The Economic Importance of the U.S. Shipbuilding and Repairing Industry

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Executive Summary

The U.S. shipbuilding and repairing industry is comprised of establishments that are primarily engaged in operating shipyards, which are fixed facilities with drydocks and fabrication equipment. Shipyard activities include ship construction, repair, conversion and alteration, as well as the production of prefabricated ship and barge sections and other specialized services. The industry also includes manfacturing and other facilities outside of the shipyard, which provide parts or services for shipbuilding activities within a shipyard, including routine maintenance and repair services from floating drydocks not connected with a shipyard.

The purpose of this report is to measure the economic importance of the U.S. shipbuilding and repairing industry at the national and state levels for calendar year 2013. The importance of the industry is not limited to the direct output and employment it generates (i.e., “direct impact”). Companies in the shipbuilding and repairing industry purchase inputs from other domestic industries, contributing to economic activity in those sectors (i.e., "indirect" impact). Employees spend their incomes, helping to support the local and national economies (i.e., "induced" impact). Thus, the economic importance of the U.S. shipbuilding and repairing industry includes direct, indirect, and induced effects. Put differently, the report seeks to document what happens in the shipbuilding and repairing industry and its relationships to the broader economy. It is important to note that the term “economic impacts” as used in this report reflects the association of employment, labor income, and gross domestic product (GDP) with the shipbuilding and repairing industry, but does not imply that some of this economic activity would not otherwise exist without the industry (particularly with regard to induced impacts).

The IMPLAN model, an input-output (I-O) model based on Federal government data, was used to estimate the industry's overall economic impact. I-O modeling is typically employed to analyze how a change in economic activity in one sector of the economy affects activities in other sectors of the economy. In a so-called “marginal” impact analysis, I-O model results can be viewed as showing the impact of small changes in activity in one sector (e.g., shipbuilding) on the rest of the economy before any price adjustments and before businesses, workers, and consumers adjust their activities. The ultimate economic impact of a change in activity can be less pronounced than shown in initial I-O results, particularly if induced price changes are large.

I-O models can also be used in an economic contribution analysis, as done in this study. By simulating a “complete shutdown” of an existing industry, an economic contribution study attempts to quantify the portion of a region’s economy that can be attributed to such an existing industry. It uses the I-O model to identify all backward (i.e., upstream) linkages in the study area. An economic contribution analysis, when compared with the entire study area economy, offers insights into the relative extent and magnitude of the industry in the study area. However, this is not to say that a complete shutdown of the shipbuilding and repairing industry would result in the permanent loss of the jobs and output attributable to the industry through this exercise. In this unlikely event, the resources currently allocated to the shipyards may find employment in other industries, which would compensate in part for the loss of the jobs and output from the shipyard sector.

The study disaggregates the industry's economic activity into two components, operational and capital investment impacts. The operational impact is from purchases of intermediate goods and services,

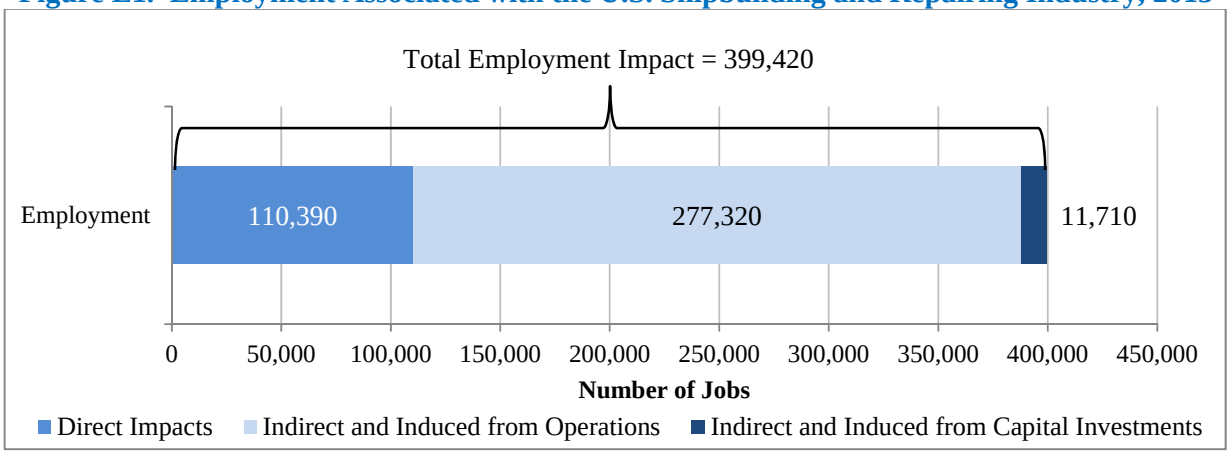
and its capital investment impact is from investment in new structures and equipment.[1] These economic impacts represent all of the backward linkages of the U.S. shipbuilding and repairing industry to its suppliers. They do not capture any forward linkages (i.e., the economic impact on production in sectors that use ships or other shipyard products as an input).

Currently there are 124 shipyards in the United States, spread across 26 states, that are classified as active shipbuilders. In addition, there are more than 200 shipyards engaged in ship repairs or capable of building ships but not actively engaged in shipbuilding.[2] The majority of shipyards are located in the coastal states, but there also are active shipyards on major inland waterways such as the Great Lakes, the Mississippi River, and the Ohio River. Employment in shipbuilding and repairing is concentrated in a relatively small number of coastal states, with the top five states accounting for 63 percent of all private employment in the shipbuilding and repairing industry.

The Federal government, including the U.S. Navy, U.S. Army, and U.S. Coast Guard, is an important source of demand for U.S. shipbuilders. While just one percent of the vessels delivered in 2014 (11 of 1,067) were delivered to U.S. government agencies, 10 of the 12 large deep-draft vessels delivered were delivered to the U.S. government: five to the U.S. Navy, four to the U.S. Coast Guard, and one to the National Science Foundation.

In 2013, the U.S. private shipbuilding and repairing industry directly provided 110,390 jobs (see **Figure E1**), $9.2 billion in labor income, and $10.7 billion in gross domestic product, or GDP, to the national economy (see **Figure E2**). Including direct, indirect, and induced impacts, on a nationwide basis, total economic activity associated with the industry reached 399,420 jobs, $25.1 billion of labor income, and $37.3 billion in GDP in 2013.

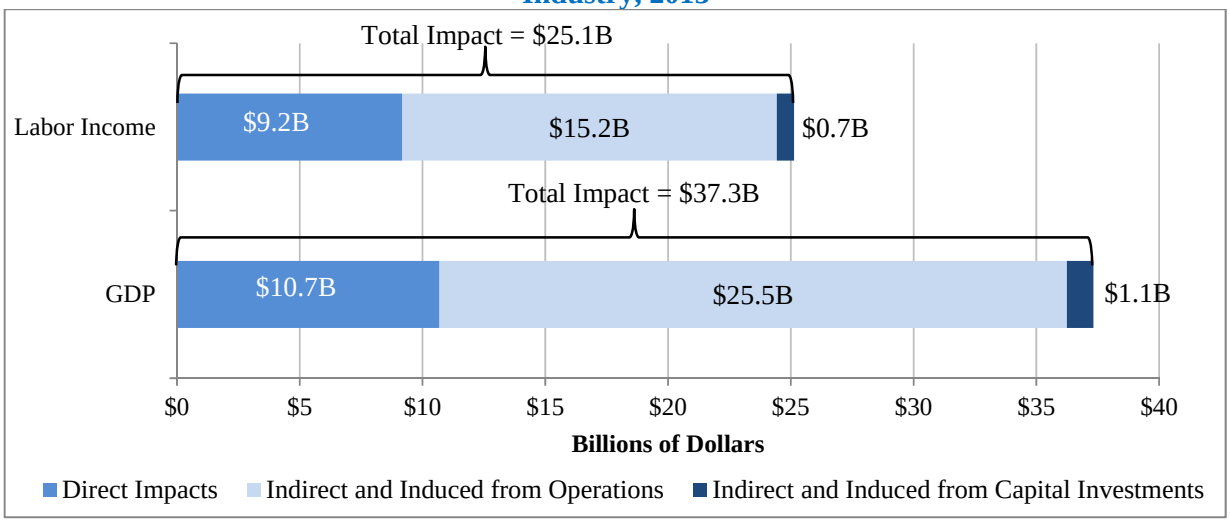
Figure E1. Employment Associated with the U.S. Shipbuilding and Repairing Industry, 2013



Source: Calculations using the IMPLAN modeling system (2013 database).

[1] The IMPLAN model results were adjusted to include the economic activity attributable to capital spending by the shipbuilding and repairing sector.
[2] See www.shipbuildinghistory.com for details.

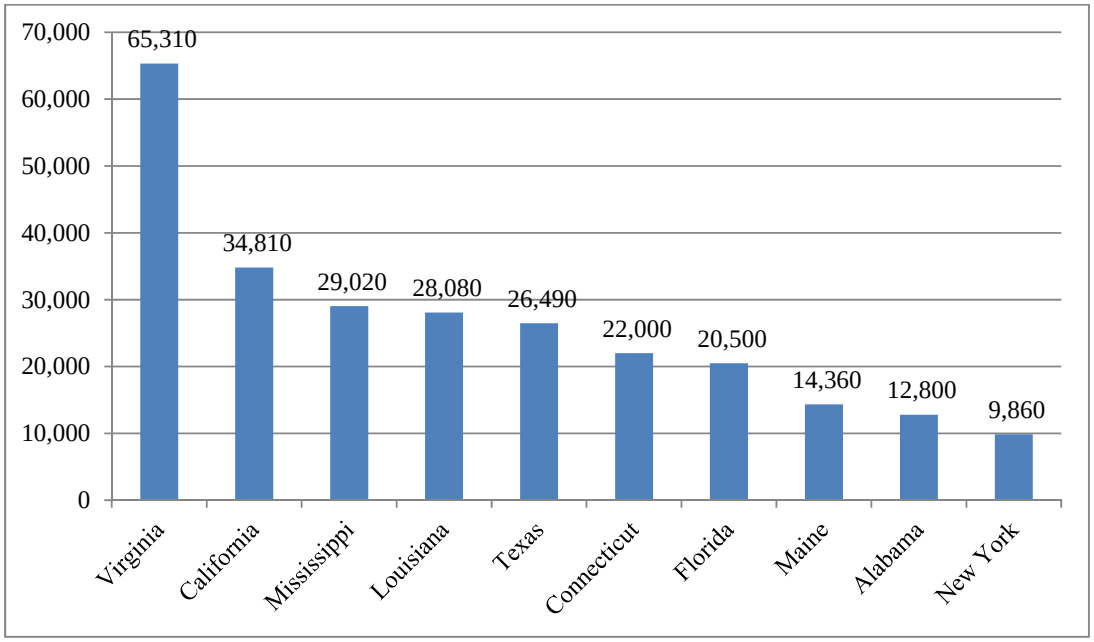
Figure E2. Labor Income and GDP Associated with the U.S. Shipbuilding and Repairing Industry, 2013



Source: Calculations using the IMPLAN modeling system (2013 database).

The industry impact by state varies based on the level of direct activity and the share of the supply chain included in the state. The states with the highest levels of overall direct, indirect, and induced employment associated with the industry are Virginia, California, Mississippi, Louisiana, and Texas (see **Figure E3**).

Figure E3. Total Direct, Indirect, and Induced Employment Associated with U.S. Shipbuilding and Repairing Industry Operations, by State (10 States with Highest Levels, 2013)



Source: Calculations using the IMPLAN modeling system (2013 database).

Considering the indirect and induced impacts, each direct job in the shipbuilding and repairing industry is associated with another 2.6 jobs in other parts of the US economy; each dollar of direct

labor income and GDP in the shipbuilding and repairing industry is associated with another $1.74 in labor income and $2.49 in GDP, respectively, in other parts of the US economy.

