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Proceedings of the

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PROCEEDINGS
OF
12th ANNUAL SUMMER CONFERENCE ON PORTS, WATERWAYS, INTERMODAL TERMINALS, AND INTERNATIONAL TRADE TRANSPORTATION ISSUES
JULY 1987
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INTRODUCTION

The TRB Committee on Inland Water Transportation and the Committee on Ports and Waterways have been holding summer conferences for the past twelve years. This year they were joined by the Committees on Intermodal Freight Transportation, Intermodal Freight Terminal Design, and International Trade and Transportation, and the scope of the meeting was broadened to include the activities and interests of those committees. For the third consecutive year, the conference was co-sponsored by the AASHTO Standing Committee on Water Transportation. This expanded 12th edition of the summer conference was held July 7-10, 1987, in Norfolk, Virginia.

The summer conference is always held at a coastal or inland waterway port city to provide the opportunity for local technical presentations and field trips. The Norfolk location was excellent in this regard. The program included technical tours of the Newport News Shipbuilding Yard, Dominion Coal Terminal, Norfolk Harbor, and the container yards and new 50-container per hour dual-hoist cranes at the Norfolk International Terminal. In addition, the Hampton Roads chapter of the Transportation Research Forum and the Norfolk Southern hosted a demonstration of a new intermodal "spine" car. The joint program attracted 100 participants to hear 16 speakers in four conference sessions. The session topics included:

- The structural, financial and policy aspects of international trade.
- Intermodal freight terminals and operations.
- Port technology and innovation.
- Planning, development and economics of inland and coastal waterways.

One of the highlights of the conference was a luncheon presentation by Bory Steinberg, Department of the Army-Office of Civil Works, on the key provisions in the Water Resources Development Act of 1986 affecting ports and waterways. This included a status report on the harbor deepening projects authorized by the Act.

Following are the papers presented at the conference or summaries of the papers, including excerpts from the presentation by Mr. Steinberg.

THE PROVISIONS IN THE WATER RESOURCES DEVELOPMENT ACT OF 1986 (PL-99-662) FOR PORTS AND WATERWAYS

By
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Office of Civil Works

Public Law 99-662 was enacted by the 99th Congress in October 1986 and signed by the President a month later. There were 900 differences between the House

and Senate versions of the bill and a threat of a veto in the event the House version was passed. The final bill had many of what the Administration called objectionable provisions. However, along with the objectionable provisions are safeguards against spending money without an appropriate review and the requirements of cost sharing and user fees for the major construction programs.

The law calls for cost sharing of 10 percent for port projects shallower than 20 feet, 25 percent for 20 to 45 feet, and 50 percent for deeper than 45 feet. In addition, the non-federal partner in the project pays an additional 10 percent of the project cost over a period not to exceed 30 years and is responsible for providing lands, easements, rights-of-way, relocations, dikes and disposal areas for the dredged material.

There is an ad valorem fee placed on imports and exports of .04 percent. These funds are intended to pay for about 40 percent of the annual amount that the Corps spends in maintaining the harbors of the United States. Four dollars on a $10,000 imported automobile doesn't sound like a lot, but .04 percent of cargoes valued at $4 to $5 billion, generates an estimated $160 million a year. The following is the progress on the port deepening projects. Baltimore Harbor is proceeding with a 50-foot deepening. At the Norfolk Harbor, construction is proceeding with the 50-foot outbound lane only. The Corps recently awarded contracts in Mobile, New Orleans and Baton Rouge to deepen their channels to 45 feet. The new cost sharing has taught us something about the current dredging market. The projects formulated in Corps district offices, where most of the planning and engineering work is done, were developed without cost sharing in mind. Benefit estimates were frequently based on continued growth in coal exports and increased demand for oil imports. Design parameters without cost sharing were liberal. With cost sharing, there have been substantial changes. First, project sponsors have asked our district offices to stage construction and to modify the design. In the case of Norfolk, we are deepening a 50-foot outbound lane only, at a cost of less than $50 million, rather than the planned $400 million plus to deepen both lanes to 55 feet. The Baltimore 50 foot deepening project was authorized to be 1,000 feet wide, but the pilots and vessel operators both indicated that 700 to 800 feet would be safe, effective and acceptable. In Mobile and in the channel between New Orleans and Baton Rouge, we are proceeding with deepening to 45 feet rather than the full 55 foot authorized channel.

The 25 to 50 percent cost sharing for port projects is a substantial financial burden for the non-federal sponsors. Where the state is involved as a partner, or where cost sharing was accepted and planned for over a period of time by a non-federal sponsor, the financing appears to be more readily available. Where a combination of operational revenues and bond issues provide the source of non-federal financing, the cost sharing is achievable as long as the benefits are perceived as realistic by the sponsor. However, putting together the financing package may take a substantial amount of time.

At the time the bill was signed into law, the price of fuel dropped and then stabilized. There was also a significant amount of underutilized dredging capacity within the total dredging industry. These factors and perhaps others have resulted in the bids coming in substantially below the amounts that we advised both Congress and the project sponsors would be needed when we testified for federal appropriations.

Cost sharing has improved the budget for the Corps of Engineers, certainly through fiscal year 1988 and probably beyond. Cost sharing makes federal funds available for more projects than would otherwise be possible, and when considered in conjunction with the phasing of construction, enables the Corps to stretch the federal dollar to accomplish all authorized port projects that are ready to proceed. Cost sharing has also prompted sponsors to take a keener interest in how the Corps administers and manages its design and dredging contracts.

Another new process that we are using involves improved cash flows. In the past, when the Corps financed the entire dredging costs, it was common to obligate funds for the entire year upon award of the contract or at the start of the following year if it was a continuing contract. With cost sharing, we are obligating the funds much more frequently so that the sponsors may continue to draw interest on their money. Generally, this has been accomplished by establishing an escrow account from which the contracting officer, which is the Corps district engineer, draws funds for incremental contract obligations. The interest on the balance of the principal can be substantial and may serve to finance a portion of the non-federal share.

The Corps is conducting an analysis of dredging schedules and work load versus available equipment. We recently prepared a 5-year program in which we are considering all program dredging work, deepening projects, operation and maintenance, and work we do for the Navy. This will help us to determine whether there is adequate equipment available to keep prices competitive. Toward the end of 1988, the amount of equipment may be tight, and this could have a bearing on the bids we will be receiving. We will continue to monitor this with a view toward scheduling work consistent with the ports needs but also to assure that we get the best prices we can.

Another new issue is treating sand as a resource. In certain parts of the country, we are under considerable pressure to dispose of suitable dredged sand on the beach rather than offshore into deep holes. Florida recently passed legislation to this effect, and the work we're doing for the Navy at Kings Bay includes beach disposal. We are considering this type of disposal at other locations, keeping in mind that the type of equipment needed to dispose of major quantities of sand on the beach rather in deep holes is considerably different. The deepening of Norfolk Harbor and the approach channels provide ample opportunity for nourishing Virginia beaches particularly in the vicinity of the heavily developed Virginia Beach and New Virginia Beach areas. Philosophically, I believe that when the material is suitable and there is a need for beach quality sand, we ought to take full advantage of navigation dredging contracts for that purpose. There are a number of external considerations aside from the purely technical engineering considerations. You have to revise the environmental impact statement for a different type of disposal.

Financially, the question arises: should the federal government contribute its 50 percent share of difference in costs between dumping sand in deep holes versus putting it on the beach? We are wrestling with these issues, and I believe that next year you will see the contracts for dredging reflect bid items for putting sand on the beach.

FINANCING INTERNATIONAL EXPORT TRADE

BY
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Many businesses find financing a critical element in their day to day operation, and it is essential for the growth of the business. Frequently, we in the banking industry see that businesses have excellent ideas but no financial means to support their day to day activities. It is more true for businesses involved in international trade, particularly in the export business. A number of different elements have to be considered in the decision-making process to finance an export trading business.

However, even with these additional elements which increases the risk factor in international trade, there are a number of ways available for businesses to finance export transactions. I would like to direct my comments to businesses with annual sales of $100,000 or less. Two elements will be referred to throughout my presentation: pre-export and post-export financing.

In pre-export financing, we are talking about the time period between when the business receives an order from overseas and the merchandise is delivered for shipment to its overseas destination. To finance a pre-export transaction, the resources available to the company can be either internal or external. Internal resources are generated from the day to day activities of the business as cash flow. Most businesses are in the position to generate sufficient cash flow from operations in order to purchase the materials necessary for their manufacturing process and will not require outside sources for working capital purposes.

Business can look outside of its entity for financial resources to provide the necessary cash for the manufacturing process. The borrowing can take two major forms: direct borrowing or induced borrowing.

Under direct borrowing the business receives the necessary working capital from a financial institution in the form of a working capital credit or a one time loan for a specific transaction. All borrowing is based on the financial strength of the company, and if the financial institution is satisfied that the borrower is credit worthy, money will be provided to support the pre-export activity.

In those cases where the borrower is not strong financially, we can find federal and state agencies which can provide some sort of inducement to the financial institutions to make financial resources available to the borrower. Within the international arena, there are three government agencies that will guarantee a loan. The Small Business Administration (SBA) can provide a revolving export line of credit to businesses which can qualify under the criteria as a small business. The Export-Import Bank has a working capital guarantee program which will guarantee the lending institution the credit and provide an inducement for the extension of an export related credit facility. A number of states also have programs to encourage exportation of goods manufactured locally and guaranteed through a state guarantee program which will perform a similar function as the federal agency programs.

In post-export financing, we primarily deal with the situation where the exporter was able to purchase the goods or services and shipment was made to its overseas destination. The U.S. exporter might look to the financial industry for resources in order to shorten their business payments cycle since the international transaction normally takes longer to complete than domestic trade.

Within the element of risk we have to consider two important features: commercial risk and political risk. Commercial risk on the international scene has to consider foreign business practices and the long distance to the overseas buyer. Political risk will entail the economic and political condition created by foreign governments. It is very possible that a foreign buyer is a very strong business entity. However, due to economic policies, the importer's country is unable to generate foreign exchange for its economy. The result is the foreign business has no means to pay for U.S. goods imported into the country. A good example is Mexico and Latin American countries in late 1982.

To get paid in the international market, four alternatives are available: cash payment, open account transactions, documentary collections, and letters of credit transaction. The most significant and commonly used vehicle in international trade is letters of credit. A letter of credit is a guarantee issued by a bank to a beneficiary stating that if the beneficiary will meet all terms and conditions of the letter of credit, the bank will guarantee payment. In most cases, a commercial letter of credit is the only way a U.S. exporter is willing to sell his products overseas.

There are three ways post-export financing can be handled. In direct borrowing, financial resources will be made available to a company based on their financial strength. Considering the lag time, from the time a shipment is made and payment is received, it is foreseeable that the manufacturer will need to borrow money from a financial institution. Receivable financing is another way a financial institution will make monetary resources available to the borrower. This is a factoring arrangement, and the foreign receivables will support the transaction.

Sometimes an inducement will be necessary to encourage a financial institution to lend money to an exporter for post-export financing. The inducement can take various forms, but the most commonly used vehicles are private insurance companies, foreign credit insurance associations such as the FCIA, Export-Import Bank, and the U.S. Department of Agriculture.

THE ROLE OF THE EXPORT-IMPORT BANK IN EXPORT FINANCING

By
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Export-Import Bank of the U.S.

The Export-Import Bank of the United States is a U.S. government agency. It is an independent agency, with five Presidentially appointed directors Eximbank has one mission -- to aid in financing and to facilitate U.S. exports. It was founded in 1934 to stimulate trade during the depression.

Contrary to its name, Eximbank does nothing with imports. However, Eximbank has contributed financing support for over $180 billion of U.S. exports. That's about five percent of total U.S. exports during the period. During the past five decades, it helped create extensive markets for U.S. products abroad and sustained U.S. jobs at home.

Eximbank through the years has enabled U.S. companies to market new products, such as commercial jet aircraft, and new technologies, such as nuclear power plants, which commercial banks could not finance on their own. Today, Eximbank is also engaged in a major new marketing effort to broaden our nation's export base by reaching out to small and medium-size companies.

