The Challenges of Freight Distribution in the New York Metropolitan Area: The Role of the Port Authority

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Introduction

Freight transportation remains a relatively understudied segment of transportation, in spite of its critical importance for the economy. This is particularly the case of urban freight transportation which has been overshadowed by an emphasis on passenger transportation. Most concerns in urban transportation, particularly in metropolitan areas, mainly relate to car congestion, urban transit, environmental issues and the complex land use structures to which they are related. Transport challenges, thus, have mainly been aimed at finding ways to improve the efficiency of passengers’ movements, a domain of action supported by different levels of public agencies involved in the planning, construction and maintenance of transport infrastructure. Fairly out of the scope of the concerns of the general public, freight distribution in urban areas is facing challenges on par with those of passengers.

Over the last two decades, significant growth in freight distribution has propelled the issue of freight to the forefront. For instance, deregulation of the transport industry has permitted the emergence of new freight transport companies, increased the efficiency of freight distribution and enabled a higher level of integration between different modes. This trend was reinforced by the Intermodal Surface Transportation Efficiency Act of 1991 (ISTEA), which required freight transport to be part of the planning process of metropolitan areas. There are now large freight carriers (especially rail) operating in a deregulated environment that have various stakes in urban transport infrastructures.

The role of New York as one of the world’s true global cities and the main gateway of the eastern seaboard of North America is widely acknowledged. The metropolitan area is a major port, an air transport hub and a nexus of rail and highway transport systems. New York is the undeniable “freight capital” of the eastern seaboard. Nevertheless, moving freight and passengers in the New York - northern New Jersey metropolitan area is compounded by congestion, the regional geography and the acute concentration of transport facilities.
Most of the concerns regarding freight have traditionally been addressed by the Port Authority of New York and New Jersey (PANYNJ), a public agency established to build, operate and manage large transport infrastructures in the New York metropolitan area. Globalization and the growth of regional freight flows have created a new environment where the PANYNJ operates. While the major freight carriers are private entities, the agencies that plan, finance and operate transport infrastructure are public.

As freight transport issues have become more evident, many transport agencies have become more involved in the process of planning and mitigating freight distribution. There is a rather complex structure of public agencies involved in freight distribution in the New York metropolitan area (Holguin-Veras and Paaswell, 2000):

- **Special purpose agencies.** Established for specific purposes, namely to manage a transport system and/or terminals. To do so, they have the ability to collect tolls and fees, and even issue debt for the purpose of planning, building and operating the transport facilities under their jurisdiction. The most significant are The Port Authority of New York and New Jersey (1921), the Metropolitan Transportation Authority (1965), the New York State Thruway Authority, and the New Jersey Turnpike Authority.

- **Departments of Transportation.** Two state level DOTs have jurisdiction in the metropolitan area, the New Jersey DOT and the New York State DOT. Although state agencies were performing a similar function in the past, that is planning, building and maintaining roads, DOTs were established in the mid 1960s to use federal funds, mainly for the development of the Interstate highway system.

- **Metropolitan Planning Organizations.** Established by Federal Law in 1975, MPOs try to coordinate regional transport planning by identifying trends and needs. While MPOs plan and justify fund allocation, other agencies (mainly DOTs and transit agencies) are the recipients of these funds.

This paper will thus address the issue of urban freight distribution in one of the world’s largest and most complex metropolitan areas, New York. Freight transport issues are likely to be the most prevalent in the first part of the 21st century. A particular emphasis is placed on the Port Authority of New York and New Jersey, the main public stakeholder of freight transport infrastructure, mainly internationally-oriented. First, the context in which contemporary freight distribution is evolving is discussed, namely what are the major paradigms with which a global city must cope. Second, the role of the New York region as a “freight capital” and the involvement of the Port Authority are presented. Third, the main challenges freight distribution is facing are identified and the major projects undertaken by the Port Authority in response or in anticipation to these challenges. The Port Authority, while being a multi-modal agency coping both with passengers and freights issues, has shown remarkable initiative to insure that New York’s transportation challenges are met.
Contemporary Changes in Global Trade and Production

Since urban freight distribution is correlated with processes occurring at a much wider scale, the purpose of this section is to provide a brief overview of the major global trends in freight distribution and their consequences for North America and the New York metropolitan area. Of particular interest are the factors driving the growth in freight distribution as well as the spatial structure this distribution takes, namely the emergence of large gateways and freight corridors.

