path to approval, security concerns, and logistical challenges.

Table 6. Immigration Policy Evaluation Table for Expansion of Existing Visa Programs

Expansion of Existing Visa Programs			
Criteria	Score	Rating	Notes
Legal Feasibility	3	Moderate feasibility	This policy requires congressional approval. This policy threatens the domestic workforce if protections are not properly put in place. This presents legislative and political barriers to amend an existing immigration pathway within the Immigration and Nationality Act
Security Concerns	3	Moderate security concern	This policy presents security concerns due to the vetting process and background checks required for this policy to be implemented. There exists further concerns for the clearance levels that are required and escort requirements for those that do not meet certain clearance levels to work in or around classified spaces.
Logistical Challenges	2	High Logistical Challenges	This policy presents an administrative burden on stakeholders to ensure that applicants hold or have similar credentials that align with NAVSEA standards.
Overall	8		This policy presents a challenge to congressional approval for an amendment to an existing immigration pathway due to annual visa cap. Additionally, this policy would require additional administrative processes to implementation.

3. Project the Outcomes: Bilateral Labor Agreements

Leveraging a Bilateral Labor agreement with countries that already support the U.S. Navy maintenance overseas could expedite the deployment of a skilled workforce to address domestic shortage. Policy Alternative #3 overcomes the logistical challenge of skilled worker credentials and can potentially be less of an administrative burden to manage. Additionally, for security concerns, these workers would have already undergone a vetting process with background checks to ensure that they exhibit minimal risk to national security. If background checks have not been completed, the benefit is that there is already an established process with that country and the companies that employ or have employed these applicants.

Upon analyzing this bilateral agreement policy, it became clear that this policy alternative must be executed in conjunction with both previous policy alternatives regarding visas because it provides an already established pool of potential skilled worker applicants. A bilateral agreement has the same legal feasibility issue as the other two previously mentioned alternatives, where it is dependent on Congressional approval to become an amendment to the Immigration and Nationality Act and that the proof of burden is on the employer to ensure that wages are not being depressed or that the domestic workforce is not being disadvantaged. A bilateral policy agreement is agnostic to whether the visa quotas are managed through a new category or an expansion of an existing one.

Table 7 shows the evaluation of Policy Alternative #3: Bilateral Labor Agreements, according to legal feasibility, security concerns, and logistical challenges. For legal feasibility, Alternative # 3 is moderate feasibility due to congressional approval to create or expand an existing immigration pathway. The benefit of a bilateral agreement policy is that it would leverage skilled workers from countries that have already and continue to provide maintenance support overseas to Naval vessels. For security concerns, a bilateral agreement policy is a low security concern, as the countries identified for a bilateral agreement can be assumed to have a vetting process already in-place that is approved by the U.S. Navy and that countries' Defense Attache. Additionally, they should have a list of previously security screened applicants that could potentially expedite the visa approval process. Logistically, Alternative #3 presents less of an administrative burden due to



having an established vetting process and a skilled worker certification alignment with the applicants' host nation. This policy poses moderate logistical challenges as it would still require administrative oversight to manage the visa applicants and holders to ensure that their period of eligibility aligns with Naval shipyard capacity to address the workforce shortage. Overall, the tradeoffs associated with a bi-lateral agreement as a policy lever to address the skilled workforce shortage presents a favorable path to implementation with challenges related mainly to the legal feasibility of congressional approval.

Table 7. Immigration policy Evaluation Table for Expansion of Existing Visa Programs

Bilateral Labor Agreement			
Criteria	Score	Rating	Notes
Legal Feasibility	3	Moderate feasibility	This policy requires congressional approval. This policy threatens the domestic workforce if protections are not properly put in place. This presents legislative and political barriers to amend an existing immigration pathway or create a new-sector specific visa.
Security Concerns	4	Low security concern	This policy presents minimal security concerns due to existing vetting processes and background checks in selected countries. Procedures are already in place for clearance levels and escorted access to conduct work in classified spaces.
Logistical Challenges	3	Moderate Logistical Challenges	This policy moderate challenges to implement due to pre-approved workers possessing similar certifications and have conducted work on U.S. Navy vessels under NAVSEA standards.
Overall	10		This policy presents a challenge to congressional approval but presents an easier path to amendment due to potential countries that can be selected for this. This policy would also be easier to implement with processes already in place with selected countries and an assumed skilled workforce pool.



