

*Understanding
the
Workforce
Needs
of*

EMPLOYERS

**SUPPORTING THE
OPERATION OF
PORT NEWARK
AND THE
ELIZABETH
MARINE TERMINAL**

**A REPORT OF THE
READY FOR THE JOB
INITIATIVE**

Prepared for the
New Jersey
State Employment and
Training Commission

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Background: The Ready for the Job Initiative

This report is an integral part of the *Ready for the Job* initiative, which began in 2002 to determine the skill needs of New Jersey's employers. The goal of *Ready for the Job* is to improve alignment between the workforce needs of employers and the preparation of potential and current workers by providing timely and accurate information about employer skill needs to policymakers, educators, counselors, job seekers, students, and others.

The *Ready for the Job* initiative, a joint effort of the New Jersey State Employment and Training Commission, the New Jersey Department of Labor and Workforce Development, and the New Jersey Department of Education, uses industry advisory groups, interviews and focus groups with employers, and analysis of all available data to profile the workforce and skill requirements of key industries and occupations.

Two fundamental assumptions underlying *Ready for the Job* are:

- A skilled workforce is essential to the state's economic growth, and
- In order to fully participate in the economy, the state's residents must possess the skills employers need.

Ready for the Job reports have focused on the skill and workforce requirements of key industries in the state including:

- Health Care
- Construction
- Hospitality/Tourism
- Manufacturing
- Utilities/Infrastructure
- Finance
- Information Technology
- Transportation
- Public Health/Disaster Management
- Retail
- Port Newark/Elizabeth Marine Terminal

Results and reports from the Ready for the Job initiative are distributed through the NJNextStop website, www.njnextstop.org. NJNextStop is the State of New Jersey's primary career guidance Internet portal for high school students, counselors, teachers, and parents.

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Executive Summary

Port Newark and the Elizabeth Port Authority Marine Terminal (Port Newark/Elizabeth) are veritable economic engines for New Jersey and the surrounding region. Together, they comprise the largest maritime freight handling complex on the East Coast¹ and the third largest port in the United States.² More than \$132 billion worth of goods entered through this port area in 2005³ and millions of containers were moved from the port by rail, air, water, and truck to destinations throughout the state and nation.

Based on recent growth trends, some experts predict up to a fourfold increase in cargo handling in the region's ports by 2040.⁴ The growth of international trade, coupled with increasing capacity at Port Newark/Elizabeth to process cargo, are contributing to this trend. Planned dredging and channel deepening projects will also make the port more accessible to larger ships.

Given rapid advances in technology to improve cargo handling efficiency, such as advanced cargo handling equipment, new gate systems, and automated warehouses, it is difficult to predict the impact that cargo growth will have on job demand. Experts expect, however, that a combination of new jobs and technology will be needed. Job growth is likely to be concentrated in transportation, as truck drivers and rail operators may be needed to move additional goods from Port Newark/Elizabeth to off-port sites. The Portfields project will remediate brownfield areas to increase the amount of available space for warehousing around the port, which may lead to the creation of new warehousing jobs in the area surrounding the port.

The freight activity through Port Newark/Elizabeth sustains a large and increasingly sophisticated warehousing and distribution industry in the region. According to a Rutgers University study, the Port of New York and New Jersey (PONYNJ), of which Port Newark/Elizabeth is by far the largest facility, directly and indirectly

supported over 233,000 full-time equivalent jobs in a 26-county New York/New Jersey region in 2004.⁵

Of the more than 122,500 jobs directly supported by PONYNJ in the region in 2004, about 16% (20,947) were physically located at the port terminals. The lion's share of directly supported jobs, about 64% or 78,000 jobs, were distributed throughout the region's transportation, warehousing, and wholesale business, which is heavily concentrated in northern and central New Jersey. The remaining 20% of jobs were found in other industries, including government, finance and insurance, and others.⁶

A skilled workforce is essential to sustaining the operations and goods movement supply chain to and from Port Newark/Elizabeth. Employers from some New Jersey industries vital to port operations report experiencing significant challenges finding and keeping skilled workers, however. This report explores the major trends that are affecting the workforce and skill needs of employers that support Port Newark/Elizabeth as well as the priority skill needs these employers have.

To conduct this study, Heldrich Center researchers reviewed existing studies that draw heavily on input from employers, including reports by Rutgers University and Opportunity Newark, a coalition of researchers, employers, and community-based agencies working to improve Newark residents' access to good jobs by building a better understanding of the local labor market. Researchers also reviewed state and national websites and available labor market data to obtain information about employer workforce needs and trends. Finally, researchers conducted interviews with port-related industry experts, including officials from the New York Shipping Association, the employer association for PONYNJ employers, port consultants, and educators familiar with the needs of port employers. For a list of those interviewed, see the Appendix.

Key Findings

Finding #1: Off-port employers that support the supply chain of goods movement from Port Newark/Elizabeth are experiencing the most significant difficulties attracting, hiring, and retaining skilled workers.

Researchers identified the following broad workforce challenges employers are facing in each segment of the supply chain for Port Newark/Elizabeth:

Goods Movement (On and Off Port) Trucking.

Employers face perhaps the greatest workforce challenge within the Port Newark/Elizabeth supply chain. According to employers and several reports, there are significant structural problems that make it difficult for employers to hire qualified truck drivers.⁷

First, the financial incentive to enter the truck driving profession is low. According to port experts consulted for this study, most truck drivers serving Port Newark/Elizabeth are independent contractors who have their own trucks and who do not receive benefits from their employers. Given this, the average starting salary of \$39,200, while significantly higher than the state average of \$22,370, is low given the investment that truckers must make.⁸ Employers report that long stretches of time away from home make long-haul tractor-trailer driving particularly difficult and even short-haul drivers spend much of their time managing traffic and security clearances. Finally, most truckers have little access to a career ladder, according to employers, and there is limited information available to students and job seekers about industry job requirements.

