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An Analysis Of Sea Shipping As Global And Regional Industry

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AN ANALYSIS OF SEA SHIPPING AS GLOBAL AND REGIONAL INDUSTRY

ABSTRACT: SEE PAGE 3

KEYWORDS: SHIPPING, CONTAINERIZATION, PORT, STANDARDIZATION, MECHANIZATION, TRANSPORTATION, COASTAL ZONE MANAGEMENT, ENVIRONMENTAL AWARENESS, PANAMA CANAL

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AN ANALYSIS OF SEA SHIPPING AS GLOBAL AND REGIONAL INDUSTRY

SPRING SEMESTER 2006
URI HONORS PROGRAM

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ABSTRACT: AN ANALYSIS OF SEA SHIPPING AS GLOBAL AND REGIONAL INDUSTRY

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Our hectic world is one filled with constant change through motion: the movement of ideas, political thought, money, people, and cargo all coming together to create an economy of global scale and activity. Transportation is the connection between both these intangible notions and physical bodies. It is through the evolution of one of the fastest growing and most influential transportation industries that we have conquered an international shipping exchange. International trade has dominated as a leader of world economics through the traffic in ports, its ancillary coastal regulations, management of the navigable waterways, and a revolution in containerization. This 'industry on the sea' transports billions of dollars worth of goods across rivers and oceans each year. Ports stand as a connecting facility to process this cargo to its final destination.

Ports symbolize much more than a coastal processing complex. Above and beyond functional satisfaction, these seacoast landmarks represent business, international relations, a welcoming committee, a center for trade, a fast paced work environment of deadlines and scheduling, and the most expensive, technologically advanced marinas on our coastlines.

This study focuses on the value of ports from a practical and business approach, detailing the importance of operational offloading, the container transformation of the shipping industry during the 1960s and its direct relationship to employment, scheduling, overhead, and ship movement, and the technological innovations in port machinery. The overall impact of ports on the environment and governmental interest has also led to multiple Acts, government funding, and country wide initiatives to balance the delicate scale of environmental protection and economic trade. Strict Coastal Zone Management regulations, environmental directives, and efforts to appease the local aesthetic and ecological desires further tip that fragile scale.

Recent national and international issues have also substantially impacted the shipping industry and add an interesting segment to my analysis. Hurricane Katrina, forming August 23, 2005, caused havoc in the southern U.S. states, particularly affecting the New Orleans coastal region and one of the largest port centers on the Atlantic coast. Current political controversy between the United States and Dubai has also left many intrigued on our fragile international relations.

This study is dedicated to a deeper understanding of ports and their role in our global economy, also focusing on factors contributing to the unprecedented growth. The initiatives taken on behalf of local and federally involved leaders of the shipping world to understand and develop ports as an imperative part of global business truly demonstrate the dependency we have on ports to sustain our trade relationships.

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AN ANALYSIS OF SEA SHIPPING AS GLOBAL AND REGIONAL INDUSTRY

The view from above reveals a serene, 100 foot square cut of the Atlantic Ocean. With no land in sight, the oceanic picture exposes a horizon indistinguishable from the sea's surface. Rolling waves crest and fall as winds create white caps and foam, and whip patterns of unpredictable motion between air and ocean. As the swells methodically travel the seas, a sense of movement begins to affect the balance of the untouched waters. The winds shift and the sea parts to let the 900 foot container ship bow slice the ocean as it barrels through at 22 knots towards the Port of New York. From the aerial view, 4,853 truck container rigs line the deck in systematic and linear lines transporting edible goods from Europe towards the American eastern seaboard. The ship is behind schedule and the deadline for arrival is in 48 hours. As the massive vessel pans out of the overhead shot, the churning propellers leave nothing more than the hissing foam of transportation in one of its most powerful capacities: an industry of shipping by water.

The concept of motion truly is the preliminary groundwork for an understanding of what has become the transportation industry. The movement of people, goods, cargo, and freight via some of the most technologically advanced ships in the world has shaped a global commerce with such a large wake that no other industry can compare with any type of equivalency. International and national shipping has been dominate as one of the principle forces in our ever changing economy. As movement across our seas continually increases, it has become a stable connector of continents. Shipping has developed into one of the fastest growing and most influential industries in our world today. It allows for intercontinental relationships, cargo exchanges, economic dependencies, world-wide employment, and technological advancements all within these multibillion dollar conglomerates. These industrial aspects come together to

create both an at sea and onshore experience not to be reckoned with. This oceanic means of travel brings across billions of dollars of goods each year into ports along our vitally important coastlines.

Worldwide ports provide crucial connections as processing facilities imperative to the success of cargo movement to its final destination. The interrelatedness of motion, shipping, and port management has developed a dependency on each of these segments along the concrete circle of the transportation industry. This detailed analysis of the port system from both a business and practical position examines functional daily operations, procedural offloading, ship movement, facility management, and the container transformation of the industry during the 1960s. Governmental interest has also increased awareness of environmental issues related to the shipping industry. Environmental protection through Coastal Zone Management Programs and Acts has highlighted the difficult balance between local aesthetic pleasure and a growing economic business in a realistic view. This centralized dependency surrounding the functions of ports reveals the commitment we have made as individual countries to each other and forces a centralized concentration of all the demands we place on shipping to sustain an economy of trade. To put the role of shipping in perspective, "ships carry some 99 per cent of world trade in volume terms and almost 80 per cent in value terms, the remainder being conveyed primarily by air" (Branch 13). The shipping industry highlights every aspect of transportation including the detailed, strictly scheduled, and technologically advanced process of port time.

"Along the coasts and Great Lakes of the United States, there are 1,435 navigable waterways, harbors, and river stretches" (Hershman 3). Ports dot these coastlines providing landing terminals for both foreign and native ships carrying goods and seamen ready to disembark. Technically, a port's main function is to provide services necessary for cargo

turnaround in an effort to move freight closer to its ultimate destination. In a textbook analysis, this certainly would suffice, however, ports are valued with much greater appreciation as an indispensable portion of a multi-dimensional and complicated process. A seaport symbolizes business, visual economics, and a center for trade in a highly structured but hectic arena. Ports represent international and national relations and act as welcoming committees to vessel crews and cargo, as a port may be the first physical contact for a ship with land in weeks. As a place of employment, these sometimes cities unto themselves signify a customized language, skill, geographic region, and culture. Functionally, ports denote steadfast scheduling, committed work staff, a battle against loading deadlines, environmental concerns, and local coastal resident relations. A port embodies every aspect of the words arrival, departure, safety, and technology. In the whirlwind of the basic, functioning activities, a port must also learn to encompass and balance these underlying responsibilities.

Port development has reached a pinnacle position in the past several decades. Both individually and collectively, ports continue to accommodate current needs and fulfill expected duties, all the while aiming to recognize a growing demand and keep up with technological advancements, improve competitive positioning, and struggle with local and industry pressures, usually under a limited budget.

The governance of ports is a difficult role undertaken by one of several different authorities, known as public port agencies. Their general responsibility revolves around the concept of "developing, managing, and promoting the flow of waterborne commerce and to act as catalysts for economic growth. Currently there are 126 public seaport agencies along U.S. coasts, as well as Puerto Rico and Guam shorelines which regulate these seaport facilities" (www.aapa-ports.org). The general term *port agency* includes the regulation of trains, commuter

rail, bridges, and airports as just a few examples of the responsibilities of this transportation governing body. This analysis, however, is specifically related to the more than 2 billion tons of cargo shipped over waterways and through our vital seaports each year. Many major seacoast cities have invested public funding into the development of a port, basing this massive financial venture on the importance of cargo transport in their individual state or local economy. The huge monetary investment necessary to develop and sustain a working port is justified by these areas in that they directly and positively affect employment, product availability, and create favorable market conditions. A public port authority receives funding from local and state residents via tax contributions, some national level subsidy, and a large percentage as individual account income; from a business standpoint, a port is just that, a *business*, and therefore requires a profit margin for continued existence.