D. CONFRONT THE TRADE-OFFS

The evaluation of these alternatives reveals critical trade-offs. First, clear tension exists between speed and precision. Expanding an existing visa program offers rapid implementation but lacks the targeted design of a new visa category. Policy Alternative #2, Expansion of an Existing Visa Program would allow skilled workers to apply for an existing visa but the execution and preciseness of the number of visas approved is left unclear. Creating an entirely new visa category under Policy Alternative #1, Sector-specific Visa ensures that applicants approved for this visa specifically address the workforce shortage in the shipyard. However, as stated earlier, Congressional approval for a new work visa may take more time than a simple amendment to an existing one. As for Alternative #3, it provides a quicker and more precise solution to the workforce shortage by specifically identifying countries that are known to have certifications and skilled workers to address the workforce shortage. Additionally, a training pipeline or indoctrination period would be minimal for Alternative #3 while the logistical challenges to ensure that foreign certifications align with NAVSEA standards could take time to establish.

Another tradeoff that was identified was that policymakers must balance domestic labor protections with industry demands. Increasing access for foreign labor may alleviate immediate shortages but this could generate concerns about wage depression or reduced incentives to invest in domestic workforce development. Especially, if a training pipeline is established abroad similar to South Korea and Hyundai Heavy Industry. This could intensify concerns about domestic job displacement, particularly in Alternative #2 if the overall visa caps for H1-B or H-2B are not raised. Other economic sectors that rely on H1-B or H-2B visa holders would not want to see a decrease in their share. This can lead to conflict over the passage and implementation of Alternative #2. Policy and decision-makers must ensure that any expansion of immigration policy does not stifle domestic growth but also addresses the problem. These policy and decision-makers consist of committee members to include the House Judiciary Committee, House Armed Services Committee (HASC), Department of War (DoW), Department of Homeland Security (DHS), Department of State (DOS), Department of Labor (DOL), and congressional representatives for States and districts that would be impacted by an increase in



immigration These organizations represent congressional lawmakers to include policy sponsors and voters, organizations that would implement the policy, and representatives for state and local municipalities.

The analysis of policy tradeoffs was impacted by the lack of quantitative metrics for skilled workforce labor shortages in Naval shipyards and the expected visa cap allocated for each of the proposed policy alternatives. This prevented an evaluation of the benefits and risks of the policy alternatives and resulted in an evaluation that leaned heavily on the projected ease of congressional approval and policy implementation to address the skilled workforce shortage.

E. SENSITIVITY ANALYSIS

A sensitivity analysis is used to evaluate how changes in assumptions or variables influence the outcome of a policy recommendation. Testing how different variables might affect the final policy outcome score helps determine which policy alternative remains effective under changing circumstances. The sensitivity analysis was conducted in an excel spreadsheet using a weighted scoring model. Legal feasibility, security concerns, and logistical challenges were assigned scores based on this research's analysis which is summarized in Table 8.

Table 8. Immigration Policy Evaluation Summary Table

	New Sector-specific Visa for Shipbuilding	Expansion of Existing Visa Programs	Bilateral Labor Agreements
Legal Feasibility	2 – Low feasibility	3 – Moderate feasibility	3 – Moderate feasibility
Security Concerns	3 - Moderate security concern	3 - Moderate security concern	4 – Low security concern
Logistical Challenges	2 – High logistical challenges	2 – High logistical challenges	3 – Moderate logistical challenges
Overall	7	8	10