In addition, training, education, and credentials are not sufficient to obtain most truck driving jobs. According to employers, drivers must have significant experience in order to qualify for insurance. Security requirements are becoming more stringent and may soon require all truck drivers who enter the port to undergo more extensive background checks and to prove their citizenship, which will further limit the pool of eligible workers.

Warehousing and Distribution (Off Port). According to employers, off-port warehousing operators have difficulty attracting and retaining entry-level workers who have the English language, workplace readiness, and basic technology, communication, reading, and comprehension skills required to do their jobs effectively. Employers face even greater difficulties finding workers among their ranks who have the leadership, technology, analytical, and other skills needed to advance to higher positions. Experts report, however, that low starting wages and benefits in entry-level positions, a lack of awareness about available positions among job seekers, and limited opportunities for advancement may contribute to the difficulties some employers face attracting, recruiting, and retaining skilled entry-level workers. More research with off-port warehousing employers is needed to fully understand the evolving needs of this growing sector.

Port Operations and Marine Transportation. Employers located at Port Newark/Elizabeth do not anticipate workforce challenges for most on-port jobs in the near to mid-term future, according to officials at the New York Shipping Association (NYSA). NYSA reports that unionized jobs experience low turnover and are in high demand among job seekers due to high wages and low educational requirements. The most significant workforce-related challenge unionized Port Newark/Elizabeth employers face involves lowering the cost-associated background checks on large numbers of job applicants who have substance abuse problems and/or criminal or driving violations on their records. Non-unionized, on-port warehouses also face few workforce challenges, as employers report that turnover is low and job openings are filled by word of mouth. From a job seeker perspective, obtaining any type of on-port job can present a challenge given the long approval and background check processes, which can take from 6 to 12 months to resolve.⁹ Employers expect that advances in technology will limit the need to hire new on-port workers in response to increasing cargo volume at Port Newark/Elizabeth.

Finding #2: Three broad trends are affecting the skill needs of employers that support operations at Port Newark/Elizabeth.

Several trends are affecting the skills employers in various aspects of port operations require. These trends are:

- 1. Increasing reliance on technology in the port and warehouses.** Many, though not all, warehouses increasingly rely on computer-automated, sales-based ordering and inventory management systems to manage the flow of goods. Some warehouses are also automating the movement of goods within the warehouse through the use of robotics. Truck drivers must operate up to 15 on-board computers and logisticians must be skilled at operating complex logistical software packages and accurately interpreting their output. These are just a few examples of the myriad ways that technology is influencing jobs in port-related industries. Since new machines and computer systems can be complex, some warehouse workers, especially warehouse managers, machine operators and repair persons, and logisticians, often need technology, problem-solving, and analytical skills to interact effectively with new technologies. According to employers, the skills that most frontline warehouse workers need have not changed significantly, as computer interfaces that these workers use are often simple. Nonetheless, even these workers need a basic comfort level with computers and other technology to be effective.
- 2. Rising security concerns.** Security is a top concern at New Jersey's ports. Since the terrorist attacks of September 11, 2001, the Port Authority of New York and New Jersey has made and will continue to make significant investments to improve security. The introduction of new technology and more complex procedures, such as scrutinizing ship manifest records or performing rigorous container inspections, is increasing the level of knowledge and skill that many port-related workers must have to succeed on the job, according to employers and

port experts consulted for this study. In addition, security regulations are leading to more stringent background checks for many workers, especially truck drivers, which contributes to the difficulties employers have in filling truck driver positions.

- 3. Just-in-time delivery practices.** In response to increasing competition and the development of more sophisticated logistics techniques and software programs, supply chains have become more efficient. "Just-in-time" delivery, which involves ordering products directly from manufacturers or vendors based on an analysis of the amount of product needed, has thrived in the past several decades.¹⁰ These processes increase efficiency in the goods movement process, but place additional pressure on workers at all levels to work quickly and accurately. With little room for error at all points along the supply chain, workers from pickers and packers to logisticians must have the skills needed to perform their jobs to peak efficiency. While technology has greatly assisted with speed and accuracy, workers must have the comprehension skills to follow instructions, as well as the problem-solving skills to adjust to glitches in technological processes.

Priority Skill Needs of Employers Supporting the Operation of Port Newark and Elizabeth Marine Terminal

In addition to job-specific skills, port-related employers need workers who have additional skills to ensure the smooth and efficient movement of goods along the supply chain to and from Port Newark/Elizabeth. The majority of these skills are of primary importance for supervisors and managers. Many entry-level positions, such as warehouse laborers and longshore workers, generally only require basic English, technology, and work readiness skills to start. The skills below, however, are essential for workers to develop if they plan to advance from an entry-level position to a supervisory job or to a more technical position, such as a machine operator

or repair position. According to employers, the following skills are the most important for these workers to possess:

- **Information and machine technology skills** are needed to interact effectively with the various types of new computer-assisted technologies being introduced in warehousing, transportation, and port operations, including inventory control systems, logistics software, global positioning systems, and other systems.
- **Problem-solving and critical thinking skills** are critical as managers and supervisors are expected to make decisions independently to address issues that threaten to interrupt the efficient flow of goods to and from the port or that cause security-related concerns.
- **Leadership and teamwork skills** are essential for ensuring that employees work well together to keep the supply chain moving.
- **Analytical skills** are important, especially for logisticians and security personnel to interpret and react to complex data about goods movement. Warehouse managers and supervisors in more advanced, high-tech warehouses may also need analytical skills to interpret output from inventory control systems.
- **Customer service and communication skills** are important for handling interactions with customers, retailers, and vendors.