In many public ports, these forms of income make a substantial contribution to overhead costs, yet unfortunately, often times do not generate enough for economic feasibility. This fact has led to the recent popular trend of another type of port governing body: a public/private partnership. This rather specific sector requires the collaboration of a public port with a private industry. The Port of Portland, Oregon, for example, developed a public/private partnership with Toyota Logistics Services. Toyota's investment of $30 million coupled with the Port of Portland's investment of $10 million allowed for the auto import and processing facility completion January of 2005 on the West coast. The joint venture allowed for new dockage, shoreline landscaping, environmental and aesthetic improvements on behalf of the public port along with the majority of Toyota's capital directed towards new buildings, facilities, and the largest expense being technological advancements. "Over 175,000 imported and domestically built Toyota vehicles are expected to be processed annually through these port facilities"

(http://www.aapa-ports.org). Through the alliance of these two organizations, an efficient, advanced, and *profitable* business was not only implemented, but successful.

The trend in public/private partnership stems from two risks facing not only ports, but essentially any other business dealing establishments. The first risk is the major underlying principle in any successful (or unsuccessful, for that matter) business: cost risk, the potential of initial investments surpassing actual charges. The foundation and support of a large, private industry in conjunction with the public sector helps to solidify traditionally unstable starting initiatives or low funds. Revenue risk, also known as commercial risk, is essential once business is in practice. A large company partnership, such as Toyota, creates a cushion of previous industry trade, experienced corporate members, and financial backing. The benefits received by the private entity by partnering with a public port include an increased connection with the public sector. The public Port of Portland, in this case, worked extensively with public investments to develop and carry out a service which many community members appreciate, finance, and want to see succeed to help Portland's economy. The public involvement opportunities for Toyota seemed to outweigh the 75 versus 25 percent investment on the auto company's behalf to develop a great team effort with a beneficial outcome for each party.

Over 150 U.S., Canadian, Caribbean, and Latin American port agencies are represented by a globally recognized organization, the American Association of Port Authorities. Headquartered in Alexandria, Virginia, "AAPA promotes the common interests of the port community and provides leadership on trade, transportation, environmental, and other issues related to port development and operations" (Sherman). The association works extensively to inform the public and its authoritative figures on the imperative role ports play in our transportation system on both a national and international level.

The association's first meeting was held in New York City, 1912, where an official meeting of U.S. ports was called to promote discussion and develop ideas to create a unified grouping of essential ports within the country. Eleven ports attended the first conference and the association grew exponentially. In its earliest years, AAPA was created during a turning point in public port administration. Hardly any states owned their own port facilities and the few large ports on the seacoasts were taken over by the transportation monopolizing railroad companies. Many supporters joined AAPA in an effort to alleviate power from this locomotive supremacy, and AAPA was gaining commanding steam. Since that first gathering 94 years ago, the American Association of Port Authorities has a 10-member Executive Committee and a 66-member Board of Directors. Association efforts now envelope the advancement and education of seaports within the entire Western Hemisphere. It has printed directories, created a magazine, developed surveys, glossary, and texts, all through its annual budget of $2.2 million. Most importantly, AAPA has guided the process of initially unheard of or early start up costs and concerns of publicly owned ports.

Massive technological advancements in port machinery, along with the sheer size of port facilities and capabilities have created an industry where it is no longer inexpensive to move cargo. During the World War II era, ships could be docked for $500 per day. Now, only decades later, realistically rising costs ring closer to dockage fees of $50,000 per day. It is not difficult for a port to operate 'in the black,' referring to the standard accounting principle of creating income. Rather, the problem is generating enough revenue to cover the unbelievable operating expenses such as dredging, dockage increase, machinery overhead, and payroll. New age concerns such as the high demand for waterfront property and therefore the premium dollar paid for coastal land has increased the territory prices which ports are looking to purchase. Income is

most commonly obtained from loading charges, dockage rates, wharfage, and demurrage fees. The changing economy brought with it an array of industry changes. Ocean crossing voyages were becoming more expensive, processes were becoming faster, facility machinery more complex, and one of the most amazing changes was the alterations made to the shipment container.

As the revolution in container development evolved, the use of a unified transport box fell into place. However, the much needed concept of standardization had yet to be widely embraced. Prior to the mid-1960s, each shipping company primarily used whichever sized container best fit their product and needs. Although companies would traditionally use the same sized container within their own shipping fleet, containers among competitors in the industry ranged anywhere from 35' boxes by Sea-Land Corporation and 24' truck beds by Matson, down to even multiple shipments at one time of 8', 12', or 15' containers (Hannes). Although it may appear as a relatively minor difference, this lack of standardization prevented any form of inter-shipment overall among the industry, and in turn, unknowingly promoting a limited level of individual growth.

This need for a universal approach to such a rapidly growing division of commerce led to world standard container sizes in the mid-1960s. The International Organization for Standardization, ISO, is the world's largest developer of standards. "On the basis of one member per country, ISO is a network of the national standards institutes of 156 countries. Their standards contribute to making the development, manufacturing, and supply of products and services more efficient, safer, and cleaner" (http://www.iso.org). The nongovernmental company began in 1906 with a focus in standardizing elements of electronic and technical fields. Interestingly, the abbreviation ISO does not parallel the name, International Organization for

Standardization. As an international association, each language has a different translation. Since its first days in the early 1900s, originators decided to use a word derived from the Greek term, isos, meaning 'equal'. No matter the country, language spoken, or title given to the organization, the acronym used is always ISO (http://www.iso.org). Today, it helps establish quality products for consumers, equal regulations for producers, regulates the market with some stabilizing balance, and, in terms of shipping, researches the most cost effective standardization options for the economy.

The ISO standards allowed container dimensions to be set at lengths of 10, 20, 30, 40, or 45 feet. Widths must be 8'0" and the standard height at 8'6'' (Hannes). The 10 and 30 foot containers never popularized and during the years following these initial regulations, a 9'6" height 'high-cube' container became common and was eventually standardized by the ISO as well. The volume of cargo that a port or vessel can hold is most commonly measured in terms of how many TEUs will fit in the confines of available space. TEU stands for 20 foot equivalent unit, referring to the smallest of the common sized containers. In the earlier years of container ships, commonly known as box boats, maximum TEU capacity averaged 1,000 to 1,500 boxes. To put it in perspective, the largest ship in the world, built in 2005 is the MSC Pamela, at an overall length of 321 meters, can carry an impressive 9,200 TEUs. (http://en.wikipedia.org). A view into the future reveals production has already commenced for the Suezmax ship, capacity at 12,000 TEUs! The next step, also in the planning process will be the MalaccaMax vessel. At plans for 470 meters long, the design of this ship will allow for an 18,000 TEU capacity. Interestingly, it is not the colossal size of the ship holding back production, rather the inability to find a manufacturer able to create a 10 meter long, 130 ton propeller. (http://en.wikipedia.org).

Truly, at this stage of level of transportation capability, port facilities will once again need a redesign to accommodate such gargantuan ships.

When these regulations became globally accepted, shipping companies soon realized they owned entire fleets of non-standard sized cargo holders. With this industry change and the entire shipping world adjusting to this new criterion, corporations found themselves dealing with their shipment containers in different ways. Some companies continued to use their current boxes against standards, basing their decision on the usually small size of their company, limited domestic or regional distribution, or minimal exchange between shipment companies during the route. This choice proved to be an extremely difficult means of survival. Large ports were developing highly technical mechanization methods for the now common sizes and eliminating their older machinery used for these relatively obsolete, non-traditional box sizes. Although there are still a few non-standardized companies today, and the majority that converted took decades to complete the change to their fleet, most have completely converted to the standard dimensions due to easement in the ports, on and offloading turnover time, and a sheer need to remain competitive in this growing market.