There are certain key elements and developments in the world economy which have a major impact on what Eximbank can do to assist the U.S. economy. With the world's largest gross national product of 4.4 trillion dollars, the U.S. is showing a sustained period of real growth. The U.S. economy has increasingly relied on imports resulting in major deficits in both trade and current accounts. However, the U.S. has no problem in financing these growing deficits, because foreign governments and private business continue to see the healthy U.S. economy as the place to invest their money in equities and securities. Indeed, the U.S. is already the world's largest debtor, with obligations to foreign creditors of over $800 billion dollars.

The scale of persistent imbalances in U.S. external accounts and its federal budget deficit have contributed to a major dollar depreciation. These trends are of concern to many, but too often critics place total responsibility for correction on the U.S. In spite of the dominant U.S. role, other countries also have a major influence on world trends. Japan, particularly, is being called upon to adjust its economy to the benefit of other countries throughout the world. With its GNP reaching 2.3 trillion dollars, it is the second largest economy in the world. It shows the largest trade and current account surpluses of any country in the world with 90 billion dollars, compared to the U.S. deficits of 150 billion dollars. As a result, its capital accumulation has led to massive new outflows of loans and investments. One year ago, of the fifty largest banks in the world, 20 were in Japan, and seven of the top ten were Japanese. Europe also has become a center of trade and current account surpluses, and the largest of these is in Germany at 40 billion dollars. There is room, too, for these capital accumulations to flow to the benefit of borrowers throughout the world. Both in Japan and in Europe, their current account surpluses have come largely at the expense of the U.S. A steady U.S. growth has enabled these countries to export with increasing success into the United States. Moreover, these countries have competed with increasing aggressiveness for markets in third world areas.

The world's attention is focused increasingly on how to resolve the external debt services problems of less developed countries. When the world moved into a recession after the series of oil shocks, commodity prices of many key exports of these debtor problem countries dropped remarkably. They further suffered the impact of a rise in dollar interest rates, which compounded their debt service problems at the same time their export foreign exchange earnings declined.

With austerity programs combined with policy and structural reform, assisted by

the International Monetary Fund and World Bank, these countries have struggled to reduce their trade deficits and related debt burdens. However, the progress in reducing deficits has come largely through curtailing imports which are necessary to the long term growth of these developing countries. This is not a posture they can maintain, because growth must be restored for economic, social, and political reasons.

Viable growth in the less developed countries will require an ability to restore equilibrium in exports, imports and two-way capital flows on a sustained basis. This growth will also facilitate resumption of substantial U.S. exports to traditional U.S. markets and in Latin America particularly. Consequently, today we face a great turmoil in the world of ideas from our academic, business and public policy leaders as they seek appropriate policies, and possibly new solutions, to meet the needs of these debt problem countries. Against these contemporary trends in the world scene, what corrective actions are emerging to improve the U.S. situation? We have seen a marked depreciation of the dollar, particularly against the Japanese Yen and the German Mark, which is restoring U.S. export price competitiveness. However, that depreciation in itself cannot assure a turnaround in the American trade deficit. A large portion of the U.S. loss of market share overseas has come through gains by the newly industrialized countries of Hong Kong, Korea, Singapore, and Taiwan. Against those currencies the dollar depreciation has been minimal.

Domestically, U.S. monetary policy designed to avoid the resurgence of inflation has buttressed confidence of foreign investors in the U.S. dollar. The U.S. has collaborated with other governments to avoid a chaotic drop in the dollar, while accepting economically driven depreciation. The U.S. is also pursuing budget restraint as a further control on inflation which also strengthens confidence in the U.S. economy.

As further action to deal with the U.S. trade deficit, the U.S. has taken steps in multilateral forums, as well as in bilateral negotiations, to sustain open markets for U.S. exporters. Congress is greatly concerned about the failure of other governments to comply with this international objective of open markets, and has sharpened U.S. tools for potential retaliatory actions should these prove necessary. What is the Eximbank strategy to be relevant and operate effectively in this environment? What are the key areas where we can best contribute? Recognizing that macro-economic policies, exchange rates and LDC debt management will remain the dominant forces in deciding the pace of U.S. exports, we believe Eximbank can contribute significantly in the following areas to benefit the U.S. economy:

1) continuing to assure financing for exports which otherwise would not go forward because adequate financing is unavailable for reasons of risk assessment or competition from other government export agencies.

2) offering programs to bring new companies into exporting, particularly the smaller firms.

3) offering programs to bring banks back into the trade finance role on which U.S. exporters have relied in the past.

4) assuring that Eximbank export credit programs are competitive with those offered by other governments.

5) working with export credit agencies of other countries and the IMF, IBRD, and other international development banks to assist the restoration of viable economic growth and debt service by LDCs with debt management problems.

Eximbank's basic mission remains to help finance the exports of U.S. goods and services. This has been our objective for fifty-three years, and Administrations and the Congress have consistently restated the importance of this purpose. The Administration sought, and the Congress has given Eximbank ample budget authority in recent fiscal years. For FY 1987, we have a guarantee and insurance authority of 11.4 billion dollars and 900 million dollars in subsidized direct credit authority. We will use perhaps two thirds of our guarantee and insurance authority, and perhaps sixty percent of our authority to issue subsidized direct credits.

We have seen a substantial increase in requests for use of our insurance, because trade finance which used to go through the commercial banks can no longer rely on the same volume of bank support. Banks have reacted to legitimate concerns with the riskier international lending environment, and particularly the larger banks have changed their pattern of business to seek better returns through capital market activity instead of relying on holding credit paper.

The failure to draw fully upon our subsidized direct credit authority has been somewhat unexpected. We offer such credits only to compete with subsidized credits by other governments. While we have made billions of dollars in offers, many of these simply do not proceed because of curtailed growth in developing countries. Large infrastructure projects, such as mining, electric power, and basic metals expansion, all have been cut back because of slower economic growth.

To assist commercial banks to remain active in trade finance for their client exporters, we have enhanced our guarantee coverage. For commercial risk we have increased cover so that the commercial bank or the exporter will have to take only a two percent risk-sharing with us. The balance is covered by Eximbank. For political risk, Eximbank covers one hundred percent.

We have improved our programs to reach out to new exporters and to the small businessman. We have a highly successful working capital program. We provide guarantees to a commercial bank which finds it cannot risk a working capital loan to a company which is new to export, or to a small company undertaking a large export beyond its previous scope of operations.

In summary, we feel our programs are fully competitive with those of countries whose exporters are the major competitors of U.S. exporters. We are ready to take greater risk, both through our risk protection programs and in our country-risk attitude. We think Eximbank is now ready to help exploit the growing opportunities for American exporters, as the dollar has become more competitive and as the U.S. works to restore growth in the developing countries.

U.S. DOMESTIC TRANSPORTATION INFRASTRUCTURE RELATIONSHIPS IN INTERNATIONAL TRADE

By
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This paper provides a brief overview of some Department of Transportation programs that increase the efficiency of the United States in international trade and the competitiveness of our exporters of both goods and services. The Administration is committed to do whatever is necessary to maintain the free trade system. That means fighting unfair trade practices through negotiation and, when necessary, through retaliation. It also means fighting Congress when it attempts to enact protectionist legislation, such as it is proposing to do in the areas of textiles and telecommunications equipment.

Deregulating Transportation Domestically

The Administration and the Department are also very much aware of the need to adopt domestic policies that increase the efficiency of our transportation services, which in turn, should lower the costs of U.S. exports. As President Reagan remarked in the State of the Union message:

> "America cannot hope to compete in world markets if product prices are needlessly inflated by transportation costs, which can account for as much as 25 percent of the cost of a delivered product."

There is a definite linkage between domestic transportation deregulation and export competitiveness. Deregulation, by allowing the actual characteristics of each transportation mode to govern its operations, leads to the best mix of transportation prices and services in the market and through competition to the lowest costs for particular services. As the final prices of virtually all products contain some transportation charges, the lower costs can be directly reflected in lower final product prices. Lower final product prices directly increase the global competitiveness of U.S. industry.

We have seen estimates that, since transportation deregulation, buyers and sellers of U.S. goods save as much as $56 billion a year due to lower inventory and transportation -- primarily trucking -- costs. Indeed, we know that the logistics costs of all U.S. industry, which include transportation, inventory and related administrative costs, have declined as a percent of GNP since the deregulation of trucks and railroads.

Trucking deregulation is not yet complete. In many states it does not yet apply to the intra-state services of both intra- and inter-state carriers. Perhaps as a result, the Department hears tales such as:

- A retailer in Dallas reportedly pays less for transportation when importing blue jeans from Taiwan than from manufacturers in his own state of Texas.

- In November, an import trading company arranged to deliver 600 pounds of custom-designed pens from Taiwan to Chicago for only $100. By contrast, it would cost $100 to ship 600 pounds of office supplies from Boston to New York.

While, obviously, there are many different factors involved in these examples, they do speak to the basic truth that transportation deregulation definitely lowers overall costs. That is why the President has committed to press for legislation to complete the deregulation of trucking.

It is sometimes useful to look at what your competitors are doing and see if you can adopt some of the same practices. By now the Japanese have made famous the so-called "just-in-time" inventory management technique, in which subcontractors manufacture components and transport them to the main assembly plant "just in time" for assembly. The system drastically reduces inventory costs but can only be effective in the United States if the cost of transportation services are lowered.

We have made significant progress toward the Staggers Act goals of a strong and healthy railroad industry, competing in the private market, and regulated only where competition is not effective in constraining rail rate and service actions.

The financial health of the railroads has improved. In 1985, they earned 4.8 percent on investment, compared to less than 2 percent in the crisis years of the 1970's. Deferred maintenance has been virtually eliminated, service is more reliable, deliveries are faster, and rates have gone up less than half as fast as they did before the Staggers Act, rising generally in line with railroad costs. In the six years since the Staggers Act, the percentage of trains moving on main lines under so-called "go slow" orders has decreased from some 30% to under 1% percent. Cost savings, in other words, can be very visible and dramatic.

The Role of Infrastructure in International Competitiveness

There is a definite link between infrastructure and our export competitiveness. If you can't move goods, you can't export; if you can only move goods expensively, then your exports are less competitive.

However, our system of transportation infrastructure is, by world standards, exceedingly efficient. This remains true even by western European standards. It is not falling down. We have made huge federal, local, and private investments in our ports, railroads and highways. The goal now is to concentrate on the rehabilitation and maintenance of this very efficient infrastructure and to prevent it from falling into disrepair.

Even though we believe that maintenance and rehabilitation are the most important goals, we have not excluded new infrastructure projects, such as the 42 port improvement projects that are authorized by the Water Resources Development Act of 1986.

Some of our major exports are basic raw materials such as grains, tobacco, coal, and the like -- commodities that are shipped at low bulk rates. Agricultural products are produced at very competitive prices, and their shipment on inland barges is at an almost absurdly low ton/mile cost. Even coal, which is relatively more expensive to extract in the United States than in foreign countries, and which often has to travel substantial distances to port, is quite competitive in world markets. In general, U.S. infrastructure

has to be much better because we are a large country whose economy has not been generally export-oriented. We are competing against smaller countries which do not have to haul products over such long distances, or large countries like Australia and South Africa which have long oriented their industries (such as coal) to the export market.

Fighting for the Rights of U.S. Airlines and Maritime Interests Abroad

We believe that our international transportation industries are vital to the economy, and we are concerned with their health. That means, on occasion, fighting for access to foreign markets for our carriers, and for their right to operate efficiently once that access has been gained. U.S. carriers do encounter occasional but significant difficulty in gaining access to foreign markets and in operating efficiently once access has been achieved.

Working with the Department of State, we have successfully utilized the special retaliatory powers given to us by Congress for these two service sectors to fight unfair trade practices. (The powers are contained for aviation, in the International Air Transportation Fair Competitive Practices Act of 1974 and the International Air Transportation Competition Act of 1979, and for maritime services, in the Shipping Acts of 1920 and 1984.)