Employers note particular difficulties addressing skills-related gaps among workers in the following occupations:

- Laborers, Freight, Stock, and Material Movers, Hand
- Packers and Packagers, Hand
- Truck Drivers, Heavy and Tractor-Trailer
- First-line Supervisors/Managers of Helpers, Laborers, Material Movers, Hand
- First-line Supervisors/Managers of Transportation and Material Moving Machine and Vehicle Operators, Hand
- Bus and Truck Mechanics and Diesel Engine Specialists
- Transportation, Storage, and Distribution Managers
- Industrial Engineers
- Operations Research Analysts
- Logisticians

To address the priority skill requirements of these and other port-related jobs, New Jersey's state agencies and educational institutions must work together to provide pre- and post-employment training for entry-level workers that prepares them with the higher-level skills and knowledge that they need to advance to higher-paying positions. As port-related workplaces become more high-tech and complex, it becomes more difficult for workers to pick up the knowledge and skill they need to advance on the job. Workers also need additional knowledge about career ladders and opportunities within the industry, especially for truck drivers, who are often isolated on the road and unable to access information and training that would help them advance to supervisory positions.

Overview: Goods Movement In and Out of Port Newark/Elizabeth

Port Newark and the Elizabeth Marine Terminal serves as the primary seaport for goods being shipped into and out of the New York region and the entire northeastern United States. Port Newark/Elizabeth occupies 2,100 acres just east of the New Jersey Turnpike and spans the boundaries of the cities of Newark and Elizabeth, New Jersey. It houses container handling operations, vehicle processing facilities, bulk cargo terminals, and warehousing and distribution operations. Together, Port Newark and the Elizabeth Marine Terminal operate as a fully integrated shipping complex that forms the backbone of the Port of New York and New Jersey.¹¹

PONYNJ consists of five port facilities managed by the Port Authority of New York and New Jersey. In addition to the Port Newark/Elizabeth-Port Authority Marine Terminal complex in New Jersey, which is the largest facility, the Port Authority also manages the Port Authority Auto Marine Terminal (NJ), Brooklyn Piers and Red Hook Container Terminal (NY), and Howland Hook Marine Terminal (NY). PONYNJ also includes several privately managed marine terminals in New York and New Jersey.¹²

Over 3.3 million containers of cargo moved through the PONYNJ terminals in 2005,¹³ and much of this volume was handled at the Port Newark/Elizabeth facility. The movement of these goods into and out of the port facility to their final destinations requires a complex supply chain that has a nexus at the port terminal, but that extends much farther, spanning a wide range of industries and job types.

The amount of cargo moving through Port Newark/Elizabeth has increased over the past several years and is anticipated to rise even more sharply in the future. According to the study conducted by Rutgers University for the

New York Shipping Association, container-based shipments grew by 27% at PONYNJ from 2000 to 2004.¹⁴ The North Jersey Transportation Planning Authority (NJTPA) projects that container handling at the region's marine terminals will triple by 2030 and quadruple by 2040.¹⁵

In response to the expected rise in cargo shipments, NJTPA anticipates that rail traffic will grow by three to four times, container truck volume will increase by a factor of two-and-a-half, non-container truck volume is projected to double, and air cargo traffic will also double. NJTPA also expects demand for warehousing space to double by 2030, to 1.3 billion square feet.¹⁶

Much of this growth in cargo shipment and handling is fueled by the growth of international trade. In 1965, international trade comprised 11% of the nation's Gross Domestic Product.¹⁷ By 1995, this figure had risen to 25%. In addition to factors of economic demand in an increasingly globalized economy, the current and expected future growth in container shipments at PONYNJ is driven by improvements that increase the port's capacity to handle, transport, and store additional containers.

The Portways project and several dredging and channel deepening projects are designed to increase the capacity to move more goods more efficiently through Port Newark/Elizabeth. The Port Authority's Portways project is expected to lead to the development of an express freight rail system and a freight truck-only roadway that is designed to increase the efficiency of goods movement to and from Port Newark/Elizabeth. A series of dredging and channel deepening projects in the waters surrounding Port Newark/Elizabeth will allow more large ships to move in and out of the port harbor.

The Portfields project is designed to increase the amount of available space for warehousing close to Port Newark/Elizabeth. As the cargo volume through Port Newark/Elizabeth increases, there is an increasing demand for modern warehousing and distribution facilities near the port. It has become difficult, however, for businesses to find appropriate sites within the counties that surround the port, such as Essex, Hudson, Middlesex, and Union Counties. The Portfields initiative addresses the shortage of needed warehouse space by remediating 2,500 acres of brownfield sites in areas surrounding the port to allow for the development of 60 million square feet of warehousing space. Ideally, this development will lead to the creation of new jobs in the area surrounding Port Newark/Elizabeth.

In addition, new technology is also improving cargo handling efficiency at Port Newark/Elizabeth. New gate systems are being installed that make it easier for truck drivers to move in and out of the port area securely and efficiently. New security systems are also making the process of checking cargo and ship registries more efficient, according to experts interviewed for this study. Advanced cargo handling equipment, including cranes and top loaders, are being introduced at Port Newark/Elizabeth to make the process of loading and unloading ships more efficient.

The increasing flow of cargo through Port Newark/Elizabeth is a likely factor in the rapid growth in port-related jobs in recent years. Between 2000 and 2004, the number of all jobs directly supported by PONYNJ grew by 50%, jumping from 81,550 to 122,550, or over 41,000 jobs. Growth in on-port jobs during this period mirrored the growth in container shipments (27% growth in container-based shipments vs. 29% growth in on-port jobs).¹⁸ Though experts expect much of the new cargo growth to be handled by technology, the New Jersey Department of Labor and Workforce Development projects that jobs in the state's transportation and warehousing sector will grow by 8%, while the wholesale sector will grow by 12.5% between 2004 and 2014.¹⁹