I. Introduction

The purpose of this report is to quantify the economic importance of the U.S. private shipbuilding and repairing industry in 2013, in terms of employment, labor income, and GDP.[3] The study quantifies the industry's ***operational impact*** (due to its purchases of intermediate inputs) at the national and state levels and ***capital investment impact*** (due to its investment in new structures and equipment) at the national level. These economic impacts represent all of the backward linkages of the U.S. shipbuilding and repairing industry to its suppliers. They do not capture any forward linkages (i.e., the economic impact on production in sectors that use ships as an input). All economic impacts are reported in gross terms, which means they do not take account of what would have taken place in the absence of the shipbuilding and repairing industry.

In describing the economic importance of the U.S. shipbuilding and repairing industry through its employment and purchases of goods and services, this report considers three separate channels -- the direct impact, the indirect impact, and the induced impact -- that in aggregate provide a measure of the economic importance of the U.S. shipbuilding and repairing industry.

- **Direct impact** is measured as the jobs, labor income, and GDP within the shipbuilding and repairing industry.
- **Indirect impact** is measured as the jobs, labor income, and GDP occurring throughout the supply chain of the shipbuilding and repairing industry. The indirect impact also includes suppliers to the companies providing goods and services to the shipbuilding and repairing industry.
- **Induced impact** is measured as the jobs, labor income, and GDP resulting from household spending of labor income earned either directly or indirectly from the shipbuilding and repairing industry's spending under standard input-output modeling assumptions. It should be interpreted with caution as it involves personal spending decisions by employees of shipyards and its supply chain that are further removed from direct shipyard expenditure activities and is more difficult to estimate.

Together these effects demonstrate the shipbuilding and repairing industry's economic importance and relationship to all sectors of the U.S. economy.

The IMPLAN model, an input-output (I-O) model based on Federal government data, was used to estimate the industry's overall economic impact. I-O modeling is typically employed to analyze how a change in economic activity in one sector of the economy affects activities in other sectors of the economy. In a so-called “marginal” impact analysis, I-O model results can be viewed as showing the impact of small changes in activity in one sector (e.g., shipbuilding) on the rest of the economy before any price adjustments and before businesses, workers, and consumers adjust their activities in response to potential changes. The ultimate economic impact of a change in activity can be less pronounced than shown in initial I-O results, particularly if induced price changes are large.

I-O models can also be used in an economic contribution analysis, as done in this study. By simulating a “complete shutdown” of an existing industry, an economic contribution study attempts to quantify the portion of a region’s economy that can be attributed to such an existing industry. It uses

[3] Gross domestic product (GDP) reflects the income earned by labor (e.g., wages and salaries) and capital (e.g., profits) and any indirect business taxes (including excise taxes, property taxes, fees, licenses, and sales taxes paid by businesses).

the I-O model to identify all backward (i.e., upstream) linkages in the study area. An economic contribution analysis, when compared with the entire regional economy, offer insights into the relative extent and magnitude of the industry in the study area. However, this is not to say that a complete shutdown of the shipbuilding and repairing industry would result in the permanent loss of the jobs and output attributable to the industry as these resources may find employment in other industries.

The rest of this report is organized as follows. **Section II** provides a brief overview of the U.S. shipbuilding and repairing industry. **Section III** presents estimates of the industry's economic impact in 2013 in terms of employment, labor income, and GDP at the national and state levels. **Appendix A** provides additional details on the industry's economic impact at the state level. **Appendix B** provides a description of the data sources and methodology used for the study. **Appendix C** provides a brief description of the input-output model used in the analysis.

II. Overview of the U.S. Shipbuilding and Repairing Industry

A. Industry Definition

Economic activity directly associated with the U.S. shipbuilding and repairing industry is primarily captured in goverment data under the North American Industry Classification System (NAICS) sector 336611, Shipbuilding and Repairing. According to the U.S. Census Bureau, this industry comprises establishments that are primarily engaged in operating shipyards, which are fixed facilities with drydocks and fabrication equipment. Shipyard activities include ship construction, repair, conversion, and alteration. They also include the production of prefabricated ship and barge sections, and other specialized services.[4] The industry may also include manfacturing and other facilities outside of the shipyard, which provide parts or services for ship building activities within a shipyard.

The industry also includes a portion of NAICS sector 488390, Other Support Activities for Water Transportation. Among other activities, NAICS sector 488390 includes routine repair and maintenance of ships from floating drydocks, as well as ship scaling services not done in a shipyard. According to the 2012 Economic Census, approximately 84.2 percent of the revenues of NAICS sector 488390 were derived from routine repairs and maintenance of maritime vessels.[5]

B. Description of the Industry

Currently there are 124 shipyards in the United States, spread across 26 states, that are classified as active shipbuilders. In addition there are more than 200 shipyards engaged in ship repairs or capable of building ships but not actively engaged in shipbuilding.[6] As shown in **Figure 1**, below, the majority of active shipbuilders are located in the coastal states. However, there also are active shipyards on major inland waterways such as the Great Lakes, the Mississippi River, and the Ohio River. The industry also includes manufacturing and other facilities outside of these shipyards that provide parts or services for the shipbuilding and repairing industry. Furthermore, the industry includes routine maintenance and repairs conducted from floating drydocks. As a result, the scope of economic activity directly attributable to the U.S. shipbuilding and repairing industry is wider than the 26 states shown in **Figure 1**, below.

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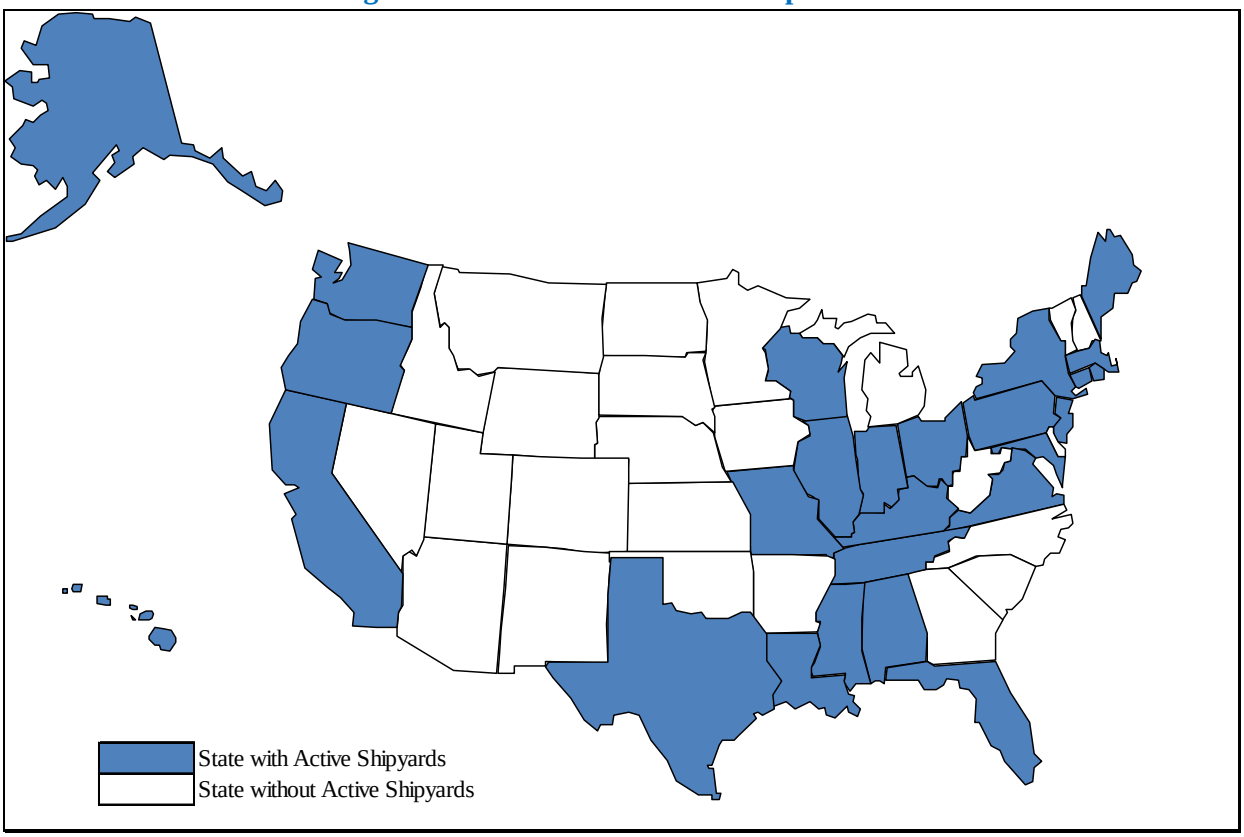
[4] http://www.census.gov/cgi-bin/sssd/naics/naicsrch?chart=2007

[5] U.S. Census Bureau, 2012 Economic Census, Report EC1248I3, "Transportation and Warehousing: Industry Series: Preliminary Product Lines Statistics by Industry for the U.S.: 2012"

[6] See the directory of shipyards at http://shipbuildinghistory.com. Of the 124 shipyards summarized in Figure 1, five are public yards operated by the U.S. Navy or U.S. Coast Guard, 22 are mid-sized to large shipyards capable of building naval ships and submarines, oceangoing cargo ships, drilling rigs and high-value, high-complexity mid-sized vessels, 88 are smaller yards capable of building the simpler types of smaller commercial vessels, such as tugs, towboats, offshore service vessels, fishing vessels, ferries and barges. In addition to these shipyards, there are nine shipyards currently producing large yachts and 13 occasionally producing larger vessels. Shipbuildinghistory.com also lists 287 shipyards and boatyards that are classified as inactive.

Figure 1. 26 States with Active Shipbuilders



Source: Directory of shipyards at http://shipbuildinghistory.com

1. Private Employment

The U.S. private shipbuilding and repairing industry accounted for an estimated 110,390 jobs in 2013, including both payroll employees and self-employed workers and both full-time and part-time workers. The vast majority of these jobs (101,870) were in NAICS sector 336611, with the remainder (8,520) accounted for by routine maintenance and repair conducted outside of a shipyard (NAICS sector 488390).[7]

Employment in shipbuilding and repairing is concentrated in a relatively small number of states (see **Figure 2**, below). In fact, as shown in **Table 1**, below, 63 percent of all private direct employment in the industry is located in just five states: Virginia, Mississippi, Louisiana, Connecticut, and California.

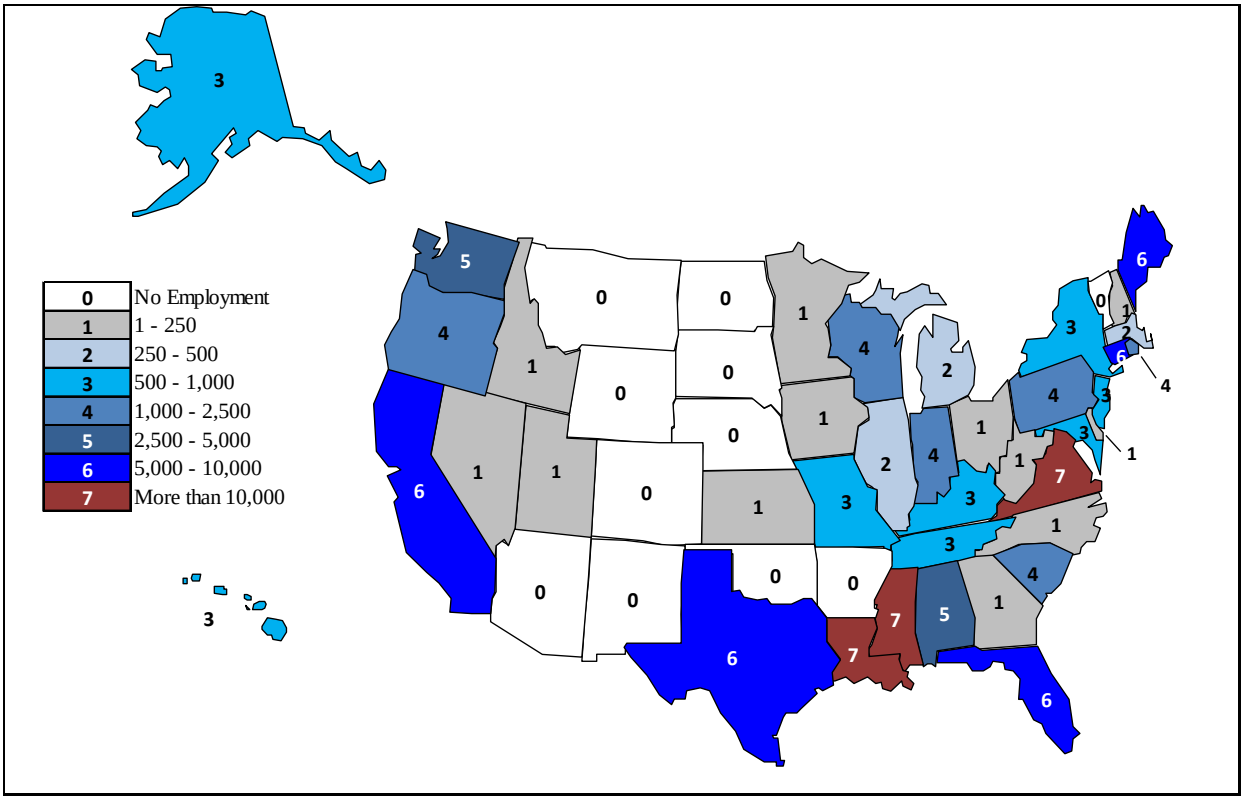
[7] These numbers do not include federal government employment. According to the U.S. Bureau of Labor Statistics, total employment at federal government-operated shipyards was 30,370 in 2013, down from 30,435 in 2012.