Though world trade continuously rose through the twentieth century, the trends of an international economy became an especially dominating concept during the 1950s. Economic dependencies branched out among countries, reaching across oceans at a much greater volume than pre World War II tendencies. It was at this time that technological advancements became a leading concept in the shipping industry. The most incredible of all technology changes made to the industry was initially begun in 1956 by Mr. Malcom McLean, creator of Sea-Land Corporation (Hershman 126). His efforts altered the containerization process of shipped goods in one of the most dramatic changes the industry has ever seen.

The movement of goods via ships dates back to Roman times where men carried individual items onboard and the loading process of a relatively large ship could take substantially more time than the actual sea voyage. As time progressed, gradual innovations were developed to assist this process, such as dollies and forklifts in more present day times. Before any successful standardization efforts, ships spent upwards of *50 percent* (Hershman 130) of their life docked at port, a fact shipping companies soon realized to be an unacceptable figure if any profit were to be made. Therefore, many took on the endeavor of creating a shipping method to standardize travel containers in an effort to decrease on and offloading time, in turn decreasing port time, and finally, increasing profit.

The process of containerization is simple enough. The ideal situation allows for the packaging of any type of good onshore, away from the port area. When the vessel arrives, the boxes are quickly loaded onto the ship using highly technical cranes whose base is located on the port pier. The ship would have preset grooves or another fastening device to secure the boxes as they traveled to its next destination allowing not only a safe trip in rough seas, but a maximization of space onboard each ship deck. Boxes had to be developed to transport a variety of products, including perishables needing refrigeration or liquids that could not leak, for example. Once each shipment arrived at its destined port, the process was the same, again, using the standard equipment on the docks to match the standardized containers.

One initial attempt was the Conex box, developed by the U.S. Navy to originally aid in World War II military travel needs from the United States to Korea and Vietnam. “These boxes were 6x6x6’ in size and used basic principles of containerization to maximize efficiency” (Hannes). Though some Conex boxes are still utilized in today’s shipping world, they lacked a

dramatic enough change in loading productivity; it was the initial efforts of Mr. McLean that really revolutionized this industry alteration.

Mr. McLean was employed as a trucker at one point and used this industry knowledge to realize the irreplaceable impact the trucking aspect of the shipping process had on industry travel time. Mr. McLean's first containerization attempt was actually the shipment of an entire van style vehicle. Port cranes would lift the cars onto ship decks; the vans would be secured for the trip and offloaded in the arriving city. Problems arose with a continued limited productivity increase as well as the need for specialized drivers and vehicle regulations in the arriving country. This preliminary thinking led to Mr. McLean's extremely successful concept of containerization as we know it today.

Realizing his setbacks from the van transport idea, he developed a very basic truck body that could be detached from the cab and chassis, loaded onboard, secured, and offloaded in the arriving country. "On April 26, 1956, a crane lifted fifty-eight aluminum truck bodies aboard an aging tanker ship moored in Newark, New Jersey. Five days later, the Ideal-X sailed into Houston where fifty-eight trucks waited to take on the container boxes" (Levinson 1). This was the first containerized shipment and the transformation of an industry. All that was needed in the arrival location to continue shipment was a standardized chassis and truck cab. Even the unpacking process typically accomplished in port could be postponed until the final destination. Companies began to realize the trend in standardization of port shipments and soon understood this amazing concept decreased the on and offloading process by approximately *30 percent* (Hershman 130). This containerization idea developed solutions to problems from even the earliest of shipping methods. The change resulted in less damage of cargo via handling of the actual product by stevedores, minimized easy freight accessibility and therefore less theft, and

certainly lowered the percentage of lost cargo as it remained stored inside containers from point of origin to final destination. The linear alignment of cargo in TEU containers onboard also allowed for a maximum use of deck space, never utilized to the fullest extent before. Exposure to the elements in initial cargo holders that could not stand the weather on top of a ship deck required below deck storage in earlier shipment times. With advancements in this container technology, space for transport was increased along with a substantial decrease in offloading time, as now cranes simply retrieved boxes off the top deck or reached down into deep holds through very large hatches. "Loading loose cargo on a medium-size cargo ship cost $5.83 per ton in 1956. McLean's experts pegged the cost of loading the Ideal-X at 15.8 cents per ton. With numbers like that, the container seemed to have a future" (Levinson 52).

If other shipping companies did not attempt to keep up with Mr. McLean's Sea-Land Corporation advances, their place in this rising and cutthroat industry was soon to be extremely unstable. This advancement was the turning point for major changes in the transport of goods, while also severely impacting turnaround time, ship size, port employment, and seaport technology. As the global shipping world continues to adjust and expand on a variety of levels, the most expensive and drastically improved aspect, however, is without competition, the advancements made in port and ship technology. In order to maintain the unbelievable import and export reputation (in terms of volume) the United States possesses, it is imperative to allocate financial funding for port advancement projects. Nationwide port efforts towards facility modernizing and growth in the U.S. alone average just over $1.5 billion each year in investments. Seaside efforts predominantly include port size expansion in terms of acreage purchasing, followed by the fast moving, yet expensive concept of machinery mechanization.

Beginning in the early days of ports, cargo movement was accomplished through the hard and diligent efforts of muscle power. From the start, this process proved difficult, hazardous, unreliable, and most importantly, time consuming. The most valuable asset a machine contributes in any production situation is that it never tires of work. The dependability of these creations coupled with the ability to process multiple times the strength of a human hand far outweighs the costs of maintenance and initial purchase price. In the essence of their actual purpose, ports are not designed to create a final product. Their main function and measure of quality of business is the speed at which they could transport cargo through their facility.

As the originators for modernization began the ever-changing adjustments, they found it possible to categorize the desired end result into three procedural sections. First, any change to a process in the transportation facility will directly impact the previous and following stages. For example, newer age technology in ship engine development leads to faster, larger ships, and as a result, less travel time. On the loading end of the voyage, a bigger vessel could lead to more tonnage and a reassessment of the amount of product to be transported. With a more powerful engine, potentially more ship could be moved, and therefore more product could fill the increased footage of the larger vessel. On the receiving end, a faster engine would decrease ocean time and therefore place more pressure on the offloading procedures as they would be more frequent with faster ships. Ports would require an increased regularity of delivery mode from the port to the final destination, whether it is an increased number of truck chassis's at the port or more frequent schedule of railroad cars.

The second finding by the initial instigators of the modernization process dealt with the form in which products were moved through port. As Mr. McLean revolutionized the development of containerization, the principles of his observations rang true again in smaller

form. Many products, especially in primitive shipping times traveled as individual packages or were just finding their way, in terms of financial feasibility, into containers. No matter which shipping box was used for transport, the second rule determined that cargo units must be as large as realistically possible and products must be in containers for as long a time between the initial shipment and final consumer destination. This concept allowed for minimal unpacking/packing efforts, resulting in shorter time in transit and less manpower needed in port for excess work.

The third principle of which these founders deemed important dealt directly with the mechanization of machinery in a newer technological age. For maximum use, equipment must be used to its fullest potential at all times. This third and final thought process was developed in order to fully appreciate the value of each expensive piece of machinery in an effort to lower handling costs in port. If a crane is able to lift two containers per trip and it is only transporting one, it is simple business to realize loading procedures will take twice as much time and, in turn, twice as much overhead costs. These 3 principles paved the bumpy road to a deeper understanding of the inner workings of port management and the changes necessary to mechanize the industry.