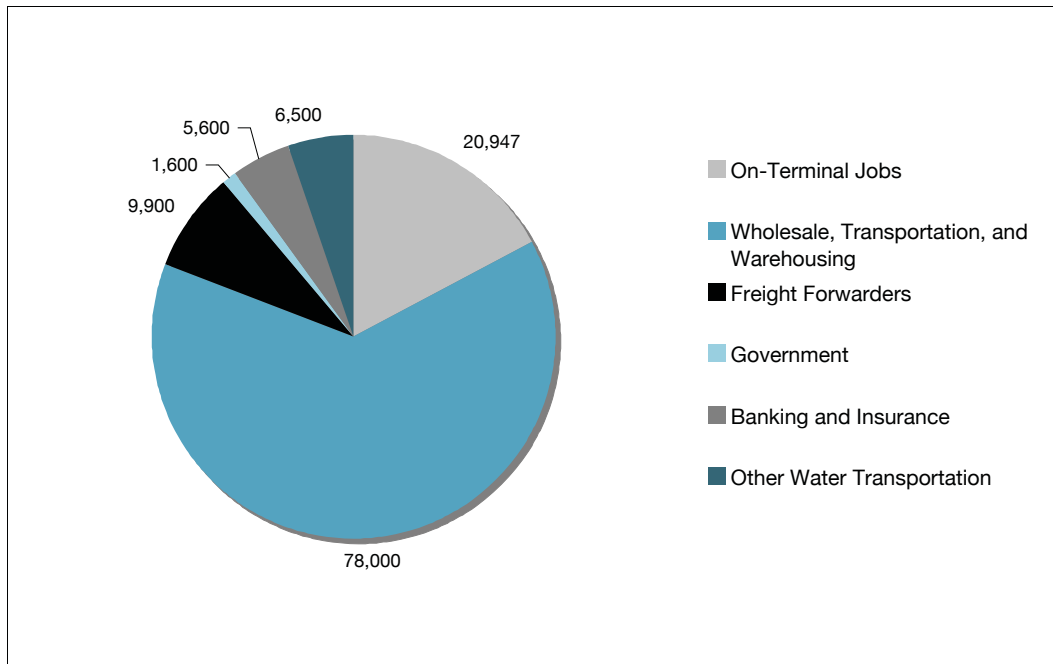
The Structure of Port-Related Employment in New Jersey

The Port of New York and New Jersey supports a large and growing number of jobs in New Jersey and the surrounding region. A 2005 study from Rutgers University estimated that PONYNJ **directly** and **indirectly** sustained nearly 233,000 jobs in 2004 in a 26-county region of New York and New Jersey.²⁰ The New York Shipping Association, the employer association for port terminal operators and shippers in PONYNJ, estimates that nearly 60% (138,000) of these jobs are based in New Jersey.²¹

Of the nearly 122,550 full-time equivalent jobs in the New York/New Jersey region that were directly tied to PONYNJ operations, the Rutgers University study estimated that 84% (102,942) are located outside of the port terminals in industries including warehousing and transportation, wholesale trade, banking and insurance, government, transportation support activities, such as freight forwarding, and other types of water transportation. By contrast, only 16% (20,947) of these jobs are located at a port facility. The majority of all directly supported jobs (nearly 64% or 78,000 jobs) are located in warehousing and distribution centers and wholesale facilities surrounding the ports. The remaining 20% (23,600) are distributed among other water transportation, government, banking and insurance, and freight forwarding operations.²² (See Figure 1.)

In New Jersey, jobs in port-related industries are heavily concentrated in the five-county area surrounding Port Newark/Elizabeth. These counties — Bergen, Essex, Hudson, Middlesex, and Union — are home to less than half (44%) of all jobs in New Jersey. They contain 57% of the state's jobs in the wholesale trade, truck transportation, warehousing, and support activities for transportation industries, accounting for nearly 200,000 jobs.²³ While not all of these jobs are directly related to port activity, the port is undoubtedly a driving force for these industries in these areas. See Table 1 for additional information.

Figure 1
Distribution of Jobs in the New York/New Jersey Region Directly Supported by the Port of New York and New Jersey



Source: Michael Lahr. 2005. *Economic Impacts of the New York/New Jersey Port Industry 2004*. Center for Urban Policy Research, Rutgers University and A. Strauss Weider Inc., New Brunswick, NJ.

Table 1
Average Quarterly Employment in Key Port-Related Industries in New Jersey and the Five-County Region Surrounding Port Newark/Elizabeth, 2006

	Key Port-Related Industries					
	All Industries	Total Port-Related Industry Jobs	Wholesale Trade	Warehousing and Storage	Truck Transportation	Support Activities for Transportation
New Jersey	3,858,523	328,367	237,389	24,647	40,477	25,854
Port Newark/Elizabeth Region*	1,704,360	187,858	128,878	16,692	23,462	18,826

* Defined as Bergen, Essex, Hudson, Middlesex, and Union Counties

Note: Employment figures represent an average of quarterly employment estimates from the second quarter of 2006 and the three previous quarters.

Source: U.S. Census Bureau, *Longitudinal Employer Household Dynamics, Quarterly Indicators, 2006*.

According to the New York Shipping Association, the average salary for jobs physically located at PONYNJ terminals was \$85,000 in 2005.²⁴ This contrasts sharply with the average salaries for workers in off-port industries that support the supply chain for Port Newark/Elizabeth. In 2004, the statewide average salary for workers in the transportation and warehousing industry in New Jersey was \$41,800, while workers in the wholesale industry had an average wage of \$50,370.²⁵

Description of the Port-Related Supply Chain

The descriptions below provide an overview of the supply chain for Port Newark/Elizabeth, the types of industries that participate in each link, and a sample list of the types of workers that are likely to be found. While not all firms within a given industry in the region surrounding the port participate in the port's supply chain, these descriptions provide an overview of the types of businesses and workers that directly and indirectly support port operations and container movement in the region.

The Heldrich Center has identified three primary aspects of the Port Newark/Elizabeth supply chain: port operations and marine transportation, warehousing and distribution, and goods movement. These categories were derived based on discussions with port experts and a review of several port-related studies.

Port Operations and Marine Transportation

This sector includes the loading and unloading of cargo-bearing vessels. Freight that arrives and departs from port terminals via water is classified as either general or bulk cargo. General cargo includes containerized freight (anything shipped in a standard-sized container), automobiles, and break-bulk cargo, which is freight moved in non-container prepackaged units. Containers are generally used when the goods are of a higher value and need to be transferred from marine terminals to rail or truck with a relatively high level of speed, security, or visibility. Bulk cargo can be either solid or liquid

cargo shipped directly in a vessel's cargo hold. Examples of bulk cargo include coal, grain, crude petroleum, and petroleum products including gasoline.