For example, in aviation we:

- Retaliated against the Malaysian airline because Malaysia required U.S. carriers to use a monopoly handling agent in its country;

- Informed the Republic of Korea that we could not engage in meaningful negotiations to improve Korean Airline's access to the United States until Korea corrects certain "doing business" and operational problems that U.S. airlines are experiencing in their country; and

- Refused to grant Lufthansa permanent authority to serve Houston, thereby persuading that airline to correct the anti-U.S. bias in its computer reservation system;

In maritime services, we:

- Persuaded the Philippines to rescind a government decree that unilaterally attempted to establish cargo-sharing in the U.S. - Philippines trade;

- Challenged the Peruvian Government on its move to reserve 100 percent of cargo for Peruvian-flag vessels -- a Federal Maritime Commission action (Section 19) is currently in the works;

- Persuaded the Pakistani Government to suspend an 8 percent gross freight revenue tax that discriminated against U.S.-flag carriers; and

- Continued to make progress in eliminating Japanese barriers to the use of high-cube containers by U.S. carriers.

As a result of these actions, we find that our air carriers and our shipping

lines have retained a healthy share of their markets. Over the past several years, U.S. airlines have carried roughly 50 percent of the traffic to and from the United Sates, and U.S. ocean liner carriers have retained about 25 percent of total U.S. liner trade.

Trade Enhancing Facilitation Activities

We define facilitation as anything that makes the movement of passengers and goods across our borders more efficient. That means that infrastructure deficiencies can create facilitation problems. Two operational areas in which the Department of Transportation is involved to facilitate international transport include passenger and cargo pre-clearance and cargo documentation.

In a pre-clearance program, the inspection agencies examine passengers and cargo at the airport of departure rather than at the airport of arrival. For the Immigration and Naturalization Service (INS) in particular, this has significant advantages. Rather than having to detain an inadmissible alien, conduct a hearing, and transport the passenger back overseas, INS simply turns the person away. For Customs, there are slightly more problems, but we believe there are advantages for them too. For our air carriers and passengers, the ability to avoid the congested international gateways where federal inspections take place would be an incredible boon.

We have pre-clearance sites in Canada already, and in the Bahamas. What we are trying to do now is acquire additional sites in Europe -- we had a four month demonstration of "pre-inspection" (which involves only INS) at Shannon Airport in Ireland, and it worked very well. Our estimates of its cost efficiency were very impressive. Even through the cost of placing an INS inspector overseas was much greater, the increased effectiveness of enforcement (a larger number on inadmissible aliens turned back, and without costly hearings and detention proceedings) more than made up for that extra cost.

For international shipments of cargo, the volume of paperwork is staggering. It is estimated that 8 percent of total cost is attributable to producing documentation for international trade. One air carrier tells of a shipper that was spending $24 to manually handle an invoice for air shipments the value of which was only $7.00.

The computer can cut these costs and make trading more efficient. In the world of paper, a commercial invoice is produced manually, copies are made, and the original sent by mail, received and stored. Overhead, direct and delay costs are high. With electronic data interchange, or EDI, the required information is simply entered into a computer in one country and sent electronically to a computer in another. The First National Bank of Chicago estimates that nationwide there is a $6.6 billion savings opportunity in generating trade documents electronically.

Here are some examples of these cost savings:

- The cost of generating a purchase order has been estimated at $50.00 a piece. EDI can bring that cost down to $7.00. Most companies generate hundreds of purchase orders a day.

- The automotive industry estimates that EDI will save approximately $200.00 per car; one automobile manufacturer saved $80 million in freight costs by using EDI.

- One large motor carrier estimates that it can generate 50,000 freight bills at a total cost of 41 cents each.

- One manufacturing firm saved $30,000 a year in stamps alone by not mailing purchase orders.

The use of EDI is growing dramatically among shippers, carriers, and ports. Booz, Allen, Hamilton estimates the EDI applications will grow at an annual rate of 50 percent during the remainder of the decade, and the Yankee Group estimates that 1/3 of all business transactions will be conducted electronically by 1995.

DESIGN AND OPERATION OF THE NEW ICTF INTERMODAL TERMINAL IN LOS ANGELES/LONG BEACH

by
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Background

The new Intermodal Container Transfer Facility (ICTF) which serves the ports of Los Angeles and Long Beach has a geographic advantage over other major rail yards in that it is only 4 miles from the ports or a 10-minute truck trip, in comparison to other rail facilities located 25 miles further from the ports. The ICTF features 5 working tracks with 3 center-row parking areas for trucks, and the facility is 1.3 miles long and covers 146 acres.

Funding the Project

The two ports formed a Joint Powers Authority (JPA) as a political entity for the specific purpose of financing and constructing the ICTF. To finance the construction, the JPA issued $54 million in industrial revenue bonds, which are guaranteed by the Southern Pacific (SP). The facility was built on land leased by the JPA from the Port of Los Angeles, and the land is sub-leased to the SP. In addition to the bond funds, the SP spent $25 million to reconstruct part of the existing Dolores rail yard to provide rail access to the ICTF. A total of 55 permits and agreements were required before construction could get underway.

Physical Features

Grading the site began in the Spring of 1985, and the subgrade was compacted to a depth of 3 feet. Full scale construction began in July 1985, and the facility opened to traffic in November of 1986. Basic features of the ICTF include:

- 5 loading tracks
- 2 runaround tracks
- 7 buildings including: administration building, operations tower,

gatehouse structures and customs building
- basic drainage, electrical and mechanical systems
- all paving
- all other features necessary for basic operation
- 5 Mi-Jack 1,000 cranes.

Truck Access

The ICTF has 16 truck lanes at the gate. The middle 8 lanes are reversible. The ICTF uses a totally automated gate entry/exit operation. An arriving truck stops at the gate precheck station. Over the intercom system, the trucker communicates with the operations staff located on the 6th floor of the Control Tower.

The operations staff receives from the trucker essential information for input into the computer and simultaneously calls up on the CRT screen all advance shipment information which has been received through electronic data interchange from the steamship line. The ability to have prior shipment information on file significantly reduces the amount of trucker waiting time.

The trucker is instructed at this point to proceed to a specific lane at the all-weather gate structure for inspection of container and chassis. During the trucker's advance from the precheck station to the actual gate, all required paperwork is computer-printed and is waiting at the gate house. These computer generated documents contain all necessary information to accomplish the legal interchange of equipment from the truck to the SP.

Rail Access

A key feature in providing the rail connection to the ICTF via the Dolores Yard involved the construction of a double grade separation over Alameda Street.

The ICTF can load/unload up to 5 double-stack trains simultaneously. There are over 7 miles of track within the ICTF, with room to spot 84 double-stack cars. The facility has center-row parking areas consisting of 3,000 container stalls. Inventory of the stalls is maintained in the computer.

Trains can pull directly into the facility and cut off their power. After containers are loaded and trains depart, customers can trace shipments via Customer Account Report Systems. Customers can make direct contact with SP's computer system to track car movements on a real-time basis.

Operations

Container throughput at the ICTF is running 35% ahead of the traffic handled in the past to and from the ports. The facility has 170 employees and operates at about 1,400 container lifts per day. As many as 2,700 trucks have passed through the gates of the ICTF in a single day.

LINER TRAIN AND MARKETING SYSTEM IMPLEMENTED BY AMERICAN PRESIDENT LINES

By
Michael D. Morris
American President Intermodal

This presentation provides an overview of recent innovations undertaken by American President Company (APC), the parent company of American President Lines (APL) and American President Intermodal (API), in the development of a full distribution service. This effort was undertaken primarily to reduce the costs of shipping containers from the West Coast, and has led to the introduction of double-stack container train service.

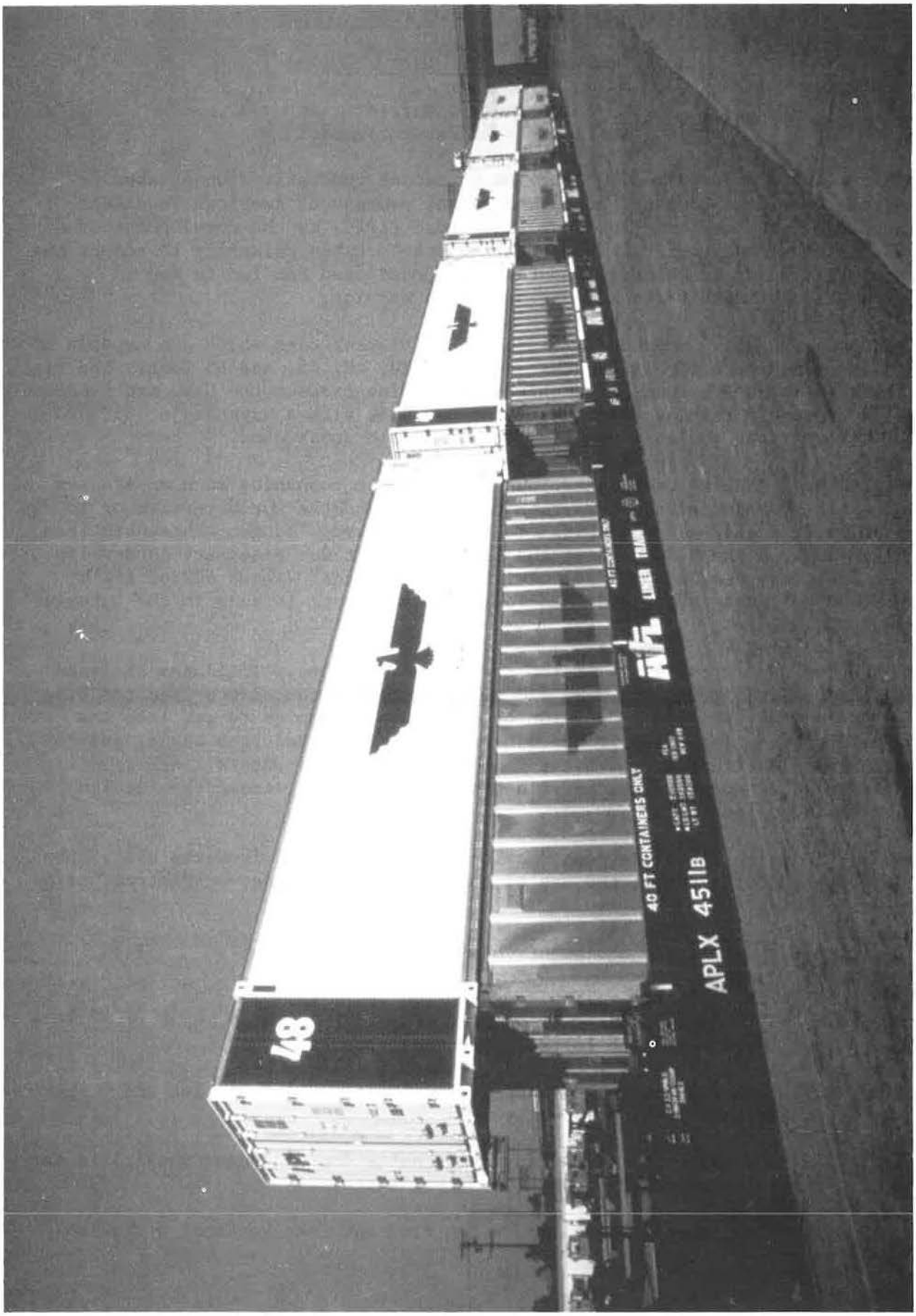
The photograph shows a number of loaded double-stack cars which are capable of handling containers of all lengths including 20, 40, 45, and 48 feet. The rail network on which APL runs its double-stack trains crosses the U.S. and Canada. APL is presently running 16 stack-trains per week with a capacity of 350,000 FEU's (Forty-foot equivalent units) in 595 double-stack cars.

The growth of double-stack operations by steamship companies such as APL was the result of a decision not to run ships in around-the-world service or to run the ships through the Panama Canal to the East Coast. To get containers from the Far East to the U.S. Midwest and East Coast, it was necessary to develop intermodal services in cooperation with the railroads. About 60% of APL's container business is not destined for the West Coast; it goes to the interior or East Coast.

One problem that arose early in the service was the heavy imbalance of loaded eastbound containers to the U.S. and empty westbound containers from the U.S. This has now resulted in a decision by steamship companies to get into the business of handling domestic containers to create loaded back hauls, and fortunately, California is a big consumer of domestic products. APL is projecting that domestic stack-train business will soon exceed the foreign stack-train business.