Post WWII efforts led the way for the port modernizing efforts through forklifts, small scale cranes, and conveyors. It was after the war efforts, when much of this machinery debuted as potential for everyday port use and played a large role in the global scale battles, that they begin to be considered for incorporation on a smaller scale into the ports. The first necessary major change was the facility layout. Docks were not initially constructed to cater to the size and weight of these cranes. Pathways between buildings and docks were not always smoothly paved. Railroad tracks were relatively close to the water's edge, but these new efforts required a physical closeness relationship between the two. Intensive capital was first allocated to these

proximity barriers and similar efforts in the reconstruction of the port design. The thought process, and rightfully so, was that properties must first have the capacity to hold new machinery and faster processing before any purchasing in order to be successful.

This major adjustment in new machinery was further divided into three categories: (1) machines that were meant to lift and lower cargo, such as forklifts and cranes (2) machines made for cargo transportation over distances, such as trucks, tractors, trailers, and conveyors and (3) machines used for loading and unloading cargo such as forklifts, piling machines, and gantry cranes (Oram 67). Over time, it became imperative that each machine performed in the category they were originally intended. Port management found that for example, small forklifts were often used for relatively long distance traveling between ship and storage or truck. This proved to be an expensive choice; it was not the most efficient in terms of time or fuel not to mention potential machinery failure due to over exhaustion. Although this practice may still occur on a much smaller scale today, the early days of modernization saw the trial and error necessary to gain this and similar valuable knowledge and adjust regulations and machinery accordingly.

Although each piece of equipment had individual characteristics, there was an overall theme of *mobility* connecting this new age in port workings. Relatively simplistic mechanics had been used to perform tasks, but before these modernizing efforts, these machines were primarily stationary. Expensive maintenance and overhead costs on immobile machinery continue to increase, especially when a machine is not in use. With a mobile device, work can be done at all times, in any location. This advent in portability, though initially expensive to purchase, decreased daily overhead costs for the port. Take, for example, a permanent structure crane located on Dock A, a port's main dock, was used to offload trailer containers. As years traveled by, the port became increasingly busy and began to utilize its once auxiliary Dock B in

conjunction with Dock A as a primary facility. As long as offloading schedules permit, a movable crane would easily travel between the two docks, not to mention have the ability to be in storage when not in use to prevent weather deterioration. However, with the present crane, the immobility prevents any of these opportunities. Identical to the importance of movement in transportation, mobility is *key* in the delivery of port objectives. This first step in the modernization process proved to be a huge financial endeavor for the port facilities. The capital necessary for any one piece of new equipment could run well into the millions. The way the industry was changing, however, made these adjustments a requirement to sustain business rather than a suggestion in this competitive form of commerce. It was contributing factors like these, such as the need for large capital that eventually led to the combined efforts such as public/private partnerships that ports formed with existing, well established companies to survive.

Other technological advancements have also added to the growing speed of delivery through ports. Just-in-time inventorying techniques are a relatively new and quickly evolving method of product delivery. This extremely specialized type of inventorying is primarily used by larger, worldwide companies, such as Wal-Mart, due to its overall expense and primitive stages of development. Just-in-time procedures require a complex and detailed computerized system on the part of the company. Wal-Mart, to use the example mentioned above, has bar none, the most sophisticated just-in-time inventorying system in the world. At every world-wide location, each item is scanned at checkout and relayed to a master computer program to report one less of each checkout item remains on their store shelves. When a certain number of each product remains on site, (numbers are based on statistical evidence and popularity by purchase) an automatic order is sent to the wholesaler by Wal-Mart for an immediate shipment. When the order is placed, the

shipment process begins. The sheer size of the Wal-Mart Corporation makes it a valuable outlet for any wholesaler to sell through. It is certainly to Wal-Mart's advantage to be such a dominating figure in their industry and therefore can require that their wholesale companies follow these just-in-time principles. Any smaller corporation would not have the power to enforce these restrictions on their wholesalers, but the lure and success of big business can often make such monopolistic rules a reality.

The advanced computerized technology linked to this just-in-time inventorying concept has put tremendous strain on the structure of shipping. The underlying concept is to ship items to the store on a need basis requiring little, if any, storage time for the product as well as a zero dollar financial investment before items plan to 'hit' shelves. Therefore, when the order is sent, timing must be exact in terms of receiving the product in the store. There is no tolerance for setbacks in scheduling and movement, putting pressure on the ports to decrease port time and stay in stringent accordance with the timing agendas. If Wal-Mart sends an order for bicycles from China to be delivered in two weeks, their statistics represent a nearly empty shelf of bikes in stock by the delivery date. Delays in delivery or postponements in port could lead to a near zero inventory selection for the customer for an undetermined period of time. With the world relying more on computerized technology, we are closing in the once remote sections of the globe. Shipping began as the extensive, uncertain process where transportation took weeks into months to arrive and port time often outlasted actual travel time. Now, with magnificent machines in port and elaborate computerized programming, port time has become a shrunken ring in the chain of destination.

The expanding wings of the global sea shipping industry are extending into all sectors of the water transportation segment. In fascinating and extremely recent news coverage, discussion

has been brought up in hopes of updating a landmark which was, not so long ago, the epitome of world-wide cargo shipment via waterways. At less then one hundred years old and one of the most impressive undertakings of its time, the Panama Canal is officially and unbelievably outdated. Built by U.S. engineers and opened in 1914, the Panama Canal "uses a series of parallel locks 108 feet wide to move ships from the Atlantic to the Pacific on a 50-mile route that rises, at it's highest point, 105 feet above sea level" (Aguilar). Its primary goal is to speed the process by which boats travel between oceans in an effort to avoid the time consuming and often weather dependent task of traveling up and down South America's coastline. The Canal proves to be a substantial income segment for the country; last year, 13,000 ships passed through the lock system, paying $1.2 billion to Panama in canal fees to be used towards maintenance, facilitation, and other country wide needs (Aguilar). As vessel size increases and, at no point looks to be slowing down in the advancement of bigger ships, companies are gradually less able to utilize the Panama Canal; put simply, they do not fit the lock dimensions. Subsequently, the alternate route from Asia to the port of Long Beach, California is increasing in frequency at unbelievable rates, giving Long Beach title to being one of the busiest seaports in the world. More cargo passes through the Port of Long Beach than any port other than Los Angeles in the entire United States.

In response to the diminishing business in the Canal due to gargantuan vessel size, Panama's President, Martín Torrijos, has proposed a multi-billion dollar plan to voters. His idea is the undertaking of the possible decade long project to expand the locks in order to accommodate these massive crafts. To be decided later this year when more concrete studies and research have been conducted, Panama's main concern for the Canal in its present state is the loss of income from alternate ship routes. A large majority of residents seem to agree with the

initial plan proposal; however critics argue expense and alternate options as a better means of alleviating foreseeable financial woes. One such option brought up at preliminary negotiations would be the development of a $600 million transfer station on the Pacific side of the Canal where cargo from ships too large for the current lock system would be offloaded onto smaller vessels, travel through the waterway, and picked up on the other side. Arguments suggest uncertainty in growth and weariness of the shipping economy, which therefore questions the value of such a large financial endeavor of lock expansion by Panama in such an unstable market. Those opposed to this transfer station project, however, argue the option to be unreasonable and a step backwards in the successful containerization efforts. Adding a secondary on and offload site will most assuredly increase port time and delay arrival, something the industry has worked diligently to reduce. Nevertheless, Panama is facing a situation where some type of action must be taken. The advancements in shipping are creating an industry where 'bigger *is* better' and those who want to compete must play the game. Time really is money and Panama's recent efforts and relatively close referendum date shows they are wasting no time in addressing the issue.