Table 8 summarizes the results of the sensitivity analysis. The higher the overall score indicates greater overall policy feasibility and desirability. Legal feasibility weighted



most heavily due to the reliance on congressional approval for immigration reform, followed by security concerns, and then logistical challenges. Legal feasibility is weighted heavier than security concerns and logistical challenges from the perspective of a bill sponsor due to the challenges involved in congressional approval. The other two criteria demonstrate the operational and administrative executability of the policy and highlight potential friction points that must be mitigated for implementation to be successful. The value of security concerns and logistical challenges are contingent on the legal feasibility of the immigration policy alternative and congressional approval. Without legal feasibility and congressional approval, there would be minimal benefits to implementing mitigation factors identified in security concerns and logistical challenges.

Row one of Table 9 displays the initial analysis with the weighted criteria used are as follows: legal feasibility 0.5, security concerns 0.3, and logistical challenges 0.2. Alternative #3, Bi-lateral Agreement, scored the highest at 3.3 with Alternative #2, expanding an existing visa came in second at 2.8 and Alternative #1, creating a new sector specific Visa coming in last at 2.3. Across all tested weighting scenarios, Alternative #3 remained the highest-ranked option, followed by Alternative #2 and Alternative #1. This indicates there is little sensitivity to change. Adjusting the weights assigned to each criterion does not significantly alter the overall policy ranking. Instead, the results are primarily influenced by the performance scored assigned to each policy alternative across the three evaluation criteria.

Table 9. Sensitivity Analysis

Criteria			Alternatives		
Legal Feasibility	Security Concerns	Logistical Challenges	Alt #1	Alt #2	Alt #3
0.5	0.3	0.2	2.3	2.8	3.3
0.6	0.2	0.2	2.2	2.8	3.2
0.4	0.4	0.2	2.4	2.8	3.4
0.4	0.3	0.3	2.3	2.7	3.3
0.3	0.3	0.4	2.3	2.6	3.3

Alternative #3, Bi-lateral Agreement, consistently performs well because it maintains strong scores across all categories, particularly in security concerns and logistical challenges that are assumed to present low security concerns and a moderate logistical challenge. As a result of both Alternative #1 and Alternative #2 receiving the same score in security concerns and logistical challenges, legal feasibility was the influential factor in Alternative #2 outperforming Alternative #1.

The sensitivity analysis indicates that the ranking of policy options remains consistent across different weighting scenarios. This suggests that the results are stable and not dependent on specific assumptions regarding the relevancy of legal feasibility, security concerns, and logistical factors. As a result, the findings are robust and the preferred policy alternative remains unchanged under varying conditions.



V. CONCLUSION AND RECOMMENDATIONS

A. BARDACH'S EIGHT-STEP METHOD

Three policy alternatives to address the skilled workforce shortage through immigration were analyzed using Bardach's Eightfold Path. Each of these alternatives were evaluated on the criteria of legal feasibility, security concerns, and logistical challenges if they were to be implemented. This chapter fulfills step eight of Bardach's Eightfold Path—"Tell the story"—by presenting a final recommendation to decision-makers. This chapter provides decision-makers with a recommendation on whether a policy is suitable and executable to address the workforce shortage problem (Bardach & Patashnik, 2019).

1. Define the Problem

Chapter 1 of this research project fulfills Bardach's step one: define the problem. Ship construction and maintenance have been a significant constraint on national defense readiness and is part of the ongoing dialogue on national-security industrial-base revitalization. Domestic efforts to revitalize the skilled workforce to include training subsidies and domestic trade-education programs have not produced the numbers needed (Circone et al., 2023) to overcome the 4.6 percent annual labor shortfall for Navy maintenance that was projected by the Congressional Budget Office (2021). Historically, U.S. shipbuilding relied heavily on skilled immigrant labor (Hanlon, 2018) and could potentially ease the workforce shortage that the United States Navy is experiencing today. This led to this research paper's primary research question: How can U.S. immigration policy be leveraged to mitigate skilled-trade workforce shortages in the Naval shipbuilding and maintenance industrial base?