Table 1. -- Total Private Sector Direct Employment in the U.S. Shipbuilding and Repairing Industry, Top 10 States in 2013

State	Private Employment[a]	Percent of U.S. Total
Virginia	***28,210***	***25.6%***
Mississippi	***12,720***	***11.5%***
Louisiana	***12,230***	***11.1%***
Connecticut	***9,030***	***8.2%***
California	***7,190***	***6.5%***
Texas	6,060	5.5%
Maine	5,770	5.2%
Alabama	5,590	5.1%
Florida	4,890	4.4%
Washington	3,060	2.8%
All other states combined	15,650	14.2%
U.S. Total	**110,390**	**100%**

Source: Estimates based on data from the U.S. Census Bureau, U.S. Bureau of Labor Statistics, and U.S. Bureau of Economic Analysis.
Note: Details may not add to totals due to rounding.
[a] Employment is defined as the number of payroll and self-employed jobs, including part-time jobs.

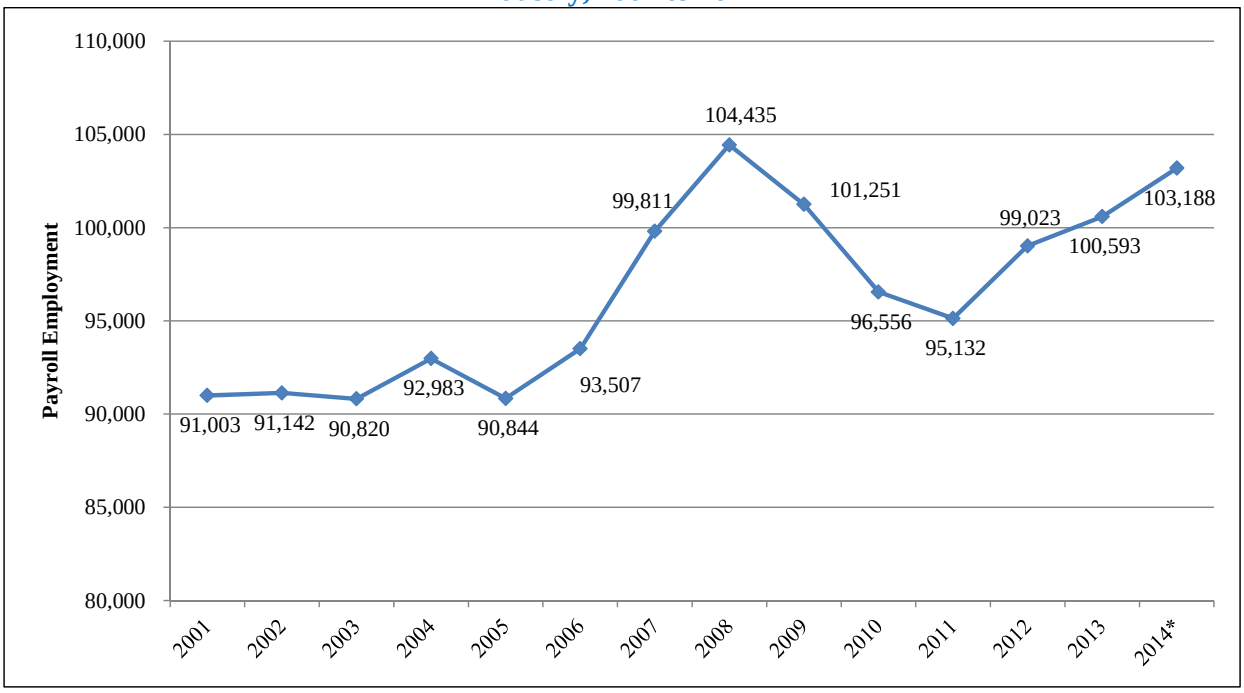
Figure 2. Private Sector Direct Employment in the U.S. Shipbuilding and Repairing Industry by State, 2013



Source: Estimates based on data from the U.S. Census Bureau, U.S. Bureau of Labor Statistics, and U.S. Bureau of Economic Analysis

The majority of private sector jobs in the U.S. shipbuilding and repairing industry are payroll jobs. In 2013, payroll employment accounted for 100,593 of the total 101,866 jobs in NAICS sector 336611, 99 percent of the total. Payroll employment in NAICS 336611 grew rapidly between 2005 and 2008, from 90,840 to 104,440 (see **Figure 3**, below). As a result of the global recession the industry contracted, losing more than 9,000 payroll jobs between 2008 and 2011, before rebounding in 2012. Payroll employment in NAICS sector 336611 continued its strong growth into 2014, averaging 103,188 jobs through September 2014.

Figure 3. -- Private Sector Direct Payroll Employment in the U.S. Shipbuilding and Repairing Industry, 2001 to 2012*



Source: Total private sector payroll employment for NAICS sector 336611 from U.S. Bureau of Labor Statistics, *Quarterly Census of Employment and Wages* (Downloaded April 8, 2015). Excludes the portion of the industry classified in NAICS sector 488390.
*Data for 2014 is average for January through September.

2. Labor Income

Total private sector labor income in the U.S. shipbuilding and repairing industry (including wages and salaries and benefits as well as proprietors' income) amounted to $9.2 billion in 2013. As with private employment, industry labor income is concentrated in a relatively small number of states, with five states (Virginia, Mississippi, Connecticut, Lousiana, and California) accounting for nearly 66 percent of all direct labor income for the U.S. shipbuilding and repairing industry (see **Table 2**, below).

Average labor income per job was approximately $83,166 in 2013, 55 percent higher than the national average for the private sector economy ($53,639).

Table 2. -- Total Private Sector Direct Labor Income in the U.S. Shipbuilding and Repairing Industry, Top 10 States in 2013

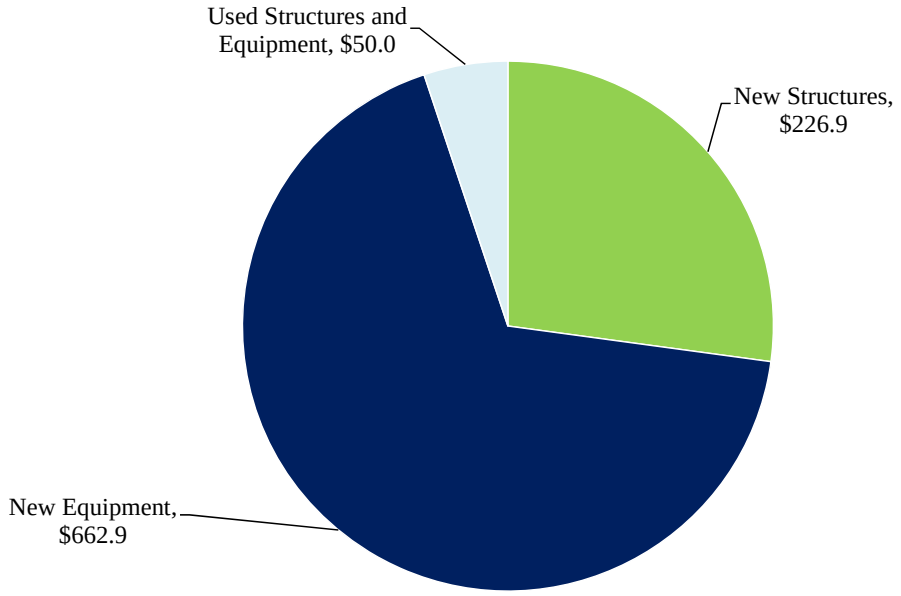
State	Private Labor Income[a] ($ millions)	Percent of U.S. Total
Virginia	$2,310.5	25.2%
Mississippi	1,227.5	13.4%
Connecticut	974.9	10.6%
Louisiana	909.4	9.9%
California	618.0	6.7%
Maine	496.7	5.4%
Texas	410.3	4.5%
Alabama	370.2	4.0%
Florida	319.6	3.5%
Washington	242.7	2.6%
All other states combined	1,300.6	14.2%
U.S. Total	**$9,180.3**	**100%**

Source: Calculations using the IMPLAN Modeling system (2013 database) and data from the U.S. Census Bureau, U.S. Bureau of Labor Statistics, and U.S. Bureau of Economic Analysis.
Note: Details may not add to totals due to rounding.
[a] Labor income is defined as wages and salaries, benefits, and proprietors' income.

3. Capital Expenditures

According to data from the U.S. Census Bureau, the shipbuilding and repairing industry (NAICS sector 336611) spent a total of $978.6 million on new and used capital assets in 2013, up from $834.4 million in 2012. The majority of capital spending for the industry is spending on new structures and equipment. In 2013, the industry spent an estimated $928.6 million on new capital assets ($662.9 million on new equipment and $265.7 million on new structures) and $50.0 million on used structures and equipment (see **Figure 4**, below).

Figure 4. -- Capital Expenditures by U.S. Shipbuilders, by Type, 2013 (in $ millions)



Source: Estimates based on data from U.S. Census Bureau, *2012 Economic Census* and *2013 Annual Survey of Capital Expenditures.*

4. Industry Output

U.S. shipbuilders delivered 1,067 vessels of all types in 2014, down from 1,147 vessels in 2013 (see **Table 3**, below). Over 80 percent of vessels delivered during the last five years have been inland tank and deck barges. Deliveries of inland tank barges and tugs and towboats showed the greatest increase in terms of vessels delivered between 2010 to 2014.

Table 3. -- Deliveries by U.S. Shipyards, by Type of Vessel, 2010-2014

Type of Vessel	2010	2011	2012	2013	2014
Large Deep-Draft Vessels	16	11	11	8	12
Offshore Service Vessels and Crew Boats	38	21	28	44	52
Tugs and Towboats	81	110	119	105	114
Passenger Vessels (>50 feet)	23	30	33	23	21
Commercial Fishing Vessels (>50 feet)	8	20	15	27	18
Other Self-Propelled Vessels (>50 feet)	19	23	25	14	10
Large Oceangoing Barges	14	6	2	6	2
Inland Tank Barges	141	185	279	327	311
Inland Freight and Deck Barges	861	1,053	749	593	527
Total Delivered	**1,201**	**1,459**	**1,261**	**1,147**	**1,067**
New Construction Contracts*	75	89	84	114	77

Source: www.shipbuildinghistory.com

Note: The delivery date for a vessel was determined by the date on which its Certificate of Documentation was issued, which should be, but may not be, the date on which the shipyard made delivery.