Global Imbalances

Changes in contemporary freight distribution are an outcome of large global trade imbalances resulting in unique flow structures. The global economy is in a state of disequilibrium between its core elements of industrial production, manufacturing, resource extraction and consumption, all of which tend to be acutely separated. The rapid industrialization of China is widely acknowledged to be the dominant factor in the new global trade structure, as China accounted for about a quarter of the world’s GDP growth in recent years and became the

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Source: adapted from Holguin-Veras and Paaswell (2000)
world’s 4th largest exporter in 2003. Propelled by massive investments and accumulation of production capabilities (some foreign), China is inundating the rest of the world with low-priced goods, a sector in which it has clear comparative advantages. This growth in production has been matched by a growth in consumption elsewhere, but with a significant geographical imbalance, which can only be reconciled with substantial freight flows. The United States accounted for a large share of the additional consumption and remains the world’s largest importer, an indication that the American economy still acts as the dominant “locomotive” of the global economy. Since the mid 1970s, the American economy has systematically produced a negative goods trade balance, but it is only over the last 5 years that imbalances blew out of proportion (Figure 1). For 2004, exports of $1,146.1 billion and imports of $1,763.9 billion resulted in a goods and services deficit of $617.7 billion, the largest ever. For goods, exports were $807.6 billion and imports were $1,473.8 billion, resulting in a goods deficit of $666.2 billion (US Department of Commerce, 2005).

This disequilibrium is jointly the result of a growth in national consumption, a shift of labor-intensive manufacturing activities outside the United States, the massive purchase of US securities (e.g. Treasuries) by its major trade partners (Japan and China) to maintain the value of the US dollar and the inflation of American assets, namely real estate. This in turn has favored low interest rates and kept the American consumer buying growing quantities of imported goods without significant income improvements using debt (through revolving credit and equity extraction) instead of savings as an instrument of consumption. It is very difficult to infer for how long this acute global trade disequilibrium will endure, but meanwhile significant impacts on global freight distribution can be observed in the recent growth of Asia-USA container flows in Figure 2.
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Figure 1:

Source: US Census Bureau

Figure 2:
Containerized Cargo Flows along Major Trade Routes, 2000-2003 (in millions of TEUs)

Source: UNCTAD, Review of Maritime Transport
Container flows are quite representative of global trade imbalances. For instance, there are 2.5 times as many containers moving from Asia to the United States (10.2 million TEUs in 2003) than there are from the United States to Asia. In addition, the costs of moving a container from East Asia to the United States have been reduced by 50% during the 1990s, but due to trade imbalances Asian exporters pay on average 50% more in container shipping costs than their American counterparts.

**North American Freight Distribution**

North America and the United States, in particular, have particularly been affected by global imbalances with a sizeable growth in traffic, accompanied by a shift in its direction. About 44% of the world’s merchant fleet calls at an American port each year, but these calls are more for unloading than loading. The main driving forces of North American freight distribution, in addition to the imbalances, are linked to the commodification of the economy (Figure 3), growing levels of consumption, international/continental division of production (de-industrialization), and changes in the logistics industry from supply driven to demand driven (Figure 4).

The high rate of growth of retail and wholesale activities in the United States in the 1990s suggests a substantial commodification of the economy and a new commercial environment where the consumer plays a greater role. Estimates place personal consumption accounting for about 70% of the GDP. While the population increased by about 11% over that decade, retail sales increased by 62%, twice the growth of the GDP. Distribution activities have been organized to cope with this growth of the demand, which has been accompanied by a growth of the value of freight shipments (value added products) and the average haul distance.

The evolution of distribution systems to being driven by demand instead of by supply implies a shift in the relative importance of specific logistical functions, mainly inventory, transport and information systems.

- **Supply Driven Distribution System.** In a conventional situation, a supply driven distribution system is mainly based on the function of inventory. Since elements of the supply chain are loosely integrated, parts and/or products must be stored to accommodate the demand.

- **Demand Driven Distribution System.** Contemporary distribution systems show a remarkable change, as they are becoming increasingly demand driven. Under such circumstances, minimal inventories are maintained and most of it is circulating, thus the increasing importance of the transport component in distribution. The operational management of such a system relies heavily on information systems to insure that parts and/or products are delivered when required (on demand).
Figure 3:
Increases in U.S. Commercial Freight Shipments and Related Growth Factors, 1993-2002

Source: U.S. Department of Transportation, Bureau of Transportation Statistics

Figure 4:
Changes in the Relative Importance of Logistical Functions in Distribution Systems

Like many segments of the American economy and territory, integration processes, namely NAFTA\(^1\), have impacted on the nature and function of continental production, consumption and distribution (Woudsma, 1999). About a third of American trade takes place within NAFTA. Land gateways are dominantly servicing an import function, expanded under NAFTA trade, and connected to corridors of continental freight circulation. These include three longitudinal and four latitudinal axes. One such axis, labeled as the NAFTA Corridor, links the two largest land gateways of North America, Detroit, Michigan and Laredo, Texas. It dominantly relies upon trucking as about 65% of the value of the NAFTA trade is serviced by this mode.