Economic and operational savings that have been generated from the use of the double-stack trains versus the use of conventional container-on-flatcar trains are as follows:

- 55% reduction in equipment tare weight per FEU
- 15%-20% reduction in fuel consumption
- 50% labor reduction in train crew cost per FEU
- 33% reduction in railcar and locomotive capital costs for an equivalent carrying capacity
- 20%-30% reduction in railcar maintenance due to longer wheel life and fewer replacements of wheels and brake shoes
- Improved lateral stability in the ride and less vertical vibration.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APL

AUTOMATIC EQUIPMENT IDENTIFICATION SYSTEMS FOR INTERMODAL OPERATIONS A RAILROAD PERSPECTIVE

By
Paul N. Kromberg
Association of American Railroads

There are two distinct aspects of intermodal terminal inventory systems:

- Terminal inventory control, which deals with the routine operation of locating equipment within the terminal and with reconciling the difference in the number of pieces of equipment that are indicated in the computer with an actual field inventory.

- Automated equipment identification (AEI), which deals with the problem of encoding each trailer which enters a terminal and when it leaves.

There are several types of AEI technologies in use:

- Temporary bar codes are temporary paper labels that are posted on a trailer when it enters through the entrance gate and are removed at the exit gate.

- Optical character recognition involves the use of a machine which reads the markings on vehicles entering and leaving the terminal, which saves time that would be spent manually marking and recording each vehicle.

- Radio frequency tags, which are temporarily or permanently affixed to the vehicle and enable the terminal operator to keep track of the vehicle at all times within the facility. Temporary tags are useful in intermodal operations where the fleet of vehicles is not captive to the railroad or the steamship company.

The Association of American Railroads and the Massachusetts Institute of Technology conducted a survey of railroads to determine what the railroad requirements are for an AEI system. Sixteen responses were received. In terms of current terminal operations practices, the survey found that few terminals have individually marked parking spaces and that virtually no terminals assign equipment to specific areas. Actual inventories of equipment in the terminals are performed from zero (0) to three times per day, and the inventories require from 0.5 to 24 man-hours to perform.

Following are a series of questions posed to the railroads about the severity of their problems in locating equipment in the terminals and their operations of AEI systems to expedite inventory control.

- Difficulty in locating equipment in yard:

  Great - 5 railroads, Moderate - 6 railroads, Small - 3 railroads

- Could manual input to hand-held computers assist in the inventory control?

Yes - 4 railroads, Conditional - 3, No - 7

- Would radio frequency tags help in inventory control?

  Yes - 1, Conditional - 4, No - 9

  The railroads fear that the tags would break or get lost.

- How much a problem is it to clean labels on vehicles?

  No Problem - 0, Minor Problem - 6.5, Major Problem - 7.5

- Would there be benefits to industry-wide standardization for an inventory control system?

  Yes - 9, No - 5

- Is there a need for compatibility between intermodal yards and railcars?

  Yes - 7, Conditional - 4, No -4

- Is there a need for field encodability?

  Yes - 7, Conditional - 1, No - 3

- Is there a need to store information temporarily?

  Yes - 5, Conditional - 3, No - 3

- Where should research efforts be concentrated?

  Radio Frequency systems - 4

  Optical character recognition systems - 2

  Both or other systems - 4

Desirable system for a small AEI system include:

- Cost effectiveness.
- Minimal maintenance and operating requirements.
- Reliability and readability are 100%.
- Ability to efficiently read/write all needed data.
- System is widely accepted by the industry and by all modes, including rail, truck, maritime.

PORT-RAIL INTERFACE AND CONTAINER SYSTEMS AT THE PORT OF HALIFAX

By
Douglas P. Smith
Canadian National Railroad

There have been recent references to on-dock transfer, near-dock transfer and off-dock transfer of containers. The Canadian system is based on a system using on-dock transfer of containers between vessels and rail cars.

Halifax, Nova Scotia, is a major container port serving the East Coast of Canada. Halifax lies close to the Great Circle Route from Europe to the East Coast of the U.S. Vessels traveling the route pass within a few hours sailing time of Halifax, so there is no delay to vessels that stop off at the port.

Most of containers handled by Halifax originate at or are heading to the Montreal and Toronto markets. Very little of the traffic is to the U.S. Midwest. It is 1,150 miles between Halifax and Toronto and 810 miles from Halifax to Montreal.

On-dock transfer of containers from the vessel to the rail car involves direct transfer from the wharf to the rail car. There is no placement of containers on chassis and the containers do not pass through a gate. Canadian National (CN) and Canadian Pacific railroads have dedicated container car fleets which serve the Port of Halifax.

This presentation is based on the Halterm terminal in the Port of Halifax which has three ship-side cranes and four rail transfer tracks. These four tracks are each 1,800 feet in length and can handle 17 standard container flat cars per track. The CERES terminal in the port has two ship-side cranes and has just added another berth, and there are 6 rail transfer tracks each of which can hold 13 to 14 standard container flat cars.

At Halterm, the rail classification yard is located about one-half of a mile from the wharf. It is critical that rail support be located as close to the wharf as possible. The containers are moved from the wharf to the rail track by a hostler and an internal chassis, and the front-end loader places the container on the rail cars. The containers are blocked on rail cars going to Toronto or Montreal and to western points. Generally, there is no ground storage of inbound containers except for some refrigerated containers or for Customs inspections.

It is imperative that the terminal operations not cause delays for vessels or have the ship-side crane just sitting while waiting for a chassis to return for a pickup. Three people are critical to an efficient operation.

1. Deck checker. The person on the vessel who controls the crane on the vessel side. He directs the crane to the proper bay and passes the information as to which box is coming off the ship.

2. Separator. The person who dispatches the hostlers and indicates where each box is to go, to the rail tracks or storage.

3. Yard checker. The person who makes sure that the chassis goes to the appropriate rail track. The chassis are not assigned to a particular rail car, only to a particular track. The containers are arriving at the rail tracks at a rate of up to 75 per hour.

With each ship-side crane, there are generally 3 to 4 hostlers with chassis to serve the crane. Each box operation involves a 5 or 6 minute cycle that includes getting the box out of the vessel, running it over to the rail car, putting it on the rail car and returning the hostler to the ship-side crane. If the vessel is also handling export containers, the hostler will run from the train to the storage yard to pickup a container to bring to ship-side.

If a terminal has 2 or 3 ship-side cranes, the operation can be run manually without the need for a computer system. However, once a terminal goes to 3 or 4 ship-side cranes, then a computer system will be necessary.

DEEPER PORTS INCREASE THE COMPETITIVENESS OF U.S. COAL EXPORTS

By
T. Parker Host, Jr.
T. Parker Host, Inc.

Our success in achieving the recent start-up of our 50-foot outbound channel in Hampton Roads was not an easy task, and I think it is appropriate to quote Assistant Secretary of the Army (Civil Works), Robert K. Dawson's remarks made at the Hampton Roads Deepening Ceremony on April 6, 1987. "The project getting underway today is a highly successful example to how the Corps and other federal and state agencies, and non-governmental organizations such as the Hampton Roads Maritime Association, can join in a team effort to serve our nation."

Hampton Roads has always been the bread basket for coal users worldwide. Our exports in the early 1980's was over 50 million tons. Last year this figure was over 40 million tons. Fostering deeper water in Hampton Roads, we committed to our overseas coal buyers that we would reduce their delivery cost of coal and waiting time for loading by achieving in the future a 55-foot channel. A first phase improvement of a 50-foot outbound reach is now underway.

Some years ago when oil was selling at $45.00 per barrel, the cry from our coal buyers was, "You get the authorization and we'll pay for the harbor deepening." Clearly their interest was understandable.
A Panamax vessel (a vessel that can transit the canal that has less than 105-foot breadth and loads approximately 80,000 tons at a draft of approximatlely 40 feet) had a freight rate of about $24.00/$26.00 per ton to Japan from Hampton Roads. A Cape sized vessel at that time (a vessel that cannot transit the Panama Canal which loads up to 160,000 tons) had a freight rate of $14.00/$16.00 per ton to Japan from Hampton Roads. There was a savings in the coal transportation to Japan of about $10.00 per ton by using a larger size vessel. Our draft at the coal pier in Hampton Roads is 46 1/2 feet sailing on high water with a vessel's cargo of approximately 120,000/130,000 tons.

I don't see 150 ships at Hampton Roads waiting for berths or coal freight rates to Japan at $26.00 per ton as it was in the early 80's,but I do see by the early 1990's an increased dependency on coal. Our additional draft will ensure a quick turnaround and stabilization of ocean freight rates by using the Cape sized vessel. Obviously, this will increase the competitiveness of U.S. coal exports.

Clearly coal exporters seek deeper ports to stay competitive. This point appeared in early June in Dean Witter's monthly Coal Newsletter, "Conrail's dumpings at pier 124 in Philadelphia may be reduced in the future. Conrail may divert some of its Philadelphia coal to the Consol pier in Baltimore. The Baltimore pier will be dredged to 50 feet in 1988 and will therefore be better equipped to handle larger vessels than the Philadelphia pier, which will remain at a depth of 40 feet."

By next summer, we will have a 50-foot draft at Hampton Roads. Presently, at Hampton Roads, there is loaded on a Cape sized vessel of 150,000 dead weight tons loading for Japan via Richards Bay, South Africa, on a draft of 46 1/2 feet, approximately 120,000 tons. Afterwards, she proceeds by Richards Bay to top off for her balance of an additional 25,000 tons of coal. When we achieve our 50-foot channel next summer, it would not be economically feasible for this vessel to top off at Richards Bay based on the following:

1. Deviation would be about two days, costing about $20,000 based on ship's cost per day of $10,000.

2. Loading time at Richards Bay one day - additional cost approximately $10,000.

3. Port expenses at Richards Bay $40,000.

This means a total cost of $70,000 for the extra call at Richards Bay for loading the additional amount of cargo of approximately 25,000 tons. Calculating this to a ton of coal results in the figure $2.80 per ton. In less than a year, there will be no need to call at Richards Bay by vessels sailing from Hampton Roads to Japan, since we can then load these vessels to 150,000 tons. This will effect a savings of $2.80 per ton to the transportation cost of the coal to the consumer and make U.S. coal more competitive.

VEXTRAC, THE EXPORT TRADING COMPANY

By
Barry Owens
Virginia Port Authority

World trade and the U.S. trade deficit are important challenges and issues facing the U.S. An Export Trading Company (ETC) is a device which can improve our ability to export goods to overseas markets. An ETC is usually set up to help market and sell overseas a series of similar product lines.

VEXTRAC, the export trading company of the Virginia Port Authority, was set up in 1983 as a non-profit corporation to handle products that can be shipped through the facilities of the Port Authority. VEXTRAC accomplishes the shipment of cargoes through the port facilities of Hampton Roads in various

ways including exporting, importing, formation of shippers association and using the Port Authority's shipper databases.

Presently, VEXTRAC is emphasizing assistance to small and medium size companies in importing and exporting. This is an example of how the Port Authority is taking direct action to expand its shipments and is not just waiting for shipments to come through the port.

VEXTRAC uses a computer database that indicates types of overseas cargoes being shipped, where the cargoes are being shipped, what parts of the U.S to which they are being shipped, what parts of the U.S. are shipping and receiving certain products. The port's traffic department furnishes VEXTRAC with the costs of shipping the products internationally, and VEXTRAC works with the terminals to develop low cost handling charges for shipments. This results in a least cost transportation package prepared by VEXTRAC for shippers. Depending on the rate quotation needed by the buyer, VEXTRAC provides rates on the basis of Cost, Insurance and Freight; Cost and Freight; and Free On Board.

To assist shippers in marketing their goods worldwide, VEXTRAC uses trade shows, trade missions, overseas field offices and the services of the U.S. International Trade Administration. VEXTRAC uses its resources to find and develop markets, negotiate deals, arrange and expedite the transportation of goods, and correspond with international customers.

As an example of VEXTRAC programs, one of the first companies was a chemical company which had stacks of inquiries from around the world, but the company was unsuccessful in finding a market. The company approached VEXTRAC, and we determined that Taiwan would be a good market for its products. We went out and found distributors for the chemical products.