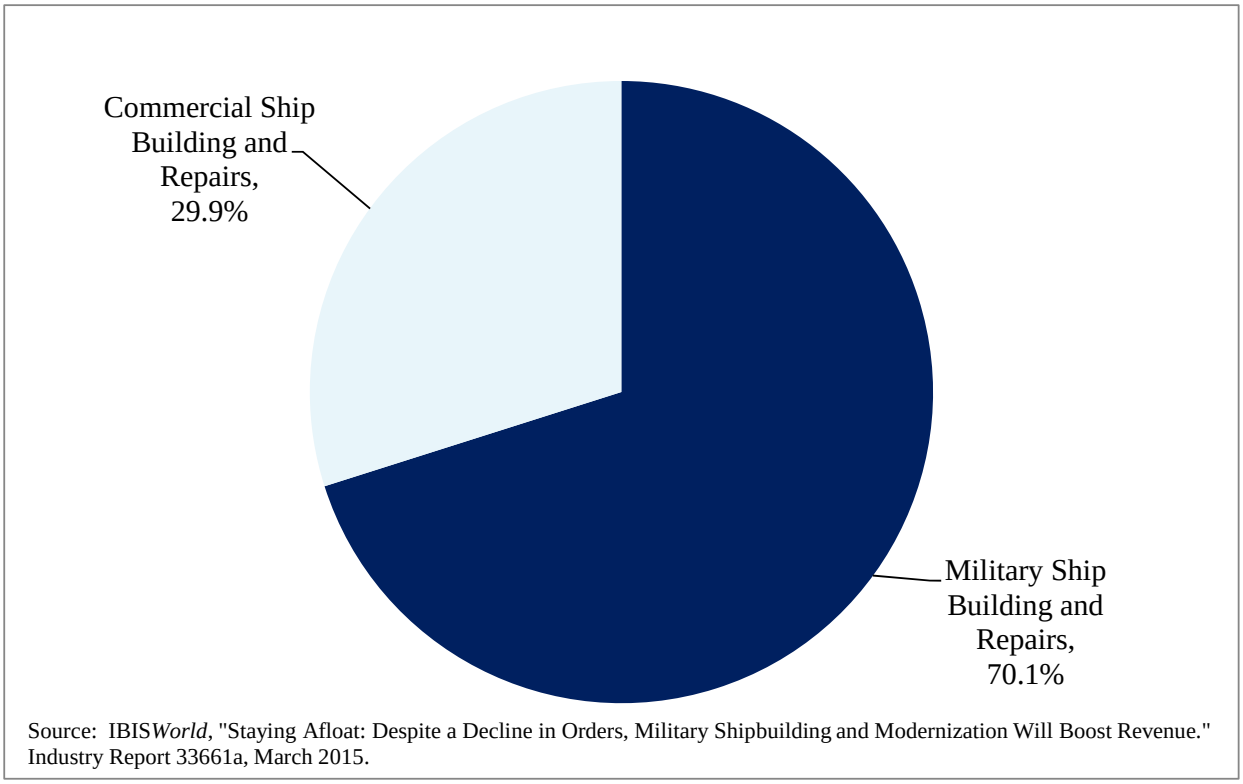
*Announced new construction contracts with U.S. shipyards for self-propelled vessels and oceangoing barges. Excludes inland barges, tugs, and towboats. Note, each contract may cover the construction of one or more vessel. For example, the 191 contracts announced in 2013 and 114 cover the construction of 347 new vessels.

While the total number of deliveries by U.S. shipbuilders has fallen in recent years, the number of new construction contracts have increased. In 2013, U.S. shipyards announced 114 new construction contracts for self-propelled vessels and oceangoing barges, most of which will be delivered in 2015 and beyond.[8] Given the significant lag in construction of many types of vessels, employment in the U.S. shipbuilding and repairing industy has continued to grow while deliveries have declined.

The federal government, including the U.S. Navy, U.S. Army, and U.S. Coast Guard, remains an important source of demand for private U.S. shipbuilders. While only 11 of the 1,067 vessels delivered in 2014 were delivered to the U.S. government, nearly all (10 out of 12) of the large deep-draft vessels delivered were delivered to U.S. government agencies (five to the U.S. Navy, four to the U.S. Coast Guard, and one to the National Science Foundation). Furthermore, 98 out of the 150 new vessels ordered from U.S. private shipbuilders in 2014 were for the U.S. military.[9]

According to the *Annual Survey of Manufactures*, total revenues for the U.S. shipbuilding and repairing industry amounted to $25.7 billion in 2013, up from $25.0 billion in 2012.[10] Initial estimates from industry sources indicate total revenues of $26.3 billion for the U.S. shipbuilding and repairing industry in 2014 and $25.5 billion in 2015, with 70 percent coming from military shipbuilding and repair and the remaining 30 percent from commercial shipbuilding and repairs (see **Figure 5**).

Figure 5. -- Industry Revenues by Product Type, 2015

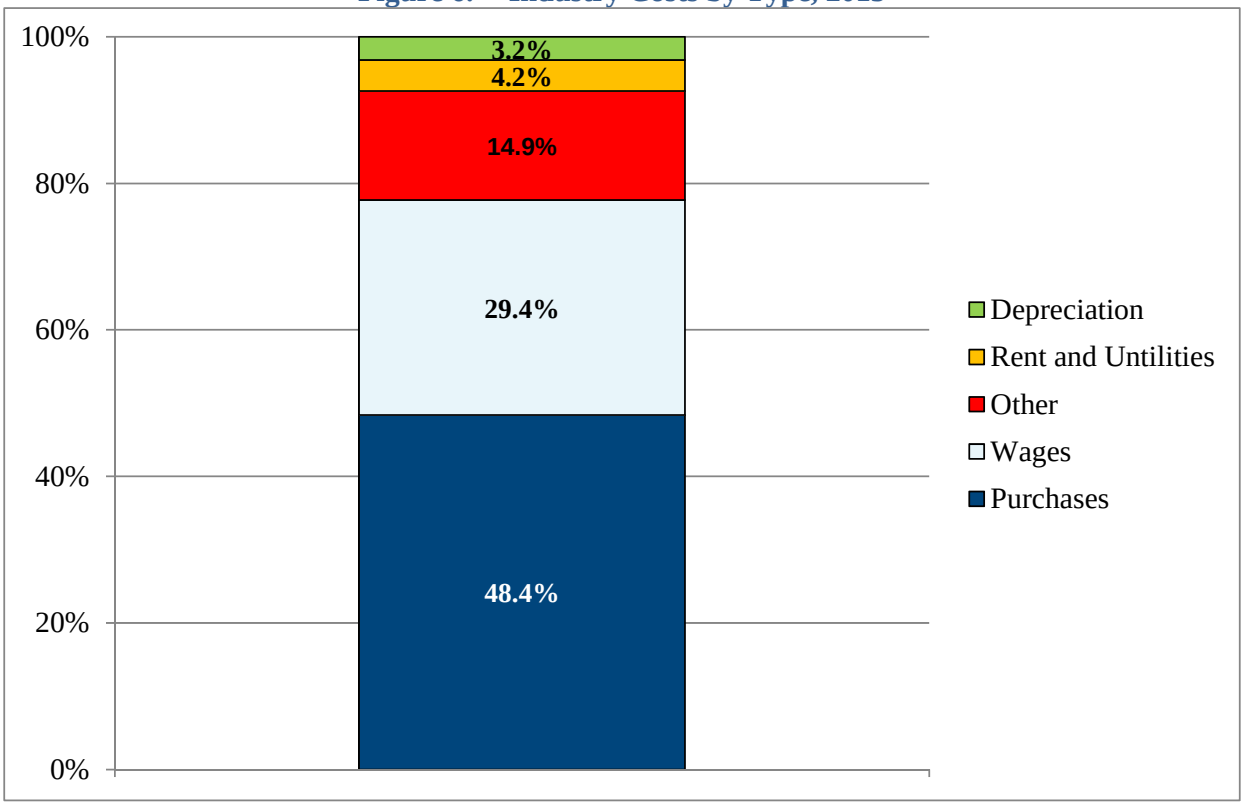


Source: IBIS*World*, "Staying Afloat: Despite a Decline in Orders, Military Shipbuilding and Modernization Will Boost Revenue." Industry Report 33661a, March 2015.

[8] New construction contracts can be for a single vessel or for multiple vessels. The 114 contracts announced in 2013 cover the construction of 187 new ships to be delivered between 2014 and 2018.
[9] Based on announced new construction contacts as reported by www.shipbuildinghistory.com.
[10] The Annual Survey of Manufacturers was not published in 2012 due to the Economic Census. As such, 2012 numbers are from the 2012 Economic Census.

Figure 6, below, provides a breakdown of industry costs. The largest expense for ship builders is purchases of raw materials and supplies used in the construction and repair of ships, including paints, steel plates, copper tubing, aluminum, and iron castings. These purchases account for an estimated 48.4 percent of total industry costs. Labor costs are the second largest expenditure for the industry, amounting to approximately 29.4 percent of industry costs. Depreciation, rent and utilities, and other costs represent 22.3 percent of industry costs.

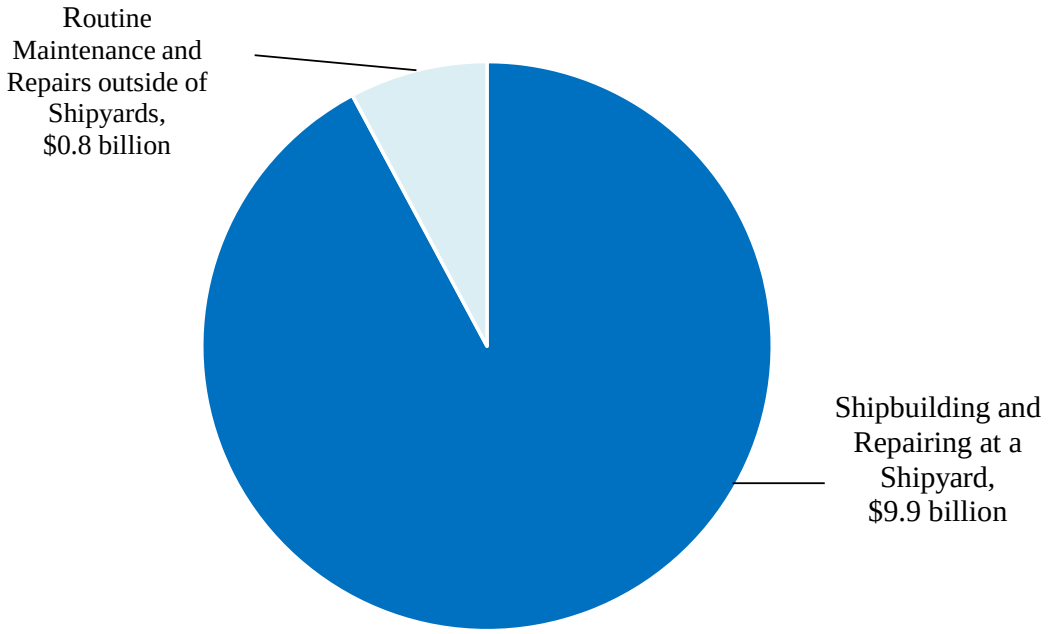
Figure 6. -- Industry Costs by Type, 2015



Source: Estimates based on IBISWorld, "Staying Afloat: Despite a Decline in Orders, Military Shipbuilding and Modernization Will Boost Revenue." Industry Report 33661a, March 2015.

Total GDP in the U.S. private shipbuilding and repairing industry (including routine maintenance and repairs conducted outside of shipyards) amounted to $10.7 billion in 2013. As with employment, the majority of the industry's GDP ($9.9 billion) was related to shipbuilding and repairing tied to shipyards (NAICS sector 336611), compared to $0.8 billion for routine maintenance and repairs conducted outside of a shipyard (see **Figure 7**, below).

Figure 7. -- Total GDP in U.S. Shipbuilding and Repairing Industry, 2013



Source: Calculations based on the IMPLAN Modeling system (2013 database).