The East/West corridors are also linked with the Landbridge function, a continental system of double stack container services using the Seattle-Chicago-New York rail chain which reduces distances considerably. It circumscribes the need of using the Panama Canal or the Magellan Passage for large quantities of containerized freight. For instance, a container coming from Singapore takes 36 days to reach New York by maritime transport using the Panama Canal. The same journey takes 19 days if the Landbridge is used. On average, transit times between the East Coast of the United States and Pacific-Asia are reduced by 6 to 14 days depending on the situation. The North-American Landbridge is also competing to capture a share of the Europe-Asia trade. Maritime shippers on average take 5 to 6 weeks to service the harbors of Tokyo and Rotterdam. With the Landbridge, this transit time is reduced to about 3 weeks with an 80 hours railway journey across North America. With this service, several maritime companies abandoned the Panama Canal and put in operation post panamax class containerships. The North-American Landbridge also includes a Canadian (Vancouver-Montreal-Halifax) and a Mexican section (Salina Cruz-Coatzacoalcos).

The East Coast and the Boston–Washington Corridor

In this system of internationally linked continental freight circulation, the importance and structure of the 400-mile Boston–Washington consumption corridor can be preliminarily assessed by the size of its market. With a population nearing 75 million, and high population densities, over 250 persons per square mile, accounting for about 27% of the U.S. population, but occupying only 6.2% of its landmass, the significance of the corridor as a sphere of consumption is undisputable. The New York metropolitan statistical area alone, with its population of 21.2 million, accounts for 7.5% of the national population. This concentration of population, facilities and their associated circulation makes the Boston–Washington corridor the most congested region in the United States.
Freight Capital: New York / New Jersey

Context

The emergence of the New York metropolitan area as a freight distribution center is the outcome of the accumulation of geographical advantages. The site of New York itself is a protected harbor at the head of the Hudson River. The construction of the Erie Canal (built between 1821 and 1825), enabled New York to considerably expand its hinterland in the American Midwest. The canal linked New York to Albany and Buffalo and initiated a new era of growth for inland freight transportation. At that time, New York was only the fifth-largest American seaport, behind Boston, Baltimore, Philadelphia and New Orleans. But by 1850 New York had evolved to become the most active port in the United States, as well as its premier city. Its throughput exceeded the amount handled by Boston, Baltimore and New Orleans combined. The later part of the 19th century focused on rail infrastructure developments, undermining the importance of the canal system, but confirming the function of New York as the hub of the national transport system. This growth of port activities was on a par with the consolidation of foreign trade, wholesaling, and financial, shipbuilding and industrial activities.

The dynamism of a maritime gateway of the caliber of New York is unmistakably linked with its regional economy, which has considerably changed over the last decades. After a period of relative stagnation, which roughly lasted from the 1970s to the late 1980s, the New York metropolitan area undertook an unprecedented phase of economic growth in the mid 1990s, with growing local consumption (Warf, 2000). About 80% of the new employment is service-related and the region has intensively de-industrialized since the 1950s, implying that its export function has decreased. New York spurred a new wave of development increasingly leaning on activities global in scale, such as finance and banking, international investments, information technologies, and marketing and media activities (Lakshmanan and Chatterjee, 2000). According to the PANYNJ, port activities support directly and indirectly more than 220,000 jobs and contributes $14.6 billion to the regional economy (PANYNJ, 2003). These conditions expanded inbound cargo demands for port activities, notably containerized cargo (Figure 5).

As such, New York is the busiest container port of the East Coast and the third largest tonnage and container port on the United States. Recent growth in containerized traffic underlines the concentration of traffic among the 5 largest ports of the East Coast. New York alone accounted for more than half of the container traffic growth.
The Port Authority of New York / New Jersey

Founded in 1921, the PANYNJ became responsible for a region of 1,500 square miles (3,880 sq km), overlapping two powerful states and centered around the New York harbor. It received a very broad governance mandate enabling it to undertake any project concerning any transport mode as long as it would promote commerce, trade and the public good. This explains why it has been involved in a wide array of infrastructure developments, only a part related to freight.

The most noteworthy achievements of the PANYNJ in its early years (1920s-1930s) were the construction or the take over of a succession of bridges and tunnels linking the two states, an urgent need on which both sides of the Hudson agreed. The issue of connectivity between New York and New Jersey was thus addressed, by road if not by rail. This focus also reflected a modal shift in priority in American land transportation development with the funding of regional and national highway systems, which accelerated in the 1950s with the construction of the Interstate system. The Goethals Bridge and Outerbridge Crossing were the first constructed (1928), followed by the George Washington and Bayonne bridges (1931). These projects were completed before time and below estimated costs, which boosted the reputation of the PANYNJ as an efficient legal and administrative body. The PANYNJ also received the jurisdiction for the Holland tunnel in 1930 (completed in 1927) and opened the Lincoln tunnel in 1937, both of which were directly servicing high density Manhattan downtown and midtown areas.