This major industry alteration of technological advancement and size development affects the industry on several multi-dimensional levels. The expensive machinery decreased port time and the loading process, drastically affecting our abilities, worldwide, to transport at speeds which, at one point, could only be dreamt of. This modernizing process began the figurative shrinking of our globe. We were connecting more places with more products at unbelievably high speeds. Due to this massive industry change, the direct impact on other related segments caused a small uprising in the security of employment in this once strictly manpower dominated field.

As one example of the drastic changes made to the employment sector by technology, author Fairley explains, "Sea-Land estimated that 24,000 working hours would have been clocked on a 40,000 metric ton containership unload/load using traditional, breakbulk methods. The new process would require a total of only 750 working hours, a productivity gain of 32 times" (Hershman 130)! Now, what may be profitable and provide growth potential for one 'side of the coin,' is truly bad news for the other. The 'first side of the coin' represents increased productivity, faster, more efficient product flow, and more dependent and consistent work by machines for the port management and facility directors. The other 'side of the coin' looks comparatively drab, scratched, and dull as it signifies the once massive scale employee population. Even today, inclusive of the major technological changes, positions ranging anywhere from longshoremen and dock crews to stevedores, loaders, transportation drivers and equipment operators number over 4 million American workers. These jobs generate an astounding "$44 billion in annual personal income and $16.1 billion in federal, state, and local taxes, not to mention port contributions of $723 billion annual to the Gross Domestic Product" (www.aapa-ports.org). Nevertheless, job security was certainly not organized before or stable during this modernizing process.

In the early days of port development, during the years surrounding 1850, a few strong men were 'employed' to handle the on and offloading process of small ocean vessels at the town seaport, which, in most cases was represented by a few docks along a shore of the inner harbor. When calm weather prevailed, burlap sacks were transferred between ship and dock. The men often fished in the downtime, which was sometimes more common then the manual labor. The industry was in its beginning chapters and the dock workers took the simple life for granted.

They were content with their role as the working welcoming committee and forming strategic alliances or unions was not a thought in anyone's mind.

In both a past and present day analysis, port labor is a difficult comparison to any other field which requires employees. A factory, for example produces a visible, tangible product. Managers can tally yearly totals and assess necessary hires and fires based on annual production or income. More goods off the production line may require a larger staffing of workers. A great year of sales could represent a company wide worker bonus. In factory (or a similar setting) work, a weekly schedule provides regularity and a consistent paycheck delivers expected support. Comparative to factory production, dock work held no sense of consistency. A port does not *produce* any said product, resulting in the only realistically feasible measurement of success, and a difficult one at that, as the efficiency of transportation. Until relatively recent times, there was no system to the arrival of vessels; workmen were expected to diligently labor when boats were docked and leave (or not arrive) when the day was slow. Staff was not kept on hand when there was limited work to be done. Most early dock workers were new to the country and unfamiliar with American customs. They found dock conditions difficult to work in, in terms of understanding tasks, co-workers, or machinery operation. . This approach left workers frustrated; unstable hours equaled irregular paychecks and uneven earnings among workers; it became increasingly difficult to gauge income. As the industry grew and the need for employees increased however, changes began filling in the cracks of the once carefree life of burlap sacks and fishing downtime.

As small swells began to form in the beginning of change for the shipping industry, the unsteady work environment began to feel those slight swells break with white caps. The first modern longshoreman's union was officially recognized in 1864, formed in the port of New

York. Although it took years of convincing and resistance proved strong, the Longshoreman's Union Protective Association, LUPA, was the cornerstone of the unionized port work we know of today. Containerization and modernization began to decrease onshore labor requirements while still increasing productivity rates. Employee frustration and tension rose as their valuable positions were quickly adjusting. What was once a profession of strength, demanding power and vigor where men originally prided themselves in physical accomplishments was being replaced by complex contraptions of steel machinery, equally maneuverable by (gasp) women! Although a few strikes had been loosely organized against poor pay, difficult conditions, and the threat of automated replacement, the lack of collaboration among the longshoremen seemed to work against its goals. In an interesting interview to research more on this topic, I learned through my grandmother that my great-grandfather, Victor Demarest, operated loading cranes. He began this career by unloading granite blocks from Maine on docks in the East River of New York and later loaded torpedoes, among other cargo into ship holds on their way to partake in World War II. This personal discussion put light to the issue of the dangers of port work even after official unions had been recognized. My grandmother's reflection as a child put the potential hazardous job into perspective, "For years, he climbed the gantry crane ladders to the sky where he stood and operated ship loading (no heat or air conditioning)…that operation, like many loading jobs required you to work with only signals, you could not "see" the object, putting great faith in the trust of your co-workers. Mistakes could be awful. He was proud that he never had a fatality. But then again, he didn't talk about his work much, and I do know there were bad days."

To protect benefits, job security, and dangers from this dominating mechanization, two particularly opposing unions were formed. The first union actually originated from the Association of Lumber Handlers, founded in 1877 which was primarily concerned the workers of

the Great Lakes as they handled the transportation of timber through port. In 1892 it was renamed the National Longshoreman's Association of the United States and a few years later renamed itself the International Longshoremen's Association when membership invitation extended to the Canadian workforce. By 1905, Dan Keefe, an Irish tugboat worker, became comparable to today's CEO status, organizing the ILA's nearly 100,000 members spanning the United States, East Coast to West Coast.

The second union of interest was actually formed as a result of a 3 month long strike in the Western United States. The International Longshore and Warehouse Union, ILWU, was established after the 1934 West Coast longshore strike based out of the largest port in California at the time, San Francisco. These years depicted the worst economic times for the port worker positions. The U.S. was the only country where such a large foreign trade was developing yet was not regulated by any laws to protect the safety of coastal working longshoremen. Since the beginning, efforts had been continuously made up to this point to develop some sort of civilized collaboration between employee and benefits, yet nothing thus far had provided the concrete foundation needed for serious improvement. "Even the Clayton Anti-Trust Act of 1914, which legalized strikes, boycotts, and peaceful picketing, did little to improve actual working conditions for longshoremen" (www.ilaunion.org/history_begin.asp). West Coast activists, represented by the aggravated port workers, dilligently struggled to receive their demands: a coastwide contract, a hiring hall, and a waterfront federation to aide in the success of the union they hoped to create. Negotiators agreed to consider, as long as the workers agreed to an open shop approach. This concept refers to a general United States term in which it is possible to be employed, or continue already existing employment without joining the forces of a union. As an unfortunate response to such contradicting demands, a violent strike ensued May 9, 1934 in

every major port along the Western Coast of the U.S. Strikers battled against their employers as they tried to reopen port business. Local police found themselves overwhelmed and fighting resulted in shotgun strikes to four people amid the chaos.

It was not until the National Guard was called in when picketers and strike supporters slightly retreated. "The San Francisco and Alameda County Central Labor Councils voted to call a general strike in support of the longshoremen, which shut down much of San Francisco and the Bay area for four days" (http://en.wikipedia.org). It was determined that remaining negotiations would be resolved in peaceful discussion. Most requests by ports were won by the longshoremen, and those not initially accepted were eventually gained with time. The main objective of port worker demands surrounding the idea of having a body of rules to govern port operations. The employees felt it imperative to have this type of code in order to protect jobs and create some form of uniformity between major industry competitors. The negotiators realistically had a small chance of rejecting such requests on the basis that one, they could not afford the interruptive boycotts and the effect they had on business and two, the collective power these workers were gaining made it one of the only practical solutions. As a direct result of the strike, the International Longshore and Warehouse Union began and has since grown extensively. Today, the ILWU represents 42,000 members in over 60 local unions throughout the country. One interesting action by the ILWU occurred in 2002, when the Union was accused of intentionally slowing down dock work to create a similar effect of striking. This action riled governmental administrations into reassessing which natioanl acts longshoremen are covered under. For example, although coverage for these employees is currently under the National Labor Relations Act, many anti-union supporters have encouraged the change of coverage to be under the Railway Labor Act, which would state any striking by these groups to be illegal.