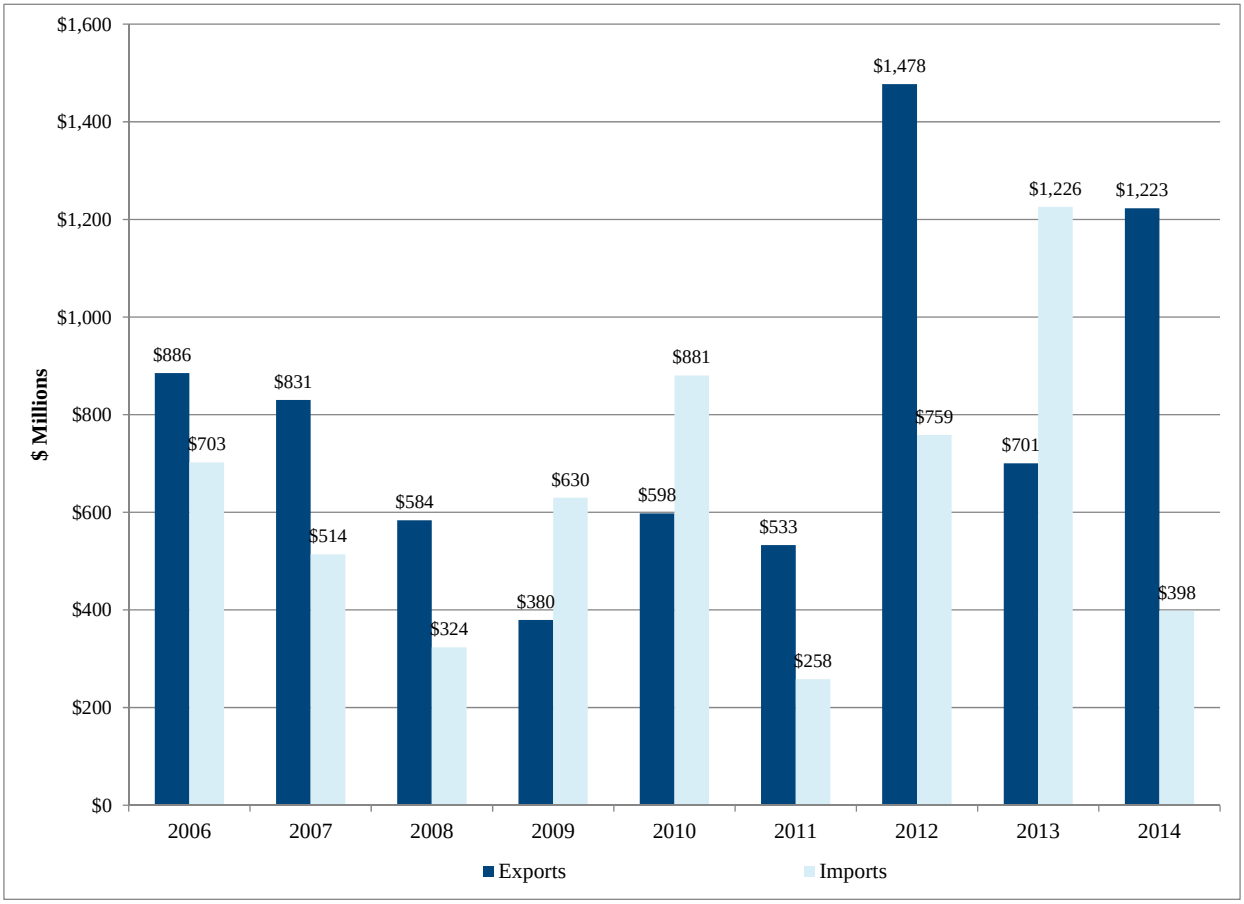
5. Foreign Trade

The value of imports and exports of ships and repair services varies considerably over time, in part due to the long lead time associated with manufacturing and delivering finished ships (see **Figure 8**, below).

Imports of finished ships, inputs, and repair services amounted to $398 million in 2014, down from $1.2 billion in 2013. Industry imports are limited by regulation; in particular, the Jones Act (section 27 of the Merchant Marine Act of 1920) requires that all vessels carrying goods between U.S. ports be manufactured (or rebuilt) in the United States and be owned, operated, and crewed by U.S. citizens. Additionally, the defense sector remains the industry's biggest client, accounting for more than 70 percent of industry revenues. Because defense contracts typically require access to sensitive military technology and information, the U.S. government generally limits any foreign involvement in defense contracts.

In contrast, despite an increase in foreign competition, exports by U.S. shipbuilders have strengthened in recent years, rising to $1.2 billion in 2014 (representing 4.6 percent of industry revenues). As a result, the U.S. shipbuilding industry has run a trade surplus in six out of the last nine years and a cumulative trade surplus of $1.5 billion over this period.

Figure 8. -- Imports and Exports for the U.S. Shipbuilding and Repairing Industry, 2006-2014



Source: IBISWorld, "Staying Afloat: Despite a Decline in Orders, Military Shipbuilding and Modernization Will Boost Revenue." Industry Report 33661a, March 2015.

III. The Economic Impact of the U.S. Shipbuilding and Repairing Industry

In this study, the economic impact of the U.S. shipbuilding and repairing industry is measured in terms of its direct, indirect and induced impacts at the national and state levels.

The IMPLAN model, an input-output (I-O) model based on Federal government data, is used to quantify these linkages.[11] The IMPLAN model does not track capital expenditures (such as spending on equipment) by industry; consequently, the activity associated with capital spending by the shipbuilding and repairing industry has been separately calculated. This detail is only available on a national basis. See **Appendix C** for a more detailed description of the methodology used for this study.

A. National Impact

In 2013, on a national basis, the U.S. shipbuilding and repairing industry directly provided 110,390 jobs (see **Table 4**, below). Including direct, indirect, and induced impacts, approximately 399,420 jobs were associated with the industry. Total labor income associated with all direct, indirect, and induced jobs was $25.1 billion. The industry directly and indirectly was associated with $37.3 billion in GDP in 2013.

Table 4. Economic Importance of the U.S. Shipbuilding and Repairing Industry, 2013

	Direct Impacts	Indirect & Induced Impacts		Total Impacts
		Operational Impacts	Capital Investment Impacts	
Employment [a]	110,390	277,320	11,710	399,420
Labor Income ($ millions) [b]	$9,180	$15,251	$700	$25,131
GDP ($ millions)	$10,689	$25,551	$1,085	$37,325

Source: Calculations using the IMPLAN Modeling system (2013 database) and data from the U.S. Census Bureau, U.S. Bureau of Labor Statistics, and U.S. Bureau of Economic Analysis.

Note: Details may not add to totals due to rounding.
[a] Employment is defined as the number of payroll and self-employed jobs, including part-time jobs.
[b] Labor income is defined as wages and salaries and benefits as well as proprietors' income.

By segment, over 90 percent of the direct economic activity is in the primary industry code, shipbuilding and repairing (NAICS 336611), which was responsible for 101,870 direct jobs, paid $8.5 billion in labor income, and generated $9.9 billion in GDP in 2013. Routine ship maintenance and repair activities (part of NAICS 488390) directly accounted for 8,520 jobs, $685 million in labor income, and $837 million in GDP (see **Table 5**, below).

[11] The IMPLAN model is based on input-output (I-O) tables that map the flow of value along the supply chain for the different industries in the economy. For example, for the shipbuilding and repairing industry these tables provide the value of inputs purchased from other industries that supply the shipbuilding and repairing industry. The supplying industries also purchase inputs from other industries to deliver their products; these impacts are also captured. See **Appendix D** for a description of the model.

Table 5. Direct Economic Impact of the U.S. Shipbuilding and Repairing Industry, by Segment, 2013

NAICS	Segment Description	Employment [a]	Labor Income [b]	GDP
		Amount	($ Millions)	($ Millions)
336611	Shipbuilding and repairing	101,870	$8,496	$9,852
488390	Routine ship maintenance and repairs	8,520	$685	$837
	Total	**110,390**	**$9,180**	**$10,689**

Source: Calculations using the IMPLAN Modeling system (2013 database) and data from the U.S. Census Bureau, U.S. Bureau of Labor Statistics, and U.S. Bureau of Economic Analysis.

[a] Employment is defined as the number of payroll and self-employed jobs, including part-time jobs.
[b] Labor income is defined as wages and salaries and benefits as well as proprietors' income.

Most of the indirect and induced economic impact of the industry is associated with the industry's ongoing operations, as its capital expenditures account for less than five percent (see **Table 6**, below). The largest amount of indirect and induced economic activity associated with the industry is in the services sector.[12] Other signficant indirect and induced activities occur in wholesale and retail trade; finance, insurance and real estate; and manufacturing.[13]

Considering the indirect and induced impacts, each direct job in the U.S. shipbuilding and repairing industry is associated with another 2.62 jobs in other parts of the national economy; each dollar of direct labor income and GDP is associated with another $1.74 in labor income and $2.49 in GDP, respectively, outside of the shipbuilding and repairing industry .

[12] The services sector, such as management of companies, architectural, engineering, and related services, other professional services, employment services, and business support services, received nearly half of the indirect impact due to its importance in the supply chain to the shipbuilding and repairing industry. The services sector further received more than half of the induced impact from consumer spending attributable to the industry.
[13] Wholesale trade accounted for 7.5 percent of the shipbuilding and repairing industry's intermediate purchases in 2013. Retail trade typically receives a large share of the induced impact from consumer spending.

Table 6. Indirect and Induced Activities Associated with the U.S. Shipbuilding and Repairing Industry, by Industry, 2013

Sector Description	Employment [a]	Labor Income ($ millions) [b]	GDP ($ millions)
Direct Impact of the Shipbuilding and Repairing Industry	**110,390**	**$9,180**	**$10,689**
Indirect and Induced Impact on Other Industries	**289,040**	**$15,951**	**$26,636**
Operational Impact	***277,320***	***$15,251***	***$25,551***
Agriculture	3,460	$134	$212
Mining	1,590	$211	$526
Utilities	1,030	$146	$499
Construction	2,570	$168	$200
Manufacturing	28,430	$2,165	$4,077
Wholesale and retail trade	32,630	$1,663	$2,916
Transportation and warehousing	13,980	$795	$1,106
Information	5,680	$574	$1,369
Finance, insurance, real estate, rental and leasing	31,250	$1,696	$5,319
Services	143,410	$6,740	$8,145
Other	13,300	$958	$1,182
Capital Investment Impact	***11,710***	***$700***	***$1,085***
Agriculture	110	$4	$6
Mining	50	$7	$18
Utilities	30	$4	$14
Construction	2,870	$184	$206
Manufacturing	1,740	$134	$222
Wholesale and retail trade	1,350	$76	$136
Transportation and warehousing	330	$19	$26
Information	140	$15	$33
Finance, insurance, real estate, rental and leasing	820	$42	$140
Services	3,880	$202	$235
Other	390	$13	$47
Total Economic Impact	**399,420**	**$25,131**	**$37,324**

Source: Calculations using the IMPLAN modeling system (2013 database).

Note: Details may not add to totals due to rounding

[a] Employment is defined as the number of payroll and self-employed jobs, including part-time jobs.

[b] Labor income is defined as wages and salaries and benefits as well as proprietors' income.

In 2013 the U.S. shipbuilding and repairing industry generated a total of $2.6 billion in federal, state, and local taxes. Including the additional taxes supported by the industry's supply chain and its employees, the industry's total tax contribution was $8.5 billion in 2013 (see **Table 7**, below).