The price of U.S. goods has been the major problem for VEXTRAC in finding overseas markets. However, in terms of overall traffic at the Port, our export tonnage has increased in response to the declining value of the dollar which has generated more overseas demand. Another problem has been that some smaller companies do not follow-through on the efforts made by VEXTRAC to get the companies involved in exporting.

In 1985, VEXTRAC worked with 22 primary clients and 20 secondary clients, and over 10,000 tons of cargo were shipped as a result of these contacts, most going to the Far East and Europe. Export products included peanuts and peanut butter to France, while imports included lumber from Canada and tractors from Japan.

NEPTUNE, THE PORT COMPUTER SYSTEM

By
Richard K. Matika
Virgina Port Authority

Automation offers benefits for a port in terms of customer service for users of the port and for the port itself in providing improved services at reduced costs. Now is a good time for ports to automate to maintain and improve their competitive position. The Virginia Port Authority and its terminal operating subsidiary - the Virginia International Terminals - are committed to automation.

Automation began at VPA in 1970 for payroll, invoicing and account receivables. Through 1978, cargo control systems were added for export and import cargoes. These started out as batch systems in which the operator would enter data and then prepare a report from the data at the end of the day. Beginning in 1978, the system became on-line whereby various users of the system could access data for different purposes. Through 1985, the accounting and operations computer system was further refined to include a spare parts inventory, accounts receivable, cost accounting, work order, billing, general ledger, container inquiry, vessel scheduling, and break bulk cargo.

A recent development involves the interphase with the Customs Automated Manifest System. This effort by Customs is intended to reduce the amount of paperwork and to increase the effectiveness of its inspection services for import cargoes. Another recent development involves the use of personal computers for communication with port sales offices on customers and their service needs. We are also looking at improved yard management in the port to track containers and equipment. The port personnel in the terminals will feed data using hand-held units into a central computer to provide for real-time data on the location of containers, chassis and other equipment. Worker orders can then be sent from the central control office to various yard locations.

In the future, the VPA is looking at developing decision-support data to help the port operate more efficiently, and also an Electronic Data Interchange system to link the port with Custom, shiplines, inland carriers, importers and exporters.

INTEGRATED AUTOMATED TERMINAL OPERATIONS

By
John H. Leeper
Leeper, Cambridge & Campbell, Inc.

The term Integrated Automated Terminal (IAT) is a proprietary term coined in 1986 to describe a new generation of multi-purpose intermodal transshipment facilities that combine materials handling devices and robotics with advanced computer communications and control technology.

The IAT is focused on improving transshipment productivity

The concept for the IAT was developed from a perceived need in the transportation industry to improve transshipment productivity and to reduce excessive capital investment in containers, transportation equipment, and port facilities.

In the container business, major productivity gains have been realized in the last five years through the introduction of jumbo containerships and double-stack rail platforms. However, these productivity gains were not matched by similar productivity increases in inland transshipment systems. In fact, inland transshipment inefficiencies have generally added to the cost of through intermodal transportations and have offset the remarkable unit cost decreases that have been realized in the various transportation line-haul modes. Symptons of transshipment system failures include:

- The generally stagnant state of coastal port loading and unloading productivity and the poor application of new technology to the problem.

- The high number of ship sets of containers that must be owned or leased by containership operators to maintain acceptable standards of service.

- The existence of large numbers of idled containers in some locations while containers are unavailable for export cargoes in other locations.

- The existence of high volumes of empty containers passing each other in opposite directions on inland rail and highway routes.

- The emergence of conventional transshipment services as the low cost competitor on some trade routes.

Intergrated Automated Terminals seek out selected markets and correct their transshipment inefficiences

The integrated automated terminal seeks out a market niche where the applications of automated systems can eliminate or reduce transshipment inefficiencies. In the past six months, our firm has prepared market analyses and economic feasibility evaluations on several markets that are vulnerable to IAT penetration. Among these are:

- The transfer of bagged cargoes between rail cars and ocean transshipment vessels.

- The transfer of boxed and baled cargoes between containers/trailers and transshipment vessels.

- The transfer of lumber from mills or motor carriers to trailers and containers.

- The transfer of general cargo between rail cars, trailers, and containers.

- The transfer of new automobiles between containers and trailers and intermodal distribution hubs.

- The assembly and loading of containers and trailers in a container freight station.

- The transfer of small package and courier cargoes between aircrafts and motor carriers.

The Matsystem is an example of an IAT-type application

Although there have been other experiments with computer enhanced container transfer facilities in ocean ports, the Matsystem, developed by Matson Terminals, is one of the more advanced.

The Matsystem is designed to handle up to 60 moves per hour and features a container conveyor device that continuously feeds the container crane so that the yard gantry crane can function independently.

Computers serve a number of purposes in the Matsystem including:

- determination of container center of gravity,
- lashing limits,
- deck strengths,
- stowage plan printouts,
- yard gantry direction,
- container stacking and positioning locations,
- continuous load-out positioning,
- documentation processing and container tracking, and
- transaction integration.

The Matsysem complex in Los Angeles is designed to handle 2,400 gate transactions a day.

The first green field designed IAT in the U.S. will combine U.S. and European technology

The first green field IAT design in the U.S. will involve the application of advanced conveyor technology (called Spiralveyor in the U.S.) that was first developed and used in Europe. The first Spiralveyor unit was placed in operation in Antwerp at the Belgian new Fruit Wharf in 1980 and has operated since then at high rates of productivity and reliability.

The Spiralveyor employs a spiral conveyor which is suspended from a specially designed crane. It is an all weather system which can position or retrieve cargo from a ship's hold with a retractable/extendable conveyor arm which can reach all corners and levels of a breakbulk or barge hold.

In the IAT application, the Spiralveyor is combined with an automated computer controlled transit shed and rail siding which unloads, accepts, stores, transfers, palletizes, depalletizes, and loads cargo while it processes documentation with computer controlled materials handling and communications equipment. The facility can unload 72 conventional rail box cars with automated car unloaders in a 7-hour work shift.
In essence, this facility can transfer selected transshipment cargoes with dockside efficiency similar to that of a containership at reduced terminal handling and stevedore costs and without the capital cost of containers and high technology containerships.

The IAT will not replace the container, but in selected locations and for

specific flows, it will establish a profitable market niche based on fast transit time and reduced through costs. The facility will also allow rail operators to use box car equipment and will increase the number of revenue voyages that can be made by transshipment vessel operators.

Other IAT applications will also address special market niches

There are other applications for IAT technology under study which will focus on specific markets.

Similar to the Spiralveyor-based IAT is a facility that transfers and loads pallets of mixed cargoes. This facility is also equipped with materials handling devices and computer technology. It can achieve loading speeds similar to some containership operations and can be applied to a broader market than the Spiralveyor-based system. This system features an elevator crane called a Palletveyor.

In addition, multi-use computer based terminals have been designed. For instance, one specific design can handle both steel, as a neobulk cargo, and containers. Such a facility can be profitable for terminal operations that are focused on a specific neobulk cargo but also want the flexibility of handling containers.

Still other versions of IAT technology address the need for inland rail/motor carrier transfer hubs and barge-rail transfer facilities.

One IAT application that is under preliminary study serves an entire industrial park with a cargo transporter system that unloads, loads, and moves cargoes between shipper/consignee loading platforms and ocean, rail and motor carrier transshipment stations. This self-contained computer controlled system virtually eliminates both redundant longshore/terminal handling and expensive drayage operations between ports and origin/destination platforms.

This type of industrial port appeals to larger manufacturers with high volumes of import component parts and export products. There are numerous greenfield locations for this type of industrial park on the Gulf Coast.

IAT and other market-oriented systems will focus on changing future port requirements

Shippers and carriers will increase their demands for improved transshipment systems both inland and in ocean ports. Priorities will be placed on:

- Improving vessel turn-around time
- Reducing transshipment costs and time
- Reducing land utilization
- Improving inland transport efficiency
- Improving system reliability

IAT systems will appeal to private investors

Our experience to date with IAT system planning is that private investors see the need for automated terminal development and are prepared to assume the lead

in both equity and debt financing. In some cases, where strong market responses can be predicted, non-recourse debt financing may be available from financial institutions.

Other sources of capital for IAT construction include traditional entities and instruments

Public port authorities can and will be a source of capital either as total or participating investors in IAT facilities. They may invest in supporting inland terminals as well as those within their immediate port jurisdiction.

The IAT will impose new variables on port planners

New IAT development and emerging market niches that attract purpose-designed facilities will increase the difficulty of long-range port planning.

In the coming era, the principles of port planning will include what we have identified as the six obstacles to confident investing.

- Technology is dynamic - to get the longest life cycle you must be the first to invest.
- Regulation is unpredictable - will the next Congress begin to reregulate and if so, how will cargo flow patterns react?
- World trade is fickle - today's backhaul may be tomorrow's headhaul.
- Hinterlands are vulnerable - nobody owns a hinterland, not even within a port city.
- Users will change perspective - will railroad-owned ocean carriers continue to focus on load centers that maximize ocean revenue?
- Sources of money are unstable - public money for port expenditures may not readily available in the future.

There are two important rules of thumb in port planning

Port planners, faced with increased planning uncertainty and more pressure to produce a winning plan, would do well to remember two rules of thumb:

- Port planning is a journey, not a destination. The ultimate, final plan does not exist.
- If you are correcting today's problems, you are in operations, not planning.

Don't invest based on today's needs. Anticipate and discount those who say, "Its's never been done that way," or "it can never be done that way." Ultimately, they are always wrong.

Port strategists have alternatives for the future

Increasingly one of the more popular and profitable strategies for port planners will be to convert land and facilities to non-transportation uses. In many cases, such strategy will increase the economic impact of the port and remove inefficient facilities and underutilized workers form the nation's transportation network. More efficient transportation reduces the unit cost of commerce, increases demand and stimulates economic growth.

For those ports that do stay in transportation, there must be a focus on increased efficiency. Ports must increase facility volume so that fixed costs can be spread over a greater throughput of cargo, thereby reducing the unit cost of transshipment.

Future port strategies will include facilities that specialize in:

- load center container ports
- specialized container ports
- market niche breakbulk/neobulk ports
- multi-use industrial ports.

THE COMPETITIVE BATTLE AMONG GULF PORTS

By
Donald R. Gibson
and
E. Cameron Williams
University of South Alabama

Changing Shipping Patterns in the Gulf

Recent trends in ocean transportation are changing traditional ways of doing business at seaports. These trends, which are inter-related, are: deregulation of transportation; intermodalism; the increasing cost of operating modern vessels; and the development of "land bridge" and "load center" concepts. These trends have implications for Gulf seaports which are largely negative.

Intermodalism, generally speaking, is any transfer of goods between two modes of transportation, however accomplished, which achieves an intermodal transfer (Mahoney 1985). However, in common usage the term usually means the development of systems for rationalizing and facilitating intermodal transfers. Of these systems, the one which has had the most profound effects on global logistics is containerization.

Briefly, containerization involves the use of standard-sized steel containers, holding up to 20 tons of cargo, which can be quickly transferred between rail, highway, and ocean carriers, using special container-handling equipment and vehicles. As an illustration of the productivity increases brought about by containerization, a single crane operator, assisted by a handful of spotters and yard drivers, can load or discharge as much cargo in containers in 15

minutes as a gang of 20 or more longshoremen, handling breakbulk cargo, can accomplish in an entire working day (Nersesian 1981).

This additional productivity comes at the cost of increased capital investment. However, full enjoyment of the benefits of containerization requires special terminals, container handling equipment, and vessels. Nevertheless, liner steamship companies, reacting to shipper preference for the advantage in speed, convenience, and reduced damaged and pilferage that containerization has over break-bulk, have invested massively in containerization over the past twenty years. Beginning with high-unit value, high value-added cargoes and working downward, virtually every kind of cargo which moves in liner service has been containerized.

At the port level, traditional waterfronts do not readily lend themselves to the requirements of container operations because of the land required. A rule of thumb is that a minimum of seven acres of paved container marshalling area is required for each container-vessel berth. This has promoted the growth of container terminals in areas remote from traditional waterfronts, and has hampered the development of container operations in the major U.S. Gulf ports of Houston, New Orleans, and Mobile. In addition, at least one, and ideally two, container cranes are needed per berth, at a cost of 3.5 million dollars each.