Industries related to port operations and marine transportation include various types of water transportation and the support activities associated with them. Table 2 shows the industry sectors that comprise port operations and marine transportation.

Table 2
Industries Related to Port Operations and Marine Transportation

Deep Sea Freight Transportation

Coastal and Great Lakes Freight Transportation

Inland Water Freight Transportation

Support Activities for Water Transportation

Occupations in these industries often involve moving goods on and off ships at the port, usually using complex equipment, or supervising workers that perform this type of work.

Sample occupations:

- Laborers and Freight, Stock, and Material Movers, Hand
- Material-Moving Workers, All Other
- Tank Car, Truck, and Ship Loaders
- Crane and Tower Operators
- First-Line Supervisors/Managers of Transportation and Material-Moving Machines

Warehousing and Distribution

Warehousing operations receive, store, and often modify goods before shipping them to other points on the supply chain. The modifications warehouses perform are generally customized, "value-added" functions. Beyond the receiving, storing, and distribution of merchandise, many warehouses now perform special services for particular customers to add value to the services they provide. Workers in these warehouses may assemble pieces of a product, customize a generic product to meet a specific order, and package the product to complete an existing

order or for store shelves. Goods are often transferred from a warehouse to a wholesale operation, where goods may be stored and sold to retailers.

Logistics and transportation planning services are also important components of the goods distribution process. Often, warehouses provide logistics services, planning the distribution of goods from their storehouses to and from other points on the supply chain. According to port experts consulted for this study, however, some firms provide only logistics services, often helping companies to plan complex movements of specialized goods in an efficient manner. Freight forwarding operations help to arrange the transport of large quantities of goods, often to international destinations.

Industries related to warehousing and distribution include warehousing and wholesale operations, as well as the support and planning services that are instrumental to planning the efficient distribution of goods. Table 3 shows the industry sectors that comprise warehousing and distribution.

Table 3
Industries Related to Warehousing and Distribution

Warehousing and Storage

Process, Physical Distribution, and Logistics Consulting Services

Freight Transportation Arrangement (includes Shipping and Freight Forwarding)

Wholesale Trade

Occupations in these industries often involve moving and handing goods in and around the warehouse or wholesale establishment, as well as planning and organizing the goods distribution process.

Sample occupations:

- Laborers and Freight, Stock, and Material Movers, Hand
- Industrial Truck and Tractor Operators
- Stock Clerks and Order Fillers
- Packers and Packagers, Hand

- First-Line Supervisors/Managers of Helpers, Laborers, and Material Movers, Hand
- Logisticians
- Industrial Engineers
- Operations Research Analysts
- Management Analysts

Goods Movement

Goods movement is a category of services that involves the transportation of products that flow through the port. Much of the freight generated through Port Newark/Elizabeth moves in and out of the port via trucks. Trucks transport goods from the receiving terminals to warehousing and distribution centers and then to either other transportation methods or their final locations. Trucks may also deliver goods to the port for export. Unlike the other three major forms of freight transport — air, rail, and water — trucks are able to connect any two points along the supply chain.

Rail cargo transport serves a different demand than truck transport does. Rail transport is the most frequent alternative to truck transport when factors such as length of travel, volume of cargo, and congestion of truck routes make trucking unattractive. Trains can generally move goods over longer distances more efficiently than trucks.

While most goods are moved from Port Newark/Elizabeth via truck or rail, a small number of items are transported via air transportation. According to port experts interviewed for this study, goods moved by air tend to be of higher value, are relatively lightweight, and need to arrive at the next stop on the supply chain quickly. These products include perishables or items that may be damaged in trucks or railcars, such as flower bulbs, high-value consumer goods, and printed information. Air freight can be moved by firms only operating cargo aircraft or by firms with an integrated air and ground cargo transport operation. Major firms running integrated cargo transport firms that serve Port Newark/Elizabeth through Newark Liberty International Airport include FedEx and UPS.

Industries related to goods movement include truck, rail, and air transportation, as well as support activities. Table 4 shows the industry sectors that comprise goods movement.

Table 4
Industries Related to Goods Movement

General Freight Trucking
Specialized Freight Trucking
Rail Transportation
Air Transportation
Commercial, Air, Rail, and Water Transportation Equipment Rental and Leasing

Occupations in these industries often involve operating or repairing vehicles, ensuring transportation safety, and supervising workers who perform these activities.

Sample occupations:

- Truck Drivers, Heavy and Tractor-Trailer
- Bus and Truck Mechanics and Diesel Engine Specialists
- First-Line Supervisors/Managers of Transportation and Material-Moving Machines
- Railroad Conductors and Yardmasters
- Locomotive Engineers
- Railroad Brake, Signal, and Switch Operators
- Electrical and Electronics Installers and Repairers, Transportation Equipment
- Airline Pilots, Copilots, and Flight Engineers
- Aircraft Mechanics and Service Technicians
- Cargo and Freight Agents
- First-Line Supervisors/Managers of Mechanics, Installers, and Repairers

Key Workforce Challenges Facing Employers that Support Operations at Port Newark/Elizabeth

Researchers identified the following broad workforce challenges employers are facing in each segment of the supply chain for Port Newark/Elizabeth:

Goods Movement (On and Off Port)

According to reports by Opportunity Newark and Rutgers University, the most significant workforce challenge among employers involved in moving goods to and from Port Newark/Elizabeth occurs in the trucking industry. Both on and off the port terminals, employers also report significant structural problems that make it difficult to hire qualified truck drivers.

According to these reports, contributing factors for the widespread trucker shortage include:

- Low starting wages and benefits in entry-level positions relative to the investment truckers must make to enter the port-related labor market,
- Difficult working conditions,
- Minimum age and experience requirements limit insurance availability,
- Increasingly stringent security background check requirements,
- Limited awareness among job seekers about how to access open positions, and
- Limited opportunities for advancement.