The ILA and ILWU are two unions which have surpassed the strains of resistance by many opposers as they continue in existence today. Especially during the organization's early and developmental years, many unions found the pressures to fail overwhelming and often succumbed to their own demise. Violence broke out, union workers would strike or boycott, and fighting or a loss in wages was almost a guarantee. LUPA, the first among the union concept, was disassembled after just a few decades of existence. Though it appeared to be taking years of effort, organization, violence, and loss of employment or wages, not to mention the economic disruption that the boycotting activities held on cargo transportation through port, it appeared that port workers were finally becoming recognized as a unionized industry. Unions are now common among many aspects of the shipping industry and in most cases, required by workers based on the closed shop approach they initially fought for. Onboard ship crew, for example, must be union members. What was once a hopeful goal for early dock workers has now exploded into an industry unto itself. Ship engineers, as one example, must belong to a union, as previously stated, and have a variety of choice between three major unions: the Marine Engineers' Beneficial Association, MEBA, American Maritime Officers, AMO, or the International Organization of Masters, Mates and Pilots, MMP. Though each is slightly different in membership and benefits, the groups collectively provide the basic idea of harnessing the collaborative power of workers to unify and work as an industry.

As years pass, change inevitably occurs with the times. It is sometimes said that the only thing that stays consistent in life is the element of change itself. The gradual and expected changes brought about by the containerization story to the industry also brought about an array of social problems. One predominent theme among seaports was the evolving need for increased security. As this issue became a growing concern, measures were taken to avoid potentially

difficult situations. No one can forget the devastation caused by the events of September 11, 2001 and certainly before, but most assuredly after the attacks, strict actions were taken with U.S. port control; ports are, after all, our open doors to the global world.

Before September 11, already five years ago, port regulations were comparatively less strict than the rules developed for today's much different standards. In pre 9/11 times, rising problems were dominated by things such as illegal immigrants attempting to smuggle across borders via waterway transportation. With the continued increase in ship cargo capacity, immigration inspectors found it increasingly difficult to regulate and locate hidden passengers. In the thousands of cargo boxes per shipment, it was similar to finding a needle in a haystack and only a handful of immigrants were found within the containers at port. Port access was relatively easy to obtain from the outside in and vessel crews meandered in and out port gates during downtime on the docks. Loose security measures on the part of federal and state regulations were a gathering of several divisions which, collectively, formed a minimal level of cohesiveness in the purpose of security, prevention, and mitigation efforts.

In the aftermath of the 9/11 tragedies, the U.S. Congress completely revisited their department duties and reassessed the level of importance placed on securing our ports, especially from a similar terrorist attack. The Department of Homeland Security, DHS was developed in an effort to bring order to the chaotic and disheveled sense of border protection. "There are now four main federal agencies charged with securing the United States' borders under the DHS: the Bureau of Customs and Border Protection, CBP; the Bureau of Immigrations and Custom Enforcement, ICE; the United States Coast Guard; and the Transportation Security Administration, TSA" (Nuñez-Neto). The Homeland Security Act of 2002 dealt directly with the DHS in an effort to combine currently unorganized responsibilities among several federal

departments. Today, U.S. ports are governed under the Homeland Security Act through the Directorate of Border and Transportation Security, BTS. The division's main goal is to protect every coastal ports of entry including all onshore and some offshore security and mitigation. In an interview with Mr. John E. Dunn, 2nd Assistant Engineer Motor and Gas Turbine and a three year employee with Seabulk Tankers, he disclosed his firsthand experience of port security. "In the months directly following the September 11th attacks, the government found themselves in a state of uncertainty and panic. Every port was given general, unclear guidelines by authorities and told to handle security as they saw best fit. Although regulation has since become more organized, at times, it continues to be unstandardized and frustrating for port workers and vessel crew" (Dunn). Regulation protocol was primarily administered by the Coast Guard. Safety procedures and responsibilities were extremely vague; on one hand, the situation was understandable, the United States was in a vulnerable position, to an extent that it had never been before. There was no 'manual' or previously determined steps to take to alleviate the terrorist situation we were now facing. On the other hand, however, the U.S. government is the backbone of our existence. When one state falls, Congress and the Federal government arrive to assist. When we are at our weakest point as a country, our leaders and organizations must be strong enough to offer the support and tenacity to fight through.

Mr. Dunn's testimony relayed that the support circle of the federal government efforts was not completely connected. Perhaps it was because of an uncertainty of exactly which actions to take, or due to a sense of being overwhelmed, Congress passed off the duties of assessing and implementing increased border patrol to the U.S. Coast Guard. A sense of panic by the Coast Guard caused the creation of very ambiguous rules and actually led to each port developing their own standards based on the Coast Guard's minimalistic rules. On such an individual level, ports

were extremely uncertain how to determine, create, and allocate the necessary ordinances required for the new, stringent border safety patrolling. Therefore, most port agencies created personalized regulations according to what they saw would best address their own faced problems. From Mr. Dunn's viewpoint as a crew member, he found this system to be extremely difficult. For example, every port which his vessel docked at, to on or offload required the knowledge of an entirely new set of standards. In Providence, R.I., Mr. Dunn is free to leave the boat and meander around town to get personal items or tour for the hour or so he may have off official duties. However, in the Port of Philadephia, no matter position onboard, amount of time at the dock, or frequency of stay, no crew member is allowed to go ashore.

After the events of September 11th, the Port of Philadelphia, along with many other ports along our coastal waterways, has implemented the need for strict inspections before humans travel on land. The shipping corporation must pay for a private company in the port area to come aboard and inspect the crew (primarily for identity documentation) in order to go ashore, a process which has proven extensive, time consuming, and extremely expensive for the shippers. Often times, the companies will not be hired due to expense and usually lack of time. By the time the several hour procedures would be complete, it may only leave a matter of an hour to travel ashore. In most cases, the closest crew members can get to shore would be a far (but not too far) lean over the dockside railing.

Social pressures remain a continuing problem for port developers and agencies. As noted above, threats of terrorism have created stringent regulations on the port system and have resulted in an economic chain of effect. Not only does this new approach directly affect the shipping companies, but subsequently affects the workers in port, the companies needed to do the inspections, and the economy of the surrounding towns when crew members can not go

ashore. Another similar social pressure facing the shipping industry is that of environmental awareness. As a general population in the 21st century we are bombarded with efforts like 'Save the Planet,' recycling, 'Protect the Ozone,' emissions testing, landfill capacities, and hybrid vehicles. We have gradually become more aware of our surroundings and even more concerned of their limited supply. Resources are at an all time premium today and although efforts are being made in every industry world-wide, seaports have an amazing role in the enforcement and facilitation of the protection of our coastal waters. As interest in the conservation of the environment steadily rose, local residents and port authorities alike became concerned with the industry's approach to this steadfast matter; at the time when the 20th century was nearly halfway over, changes were soon to come.

In an overall assessment, transportation by water is the safest and cleanest mode of cargo movement. Collisions and spills offshore, though of devastating proportions, are amazingly small in number comparative to other transportation forms. "A ship loaded with one metric ton of goods sails farther and causes less air pollution on one gallon of fuel than an airplane (of comparable standards) flies, a truck drives, or a train travels" (www.aapa-ports.org). In this wonderful mode of cargo movement, it is imperative to collectively, as an industry, monitor the constant environmental factors which play such a large role in the success of port business.