Even when ports in the Gulf have been willing to make this investment, other factors, such as the cost of vessel operations and the rise of mini-landbridge services, have made it difficult for them to attract container service.

The deregulation of transportation in the United States, culminating with the Shipping Act of 1984, has had profound effects on transportation in general, and port development in particular. The most important development, from the point of view of Gulf ports, has been the freedom of steamship companies to issue ocean bills of lading from any point, including inland points, and to use other modes of transportation. This has led to the development of the "mini-landbridge." (This term is an offshoot of the concept of the "landbridge" -- for example, transporting cargo originating in Japan and destined for Europe by ship to the West Coast of the U.S., by rail to an East Coast port, and by ship again for the balance of the voyage, thus avoiding the Panama Canal transit, and saving time and distance.)

Mini-landbridge operations allow a steamship company to issue an ocean bill of lading from a port at which its ships do not actually call, and to rail or truck the cargo to another port for loading on one of the company's ships. (The reverse takes place for inbound cargo.) Incentives for steamship companies to do this arise from lower truck and rail freight rates, due to deregulation, and higher vessel operating costs which encourage minimizing the number of port calls.

Mini-landbridge service has deprived Gulf ports of container service between both Europe and the Far East, representing the bulk of U.S. foreign trade. As an example, a large U.S. flag container operator offered service to all major Gulf ports--but its vessels never entered the Gulf. Instead, this cargo was railed to Savannah. The Port of Savannah, in trade advertisements, billed itself (somewhat tongue-in-cheek) as the "fastest-growing port in the Gulf."

Liner cargoes inbound from the Far East for East Coast and Gulf destinations using mini-landbridge rather than the all-water route through the Panama Canal more than doubled, from 0.8 to 1.7 million tons between 1976 and 1983 (O'Brien 1985). The ratio of sea containers unloaded at the Port of Long Beach, California and transferred to unit trains (that is, mini-landbridge cargo) to those trucked to local California markets has risen from three per cent in 1981 to nearly 50 per cent in 1986, and was reported to be still rising (McJunkin 1986).

Load-center ports, such as Long Beach and Savannah, serve huge hinterlands through the use of mini-landbridge services . The trend among container operators toward calling at fewer and fewer ports is called "load-centering." It is worth noting that no container operator has picked a U.S. Gulf port to be a load-center; the all-water container service which remains in the Gulf is provided by operators who have not fully adopted this concept in their operations.

Along with containerization of general cargo has come a trend toward larger, faster, more expensive vessels. This trend is by no means confined to container operations. In breakbulk cargo, there has been a trend away from conventional geared (self-unloading) vessels to rollon-roll off ships which are larger and more expensive than those they replaced.

Daily operating costs plus the variable costs associated with a port call (pilotage, fees, etc.) are compared by the ship operator to the marginal revenue likely to be derived from the port call in order to determine the economic feasibility of calling at any given port. As daily operating costs rise--in 1980, the daily financial cost alone of a 20,000 dwt containership averaged nearly $8,000, as opposed to $4,240 for a general cargo ship of similar size (Frankel 1982)--the amount of cargo needed to justify a port call rises, too. Twenty years ago, the scheduling of ports of call by conventional breakbulk vessels was induced by as little as ten tons of cargo. By contrast, a survey of steamship companies to ascertain the volume of cargo necessary to induce calls at a particular Gulf port showed ranges from several hundred to a thousand tons, and from $40,000 to $150,000 in revenue, per call (PRC Harris 1983).

In fact, the economics of modern container operations can result in a decision not to call at any Gulf port, but to serve the region instead by mini-landbridge. Consider a hypothetical steamship company in the transatlantic trade, operating an 18-knot containership with a total operational cost-per-day of $30,000. Calling at Gulf ports as opposed to land-bridging cargo to Savannah adds nearly 1,000 nautical miles, or about two and one-quarter steaming days or more than $69,000 in operating costs for a call at Mobile, plus port costs. A similar calculation for transpacific service, comparing landbridge service vs. the all-water route through the Panama Canal to Gulf ports, would show even more dramatic cost differences.

Coping strategies of Gulf ports

Port managers and local authorities in the Gulf are of course cognizant of these trends. The Journal of Commerce and Cargo Systems have featured several articles on the competitive actions taken by Gulf ports. Depending upon the circumstances of each port, a variety of coping strategies appear to have

revolved. These include: gaining a larger share of the declining container traffic; becoming a specialist or "market nicher;" becoming a bulk port; or abandoning the cargo market and finding other uses for the waterfront.

The authors evaluated the competitive strategies being used by eleven Gulf ports, which included Tampa, Panama City, Pensacola, Mobile, Pascagoula, Gulf Port, New Orleans, Baton Rouge, Lake Charles, Houston, and Galveston. This study addressed four questions:

1) Had the port developed a strategic plan?
2) Had the port developed a tactical plan?
3) Was the port plan an operationally orientated plan?
4) Was the port plan a marketing orientated plan?

A strategic plan can be defined as a plan to determine the primary objectives of a port and the adoption of actions and allocation of resources necessary to achieve those objectives. A strategic plan for a port might be to attract bulk cargo. This might require the development of new, efficient bulk loading and unloading facilities, deepening the inlet channel, and concentrating on identifying and contacting bulk shippers and carriers.

Tactical plans are more short-term and focus on current and near term activities. Lowering wharfage fees, improving stevedore services in response to a competitor's action would signify tactical planning.

A marketing orientation is when the port managers have identified the shippers and carriers they feel the port can satisfy. They then carefully select the capital equipment and facilities necessary for those customers; coordinate the necessary inland transportation; develop the appropriate support services; identify the applicable promotion; and set the pricing structure. Marketing requires identification of the market and developing a complete package that will satisfy that market.

Operational orientation is when the port managers are mainly interested in improving operating efficiency. Ports must be careful how they spend their limited funds--increasing operational effectiveness does not necessarily mean increased throughput.

The study found that only three ports had developed a strategic marketing plan and were actively developing tactical plans to support the strategic plan. One port manager had developed a computer model to show the changes resulting from the strategic marketing plan.

Over half of the ports visited relied mainly on short range planning and adjusting to competitive pressures. This does not infer that they did not have some type of long term plan, but they relied mainly on short term adjustments and the long term plans were mainly to improve the efficiency of the port infrastructure. One port had a definite long term plan which was to improve operational efficiency. In this case, the customer needs did not appear to have been evaluated.

Research Needs by Gulf Ports

There is a need to examine the extent to which the adverse trends identified are fundamental and long-lasting, as opposed to the effects of temporary problems such as the strong dollar, imbalances in U.S. trade with the Far East and Europe, and depression in U.S.-South American trade.

Another area for investigation is the possibility that innovative strategies for Gulf ports can mitigate the negative effects of, or even reverse, one or more of the adverse trends identified. For example, the North Carolina State Ports Authority has enjoyed considerable recent success in competing with Hampton Roads and Charleston due to its Charlotte Intermodal Terminal, which, in effect, moved the Port of Wilmington inland to a more favorable conjunction with inland modes of transportation. Is this innovation transferable to one or more Gulf ports? If so, under what conditions?

Finally, is it feasible for a Gulf port to become a terminus for a new, as yet undeveloped land bridge, such as one between the Far East and the east coast of South America--or western Canada and the east coast of South America?

Summary

The adverse trends in Gulf shipments are the result of several inter-related trends in ocean shipping, and has had, and will continue to have negative impacts on U.S. seaports in the Gulf of Mexico. Coping strategies have evolved through the efforts of individual ports, but are believed to be suboptimal due to a lack of information on which to base sound strategic planning. As a result, port managers have tended to avoid long term strategic plans and have worked on improving the facilities without fully evaluating future requirements. Research is badly needed in this area.

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COMMERCE AND NAVIGATION FACILITIES ON THE ATLANTIC INTERCOASTAL WATERWAY

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The Atlantic Intercoastal Waterway, General

The Atlantic Intercoastal Waterway (AIW) is an inland route running 2,000 miles from Boston to Florida. However, the AIW is not clearly defined north of Norfolk, Virginia. Over the years, Congress appropriated funds for work on "inland" waterways on the East Coast under several titles, the principal one being Norfolk, Virginia to the St. Johns River, Florida. North of Norfolk, Federal projects had various names and included privately-owned canals -- the Cape Cod and the Chesapeake and Delaware.

Along its entire route, the AIW coincides with or provides access to deeper major water ports such as Boston, New York, Philadelphia, and Baltimore. Ocean-going commerce of all kinds is therefore credited to these ports and not the AIW. The same is true for ports south of Norfolk. The Port of Hampton Roads, Virginia, is a collective term encompassing the region around Norfolk. It is a major ocean-access port. The AIW south of Norfolk from both commercial and recreation standpoints takes advantage of rivers, creeks, sounds, bays, and esturaries bound together where necessary by man-made cuts to provide depths up to 12 feet. It proceeds through coastal North and South Carolina, Georgia, and Florida to the St. Johns River. The waterway continues along the coast of Florida to Miami, and via a shallower route through the keys from Fort Lauderdale to Key West.

The AIW from project Norfolk to the St. Johns River supports commerce of nearly 4 million tons - a substantial amount. Major commodities carried mostly by barge include fertilizers, sand, gravel, crushed rock, jet fuels, iron materials, chemicals, and pulpwood. North of Norfolk, the Chesapeake Bay, Chesapeake and Delaware Canal, and Delaware River carried more than 17 million tons of commerce in the mid-80s, but most of this involved deepwater ports. The remainder of the waterway commerce consists primarily of fish oil, crabs, clams, and oysters.

The entire waterway is important from a recreational standpoint. The AIW itself is utilized as well as satellite channels. Every year there is a migration of yachts form north to south in the fall and south to north in the spring. The scenery varies from the broad bays, vast wetlands, and narrow canals to great urban harbors.

The Atlantic Intracoastal Waterway, Norfolk District

Within the jurisdiction of Norfolk District are two alternate, essentially parallel routes of the AIW. They have very interesting histories and contemporary characteristics which are worthy of mention. Their names are the Dismal Swamp Canal and the Albermarle and Chesapeake Canal. Both of these

routes begin at a common point in the Southern Branch of the Elizabeth River which divides Norfolk and Portsmouth, Virginia. They proceed in a southerly direction into North Carolina eventually meeting again at Wade Point in Albermarle Sound. The Dismal Swamp Canal Route is about 75 miles long; the A&C Route about 72 miles long.

A unique feature about both canals is that they have the only locks on the AIW main stem. The A&C Canal is an 8-mile long sea level cut with a channel 12 feet deep and 90 feet wide. It connects the upper Southern Branch of the Elizabeth River which is saline and tidal with the upper North Landing River which is fresh and governed by wind tides only. There is a reversible head tidal guard lock at the western end of the cut whose primary purpose is to keep saline waters from mixing with the fresh water of the North Landing River. The 600-foot long lock has 4 sets of gates rather than 2. This is because of the variation of tides in the Southern Branch and wind blown tides in the canal which can cause unequal heads at either end of the lock.

The Dismal Swamp Canal (DSC) is a 22-mile long summit level and cut connecting the Southern Branch's tributary of Deep Creek in Chesapeake, Virginia, with the upper Pasquotank River in Camden County, North Carolina near the village of South Mills. It is the oldest operating canal in the United States. Much of the canal is overhung by trees on either side which in summer forms a shadowy canopy. The DSC is about 100 feet wide with a navigation channel of 50 feet maintained at a 6-foot depth. The Dismal Swamp itself, an area of about 200,000 acres, lies adjacent to the west side of the canal in both Virginia and North Carolina. In the middle of this area, which is mostly a peat bog rather than a swamp, is Lake Drummond, one of only 2 natural lakes in Virginia. It is a hollow body of dark stained water with a surface area of about 5 square miles or 3,200 surface acres. The lake is connected to the canal by means of a 3 1/2-mile Feeder Ditch controlled by a small concrete dam with steel wicket gates. Lake levels are controlled by the dam as is the canal itself when natural inflows during dry weather are too low to support navigation.