Table 7. Direct, Indirect, and Induced Taxes Supported by the U.S. Shipbuilding and Repairing Industry, in $ Millions, 2013

Tax Level	Tax Category	Direct	Indirect	Induced	Total
Federal	Corporate Income Taxes	$88.2	$305.4	$348.8	$742.4
	Personal Income Taxes	$780.0	$642.5	$653.1	$2,075.5
	Excise Taxes	$26.1	$50.6	$78.9	$155.6
	Customs Duties	$10.8	$20.9	$32.7	$64.4
	Social Insurance Contributions	$1,041.3	$817.5	$817.4	$2,676.2
	Other	$2.8	$5.3	$8.3	$16.4
	Federal Total	**$1,949.2**	**$1,842.2**	**$1,939.1**	**$5,730.5**
State & Local	Corporate Income Taxes	$12.7	$43.9	$50.1	$106.7
	Personal Income Taxes	$207.7	$171.1	$173.9	$552.8
	Property Taxes	$136.4	$264.0	$411.8	$812.3
	Sales Taxes	$153.2	$296.4	$462.3	$911.8
	Social Insurance Contributions	$17.5	$13.3	$13.2	$44.0
	Other	$92.2	$110.2	$142.6	$345.0
	State & Local Total	**$619.7**	**$898.9**	**$1,253.9**	**$2,772.5**
Federal, State & Local Total		**$2,568.8**	**$2,741.1**	**$3,193.0**	**$8,503.0**

Source: Calculations using the IMPLAN modeling system (2013 database).

B. State Impacts

State-level IMPLAN models were used to estimate the shipbuilding and repairing industry's state-by-state impacts. The study also estimates interstate spillover effects (i.e., indirect and induced impacts in a given state resulting from direct shipbuilding and repair activities in another state). As noted above, the state-level estimates only include the industry's operation impacts and do not include capital investment impacts.

The operations of the shipbuilding and repairing industry directly provided employment in 37 states in 2013. The five states with the largest direct employment impacts are Virginia, Mississippi, Louisiana, Connecticut, and California (see **Table 8**, below). Operations in these states represented approximately 63 percent of total industry operations in 2013.

Table 8. Direct Impact of the U.S. Shipbuilding and Repairing Industry, by State, 2013

State	Direct Employment [a]		Direct Labor Income [b]		Direct GDP	
	Amount	Percent of U.S. Total	($ millions)	Percent of U.S. Total	($ millions)	Percent of U.S. Total
Alabama	5,590	5.1%	$370	4.0%	$416	3.9%
Alaska	360	0.3%	$35	0.4%	$36	0.3%
Arizona	-	0.0%	$0	0.0%	$0	0.0%
Arkansas	90	0.1%	$6	0.1%	$7	0.1%
California	7,190	6.5%	$618	6.7%	$724	6.8%
Colorado	-	0.0%	$0	0.0%	$0	0.0%
Connecticut	9,030	8.2%	$975	10.6%	$1,087	10.2%
Delaware	10	0.0%	$1	0.0%	$1	0.0%
District of Columbia	-	0.0%	$0	0.0%	$0	0.0%
Florida	4,890	4.4%	$320	3.5%	$385	3.6%
Georgia	100	0.1%	$6	0.1%	$7	0.1%
Hawaii	780	0.7%	$118	1.3%	$130	1.2%
Idaho	30	0.0%	$3	0.0%	$4	0.0%
Illinois	400	0.4%	$32	0.4%	$39	0.4%
Indiana	1,010	0.9%	$62	0.7%	$74	0.7%
Iowa	*	0.0%	$1	0.0%	$1	0.0%
Kansas	-	0.0%	$0	0.0%	$0	0.0%
Kentucky	990	0.9%	$56	0.6%	$62	0.6%
Louisiana	12,230	11.1%	$909	9.9%	$1,096	10.3%
Maine	5,770	5.2%	$497	5.4%	$599	5.6%
Maryland	440	0.4%	$32	0.3%	$36	0.3%
Massachusetts	350	0.3%	$35	0.4%	$40	0.4%
Michigan	120	0.1%	$9	0.1%	$10	0.1%
Minnesota	-	0.0%	$0	0.0%	$0	0.0%
Mississippi	12,720	11.5%	$1,227	13.4%	$992	9.3%
Missouri	840	0.8%	$43	0.5%	$48	0.5%
Montana	-	0.0%	$0	0.0%	$0	0.0%
Nebraska	-	0.0%	$0	0.0%	$0	0.0%
Nevada	-	0.0%	$0	0.0%	$0	0.0%
New Hampshire	60	0.1%	$3	0.0%	$3	0.0%
New Jersey	530	0.5%	$40	0.4%	$48	0.4%
New Mexico	-	0.0%	$0	0.0%	$0	0.0%
New York	610	0.6%	$77	0.8%	$88	0.8%
North Carolina	70	0.1%	$5	0.1%	$7	0.1%
North Dakota	-	0.0%	$0	0.0%	$0	0.0%
Ohio	480	0.4%	$22	0.2%	$33	0.3%
Oklahoma	-	0.0%	$0	0.0%	$0	0.0%
Oregon	1,210	1.1%	$119	1.3%	$124	1.2%
Pennsylvania	1,380	1.3%	$104	1.1%	$120	1.1%
Rhode Island	2,290	2.1%	$236	2.6%	$231	2.2%
South Carolina	830	0.7%	$58	0.6%	$65	0.6%
South Dakota	-	0.0%	$0	0.0%	$0	0.0%
Tennessee	580	0.5%	$55	0.6%	$63	0.6%
Texas	6,060	5.5%	$410	4.5%	$482	4.5%
Utah	20	0.0%	$5	0.1%	$5	0.0%
Vermont	-	0.0%	$0	0.0%	$0	0.0%
Virginia	28,210	25.6%	$2,310	25.2%	$3,158	29.5%
Washington	3,060	2.8%	$243	2.6%	$301	2.8%
West Virginia	*	0.0%	$1	0.0%	$1	0.0%
Wisconsin	2,090	1.9%	$139	1.5%	$166	1.6%
Wyoming	-	0.0%	$0	0.0%	$0	0.0%
U.S. Total	**110,390**	**100%**	**$9,180**	**100%**	**$10,689**	**100%**

Source: Calculations using the IMPLAN modeling system (2013 database).

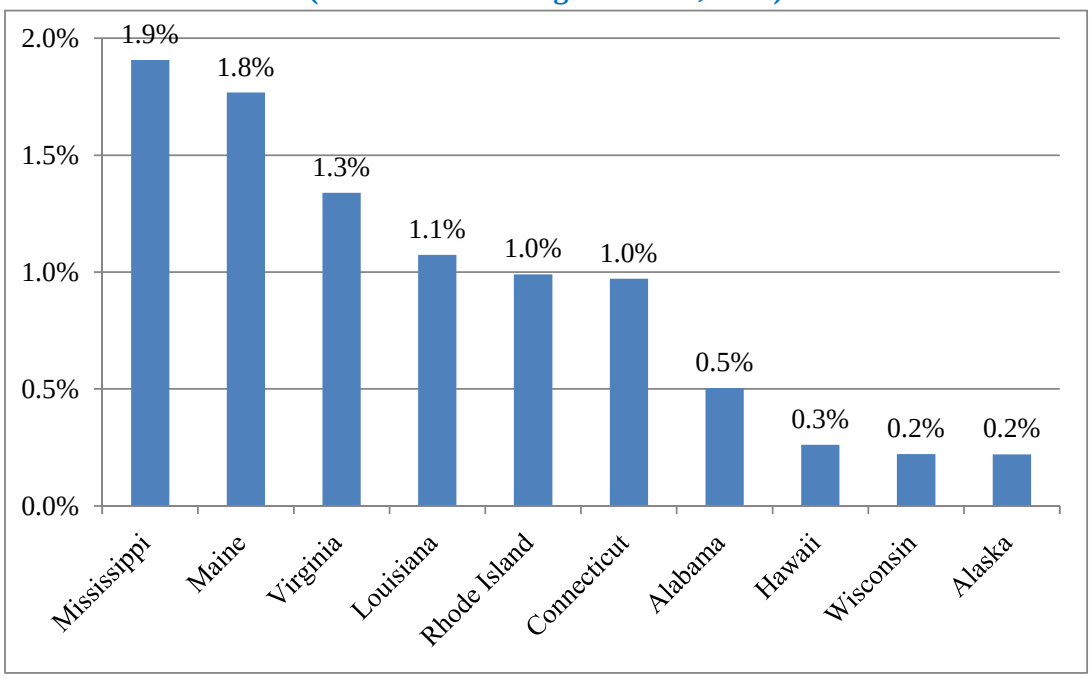
Note: Details may not add to totals due to rounding. * indicates less than 5 jobs.

[a] Employment is defined as the number of payroll and self-employed jobs, including part-time jobs.

[b] Labor income is defined as wages and salaries and benefits as well as proprietors' income.

In six states the total direct, indirect, and induced economic activity associated with the shipbuilding and repairing industry amounts round to 1 percent or more of total state employment (see **Figure 9**, below).

Figure 9. Shipbuilding and Repairing Industry Employment / Total State Employment (10 States with Largest Shares, 2013)

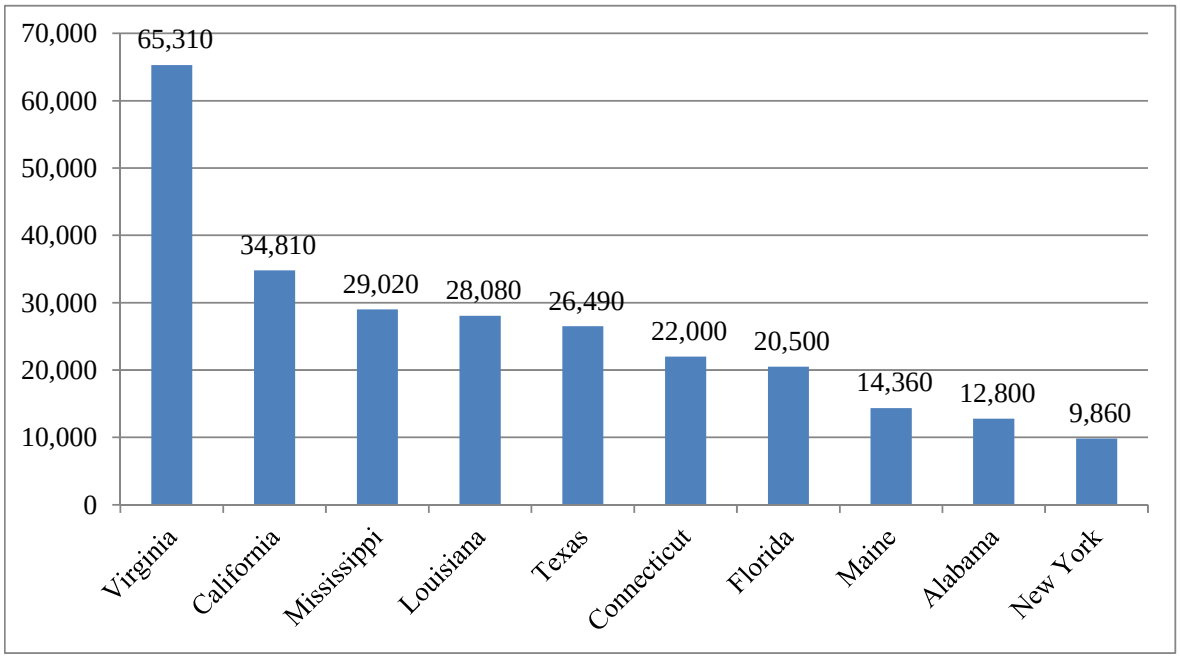


Source: Calculations using the IMPLAN modeling system (2013 database).

In terms of the total number of direct, indirect, and induced jobs, employment associated with the operations of the shipbuilding and repairing industry is highest in Virginia, California, Mississippi, Louisiana, Texas, Connecticut, and Florida (see **Figure 10** and **Table 9**, below).

Additional detail is provided in **Appendix A**.

Figure 10. Total Direct, Indirect, and Induced Employment Associated with the U.S. Shipbuilding and Repairing Industry's Operations (10 States with Largest Number of Jobs, 2013)



Source: Calculations using the IMPLAN modeling system (2013 database).