Figure 5:
Container Traffic at Major East Coast Ports, 1990-2003 (TEU)
The post World War II era marked tremendous technological and spatial changes for transport activities in New York, mainly with the development of air transport terminals, which the PANYNJ inherited. By 1948, the PANYNJ was responsible for the New York area’s three major airports, Newark, La Guardia and John F. Kennedy which were developed to become world class terminals. A major shift was also in the making for maritime transportation. Most port terminals were relocated from the general cargo wharves of Manhattan, Brooklyn, Hoboken and Jersey City to specialized and more spacious terminals at Port Elizabeth, Newark, Red Hook and Howland Hook. The first dedicated container terminal in the world, the Elizabeth-Port Authority Marine Terminal opened in 1962. By the early 1980s, almost all maritime cargo transshipment in Manhattan has ceased and traffic was dominantly handled in New Jersey, a complete reversal in the port’s geography of freight (Figure 6). Later in the century, Howland Hook on Staten Island took an increasing share.

This process is a classic example of port terminal expansion and relocation. Most, if not all, port activities were thus disconnected from the traditional urban core and relocated towards peripheral settings having higher accessibility to rail and interstate road infrastructures.

Figure 6: Distribution of General Cargo Operations, Port of New York, 1959, 1987 and 2000

Source (for years 1959 and 1987) and Moss (1988) and (for year 2000): Port Authority of New York and New Jersey
The 1950s and 1960s saw a commitment to public transit with the opening of the Port Authority Bus Terminal (1950), the Port Authority Trans Hudson railway (PATH, 1962) and the George Washington Bridge Bus Terminal (1963). As New York, like all American cities, was suburbanizing, a growing demand for passenger movements between both sides of the Hudson was being felt. The PANYNJ deemed it had the responsibility to help accommodate this increase in interstate interactions. In the 1970s and 1980s, as New York’s economy was compromised by de-industrialization and the flight of head offices of major corporations, the PANYNJ became more specifically involved in regional economic development with the construction of the World Trade Center (1970), the setting of industrial and telecommunication parks and of a power plant (1990). By the early 21st century, the PANYNJ has addressed the problem of connectivity between its two main airports and Manhattan, which could only be reached by road transportation. AirTrain services connecting the Newark Liberty International airport with regional rail transit opened in late 2001 and another service between JFK and rail connections to Manhattan opened in 2003.

Figure 7 provides an overview of the facilities under the jurisdiction of the Port Authority in 2005 (see the appendix for an enumeration). The PANYNJ has grown along considerably and exercises a sizeable influence over the city’s transport system with 7,200 employees, an annual budget of $4.6 billion and a cumulative infrastructure investment of $35 billion (PANYNJ, 2001).

The PANYNJ’s diversification is, therefore, impressive. Moreover, its extent is underlined by the Port Authority’s financial profile. Operating revenues in 2003 were about $2.7 billion, of which 57% was derived from air terminal operations and 29% from interstate transportation in the form of bridge tolls and transit fares. In sharp contrast, port activities accounted for only 5% of revenue income. The asset picture differs in detail, but port infrastructures account for only 12% of the PANYNJ’s total assets.

From this overview, it is quite clear that the PANYNJ was involved in almost every major development of transport infrastructure since its inception early in the 20th century and provided New York with an extensive array of terminals handling freight and passengers. New York could not have become a global city without the transshipment and distribution capabilities provided by these projects. The current trend underlines that the next phase of development in the early 21st century will focus at improving regional freight distribution. The PANYNJ is thus continuing its tradition of addressing freight transportation challenges, dominantly centered around the port.
Figure 7:
Facilities of the Port Authority, 2005

Source: PANYNJ, 2005; Bureau of Transportation Statistics, Transportation Atlas of the United States
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The Port of New York / New Jersey

The Port of New York / New Jersey is a typical example of a major port adapting to global changes, as 75% of the value and 90% of the tonnage of its trade is import/inbound-related. It serves a huge regional market as it handles 11% of all oceanborne general cargo imported into the United States. It services a metropolitan region of more than 20 million persons and 600,000 businesses representing one of the most extensive accumulations of economic activities in the world. About 700 million tons of freight are being moved annually within the metropolitan area. In addition, 40% of the Midwest bound cargo transshipped by North Atlantic ports comes through the Port of New York.

The growth of the traffic handled by the port is solely attributed to cargo imports (Figure 8). Export sales coming from the metropolitan region have steadily declined in the 1990s, as de-industrialization endured. While cargo exports declined by 11.6% in tonnage between 1991 and 2000, cargo imports boomed by 64.6%. By 2010, the port is expected to double its amount of cargo transshipped. A similar trend is observed in the vehicle transshipment function of the Auto Marine Terminal, which handled 725,000 vehicles in 2004, of which 87% were inbound. Port dynamism is thus increasingly linked to the demands of the regional economy, which are in turn spurred by the globally-linked service functions of New York. Freight transportation in the Eastern Seaboard is thus increasingly consumption-related, as opposed to production-related. This represents a structural shift in the hinterland of the port of New York, which globalization has regionalized.