The locks at either end are 300 feet long, 52 feet wide, and 12 feet deep over the sills. The summit level of the canal is about 10 feet higher than either end. During times of normal or excess rainfall, both lake and canal would overflow causing flooding problems. Therefore, at either end are waste water spillways with gates to provide for canal level control. These are augmented by valves in the lock gates themselves which are normally used to fill and empty the chambers.

Because the A&C Canal is wider and deeper with only one lock, it receives virtually all of the commercial traffic and most of the through recreation traffic where large yachts are concerned. The Dismal Swamp Canal is the historic route and receives considerable interest from this standpoint. Also, Elizabeth City, NC on the Pasquotank River is on the route and caters to the boating public. The Great Dismal Swamp National Wildlife Refuge was created in 1974. Its present area of about 105,000 acres lies on the west side of the canal and includes Lake Drummond. In 1977, the Refuge Manager and the Norfolk District Commander made an agreement whereby a strict limitation was placed on the level at which Lake Drummond could be drawn upon to support navigation in the canal. In the enabling act establishing the refuge, Congress made navigation subservient to conservation of water within the refuge.

THE CORPS OF ENGINEERS EXPERIENCE WITH MULTIPORT ANALYSIS

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Background

In 1982, The Assistant Secretary of the Army for Civil Works, Mr. William Ginanelli, asked the U.S. Army Corps of Engineers (Corps) to develop procedures for analyzing deep draft ports, which included data and analysis of competing ports. This resulted from a concern that the project by project study, analysis and recommendation procedures used for Corps projects de-emphasized information and insight into system-wide implications.

The Methodology

The basic problem was defined to be the need for a methodology to identify the traffic which could swing from or to the port under study with modest shifts in relative costs (between ports). The Corps' basic context for study would be individual projects, but with more open consideration of what if the competing ports would be deepened to various depths. Finally, the emergence of increased project study cost sharing would mean that economic analysis of the demand for any given port should contemplate how cost recovery through user charges might affect revenues which could be used to repay part or all of the local costs for the project.

Assumptions of Multiport Methodology

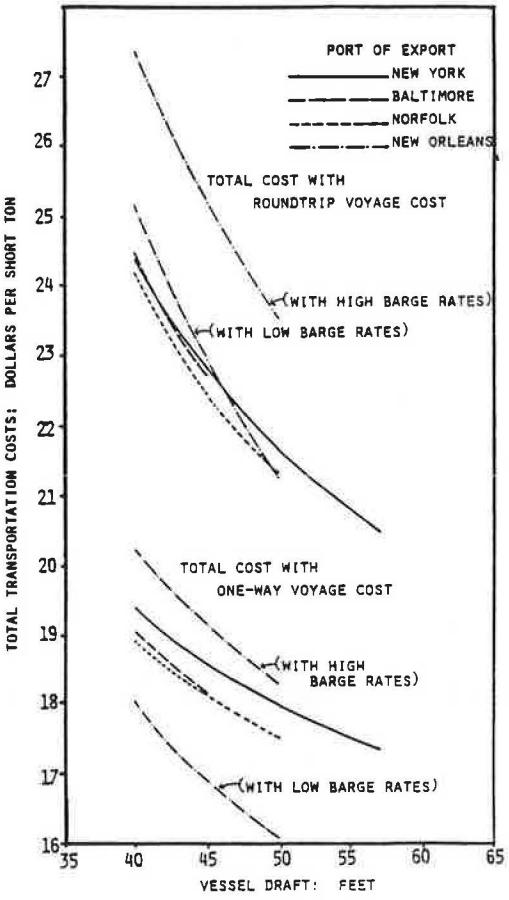
"Without Project" assumptions are defined as the existing or authorized project at the port under study and at competing ports. "Without Project" assumptions for the base case Benefit/Cost ratio is the project alternative which is environmentally acceptable, financially acceptable to project interests, economically feasible and reasonably maximizes net benefits. Additional "with & without" project assumptions would be explored in a sensitivity analysis. An example of a practical demonstration of the economics of multiport analysis is shown in figure 1, from economic analysis of New York Harbor deepening, prepared in 1982. Analytically, multiport analysis requires information about the ocean leg, port and land leg costs of moving goods from inland origins to foreign destinations and from foreign originating points.

The traditional approach to port analysis by the Corps has been to estimate benefits by comparing the ocean leg costs of the "with & without" project scenario, normally assuming existing or authorized depths at the pairs. For a deepened port alternative, it is assumed that larger vessels drawing deeper drafts which operate at lower costs per ton of cargo would use the deeper channel (subject to depth constraints at the other end of the haul). By assessing the savings that occur to existing and to projected traffic in the "with or without" project scenario, benefits are generated.

The multiport analysis approach generates much more information. First, the potential benefits due to savings on the land leg are evaluated. Second, port cost differentials are evaluated. Thus, combined land leg, port and ocean leg costs are obtained for the port under study and its competing ports. Finally,

FIGURE 1

AN EXAMPLE OF TOTAL TRANSPORATION COSTS
FOR U.S. COAL EXPORTS FROM MINE VIA SELECTED PORTS
TO ROTTERDAM IN VESSELS OF DRAFTS OF 40 TO 57 FEET[2,3]



NOTES: 1) INCLUDES RAIL AND BARGE RATES, PORT CHARGES AND VESSEL COSTS; 2) ADAPTED FROM FIGURE V-1 OF IWR REPORT, NEW YORK HARBOR AND ADJACENT CHANNELS STUDY, ECONOMIC ANALYSIS, STAGE 1, SEPTEMBER 1982; 3) RAIL DISTANCE (MILES) FROM MINE TO PORT ARE: NEW YORK 387; BALTIMORE, 334; AND NORFOLK 373. BARGE SHIPMENTS ARE FROM EVANSVILLE, In, 1058 MILES TO NEW ORLEANS.

the conditions under which some part of the traffic would logically be diverted from one port to another can be discerned. To get a better understanding of how the methodology works, a discussion of a case studies follows.

The Delaware River Ports Study

The Philadelphia District of the Corps has a comprehensive study of the deep-draft channels serving several ports in Delaware, Pennsylvania, and New Jersey underway. The analysis came to an early finding that the primary commodities affected by deepening of the Delaware River would be coal, petroleum and grain. The origin of the coal would be the northern part of the Central Appalachian coal fields via Conrail. There would be potential diversions of export coal from Baltimore and Norfolk. The origin for oil would be crude imports from the Middle East to be refined in the Philadelphia/New Jersey refineries. These would be potential diversions from the Gulf and New York Harbor. The origin for grain is the eastern portion of the Midwest, primarily Ohio and Indiana with some diversion potential from Great Lakes ports or from New Orleans.

The analysis confirmed that export coal diversions from Baltimore and Norfolk were possible, due to an existing $2.00 per ton lower rate by Conrail to Philadelphia than the Norfolk Southern to Norfolk and by CSX to Baltimore. The rail rate advantage is a marketing effort by Conrail to build volume of the railroad and for a Conrail coal loading dock at Philadelphia. If the rail rate advantage were to be eliminated, the diversions to Philadelphia would, in large part, be negated.

There are several refineries located in the greater Philadelphia area. For the most part, these refineries have not been expanded, but refineries along the Gulf Coast have expanded in recent years. The multiport analysis concludes that, if the refineries accessible to Philadelphia could be expanded, that a deeper channel would divert sizable quantities of crude from the Gulf to Delaware ports. A relatively small diversion from New York Harbor would also be expected if the Delaware is deepened and New York is not deepened.

The following table indicates the amount of cargo that would be diverted to ports on the Delaware River from other U.S. ports as a result of the river being deepened by 1995 while the competing ports were not deepened. For channel depths increasing from 42 feet to 50 feet, Delaware River ports would gain 9.6 to 10.8 million tons annually, and shippers would save $3.1 to $12 million.

Delaware River Deepening
Cargo Diversions and Cost Savings

Channel Improvement	Cargo Diversion (Millions of Tons)	Transport Savings (Millions)
42 feet	9.6	$ 3.1
45 feet	9.7	$ 7.9
50 feet	10.8	$12.1

The multiport analysis for the Delaware River ports also found that if the Delaware was not deepened, and their competitors did deepen, that the Delaware ports would lose substantial tonnage. If competing ports were deepened to 42 feet, a total of 7.0 million tons of cargo would be diverted from the Delaware River ports, at a saving to shippers of $1.7 million, while deepening competing ports to 50 feet would result in the diversion of 10.3 million tons at a savings of $4.2 million.

Conclusion

Analysis of competing ports can be accomplished with moderate investment in time and money. It holds open an opportunity to obtain more comparable data and analysis from various studies, and it systematically explores more "what if" scenarios in both the "with and without" project context.

PORTS: MANAGING THE CHALLENGES OF CHANGE

By
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To successfully manage the challenges of change, ports should assess the following factors:

- What changes have occurred in the external environment?
- What are the implications for ports?
- How are ports responding?
- What does the future hold?

A. External Environment

1. Trade Patterns

The dominance of the Far East in U.S. liner trades will continue, and ocean shipments will involve increased numbers of high-value containers that require faster transit times. This reflects the growing trend toward just-in-time manufacturing and retail operations. Container shipments in the U.S./Far East liner trades increased from 2.7 million twenty-foot equivalent units (TEU) in 1982 to 4.4 million TEU in 1987, while container shipments between the U.S. and Europe increased only from 1.1 million TEU to 2.0 million TEU. It is forecast that container shipments in the U.S./Far East trades will increase to 6.5 million TEU by 1991, while the U.S./Europe trade will reach only 2.7 million TEU by 1991.

The outlook in U.S. trade patterns is for continued healthy growth in imports along with strengthening export demand. However, the persistent imbalance in favor of import shipments will continue. This imbalance is particularly evident in the U.S./Far East trade, where

eastbound or imported containers totalled 2.8 million TEU in 1987 while 1.6 million TEU were shipped westbound from the U.S. to the Far East. By 1991, eastbound container traffic will reach 4.3 million TEU while westbound traffic will be only 2.2 million TEU.

2. Transportation Trends

a. Deregulation

Deregulation of railroads, motor carriers, and ocean steamship service has allowed for increased modal integration, which is creating true intermodalism and is blurring the distinction between domestic and international carriers and transport service.

b. Rationalization

Related to deregulation and business conditions in the steamship industry, there will continue to be rationalization of ocean carriers and services.

c. Cargo Concentration

Increased volumes of cargo need to be concentrated to effectively operate the larger containerships and stack trains to and from ports.

B. Implications for Ports

To respond to the changing environment in trade patterns and intermodalism, ports need to emphasize service to steamship companies and shippers. Ports can no longer focus on defining their markets by a geographic area encompassing a local captive market for a port.

Ports need to adjust their operations in terms of pricing, services and facilities. In the past, a port charged each steamship company a fixed rate per acre of backup area. In response to the changing shipping environment, ports now offer volume-based contracts. In terms of services, ports have begun to take steps to enhance cargo distribution by implementing electronic data interchange systems and computerized systems to expedite Customs clearances. In the past, the primary concern of ports was on shipside facilities such as cranes. While this continues, there is growing attention to landside facilities such as improved rail access to handle stack trains.

C. Responses By Ports To Increase Competitiveness

1. Facility and Service Improvements

Following is a list of facility and service improvements undertaken by various ports to maintain and increase their competitive position: Seattle - Intermodal Container Transfer

Facility (ICTF), double-stack train service, warehousing service, truck shipment consolidation.

Los Angeles/Long Beach - ICTF, stack-train service, warehousing, distribution.

Oakland - ICTF, stack-train service, warehousing.

North Carolina State Port Authority - large capital expansion, inland terminals.

Miami - improved truck and rail access.

Virginia Port Authority - ICTF, inland terminals.

Houston - reverse mini-landbridge.

2. Intermodal Container Transfer Facilities

The recent boom in the construction of Intermodal Container Transfer Facilities by ports is seen as being critical to a port's competitive position. However, ports need to focus on such factors as the type of ICTF to construct and the needs of domestic container shipments, and ports need to avoid over-building the facility which could strain their financial resources.