According to a study conducted by Rutgers University, most of the tractor-trailer drivers who deliver goods to and from Port Newark/Elizabeth are independent contractors who own their own trucks, work on a contractual basis, and are responsible for providing their own benefits.²⁶ The average annual salary for these jobs is \$39,200, significantly higher than the state average of \$22,370, but low considering

the investment that independent truckers must make to purchase and maintain their vehicles.²⁷

Employers report that the growing shortage of truck drivers, especially long-haul drivers, is exacerbated by difficult working conditions. Long hours and days away from home make long-haul, tractor-trailer driving an especially difficult job. According to employers, many truck drivers take long-haul jobs until they can find driving jobs requiring shorter distances and hence less time away from home, diluting the pool of experienced long-haul drivers. Even short-haul drivers, especially if they deliver goods to and from Port Newark/Elizabeth, spend long hours driving, sitting in traffic, and waiting to enter and leave secure areas.

Structural barriers to becoming a truck driver also exist. In addition to the requirement for many port-related trucking jobs that drivers own their own vehicles, insurance rates for inexperienced truck drivers are often too high for potential employers to pay. Many insurance companies also require that drivers be at least 21 years of age. As a result, many people who have the necessary training, education, and credentials cannot find employment at Port Newark/Elizabeth or with many surrounding firms. Experts add that minimum age requirements also limit the pool of workers, as many high school graduates who are prevented from entering the profession get established in other careers before the age of 21. Rising security requirements will also require that truck drivers pass even more extensive criminal, substance abuse, and driving background checks, which further limits the pool of eligible workers.

In addition, since many truck drivers work as independent contractors, they have no direct access to a career ladder in their industry, according to employers. Employers also observe that there is no coordinated attempt to inform

students and adult workers about job and career opportunities in New Jersey's transportation and logistics sector. Some county vocational-technical schools have auto-shops, which provide students with the core skills needed in that part of the industry (e.g., County College of Morris has a diesel shop). Organized labor groups are also currently participating in some "career day"-type activities, according to employers. The lack of a coordinated effort to inform students and job seekers about career options in the industry and the associated skill requirements makes it difficult for potential workers to adequately prepare for industry jobs, however.

Warehousing and Distribution (Off Port)

According to port-related experts interviewed for this study, off-port warehousing employers are having difficulty finding employees who have the English language, workplace readiness, and basic technology, communication, reading, and comprehension skills needed to do their jobs effectively. More importantly, many entry-level workers lack the more advanced communication, teamwork, leadership, technology, and analytical skills needed to advance to supervisory and managerial positions.

Based on a review of labor market information, industry trends, and a report by Rutgers University, the following factors may play a role in making it difficult for warehousing and distribution employers to attract and recruit qualified workers:

- Low starting wages and benefits in entry-level positions,
- Lack of awareness of available positions,
- Limited training opportunities, and
- Limited opportunities for advancement.

For some entry-level jobs, lower-than-average wages may be a barrier to recruiting and retaining skilled workers. For example, packers and packagers in New Jersey's warehouses earned an average annual salary of \$16,200 in 2004, substantially less than the statewide average annual salary of \$22,370 for all occupations combined.

Limited benefits can be a problem in other jobs. Most off-port warehousing jobs are not unionized and worker benefits can vary greatly.²⁸

A lack of awareness about the types of jobs that are available in the warehousing and distribution industry may also make it difficult for firms to attract and recruit workers. A report by Rutgers University indicates that some employers do not routinely advertise job openings.²⁹ According to employers consulted for this study, students and job seekers may also lack accurate information about the skill requirements of jobs in the warehousing and logistics industry. This lack of awareness about job requirements may be a particular problem for some of the more highly skilled analytical positions that handle logistics operations, such as logisticians and operations research analysts.

Training opportunities that would allow entry-level workers to learn the skills needed to excel and advance on the job are also limited. Few employers report having in-house training programs and opportunities for pre-employment basic skills and other skills training is limited.

There may be limited opportunities for advancement in some warehouses, especially for entry-level workers, such as laborers. According to a Rutgers University report, warehouse employers report that managers tend to remain in their jobs for long periods, limiting the opportunity for career advancement for entry-level workers. In addition, there are many more laborer positions than management or other positions available.³⁰ Given the differences in the skills and education required to move into other job opportunities that may be available in warehouses, such as business and accounting positions, which often require a business-related Associate's degree, job ladders in warehouses for entry-level workers are often limited.

Port Operations and Marine Transportation

Officials from the New York Shipping Association, the primary employer association for on-port employers offering unionized jobs, report that employers face few workforce challenges

that they are not able to overcome on their own. Employers have little difficulty filling open union positions at the port, as these jobs are in high demand among job seekers. The pay is high — an average of \$85,000 per year, according to NYSA. And the entry requirements are low — a clean driving and criminal record and less than a high school diploma are required for most jobs. In addition, NYSA officials report that the agency provides all of the training workers require, often partnering with the New Jersey Department of Labor and Workforce Development's customized training office and local community colleges to fund and deliver the training.³¹

The largest challenge port employers face, according to NYSA, involves keeping down the costs associated with the employment pre-screening process. NYSA officials report that over two-thirds of applicants are denied employment, not based on their educational background, but based on their criminal, substance abuse, or poor driving backgrounds. While there are still more than enough qualified applicants to fill available job openings, the cost of processing background checks and other paperwork for people who are found to have violations on their records remains high, according to NYSA.