Figure 8:
Cargo Handled by the Port of New York, 1991-2004 (metric tons)

![Bar chart showing cargo handled by the Port of New York, 1991-2004.](Image)

Source: Port Authority of New York and New Jersey
Containerization has been another dominant paradigm shift of maritime transportation over the last 30 years and has triggered a phase of port restructuring. On this issue, the PANYNJ has a tradition of innovation and adaptation, since the first containership called from New York in 1956 and the first specialized container terminal was constructed at Port Elizabeth, New Jersey in 1962. By the 1970s, New York was the largest container port in the world, handling just under 1 million TEUs in 1975, 1.9 million in 1980 and 2.3 million in 1985. From this peak, a period of stagnation and relative decline endured as New York was handling roughly the same amount of containerized traffic in the early 1990s (1.8 million TEUs) as it did in the early 1980s. While the decline of the port of New York during that period can be attributed to international trade changes, which are factors outside local control, local factors such as inadequate intermodal rail access and high labor costs, played significantly in its demise (Warf and Kleyn, 1989).

Meanwhile, Pacific Asian container ports boomed and topped New York. These included Hong Kong (surpassed New York in 1986), Singapore (1987), Kaohsiung (1986) and Pusan (1989). Similar growth and surpassing of New York occurred at the Pacific Coast ports such as Los Angeles (1989) and Long Beach (1993). Even if containerization resulted in significant productivity gains, these gains were not uniformly achieved. Newer container handling facilities had an advantage in terms of the quality of their infrastructures as well as room for development. It is worth noting that most of these ports, especially Hong Kong and Singapore, are transshipment ports deriving the bulk of their activities from their intermediate functions. While intermediate ports are more linked to business cycles of the global economy, a port such as New York is more linked to the cycles of its regional economy.

While the New York metropolitan area houses 20 million people, an extra 80 million can be reached within 24 hours, making the direct market area of the port of New York the largest in North America and one of the most extensive in the world. The market advantage of New York is thus significant since within 700 miles of the port resides about 55% of the U.S. population. Under such circumstances, the late 1990s saw a spectacular growth of container traffic for New York, on par with the significant growth the American economy was experiencing. The port was able to maintain its rank among the 15 largest container ports in the world with a traffic of almost 4.5 million TEUs in 2004 (Figure 9). Its national share has also improved in the last 5 years as the Port of New York/New Jersey accounted for 13.5% of all containers handled by American ports and for 59% of all containers on the North Atlantic coast.
Urban Freight Distribution in the New York Metropolitan Area

Urban freight distribution in the New York metropolitan area faces rather unique challenges. The role of New York as a gateway, implying large amounts of freight transiting through the region, in addition to the mere size of the metropolitan area as a consumption market, creates a condition favorable to high levels of congestion. This situation is even more exacerbated by the regional geography that constrains circulation to a limited number of bridges and tunnels. The high density island market of Manhattan is difficult to access, while the large suburbs of Long Island (population of over 6 million including Queens and Brooklyn) can only be reached through limited number of bridges (most of them through Manhattan) and have almost no rail freight links (Figures 10 and 11).

New York’s densely populated region has strong impacts on the port hinterland. Since 84% of containers bound for the port are carried by 15,000 trucks’ trips each day, highway accessibility to maritime terminals is of strategic importance for regional freight distribution. This problem is further exacerbated by the transit function of New York, especially for freight from/to New England circulating along the I-95 corridor, which has limited alternatives to bypass the metropolitan area. Capacity restrictions are also prevalent with only a single designated route (I-95/GWB to I-495) accessible to the national standard of 53-foot long tractor trailers. Congestion and very high local transportation costs, which are on average 30% higher than other American metropolises, thus makes urban freight circulation highly complex.
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**Figure 10:**
*Truck Freight Corridors*

*Source: adapted from Cambridge Systematics*

**Figure 11:**
*Rail Freight Corridors and Port Facilities*
Freight movements across the harbor are limited to two bridges, George Washington (GWB) and Verrazano-Narrows (VZB), handling crossings of more than 30,000 trucks per day. In addition, road congestion is expected to increase by 50% by 2020 (NYCEDC, 2000). A survey found that it costs roughly the same to move a container by truck from Port Elizabeth to Manhattan (straight distance of 1.5 miles but the truck has to go through the George Washington Bridge) than from Connecticut to Ohio (a distance of 500 miles) (Holguin-Veras and Paaswell, 2000).

Most of the major freight rail lines converge/originate from a major distribution cluster in New Jersey, adjacent to the major container port terminals. Most of the flows are bound southwest, mainly along the “chemical coast”. Rail freight distribution is also limited by old infrastructures (namely bridges) that do not handle well modern rail operations, especially double-stack trains that are heavier and require a higher clearance (about 20’6”). The whole rail system east of the Hudson cannot handle double-stack trains and the best clearance is limited to TOFC⁵ (about 17’) on a few segments. The importance of passenger rail systems used for commuting also imposes limitations on rail freight circulation as passenger service has priority over freight on most of the facilities which are owned by public transit operators.