At various ports, ICTFs have been constructed either separate from the port facilities, adjacent to port facilities, or as integrated port/intermodal facilities. Examples of ICTFs as separate facilities include the ports of Los Angles/Long Beach, Baltimore, Jacksonville, and Seattle. Adjacent ICTFs have been constructed at the ports of New Jersey (Elizabeth), Norfolk, Savannah, San Francisco, and Montreal. The Port of Tacoma is a good example of an integrated ICTF/port operation.

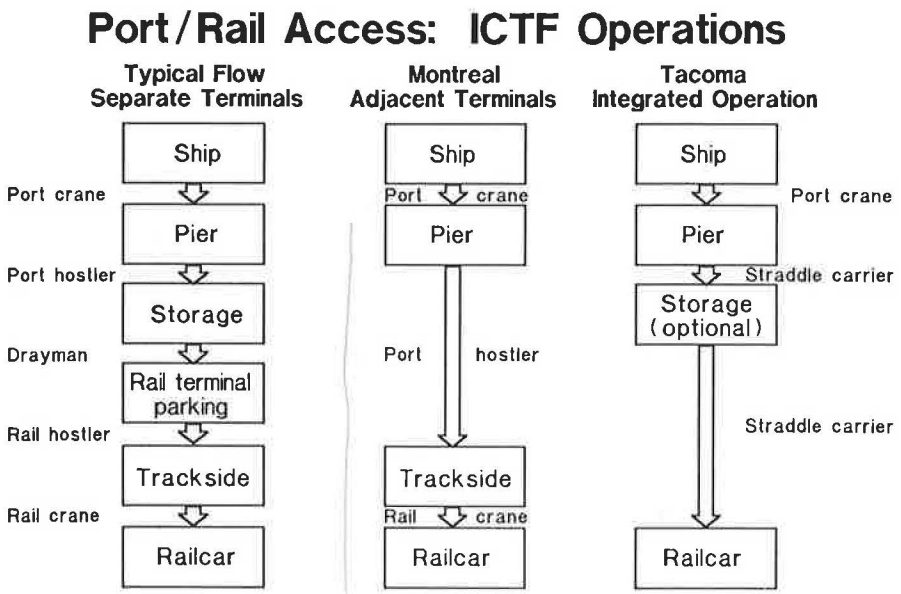
The following diagram indicates the differences in container handling operations caused by differing locations of the ICTF.

- Where the ICTF is separate from the port (as shown in the left column), off-loaded containers are first moved by port hostlers from the pier to the port's marshalling yard for storage. The container is then moved by commercial truck to the ICTF where it is placed in a parking area until the train arrives, and the container is then moved by hostler vehicle to track side for loading onto the rail car.

- In an adjacent ICTF (center column), the container is off-loaded from the ship and, instead of going into storage, the container is moved by a port hostler direct from the pier to track side for loading onto the rail car.

- Where the ICTF is integrated into the port (right column), the

rail facilities are located on or nearby the pier, and containers off-loaded from the vessel can be readily transferred from the pier to trackside (or to storage if a train is not available for loading), using straddle carriers or other container-handling vehicles without the need for port hostlers and chassis.



D. What Does the Future Hold

Ports will find themselves in an increasingly competitive environment in which they will have to focus on several key areas:

- Forming strategic alliances with ocean carriers, railroads, forwarders and warehousing operations to ensure rapid, low cost services to shippers.

- Developing facilities and services that meet the needs of both international and domestic shippers of containers and that enable the port to optimize the use of intermodal transfer facilities.

THE ST. LAWRENCE SEAWAY: PLANNING FOR THE FUTURE IN A CHANGING ENVIRONMENT

by
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Background

In 1951 the Canadian Parliament created the St. Lawrence Seaway Authority of Canada and authorized the agency to proceed with construction of a deep draft waterway between Montreal and Lake Erie. In response, Congress created the Saint Lawrence Seaway Development Corporation in 1954 and authorized American participation in a bi-national Seaway. A legislative compromise limited the lock dimensions to those prescribed in a pre-World War II engineering report. This resulted in Seaway locks which are significantly smaller than those of the Panama Canal and now preclude a sizeable portion of the world's fleet from access to the Great Lakes. (The maximum size of a Seaway vessel is 76' beam, 730' length with a draft of 26' vs a Panama Canal maximum of 107' beam, 950' length with a draft of 38'). This legislation also provided for Seaway tolls to ensure that there would be no Federal transportation subsidy. (Public Law 99-662 now provides that the U.S. portion of any Seaway toll be rebated to users).

Traffic

Traffic rose rapidly during the first few years as shippers became aware of the Seaway's advantage as an efficient, low cost transportation system, particularly for bulk commodities. The new Seaway spurred the development of Quebec-Labrador iron ore deposits to supply the requirements of the steel mills on the Great Lakes. The combination of an upbound (into the Lakes) Quebec-Labrador iron ore movement and a downbound (out of the Lakes) grain movement by lake carriers to transloading ports on the St. Lawrence River provided a balanced trade that not only avoided empty backhaul, but also provided strong price competition to alternate transportation routes and modes. Despite the efforts of Seaway interests over the years to secure other types of commodity traffic, the Seaway has historically been dominated by the ore-grain traffic. There two commodities and coal have consistently accounted for about three-fourths of the traffic on the Seaway.

Even though the composition of Seaway traffic has been relatively constant, traffic volumes have changed dramatically. Tonnage through the Montreal-Lake Ontario section grew from 9.6 million (metric) tons in 1954, before the Seaway opened, to 18.6 million tons in the first year of operation. The period 1959 through 1966 can be characterized as the Seaway's development and growth stage. During this period, ports, industries and markets adjusted to the new expanded waterway. Tonnage grew rapidly and increased steadily to 44.6 million tons annually.

In the decade from 1962 to 1972 the number of shipping lines with Lakes service declined 48%. This was a period of rapid development of containerization throughout the world that resulted in a realignment of ocean carrier operations, finances, and vessel deployment to the detriment of the Lakes. Since 1966, Seaway traffic has showed little growth.

Canada's St. Lawrence Seaway Authority (SLSA) is now estimating a compound growth rate of three and one-fourth percent between 1985 and the year 2,000. While this may sound overly optimistic, one must bear in mind that even at this rate of growth, traffic will not return to the historically high levels of the late 1970's until almost the end of the century.

Grain

Grain shipments have traditionally accounted for almost 50% of all Seaway traffic. Roughly 60% of these grain shipments consist of Canadian grain, while the other 40% are U.S. Most grain moving on the Seaway is destined for export and originates at Great Lakes terminals for shipment primarily to Europe, the U.S.S.R., North Africa/Middle East, and Latin America. Grain shipments fell from about 30 million (metric) tons in 1980 to 18 million tons in 1985.

The decline in grain shipments can be traced to several causes. World markets for grain are changing and countries that traditionally were importers are now self sufficient or producing more than they need and, in some cases, are becoming exporters. India and the European Economic Community are examples. Argentina and Australia are particularly strong competitors in wheat and coarse grains which are the principal grains transported on the Seaway.

The high value of the U.S. dollar in recent years has hurt our competitive position. Even though the value of the dollar has declined significantly, it takes time for markets to adjust. Foreign exchange restrictions by developing countries and tariff barriers, such as those imposed by the European Common Market, have also discouraged purchase of U.S. wheat, feed grains, and oil seeds.

Strong competitive transportation alternatives exist to the Seaway routing, including barges using the Mississippi River and its tributaries, and low cost unit trains to U.S. Atlantic, Pacific, and Gulf Coast ports. In addition, an increasing proportion of Canadian grain is now moving to Pacific Coast ports. The 1985-1986 crop year, for example, marked the first year that a larger percentage of Canadian prairie grain was exported through West Coast ports than through Thunder Bay on Lake Superior.

In the U.S., barges and rail cars were built on speculation of traffic growth which never materialized and on the stimulus of very favorable tax treatment. The dry cargo barge industry, for example, estimated that there were perhaps 3,000 or 4,000 excess barges out of a fleet of about 17,000 covered and open top jumbo hopper barges. This over capacity has led to cutthroat price competition which has, in turn, had a negative impact on Seaway traffic.

While total U.S. grain exports fell 30% from 1980 to 1985, the volume through Great Lakes ports dropped 63%. Gulf ports, in contrast, suffered only a 24% drop. The Gulf ports' advantage during this period was the unsually low inland transportation rates, particularly for barges. However, there are now indications that barge rates are rising. Analysis by the U.S. Maritime Administration, for example, indicates a significant improvement in the volume of cargo carried on the inland waterways during 1986. This, coupled with a slow but steady reduction in the size of the river barge fleet, could result in improved fortunes for the barge industry in terms of continued tonnage growth a

and capacity rationalization. Similar reductions in railcar over capacity, over time, will result in firmer rates for barge and rail competitors to the Seaway. This could reduce the current cost advantage which Gulf and Atlantic ports have enjoyed over Lake ports using the Seaway routing.

Traffic projections show grain continuing to account for half of all traffic on the Seaway. Seaway grain traffic, while increasing, will not grown as fast as world demand, because an increasing share of U.S. and Canadian grain exports will go to Pacific Rim markets which traditionally do not use the Seaway.

Iron Ore and Steel

Iron ore is second only to grain in importance to the Seaway. However, imports of steel and finished products with high steel content, such as autos, have reduced U.S. steel production along with the demand for iron ore. The drop in upbound iron ore is particularly damaging to the competitiveness of the Seaway routing because these commodities serve to balance grain shipments in the opposite direction. When ships using the Seaway can avoid an empty backhaul, they are much more competitive with other transportation routing.
Steel demand is expected to grow by 0.6% and 1.5%, annually, in the U.S. and Canada, respectively, until the year 2000. Despite this moderate growth in total steel demand, domestic raw steel production is expected to grow by a much lower rate until the year 2000 because of the expected improvement in the yield ratio between finished and raw steel and the increase in import share. Imports of iron and steel products can be projected to fluctuate between 25% and 30% of total U.S. steel consumption. Steel mills serving the Great Lakes Seaway region are expected to have an even smaller share of total U.S. production due to a shift in steelmaking technology. The end result of all of these factors should be very slow growth, if there is growth at all, in iron ore shipments through the Seaway.

Lock Capacity and System Integrity

Currently, only 39% of the world's bulk transports and 68.9% of the freighters are able to transit the Seaway locks. When they can enter the system, many of these ships must light-load. Only 9.3% of the bulk carriers do not exceed the draft limitations of the locks. In contrast, well over 90% of the world's bulk carriers and freighters can use the Panama Canal. Seventy-two percent can transit the Canal fully loaded.

The Seaway's lock size limitation is a severe competitive disadvantage. Both the Corps of Engineers and the Department of Transportation have recently completed studies of the feasibility of increasing the capacity and the lock size of the Seaway. Both studies, independently, reached essentially the same conclusion. "Few, if any, benefits would occur from the construction of a new higher capacity Seaway facility at this time." (St. Lawrence Seaway Lock Expansion Study, March 1987, Report of the Secretary of Transportation to the United States Congress). The reasons are two-fold. First, current traffic levels are substantially below historical traffic peaks and projected traffic growth is not expected to exceed Seaway lock capacity for some time. Second, the costs of constructing new locks would be prohibitive. Even without considering the substantial costs of increasing Seaway depth, construction of larger locks of up to 1,200 feet in length and 110 feet in width would cost the

U.S. about $700 million. Canada would have to spend $5.4 - $6.4 billion to enlarge its lock facilities. Based on this analysis, it is unlikely that there will be any enlargement of the Seaway locks in the near future.

For a number of years both the U.S. locks and the Welland Canal have been in need of major rehabilitation. The problems with the U.S. Eisenhower and Snell Locks date back to their initial construction. From 1959 to 1985, the Seaway Corporation invested over $15 million in repairs to these locks. Congress recently appropriated $2 million to complete the remaining concrete rehabilitation at Eisenhower Lock. It also authorized $39 million for the remaining repairs to the two locks. Late last year, Canada announced a seven year $175 million rehabilitation project for the Welland Canal. When completed, the rehabilitation effort of the U.S. and Canadian governments will ensure the structural integrity of the Seaway lock system for a number of years.