Since the early days of port development, agencies have had to deal with all types of environmental issues. Until recently, however, these problems were usually in conjunction with physical rather than social difficulties causing distress or problems for further development. For example, a growing industry led to larger ships needing more dock space. The physical need for increased dockside facilities led to environmental challenges for the port to overcome dredging issues and filling concrete bottoms to create more docks in their lagoon areas. Initial seaport

creation required landfilling and the taming of wild forestry on land needed for facility development. Minor requirements were demanded of ports when making alterations or additions to their establishments. In recent years, however, the focus has shifted from a physical awareness to a more stringent social environmental awareness. Pressures on port agencies are derived from every possible source including residential neighbors, anti-port organizations, local environmental groups to save sealife, local aesthetics, coastal land, or commercial commerce, state regulations and probably the largest contributor to increased social strains on seaports, federal requirements.

According to necessary standards as well as voluntary projects, coastal port agencies around the U.S. have substantially contributed in large part to the success of environmental clean-up, awareness, and prevention efforts. Ports create wetlands for endangered species, educate the public of their intentions through presentations explaining their business related environmental impacts, conduct water testing on their waterfront as well as the surrounding locations, contribute to site clean up, and air quality monitoring. Most U.S. ports have found ways to adapt to these rising social pressures they face and incorporate their efforts through public advertising for both a personal and public benefit. These betterment dedications can be found on nearly every port website in a detailed section or as part of the mission statement. With the capital needed to construct and the revenues often created from seaport business, huge financial amounts are being allocated towards the advancement of environment conditions.

In recent years, several issues have risen to the once placid surface of global resource protection. Conservationists world-wide have rallied towards the leveling of an appreciation for both the need for a successful shipping economy as well as the preservation of our precious and diminishing Earthly qualities. As ports remain the dominating users (and sometimes abusers) of

the majority of our coastal entrances, seaport development and daily operations receive the brunt of conservation controversy. The containers were being built larger and more advanced every year, leading to a surplus of unused, rusting, and eroding older boxes. Thousands of old truck beds were left onshore among growing weeds; a physical eyesore and an environmental nightmare. The boxes were outdated for use and expensive to fix. Traffic and operations in port led to noise, vehicle bottlenecking, and record vehicle exhaust measurements. Even present day dredging for deeper channels exposes hundreds of tons of ocean ground, sometimes containing toxic particles that needs a new resting place. The excavation process disrupts and often destroys natural fishery habitats and affect nearby vegetation or natural forestry. Some wildlife reconstruction efforts are fruitless in that many of the affected underwater habitat areas have too little information known about them to properly create a similar ecosystem elsewhere. With continued port situations such as these and constant battles where chants of "Ducks not docks!" were resounding against port terminal walls, it was clear that mitigation efforts were no longer an option, they were becoming a necessary standard. Regulated and required programs by a variety of agencies were being developed and implemented to alleviate the growing issue.

Beginning in the early 1970s, it became a new responsibility of the ports to take on the role of environmental awareness. According to regulations, they must now show concern for issues such as air quality and pollution, public water access and shore development, and wildlife habitats. Until this point, any efforts by local, even national programs to develop awareness and conservation plans of coastal zones had been to no avail. Coastal management programs had been unorganized, incohesive, obscure, undefined, and orderless. The limited effort made by individual groups lacked the collaboration necessary to get the desired results. "In 1969 the Stratton Commission, a major federal study concerned with the nation's ocean-related efforts,

recommended establishment of a national coastal and marine resources program" (Goodwin 7). This suggested study would review coast to coast ports in regards to the technology changes and environmental alterations. At first, the public port industry was not open to this type of review and it took several attempts, including this suggested study which was never actually carried out, to finally establish a program that would stand its ground.

The first of many substantial initiatives developed for the described environmental awareness purposes was the Federal Coastal Zone Management Act, CZMA, of 1972. As one of the first successful programs of its kind by the Federal government, this Act provided legal and financial offerings to U.S. states in hopes of them choosing to design and implement individual coastal and water management programs. The state's responsibilities included creating the framework for their own policies and developing the necessary requirements to successfully carry them out. Each state would have to create programs that would *preserve, protect, develop,* and where possible, *restore* and *enhance* coastal resources. The purpose was to head a national scale system in which the ecological, historical, cultural, and aesthetic values, along with components of economic development were considered and managed (Marti). The Federal government's contribution was a substantial amount of funding, among other things, to help entice these states to partake in this nation-wide voluntary programming. To date, over 60 per cent of the states have become active participants of the CZMA.

The CZM Act was originally intended to combat two major problems facing the growing environmental dilemma: resource situations and organizational hazards. Its main objectives focused around resource problems such as use conflicts, public access issues, and environmental degradation. Organizational concerns were primarily of overlapping jurisdiction, insufficient information between officials, decision conflicts, and a general atmosphere of chaos and

strucural confusion. Before 1972, states tended to focus on a particular natural resource, such as wetland conservation or beach erosion, instead of focusing on the larger picture, like an overall/statewide shoreline protection effort.

When it was first introduced 34 years ago, the Federal government provided, on average, two thirds of the cost of the state developed and initiated programs, whether it be energy programs, educational training, beach acquisition, or other related objectives. Amendments passed in 1976 changed the Federal government's contribution to 80% funding and required a deepened sense of coordination, not conflict, between the state and Federal relationship. The strategic groundwork for the Coastal Zone Management Program has three levels of devotion. First, efforts are intended to sustain coastal communities. "Coastal areas of our country have over 50% of the U.S. population and over 17% of the nation's land area" (Marti), clearly an imperative and overwhelming section of our environmental identity. Second, the program intends to sustain coastal ecosystems, whose importance has most assuredly been addressed before in terms of the preservation of wildlife habitats. Thirdly, efforts are made to improve government efficiency and coordination between systems, a sector that has grown, but certainly has more work ahead to truly meet relational potential.

The amazingly successful CZMP is administered by the Coastal Programs Divisions, which is part of the National Ocean and Atmospheric Administration's Office, NOAA, of Ocean and Coastal Resource Management, OCRM. This partnership between state and federal agents creates a dedication to the management efforts of coastal resources in order to find a balance between the economic and environmental interests today and the protection of these assets for the future.

"Environmental mitigation, in principle, is a management tool capable of creating a 'win-win" situation for economic development interests and environmental resource managers" (Hershman 283). A successful environmental port manager is able to find the unstable line where satisfaction can be won by both parties: the working port side and the local protection side. It truly is in the best interest of the port to work with environmental terms and rules from even the early beginnings of their port endeavor. A solid relationship between everyone involved will most likely create benefits such as financial leniency and local public relational support. Today, ports are becoming even more involved with local regulations and decision making efforts. Municipalities are recognizing the power ports have in terms of financial position, physical location and economic impact and are utilizing their strengths to build the future rather than fight their cause. Ports have a wider scope of interest over simply just their small harbor setting and in many events, traditionally considered 'outside' their small circle of business, really have a direct relationship to the success and operations of the port activity. Ports are looking to form a unified bond with local agencies and residents and in recent years have displayed this thinking to be more of a trend than ever before.