The process of getting a unionized job at Port Newark/Elizabeth is also difficult from the job seeker's perspective. All new positions and job applicants must be cleared and approved by the International Longshoreman's Association (ILA), the union that covers port workers; the Waterfront Commission, a bi-state commission established to stop corruption at the ports; and the New York Shipping Association. The Waterfront Commission must perform a lengthy background check and approval process, which has become stricter and more thorough as a result of growing security concerns since September 11, 2001. ILA and NYSA must also approve each hire. According to a Rutgers University study, there is no clear process for finding out about job openings at the port, and when workers do find their way to a job opening, the interview, background check, and hiring process can take from 6 to 12 months to complete.³²

Non-unionized warehouse facilities employers located at Port Newark/Elizabeth also face few workforce challenges. Most job openings are filled by word of mouth, and employers report very little turnover, especially in supervisory jobs.³³

Industry Trends Affecting the Skill and Educational Requirements of Port-Related Jobs

The Heldrich Center has identified three broad trends influencing the workforce needs of the employers within the supply chain serving Port Newark/Elizabeth. These trends are increasing reliance on technology in the workplace, rising security concerns, and just-in-time delivery practices.

Trend #1: Increasing Reliance on Technology in Port and Warehouse Operations

Technological change is sweeping through all aspects of the transportation and logistics sectors, creating skill-related challenges for employers. For example, warehouses increasingly use computer-automated, sales-based ordering systems to manage the flow of goods to retailers. Since these computer systems can be complex, more warehouse workers now need an increased level of skill and knowledge to operate these systems and to understand the analytical reports that they produce. In addition, on-port equipment, from new lifts and cranes for moving containers and other materials require workers to have new safety and technology-related skills. One marine construction employer consulted for this study reports a gap between the skills of new engineers (who are only trained in computer-aided design) and veteran engineers (who still rely on drafting). Ideally, the employer reports, workers need both types of skills and knowledge — the fundamental principles of the trade and the skills to effectively use new technologies.

Key Skill and Education Implications for Workers

Other traditional jobs require new levels of technical skill as well. Port security officers now use high-tech devices to monitor, photograph,

and track all incoming goods. Port areas are secured by a network of sophisticated gate systems. Schedulers employ advanced computer systems and electronic filing. Truck drivers need to understand global positioning system (GPS) tracking devices, and cargo handlers need to be able to adapt to new shipping technologies as they emerge.³⁴

Trend # 2: Rising Security Concerns

Since the terrorist attacks of September 11, 2001, officials at Port Newark/Elizabeth have been increasingly concerned about security issues. According to the Port Authority of New York and New Jersey's website, the agency has spent over \$2.3 billion to improve security throughout PONYNJ. Significant investments have been made to improve security technology, including perimeter security and surveillance, as well as to increase the size and to improve training for the Port Authority's police and security forces. The Port Authority plans to spend an additional \$500 million on security technology and infrastructure, including additional improvements to perimeter fences and closed circuit surveillance systems, as well as cargo scanning technology. In October 2006, new radiation scanners were introduced at Port Newark/Elizabeth to detect nuclear materials in marine cargo containers.³⁵

In addition to scanning and manually checking containers that move through Port Newark/Elizabeth, the Port Authority also employs workers who are responsible for checking ship documents that track the type of cargo being carried, the origin of the goods, and any existing documentation on those goods from other ports. According to port experts consulted for this study, these job functions are increasingly important in the post-9/11 world.

The Port Authority also works closely with local, state, and national security agencies to ensure safety at Port Newark/Elizabeth and other PONYNJ facilities. The governors of New York and New Jersey can deploy the National Guard and State Police to supplement Port Authority police and security personnel when needed. In addition, the Port Authority interacts with local, state, and federal law enforcement and counter-terrorism agencies, including Governor Pataki's Office of Public Security, Governor Corzine's Office of Counter-Terrorism, the U.S. Department of Homeland Security, the U.S. Transportation Security Administration, the U.S. Department of Energy, the Coast Guard, and U.S. Customs.³⁶

Key Skill and Education Implications for Workers

From security personnel, to truck drivers, to longshore workers, workers need critical thinking and problem-solving skills to be able to know when to alert higher authorities to suspicious activities. Workers of all types also need to be accurate, as well as efficient, when checking and handling cargo. For example, truck drivers need to perform additional checks to make sure that they are carrying the correct cargo and that all of the paperwork associated with the cargo is complete and accurate.

Trend #3: Just-in-Time Delivery Practices

In response to increasing competition and the development of more sophisticated logistics techniques and software programs, supply chains have become more efficient. Just-in-time delivery, which involves ordering products directly from manufacturers or vendors based on an analysis of the amount of product needed, has thrived in the past several decades.³⁷

Key Skill and Education Implications for Workers

These processes increase efficiency in the goods movement process, but place additional pressure on workers at all levels to work quickly and accurately. With little room for error at all points along the supply chain, workers from pickers and packers to logisticians must have the skills needed to perform their jobs to peak efficiency. While technology has greatly assisted with speed and accuracy, workers must have the comprehension skills to follow instructions, as well as the problem-solving skills to adjust to glitches in technological processes.

Conclusion: The Priority Skill Needs of Employers Supporting the Operation of Port Newark/Elizabeth

The introduction of new technologies within various aspects of the port-related supply chain is having the greatest impact on the skill needs of port-related employers and is increasing the skill and education requirements for workers. The majority of these skills are of primary importance for supervisors and managers. While they are often not specifically required for many entry-level positions, such as packers and packagers in warehouses, those who wish to advance from an entry-level position to a supervisory job or to a more technical position, such as a machine operator or repair position, must develop these critical skills in order to be considered for hire. According to employers the following skills are the most important for workers to possess:

Information and machine technology skills are especially important for supervisors, managers, logisticians, and machine operators and repair persons, who must interface with the more complex aspects of new technologies, including logistics software, warehouse inventory management systems, and computer-operated machinery. Entry-level workers must have a basic comfort level with technology to operate simple computer-based interfaces associated with new machinery and technology systems. Those who wish to advance, however, must acquire additional knowledge of the systems prevalent in their workplaces.

Problem-solving and critical thinking skills are critical as managers and supervisors are expected to make decisions independently to address issues that threaten to interrupt the efficient flow of goods to and from the port or that cause security-related concerns.

Leadership and teamwork skills are essential for supervisors and managers and entry-level workers who wish to advance within the industry. Employers report increasing difficulty finding these skills among entry-level workers, an issue that forces many employers to hire supervisors from outside the ranks of their existing workforce.