In view of these challenges in urban freight distribution, the New York Metropolitan Transportation Council (2004) has identified four major problem categories:

- **Intermodal integration.** Historically, freight transportation has evolved around independent modal networks, each competing with others in a redundant manner. This has left a fragmented transport system.

- **Modal dependence.** Regional freight distribution is dominantly relying on road transport, which is subject to high levels of congestion and capacity limitations.

- **State of infrastructure.** Freight movements over rail and highway systems are restricted by inadequate transport infrastructures preventing rail cars and trucks from efficiently moving. This creates bottlenecks in freight circulation.

- **Operational limitations.** Truck access is hampered by a highway system that is not always contiguous for commercial vehicle movement, while freight trains must share publicly owned and intensively used passenger rail lines.

Obviously, solving these problems require a comprehensive approach. The PANYNJ, as the traditional stakeholder in freight transportation, has a dominant role to play.
The Role of the Port Authority of New York and New Jersey

The PANYNJ is reinvesting significantly in the port and its inland accessibility with the goal of maintaining and expanding the role of New York/New Jersey as the “freight capital” of the northeast. Few metropolitan areas around the world have a public transport agency which has such a diversified scope in its jurisdiction and such strength in planning and financing. Evidence of the PANYNJ’s continuing commitment to the port, despite its other varied interests, comes also from future plans. In the port system generally, the global and regional forces dictating change will continue to impact at the local level. Given this reality, the PANYNJ recognizes that the major challenge is to continue to upgrade facilities to meet the needs of port operations in the early twenty-first century. Above all, the goal is to enable container traffic to realize its potential and reach 6 million TEUs by 2015.

In 2000 the PANYNJ, in collaboration with several federal, state and local transport agencies, established a Comprehensive Port Improvement Plan (CPIP, 2000) to explore a wide set of alternatives to support the port’s future freight transport needs. The PANYNJ committed $1.8 billion for port redevelopment, encouraging local marine operators to commit another $500 million in marine terminal investments. The two main alternatives are centered on improving the productivity and handling capabilities of existing terminals and on developing new terminals facilities and/or reclamation projects. Due to excessive real estate costs and limited land available for new terminals, this option appears to be less likely. The Port Authority is thus embarking in several strategies to improve the port’s throughput using existing terminals, mainly involving dredging and ship/rail efficiency. However, the alternative of developing new terminals can take shape, but not necessarily next to the port site itself. Satellite/inland terminals are also an alternative that the Port Authority is exploring, notably through the development of a Port Inland Distribution Network.

Dredging

Planned channel deepening reflects the world-wide driver that, as the global container fleet is upgraded with larger ships, major ports face the challenge of accommodating deeper vessel drafts. While a typical Panamax container ship could be accommodated by a 35-foot (10 m) channel, the new generation of post-Panamax vessels — carrying between 4,000 and 5,000 TEUs — requires a channel depth between 42 and 52 feet (13-16 m). New York’s late-1990s clearance of 40 feet (12 m) for its container terminals was consequently a threat to its continued viability, especially as several North American ports already had better access (Figure 12). Channel deepening has thus become an important issue relating to the port’s ability to keep and enhance its containerized traffic. This was emphasized in July 1998, when the newly merged Maersk-Sealand company was negotiating with the Port Authority over its
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choice of New York as its East Coast container hub, and brought pressure to bear by arranging for the post-Panamax containership Regina Maersk to call at Port Elizabeth half empty. Fully loaded it could not have navigated the Kill van Kull channel linking Port Elizabeth with New York harbor.

The PANYNJ’s most significant response to the Regina Maersk episode was to include in its agreement with Maersk-Sealand a clause undertaking to deepen the Kill van Kull to accommodate the shipping line’s new fleet of post-Panamax container ships. As early as 1999 the Army Corps of Engineers\(^7\) started dredging work on a 45-foot Kill Van Kull channel costing $700 million and completed in 2003. But in 2001 the PANYNJ went well beyond this by accelerating and expanding the dredging project. Plans now envisage a depth of 50 feet for the whole harbor access channel,\(^8\) and an improved depth of 41-45 feet in the approach to the Howland Hook terminal (compared with the current 37 feet; Figure 13). This work is expected to be completed by 2009, with dredging costs of around $1.8 billion, of which about 50% is to be provided by the Port Authority.