Not to be unexpected, the wave of the future sees continuous change in the shipping industry. As many people can attest, change is not always welcome in a place where some feel uncertain about risks or weary due to a lack of knowledge or confidence in outcome. One recent and extremely controversial change facing the shipping industry as we know and understand it today is the relatively new concept of liquefield natural gas, LNG transportation. LNG is natural gas cooled to a temperature of approximately -260°F at which point it condenses to a liquid. It is odorless, colorless, non-corrosive, and non-toxic (http://www.ch-iv.com/lng/lng fact.htm) and with further education and research, advocates hope it to be a global gas alternative solution. It is

primarily composed of methane, on average at least 90% and a small amount of other compounds. LNG transportation is very controversial, mostly due to factors when the gas is in transit. It is extremely combustible, and a small hole allowing air into holding chambers, especially onboard a vessel, could lead to disasterous and explosive results. Although serious LNG accidents are few in number, the fact that it is a form of energy demands great care and risk when being handled. Proponents for the product realize the negative possibilities that could occur while being shipped but consider it a "necessary evil," and suggest many will change their opinion when they are more informed. Opponents, however, argue the LNG tankers to be "floating bombs" and extremely viable terrorist targets while passing near populated areas, although it is understood that the ships are fully equipped and carefully designed to handle the product. Similar to the containerization efforts, it is certain that the LNG battle will take decades to decipher.

The recent political debate of United States port ownership by foreign countries, such as Dubai, puts global perspective on another similar event which shows constant change in the shipping industry. Many authority figures, including our country's leader, President Bush, feel hesitant when ownership is left to foreign countries in multi-billion dollar transactions. Similar to LNG concerns, terrorism factors into the question of safety in port ownership. A fear of the unknown in both industry altering cases, LNG and foreign port management, is the leading cause of uncertainty for many who are unsure of what lies ahead for the growing, global shipping industry.

Port activities and closely related occurances can be found through world television, newspapers, journal listings, internet articles, and other media every single day. Events range anywhere from port ceremonies to world wide controversies. On Wednesday, April 26, 2006

Port Newark, New Jersey celebrated the 50 year mark of mogul Malcom McLean's cargo container being used at their facilities. Each and every day, ports on the coastal U.S. waterways celebrate, not necessarily through formal observance as Newark did, but certainly through daily usage, the success of industry changes over the years. The transportation industry is a flowing circle of motion, shipping, and port management. The interdependency between the three elements creates a vital success story in the movement of goods and the transactions of a global economy. Who would have guessed that it would be possible to purchase grapes from Chili, in the middle of winter at a supermarket in Ohio? Fifty years ago, who would have bet that portside steel machinery could offload 9,000 TEUs in a 24 hour day and send them via truck and rail to cross country cities with expected arrival within the week? We have grown to take advantage of the industry changes that spoil us so well. What used to be month long adventures transporting people across oceans is now week long endeavors moving thousands of containers filled with everything from sneakers to perishables from the Asian economy. We are no longer 7 continents separated by oceans where textbooks are the only tale of other customs and lifestyles. We live in an intertwined world of goods, money, and commerce. So, next time you wear your Nike sneakers and Old Navy sweatshirt as you climb into your Mitsubishi sedan, consider the source. Your belongings may have seen more of the world than you have.

WORKS CITED

Ackman, Dan. "Innovation in Shipping Enabled Global Growth: Containerized Cargo Started Shipping 50 Years Ago at Port Newark." The New York Sun 29 Apr 2006: Business Section.

Aguilar, Eloy O. "Panama Planning Biggest Ever Expansion of Canal Project; Costing Billions Must Get Voters OK." The Record Associated Press 24 Apr. 2006: A12.

America's Ports: Gateways to Global Trade. 2006, American Association of Port Authorities <http://www.aapa-ports.org/education/index.html>.

Bird, James. Seaports and Seaport Terminnals. London: Hutchinson & Co. Ltd, 1971.

Bragaw, Louis, and Henry Marcus and Gary Raffaele and James Townley. The Challenge of Deepwater Terminals. Lexington, Massachusetts: D.C. Heath and Company, 1975.

Branch, Alan E. Economics of Shipping Practice and Management. London: Chapman and Hall, 1982.

Caso, Joan. "SeaLand, etc." E-mail interview from Joan Caso. 31 Mar. 2006.

"Container Ship". 2006, Wikipedia, the free encyclopedia. <http://en.wikipedia.org/wiki /Container_ship> 13 Apr. 2006.

Development of Ports: Improvement of Port Operations and Connected Facilities, New York: United Nations Publication, 1969.

Dunn, John E. Personal Interview with John Dunn. 14 Apr. 2006.

Ferguson, Tim W. "The Real Shipping News, How a Disruptive Technology Now Crucial to Ports, Changed the World for the Better." Wall Street Journal 12 Apr. 2006: D12.

Frankel, Ernst G. Port Planning and Development. New York: John Wiley & Songs, 1987.

Hannes, Matt. Background Information on Non-Standard Containers. 2004, "The Early Days". <http://www.matts-place.com/intermodal/part4/background.htm> 24 Mar. 2006

Hedden, Walter P. Mission: Port Development. Washington, D.C.: The American Association of Port Authorities, 1967.

Hershman, Marc, and Robert Goodwin and Maureen McCrea and Yehuda Hayuth. Under New Management: Port Growth and Emerging Coastal Management Programs. Seattle: University of Washington Press, 1978.

Hershman, Marc J. Urban Ports and Harbor Management. New York: Taylor and Francis, 1988.

"House Committee Approves Bill to Restrict LNG Tankers." 13 Apr. 2006. The New York Times Company. 16 Apr. 2006 <http://www.boston.com/news/local/rhode_island /articles/2006/04/13/house_committee_approves_bill_to_restrict_lng_tankers/>.

Imakita, Junichi. A Techno-Economic Analysis of the Port Transport System. New York: Praeger Publishers, 1978.

Jansson, Jan, and Dan Shneerson. Port Economics. Cambridge, Massachusetts: The MIT Press, 1978.

Levinson, Marc. The Box: How the Shipping Container Made the World Smaller and the World Economy Bigger. Princeton: Princeton University Press, 2006.

LNG Fact Sheet. CH-IV International, the LNG Specialists. 19 Nov 2003, <http://www.ch-iv.com/lmg/lngfact.htm> 20 Apr 2006.

Ludwig Beth, Hans, and Arnulf Hader and Robert Kappel. 25 Years of World Shipping. London: Fairplay Publications, 1984.

Martel, Hervé. Public-Private Partnerships in the Port Domain in Developing Countries: Risk Analysis, Sharing and Management. June 1999, ISTED port group. <http://www.isted. Com/publications/English/partnership_port.htm> 5 Apr. 2006.

Marti, Bruce. Lecture/discussion forum. "Coastal Zone Management, Past and Present." 7 Jan 2006.

Morgan, F.W. Ports and Harbours. London: Hutchinson & Co., 1952.

Nuñez-Neto, Blas. "Border Security: Key Agencies and Their Missions." Congressional Research Service Reports. 9 May 2005. CRS Report for Congress through CRS Web. 23 Apr. 2006 < http://www.usembassy.it/pdf/other/RS21899.pdf> .

Oram, Colonel R.B. Cargo Handling and the Modern Port. Oxford: Pergamon Press, 1965.

Oram, R.B., and C.C.R. Baker. The Efficient Port. Oxford: Pergamon Press, 1971.

Savannah Morning News. Photo Index. 2006, savannahnow.com. <http://www. savannahnow.com/images/040502/full_ports.jpg> 27 Apr. 2006.

Sherman, Rexford B. AAPA: The First Eighty-Five Years. 2006, American Association of Port Authorities <http://www.aapa-ports.org/about/85years.htm> 20 Mar. 2006.

"The Dawn of Unionism". ILA Union, Our History 2003. The International Longshoremen's Assoication. 10 Apr. 2006 <http://www.ilaunion.org/history_dawn.asp>.

"Why Standards Matter; What if Standards Did Not Exist?" The International Organization for Standardization. 5 Apr. 2006 <http://www.iso.org/iso/en/ISOOnline.frontpage>

Winters, Tobey L. Deepwater Ports in the United States: An Economic and Environmental Impact Study. New York: Praeger Publishers, 1977.