Table 9. Total Direct, Indirect, and Induced Economic Activities Associated with the U.S. Shipbuilding and Repairing Industry's Operations, 2013

State	Employment [a]		Labor Income [b]		GDP	
	Amount	Percent of State Total	($ millions)	Percent of State Total	($ millions)	Percent of State Total
Alabama	12,800	0.5%	$683	0.6%	$953	0.5%
Alaska	1,070	0.2%	$79	0.2%	$122	0.2%
Arizona	2,660	0.1%	$142	0.1%	$242	0.1%
Arkansas	1,450	0.1%	$72	0.1%	$132	0.1%
California	34,810	0.2%	$2,389	0.2%	$3,674	0.2%
Colorado	2,550	0.1%	$153	0.1%	$250	0.1%
Connecticut	22,000	1.0%	$1,800	1.2%	$2,439	1.0%
Delaware	400	0.1%	$26	0.1%	$56	0.1%
District of Columbia	520	0.1%	$52	0.1%	$74	0.1%
Florida	20,500	0.2%	$1,053	0.2%	$1,586	0.2%
Georgia	4,450	0.1%	$241	0.1%	$410	0.1%
Hawaii	2,460	0.3%	$205	0.4%	$274	0.3%
Idaho	780	0.1%	$37	0.1%	$62	0.1%
Illinois	7,080	0.1%	$457	0.1%	$737	0.1%
Indiana	4,850	0.1%	$272	0.1%	$446	0.1%
Iowa	1,660	0.1%	$93	0.1%	$152	0.1%
Kansas	1,430	0.1%	$77	0.1%	$124	0.1%
Kentucky	3,890	0.2%	$196	0.2%	$295	0.2%
Louisiana	28,080	1.1%	$1,618	1.2%	$2,321	0.9%
Maine	14,360	1.8%	$867	2.4%	$1,185	2.1%
Maryland	3,310	0.1%	$206	0.1%	$327	0.1%
Massachusetts	4,090	0.1%	$307	0.1%	$468	0.1%
Michigan	4,720	0.1%	$263	0.1%	$420	0.1%
Minnesota	2,970	0.1%	$183	0.1%	$287	0.1%
Mississippi	29,020	1.9%	$1,848	2.8%	$2,016	1.9%
Missouri	4,640	0.1%	$235	0.1%	$368	0.1%
Montana	450	0.1%	$19	0.1%	$33	0.1%
Nebraska	960	0.1%	$53	0.1%	$92	0.1%
Nevada	1,350	0.1%	$70	0.1%	$121	0.1%
New Hampshire	830	0.1%	$48	0.1%	$72	0.1%
New Jersey	4,870	0.1%	$341	0.1%	$536	0.1%
New Mexico	740	0.1%	$36	0.1%	$69	0.1%
New York	9,860	0.1%	$793	0.1%	$1,255	0.1%
North Carolina	4,330	0.1%	$236	0.1%	$434	0.1%
North Dakota	420	0.1%	$25	0.1%	$43	0.1%
Ohio	6,600	0.1%	$365	0.1%	$617	0.1%
Oklahoma	1,750	0.1%	$98	0.1%	$161	0.1%
Oregon	4,900	0.2%	$309	0.3%	$537	0.3%
Pennsylvania	9,210	0.1%	$567	0.1%	$873	0.1%
Rhode Island	5,970	1.0%	$431	1.3%	$553	1.0%
South Carolina	3,780	0.2%	$196	0.2%	$297	0.2%
South Dakota	440	0.1%	$22	0.1%	$39	0.1%
Tennessee	4,440	0.1%	$257	0.1%	$388	0.1%
Texas	26,490	0.2%	$1,596	0.2%	$2,603	0.2%
Utah	1,410	0.1%	$75	0.1%	$139	0.1%
Vermont	320	0.1%	$16	0.1%	$25	0.1%
Virginia	65,310	1.3%	$4,304	1.5%	$6,405	1.4%
Washington	7,900	0.2%	$538	0.2%	$800	0.2%
West Virginia	690	0.1%	$35	0.1%	$61	0.1%
Wisconsin	7,850	0.2%	$434	0.2%	$631	0.2%
Wyoming	280	0.1%	$15	0.1%	$37	0.1%
U.S. Total	**387,710**	**0.2%**	**$24,431**	**0.2%**	**$36,240**	**0.2%**

Source: Calculations using the IMPLAN modeling system (2013 database).

Note: Details may not add to totals due to rounding

[a] Employment is defined as the number of payroll and self-employed jobs, including part-time jobs.

[b] Labor income is defined as wages and salaries and benefits as well as proprietors' income.

Appendices

Appendix A: Economic Impact Breakdown: State Level Detail

Tables A1, A2, and A3 provide the state-by-state breakout of the direct, indirect, and induced impacts associated with the operations of the U.S. shipbuilding and repairing industry. These results do not include the additional indirect and induced economic impact resulting from the industry's capital expenditures.

Table A1. Employment Associated with the U.S. Shipbuilding and Repairing Industry's Operations, 2013

State	Direct Employment	Indirect Employment	Induced Employment	Total Contribution	Total State Percentage
Alabama	5,590	4,030	3,180	12,800	0.5%
Alaska	360	310	410	1,070	0.2%
Arizona	-	1,080	1,580	2,660	0.1%
Arkansas	90	610	750	1,450	0.1%
California	7,190	12,080	15,550	34,810	0.2%
Colorado	-	1,040	1,520	2,550	0.1%
Connecticut	9,030	5,140	7,820	22,000	1.0%
Delaware	10	140	250	400	0.1%
District of Columbia	-	190	330	520	0.1%
Florida	4,890	6,890	8,720	20,500	0.2%
Georgia	100	1,760	2,600	4,450	0.1%
Hawaii	780	730	950	2,460	0.3%
Idaho	30	300	450	780	0.1%
Illinois	400	2,920	3,760	7,080	0.1%
Indiana	1,010	2,120	1,720	4,850	0.1%
Iowa	*	680	970	1,660	0.1%
Kansas	-	580	850	1,430	0.1%
Kentucky	990	1,320	1,590	3,890	0.2%
Louisiana	12,230	7,310	8,540	28,080	1.1%
Maine	5,770	3,460	5,120	14,360	1.8%
Maryland	440	1,120	1,750	3,310	0.1%
Massachusetts	350	1,500	2,240	4,090	0.1%
Michigan	120	2,060	2,550	4,720	0.1%
Minnesota	-	1,260	1,710	2,970	0.1%
Mississippi	12,720	7,080	9,220	29,020	1.9%
Missouri	840	1,650	2,160	4,640	0.1%
Montana	-	150	300	450	0.1%
Nebraska	-	360	600	960	0.1%
Nevada	-	540	810	1,350	0.1%
New Hampshire	60	340	430	830	0.1%
New Jersey	530	1,830	2,510	4,870	0.1%
New Mexico	-	270	470	740	0.1%
New York	610	3,650	5,610	9,860	0.1%
North Carolina	70	1,780	2,490	4,330	0.1%
North Dakota	-	150	260	420	0.1%
Ohio	480	2,770	3,340	6,600	0.1%
Oklahoma	-	750	1,010	1,750	0.1%
Oregon	1,210	1,580	2,110	4,900	0.2%
Pennsylvania	1,380	3,370	4,460	9,210	0.1%
Rhode Island	2,290	1,430	2,250	5,970	1.0%
South Carolina	830	1,340	1,610	3,780	0.2%
South Dakota	-	160	280	440	0.1%
Tennessee	580	1,660	2,200	4,440	0.1%
Texas	6,060	9,260	11,170	26,490	0.2%
Utah	20	580	810	1,410	0.1%
Vermont	-	120	200	320	0.1%
Virginia	28,210	16,160	20,940	65,310	1.3%
Washington	3,060	2,850	1,990	7,900	0.2%
West Virginia	*	270	420	690	0.1%
Wisconsin	2,090	2,720	3,040	7,850	0.2%
Wyoming	-	100	170	280	0.1%
U.S. Total	**110,390**	**121,550**	**155,770**	**387,710**	**0.2%**

Source: Calculations using the IMPLAN modeling system (2013 database).

Note: Details may not add to totals due to rounding. An * indicates less than 5 jobs.

Employment is defined as the number of payroll and self-employed jobs, including part-time jobs.

Table A2. Labor Income Associated with the U.S. Shipbuilding and Repairing Industry's Operations, in $ Millions, 2013

State	Direct Labor Income	Indirect Labor Income	Induced Labor Income	Total Contribution	Total State Percentage
Alabama	$370.2	$185.0	$127.7	$683.0	0.6%
Alaska	$34.5	$21.9	$22.6	$79.0	0.2%
Arizona	$0.0	$67.2	$74.6	$141.8	0.1%
Arkansas	$5.6	$33.9	$32.2	$71.6	0.1%
California	$618.0	$899.7	$871.1	$2,388.7	0.2%
Colorado	$0.0	$73.3	$79.3	$152.6	0.1%
Connecticut	$974.9	$382.4	$442.5	$1,799.8	1.2%
Delaware	$0.7	$11.0	$14.5	$26.2	0.1%
District of Columbia	$0.0	$21.5	$30.4	$51.9	0.1%
Florida	$319.6	$353.4	$380.0	$1,053.0	0.2%
Georgia	$5.8	$106.6	$128.3	$240.7	0.1%
Hawaii	$117.7	$41.9	$45.0	$204.6	0.4%
Idaho	$2.6	$15.7	$18.7	$37.0	0.1%
Illinois	$32.2	$213.0	$212.1	$457.2	0.1%
Indiana	$61.8	$129.1	$81.6	$272.4	0.1%
Iowa	$0.7	$43.7	$48.4	$92.7	0.1%
Kansas	$0.0	$35.8	$41.1	$76.8	0.1%
Kentucky	$56.3	$71.8	$68.0	$196.1	0.2%
Louisiana	$909.4	$352.4	$356.5	$1,618.3	1.2%
Maine	$496.7	$158.7	$211.5	$867.0	2.4%
Maryland	$31.5	$79.3	$95.2	$206.0	0.1%
Massachusetts	$35.1	$131.0	$140.9	$307.0	0.1%
Michigan	$9.2	$132.9	$120.6	$262.7	0.1%
Minnesota	$0.0	$90.5	$92.7	$183.2	0.1%
Mississippi	$1,227.5	$279.7	$340.8	$1,848.0	2.8%
Missouri	$42.5	$94.2	$98.4	$235.2	0.1%
Montana	$0.0	$7.3	$11.8	$19.2	0.1%
Nebraska	$0.0	$22.3	$31.0	$53.3	0.1%
Nevada	$0.0	$31.2	$38.9	$70.0	0.1%
New Hampshire	$3.3	$23.3	$21.7	$48.3	0.1%
New Jersey	$40.4	$145.0	$155.4	$340.9	0.1%
New Mexico	$0.0	$15.3	$20.3	$35.5	0.1%
New York	$77.0	$328.7	$386.9	$792.5	0.1%
North Carolina	$5.4	$111.4	$119.1	$235.9	0.1%
North Dakota	$0.0	$10.3	$15.2	$25.5	0.1%
Ohio	$22.0	$178.9	$163.5	$364.5	0.1%
Oklahoma	$0.0	$48.2	$49.4	$97.6	0.1%
Oregon	$119.1	$95.9	$93.7	$308.7	0.3%
Pennsylvania	$104.4	$228.0	$234.9	$567.3	0.1%
Rhode Island	$236.1	$85.3	$109.9	$431.2	1.3%
South Carolina	$57.5	$71.6	$67.4	$196.5	0.2%
South Dakota	$0.0	$8.7	$13.6	$22.3	0.1%
Tennessee	$54.5	$95.5	$106.9	$256.9	0.1%
Texas	$410.3	$608.7	$576.7	$1,595.6	0.2%
Utah	$5.3	$33.8	$35.7	$74.8	0.1%
Vermont	$0.0	$7.2	$8.5	$15.8	0.1%
Virginia	$2,310.5	$1,016.2	$977.3	$4,304.0	1.5%
Washington	$242.7	$185.3	$109.5	$537.6	0.2%
West Virginia	$0.5	$16.1	$18.3	$35.0	0.1%
Wisconsin	$139.0	$156.8	$138.5	$434.2	0.2%
Wyoming	$0.0	$6.8	$8.4	$15.3	0.1%
U.S. Total	**$9,180.3**	**$7,563.7**	**$7,687.2**	**$24,431.2**	**0.2%**

Source: Calculations using the IMPLAN modeling system (2013 database).