Congestion and Rail/Ship Connectivity

Regional freight distribution massively uses trucking (79%), with marginal roles left to waterborne (15%) and rail (6%). Recognizing that road congestion is a major drawback for inland accessibility, the PANYNJ has for some time been attempting to promote better inter-modal rail connectivity. Not all these efforts have yet borne fruit, particularly in relation to the major problem of cross-harbor rail accessibility between Brooklyn and New Jersey. On this route, traffic must either take a 140-mile detour north through Albany or be floated by rail barges. Rail on the eastern part of the Hudson, poorly dotted in rail freight infrastructures, account for less than 2% of the tonnage. There are thus limited rail freight distribution capacities in southern New York, Connecticut and Long Island. A proposed solution is a cross-harbor rail tunnel, either from Greenville Yard in New Jersey or from Staten Island\(^9\) (NYCEDC, 2000). Additional attractions of this solution are that it would increase port capacity by supporting the construction of a major container terminal in South Brooklyn and — through modal diversion — would alleviate road freight movements between New Jersey and Long Island.\(^10\) But this project is controversial because of very high construction costs (ranging anywhere between $1.3 billion and $2.4 billion), of unproven impacts on modal preferences and because of poor terminal accessibility in Brooklyn by truck. Consequently, as an alternative, further expansions of rail float barge services have been proposed (NYMTC, 2001). However, the question remains whether these services would be adequate to satisfy the requirements of a modern container terminal on the Brooklyn side of the harbor, where rail access is primordial.
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Figure 12:
Channel Depth at Selected North American Ports, 1998 (in feet)

- Jacksonville: 38 feet
- Charleston: 40 feet
- New York: 40 feet
- Savannah: 42 feet
- Oakland: 42 feet
- Los Angeles: 46 feet
- Baltimore: 50 feet
- Hampton Roads: 50 feet
- Halifax: 60 feet
- Savannah: 76 feet


Figure 13:
Intermodal Facilities and Navigation Channels of the Port of New York, 2003
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The PANYNJ is trying to promote better intermodal rail connectivity at its major container terminals as larger ships are placing increasing pressures on the port’s container throughput. In 1991, a 35-acre ExpressRail terminal, built by the intermodal freight operator Maher Terminals at Port Elizabeth, opened. It offers direct ship-to-rail and rail-to-ship transshipment capabilities, a function which grew at a phenomenal rate from 43,000 containers handled in 1992 to 283,000 in 2004 (Figure 14). A new ExpressRail terminal having better truck and rail access opened in 2004. The PANYNJ plans to expand the ExpressRail system to handle about 1.5 million containers annually at its major container terminals (Port Elizabeth, Howland Hook and the Corbin Street Intermodal Terminal). In addition, new dedicated rail facilities for container terminals, adding support track and expanding rail infrastructure, are planned on Staten Island, which is currently inadequately serviced. It is expected that by 2010, intermodal rail share would climb to 25-30% of transshipped containers, resulting in improved economic and environmental benefits for the locality (NYMTC, 2001). Inland rail terminals could consequently act as satellite terminals and permit freight circulation to avoid the congested road system of the metropolitan area, especially near port terminal facilities.

Inland Distribution

Another point of concern is the time needed to develop a regional load centre network. It has been underlined that the port of New York and the road infrastructure that serves it is under increasing pressure as cargo throughput surges. The PANYNJ has developed an ambitious $60 million plan to siphon off some of that traffic through a web of inland hubs connected to the mother port by barge and rail (Figure 15). The Port Inland Distribution Network (PIDN) plan would free up valuable terminal space, ease mounting congestion and provide environmental benefits, namely through “freight diversion”. It would also provide reliable, scheduled service for containers no longer subject to the saturated highway system and it should offer clear logistical benefits for carrier, shipper and consignee. However, the first service — Albany ExpressBarge, a barge operation linking New York and New Jersey with Albany 150 miles to the north — is confronted with a slow start. In the period April 2003 — September 2004 it only handled 15% of what its initiators had anticipated, about 3,541 TEU. The Port Authority outlined a range of operating concessions and financial subsidies to help kick-start the new service. A number of freight clusters have already been established around major highways in the periphery of metropolitan areas of the Boston-Washington corridor. Existing distribution activities may take time to respond and adjust to this new inland freight distribution strategy as trucking dominates regional inland distribution.
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Figure 14: Expressrail Lifts, 1991-2004

Figure 15: Port Inland Distribution Network
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The Port Authority is also focusing on its nearest freight cluster (I95/New Jersey) by trying to find land near its port terminals to be allocated for warehousing and distribution. The development of “freight villages” has many benefits to manage the freight flows generated by several unrelated users through economies of scale since they are sharing the same facilities and equipment. This in turn reduces transport costs and promotes its reliability.

By 2005, the Port Authority hopes to have five feeder port operations running within the range of the main freight clusters and expects to see a gradual freight capture and modal shift. The next port being added to PIDN will be Bridgeport in the state of Connecticut. Camden (New Jersey) and Wilmington (Delaware) are also in the frame. It will take time to get all these new services off the ground, to make them self-sustaining and to change existing freight distribution practices. PIDN should decrease the market share of road haulage in container land movements to and from the port of NY/NJ from 85% now to 57% in 2020, while the share of barges and rail are expected to reach 20% and 23% respectively.

The rail component is also of importance with the creation of inland rail terminals acting as container load centers for trucking (Reading, Albany and Syracuse). Such load centers would be linked to the port by rail shuttles. In addition, many market factors are favoring the extension and the consolidation of the PIDN in the medium run, namely congestion and higher energy costs creating diseconomies in the trucking industry.