Analytical skills are important, especially for logisticians and security personnel to interpret and react to complex data about goods movement. Warehouse managers and supervisors in more advanced, high-tech warehouses may also need analytical skills to interpret output from inventory control systems.

Customer service and communication skills are important for handling interactions with customers, retailers, and vendors.

Endnotes

- 1 Port Authority of New York and New Jersey Website. Accessed on June 12, 2006 at: <http://www.panynj.gov/commerce/nemain.html>.
- 2 New York Shipping Association Website, "Frequently Asked Questions." Accessed on June 12, 2006 at: <http://www.deliveringprosperity.com/faq.asp>
- 3 Michael Lahr, *Economic Impacts of the New York/New Jersey Port Industry 2004* (New Brunswick, NJ: Center for Urban Policy Research, Rutgers University and A. Strauss Weider Inc., 2005).
- 4 New Jersey Department of Transportation, *The Value of Freight to the State of New Jersey* (New Brunswick, NJ: Alan M. Voorhees Transportation Center, Rutgers University, 2001).
- 5 New York Shipping Association Website, "Frequently Asked Questions."
- 6 Michael Lahr, *Economic Impacts of the New York/New Jersey Port Industry 2004*.
- 7 Transportation industry education session, May 20, 2006. Newark Alliance, *Opportunity Newark: Jobs and Community Development for the 21st Century* (Newark, NJ: Author, 2006).
- 8 New Jersey Department of Labor and Workforce Development, *State of New Jersey Employment Estimates and Projections by Detailed Occupation, 2004 and 2014* (Trenton, NJ: Author, 2005).
- 9 William M. Rodgers III, *The Globalization of Warehousing* (New Brunswick, NJ: Rutgers University, 2005).
- 10 Annette Bernhardt, *The Future of Low-Wage Jobs: Case Studies in the Retail Industry* (New York: Institute on Education and the Economy, Teachers College, Columbia University, 1999).
- 11 Port Authority of New York and New Jersey Website. Accessed on May 10, 2006 at: <http://www.panynj.gov/commerce/nemain.html>.
- 12 Ibid.
- 13 Port Authority of New York and New Jersey, *The Port of New York and New Jersey 2005 Year-End Statistics*. Accessed on May 10, 2006 at: <http://www.panynj.gov/commerce/nemain.html>.
- 14 Michael Lahr, *Economic Impacts of the New York/New Jersey Port Industry 2004*.
- 15 New Jersey Department of Transportation, *The Value of Freight to the State of New Jersey*.
- 16 Ibid.
- 17 U.S. Department of Transportation, *Transportation in the United States: A Review* (Washington, D.C.: Author, 1997).
- 18 Michael Lahr, *Economic Impacts of the New York/New Jersey Port Industry 2004*.
- 19 New Jersey Department of Labor and Workforce Development, *State of New Jersey Employment Estimates and Projections by Detailed Occupation, 2004 and 2014*.
- 20 Michael Lahr, *Economic Impacts of the New York/New Jersey Port Industry 2004*.
- 21 New York Shipping Association Website, "Frequently Asked Questions."
- 22 Michael Lahr, *Economic Impacts of the New York/New Jersey Port Industry 2004*.
- 23 U.S. Census Bureau, *Longitudinal Employer-Household Dynamics, Quarterly Workforce Indicators, 2006* (Washington, D.C.: Author, 2006).
- 24 New York Shipping Association Website, "Frequently Asked Questions."
- 25 New Jersey Department of Labor and Workforce Development, *Statewide New Jersey Occupational Wages from the Occupational Employment Statistics Wage Survey by Major Industry Group* (Trenton, NJ: Author, 2005).
- 26 William M. Rodgers III, *The Globalization of Warehousing*.

27 New Jersey Department of Labor and Workforce Development, *State of New Jersey Employment Estimates and Projections by Detailed Occupation, 2004 and 2014*.

28 William M. Rodgers III, *The Globalization of Warehousing*.

29 Ibid.

30 Ibid.

31 Interview, New York Shipping Association, May 1, 2006.

32 William M. Rodgers III, *The Globalization of Warehousing*.

33 Ibid.

34 Eric Lipton, "New York Port Hums Again, With Asian Trade," *The New York Times* (November 22, 2004).

35 Interview with Matt McDermott, May 15, 2006.

36 Port Authority of New York and New Jersey Website, accessed on May 10, 2006 at: <http://www.panynj.gov/commerce/nemain.html>.

37 Bernhardt, *The Future of Low-Wage Jobs: Case Studies in the Retail Industry*.

Appendix: List of Industry Education Session Members and Interviewees

The Heldrich Center conducted background interviews with industry experts in May 2006. An industry education session consisting of employers and others knowledgeable about the transportation and warehousing industry and port operations was also held on February 17, 2006.

Individuals Interviewed

Tom Carver
Casino Reinvestment Development Authority
Formerly of the Port Authority of New York and New Jersey

Marshall Cooper
Newark Workforce Investment Board

Harold Hawkins
Army Corps of Engineers

Matt McDermott
McDermott Public Affairs

Frank McDonough
New York Shipping Authority

Dr. William M. Rodgers III
Rutgers University

Gail Toth
New Jersey Motor Truck Association

Kathy Weaver
Newark Alliance

James Cobb
New York Shipping Association

Gary Cooper
Middlesex County Department of Workforce Development

Chris Emigholz
New Jersey Business and Industry Association

Mark Hiltwein
Smartshipper

Andrew Kanter
Hertz

Glenn Lang
New Jersey Commission on Higher Education

Patricia Moran
Middlesex County College

Judy Savage
New Jersey Council of County Vo-Tech Schools

Jason Timian
New Jersey Department of Labor and Workforce Development

Cathy Tramontana
New Jersey Principals and Supervisors Association

Bernard Yostpille
Port Authority of New York and New Jersey

Industry Education Session Members

Phil Beachem
Alliance for Action

Robert Bowman
New Jersey Council of County Colleges Consortium