Note: Details may not add to totals due to rounding

Labor income is defined as wages and salaries and benefits as well as proprietors' income.

Table A3. GDP Associated with U.S. Shipbuilding and Repairing Industry's Operations, in $ Millions, 2013

State	Direct GDP	Indirect GDP	Induced GDP	Total GDP	Total State Percentage
Alabama	$416.5	$304.5	$231.7	$952.6	0.5%
Alaska	$36.3	$41.1	$44.5	$122.0	0.2%
Arizona	$0.0	$112.4	$129.8	$242.2	0.1%
Arkansas	$6.7	$64.4	$60.6	$131.7	0.1%
California	$723.9	$1,443.5	$1,506.8	$3,674.3	0.2%
Colorado	$0.0	$116.4	$134.0	$250.4	0.1%
Connecticut	$1,087.1	$598.5	$753.4	$2,439.0	1.0%
Delaware	$0.8	$22.9	$32.1	$55.8	0.1%
District of Columbia	$0.0	$29.0	$44.6	$73.6	0.1%
Florida	$385.1	$553.3	$647.4	$1,585.8	0.2%
Georgia	$7.4	$179.5	$223.4	$410.3	0.1%
Hawaii	$130.2	$65.7	$78.3	$274.3	0.3%
Idaho	$3.8	$27.9	$30.7	$62.4	0.1%
Illinois	$39.0	$339.5	$358.4	$736.9	0.1%
Indiana	$73.5	$218.3	$154.3	$446.1	0.1%
Iowa	$0.6	$67.5	$84.4	$152.5	0.1%
Kansas	$0.0	$54.8	$69.0	$123.8	0.1%
Kentucky	$61.8	$114.8	$118.9	$295.5	0.2%
Louisiana	$1,096.1	$582.2	$642.6	$2,320.9	0.9%
Maine	$598.7	$230.2	$355.8	$1,184.7	2.1%
Maryland	$35.9	$126.7	$164.2	$326.7	0.1%
Massachusetts	$40.4	$205.8	$222.3	$468.5	0.1%
Michigan	$9.9	$204.6	$205.6	$420.1	0.1%
Minnesota	$0.0	$139.4	$147.8	$287.3	0.1%
Mississippi	$992.2	$429.5	$593.9	$2,015.6	1.9%
Missouri	$48.3	$150.4	$169.5	$368.2	0.1%
Montana	$0.0	$12.8	$20.3	$33.1	0.1%
Nebraska	$0.0	$38.3	$53.2	$91.5	0.1%
Nevada	$0.0	$51.4	$69.4	$120.7	0.1%
New Hampshire	$3.5	$34.0	$34.9	$72.5	0.1%
New Jersey	$48.0	$226.1	$261.5	$535.6	0.1%
New Mexico	$0.0	$31.1	$37.8	$68.9	0.1%
New York	$87.7	$513.1	$653.8	$1,254.6	0.1%
North Carolina	$6.8	$202.2	$224.6	$433.6	0.1%
North Dakota	$0.0	$18.9	$24.5	$43.4	0.1%
Ohio	$33.1	$294.6	$289.1	$616.8	0.1%
Oklahoma	$0.0	$78.2	$83.0	$161.2	0.1%
Oregon	$123.9	$251.3	$161.9	$537.2	0.3%
Pennsylvania	$119.6	$366.3	$386.7	$872.6	0.1%
Rhode Island	$230.6	$131.0	$191.0	$552.6	1.0%
South Carolina	$65.1	$115.0	$117.0	$297.1	0.2%
South Dakota	$0.0	$15.6	$23.3	$38.9	0.1%
Tennessee	$63.4	$152.3	$172.5	$388.2	0.1%
Texas	$481.9	$1,088.2	$1,032.5	$2,602.6	0.2%
Utah	$4.6	$69.1	$65.3	$139.0	0.1%
Vermont	$0.0	$10.8	$14.1	$24.8	0.1%
Virginia	$3,158.4	$1,534.1	$1,712.2	$6,404.7	1.4%
Washington	$301.0	$302.2	$196.3	$799.5	0.2%
West Virginia	$0.5	$27.8	$32.8	$61.1	0.1%
Wisconsin	$166.1	$231.5	$233.3	$630.9	0.2%
Wyoming	$0.0	$17.6	$19.8	$37.4	0.1%
U.S. Total	**$10,688.6**	**$12,236.4**	**$13,314.7**	**$36,239.7**	**0.2%**

Source: Calculations using the IMPLAN modeling system (2013 database).

Note: Details may not add to totals due to rounding

Appendix B: Data Sources and Methodology

This Appendix describes the methodology used to derive the results for the study. It first discusses the data sources used to develop the estimates of the shipbuilding and repairing industry's direct economic impacts. It then describes the development of the indirect and induced impact estimates for the industry.

I. Estimates of the Industry's Direct Economic Impacts

The definition of the U.S. shipbuilding and repairing industry is based on the *North American Industry Classification System* (NAICS) and combines NAICS sector 336611 ("Shipbuilding and repairing") and a portion of NAICS sector 488390 ("Other support activities for water transportation"). Among other activities, NAICS sector 488390 includes routine repair and maintenance of ships from floating drydocks, as well as related activities not done in a shipyard.

This study uses data on employment and self-employment from the U.S. Bureau of Labor Statistics (BLS) and Bureau of Economic Analysis (BEA) to estimate direct employment in NAICS sectors 336611 and 488390. In particular, direct employment was estimated by combining counts of payroll employees from the BLS' *Quarterly Census of Employment* with estimates of self-employment based on data from the BEA. For some states, the count of payroll employees was suppressed because of the small number of establishments in the industry in the state. Relying on employment counts available for the sector at the national-level and for higher-level industries at the state-level, a two-stage "raking" process was used to estimate the state-level employee count. The raking process uses information from known sectors within a state and across states to impute information for the sectors with suppressed data.[14] Because the BEA data are only available for more aggregated industries, self-employment was first estimated for the aggregated industries and then allocated across the subsectors according to each industry's share of paid employment.

Direct employment was separately estimated for the US as a whole and for each of the 50 states and the District of Columbia. The state-level estimates were then scaled to match the national level estimates.

As noted above, only a portion of NAICS sector 488390 is part of the shipbuilding and repairing industry. Based on data from the 2012 Economic Census, it is estimated that approximately 84.2 percent of the employment in NAICS sector 488390 is for routine repair and maintenance of ships not conducted at a shipyard. As such, the initial estimates of employment in NAICS sector 488390 (based on the BLS and BEA data) were multiplied by 84.2% to derive our final estimates of direct employment.

A similar approach was used to estimate the national direct labor income associated with the industry's direct employment. The IMPLAN model was used to estimate the industry's direct GDP at the national and state levels.. The state-level direct labor income was first estimated using the IMPLAN state models, and then controlled to the national direct labor income estimate.

Estimates of the U.S. shipbuilding and repairing industry's new capital investment in 2013 were developed using data from the Census Bureau's *Annual Capital Expenditure Survey* and the 2012 *Economic Census*. In particular, expenditures on new capital for "other transportation equipment manufacturing" (comprised of NAICS sectors 3365, 3366, and 3369) were obtained from the 2013

[14] Oh, H.L. and Scheuren, F. (1987). Modified Raking Ratio Estimation. *Survey Methodology*, vol. 13, no. 2, pp. 209-219.

Annual Capital Expenditure Survey database. The ratio of total capital spending in shipbuilding and repairing (NAICS sector 336611) to other transportation equipment manufacturing from the 2012 *Economic Census* was used to estimate the portion of new capital investment in other transportation equipment manufacturing that is attributable to shipbuilding and repairing.

The U.S. shipbuilding and repairing industry's capital investment was translated into purchases of capital assets by type through use of the "capital flow matrix" from the U.S. Department of Commerce.[15]

II. Estimates of Indirect and Induced Economic Activities

The initial round of output, income, and employment generated by shipbuilding and repairing leads to successive rounds of re-spending in the chain of production. Such indirect and induced economic impacts by the shipbuilding and repairing industry can be measured using various approaches. The most common is multiplier analysis. In broad terms, a multiplier is an index that indicates the overall change in the level of economic activity that results from a given initial change. It effectively adds up all the successive rounds of re-spending, based on a number of assumptions that are embedded in the method of estimation.

There are different methods available for calculating multipliers. The method used in this report is *input-output* analysis. It is the most commonly used approach in regional economic impact studies. The input-output model developed by IMPLAN is one of the best known input-output models for regional economic studies in the United States and is widely used by government, academics and private-sector researchers. The IMPLAN modeling system is similar to the Regional Input-Output Modeling System developed by the U.S. Department of Commerce. The system has been in use since 1979.

The IMPLAN database represents a consistent set of economic data processed from various published sources (such as the Bureau of Economic Analysis's *National Income and Product Accounts* (NIPA) and *Regional Economic Information System* (REIS), the Census Bureau's *County Business Patterns* (CBP), and the Bureau of Labor Statistics' *Covered Employee and Wages Program* (CEW) in a variety of formats and under varying disclosure restrictions.

Estimates of indirect and induced economic impacts by the U.S. shipbuilding and repairing industry were derived based on the IMPLAN model for the national economy and its regional models for each of the 50 states and the District of Columbia.

IMPLAN uses an "input-output" framework that relates the output of each industry to inputs purchased from other industries. Output in one industry requires purchases of inputs from other industries, and these supply industries in turn make purchases from their suppliers, and so on. Employees and business owners make personal purchases out of the income that is generated by this process, which ripple through the economy. Multipliers describe these relationships. The Type I multiplier measures the direct and indirect effects of a change in economic activity. It captures the inter-industry effects only, i.e., industries buying from local industries. The Type II (Social Accounting Matrix or SAM) multiplier captures the direct and indirect effects and, in addition, it also reflects induced effects. The indirect and induced impacts of the shipbuilding and repairing industry

[15] http://www.bea.gov/newsreleases/industry/capflow/capitalflownewsrelease.htm

on other sectors of the economy in terms of employment, labor income (including wages and salaries and benefits as well as proprietors' income), and GDP were calculated using the IMPLAN model.[16]

Because individual state models do not account for cross-state impacts, the sum of the state indirect and induced impacts will not add to the national totals. The indirect and induced effects crossing state borders ("cross-state spillover effects") were allocated across the 50 states and the District of Columbia in proportion to each state's share of the total national employment, labor income, and GDP in each industry. The state indirect and induced effects reported throughout this study include such allocation of the cross-state spillover effects.

[16] Because the IMPLAN models are used for total impact analysis (as opposed to marginal impact analysis) in this study, necessary adjustments are made to the initial indirect and induced impact estimates to prevent double-counting. For instance, any indirect or induced effects from the initial estimates for IMPLAN sectors that are fully mapped to the shipbuilding and repairing industry are removed. Similarly, indirect and induced effects for IMPLAN sectors that are partially mapped to the shipbuilding and repairing industry are proportionately adjusted.

Appendix C: Description of IMPLAN Model

IMPLAN is a well known modeling system developed by IMPLAN Group LLC for estimating economic impacts and is similar to the Regional Input-Output Modeling System developed by the U.S. Department of Commerce. The model is primarily based on government data sources. It can address a wide range of impact topics in a given region (county, state, or the country as a whole). IMPLAN is built around an "input-output" table that relates the purchases that each industry has made from other industries to the value of the output of each industry. To meet the demand for goods and services from an industry, purchases are made in other industries according to the patterns recorded in the input-output table. These purchases in turn spark still more purchases by the industry's suppliers, and so on. Meanwhile, employees and business owners make personal purchases out of the additional income that is generated by this process, further increasing demand that ripples through the economy. Multipliers describe these iterations. The Type I multiplier measures the direct and indirect effects of a change in economic activity. It captures the inter-industry effects only, i.e., industries buying from local industries. The Type II (Social Accounting Matrix or SAM) multiplier captures the direct and indirect effects. In addition, it also reflects induced effects (i.e., changes in spending from households as income increases or decreases due to the changes in production).

More information on IMPLAN is available at www.implan.com.