Conclusion

The port of New York/New Jersey is linked to the trade characteristics of the American economy, with a recurrent trade deficit that is reflected in systematic imbalances in traffic with greater quantities of inbound cargo. This structural problem cannot be addressed at the local and regional levels and represents a condition to which American ports, including New York, must adapt.

One of the main challenges of the early 21st century is thus for New York to reaffirm and strengthen its prominence as the gateway of the North American eastern seaboard; its “freight capital”. In view of the Comprehensive Port Improvement Plan the Port Authority leans towards promoting the efficiency of existing terminals and facilities with major projects such as the dredging of the harbor and the promotion of better rail/ship connectivity. A greater emphasis is also placed on warehousing and inland freight distribution. The intermodal and hubbing future of the port mainly lies in the Staten Island/New Jersey corridor where land is available for infrastructure development and inland accessibility is optimal to both road and rail. In view of larger containerships, physical infrastructure developments are primordial and mainly include channel deepening, adequate berths and cranes, enough terminal space to handle transshipment and its logistics and rail and highway connections. The Staten Island/New Jersey corridor provides more benefits as it is better linked with the Boston–Washington corridor.
In addition, the Port Authority must look beyond its jurisdiction in order to find opportunities to support freight development as it is no longer only a local problem, but a regional one involving the interaction between several transport modes. This requires establishing strategic partnerships with stakeholders in the region, but also beyond. The Port Inland Distribution Network is a good example of the Port Authority being proactive on the issue of regional freight distribution. Hopefully, similar strategies supporting the transshipment, warehousing and distribution of freight will be pursued for the benefit of the metropolitan area.

Appendix

Facilities under the jurisdiction of the Port Authority of New York and New Jersey:

- **Bridges and tunnels.** Every river crossing between the city of New York and the state of New Jersey is operated by the PANYNJ. Together they carry more than 250 million vehicular crossings each year, and the George Washington Bridge is the most heavily used in the world, with about 300,000 crossings a day. To improve the efficiency of regional vehicle circulation, the PANYNJ has implemented since 1997, in collaboration with several State and transportation authorities, an electronic toll system.

- **Airports.** The three major airports — Newark, John F Kennedy and La Guardia — handled 29.2, 29.9 and 21.9 million passengers respectively in 2002, making New York a global air transport hub ranking alongside London and Tokyo. The combined air passenger traffic of all four airports was 81 million, making the authority the largest direct overseer of air traffic in the world. In addition, air cargo amounted to 2.6 million tons.

- **Public transit.** The PATH heavy rail line, linking New Jersey with downtown Manhattan, carried 73.4 million passengers in 2000. The same year, the Port Authority Bus Terminal handled over 2.3 million bus movements and 58 million passengers. On a typical weekday, approximately 7,200 buses and 200,000 people use the bus terminal. Because the George Washington Bridge Bus Station is more oriented to longer-distance commuting, its figures are lower. Even so, it handled 5.7 million passengers in 2000.

- **Regional development initiatives** include both the industrial parks (Bathgate in the Bronx and Elizabeth, New Jersey) and commercial developments offering office space (the Staten Island Teleport and the Legal Center, New Jersey). The PANYNJ is also involved in two waterfront development projects contributing to the reduction of inner-urban problems by converting centrally located maritime terminals to mixed urban land use. The power plant’s contribution to regional development is via sustainability: on average, 2,500 tons of refuse are converted into electricity every day.
Notes

1 North American Free Trade Agreement.
2 To finance its activities, the PANYNJ can issue bonds, charge user fees and collect rent.
3 The problem of rail connectivity will re-emerge as a major issue in the 1990s.
4 Known at that time as New York International.
5 Trailer On Flat Car, also known as “piggyback”.
6 Larger container ships are on the drawing board, including a ‘Malacca-max’ concept that could carry between 16,000 and 18,000 TEUs. This would require a draft of about 69 feet (20 m) and currently no port on the Eastern Seaboard could accommodate such a ship.
7 The Army Corps of Engineers is the sole agency authorized to undertake dredging projects in the United States.
8 Various environmental and technical problems arise from this project as a 50-foot channel involves cutting into the bedrock at several points.
9 Proposals of this type are longstanding: construction of a rail tunnel has been considered by the PANYNJ and other agencies since 1936.
10 The prediction is that trucking trips would be reduced by 6%.
11 Congestion on these crossings is now a major issue because of the intensity of use.
12 Known as E-Zpass, electronic tags which are valid in all major tolls in the states of New York, New Jersey, Pennsylvania, Delaware, Massachusetts and Maryland.
13 The fourth airport, Teterboro, handled less than 200,000 passengers.
14 The Elizabeth industrial park, adjacent to the container terminal, is not a pure industrial development and was completed in 1997 with the addition of a giant IKEA store.
References