2. Assemble Some Evidence

Chapters II and III identified primary factors contributing to current and projected workforce shortfalls in U.S. Naval Shipbuilding due to a combination of factors, including an aging workforce, limited domestic training pipelines, and regional economic constraints. Additionally, it satisfied step two of Bardach's Eightfold path: Assemble Some



Evidence that provided context for the policy analysis. Specifically, Chapter II provided the historical background and the current state of U.S. Naval shipbuilding from its peak during World War II to its current state of a near-duopoly for complex warship construction. Chapter III reviewed relevant literature to explain the current state of U.S. Naval shipyards, immigration policy frameworks relevant to skilled labor, and comparative case studies from allied nations. The literature review outlines how immigration played a critical role in shaping skilled labor across the United States and outlines a clear deficiency in existing immigration pathways to support skilled labor. Finally, the literature review discusses successes that the United States Navy have experienced with maintenance overseas and the successes that our Allied Nations such as South Korea have had with leveraging immigration policies to supplement their skilled workforce to support their defense industrial base.

3. Construct the Alternatives, Select the Criteria, Project the Outcomes, and Confront Tradeoffs

Chapter IV introduced three immigration policy proposals for analysis that could potentially address the skilled workforce shortage. Steps three through six of Bardach's Eightfold Path were addressed. The three alternatives constructed were: a New Sector-specific Visa, an Expansion of an existing visa program, and a Bi-lateral Labor agreement. Each of these alternatives were evaluated on their legal feasibility, security concerns, and logistical challenges. Legal feasibility regarding congressional approval and potential conflicts of interest with the domestic workforce is any immigration policy's biggest concern. This criterion was thus given a weight of 0.5. The other two criteria, security concerns and logistical challenges, were each weighted at 0.3 and 0.2, respectively. The outcomes of these three policy alternatives were evaluated against the three selected criteria. Chapter 4 then confronted the tradeoffs by acknowledging the positives and negatives of the constructed policy alternatives to address the skilled workforce shortage in the short, near, and long term. Finally, scores were assigned to each alternative after discussing each alternative's challenges to implementation. These scores were further examined in a sensitivity analysis using varying weights assigned to each criterion. In each simulation, Alternative #3, Bi-lateral Agreement scored the highest.



B. SUMMARY OF RESEARCH FINDINGS

This research sought to determine how U.S. immigration policy could address critical workforce shortages in the Naval shipbuilding industry. The analysis, guided by the primary and supporting research questions, yielded the following key findings:

1. What are the primary factors contributing to current and projected workforce shortfalls in U.S. Naval shipbuilding?

The analysis confirms that workforce shortfalls are driven by a combination of historical and contemporary factors. These include the long-term industrial contraction following the Cold War, an aging and retiring skilled-trade workforce, insufficient domestic training pipelines to produce replacements, and high attrition rates. These national trends are intensified by the geographic concentration of shipyards, which creates acute, localized labor crises that exhaust regional talent pools.

2. In what ways have existing DoD and industry workforce development programs succeeded or fallen short?

The research indicates that while domestic workforce initiatives like training subsidies and trade education programs are valuable, they have fallen short of producing enough qualified welders, pipefitters, and electricians to meet the immediate and projected demand. The programs have not been able to overcome the structural deficits in the labor pipeline, making them insufficient as a standalone solution to the current crisis.

3. Which immigration programs or visa categories could be adapted to meet defense-industry labor needs?

The study found that no current visa category is a perfect fit. The H-1B visa is for degree-holding professionals, while the H-2B visa is designed for temporary, seasonal non-agricultural work and is not tailored for specialized industrial skills. The analysis concludes that the most viable pathways involve either creating a new sector-specific visa for skilled



trades or, more feasibly, modifying and expanding an existing visa program to accommodate the unique, long-term needs of the defense industrial base.

4. What policy, legal, or security challenges must be addressed when integrating foreign skilled labor?

The primary challenges identified are significant. Legally, any change requires congressional action to amend the Immigration and Nationality Act, a politically difficult process. Security is a major concern, requiring robust vetting processes and measures to protect classified information which can limit the roles foreign workers can fill. Logistically, challenges include standardizing and recognizing foreign skill certifications, managing visa backlogs, and aligning the number of incoming workers with fluctuating shipyard demand.

C. RECOMMENDATION

This research analyzed three alternatives to immigration policy using Bardach's Eightfold Path. Immigration has played a significant role in shaping the United States' industrial base and can be a potential policy lever to address critical skilled workforce shortages in shipyards. Leveraging a bi-lateral agreement that already has a skilled workforce training pipeline that is near equivalent to NAVSEA standards would be the most effective and efficient way to address the workforce shortage in the near to long term future. Bardach's Eightfold Path method of policy analysis helps determine the supporting reasons for reform of immigration policy to support Naval Shipbuilding. Assembling the evidence of success stories of Allied Nations leveraging immigration policy and training pipelines to supplement their workforce provides an example that the United States could mirror. Additionally, leveraging Allied Nations that conduct repairs overseas while Ship's are on deployment presents a potential qualified work-pool that can supplement the skilled workforce within the Continental United States. This provides an opportunity for the United States to address a critical workforce gap while re-building the infrastructure and incentives to train and retain domestic workers.



Historically, immigration as a policy to bolster the industrial base has proven successful and it is recommended that bi-lateral agreements and visa amendments be considered to address the critical skilled workforce shortages in Naval Shipyards. The current state of Naval shipbuilding and Naval repairs is insufficient to address competition with a near-peer competitor like China.

Step seven of Bardach's Eightfold Path is "Decide!." Alternative #3 provides the best opportunity for immigration as a policy lever to address the skilled workforce shortage in Naval shipyards and is the recommended policy alternative to address the workforce shortage. A bi-lateral agreement would require an increase in visa CAP to facilitate foreign skilled workers. This can be addressed with Alternative #2, expansion of an existing visa to enable the immigration requirements once a bi-lateral agreement is met in Alternative #3.

D. FUTURE RESEARCH

Future research should focus on assembling additional information regarding the number of work visa applicants who become naturalized U.S. citizens and remain in their profession. This data would help quantify the long-term retention of skilled immigrant labor, strengthening the case for policy amendments. While work visas can provide temporary reprieve from a work force shortage, the issue of a decline in domestic workforce remains. Recruiting and retaining a skilled workforce domestically can further bolster shipyard capacity to produce and maintain U.S. Naval ships on time. The research question can be "How many work visa applicants became naturalized citizens and maintained their profession?"

To ease the concern on legal feasibility, further research can be conducted on the economic impact that immigration has on a local economy with quantitative metrics. The United States Navy is limited on shipyard locations and the companies that operate private shipyards. Further information supporting the benefits and consequences of immigration to the affected area can bolster the argument for immigration policy reform for skilled workers. Another research question can be "What is the economic impact to surrounding



communities and cities that have experienced an influx of work visa holders due to an increased job market demand?

Finally, while this research primarily focused on immigration to the United States as a policy lever, a cost-benefit analysis should be conducted that compares maintenance repairs and ship construction abroad with Allied Nations versus production within the Continental United States. Allied nations have shown success in maintaining and producing naval combatants equivalent to the U.S. Navy's Arleigh Burke Destroyers. An on-going example for this is the Coast Guard Arctic Security Cutters that were announced in October 2025. Six of these cutters will be designed and built simultaneously by Rauma Marine Constructions and Bollinger shipyard (Bollinger, 2025). Construction of three cutters will take place in Finland and the remaining three will be built in the United States. An international dual path to produce the U.S. Coast Guards new arctic cutters mirrors the efforts of General Dynamics Bath Iron Works and Ingalls Shipbuilding in Pascagoula to produce the United States Arleigh Burke Class Destroyers. Lessons learned from this endeavor can be further employed by the U.S. Navy to bolster the production of Naval Combatants for a future war with a near-peer competitor.



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